J. Rodriguez (ext 2208)

doc. control

MEMORANDUM

EMCON ASSOCIATES
Consultants in Wastes Management and Environmental Control

CURRENT: 1921 Ringwood Ave San Jose 95131

Date 1/18/85
Project 438-56.03

To Jeffrey Ryan
Gettler-Ryan, Inc.
1992 National Avenue
Hayward, California 94545

Re Chevron Station, First and Front Streets, Livermore, California

Eighteen exploratory borings (C-1 through C-18) were drilled at the Chevron station at First and Front Streets between December 21st and January 15th, 1985. Three of the borings (C-10, C-11, and C-13) were terminated and backfilled after encountering underground utilities within five feet of the surface. The remainder of the borings ranged in depth between 21 and 35 feet. They encountered primarily clayey materials interlayered with sands and gravels to the total depth explored. Groundwater was encountered between 14 and 17 feet below grade. Borings C-1 through C-9, C-12, and C-14 through C-18 were converted to groundwater monitoring wells by the installation of 3-inch PVC casings as noted on the attached boring logs.

Evidence of petroleum product was encountered just above the water table in borings C-1, C-2, C-4, C-6, C-7, C-9, C-14, C-16, and C-17. Data obtained during this investigation indicates that groundwater flow beneath the site is toward the southwest.

Boring logs, a site map, and elevation data are attached.

Erin Garner

LOG C
EXPLORATORY BORING

EMCON ASSOCIATES

CLIENT GR
LOCATION Livermore 1st & 580
LOGGED BY CMP DRILLER HEW

E-1
Sheet 1 of 1

Field location of boring:

Ground Elev.

Drilling method Hollowstem
Hole dia. 8"

Casing installation data 20 ft. 3" PVC lower 12 slotted & blank sand to 6, bent/concrete (lift bag) & 6 to surface

Water level	13.5±	13		
Time	during drill	1pm		
Date		12/21		

Pocket Torr vane TSF	Pocket Penetrometer TSF	Blows/ft. or Pressure PSI	Type of Sample	Sample Number	Depth	Sample	Soil Group Symbol (U.S.C.S.)	DESCRIPTION
								AC
	2.60 (2.1)	6/10/14 18" drive	Sten rec 95%	1	2 4 6		CL	CL - Olive (5Y. 4/3) to black (5Y. 2.5Y/1) gravelly, silty CLAY FILL, fine to crs gravel - damp no odor - all black (5Y. 2.5Y/1)
		6/11/13	MOD	2	8 10			SC-CL - Olive gray (5Y. 5/2) clayey fine SAND & fine sandy CLAY contains root holes, lmonite mottles faint petrol odor - damp
	1.55	18" drive	rec 100%		12			- petrolic odor in returns
		4/7/9	Sten rec	3	14			SC - Yellowish brown (10YR. 5/6) clayey fine SAND root holes, faint petrol odor sand discrete wet - clay dyc 15.5 - water moving thru soil and root holes
	NT	18" drive	rec 100%		16 18			
	2.55	6/8/12 18" drive	Sten rec	4	20			CL - Light gray (10YR. 7/2) silty CLAY appears oxidized as a leached zone, very few root holes, 5% fine sand discon. - damp no odor
					22			- TD 21.5 End hexcore into 3-4 ft clay - no odor look for gas presence only
					24 26 28			

PRELIMINARY

LOG C. EXPLORATORY BORING

EMCON ASSOCIATES

CLIENT GR
LOCATION Livermore
LOGGED BY Amp DRILLER HEW

C-2 Sheet 1 of 1

Field location of boring:

Ground Elev. Datum

Drilling method Hollowstem Hole dia. 8"

Casing installation data Cored w/ 25' 3/4" PVC lower 15 slot Sand to 8' bent to 2' conc 7to0 vault

Water level	17 ± - could hold by auger
Time	155
Date	12/21

Pocket Torr vane TSF	Pocket Penetrometer TSF	Blows/ft. or Pressure PSI	Type of Sample	Sample Number	Depth	Sample	Soil Group Symbol (U.S.C.S.)	DESCRIPTION
							FILL	AC
					2			CL - Dark yellowish brown (10YR 3/4) slightly fine sandy silty CLAY - damp FILL
					4			
	2.5	5/8/12 18" drive	St Pen rec. 100%	1	6			- clr black (5Y 2.5/1) minor 5% < fine sand dissem, no odor - damp
					8		CL	dissem fine sandy CL - Yellowish brown (10YR 5/4) silty CLAY, some root holes or burrows, (manganese mottles (fluctuating water table?) - damp
	NT	6/15/17 18" drive	MOD rec 50%	2	10			
					12			
					14		▽	
	3.10	5/7/11 18" drive	St Pen rec. 100%	3	16			- contains rare fine gravel and 10% dissem fine sand no odor - damp very stiff
					18		SC	SC - Clayey fine SAND, wet no sample infer same as in C-1
					20		CL	
	NT	12/18/16 18" drive	St Pen rec 100%	4	22			CL - Light gray (10YR 7/2) silty CLAY, contains dissem fine sand (5% <) appears strongly oxidized and leached very stiff - damp
					24			
	2.0	5/8 12" drive	St Pen/SS	5	26			- clr change to dark grey brown (10YR 4/2) - damp
					28			TD 26.5 prove 5+ feet clay end in clay aquitude
					30			

NOTE - odor from hole of "fresh" gas assume some in water

1/8" push on mats

PRELIMINARY

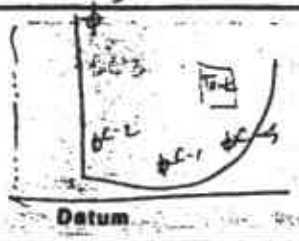
LOG O. EXPLORATORY BORING

EMCON ASSOCIATES

PROJECT NO. ____ DATE ____
CLIENT GR
LOCATION Livermore
LOGGED BY CMP DRILLER HEW

C-3
Sheet 1 of 1

Field location of boring:



Ground Elev.

