

Khatri, Paresh, Env. Health

From: Goloubow, Ron [Ron.Goloubow@lfr.com]
Sent: Friday, December 04, 2009 9:26 AM
To: Annie Bauer; 'Mike Barr'; Charles Robitaille; Khatri, Paresh, Env. Health; Drogos, Donna, Env. Health
Cc: Gibbs, Alan; ron goloubow; gseif@icsinc.tv
Subject: Aspire Oakland - Sample Letter for Partial Site Approval
Attachments: PSA Form-4-15 Aprvl SCOE Proposed Alt Ed School Site(104623).pdf

Alan Gibbs has provided the attached sample letter. The questions I have about this letter are for Alameda County Health Agency & Aspire, Pacific Charter, or the lending institution :

1 - Is this the type of letter that the Alameda County Health Agency could provide for the Aspire Oakland Site given the amount of remediation that has taken place? LFR can provide a progress report documenting the progress of the remedial actions completed to date.

2 – Does this type of letter provide the information that either, Aspire, Pacific Charter, or the lending institution would need in order to procure the financing necessary to continue with the project?

As for the 2:00 conference call, I think we should proceed. I left Carmen Santos at EPA a voice message at 9:00 AM today and spoke to the operator-receptionist at her office. She is NOT on vacation and is supposed to be in their office today. In any event I think it would be good to have Aspire, Pacific Charter, LFR, and Alameda County on the phone for a brief update-discussion. If EPA can make it that would be good too.

Ron.

Ron Goloubow, P.G.
LFR Inc., an ARCADIS Company
510-596-9550 Direct Dial
510-501-1789 Cell
510-652-4906 Facsimile
ron.goloubow@lfr.com

From: Gibbs, Alan
Sent: Friday, December 04, 2009 8:56 AM
To: Goloubow, Ron
Subject: FW: Sample of Partial Site Approval

From:
Sent: Friday, December 04, 2009 8:43 AM
To: Gibbs, Alan
Subject: Sample of Partial Site Approval

Hi Alan,

SFPD 4.14 or 4.15 is what would allow a district to get CDE approval (and therefore request funding) before the DTSC clearance is complete. Attached is an example of a DTSC approval on an SFPD Form 4.15. Let me know if there's something else I can do...

Lesley Taylor, MPPA
Project Manager

School Site Solutions, Inc.
428 J Street, Suite 370
Sacramento, CA 95814
916.930.0736 P
916.930.0788 F
916.770.6867 C

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Department of Toxic Substances Control



Linda S. Adams
Secretary for
Environmental Protection

Maziar Movassaghi, Acting Director
8800 Cal Center Drive
Sacramento, California 95826-3200



Arnold Schwarzenegger
Governor

March 23, 2009

Ms. Kathy Lasiter
Director of Operations and Support Services
Stanislaus County Office of Education
1100 H Street
Modesto, California 95354

PARTIAL SITE APPROVAL AND APPROVAL OF FORM SFPD 4.15, COMMITMENT TO COMPLETE FURTHER INVESTIGATION AND/OR RESPONSE ACTION PRIOR TO SCHOOL OCCUPANCY, PROPOSED ALTERNATIVE EDUCATION SCHOOL, 1013 SOUTH YOSEMITE AVENUE, OAKDALE (104623)

Dear Ms Lasiter:

The Department of Toxic Substances Control (DTSC) received a Partial Site Approval (PSA) request and approval of the School Facilities Planning Division (SFPD) 4.15 form (Form 4.15) for the California Department of Education's (CDE) final site approval and/or final plan approval for the proposed Alternative Education School (Site). This form is required prior to issuance of funding approvals when further investigation or a response action is required by DTSC prior to occupancy of the project.

The proposed school will be constructed on a 5.06-acre parcel zoned for limited industrial. Historically, the Site included several structures and cattle pens from 1915 until the mid-1980's. An approximately 40 cubic yard (cy) soil and debris stockpile, located in the northeastern corner of the site, was removed from the site prior to this investigation. An existing 1,500 cy soil pile is located on the central-east section of the Site. Reportedly, the soil pile appears to have been generated from the storm detention basin located directly east of the Site. In addition, a six-inch diameter capped metal pipe was observed next to a concrete pad in the southwestern corner of the Site.

A Preliminary Environmental Assessment (PEA) investigation was conducted to evaluate potential impacts from residual agricultural chemicals, application of lead-based paints and application of termiticides, and fill material. Soil samples were analyzed for one or more of the following constituents: metals, organochlorine pesticides (OCPs), total petroleum hydrocarbons, polychlorinated biphenyls, volatile organic compounds, and semi-volatile organic compounds. The PEA report indicates that elevated levels of the OCP toxaphene and lower levels of the OCP dichlorodiphenyltrichloroethane were

Ms. Kathy Lasiter
March 23, 2009
Page 2

detected in Site soils. The PEA identified the OCP toxaphene, believed to have been used as an insecticide in the area of the cattle pens, as the only chemical of concern. The PEA report concludes that a response action is required for the site.

DTSC approved the PEA report on February 10, 2009 with a determination that further investigation is necessary in the area of the former structures and cattle pens, located in the western end of the Site totaling approximately 1.43 acres of the proposed 5.06-acre Site. The PEA report also concluded that a release or threatened release of hazardous material or the presence of a naturally occurring hazardous material, which would pose a threat to public health or the environment under unrestricted land use, was not indicated on approximately 3.63 acres of the 5.06-acre Site.

On February 11, 2009, the Stanislaus County Office of Education (SCOE) submitted a request to DTSC for approval of Form 4.15. On March 20, 2009, SCOE submitted a request to DTSC for partial site approval of the approximately 3.63 acre area of the 5.06-acre Site not impacted (see attached Figure).

Pursuant to Education Code section 17213.2(a), if the SCOE elects to pursue site acquisition or construction, the SCOE shall enter into an agreement with DTSC to oversee a removal or remedial action within the approximately 1.43-acre area of the Site. On March 3, 2009, SCOE entered into a School Cleanup Agreement (SCA) with DTSC for the response action at the Site.

If the District is unable or unwilling to complete the investigation and/or response action, it shall immediately notify DTSC, the Office of Public School Construction, and CDE. Attached please find a signed Form 4.15 for the site.

If you have any questions regarding this project, you may contact me at (916) 255-3577 or by e-mail at JLuevano@dtsc.ca.gov.

Sincerely,



Jose Luevano, Project Manager
Schools Team - Sacramento Office
Brownfields and Environmental Restoration Program

Attachment: *Figure 1 – Area Requested for PSA*
Signed Form 4.15

Ms. Kathy Lasiter
March 23, 2009
Page 3

cc: (via e-mail)

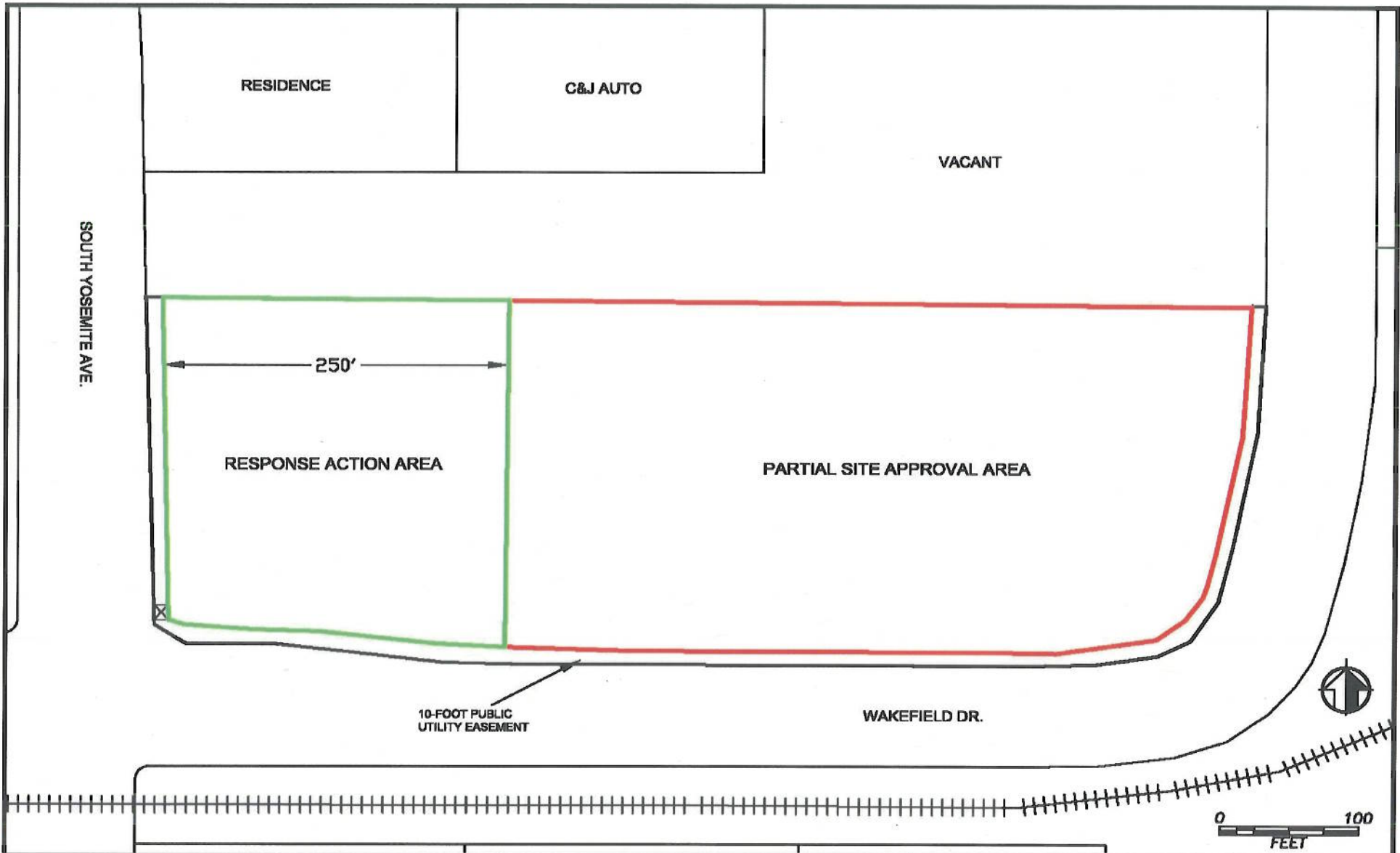
Mr. Alan J. Klein, R.E.A. II, R.B.P.
Senior Environmental Scientist
Padre Associates, Inc.
aklein@padreinc.com

Ms. Lesley Taylor
Planning Manager
School Site Solutions
ltaylor@schoolsitesolutions.com

Mr. Harold "Bud" Duke, P.G., Acting Chief
Schools Team – Sacramento Office
bduke@dtsc.ca.gov

Jimmy Spearow, Ph.D., Staff Toxicologist
HERD – Sacramento Office
jspearow@dtsc.ca.gov

Schools Reading File – Sacramento Office (hard copy)



padre
associates, Inc.
 ENGINEERS, GEOLOGISTS &
 ENVIRONMENTAL SCIENTISTS

ALTERNATIVE EDUCATION SCHOOL
 1013 S. YOSEMITE AVENUE
 STANISLAUS COUNTY OFFICE OF ED.
 OAKDALE, STANISLAUS COUNTY, CALIFORNIA

PROJECT NO. 0701-1904	DATE 3/19/09	DR. BY AC	APP. BY AJK
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FIGURE 1
 CDE FORM 4.15



**CALIFORNIA DEPARTMENT OF EDUCATION
SCHOOL FACILITIES PLANNING DIVISION**

SFPD 4.15 (Rev 06/08)

LOCAL EDUCATIONAL AGENCY AND DEPARTMENT OF TOXIC SUBSTANCES CONTROL COMMITMENT TO COMPLETE FURTHER INVESTIGATION AND/OR RESPONSE ACTION

County Stanislaus	Project Tracking Number 1 0 5 0 4 — 2 2
Local Educational Agency Stanislaus County Office of Education	Project Identification Proposed Alternative Education School (Oakdale)

Local Educational Agency Completion

The above named local educational agency (LEA) requests a California Department of Education (CDE) final site approval and/or final plan approval for the above named project prior to completion of a Department of Toxic Substances Control (DTSC) required further investigation and/or response action (cleanup).

The LEA commits to complete, prior to occupancy of this project, all such further investigation and/or response action (except ongoing operations and maintenance) as required and under the oversight specified in a School Cleanup Agreement with the DTSC. The LEA shall immediately notify the DTSC, the Office of Public School Construction, and the CDE should the LEA be unwilling or unable to complete the investigation and/or response action. The LEA also commits to immediately stop construction and notify the DTSC if previously unknown contamination is found subsequent to cleanup. The LEA then shall obtain DTSC approval prior to implementing mitigation measures and resuming construction.

The LEA acknowledges that this request and subsequent approvals may result in a funding apportionment based upon costs known at the time of this project application, and that any related additional costs may be the responsibility of the LEA and would be subject to applicable statutes and regulatory criteria including limits for state funding adjustments. Pursuant to the *Education Code* and to the State Allocation Board (SAB) adopted regulations, funding for this project shall be rescinded if the LEA has not met the applicable criteria to have funds released within 18 months of the SAB apportionment. Failure to complete the above LEA commitments prior to project construction may subject the LEA to enforcement actions and/or penalties pursuant to applicable statutes and regulations.

<u>Kathy Lasiter</u> Print Name of Authorized Local Educational Agency Representative	<u>Director of Operations and Support Services</u> Title
<u><i>Kathy Lasiter</i></u> Signature of Authorized Local Educational Agency Representative	<u>3-9-09</u> Date

Department of Toxic Substances Control Completion

The DTSC has issued a determination letter dated February 10, 2009 approving a Preliminary Endangerment Assessment indicating that further investigation and/or response action is required at this project site.

