GAS SYSTEM/PCB INVESTIGATION

INTRODUCTION

LILCO has designed and initiated a program of study to address the problems we are presently experiencing with oil and possible presence of PCB in our natural gas distribution system. Our study will focus on three separate areas of concern. One element of our study is intended to investigate the extent of contamination (if any) of LILCO's natural gas system and resultant customer impacts. The second study element is intended to identify the actual source or sources of the oil contamination. The third element will be to determine the location of oil in the distribution system with the objective of removing it from the system. All phases of the study are being conducted concurrently.

The following discusses each of the study elements in more detail:

I ELEMENT 1

A) Customer Impact Assessment

In order to determine the existence of and geographical area affected by oil potentially containing PCB's, the following sampling and analytical protocols have been placed in operation:

1. Sampling Program - Individual Suspect Locations

The Company's Customer Service Department, upon becoming aware of the presence of an oil blockage in a residential or commercial gas meter, identifies this location as a potential PCB-affected site. A sample of the oil is then

removed from such meters and sent for analytical determination for the presence of PCB's. Each oil sample will be split and made available to the New York State and Suffolk County Health Departments if they desire to conduct duplicate analysis.

At each suspect location, the following additional samples will be obtained in a screening effort to determine the existence of any health concerns:

1) Pure natural gas from the incoming gas service line.
2) The products of combustion in close proximity to the residential gas range (if any).
3) The indoor ambient air.

Whenever possible, the three samples mentioned above are obtained during a single visit to the residence or commercial establishment. Sampling at each of these locations is also conducted by representatives of the New York State Health Department for analysis by the department's laboratory in Albany.

Because certain oil samples obtained from clogged gas meters have been confirmed to contain PCB's, all further samples will be keyed for PCB determination as the indicator compound of concern. However, should these analyses confirm the presence of a <u>significant</u> level of PCB's in

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gas range combustion product or indoor ambient air samples, further investigation could be performed to determine the existence of any additional compounds (from partial decomposition of PCB) posing potential health concerns. Samples showing no presence of the PCB "indicator" need not be further analyzed for other complex compounds.

2. Sampling Technique

Florisil adsorption columns are used as the PCB collection media in all gas line, combustion air, and indoor ambient air sampling. The natural gas, combustion product, or ambient indoor air is drawn through a standard florisil tube at a controlled rate of 200 cc/min for a period of two to four hours. For the combustion products and indoor ambient air, a calibrated Sipin air pump is used to provide the required sample flow through the florisil tube. In gas line sampling, the natural pressure of the gas line is throttled via a needle valve to control the flow through the florisil tube. A standard ball float meter is used to monitor the gas flow rate.

B) Area-Wide and Background Sampling

In conjunction with the sampling at individual suspect residences and commercial facilities, the following system-wide sampling program is underway in an effort to determine the potential source and extent of PCB's in the natural gas in our distribution system.

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1. Gate Stations - Gas distributed from the Company's three major gate stations located at Long Beach, Garden City, and Glenwood Landing will be sampled for PCB's. The gas distributed from these gate stations supplies all of LILCO's service territory. Sampling of the gas and any liquids collected at these locations will indicate whether there exists a source of PCB's outside Long Island.

2. Gas Regulator Stations - Bulk quantities of gas distributed from regulator stations to the communities within which the existing "problem" homes lie will be sampled for PCB's. Results from sampling gas and any liquids collected at these locations will aid in determining whether any PCB's found in individual residences are the result of local phenomena or are influenced by conditions outside the immediate supply area.

3. Background Sampling

   a) Suspect Community Survey

      Sampling of gas service lines, gas range combustion products, and indoor ambient air will be performed in residences located within suspect communities, but at which no oil has been reported to exist in the meters. This will provide more detailed information as to whether the presence of PCB's in a single residence's gas supply is indicative of a similar problem throughout the immediate community or whether it is an extremely localized phenomena. In order to avoid inconveniencing LILCO's customers, background

sampling will be performed whenever possible at the homes of LILCO employees living in the identified suspect communities.

b) Extended Area Survey

To provide further background information, the Company will sample residential gas service lines, gas range combustion products and indoor ambient air in communities in which no evidence of PCB's has arisen. In addition, indoor ambient air will be sampled at residences not supplied by gas service (oil heated; electric heat). This will provide a control sample for comparative purposes.

