UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION VII
726 MINNESOTA AVENUE
KANSAS CITY, KANSAS 66101

Paul

Site: Atlantic PWS
ID #: IAD039954300
Break: 1.1
Other:
10-31-86

A72Q 1.0

OCT 3 1 1986

161029

MEMORANDUM 04 00

SUBJECT: FIT Assistance to Iowa DNR at Atlantic Water Supply Site (IAD039954300)

FROM: Robert L. Morby, Chief Kenny Henderson for
SPFD/WSTM

TO: Charles Hensley
EP&R/ENSV

This memo is to formalize discussions between Iowa DNR and Ron McCutcheon of your staff, as confirmed by Pete Culver of my staff with Mr. McCutcheon on October 31, 1986.

The Iowa DNR's written request and background information is attached. Please keep Pete Culver informed as this investigation proceeds.

Attachment

RECEIVED
NOV 0 5 1986
E & E K.C.K.

Iowa
department of water, air and waste management

October 28, 1986

Dr. Pete Culver
Superfund Branch
Environmental Protection Agency
726 Minnesota Avenue
Kansas City, KS 66101

Dear Dr. Culver:

Attached is the preliminary assessment of the Atlantic Water Supply site (identification number IAD039954300).

This site has been assigned a medium priority for inspection because contamination has been observed in two of the city's drinking water wells and the remaining nine wells are in close proximity. The source of contamination has not been identified.

We are requesting assistance from EPA's FIT contractor in identifying possible sources of contamination through soil gas monitoring. The Department is considering purchasing soil gas monitoring equipment. Ideally, this inspection would serve as training in the use of various soil gas monitoring devices prior to procurement.

Thank you for your assistance.

Sincerely,

Morris L Preston

MORRIS L. PRESTON
SECTION CHIEF
ABANDONED/UNCONTROLLED SITES SECTION

RECEIVED
OCT 30 1986
REMD SECTION

MLP:JC:pla/AUSW301M08.01

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EPA

POTENTIAL HAZARDOUS WASTE SITE
PRELIMINARY ASSESSMENT
PART 1 - SITE INFORMATION AND ASSESSMENT

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
IA	DC399 54300

II. SITE NAME AND LOCATION

01 SITE NAME (Legal, common, or descriptive name of site)	02 STREET, ROUTE NO., OR SPECIFIC LOCATION IDENTIFIER
Atlantic Water Supply	15 West Third Street

03 CITY	04 STATE	05 ZIP CODE	06 COUNTY	07 COUNTY CODE	08 CONG DIST
Atlantic	IA	50022	Cass (15)		

09 COORDINATES LATITUDE	LONGITUDE
41° 24' 30"	95° 00'

10 DIRECTIONS TO SITE (Starting from nearest public road)
The water plant is on the east end of third st. in Atlantic. Well #7 is further east on third street - directly south of the RR tracks and Buttermilk creek (drainage ditch) past the road to the power plant (Pine St). See map

III. RESPONSIBLE PARTIES

01 OWNER (If known)	02 STREET (Business, mailing, residential)
Board of Trustees Atlantic Municipal Waterworks	15 West Third St.

03 CITY	04 STATE	05 ZIP CODE	06 TELEPHONE NUMBER
Atlantic	IA	50022	( )

07 OPERATOR (If known and different from owner)	08 STREET (Business, mailing, residential)
Mr. Wilbert Hoeck Water Superintendent	15 West Third St.

09 CITY	10 STATE	11 ZIP CODE	12 TELEPHONE NUMBER
Atlantic	IA	50022	( )

13 TYPE OF OWNERSHIP (Check one)
☐ A. PRIVATE ☐ B. FEDERAL: _____ (Agency name) ☐ C. STATE ☐ D. COUNTY ☒ E. MUNICIPAL
☐ F. OTHER: _____ (Specify) ☐ G. UNKNOWN

14 OWNER/OPERATOR NOTIFICATION ON FILE (Check all that apply)
☐ A. RCRA 3001 DATE RECEIVED: ___/___/___ (MONTH DAY YEAR) ☐ B. UNCONTROLLED WASTE SITE (CERCLA 103 c) DATE RECEIVED: ___/___/___ (MONTH DAY YEAR) ☒ C. NONE

IV. CHARACTERIZATION OF POTENTIAL HAZARD

01 ON SITE INSPECTION
☐ YES DATE ___/___/___ (MONTH DAY YEAR)
☒ NO

BY (Check all that apply)
☐ A. EPA ☐ B. EPA CONTRACTOR ☐ C. STATE ☐ D. OTHER CONTRACTOR
☐ E. LOCAL HEALTH OFFICIAL ☐ F. OTHER: _____ (Specify)
CONTRACTOR NAME(S): _____

02 SITE STATUS (Check one)
☒ A. ACTIVE ☐ B. INACTIVE ☐ C. UNKNOWN

03 YEARS OF OPERATION
BEGINNING YEAR | ENDING YEAR ☒ UNKNOWN

04 DESCRIPTION OF SUBSTANCES POSSIBLY PRESENT, KNOWN, OR ALLEGED
Well #7 has shown contamination with ≈ 200ppb Tetrachloroethene. Well #3 has also shown some PCE (≈4ppb). The source of the contamination is unknown.
These wells are not presently being used as supply. Well 7 is pumped to waste.

05 DESCRIPTION OF POTENTIAL HAZARD TO ENVIRONMENT AND/OR POPULATION
All the wells are in the same aquifer in close proximity to each other.
Finished water contains ≈1ppb PCE.

V. PRIORITY ASSESSMENT

01 PRIORITY FOR INSPECTION (Check one. If high or medium is checked, complete Part 2 - Waste Information and Part 3 - Description of Hazardous Conditions and Incidents)
☐ A. HIGH (Inspection required promptly) ☒ B. MEDIUM (Inspection required) ☐ C. LOW (Inspect on time available basis) ☐ D. NONE (No further action needed, complete current disposition form)

VI. INFORMATION AVAILABLE FROM

01 CONTACT	02 OF (Agency/Organization)	03 TELEPHONE NUMBER
		( )

04 PERSON RESPONSIBLE FOR ASSESSMENT	05 AGENCY	06 ORGANIZATION	07 TELEPHONE NUMBER	08 DATE
Jean Carleton	IDNR		(515) 281-7040	10 / 15 / 86 (MONTH DAY YEAR)

EPA FORM 2070-12 (7-81)

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POTENTIAL HAZARDOUS WASTE SITE
PRELIMINARY ASSESSMENT
PART 2 - WASTE INFORMATION

I. IDENTIFICATION

01 STATE	02 SITE NUMBER

II. WASTE STATES, QUANTITIES, AND CHARACTERISTICS

01 PHYSICAL STATES (Check all that apply)

- _ A SOLID
- _ B POWDER FINES
- _ C SLUDGE
- _ D OTHER _____ (Specify)
- _ E SLURRY
- _ F LIQUID
- _ G GAS

02 WASTE QUANTITY AT SITE (Measures of waste quantities must be independent)

TONS _____

CUBIC YARDS _____

NO OF DRUMS _____

03 WASTE CHARACTERISTICS (Check all that apply)

- _ A TOXIC
- _ B CORROSIVE
- _ C RADIOACTIVE
- _ D PERSISTENT
- _ E SOLUBLE
- _ F INFECTIOUS
- _ G FLAMMABLE
- _ H IGNITABLE
- _ I HIGHLY VOLATILE
- _ J EXPLOSIVE
- _ K REACTIVE
- _ L INCOMPATIBLE
- _ M NOT APPLICABLE

III. WASTE TYPE

CATEGORY	SUBSTANCE NAME	01 GROSS AMOUNT	02 UNIT OF MEASURE	03 COMMENTS
SLU	SLUDGE			
OLW	OILY WASTE			
SOL	SOLVENTS (Tetrachloroethene)	5	gallons	Based on pumping 200ppb PCE 8hr/day at 80gal/min from 11/28/84 - 9/25/86
PSD	PESTICIDES			
OCC	OTHER ORGANIC CHEMICALS			
IOC	INORGANIC CHEMICALS			
ACD	ACIDS			
BAS	BASES			
MES	HEAVY METALS			

IV. HAZARDOUS SUBSTANCES (See Appendix for most frequently cited CAS Numbers)

01 CATEGORY	02 SUBSTANCE NAME	03 CAS NUMBER	04 STORAGE/DISPOSAL METHOD	05 CONCENTRATION	06 MEASURE OF CONCENTRATION
Solvents	Tetrachloroethene	127184	unknown	200ppb H_2O	
	Trichloroethene	79-01-6	unknown	1ppb H_2O	
	Chloroform	67-66-3	unknown	Below quantification limit	
	Atrazine		unknown	1.7 ppb H_2O	

V. FEEDSTOCKS (See Appendix for CAS Numbers)

CATEGORY	01 FEEDSTOCK NAME	02 CAS NUMBER	CATEGORY	01 FEEDSTOCK NAME	02 CAS NUMBER
FDS			FDS		
FDS			FDS		
FDS			FDS		
FDS			FDS		

VI. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

State of Iowa files: Harlan Water Supply - Sample results

EPA FORM 2070-12 (7-81)

EPA

POTENTIAL HAZARDOUS WASTE SITE
PRELIMINARY ASSESSMENT
PART 3 - DESCRIPTION OF HAZARDOUS CONDITIONS AND INCIDENTS

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER

II. HAZARDOUS CONDITIONS AND INCIDENTS

01 A GROUNDWATER CONTAMINATION — 02 ☒ OBSERVED (DATE ~~[illegible]~~) — ☐ POTENTIAL — ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED 7,789 (Population of Atlantic) — 04 NARRATIVE DESCRIPTION

See attached sample reports. Tetrachloroethene has been observed consistantly in well #7 at ≈200ppb. Other contaminants observed in #7 have been TCE, Trans 1,2 Dichloroethene, Chloroform and Atrazine. Organic contaminants have also been detected in wells 2, 3, 8, 9 & 12.

01 ☐ B SURFACE WATER CONTAMINATION — 02 ☐ OBSERVED (DATE ____) — ☒ POTENTIAL — ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED ____ — 04 NARRATIVE DESCRIPTION

Water from Well #7 is discharged to Buttermilk Creek (Drainage Ditch) which flows into Troublesome Creek (≈ 850 ft downstream). Troublesome Creek flows into the Nishnabotna River about 1½ miles downstream.

01 ☐ C CONTAMINATION OF AIR — 02 ☐ OBSERVED (DATE ____) — ☐ POTENTIAL — ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED ____ — 04 NARRATIVE DESCRIPTION

Source of groundwater contamination is unknown. If the source is on the surface some air contamination is likely because of the volatile nature of tetrachloroethene.

01 ☐ D FIRE/EXPLOSIVE CONDITIONS — 02 ☐ OBSERVED (DATE ____) — ☐ POTENTIAL — ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED ____ — 04 NARRATIVE DESCRIPTION

No information to support that fire/explosive conditions are present.

01 ☐ E DIRECT CONTACT — 02 ☐ OBSERVED (DATE ____) — ☐ POTENTIAL — ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED ____ — 04 NARRATIVE DESCRIPTION

Above ground source has not been identified. Contact may occur after pumping groundwater to drainage ditch. Water is aerated by falling into the ditch. No odor was observed at this location.

01 ☐ F CONTAMINATION OF SOIL — 02 ☐ OBSERVED (DATE ____) — ☐ POTENTIAL — ☐ ALLEGED
03 AREA POTENTIALLY AFFECTED ____ (Acres) — 04 NARRATIVE DESCRIPTION

Above ground source has not been identified. Soil may be contaminated by contact with contaminated water.

01 ☐ G DRINKING WATER CONTAMINATION — 02 ☒ OBSERVED (DATE ____) — ☐ POTENTIAL — ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED 7,789 (Population of Atlantic) — 04 NARRATIVE DESCRIPTION

See #1 above. The finished water has had 1ppb PCE.

01 ☐ H. WORKER EXPOSURE/INJURY — 02 ☐ OBSERVED (DATE ____) — ☐ POTENTIAL — ☐ ALLEGED
03 WORKERS POTENTIALLY AFFECTED ____ — 04 NARRATIVE DESCRIPTION

Water plant & power plant employees work near the contaminated wells.

01 ☐ I. POPULATION EXPOSURE/INJURY — 02 ☐ OBSERVED (DATE ____) — ☐ POTENTIAL — ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED ____ — 04 NARRATIVE DESCRIPTION

The area is not fenced.

EPA

POTENTIAL HAZARDOUS WASTE SITE
PRELIMINARY ASSESSMENT
PART 3 - DESCRIPTION OF HAZARDOUS CONDITIONS AND INCIDENTS

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER

II. HAZARDOUS CONDITIONS AND INCIDENTS (Continued)

01 ☐ J. DAMAGE TO FLORA — 02 ☐ OBSERVED (DATE _____) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

None noted near the site or along Buttermilk Creek.
PCE ~~was~~ has not been shown to effect aquatic plants in studies done to date.

01 ☐ K. DAMAGE TO FAUNA — 02 ☐ OBSERVED (DATE _____) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION (Include name(s) of species)

PCE can be carried up the food chain, however it does not appear to bio magnify or concentrate as it moves up the food chain. It is generally eliminated rapidly from aquatic organisms.

01 ☐ L. CONTAMINATION OF FOOD CHAIN — 02 ☐ OBSERVED (DATE: _____) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

See above

01 ☐ M. UNSTABLE CONTAINMENT OF WASTES (Spills/runoff/standing liquids/leaking drums) — 02 ☐ OBSERVED (DATE: _____) ☐ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: _____ 04 NARRATIVE DESCRIPTION

None observed to date. Wells are near a power plant which has been operating since the early 1900's. Wastes are likely to be disposed nearby. Some well logs contain references to fill-blocks & cinders.

01 ☐ N. DAMAGE TO OFFSITE PROPERTY — 02 ☐ OBSERVED (DATE: _____) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

None observed to date. The city wells are likely to draw any contamination to them.

01 ☐ O. CONTAMINATION OF SEWERS, STORM DRAINS, WWTPs — 02 ☐ OBSERVED (DATE: _____) ☒ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

There is a potential for contamination of sewers. The sewer runs along the street ~~in front~~ South of well #7.

01 ☐ P. ILLEGAL/UNAUTHORIZED DUMPING — 02 ☐ OBSERVED (DATE: _____) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

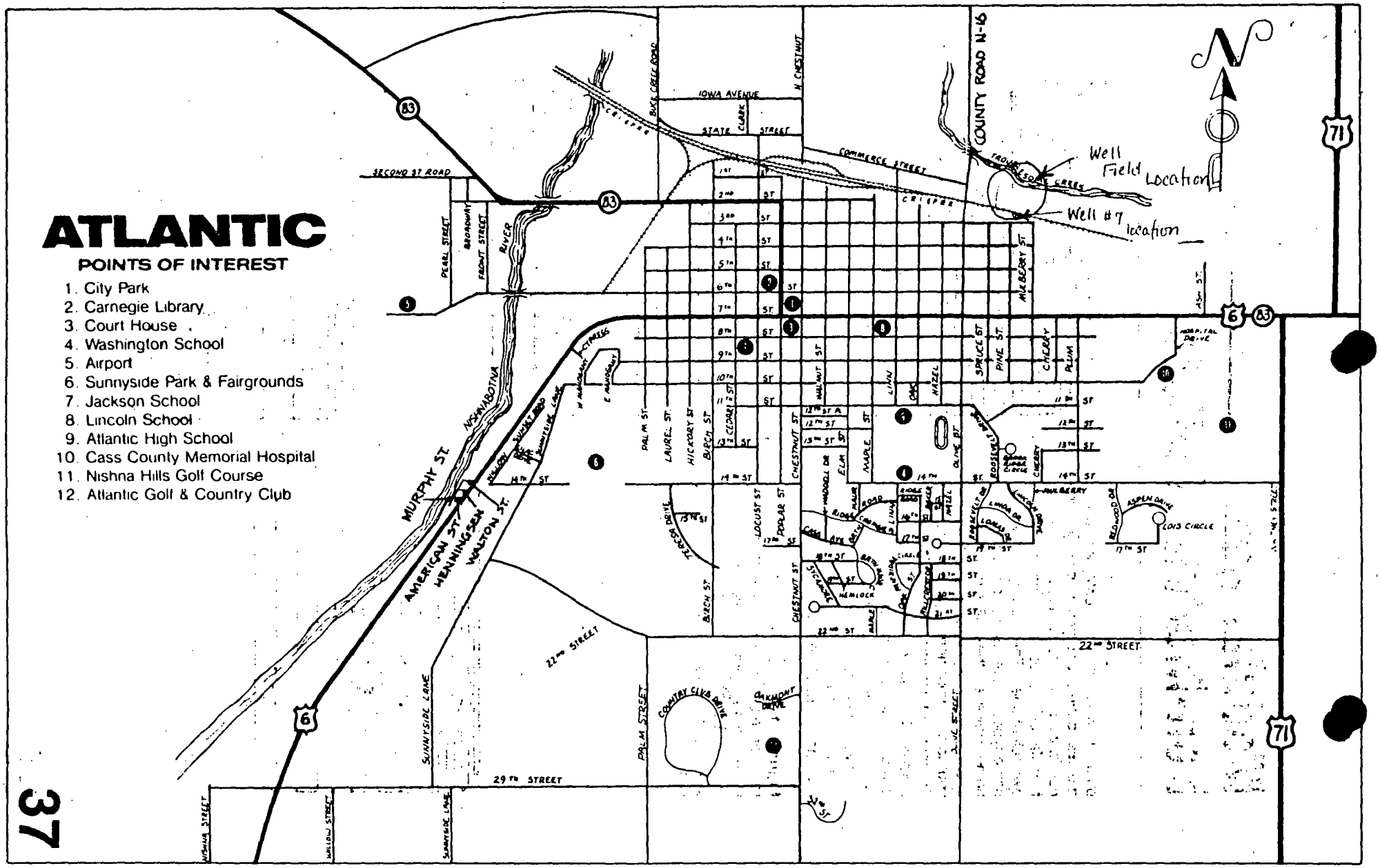
None noted to date.

