Pacific Gas and Electric Company®

Anne Conner
Sr. Project Manager
Environmental Remediation

3401 Crow Canyon Rd.
San Ramon, CA 94583

925.415.6381 direct
925.415.6852 fax
APB1@pge.com

RECEIVED
By Alameda County Environmental Health 3:54 pm, Dec 29, 2015

December 28, 2015

Mr. Jerry Wickham
Hazardous Materials Specialist
Alameda County Environmental Health Department
Division of Environmental Protection
1131 Harbor Way Parkway, 2nd Floor
Alameda, CA 94502-6577

Subject: **December 2015 Monitoring Well Decommissioning Report**
Pacific Gas and Electric Company, Oakland General Construction Yard
4930 Coliseum Way, Oakland, California

Dear Mr. Wickham:

Please find attached the letter entitled *December 2015 Monitoring Well Decommissioning Report, Pacific Gas & Electric Company (PG&E), Oakland General Construction Yard, 4930 Coliseum Way, Oakland, California*, prepared by ETIC on behalf of PG&E.

If you have any questions regarding this document, please contact Kathleen Isaacson, P.G., CHG (PG&E project manager) at (415) 392-3875.

Sincerely,

for Anne Conner

Anne Conner
Sr. Project Manager
PG&E Environmental Remediation

Enclosure

December 28, 2015

Project 013045007G

Ms. Kathleen Isaacson
Consultant Project Manager
WAU & Company
400 Montgomery Street, Suite 1100
San Ramon, California 94104

Subject: **December 2015 Monitoring Well Decommissioning Report**
Pacific Gas and Electric Company
Oakland General Construction Yard
4930 Coliseum Way
Oakland, California

Dear Ms. Isaacson:

Amec Foster Wheeler Environment & Infrastructure, Inc. (Amec Foster Wheeler), is pleased to submit the *December 2015 Monitoring Well Decommissioning Report*. This report was prepared by ETIC Engineering, Inc. (ETIC) on behalf of Amec Foster Wheeler. This report presents a summary of observations made during this well decommissioning.

Please contact the undersigned if you have any further questions.

Sincerely yours,
Amec Foster Wheeler Environment & Infrastructure, Inc.

Heidi Dietrich-Foronda
Environmental Scientist

Harold C. Rush
Associate Engineering Professional

hdf/hr/ldu
x:\13000s\13045.007g\3000\2012_ac_inspection_rpt\amec_ogcy_capinspectcvrltr_013045007g_01-21-2013.docx

Attachment: ETIC Monitoring Well Destruction Report December 2015

Amec Foster Wheeler Environment & Infrastructure, Inc.
2101 Webster Street, 12th Floor
Oakland, California 94612-3066
USA
Tel (510) 663-4100
Fax (510) 663-4141
amec.com

Monitoring Well Destruction Report

Pacific Gas and Electric Company
Oakland General Construction Yard
4930 Coliseum Way
Oakland, California 94601

SLIC Case No. RO0000099

December 2015

Prepared For:

Pacific Gas and Electric Company
3401 Crow Canyon Road
San Ramon, California 94583

Prepared By:

ETIC Engineering, Inc.
2285 Morello Avenue
Pleasant Hill, California 94523

Monitoring Well Destruction Report

Pacific Gas and Electric Company
Oakland General Construction Yard
4930 Coliseum Way
Oakland, California 94601

SLIC Case No. RO0000099

December 2015

Prepared For:

Pacific Gas and Electric Company
3401 Crow Canyon Road
San Ramon, California 94583

Prepared By:

ETIC Engineering, Inc.
2285 Morello Avenue
Pleasant Hill, California 94523

December 21, 2015

Karina Gillette **Date**
Project Geologist

December 21, 2015

Thomas E. Neely, PG, CHG, QSD **Date**
Senior Hydrogeologist

REGISTERED GEOLOGIST
THOMAS E. NEELY
Exp. 9.30.2017
No. 7652
STATE OF CALIFORNIA

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1.0 INTRODUCTION

On behalf of Amec Foster Wheeler Environment & Infrastructure, Inc. (Amec Foster Wheeler) and Pacific Gas and Electric Company (PG&E), ETIC Engineering, Inc. (ETIC) has prepared this *Monitoring Well Destruction Report* for the PG&E General Construction Yard located at 4930 Coliseum Way in Oakland, California (the Site) (Figure 1).

Destruction (decommissioning) of groundwater monitoring wells OW-5, OW-6, and OW-7 was approved by the Alameda County Health Care Services Agency in a letter dated June 16, 2015 (ACHCSA, 2015). A copy of the letter is included in Appendix A.

2.0 SITE DESCRIPTION AND BACKGROUND

The approximate 5-acre site is bounded by Coliseum Way to the south, 50th Avenue to the southeast, and industrial properties to the west, north, and northeast (Figure 1). The site vicinity consists primarily of commercial and industrial businesses. The site has been operated by PG&E as a natural gas distribution center and equipment storage facility from at least the late 1930s until 1990. Since 1990, the site has been used as an equipment and vehicle storage facility (AMEC, 2010).

3.0 FIELD ACTIVITIES

Activities associated with the work performed included the following:

- Performing pre-field activities.
- Collecting and analyzing a sample of the oily material from OW-5.
- Decommissioning groundwater monitoring wells.
- Containing the investigation-derived waste.
- Collecting and analyzing a sample of the investigation-derived waste.
- Completing and submitting Department of Water Resources (DWR) Well Completion Report Forms – DWR 188.
- Preparing a written report summarizing decommissioning activities.

Details of the work performed are presented in the following sections.

3.1 PRE-FIELD ACTIVITIES

A well destruction permit was obtained from the Alameda County Public Works Agency (ACPWA) for three groundwater monitoring wells (OW-5, OW-6, and OW-7) (Figure 2). A copy of the permit is included in Appendix B, and construction details are provided in Table 1. A site-specific health and safety plan was prepared for, and implemented, during field activities. The area surrounding each well was marked with white paint, and Underground Service Alert (USA) was notified. Subtronic Corporation, a private utility locator, was retained to locate and mark underground utilities in the vicinity of each well. The ACPWA inspector was notified prior to commencing monitoring well decommissioning.

3.2 WELL OW-5 PRODUCT SAMPLING AND RESULTS

The presence of oily material in well OW-5 was noted during a gauging event on July 21, 2014 during well destruction activities and was reported to the ACHCSA on July 24th. At a meeting on May 27, 2015 between PG&E, Amec Foster Wheeler and the ACHCSA, the conditions on neighboring properties were discussed and it was agreed that the oil in soil and groundwater is an issue that is common to the properties bounding the GC yard. Given those conditions, the ACHCSA allowed well OW-5 to be destroyed as previously planned (Amec Foster Wheeler, 2015).

On October 6, 2015, prior to well destruction, a sample of the oily material in well OW-5 was collected. An oil/water interface probe was used to attempt to measure the thickness of the oily material. The oily material was present near the bottom of the well, but the thickness could not be confirmed. A new, disposable bailer was used to collect the oily material, and a total of approximately 20 milliliters was collected. The sample container was sealed, labeled, placed with ice in a cooler, and submitted under chain-of-custody protocol to Pace Analytical in Pittsburgh, Pennsylvania for fingerprint identification analysis. The laboratory analytical report was submitted directly to Amec Foster Wheeler. After the sample of oily material was collected, well OW-5 was decommissioned, as described below.

The sample of the oily material in well OW-5 was analyzed for C8-C40 hydrocarbons using ASTM 5739. The Total Ion Chromatogram (TIC) of the sample was interpreted by Dr. Alan Jeffery, PhD, of Zymax Forensics, a laboratory affiliated with Pace Analytical. As noted in the Zymax Forensics report, the TIC showed a multitude of aromatic hydrocarbons including unsubstituted (parent) polyaromatic hydrocarbons (PAHs) naphthalene, phenanthrene, anthracene, fluoranthene, and pyrene, and alkylated PAHs, including C1-naphthalenes and C2-napthalenes. The parent PAH distribution is characteristic of a pyrogenic (high temperature) product such as creosote. The alkylated PAHs are more prevalent in petroleum products. The product sample has a broad carbon range, from C10 to approximately C30, and may represent a residual fuel oil (Zymax Forensics, 2015). The Zymax hydrocarbon product characterization report and Pace Analytical laboratory analytical report are included in Appendix C.

3.3 MONITORING WELL DECOMMISSIONING

On October 6, 2015, in accordance with ACPWA requirements, groundwater monitoring wells OW-5, OW-6, and OW-7 were decommissioned by PeneCore Drilling of Woodland, California, a C-57 licensed contractor (PeneCore).

On October 6, 2015, PeneCore conveyed a neat cement grout through a tremie line, filling each well casing from the bottom to top. PeneCore applied pressure at 25 pounds per square inch (psi) for 5 minutes. The protective well covers and boxes were removed, and the surface was patched with concrete to match grade. An inspector from ACPWA observed and approved the grouting and well decommissioning activities.

3.4 INVESTIGATION-DERIVED WASTE

Disposable sampling equipment, well destruction debris (e.g. concrete and PVC casing) and water derived from the field activities were contained in DOT-approved 55-gallon drums stored temporarily at the Site. One metal stovepipe monument containing PVC casing and concrete was sealed with plastic and placed with the drums. One drum of solid waste and one drum containing three 5-gallon buckets of wastewater were generated during the field activities. A composite wastewater sample was collected from the three buckets of water and submitted to a state-certified laboratory for analysis. The sample was collected in laboratory-supplied bottles. The bottles were sealed, labeled, placed with ice in a cooler, and transported under chain-of-custody protocol to Eurofins Calscience, Inc. (Calscience), a state-certified analytical laboratory. Metal debris from the well boxes was recycled.

The wastewater sample was analyzed by Calscience for total petroleum hydrocarbons quantified as diesel and motor oil using EPA Method 8015B(M), volatile organic compounds (VOCs) including gasoline range organics using EPA Method 8260B, and the Title 22 Metals using EPA Method 6010B/7470A. Amec Foster Wheeler forwarded the results to PG&E for waste profiling and subsequent transportation to an approved waste disposal facility.

4.0 REPORTING

Upon completing the field activities, a Well Completion Report Form – DWR 188 was completed for each decommissioned groundwater monitoring well and was submitted to ACPWA and DWR. Copies of the DWR forms are included in Appendix D.

5.0 REFERENCES

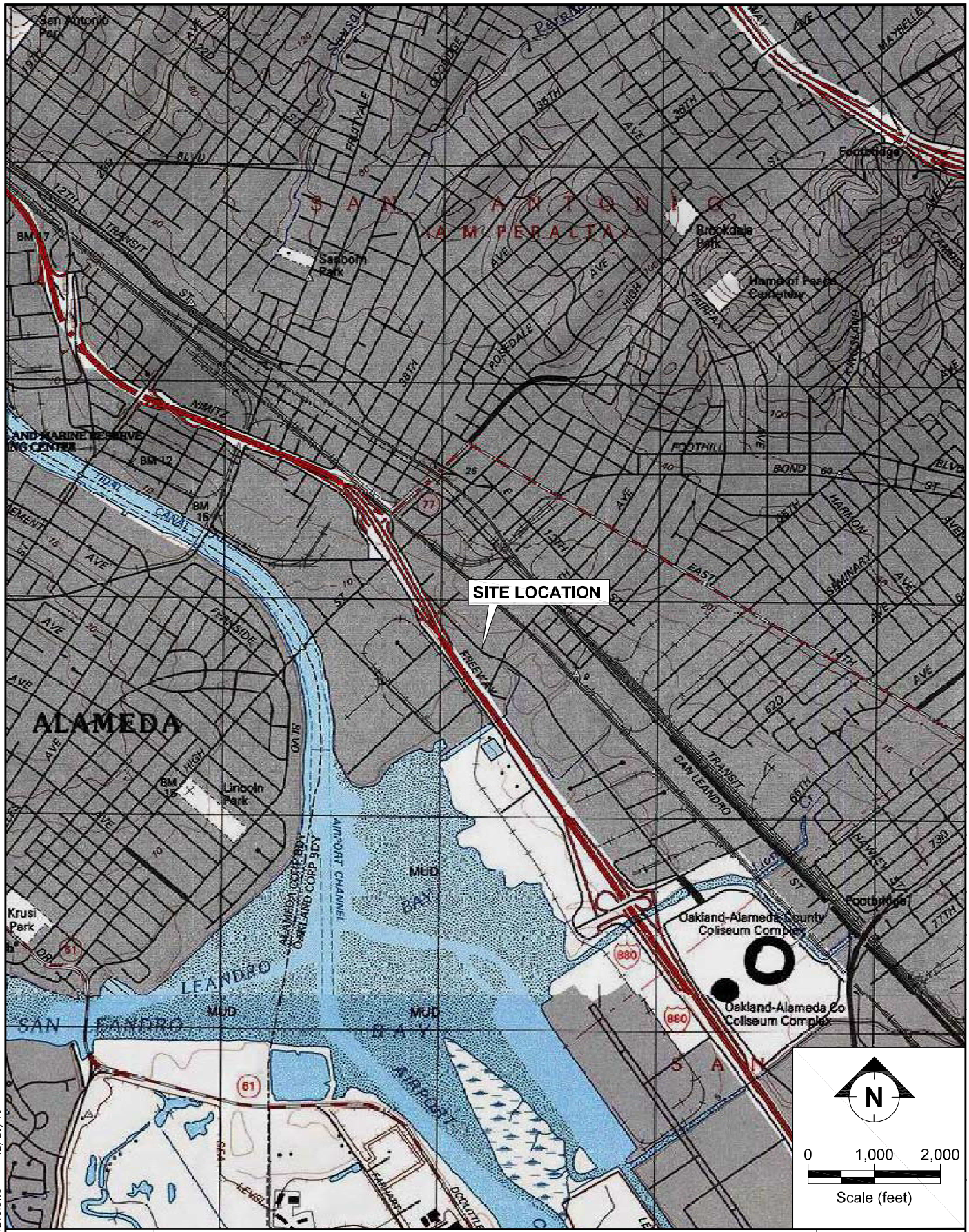
AMEC Geomatrix, Inc. (AMEC), 2010. Soil Investigation Work Plan, Pacific Gas and Electric Company, Oakland General Construction Yard, 4930 Coliseum Way, Oakland, California, September 16.

Amec Foster Wheeler, 2015. Electronic mail correspondence from Heidi Dietrich-Foronda, December 18.

Alameda County Health Care Services Agency (ACHCSA), 2015. Case File Review for SLIC Case No. RO0000099 and GeoTracker Global ID T0600100258, PG&E, 4930 Coliseum Way, Oakland, CA 94601, June 16.

Zymax Forensics, 2015. Oakland GC Yard, Hydrocarbon Product Characterization, November 8.