Drilling method Hollow stem
Hole dia. 8"

Casing installation data 20 ft 3" PVC
lower 12 slotted sand to 6
bent. 6-5 concrete 5-0 vault

Water level	14' ±			
Time	400			
Date	12/2			

Pocket Torr vane TSF	Pocket Penetrometer TSF	Blows/ft. or Pressure PSI	Type of Sample	Sample Number	Depth	Sample	Soil Group Symbol (U.S.C.S.)	DESCRIPTION
								AC DK
					2		CL	CL - Black (5Y 2.5/1) sandy slightly gravelly silty CLAY, FILL - damp to moist
					4			
	1.0	5/4/7	SS	1	6			- as above, no odor
		18"	rec 80%					
					8			
					10		CL	CL - Brown (10YR 5/3) slightly fine sandy silty CLAY, sand 5% ± m, stiff, no odor root holes rare and unfilled - damp; rare root holes open
	3.8	6/6/12	SS	2	12			
		18"	rec					
					14			
							SC	SC - Brown (10YR 5/3) clayey fine SAND, very faint odor, stiff, wet, root holes - wet - decrease odor 16 to 16.5
	2.5	6/9/11	SS	3	16			
		18"	rec 100%					
					18		CL	CL - Brown (10YR 5/3) and light gray (10YR 7/2) silty CLAY, contains discrete fine sand - 10% and fine gravel - 5% in clay matrix, no odor damp - very stiff - damp all color light gray (10YR 7/2)
	4.25	6/7/12	SS	4	20			
		18"	rec					TD C 21.5 in stiff clay as with rude as in C-1, C-2, C-5

PRELIMINARY

LOG O. EXPLORATORY BORING

EMCON ASSOCIATES

PROJECT NO. [illegible] DATE [illegible]

CLIENT GR Che n

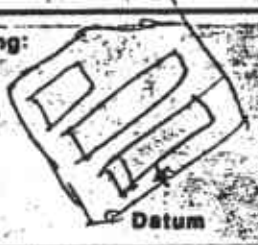
LOCATION LIVERMORE

LOGGED BY [illegible] DRILLER [illegible]

C-4

Sheet 1 of [illegible]

Field location of boring:



Ground Elev.

Drilling method 7 1/2 HS Hole dia. 7"

Casing installation date 3" PVC SLOT 23.9' BLANK TO SURF. SAND TO 8', BC TO SURF

Water level

Time

Date

Pocket Torr vane TSF	Pocket Penetrometer TSF	Blows/ft. or Pressure PSI	Type of Sample	Sample Number	Depth	Sample	Soil Group Symbol (U.S.C.S.)	DESCRIPTION
							AC	Asphalt
					2		CL	CLAY Black (5Y 2.5/1), 5% sand, 5% fine to medium gravel, dry, slight product odor
					4		SW	SAND Greyish brown (2.5Y 5/2), 0-5% clay, 5% fine gravel, 90% fine to medium sand, strong product odor
					6			
					8			8.5-9.5': saturated w/ gas
		1/2/4	STP 100%		10		CL	CLAY Olive (5Y 5/3), 0-5% fine sand, 5% silt, 90% fines, white calcite mottle, moist, very strong gas odor
					12			~12.5-14': saturated w/ black gas (old?)
		15/14/22	STP 100%		14	▽		~13.0-16.0' increase fine to medium sand (≈10%), much white discoloration (wet), very slight gas odor
					16			16.5'-23': much discoloration (leaking?), stiff, damp, no gas odor
					18			
		5/18/20	STP 100%		20			
					22			
					24			HOLE TERMINATED & S.I.O.
					26			

PRELIMINARY

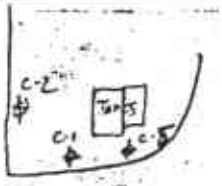
LOG OF EXPLORATORY BORING

EMCON ASSOCIATES

PROJECT NO. _____ DATE _____
CLIENT GR
LOCATION Livermore
LOGGED BY CMP DRILLER HEW

C-5
Sheet 1 of 1

Field location of boring:



Ground Elev. Datum

Drilling method Hollowstem
Hole dia. 8"

Casing installation data Case w/ 20' 3" PVC
lower 12 slotted sand to 6 bent. to 5
concrete to 0

