

CURT STANLEY - 1/20

Shell Oil Company



P O Box 3105
Houston Texas 77001

June 10, 1983

Ms. Carmen Carlson
American Petroleum Institute
2101 L Street, N.W.
Washington, DC 20037

Dear Carmen:

SUBJECT: MAY 24, 1983 SURVEY REQUEST - ENVIRONMENTAL FATE AND
HEALTH EFFECTS OF PETROLEUM HYDROCARBON IN GROUNDWATER

I forwarded the subject survey questionnaire to Environmental Affairs Geologist Curt Stanley. I requested data on one of our spills in the Northeast that he was very much involved with. We were trying to clean up a water system contaminated with MTBE along with other pollutants not associated with our product spill.

Curt's response was that he didn't think the survey was the route to take as outlined for the study. The questionnaire reports from other companies should indicate the confusion and difficulty you will find in gathering good data for the study.

In our spill situation the MTBE was detectable (by drinking) in 7 to 15 parts per billion so even if it were not a factor to health, it still had to be removed to below the detectable amount in order to use the water. Also, our mobile product didn't indicate movement offsite even though the water-soluble fractions were in water wells 1500 feet away.

If you still decide to require Shell to provide data on the survey as outlined, I will try to get as much information as possible even though our people don't think it will be helpful to the study.

Please advise.

Sincerely,

T. G. Kirkpatrick
Staff Engineer
Environmental
Marketing Engineering

TGK:DLJ

cc: File E-1-8

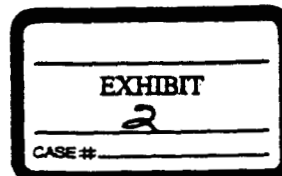
SHELL OIL COMPANY
Environmental Affairs - HS & ES

JUN 13 1983

AGS	WJD	JAM
RWR	RMD	JVS
BNS	WDS	CVS
TMC	WJC	JPR
HDM	CCS	WFB
JNT	RS	MFJ

JUN 13 1983
RECEIVED
H.S. & E.S.

MENV1(n)



EQ-SH156 0071



ACTION REQUIRED

American Petroleum Institute
2101 L Street, Northwest
Washington, D.C. 20037
202-462-7000



DARREN A. CARLSON
202-462-7013

May 24, 1983

TO: Ad Hoc Task Force on the Environmental Fate and Health
Effects of Petroleum Hydrocarbons in Groundwater*

Dear Members:

Enclosed for your review and comment is a proposed questionnaire to be sent to member companies with representation on the Environmental Affairs General Committee requesting company information on groundwater contamination incidents for which water quality and/or vapor analytical data are available. Also provided is a sample of the completed draft questionnaire. The questionnaire was prepared by Chevron.

Pending review and acceptance by the task force of the questionnaire, TRC Environmental Consultants, Inc. will be asked to submit a proposal to evaluate the questionnaire responses and to prepare a report. The results of the literature review and questionnaire will be used to determine the vapor and solution characteristics to use in various toxicological and other health studies.

Please review the draft questionnaire for completeness and readability. Your comments should be sent to me by June 10, 1983. Please call me if you have any questions.

Sincerely,

Darren Carlson

Enclosures

*Updated task force roster attached.

Should use regulatory guidelines also. We know that oxygenated hydrocarbons can be smaller tested before other components such as aromatics at concentrations of ~ 20ppb. These concentrations should be studied as ingestion, inhalation. The geohydrological questionnaire is almost useless.

May 1983



API Environmental Affairs Department
Ad Hoc Task Force
on the
Fate and Effects of Petroleum Hydrocarbons in Groundwater

Wm. Leek (Chairman)
Chevron USA
575 Market St.
San Francisco, CA 94103
415/894-2107

John DelPup, Ph.D.
Texaco, Inc.
PO Box 509
Beacon, NY 12508
914/831-3400 (MBSD rep.)

Verne Farmer
Exxon Co. USA
PO Box 2180
Houston, TX 77001
713/656-4306 (GW Tech. TF rep.)

Ron Ganim
Standard Oil Co. Ind.
200 E. Randolph Dr.
Chicago, IL 60601
312/856- (SEHL rep.)

Arch E. Makitarian, Ph.D.
Mobil Oil Corp.
PO Box 1029
Princeton, NJ 08540
609/452-9440 x15 (MBSD rep.)

Ben F. Thomas, Ph.D.
Shell Development Co.
PO Box 4320
Houston, TX 77210
713/241-6846 (MBSD rep.)

Gloria Rowe
Env. Affairs
Energy Conservation
Sun Company
1801 Market-St.
Philadelphia, PA 19103-1699
215/977-3285

T.G. Kirkpatrick
Shell Oil Co.
PO Box 3105
Houston, TX 77001
713/241-1796 (Mktg. rep.)