Figures

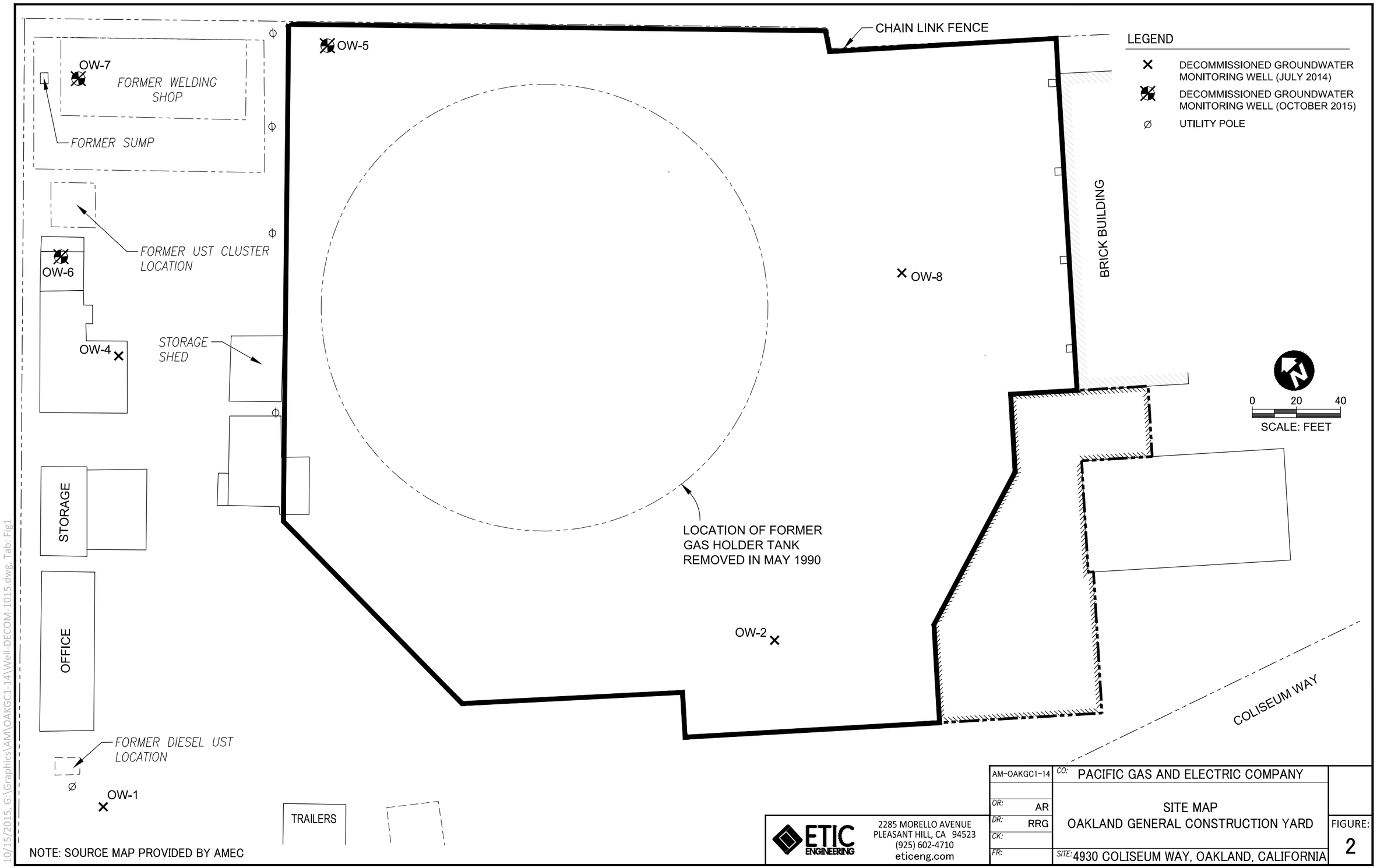


FILENAME: Topo1210.DWG 12/26/10

ETIC ENGINEERING

SITE LOCATION AND TOPOGRAPHIC MAP
OAKLAND GENERAL CONSTRUCTION YARD
4930 COLISEUM WAY
OAKLAND, CALIFORNIA

FIGURE: 1



NOTE: SOURCE MAP PROVIDED BY AMEC

ETIC ENGINEERING
2285 MORELLO AVENUE
PLEASANT HILL, CA 94523
(925) 602-4710
eticeng.com

AM-OAKGC1-14	CO: PACIFIC GAS AND ELECTRIC COMPANY
OR: AR	SITE MAP
DR: RRG	OAKLAND GENERAL CONSTRUCTION YARD
CK:	
FR:	SITE: 4930 COLISEUM WAY, OAKLAND, CALIFORNIA

FIGURE: 2

Tables

TABLE 1 MONITORING WELL CONSTRUCTION DETAILS
PG&E Oakland General Construction Yard
4930 Coliseum Way, Oakland, California

Well Number	Date Installed	Date Decommissioned	Borehole Diameter (inches)	Borehole Depth (feet bgs)	Well Depth (feet bgs)	Casing Diameter (inches)	Casing Material	Screened Interval (feet bgs)	Slot Size (inches)	Filter Pack Interval (feet bgs)	Filter Pack Material
OW-1	3/17/1988	7/21/2014	8	18	18	2	PVC	3-18	0.010	2.5-18	unknown
OW-2	3/22/1988	7/21/2014	8	19	19	2	PVC	4-19	0.010	3.5-19	#2/12 sand
OW-3	3/16/1988	NA	8	18.5	18.5	2	PVC	3.5-18.5	0.010	3-18.5	unknown
OW-4	5/18/1988	7/21/2014	12	21.75	20.75	2	PVC	NA-20.75	0.010	NA-21.75	#2/12 sand
OW-5	4/16/1991	10/6/2015	8	16.5	16.5	2	PVC	6.5-16.5	0.020	6-16.5	#3 sand
OW-6	12/19/1991	10/6/2015	8	18.5	18	2	PVC	8-18	0.020	6-18.5	#2/12 sand
OW-7	12/19/1991	10/6/2015	8	18	18	2	PVC	8-18	0.020	6-18	#2/12 sand
OW-8	2/10/1993	7/21/2014	8	18.33	18	2	PVC	8-18	0.020	7-18	#2/12 sand

Notes:
TOC = Top of well casing elevation; datam is mean sea level.
PVC = Polyvinyl chloride.
feet bgs = Feet below ground surface.
NA = Not available.
--- = Not applicable.

Appendix A

Regulatory Correspondence

ALAMEDA COUNTY
HEALTH CARE SERVICES
AGENCY
ALEX BRISCOE, Director

ENVIRONMENTAL HEALTH SERVICES
ENVIRONMENTAL PROTECTION
1131 Harbor Bay Parkway, Suite 250
Alameda, CA 94502-6577
(510) 567-6700
FAX (510) 337-9335

June 16, 2015

Ms. Kathleen Isaacson (*Sent via E-mail to: kai3@pge.com*)
PG&E Consultant Project Manager
WAU & Company
3401 Crow Canyon Road
San Ramon, CA 94583

Subject: Case File Review for SLIC Case No. RO0000099 and GeoTracker Global ID T0600100258, PG&E, 4930 Coliseum Way, Oakland, CA 94601

Dear Ms. Isaacson:

Alameda County Environmental Health (ACEH) staff has reviewed the Spills, Leaks, Investigations, and Cleanups (SLIC) case file for the above referenced site. This case was also discussed during a meeting held in ACEH offices on May 27, 2015 between Kathleen Isaacson of PG&E, Jerry Wickham of ACEH, Kit Soo of ERM, and two representatives from Amec Foster Wheeler. The action items and several issues discussed during the May 27, 2015 meeting are summarized in the technical comments below.

TECHNICAL COMMENTS

1. **Well Destruction.** We have no objection to the destruction of monitoring wells OW-5, OW-6, and OW-7. Well destruction permits may be obtained from the Alameda County Public Works Agency (http://www.acgov.org/pwa/wells/index.shtml). Upon completion of the well destruction, please present documentation of the well destruction and waste disposal to this office in the form of a Well Destruction Report.

2. **Condition of Asphalt Cap.** A Corrective Action Plan (dated July 2, 2012) that includes maintenance of the asphalt cap, development of a Soil Management Plan, and a Covenant and Environmental Restriction on Property was approved in 2013. Implementation of the Corrective Action Plan was delayed until the third quarter of 2015 after improvements were made to the asphalt surface in September 2013 as part of PG&E site maintenance. As discussed during our May 27, 2015 meeting, some deterioration of the physical cap for the site has recently been observed. Maintenance of the physical cap is necessary to prevent exposure to lead and petroleum hydrocarbons in soil beneath the site. Please submit the 2014 cap inspection report along with recommendations for maintenance of the asphalt cap by August 14, 2015.

3. **Underground Storage Tanks.** In addition to regulatory oversight of lead in soils from a former gas holder tank, ACEH case RO0000099 historically has included regulatory oversight of investigation and remedial actions for five underground storage tanks (USTs). Site investigation activities for the USTs have been completed and PG&E excavated 2,000 cubic yards of soil from the northern corner of the property where four of the USTs were formerly located. ACEH is not requesting further investigation or remediation for the former USTs at this time. Case closure for the USTs would be considered in the future at the same as case closure for the remainder of case RO0000099. If you have questions or concerns regarding the UST portion of the case, please contact your ACEH case worker, Jerry Wickham.

TECHNICAL REPORT REQUEST

Please upload technical reports to the ACEH ftp site (Attention: Jerry Wickham), and to the State Water Resources Control Board's GeoTracker website according to the following schedule and file-naming convention:

- **August 14, 2015** – Recommendations for asphalt cap maintenance
  File to be named: MISC_R_yyyy-mm-dd RO99

If you have any questions, please call me at (510) 567-6791 or send me an electronic mail message at jerry.wickham@acgov.org.

Sincerely,

Digitally signed by Jerry Wickham
DN: cn=Jerry Wickham, o=Alameda County Environmental Health, ou, email=jerry.wickham@acgov.org, c=US
Date: 2015.06.16 11:01:43 -07'00'

Jerry Wickham, California PG 3766, CEG 1177, and CHG 297
Senior Hazardous Materials Specialist

Attachments: Responsible Party(ies) Legal Requirements/Obligations

Enclosure: ACEH Electronic Report Upload (ftp) Instructions

cc: Kit Soo, ERM (*Sent via E-mail to: Kit.Soo@erm.com*)

Jerry Wickham, ACEH (*Sent via E-mail to: jerry.wickham@acgov.org*)

GeoTracker, eFile

Attachment 1

Responsible Party(ies) Legal Requirements / Obligations

REPORT REQUESTS

These reports are being requested pursuant to California Health and Safety Code Section 25296.10. 23 CCR Sections 2652 through 2654, and 2721 through 2728 outline the responsibilities of a responsible party in response to an unauthorized release from a petroleum UST system, and require your compliance with this request.

ELECTRONIC SUBMITTAL OF REPORTS

ACEH's Environmental Cleanup Oversight Programs (LOP and SLIC) require submission of reports in electronic form. The electronic copy replaces paper copies and is expected to be used for all public information requests, regulatory review, and compliance/enforcement activities. Instructions for submission of electronic documents to the Alameda County Environmental Cleanup Oversight Program FTP site are provided on the attached "Electronic Report Upload Instructions." Submission of reports to the Alameda County FTP site is an addition to existing requirements for electronic submittal of information to the State Water Resources Control Board (SWRCB) GeoTracker website. In September 2004, the SWRCB adopted regulations that require electronic submittal of information for all groundwater cleanup programs. For several years, responsible parties for cleanup of leaks from underground storage tanks (USTs) have been required to submit groundwater analytical data, surveyed locations of monitoring wells, and other data to the GeoTracker database over the Internet. Beginning July 1, 2005, these same reporting requirements were added to Spills, Leaks, Investigations, and Cleanup (SLIC) sites. Beginning July 1, 2005, electronic submittal of a complete copy of all reports for all sites is required in GeoTracker (in PDF format). Please visit the SWRCB website for more information on these requirements (http://www.waterboards.ca.gov/water_issues/programs/ust/electronic_submittal/).

PERJURY STATEMENT

All work plans, technical reports, or technical documents submitted to ACEH must be accompanied by a cover letter from the responsible party that states, at a minimum, the following: "I declare, under penalty of perjury, that the information and/or recommendations contained in the attached document or report is true and correct to the best of my knowledge." This letter must be signed by an officer or legally authorized representative of your company. Please include a cover letter satisfying these requirements with all future reports and technical documents submitted for this fuel leak case.

PROFESSIONAL CERTIFICATION & CONCLUSIONS/RECOMMENDATIONS

The California Business and Professions Code (Sections 6735, 6835, and 7835.1) requires that work plans and technical or implementation reports containing geologic or engineering evaluations and/or judgments be performed under the direction of an appropriately registered or certified professional. For your submittal to be considered a valid technical report, you are to present site specific data, data interpretations, and recommendations prepared by an appropriately licensed professional and include the professional registration stamp, signature, and statement of professional certification. Please ensure all that all technical reports submitted for this fuel leak case meet this requirement.

UNDERGROUND STORAGE TANK CLEANUP FUND

Please note that delays in investigation, later reports, or enforcement actions may result in your becoming ineligible to receive grant money from the state's Underground Storage Tank Cleanup Fund (Senate Bill 2004) to reimburse you for the cost of cleanup.

AGENCY OVERSIGHT

If it appears as though significant delays are occurring or reports are not submitted as requested, we will consider referring your case to the Regional Board or other appropriate agency, including the County District Attorney, for possible enforcement actions. California Health and Safety Code, Section 25299.76 authorizes enforcement including administrative action or monetary penalties of up to $10,000 per day for each day of violation.

Alameda County Environmental Cleanup Oversight Programs (LOP and SLIC)	**REVISION DATE:** May 15, 2014
	ISSUE DATE: July 5, 2005
	PREVIOUS REVISIONS: October 31, 2005; December 16, 2005; March 27, 2009; July 8, 2010, July 25, 2010
SECTION: Miscellaneous Administrative Topics & Procedures	**SUBJECT:** Electronic Report Upload (ftp) Instructions

The Alameda County Environmental Cleanup Oversight Programs (LOP and SLIC) require submission of all reports in electronic form to the county's ftp site. Paper copies of reports will no longer be accepted. The electronic copy replaces the paper copy and will be used for all public information requests, regulatory review, and compliance/enforcement activities.

REQUIREMENTS

- **Please do not submit reports as attachments to electronic mail.**
- Entire report including cover letter must be submitted to the ftp site as **a single portable document format (PDF) with no password protection**.
- It is **preferable** that reports be converted to PDF format from their original format, (e.g., Microsoft Word) rather than scanned.
- **Signature pages and perjury statements must be included and have either original or electronic signature.**
- **Do not password protect the document**. Once indexed and inserted into the correct electronic case file, the document will be secured in compliance with the County's current security standards and a password. **Documents with password protection will not be accepted**.
- Each page in the PDF document should be rotated in the direction that will make it easiest to read on a computer monitor.
- Reports must be named and saved using the following naming convention:

  RO#_Report Name_Year-Month-Date (e.g., RO#5555_WorkPlan_2005-06-14)

Submission Instructions

1) Obtain User Name and Password
   a) Contact the Alameda County Environmental Health Department to obtain a User Name and Password to upload files to the ftp site.
      i) Send an e-mail to deh.loptoxic@acgov.org
   b) In the subject line of your request, be sure to include **"ftp PASSWORD REQUEST"** and in the body of your request, include the **Contact Information, Site Addresses**, and the **Case Numbers (RO# available in Geotracker) you will be posting for**.

2) Upload Files to the ftp Site
   a) Using Internet Explorer (IE4+), go to ftp://alcoftp1.acgov.org
      (i) Note: Netscape, Safari, and Firefox browsers will not open the FTP site as they are NOT being supported at this time.
   b) Click on Page located on the Command bar on upper right side of window, and then scroll down to Open FTP Site in Windows Explorer.
   c) Enter your User Name and Password. (Note: Both are Case Sensitive.)
   d) Open "My Computer" on your computer and navigate to the file(s) you wish to upload to the ftp site.
   e) With both "My Computer" and the ftp site open in separate windows, drag and drop the file(s) from "My Computer" to the ftp window.

3) Send E-mail Notifications to the Environmental Cleanup Oversight Programs
   a) Send email to deh.loptoxic@acgov.org notify us that you have placed a report on our ftp site.
   b) Copy your Caseworker on the e-mail. Your Caseworker's e-mail address is the entire first name then a period and entire last name @acgov.org. (e.g., firstname.lastname@acgov.org)
   c) The subject line of the e-mail must start with the RO# followed by **Report Upload**. (e.g., Subject: RO1234 Report Upload) If site is a new case without an RO#, use the street address instead.
   d) If your document meets the above requirements and you follow the submission instructions, you will receive a notification by email indicating that your document was successfully uploaded to the ftp site.

Appendix B

Well Decommissioning Permit

Alameda County Public Works Agency - Water Resources Well Permit

Public Works Agency
Alameda County

399 Elmhurst Street
Hayward, CA 94544-1395
Telephone: (510)670-6633 Fax:(510)782-1939

Application Approved on: 09/21/2015 By jamesy

Permit Numbers: W2015-0870 to W2015-0872
Permits Valid from 10/06/2015 to 10/07/2015

Application Id:	1442269658983	**City of Project Site:**	Oakland
Site Location:	717 50th Ave.(4930 Coliseum Way) Oakland General Construction Yard.		
Project Start Date:	10/06/2015	**Completion Date:**	10/07/2015
Assigned Inspector:	Contact Steve Miller at (510) 670-5517 or stevem@acpwa.org		
Applicant:	PeneCore Drilling - Tuan Nguyen 220 N. East Street, Woodland, CA 95776	**Phone:**	530-661-3600
Property Owner:	Pacific Gas and Electric Company Pacific Gas and Electric Company PO Box 770000, San Francisco, CA 94177	**Phone:**	--
Client:	Pacific Gas and Electric Company Pacific Gas and Electric Company 3400 Crow Canyon Rd, San Ramon, CA 94583	**Phone:**	--

Total Due: $1191.00
Receipt Number: WR2015-0464 **Total Amount Paid:** $1191.00
Payer Name : Christine Gray Paid By: MC **PAID IN FULL**

Works Requesting Permits:

Well Destruction-Monitoring - 3 Wells
Driller: PeneCore Drilling - Lic #: 906899 - Method: press **Work Total: $1191.00**

Specifications

Permit #	Issued Date	Expire Date	Owner Well Id	Hole Diam.	Casing Diam.	Seal Depth	Max. Depth	State Well #	Orig. Permit #	DWR #
W2015-0870	09/21/2015	01/04/2016	OW-5	8.00 in.	2.00 in.	6.50 ft	16.50 ft	2S/3W8Q5	No Records	No Records
W2015-0871	09/21/2015	01/04/2016	OW-6	8.00 in.	2.00 in.	6.50 ft	18.50 ft	2S/3W8Q8	No Records	No Records
W2015-0872	09/21/2015	01/04/2016	OW-7	8.00 in.	2.00 in.	6.50 ft	18.00 ft	2S/3W8Q9	No Records	No Records

Specific Work Permit Conditions

1. Drilling Permit(s) can be voided/ cancelled only in writing. It is the applicant's responsibility to notify Alameda County Public Works Agency, Water Resources Section in writing for an extension or to cancel the drilling permit application. No drilling permit application(s) shall be extended beyond ninety (90) days from the original start date. Applicants may not cancel a drilling permit application after the completion date of the permit issued has passed.