Water level	14'±			
Time	253			
Date	12/21			

Pocket Torr vane TSF	Pocket Penetrometer TSF	Blows/ft. or Pressure PSI	Type of Sample	Sample Number	Depth	Sample	Soil Group Symbol (U.S.C.S.)	DESCRIPTION
								2" AC; crs base rock to 12"
					2		CL	CL - Black (5Y. 2.5/1) silty CLAY FILL, contains some crs gravel - damp to moist
		4/7/13	SS	1	4			
		18"	rec 0					
		lost sampler			6			-very faint odor
					8		CL	CL - Olive gray (5Y. 5/2) silty CLAY, fine sand dissem in clay matrix 2% ± faint petrol odor root holes infilled with clay, occ; open root holes 1% ± some gray discoloration ~~product~~? See note
	3.1	5/9/11	SS	2	10			
NOTE-		18"	rec 100%		12			
discoloration & fluctuating water table								do change to yellowish brown (10YR. 5/6)
					14		SC	SC - Yellowish brown (10YR. 5/6) clayey fine SAND in clay matrix very faint odor, finally very sandy wet; becomes clayier @ 16.5
		4/7/10	SS	3	16			
SC → 1.5		18"	rec 100%				CL	
CL → 2.5					18			CL - Light gray (10YR 7/2) silty CLAY stiff, appears leached and oxidized no odor - damp
	1.5	6/9/	SS	4	20			
		12"	rec 100%					
								TD 21.0 into same clay aquitclude as C-1, C-2

PRELIMINARY

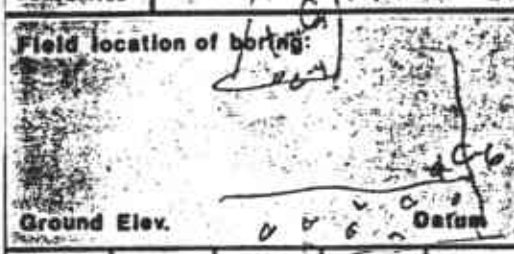
LOG OF EXPLORATORY BORING

EMCON ASSOCIATES

PROJECT No. [illegible] DATE [illegible]
CLIENT Gt Ct Iron
LOCATION LIVERMORE
LOGGED BY SM DRILLER XD

C-6
Sheet [illegible] of [illegible]

Field location of boring:



Ground Elev. [illegible]

Drilling method 7½" HS Hole dia. 7½"

Casing installation data 3" PVC SLOT 22-7
BLANK TO SURF. SAND TO 6'
BC TO SURF.

Water level
Time
Date

Pocket Torr vane TSF	Pocket Penetrometer TSF	Blows/ft. or Pressure PSI	Type of Sample	Sample Number	Depth	Sample	Soil Group Symbol (U.S.C.S.)	DESCRIPTION
					0			Asphalt & coarse gravel base
					2		CL	CLAY (FILL) Black To Reddish brown (5YR 2.5/1) - (5YR 4/3) ~50% fine to medium sand, 10-15% silt 80-85% fines - trace medium gravels - damp
					4			
					6			
					8			
		15/20/18	STP		10	X	SW	SAND dk brown (7.5YR 4/4), 0-5% fines, 40% fine to med gravels, 85-90% fine to coarse SAND - moist, STRONG GAS ODOR
					12			
					14	▽		(wet)
	2.0	6/6/9	STP		16	X	CL	CLAY Pale yellow (2.5Y 7/4), 0-5% silt, white caliche mottle, moist, no gas odor, occ. open root holes
					18			
		15/17/18	STP		20	X		~19.0 - 22.0' slightly sandy (~5%) with abundant leaching & discoloration
					22			H.T.: 510
					24			
					26			
					28			
					30			

PRELIMINARY

LOG OF EXPLORATORY BORING

EMCON ASSOCIATES

PROJECT No. 450 [illegible] DATE 1-[illegible]-[illegible]
CLIENT GR Chevron
LOCATION Livermore
LOGGED BY GR DRILLER XD

C-7
Sheet 1 of 2

Field location of boring: Taylor ± C-4

± C-7
Datum

Ground Elev.

Drilling method 7½" HS
Hole dia. 7½"

Casing installation data 3" PVC SLOT 22-7, BLANK TO SURF. SAND TO 6, BC TO SURF.

Water level				
Time				
Date				

Pocket Torr vane TSF	Pocket Penetrometer TSF	Blows/ft. or Pressure PSI	Type of Sample	Sample Number	Depth	Sample	Soil Group Symbol (U.S.C.S.)	DESCRIPTION
								Asphalt 2" & 8" CRS gravel base
					2		CL	CLAY (FILL) Dk brown to black (5Y2.5/1 - 5Y4/3), ~5% fine to medium sand, ~10% silt, ~85% clay, trace fine to coarse gravel - damp, no gas odor
					4			
					6			
					8			
					10		CL	CLAY Olive (5Y5/3) 5% 10% silt & very fine sand, moist to wet, strong gas odor
					12			12'-16': 30-40% silt & fine sand
	2.3	12/14/14	STP 100%		14	X		13'-14.5': Thin 1"-2" stringers of clayey fine sand - moist, nearly saturated w/ gas
					16			
					18			~16.5-22': Decrease silt & sand to 5-10%, heavily oxidized & leached - stiff - damp, no gas odor
	3.0	5/10/15	STP 100%		20	X		
					22			H.I. = S.I.O.
					24			
					26			

PRELIMINARY

LOG C. EXPLORATORY BORING

EMCON ASSOCIATES

CLIENT OR C DSN
LOCATION CLOVERDALE
LOGGED BY DRILLER

C-8
Sheet 1 of

Field location of boring:

Ground Elev. Datum

Drilling method 2½" HS Hole dia. 7½"