05 DESCRIPTION OF ANY OTHER KNOWN, POTENTIAL, OR ALLEGED HAZARDS

III. TOTAL POPULATION POTENTIALLY AFFECTED: _____

IV. COMMENTS

V. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)


ATLANTIC
POINTS OF INTEREST
1. City Park
2. Carnegie Library
3. Court House
4. Washington School
5. Airport
6. Sunnyside Park & Fairgrounds
7. Jackson School
8. Lincoln School
9. Atlantic High School
10. Cass County Memorial Hospital
11. Nishna Hills Golf Course
12. Atlantic Golf & Country Club
Well Field Location
Well #7 location
COUNTY ROAD N-16
IOWA AVENUE
STATE STREET
COMMERCE STREET
SECOND ST ROAD
MURPHY ST.
AMERICAN ST
HENNINGSEN
WALTON ST.
NISHNABOTNA
RIVER
22nd STREET
29th STREET
SUNNYSIDE LANE
PALM STREET
COUNTRY CLUB DRIVE
OAKMONT DRIVE
HOSPITAL DRIVE
LOIS CIRCLE
ASPEN DRIVE
REDWOOD DR
HEMLOCK
71
6
83

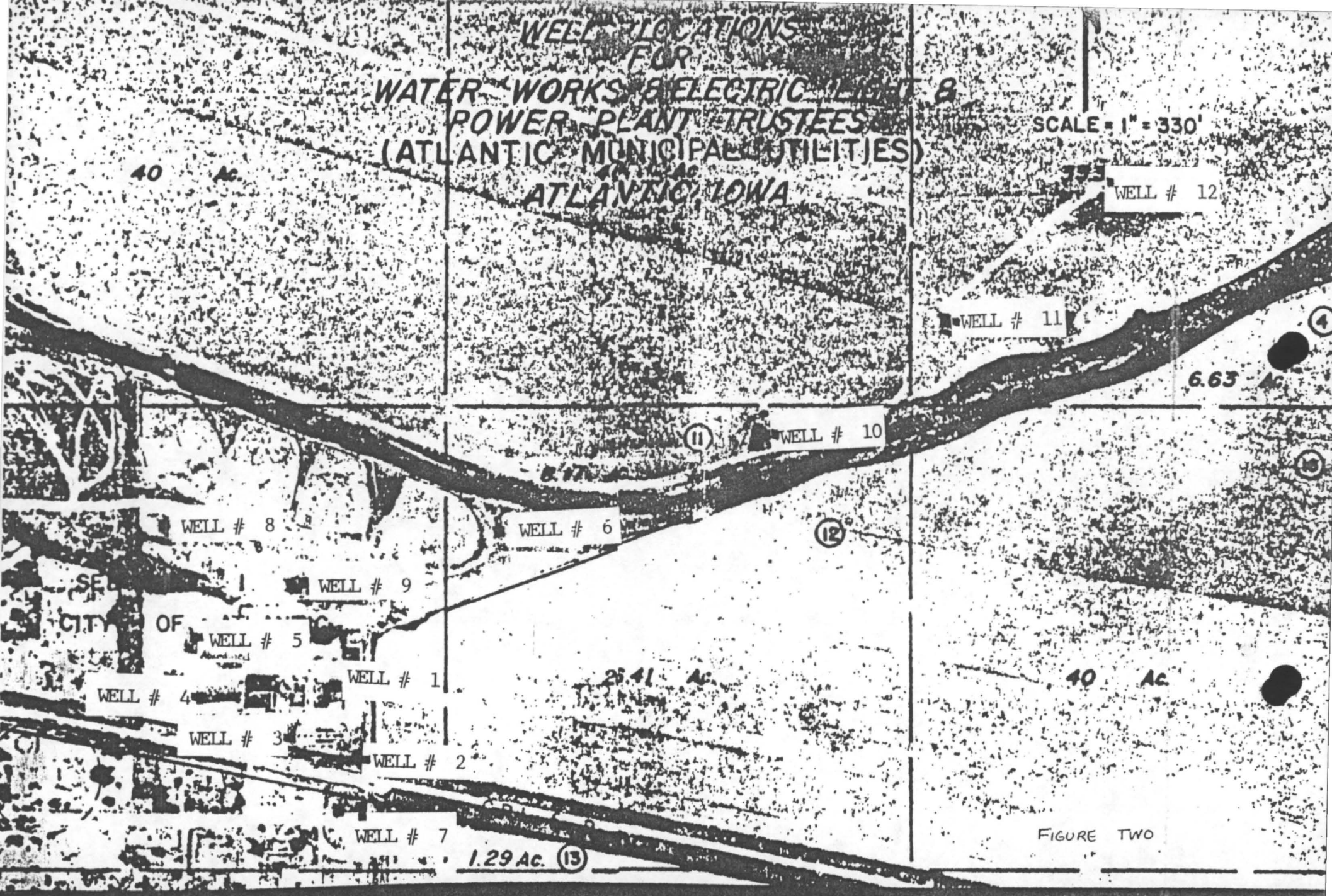
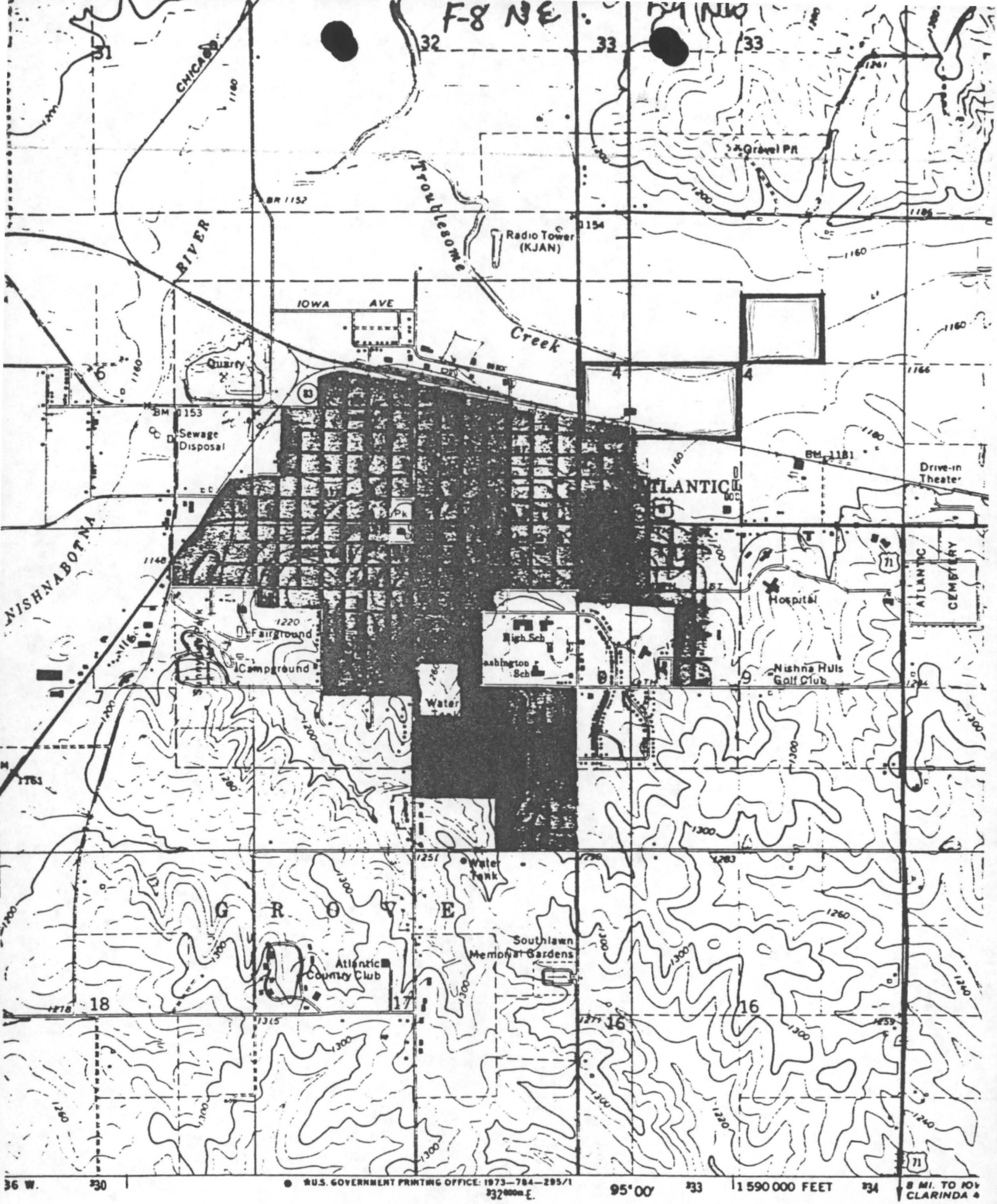

WELL LOCATIONS
FOR
WATER WORKS & ELECTRIC LIGHT &
POWER PLANT TRUSTEES
(ATLANTIC MUNICIPAL UTILITIES)
ATLANTIC, IOWA
SCALE = 1" = 330'
40 Ac.
WELL # 12
WELL # 11
6.63 Ac.
WELL # 10
WELL # 8
WELL # 6
WELL # 9
CITY OF
WELL # 5
Abandoned
WELL # 1
WELL # 4
25.41 Ac.
40 Ac.
WELL # 3
WELL # 2
WELL # 7
1.29 Ac.

FIGURE TWO



ROAD CLASSIFICATION

Primary highway, hard surface

Light-duty road, hard or improved surface

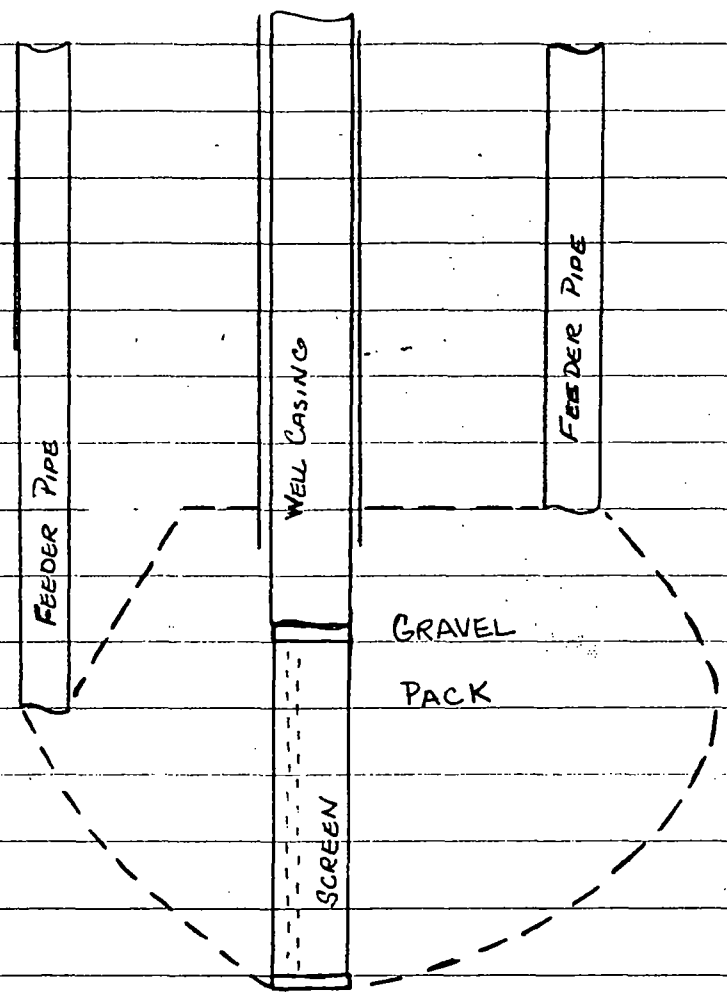
Mapped, edited, and published by the Geologic

Control by USGS and USC&GS

Topography by photogrammetric methods from aerial

Figure 1

FIGURE THREE



WELL WITH FEEDER PIPES

The old wells have feeder pipes used to feed gravel to the gravel pack below ~~where~~ The gravel pack needed to be replenished following frequent acidification.

PRELIMINARY ASSESSMENT - ATLANTIC

HISTORY OF SITE

Atlantic began providing water to its residents in the 1880's. Shortly after that time, a power plant was combined with water treatment facilities at the same location. Presently Atlantic uses ~~mine~~ nine wells along Troublesome Creek in Cass County, Iowa (see figures one & two).

Wells one through four were probably constructed in 1919 using a gravel pack construction method (see figure three). They were between 75 and 90 feet deep completed in the Dakota Sandstone. Well four is connected to the system but is not presently being used. Well 3 was taken off line on ~~1/15/86~~ 10/15/84 due to contamination. Well 5 is abandoned and is capped. Well 7 has been off line since 1982 but has been pumped to waste during that time. It is 83 feet deep completed in the Dakota Sandstone with similar construction as described in figure three. Wells 6,8,9,10,11 and 12 were constructed between 1956 and 1977 and do not have gravel feeder lines like the older wells. These wells are also completed in the Dakota Sandstone. Information on well geology and construction is in Appendix One.

Groundwater Contamination

Tetrachloroethene was first observed in well 7 on 8/26/82 at 170 ppb. Sample results in 1984 and 1986 have been consistantly around 200 ppb except for one sample in January 1986 which was analyzed to contain 1900 ppb Tetrachloroethene. Other contaminants observed in well 7 have been trichloroethene, trans 1,2 dichlorethene, chloroform and atrazine. Organic contamination has also been detected in wells 2,3,8,9 and 12. Sample results are attached in Appendix Two. Wells 3 and 7 have been taken off line due to contamination. From 1982 to January 1986 well 7 was pumped at approximately 80 gallons per minute for 8 to 12 hours per day to Buttermilk Creek (Drainage Ditch). Following the very high sample result in January, 1986, well 7 was shut off for 3 months. It was run for about 3 hours prior to sampling in March, 1986. Since that time well 7 has been pumped to waste for 24 hours per day. Well logs indicate a layer of clay about 15 feet thick above a thin gravel layer which overlies the sandstone.

Possible Contamant Sources

The source of contamination has not been identified. Some possible sources of contamination are listed below.

1. Power Plant

   It is likely that the power plant had a disposal area on site. The well logs for wells 3 and 5 note layers of fill (cinders and brick) and empty cavities. Solvents may have been disposed on this property.

   The power plant had a lake on the property which was used for cooling water prior to the 1960's. Solvents may have been introduced to this pond and leached to the aquifer.

2. Several gas stations, car repair places, dry cleaning establishments and probably other sources are located within the drainage basin of the drainage ditch which flows by well 7.

3. A sewer line runs along the street south of well 7. This may be acting as a conduit for contaminants from other parts of town.

4. Railroad tracks run by well 7. A train derailment or spill may have caused the contamination.

NATURE OF HAZARDOUS MATERIAL

Tetrachloroethene is also known as perchloroethylene, perk, PEC, PERC, carbon disulfide, tetrachloroethylene and 1,1,2,2-tetrachloroethylene.

Solubility: 170 mg/l
Vapor Pressure: 0.19 Pascals at 20°C
In air at STP - 1 ppm = 6.78 mg/m^3

Fate

PCE ~~vaporings~~ vaporizes easily and the major loss from water is through evaporation. It is expected to leach through soils of low (<0.1 percent) organic carbon content. Prolonged storage of PCE in light increases decomposition.

PCE can be carried up the food chain, however, it does not appear to bio-magnify or concentrate as it moves up the food chain. It is generally eliminated rapidly from aquatic organisms and does not appear to affect aquatic ~~planks~~ plants. The following limits apply to freshwater aquatic life:

Acute toxicity	5,280 mg/l
Chronic toxicity	840 mg/l
Toxicity (humans)	Lifetime Health Advisory Level in drinking water is 608 µg/l Cancer Risk at 10^{-5} is 6.6 µg/l
In Air:	HRS Toxicity/Persistance value is 12

5 ppm	odor threshold-smells like chloroform
75 ppm	very sligh eye irritation
100 ppm	central nervous system depression

The NIOSH Standards are:

TWA	50 ppm
Ceiling	100 ppm

Neither of these air levels may provide adequate protection because they were selected to prevent toxic effects other than cancer.

Uses

The uses of PCE are: Dry cleaning solvent; textile scouring solvent; dried vegetable fumigant; rug and upholstery cleaner; stain, spot, lipstick and rust remover; paint remover; ~~printig~~ printing ink ingredient; heat transfer media ingredient; chemical intermediate in the production of other organic compounds and a metal degreaser.