2. Prior to any drilling activities, it shall be the applicant's responsibility to contact and coordinate an Underground Service Alert (USA), obtain encroachment permit(s), excavation permit(s) or any other permits or agreements required for that Federal, State, County or City, and follow all City or County Ordinances. No work shall begin until all the permits and requirements have been approved or obtained. It shall also be the applicants responsibilities to provide to the Cities or to Alameda County an Traffic Safety Plan for any lane closures or detours planned. No work shall begin until all the permits and requirements have been approved or obtained.

3. Compliance with the well-sealing specifications shall not exempt the well-sealing contractor from complying with appropriate State reporting-requirements related to well construction or destruction (Sections 13750 through 13755 (Division 7, Chapter 10, Article 3) of the California Water Code). Contractor must complete State DWR Form 188 and mail original to the Alameda County Public Works Agency, Water Resources Section, within 60 days. Include permit

number and site map.

4. Applicant shall submit the copies of the approved encroachment permit to this office within 10 days.

5. Permittee shall assume entire responsibility for all activities and uses under this permit and shall indemnify, defend and save the Alameda County Public Works Agency, its officers, agents, and employees free and harmless from any and all expense, cost and liability in connection with or resulting from the exercise of this Permit including, but not limited to, property damage, personal injury and wrongful death.

6. Applicant shall contact assigned inspector listed on the top of the permit at least five (5) working days prior to starting, once the permit has been approved. Confirm the scheduled date(s) at least 24 hours prior to drilling.

7. Permittee, permittee's contractors, consultants or agents shall be responsible to assure that all material or waters generated during drilling, boring destruction, and/or other activities associated with this Permit will be safely handled, properly managed, and disposed of according to all applicable federal, state, and local statutes regulating such. In no case shall these materials and/or waters be allowed to enter, or potentially enter, on or off-site storm sewers, dry wells, or waterways or be allowed to move off the property where work is being completed.

8. Remove the Christy box or similar structure.

Destroy well by grouting neat cement with a tremie pipe or pressure grouting (25 psi for 5min.) to the bottom of the well and by filling with neat cement to three (3-5) feet below surface grade. Allow the sealing material to spill over the top of the casing to fill any annular space between casing and soil.

After the seal has set, backfill the remaining hole with concrete or compacted material to match existing conditions.

9. Copy of approved drilling permit must be on site at all times. Failure to present or show proof of the approved permit application on site shall result in a fine of $500.00.

10. Electronic Reporting Regulations (Chapter 30, Division 3 of Title 23 & Division 3 of Title 27, CCR) require electronic submission of any report or data required by a regulatory agency from a cleanup site. Submission dates are set by a Regional Water Board or by a regulatory agency. Once a report/data is successfully uploaded, as required, you have met the reporting requirement (i.e. the compliance measure for electronic submittals is the actual upload itself). The upload date should be on or prior to the regulatory due date.

11. Remove the Christy box or similar structure. Tremie Grout with Cement (More than 30 ft in depth). After the seal has set, backfill the remaining hole with concrete or compacted material to match existing.

Appendix C

Pace Analytical Laboratory Analytical Report, Chain-of-Custody Documentation, and Zymax Hydrocarbon Product Characterization Report

Oakland GC Yard

Report Prepared for:

AMEC Foster Wheeler
180 Grand Avenue, Suite 1100
Oakland, CA 94612

Report Prepared By:

Alan Jeffrey, PhD

ZymaX Forensics, 220 William Pitt Way, Pittsburgh, PA 15238

8 November 2015

TABLE OF CONTENTS

Introduction

One product sample, labeled OW-5, was received at Zymax on October 8, 2015 for identification of hydrocarbon products in the samples. C_8-C_{40} hydrocarbon analysis by ASTM 5739 was performed on the sample.

The complete laboratory data report is presented as an Appendix to this report.

Methodology

C_8-C_{40} GC/MS Full Scan analysis (ASTM D5739)

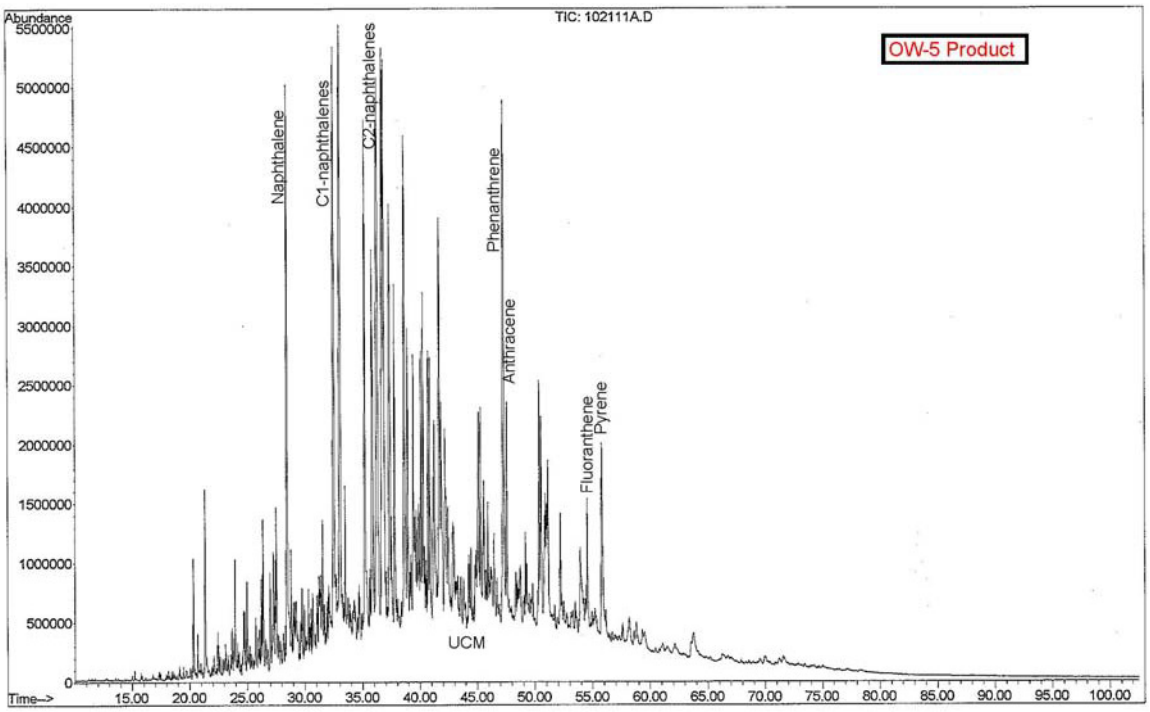
Oils and extracts are directly injected into a GC equipped with a 60 meter DB1 column to separate the hydrocarbons, which are detected with a mass spectrometer (MS) in full scan mode, interfaced to the GC. Hydrocarbons in the range of C_8 to C_{40} are identified. By scanning the ion fragments shown in the following table, chromatograms of a number of classes of hydrocarbons are generated. Aromatic hydrocarbons are identified by scanning over a large number of ion fragments, and the results are normalized in a bar diagram.

ION (M/Z)	COMPOUND CLASS
Total Ion Chromatogram (TIC)	All Compounds
85	n-Alkanes
113	Iso-Alkanes and Isoprenoids
83	Alkylcyclohexanes
134	C_4-benzenes
123	Bicyclanes
191	Terpanes
217	Steranes
253	Monoaromatic Steranes
231	Triaromatic Steranes
Bar Diagram	Aromatic Hydrocarbon Distribution

Hydrocarbon Product Characterization

The C8-C40 Total Ion Chromatogram (TIC), which provides the distribution or fingerprint of all hydrocarbons and other organic compounds in the samples, is shown below. In general, the size of hydrocarbon molecules increases with increasing retention time. Chromatograms of the individual hydrocarbon classes – n-alkanes, isoalkanes, cyclohexanes, C4-alkylbenzenes, bicyclanes, steranes, terpanes, and aromatic hydrocarbons – are shown in the data appendix.

The TIC below shows a multitude of aromatic hydrocarbons including the unsubstituted (parent) polyaromatic hydrocarbons (PAHs) naphthalene, phenanthrene, anthracene, fluoranthene, and pyrene, and alkylated PAHs, including C1-naphthalenes and C2-naphthalenes. The parent PAH distribution is characteristic of a pyrogenic (high temperature) product, such as creosote. The alkylated PAHs are more prevalent in petroleum products. A petroleum product is also indicated by the broad baseline elevation from 25 min retention time to above 60 min. This is an Unresolved Complex Mixture (UCM) containing a multitude of petroleum hydrocarbons that cannot be resolved by GC. This product has a broad carbon range, from C10 to around C30, and may represent a residual fuel oil, which is primarily used as a fuel in industrial furnaces.



October 26th, 2015

formerly ZymaX Forensics

Heidi Dietrich-Foronda
AMEC Foster Wheeler
180 Grand Avenue; Suite 1100
Oakland, CA 94612

RE: Oakland GC Yard
Project Number: AM-GCYOAK-01

Pace Analytical received 1 sample(s) received on October 8th, 2015 for analysis labeled OW-5. Per client request, the following analyses were performed:

1. C8-C40 Full Scan (ASTM 5739)

The sample was performed in house under laboratory number **16913** .

Please call the lab at 412-826-4481, or you may email any questions or concerns to taryn.mancine@pacelabs.com regarding any analytical data reports.

Respectfully submitted,

Taryn Mancine

Taryn Mancine
Project Manager/Scientist

Pace Analytical®
www.pacelabs.com
Microseeps

220 William Pitt Way
Pittsburgh, PA 15238
412-826-5245

16913

CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Page: 1 of 1

005265

Section A Required Client Information:	Section B Required Project Information:	Section C Invoice Information:
Company: Amec Foster Wheeler	Report To: Heidi Dietrich-Forenda	Attention: Heidi Dietrich-Forenda
Address: 180 Grand Ave., Suite 1100 Oakland, CA	Copy To:	Company Name: Amec Foster Wheeler Address: 180 Grand Ave., Suite 1100
Email To: heidi.dietrichforenda@amecfw.com	Purchase Order No.: C0122071 13	Pace Quote Reference:
Phone: (510)663-4153 Fax:	Project Name: Oakland GC Yard	Pace Project Manager:
Requested Due Date/TAT:	Project Number: AM-GCYOAK-01	Pace Profile #:

REGULATORY AGENCY

☐ NPDES ☒ GROUND WATER ☐ DRINKING WATER
☐ UST ☐ RCRA ☐ OTHER

Site Location STATE: CA

Section D Required Client Information

Matrix Codes (MATRIX / CODE)

Drinking Water	DW
Water	WT
Waste Water	WW
Product	P
Soil/Solid	SL
Oil	OL
Wipe	WP
Air	AR
Tissue	TS
Other	OT

SAMPLE ID
(A-Z, 0-9 / ,-)
Sample IDs MUST BE UNIQUE

Requested Analysis Filtered (Y/N)

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED COMPOSITE START/GRAB DATE	COLLECTED COMPOSITE START/GRAB TIME	COLLECTED COMPOSITE END/GRAB DATE	COLLECTED COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	TSP	BAK	Zinc Acetate & NaOH	Other	Analysis Test Y/N: Fingerprint Analysis Per Amec	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	OW-5	P	G	10/6/15	0940	—	—		1	X								X		
2																				
3																				
4																				
5																				
6																				
7																				
8																				
9																				
10																				
11																				
12																				

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
FEDEX TRACKING:	/ ETIC	10/6/15	1215	PACE	10.8.15	1100	5	Y	Y	Y
774688536960										

ORIGINAL

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: ADAM GRUNSBURG

SIGNATURE of SAMPLER: DATE Signed (MM/DD/YY): 10/06/15

Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)

*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

Cooler Receipt Form

Client Name: Amec Project: Oakland GC Yard Lab Work Order: 16913

A. Shipping/Container Information (circle appropriate response)

Courier: (FedEx) UPS USPS Client Other:_____ Air bill Present: (Yes) No

Tracking Number: 7746 8853 6960

Custody Seal on Cooler/Box Present: (Yes) No Seals Intact: (Yes) No

Cooler/Box Packing Material: (Bubble Wrap) Absorbent Foam Other:_____

Type of Ice: (Wet) Blue None Ice Intact: (Yes) Melted

Cooler Temperature: 5°C Radiation Screened: Yes (No) Chain of Custody Present: (Yes) No

Comments:_____

B. Laboratory Assignment/Log-in (check appropriate response)

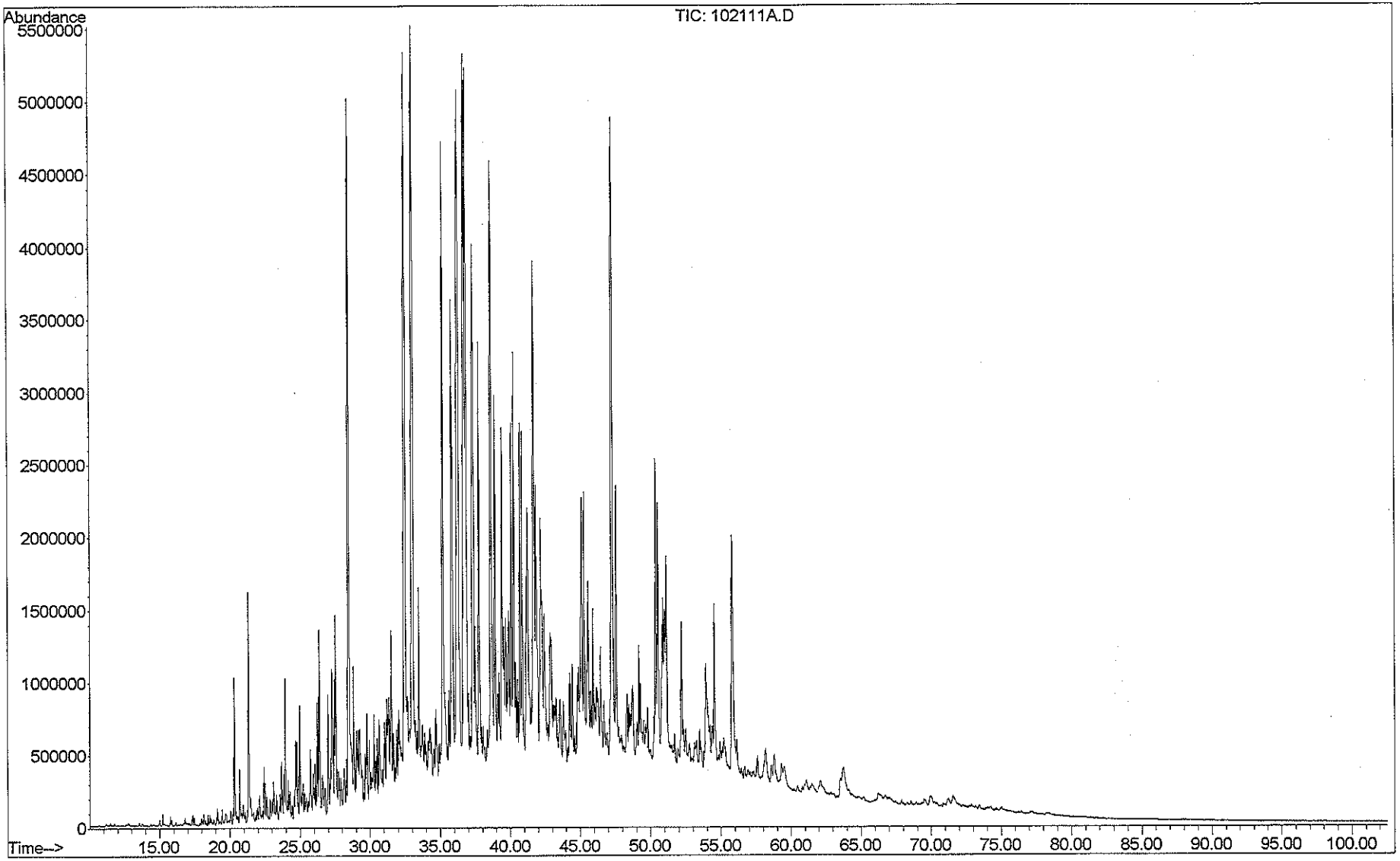
	YES	NO	N/A	Comment Reference non-Conformance
Chain of Custody properly filled out	✓			
Chain of Custody relinquished	✓			
Sampler Name & Signature on COC	✓			
Containers intact	✓			
Were samples in separate bags			✓	
Sample container labels match COC Sample name/date and time collected	✓			
Sufficient volume provided	✓			
PAES containers used	✓			
Are containers properly preserved for the requested testing? (as labeled)			✓	
If an unknown preservation state, were containers checked? Exception: VOA's coliform			✓	If yes, see pH form.
Was volume for dissolved testing field filtered, as noted on the COC? Was volume received in a preserved container?			✓	