The DTSC certifies that it does not object to the CDE's issuing of final site approval and/or final plan approval, nor to the release of funding apportionment to the LEA for this project prior to the completion of further investigation and/or response action. In accordance with a School Cleanup Agreement signed by the DTSC on March 3, 2009, the DTSC has:

- Select one or more as appropriate: Site Code 1 | 0 | 4 | 6 | 2 | 3
- A. Issued draft or final (circle as applicable) approval of the cleanup plan (Removal Action Workplan or Remedial Action Plan) for the required response action for this site, on _____ (date).
 - B. Determined that the required response action must be implemented in the design and/or construction of this proposed project (e.g., addressing methane or naturally occurring asbestos), on _____ (date).
 - C. Made all required findings per *Education Code* Section 17213.2(f) that the response action and proposed construction project are on separate portions of the project site and will not interfere with each other, on March 20, 2009 (date).
 - D. Determined that a response action has been satisfactorily completed; however, further groundwater investigation is still required which may also require additional response action at this site on _____ (date).

The DTSC commits to oversee the LEA's completion of the required further investigation and/or response action prior to project occupancy and will immediately notify the Office of Public School Construction and the CDE should the LEA fail to complete the further investigation and/or response action as required.

<u>Mark Malinowski</u> Print Name of Authorized DTSC Branch or Division Chief	<u>Acting, Sect. Manager, schools Program</u> Title
<u><i>Mark Malinowski</i></u> Signature of Authorized DTSC Branch or Division Chief	<u>3/23/09</u> Date

Khatri, Paresh, Env. Health

From: Goloubow, Ron [Ron.Goloubow@lfr.com]
Sent: Friday, December 04, 2009 11:13 AM
To: Annie Bauer; Mike Barr; Charles Robitaille; Khatri, Paresh, Env. Health; Drogos, Donna, Env. Health
Cc: Gibbs, Alan; ron goloubow; gseif@icsinc.tv
Subject: RE: Aspire Oakland - Sample Letter for Partial Site Approval

I just spoke to Carmen and she and Patrick Wilson (the toxicologist working on this site for the EPA) will call in at 200

Ron Goloubow, P.G.
LFR Inc., an ARCADIS Company
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510-501-1789 Cell
510-652-4906 Facsimile
ron.goloubow@lfr.com

From: Annie Bauer [mailto:Annie.Bauer@aspirepublicschools.org]
Sent: Friday, December 04, 2009 11:16 AM
To: Goloubow, Ron; Mike Barr; Charles Robitaille; Khatri, Paresh, Env. Health; Donna.Drogos@acgov.org
Cc: Gibbs, Alan; ron goloubow; gseif@icsinc.tv
Subject: RE: Aspire Oakland - Sample Letter for Partial Site Approval

I look to Mike to comment on whether or not a letter along this vein is suitable for Wells Fargo, given his conversations with them. I think it is consistent with what we discussed the other day and is on the right track. I will dial in today to the 2pm conference call.

Annie

From: Goloubow, Ron [mailto:Ron.Goloubow@lfr.com]
Sent: Friday, December 04, 2009 9:26 AM
To: Annie Bauer; Mike Barr; Charles Robitaille; Khatri, Paresh, Env. Health; 'Donna.Drogos@acgov.org'
Cc: Gibbs, Alan; ron goloubow; gseif@icsinc.tv
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As for the 2:00 conference call, I think we should proceed. I left Carmen Santos at EPA a voice message at 9:00 AM today and spoke to the operator-receptionist at her office. She is NOT on vacation and is supposed to be in their office today. In any event I think it would be good to have Aspire, Pacific Charter, LFR, and Alameda County on the phone for a brief update-discussion. If EPA can make it that would be good too.

Ron.

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Lesley Taylor, MPPA

Project Manager
School Site Solutions, Inc.
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Khatri, Paresh, Env. Health

From: Santos.Carmen@epamail.epa.gov
Sent: Friday, December 04, 2009 1:31 PM
To: Khatri, Paresh, Env. Health
Subject: Fw: PCBs: USEPA Conditional Approval of Aspire's Notification - 1009 66th Avenue, Oakland, CA
Attachments: 11_13_2009_Aspire_USEPA_Approval_PDF_BW_1S735.pdf

Carmen D. Santos, Project Manager
RCRA Corrective Action Office
Waste Management Division
USEPA Region 9
415.972.3360
fax: 415.947.3533

----- Forwarded by Carmen Santos/R9/USEPA/US on 12/04/2009 01:27 PM -----

From: Carmen Santos/R9/USEPA/US
To: Ron.Goloubow@lfr.com, Alan.Gibbs@lfr.com, charles@pacificcharter.org
Cc: Steve Armann/R9/USEPA/US@EPA, Patrick Wilson/R9/USEPA/US@EPA
Date: 11/13/2009 02:50 PM
Subject: PCBs: USEPA Conditional Approval of Aspire's Notification - 1009 66th Avenue, Oakland, CA

Greetings, Ron:

Attached is USEPA's letter conditionally approving Aspire's Notification. The original hard copy is being mailed to the property owner and all the recipients of this message.

We received a sampling plan and a revised, signed Certification via Ron Goloubow. This message acknowledges receipt of these documents. The Certification needs to be signed by both the party conducting the cleanup and the owner of the property as required in 40 CFR 761.61(a)(3)(i)(E). The Certification sent by Ron via e-mail message to us only has the owner's signature and it is therefore incomplete. Please resubmit the Certification signed by both the owner (Aspire) and the party conducting the cleanup (LFR Inc.) as required in the cited regulation.

I take this opportunity to answer Ron Goloubow's and Alan Gibbs' question concerning collection of soil cleanup verification samples at the bottom of the excavation areas if ground water enters the excavations. Soil cleanup verification samples must be collected at the bottom of the excavation areas. The laboratory preparation and analysis of these moist soil samples should be conducted in a manner that facilitates analysis of the soils for PCB Aroclors using USEPA Method 8082. Analysis of ground water entering the excavation areas should be conducted without filtering the ground water samples.

Thank you. Please call me if you have any questions concerning the attached conditional approval.

Sincerely,

Carmen D. Santos, Project Manager
RCRA Corrective Action Office
Waste Management Division
USEPA Region 9
415.972.3360
fax: 415.947.3533



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105

Via U.S. Postal Service and Electronic Mail
Certified Mail Receipt No. 7000 0520 0021 6107 8407

November 13, 2009

Aspire Public Schools, a California
non-profit public benefit corporation
1001 22nd Avenue, Suite 100
Oakland, CA 94606
Attention: Mike Barr, CFO

Re: Polychlorinated Biphenyls – U.S. EPA Conditional Approval Under 40 C.F.R. § 761.61(a), Toxic Substances Control Act - - “Toxic Substances Control Act Self-Implementing Cleanup Notification and Certification Former Pacific Electric Motors Facility 1009 66th Avenue in Oakland, California”

Dear Mr. Barr:

We have reviewed the “*Toxic Substances Control Act Self-Implementing Cleanup Notification and Certification Former Pacific Electric Motors Facility 1009 66th Avenue in Oakland, California,*” letter dated October 23, 2009 and prepared by LFR Inc. an Arcadis Company (LFR) for Aspire Public Schools (“Aspire”). The U.S. Environmental Protection Agency Region 9 (USEPA) is approving Aspire’s October 23, 2009 Notification with the conditions established in the attached “*USEPA Conditional Approval for Aspire Public Schools, 1009 66th Avenue, Oakland, CA PCB Self-Implementing On-Site Cleanup and Disposal of PCB Remediation Waste.*”

The LFR letter is intended to serve as the notification and certification (“Notification”) required in 40 C.F.R. § 761.61(a) of the Toxic Substances Control Act (TSCA) for a self-implementing on-site cleanup and disposal of polychlorinated biphenyls (PCBs) at the Aspire property at 1009 66th Avenue in Oakland. PCBs are present at the Aspire property (“Aspire site”) in soils and a potential exists for PCB-containing manufactured products to be present in structures to be demolished at the site. Aspire plans to redevelop the site as a public school for sixth to 12th grade students.

In addition, the Notification requests a “variance” to the schedule provided in 40 C.F.R. § 761.61(a)(3)(ii). USEPA is granting the requested waiver for the schedule in 40 C.F.R. § 761.61(a)(3)(i) in accordance with 40 C.F.R. § 761.61(a)(3)(iii) and in consideration of financial matters that Aspire claims if not resolved could prevent or further delay construction of the school. However, the owner of the property still needs to obtain a similar written waiver from the California Department of Toxic Substances Control (DTSC) and Alameda County Environmental Health (ACEH) in accordance with 40 C.F.R. § 761.61(a)(3)(iii) and maintain all waivers and other records in accordance with 40 C.F.R. § 761.61(a)(9).

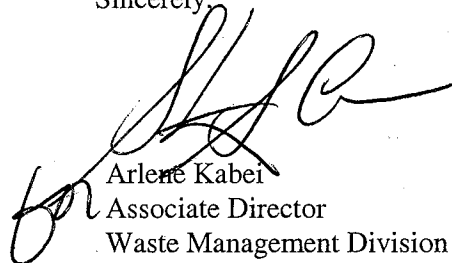
While we recognize that, at an October 27, 2009 meeting with Charles Robitaille (Aspire Charter Schools) and LFR representatives (Aspire consultants), Aspire had sought a cleanup standard of 0.39 mg / kg (ppm), we have decided to approve a cleanup standard of 0.13 ppm, as specified in Condition 7 of

Aspire Public Schools
Attn: Mike Barr, CFO
November 13, 2009

the attached approval. This cleanup level is consistent with the levels approved by both ACEH and DTSC as being protective of human health, in that it meets the cleanup goal for PCBs in soils corresponding to a 1×10^{-6} risk level. This level is also consistent with the TSCA regulations in 40 C.F.R. § 761.61(a)(4)(v) and 761.61(a)(4)(vi).

We look forward to be of assistance to Aspire during implementation of the subject Notification as modified by the attached USEPA approval. Please call Carmen Santos at (415) 972-3360 if you have any questions concerning this approval.

Sincerely,



Arlene Kabei
Associate Director
Waste Management Division

Enclosure

Cc: Mark Malinowski, DTSC (Chief Schools Unit, Sacramento Office)
Tom Booze, DTSC
Paresh Khatri, Alameda County Environmental Health
Charles Robitaille, Aspire Charter Schools
Alan Gibbs, LFR Inc. an Arcadis Company
Ron Goloubow, LFR Inc. an Arcadis Company
Steve Armann, USEPA R9
Patrick Wilson, USEPA R9
Katherine Baylor, USEPA R9
Carmen Santos, USEPA R9



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105

November 13, 2009

**USEPA Conditional Approval for Aspire Public Schools, 1009 66th Avenue, Oakland, CA
PCB Self-Implementing On-Site Cleanup and Disposal of PCB Remediation Waste**

“Toxic Substances Control Act Self-Implementing Cleanup Notification and Certification Former Pacific Electric Motors Facility 1009 66th Avenue in Oakland, California,” letter dated October 23, 2009 and prepared by LFR an Arcadis Company (LFR) for Aspire Public Schools (“Aspire”).

The U.S. Environmental Protection Agency Region 9 (USEPA) is approving with conditions the Aspire October 23, 2009 Notification and Certification (“Notification”). The Notification is required by 40 C.F.R. § 761.61(a) of the Toxic Substances Control Act (TSCA) for a self-implementing on-site cleanup and disposal of polychlorinated biphenyls (PCBs), 40 C.F.R. § 761.61(a), at the Aspire property at 1009 66th Avenue in Oakland. Aspire must implement the terms of the Notification, as modified by the conditions of approval.

This conditional approval does not relieve the owner of the property from complying with all other applicable federal, state, and local regulations and permits. Departure from the approval conditions without prior written permission from USEPA may result in the commencement of proceedings to revoke this approval, and/or an enforcement action. Nothing in this approval bars USEPA from imposing penalties for violations of this approval or for violations caused by other activities not covered under the terms of this approval that trigger TSCA PCB requirements.

USEPA Conditions of Approval

- 1. Written, signed certification by owner of Aspire property and party conducting cleanup.** The Notification includes an incomplete, unsigned certification. Within two (2) days after the date of this approval, Aspire must submit a revised written, signed Certification including the language under “*Certification*” in 40 C.F.R. § 761.3 and in 40 C.F.R. § 761.61(a)(3)(i)(E). Both the owner of the Aspire property and the party conducting the cleanup must sign the Certification.
- 2. Pre-demolition survey.** As discussed with Aspire on October 27, 2009, Aspire shall conduct a survey and sampling of building materials in structures currently at the site to determine if PCBs are present. We understand that structures at the site were built in 1946. Considering the production period of PCB-containing materials, it is likely that building materials in structures at the site may contain PCBs. Also see Condition 3 below. In addition, the compressor, underground pipelines, and transformer present at the site shall be tested for PCBs.
- 3. Sampling and analysis plan.** This sampling plan is to address pre-demolition and pre-cleanup sampling activities as well as post-demolition sampling and PCB cleanup verification sampling. Within two (2) days after the date of this approval, Aspire must submit for USEPA approval a sampling and analysis plan (SAP) describing data quality objectives, sampling procedures, quality assurance / quality

control procedures for sample collection, number of samples to be collected, sample preservation, and chain-of-custody for sample delivery to the analytical laboratory. The SAP must identify the analytical laboratory performing analysis of the samples. In addition, the SAP must include decontamination procedures for movable equipment, tools, and sampling equipment in accordance with 40 C.F.R. § 761.79(c)(2). Aspire must obtain USEPA's written approval of the SAP before beginning sampling activities.

The SAP must include the procedures that Aspire will use to characterize building materials for PCBs in structures currently present at the site and planned for demolition before beginning school construction. Aspire shall follow the requirements in 40 C.F.R. Part 761, Subpart R ("Sampling Non-liquid, Non-Metal PCB Bulk Product Waste for Purposes of Characterization for PCB Disposal in Accordance with 40 C.F.R. § 761.62, and Sampling PCB Remediation Waste Destined for Off-Site Disposal, in Accordance with 40 C.F.R. § 761.61") for sampling of building materials to determine their PCB concentration for disposal.