Elevated levels of PCE were found in drinking water transported in vinyl coated asbestos-cement pipes. However, from information on the water supply permit, Atlantic does not have this kind of pipe.

JC:bkp/WQPM296P09.01 -.02

Possible Affected Population and Resources

The latest sample results for the finished water showed tetrachloroethene at 1 ppb. The Atlantic Water Supply has 3009 service connections serving approximately 8,000 customers. Additionally some private wells in the area may potentially be effected.

The waste flow from well 7 presently discharges, without treatment, to Buttermilk Creek which flows to Troublesome Creek then to the Nishnabotna River about 1 1/2 miles downstream. The levels observed in the well water prior to discharge are about 1/4 of the chronic toxicity level for fresh water aquatic life (840 mg/l). Losses ~~are~~ likely occur through volatilization as the discharge splashes into the Creek. Buttermilk Creek is an intermittent stream (Drainage Ditch).

Conclusions and Recommendations

Conclusions

Well 7 of the Atlantic water supply is contaminated with tetrachloroethene and low levels of other chemicals. Well 3 has shown low levels of PCE. The water supply is presently able to meet its demand without these wells and has taken them off line. Well 7 is pumped continuously to waste. Contaminants have also been detected in wells 2,8,9 and 12. Except for well 2, these wells have not been retested since contamination was detected in 1984. The amount of PCE in the finished water was 1 ppb prior to taking well 3 off line.

The source of contamination has not been identified to date.

Recommendations

A site inspection should be performed with the following goals.

1. Determine which wells are presently contaminated. Wells 8,9 and 12 have not been tested since 1984 when contamination was detected and wells 4,6,10 and 11 have never been tested for organics. Ideally, all wells would be examined at one time.

2. Attempt to determine the source of contamination. EPA has agreed to assist us through their FIT. Because of the violatile nature of PCE, a soil gas survey may help to determine the source. However, due to the depth of clay near the site, a drill rig would probably be required for this type of investigation.

JC:bkp/WQPM296P09.01 -.02

REFERENCES

IDNR Files

Atlantic Water Supply - File, Fische & film
Con 12-15 - Atlantic
Atlantic Water Use

Atlantic Water Supply Files:

Well Files and Well Operating Logs

Draft Health Assessment Document for Tetrachloroethylene EPA-600/8-82-005B
December, 1983

Handbook of Toxic and Hazardous Chemicals by Sitting, 1985.

JC:bkp/WQPM296P09.01 -.02

Appendix One
Well Logs

Well No. 3 Kind of Well Gravel Pack Depth 87'6" Size hole started 12 in.

Finish 12" G. P. M. _____ Static head 16'9" Drawdown _____

Water was first encountered at 35' in Sand Approximate Amount 150GPM

Remarks Side holes are 8".

40 yards of gravel in hole.

RECORD OF PERMANENT PIPE					TEMPORARY PIPE	
SIZE PIPE	AMOUNT OF PIPE	DEPTH TO BOTTOM OF PIPE	DEPTH TO TOP OF PIPE	MAKE OF PIPE	SIZE PIPE	AMOUNT
Our well 12"	35'	35'	Surface			
12"	25'	Strainer	attached to 10" pipe			
10'	43'9"		19'9"	Drive shoe on	top	
12	Side holes cased with 8" pipe with drive shoe on bottom					

Driller _____ From Surface to _____ feet

Driller _____ From _____ feet to _____ feet

Driller _____ From _____ feet to _____ feet

AMOUNT IN FEET	KIND OF SOIL OR FORMATION	TOTAL DEPTH FEET
	Log of sideholes- Main hole already drilled	
35	Clay	35
15	Fine sand	50

Back of
Well #1
Log

Clay

35'

13' Coarse Sand

37' Rock

THORPE WELL COMPANY

4340 SIXTH AVENUE
DES MOINES, IOWA

Drilled for City of Atlantic *of*

Well is located _____ *miles N-E-S-W and* _____ *miles N-E-S-W from*

in the _____ ¼ _____ ¼ *Section* _____ *Township* _____ *Range* _____

Drilling started Dec. 16 *19* 31 *Completed* Jan 15 *19* 32

~~12th 3~~

Well No. 1 *Kind of Well* Gravel packed *Depth* 87' 6" *Size hole started* 12 *in.*

Finish 12" *G. P. M.* _____ *Static head* 16' 9" *Drawdown* _____

Water was first encountered at 35 *in* sand *Approx. Amt.* 15 GPM *Temp.* _____

Remarks Side holes are 8". Amount of gravel in hole 40 yards.

RECORD OF PERMANENT PIPE					TEMPORARY PIPE	
SIZE PIPE	AMOUNT OF PIPE	DEPTH TO BOTTOM OF PIPE	DEPTH TO TOP OF PIPE	MAKE OF PIPE	SIZE PIPE	AMOUNT
Our well 12"	35'	35'	Surface	Steel		
12"	25' (Strainer)					
10"	43' 9"		19' 9"	Steel		
10"	1			Drive shoe		
8"	2			Drive shoes		

Driller J. H. Meisters *From Surface to* 87' 6" *feet*

Driller _____ *From* _____ *feet to* _____ *feet*

Well #2

Log from plans - City of Atlantic Water Suppy Files

Side holes 60' deep

Well #2

Amount (ft)		Total depth (ft)
7'	Top Soil	7'
5'	Clay	12'
17'	Sandy blue Clay	29'
6'	Sand & Gravel	35'
46'	Sandstone	81'

R-1-B

THORPE WELL COMPANY

2340 SIXTH AVENUE
DES MOINES, IOWA

Drilled for City Water & Power House *at* Atlantic, Iowa

Well is located South of Plant *miles N-E-S-W and* _____ *miles N-E-S-W from* _____

in the _____ *¼* _____ *¼ Section* _____ *Township* _____ *Range* _____

Drilling started 7-30 *19* 46 *Completed* 8-2 *19* 46

Well No. 3 *Kind of Well* Feeder Hole *Depth* 53' *Size hole started* 10" *in.*

Finish 8" *G. P. M.* _____ *Static head* _____ *Drawdown* _____

Water was first encountered at _____ *in* _____ *Approx. Amt.* _____ *Temp.* _____

Remarks _____

RECORD OF PERMANENT PIPE					TEMPORARY PIPE	
SIZE PIPE	AMOUNT OF PIPE	DEPTH TO BOTTOM OF PIPE	DEPTH TO TOP OF PIPE	MAKE OF PIPE	SIZE PIPE	AMOUNT
8"	55'	Set inside hole				
10"	49'	Attached to top of a 12" - 30' long strainer				
1	12"	Cast iron strainer shoe - shop				
This 10" casing on top of strainer is in 5 joints with couplings turned down.						

Driller Ed Atcheson *From Surface to* _____ *feet*

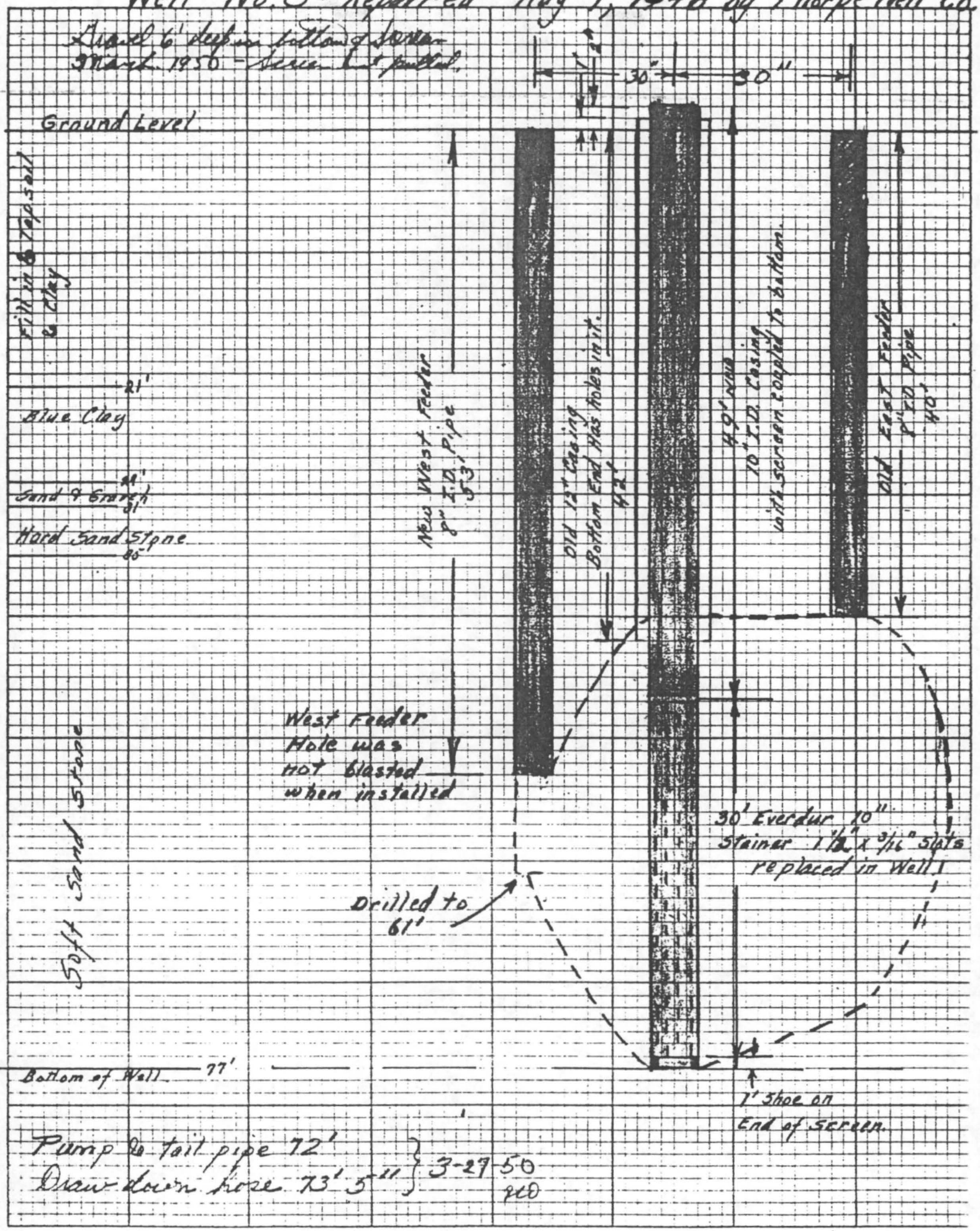
Driller _____ *From* _____ *feet to* _____ *feet*

Driller _____ *From* _____ *feet to* _____ *feet*

AMOUNT IN FEET	KIND OF SOIL OR FORMATION (BE SPECIFIC)	TOTAL DEPTH FEET
7	Fill Brick & Concrete	7
24	A little of everything mixed together. Loose cavity was found from 7' to 20' - filled it with 3 tons of sand.	31
22	Sandstone	53
	Quit drilling at 60' when gravel broke through between 53' & 55'.	

Well No. 3 Repaired Aug 7, 1946 by Thorpe Well Co.

Gravel 6' deep in bottom of sewer
March 1956 - Sewer Cut pulled.



Pump & tail pipe 72'
Draw down hose 73' 5" } 3-27-50 RLD

THORPE WELL COMPANY

2340 SIXTH AVENUE
DES MOINES, IOWA

Drilled for City of Atlantic, Iowa *at* Sunnyside Park

Well is located _____ *miles N-E-S-W and* _____ *miles N-E-S-W from* _____

in the _____ ¼ _____ ¼ *Section* _____ *Township* _____ *Range* _____

Drilling started June 1 *19* 31 *Completed* July 1 *19* 31

Well No. 4 *Kind of Well* Thorpe Pat. *Depth* 42 ft. *Size hole started* 48 *in.*

Finish 12" *G. P. M.* 180 *Static head* 15 *Drawdown* 23

Water was first encountered at 25' *in* Sand gravel. *Approx. Amt.* _____ *Temp.* _____

Remarks Well was completed with 21'3" of 12" pipe with 20' 6" of 11" strainer attached. Well was packed with 22 ton of gravel.

RECORD OF PERMANENT PIPE					TEMPORARY PIPE	
SIZE PIPE	AMOUNT OF PIPE	DEPTH TO BOTTOM OF PIPE	DEPTH TO TOP OF PIPE	MAKE OF PIPE	SIZE PIPE	AMOUNT
12"	21' 6"	21' 3"			48"	25'
					42"	40'
					20"	42'

Driller Carl Allen *From Surface to* finish 42 *feet*

Driller _____ *From* _____ *feet to* _____ *feet*

Driller _____ *From* _____ *feet to* _____ *feet*

AMOUNT IN FEET	KIND OF SOIL OR FORMATION (BE SPECIFIC)	TOTAL DEPTH FEET
3	Black Soil	3
15	Yellow Clay	18
2	Dry Sand	20
5	Blue Clay	25
10	Fine Sand	35
5	Gravel and Boulders	40
2	Blue Shale	42

THORPE WELL COMPANY
2340 SIXTH AVENUE
DES MOINES, IOWA

Drilled for Atlantic Water Dept. at Atlantic, Iowa

Well is located 500 ft x miles N-E-S-W and _____ miles N-E-S-W from Light Plant

in the _____ ¼ _____ ¼ Section _____ Township _____ Range _____

Drilling started Aug. 11 19 51 Completed Sept. 15 19 51

Well No. 5 Kind of Well Repaired Gravel Packed Well Depth 85' from top of 12" pipe. Size hole started _____ in.

Finish 10" G. P. M. _____ Static head 18' Drawdown _____

Water was first encountered at _____ in _____ Approx. Amt. _____ Temp. _____

Remarks: Old screen in good shape used again.
Did not pump this well, repair job. Drilled Side Hole #2.
Used carload of gravel. Shot side holes in at 60, 65 & 77' depths.
We furnished 57'4" of 8" pipe, no plug on top, & 43'3" of 10" pipe.

	RECORD OF PERMANENT PIPE					TEMPORARY PIPE	
	SIZE PIPE	AMOUNT OF PIPE	DEPTH TO BOTTOM OF PIPE	DEPTH TO TOP OF PIPE	MAKE OF PIPE	SIZE PIPE	AMOUNT
Side Hole #2	8"	57' 4"	55'	2' above Surface	Standard	10"	13'3"
Main Hole	12"	31'11"	31'11"	Surface	Standard	6"	75'
Screen	12"	25'	84'	59'	Thorpe Everdur		
	10"	43'3" (2 joints new)	59'	Surface	Standard		
		1 old joint	13'9"				

Driller E. E. Walker From Surface to 85' on #2 side hole feet

Driller Main hole & #1 side hole drilled in 1932 by Meister From _____ feet to _____ feet

Driller _____ From _____ feet to _____ feet

AMOUNT IN FEET	KIND OF SOIL OR FORMATION (BE SPECIFIC)	TOTAL DEPTH FEET
	#2 Side Hole	
6"	Concrete floor	
6'6"	Cinders, bricks & fill	7
6'	Black dirt top soil	13
22	Dirty sand & clay	35
10	Chalky yellow clay, fine sand	45
30	Fine sand rock	75
10	Sand rock	85

Layne-Western Company Omaha, Nebraska Well #6 **Well Information**

1. Contract City of Atlantic Date February 4, 1966

2. City and State Atlantic, Iowa Driller Vic Soukup

3. Well No. 6 at test hole No. 66-1 Well location (attach map) North of Troublesome Creek and North of power plant

4. Work completed ..... No of man hours as charged to job on time sheet .....

5. MATERIAL:

	LENGTH	DIA.	GAUGE OR WALL THICKNESS	MATERIAL	TYPE	NO. OF OPENINGS
6. Screen	25'	12"	7 ga.	Stainless Steel	Shutter	4
7. Inner Casing	55'	12"	Cast Iron		T & C	
8. Outer Casing						

9. 42 tons of gravel used in the well. Size concrete mix - Fremont

10. Test of well. Did you use test or permanent pump? test 10" (Size of Bowl) 9 (Stages)

11. Size of orifice 6 inch by 4 inch. Orifice tube reading ..... inches.

12. Pumping test — measurements from ground level:

TIME	G.P.M.	STATIC	DRAWDOWN	PUMPING LEVEL
1 hr.	130	14' 6"	6'	20' 6"
4 hr.	210	14' 6"	10'	24' 6"
2 hr.	317	14' 6"	14'	28' 6"
1 hr.	517	14' 6"	23' 6"	37' 6"

13. Recovery in 5 minutes full in 10 sec., in 30 minutes .....

14. Did you seal bottom of well? yes Thickness 3/16 inches, material Stainless steel plate

15. Well underreamed? ..... From ..... feet to ..... feet, ... feet to ..... feet.

16. If all screen was not placed at bottom, state how it was spaced.

From ..... feet to ..... feet; from ..... feet to ..... feet; from ..... feet to ..... feet.

