CITY OF EMERYVILLE
REDEVELOPMENT AGENCY
2200 POWELL STREET, SUITE 1200
EMERYVILLE, CALIFORNIA 94608
(510) 596-4350

March 30, 1992

Brian Oliva
Alameda County Health Care Services Agency
80 Swan Way, Room 200
Oakland, CA 94621

RE: Soils remediation at 1056-48th Street, Emeryville, CA.

Dear Mr. Oliva:

Per our discussion today, enclosed you will find the letter our office sent to Lester Feldman of the Regional Water Quality Control Board regarding our plans to develop residential units at the referenced site, as well as the risk analysis prepared by Bendix Environmental Research Inc.

If you have any comments, I can be reached at (510) 596-4354.

Sincerely,

Maria B. Bigornia
Assistant Projects Coordinator

Assistant Projects Coordinator

CITY OF EMERYVILLE
REDEVELOPMENT AGENCY
2200 POWELL STREET, SUITE 1200
EMERYVILLE, CALIFORNIA 94608
(510) 596-4350

FAX 658 8095

March 23, 1992

Lester Feldman
California Regional Water Quality Control Board
San Francisco Bay Region
2101 Webster Street, Suite 500
Oakland, CA 94612

RE: Soils Remediation at 1056-48th Street, Emeryville, CA.

Dear Mr. Feldman:

The Emeryville Redevelopment Agency plans to develop a residential duplex at the referenced site under its Vacant Housing Program. As part of predevelopment work, an environmental assessment was performed by Subsurface Consultants Inc.

To summarize the results of the soils study, the property contains concentrations of polynuclear aromatic hydrocarbons (up to 31,020 ug/kg) and soluble lead (up to 9.4 mg/1) in the near surface soils, and oil and grease (up to 15,000 mg/kg) at depths of up to 9 feet in a filled area. No contaminants were detected in groundwater samples from the site.

On November 21, 1991, a meeting was held at your office regarding the soil contamination at the subject property. The meeting was attended by Susan Hugo and Larry Seeto of the Alameda County Health Care Services Agency, Maria Bigornia and myself from the Emeryville Redevelopment Agency, Rich Hiett and yourself from the San Francisco Bay RWQCB, and representatives of Subsurface Consultants.

Our understanding of what transpired in the meeting is that if the contaminated soil is to remain in place, the following steps should be taken:

1. A remediation plan should be developed which includes capping the contaminated soils with clean fill, slabs or pavement.

2. A qualified toxicologist should be retained to conduct a health risk analysis considering the proposed remediation and site development plans.

3. The three existing groundwater monitoring wells at the site should be properly abandoned.

4. A deed attachment disclosing the existence of contaminants on the site might possibly be required.

The Redevelopment Agency contracted with Selina Bendix, a qualified toxicologist with Bendix Environmental Research Inc., to analyze health risk considering the proposed remediation (capping the site) and site development plans.

The results of the analysis indicate that capping would prevent infiltration of rainwater and eliminate the primary cause of soil contaminant migration. However, clean topsoil would not be an adequate capping material. It seems the preferred plan is to build the residential structure with an on-grade slab and all remaining spaces around the home to be paved with concrete. It is the toxicologist's opinion that under this remediation plan, construction and living on the subject property would not pose a health hazard.

We are certain that all concerns of the regulatory agencies have been properly addressed in the risk analysis prepared by Bendix Environmental Research Inc. Please review the enclosed report.

If the Redevelopment Agency does not hear from your office within ten days of this letter, we will assume it is appropriate to proceed with the remediation plan and begin construction of the affordable housing project as soon as possible.

Sincerely,

Kofi Bonner
Department of Economic Development and Housing Director

cc: ~~Susan Hugo~~ BRIAN OLIVA
Alameda County Health Care Services Agency
80 Swan Way, Room 200
Oakland, CA 94621

Bill Rudolph
Subsurface Consultants Inc.
171 - 12th Street, Suite 201
Oakland, CA 94607

BENDIX ENVIRONMENTAL RESEARCH, INC.

FOX PLAZA, SUITE 418 • 1390 MARKET STREET • SAN FRANCISCO, CA 94102 • TELEPHONE (415) 861-8484

15 March 1992

Maria Bigornia
City of Emeryville
2200 Powell Street, 12th Floor
Emeryville, CA 94608

RE: 1056 - 48th Street, Emeryville, CA
BERI Case No. 92-BR-1

Dear Ms. Bigornia:

Staff of Bendix Environmental Research. Inc. (BERI), made a field trip to subject site (Gilbert G. Bendix, P.E.) and reviewed reports on subject site by Subsurface Consultants, Inc. (SCI), of 8 February, 11 March, 5 April, 29 September and 9 December 1991 (Selina Bendix, Ph.D.), as a basis for a health hazard evaluation for the site.

