

Approved: 1-24-96
Date

MINUTES OF THE SENATE COMMITTEE ON ENERGY & NATURAL RESOURCES.

The meeting was called to order by Chairperson Don Sallee at 8:00 a.m. on January 17, 1996 in Room 254-E- of the Capitol.

All members were present except:

Senator Phil Martin, excused
Senator Bill Wisdom, excused

Committee staff present: Raney Gilliland, Legislative Research Department
Dennis Hodgins, Legislative Research Department
Ardan Ensley, Revisor of Statutes
Clarene Wilms, Committee Secretary

Conferees appearing before the committee:

Bill Wix, Ass't. General Counsel, Conservation Division, State Corporation
Commission

Others attending: See attached list

The chairperson called for bill requests.

Senator Morris requested introduction of a bill which would accomplish truth in reporting concerning royalties reported by oil and gas companies. Currently some companies report all deductions while others combine deductions without any explanation. Senator Morris stated that North Dakota and several other states have instituted such reporting.

Senator Tillotson moved to introduce the bill with Senator Morris seconding the motion. The motion carried.

SCR 1613--Requesting the Kansas Corporation Commission to open one or more generic dockets to study the need for regulation of natural gas gathering lines and to report findings and recommendations to the Legislature.

Bill Wix, Ass't. General Counsel, Conservation Division, Kansas Corporation Commission, appeared before the Committee concerning **SCR 1613** which resulted from hearings on Proposal No. 26 by the interim committee on Energy and Natural Resources (Attachment 1).

Mr. Wix stated that due to time constraints the Kansas Corporation Commission proceeded with public hearings as outlined in Attachment 1.

Concern had previously been expressed as to whether the Kansas Corporation Commission could legally operate under Chapter 66 concerning some issues. Mr. Wix stated that the Kansas Corporation Commission was providing a legal opinion stating that jurisdiction could properly be found under Chapter 55 or Chapter 66 of the Kansas Statutes Annotated. He further noted the type of regulation would determine what Division of the KCC would have jurisdiction.

SCR 1614--Requesting the Kansas Corporation to submit to the Legislature certain information relating to cleanup of pollution from certain oil and gas activities.

Bill Wix, Ass't. General Counsel, Conservation Division, Kansas Corporation Commission, appeared before the Committee concerning Proposal 26 studied by the interim committee on Energy and Natural Resources and **SCR 1614** which resulted from that study (Attachment 2).

Mr. Wix told Committee members that 18 remediation sites were transferred from KDHE to the Kansas Corporation Commission and a bill accompanied Proposal 27 which would provide financing for remediation of the sites. He further stated preparations were underway to provide the related report due February 1, 1996.

CONTINUATION SHEET

MINUTES OF THE SENATE COMMITTEE ON ENERGY AND NATURAL RESOURCES, ROOM 254-E-Statehouse, at 8:00 a.m. on January 17, 1996.

In answer to questions by members Mr. Wix commented that remediation of some sites will cost very little while some such as the Hollow Nikkel (Burrton) sites could require at least \$3,000,000 to remediate. In addition to the 18 sites there are 70 others resting with the Kansas Corporation Commission, some of which could require remediation funds.

Two of the 18 sites transferred to the KCC were returned to KDHE, Barton County Crude Oil where it was determined the contamination was due to a leaking pipeline and the Bogue Area IV where it was determined the contamination was from subsurface gasoline tanks. The Hollow Nikkel (Burrton) II (Burrton) was split, thereby bringing the total sites to 17. It was also noted there are 14,000 abandoned wells under the care of the KCC.

Mr. Wix told the Committee that several bills, one of which is **HB-2599**, were being introduced to provide alternative financing to pay for remediation.

Senator Morris moved to report SCR 1613 and SCR 1614 favorable for passage. Senator Tillotson seconded the motion and the motion carried.

The meeting adjourned at 8:40 a.m.

The next meeting is scheduled for January 18, 1996.

SENATE ENERGY & NATURAL RESOURCES
COMMITTEE GUEST LIST

DATE: January 17, 1996

NAME	REPRESENTING
J.C. Long	UtiliCorp United, Inc.
James Schwab	KPOC
Tom Bruno	Allen & Assoc.
Jim Allen	EKOGA
ED SCHAUB	THE WESTERN RESOURCES
Susan Seltman	KCC
M.L. Korphey	KCC
DAVE HEINEMANN	"
John McCANNON	"
Bill Wix	KCC
Tom DAY	KCC
Whitney Damron	Anadarko Petroleum Corporation
Tom Stiles	KWO
Doug Smith	SW KS Royalty owners
LEW JENE SCHNEIDER	Ks. LIVESTOCK Assoc.
Jakie Hein	Hein Ebert & Walter
DAVID B SCHLOSSER	PETE McGill & Assoc.
Don Schuack	KIOGA -

Testimony of William J. Wix
Assistant General Counsel
Kansas Corporation Commission
Conservation Division
before the
1996 Senate Committee on Energy and Natural Resources
January 17, 1996

Good morning, I am William J. Wix, Assistant General Counsel for the Conservation Division of the Kansas Corporation Commission. It is the Commission's belief that the Interim Committee on Energy and Natural Resources felt the regulation of gas gathering was of great concern. The Commission concurred in that opinion and proceeded to conduct the fact finding hearings contemplated in Proposal No. 26 and Senate Concurrent Resolution No. 1613.

Public hearings were held in Wichita on January 4, 1996, Chanute on January 9, 1996, and Liberal on January 10, 1996. Approximately 36 witnesses appeared and gave testimony ranging from recommending extremely light-handed regulation to the creation of a very comprehensive mini-FERC within the Corporation Commission. We are providing you with a legal opinion stating that jurisdiction could properly be found under Chapter 55 or Chapter 66 of the Kansas Statutes Annotated. The type of regulation eventually determined to be necessary by the Legislature should effect what Division of the Corporation Commission has jurisdiction. Light-handed regulation similar to that used by Oklahoma would properly be in the Conservation Division. Regulation which would involve filing of rates and rate making determinations would probably be under Chapter 66 as they have utility staff familiar with this type of regulation.

Senate Energy + Nat'l Resources
January 17, 1996
Attachment 1

KCC Testimony
Page 2

Our report is due to the Legislature as contemplated by proposal 26 on or before March 1, 1996. We will have the report for distribution when appropriate.

Thank you for letting me appear before you today. If you have any questions I will be glad to answer them.

Testimony of William J. Wix
Assistant General Counsel
Kansas Corporation Commission
Conservation Division
before the
1996 Senate Committee on Energy and Natural Resources

Mr. Chairman and committee members, good morning. My name is William J. Wix. I am the Assistant General Counsel of the Conservation Division of the Kansas Corporation Commission. Today I am here to provide testimony on Proposal No. 27 and Senate Concurrent Resolution 1614.

Pursuant to Chapter 204 of the 1995 Session laws, eighteen remediation sites were transferred from KDHE to the KCC. However, that Legislation also specifically provided that we were not allowed to increase assessments to pay for remediation. Proposal 27 is a vehicle which would provide such financing.

Attached to my testimony you will find the report which was given to the Interim Committee. We are currently in the process of updating and expanding on that report. Those revisions will reflect work done to date, additional data which has been gathered and expanded to those areas set forth in Senate Concurrent Resolution 1614. That report is due on or before February 1, 1996 and we will have the report available for distribution when appropriate.

Thank you for letting me appear here today. If you have any questions, I will be glad to answer them.

Senate Energy & Nat'l Resources
January 17, 1996
Attachment 2

**Estimated Cost of Pollution Cleanup
of
Certain Contamination Sites Transferred to the Kansas Corporation Commission**

Site Name	Estimated Investigatory Cost	Estimated Long Term Cost	Estimated Total Cost	Page Number
Alta Mills II	\$6,000.	\$14,500.	\$20,500.	8
Avey, Gene I	500.	-	\$ 500.	1
Barton County Crude Oil IV	-0-	-	-0-	30
Bogue Area IV	-0-	-	-0-	32
Catron, James II	\$3,000.	\$15,000.	\$18,000	10
Clawson (Mesa) I	PRP	-	-0-	2
Dettweiler II	\$1,000	\$12,500.	\$13,500.	13
Fink, Leon IV	\$1,000	\$19,000.	\$20,000.	33
Gross, Marcellus IV	\$1,000.	unknown	\$1,000.	35
Hollow Nikkel (Burrton) II	\$2,250.	\$75,000.	\$77,250.	15
(Burrton)	\$70,000.	\$3,000,000.	\$3,070,000.	18
Lang, Doris IV	\$500.	PRP	\$500.	37
Otis Creek Basin III	\$152.	unknown	\$152.	28
Richmeier IV	\$500.	\$10,000.	\$10,500.	39
Schraeder Stock Well I	\$1,000.	\$200,000.	\$201,000.	4
Schruben-Rogers IV	\$1,000. per year	unknown	+ \$1,000.	41
Schulte Field	\$15,000.	\$600,000.	\$615,000.	22
South Wichita (Blood Orchard)	\$133,000.	unknown	\$133,000.	25
Wildboy's	\$1,000. per year	unknown	+\$1,000.	6
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	\$236,902.	\$3,946,000.	\$4,182,902.	

DISTRICT I

Gene Avey

Clawson

Schraeder Stock Well

Wildboy's Land & Cattle

Project: *Gene Avey Contamination Site*

Site Location: Legal location is NE/4 of Section 15, Township 18 South, Range 16 West, Rush County.

Impact: Domestic water well.

Site Description: The project area consists of a localized groundwater pollution problem with groundwater movement to the east/southeast. The affected well is located in the alluvial valley of a tributary of the Wet Walnut Creek. The depth to groundwater is 20 feet. The depth to bedrock is 50 feet.

Site History: The contamination is probably due to saltwater originating from the Cheyenne or Cedar Hills via an old poorly plugged oil exploration hole. The house well yielded water containing 580 ppm chlorides.

Status of Project: KDHE drilled test holes which indicated a localized problem. In 1990 KDHE indicated that no additional work or monitoring had been done in the 1980's. Samples were taken in April of 1991 which indicated a continuing mineralization problem, the water tested at 340 ppm chlorides. In October 1993, a water sample contained 252 ppm chlorides. KDHE attributed the decline to be temporary due to substantial local aquifer recharge.

Recommendation for Future Work:

1. Thoroughly examine, evaluate, and process materials when received.
2. Perform site inspection and investigation.
3. Sample house well.
4. Evaluate sample results and determine monitor schedule.

Initial Costs:

\$500 Labor costs to perform site inspection, sample house well and run chloride analysis.

Project: Clawson Contamination Site

Site Location: Legal location is E/2 of Section 33 and all of Section 34, Township 29 South, Range 34 West, Haskell County.

Impact: Public water supply, irrigation well.

Site Description: The site consists of a plume of brine contaminated groundwater moving in an easterly direction. Area is blanketed by 500 feet of Ogallala sand and gravel bedrock underlying the Ogallala is the Dakota/Cheyenne formation. Total of 600 feet of freshwater bearing strata. Pollution occurs along a clay layer 360 feet below the surface (in the upper part of the freshwater aquifer). No domestic wells in the affected area. One irrigation well is polluted to the extent it cannot be used. Depth to groundwater is 300 feet. Depth to bedrock is 635 feet.

Site History: The groundwater contamination was caused by brine leaking from a saltwater disposal well in the SE/4 of 33-29S-34W. The well was drilled in 1961 and was subsequently plugged in May of 1983 when Mesa Petroleum (PRP) discovered that the well had "extensive damage of casing due to corrosion". KDHE received a complaint on September 10, 1983, of an irrigation well which was producing water with a chloride content of 700 ppm.

Status of Project: PRP drilled 10 test holes during the spring 1984 in an attempt to define the extent of the contamination plume. Water sample test results ranged from 22 ppm to 27,400 ppm chloride. Twenty-one test holes, 44 monitor wells, and five recovery wells have been installed to date. Recovery of the contaminated water commenced on August 1, 1988, with one recovery well and increased by four additional recovery wells during June of 1993. Total cumulative recovered water through April 1995: 4,121,172 bbls. Samples collected from the recovery wells in May of 1995 ranged from 990 ppm to 7790 ppm chloride.

Recommendations for Future Work: Site is managed by the PRP which has contracted with a consulting firm. KCC District staff will review all documentation and will schedule a meeting with all parties to discuss the project.

Costs: PRP has expended over \$1.6 million. KCC costs will be reimbursed by PRP up to \$1000 a month.

Project: *Schraeder Contamination Site*

Site Location: Legal location is E/2 of Section 03 and W/2 of Section 02, Township 24 South, Range 24 West, Hodgeman County.