Comments:_____

Cooler contents examined/received by: CG Date: 10.8.15

Project Manager Review: TM Date: 10-12-15

Sample Name: OW-5 (16913-1)
Misc Info :



full list

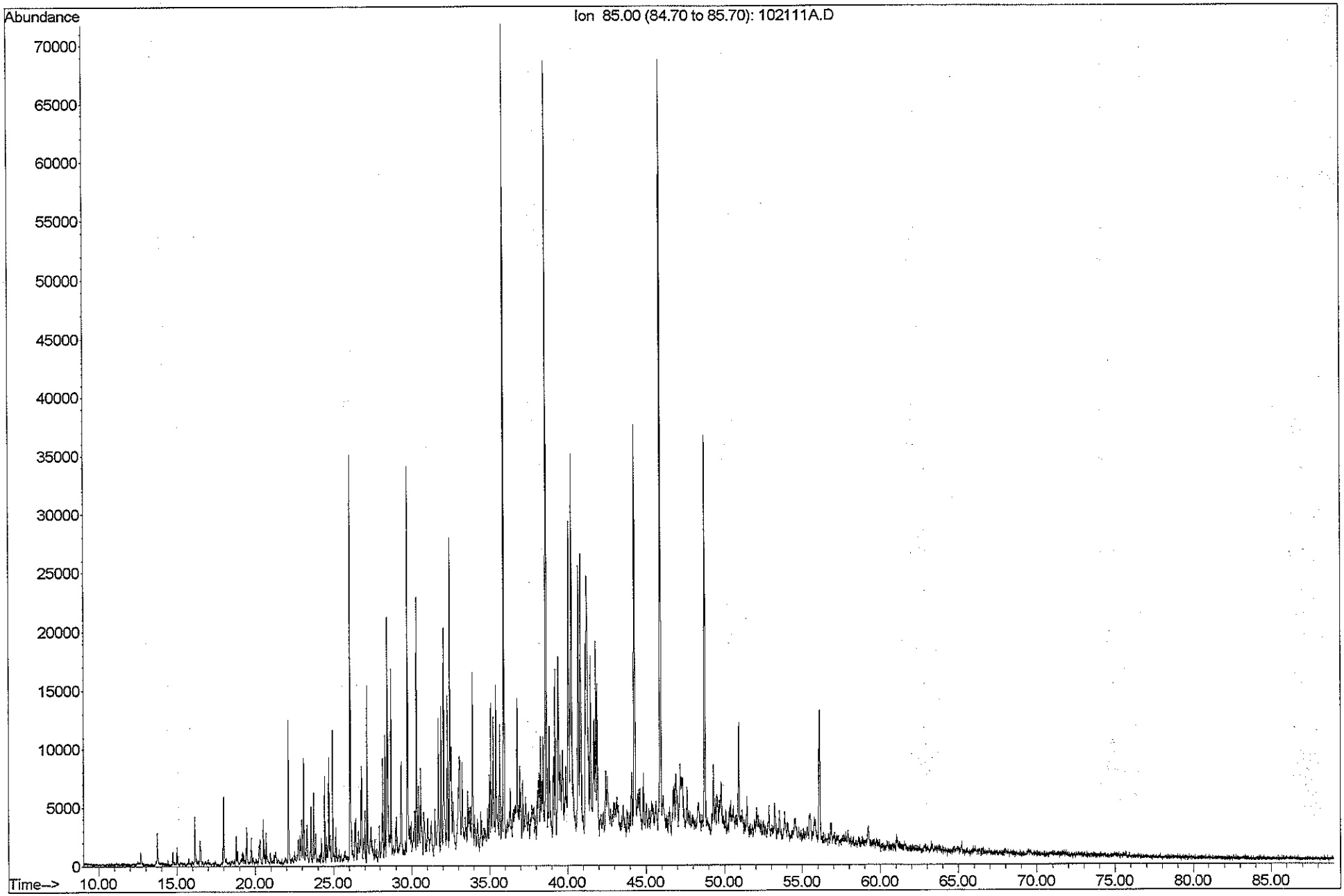
ZymaX FORENSICS

Table

Key to Chromatogram Symbol Identification for m/z 85 and m/z 113 Paraffins and Isoparaffins

Symbol	Detail
i-10	Iso-alkane with 10 carbon atoms
i-15	Farnesane (isoprenoid with 15 carbon atoms)
i-16	Isoprenoid with 16 carbon atoms
Pr	Pristane (isoprenoid with 19 carbon atoms)
Ph	Phytane (isoprenoid with 20 carbon atoms)
nC_8	n-C_8 normal alkane
nC_{15}	n-C_{15} normal alkane
i-8	2,5-(2,4)-Dimethylhexane
i-8'	2,3,4-Trimethylpentane
i-8"	2,3-Dimethylhexane
CH-*n*	Alkylcyclohexane (where *n* indicates number of carbon atoms in the side chain)

OW-5 (16913-1)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Ion 85.00 (84.70 to 85.70): 102111A.D
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60000
55000
50000
45000
40000
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30000
25000
20000
15000
10000
5000
0
Time-->
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15.00
20.00
25.00
30.00
35.00
40.00
45.00
50.00
55.00
60.00
65.00
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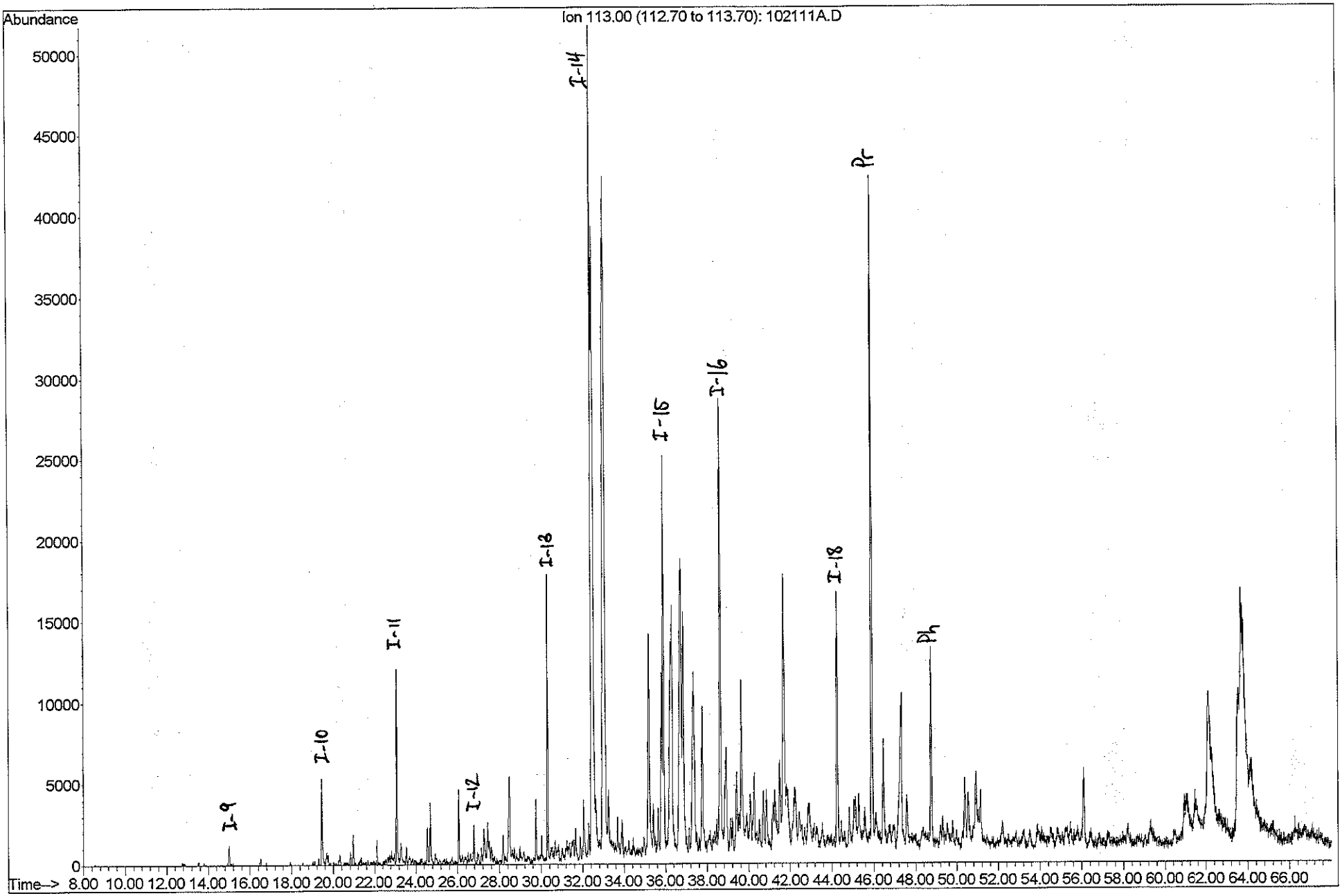
75.00
80.00
85.00

OW-5 (16913-1)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25000
20000
15000
10000
5000
0
I-9
I-10
I-11
I-12
I-13
I-14
I-15
I-16
I-18
Pr
Ph
Time-->
8.00 10.00 12.00 14.00 16.00 18.00 20.00 22.00 24.00 26.00 28.00 30.00 32.00 34.00 36.00 38.00 40.00 42.00 44.00 46.00 48.00 50.00 52.00 54.00 56.00 58.00 60.00 62.00 64.00 66.00

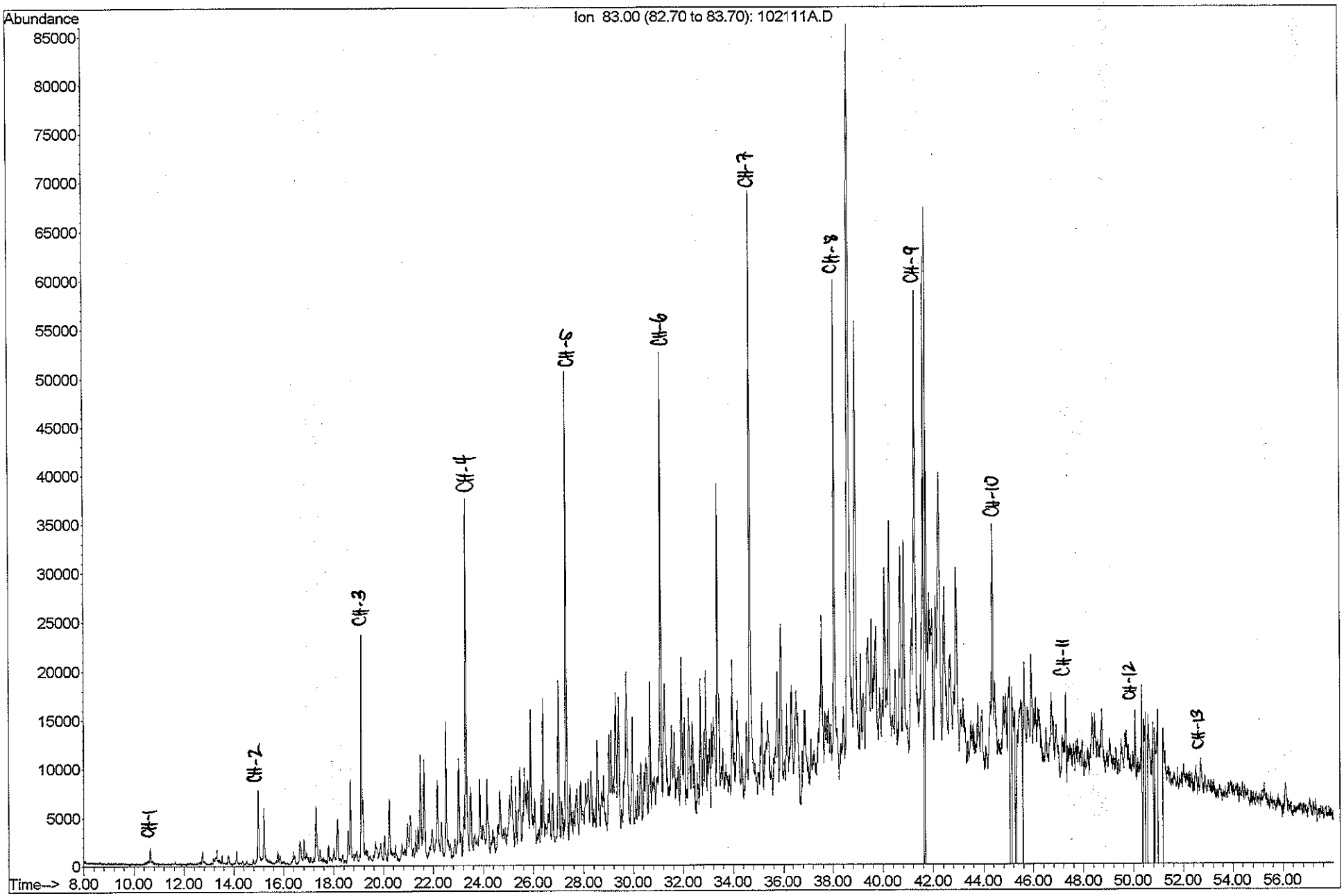
ZymaX FORENSICS

Table

Key for Alkylcyclohexanes at m/z 83

Symbol	Detail
CH-1:	Methylcyclohexane
CH-2:	Ethylcyclohexane
CH-3:	Propylcylohexane
CH-4:	Butylcyclohexane
CH-5:	Pentylcyclohexane
CH-6:	Hexylcyclohexane
CH-7:	Heptylcyclohexane
CH-8:	Octylcyclohexane
CH-9:	Nonylcyclohexane
CH-10:	Decylcyclohexane
CH-11:	Undecylcyclohexane
CH-12:	Dodecylcyclohexane
CH-13:	Tridecylcyclohexane
CH-14:	Tetradecylcyclohexane

OW-5 (16913-1)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35000
30000
25000
20000
15000
10000
5000
0
Time-->
8.00
10.00
12.00
14.00
16.00
18.00
20.00
22.00
24.00
26.00
28.00
30.00
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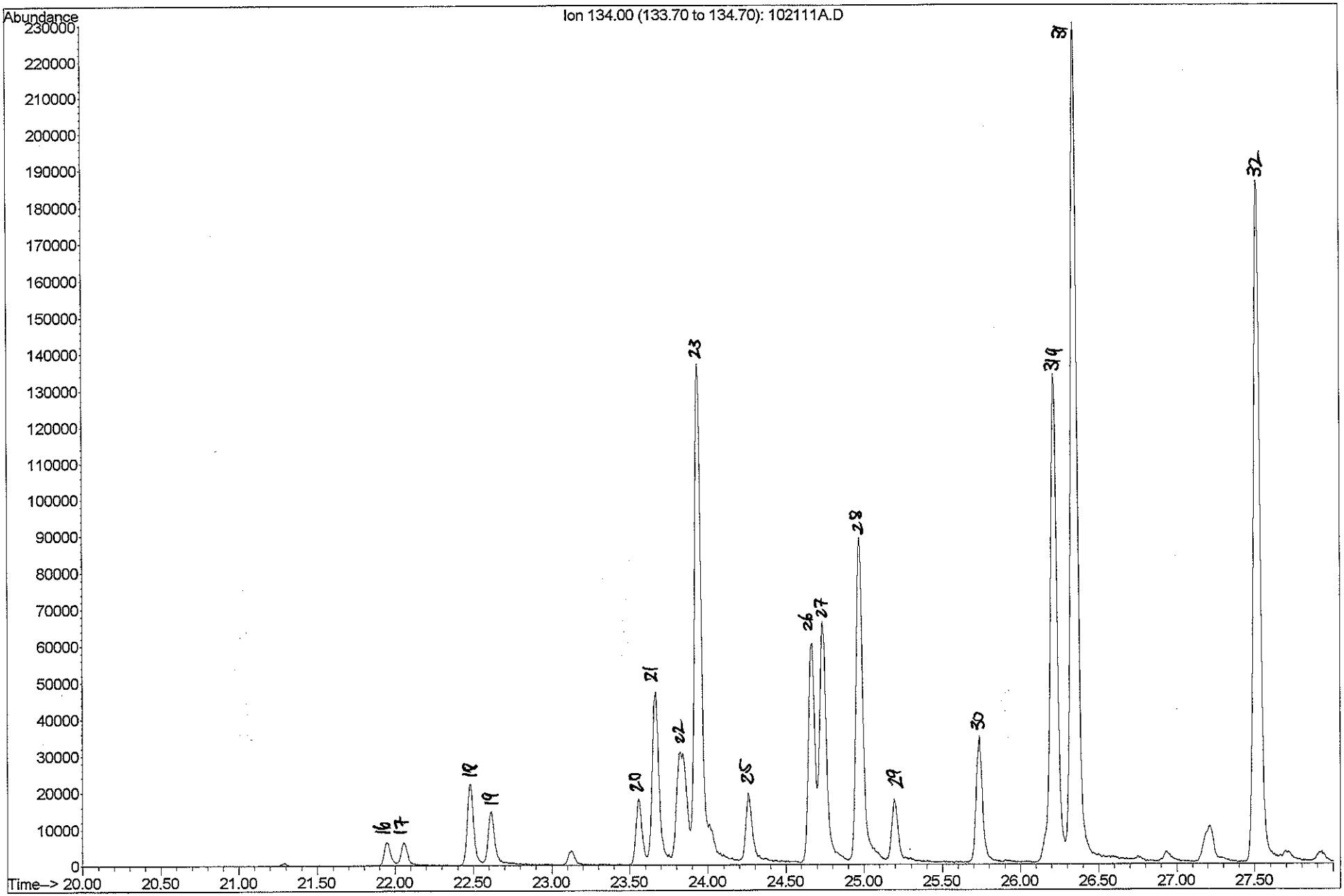
34.00
36.00
38.00
40.00
42.00
44.00
46.00
48.00
50.00
52.00
54.00
56.00
CH-1
CH-2
CH-3
CH-4
CH-5
CH-6
CH-7
CH-8
CH-9
CH-10
CH-11
CH-12
CH-13