4. Sequence of pre-cleanup PCB soil characterization; pre-demolition sampling (building materials); soil remediation; and soil cleanup verification. We understand that except for certain areas in the northwestern portion of the site, most of the site is paved. Current paving materials will be removed and all above ground structures demolished. The site will be completely bare prior to construction of the school. Within five (5) days after the date of this approval, Aspire shall propose the sequence that Aspire will follow for pre-cleanup PCB soil characterization, pre-demolition sampling, soil remediation, and soil cleanup verification to prevent recontamination of soils with PCBs if building materials in existing structures and underground structures (e.g., piping) contain PCBs.

5. PCB remediation waste; PCB bulk product waste; cleanup wastes; and disposal requirements. PCB remediation wastes and PCB bulk product wastes may be generated at the Aspire site during the PCB cleanup and demolition of structures (e.g., corrugated metal buildings) at the site. As the generator of such waste, Aspire must meet all applicable regulatory requirements for storage and offsite disposal in 40 C.F.R. § 761.61(a)(5) (Site Cleanup) and 761.62 (Disposal of PCB Bulk Product Waste). It is also acceptable to dispose of PCB remediation waste in accordance with 40 C.F.R. §§ 761.60 and 761.70. PCBs are a hazardous waste in California. Aspire must ensure that off-site disposal of PCB wastes also meet all applicable and relevant state and local regulatory requirements. Within five (5) days after the date of this approval, provide to USEPA the EPA identification number which confirms that Aspire has an USEPA identification number to manage the PCB wastes.

- *Bulk PCB remediation wastes (e.g., PCB-contaminated soil, PCB-contaminated concrete).* Disposal requirements for bulk PCB remediation waste with PCB concentration less than 50 ppm and equal to or above 50 ppm are contained in 40 C.F.R. §§ 761.61(a)(5)(i)(B)(2)(ii) and 761.61(a)(5)(i)(B)(2)(iii), respectively. Further, the generator must provide written notice to the disposal site of the wastes being shipped for disposal in accordance with 40 C.F.R. § 761.61(a)(5)(i)(B)(2)(iv).

- *Non-porous (e.g., metal) surfaces.* Non-porous surfaces contaminated with PCBs due to spills of liquid PCBs or the migration of PCBs from a manufactured product applied to these surfaces are bulk PCB remediation wastes. Dispose of these wastes offsite in accordance with 40 C.F.R. § 761.61(a)(5)(ii)(B).
- *Porous (e.g., concrete, metal coated with a porous surface) surfaces.* Porous surfaces contaminated with PCBs due to spills of liquid PCBs or the migration of PCBs from a product applied to these surfaces are bulk PCB remediation wastes. Dispose of these wastes offsite in accordance with 40 C.F.R. § 761.61(a)(5)(i).
- *Liquids (e.g., water).* Water contaminated with PCBs at the site (e.g., water generated during excavation of soils due to shallow ground water conditions) must be disposed offsite in accordance with 40 C.F.R. § 761.61(a)(5)(iv) if the PCB concentration in the water is above the applicable standard in 40 C.F.R. § 761.79(b)(1).
- *PCB bulk product waste.* This waste is defined in 40 C.F.R. § 761.3 and disposal requirements are in 40 C.F.R. § 761.62. This waste category includes materials manufactured with PCBs where the PCB concentration in these materials at the time of designation for disposal is ≥ 50 ppm.
- *Cleanup wastes (e.g., non-liquid cleanup materials, personal protective equipment).* Dispose of these wastes in accordance with 40 C.F.R. § 761.61(a)(5)(v).

6. Measures to prevent exposure of neighboring community to airborne particulates. In the “Air Monitoring” section of the Notification, Aspire proposes to conduct real-time airborne monitoring for particulates during activities likely to generate dust such as excavation of contaminated soils. This monitoring is proposed in the context of worker health and safety. However, such monitoring shall be expanded to include airborne particulate monitoring to determine if the neighboring community is being exposed to air particulates from the site during dust generating activities including building demolition. Within five (5) days after the date of this approval, submit for review the measures that Aspire will implement (including air monitoring) to prevent exposure of neighboring communities to airborne particulates.

In addition, Aspire shall notify neighboring communities of the soil excavation and building demolition activities to be conducted at the site before beginning such activities.

7. Cleanup levels. Aspire plans on redeveloping the site into a public school, which is a high occupancy area. In 40 C.F.R. § 761.61(a)(4)(vi), USEPA requires a PCB cleanup level for high occupancy areas of ≤ 1 mg / kg (ppm) PCBs. In accordance with 40 C.F.R. § 761.61(a)(4)(vi), USEPA has the authority to specify cleanup levels that are more stringent than ≤ 1 ppm PCBs. USEPA is approving a cleanup level of 0.13 mg / kg (ppm) for PCBs in soils. The DTSC School Program and Alameda County Environmental Health (ACEH) had approved this PCB cleanup level for the Aspire

school site that is the subject of this conditional approval. Refer to the ACEH March 12, 2009 letter to Aspire, which is attached to the cover letter. It is also our understanding that DTSC considers cumulative health risks when addressing school sites with multiple contaminants. The Aspire site has multiple contaminants in soils and ground water.

8. Cap (protective barrier). USEPA requires that a cap be installed at the Aspire proposed school site in accordance with the requirements in 40 C.F.R. § 761.61(a)(7). Please note that Aspire has acquired a property to construct the proposed school that has a long history (1946 – 2008) of industrial activity during which PCB releases occurred at the site. A possibility exists for PCB congeners (i.e., weathered PCB Aroclors that are dioxin-like PCB compounds) to be present at the site due to historic PCB releases. A cap will prevent direct exposure to soils containing these compounds.

In addition, USEPA was not involved with any of the investigations so far conducted at the site prior to Aspire's October 23, 2009 Notification to USEPA. PCB contaminated soils may remain at the site due to potential uncertainties in the characterization and remediation of PCB-contaminated soils at the site; and shallow ground water conditions potentially impacting site characterization and remediation. A potential may also exist for future changes at the school grounds where penetration of barriers (e.g., concrete, asphalt surfaces) preventing exposure to onsite soils may be necessary (e.g., repair of utilities).

9. Risk management plan and deed notice. The regulations in 40 C.F.R. § 761.61(a)(4)(i)(A) do not require further restrictions such as a deed notice when the ≤ 1 ppm PCB cleanup level for high occupancy is verified as achieved via confirmatory sampling. However, USEPA believes that in addition to Conditions 7 and 8 a risk management plan would be an institutional control protective of children at the future Aspire school.

USEPA is approving the 0.13 ppm PCB soil cleanup level for the Aspire site under the condition that (1) site soils are overlain with asphalt, concrete, and / or other cap (protective barrier) that impedes direct exposure to on-site soils and (2) a deed notice that includes a risk management plan be recorded in accordance with California state law.

Within 30 days after completion of the PCB cleanup, Aspire shall submit for USEPA approval a risk management plan that at a minimum includes:

- A survey of the Aspire property and map clearly depicting all areas where PCBs were encountered and remediated,
- A description of specific activities to be prohibited at the school because of their potential to penetrate protective barriers (e.g., asphalt, concrete) that would expose onsite soils,
- A description of how the teachers, administrators, and staff at the school will be notified of the specific activities which are prohibited at the school because of their potential to penetrate protective barriers (e.g., asphalt, concrete) that would expose onsite soils and
- The conditions under which penetration or alteration of protective barriers is permitted and the contingencies that must be implemented to prevent exposure to onsite soils.

U.S. EPA Conditional Approval for Aspire Public Schools
1009 66th Avenue, Oakland, CA
PCB Self-Implementing On-Site Cleanup and Disposal of PCB Remediation Waste
November 13, 2009

Within 60 days after completing the PCB cleanup at the Aspire site, pursuant to 40 C.F.R. § 761.61(a)(8), Aspire shall record in accordance with California state law, a notation on the deed to the property, or on some other instrument which is normally examined during a title search, that will in perpetuity notify any potential purchaser of the property (1) That the land has been used for PCB remediation waste disposal and specific activities are prohibited as described in the risk management plan described above; (2) Of the existence of the cap (protective barriers) and the requirement to maintain the protective barriers in perpetuity; and (3) The applicable cleanup levels left at the site, under the cap; and (4) the procedure by which USEPA will be notified of penetrations or alterations of the required cap. In addition, Aspire must submit to USEPA a certification signed by the owner certifying the required deed was recorded.

10. Recordkeeping and PCB cleanup report. The owner of the property must keep records of the PCB cleanup including any cleanup conducted prior to the date of this approval that involved the removal of PCBs from the site. All reports currently available that document PCB cleanup at the site are incorporated herein as part of the Aspire October 23, 2009 Notification. In accordance with 40 C.F.R. § 761.61(a)(9), the owner of the property must keep cleanup records as required in 40 C.F.R. § 761.125(c)(5).

Submit for approval a PCB cleanup report within 30 days after completing the PCB cleanup (including removal and disposal of PCB remediation and bulk product waste). The report must contain all supporting sample analysis results documenting achievement of the PCB cleanup level, data summaries, waste disposal, and all the information required in 40 C.F.R. § 761.125(c)(5).

11. Restoration of the site. After achieving the PCB cleanup level, site restoration shall be done consistent with local and California State regulatory requirements as well as in accordance with the requirements in ACEH's March 12, 2009 letter approving the LFR CAP. The PCB soil cleanup level for the Aspire site is 0.13 ppm. The PCB concentration in the backfill material should not exceed this PCB soil cleanup level.

Khatri, Paresh, Env. Health

From: Santos.Carmen@epamail.epa.gov
Sent: Friday, December 04, 2009 1:42 PM
To: Khatri, Paresh, Env. Health
Subject: Fw: 1009 66th Ave. Oakland - TSCA Letter Response 11-18-2009.pdf
Attachments: TSCA Letter Response 11-18-2009.pdf

Carmen D. Santos, Project Manager
RCRA Corrective Action Office
Waste Management Division
USEPA Region 9
415.972.3360
fax: 415.947.3533

----- Forwarded by Carmen Santos/R9/USEPA/US on 12/04/2009 01:40 PM -----

From: "Goloubow, Ron" <Ron.Goloubow@lfr.com>
To: Carmen Santos/R9/USEPA/US@EPA
Cc: "Gibbs, Alan" <Alan.Gibbs@lfr.com>, "Goloubow, Ron" <Ron.Goloubow@lfr.com>, Charles Robitaille <charles@pacificcharter.org>, Annie Bauer <Annie.Bauer@aspirepublicschools.org>, Mike Barr <Mike.Barr@aspirepublicschools.org>
Date: 11/18/2009 04:25 PM
Subject: 1009 66th Ave. Oakland - TSCA Letter Response 11-18-2009.pdf

On behalf of Aspire Schools attached is our response to the EPA's letter for the Subject Site dated November 13, 2009. Please contact me should you have any questions or need any more information.

Ron.

Ron Goloubow, P.G.
LFR Inc., an ARCADIS Company
510-596-9550 Direct Dial
510-501-1789 Cell
510-652-4906 Facsimile
ron.goloubow@lfr.com

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November 18, 2009

003-09155-08
transmitted via email only

Ms. Carmen Santos
U.S. Environmental Protection Agency, Region 9
Mail Code WST-5
75 Hawthorne Street
San Francisco, CA 94105

Subject: Conditional Approval of the Toxic Substance Control Act Self-Implementing Cleanup Notification and Certification, Former Pacific Electric Motors Facility, 1009 66th Avenue in Oakland, California

Dear Ms. Santos:

The property owner, Aspire Public Schools (Aspire) and LFR Inc., an Arcadis Company (LFR) would like to thank the staff of the U.S. Environmental Protection Agency (USEPA) for the letter providing the conditional approval of the Self-Implementing Cleanup Plan (SICP; dated October 23, 2009) with conditions at the former Pacific Electric Motors Facility 1009 66th Avenue in Oakland, California (the “Site” [Figure 1] letter dated, November 13, 2009; the “EPA Letter”). The excavation of the polychlorinated biphenyl (PCB) affected soil began at the Site in accordance with the SICP and the EPA Letter on November 4, 2009 (Figure 2).

Aspire and LFR’s intention to comply with the parameters of the conditional approval are provided as follows:

1. Certification Signed by LFR & Aspire

A revised certification for this project signed by representatives of both Aspire and LFR is attached.

2. Pre-Demolition and Post-Demolition PCB survey

The pre-demolition and post-demolition sampling plan for building materials is provided as an attachment to this letter.

3. Sampling & Analysis Plan

As acknowledged in the EPA Letter, LFR transmitted a Sampling and Analysis Plan for the Site (the "SAP") on November 5, 2009. This SAP focused on the objectives, methods, procedures associated with the soil samples to be collected and analyzed in conjunction with pre-demolition soil characterization and post-remediation soil sampling. As requested, the pre-demolition and post-demolition sampling plan for building materials is provided as an attachment of this letter.