Impact: Groundwater, stockwell.

Site Description: The chloride concentration of the Ogallala formation water supplying a stockwell has been high in chlorides.

Site History: This case was brought to the attention of KDHE in 1972 and was under investigation and a groundwater management program. The pollution was originally related to periodic use of an emergency pit at a disposal well where the brine was not removed properly after each period of use.

Status of Project: In 1982 the 11,200 ppm chloride in the stockwell was higher than the 7600 ppm found in 1972. The Cedar Hills formation brine disposal well was under observation and was to be tested for casing and cementing integrity. KCC's 1988 Program Report notes that repair of the disposal well several years ago may have eliminated the source. Contamination at the stockwell continues to decrease. In July of 1993, the irrigation well tested 480 ppm chloride. Much of the contamination is probably diluted and spread out.

Recommendations for Future Work:

1. KCC district staff will continue to monitor site.
2. Samples will be collected every 6 months and tested for chloride content.
3. Drill additional test holes.
4. Install monitor wells if additional test results warrant.
5. Compile new data and formulate a remediation plan if appropriate.

Initial Costs:

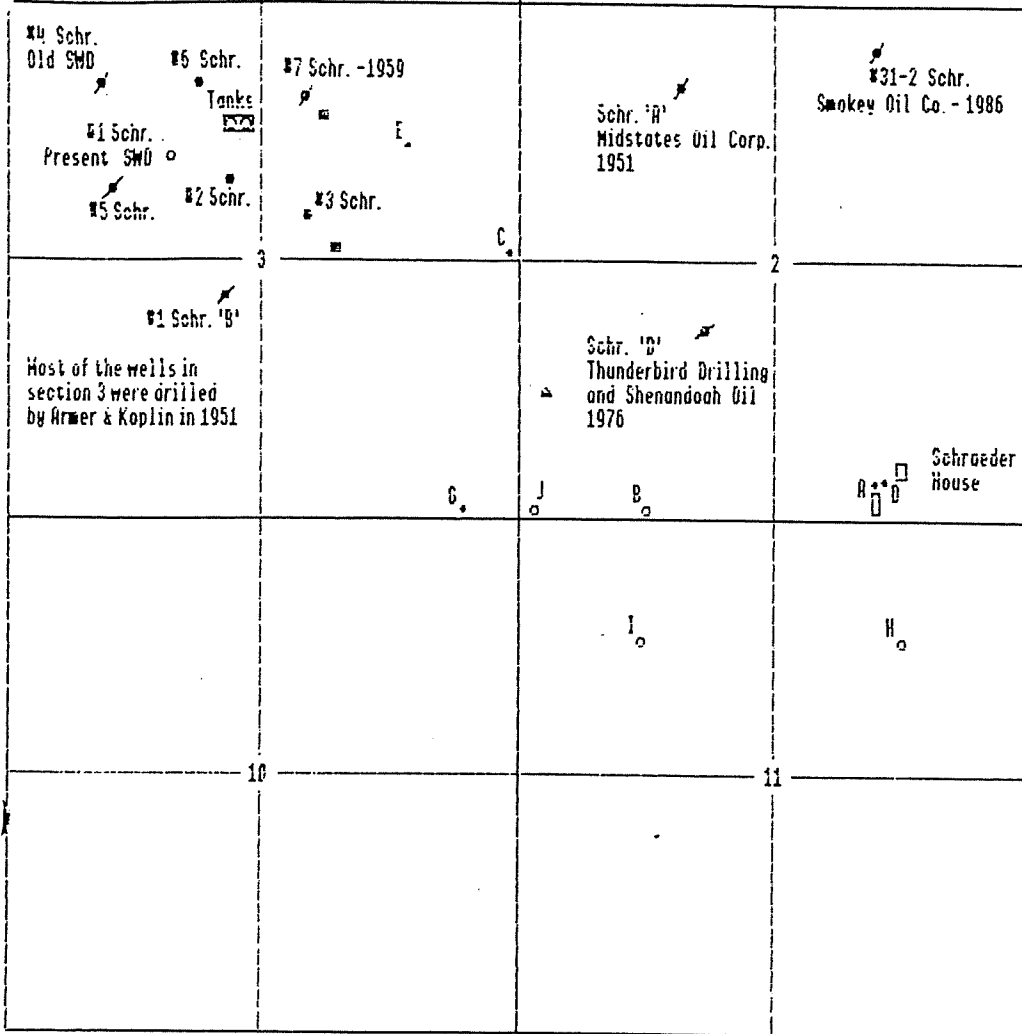
\$1000 Labor costs to perform site inspection and to collect water sample and run chloride analysis.

Long-term Costs:

\$100,000 - \$200,000 Estimated long-term costs to implement a remediation program.

R24w

F. Schraeder Pollution Area -- Well Locations



- Producing Oil Well
- ✕ Plugged Oil Well
- ⊘ Dry Hole
- Disposal Well
- Observation Well
- Irrigation Well
- ⊞ Surface Pond or Pit
- ⊞ Proposed Monitor Well Location

Scale:
1" = _____

Kansas Corporation Commission
Conservation Division

Site: Schrader Contamination Site
 County: Hodgeman
 Datum: Location Map
 Comments: _____

Project: Wildboy's Land & Cattle Contamination Site

Site Location: Legal location is NE/4 of Section 28, Township 33 South, Range 11 West, Barber County.

Impact: Groundwater, surface water, public water supply wells.

Site Description: The site is located within the Medicine Lodge River Valley.

Site History: On April 27, 1981, Supreme Drilling Company encountered an uncontrollable flow of salt water at 220-230 feet while drilling an oil test for Wildboy's Land and Cattle Company. Initial flow was 10,000 barrel of brine per hour, with a chloride concentration exceeding 100,000 ppm. Four days later the flow had decreased to less than 100 barrels per hour, most of which was feeding back into the groundwater aquifer which bottoms out at 32-37 feet below surface.

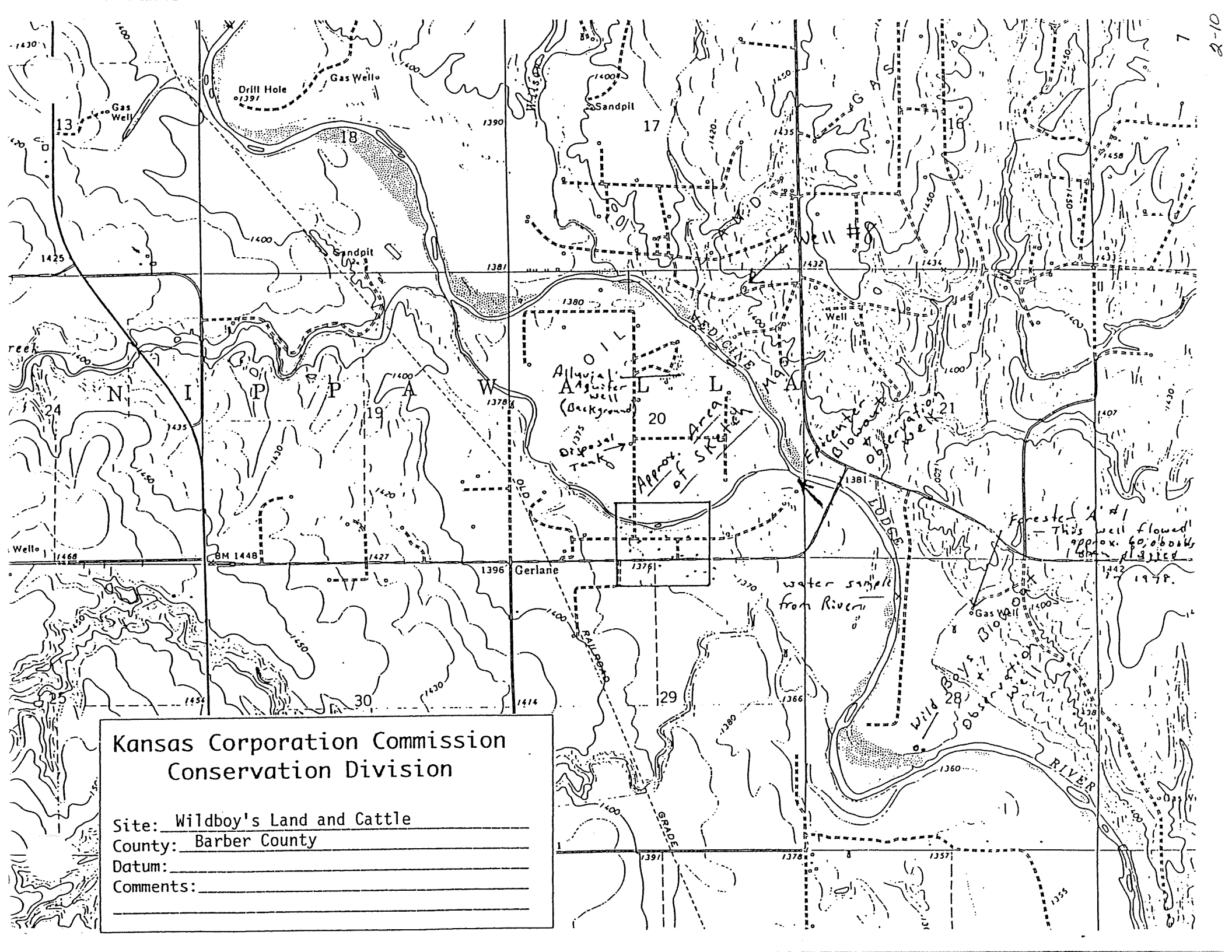
Status of Project: A monitor well was completed to 38 feet on August 15, 1981. The initial concentration was 84,000 ppm chlorides. The chloride concentration in the 38' well declined to 2500 ppm during the last several years but indicates there is still some saltwater upwelling from the "lost hole" (1989). Chloride levels in three of the observation wells remained relatively the same as 1991, 400-900 ppm. (1992). The observation well chloride concentration at the blowout site have declined from 5,150 ppm in 1988 to 1,550 ppm in September 1992. Wells were sampled in April of 1994 and showed a decrease of approximately 50 ppm.

Recommendations for Future Work:

1. KCC district staff will continue to monitor site.
2. Samples will be collected every 6 months and tested for chloride content.

Yearly Costs:

\$1000 Labor costs to perform site inspection and to collect water sample and run chloride analysis.



**Kansas Corporation Commission
Conservation Division**

Site: Wildboy's Land and Cattle

County: Barber County

Datum: _____

Comments: _____

DISTRICT II

Alta Mills Area

James Catron

Dettweiler

Hollow Nickkel Field (Burrton Task Force)

Schulte Field

South Wichita (Chloride) Blood

Project: Alta Mills Contamination Site

Site Location: The site is located in northwestern Harvey County approximately 14 miles northwest of the city of Newton. The site includes parts of Section 2, Township 22 South, Range 2 West and possibly portions of adjoining acreage.

Impact: Specific information as to site impact is unknown, but is believed to involve primarily rural domestic water supply.

Site Description: No specific information is available as to the size of the area effected by the contamination. The general area of the site is underlain by the Equus Beds aquifer with depth to water at approximately 35 feet and total saturated thickness within the range of 100 to 150 feet.

Site History: The contamination at this site is believed to be the result of "evaporation" pond use and improper use of emergency pits in the general area of the Alta Mills and Harmac Southeast Fields. On going sources of the contamination were reportedly removed during 1984 and 1985.

Status of the Project: The file and record on this site is very sparse. Some water quality monitoring occurred in 1989. Levels of contamination and degree of impact to water resources is unknown.

Recommendations for Future Work: District staff's plan for future activities for this site include:

1. Perform complete site inspection and file review.
2. Sample any available monitoring or private wells with in the area to determine scope of contamination.

Initial Costs:

Phase I: Site inspection and file review.

\$1000 Staff time and some water analysis.