ZymaX FORENSICS

Key for C_4-Alkylbenzenes (m/z 134 mass chromatograms)

#	Compound
16	Sec-Butylbenzene
17	1-Methyl-3-Isopropylbenzene
18	1-Methyl-4-Isopropylbenzene
19	1-Methyl-2-Isopropylbenzene
20	1,3-Diethylbenzene
21	1-Methyl-3-Propylbenzene
22	Butylbenzene
23	1,3-Dimethyl-5-Ethylbenzene
24	1,2-Diethylbenzene
25	1-Methyl-2-Propylbenzene
26	1,4-Dimethyl-2-Ethylbenzene
27	1,3-Dimethyl-4-Ethylbenzene
28	1,2-Dimethyl-4-Ethylbenzene
29	1,3-Dimethyl-2-Ethylbenzene
30	1,2-Dimethyl-3-Ethylbenzene
31a	1,2,4,5-Tetramethylbenzene
31	1,2,3,5-Tetramethylbenzene
32	1,2,3,4-Tetramethylbenzene

OW-5 (16913-1)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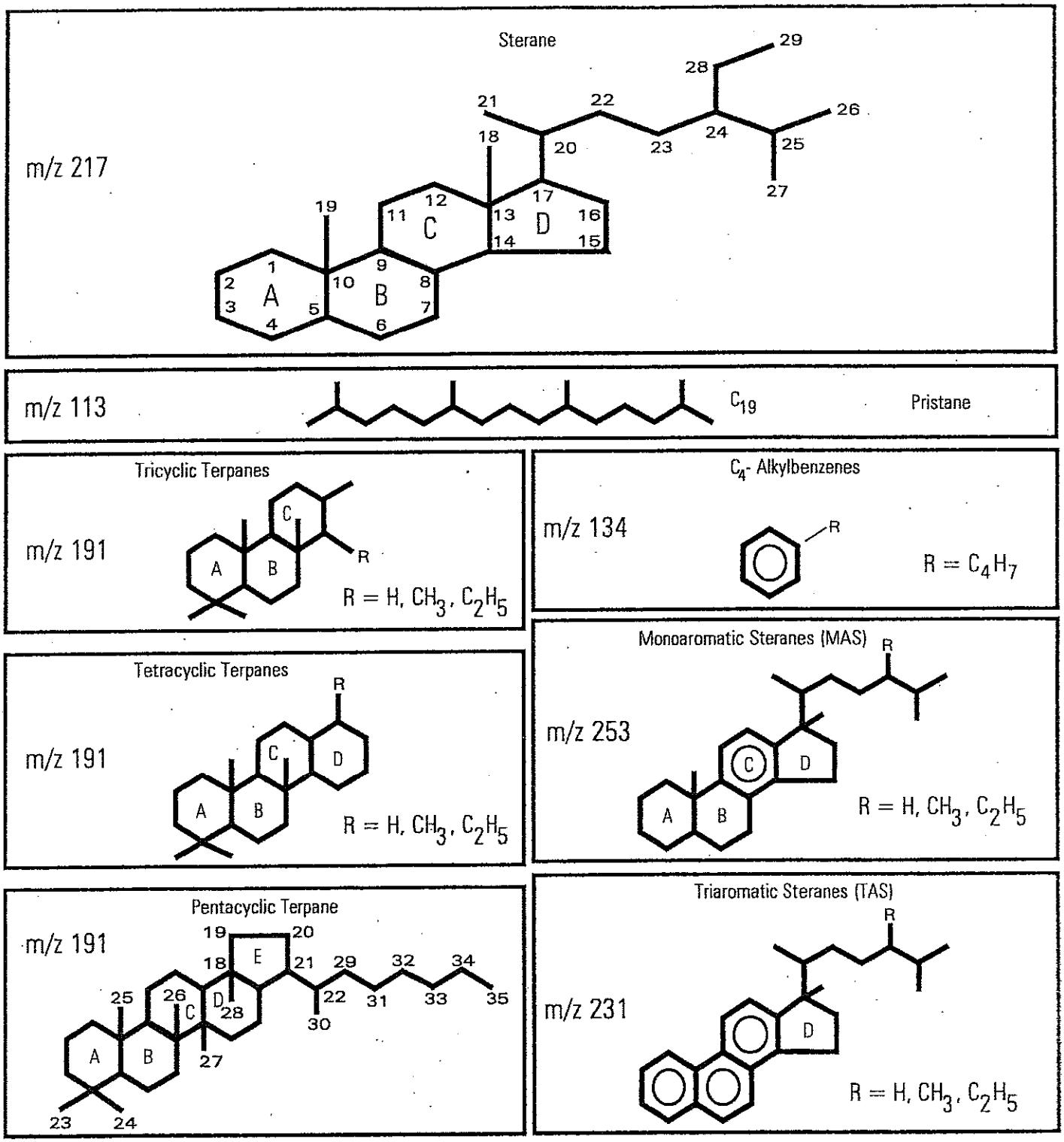
160000
150000
140000
130000
120000
110000
100000
90000
80000
70000
60000
50000
40000
30000
20000
10000
0
Time--> 20.00
20.50
21.00
21.50
22.00
22.50
23.00
23.50
24.00
24.50
25.00
25.50
26.00
26.50
27.00
27.50
16
17
18
19
20
21
22
23
25
26
27
28
29
30
31
32

ZymaX FORENSICS

Table

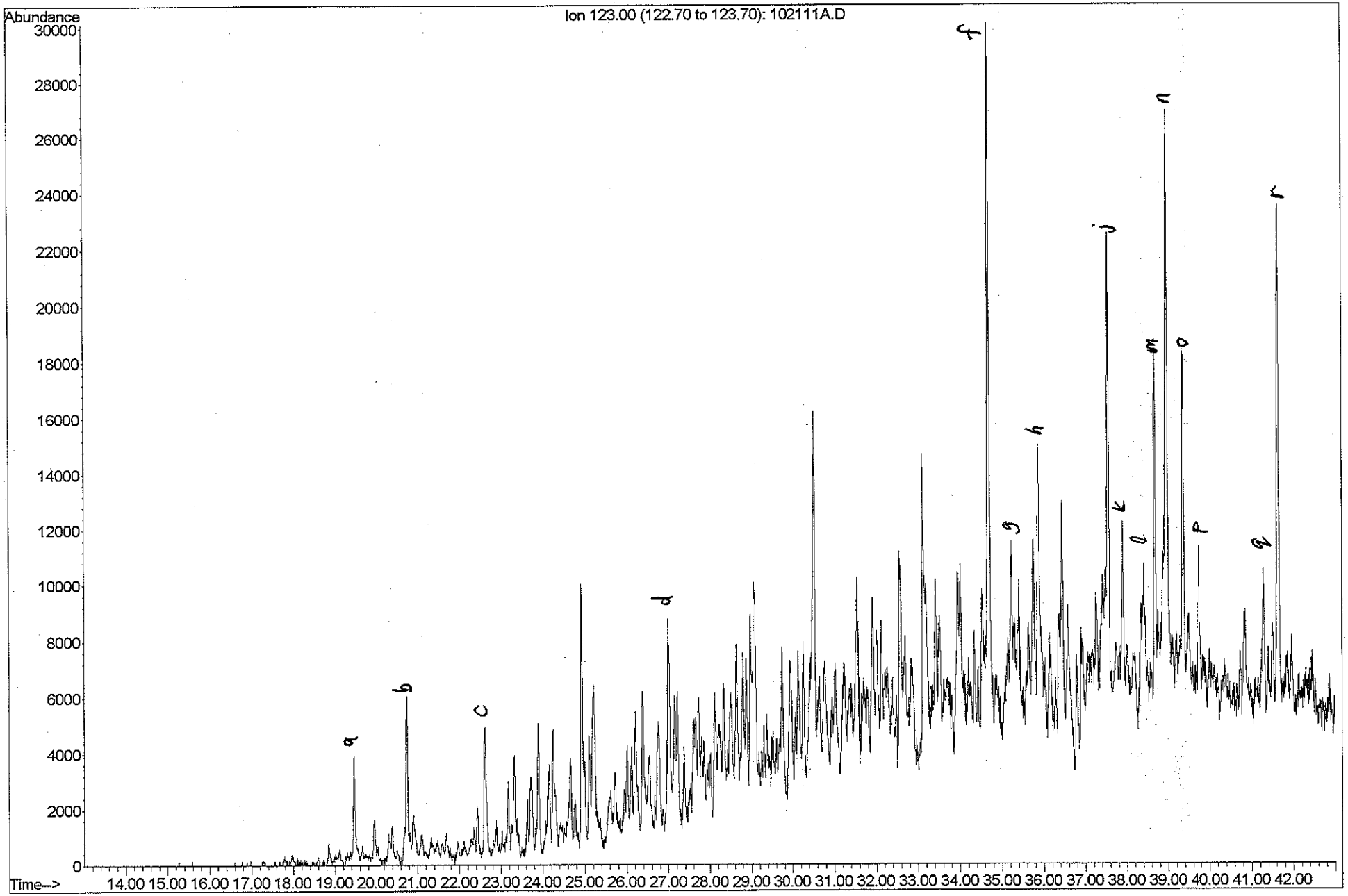
Key for identification of the Bicyclanes (m/z 123 mass chromatograms)

Peak No.	Identity	Formula	M.W.
a	2,2,3-Trimethylbicyloheptane	$C_{10}H_{18}$	138
b	C_{10} bicycloalkane	$C_{10}H_{18}$	138
c	3,3,7-Trimethylbicycloheptane	$C_{10}H_{18}$	138
d	C_{11} decalin	$C_{11}H_{20}$	152
f	Nordrimane	$C_{14}H_{26}$	194
g	Nordrimane	$C_{14}H_{26}$	194
h	Rearranged drimane	$C_{15}H_{28}$	208
j	Rearranged drimane	$C_{15}H_{28}$	208
k	Isomer of eudesmane	$C_{15}H_{28}$	208
l	4β(H) Eudesmane	$C_{15}H_{28}$	208
m	C_{15} bicyclic sesquiterpane	$C_{15}H_{28}$	208
n	8β(H) Drimane	$C_{15}H_{28}$	208
o	C_{15} bicyclic sesquiterpane	$C_{15}H_{28}$	208
p	C_{16} bicyclic sesquiterpane	$C_{16}H_{30}$	222
q	C_{16} bicyclic sesquiterpane	$C_{16}H_{30}$	222
r	8β(H) Homodrimane	$C_{16}H_{30}$	222



The compound structures of pristane, C_4-alkylbenzenes, sterane; terpanes; monoaromatic and triaromatic steranes

OW-5 (16913-1)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22000
20000
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12000
10000
8000
6000
4000
2000
0
Time-->
14.00 15.00 16.00 17.00 18.00 19.00 20.00 21.00 22.00 23.00 24.00 25.00 26.00 27.00 28.00 29.00 30.00 31.00 32.00 33.00 34.00 35.00 36.00 37.00 38.00 39.00 40.00 41.00 42.00
a
b
c
d
f
g
h
j
k
l
m
n
o
p
q
r

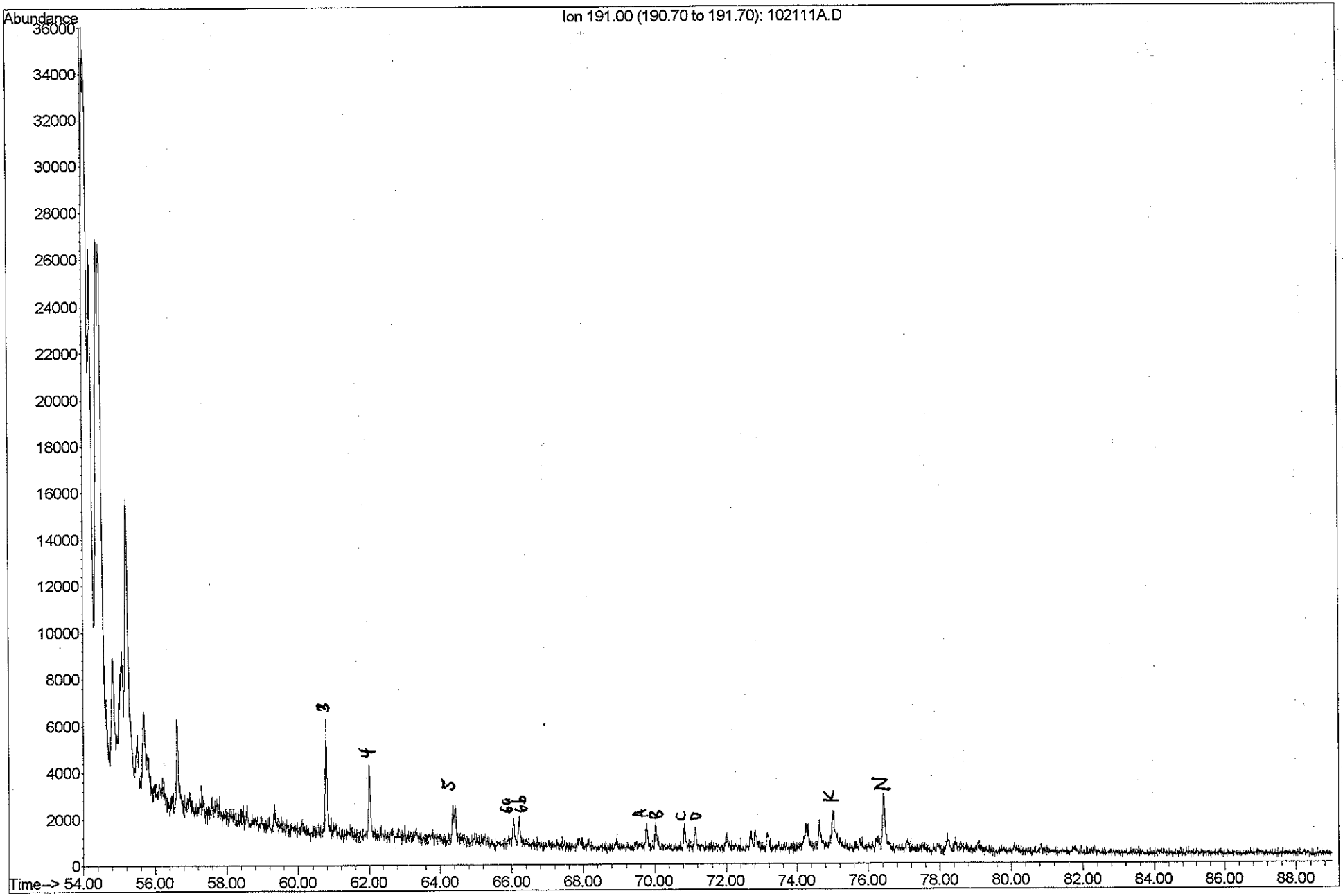
Table

ZymaX FORENSICS

Key for Tricyclic, Tetracyclic, and Pentacyclic Terpanes Identification (m/z 191 mass chromatograms)

Code	Identity	Carbon #
0	C_{20}-Tricyclic Terpane	20
1	C_{21}-Tricyclic Terpane	21
2	C_{22}-Tricyclic Terpane	22
3	C_{23}-Tricyclic Terpane	23
4	C_{24}-Tricyclic Terpane	24
5	C_{25}-Tricyclic Terpane	25
Z4	C_{24}-Tetracyclic Terpane	24
6a	C_{26}-Tricyclic Terpane	26
6b	C_{26}-Tricyclic Terpane	26
7	C_{27}-Tricyclic Terpane	27
A	C_{28}-Tricyclic Terpane #1	28
B	C_{28}-Tricyclic Terpane #2	28
C	C_{29}-Tricyclic Terpane #1	29
D	C_{29}-Tricyclic Terpane #2	29
E	18α-22,29,30-Trisnorneohopane (Ts)	27
F	17α-22,29,30-Trisnorhopane (Tm)	27
G	17ß-22,29-30-Trisnorhopane	27
H	17α-23,28-Bisnorlupane	28
10a	C_{30}-Tricyclic Terpane #1	30
10b	C_{30}-Tricyclic Terpane #2	30
I	17α-28,30-Bisnorhopane	28
11a	C_{31}-Tricyclic Terpane #1	31
J	17α-25-Norhopane	29
11b	C_{31}-Tricyclic Terpane #2	31
K	17α,21ß-30-Norhopane	29
C_{29}Ts	18α-30-Norneohopane	29
C_{30}*	17α-Diahopane	30
L	17ß-21α-30-Normoretane	29
Ma	18α-Oleanane	30
Mb	18ß-Oleanane	30
N	17α,21ß-Hopane	30
O	17ß,21α-Moretane	30
13a	C_{33}-Tricyclic Terpane #1	33
13b	C_{33}-Tricyclic Terpane #2	33
P	22S-17α,21ß-30-Homohopane	31
Q	22R-17α,21ß-30-Homohopane	31
R	Gammacerane	30
14a	C_{34}-Tricyclic Terpane #1	34
S	17ß,21α-Homomoretane	31
14b	C_{34}-Tricyclic Terpane #2	34
T	22S-17α,21ß-30-Bishomohopane	32
U	22R-17α,21ß-30-Bishomohopane	32
15a	C_{35}-Tricyclic Terpane #1	35
15b	C_{35}-Tricyclic Terpane #2	35
V	17ß,21α-C_{32}-Bishomomoretane	32
WS	22S-17α,21ß-30,31,32-Trishomohopane	33
WR	22R-17α,21ß-30,31,32-Trishomohopane	33
16a	C_{36}-Tricyclic Terpane #1	36
16b	C_{36}-Tricyclic Terpane #2	36
XS	22S-17α,21ß-30,31,32,33-Tetrahomohopane	34
XR	22R-17α,21ß-30,31,32,33-Tetrahomohopane	34
YS	22S-17α,21ß-30,31,32,33,34-Pentahomohopane	35
YR	22R-17α,21ß-30,31,32,33,34-Pentahomohopane	35