Casing installation data 3" PVC SLOT DWN TO 8', BLANK TO SURF. SAND TO 6', BC TO SURF

Water level				
Time				
Date				

Pocket Torr vane TSF	Pocket Penetrometer TSF	Blows/ft. or Pressure PSI	Type of Sample	Sample Number	Depth	Sample	Soil Group Symbol (U.S.C.S.)	DESCRIPTION
					0			3" Asphalt & 6" cru gravel base
					2		CL FILL	CLAY (FILL) Grayish brown (2.5Y 4/2) ~ 5-10% fine to coarse sand, 10% silts ~ damp
					4		GW FILL	GRAVEL (FILL) Grayish brown (2.5Y 4/2) 25-30% medium to coarse SAND, 70-75% fine to medium gravel - damp
					6		CL FILL	CLAY FILL Dk brown (7.5YR 4/4) ~ 5% fine to medium sand, 5-10% silts, 85% clay, trace gravel - damp mc
					8			
	1.75	5/8/12	STD		10	X	CL	CLAY olive (5Y 5/3) 0-5% fine sand, 5% silts, 90% clays, calcite & Fe oxide mottle - damp mc
					12			
					14			
		//	STD		16	X		14.5'-23': clay becomes heavily leached & oxidized, stiff - damp w/ root frags, trace coarse sand
					18			
	4.5	9/14/19	STD		20	X		
					22			
					24			T.H: 31.0
					26			
					28			
					30			
					32			
					34			
					36			

PRELIMINARY

LOG O. EXPLORATORY BORING

EMCON ASSOCIATES

PROJECT No. 738-30.4 DATE 1-3-87
CLIENT GR Chevron
LOCATION LIVERMORE
LOGGED BY [illegible] DRILLER XD

BORING No. C-9
Sheet ___ of ___

Field location of boring:

Ground Elev. Datum

Drilling method 7½" HS
Hole dia. 7½"

Casing installation data 3" PVC SLOT 23-7, PLAIN TO SURF. SAND TO 6, BC TO SURF.

Water level				
Time				
Date				

Pocket Torr vane TSF	Pocket Penetrometer TSF	Blows/ft. or Pressure PSI	Type of Sample	Sample Number	Depth	Sample	Soil Group Symbol (U.S.C.S.)	DESCRIPTION
								3" Asphalt & 6" crs gravel base
					2		CL	CLAY (Fill) Grayish brown (2.5Y 4/2) 5-10% fine to coarse sand, 10% silt, trace fine to coarse gravel - damp, mpo
					4		FILL	4.0'-4.5' : coarse Sandy GRAVEL Fill - damp
					6			4.5-8' : Black (5Y 2.5/1) decrease sand (5%)
					8		CL	
	1.75	5/8/10	SP		10	X		CLAY - Olive (5Y 5/3), 5-10% silts, 15-20% fine sand, 70-75% clay - Fe oxide stain & particles - damp - strong gas odor, trace medium sand
					12			
					14			
	2.0	7/10/13	SP		16	X		Decrease silt (~5%) & fine sand (~5%), rootholes moist) (slight gas odor
					18			~17.0-20' : clay becomes leached & discolored, stiff, damp, no prod odor
	4.0	8/9/10	SP		20	X		
					22			
					24			HT : SED.
					26			
					28			
					30			

PRELIMINARY

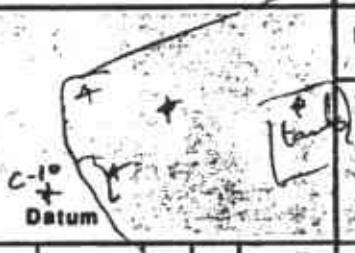
LOG O. EXPLORATORY BORING

EMCON ASSOCIATES

PROJECT No. [illegible] DATE [illegible]
CLIENT BA Chevron
LOCATION LIVERMORE
LOGGED BY [illegible] DRILLER XD

BORING NO. C-10 & C-11
Sheet [illegible] of [illegible]

Field location of boring:



Ground Elev.

Drilling method 7½" HS
Hole dia. 7¾"

Casing installation data 8" PVC SLOT - BLANK TO SURF. SAND TO BC TO SURF.

Water level				
Time				
Date				

Pocket Torr vane TSF	Pocket Penetrometer TSF	Blows/ft. or Pressure PSI	Type of Sample	Sample Number	Depth	Sample	Soil Group Symbol (U.S.C.S.)	DESCRIPTION
							TOPSOIL	3" Asphalt & 6" CMS gravel base
					2		CL	CLAY (Fill) Grayish brown (2.5Y 4/2), 5-10% fine to coarse sand, 10% silt, ~~[illegible]~~ damp
					4		GW-GC	GRAVEL
					6			BORING TERMINATED - HIT CONCRETE BUT DID NOT PENETRATE
					8			
					10			
					12			
					14			
					16			
					18			
					20			
					22			
					24			
					26			
					28			
					30			

9 - 23' 16/7
8 - 22½ 16/6½"
7 - 22 16/6
6 - 22 16/6
4 - 23' 16/7

PRELIMINARY

LOG OF EXPLORATORY BORING

EMCON ASSOCIATES

C-12 (C-12)

CLIENT GR Ch USN
LOCATION LIVERMORE
LOGGED BY SR DRILLER XD

C-12 Sheet ___ of ___

Field location of boring: MOBIL 100

Ground Elev. 84 Datum

Drilling method 7½" HS
Hole dia. 7½"

Casing installation data 3" PVC SLOT 20 - 10, BLANK TO SURF. SAND TO 9, BC TO SURF.