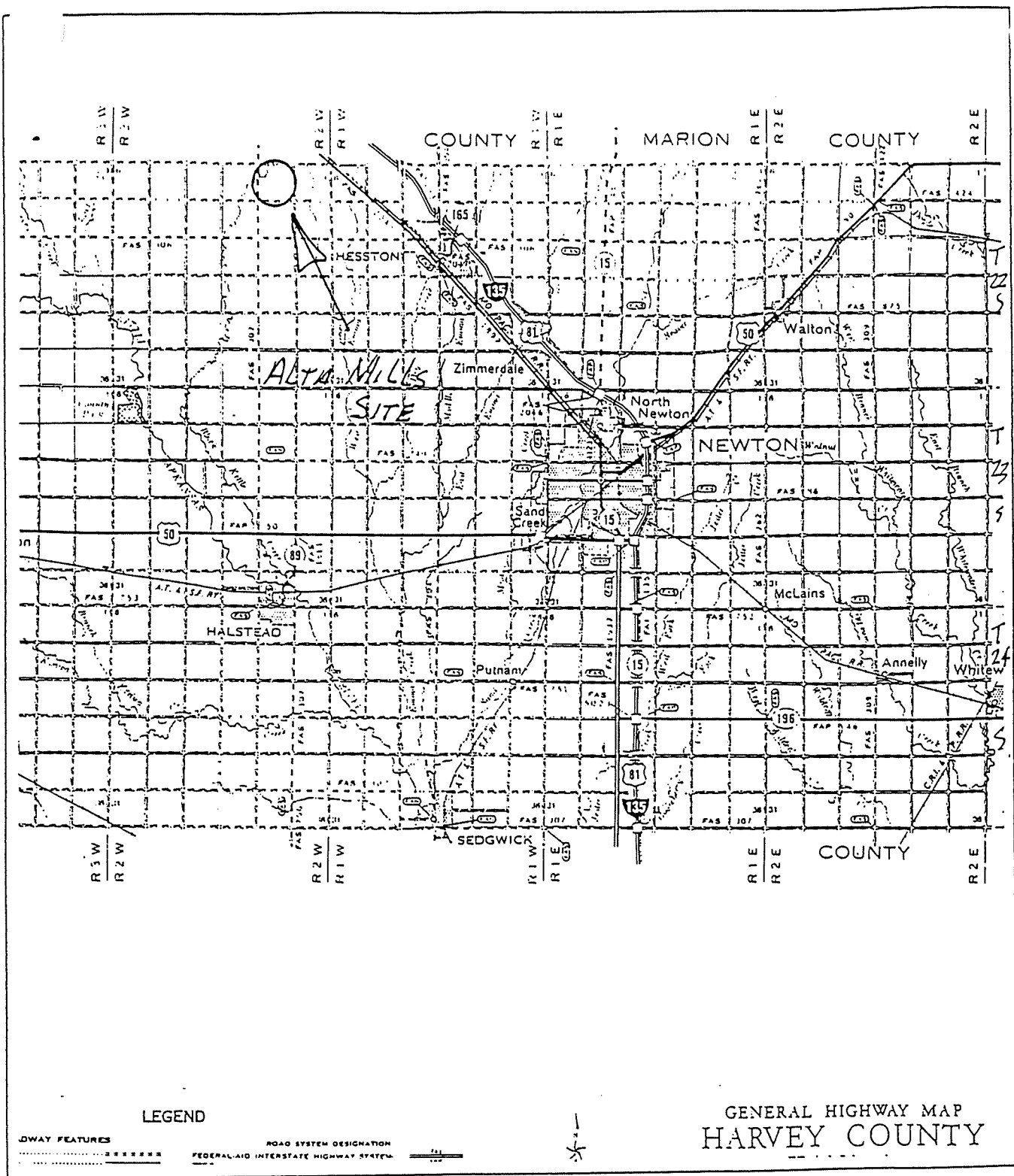
\$5000 Initial water quality monitory from existing wells, staff time and water analysis.

\$6000 Total Estimated Cost of Initial Investigation.

Long Term Costs:

Assuming adequate access to existing wells indicates no severe or extensive contamination this site would be placed on a 5 year monitoring program for further evaluation.

Estimated Costs: \$14,500



Scale:
1" = 4 miles

Kansas Corporation Commission
Conservation Division

Site: ALTA MILLS SITE

County: Harvey

Datum: Location Map

Comments: _____

Project: James Catron Contamination Site

Site Location: The site is located in north central Sedgwick County approximately 1.5 miles north of the city of Wichita and one mile south of city of Valley Center. The site includes parts of Section 7, Township 26 South, Range 1 East and Sections 1 and 12 of Township 26 South, Range 1 West.

Impact: Residential wells used for drinking and residential irrigation in a suburban setting.

Site Description: The project area covers approximately 400 acres with maximum chloride values in the range of 260 ppm to 1950 ppm. Water quality data suggests an area of contamination approximately 1 mile in length and .5 mile in width. Groundwater flow is generally to the southeast. Most wells in the area are 35 to 45 feet in depth and are completed in alluvium or terrace deposits. The wells are utilized for domestic supply and residential irrigation. Most residences are equipped with water softeners and / or reverse osmosis treatment systems. Maximum thickness of the aquifer is approximately 65 feet. Naturally occurring levels of sulfates and iron appear to be aggravating water quality problems in the area.

Site History: The brine contamination at this site is the result of past brine disposal practices associated with the early production in the Valley Center Oil Field. The use of "evaporation" ponds in the sandy alluvial soil is considered to be the major contributor to the current contamination problem. A secondary source may have been pressure injection operations which were active in the early 1960's. A field survey and limited test drilling effort were conducted by KDHE in the early 1980's. This effort found no active or ongoing sources for the contamination. In addition to the brine contamination some complaints relative to hydrocarbon contamination have been received within the general area of this site. No verifiable sources for this contamination have been established to date.

Status of the Project: Following the initial complaint and KDHE's investigatory program the site was placed on a long term monitoring program with only limited sample collection. An initial report by KDHE personnel indicated that the site hydrology is not conducive to the placement of an effective withdrawal system. Residential reverse osmosis treatment systems were recommended as the most effective way of dealing with the contamination. During the past two years the KCC has done some limited water sampling in the area and has reviewed well plugging information in the W/2 Section 7, Township 26 South, Range 1 East to determine if any remedial plugging operations were warranted.

Recommendations for Future Work: District staff's plan for future activities for this site include:

1. Establishment of a water quality monitoring network at existing water wells within the contaminated area.
2. Placement of two down gradient monitoring wells at the leading edge of the plume to monitor plume movement beyond current boundaries.
3. Continue investigation into sources for hydrocarbon contamination.

**James Catron Site
Sedgwick County**

Initial Costs:

Phase I: Establish monitoring network at existing wells.

\$1000 Staff time and sample analysis

Phase II: Complete installation of monitoring wells.

\$2000 Staff time, equipment and sample analysis.

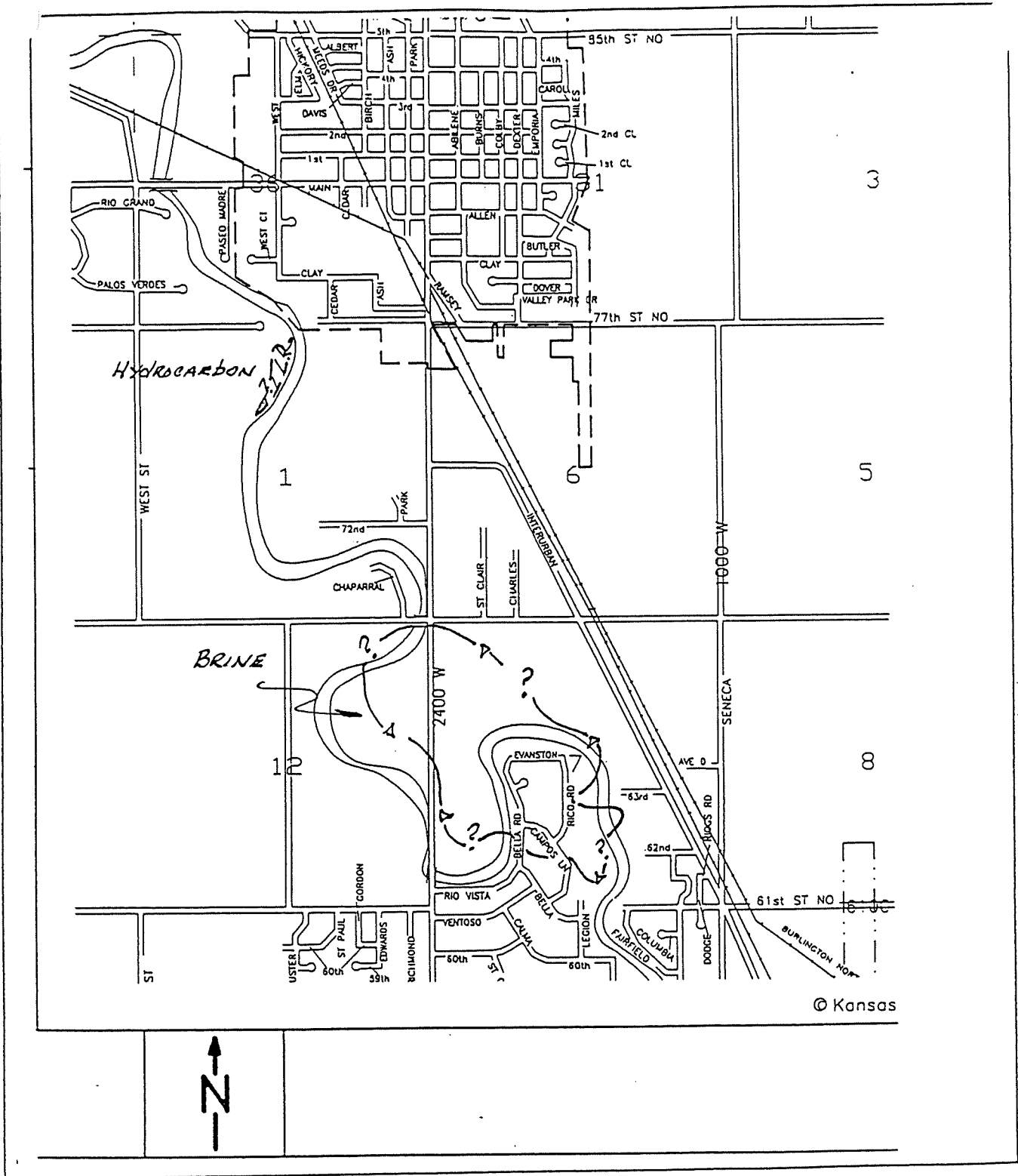
\$3000Total Estimated Cost of Initial Investigation

Long Term Costs:

Following completion of the initial investigatory work plan the site would be placed on a long term monitoring program. Sampling and site monitoring would continue for a minimum of ten years.

Costs to be incurred during this period would include staff time and water quality analysis.

Estimated Costs: \$15,000



Scale:
1" = 1/2 Mile

Kansas Corporation Commission
Conservation Division

Site: JAMES CATRON (RIO VISTA)
 County: Sedgwick (400 Acres)
 Datum: Approx. Plume Boundry
 Comments: Brine contamination.
 Maximum contamination levels 500-1900 PPM

Project: Dettweiler Contamination Site

Site Location: The site is located in northwestern Harvey County approximately nine miles northwest of the city of Newton. The site includes parts of Section 2, Township 23 South, Range 3 West.

Impact: Rural residential and possibly irrigation.

Site Description: From the available information it would appear that the site covers less than 160 acres. The maximum chloride levels found at the site during the initial investigation were in the order of 700 to 1700 ppm. Depth to groundwater is estimated at 35 feet.

Site History: The original complaint filed with KDHE and subsequent investigation indicates that the contamination was the result of improper use of an emergency pit at a lease facility. The operator of the property was required to drill two water quality monitoring wells between the emergency pit and the effected domestic well. The domestic well had experienced chloride levels as high as 1200 ppm. In addition to the monitoring wells it appears that the operator was required to replace some lease tankage.

Status of the Project: The file and record on this site is very sparse. The last record of sampling is approximately 1978. The Dettweiler lease is no longer active and all oil wells have been plugged.

Recommendations for Future Work: District staff's plan for future activities for this site includes:

1. Perform complete site inspection and file review. Determine if monitoring and domestic wells are still in place and accessible for sampling.
2. Sample wells for water quality.

Initial Costs:

Phase I: Site inspection, water sampling, and file review.