C) Chemical Analysis

1. Oil Samples

Samples of oil collected from residential meters and other locations at which oil is discovered will be split and made available to the New York State and Suffolk County Health Departments if they desire to conduct duplicate analysis. Analyses of the Company's samples is performed by Gallob Laboratories, Berkely Heights, New Jersey. To determine the PCB content of the oil, Gallob Laboratories utilizes the following general analytical technique:

The sample first goes through a clean-up procedure recommended by the U.S. Environmental Protection Agency guidelines using sulfuric acid and, if necessary, a

florisil adsorption column. Any PCB's are extracted from the sulfuric acid digested oil (and florisil column if employed) by hexane. The volume of hexane is adjusted by concentration or dilution based on the expected concentration of PCB's. The sample is then analyzed by standard gas chromatography technique utilizing an electron capture detector.

2. Natural Gas, Gas Range Combustion Products and Indoor Ambient Air Samples

In general, samples collected at affected residences (as adsorbed onto florisil adsorption tubes) are analyzed by both New York State Department of Health and Gallob Laboratories. Gallob Laboratories elutes any PCB's off the florisil column with hexane and analyzes the sample with proper precautions as described in Section I (Oil Samples).

D) Conclusions and Preliminary Results

The attached Tables I and II summarize the results of the initial stages of the sampling effort described in Sections A and B.

Oil samples from affected customers confirmed to contain PCB's thus far indicate concentrations at approximately 0.5%. (One sample was originally reported to contain a higher concentration of PCB but was reanalyzed and found to contain 0.5% PCB).

Only two florisil tube natural gas samples taken at suspect locations have thus far indicated any detectable concentration of PCB's. One is believed to have been contaminated in the field and the gas service has been re-sampled. The second was found to contain only 0.4 ug/m^3 (or 0.04 ppb) but Gallob Laboratory is not completely confident that PCB's are indeed present.

To date, none of the background gas service samples taken at non-suspect homes have indicated detectable PCB levels.

All gas range combustion and ambient air samples taken to date have not resulted in detectable concentrations of PCB's.

Continuation of the environmental sampling and analysis program embarked upon, will provide a timely and realistic assessment of the nature and extent of PCB contaminated oil in certain gas mains. More significantly, it will provide the technical basis for assessing potential impacts on public health.

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TABLE I STATUS OF SAMPLING AT CUSTOMER COMPLAINT LOCATIONS

STATUS: 1/22/81 9:00 AM

LOCATIONS	Oil in Meter Sampled Date	Oil in Meter PCB's ppm	Natural Gas Svc. Sampled Date	Natural Gas Svc. PCB's ug/m³	Ambient Air Sampled Date	Ambient Air PCB's ug/m³	Range Combustion Prodt. Sampled Date	Range Combustion Prodt. PCB's ug/m³	Comments
11 Amy Drive Sayville N.Y.	1/13 1/14	6400 6000	1/15 1/19	28	1/19		NO GAS RANGE		initial (1/15) ga results a suspect.
40 Amy Drive Sayville N.Y.	1/15		1/17	N.D.*	1/17	N.D.	1/17		*<0.3
51 Amy Drive Sayville N.Y.	1/19		1/17	N.D.*	1/17	N.D.	1/17		*<2.0
Lamplighter Restaurant Montauk Highway Sayville	1/14	4900	1/15	<1.0					
72 Fawn Lane Centereach	1/9 1/13 1/14	5000 5000 5400	1/15 1/18 1/20	<1.0 0.4	1/14 1/18	<1.0 N.D.	< 1/14 1/18	1.0 N.D.	Baked mea sampled gas rang on 1/20
188 Wickfield Lane N. Babylon	1/19		1/17	N.D.*	1/17	N.D.	1/17	N.D.	*<0.7

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TABLE I STATUS OF SAMPLING AT CUSTOMER COMPLAINT LOCATIONS (CONT'D)

STATUS: 1/22/81 9:00 AM

LOCATIONS	Oil in Meter Sampled Date	Oil in Meter PCB's ppm	Natural Gas Svc. Sampled Date	Natural Gas Svc. PCB's ug/m^3	Ambient Air Sampled Date	Ambient Air PCB's ug/m^3	Range Combustion Prodt. Sampled Date	Range Combustion Prodt. PCB's ug/m^3	Comments
42 Ruland Rd. Selden	1/19		1/16	N.D.*			1/16	N.D.**	*<13. **< 0.2
61 Sejon Dr. Sayville	1/20		1/20		1/20		No Range		
57 Sejon Dr. Sayville	1/20		1/20		1/20		No Range		
49 Sejon Dr. Sayville			1/21		1/21		No Range		
35 Sejon Dr. Sayville			1/21		1/21		No Range		