Water level				
Time				
Date				

Pocket Torr vane TSF	Pocket Penetrometer TSF	Blows/ft. or Pressure PSI	Type of Sample	Sample Number	Depth	Sample	Soil Group Symbol (U.S.C.S.)	DESCRIPTION
								Asphalt (5")
					2		CL	CLAY (5") - Dk grayish brown (2.5Y 3/2), 0-5% silt, trace sand & fine gravel - damp, nco
					4			
					6			
					8			
	2.5	7/8/11	STC 75% 18"		10	X		Light Olive gray (5Y 6/2), 5% fine to coarse sand, 5-10% silt, damp, no gas odor - iron stained, firm
					12			
		27/48	SPT 100% 12"		14		SW	SAND & GRAVEL - Brown (10YR 4/3), 0-3% clay binder, 35-40% fine to coarse sand, 55-60% fine to coarse gravel - wet, nco, trace rounded cobble size gravel
					16	X		
					18		GC	CLAYEY GRAVEL - Olive (5Y 5/3), 10-15% silty clay binder, 20% fine to coarse sand, 65% fine to coarse gravel -
		16/30	SPT 0%	12"	20	X		
		14/30	SPT	12"	22	X		
					24			B.T.: 810
					26			Pulled augers - hole caved to 18½ ft. Pushed casing to 20'
					28			
					30			
					32			

PRELIMINARY

EMCON ASSOCIATES

LOG OF EXPLORATORY BORING

PROJECT No. 129.27 DATE 1-11-87

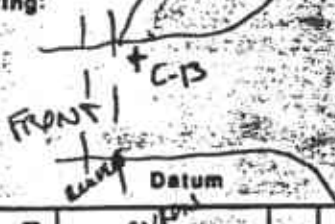
CLIENT GR Chevron

LOCATION LIVERMORE

LOGGED BY SM DRILLER XD

C-13 Sheet 1 of 1

Field location of boring:



Ground Elev.

Drilling method 7½" HS Hole dia. 7½"

Casing installation data 3" PVC SLOT BLANK TO SURF. TAPE TO BC TO SURF.

Water level					
Time					
Date					

Pocket Torr vane TSF	Pocket Penetrometer TSF	Blows/ft. or Pressure PSI	Type of Sample	Sample Number	Depth	Sample	Soil Group Symbol (U.S.C.S.)	DESCRIPTION
								Asphalt
					2		CL	CLAY (FILL) - Dk brown, 20% fine to coarse sand, trace gravel, damp, mod. plastic
							SW	GRAVELLY SAND - light olive brown (2.5Y 5/4), 25-30% fine gravel, 70% - 75% fine to coarse sand - temp. ave gas abs.
					4			
					6			TERMINATED HOLE: HIT CONCRETE UTILITY
					8			
					10			
					12			
					14			
					16			
					18			
					20			
					24			
					26			
					28			
					30			

PRELIMINARY

LOG C. EXPLORATORY BORING

EMCON ASSOCIATES

Chevron

PROJECT NO. _____ DATE _____

CLIENT GR Chevron

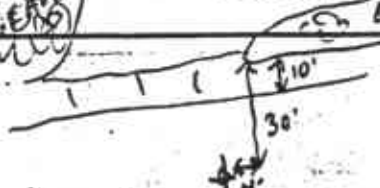
LOCATION Livermore

LOGGED BY _____ DRILLER _____

C-14

Sheet _____ of _____

Field location of boring:



wpo = no product odor

Ground Elev. _____ Datum C-14

Drilling method 7½" HS

Hole dia. 7½"

Casing installation data 1 HOLE BACKFILLED W/CEMENTITE TO 22', 3" PVC SLOT 20-10, BLANK TO SURF. SAND TO 9', BC TO SURF.

Pocket Torr vane TSF	Pocket Penetrometer TSF	Blows/ft. or Pressure PSI	Type of Sample	Sample Number	Depth	Sample	Soil Group Symbol (U.S.C.S.)	Water level	Time	Date	DESCRIPTION
											Asphalt Concrete
					2		CL				SILTY CLAY, Very dark gray (5Y3/2), 1-20% silt, firm - damp, wpo
					4						3-4': 10% fine to coarse sand, 10% fine to medium gravel
					6						6-9': Yellowish brown (10YR 11/4), 10% well graded sand, 35% well graded gravels, well rounded - damp, wpo
					8						
		6/24/35	STP 75%		10	X	SW				GRAVELLY SAND - Brown (7.5YR 5/4) 5% silty clay binder, 25-30% well graded well rounded gravels, 69-70% well graded sand - moist to wet, strong product odor
					12						
					14						
	3.0	5/7/9	STP 100%		16	X	CL				CLAY - (5Y 7/4) Pale yellow, 0-5% silt, white caliche discoloration, damp wpo
					18						
	4.5	9/11/22	STP 100%		20	X					19': Becomes stiff w/ trace fine sand, wpo
					22						
					24						(Trace iron oxide stains & particles)
	4.0	6/6/10	STP 100%		26	X					
					28						
					30						Olive (5Y5/4)
	1.5	7/8/13	STP 100%		32	X					29.5': Becomes very silty (30-35%), no caliche mottle, iron oxide stains, moist to wet
	1.5	15/9/20	STP		34	X					
					36						T.H.: SIO
					38						PRELIMINARY