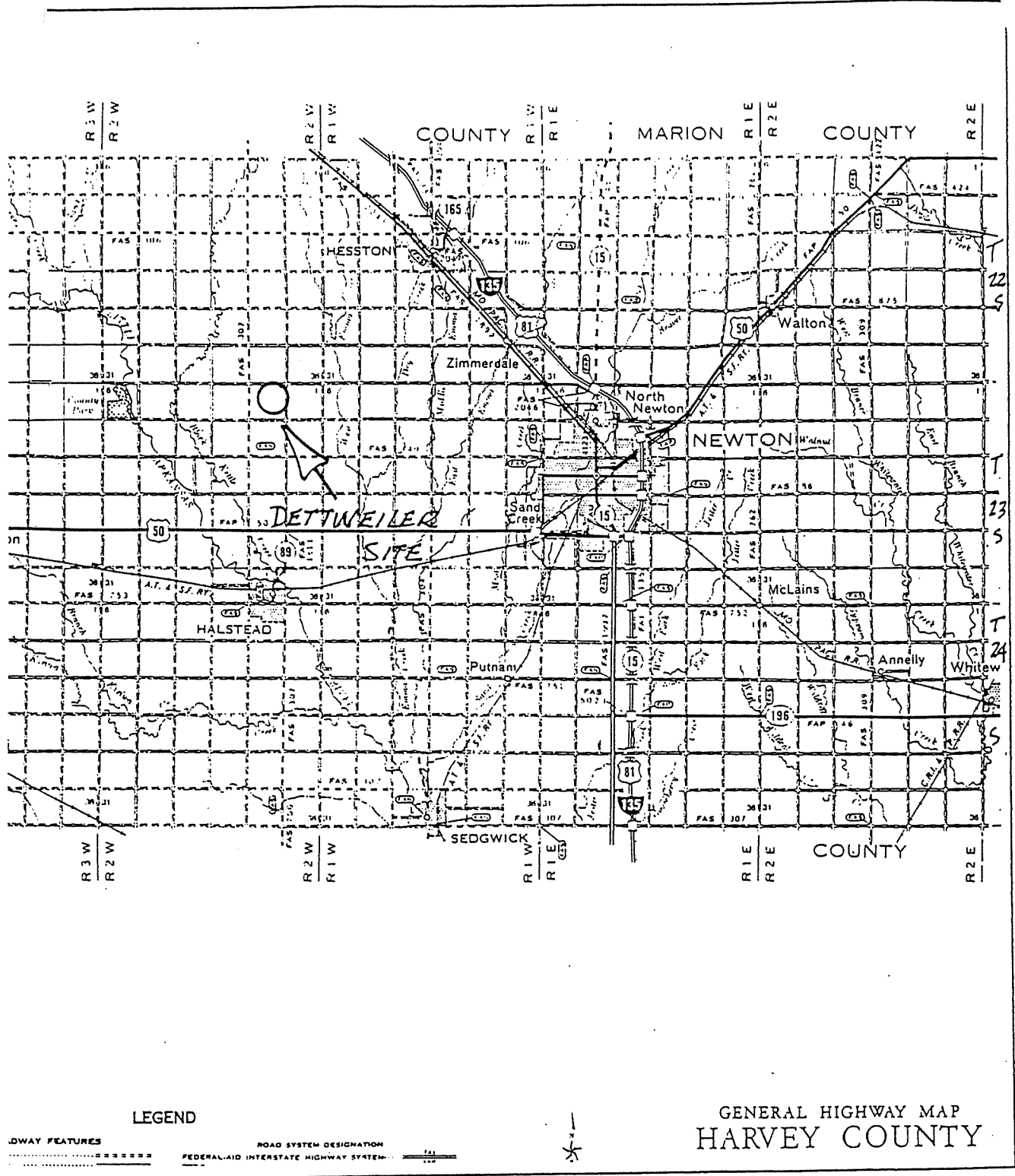
\$1000 Staff time and water analysis.

\$1000 Total Estimated Cost of Initial Investigation

Long Term Costs:

Assuming monitoring well or wells are still in place, sample wells and place project on 5 year monitoring program for further evaluation. If no wells are accessible for sampling then a minimum of three investigatory wells will be needed to determine status of project.

Estimated Costs: \$12,500



Scale: 1" = 4 miles

Kansas Corporation Commission
 Conservation Division

Site: DETTWEILER SITE
 County: Harvey (140 Acres ?)
 Datum: Location Map
 Comments: Impact is to a rural residential well.

Project: Hollow-Nikkel Contamination Site

Site Location: The site is located in northwestern Harvey County approximately eighteen miles northwest of the city of Newton . The site includes parts of Sections 7, 8, 17, 18, 19, 20, 29, and 30 in Township 22 South, Range 3 West.

Impact: Potential impact is to irrigation and rural residential wells.

Site Description: The project area covers approximately 700 acres with maximum chloride values in the range of 6000 to 7000 ppm. The contaminate plume is aligned in a north to south configuration and is approximately .5 mile wide and 2 miles in length. Plume morphology appears to be controlled by a bedrock channel which has an alignment similar to that of the plume. Contamination mapped to date is primarily confined to the lower zone of the Equus Beds aquifer which consists of unconsolidated sand and gravel deposits and lies at a depth of 200 to 250 feet.

Site History: The brine contamination at this site is the result of past brine disposal practices used in the Hollow-Nikkel Oil Field which is closely associated with the site. These practices included the use of "evaporation" ponds and shallow injection zones which were quite common to the area from the late 1930's through the late 1950's. The resulting contamination has become vertically segregated with time to its current position. A groundwater monitoring system installed in the 1980's identified the plume and delineated the hydrogeology.

Status of the Project: A pilot project for remediation of the site was undertaken in 1989. The project was funded by KDHE and managed by Equus Beds Groundwater management District No. 2. The project operated from December 1989 to April of 1993. During the course of operations the Chloride concentration of the withdrawal water ranged from approximately 5000 ppm to 2000 ppm. Within the past two years some interest has been shown by a local firm as to the possibility of using the contaminated water in enhanced oil recovery operations . Project economics and a depressed oil market have stalled these privatization efforts. The KCC has done some preliminary bid summary work to delineate the construction cost for a recovered water transport line.

Recommendations for Future Work: District staff's plan for future activities for this site include:

1. Complete transport line survey work.
2. Renew efforts to gain commitment for access to enhanced oil recovery project. Low disposal cost and beneficial use of recovered water would greatly reduce overall cost of site remediation.

Initial Costs:

Phase I: Complete bid summary and cost estimates for transport line

\$750 Staff time and legal services for development of disposal agreement.

Phase II: Complete line survey and obtain necessary permits.

\$1500 Staff field survey work.

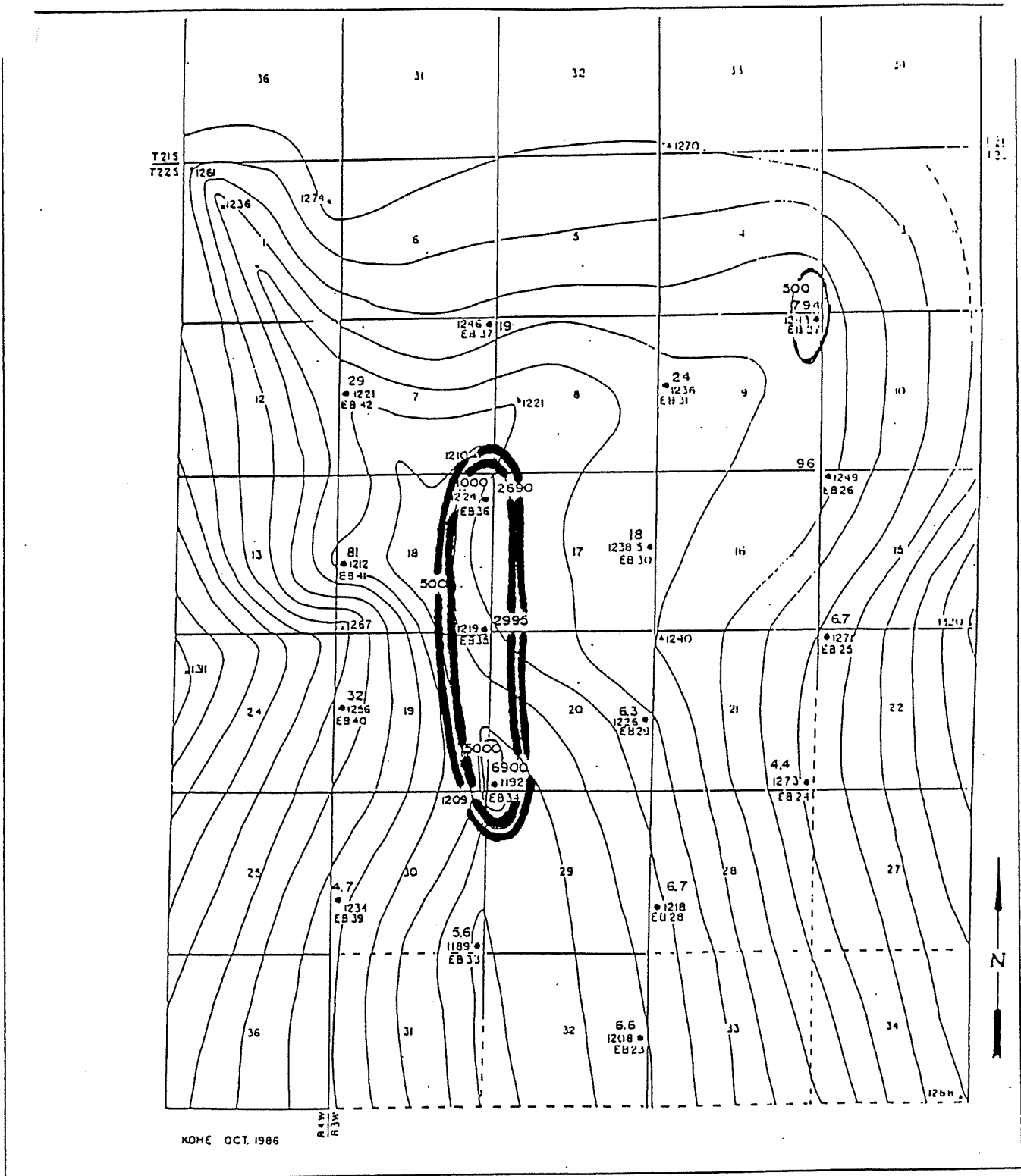
\$2250 Total Estimated Cost of Initial Investigation

**Hollow-Nikkel Site
Harvey County**

Long Term Costs:

Assuming access to enhanced oil recovery operations can be secured, a five year remediation project would be placed in operation at a withdrawal rate of approximately three to four orders of magnitude above the previous system. Because of the unique hydrogeology of the site a one point withdrawal system should be sufficient.

Estimated Costs: \$75,000



KDHE OCT. 1986

R13W
R14W

Scale:
1" = 1 Mile

Kansas Corporation Commission Conservation Division

Site: HOLLOW-NIKKEL SITE
 County: Harvey (700 Acres)
 Datum: Bedrock Surface & Chloride Plume
 Comments: Area extent of Chloride Plume
for Equus Beds "C" Zone

Project: Burrton Contamination Site

Site Location: The site is located in western Harvey County and eastern Reno County approximately 18 miles west of the city of Newton and 12 miles east of the city of Hutchinson. The site includes acreage in Townships 23 and 24 South, Ranges 3 and 4 West.

Impact: Current impact is to domestic and irrigation wells with significant potential impact to public water supplies (City of Wichita Well Field).

Site Description: Total maximum area effected by the contamination covers approximately 25 to 30 square miles. The contaminate plume is aligned in a northeast to southwest configuration parallel with the associated producing areas. A water quality sampling network maintained by the local groundwater management district indicates oil field brine contamination of all three major zones within the Equus Beds Aquifer. Depth to groundwater ranges from 10 to 35 feet with saturated thicknesses in the order of 150 to 250 feet.

Site History: The brine contamination at this site is the result of past disposal and production practices used in the Burrton Oil Field. Contaminate plume morphology is closely aligned with the pattern of "evaporation ponds" utilized in the early production history of the area. Additional contamination may have also resulted from the use of a shallow injection zone for the disposal of produced brines. The resulting contamination from these sources and other surface sources (spills, line leaks, and poorly maintained production facilities) has become vertically segregated within the aquifer. Current maximum chloride values for the shallow zone stand at approximately 1900 ppm, while the intermediate zone exhibits maximum values within the range of 2200 to 4100 ppm.

Following a hearing in 1982 before the Chief Engineer of the State of Kansas (DWR), a task force was created to study part of the area of contamination. The task force consisted of representatives from KDHE, GWMD #2, KCC, the Kansas Water Office, the Kansas Water Authority, the KGS, and the Kansas Independent Oil & Gas Association. The task force developed a number of recommendations in an initial report generated in February of 1984. During the next ten years the majority of these recommendations were acted on by agencies or organizations associated with the site. During the early phases of this work, oil and gas regulatory efforts and this site were the under the joint control of KDHE and KCC. In addition, GMD #2 has actively sought out alternate funding for additional studies relative to overall water quality within the area of contamination. The Bureau of Reclamation and the USGS have been involved in some of these water quality investigatory / management studies. In June of 1992 the Kansas Corporation Commission issued an Order (Docket No. 178,904-C) creating an Equus Beds Oil and Gas Brine Committee. The principle charge of this committee is to gather together data concerning brine contamination to the Equus Beds Aquifer and develop methods to manage or remediate such contamination. The committee members include representatives of the KCC, KGS, KDHE, DWR, KWO, GMD #2, KIOGA, and the Kansas Water Authority.