Site Description

The rectangular, roughly 40 by 120 ft. site, is approximately level. The SCI Phase 2 report indicates that Temescal Creek originally ran along the north property line. By 1977 the Temescal Creek channel had been filled in and the Creek ran in a culvert. Creek channel fill is found to a depth of 11 ft. at the north side of the site. Fill depth decreases moving south on the site. The site was formerly occupied by a single family residence. Ground water was found at a depth of about 20 ft. during drilling of one boring.

At a site visit of 28 February 1992, the site was found to be largely covered with grass and weeds without evidence of barren spots or discolored vegetation. Some parts of the lot surface could not be observed due to the presence of a recreational vehicle conversion, a boat trailer with boat, a van and a sedan. Miscellaneous rubbish is present all over the site: automobile doors and tires, furniture, a ladder, etc. Three iron covers observed near the NE and NW corners of the site and along the western fence line presumably represent monitoring well sites. Three 55 gallon drums, one near each of the monitoring well sites presumably contain development water and/or soil from well installation. The following potential sources of site contamination were not observed: electrical equipment and transformers. No stained soil or odors suggestive of chemical contamination were observed. Adjacent land uses did not appear likely to be sources of contamination.

Composite Sample Analyses

The site has been investigated by SCI. According to the SCI report of 8 February 1991, "No visual or olfactory indications of contamination were noted" at the time of soil sam-

pling. Chemical analyses of soil samples were performed by Curtis & Tompkins, Ltd., a State of California certified analytical laboratory for the tests performed.

Analysis of an initial composite of four soil samples revealed:

- **12 ppm (parts per million)** of extractable petroleum hydrocarbons (EPA 3550/LUFT Manual October 1989). Since the sample analyzed was a composite of four samples, it is possible that a **single sample at 48 ppm** was responsible for the results of analysis of the composite sample. A level of **48 ppm** of petroleum hydrocarbons is below the commonly accepted level of **100 ppm** of extractable petroleum hydrocarbons as not requiring remediation and would not be expected to result in detectable toxicological effects on humans or other organisms. **No further evaluation of health hazard is warranted on the basis of this information.**

- **0.040 ppm** of 1,1,1-trichloroethane (TCA) (EPA Method 5030/8010). This means that there could have been a maximum **of 0.16 ppm** in an individual soil sample. **This is about 0.1% of the DHS/CalEPA soil trigger level for hazard analysis.** (*Interim Guidance for Preparation of a Preliminary Endangerment Assessment Report*, CA Department of Health Services, 22 June 1990.) This level of TCA would not be expected to be a toxicological hazard.

- **0.60 ppm of phenanthrene**, **0.57 ppm of fluoranthene**, and **0.66 ppm of pyrene** (all by EPA Method 3550/8270), The DHES/CalEPA trigger level for **phyenanthrene is 10 ppm**. Since there are no trigger levels for fluoranthene and pyrene, it is appropriate to use **10 ppm** as a trigger for the total of these three **polyaromatic hydrocarbons (PAHs)**. The total of PAHs in the composite sample is 1.83 ppm. Multiplying by four to allow for compositing gives 7.3 ppm which is close enough to the trigger.level to require further analysis of potential hazard.

- **5.6 ppm of cyanide** (modified EPA Method 335.2). This means that the maximum possible level of cyanide in one of the composited samples was **22.4 ppm**. This is about half of the DHS/CalEPA trigger level. This level of cyanide would not be expected to be a toxicological hazard to people or the environment. No further toxicological hazard investigation is warranted by this information.

- **0.7 ppm of mercury**. Allowing for compositing, the maximum possible single sample level would have been 2.8 ppm of mercury. Although this level of mercury is **below the Total Threshold Limit Concentration (TTLC)** which defines a material as a hazardous waste pursuant to 22 CAC 66699, it is outside of the normal soil range and above the DHS/CalEPA hazard analysis trigger level of 0.7 ppm. **Further toxicological analysis is warranted.**

- 2.7 ppm of cadmium. Allowing for compositing, the maximum possible single sample level would have been 10.8 ppm which is about 5 times the DHS/CalEPA trigger level of 2 ppm. Further toxicological analysis is required.

- 140 ppm of lead. Allowing for compositing, the maximum possible single sample level would have been 560 ppm, which is above the DHS/CalEPA trigger level of 500 ppm. Further toxicological analysis is warranted.