17. Depth of well from ground level to top of plug 75' Size of drilled hole 42"

18. Was cement placed around or between any of the casings? none

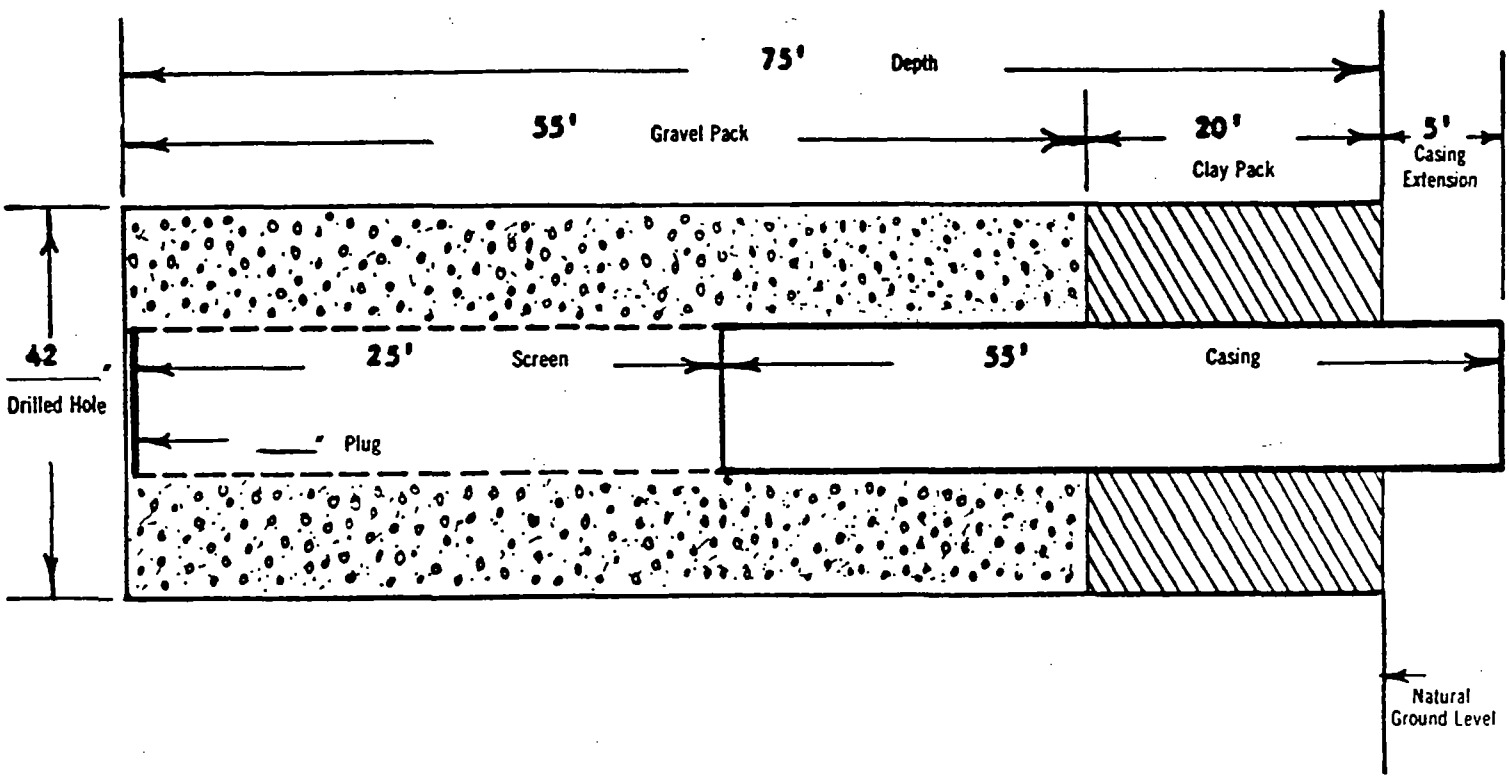
19. If so, state where, how much and method used. .....

Layne-Western Company Omaha, Nebraska **Well Information** Page 2

CONTRACT Atlantic, Iowa Well No. 6

Log of well from ground level:

Feet		Feet	Formation
	to		
0	to	17	Clay
17	to	29	Coarse sand and gravel
29	to	75	Sandstone, medium to coarse
	to		
	to		
	to		
	to		
	to		
	to		
	to		
	to		
	to		
	to		
	to		
	to		



R-1-8

THORPE WELL COMPANY

2340 SIXTH AVENUE

DES MOINES, IOWA

Drilled for Board of Waterworks & Electric Light & Power Plant Trustees *at* Atlantic, Iowa

Well is located _____ *miles N-E-S-W and* _____ *miles N-E-S-W from* _____

in the _____ ¼ _____ ¼ *Section* _____ *Township* _____ *Range* _____

Drilling started 8/11/42 *19*____ *Completed* 10/3/42 *19*____

Well No. 7 *Kind of Well* Side hole gravel pack *Depth* 82'8" *Size hole started* 16 *in.*

Finish 12" *G. P. M.* 222 *Static head* 24' *Drawdown* 17'

Water was first encountered at _____ *in* _____ *Approx. Amt.* _____ *Temp.* 51°

Remarks _____

RECORD OF PERMANENT PIPE					TEMPORARY PIPE	
SIZE PIPE	AMOUNT OF PIPE	DEPTH TO BOTTOM OF PIPE	DEPTH TO TOP OF PIPE	MAKE OF PIPE	SIZE PIPE	AMOUNT
12"	60'2"	58'2"	2' above surface		16"	53'
12"	25'	82'8"	57'8"	Thorpe Everdur Screen		
10"	11'5"	57'8"	46'3"	attached to screen		
		SIDE HOLES				
6"	50'	50'	Surface	East side hole		
8"	65'	65'	Surface	North side hole		
10"	42'	42'	Surface	South side hole		

Driller Ray Megrew *From Surface to* _____ *feet*

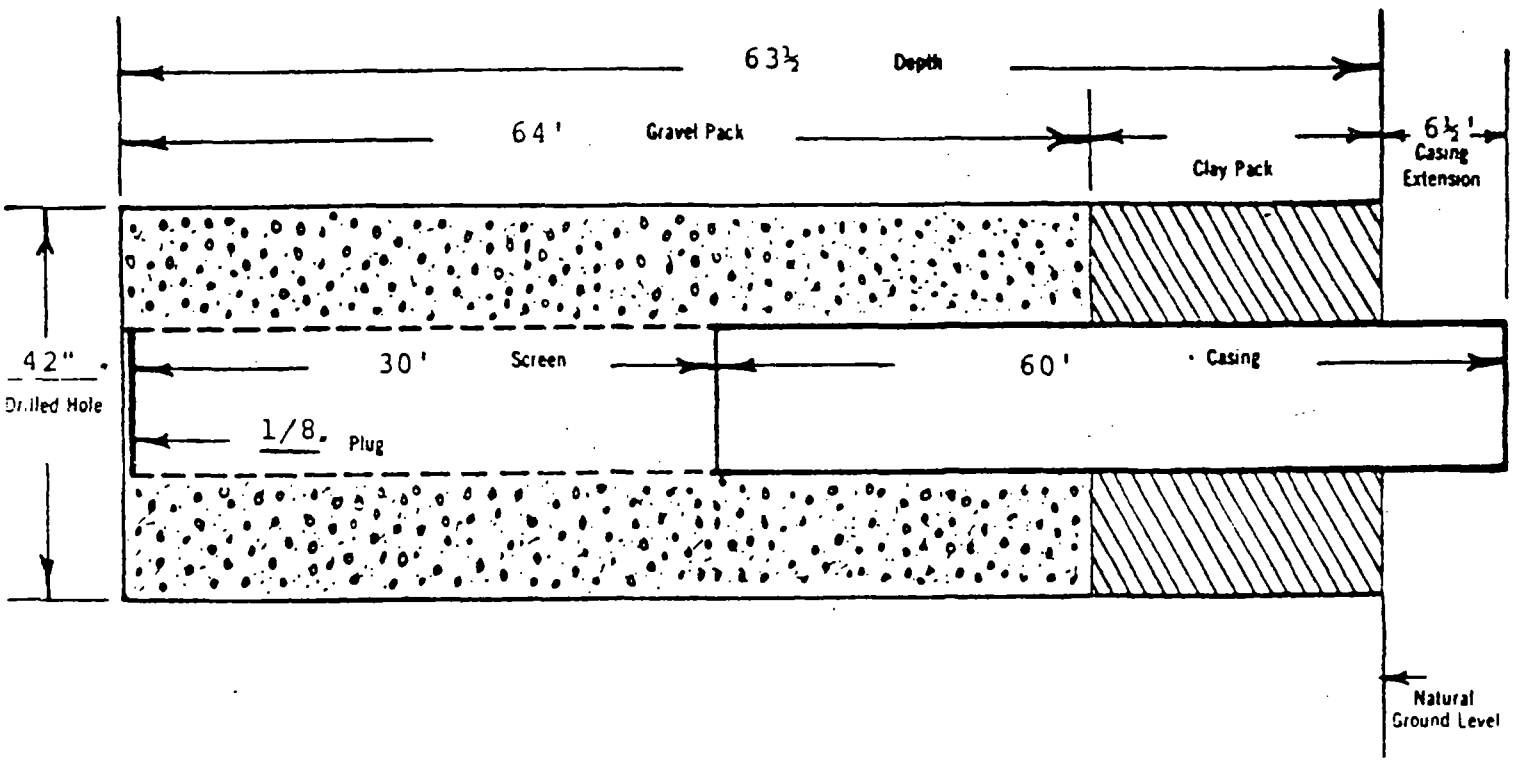
Western Company, Inc. Well Information

Omaha, Nebraska

CONTRACT Atlantic, Iowa Well No. 12

Log of well from ground level:

Feet		Feet	Formation
0	to	3	Top soil, black
3	to	16	Gray & brown clay
16	to	18	Blue clay & sand
18	to	20	Coarse and fine sand, small gravel, blue
20	to	26	Coarse and fine sand, gravel, buff
26	to	31	Coarse and fine sand, gravel, boulders
31	to	38	Dakota sandstone
38	to	40	Yellow shale
40	to	48	Dakota sandstone, fine, tight
48	to	74	Dakota sandstone, medium, loose
74	to	75	Yellow shale
75	to	84	Sandstone, medium, loose
84	to	86	Yellow shale
	to		
	to		
	to		



Record of Wells #8 and #9

Layne-Western Company

WATER WELL DRILLING
EXPLORATION BORINGS AND TEST SURVEYS
LAYNE TURBINE PUMPS

AFFILIATED WITH
LAYNE & BOWLER, INC
MEMPHIS, TENNESSEE

PHONE 451-2388

OFFICES
KANSAS CITY, MISSOURI
WICHITA, KANSAS
OMAHA, NEBRASKA
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DENVER, COLORADO

4430 COMMERCIAL AVENUE
OMAHA 10
NEBRASKA

October 4, 1961
(dict. 10-3-61)

Mr. Adolph Paul
Water Commissioner
Atlantic, Iowa

Dear Adolph:

Enclosed please find one copy of each well information sheet on well No. 8 and 9 which we drilled for the City of Atlantic in August, 1955. I believe you mentioned to me yesterday that your city numbers were exactly the opposite so that you might want to renumber these sheets.

Also, I believe you asked the question about the size of the screen in the bottom of the wells. You will note that the casing size is 16" O.D., and according to our information is 1/2" wall casing which would have an I.D. then of 15". The screen is a Layne bronze shutter screen, and the maximum O.D. of the screen over the welded bronze bands at each screen joint would be approximately 13½ to 14" O.D.; and I am sure you would find a clear opening through the strainer as approximately 12 1/4". There is a total of 30 ft. of screen inthe bottom of each well, and each well has a 5 ft. length of bronze blank casing on the top of the screen with a lead seal swedged out against the 16" O.D. casing.

If you were to use your surge block plunger on either of the wells and wanted to actually surge in the well screen I am sure that you would find that a 11 1/2" or 11 3/4" diameter ring would fit nicely inside the screen, and if you wanted a tighter fit you probably could even go to a 12" diameter rubber ring.

I trust this gives you the information you might have desired. Should you have any further questions, please advise me.

Yours truly,

LAYNE WESTERN COMPANY

C. C. Haas

C. C. Haas

CCH/cc

Att.

Layne-Western Company Omaha, Nebraska **Well Information**

1. Contract City of Atlantic Date August 7, 1955
2. City and State Atlantic, Iowa Driller Bruce Canarsky
3. Well No. 8 Well location: 400' North west of Power Plant across creek
4. Work began July 27, 1955 work completed August 2, 1955 Number of working days 6
5. Diameter, length and type of material left in well: 5' of bronze blank with lead seal
6. 30' feet of shutter insert type screen made of bronze No. 3 openings.
7. 52 feet of 16 inch inside casing made of std pipe ½" wall with welded connections.
8. feet of inch outside casing made of with connections.
9. 24 yards of gravel used in the well. Size road gravel
10. Test of well. Did you use test or permanent pump? Test 6" (Size of Bowl) 5 (Stages)
11. Size of orifice 4 inch by 3 inch. Orifice tube reading 23 inches.
12. Pumping test — measurements from ground level:

taken every 30 minutes

TIME	G.P.M.	STATIC	DRAWDOWN	PUMPING LEVEL
8:30 am	200	20	15	35
8:30 pm	200	20	15	35
12:00 am	200	20	15	35
6:00 am	250	20	18' 6"	38' 6"
7:00 am	300	20	22	42
8:00 am	200	20	15	35
10:00 am	200	20	15	35

13. Recovery in 5 minutes, in 30 minutes
14. Did you seal bottom of well? yes Thickness 3/8 inches, material bronze plate
15. Well underreamed? no From feet to feet, feet to feet.
16. If all screen was not placed at bottom, state how it was spaced.

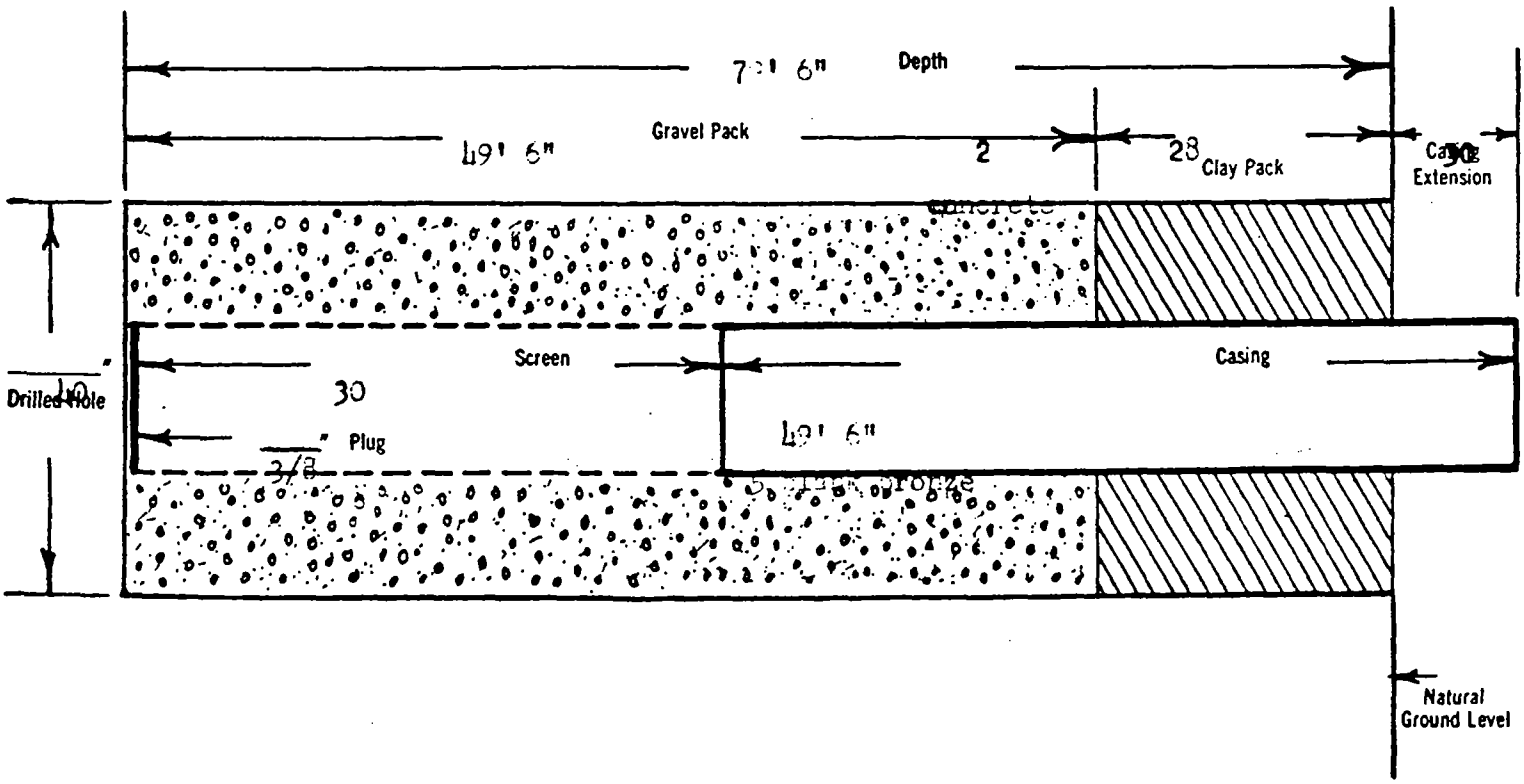
From feet to feet; from feet to feet; from feet to feet.