Status of the Project: The most recent investigatory / management study for the area was completed in 1993 under the direction of the Bureau of Reclamation in conjunction with the USGS and several state and local agencies. This study examines water management strategies and attempts to determine how aquifer use affects the distribution of existing chloride

**Burrton Contamination Site
Harvey County**

contamination . The computer modeling and sensitivity analysis included in this study suggests that the installation of intercept wells within the pathway of the oil field brine would be effective in minimizing the impact on the Wichita well field. The degree of effectiveness of this strategy would be dependent on the position of the wells and the volumes of contaminated water removed.

In July of 1995 the KCC completed eight monitoring wells at three locations in the contaminated area. In addition the KCC committed to funding water quality analysis for the 1995 sampling period (previously water analysis was funded by KDHE).

Recommendations for Future Work: District staff's plan for future activities for this site include:

1. Complete evaluation of existing investigatory and hydrogeologic data.
2. Develop a list of potentially responsible parties and establish commitment for participation in remediation activities.
3. Contract engineering services for design and development of withdrawal and disposal system.

Initial Costs:

Phase I: Complete review and evaluation of existing data.

\$5000 Staff time

\$5000 Water quality analysis (1995 & 1996 sampling)

\$5000 Installation of additional monitoring wells

Phase II: Perform records check to determine past and present ownership of production operations in the source area of the contamination.

\$5000 Staff time

Phase III: Contract design and development for remediation project.

\$50,000 Engineering services * (Variable with size and complexity of the project)

\$70,000 Estimated Total Initial Costs

Long Term Costs:

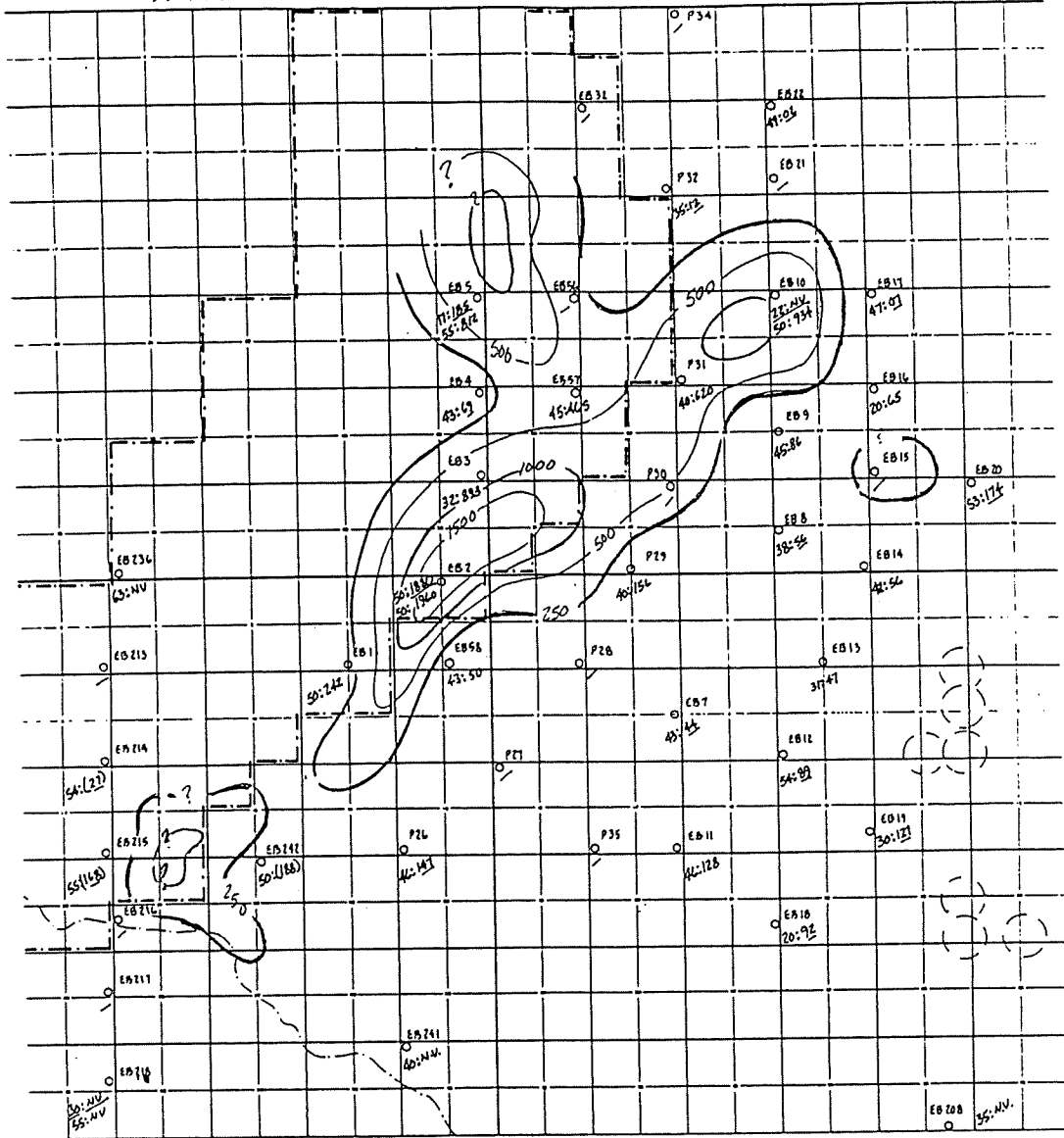
Long term costs for remediation of this site would include construction of withdrawal wells, a relatively lengthy distribution system, and a disposal system capable of handling large volumes of brine contaminated water. The size, operating capacity, and length of service for the system would ultimately depend on the final hydrogeological and engineering assessment. Additional considerations would include the presence of concurrent management strategies implemented through alternative funding sources.

Assuming a mid level rate of withdrawal (3,200 acre-ft/year) from a total of approximately 20 withdrawal wells with disposal into 4 or 5 high volume disposal wells would, even over a relatively short time frame, yield a very significant cost allocation.

Estimated Long Term Costs: \$2,750,000 to \$3,000,000 (?)

R4W

R3W



T
23
S

T
24
S

Legend

- EB 15 Monitoring Site
- - - Oil Field
- Well Field (City of Wichita)

Scale: 1" = 1 MILE

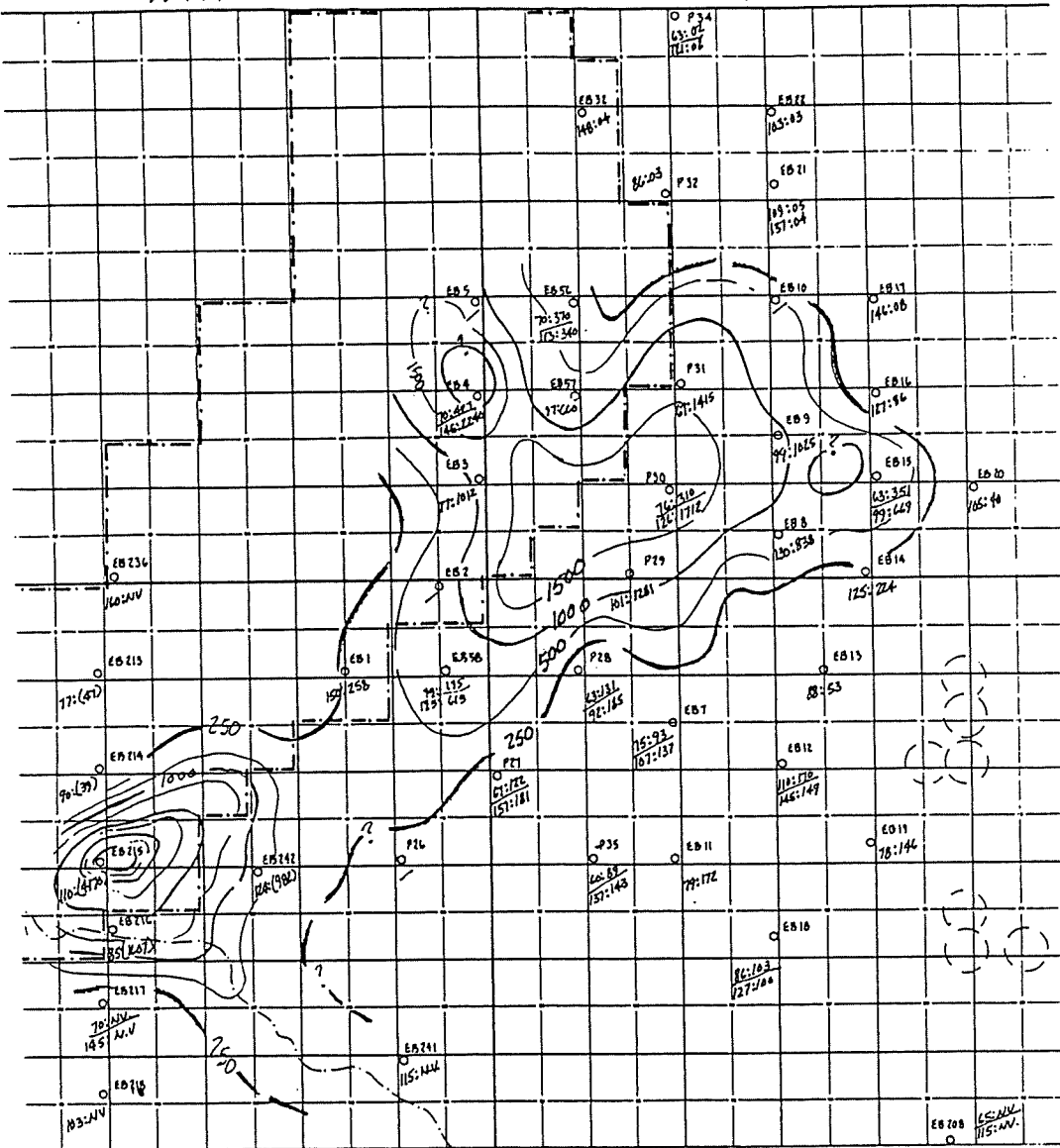
Scale:
1" = 1/2 Mile

**Kansas Corporation Commission
Conservation Division**

Site: BURTON CONTAMINATION SITE
 County: Harvey & Reno
 Datum: Chloride Plume - Shallow Zone
 Comments: Based on 1992, 1993, & 1995
Water Quality Data

R4W

R3W



T
23
S

T
24
S

LEGEND

- _{EB 15} MONITORING SITE
- - - OIL FIELD
- () WELL FIELD (City of Wichita)

Scale: 1" = 1 MILE

Scale:
1" = 1/2 Mile

**Kansas Corporation Commission
Conservation Division**

Site: BURRTON CONTAMINATION SITE
 County: Harvey & Reno
 Datum: Chloride Plume, Intermediate Zone
 Comments: Based on 1992, 1993 & 1995
Water Quality Data.

Project: *Schulte Brine Contamination Site*

Site Location: The site is located north and east of the city of Schulte in Sedgwick County. Legal location is E/2 of Sections 7 and 17 and the W/2 of Sections 8 and 18, all in Township 28 South, Range 1 West.

Impact: Public supply wells and domestic water wells.

Site Description: The project area consists of a groundwater plume contaminated by oilfield brine moving in an easterly direction. The site is situated between Wichita Mid-Continent Airport to the northeast and the unincorporated town of Schulte to the west. The land use is a combination of light industrial, agricultural and residential.

The depth of the effected water wells in the area is approximately 50 feet. The depth to bedrock is approximately 150 ft. The aquifer consists of unconsolidated sand, clay and gravel deposits.

Site History: The brine contamination is apparently a result of salt water evaporation pits associated with the production of oil and gas from the Schulte Field in the late 1940's and early 1950's. KDHE was initially contacted by a landowner in 1952 reporting contamination in two farmstead wells.

Status of Project: KDHE, using EDIF and SWP funds, retained the services of Test Environmental Services and Technologies (TEST) to do a study of the area in 1989. TEST subsequently performed an extensive conductivity survey and drilling program to define the plume. The firm drilled 16 wells (casing 8 wells) and took 515 conductivity readings. The highest chloride value encountered was 19,963 parts per million. Using this data the contractor submitted a report containing maps, cross sections and basic hydrologic parameters. In this report the firm recommended additional drilling to better define the plume and another round of water well sampling of private wells (the last such sampling event occurred in the early 1970's).