Bill Tansey
Getty Ref. & Mktg. Co.
Delaware City, DE 19706
302/834-6162 (Pending approval)
(Refining rep.)

Ernest Hagan
Texas Eastern Products Pipeline
PO Box 2521
Houston, TX 77252 (Trans. rep.)

Earl Arp, Ph.D.
Ashland Oil Co.
PO Box 391
Ashland, KY 41114 (HSRD rep.)

Earl Snavelly
Mobil R&D Corp. (FRL)
3600 Duncanville Rd.
Dallas, TX 75236
214/851-8104

Info copies

W. Kelly - Arco
R. Kreutzen - Chevron
S. Back - Sun
C.V. Henderson - Texaco

Merril Coomes
Tosco Corp.
10100 Santa Monica Blvd.
Los Angeles, CA 90067

API Staff

G. Patton - EAD
C. Carlson - EAD
E. Rucker - EAD
D. Chen - MBSD
C. Holdsworth - MBSD
J. Vail - Asst. to VP
S. Williams - OGC
L. Scott - HSRD
R. White - Marketing
W. Retzsch - Refining
J. Greer - Production
W. Rozett - State Relations

EQ-SH156 0073



DRAFT

CONFIDENTIAL INFORMATION
QUESTIONNAIRE

API Multi-Discipline Task Force - Research on Fate and Effects
of Underground Hydrocarbon

Groundwater Quality and Vapor Analysis of Liquid Hydrocarbon Release

Company Name SHELL OIL COMPANY
Contact Name T. G. LILPATRICK
Title STAFF ENGINEER - MARKETING ENGINEERING
Address P.O. Box 3105
HOUSTON TEXAS 77001
Telephone Number 713-241-1796

Please make as thorough and complete response as possible to this questionnaire. The identity of the responding company will be protected by the API staff. If it is necessary to ask questions regarding your response, the initial contact will be made by API staff before the company identity and your name is given to the contractor.

Please complete one copy of the questionnaire for each release incident that you have sufficient data to report.

Questions and the completed questionnaire should be directed to:

Ms. Carmen A. Carlson
Department of Environmental Affairs
American Petroleum Institute
2101 L Street, Northwest
Washington, D.C. 20037
(202) 457-7315

API Code No. _____
(to be assigned by API)

EQ-SH156 0074

Shell does ~ 100 of these per year



API Code No.

Section 1

Groundwater Quality Analysis of Liquid Hydrocarbon Release

1. Release Information

combine to both leak period

- a. Discrete spill: _____ or continuous release _____
- b. Estimated release date(s): _____
- c. Discovery date: _____
- d. How discovered: visual observation _____, inventory control _____, sewer _____, utility trench or vault _____, water well _____, reported vapor _____, other _____
- e. Source(s): pipeline _____, underground storage _____, transfer line _____, surface storage _____, other _____
- f. Material released: (gasoline, diesel, reformate, etc.)
1) _____, 2) _____, 3) _____, 4) _____
- g. Estimated amount released (gals): 1) _____, 2) _____, 3) _____, 4) _____
- h. Number of private wells impacted: _____
- i. Public water supply impacted: yes _____ no _____

2. Subsurface Characteristics

This is no good should provide soil classification or GW, etc

- a. Soil classification: 1) gravel and gravelly soils _____, 2) sand and gravelly soils _____, 3) silts and clays _____, 4) fractured rock _____, 5) other _____
- b. Porosity: _____
- c. Depth to groundwater (feet): _____
- d. Groundwater characteristics: 1) fresh _____, 2) potable _____, saline _____, T.O.S. _____ ppm

B.S.

3. Plume Description (use sketch if possible; see example)

- a. Maximum thickness of free hydrocarbon: _____ ft., _____ in.
- b. Maximum area of free hydrocarbon: _____ acres
- c. Maximum area of dissolved hydrocarbon halo: _____ acres

4. Investigation and Responses

- a. Number of investigation wells: _____
- b. Number of recovery wells: _____
- c. Number of recovery trenches: _____
- d. Water disposal methods: 1) reinjection _____, 2) surface _____, 3) public waste treatment facility _____, 4) other _____
- e. Number of reinjection wells: _____
- f. Number of reinjection trenches: _____
- g. Water treatment before disposal: yes _____ no _____
- h. Methods: 1) air stripping _____, 2) carbon filtration _____, 3) other _____
- i. Disposed water quality criteria: _____
- j. Criteria source: 1) Drinking Water Standards _____, 2) state _____, 3) regional _____, 4) local _____, 5) other _____
- k. Statutory criteria: yes _____ no _____, or negotiated: yes _____ no _____