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TABLE I STATUS OF SAMPLING AT CUSTOMER COMPLAINT LOCATIONS (CONT'D)

STATUS: 1/22/81 9:00 AM

LOCATIONS	Oil in Meter Sampled Date	Oil in Meter PCB's ppm	Natural Gas Svc. Sampled Date	Natural Gas Svc. PCB's ug/m3	Ambient Air Sampled Date	Ambient Air PCB's ug/m3	Range Combustion Prodt. Sampled Date	Range Combustion Prodt. PCB's ug/m3	Comments
31 Sejon Dr. Sayville									
5 Amy Dr. Sayville			1/21		1/21		No Range		
8 Amy Dr. Sayville									
353 Montauk Hwy. Sayville			1/21		1/21		1/21		Broiled sampled 1/21 fro gas rang

1) ppm - Parts per million by weight in oil
   0-50 ppm not considered significant by EPA, could be disposed of as any waste oil except for us in road oiling.
   50-500 ppm marginal - disposal regulated by EPA only in licensed chemical landfill or in power pl boiler under controlled conditions.
   over 500 ppm significant - disposal regulated by EPA only in specially licensed incinerator.

2) ug/m3 - micrograms per cubic meter of air (or natural gas)
   1000. ug/m3 - OSHA 8 hour occupational limit (1000 ug/m3 = 1 mg/m3 = milligram per cubic meter)
   10,000 ug/m3 - OSHA immediate threat to life and health

3) N.D. - Not Detectable (Detectability for oil samples 5.0 ppm)
   (Detectability for air & gas samples 0.1 ug/m3)

4) N.D.* - Not Detectable, see Comment margin for detectability level

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TABLE II STATUS OF BACKGROUND SAMPLING AT RESIDENTIAL LOCATIONS NOT HAVING OIL IN METER PROBLEM

STATUS: 1/22/81 9:00 AM

LOCATIONS	Oil in Meter Sampled Date	Oil in Meter PCB's ppm	Natural Gas Svc. Sampled Date	Natural Gas Svc. PCB's ug/m3	Ambient Air Sampled Date	Ambient Air PCB's ug/m3	Range Combustion Prodt. Sampled Date	Range Combustion Prodt. PCB's ug/m3	Comments
109 Gannet Dr. Commack	N/A		1/15	N.D.*					*<1.0
8 August Crescent Commack	N/A		1/15	N.D.*					*<1.0
109 Hallock Rd. Lake Grove	N/A		1/15	N.D.*					*<0.2
Hicksville Gas Customer Service	N/A		1/15	N.D.*					*<0.2
Training Room			1/15						
7 Euclid Ave. Dix Hills	N/A		1/20						meat bake gas range backgroun comparis

N/A - Not Applicable.

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II ELEMENT 2

A) Source of Oil Contamination Assessment

In addition to determining the extent of PCB contamination, LILCO's program of study is also intended to identify the source of contamination. Therefore, a second study element has been initiated which will determine whether PCB's are presently being added to the system and/or whether the source(s) is from activities no longer taking place.

1. Background

The natural gas delivered to LILCO by the pipelines contains small quantities of compressor lubricating oils in addition to the components coming from the gas or oil well. Since natural gas is odorless and colorless, an odorant is added to the natural gas by the pipeline company to insure that the gas is detectable.

Upon receiving the natural gas, LILCO compresses the gas when required, adds air to provide a stable Btu product, and sends it out into its transmission and distribution system. Through these processes, minor amounts of gas and air compressor lubricant oils will normally enter the system. Further quantities of odorant are also periodically added as, and where, required.

Under severe weather conditions, methanol is added at a few points to reduce the possibility of service freeze-ups. Oil is also used in inlet gas scrubbers at

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certain outlying compressor stations in order to prevent damage to the cylinders of the compressors by pipeline dust and scale particles.

B) Sampling Program

The sampling program initiated under this phase of the study is intended to investigate the possible entry points of alleged contaminated oil. Aside from a contamination source outside of LILCO's system, the major suspected entry points of contaminated oil center upon the activities described in the previous "Background" Section.