17. Depth of well from ground level to top of plug 79' 6" Size of drilled hole 10"
18. Was cement placed around or between any of the casings? from 28' to 30'
19. If so, state where, how much and method used. Put through 2" pipe

CONTRACT City of Atlantic, Iowa Well No. 8

Log of well from ground level:

Feet		Feet	Formation
0	to	11	Brown silty clay
11	to	13	Blue clay
13	to	17	Coarse sand trace of clay
17	to	20	Blue clay
20	to	22	Coarse sand trace of boulders [illegible]
22	to	27	Blue clay
27	to	30	Coarse sand and gravel - boulders
30	to	36	Dakota sandstone with clay streaks
36	to	41	Dakota sandstone fairly tight
41	to	77' 6"	Dakota sandstone fairly loose
77' 6"	to	79' 6"	Limestone and Dakota sandstone
	to		
	to		
	to		
	to		
	to		



Layne-Western Company

4430 Commercial Ave. Omaha, Nebraska

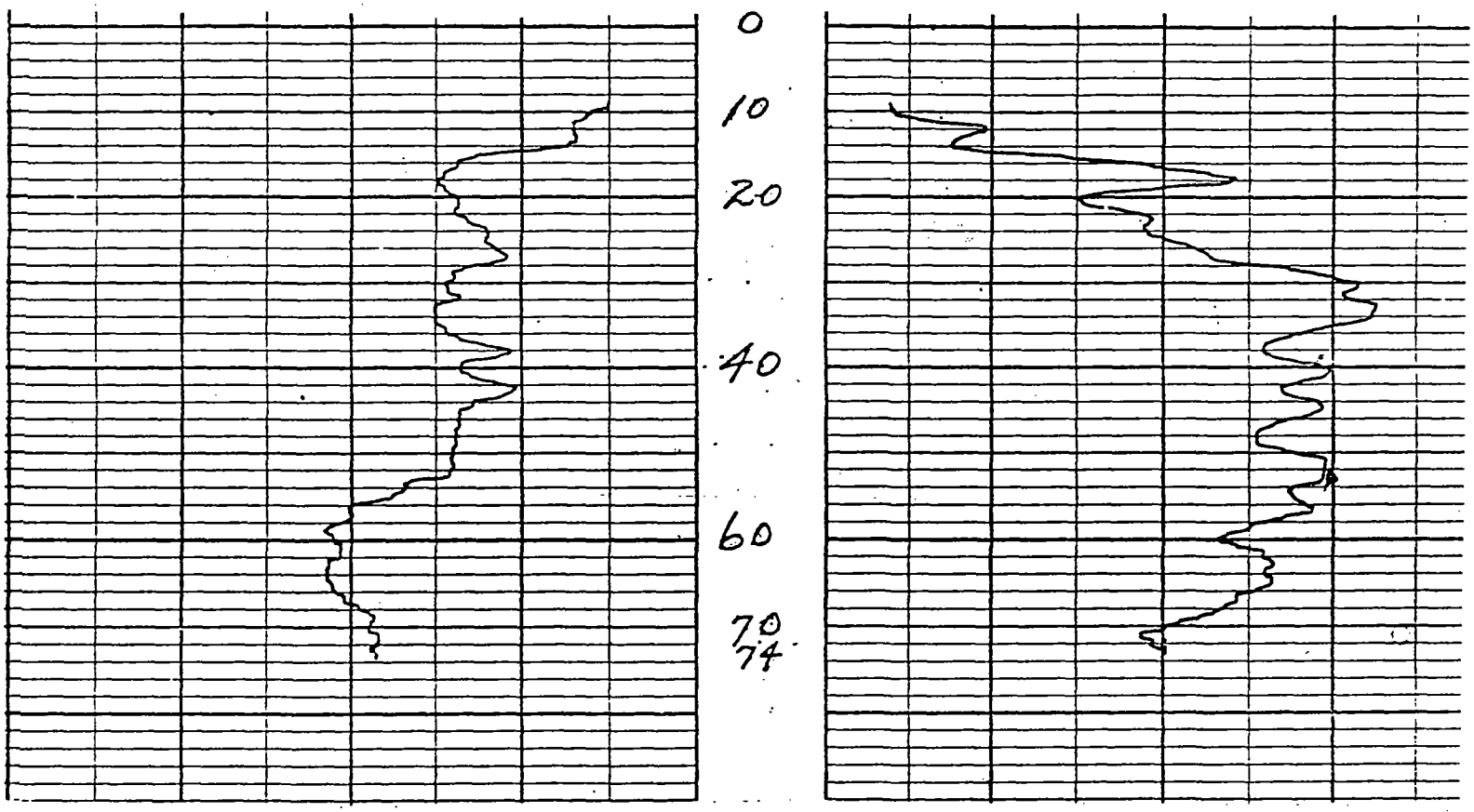
ELECTRICAL LOG

CUSTOMER City of Atlantic				ADDRESS Atlantic Iowa			
WELL NO. Test '66-1		ZERO ELEVATION GL		COUNTY Cass		STATE Iowa	
LOCATION							
Date	1-12-66	Resistivity Scale: 1"	2.5 Ω	Nature of Mud	bentonite	pH	
First Reading	74'	Potential Scale: 1"	10 mv.	Density		Circ. Temp.	
Last Reading	10'	Lineal Scale: 1"	20'	Viscosity		Weather	
Footage Logged	64'	Casing (Driller)	None	Bottom (Driller)		Logged by	D. Oseka
Bit Size:	6"	Casing Size	—	Casing (From Log)		Witnessed by	

REMARKS

SPONTANEOUS-POTENTIAL (MILLIVOLTS)

RESISTIVITY (OHMS)



Layne-Western Company Omaha, Nebraska **Well Information**

1. Contract City of Atlantic Date August 7, 1955
2. City and State Atlantic, Iowa Driller Bruce Caransky
3. Well No. 9 Well location: 300' North of Power Plant across creek.
4. Work began July 17, 1955; work completed July 27, 1955 Number of working days 7
5. Diameter, length and type of material left in well:
6. 30 feet of shutter screen made of 5' bronze blank with lead seal bronze No. 3 openings.
7. 57'6" feet of 16 inch inside casing made of std. pipe ~~12"~~ 1/2" with welded connections.
8. ..... feet of ..... inch outside casing made of ..... with ..... connections.
9. 20 yards of gravel used in the well. Size road gravel
10. Test of well. Did you use test or permanent pump? test 6 Size of Bowl 5 Stages
11. Size of orifice 4 inch by 2½ inch. Orifice tube reading 23 inches.
12. Pumping test — measurements from ground level:

TIME	G.P.M.	STATIC	DRAWDOWN	PUMPING LEVEL
3:30 pm	200	19	9	28
3:30 am	200	19	9	28
8:00 am	200	19	9	28
9:00 am	250	19	11	30
12:00 pm	250	19	11	30
2:00 pm	300	19	13	32
3:30 pm	300	19	13	32

13. Recovery in 5 minutes ....., in 30 minutes .....
14. Did you seal bottom of well? yes Thickness 3/8 inches, material bronze
15. Well underreamed? no From ..... feet to ..... feet, ... feet to ..... feet.
16. If all screen was not placed at bottom, state how it was spaced.

    From ..... feet to ..... feet; from ..... feet to ..... feet; from ..... feet to ..... feet.
17. Depth of well from ground level to top of plug 85' Size of drilled hole 40"
18. Was cement placed around or between any of the casings? 28' to 30'
19. If so, state where, how much and method used. through 2" pipe

CONTRACT City of Atlantic, Iowa Well No. 9

Log of well from ground level:

Feet		Feet	Formation
0	to	11	Brown clay
11	to	17	Blue clay
17	to	26	Coarse sand and gravel - boulder
26	to	31	Dakota sandstone
31	to	36	Dakota sandstone with clay streaks
36	to	65	Dakota sandstone fairly loose
65	to	85	Dakota sandstone loose and coarse
	to		
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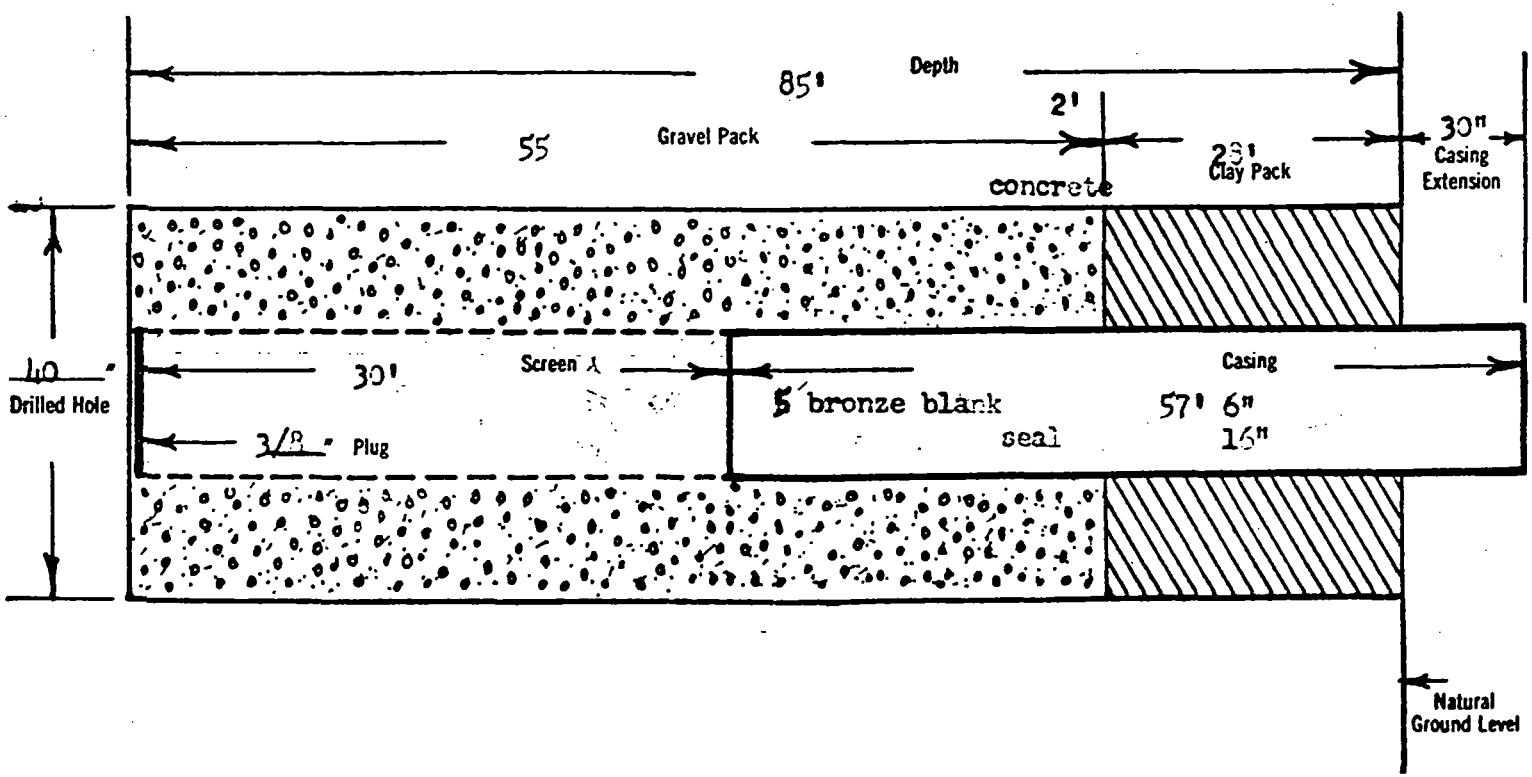
	to		



Layne-Western Company
WATER WELL DRILLING
EXPLORATION BORINGS AND TEST SURVEYS
LAYNE TURBINE PUMPS

PHONE 451-2388

OFFICES
KANSAS CITY, MISSOURI
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AURORA, ILLINOIS
ST. LOUIS, MISSOURI
DENVER, COLORADO

4430 COMMERCIAL AVENUE
OMAHA
NEBRASKA
68110

May 13, 1966
(dict. 5-12-66)

Mr. Lowell G. Edwards
Manager
Atlantic Municipal Utilities
Atlantic, Iowa

Dear Mr. Edwards:

We are pleased to attach two copies of well record sheet on your new well No. 10 installed at test hole 66-2.

Yours truly,

LAYNE-WESTERN COMPANY

G H Beard

G. H. Beard

GHB:ks

Encl. 2

Layne-Western Company Omaha, Nebraska

Well Information

1. Contract City of Atlantic Date May 2, 1966
2. City and State Atlantic, Iowa Driller Dick Farrell
3. Well No. 10 at test hole No. 66-2 Well location (attach map) 680' east of well # 6 in city well field
4. Work completed May 2, 1966. No of man hours as charged to job on time sheet

5. MATERIAL:

	LENGTH	DIA.	GAUGE OR WALL THICKNESS	MATERIAL	TYPE	NO. OF OPENINGS
6. Screen	25'	12"	7 ga.	Stainless steel	Shutter	5
7. Inner Casing	57' 6"	12"	.6	Cast Iron	T & C	
8. Outer Casing						

9. 20 yds ~~tons~~ of gravel used in the well. Size Road & cement mix
10. Test of well. Did you use test or permanent pump? test 8" Size of Bowl 9 Stages
11. Size of orifice 6 inch by 4 inch. Orifice tube reading 25 inches.
12. Pumping test — measurements from ground level:

TIME	G.P.M.	STATIC	DRAWDOWN	PUMPING LEVEL
8:00	317	14'	15'	29'
8:30	317	14'	15'	29'
9:00	317	14'	17'	31'
11:00	317	14'	17'	31'
2:00	317	14'	17'	31'
3:00	317	14'	17'	31'
4:30	492	14'	26'	40'

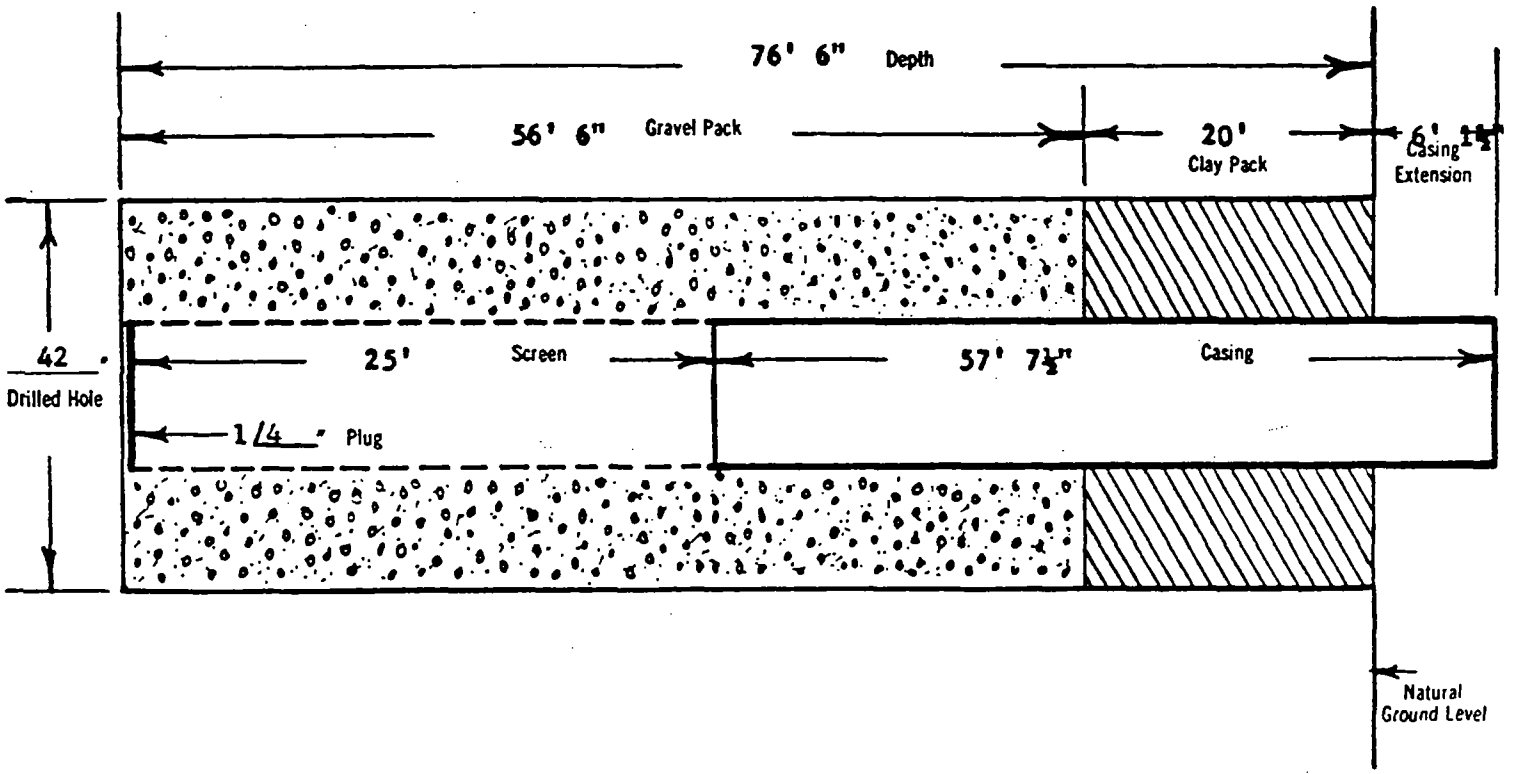
13. Recovery in 5 minutes, in 30 minutes
14. Did you seal bottom of well? yes. Thickness inches, material stainless 7 ga. plate
15. Well underreamed? From feet to feet, feet to feet.
16. If all screen was not placed at bottom, state how it was spaced.