API Code No. _____

Section 2

Vapor Analysis from a Liquid Hydrocarbon Release

1. Release Information (If same as previously reported, indicate release date and proceed to 14.)

- a. Discrete spill: _____ or continuous release _____
- b. Estimated release date(s): _____
- c. Discovery date: _____
- d. How discovered: visual observation _____, inventory control _____, sewer _____, utility trench or vault _____, water well _____, reported vapor _____, other _____
- e. Source(s): pipeline _____, underground storage _____, transfer line _____, surface storage _____, other _____
- f. Material released: (gasoline, diesel, reformate, etc.)
1) _____, 2) _____, 3) _____, 4) _____
- g. Estimated amount released (bbbls): 1) _____, 2) _____, 3) _____, 4) _____
- h. Buildings impacted (indicate number): 1) private homes _____, 2) institutions _____, 3) businesses _____
- i. Other facilities impacted: 1) sewers _____, 2) vaults _____, 3) other _____
- j. Emergency evacuations required: _____
- k. Authority ordering evacuations: _____

2. Subsurface Characteristics (If same as previously reported, proceed to 3.)

- a. Soil Classification: 1) gravel and gravelly soils _____, 2) sand and gravelly soils _____, 3) silts and clays _____, 4) fractured rock _____, 5) other _____
- b. Porosity: _____
- c. Depth to groundwater (feet): _____
- d. Groundwater characteristics: 1) fresh _____, 2) potable _____, saline _____, T.D.S. _____ ppm

Refer to previous section

3. Plume Description (Use sketch if possible; see example.)

- a. Maximum thickness of free hydrocarbon: _____ ft., _____ in.
- b. Maximum area of free hydrocarbon: _____ acres
- c. Maximum area of dissolved hydrocarbon halo: _____ acres

4. Health Effects

- a. Number of individuals reporting or claiming adverse health effects from vapors: _____
- b. Principal health complaints: 1) _____, 2) _____, 3) _____, 4) _____

5. Corrective Action

- a. Modified ventilation system: _____
- b. Installed underground ventilation: _____
- c. Sealed vapor entry points: _____
- d. Vacated buildings: _____
- e. Other: _____



6. Chemical Analysis

a. Analytical approach: 1) _____, 2) _____, 3) _____

VAPOR EXPOSURE ANALYSIS (ppbv)

Location:	M		N		O		P		Q		R	
Component	MAX	TYP	MAX	TYP	MAX	TYP	MAX	TYP	MAX	TYP	MAX	TYP
Benzene												
Toluene												
Ethylenes												
Ethylbenzene												
1, 2-dichloroethane												
1, 2-dibromoethane												
lead alkyls												
Total hydrocarbon												
Other												

MAX = maximum
TYP = typical

Vapors usually sampled & identified as TOC
or some component



SAMPLE

DRAFT

CONFIDENTIAL INFORMATION
QUESTIONNAIRE

API Multi-Discipline Task Force - Research on Fate and Effects
of Underground Hydrocarbon

Groundwater Quality and Vapor Analysis of Liquid Hydrocarbon Release

Company Name ZYX OIL COMPANY
Contact Name N. N. JONES
Title MANAGER, ENVIRONMENTAL PROGRAMS
Address 1 MAIN STREET
OILFIELD, TEXAS
66666
Telephone Number 999 888-7777

Please ~~make~~ as thorough and complete response as possible to this questionnaire. The identity of the responding company will be protected by the API staff. If it is necessary to ask questions regarding your response, the initial contact will be made by API staff before the company identity and your name is given to the contractor.

Please complete one copy of the questionnaire for each release incident that you have sufficient data to report.

Questions and the completed questionnaire should be directed to:

Ms. Carmen A. Carlson
Department of Environmental Affairs
American Petroleum Institute
2101 L Street, Northwest
Washington, D.C. 20037
(202) 457-7315

API Code No. A-1
(to be assigned by API)

EQ-SH156 0078



Section 1

Groundwater Quality Analysis of Liquid Hydrocarbon Release

1. Release Information

- a. Discrete spill: _____ or continuous release
b. Estimated release date(s): from before 1970
c. Discovery date: Jan. 1981
d. How discovered: visual observation _____, inventory control _____,
sewer _____, utility trench or vault _____, water well ,
reported vapor _____, other _____
e. Source(s): pipeline _____, underground storage _____, transfer
line , surface storage , other _____
f. Material released: (gasoline, diesel, reformate, etc.)
1) gasoline, 2) fuel oil, 3) _____, 4) _____
g. Estimated amount released (bbls): 1) 10,000, 2) 25,000,
3) _____, 4) _____
h. Number of private wells impacted: 6
i. Public water supply impacted: yes _____ no