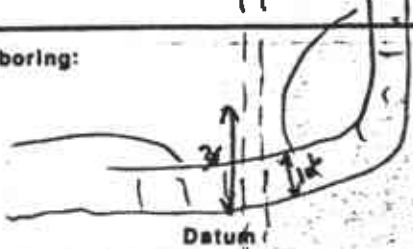
LOG C
EXPLORATORY BORING

EMCON ASSOCIATES

CLIENT GR Cha Inc Livermore
LOCATION 84 & Forest
LOGGED BY SM DRILLER KD

C-15 Sheet ___ of ___

Field location of boring:



Drilling method 8" HS Hole dia. 8"

Casing installation data HOLE BACKFILLED W/CONCRETE FROM 35' TO 20' 6" PVC SLOT 20-10, BLANK TO SURFACE. SAND TO 9', BENTONITE/CONCRETE TO SURFACE.

Water level
Time
Date

PRELIMINARY

Pocket Torr vane TSF	Pocket Penetrometer TSF	Blows/ft. or Pressure PSI	Type of Sample	Sample Number	Depth	Sample	Soil Group Symbol (U.S.C.S.)	DESCRIPTION
								Asphalt
					2		CL	CLAY (FILL) - Very dark grayish brown (10YR3/2), ~5% fine to medium sand, ~10% fine gravel, 85% silty clay - damp, no product odor, soft
					4		FILL	4'-6': 5-10% coarse gravel, well rounded
					6			
					8			
		3/5/5	STP-BAG	80% RECVRY	10		GW FILL	SANDY GRAVEL (FILL) - Dk brown (7.5YR3/2), 5% fines, 25-30% fine to medium sand, 65-70% fine gravel - loose, damp, no product odor
		4/7/8	STP-BAG	80%	12			
	4.5	15/17/20	STP-BAG	50%	14		CL	CLAY - Olive (5Y5/3), 15-20% silt, white caliche mottle and trace iron oxide stain & particles - stiff (damp) to firm (wet), no product odor - dissipated fine sand
	2.5	5/8/16	STP-BAG	90%	16			16'-17.0': contains very thin (2") clayey fine sand interbedding - wet, no product odor
	3.0	15/15/24	STP-BAG	90%	18			(Fine sand content increase to 5-10%, highly discolored & leached, dry to damp, firm, no product odor increased iron oxide staining)
	3.0	13/17/27	STP-BAG	90%	20			21.0'-21.5': contains very thin (4") clayey fine sand interbed (~50% sand, ~50% clays), wet
	4.0	24/30/36	STP-BAG	90%	22			
	3.5	25/8/21	STP-BAG	80%	24		SP/SC	FINE SAND to CLAYEY FINE SAND - Light Olive brown (2.5Y5/4), 5-20% silts & clays, 80-95% fine sand w/ trace medium sand - moist to wet, medium dense, no product odor
		14/33/33	STP-BAG	100%			SP	
		14/36/37	STP-BAG	100%	26			
		15/26/28	STP-BAG	100%				
		9/13/17	STP-BAG	100%	28		CL	SILTY CLAY, Light yellowish brown (2.5Y6/4) 5-10% silt & fine sand, abundant root fragments & rootholes, trace shell fragments - firm, damp, no product odor (becomes moist at 30') - decrease shell fragments below 30', becomes laminated with iron oxide stain
	2.0	9/14/20	STP-BAG	100%	30			
	2.5	15/27/30	STP-BAG	40%				
	2.5	13/19/24	STP-BAG	50%	32			
		17/19/30	STP-BAG	100%	34		SP/SW	FINE SAND INTERBEDDED W/ FINE TO MEDIUM SAND - Olive gray (5Y4/2), ~70% fine sand, ~25% medium sand, trace coarse sand - loose, wet, occasional iron oxide staining & rootholes, no product odor
		50/-/-	STP-BAG	0%			SW	GRAVELLY SAND - Dk Olive Gray (5Y3/2), 15-20% fine to coarse gravel, 80-85% fine to coarse sand - loose, wet, no product odor
					36			HOLE TERMINATED: SUFFICIENT SAMPLES OBTAINED
					38			

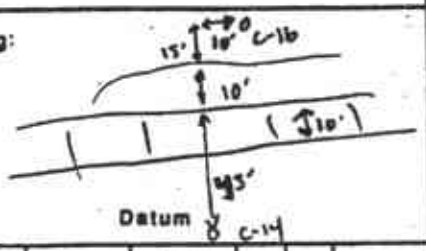
LOG C
EXPLORATORY BORING

EMCON ASSOCIATES

CLIENT GR Chan, Livermore
LOCATION 84 & Front
LOGGED BY EG DRILLER XD

C-16
Sheet ___ of ___

Field location of boring:



Ground Elev.

Drilling method 8" HS
Hole dia. 8"

Casing installation data Hole caved to 21' 3" PVC slot 25'-11', blank to surface. Sand to 10, Bc to surface.