4. Sequence of Pre-Cleanup PCB Soil Characterization; Pre-Demolition Sampling; Soil Remediation; Soil Clean-Up Verification

Aspire and LFR will complete the project under the following sequence of work:

- Pre-Cleanup PCB Soil Characterization – The scope of this work was completed in accordance with the SAIC and the SAP
- Pre-Demolition Sampling - this sampling was completed in accordance with the building materials SAP provided above (in this letter).
- Soil Remediation - Site remedial actions are taking place at the Site in accordance with the Revised Corrective Action Plan, the SAIC, and the SAP
- Soil Clean-Up Verification and Post-Demolition Sampling - Soil clean up verification and post-demolition sampling will be conducted in accordance with the procedures provided in the CAP, SAP, and SAIC. As provided in the SAIC, post-demolition soil sampling regarding the removal of the sewer pipelines at the Site will take place by collecting soil samples adjacent to the sanitary and storm sewer pipelines that are to be abandoned as part of the redevelopment of the Site. If material (liquid or solid) is present in the sewer pipes, samples will be collected for PCB analysis (EPA test method 8082) so that the material may be disposed of in accordance with the procedures provided in the EPA letter (see item 5 below).
- Following the demolition of the large warehouse building, soil samples will be collected from the ground surface (surface soil samples) at areas of the Site that were unpaved during demolition activities. Soil samples will be collected on a 75-foot grid in the unpaved areas. Samples will be collected and analyzed using methods provided in the SAP.
- In addition to samples of material from in the sewer pipeline(s) and as provided in the SAIC, soil samples will be collected every approximately 50 feet of sewer line approximately 1 to 2 feet below the pipeline invert. The soil samples will be analyzed for PCBs in accordance with the SAP. If soil containing greater than 0.13 milligrams per kilogram (mg/kg) is detected in the soil samples, additional soil will be removed and the additional confirmation soil samples will be collected for analysis in accordance with the SAP.

5. PCB Remediation Waste

Aspire has the following EPA identification number for this property: CAC002647778. Aspire and LFR will dispose of the soil in accordance with the procedures provided in the EPA letter. As such (porous and non-porous) building materials will be disposed of in accordance with the following regulations:

§ 761.61 PCB Remediation Waste

Bulk PCB remediation waste may be sent off-site for decontamination or disposal in accordance with this paragraph, provided the waste is either dewatered on-site or transported offsite in containers meeting the requirements of the DOT Hazardous Materials Regulations (HMR) at 49 CFR parts 171 through 180. (1) Removed water shall be disposed of according to paragraph (b)(1) of this section.

(2) Any person disposing off-site of dewatered bulk PCB remediation waste shall do so as follows:

(i) Unless sampled and analyzed for disposal according to the procedures set out in § 761.283, 761.286, and 761.292, the bulk PCB remediation waste shall be assumed to contain ≥ 50 ppm PCBs.

(ii) Bulk PCB remediation wastes with a PCB concentration of < 50 ppm shall be disposed of in accordance with paragraph (a)(5)(v)(A) of this section.

(iii) Bulk PCB remediation wastes with a PCB concentration ≥ 50 ppm shall be disposed of in a hazardous waste landfill permitted by EPA under section 3004 of RCRA, or by a State authorized under section 3006 of RCRA, or a PCB disposal facility approved under this part.

Analytical results of soil samples collected from soil boring 4B located in proposed excavation area PCB-EXC1, contained PCBs at a concentration of greater than 50 mg/kg (see Figure 2). Based on these analytical results, soil excavated from this area will be transported off-site and disposed of at Waste Management's Kettleman Hills Landfill.

Analytical results of soil samples collected from soil borings located in proposed excavation areas PCB-EXC2, PCB-EXC3, and PCB-EXC4 of the Site contained PCBs at a concentration of less than 50 mg/kg (see Figure 2). Based on these analytical results, this soil will be transported off-site and disposed of at Republic Services' Vasco Road Landfill located in Livermore, California.

§ 761.62 Disposal of PCB Bulk Product Waste

(b) Disposal in solid waste landfills. (1) Any person may dispose of the following PCB bulk product waste in a facility permitted, licensed, or registered by a State as a municipal or non-municipal non-hazardous waste landfill.

Based on the analytical results of samples collected from the various building materials at the Site, the building materials from the Site generated from demolition activities will be transported off-site and disposed of at Republic Services' Vasco Road Landfill located in Livermore, California.

6. Measures to Prevent Exposure of the Neighboring Community to Air Borne Particulates

In accordance with the SICP, the following provides the details regarding the air monitoring plan for the proposed excavation and demolition activities that are proposed for the Site.

Air Monitoring and Dust Control Measures

Real-time aerosol monitoring devices (mini-RAM) will be used to monitor total dusts generated during site work. If dust in excess of background levels (greater than 0.25 milligram per cubic meter [mg/m^3] above background levels) is observed for a sustained period of time (greater than 5 minutes), appropriate dust suppression measures (e.g., spraying soil with water) will be undertaken.

A total dust action level of $0.25 \text{ mg}/\text{m}^3$ above background levels that is sustained for 15 minutes would be conservative for the various COPCs detected on the Site that would be likely to adhere to windblown dust and protective of the on-site workers and members of the surrounding community.

Field staff will obtain and document total dust readings from the mini-RAM throughout each work day when affected soil excavation activities are occurring on the Site. These readings will be obtained from air monitoring stations established along the Site's perimeters (a total of 5 stations; see Figure 2).

In addition to monitoring for total dust using at least four fixed air monitors, equipped with a mini-RAM, Personal Air Monitors (PAMs) used to collect air samples. The air samples will be collected on cassettes (media) that will be submitted to a laboratory for analysis of PCBs, arsenic, lead, and benzene. The air samples will be collected each work day when affected soil excavation activities and site demolition activities are occurring on the Site. Air monitoring stations will be at locations illustrated on Figure 2 (attached).

Air samples to be analyzed for PCBs will be collected on laboratory supplied filter tubes equipped with a solid sorbent material comprised of 13-mm glass fiber and Florisil. The samples media will be provided by and the samples will be analyzed by EMSL Analytical, Inc. located in Westmont, New Jersey. Details regarding the collection and analytical methods for the air sample samples are provided in the attached documentation.

Public Notification

The public participation document mailed by the Alameda County Environmental Health has been laminated and is posted in two places along the fence that is adjacent to the public right-of way along 66th Avenue.

7. Revised Clean-up Level for PCBs in Soil

Aspire and LFR will remove soil containing PCBs at concentrations exceeding 0.13 mg/kg. If soil containing concentrations of PCBs greater than 0.13 mg/kg cannot be removed from the Site that area will be documented as described under item 9. Risk Management Plan and Deed Notice below.

8. Cap for Site

In accordance with the development plan for the Site, the entire property will be capped with either building structures, asphalt, or concrete. Prior to developing the Site, a minimum of 2 feet of imported fill will be placed and compacted as backfill in areas where affected soil has been previously removed from the Site. In addition, areas of the Site that will be redeveloped for vehicular traffic or structures, 8 to 12 inches of base rock will be imported to meet the geotechnical requirements of the redevelopment project.

9. Risk Management Plan and Deed Notice

A risk management plan will be prepared for the Site and a notice will be placed on the deed in accordance with item 9 of the EPA Letter.

10. Record Keeping and PCB Clean-Up Report

Documentation associated with the remediation of the PCB-affected soil and building materials will be retained and the PCB Clean-Up Report will be prepared in accordance with item 9 of the EPA Letter.

11. Restoration of the Site

The Site will be restored in accordance with the CAP, the SICP, and the EPA letter.

Following your review of this letter, please do not hesitate to contact me if you have any questions or require additional information.

Sincerely,



Alan D. Gibbs, P.G., C.HG.
Vice President/Principal Hydrogeologist



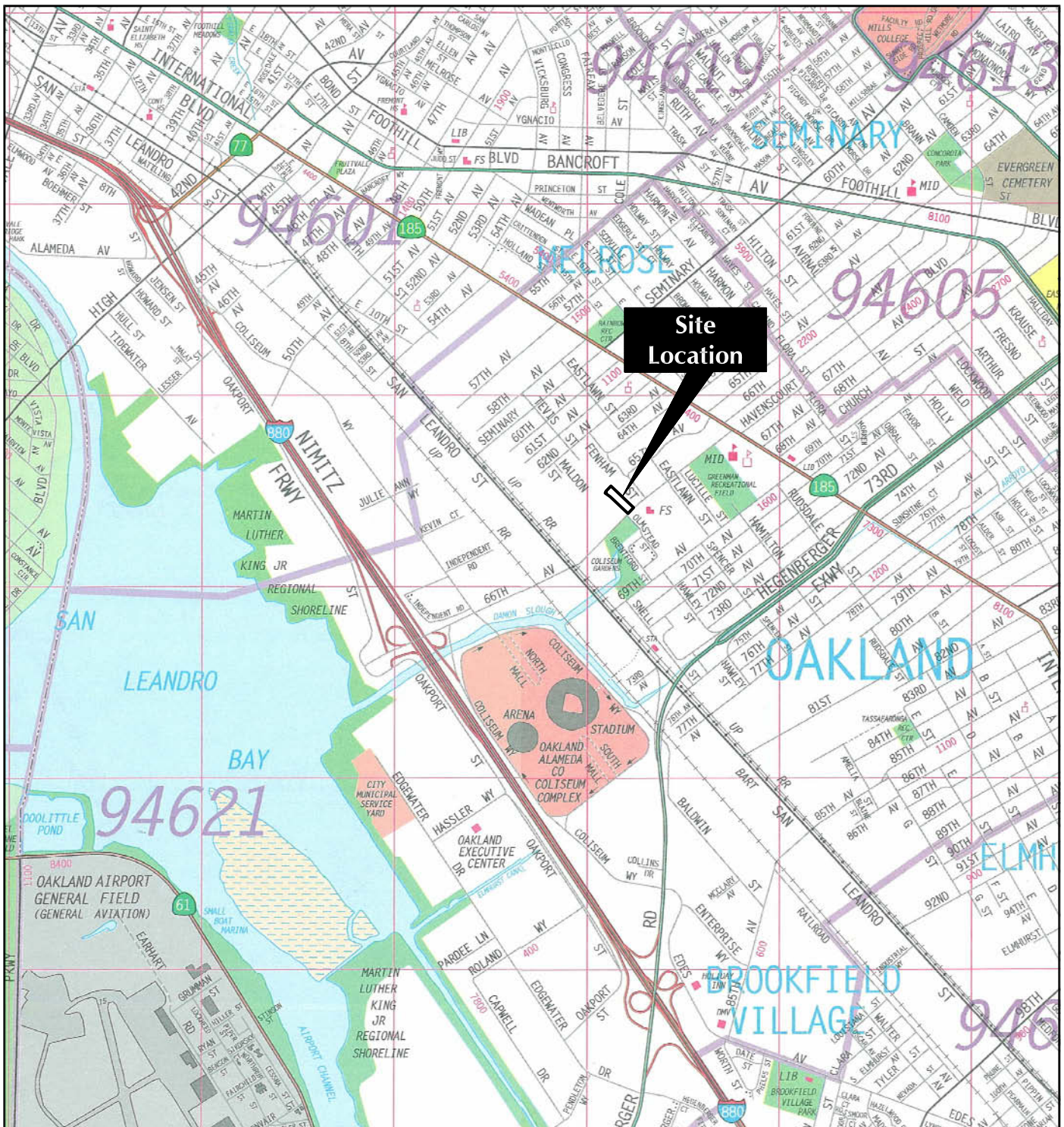
Ron Goloubow, P.G.
Senior Associate Geologist

Attachments

Figures 1 and 2
Certification
Sampling Plan for Building Materials
Air Monitoring; Sample Analysis Methods

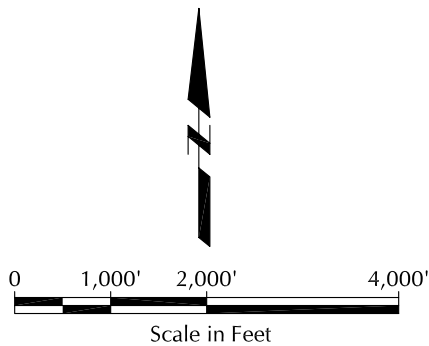
cc: Mr. Mike Barr – Aspire Charter Schools
Charles Robitaille – Pacific Charter Schools
Paresh Khatri – Alameda County Department of Environmental Health

FIGURES



MAP SOURCE:

Copyright 1995, Thomas Bros. Map
ALAMEDA COUNTY
2002 Edition

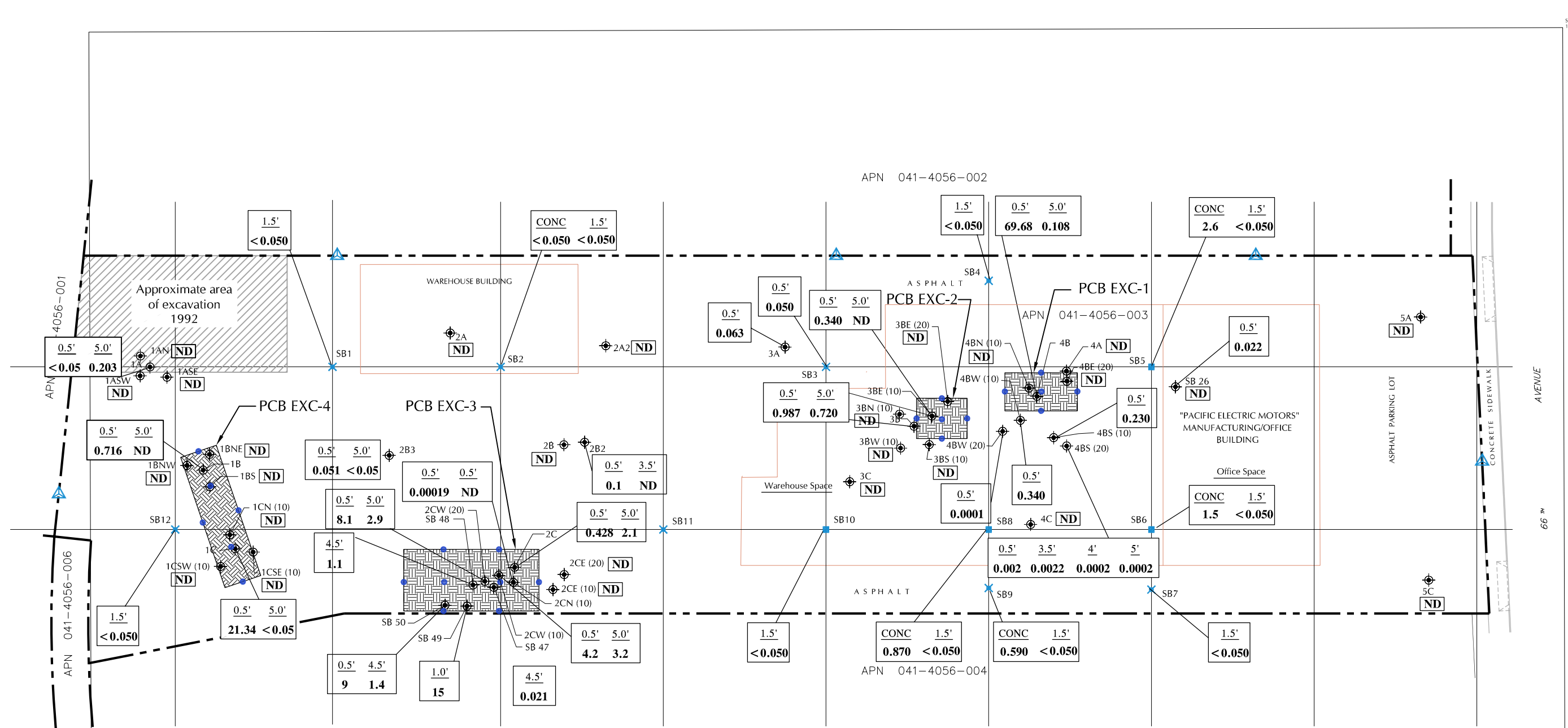


Site Vicinity Map

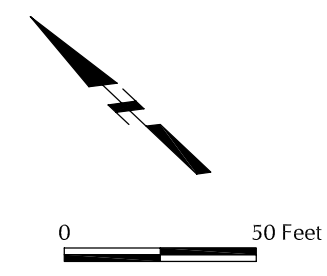
Proposed Charter School Site
1009 66th Avenue, Oakland, California