2. Subsurface Characteristics

- a. Soil classification: 1) gravel and gravelly soils _____,
2) sand and gravelly soils , 3) silts and clays _____,
4) fractured rock _____, 5) other _____
b. Porosity: 18%
c. Depth to groundwater (feet): 36-48
d. Groundwater characteristics: 1) fresh , 2) potable
saline _____, T.D.S. 420 ppm

3. Plume Description (use sketch if possible; see example)

- a. Maximum thickness of free hydrocarbon: 2.5 ft., _____ in.
b. Maximum area of free hydrocarbon: 50 acres
c. Maximum area of dissolved hydrocarbon halo: 150 acres

4. Investigation and Responses

- a. Number of investigation wells: 15
b. Number of recovery wells: 4
c. Number of recovery trenches: _____
d. Water disposal methods: 1) reinjection , 2) surface _____,
3) public waste treatment facility _____, 4) other _____
e. Number of reinjection wells: 0
f. Number of reinjection trenches: 2
g. Water treatment before disposal: yes no _____
h. Methods: 1) air stripping , 2) carbon filtration _____,
3) other _____
i. Disposed water quality criteria: benzene, 100 ppb
j. Criteria source: 1) Drinking Water Standards _____,
2) state _____, 3) regional , 4) local _____, 5) other _____
k. Statutory criteria: yes _____ no _____,
or negotiated: yes no _____

5. Health Effects



- a. Number of individuals reporting or claiming adverse health effects: 6
- b. Principal health complaints: 1) Nausea, 2) Headaches, 3) Emotional distress

6. Chemical Analysis

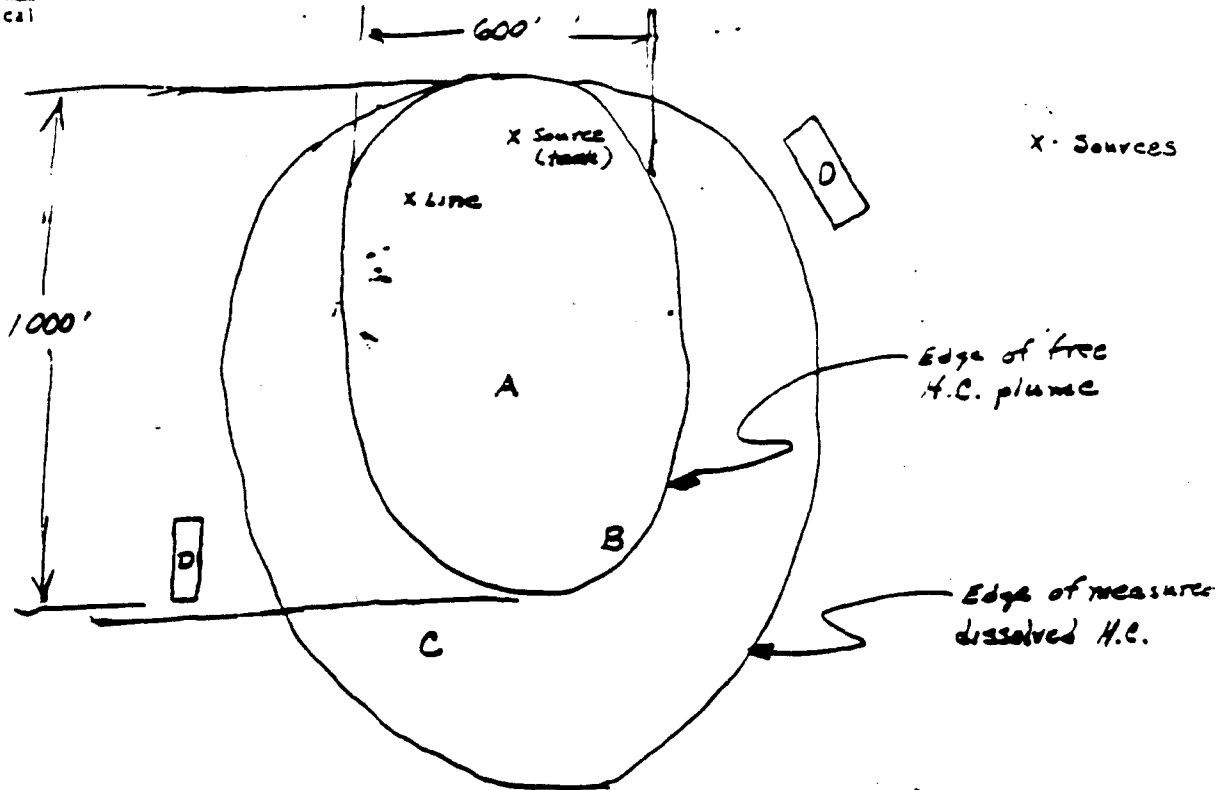
- a. Analytical approach: 1) purge & trap, 2) extraction, 3) GC, 4) GCMS, 5) TAC

B.S.