- 280 ppm of zinc. Allowing for compositing, the maximum possible single sample level would have been 1,120 ppm which is above the DHA/CalEPA trigger level for toxicological analysis of 400 ppm. Further toxicological analysis is required.

Examination of laboratory reports for the above analyses indicates that all analyses were performed within EPA prescribed time limits for holding times between the time of sampling and the time of analysis.

Composite Component Sample Analyses

Because the sample reported above was composited so that the actual concentration and location of the contaminants could not be known, the four individual soil samples that made up the composited sample were further analyzed individually. The results of these analyses, presented in the SCI report of 11 March 1991, are evaluated below.

- Diesel was detected in all four borings at concentrations ranging from 10 to 97 ppm, with an average of 36 ppm. The highest concentration, 97 ppm, is nearly double the maximum value predicted on the basis of the composite analysis. This suggests that the samples are not homogeneous and that localized diesel concentration on the site may exceed 100 ppm. Moreover, the samples were held for 10 weeks before analysis, instead of the 1 - 2 week appropriate holding time, so that some material may have evaporated from the samples. Since diesel range hydrocarbons are not very volatile, there is no reason to believe that the average concentration on the site could be above 100 ppm. I agree with SCI that past presence of an underground diesel tank on this formerly residential site is unlikely and that the presence of diesel in the soil is probably due to recent use of the site as a parking area. As previously concluded, no further toxicological analysis of the health hazards of diesel on the site is needed.

- No TCA or other volatile halocarbon compounds were found in the 4 individual soil samples. This is irrelevant because the soil samples were held for 10 weeks before analysis. The maximum soil sample holding time for EPA Method 8010 is 2 weeks. Samples containing these volatile materials held longer than 2 weeks may have lost an unknown amount of halocar-

bons, even when held at near freezing temperatures. On the basis of the analysis of the composite sample, no hazard analysis of TCA is needed.

- The PAHs naphthalene (1 sample), acenaphthylene (1 sample), fluorene (1 sample), phenanthrene (2 samples), anthracene (1 sample), fluoranthene (1 sample), pyrene (2 samples), benzo(a)anthracene (2 samples), chrysene (2 samples), benzo(b)fluoranthene (2 samples), benzo(k)fluoranthene (1 sample), benzo(a)pyrene (1 sample), indeno(1,2,3-cd)pyrene (2 samples), and benzo(g,h,i)perylene (2 samples) were found in analyses of the 4 individual soil samples by EPA Method 8270. Two samples had no PAHs. More individual PAHs were found in the two samples containing PAHs than were found in the composite sample. This suggests that soil in the samples without PAHs contained material that interfered with the analysis of the PAHs in the other soil samples in the composite. Although these samples were analyzed after 10 weeks instead of the 1 week holding time prescribed for EPA Method 8270, so that all values may err on the low side, the highest of these four samples will be used for analysis since it has higher values than would be predicted on the basis of the composite. The highest sample has a total of 31.0 ppm of PAHs, which exceeds the DHS/-CalEPA trigger for further analysis. The presence and distribution of these PAHs is presumably due to products of combustion arising from the fire which destroyed a former structure on the site, as indicated in the 11 March 1991 SCI report.

- Two samples contained cyanide at or near the detection limit (0.3 and 0.4 ppm compared to a detection limit of 0.3 ppm). Since these samples were held for 10 weeks instead of the appropriate 2 weeks for cyanide analysis, they are not relevant to health hazard considerations and do not influence the previous conclusion that no further analysis is needed on the basis of the results of the composite analysis.

- No mercury or zinc analyses were done on the 4 individual samples.

- Total and soluble cadmium were analyzed in the 4 individual samples. Since the acceptable holding time for cadmium by EPA Method 6010 is 6 months, analysis of these samples after 10 weeks can be expected to yield valid results. The total cadmium levels ran from 1.7 to 3.1 ppm, average 2.3 ppm, which exceeds the DHS/CalEPA trigger of 2 ppm total cadmium. The 2.3 ppm average compares acceptably with the 2.7 ppm value from the composite. The previous conclusion that further toxicological analysis is warranted is confirmed.