OW-5 (16913-1)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12000
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4000
2000
0
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58.00
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62.00
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70.00
72.00
74.00
76.00
78.00
80.00
82.00
84.00
86.00
88.00
3
4
5
6a
6b
A
B
C
D
K
N

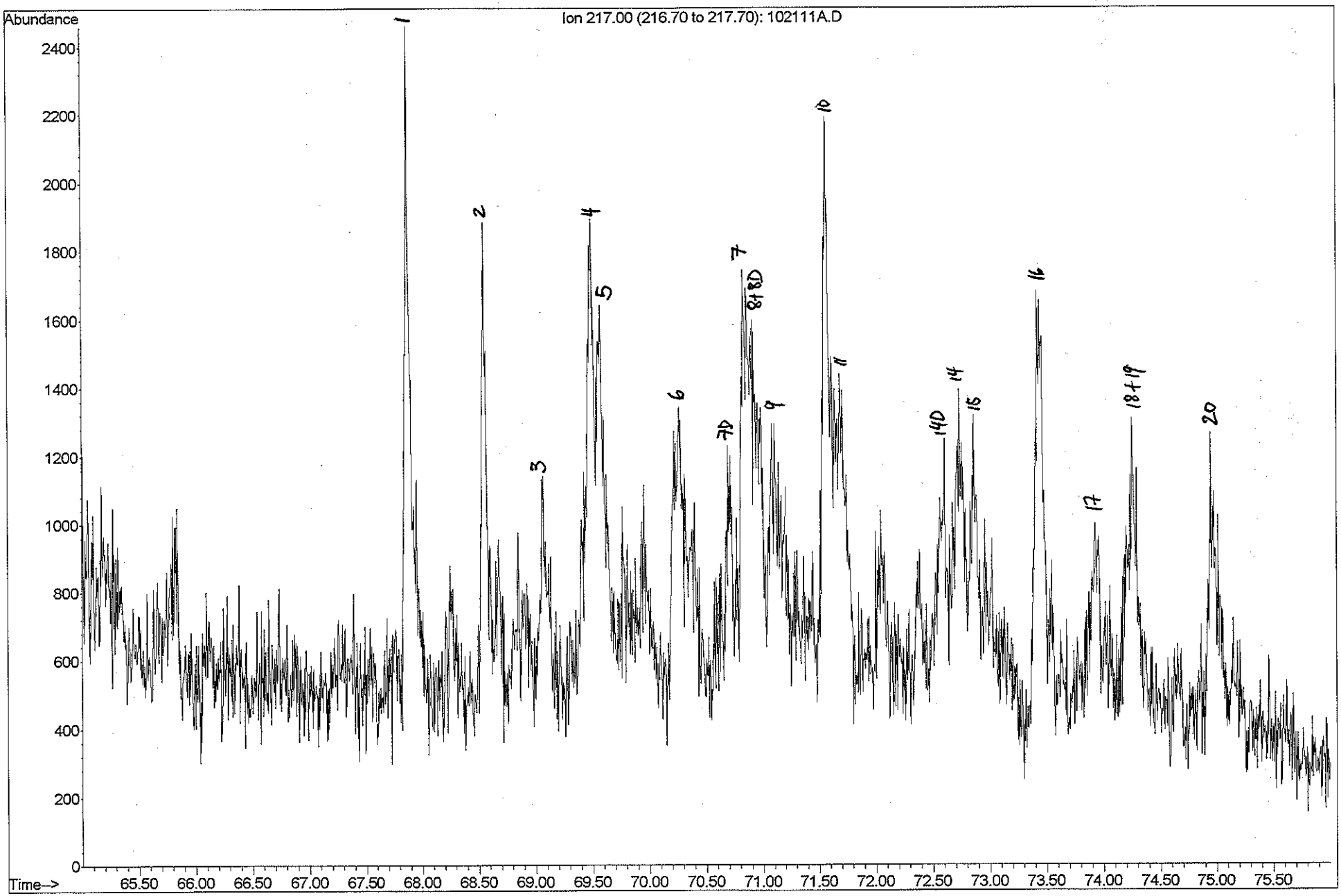
ZymaX FORENSICS

Table

Key for Steranes Identification (m/z 217 Mass Chromatogram)

Code	Identity	Carbon #
1	13ß,17α-diacholestane (20S)	27
2	13ß,17α-diacholestane (20R)	27
3	13α,17ß-diacholestane (20S)	27
4	13α,17ß-diacholestane (20R)	27
5	24-methyl-13ß,17α-diacholestane (20S)	28
6	24-methyl-13ß,17α-diacholestane (20R)	28
7D	24-methyl-13α,17ß-diacholestane (20S)	28
7	14α,17α-cholestane (20S)	27
8D	24-ethyl-13ß,17α-diacholestane (20S)	29
8	14ß,17ß-cholestane (20R)	27
9	14ß,17ß-cholestane (20S)	27
9D	24-methyl-13α,17ß-diacholestane (20R)	28
10	14α,17α-cholestane (20R)	27
11	24-ethyl-13ß,17α-diacholestane (20R)	29
12	24-ethyl-13α,17ß-diacholestane (20S)	29
13	24-methyl-14α,17α-cholestane (20S)	28
14D	24-ethyl-13α,17ß-diacholestane (20R)	29
14	24-methyl-14ß,17ß-cholestane (20R)	28
15	24-methyl-14ß,17ß-cholestane (20S)	28
16	24-methyl-14α,17α-cholestane (20R)	28
17	24-ethyl-14α-cholestane (20S)	29
18	24-ethyl-14ß,17ß-cholestane (20R)	29
19	24-ethyl-14ß,17ß-cholestane (20S)	29
20	24-ethyl-14α,17α-cholestane (20R)	29
21A	24-n-Propylcholestane (20S)	30
21B	4-methyl-24-ethylcholestane (20S)	30
22A	4α-methyl-24-ethyl-14β,17β-cholestane(20S)	30
22B	24-n-propyl-14β,17β-cholestane (20S)	30
23A	4α-methyl-24-ethyl-14β,17β-cholestane(20R)	30
23B	24-n-propyl-14β,17β-cholestane (20R)	30
24A	4α-methyl-24-ethylcholestane(20R)	30
24B	24-n-propylcholestane (20R)	30

OW-5 (16913-1)


Abundance
Ion 217.00 (216.70 to 217.70): 102111A.D
2400
2200
2000
1800
1600
1400
1200
1000
800
600
400
200
0
Time-->
65.50
66.00
66.50
67.00
67.50
68.00
68.50
69.00
69.50
70.00
70.50
71.00
71.50
72.00
72.50
73.00
73.50
74.00
74.50
75.00
75.50
1
2
3
4
5
6
7D
7
8+8D
9
10
11
14D
14
15
16
17
18+19
20

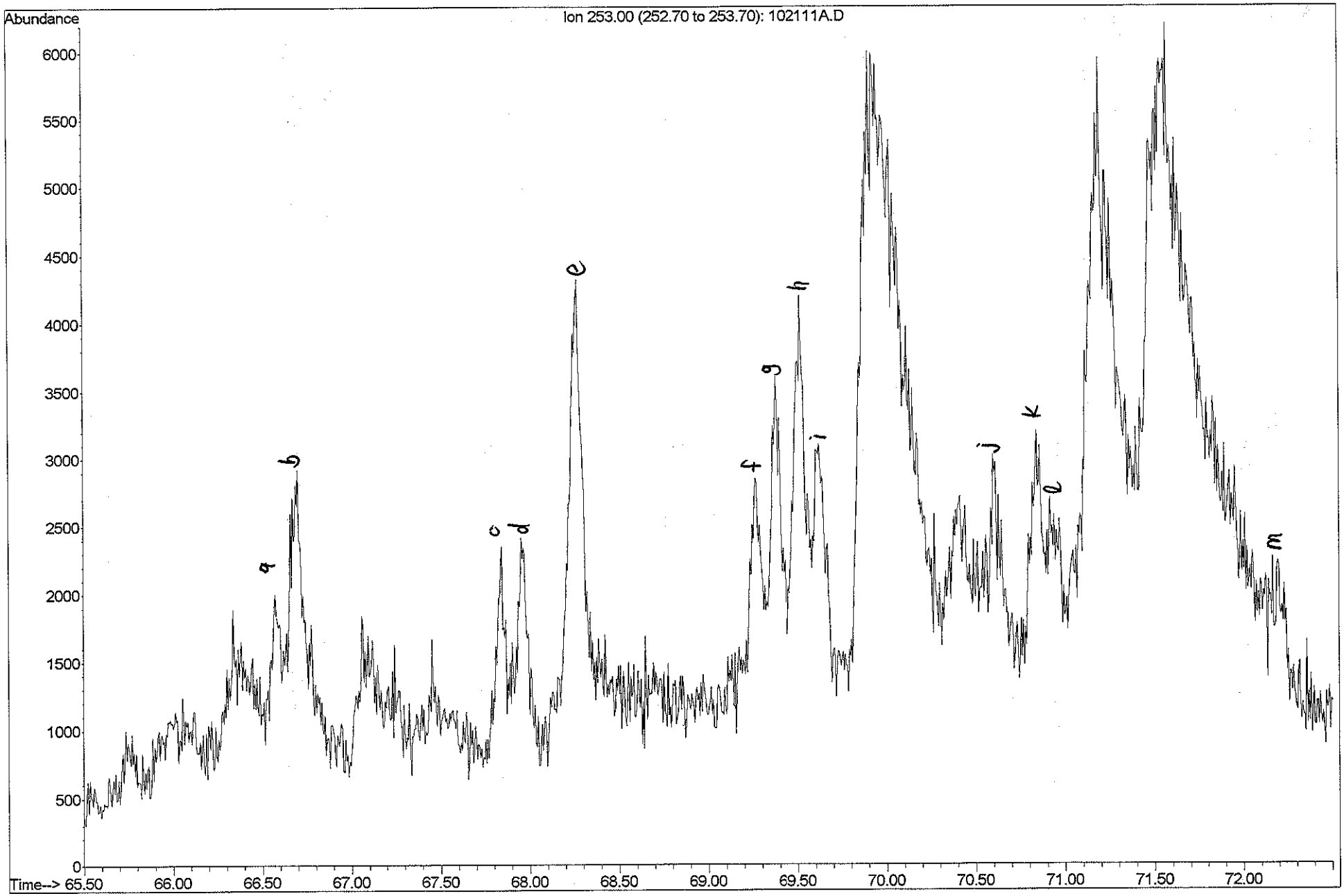
ZymaX FORENSICS

Table

Key for Monoaromatic Steranes Identification (m/z 253 mass chromatogram)

Code	Identity	Elemental Composition
a	20S, 5ß C_{27}-Monoaromatic sterane	$C_{27}H_{42}$
b	20S, dia C_{27}-Monoaromatic sterane	$C_{27}H_{42}$
c	20R, 5ß C_{27}-Monoaromatic sterane + 20R C_{27} dia MAS	$C_{27}H_{42}$
d	20S, 5α C_{27}-Monoaromatic sterane	$C_{27}H_{42}$
e	20S, 5ß C_{28}-Monoaromatic sterane + 20S C_{28} dia MAS	$C_{28}H_{44}$
f	20R, 5α C_{27}-Monoaromatic sterane	$C_{27}H_{42}$
g	20S, 5α C_{28}-Monoaromatic sterane	$C_{28}H4_4$
h	20R, 5ß C_{28}-Monoaromatic sterane + 20R C_{28} dia MAS	$C_{28}H_{44}$
i	20S, 5ß C_{29}-Monoaromatic sterane + 20S C_{29} dia MAS	$C_{29}H_{46}$
j	20S, 5α C_{29}-Monoaromatic sterane	$C_{29}H_{46}$
k	20R, 5α C_{28}-Monoaromatic sterane	$C_{28}H_{44}$
l	20R, 5ß C_{29}-Monoaromatic sterane + 20R C_{29} dia MAS	$C_{29}H_{46}$
m	20R, 5α C_{29}-Monoaromatic sterane	$C_{29}H_{46}$

OW-5 (16913-1)


Abundance
Ion 253.00 (252.70 to 253.70): 102111A.D
6000
5500
5000
4500
4000
3500
3000
2500
2000
1500
1000
500
0
a
b
c
d
e
f
g
h
i
j
k
l
m
Time--> 65.50
66.00
66.50
67.00
67.50
68.00
68.50
69.00
69.50
70.00
70.50
71.00
71.50
72.00

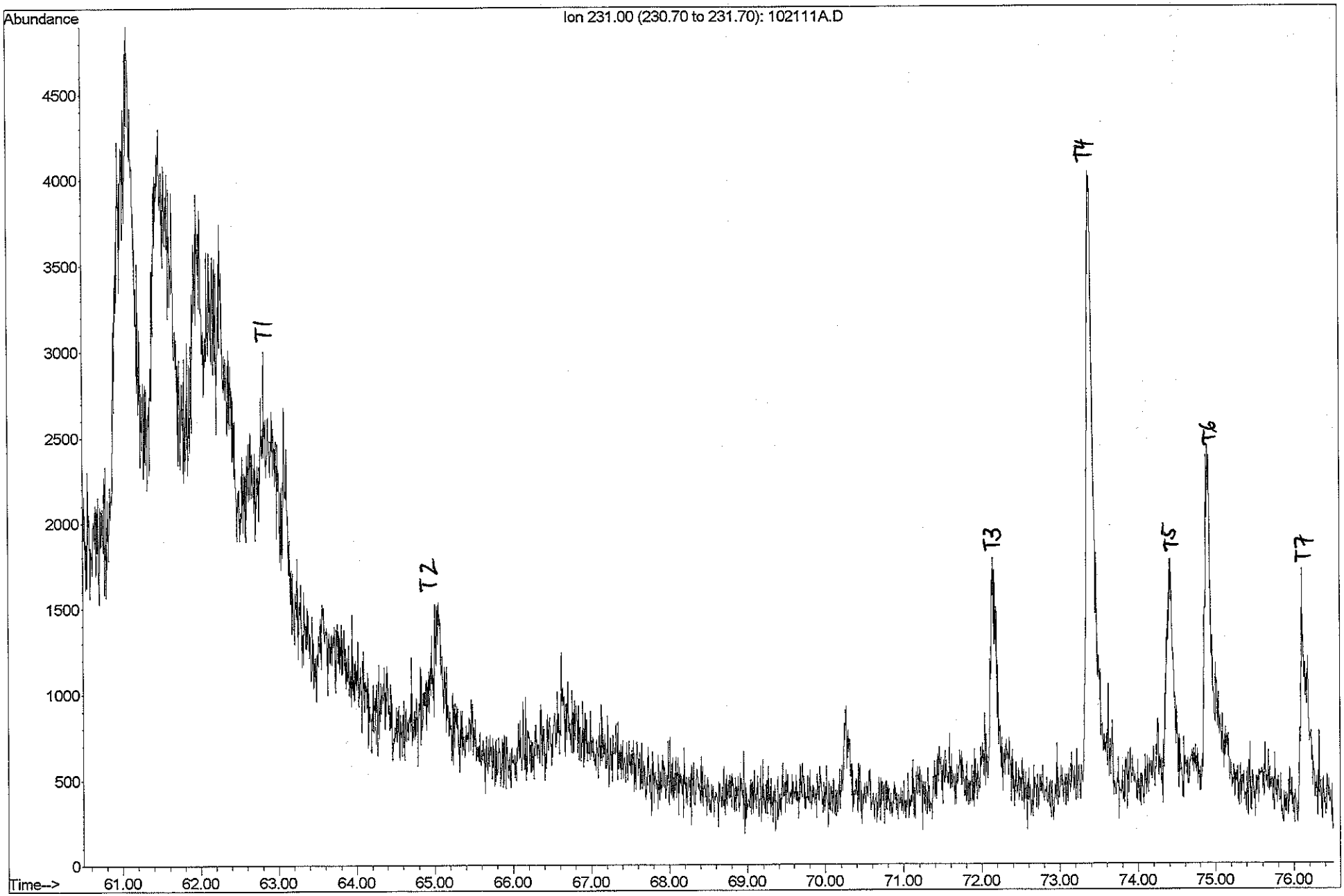
ZymaX FORENSICS

Table

Key for Triaromatic Steranes Identification (m/z 231 chromatogram)

Code	Identity	Elemental Composition
T1	C_{20} Triaromatic sterane	$C_{20}H_{20}$
T2	C_{21} Triaromatic sterane	$C_{21}H_{22}$
T3	20S C_{26} Triaromatic sterane	$C_{26}H_{32}$
T4	20R C_{26} + 20S C_{27}-Triaromatic steranes	$C_{26}H_{32}$ + $C_{27}H_{34}$
T5	20S C_{28}-Triaromatic sterane	$C_{28}H_{36}$
T6	20R C_{27}-Triaromatic sterane	$C_{27}H_{34}$
T7	20R C_{28}-Triaromatic sterane	$C_{28}H_{36}$