Figure 1

I:\Design\003\0915\04\dwg\PCBs in soil rev1.dwg Nov 16, 2009 4:49pm



- EXPLANATION:**
- 1B ⊕ Soil sample location
 - Soil and concrete sample location based on a 75'x75' grid spacing (5 locations - 10/2009)
 - Proposed confirmation soil sample based on a 30'x30' grid spacing
 - ✕ Soil sample location based on a 75'x75' grid spacing (9 locations - 10/2009)
 - ▲ Air monitoring station
 - - - Property line
 - ▨ Proposed excavation of PCB-affected soil
 - 4.5' — Depth in feet
 - 1.1 — Concentration in mg/kg
 - ND = Not detected at or above laboratory reporting limits
 - CONC = Concrete sample



PCBs Detected in Soil
0 to 5 Feet Below Ground Surface

Proposed Charter School Site
 1009 66TH Avenue, Oakland, California

Figure 2

LFR an **ARCADIS** company

TSCA CERTIFICATION

Certification Statement

Owner: Aspire Public Schools
Parties Conducting Cleanup: Arcadis and Innovative Construction Solutions
Project: Former Pacific Motors Facility – 1009 66th Avenue, Oakland, CA

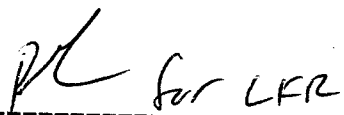
In accordance with 761.61(a)(3)(i)(E); I, Michael Barr, hereby certify, that all sampling plans, sample collection procedures, sample preparation procedures, extraction procedures, and instrumental/chemical analysis procedures used to assess or characterize the presence, concentrations, and extent of polychlorinated biphenyl- (PCB) impacted media for Former Pacific Motors Facility – 1009 66th Avenue, Oakland, CA are on file and available for USEPA review at the following location:

LFR Inc. an Arcadis Company
Contact: Ron Goloubow

Under civil and criminal penalties of law for the making or submission of false or fraudulent statements or representations (18 U.S.C. 1001 and 15 U.S.C. 2615), I certify that the information contained in or accompanying this document is true, accurate, and complete. As to the identified section(s) of this document for which I cannot personally verify truth and accuracy, I certify as the company official having supervisory responsibility for the persons who, acting under my direct instructions, made the verification that this information is true, accurate, and complete.

By: 
Michael Barr - Aspire Public Schools

Date: 11/2/09

By:  for LFR
Ronald E. Goloubow - LFR Inc. An Arcadis company

BUILDING MATERIALS SAMPLING PLAN

**Building Materials Sampling Plan
Former Pacific Electric Motors Facility
1009 66th Avenue in Oakland, California**

On behalf of Aspire Public Schools (Aspire) LFR Inc. an Arcadis company (LFR) has prepared this Building Materials Sampling Plan (BMSP). The BMSP provides the methods used by LFR to assess the presence of polychlorinated biphenyls (PCBs) in the building materials in the two buildings at located at the former Pacific Electric Motors Facility located at 1009 66th Avenue in Oakland, California. The purpose of the BMSP was to provide data regarding the presence of PCBs in the building materials at the Site. The data collected will be used to assess disposal methods for the building materials following demolition of the two buildings currently located at the Site.

During the survey, LFR attempted to identify and collect samples of the building materials that may contain PCBs in preparation for the demolition of the buildings. The building materials survey was conducted to comply a request from us U.S. Environmental Protection Agency (U.S. EPA) to determine if the building materials in the buildings at located at the Site contain PCBs.

The survey encompassed visible and accessible interior areas of the two subject buildings. To assess the presence of PCBs in the building materials LFR collected representative samples of the following materials:

Window Caulk
Paint (or painted surfaces)
Concrete
Concrete Caulk
Roofing material

Sample Collection, Handling and Documentation

Sample procedures described in this section will be used for sample collection, shipping, analysis, and disposal. Each sample of the building materials will be collected using hand tools and the sample will be placed in a laboratory supplied glass jar. Sample containers will be 4 or 8 ounce laboratory supplied glass jars, and no preservative will be used. The sample container will be labeled with the sample identification, the time and date of collection, the analysis requested, and the initials of the sampler. The samples will be stored in an ice-chilled cooler and submitted to the laboratory under strict chain-of-custody protocols. The sample identification will reference the type of building material and location that the sample was collected (i.e. window caulking-building 1). The location of the sample and the sample identification will be recorded on a map at the time of collection. LFR shall coordinate with the laboratory for the delivery of collected soil samples under chain-of-custody protocols for chemical analysis.

Concrete Sample Collection Methods

In accordance with EPA Site Revitalization Guidance, proposed concrete samples will be collected by drilling a nominal one-inch diameter hole using a rotary impact hammer drill to generate a fine concrete powder suitable for analysis. The powder is to be placed in a laboratory supplied sample container for laboratory analysis. The procedure can be used to collect concrete samples within the upper 6 inches of concrete at each proposed location. As with the soil samples, the concrete samples submitted to the laboratory will be labeled with the sample identification number, the time and date of collection, the analysis requested, and the initials of the sampler. The samples will be stored in an ice-chilled cooler and submitted to the laboratory under strict chain-of-custody protocols. LFR shall coordinate with the laboratory for the delivery of collected soil samples under chain-of-custody protocols for chemical analysis.

Analytical Methods

The samples of the building materials will be submitted for PCB analyses using USEPA SW-846 Method 8082.

Sampling Equipment Decontamination

Sampling equipment cleaning procedures are described in this section. Specifications for standard cleaning materials referred to in this section are as follows:

- Soap will be a standard brand of phosphate-free laboratory detergent such as Liquinox[®]. Use of other detergent must be justified and documented in the field logbooks.
- Tap water may be used from any municipal water treatment system. Use of an untreated potable water supply is not an acceptable substitute for tap water.
- Organic/analyte free water is defined as tap water that has been treated with activated carbon and deionizing units.

Improperly handled cleaning solutions may easily become contaminated. Storage and application containers must be constructed of the proper materials to ensure their integrity. Following are acceptable materials used containing the specified cleaning solutions:

- Soap must be kept in clean plastic, metal, or glass containers until used. It should be poured directly from the container during use.
- Tap water must be kept in clean tanks, hand pressure sprayers, and squeeze bottles, applied directly from a hose.
- Analyte free water must be stored in clean glass, stainless steel, or plastic containers that can be closed prior to use. It can be applied from plastic squeeze bottles.
- Organic/analyte free water must be stored in clean glass, Teflon[®], or stainless steel containers prior to use. It may be applied using Teflon[®] squeeze bottles.

Sampling Equipment Decontamination Procedure

The following procedures are to be used for all sampling equipment (hand tools or power tools).
When appropriate disposable equipment (one time use) will be used :

1. Clean with tap water and soap using a brush if necessary to remove particulate matter and surface films.
2. Rinse thoroughly with tap water
3. Cover the equipment with plastic. Equipment stored overnight should be wrapped in aluminum foil and covered with clean, unused plastic.

AIR SAMPLE ANALYTICAL METHODS

HYDROCARBONS, AROMATIC

1501

FORMULA: Table 1

MW: Table 1

CAS: Table 1

RTECS: Table 1

METHOD: 1501, Issue 3

EVALUATION: Full

Issue 1: 15 August 1990
Issue 3: 15 March 2003

OSHA: Table 2
NIOSH: Table 2
ACGIH: Table 2

PROPERTIES: Table 1

SYNONYMS:	<u>Group A:</u> benzene	toluene	ethylbenzene	o-xylene	m-xylene	p-xylene
(Synonyms in Table 1)	<u>Group B:</u> cumene	p-tert-butyltoluene	α-methylstyrene	β-methylstyrene	styrene	

SAMPLING		MEASUREMENT	
SAMPLER:	SOLID SORBENT TUBE (coconut shell charcoal, 100 mg/50 mg)	TECHNIQUE:	GAS CHROMATOGRAPHY, FID
FLOW RATE:	Table 3	ANALYTE:	Hydrocarbons listed above
VOL-MIN:	Table 3	DESORPTION:	1 mL CS ₂ , stand 30 min with agitation
-MAX:	Table 3	INJECTION VOLUME:	1 µL (<u>Group A:</u> split 5:1; <u>Group B:</u> split 1:1)
SHIPMENT:	Routine	TEMPERATURE	
SAMPLE STABILITY:	30 days @ 5°C	-INJECTION:	250 °C
BLANKS:	10% of samples	-DETECTOR:	300 °C
		-COLUMN:	<u>Group A:</u> 40 °C (10 min) to 230°C (10 °C/min) <u>Group B:</u> 35°C (8 min) to 225°C (10°C/min)
		CARRIER GAS:	He @ 2.6 mL/min
ACCURACY		COLUMN:	Capillary, fused silica <u>Group A:</u> 30m x 0.32-mm ID; 1-µm film 100% PEG or equivalent <u>Group B:</u> 30m x 0.53-mm ID; 3-µm film crossbonded® 35% diphenyl 65% dimethyl polysiloxane or equivalent
RANGE STUDIED:	Table 3	CALIBRATION:	Solutions of analytes in CS ₂
BIAS:	Table 3	RANGE:	Table 4
OVERALL PRECISION (Ŝ_r):	Table 3	ESTIMATED LOD:	Table 4
ACCURACY:	Table 3	PRECISION (Ŝ_s):	Table 4

APPLICABILITY: This method is for peak, ceiling, and TWA determinations of aromatic hydrocarbons. Interactions between analytes may reduce breakthrough volumes and affect desorption efficiencies. Naphthalene, originally validated in S292 [4], failed to meet acceptable desorption efficiency recovery and storage stability criteria at the levels evaluated in this study. However, the application of this method to naphthalene levels at or near the REL/PEL continues to meet acceptable recovery criteria. Styrene failed to meet acceptable recovery criteria at the two lowest levels evaluated in this study (highest level to meet the criteria was 181 µg/sample).

INTERFERENCES: Under conditions of high humidity, the breakthrough volumes may be reduced. Other volatile organic compounds such as alcohols, ketones, ethers, and halogenated hydrocarbons are potential analytical interferences.

OTHER METHODS: This method updates NMAM 1501 issued on August 15, 1994 [1] which was based upon P&CAM 127 (benzene, styrene, toluene, and xylene) [2]; S22 (p-tert-butyltoluene) [3]; S23 (cumene) [3]; S29 (ethylbenzene) [3]; S26 (α-methylstyrene) [3]; S30 (styrene); S311 (benzene) [4]; S343 (toluene) [4]; and S318 (xylenes) [4].

REAGENTS:

1. Carbon disulfide*, low benzene, chromatographic quality.
2. Analytes, reagent grade.
3. Helium, prepurified and filtered.
4. Hydrogen, prepurified and filtered.
5. Air, prepurified and filtered.

* See SPECIAL PRECAUTIONS

EQUIPMENT:

1. Sampler: glass tube, 7 cm long, 6-mm OD, 4-mm ID, flame-sealed ends, containing two sections of activated coconut shell charcoal (front = 100 mg, back = 50 mg) separated by a 2-mm urethane foam plug. A silylated glass wool plug precedes the front section and a 3-mm urethane foam plug follows the back section. Tubes are commercially available.
2. Personal sampling pump, 0.01 to 1.0 L/min (Table 3), with flexible connecting tubing.
3. Gas chromatograph, FID, integrator, and columns (page 1501-1).
4. Autosampler vials, glass, 1.8 mL, with PTFE-lined caps.
5. Pipets, 1-mL, and pipet bulb.
6. Syringes, 10- μ L, 25- μ L, and 250- μ L.
7. Volumetric flasks, 10-mL.

SPECIAL PRECAUTIONS: Carbon disulfide is toxic and extremely flammable (flash point = -30°C), benzene is a suspect carcinogen. Prepare standards and samples in a well ventilated hood.

SAMPLING:

1. Calibrate each personal sampling pump with a representative sampler in line.
2. Break the ends of the sampler immediately before sampling. Attach sampler to personal sampling pump with flexible tubing.
3. Sample at an accurately known flow rate between 0.01 and 0.2 L/min for a total sample size as shown in Table 3.
4. Cap the samplers with plastic (not rubber) caps and pack securely for shipment.