WATER QUALITY ANALYSIS (ppb)

Location: Component	A PLUME CENTER		B LEADING EDGE		C WITHIN HALO		D REINJECTED WATER		E SURFACE DISCHARGE		F POTW DISCHARGE	
	MAX	TYP	MAX	TYP	MAX	TYP	MAX	TYP	MAX	TYP	MAX	TYP
	Benzene	8500	3000	8000	1000	250	50	2000	100			
Toluene	9000	3500	3000	1000	200	30	1500	150				
Tylenes	4000	1000	2000	900	250	15	500	60				
Ethylbenzene	2500	750	1000	200	100	10	250	20				
t-butyl alcohol	0	0	0	0	0	0	0	0				
methyl t-butyl ether	0	0	0	0	0	0	0	0				
1, 2-dichloroethane	80	20	0	0	0	0	10	0				
1, 2-dibromoethane	60	10	0	0	0	0	10	0				
Other												

MAX = maximum
TYP = typical



Section 2

A-1
API Code No.

Vapor Analysis from a Liquid Hydrocarbon Release

1. Release Information (If same as previously reported, indicate release date and proceed to 1a.)

- a. Discrete spill: _____ or continuous release _____
- b. Estimated release date(s): from before 1970
- c. Discovery date: _____
- d. How discovered: visual observation _____, inventory control _____, sewer _____, utility trench or vault _____, water well _____, reported vapor _____, other _____
- e. Source(s): pipeline _____, underground storage _____, transfer line _____, surface storage _____, other _____
- f. Material released: (gasoline, diesel, reformat, etc.)
1) _____, 2) _____, 3) _____, 4) _____
- g. Estimated amount released (bbls): 1) _____, 2) _____, 3) _____, 4) _____
- h. Buildings impacted (indicate number): 1) private homes 20, 2) institutions 5, 3) businesses 5
- i. Other facilities impacted: 1) sewers , 2) vaults , 3) other _____
- j. Emergency evacuations required: 2
- k. Authority ordering evacuations: Company Fire Marshall

2. Subsurface Characteristics (If same as previously reported, proceed to 3.)

- a. Soil Classification: 1) gravel and gravelly soils _____, 2) sand and gravelly soils _____, 3) silts and clays _____, 4) fractured rock _____, 5) other _____
- b. Porosity: _____
- c. Depth to groundwater (feet): _____
- d. Groundwater characteristics: 1) fresh _____, 2) potable _____, saline _____, T.O.S. _____ ppm

3. Plume Description (Use sketch if possible; see example.)

- a. Maximum thickness of free hydrocarbon: 2.5 ft., _____ in.
- b. Maximum area of free hydrocarbon: 50 acres
- c. Maximum area of dissolved hydrocarbon halo: 150 acres

4. Health Effects

- a. Number of individuals reporting or claiming adverse health effects from vapors: 27
- b. Principal health complaints: 1) Headaches, 2) Nausea, 3) Dizziness, 4) Anxiety

5. Corrective Action

- a. Modified ventilation system: 3 buildings
- b. Installed underground ventilation: affected 6 buildings
- c. Sealed vapor entry points: 10 buildings
- d. Vacated buildings: 1
- e. Other: _____

6. Chemical Analysis

1. Analytical approach: 1) Portable analyzers 2) Charcoal tubes 3) Buy samples

VAPOR EXPOSURE ANALYSIS (ppmv)

Location	1		2		3		4		5	
Component	MAX	TYP	MAX	TYP	MAX	TYP	MAX	TYP	MAX	TYP
Benzene	670	420	300	28	150	>5	150	>5		
Toluene	650	40	750	30	200	>5	200	>5		
Xylenes	300	18	300	12	75	>5	30	>5		
Ethylbenzene	80	>5	80	>5	20	>5	75	>5		
1, 2-dichloroethane	0	0	>10	0	0	0	0	0		
1, 2-dibromoethane	0	0	0	0	0	0	0	0		
lead alkyls	0	0	0	0	0	0	0	0		
Total hydrocarbon	12000	600	2800	400	5000	400	1300	200		
Other										

MAX = maximum
TYP = typical