OW-5 (16913-1)


Abundance
Ion 231.00 (230.70 to 231.70): 102111A.D
4500
4000
3500
3000
2500
2000
1500
1000
500
0
T1
T2
T3
T4
T5
T6
T7
Time-->
61.00
62.00
63.00
64.00
65.00
66.00
67.00
68.00
69.00
70.00
71.00
72.00
73.00
74.00
75.00
76.00

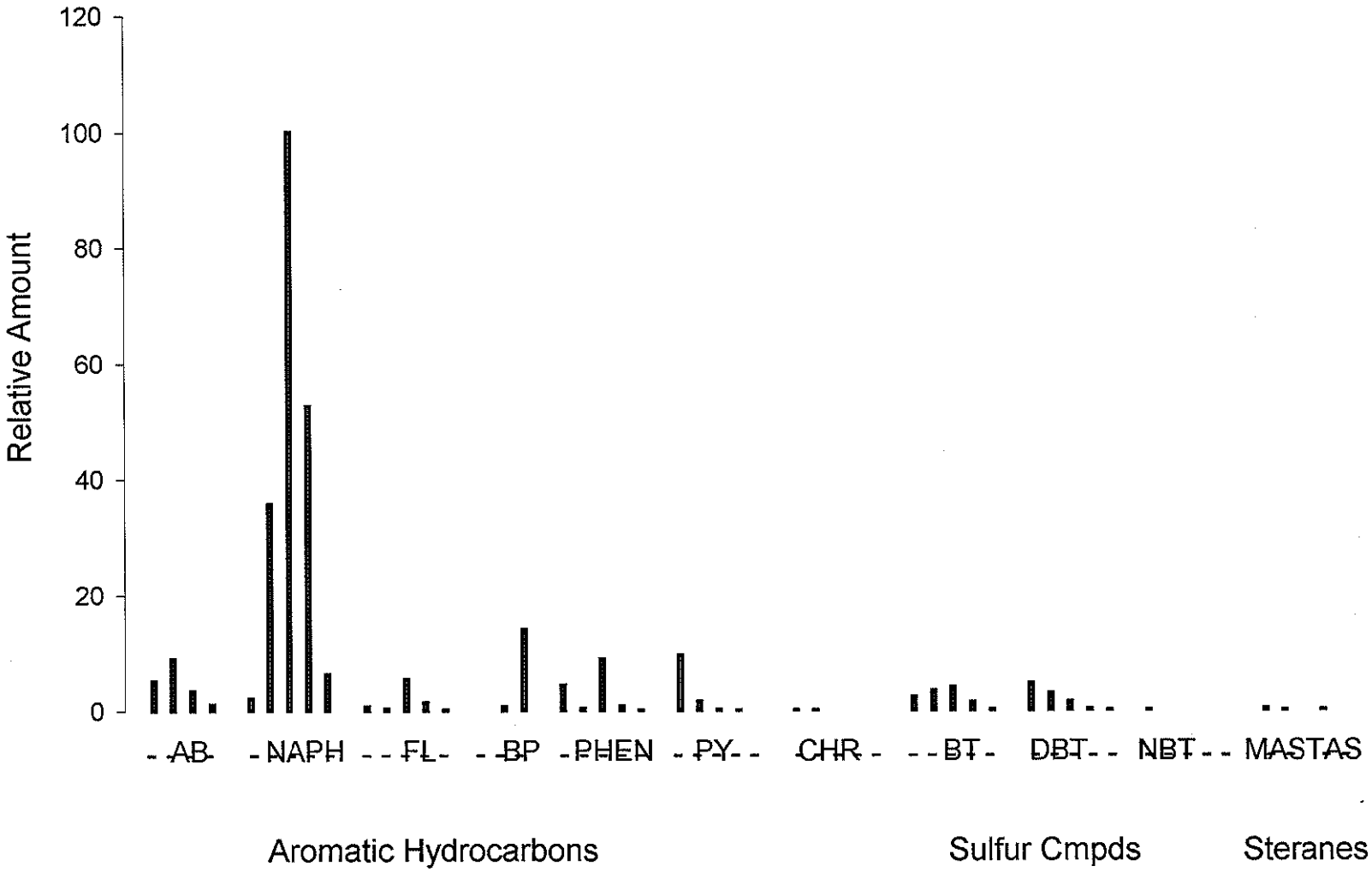
Table

Key for Identifying Aromatic Hydrocarbons

No.	m/z	Abbreviation	Compound
1	120	AB	C_3-alkylbenzenes
2	134		C_4-alkylbenzenes
3	148		C_5-alkylbenzenes
4	162		C_6-alkylbenzenes
5	128	NAPH	C_0-naphthalene
6	142		C_1-naphthalenes
7	156		C_2-naphthalenes
8	170		C_3-naphthalenes
9	184		C_4-naphthalenes
10	166	FL	C_0-fluorene
11	180		C_1-fluorenes
12	194		C_2-fluorenes
13	208		C_3-fluorenes
14	222		C_4-fluorenes
15	154	BP	C_0-biphenyl
16	168		C_1-biphenyls + dibenzofuran
17	182		C_2-biphenyls + C_1-dibenzofuran
18	178	PHEN	C_0-phenanthrene
19	192		C_1-phenanthrenes
20	206		C_2-phenanthrenes
21	220		C_3-phenanthrenes
22	234		C_4-phenanthrenes
23	202	PY	C_0-pyrene/fluoranthene
24	216		C_1-pyrenes/fluoranthenes
25	230		C_2-pyrenes/fluoranthenes
26	244		C_3-pyrenes/fluoranthenes
27	258		C_4-pyrenes/fluoranthenes
28	228	CHR	C_0-chrysene
29	242		C_1-chrysenes
30	256		C_2-chrysenes
31	270		C_3-chrysenes
32	284		C_4-chrysenes
33	148	BT	C_1-benzothiophenes
34	162		C_2-benzothiophenes
35	176		C_3-benzothiophenes
36	190		C_4-benzothiophenes
37	204		C_5-benzothiophenes
28	184	DBT	C_0-dibenzothiophene
39	198		C_1-dibenzothiophenes
40	212		C_2-dibenzothiophenes
41	226		C_3-dibenzothiophenes
42	240		C_4-dibenzothiophenes
43	234	NBT	C_0-naphthobenzothiophene
44	248		C_1-naphthobenzothiophenes
45	262		C_2-naphthobenzothiophenes
46	276		C_3-naphthobenzothiophenes
47	290		C_4-naphthobenzothiophenes
48	253	MAS	Monoaromatic steranes
49	267		Monoaromatic steranes
50	239		Monoaromatic steranes
51	231	TAS	Triaromatic steranes
52	245		Triaromatic steranes

Aromatic Hydrocarbon Distribution

OW-5 (16913-1)



Appendix D

Well Completion Report Forms – DWR 188

CONFIDENTIAL

STATE OF CALIFORNIA DWR
WELL COMPLETION REPORT
(WELL LOGS)

REMOVED

Aqua, 1991

AQUA RESOURCES, INC.

BORING LOG

LOCATION & NOTES

LOCATION: Oakland, CA	JOB NAME: PG&E	JOB NO: 90262.1
DRILLING COMPANY: HBW Drilling		BORING NO: OW-5
DRILLER'S NAME: Anibal		SHEET: 1 OF 1
DRILL RIG: CME55	[X] Hollow Stem Auger [ ] Rotary Wash	
SAMPLING METHOD: [X] 3.25" I.D. Split Spoon [ ] 3.25" I.D. Shelby Tube [ ] Bag		
DRIVE WEIGHT: 140 lb.	DROP: 30 in.	START TIME: 8:40 AM
WATER LEVEL (feet):		FINISH TIME: 10:45 AM
TIME:		DATE: 4/16/91
DATE:		
CASING DEPTH (feet):		
ELEVATION: feet	FIELD PERSONNEL:	

DATUM: [ ] Mean Sea Level [ ] Other

BLOWS PER 6 INCHES	SAMPLE	MOISTURE CONTENT % DRY WEIGHT TEST	DRY UNIT WEIGHT PCF TEST	DEPTH IN FEET	SAMPLE NO.	
						SURFACE CONDITIONS: gravel
				0		
				1	1	Silty clay, very dark brown to black, moist, soft, slightly plastic, some gravel up to 1/2" diam. (CL)
				2	2	
				3	3	Silty clay, dark gray, moist, medium stiff, slightly plastic, some decomposed rock & gravel up to 1" diam. (CL)
				4	4	
				5	5	
				6	6	Sandy gravelly clay varying to gravelly sandy clay, dark gray mottled with brown & white from decomposed rock, moist, medium stiff to stiff, slightly plastic, some gravel up to 1" diam. Liquid brown oil at 5' (CL)
				7	7	
				8	8	
				9	9	
				10	10	
				11	11	
				12	12	Clayey sand, with interbedded clayey gravel, medium brown, wet, loose, some gravel up to 1" diam. (SC)
				13	13	
				14	14	
				15	15	Sandy clay, interbedded with silty clay, medium brown with black and reddish brown mottling, saturated, medium stiff to stiff, slightly plastic, small amount of gravel up to 1/4" diam. (CL)
				16	16	
				17	17	
				18	18	
				19	19	
				20	20	
				21	21	
				22	22	
				23	23	
				24	24	

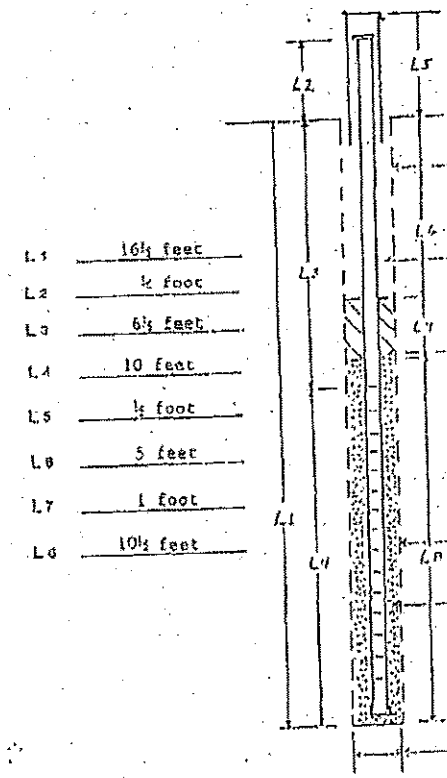
Aqua, 1991

AQUA RESOURCES, INC.

OBSERVATION WELL INSTALLATION REPORT

Well # OW-5

Project PG&E
Location 4930 Coliseum Way, Oakland, CA 94601
Type of Rig CME 55 Installed by HEW Drilling
Date Started 4/16/91 Date Finished 4/16/91
Type of Observation Well water Ground Elev. _____ Casing Top, Elev. _____

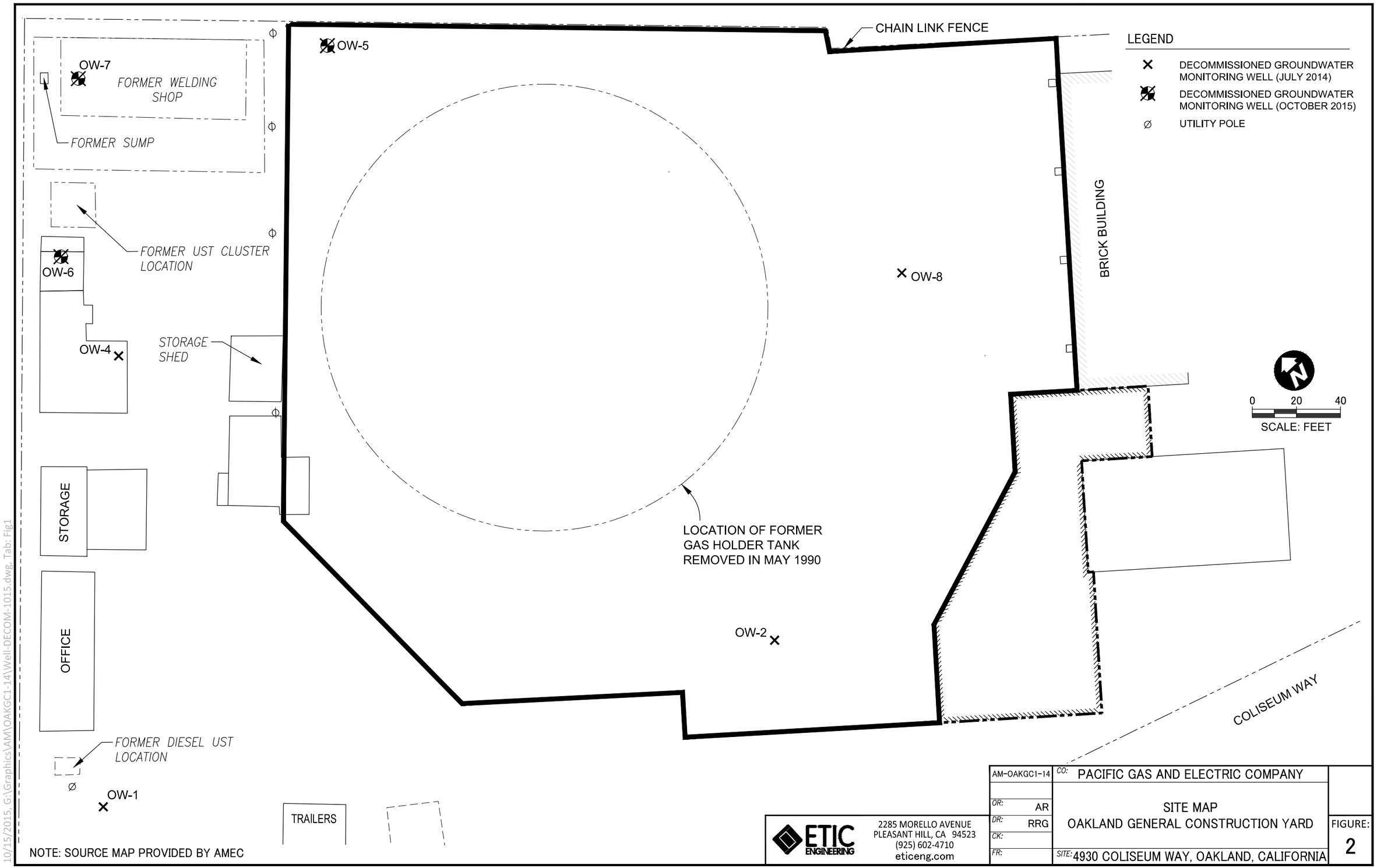


L1 16½ feet
L2 ½ foot
L3 6½ feet
L4 10 feet
L5 ½ foot
L6 5 feet
L7 1 foot
L8 10½ feet

Cap locking cap and sealed well cover
Type of Casing 2" pvc
Type of Backfill cement grout
Type of Seal Material bentonite pellets
Size of Openings .020 inch
Type of Filter Material #3 sand
Diameter of Boring 8 inches

Remarks _____

Observed by _____



NOTE: SOURCE MAP PROVIDED BY AMEC

ETIC ENGINEERING
2285 MORELLO AVENUE
PLEASANT HILL, CA 94523
(925) 602-4710
eticeng.com

AM-OAKGC1-14	CO: PACIFIC GAS AND ELECTRIC COMPANY
OR: AR	SITE MAP
DR: RRG	OAKLAND GENERAL CONSTRUCTION YARD
CK:	
FR:	SITE: 4930 COLISEUM WAY, OAKLAND, CALIFORNIA

FIGURE: 2

CONFIDENTIAL

STATE OF CALIFORNIA DWR
WELL COMPLETION REPORT
(WELL LOGS)

REMOVED

Aqua, 1992

AQUA RESOURCES, INC.

BORING LOG

LOCATION & NOTES

LOCATION	Oakland	JOB NAME	PG&E
JOB NO.	90282.2		
DRILLING COMPANY	Exceltech/Resna	BORING NO.	OW-6
DRILLER'S NAME	Don Jenkins	SHEET	1 of 2
DRILL RIG	[ ] Solid Flight Auger [X] 8" ID Hollow Auger [ ] Rotary Wash		
SAMPLER TYPE	[X] 3.0" ID Split Spoon [ ] 2.0" ID Shelby Tube [X] Other		
DRIVE WEIGHT	140 LB.	FALL	30 IN.
WATER LEVEL (Feet)	8'	START TIME	8:05 AM PM
TIME	8:15 am	FINISH TIME	8:54 AM PM
DATE	12/19/91	DATE	12/19/91
CASING DEPTH (Feet)	18'		
ELEVATION	3.37' FEET	FIELD ENGINEER	Mark Peterson

DATUM: [ ] Mean Sea Level [X] Other OW-2

BLOWS PER HALF FOOT	BLOWS/FT.	MOISTURE CONTENT %	DRY UNIT WEIGHT (pcf)	DEPTH IN FEET	USCS CLASSIFICATION
				0	
				1	
				2	
				3	
				4	
				5	
				6	
				7	
				8	
16					GC
18				9	
20		38			
				10	SP

SURFACE CONDITIONS:
Graded surface of agregate to base rock, nearly level - Since installation of well the surface has been paved with AC.