Recommendations for Future Work: After a cursory examination of the received materials the following is the District staff's plan for future activities:

1. Thoroughly examine, evaluate, and process received materials.
2. Locate and evaluate condition of monitor wells. Repair monitor wells. Perform site inspections and investigations.
3. Sample available private water wells, existing monitor wells and public water supply wells. Use this current data and update chloride and plume maps.
4. Drill a minimum of five additional wells to further define eastern and southeastern extent of plume.
5. Assimilate new data and formulate a remediation plan that would incorporate the use of up to five withdrawal wells, surface storage tankage, a transport line and an existing Class II disposal well.

Schulte Brine Contamination Site

Initial Costs:

PHASE I-Preliminary Investigation

\$1,000 Labor costs to further examine case and conduct initial field survey.

PHASE II- Sampling and Drilling of Additional Wells

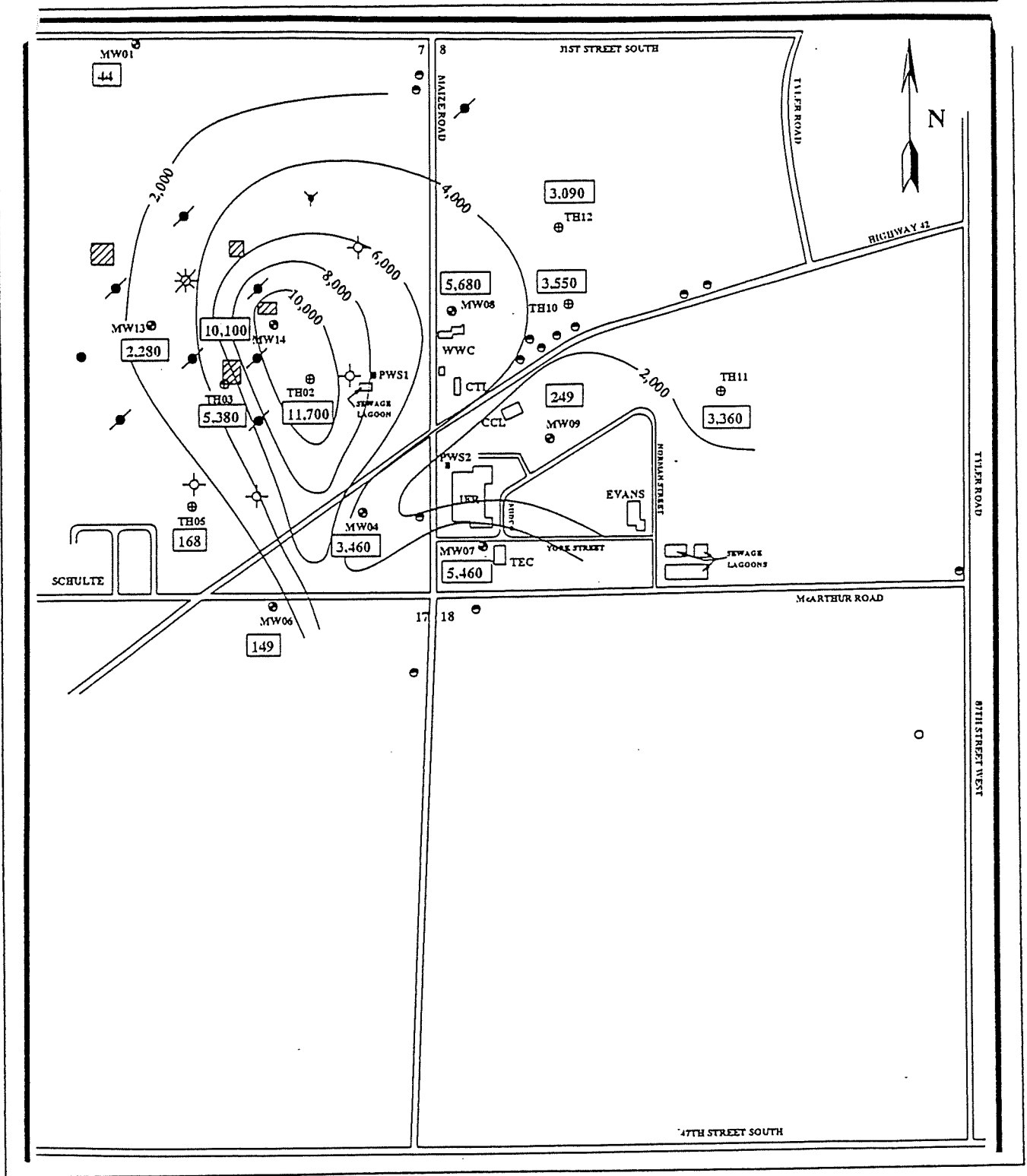
\$14,000 Estimated expenditures of sampling monitor, private and public supply water wells. Cost of internally drilling and equipping 5 monitor wells. Expense of drafting and updating maps, cross-sections and file. Labor and overhead costs of designing a remediation plan.

\$15,000 Total Estimated Cost for Initial Investigation

Long-term Costs:

PHASE III- Remediating the Aquifer

\$600,000 Estimated long-term cost for drilling and completing 5 withdrawal wells, installing surface equipment and transportation lines and disposal fees to the operator of the Class II disposal well. The life of the project is thought to be ten years with the wells continuously withdrawing water at the rate of 25 gallons per minute.



Scale:
 1" = 1200 ft.
 Source: KDHE, 1994

Kansas Corporation Commission
 Conservation Division

Site: SCHULTE SITE
 County: Sedgwick (960 Acres)
 Datum: Chloride Plume Map
 Comments: Impact is to Domestic and Public Water Supplies.

Project: *South Wichita Chloride Study*

Site Location: South Wichita, near the intersection of the Kansas Turnpike and the Wichita Valley Center Floodway. Centered roughly near the intersection of 63rd St. South and Broadway, in south Wichita. Legal location: Sections 28, 29, 31, 32, 33, and 34 of Township 28 South, Range 1 East and Sections 3 and 4 of Township 29 South, Range 1 East.

Impact: Municipal, irrigation, and domestic water uses.

Site Description: The project area consists of a groundwater plume contaminated by oilfield brine moving in an southeasterly direction. The site is situated in an area that is residential, agricultural, commercial and light industrial. The surface geology is composed of unconsolidated sand and silt. Underlying this zone are sands and gravels that form the aquifer. Historically, the aquifer has delivered large quantities of high quality drinking water. The depth of most of the domestic water wells in the area range from 30 to 50 feet.

Site History: The saltwater plume is a result of an oilfield enhanced recovery project over pressuring deep producing zones. The over pressured zone leaked brine up into the shallow fresh water zone by traveling up poorly plugged and abandon oil wells. A minor amount of the brine plume is thought to be caused by saltwater spills, leaky saltwater lines and poorly maintained emergency pits at oil production facilities. The first report of contaminated fresh water occurred in 1969. After a preliminary file review, the highest chloride value found was 2375 ppm. This sample was taken in 1988 from a well in the SE corner of 33-28-1E.

Status of Project: In 1984, KDHE formed the "South Wichita Chloride Study Task Force" to solicit input from other agencies, local governments, and the business community. A result of this Task Force was to retain an outside consulting firm to drill select monitor wells, gather additional data and produce a generalized report recommending future work to be done. In the meanwhile, the pressure maintenance operations of the oilfield were discontinued and the oilfield wells subsequently plugged. The Task Force has since disbanded leaving no future recommendations or actions to be taken.

Recommendations for Future Work: After a cursory examination of the received materials the following is the District Staff's plan for future activities.

1. Thoroughly examine, evaluate, and process received materials.
2. Perform a site inspection of project area, locating monitor wells and other sampling sources.
3. Sample available private wells, existing monitor wells and public supply wells.
4. Assimilate new data and incorporate with historical data to produce updated plume maps and cross-sections.
5. Retain an outside consulting firm to create a hydrological model of the aquifer and down gradient environment.
6. Use the hydrological model to study impact of down gradient public supply and domestic water wells.
7. Formulate a strategic plan to remediate aquifer if warranted.

South Wichita Chloride Study

Initial Costs:

PHASE I-Preliminary Investigation

\$1,000 Labor costs to further examine case and conduct initial field survey.

PHASE II- Sampling Existing Wells and Posting New Data

\$5,000 Sampling and testing of monitor wells, private wells and public supply wells.

\$2,000 Drafting and labor costs of updating maps using new data.

\$8,000 Total Estimated Initial Costs

Long-term Costs:

PHASE III- Hydrological Modeling

\$125,000 Retain an outside consulting firm to produce a computer based hydrological model of the aquifer. This model should accurately calculate plume movement, size and impact on down gradient wells.

PHASE IV- Implementation of Remediation

Estimated Costs Unknown

DISTRICT III

Otis Creek Basin

PROJECT: Otis Creek Basin Project

SITE LOCATION: SE 4-T25s-R9e, Greenwood County

IMPACT: Groundwater, surface water, soil

SITE DESCRIPTION: The original site consists of a small drainage which originates in section 4 and flows south into section 9. This is an ephemeral drainage. The affected area of this original site was very localized in size. The site/complaint eventually expanded to other suspected problems which occurred in about a 50 square mile area, according to KDHE.

SITE HISTORY: This project stems from an original complaint in section 9 from a landowner. Elevated chloride levels were observed in a small drainage in section 9. The KCC was contacted about the problem and conducted the initial investigation. The source of the high chloride water was traced to an injection well in the southeast quarter of section 4. The well was found to have a hole in the casing just below ground level. This well was immediately repaired. The chloride level in the drainage quickly declined after the source was stopped. An inventory and check of the remaining wells in section 4 did not find any other problems. The chloride level found in the drainage was about 3,000 mg/l. Numerous other complaints by the same landowner were brought to the attention of the KDHE. The last samples were collected in 1993 by Bill Thornton of the KDHE. These samples covered nearly every creek and tributary in the concerned area. The highest chloride concentration found during this sampling was 168 mg/l. From this data it appears that there are no ongoing problems.

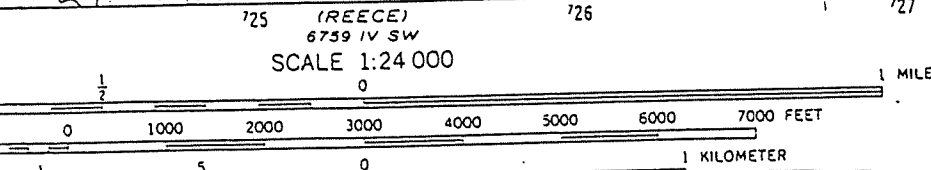
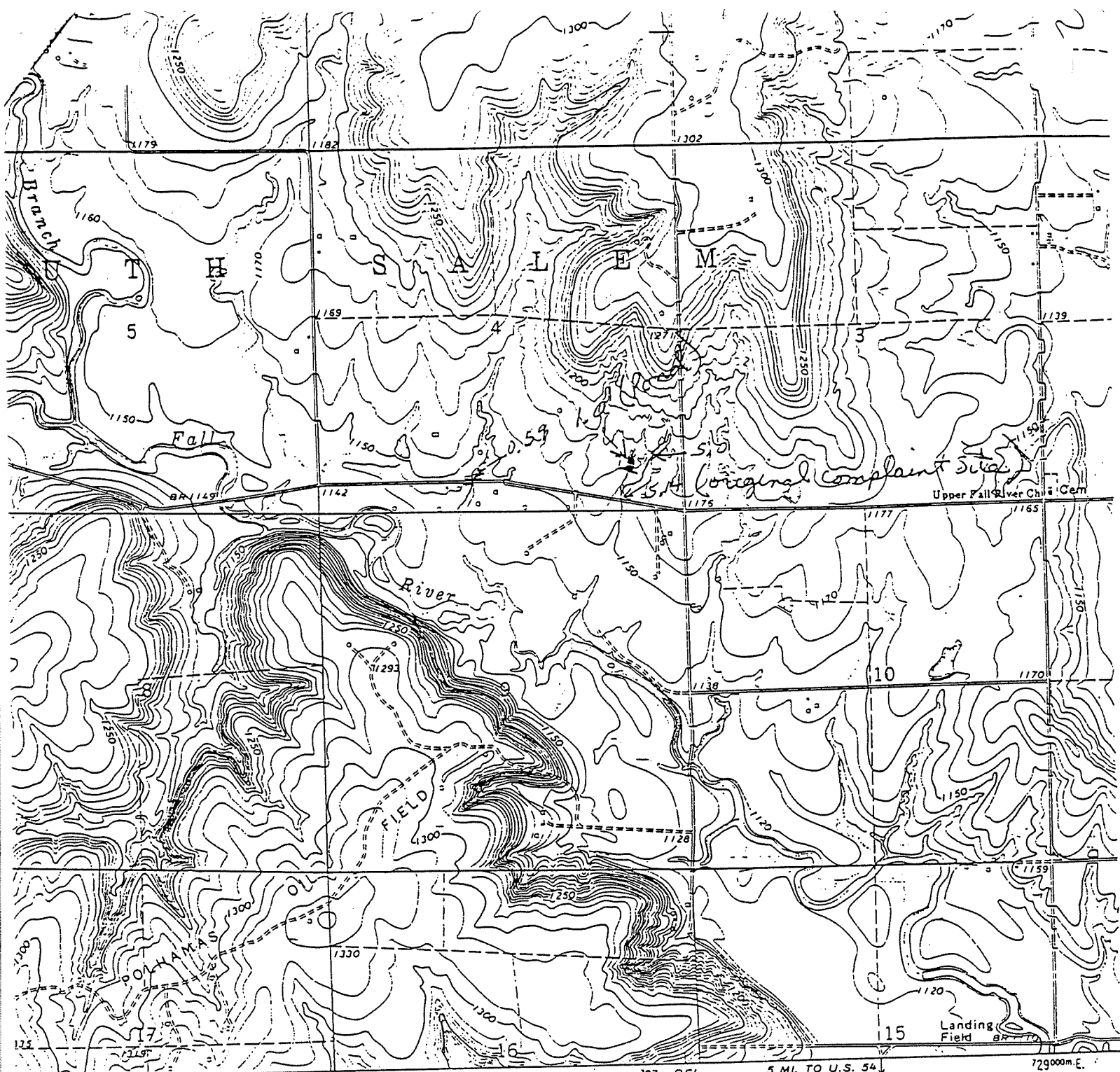
STATUS OF THE PROJECT: The original complaint on this site has been corrected. The other complaints in this area do not appear to be of concern based on the latest sampling.