SAMPLE PREPARATION:

5. Place the front and back sorbent sections of the sampler tube in separate vials. Include the glass wool plug in the vial along with the front sorbent section.
6. Add 1.0 mL eluent to each vial. Attach crimp cap to each vial immediately.
7. Allow to stand at least 30 min with occasional agitation.

CALIBRATION AND QUALITY CONTROL:

8. Calibrate daily with at least six working standards from below the LOD to 10 times the LOQ. If necessary, additional standards may be added to extend the calibration curve.
 - a. Add known amounts of analytes to carbon disulfide solvent in 10-mL volumetric flasks and dilute to the mark. Prepare additional standards by serial dilution in 10-mL volumetric flasks.
 - b. Analyze together with samples and blanks (steps 11 through 12).
 - c. Prepare calibration graph (peak area of analyte vs. μ g analyte per sample).

9. Determine desorption efficiency (DE) at least once for each batch of charcoal used for sampling in the calibration range (step 8).
 - a. Prepare three tubes at each of five levels plus three media blanks.
 - b. Inject a known amount of DE stock solution (5 to 25 μL) directly onto front sorbent section of each charcoal tube with a microliter syringe.
 - c. Allow the tubes to air equilibrate for several minutes, then cap the ends of each tube and allow to stand overnight.
 - d. Desorb (steps 5 through 7) and analyze together with standards and blanks (steps 11 and 12).
 - e. Prepare a graph of DE vs. μg analyte recovered.
10. Analyze a minimum of three quality control blind spikes and three analyst spikes to insure that the calibration graph and DE graph are in control.

MEASUREMENT:

11. Set gas chromatograph according to manufacturer's recommendations and to conditions given on page 1501-1. Inject a 1- μL sample aliquot manually using the solvent flush technique or with an autosampler.
 Note: If peak area is above the linear range of the working standards, dilute with solvent, reanalyze, and apply the appropriate dilution factor in the calculations.

<u>Analyte</u>	<u>Approximate Retention Time (min)</u>
benzene ^a	3.52
toluene ^a	6.13
ethylbenzene ^a	10.65
<u>o</u> -xylene ^a	12.92
<u>m</u> -xylene ^a	11.33
<u>p</u> -xylene ^a	11.04
cumene ^b	18.61
<u>p</u> -tert-butyltoluene ^b	21.45
α -methylstyrene ^b	19.99
β -methylstyrene ^b	20.82
styrene ^b	18.33

^a Separation achieved using a 30-m Stabilwax fused silica capillary column.

^b Separation achieved using a 30-m Rtx-35 fused silica capillary column.

12. Measure peak areas.

CALCULATIONS:

13. Determine the mass, μg (corrected for DE) of analyte found in the sample front (W_f) and back (W_b) sorbent sections, and in the average media blank front (B_f) and back (B_b) sorbent sections.
 NOTE: If $W_b > W_f/10$, report breakthrough and possible sample loss.
14. Calculate concentration, C, of analyte in the air volume sampled, V (L):

$$C = \frac{(W_f + W_b - B_f - B_b)}{V}, \text{mg} / \text{m}^3$$

NOTE: $\mu\text{g}/\text{L} = \text{mg}/\text{m}^3$

EVALUATION OF METHOD:

The desorption efficiency, at levels ranging from 5 times the LOQ to 0.1x the REL, was determined for each analyte by spiking known amounts (in CS₂) on coconut shell charcoal tubes. Both groups of analytes (A and B) were spiked together on the charcoal sorbent tubes. All analytes, with the exception of styrene and naphthalene, exhibited acceptable desorption efficiency recovery results at all five levels evaluated. Styrene failed to meet the 75% recovery criteria at the 18.1 µg and 90.6 µg levels. Naphthalene failed to meet the 75% criteria at all levels evaluated ranging from 48.8 µg to 976.0 µg.

Each analyte, at a level approximately 0.05x REL/PEL, was evaluated for its storage stability @ 5°C after 7, 14, and 30 days. All analytes, with the exception of naphthalene, had acceptable recoveries after 30 days storage.

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METHOD WRITTEN BY:

Stephanie M. Pendergrass, NIOSH/DART

TABLE 1. SYNONYMS, FORMULA, MOLECULAR WEIGHT, PROPERTIES

Name/Synonyms	Empirical Formula	Molecular Weight	Boiling Point (°C)	Vapor Pressure @ 25 °C (mm Hg)	(kPa)	Density @ 20 °C (g/mL)
benzene CAS #71-43-2 RTECS CY1400000	C ₆ H ₆	78.11	80.1	95.2	12.7	0.879
<u>p</u> -tert-butyltoluene CAS #98-51-1 RTECS XS8400000 1-tert-butyl-4-methylbenzene	C ₁₁ H ₁₆	148.25	192.8	0.7	0.09	0.861
cumene CAS #98-82-8 RTECS GR8575000 isopropylbenzene	C ₉ H ₁₂	120.20	152.4	4.7	0.63	0.862
ethylbenzene CAS #100-41-4 RTECS DA0700000	C ₈ H ₁₀	106.17	136.2	9.6	1.28	0.867
α-methylstyrene CAS #98-83-9 RTECS WL5075300 isopropenylbenzene (1-methylethenyl)-benzene	C ₉ H ₁₀	118.18	165.4	2.5	0.33	0.909
β-methylstyrene CAS #873-66-5 RTECS DA8400500	C ₉ H ₁₀	118.18	175.0	—	—	0.911
toluene CAS #108-88-3 RTECS XS5250000 methylbenzene	C ₇ H ₈	92.14	110.6	28.4	3.79	0.867
xylene ^c CAS #1330-20-7 RTECS ZE2100000 dimethylbenzene (<u>p</u> -xylene)	C ₈ H ₁₀ (<u>ortho</u>) (<u>meta</u>) (<u>para</u>)	106.17	144.4 139.1 138.4	6.7 8.4 8.8	0.89 1.12 1.18	0.880 0.864 0.861
styrene CAS #100-42-5 RTECS WL3675000 vinylbenzene	C ₈ H ₈	104.15	145.2	6.1	0.81	0.906

TABLE 2. PERMISSIBLE EXPOSURE LIMITS, PPM

Substance	OSHA TWA	NIOSH			ACGIH		mg/m ³ per ppm
		TWA	C	STEL	TLV	STEL	
benzene	1	0.1 ^a	1		10 ^b		3.19
<u>p-tert</u> -butyltoluene	10	10		20	1		6.06
cumene	50 (skin)	50 (skin)			50 (skin)		4.91
ethylbenzene	100	100		125	100	125	4.34
α-methylstyrene	100	50		100	50	100	4.83
β-methylstyrene	100	50		100	50	100	4.83
toluene	200	100		150	50 (skin)		3.77
<u>o</u> -xylene	100	100 ^c		150	100	150	4.34
<u>m</u> -xylene	100	100			100	150	4.34
<u>p</u> -xylene	100	100			100	150	4.34
styrene	100	50		100	50	100 (skin)	4.26

^a Potential carcinogen

^b Suspect carcinogen

^c Group I Pesticide

TABLE 3. SAMPLING FLOWRATE^a, VOLUME, CAPACITY, RANGE, OVERALL BIAS AND PRECISION

Substance	Sampling		Breakthrough		Range at VOL-MIN (mg/m ³)	Overall		Accuracy (±%)
	Flowrate (L/min)	Volume ^b (L) MIN MAX	Volume @ Concentration (L) (mg/m ³)	Bias (%)		Precision (\hat{S}_r)		
benzene	≤0.20	5 30	>45 149	42 - 165	-0.4	0.059	11.4	
<u>p-tert</u> -butyltoluene	≤0.20	1 29	44 112	29 - 119	-10.3	0.071 ^c	20.7	
cumene	≤0.20	1 30	>45 480	120 - 480	5.6	0.059	15.2	
ethylbenzene	≤0.20	1 24	35 917	222 - 884	-7.6	0.089 ^c	17.1	
α-methylstyrene	≤0.20	1 30	>45 940	236 - 943	-7.6	0.061 ^c	16.9	
β-methylstyrene	≤0.20	1 30	>45 940	236 - 943	-7.6	0.061	16.9	
toluene	≤0.20	1 8	12 2294	548 - 2190	1.6	0.052	10.9	
xylene (o-,m-,p-)	≤0.20	2 23	35 870	218 - 870	-1.2	0.060	12.2	
styrene	≤1.00	1 14	21 1710	426 - 1710	-7.9	0.058 ^c	16.7	

^a Minimum recommended flow is 0.01 L/min.

^b V_{Min} = minimum sample volume @ OSHA TWA;

V_{Max} = maximum sample volume @ OSHA TWA

^c Corrected value, calculated from data in Reference 5.

TABLE 4. MEASUREMENT RANGE AND PRECISION^a

Substance	LOD ($\mu\text{g}/\text{sample}$)	Measurement	
		Range (mg)	Precision (\hat{S}_r)
benzene	0.5	0.004-0.35	0.013
<u>p</u> - <u>tert</u> -butyltoluene	1.1	0.013-1.09	0.017 ^a
cumene	0.6	0.039-3.46	0.017
ethylbenzene	0.5	0.045-8.67	0.015
α -methylstyrene	0.6	0.036-3.57	0.014
β -methylstyrene	0.6	0.036-0.728	0.014
toluene	0.7	0.024-4.51	0.022
o-xylene	0.8	0.044-10.4	0.014
m-xylene	0.8	0.043-0.864	0.013
p-xylene	0.7	0.043-0.861	0.015
styrene	0.4	0.181-8.49	0.014

^a Corrected value, calculated from data in [5].

POLYCHLOROBIPHENYLS

5503

mixture: C₁₂H_{10-x}Cl_x
[where x = 1 to 10]

MW: ca. 258 (42% Cl ; C₁₂H₇Cl₅);
ca. 326 (54% Cl ; C₁₂H₅Cl₇)

CAS: Table 1

RTECS: Table 1

METHOD: 5503, Issue 2

EVALUATION: PARTIAL

Issue 1: 15 February 1984

Revision #1: 15 August 1987

Issue 2: 15 August 1994

OSHA : 1 mg/m³ (42% Cl);
0.5 mg/m³ (54% Cl)

NIOSH: 0.001 mg/m³/10 h (carcinogen)

ACGIH: 1 mg/m³ (42% Cl) (skin)
0.5 mg/m³ (54% Cl) (skin)

PROPERTIES: 42% Cl: BP 325 to 366 °C; MP -19 °C;
d 1.38 g/mL @ 25 °C;

VP 0.01 Pa (8 x 10⁻⁵ mm Hg;
1 mg/m³) @ 20 °C

54% Cl: BP 365 to 390 °C; MP 10 °C;
d 1.54 g/mL @ 25 °C; VP
0.0004 Pa (3 x 10⁻⁶ mm Hg;
0.05 mg/m³) @ 20 °C

SYNONYMS: PCB; 1,1'-biphenyl chloro; chlorodiphenyl, 42% Cl (Aroclor 1242); and 54% Cl (Aroclor 1254)

SAMPLING		MEASUREMENT	
SAMPLER:	FILTER + SOLID SORBENT (13-mm glass fiber + Florisil, 100 mg/50 mg)	TECHNIQUE:	GAS CHROMATOGRAPHY, ECD (⁶³ Ni)
FLOW RATE:	0.05 to 0.2 L/min or less	ANALYTE:	polychlorobiphenyls
VOL-MIN:	1 L @ 0.5 mg/m ³	DESORPTION:	filter + front section, 5 mL hexane; back section, 2 mL hexane
-MAX:	50 L	INJECTION	
SHIPMENT:	transfer filters to glass vials after sampling	VOLUME:	4-µL with 1-µL backflush
SAMPLE		TEMPERATURE-INJECTION:	250 to 300 °C
STABILITY:	unknown for filters; 2 months for Florisil tubes [1]	-DETECTOR:	300 to 325 °C
BLANKS:	2 to 10 field blanks per set	-COLUMN:	180 °C
ACCURACY		CARRIER GAS:	N ₂ , 40 mL/min
RANGE STUDIED:	not studied	COLUMN:	glass, 1.8 m x 2-mm ID, 1.5% OV-17/1.95% QF-1 on 80/100 mesh Chromosorb WHP
BIAS:	none identified	CALIBRATION:	standard PCB mixture in hexane
OVERALL PRECISION (Ŝ_{r,T}):	not evaluated	RANGE:	0.4 to 4 µg per sample [2]
ACCURACY:	not determined	ESTIMATED LOD:	0.03 µg per sample [2]
		PRECISION (Ŝ_r):	0.044 [1]

APPLICABILITY: The working range is 0.01 to 10 mg/m³ for a 40-L air sample [1]. With modifications, surface wipe samples may be analyzed [3,4].

INTERFERENCES: Chlorinated pesticides, such as DDT and DDE, may interfere with quantification of PCB. Sulfur-containing compounds in petroleum products also interfere [5].

OTHER METHODS: This method revises methods S120 [6] and P&CAM 244 [1]. Methods S121 [7] and P&CAM 253 [8] for PCB have not been revised.

REAGENTS:

1. Hexane, pesticide quality.
2. Florisil, 30/48 mesh sieved from 30/60 mesh. After sieving, dry at 105 °C for 45 min. Mix the cooled Florisil with 3% (w/w) distilled water.
3. Nitrogen, purified.
4. Stock standard solution of the PCB in methanol or isooctane (commercially available).*

* See SPECIAL PRECAUTIONS.