Water on top end of sampler with slight sheen
Gravel with interstitial silty clay, olive brown (2.5Y 4/3), saturated. Gravel backfill that penetrated saturated native soil.

Gravelly sand, brown (10YR 4/3), saturated, medium dense, fine to coarse grained sand, poorly sorted, subangular gravel up to 3/4" across.

Aqua, 1992

AQUA RESOURCES, INC.

BORING LOG

LOCATION & NOTES

LOCATION	JOB NAME PG&E	JOB NO. 90262.2	
DRILLING COMPANY Excaltech/Regna		BORING NO. OW-6	
DRILLER'S NAME Don Jenkins		SHEET 2 OF 2	
DRILL RIG [ ] Solid Flight Auger [X] Hollow Auger [ ] Rotary Wash			
SAMPLER TYPES [ ] 2.0" I.D. Split Spoon [ ] 2.0" I.D. Shelby Tube [ ] SPT			
DRIVE WEIGHT LB.	FALL IN.	START TIME AM PM	FINISH TIME AM PM
WATER LEVEL (Feet)		DATE 12/19/91	
TIME			
DATE			
CASING DEPTH (Feet)			
ELEVATION FEET	FIELD ENGINEER Mark Peterson		

DATUM: [ ] Mean Sea Level [ ] Other

BLOWS PER HALF FOOT	BLOWS/FT.	MOISTURE CONTENT %	DRY UNIT WEIGHT pcf	DEPTH IN FEET	USCS CLASSIFICATION	SURFACE CONDITIONS:
				10		
20						
20				11		
15	35					
				12		
				13		
				14	GM	Increased gravel at 14' to 15'
13						
9				15		
6	15				CL/CH	Silty clay with minor very fine grained sand, light yellowish brown (2.5Y5/3), wet, medium stiff to stiff, rare dark brown staining
				16		
				17		
2						
3				18		
4	SPT 7					Bottom at 18½'
				19		
				20		

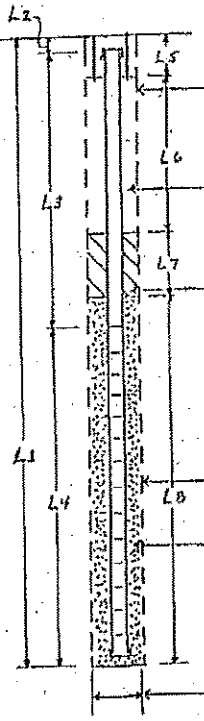
Aqua, 1992

AQUA RESOURCES, INC.

OBSERVATION WELL INSTALLATION REPORT

Well # OW-6

Project PG&E
Location 4930 Coliseum Way, Oakland CA 94601
Type of Rig Mobile B61 Installed by RESNA
Date Started 12/19/91 Date Finished 12/19/91
Type of Observation Well Water Ground Elev. _____ Casing Top, Elev. _____

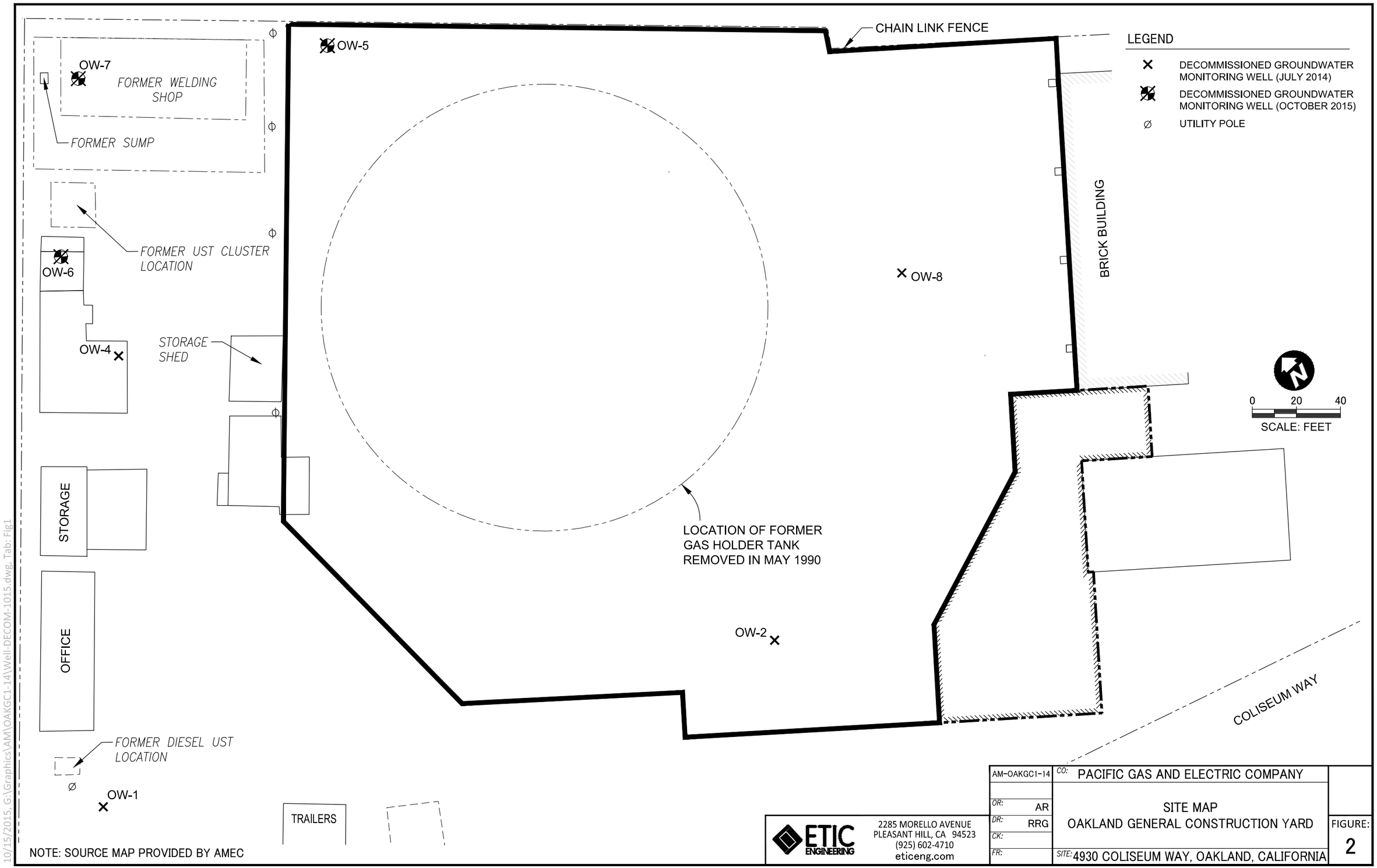


L1 18½ feet
L2 ½ foot
L3 7½ feet
L4 10 feet
L5 ½ foot
L6 5 feet
L7 1 foot
L8 12½ feet

Cap locking cap and sealed well cover
Type of Casing 2" PVC
Type of Backfill cement grout
Type of Seal Material bentonite pellets
Size of Openings 0.020
Type of Filter Material 2/12 sand
Diameter of Boring 8 inches

Remarks _____

Observed by M. Peterson/A. Stessman



NOTE: SOURCE MAP PROVIDED BY AMEC

ETIC ENGINEERING
2285 MORELLO AVENUE
PLEASANT HILL, CA 94523
(925) 602-4710
eticeng.com

AM-OAKGC1-14	CO: PACIFIC GAS AND ELECTRIC COMPANY
OR: AR	SITE MAP
DR: RRG	OAKLAND GENERAL CONSTRUCTION YARD
CK:	
FR:	SITE: 4930 COLISEUM WAY, OAKLAND, CALIFORNIA

FIGURE: 2

CONFIDENTIAL

STATE OF CALIFORNIA DWR
WELL COMPLETION REPORT
(WELL LOGS)

REMOVED

Aqua, 1992

AQUA RESOURCES, INC.

BORING LOG

LOCATION & NOTES

LOCATION: Oakland	JOB NAME: PG&E	JOB NO: 90262.2	
DRILLING COMPANY: Exceltech/Resna		BORING NO.: OW-7	
DRILLER'S NAME: Don Jenkins		SHEET: 1 of 2	
DRILL RIG: 8" [X] Hollow Auger [ ] Solid Flight Auger [ ] Rotary Wash			
SAMPLER TYPE: [X] 2.5" I.D. Split Barrel [ ] 2.0" I.D. Shelby Tube [ ] SPT			
DRIVE WEIGHT: 140 LB.	FALL: 30 in.	START TIME: 9:55 AM/PM	FINISH TIME: AM/PM
WATER LEVEL (Feet): 13½			
TIME: 10:00 am			
DATE: 12/19/91		DATE: 12/19/91	
CASING DEPTH (Feet): 17½			
ELEVATION: 4.76 FEET	FIELD ENGINEER: N. Peterson / A. Stessman		

DATUM: [ ] Mean Sea Level [X] Other OW-2

SURFACE CONDITIONS:

Graded surface of aggregate to base rock, nearly level - since well installation the surface has been paved with AC.

BLOWS PER HALF FOOT	BLOWS/FT.	MOISTURE CONTENT %	DRY UNIT WEIGHT (pcf)	DEPTH IN FEET	USCS CLASSIFICATION	
				0		NOTE: No OVM = OVM reading of 0.0
				1		
				2		
				3		
				4		
				5		
				6		
				7		
				8		
20						Gravel backfill material
12				9	SP/	Gravelly sand with minor silt and clay, greyish green (5G4/2), medium dense, wet, fine to coarse grained sand, poorly sorted, subangular gravel. Note tarry product visible. No OVM, slight hydrocarbon odor.
11		23			SC	
				10		

Aqua, 1992

AQUA RESOURCES, INC.

BORING LOG

LOCATION & NOTES

LOCATION: Oakland	JOB NAME: PG&E	JOB NO.: 90262.2
DRILLING COMPANY:		BORING NO.: OW-7
DRILLER'S NAME:		SHEET: 2 OF 2
DRILL RIG: [ ] Solid Flight Auger [ ] Hollow Auger [ ] Rotary Wash		
SAMPLER TYPE: [ ] 1.5" I.D. Split Spoon [ ] 2.0" I.D. Shelby Tube [ ] Other		
DRIVE WEIGHT: LB. FALL: IN.		START TIME: AM PM / FINISH TIME: AM PM
WATER LEVEL (FEET):		DATE:
TIME:		
DATE:		
CASING DEPTH (FEET):		
ELEVATION: FEET	FIELD ENGINEER:	

DATUM: [ ] Mean Sea Level [ ] Other

SURFACE CONDITIONS:

BLOWS PER HALF FOOT	SLOUGH/ft.	MOISTURE CONTENT %	DRY UNIT WEIGHT (pcf)	DEPTH IN FEET	USCS CLASSIFICATION	
				10		
				11		
				12		
7					SC	Gravelly sand with increasing clay and silt, yellowish brown (10 YR 516), loose, saturated, fine to coarse grained sand, poorly sorted, subangular gravel. No OVM or odor.
14				13		
11	25					
				14		Silty clay with minor very fine grained sand, light yellowish-brown (2.5Y 613), wet, stiff, rare dark brown staining. No OVM.
				15		
5					CL/CH	
8				16		No recovery/Redrove same interval recovered 100% 2" gravel lense
10	18					
6				17		3" gravelly clay lense
7						
8	15			18		Silty clay with trace sand and gravel, light yellowish brown (2.5Y 613), wet, stiff, common dark brown-brown staining. No OVM.
						Bottom at 18'
				19		
				20		

AQUA RESOURCES, INC.

Aqua, 1992

OBSERVATION WELL INSTALLATION REPORT

Well # OW-7

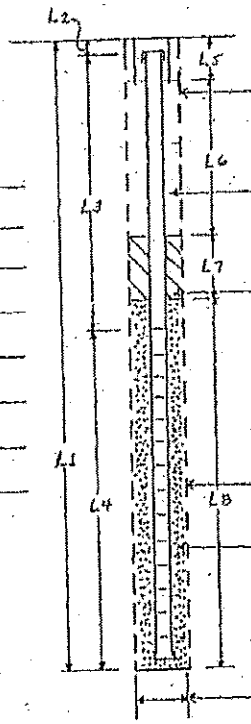
Project PG&E

Location 4930 Coliseum Way, Oakland CA 94601

Type of Rig Mobile B61 Installed by RESNA

Date Started 12/19/91 Date Finished 12/19/91

Type of Observation Well Water Ground Elev. _____ Casing Top, Elev. _____



L1 18 feet

L2 ½ foot

L3 7½ feet

L4 10 feet

L5 ½ foot

L6 5 feet

L7 1 foot

L8 12 feet

Cap locking cap and sealed well cover

Type of Casing 2" PVC

Type of Backfill cement grout

Type of Seal Material bentonite pellets

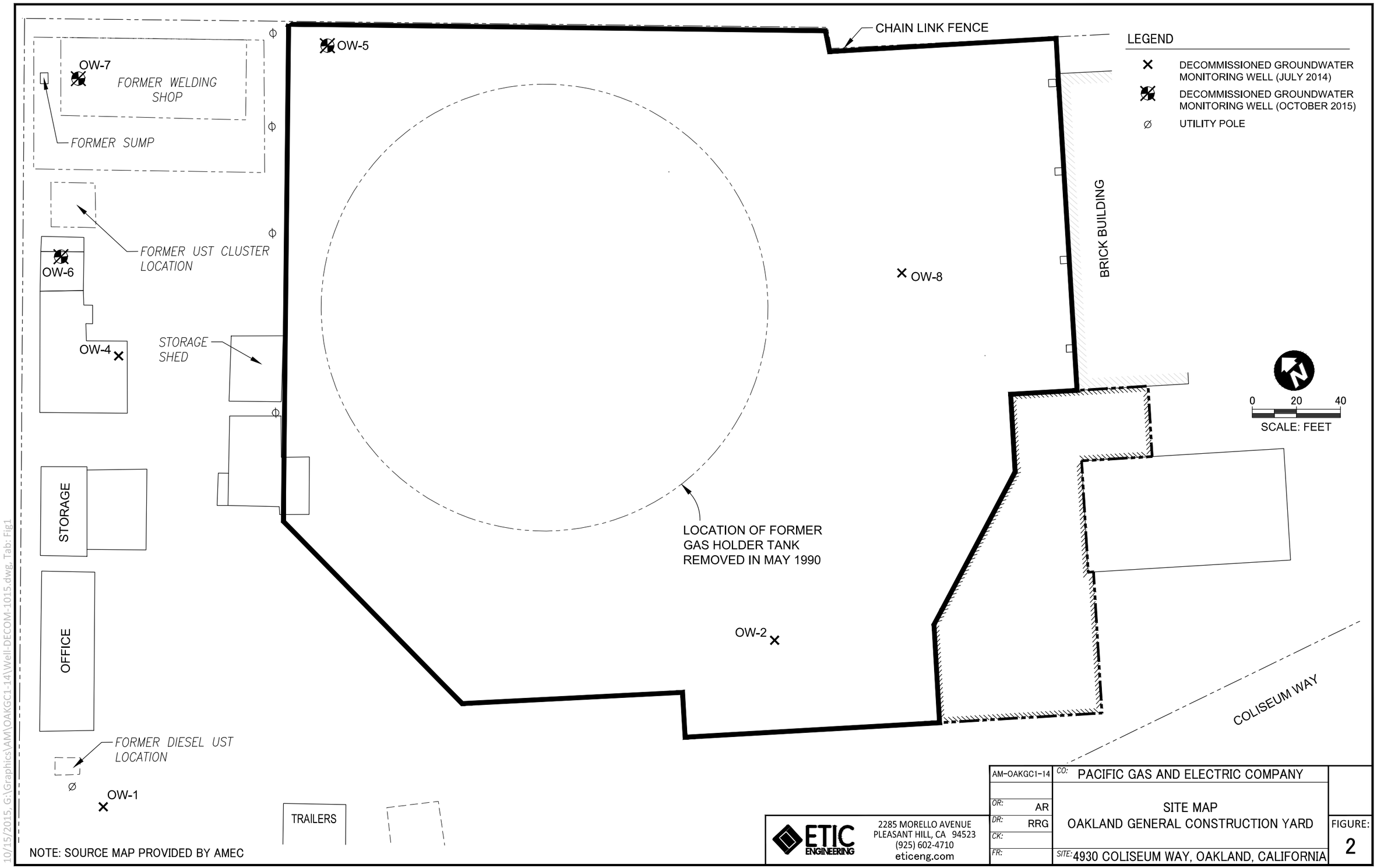
Size of Openings 0.020

Type of Filter Material 2/12 sand

Diameter of Boring 8 inches

Remarks _____

Observed by M. Peterson/A. Stessman



NOTE: SOURCE MAP PROVIDED BY AMEC

ETIC ENGINEERING
2285 MORELLO AVENUE
PLEASANT HILL, CA 94523
(925) 602-4710
eticeng.com

AM-OAKGC1-14	CO: PACIFIC GAS AND ELECTRIC COMPANY
OR: AR	SITE MAP
DR: RRG	OAKLAND GENERAL CONSTRUCTION YARD
CK:	
FR:	SITE: 4930 COLISEUM WAY, OAKLAND, CALIFORNIA

FIGURE: 2