    From feet to feet; from feet to feet; from feet to feet.
17. Depth of well from ground level to top of plug 76' 6". Size of drilled hole 42"
18. Was cement placed around or between any of the casings? No
19. If so, state where, how much and method used.

CONTRACT City of Atlantic, Iowa Well No. 10

Log of well from ground level:

Feet		Feet	Formation
	to		
0'	to	5'	Black soil
5'	to	13'	Brown clay
13'	to	21'	Coarse sand and fine sand - loose
21'	to	36'	Coarse sand, small gravel, and fine sand - loose
36'	to	41'	Dakota sandstone, medium size and fairly loose
41'	to	54' 6"	Dakota sandstone, medium, some gravel size and fairly loose
54' 6"	to	55' 6"	Shale
55' 6"	to	71'	Dakota sandstone, medium size and fairly loose
71'	to	76' 6"	Dakota sandstone, some gravel size
76' 6"	to		Yellow shale
	to		
	to		
	to		
	to		
	to		



Layne-Western Company, Inc. We nf rmation

Omaha, Nebraska

1. Contract City of Atlantic Date 8-10-77

2. City and State Atlantic, Iowa Driller Bill Leuschen

3. Well No. 12 at test hole No. 66-4 Well location (attach map) 600' east of #11

4. Work completed 8-12-77 No of man hours as charged to job on time sheet

5. MATERIAL:

	LENGTH	DIA.	GAUGE OR WALL THICKNESS	MATERIAL	TYPE	NO. OF OPENINGS
6. Screen	30'	12"	7 gauge	s.s.	Layne shutter	5
7. Inner Casing	60'	12"	.375	steel	blank	
8. Outer Casing						

9. 40 tons of gravel used in the well. Size 36 River Rock Road Gravel Grade

10. Test of well. Did you use test or permanent pump? test 8" T (Size of Bowl) 3 (Stages)

11. Size of orifice 4 inch by 3 inch. Orifice tube reading inches.

12. Pumping test — measurements from ground level:

TIME	G.P.M.	STATIC	DRAWDOWN	PUMPING LEVEL
24 hours	300	14.0'	14.0'	28.0'

13. Recovery in 5 minutes full, in 30 minutes

14. Did you seal bottom of well? yes Thickness 3/16 inches, material stainless steel

15. Well underreamed? From feet to feet, feet to feet.

16. If all screen was not placed at bottom, state how it was spaced.

From feet to feet; from feet to feet; from feet to feet.

17. Depth of well from ground level to top of plug 83½ Size of drilled hole 42"

18. Was cement placed around or between any of the casings? No

19. If so, state where, how much and method used.

Appendix Two

SAMPLE RESULTS:

Sample Synopsis

Sample Location	Sample Date	Organic Compound	Concentration (ppb)	Sample Type*
Well #1	3-6-86	Trichloroethene	undetected <.2	TT
Well #1	3-6-86	Tetrachloroethene	undetected <.2	TT
Well #2	8-8-84	1,1 Dichloroethane	1	SOC
Well #2	8-8-84	Trichloroethene	Detected <1ppb	SOC
Well #2	3-6-86	Trichloroethene	undetected <.2	TT
Well #2	3-6-86	Tetrachloroethene	undetected <.2	TT
Well #3	8-8-84	Chloroform	Detected <1ppb	SOC
Well #3	8-8-84	1,2 Dichloroethane	Detected <1ppb	SOC
Well #3	8-8-84	Trichloroethene	Detected <1ppb	SOC
Well #3	8-8-84	Tetrachloroethene	2	SOC
Well #3	3-6-86	Trichloroethene	undetected <.2ppb	TT
Well #3	3-6-86	Tetrachloroethene	undetected <.2ppb	TT
Well #3	6-18-86	tetrachloro ethene	4	PP
Well #7	8-26-82	Tetrachloroethane	170	unknown
Well #7	8-8-84	Trans 1,2 Dichloroethene	Detected <1ppb	SOC
Well #7	8-8-84	Chloroform	Detected <1 ppb	SOC
Well #7	8-8-84	Trichloroethene	2	SOC
Well #7	8-8-84	Tetrachloroethene	260	SOC

* PP - Priority Pollutants

SOC - Synthetic Organic Compounds

TT - Tetrachloroethene & Trichloroethene

Sample Location	Sample Date	Organic Compound	Concentration (ppb)	Sample Typ
Well #7	8-8-84	Atrazine	1.7	SOC
Well #7	1-23-86	trichloroethene	1.1	TT
Well #7	1-23-86	tetrachloroethene	1900	TT
Well #7	3-6-86	trichloroethene	0.9	TT
Well #7	3-6-86	tetrachloroethene	160	TT
Well #7	6-18-86	trichloroethene	1	SOC
Well #7	6-18-86	tetrachloroethene	200	SOC
Finished Water	1-23-85	Chloroform	5	SOC
Finished Water	1-23-85	Brodichloromethane	12	SOC
Finished Water	1-23-85	Dibromochloromethane	28	SOC
Finished Water	1-23-85	Bromoform	10	SOC
Finished Water	3-6-86	trichloroethene	undetected <.2	TT
Finished Water	3-6-86	tetrachloroethene	undetected <.2	TT
Finished Water	6-18-86	Chloroform	3	SOC
Finished Water	6-18-86	Bromodichloromethane	5	SOC
Finished Water	6-18-86	Dibromochloromethane	5	SOC
Finished Water	6-18-86	Bromoform	1	SOC
Finished Water	6-18-86	Tetrachloroethene	1	SOC

Iowa
department of water, air and waste management

November 28, 1984

RECORD COPY
File Name Atlantic PWS
Senders Initials

Board of Trustees
Atlantic Municipal Waterworks
15 W. 3rd St.
Atlantic, Iowa 50022

RE: Synthetic Organic Compound Study

Dear Board Members:

We appreciate the assistance you provided our regional staff during the recent sampling of your water system. The purpose of the sampling was to determine if any synthetic organic compounds were present in your drinking water sources. The attached analytical results indicate the following organic compounds were detected:

Sample Location	Organic Compound	Concentration In Parts Per Billion
Well #2	1,1 Dichloroethane	1
Well #2	Trichloroethene	Detected Only
Well #3	Chloroform	Detected Only
Well #3	1,2 Dichloroethane	Detected Only
Well #3	Trichloroethene	Detected Only
Well #3	Tetrachloroethene	2
Well #7	Trans 1,2 Dichloroethene	Detected Only
Well #7	Chloroform	Detected Only
Well #7	Trichloroethene	2
Well #7	Tetrachloroethene	260
Well #7	Atrazine	1.7
Well #8	Chloroform	Detected Only
Well #8	Tetrachloroethene	Detected Only
Well #9	Tetrachloroethene	Detected Only
Well #12	Tetrachloroethene	Detected Only

We feel it is necessary to conduct additional monitoring to determine if the contaminants are present in the finished drinking water. I have requested our Atlantic regional office staff to conduct the sampling in the very near future.

Thanks in advance for your cooperation. Please contact me directly if you have any questions concerning this letter.

Sincerely,

FIELD SERVICES DIVISION

James R. Humeston
Central Assistance Branch

JRH:blb/FSW321D01.01
cc: Region 4
Ivan Schwabbauer, University Hygienic Laboratory - Iowa City, Iowa

henry a wallace building • 900 east grand • des moines, iowa 50319 • 515/281-8690

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University Hygienic Laboratory
Analytical Report

Client: IDWAWM - SOC Study
Client Address:

Client Sample Identification: Atlantic, Well No. 2
Date Sample Collected: 8-8-84
Date Sample Received: 8-9-84

ANALYTICAL RESULTS

UHL Lab No. 4-4402

Analyte	Concentration (µg/L)	%SD Precision	Accuracy (%Recovery)	Quantitation Limit (µg/L)
chloromethane	<1	± 10%	86	1
bromomethane	<1	± 9%	99	1
vinyl chloride	<1	± 8%	102	1
chloroethane	<1	± 12%	99	1
methylene chloride	<1	± 10%	77	1
1,1-dichloroethene	<1	± 10%	97	1
1,1-dichloroethane	1	± 4%	100	1
trans-1,2-dichloroethene	<1	± 10%	76	1
chloroform	<1	± 3%	99	1
1,2-dichloroethane	<1	± 3%	92	1
1,1,1,-trichloroethane	<1	± 2%	110	1
carbon tetrachloride	<1	± 5%	104	1
bromodichloromethane	<1	± 3%	96	1
1,2-dichloropropane	<1	± 2%	87	1
trans-1,3-dichloropropene	<1	± 4%	86	1
trichloroethene	<1*	± 7%	69	1
dibromochloromethane	<1	± 11%	92	1

Analytical Method: EPA Method 624

Analyst: G. Robertson and S. Chase
Verified: [illegible]
Date Reported: 9/10/84

* compound detected but below quantitation limit

D30/augsoc25

University Hygienic Laboratory
Analytical Report

Client: IDWAWM - SOC Study
Client Address:

Client Sample Identification: Atlantic, Well No. 2
Date Sample Collected: 8-8-84
Date Sample Received: 8-9-84

ANALYTICAL RESULTS

UHL Lab No. 4-4402

Analyte	Concentration (µg/L)	%SD Precision	Accuracy (%Recovery)	Quantitation Limit (µg/L)
cis-1,3-dichloropropene	<1	± 7%	80	1
1,1,2-trichloroethane	<1	± 8%	92	1
benzene	<1	± 3%	96	1
2-chloroethylvinyl ether	<5	± 23%	84	5
bromoform	<1	± 16%	96	1
tetrachloroethene	<1	± 5%	94	1
1,1,2,2-tetrachloroethane	<1	± 12%	98	1
toluene	<1	± 5%	87	1
chlorobenzene	<1	± 9%	88	1
ethylbenzene	<1	± 8%	88	1
acrolein	<25	ND	ND	25
acrylonitrile	<25	ND	ND	25

Analytical Method: EPA Method 624

Analyst: G. Robertson and S. Chase
Verified: DL
Date Reported: 9/10/84

ND = Not Determined

D30/augsoc26

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DEPARTMENT OF WATER, AIR AND WASTE

University Hygienic Laboratory
Analytical Report

Client: IDWAWM - SOC Study
Client Address:

Client Sample Identification: Atlantic, Well No. 3
Date Sample Collected: 8-8-84
Date Sample Received: 8-9-84

ANALYTICAL RESULTS

UHL Lab No. 4-4404

Analyte	Concentration (µg/L)	%SD Precision	Accuracy (%Recovery)	Quantitation Limit (µg/L)
chloromethane	<1	± 10%	86	1
bromomethane	<1	± 9%	99	1
vinyl chloride	<1	± 8%	102	1
chloroethane	<1	± 12%	99	1
methylene chloride	<1	± 10%	77	1
1,1-dichloroethene	<1	± 10%	97	1
1,1-dichloroethane	<1	± 4%	100	1
trans-1,2-dichloroethene	<1	± 10%	76	1
chloroform	<1*	± 3%	99	1
1,2-dichloroethane	<1*	± 3%	92	1
1,1,1,-trichloroethane	<1	± 2%	110	1
carbon tetrachloride	<1	± 5%	104	1
bromodichloromethane	<1	± 3%	96	1
1,2-dichloropropane	<1	± 2%	87	1
trans-1,3-dichloropropene	<1	± 4%	86	1
trichloroethene	<1*	± 7%	69	1
dibromochloromethane	<1	± 11%	92	1

Analytical Method: EPA Method 624

Analyst: G. Robertson and S. Chase
Verified: D.L.
Date Reported: 9/10/84

* compound detected but below quantitation limit

D30/augsoc29

University Hygienic Laboratory
Analytical Report

Client: IDWAWM - SOC Study
Client Address:

Client Sample Identification: Atlantic, Well No. 73
Date Sample Collected: 8-8-84
Date Sample Received: 8-9-84

Well designation changed as result of 12/10/84 Telephone conversation w/Dr George Brewer, UHL
J. Humeston

ANALYTICAL RESULTS

UHL Lab No. 4-4404

Analyte	Concentration (µg/L)	%SD Precision	Accuracy (%Recovery)	Quantitation Limit (µg/L)
cis-1,3-dichloropropene	<1	± 7%	80	1
1,1,2-trichloroethane	<1	± 8%	92	1
benzene	<1	± 3%	96	1
2-chloroethylvinyl ether	<5	± 23%	84	5
bromoform	<1	± 16%	96	1
tetrachloroethene	2	± 5%	94	1
1,1,2,2-tetrachloroethane	<1	± 12%	98	1
toluene	<1	± 5%	87	1
chlorobenzene	<1	± 9%	88	1
ethylbenzene	<1	± 8%	88	1
acrolein	<25	ND	ND	25
acrylonitrile	<25	ND	ND	25

Analytical Method: EPA Method 624

Analyst: G. Robertson and S. Chase
Verified: [illegible]
Date Reported: 9/10/84

ND = Not Determined

D30/augsoc30

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University Hygienic Laboratory
Analytical Report

Client: IDWAWM - SOC Study
Client Address:

Client Sample Identification: Atlantic, Well No. 7
Date Sample Collected: 8-8-84
Date Sample Received: 8-9-84

ANALYTICAL RESULTS

UHL Lab No. 4-4406

Analyte	Concentration (µg/L)	%SD Precision	Accuracy (%Recovery)	Quantitation Limit (µg/L)
chloromethane	<1	± 10%	86	1
bromomethane	<1	± 9%	99	1
vinyl chloride	<1	± 8%	102	1
chloroethane	<1	± 12%	99	1
methylene chloride	<1	± 10%	77	1
1,1-dichloroethene	<1	± 10%	97	1
1,1-dichloroethane	<1	± 4%	100	1
trans-1,2-dichloroethene	<1*	± 10%	76	1
chloroform	<1*	± 3%	99	1
1,2-dichloroethane	<1	± 3%	92	1
1,1,1,-trichloroethane	<1	± 2%	110	1
carbon tetrachloride	<1	± 5%	104	1
bromodichloromethane	<1	± 3%	96	1
1,2-dichloropropane	<1	± 2%	87	1
trans-1,3-dichloropropene	<1	± 4%	86	1
trichloroethene	2	± 7%	69	1
dibromochloromethane	<1	± 11%	92	1

Analytical Method: EPA Method 624

Analyst: G. Robertson and S. Chase
Verified: [illegible]
Date Reported: 9/10/84

* compound detected but below quantitation limit

D30/augsoc31

University Hygienic Laboratory
Analytical Report

Client: IDWAWM - SOC Study
Client Address:

Client Sample Identification: Atlantic, Well No. 7
Date Sample Collected: 8-8-84
Date Sample Received: 8-9-84

ANALYTICAL RESULTS

UHL Lab No. 4-4406

Analyte	Concentration (µg/L)	%SD Precision	Accuracy (%Recovery)	Quantitation Limit (µg/L)
cis-1,3-dichloropropene	<1	± 7%	80	1
1,1,2-trichloroethane	<1	± 8%	92	1
benzene	<1	± 3%	96	1
2-chloroethylvinyl ether	<5	± 23%	84	5
bromoform	<1	± 16%	96	1
tetrachloroethene	260	± 5%	94	1
1,1,2,2-tetrachloroethane	<1	± 12%	98	1
toluene	<1	± 5%	87	1
chlorobenzene	<1	± 9%	88	1
ethylbenzene	<1	± 8%	88	1
acrolein	<25	ND	ND	25
acrylonitrile	<25	ND	ND	25

Analytical Method: EPA Method 624

Analyst: G. Robertson and S. Chase
Verified: [illegible]
Date Reported: 9/10/84

ND = Not Determined

D30/augsoc32

UNIVERSITY HYGIENIC LABORATORY
UNIVERSITY OF IOWA
OAKDALE HALL
IOWA CITY, IOWA 52242

CLIENT WAWM - SOC

SITE Atlantic PRIMARY LAB ID 4-4406

SPECIFIC SAMPLING LOCATION Well No. 7 SECONDARY ID

PESTICIDE COMPOUNDS

Compound	Concentration (µg/L)	Compound	Concentration (µg/L)
Aldrin (HHDN)	<0.02	Toxaphene (polychlorocamphene)	<0.6
alpha-BHC (α Benzene Hexachloride)	<0.01	Dyfonate (Fonofos)	<0.1
beta-BHC (β Benzene Hexachloride)	<0.02	Counter (Terbufos)	<0.1
delta-BHC (δ Benzene Hexachloride)	<0.02	Lorsban (Chlorpyrifos)	<0.1
gamma-BHC (Lindane)	<0.01	Thimet (Phorate)	<0.1
Chlordane	<0.1	MoCap (Ethoprop)	<0.1
DDD (TDE)	<0.04	Atrazine (AAtrex)	1.7
DDE	<0.02	Bladex (Cyanazine)	<0.08
DDT (Dichlorodiphenyltrichloroethane)	<0.04	Lasso (Alaclor)	<0.08
Dieldrin (HEOD)	<0.02	Treflan (Trifluralin)	<0.02
Endosulfan I (Thiodan I)	<0.02	Sencor (Metribuzin)	<0.01
Endosulfan II (Thiodan II)	<0.04	Dual (Metolachlor)	<0.1
Endosulfan sulfate	<0.02	Prowl (Pendimethalin)	<0.02
Endrin (Endrex)	<0.04	Amiben (Chloramben)	<0.07
Endrin aldehyde	<0.05	Banvel (Dicamba)	<0.07
Heptachlor	<0.01	2,4-D	<0.07
Heptachlor epoxide	<0.02	Silvex	<0.05