Water level				
Time				
Date				

Pocket Torr vane TSF	Pocket Penetrometer TSF	Blows/ft. or Pressure PSI	Type of Sample	Sample Number	Depth	Sample	Soil Group Symbol (U.S.C.S.)	DESCRIPTION
					2		CL	ASPHALT. CLAY (FILL) - Very dark grayish brown (10YR3/2) 15-20% silt & fine to coarse sand, trace fine gravel - damp, soft, no product odor
					4		FILL	
					6			5.5'-8.5': Silt & sand content decrease to 0-5%, firm
					8			
					10		CL	CLAY - Olive (5Y5/3), 20-25% fine to medium sand, trace coarse sand, slightly iron stained, slight caliche mottle - firm, damp, no product odor
	2.5	8/11/18	SPT 100%		12			
					14			13': Decrease silt & sand content to 0-5%, root fragments & moist rootholes, strong product odor
	3.0	5/10/9	SPT 100%		16			15': wet rootholes, abundant caliche mottling, no product odor
					18			18.5-21.5': Increase silt & fine sand content to 10-15%, wet, no product odor
	2.5	7/9/11	SPT 100%		20			
					22			HOLE TERMINATED; SUFFICIENT INFO OBTAINED
					24			
					26			

PRELIMINARY

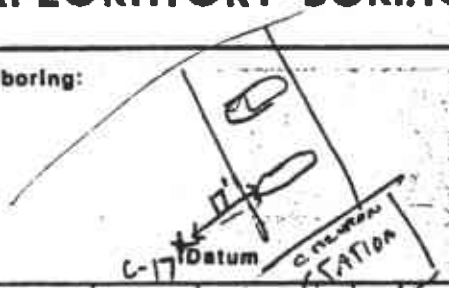
LOG OF EXPLORATORY BORING

EMCON ASSOCIATES

CLIENT GR Chevron Livermore
LOCATION 84 & Front
LOGGED BY EL DRILLER XD

C-17
Sheet ___ of ___

Field location of boring:



Ground Elev.

Drilling method 8" HS
Hole dia. 8"

Casing installation data
3" PVC SLOT 2 1/2-10, BLANK TO SURFACE. SAND TO 9', BC TO SURFACE.

Water level				
Time				
Date				

Pocket Torr vane TSF	Pocket Penetrometer TSF	Blows/ft. or Pressure PSI	Type of Sample	Sample Number	Depth	Sample	Soil Group Symbol (U.S.C.S.)	DESCRIPTION
								Asphalt & coarse gravel base
					2		CL	CLAY (FILL) - Dark brown (10YR4/3), ~80% fine to coarse sand, ~20% fine to coarse gravel - damp, soft, no product odor
					4		FILL	
					6		FILL	(Very dk gray (10YR3/1), decrease sand content to 5%, trace gravel, damp, soft
					8			
							CL	CLAY - Yellowish brown (10YR5/4), 5-10% silt & fine sand, trace medium to coarse sand, abundant caliche mottle & discoloration, some plant fragments & iron oxide stains - stiff, damp, no product odor
	4.0	10/24/43	STP 100%		10			
					12			
					14			
	1.5	5/6/6	STP 100%		16		D	15': rootholes moist to wet, soft, strong product odor, trace fine to medium gravel, very soft
					18			18': heavily discolored & leached, soft, damp to moist, no product odor
	2.5	9/4/13	STP 100%		20			
					22			HOLE TERMINATED; SUFFICIENT INFO OBTAINED

PRELIMINARY

LOG OF EXPLORATORY BORING

EMCON ASSOCIATES

PROJECT NO. _____ DATE _____

CLIENT GR Chevron - Livermore

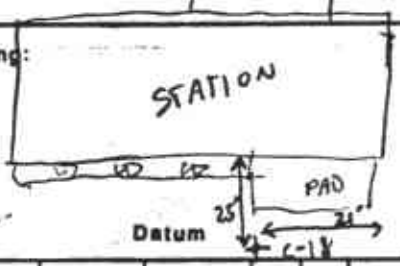
LOCATION 84 & Front

LOGGED BY GD DRILLER XD

C-18

Sheet _____ of _____

Field location of boring:



Ground Elev. Datum

Drilling method 8" HS

Hole dia. 8"

Casing installation data

3" PVC SLOT 21/2 - 10, BLANK TO SURF. SAND TO 9. BC TO SURFACE

Water level				
Time				
Date				

Pocket Torr vane TSF	Pocket Penetrometer TSF	Blows/ft. or Pressure PSI	Type of Sample	Sample Number	Depth	Sample	Soil Group Symbol (U.S.C.S.)	DESCRIPTION
								Asphalt
					2		CL	CLAY - Dark brown (10YR 4/3), ~10% fine to coarse sand, ~20% fine to coarse gravel - damp, soft, no product odor
					4		FILL	
					6			~4.5-8': Very dark gray (10YR 3/1), decrease sand content to ~5%, trace gravel, damp, soft
					8			
	>5.0	12/19/23	STP 50%		10		CL	CLAY - Yellowish brown (10YR 5/4), 5-10% silt & fine sand, 5-10% medium to coarse sand, abundant caliche mottle & discoloration, some plant fragments & iron oxide stain - damp, stiff, no product odor
					12			
					14		▽	
	2.5	5/6/9	STP 100%		16			14'-16': rootholes become wet, decreased discoloration 16': decrease sand content to 0-5%, rootholes become moist, no product odor
					18			18.5-21.5': abundant caliche mottle, soft, damp to moist
	2.5	5/9/16	STP 100%		20			
					22			HOLE TERMINATED; SUFFICIENT INFO OBTAINED
					24			
					26			