- Total and soluble lead were analyzed in the 4 samples. Since the acceptable holding time for lead by EPA Method 6010 is 6 months, analysis of these samples after 10 weeks can be expected to yield valid results. The total lead levels ran from 18 to 280 ppm, average 103 ppm. Since neither

the average nor the highest lead level are above the DHS/CalEPA trigger level of 500 ppm, no further toxicological analysis is warranted on the basis of the total lead levels in these 4 samples. Soluble lead levels ranged from 0.24 to 9.4 ppm, average 3.3 ppm. The 9.4 ppm sample exceeds the Soluble Threshold Limit Concentration of 5 ppm which defines a hazardous waste pursuant to 22 CAC 66699. Thus, further evaluation of the health hazard from lead on the site is warranted.

Evaluation of Phase 2 Investigation Results

Only those results of the SCI Phase 2 investigation, presented in their report of 5 April 1991 report, which affect or potentially affect judgements made above are discussed below. Phase 2 testing, designed to determine vertical contaminant distribution and to extend information about horizontal distribution, involved 11 boreholes. Holding times for these samples before analysis were all within the prescribed limits.

- One soil sample was found to have 15,000 ppm of total extractable hydrocarbons in the motor oil range at a depth of 9 ft. Samples above and below this point in the core had no detectable hydrocarbons, indicating a local problem. The test employed distinguishes between motor oil and fuel oil so that there is no suggestion of the past presence of a subsurface heating oil tank. No extractable petroleum hydrocarbons were found in 3 groundwater samples with a detection limit of 50 ppb (parts per billion). A common trigger for cleanup of petroleum hydrocarbons is 1000 ppm. Further evaluation of potential health hazards from motor oil is warranted.

- 10 soil samples from depths greater than 1 ft. were analyzed for oil and grease. Three of these samples from the old Temescal Creek alignment, had 3,100 to 8,800 ppm of oil and grease. The source appears to be some material in the Creek channel fill. No oil and grease were found in 3 groundwater samples. The presence of greater than 1000 ppm of oil and grease warrants further evaluation.

- Total lead levels in soil samples taken at depths of 2 to 10 ft. ranged from nondetectable to 6.5 ppm, with the maximum value well within the normal soil concentration range. This confirms the assumption that the lead source is at the surface, presumably house paint, as indicated by the SCI Phase 2 report. Lead typically moves slowly, if at all, in soil. No lead was found in a single groundwater sample.

Potential Routes of Exposure

Potential routes of exposure to contaminants on the site are ingestion or skin exposure to groundwater, should it become contaminated, and inhalation, ingestion or skin exposure to contaminants in soil.

Groundwater at the site does not contact Temescal Creek water because the Creek is in a culvert at this location. Groundwater moves toward San Francisco Bay where human and/or marine organism contact would occur. No groundwater contaminants were found in SCI studies. The heavy metal and complex organic chemical contaminants found at the site move slowly through soil. These surface contaminants are not expected to reach the groundwater at 20 or more ft. below the surface in significant amounts. Any material that reaches the groundwater would tend to be adsorbed on soil particles between the site and the Bay and any remaining material would be diluted. Groundwater at the site is not being used for any purpose and is not expected to be so used. No health hazard to humans or marine organisms from groundwater contamination at the site is expected.

Exposure through inhalation is of greatest concern for mercury. Some microorganisms can convert elemental mercury to methyl mercury. Both mercury and methyl mercury have significant vapor pressures and can often be detected in the air above mercury containing soils. Methyl mercury is more toxic than elemental mercury. Methyl mercury is a human neurotoxin which selectively accumulates in the fetus. The fetus can sustain permanent neurological damage in a symptom-free mother. Elemental mercury reacts with sulfhydryl groups which often results in poisoning the activity of enzymes required for normal cell function.

The other contaminants found at the site can be inhaled as particulates. It is unlikely that anyone would be exposed to soil particulates in air at a concentration greater than the OSHA nuisance dust limit of 10 mg per cubic meter of air because people do not voluntarily expose themselves to such conditions. If the most contaminated sample for each contaminant found in study of this site were to be the source of the particulates in air at the OSHA particulate standard, this air would be several orders of magnitude below the occupational standard for the individual contaminant. The three orders of magnitude or greater safety factor would provide an ample margin of safety below the occupational standard to allow for the greater potential sensitivity of the general population. In the case of carcinogens, any avoidable exposure should be eliminated.

The greatest risk of inhalation exposure would be for small children playing on the ground at the site or on the floor of a building on the site. Adults in the crawl space under a building would be at greatest risk of inhalation exposure. There is also a risk of inhalation of particulates when the soil is disturbed during construction.

The greatest risk of ingestion of contaminated soil occurs when small children play on contaminated soil and put hands in the dirt and then in their mouths. Vegetables grown in contaminated soil may concentrate contaminants in edible portions and/or be ingested with small amounts of soil adhering to the surface.