EQUIPMENT:

1. Sampler: 13-mm glass fiber filter without binders in a Swinnex cassette (Cat. No. SX 0001300, Millipore Corp.) followed by a glass tube, 7 cm long, 6-mm OD, 4-mm ID containing two sections of 30/48 mesh deactivated Florisil. The front section is preceded by glass wool and contains 100 mg and the backup section contains 50 mg; urethane foam between sections and behind the backup section. (SKC 226-39, Supelco ORBO-60, or equivalent) Join the cassette and Florisil tube with PVC tubing, 3/8" L x 9/32" OD x 5/32" ID, on the outlet of the cassette and with another piece of PVC tubing, 3/4" L x 5/16" OD x 3/16" ID, complete the union.
2. Personal sampling pump, 0.05 to 0.2 L/min, with flexible connecting tubing.
3. Tweezers.
4. Vials, glass, 4- and 7-mL, with aluminum or PTFE-lined caps
5. Gas chromatograph, electron capture detection (⁶³Ni), integrator and column (page 5503-1).
6. Volumetric flasks, 10-mL and other convenient sizes for preparing standards.
7. Syringe, 10- μ L.

SPECIAL PRECAUTIONS: Avoid prolonged or repeated contact of skin with PCB and prolonged or repeated breathing of the vapor [9-11].

SAMPLING:

1. Calibrate each personal sampling pump with a representative sampler in line.
2. Break the ends of the Florisil tube immediately before sampling. Connect Florisil tube to Swinnex cassette and attach sampler to personal sampling pump with flexible tubing.
3. Sample at an accurately known flow rate between 0.05 and 0.2 L/min for a total sample size of 1 to 50 L.
NOTE: At low PCB concentrations, the sampler was found to be efficient when operated at flow rates up to 1 L/min, for 24 hours [4]. Under these conditions, the limit of detection was 0.02 μ g/m³.
4. Transfer the glass fiber filters to 7-mL vials. Cap the Florisil tubes with plastic (not rubber) caps and pack securely for shipment.

SAMPLE PREPARATION:

5. Place the glass wool and 100-mg Florisil bed in the same 7-mL vial in which the filter was stored. Add 5.0 mL hexane.
6. In a 4-mL vial, place the 50-mg Florisil bed including the two urethane plugs. Add 2.0 mL hexane.
7. Allow to stand 20 min with occasional agitation.

CALIBRATION AND QUALITY CONTROL:

8. Calibrate daily with at least six working standards over the range 10 to 500 ng/mL PCB.
 - a. Add known amounts of stock standard solution to hexane in 10-mL volumetric flasks and dilute to the mark.
 - b. Analyze together with samples and blanks (steps 11 and 12).
 - c. Prepare calibration graph (sum of areas of selected peaks vs. ng PCB per sample).
9. Determine desorption efficiency (DE) at least once for each lot of glass fiber filters and Florisil used for sampling in the calibration range (step 8). Prepare three tubes at each of five levels plus three media blanks.
 - a. Remove and discard back sorbent section of a media blank Florisil tube.
 - b. Inject known amounts of stock standard solution directly onto front sorbent section and onto a media blank filter with a microliter syringe.
 - c. Cap the tube. Allow to stand overnight.
 - d. Desorb (steps 5 through 7) and analyze together with working standards (steps 11 and 12).
 - e. Prepare a graph of DE vs. µg PCB recovered.
10. Analyze three quality control blind spikes and three analyst spikes to ensure that the calibration graph and DE graph are in control.

MEASUREMENT:

11. Set gas chromatograph according to manufacturer's recommendations and to conditions given on page 5503-1. Inject sample aliquot manually using solvent flush technique or with autosampler.

NOTE 1: Where individual identification of PCB is needed, a procedure using a capillary column may be used [12].

NOTE 2: If peak area is above the linear range of the working standards, dilute with hexane, reanalyze and apply the appropriate dilution factor in calculations.
12. Sum the areas for five or more selected peaks.

CALCULATIONS:

13. Determine the mass, µg (corrected for DE) of PCB found on the glass fiber filter (W) and in the Florisil front (W_f) and back (W_b) sorbent sections, and in the average media blank filter (B) and front (B_f) and back (B_b) sorbent sections.

NOTE: If $W_b > W_f/10$, report breakthrough and possible sample loss.
14. Calculate concentration, C, of PCB in the air volume sampled, V (L):

$$C = \frac{(W + W_f + W_b - B - B_f - B_b)}{V}, \text{ mg/m}^3.$$

EVALUATION OF METHOD:

This method uses 13-mm glass fiber filters which have not been evaluated for collecting PCB. In Method S120, however, Aroclor 1242 was completely recovered from 37-mm glass fiber filters using 15 mL isooctane [8,13,14]. With 5 mL of hexane, Aroclor 1016 was also completely recovered from 100-mg Florisil beds after one-day storage [1]. Thus, with no adsorption effect likely on glass fiber filters for PCB, 5 mL hexane should be adequate to completely extract PCB from combined filters and front sorbent sections. Sample stability on glass fiber filters has not been investigated. Breakthrough volume was >48 L for the Florisil tube at 75% RH in an atmosphere containing 10 µg/m³ Aroclor 1016 [1].

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METHOD REVISED BY:

James E. Arnold, NIOSH/DPSE; S120 originally validated under NIOSH Contract 210-76-0123.

Table 1. General Information.

<u>Compound</u>	<u>CAS</u>	<u>RTECS</u>
Polychlorinated Biphenyls	1336-36-3	TQ1350000
Chlorobiphenyl	27323-18-8	DV2063000
Aroclor 1016 (41% Cl)	12674-11-2	TQ1351000
Aroclor 1242 (42% Cl)	53469-21-9	TQ1356000
Aroclor 1254 (54% Cl)	11097-69-1	TQ1360000

Table 2. Composition of some Aroclors [15].

<u>Major Components</u>	<u>Aroclor 1016</u>	<u>Aroclor 1242</u>	<u>Aroclor 1254</u>
Biphenyl	0.1%	<0.1%	<0.1%
Monochlorobiphenyls	1	1	<0.1
Dichlorobiphenyls	20	16	0.5
Trichlorobiphenyls	57	49	1
Tetrachlorobiphenyls	21	25	21
Pentachlorobiphenyls	1	8	48
Hexachlorobiphenyls	<0.1	1	23
Heptachlorobiphenyls	none detected	<0.1	6
Octachlorobiphenyls	none detected	none detected	none detected

ELEMENTS by ICP (Nitric/Perchloric Acid Ashing)

7300

MW: Table 1

CAS: Table 2

RTECS: Table 2

METHOD: 7300, Issue 3

EVALUATION: PARTIAL

Issue 1: 15 August 1990
Issue 3: 15 March 2003

OSHA: Table 2

PROPERTIES: Table 1

NIOSH: Table 2

ACGIH: Table 2

ELEMENTS: aluminum* antimony* arsenic barium beryllium* cadmium	calcium chromium* cobalt* copper iron lead*	lanthanum lithium* magnesium manganese* molybdenum*	nickel potassium phosphorus selenium silver	strontium tellurium tin thallium titanium	tungsten* vanadium* yttrium zinc zirconium*
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*Some compounds of these elements require special sample treatment.

SAMPLING		MEASUREMENT	
SAMPLER:	FILTER (0.8- μ m, cellulose ester membrane, or 5.0- μ m, polyvinyl chloride membrane)	TECHNIQUE:	INDUCTIVELY COUPLED ARGON PLASMA, ATOMIC EMISSION SPECTROSCOPY (ICP-AES)
FLOWRATE:	1 to 4 L/min	ANALYTE:	elements above
VOL-MIN:	Table 1	ASHING	
-MAX:	Table 1	REAGENTS:	conc. HNO ₃ / conc. HClO ₄ (4:1), 5 mL; 2mL increments added as needed
SHIPMENT:	routine	CONDITIONS:	room temperature, 30 min; 150 °C to near dryness
SAMPLE		FINAL	
STABILITY:	stable	SOLUTION:	4% HNO ₃ , 1% HClO ₄ , 25 mL
BLANKS:	2 to 10 field blanks per set	WAVELENGTH:	depends upon element; Table 3
ACCURACY		BACKGROUND	
		CORRECTION:	spectral wavelength shift
RANGE STUDIED:	not determined	CALIBRATION:	elements in 4% HNO ₃ , 1% HClO ₄
BIAS:	not determined	RANGE:	varies with element [1]
OVERALL PRECISION ($\hat{S}_{r,r}$):	not determined	ESTIMATED LOD:	Tables 3 and 4
ACCURACY:	not determined	PRECISION (\hat{S}):	Tables 3 and 4

APPLICABILITY: The working range of this method is 0.005 to 2.0 mg/m³ for each element in a 500-L air sample. This is simultaneous elemental analysis, not compound specific. Verify that the types of compounds in the samples are soluble with the ashing procedure selected.

INTERFERENCES: Spectral interferences are the primary interferences encountered in ICP-AES analysis. These are minimized by judicious wavelength selection, interelement correction factors and background correction [1-4].

OTHER METHODS: This issue updates issues 1 and 2 of Method 7300, which replaced P&CAM 351 [3] for trace elements. Flame atomic absorption spectroscopy (e.g., Methods 70XX) is an alternate analytical technique for many of these elements. Graphite furnace AAS (e.g., 7102 for Be, 7105 for Pb) is more sensitive.

REAGENTS:

1. Nitric acid (HNO₃), conc., ultra pure.
2. Perchloric acid (HClO₄), conc., ultra pure.*
3. Ashing acid: 4:1 (v/v) HNO₃:HClO₄. Mix 4 volumes conc. HNO₃ with 1 volume conc. HClO₄.
4. Calibration stock solutions, 1000 µg/mL. Commercially available, or prepared per instrument manufacturer's recommendation (see step 12).
5. Dilution acid, 4% HNO₃, 1% HClO₄. Add 50 mL ashing acid to 600 mL water; dilute to 1 L.
6. Argon.
7. Distilled, deionized water.

* See SPECIAL PRECAUTIONS.

EQUIPMENT:

1. Sampler: cellulose ester membrane filter, 0.8-µm pore size; or polyvinyl chloride membrane, 5.0-µm pore size; 37-mm diameter, in cassette filter holder.
2. Personal sampling pump, 1 to 4 L/min, with flexible connecting tubing.
3. Inductively coupled plasma-atomic emission spectrometer, equipped as specified by the manufacturer for analysis of elements of interest.
4. Regulator, two-stage, for argon.
5. Beakers, Phillips, 125-mL, or Griffin, 50-mL, with watchglass covers.**
6. Volumetric flasks, 10-, 25-, 100-mL, and 1-L**
7. Assorted volumetric pipets as needed.**
8. Hotplate, surface temperature 150 °C.

** Clean all glassware with conc. nitric acid and rinse thoroughly in distilled water before use.

SPECIAL PRECAUTIONS: All perchloric acid digestions are required to be done in a perchloric acid hood. When working with concentrated acids, wear protective clothing and gloves.

SAMPLING:

1. Calibrate each personal sampling pump with a representative sampler in line.
2. Sample at an accurately known flow rate between 1 and 4 L/min for a total sample size of 200 to 2000 L (see Table 1) for TWA measurements. Do not exceed a filter loading of approximately 2 mg total dust.

SAMPLE PREPARATION:

3. Open the cassette filter holders and transfer the samples and blanks to clean beakers.
4. Add 5 mL ashing acid. Cover with a watchglass. Let stand 30 min at room temperature.
NOTE: Start a reagent blank at this step.
5. Heat on hotplate (120 °C) until ca. 0.5 mL remains.
NOTE 1: Recovery of lead from some paint matrices may require other digestion techniques. See Method 7082 (Lead by Flame AAS) for an alternative hotplate digestion procedure or Method 7302 for a microwave digestion procedure.
NOTE 2: Some species of Al, Be, Co, Cr, Li, Mn, Mo, V, and Zr will not be completely solubilized by this procedure. Alternative solubilization techniques for most of these elements can be found elsewhere [5-10]. For example, aqua regia may be needed for Mn [6,12].
6. Add 2 mL ashing acid and repeat step 5. Repeat this step until the solution is clear.
7. Remove watchglass and rinse into the beaker with distilled water.
8. Increase the temperature to 150 °C and take the sample to near dryness (ca. 0.5 mL).
9. Dissolve the residue in 2 to 3 mL dilution acid.
10. Transfer the solutions quantitatively to 25-mL volumetric flasks.
11. Dilute to volume with dilution acid.
NOTE: If more sensitivity is required, the final sample volume may be held to 10 mL.

CALIBRATION AND QUALITY CONTROL:

12. Calibrate the spectrometer according to the manufacturers recommendations.
NOTE: Typically, an acid blank and 1.0 µg/mL multielement working standards are used. The following multielement combinations are chemically compatible in 4% HNO₃/1% HClO₄:
 - a. Al, As, Ba, Be, Ca, Cd, Co, Cr, Cu, Fe, La, In, Na
 - b. Ag, K, Li, Mg, Mn, Ni, P, Pb, Se, Sr, Tl, V, Y, Zn, Sc
 - c. Mo, Sb, Sn, Te, Ti, W, Zr
 - d. Acid blank
13. Analyze a standard for every ten samples.
14. Check recoveries with at least two spiked blank filters per ten samples.

MEASUREMENT:

15. Set spectrometer to conditions specified by manufacturer.
16. Analyze standards and samples.
NOTE: If the values for the samples are above the range of the standards, dilute the solutions with dilution acid, reanalyze and apply the appropriate dilution factor in the calculations.

CALCULATIONS:

17. Obtain the solution concentrations for the sample, C_s (µg/mL), and the average media blank, C_b (µg/mL), from the instrument.
18. Using the solution volumes of sample, V_s (mL), and media blank, V_b (mL), calculate the concentration, C (mg/m³), of each element in the air volume sampled, V (L):

$$C = \frac{C_s V_s - C_b V_b}{V}, \text{mg} / \text{m}^3$$

NOTE: µg/L ≡ mg/m³

EVALUATION OF METHOD:**Issues 1 and 2**

Method, 7300 was originally evaluated in 1981 [2,3]. The precision and recovery data were determined at 2.5 and 1000 µg of each element per sample on spiked filters. The measurements used for the method evaluation in Issues 1 and 2 were determined with a Jarrell-Ash Model 1160 Inductively Coupled Plasma Spectrometer operated according to manufacturer's instructions.