D24/p4-4406
102684

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University Hygienic Laboratory
Analytical Report

Client: IDWAWM - SOC Study
Client Address:

Client Sample Identification: Atlantic, Well No. 8
Date Sample Collected: 8-8-84
Date Sample Received: 8-9-84

ANALYTICAL RESULTS

UHL Lab No. 4-4408

Analyte	Concentration (µg/L)	%SD Precision	Accuracy (%Recovery)	Quantitation Limit (µg/L)
chloromethane	<1	± 10%	86	1
bromomethane	<1	± 9%	99	1
vinyl chloride	<1	± 8%	102	1
chloroethane	<1	± 12%	99	1
methylene chloride	<1	± 10%	77	1
1,1-dichloroethene	<1	± 10%	97	1
1,1-dichloroethane	<1	± 4%	100	1
trans-1,2-dichloroethene	<1	± 10%	76	1
chloroform	<1*	± 3%	99	1
1,2-dichloroethane	<1	± 3%	92	1
1,1,1,-trichloroethane	<1	± 2%	110	1
carbon tetrachloride	<1	± 5%	104	1
bromodichloromethane	<1	± 3%	96	1
1,2-dichloropropane	<1	± 2%	87	1
trans-1,3-dichloropropene	<1	± 4%	86	1
trichloroethene	<1	± 7%	69	1
dibromochloromethane	<1	± 11%	92	1

Analytical Method: EPA Method 624

Analyst: G. Robertson and S. Chase
Verified: [illegible]
Date Reported: 9/10/84

* compound detected but below quantitation limit

D30/augsoc33

University Hygienic Laboratory
Analytical Report

Client: IDWAWM - SOC Study
Client Address:

Client Sample Identification: Atlantic, Well No. 8
Date Sample Collected: 8-8-84
Date Sample Received: 8-9-84

ANALYTICAL RESULTS

UHL Lab No. 4-4408

Analyte	Concentration (µg/L)	%SD Precision	Accuracy (%Recovery)	Quantitation Limit (µg/L)
cis-1,3-dichloropropene	<1	± 7%	80	1
1,1,2-trichloroethane	<1	± 8%	92	1
benzene	<1	± 3%	96	1
2-chloroethylvinyl ether	<5	± 23%	84	5
bromoform	<1	± 16%	96	1
tetrachloroethene	<1*	± 5%	94	1
1,1,2,2-tetrachloroethane	<1	± 12%	98	1
toluene	<1	± 5%	87	1
chlorobenzene	<1	± 9%	88	1
ethylbenzene	<1	± 8%	88	1
acrolein	<25	ND	ND	25
acrylonitrile	<25	ND	ND	25

Analytical Method: EPA Method 624

Analyst: G. Robertson and S. Chase
Verified: [illegible]
Date Reported: 9/10/84

ND = Not Determined

D30/augsoc34

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'84 NOV 5 AM 11 21

University Hygienic Laboratory
Analytical Report

Client: IDWAWM - SOC Study
Client Address:

Client Sample Identification: Atlantic, Well No. 9
Date Sample Collected: 8-8-84
Date Sample Received: 8-9-84

ANALYTICAL RESULTS

UHL Lab No. 4-4410

Analyte	Concentration (µg/L)	%SD Precision	Accuracy (%Recovery)	Quantitation Limit (µg/L)
chloromethane	<1	± 10%	86	1
bromomethane	<1	± 9%	99	1
vinyl chloride	<1	± 8%	102	1
chloroethane	<1	± 12%	99	1
methylene chloride	<1	± 10%	77	1
1,1-dichloroethene	<1	± 10%	97	1
1,1-dichloroethane	<1	± 4%	100	1
trans-1,2-dichloroethene	<1	± 10%	76	1
chloroform	<1	± 3%	99	1
1,2-dichloroethane	<1	± 3%	92	1
1,1,1,-trichloroethane	<1	± 2%	110	1
carbon tetrachloride	<1	± 5%	104	1
bromodichloromethane	<1	± 3%	96	1
1,2-dichloropropane	<1	± 2%	87	1
trans-1,3-dichloropropene	<1	± 4%	86	1
trichloroethene	<1	± 7%	69	1
dibromochloromethane	<1	± 11%	92	1

Analytical Method: EPA Method 624

Analyst: G. Robertson and S. Chase
Verified: Br
Date Reported: 9/10/84

D30/augsoc35

University Hygienic Laboratory
Analytical Report

Client: IDWAWM - SOC Study
Client Address:

Client Sample Identification: Atlantic, Well No. 9
Date Sample Collected: 8-8-84
Date Sample Received: 8-9-84

ANALYTICAL RESULTS

UHL Lab No. 4-4410

Analyte	Concentration (µg/L)	%SD Precision	Accuracy (%Recovery)	Quantitation Limit (µg/L)
cis-1,3-dichloropropene	<1	± 7%	80	1
1,1,2-trichloroethane	<1	± 8%	92	1
benzene	<1	± 3%	96	1
2-chloroethylvinyl ether	<5	± 23%	84	5
bromoform	<1	± 16%	96	1
tetrachloroethene	<1*	± 5%	94	1
1,1,2,2-tetrachloroethane	<1	± 12%	98	1
toluene	<1	± 5%	87	1
chlorobenzene	<1	± 9%	88	1
ethylbenzene	<1	± 8%	88	1
acrolein	<25	ND	ND	25
acrylonitrile	<25	ND	ND	25

Analytical Method: EPA Method 624

Analyst: G. Robertson and S. Chase
Verified: DK
Date Reported: 9/10/84

ND = Not Determined

* compound detected but below quantitation limit

D30/augsoc36

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University Hygienic Laboratory
Analytical Report

Client: IDWAWM - SOC Study
Client Address:

Client Sample Identification: Atlantic, Well No. 12
Date Sample Collected: 8-8-84
Date Sample Received: 8-9-84

ANALYTICAL RESULTS

UHL Lab No. 4-4412

Analyte	Concentration (µg/L)	%SD Precision	Accuracy (%Recovery)	Quantitation Limit (µg/L)
chloromethane	<1	± 10%	86	1
bromomethane	<1	± 9%	99	1
vinyl chloride	<1	± 8%	102	1
chloroethane	<1	± 12%	99	1
methylene chloride	<1	± 10%	77	1
1,1-dichloroethene	<1	± 10%	97	1
1,1-dichloroethane	<1	± 4%	100	1
trans-1,2-dichloroethene	<1	± 10%	76	1
chloroform	<1	± 3%	99	1
1,2-dichloroethane	<1	± 3%	92	1
1,1,1,-trichloroethane	<1	± 2%	110	1
carbon tetrachloride	<1	± 5%	104	1
bromodichloromethane	<1	± 3%	96	1
1,2-dichloropropane	<1	± 2%	87	1
trans-1,3-dichloropropene	<1	± 4%	86	1
trichloroethene	<1	± 7%	69	1
dibromochloromethane	<1	± 11%	92	1

Analytical Method: EPA Method 624

Analyst: G. Robertson and S. Chase
Verified: Dr
Date Reported: 9/10/84

D30/augsoc37

University Hygienic Laboratory
Analytical Report

Client: IDWAWM - SOC Study
Client Address:

Client Sample Identification: Atlantic, Well No. 12
Date Sample Collected: 8-8-84
Date Sample Received: 8-9-84

ANALYTICAL RESULTS

UHL Lab No. 4-4412

Analyte	Concentration (µg/L)	%SD Precision	Accuracy (%Recovery)	Quantitation Limit (µg/L)
cis-1,3-dichloropropene	<1	± 7%	80	1
1,1,2-trichloroethane	<1	± 8%	92	1
benzene	<1	± 3%	96	1
2-chloroethylvinyl ether	<5	± 23%	84	5
bromoform	<1	± 16%	96	1
tetrachloroethene	<1*	± 5%	94	1
1,1,2,2-tetrachloroethane	<1	± 12%	98	1
toluene	<1	± 5%	87	1
chlorobenzene	<1	± 9%	88	1
ethylbenzene	<1	± 8%	88	1
acrolein	<25	ND	ND	25
acrylonitrile	<25	ND	ND	25

Analytical Method: EPA Method 624

Analyst: G. Robertson and S. Chase
Verified: [illegible]
Date Reported: 9/10/84

ND = Not Determined

* compound detected but below quantitation limit

D30/augsoc38

IOWA
department of water, air and waste management

March 12, 1985

Atlantic PWS
Initials

Manager
Atlantic Municipal Utilities
Atlantic, Iowa 50022

RE: Synthetic Organic Compound Study
Resampling Results

Dear Sir:

I have enclosed a copy of the results for the samples recently collected by our regional staff from your water system. These samples were collected to determine the validity of previous analytical results. The following organic compounds were detected:

Sample Location	Organic Compound	Concentration is Parts Per Billion
Finished	Chloroform	5
Finished	Bromodichloromethane	12
Finished	Dibromochloromethane	28
Finished	Bromoform	10

The synthetic organic chemicals found in the finished water sample (chloroform, bromodichloromethane, dibromochloromethane, bromoform) belong to a group of compounds called trihalomethanes (TTHM). TTHM's are formed during the disinfection process when chlorine reacts with dissolved organic matter. Public water systems serving over 10,000 people routinely monitor for these substances. The maximum contaminant level for TTHM's is 100 PPB. 45 PPB were found in your drinking water. The contaminants at their present concentrations should pose no immediate health concern.

We are in the process of compiling the data for the synthetic organic compound study and will contact you if we have any further information to provide you. Thanks again for your cooperation in this study. Please contact me directly if you have any questions about this letter or the contaminants found in your water.

Sincerely,

FIELD SERVICES DIVISION

James R. Humeston
Environmental Specialist
Central Assistance Branch

JRH:blb/FSW070D03.01

cc: Region 4

henry a. wallace building • 900 east grand • des moines, iowa 50319 • 515 281-8690

UNIVERSITY HYGIENIC LABORATORY
Analytical Report

Client: IDWAWM
Client Address:

Client Sample Identification: Bathroom Sink - IDWAWM, Reg. Office No. 4, Atlantic, Iowa
Date Sample Collected: 1-23-85
Date Sample Received: 1-24-85

ANALYTICAL RESULTS

UHL Lab No. 5-0461

Analyte	Concentration (µg/L)	%SD Precision	Accuracy (%Recovery)	Quantitation Limit (µg/L)
chloromethane	<1	± 10	86	1
bromomethane	<1	± 9	99	1
vinyl chloride	<1	± 8	102	1
chloroethane	<1	± 12	99	1
methylene chloride	<1	± 10	77	1
1,1-dichloroethene	<1	± 10	97	1
1,1-dichloroethane	<1	± 4	100	1
trans-1,2-dichloroethene	<1	± 10	76	1
chloroform	5	± 3	99	1
1,2-dichloroethane	<1	± 3	92	1
1,1,1,-trichloroethane	<1	± 2	110	1
carbon tetrachloride	<1	± 5	104	1
bromodichloromethane	12	± 3	96	1
1,2-dichloropropane	<1	± 2	87	1
trans-1,3-dichloropropene	<1	± 4	86	1
trichloroethene	<1	± 7	69	1
dibromochloromethane	28	± 11	92	1

Analytical Method: EPA Method 624

Analyst: G. Robertson and S. Chase
Verified: JC
Date Reported: 2-22-85

'85 MAR 7 AM 10 05
DEPARTMENT OF ENVIRONMENTAL QUALITY
HAZARDOUS WASTE

E13/5-0461a

ANALYTICAL RESULTS

UHL Lab No. 5-0461

Analyte	Concentration (µg/L)	%SD Precision	Accuracy (%Recovery)	Quantitation Limit (µg/L)
cis-1,3-dichloropropene	<1	± 7	80	1
1,1,2-trichloroethane	<1	± 8	92	1
benzene	<1	± 3	96	1
2-chloroethylvinyl ether	<5	± 23	84	5
bromoform	10	± 16	96	1
tetrachloroethene	<1	± 5	94	1
1,1,2,2-tetrachloroethane	<1	± 12	98	1
toluene	<1	± 5	87	1
chlorobenzene	<1	± 9	88	1
ethylbenzene	<1	± 8	88	1
acrolein	<25	ND	ND	25
acrylonitrile	<25	ND	ND	25

Analytical Method: EPA Method 624

Analyst: G. Robertson and S. Chase
Verified: SC
Date Reported: 2-22-85

ND = Not Determined

FEB 2

UNIVERSITY HYGIENIC LABORATORY
UNIVERSITY OF IOWA
OAKDALE HALL
IOWA CITY, IOWA 52242

CLIENT WAWM - SOC

SITE Atlantic PRIMARY LAB ID 5-0461

SPECIFIC SAMPLING LOCATION IDWAWM Regional Office No. 4 SECONDARY ID

PESTICIDE COMPOUNDS

Compound	Concentration (µg/L)	Compound	Concentration (µg/L)
Aldrin (HHDN)	<0.02	Toxaphene (polychlorocamphene)	<0.6
alpha-BHC (α Benzene Hexachloride)	<0.01	Dyfonate (Fonofos)	<0.1
beta-BHC (β Benzene Hexachloride)	<0.02	Counter (Terbufos)	<0.1
delta-BHC (Benzene Hexachloride)	<0.02	Lorsban (Chlorpyrifos)	<0.1
gamma-BHC (Lindane)	<0.01	Thimet (Phorate)	<0.1
Chlordane	<0.1	MoCap (Ethoprop)	<0.1
DDD (TDE)	<0.04	Atrazine (AAtrex)	<0.1
DDE	<0.02	Bladex (Cyanazine)	<0.08
DDT (Dichlorodiphenyltrichloroethane)	<0.04	Lasso (Alaclor)	<0.08
Dieldrin (HEOD)	<0.02	Treflan (Trifluralin)	<0.02
Endosulfan I (Thiodan I)	<0.02	Sencor (Metribuzin)	<0.01
Endosulfan II (Thiodan II)	<0.04	Dual (Metolachlor)	<0.1
Endosulfan sulfate	<0.02	Prowl (Pendimethalin)	<0.02
Endrin (Endrex)	<0.04	Amiben (Chloramben)	<0.07
Endrin aldehyde	<0.05	Banvel (Dicamba)	<0.07
Heptachlor	<0.01	2,4-D	<0.07
Heptachlor epoxide	<0.02	Silvex	<0.05

E14/p5-0461
021485

University Hygienic Laboratory
Analytical Report

Client: AMV Water Department
Client Address: 15 West Third
Atlantic, IA 50022

Client Sample Location: No. 7 Sample Tap

Date Sample Collected: 1-23-86
Date Sample Received: 1-24-86

ANALYTICAL RESULTS

Lab I.D.	Analyte	Concentration (ppb) (µg/L)	%SD Precision	Accuracy (%Recovery)	Quantitation Limit (ppb) (µg/L)
8600421	trichloroethene	1.1	± 4	82	.2
	tetrachloroethene	1,900	± 12	79	.2

Analytical Method: OA-601

Analyst: G. Fitzpatrick
Verified: LF
Date Reported: 2-06-86

G76/8600421

University Hygienic Laboratory
Analytical Report

Client: IDWAWM - Regional Office No. 4; ATTN: David Preston
Client Address: 316 Walnut
Atlantic, IA 50022

Client Sample Location: Well No. 1
Date Sample Collected: 3-06-86
Date Sample Received: 3-07-86

ANALYTICAL RESULTS

Lab I.D.	Analyte	Concentration (ppb) (µg/L)	%SD Precision	Accuracy (%Recovery)	Quantitation Limit (ppb) (µg/L)
8601466	trichloroethene	<.2	± 4	107	.2
	tetrachloroethene	<.2	± 5	81	.2

Analytical Method: OA-601

Analyst: S. May
Verified: LE
Date Reported: 4-09-86

H85/8601466

University Hygienic Laboratory
Analytical Report

Client: IDWAWM - Regional Office No. 4; ATTN: David Preston
Client Address: 316 Walnut
Atlantic, IA 50022

Client Sample Location: Well No. 2
Date Sample Collected: 3-06-86
Date Sample Received: 3-07-86

ANALYTICAL RESULTS

Lab I.D.	Analyte	Concentration (ppb) (µg/L)	%SD Precision	Accuracy (%Recovery)	Quantitation Limit (ppb) (µg/L)
8601467	trichloroethene	<.2	± 4	107	.2
	tetrachloroethene	<.2	± 5	81	.2

Analytical Method: OA-601

Analyst: S. May
Verified: LF
Date Reported: 4-09-86

H85/8601467

University Hygienic Laboratory
Analytical Report

Client: IDWAWM - Regional Office No. 4; ATTN: David Preston
Client Address: 316 Walnut
Atlantic, IA 50022