RECOMMENDATIONS: Sample the locations which had elevated chloride levels on a semi-annual basis to ensure that there are no further or ongoing problems.

Cost: 3 hrs. travel
3 hours to collect and analyze samples
6 hours labor @ \$19.00 per hour = \$114.00

180 miles @ .21 per mile = \$37.80

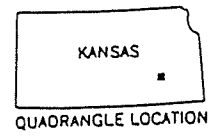
Total = **\$151.80**



(REECE)
6759 IV SW
SCALE 1:24 000

Kansas Corporation Commission
Conservation Division

Site: Otis Creek Basin Project
 County: Greenwood
 Datum: _____
 Comments: _____



Primary high surface
 Secondary high surface
 Int

THIS MAP
 BY THE
 U.S. GEOLOGICAL SURVEY
 AND BY THE
 KANSAS CORPORATION COMMISSION
 UNDER DESCENDING

DISTRICT IV

Barton County Crude Oil

Bogue Area

Leon Fink

Marcellus Gross

Doris Lang

Richmeier

Schruben-Rogers

Project: Barton County Crude Oil Site

Site Location: The site is located in southeastern Barton County approximately two miles north of the Arkansas River in a sensitive groundwater area. The site is located in Section 35, Township 19 South, Range 11 West.

Impact: Potential impact to the ground water.

Site Description: No evidence of surface contamination

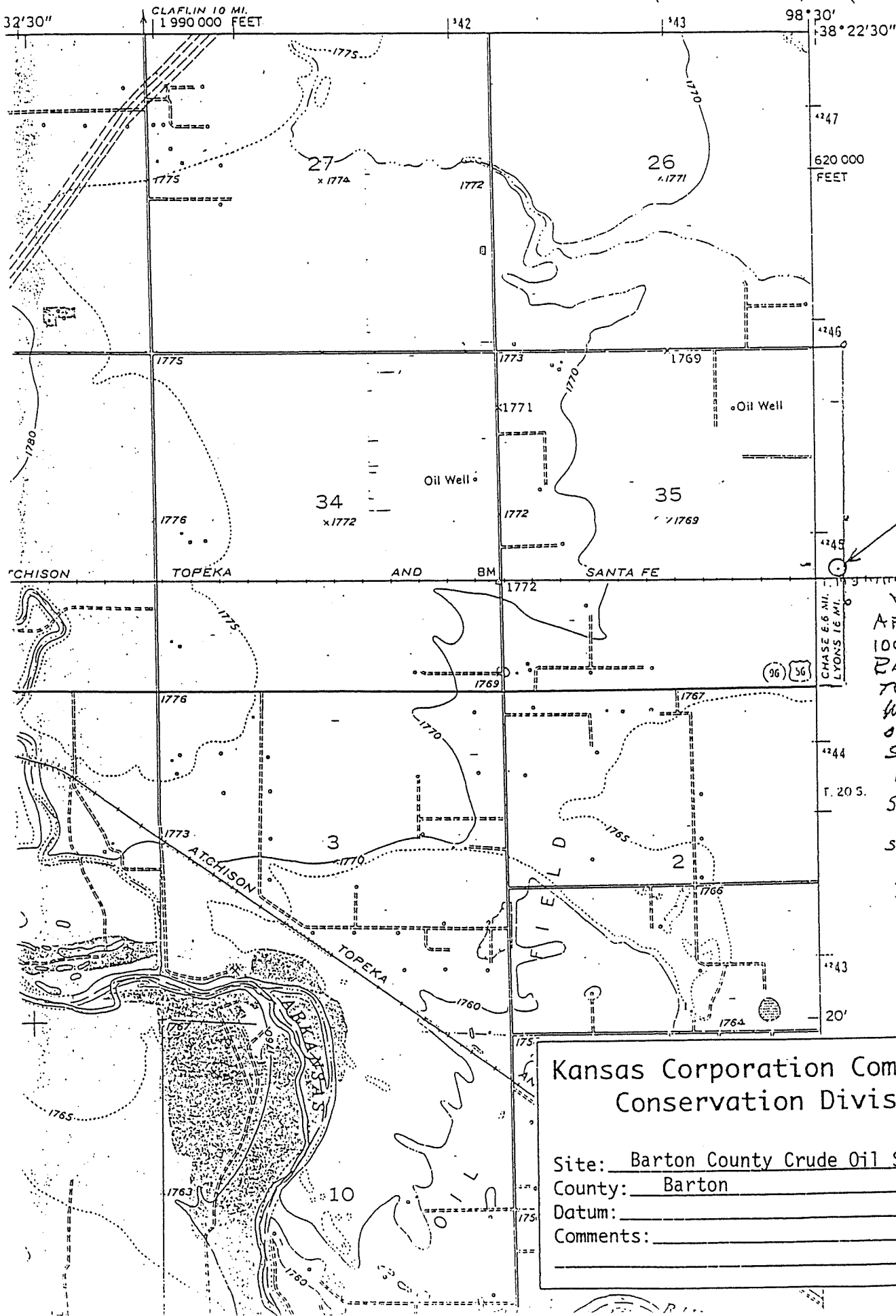
Site History: While drilling a test bore on April 2, 1993 a well servicing company encountered crude-saturated sand from 16 to 20 feet. Bore hole was plugged. KDHE requested information from several crude oil transmission pipeline operators in the area. Also noted oil production in general area. Texaco Trading & Transportation Inc. (TTTI) is in the area and company has had several spills in this area. TTTI collected a sample of spilled material visible at the surface and concluded that based on the high salinity of the sample it was related to oil lease production and not pipeline crude. KDHE regulated site to a low priority status (1/95).

Status of the Project: Upon review of the site file and subsequent conversations between KCC and KDHE field staff, KCC has been informed of an additional sampling event which showed low chlorides which is indicative of a pipeline crude spill and not a production related spill. On October 5, 1995 KCC field staff inspected the site and found that the closest production to be at least one half mile away. There was no surface scarring or damage.

Recommendations for Future Work: Staff has determined that the site should not have been transferred to the KCC and should be transferred back to KDHE. (10/95).

ELLINWOOD QUADRANGLE
KANSAS
7.5 MINUTE SERIES (TOPOGRAPHIC)

8300 IV NW
(CHASE NW)



TEST BORING
1-93

LOCATED
APPROXIMATELY
100' NORTH OF
RAIL ROAD
TRAIL ON
WEST SHOULDER
OF THE
SECTION LINE
ROAD.
SE, NE, SE
OF
SECTION 35
T 19S - R 11W
BARTON CO., KS

Kansas Corporation Commission
Conservation Division

Site: Barton County Crude Oil Site
County: Barton
Datum: _____
Comments: _____

Project: Bogue Area

Site Location: Town of Bogue in the eastern part of Graham County. The site is located in the Northeast quarter of Section 17, Township 8 South, Range 21 West.

Site Description: City water well in the town of Bogue.

Site History: A report of investigation dated September 10, 1973, from KDHE describes the situation as a gassy odor and taste from a newly drilled city well. Further, in a recheck of the complaint, a report dated October 10, 1973, states that the source of the fuel spill was from the Bogue Grain Company gasoline tanks located upgradient from the newly drilled well. The 880 ppm chlorides reported in KDHE's site status sheet on the Bogue Area is most likely in reference to the Talbot domestic well (KCC site) which is located in Section 34, Township 8 South, Range 21 West, over 4 1/2 miles from Bogue, which is not related to the Bogue Area contamination site.

Status of the Project: This site should not have been transferred to the KCC as it involves a refined product.

Recommendations for Future Work: This site should be transferred back to KDHE.
(10/95)

Project: *Leon Fink Contamination Site*

Site Location: Legal location is NE/4 of Section 27, Township 08 South, Range 22 West, Graham County.

Impact: Stock well.

Site Description: Contamination of shallow ephemeral water and Codell water well by oilfield brine. Saltwater had moved through Niabrara chalk and probably into Codell aquifer. The Codell aquifer is encountered at 300 feet.

Site History: Source of contamination has not been determined. One disposal well was MIT'd and passed. Old disposal well plugged in November 1984. Tests in 1979-1980 on old disposal well indicated no upperhole leakage. The Codell sandstone in this area carries mineralized water and may be part of the problem.

Status of Project: KCC has monitored site. Water samples were collected in January of 1995 and on October 16, 1995. The chloride concentrations in these samples were 1900 ppm and 2000 ppm respectively, a slight decrease in chloride content from June of 1990 of 2150 ppm.

Recommendations for Future Work:

1. KCC district staff will continue to monitor site.
2. Samples will be collected every 6 months and tested for chloride content.

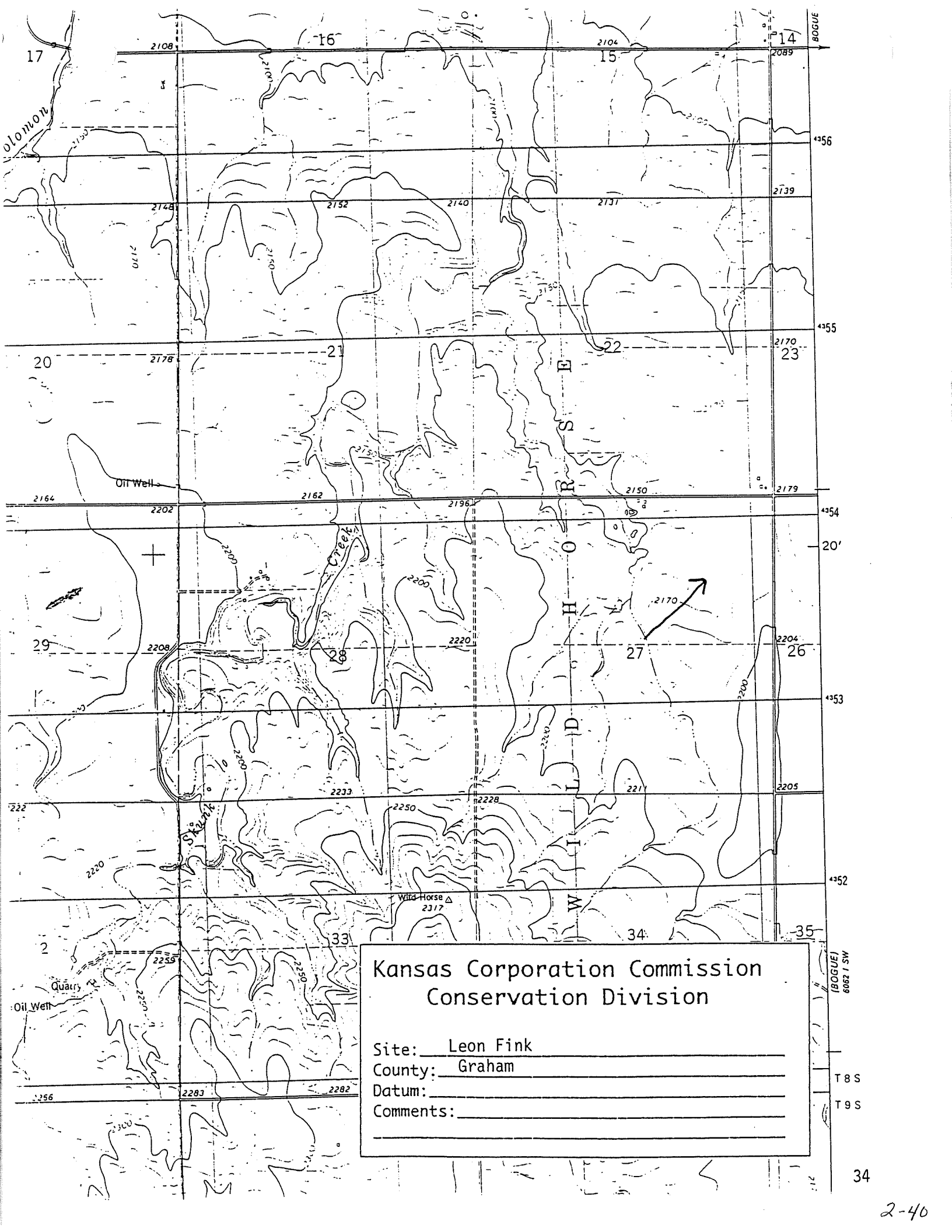
Initial Costs:

\$1000 Labor costs to perform site inspection and to collect water sample and run chloride analysis.