Issue 3

In this update of NIOSH Method 7300, the precision and recovery data were determined at approximately 3x and 10x the instrumental detection limits on commercially prepared spiked filters [12] using 25.0 mL as the final sample volume. Tables 3 and 4 list the precision and recovery data, instrumental detection limits, and analytical wavelengths for mixed cellulose ester (MCE) and polyvinyl chloride (PVC) filters. PVC Filters which can be used for total dust measurements and then digested for metals measurements were tested and found to give good results. The values in Tables 3 and 4 were determined with a Spectro Analytical Instruments Model End On Plasma (EOP)(axial) operated according to manufacturer's instructions.

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Method originally written by Mark Millson, NIOSH/DART, and R. DeLon Hull, Ph.D., NIOSH/DSHEFS, James B. Perkins, David L. Wheeler, and Keith Nicholson, DataChem Laboratories, Salt Lake City, UT.

TABLE 1. PROPERTIES AND SAMPLING VOLUMES

Element (Symbol)	Properties		Air Volume, L @ OSHA PEL	
	Atomic Weight	MP, °C	MIN	MAX
Silver (Ag)	107.87	961	250	2000
Aluminum (Al)	26.98	660	5	100
Arsenic (As)	74.92	817	5	2000
Barium (Ba)	137.34	710	50	2000
Beryllium (Be)	9.01	1278	1250	2000
Calcium (Ca)	40.08	842	5	200
Cadmium (Cd)	112.40	321	13	2000
Cobalt (Co)	58.93	1495	25	2000
Chromium (Cr)	52.00	1890	5	1000
Copper (Cu)	63.54	1083	5	1000
Iron (Fe)	55.85	1535	5	100
Potassium (K)	39.10	63.65	5	1000
Lanthanum	138.91	920	5	1000
Lithium (Li)	6.94	179	100	2000
Magnesium (Mg)	24.31	651	5	67
Manganese (Mn)	54.94	1244	5	200
Molybdenum (Mo)	95.94	651	5	67
Nickel (Ni)	58.71	1453	5	1000
Phosphorus (P)	30.97	44	25	2000
Lead (Pb)	207.19	328	50	2000
Antimony (Sb)	121.75	630.5	50	2000
Selenium (Se)	78.96	217	13	2000
Tin (Sn)	118.69	231.9	5	1000
Strontium (Sr)	87.62	769	10	1000
Tellurium (Te)	127.60	450	25	2000
Titanium (Ti)	47.90	1675	5	100
Thallium (Tl)	204.37	304	25	2000
Vanadium (V)	50.94	1890	5	2000
Tungsten (W)	183.85	3410	5	1000
Yttrium (Y)	88.91	1495	5	1000
Zinc (Zn)	65.37	419	5	200
Zirconium (Zr)	91.22	1852	5	200

TABLE 2. EXPOSURE LIMITS, CAS #, RTECS

Element (Symbol)	CAS #	RTECS	Exposure Limits, mg/m ³ (Ca = carcinogen)		
			OSHA	NIOSH	ACGIH
Silver (Ag)	7440-22-4	VW3500000	0.01 (dust, fume, metal)	0.01 (metal, soluble)	0.1 (metal) 0.01 (soluble)
Aluminum (Al)	7429-90-5	BD0330000	15 (total dust) 5 (respirable)	10 (total dust) 5 (respirable fume) 2 (salts, alkyls)	10 (dust) 5 (powders, fume) 2 (salts, alkyls)
Arsenic (As)	7440-38-2	CG0525000	varies	C 0.002, Ca	0.01, Ca
Barium (Ba)	7440-39-3	CQ8370000	0.5	0.5	0.5
Beryllium (Be)	7440-41-7	DS1750000	0.002, C 0.005	0.0005, Ca	0.002, Ca
Calcium (Ca)	7440-70-2	--	varies	varies	varies
Cadmium (Cd)	7440-43-9	EU9800000	0.005	lowest feasible, Ca	0.01 (total), Ca 0.002 (respir.), Ca
Cobalt (Co)	7440-48-4	GF8750000	0.1	0.05 (dust, fume)	0.02 (dust, fume)
Chromium (Cr)	7440-47-3	GB4200000	0.5	0.5	0.5
Copper (Cu)	7440-50-8	GL5325000	1 (dust, mists) 0.1 (fume)	1 (dust) 0.1 (fume)	1 (dust, mists) 0.2 (fume)
Iron (Fe)	7439-89-6	NO4565500	10 (dust, fume)	5 (dust, fume)	5 (fume)
Potassium (K)	7440-09-7	TS6460000	--	--	--
Lanthanum	7439-91-0	--	--	--	--
Lithium (Li)	7439-93-2	--	--	--	--
Magnesium (Mg)	7439-95-4	OM2100000	15 (dust) as oxide 5 (respirable)	10 (fume) as oxide	10 (fume) as oxide
Manganese (Mn)	7439-96-5	OO9275000	C 5	1; STEL 3	5 (dust) 1; STEL 3 (fume)
Molybdenum (Mo)	7439-98-7	QA4680000	5 (soluble) 15 (total insoluble)	5 (soluble) 10 (insoluble)	5 (soluble) 10 (insoluble)
Nickel (Ni)	7440-02-0	QR5950000	1	0.015, Ca	0.1 (soluble) 1 (insoluble, metal)
Phosphorus (P)	7723-14-0	TH3500000	0.1	0.1	0.1
Lead (Pb)	7439-92-1	OF7525000	0.05	0.05	0.05
Antimony (Sb)	7440-36-0	CC4025000	0.5	0.5	0.5
Selenium (Se)	7782-49-2	VS7700000	0.2	0.2	0.2
Tin (Sn)	7440-31-5	XP7320000	2	2	2
Strontium (Sr)	7440-24-6	--	--	--	--
Tellurium (Te)	13494-80-9	WY2625000	0.1	0.1	0.1
Titanium (Ti)	7440-32-6	XR1700000	--	--	--
Thallium (Tl)	7440-28-0	XG3425000	0.1 (skin) (soluble)	0.1 (skin) (soluble)	0.1 (skin)
Vanadium (V)	7440-62-2	YW2400000	--	C 0.05	--
Tungsten	7440-33-7	--	5	5 10 (STEL)	5 10 (STEL)
Yttrium (Y)	7440-65-5	ZG2980000	1	N/A	1
Zinc (Zn)	7440-66-6	ZG8600000	--	--	--
Zirconium (Zr)	7440-67-7	ZH7070000	5	5, STEL 10	5, STEL 10

**TABLE 3. MEASUREMENT PROCEDURES AND DATA [1].
Mixed Cellulose Ester Filters (0.45 µm)**

Element (a)	wavelength nm	Est. LOD µg/ Filter	LOD ng/mL	Certified 3x LOD (b)	% Recovery (c)	Percent RSD (N=25)	Certified 10x LOD (b)	% Recovery (c)	Percent RSD (N=25)
Ag	328	0.042	1.7	0.77	102.9	2.64	3.21	98.3	1.53
Al	167	0.115	4.6	1.54	105.4	11.5	6.40	101.5	1.98
As	189	0.140	5.6	3.08	94.9	2.28	12.9	93.9	1.30
Ba	455	0.005	0.2	0.31	101.8	1.72	1.29	97.7	0.69
Be	313	0.005	0.2	0.31	100.0	1.44	1.29	98.4	0.75
Ca	317	0.908	36.3	15.4	98.7	6.65	64.0	100.2	1.30
Cd	226	0.0075	0.3	0.31	99.8	1.99	1.29	97.5	0.88
Co	228	0.012	0.5	0.31	100.8	1.97	1.29	98.4	0.90
Cr	267	0.020	0.8	0.31	93.4	16.3	1.29	101.2	2.79
Cu	324	0.068	2.7	1.54	102.8	1.47	6.40	100.6	0.92
Fe	259	0.095	3.8	1.54	103.3	5.46	6.40	98.0	0.95
K	766	1.73	69.3	23.0	90.8	1.51	96.4	97.6	0.80
La	408	0.048	1.9	0.77	102.8	2.23	3.21	100.1	0.92
Li	670	0.010	0.4	0.31	110.0	1.91	1.29	97.7	0.81
Mg	279	0.098	3.9	1.54	101.1	8.35	6.40	98.0	1.53
Mn	257	0.005	0.2	0.31	101.0	1.77	1.29	94.7	0.73
Mo	202	0.020	0.8	0.31	105.3	2.47	1.29	98.6	1.09
Ni	231	0.020	0.8	0.31	109.6	3.54	1.29	101.2	1.38
P	178	0.092	3.7	1.54	84.4	6.19	6.40	82.5	4.75
Pb	168	0.062	2.5	1.54	109.4	2.41	6.40	101.7	0.88
Sb	206	0.192	7.7	3.08	90.2	11.4	12.9	41.3	32.58
Se	196	0.135	5.4	2.3	87.6	11.6	9.64	84.9	4.78
Sn	189	0.040	1.6	0.77	90.2	18.0	3.21	49	21.79
Sr	407	0.005	0.2	0.31	101.0	1.55	1.29	97.3	0.65
Te	214	0.078	3.1	1.54	102.0	2.67	6.40	97.4	1.24
Ti	334	0.050	2.0	0.77	98.4	2.04	3.21	93.4	1.08
Tl	190	0.092	3.7	1.54	100.9	2.48	6.40	99.1	0.80
V	292	0.028	1.1	0.77	103.2	1.92	3.21	98.3	0.84
W	207	0.075	3.0	1.54	72.2	10.1	6.40	57.6	14.72
Y	371	0.012	0.5	0.31	100.5	1.80	1.29	97.4	0.75
Zn	213	0.310	12.4	4.60	102.2	1.87	19.3	95.3	0.90
Zr	339	0.022	0.9	0.31	88.0	19.4	1.29	25	57.87

- (a) Bold values are qualitative only because of low recovery.
(b) Values are certified by Inorganic Ventures INC. at 3x and 10x the approximate instrumental LOD
(c) Values reported were obtained with a Spectro Analytical Instruments EOP ICP; performance may vary with instrument and should be independently verified.

TABLE 4. MEASUREMENT PROCEDURES AND DATA [1].
Polyvinyl Chloride Filter (5.0 µm)

Element (c)	wavelength nm	Est. LOD µg per filter	LOD ng/mL	Certified 3x LOD (b)	% Recovery (a)	Percent RSD (N=25)	Certified ¹⁷ 10x LOD (b)	% Recovery (a)	Percent RSD (N=25)
Ag	328	0.042	1.7	0.78	104.2	8.20	3.18	81.8	18.9
Al	167	0.115	4.6	1.56	77.4	115.24	6.40	92.9	20.9
As	189	0.140	5.6	3.10	100.7	5.13	12.70	96.9	3.2
Ba	455	0.005	0.2	0.31	102.4	3.89	1.270	99.8	2.0
Be	313	0.005	0.2	0.31	106.8	3.53	1.270	102.8	2.1
Ca	317	0.908	36.3	15.6	68.1	12.66	64.00	96.8	5.3
Cd	226	0.0075	0.3	0.31	105.2	5.57	1.27	101.9	2.8
Co	228	0.012	0.5	0.31	109.3	4.67	1.27	102.8	2.8
Cr	267	0.020	0.8	0.31	109.4	5.31	1.27	103.4	4.1
Cu	324	0.068	2.7	1.56	104.9	5.18	6.40	101.8	2.4
Fe	259	0.095	3.8	1.56	88.7	46.82	6.40	99.1	9.7
K	766	1.73	69.3	23.4	96.4	4.70	95.00	99.2	2.2
La	408	0.048	1.9	0.78	45.5	4.19	3.18	98.8	2.6
Li	670	0.010	0.4	0.31	107.7	4.80	1.27	110.4	2.7
Mg	279	0.098	3.9	1.56	54.8	20.59	6.40	64.5	5.7
Mn	257	0.005	0.2	0.31	101.9	4.18	1.27	99.3	2.4
Mo	202	0.020	0.8	0.31	106.6	5.82	1.27	98.1	3.8
Ni	231	0.020	0.8	0.31	111.0	5.89	1.27	103.6	3.2
P	178	0.092	3.7	1.56	101.9	17.82	6.40	86.5	10.4
Pb	168	0.062	2.5	1.56	109.6	6.12	6.40	103.2	2.9
Sb	206	0.192	7.7	3.10	64.6	22.54	12.70	38.1	30.5
Se	196	0.135	5.4	2.30	83.1	26.23	9.50	76.0	17.2
Sn	189	0.040	1.6	0.78	85.7	27.29	3.18	52.0	29.4
Sr	407	0.005	0.2	0.31	71.8	4.09	1.27	81.2	2.7
Te	214	0.078	3.1	1.56	109.6	7.49	6.40	97.3	3.8
Ti	334	0.050	2.0	0.78	101.0	9.46	3.18	92.4	5.5
Tl	190	0.092	3.7	1.56	110.3	4.04	6.40	101.9	2.0
V	292	0.028	1.1	0.78	108.3	3.94	3.18	102.5	2.6
W	207	0.075	3.0	1.56	74.9	15.79	6.40	44.7	19.6
Y	371	0.012	0.5	0.31	101.5	3.63	1.27	101.4	2.5
Zn	213	0.310	12.4	4.70	91.0	68.69	19.1	101.0	9.6
Zr	339	0.022	0.9	0.31	70.7	54.20	1.27	40.4	42.1

- (a) Values reported were obtained with a Spectro Analytical Instruments EOP ICP; performance may vary with instrument and should be independently verified.
- (b) Values are certified by Inorganic Ventures INC. at 3x and 10x the approximate instrumental LOD [12].
- (c) Bold values are qualitative only because of low recovery. Other digestion techniques may be more appropriate for these elements and their compounds.