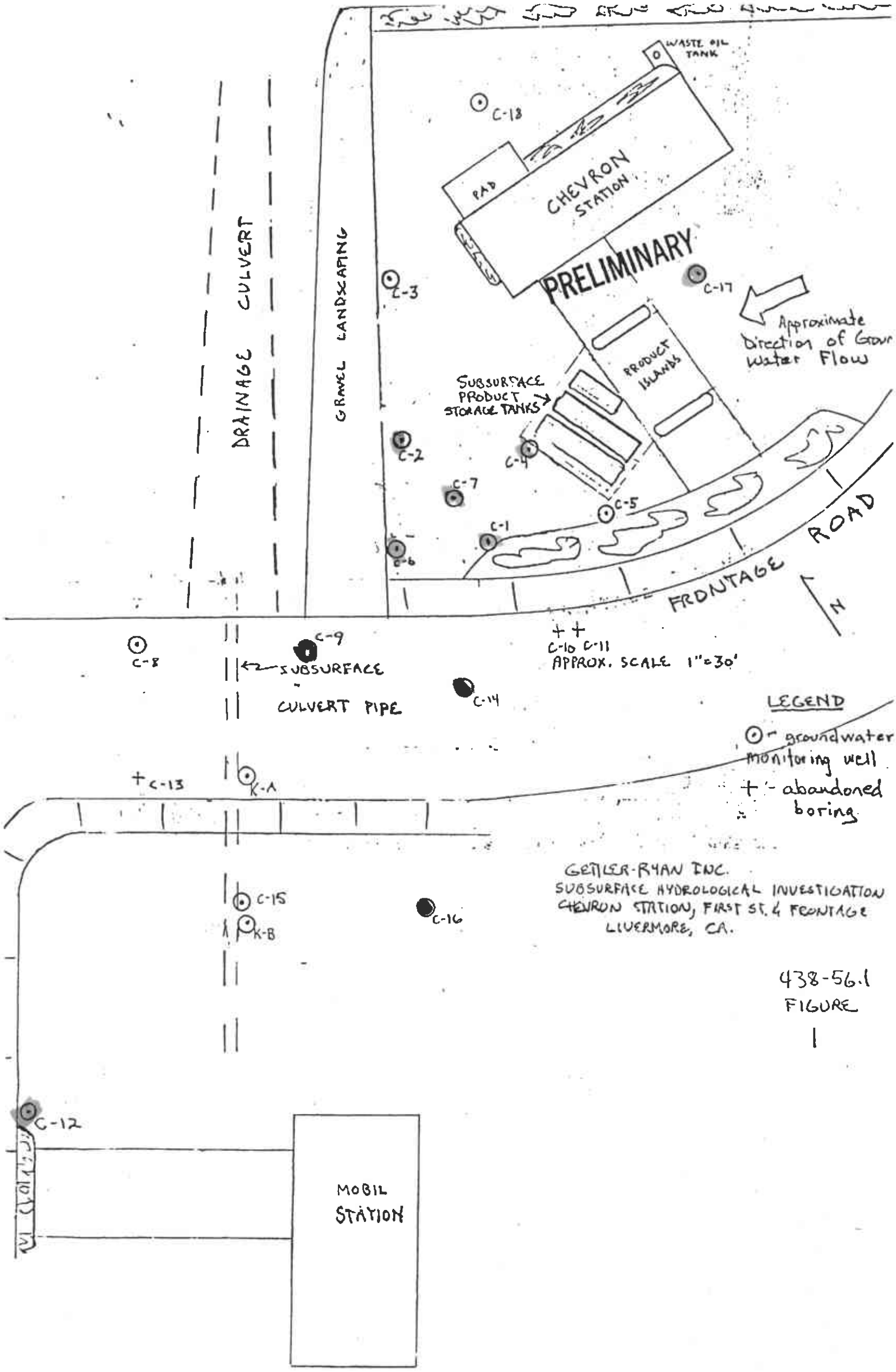
PRELIMINARY

ELEVATION DATA (1/10/85)

	TOP OF CASING (FT)	TOP OF BOX (FT)	GROUNDWATER TABLE (1/10/85)
C-1	520.27	520.83	507.27
C-2	520.61	521.08	507.01
C-3	521.16	521.92	507.06
C-4	520.68	521.39	507.08
C-5	520.66	521.32	507.36
C-6	519.46	520.32	506.96
C-7	520.17	520.98	507.07
C-8	519.56	520.16	506.36
C-9	519.38	519.73	506.82
C-10	N/A	N/A	N/A
C-11	N/A	N/A	N/A
C-12	519.68	520.03	505.78
C-13	N/A	N/A	N/A
C-14	519.91	(NOT YET INSTALLED)	(NOT YET EQUILIBRATED)
C-15	NOT YET INSTALLED		
C-16	" " "		
C-17	" " "		
C-18	" " "		
K-A	519.58	519.89	505.93
K-B	520.37	520.66	505.97

CULVERT BED: 508.77

PRELIMINARY



GETTLER-RYAN INC.
SUBSURFACE HYDROLOGICAL INVESTIGATION
CHEVRON STATION, FIRST ST. & FRONTAGE
LIVERMORE, CA.

438-56.1
FIGURE
1