Client Sample Location: Well No. 3
Date Sample Collected: 3-06-86
Date Sample Received: 3-07-86

ANALYTICAL RESULTS

Lab I.D.	Analyte	Concentration (ppb) (µg/L)	%SD Precision	Accuracy (%Recovery)	Quantitation Limit (ppb) (µg/L)
8601468	trichloroethene	<.2	± 4	107	.2
	tetrachloroethene	<.2	± 5	81	.2

Analytical Method: OA-601

Analyst: S. May
Verified: LE
Date Reported: 4-09-86

H85/8601468

University Hygienic Laboratory
Analytical Report

Client: IDWAWM - Regional Office No. 4; ATTN: David Preston
Client Address: 316 Walnut
Atlantic, IA 50022

Client Sample Location: Well No. 7
Date Sample Collected: 3-06-86
Date Sample Received: 3-07-86

ANALYTICAL RESULTS

Lab I.D.	Analyte	Concentration (ppb) (µg/L)	%SD Precision	Accuracy (%Recovery)	Quantitation Limit (ppb) (µg/L)
8601469	trichloroethene	.9	± 4	107	.2
	tetrachloroethene	160	± 5	81	.2

Analytical Method: OA-601

Analyst: S. May
Verified: LE
Date Reported: 4-09-86

University Hygienic Laboratory
Analytical Report

Client: IDWAWM - Regional Office No. 4; ATTN: David Preston
Client Address: 316 Walnut
Atlantic, IA 50022

Client Sample Location: Raw Water
Date Sample Collected: 3-06-86
Date Sample Received: 3-07-86

ANALYTICAL RESULTS

Lab I.D.	Analyte	Concentration (ppb) (µg/L)	%SD Precision	Accuracy (%Recovery)	Quantitation Limit (ppb) (µg/L)
8601470	trichloroethene	<.2	± 4	107	.2
	tetrachloroethene	.9	± 5	81	.2

Analytical Method: OA-601

Analyst: S. May
Verified: LE
Date Reported: 4-09-86

H85/8601470

University Hygienic Laboratory
Analytical Report

Client: IDWAWM - Regional Office No. 4; ATTN: David Preston
Client Address: 316 Walnut
Atlantic, IA 50022

Client Sample Location: Final
Date Sample Collected: 3-06-86
Date Sample Received: 3-07-86

ANALYTICAL RESULTS

Lab I.D.	Analyte	Concentration (ppb) (µg/L)	%SD Precision	Accuracy (%Recovery)	Quantitation Limit (ppb) (µg/L)
8601471	trichloroethene	<.2	± 4	107	.2
	tetrachloroethene	<.2	± 5	81	.2

Analytical Method: OA-601

Analyst: S. May
Verified: LE
Date Reported: 4-09-86

H85/8601471

Atlantic PWS

Iowa
department of water, air and waste management

September 25, 1986

Wilbert L. Hoeck
Director of Water Operations
Atlantic Municipal Utilities
15 W. 3rd Street
Atlantic, IA 50022

SUBJECT: Water Supply Monitoring

Dear Mr. Hoeck:

I have enclosed a copy of the results for the samples recently collected by our field staff from your water system. The samples were collected as a part of a study to determine the presence of synthetic organic chemicals and pesticides in public water systems. The following compounds were detected:

Location	Compound	Concentration in Parts Per Billion
Finished	Chloroform	3
Finished	Bromodichloromethane	5
Finished	Dibromochloromethane	5
Finished	Bromoform	1
Finished	Tetrachloroethene	1
Well #3	Tetrachloroethene	4
Well #7	Trichloroethene	1
Well #7	Tetrachloroethene	200

We would like to take this opportunity to briefly explain the health significance of the contaminants found in the finished drinking water. Chloroform, bromodichloromethane, dibromochloromethane and bromoform belong to a group of organic compounds called trihalomethanes (TTHM). TTHMs are formed during the disinfection process when chlorine reacts with dissolved organic matter. Public water systems serving over 10,000 people routinely monitor for these substances. The maximum contaminant level for TTHMs is 100 parts per billion (PPB). 14 PPB were found in your drinking water. At this concentration, the contaminants should pose no immediate adverse health concern.

The U.S. Environmental Protection Agency's Cancer Assessment Group (CAG) has classified tetrachlorethene as a probable human carcinogen. The CAG has calculated that consuming drinking water for a lifetime containing 0.7 parts per billion of tetrachloroethene would produce one excess cancer in a million people. 1 part per billion of tetrachloroethene was found in your drinking water.

Thanks for your cooperation. If you have any questions concerning this letter do not hesitate to contact me. We will contact you in the near future if corrective actions are necessary.

Sincerely,

JAMES R. HUMESTON
ENVIRONMENTAL SPECIALIST
WATER SUPPLY SECTION

JRH:bkp/WSW266P04.01

UNIVERSITY HYGIENIC LABORATORY
Analytical Report
Finnigan 4000

Client: EPD Region #4 Atten: Al Goldberg
Client Address: 316 Walnut
Atlantic, IA 50022

Client Sample Identification: Finished Water - Atlantic
Date Sample Collected: 6-18-86
Date Sample Received: 6-19-86

ANALYTICAL RESULTS

UHL Lab No. 8605513

ANALYTE	CONCENTRATION (ug/L)	QUANTITATION LIMIT (ug/L)
CHLOROMETHANE	<1	1
BROMOMETHANE	<1	1
VINYL CHLORIDE	<1	1
CHLOROETHANE	<1	1
METHYLENE CHLORIDE	<5	5
1,1-DICHLOROETHENE	<1	1
1,1-DICHLOROETHANE	<1	1
TRANS-1,2-DICHLOROETHENE	<1	1
CHLOROFORM	3	1
1,2-DICHLOROETHANE	<1	1
1,1,1-TRICHLOROETHANE	<1	1
CARBON TETRACHLORIDE	<1	1
BROMODICHLOROMETHANE	5	1
1,2-DICHLOROPROPANE	<1	1
TRANS-1,3-DICHLOROPROPENE	<1	1
TRICHLOROETHENE	<1	1
DIBROMOCHLOROMETHANE	5	1

ANALYTICAL RESULTS

UHL Lab No. 8605513

ANALYTE	CONCENTRATION (ug/L)	QUANTITAION LIMIT (ug/L)
CIS-1,3-DICHLOROPROPENE	<1	1
1,1,2-TRICHLOROETHANE	<1	1
BENZENE	<1	1
2-CHLOROETHYL VINYL ETHER	<5	5
BROMOFORM	1	1
TETRACHLOROETHENE	1	1
1,1,2,2-TETRACHLOROETHANE	<1	1
TOLUENE	<1	1
CHLOROBENZENE	<1	1
ETHYLBENZENE	<1	1
TRICHLOROFLUOROMETHANE	<1	1
ACROLEIN	<40	40
ACRYLONITRILE	<25	25

Analytical Method: EPA Method 624

Analyst: C. Barnes/T.Cain
Verified:
Date Reported: 6-24-86

Analytical Report for Sample Number 8605513

NDOSULFAN II	<0 04	"	"
NDOSULFAN SULFATE	<0 04	"	"
NDRIN	<0 04	"	"
NDRIN ALDEHYDE	<0 04	"	"
EPTACHLOR	<0 04	"	"
EPTACHLOR EPOXIDE	<0 04	"	"
OXAPHENE	<0 5	"	"

Description GC/MS VOLATILES

DATE : 06/25/86

Analyst:
Verified

Analytical Report for Sample Number 8605513

Date Entered 06/19/86 Date Completed 08/18/86

Submitter EPD 4
Address 316 WALNUT
City ATLANTIC IA 50022

Sample Location
Sample Description FINISHED WATER - Atlantic
Date Collected 06/18/86 00 00 00 Client Reference

--- C o m m e n t s ---

--- Listing of Analysis Performed and Results ---

TEST	micrograms/L(PPB)	METHOD USED	ANALYST
COUNTER	<0.1	PR 3	PF
DYFONATE	<0.1	"	"
LORSBAN	<0.1	"	"
MOCAP	<0.1	"	"
THIMET	<0.1	"	"
FURADAN	<0.1	"	"
ATRAZINE	<0.1	"	"
BLADEX	<0.1	"	"
DUAL	<0.1	"	"
LASSO	<0.1	"	"
SENCOR	<0.1	"	"
SUTAN	<0.1	"	"
TREFLAN	<0.1	"	"
AMIBEN	<0.1	PR 2	WP
BANVEL	<0.1	"	"
2,4-D	<0.1	"	"
SILVEX	<0.1	"	"
ALDRIN	<0.04	PR 9	WP
ALPHA-BHC	<0.04	"	"
BETA-BHC	<0.04	"	"
DELTA-BHC	<0.04	"	"
GAMMA-BHC (LINDANE)	<0.04	"	"
CHLORDANE	<0.2	"	"
DDD	<0.04	"	"
DDE	<0.04	"	"
DDT	<0.04	"	"
DIELDRIN	<0.04	"	"
ENDOSULFAN I	<0.04	"	"

UNIVERSITY HYGIENIC LABORATORY
Analytical Report
Finnigan 4000

Client: EPD Region #4 Atten:Al Goldberg
Client Address: 316 Walnut
Atlantic, IA 50022

Client Sample Identification: Well no.3 - Atlantic
Date Sample Collected: 6-18-86
Date Sample Received: 6-19-86

ANALYTICAL RESULTS

UHL Lab No. 8605515

ANALYTE	CONCENTRATION (ug/L)	QUANTITATION LIMIT (ug/L)
CHLOROMETHANE	<1	1
BROMOMETHANE	<1	1
VINYL CHLORIDE	<1	1
CHLOROETHANE	<1	1
METHYLENE CHLORIDE	<5	5
1,1-DICHLOROETHENE	<1	1
1,1-DICHLOROETHANE	<1	1
TRANS-1,2-DICHLOROETHENE	<1	1
CHLOROFORM	<1	1
1,2-DICHLOROETHANE	<1	1
1,1,1-TRICHLOROETHANE	<1	1
CARBON TETRACHLORIDE	<1	1
BROMODICHLOROMETHANE	<1	1
1,2-DICHLOROPROPANE	<1	1
TRANS-1,3-DICHLOROPROPENE	<1	1
TRICHLOROETHENE	<1	1
DIBROMOCHLOROMETHANE	<1	1

ANALYTICAL RESULTS

UHL Lab No. 8605515

ANALYTE	CONCENTRATION (ug/L)	QUANTITAION LIMIT (ug/L)
CIS-1,3-DICHLOROPROPENE	<1	1
1,1,2-TRICHLOROETHANE	<1	1
BENZENE	<1	1
2-CHLOROETHYL VINYL ETHER	<5	5
BROMOFORM	<1	1
TETRACHLOROETHENE	4	1
1,1,2,2-TETRACHLOROETHANE	<1	1
TOLUENE	<1	1
CHLOROBENZENE	<1	1
ETHYLBENZENE	<1	1
TRICHLOROFLUOROMETHANE	<1	1
ACROLEIN	<40	40
ACRYLONITRILE	<25	25

Analytical Method: EPA Method 624

Analyst: C. Barnes/T.Cain
Verified:
Date Reported: 6-24-86

Analytical Report for Sample Number 8605515

Date Entered 06/19/86 Date Completed 08/18/86

Submitter EPD 4
Address 316 WALNUT
City ATLANTIC IA 50022

Sample Location WELL #3 - Atlantic
Sample Description WATER
Date Collected 06/18/86 00 00 00 Client Reference

--- Comments ---

--- Listing of Analysis Performed and Results ---

TEST	micrograms/L(PPB)	METHOD USED	ANALYST
COUNTER	<0.1	PR 9	PF
DYFONATE	<0.1	"	"
FORSBAN	<0.1	"	"
FOCAP	<0.1	"	"
THIMET	<0.1	"	"
FURADAN	<0.1	"	"
ATRAZINE	<0.1	"	"
ALADEX	<0.1	"	"
DUAL	<0.1	"	"
LASSO	<0.1	"	"
LENCOR	<0.1	"	"
LUTAN	<0.1	"	"
TREFLAN	<0.1	"	"
AMIBEN	<0.1	PR 2	WP
PANVEL	<0.1	"	"
2,4-D	<0.1	"	"
SILVEX	<0.1	"	"
ALDRIN	<0.04	PR 9	WP
ALPHA-BHC	<0.04	"	"
BETA-BHC	<0.04	"	"
DELTA-BHC	<0.04	"	"
GAMMA-BHC (LINDANE)	<0.04	"	"
CHLORDANE	<0.2	"	"
DDD	<0.04	"	"
DDE	<0.04	"	"
DDT	<0.04	"	"
DIELDRIN	<0.04	"	"
ENDOSULFAN I	<0.04	"	"

Analytical Report for Sample Number 8605515

DOSULFAN II	<0 04	"	"
DOSULFAN SULFATE	<0 04	"	"
DRIN	<0 04	"	"
DRIN ALDEHYDE	<0 04	"	"
PTACHLOR	<0 04	"	"
PTACHLOR EPOXIDE	<0 04	"	"
XAPHENE	<0 5	"	"

Description GC/MS VOLATILES

DATE 06/25/86

Analyst
Verified

UNIVERSITY HYGIENIC LABORATORY
Analytical Report
Finnigan 4000

Client: EPD Region #4 Atten: Al Goldberg
Client Address: 316 Walnut
Atlantic, IA 50022

Client Sample Identification: Well no.7 - Atlantic
Date Sample Collected: 6-18-86
Date Sample Received: 6-19-86

ANALYTICAL RESULTS

UHL Lab No. 8605511

ANALYTE	CONCENTRATION (ug/L)	QUANTITATION LIMIT (ug/L)
CHLOROMETHANE	<1	1
BROMOMETHANE	<1	1
VINYL CHLORIDE	<1	1
CHLOROETHANE	<1	1
METHYLENE CHLORIDE	<5	5
1,1-DICHLOROETHENE	<1	1
1,1-DICHLOROETHANE	<1	1
TRANS-1,2-DICHLOROETHENE	<1	1
CHLOROFORM	<1	1
1,2-DICHLOROETHANE	<1	1
1,1,1-TRICHLOROETHANE	<1	1
CARBON TETRACHLORIDE	<1	1
BROMODICHLOROMETHANE	<1	1
1,2-DICHLOROPROPANE	<1	1
TRANS-1,3-DICHLOROPROPENE	<1	1
TRICHLOROETHENE	1	1
DIBROMOCHLOROMETHANE	<1	1

ANALYTICAL RESULTS

UHL Lab No. 8605511

ANALYTE	CONCENTRATION (ug/L)	QUANTITAION LIMIT (ug/L)
CIS-1,3-DICHLOROPROPENE	<1	1
1,1,2-TRICHLOROETHANE	<1	1
BENZENE	<1	1
2-CHLOROETHYL VINYL ETHER	<5	5
BROMOFORM	<1	1
TETRACHLOROETHENE	200	1
1,1,2,2-TETRACHLOROETHANE	13	1
TOLUENE	<1	1
CHLOROBENZENE	<1	1
ETHYLBENZENE	<1	1
TRICHLOROFLUOROMETHANE	<1	1
ACROLEIN	<40	40
ACRYLONITRILE	<25	25

Analytical Method: EPA Method 624

Analyst: C.Barnes/T.Cain
Verified:
Date Reported: 6-24-86

University of Iowa - Hygienic Laboratory

Analytical Report for Sample Number 8605511

Date Entered 06/19/86 Date Completed 08/18/86

Submitter EFD 4
Address 316 WALNUT
City ATLANTIC IA 50022

Sample Location WELL #7 - Atlantic
Sample Description WATER
Date Collected 06/10/86 00:00:00 Client Reference

--- Comments ---

--- Listing of Analysis Performed and Results ---

TEST	micrograms/L(PPB)	METHOD USED	ANALYST
COUNTER	<0.1	PR 9	PF
DYFONATE	<0.1	"	"
LORSBAN	<0.1	"	"
MOCAP	<0.1	"	"
THIMET	<0.1	"	"
FURADAN	<0.1	"	"
ATRAZINE	<0.1	"	"
BLADEX	<0.1	"	"
DUAL	<0.1	"	"
LASSO	<0.1	"	"
SENCOR	<0.1	"	"
SUTAN	<0.1	"	"
TREFLAN	<0.1	"	"
AMIBEN	<0.1	PR 2	WP
BANVEL	<0.1	"	"
2,4-D	<0.1	"	"
SILVEX	<0.1	"	"
ALDRIN	<0.04	PR 9	WP
ALPHA-BHC	<0.04	"	"
BETA-BHC	<0.04	"	"
DELTA-BHC	<0.04	"	"
GAMMA-BHC (LINDANE)	<0.04	"	"
CHLORDANE	<0.2	"	"
DDD	<0.04	"	"
DDE	<0.04	"	"
DDT	<0.04	"	"
DIELDRIN	<0.04	"	"
ENDOSULFAN I	<0.04	"	"

Analytical Report for Sample Number 8605511

NDOSULFAN II	<0 04	"	"
NDOSULFAN SULFATE	<0 04	"	"
NDRIN	<0 04	"	"
NDRIN ALDEHYDE	<0 04	"	"
EPTACHLOR	<0 04	"	"
EPTACHLOR EPOXIDE	<0 04	"	"
OXAPHENE	<0 5	"	"

Description GC/MS VOLATILES

DATE 06/25/86 Verified