1. Air and Gas Compressor Lubricants, Gas Condensate and Drip Pot Sampling

Representative samples are being taken from all known available stock of lubricating oils at the gas production and compression facilities. Natural gas liquids which accumulate in pipelines (through condensation) and are removed or through gas scrubbing operations and by drip pots will also be sampled. In addition, oils removed from various distribution system locations, such as drip pots or regulator stations, are being analyzed for PCB content. Laboratory analyses will indicate whether any of these operations contribute to PCB contamination. (See Element 1 write-up.)

2. Incoming Pipeline Gas

The sampling of incoming pipeline gas is discussed in the Gate Station Sampling Program given under the description

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of Element 1 of the study program. This sampling of the two points of entrance of gas into the LILCO system will show if a source of PCB contamination exists outside of LILCO's system. Condensate from the gas liquefaction process at the Holtsville LNG Plant is also being analyzed. This condensate consists of the liquids removed from 30,000,000 cu. ft. of gas which was liquified in October, 1980.

3. Odorant, Methanol

These two compounds will be sampled and analyzed to determine if they have any contribution to PCB contamination.

C) Chemical Analysis

In addition to the chemical analysis being employed in the first phase, the chemical analysis used under this phase of the study program is being developed in conjunction with Arthur D. Little, Inc. to characterize the oils found in the system.

D) Investigation of "Fogging Oil"

In order to fully assess all the possible pathways of contaminated oil entering LILCO's system, we are also reviewing past practices which have since been discontinued. In particular, in the past LILCO used a "fogging oil" in its system primarily to reduce leaks in cast iron pipe joints, to maintain the pliability of the leather regulators and meter diaphragms used at that time and to reduce odorant

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fading in newly installed steel mains. This practice was stopped approximately 20 years ago.

An investigation of the source of fogging oil used in the past will be made as well as the location of fogging points.

E) Outside Consultants

Arthur D. Little, Inc. has been retained as a consultant. They will assist in the choice of analytical techniques and also in the analysis of the weathering of the oils found in the gas mains.

Other consultants and laboratories will be brought in as the need arises.

F) Conclusions and Preliminary Results

The attached tables (III and IV) summarize the results of the initial stages of the sampling program discussed in Sections A and B.

The results of several samples of lube oil and natural gas condensate have been received thus far. The results available from samples of lubricating oils used at Company Gas Production & Operation facilities have not shown significant PCB content.

The oils in which PCB's have been found will be investigated. The manufacturers of the oils will be identified. Telephone contacts have been made with several lubricating oil manufacturers. They have indicated that PCB's are not among the

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additives that these manufacturers use in compounding lubricating oils.

A significant result has been obtained on the natural gas condensate from a scrubber at the Stewart Avenue (Garden City) Gate Station. The analysis showed 420 ppm PCB's. This indicates that condensed liquids carried by the gas stream entering the LILCO system appears to contain PCB's. The result (740 ppm PCB's) of the analysis of the condensate from the feed gas compressor inlet scrubber at the LNG Plant requires further investigation.

Results received for six of sixteen natural gas samples taken at the Gate Stations, LNG facility, and Regulator Stations indicate no detectable PCB levels.

Contacts have been made with LILCO's principal pipeline gas supplier, TRANSCO, relative to their knowledge of possible use of PCB-contaminated lubricants in TRANSCO compressors and/or the possible presence of PCB's in TRANSCO system condensates. TRANSCO has informed us that on 1/19/81 (A.M.) they began a sampling and analysis procedure at several locations of condensate collection in the metropolitan New York area. Samples collected will be analyzed by a lab selected by TRANSCO to determine if any PCB's are present. Should PCB's be identified in any significant amounts, TRANSCO will then initiate a second step of sampling to have labs analyze compressor lubricating oils for PCB's.