PAHs in soil can be ingested or inhaled if soil particulates get into the air. Many PAHs are carcinogens; therefore, all avoidable exposures should be eliminated.

Inhalation or ingestion of cadmium is of concern because it is a carcinogen with no threshold of effect and because it causes kidney damage. Part of the population is close

to the threshold of cadmium levels causing kidney damage due to the sum of various sources of exposure, so it is important to prevent any avoidable exposure increase.

Lead is a neurotoxin to which children are particularly sensitive. Over recent decades estimates of the amount of lead required to reduce intellectual ability has regularly decreased. Lead in soil can be ingested or inhaled when soil particulates get into the air. Some portion of the soluble lead may be tetraethyl lead from leaded gasoline. Tetraethyl lead is quite volatile and poses an inhalation hazard.

Inhalation of relatively large amounts of zinc or many of its compounds can result in dry throat, fever and vomiting. The occupational exposure limit for some zinc compounds is the same as for nuisance dust. Ingestion can cause shortness of breath and coughing. Skin exposure to relatively high concentrations of elemental zinc can cause skin irritation. It is not known what the chemical form of the zinc on the site is. The most hazardous of common zinc compounds is the carcinogen zinc chromate (carcinogenic because of the chromate portion of the molecule). Zinc chromate used to be found in some paints, so it could be present in the fire residue on the site.

Site Remediation

I understand that capping of the entire surface of the site is under consideration for remediation. Capping would prevent infiltration of rainwater and remove the main cause of migration of soil contaminants. Some water could still enter the site by lateral movement in the soil above the groundwater level. In view of the low soil mobility of the contaminants previously indicated, this water would not be expected to result in much migration of contaminants.

Importation of clean topsoil would not be adequate remediation unless a barrier impenetrable by plant roots were placed below the soil. Such a barrier would be expected to prevent the growth of trees on the site.

Because of the potential accumulation of volatile toxic materials under the duplex planned for the site or in the structure, the building should be built with an on-grade slab over a vapor barrier or with design to ensure permanent ventilation of any crawl space or other spaces between the surface of the soil and the underside of the structure.

Spaces around the home should be concrete paved. Planter boxes can be placed on the paving or countersunk into it with careful sealing to the paving. Pavement of all of the site not covered by the structure would eliminate the risk of ingestion of soil or inhalation of contaminated soil particulates. No contact should be allowed between soil in planters and soil beneath the pavement so as to eliminate the risk of plants accumulating contaminants from the soil under the pavement.

Grading of the site and any excavation required for foundations should not take place under windy conditions in order to minimize the exposure of workers and neighbors to contaminated dust.

Conclusion

If appropriately remediated, as discussed above, construction and living on this site would not pose a health hazard. I would be happy to discuss further details of remediation with you or other persons involved in the development of this site.

Very truly yours,

Selina Bendix

Selina Bendix, Ph.D., R.E.A.
President

REGISTERED ENVIRONMENTAL ASSESSOR
SELINA BENDIX
No. 157
Exp. 6/30/92
STATE OF CALIFORNIA

BENDIX ENVIRONMENTAL RESEARCH, INC
SITE INSPECTION RECORD

Date(s): 22 February 1992		Inspector: Gilbert G. Bendix, P.E.	
Parcel No(s):		Address: 1056 - 48th Street	
CHARACTERISTIC	YES	NO	COMMENTS
Barren spots surrounded by vegetation		X	
Discolored and/or misshaped plants		X	
Normal level of insect activity		X	No insects were sighted
Discolored soil		X	Most of the lot covered with grass & weeds; soil not visible
Stained concrete or pavement		X	
Fill line, pump, or other indication of UST	X		Iron covers bolted down ~ 30 ft. S of N property line near W fence & near NW corner & near NE corner
Evidence of fill	X		Mound near middle of E property line
Rubbish present	X		Miscellaneous rubbish all over; auto doors & tires, furniture, ladder, etc.
Oily sheen on puddles		X	
Discolored puddles		X	
Barrels or other storage containers	X		55 gal. drums near NW corner & near NE corner & midway near W property line
Discarded electrical equipment		X	
Transformer(s)/capacitor(s) on or near site		X	
Evidence of inadequate drainage		X	
Abnormal odor present		X	
Potentially contaminating activity on adjacent site		X	
Groundwater wells		X	
Off-road vehicle tracks		X	

Additional Observations:

Some parts of lot surface could not be observed due to presence of a recreational vehicle conversion, a boat trailer with boat, a van and a sedan.