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TABLE III STATUS OF LUBE OIL, GAS CONDENSATE AND DRIP POT SAMPLING

STATUS: 1/22/81 9:00 AM

Location	Date	Type of Sample	PCB's (ppm)	Comments
Stewart Ave. Gate Station	1/12	#1 BTU Control Air Compressor Crankcase Lube Oil	N.D.	
	1/12	#1 Gas Booster Compressor Crankcase Lube Oil	N.D.	
	1/12	#2 BTU Control Air Compressor Crankcase Lube Oil	1 ppm	
	1/12	#3 Gas Booster Compressor Crankcase Lube Oil	3 ppm	
	1/12	Fyrquel 550 Lube Oil (Newer): BTU Control Air Compressor Cylinders	N.D.	
	1/14	Fyrquel 550 Lube Oil (Older): BTU Control Air Compressor Cylinders	N.D.	
	1/14	Gulftown 194 Lube Oil of 1 & 2 Gas Booster Compressors - Crankcase & Cylinder Lube	N.D.	
	1/14	Incoming Pipeline Gas Scrubber Condensate	420	
Glenwood Gas Plant	1/14	Fyrquel 550 (Older) Lube Oil: Production Air Compressor Cylinders	N.D.	
Holtsville LNG Plant	1/14	Drip Oil From 124 psi Main - LNG Plant Outlet		
	1/14	Gas Condensate D17	N.D.	Condensate from Li faction process.
	1/14	Gas Condensate D11	N.D.	Same as Above.
	1/14	Lube Oil C4	N.D.	Lube oil used in compressors for LN boil off (cylinder & crankcase).
	1/18	S1 Scrubber Bottom Drain - Peco Filter-Sep; Feed Gas Compressor Suction	740	

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TABLE III STATUS OF LUBE OIL, GAS CONDENSATE AND DRIP POT SAMPLING (CONT'D.)

STATUS: 1/22/81 9:00 AM

Location	Date	Type of Sample	PCB's (ppm)	Comments
Holtsville Compressor Station	1/14	Blow-Knox Pipeline Gas Cleaner Oil	N.D.	
Riverhead Cat. Plant Compressor	1/14	Blow-Knox Pipeline Gas Cleaner Oil		Oil from Blow Knox Cleaner bottom
	1/14	Blow-Knox Cleaner		Active Oil - In Circulating Area o Cleaner
Gannet Dr., Commack	1/13	Drip Pot Oil	4000	
Breezy Point, about Rockaway	1/15	Drip Oil	N.D.	

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TABLE IV STATUS OF GATE STATION AND REGULATOR STATION GAS SAMPLING

STATUS: 1/22/81 9:00 AM

Location	Date	Type of Sample	PCB's (ug/m^3)	Comments
Stewart Ave. Gate	1/16	Gas - Incoming Pipeline Gas Downstream of Scrubbers	N.D.*	*<0.5
Glenwood Gas Plant	1/16	Gas - Incoming Pipeline Gas Upstream of Scrubbers	N.D.*	*<0.2
Holtsville Compressor Station	1/16	Gas - Station Inlet Gas Upstream of Blow-Knox Scrubber	N.D.*	*<0.2
LNG Plant	1/17	Gas	N.D.	Outlet of Vaporiz (Vaporizer in Ope
Patchogue Regulator	1/17	Gas	N.D.*	Regulator SL44 Chestnut & Austin *<0.2
Patchogue Regulator	1/17	Gas	N.D.*	Regulator SL4 Waverly Ave. & Sunrise Hwy. *<0.
Sayville Regulator	1/17	Gas		Regulator SL31 Sayville & 13th S

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TABLE IV STATUS OF GATE STATION AND REGULATOR STATION GAS SAMPLING (CONT'D)

STATUS: 1/22/81 9:00 AM

Location	Date	Type of Sample	PCB's (ug/m^3)	Comments
Bay Shore Regulator	1/17	Gas		
Great River Regulator	1/17	Gas		
Selden Regulator	1/18	Gas		
Centereach Regulator	1/18	Gas		
auppauge Regulator (SL-54)	1/18	Gas		
auppauge Regulator (SL-6)	1/18	Gas		
ommack Regulator (SL-48)	1/18	Gas		
ommack Regulator (SL-21)	1/18	Gas		
ong Beach t. Gas Entrance LILCO	1/20	Gas		

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III ELEMENT 3

Parallel with the foregoing effort of determining how PCB has gotten into the distribution system, efforts are under way to determine where oil is pocketed in the distribution system in sufficient volume to represent potential customer service problems by affecting equipment operation or by clogging service entrances.

The approach used in making this appraisal will be to:

1. Inspect and monitor regulator drip and main drip points radiating from the specific location of known service problems.

2. To expand the investigation beyond points which show significant oil accumulation by inspecting regulator drip and main drip points further into the distribution system.

3. Study topographical maps of the areas being investigated to locate low points on the system.

4. Tap distribution mains at the points where the previous steps indicate possible collection of oil and remove oil.

The services of a consultant will be employed to refine the planned approach or to suggest alternate methods to locate oil pockets.

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