Long Term Costs:

\$7000 Estimated cost for drilling monitor wells and test holes.

\$12000 Estimated cost for remediation of contaminated aquifer.



Kansas Corporation Commission
Conservation Division

Site: Leon Fink
 County: Graham
 Datum: _____
 Comments: _____

(BOGUE)
6082 1 SW

T 8 S
T 9 S

Project: *Marcellus Gross Contamination Site*

Site Location: Legal location is NE/4 of Section 18, Township 15 South, Range 17 West, Ellis County.

Impact: Groundwater.

Site Description: Contamination of shallow alluvial aquifer. The water is moving on the contact zone between soil and clay. The Greenhorn limestone outcrops in the area. The land use in the area is primarily pasture land.

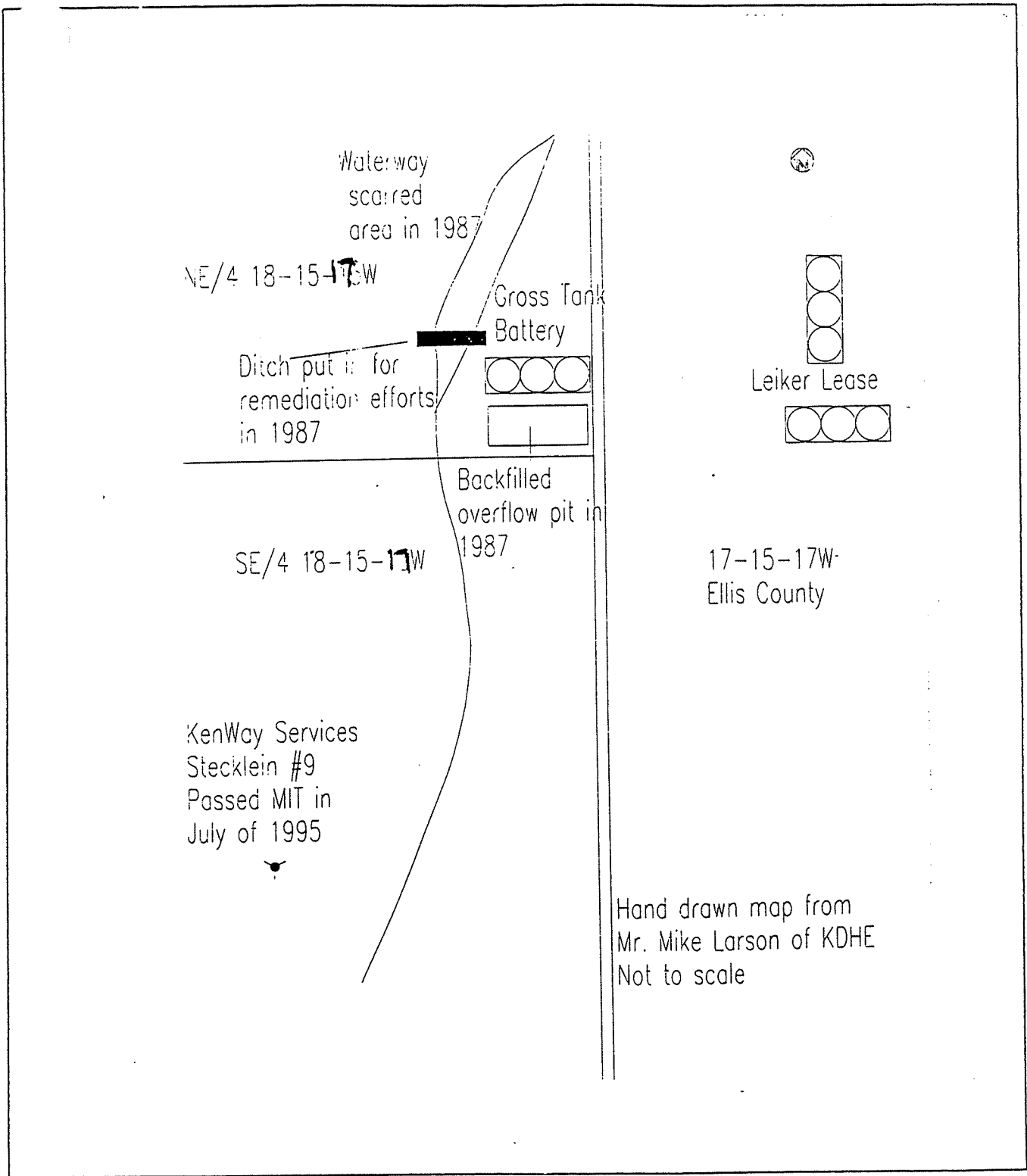
Site History: Source of contamination from past use of an emergency pit which was eliminated by KDHE years ago. A surface salt scar which was a result of the emergency pit overflows initiated the investigation. Water containing 2,450 ppm chloride was encountered at a depth of 3 feet. Believed to be a stationary body of brackish water tied up in the soil and clay. The area has been flushed out.

Status of Project: KDHE attempted to drill test holes, but was unable to arrange locations with landowner. No action has been taken since 1990 (according to fact sheet).

Recommendations for Future Work:

1. Perform site inspection and investigation.
2. Collect water samples from drainage area.
3. Evaluate sample results and determine site status.
4. Possibly close out site if test results indicate chlorides have been flushed from the drainage.

Costs: \$1000 Labor costs to perform site inspection and to collect water samples and run chloride analysis.



Scale:
1" = _____

**Kansas Corporation Commission
Conservation Division**

Site: Marcellus Gross Contamination Site

County: Ellis

Datum: _____

Comments: _____

Project: *Doris Lang Contamination Site*

Site Location: Legal location is SE/4 of Section 04, Township 14 South, Range 17 West, Ellis County.

Impact: Groundwater, domestic water well.

Site Description: Brine contamination of shallow aquifer. The use of drill pits over a very shallow sand have probably caused a faster than normal salt water percolation into this aquifer.

Site History: Source of contamination was from the disposal of high chloride water into the drilling pits in the process of testing the Pete #3 SWDW for production (SE/NW/SE). The Lange water wells test indicated a chloride content of 125 ppm in 1978 to 625 ppm in April 1982.

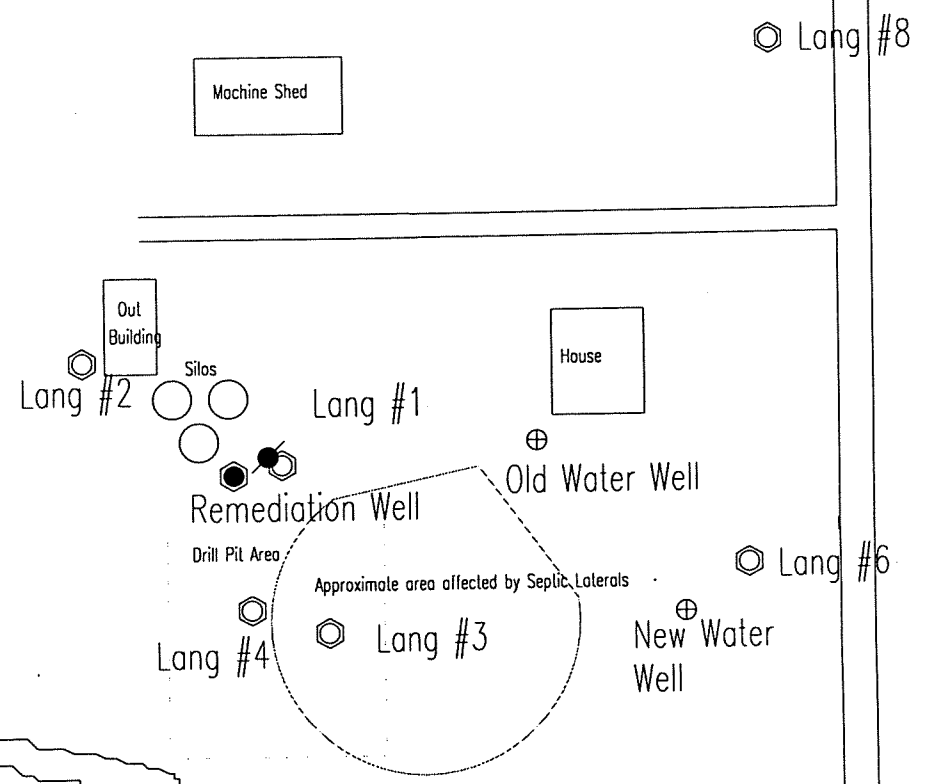
Status of Project: Eight monitor wells and one recovery well were installed in 1991 by the PRP to begin remediation of the area. The remediation well pumps at a rate of 2 to 3 gpm and has recovered 3.5 million gallons of water to date since November of 1992. Landowner drilled a new water well and the chlorides went from 400 ppm to 700 ppm in January 1995. The old water well tested 1800 ppm chloride in January 1995. These chloride results indicate movement in the plume to the northeast. Samples collected on October 10, 1995: The new water well tested 400 ppm and the old water well tested 650 ppm chloride. A decrease of 300 ppm and 1150 ppm respectively. The monitor wells ranged in chloride concentration from 450 ppm to 1100 ppm. Withdrawal well currently shut down.

Recommendations for Future Work:

1. Perform site inspections.
2. Collect water samples from monitor and recovery wells quarterly.
3. Evaluate sample results to insure stabilization or decrease in chlorides.

Costs: \$500 Labor costs to perform site inspection and to collect water samples and run chloride analysis.

PRP Expenditure: Approximately \$41,000



Doris Lang	
SE/4 Sec. 4, Twn. 14S., Rng. 17W Ellis County	
Contaminant: Chlorides Source: Oil Field Production Basin: Smokey Hill / Saline	Relative elevation is based on NW corner of concrete around the old water well and is set at 100'.
<ul style="list-style-type: none"> ● Plugged Oil Well ⊗ Remediation Well ⊕ Monitor Well ⊕ Water Well 	Scale: 1 inch = 100 feet
	February 7, 1994
Kansas Corporation Commission	Drawn by: Bruce D. Basye

Lang #5

Lang #7

Project: Richmeier Contamination Site

Site Location: Legal location is S/2 of Section 16, Township 08 South, Range 25 West, Graham County.

Impact: Groundwater, surface water, irrigation wells.

Site Description: The contamination plume, polluted by oilfield brine, is moving to the east-northeast, toward the town of Morland. The land use in the area is agricultural. Depth to groundwater is 30 feet. Depth to bedrock is 90 feet.

Site History: The contamination was caused by a leaking SWD well. The SWD well was plugged in 1981. The Richmeier, Paxson and Toll irrigation wells were contaminated. In 1981, the Richmeier well tested at 6,050 ppm chloride, down to 250 ppm in 1988; Paxson tested 3,725 ppm and 100 ppm chloride during the same period.

Status of Project: Remediation program pumped out Paxson well. Continued monitoring because of migration of plume. Toll well increased in chloride from 200 ppm to 1,500 ppm during the irrigation season of 1990, this well is located down gradient of the original contamination site. KCC drilled six monitor wells during 1991 around the Toll irrigation well. Chloride levels up to 1500 ppm in one monitor well down gradient of the irrigation well. Levels in all wells continued to fall and the monitor wells were plugged. Two additional monitor wells were drilled south of the high chloride level monitor well in October of 1992 by KCC. Chloride levels continue to decrease. On December 28, 1994, the two new wells tested at 300 ppm & 350 ppm chloride. On October 9, 1995, these wells tested at 100 ppm & 350 ppm chloride.

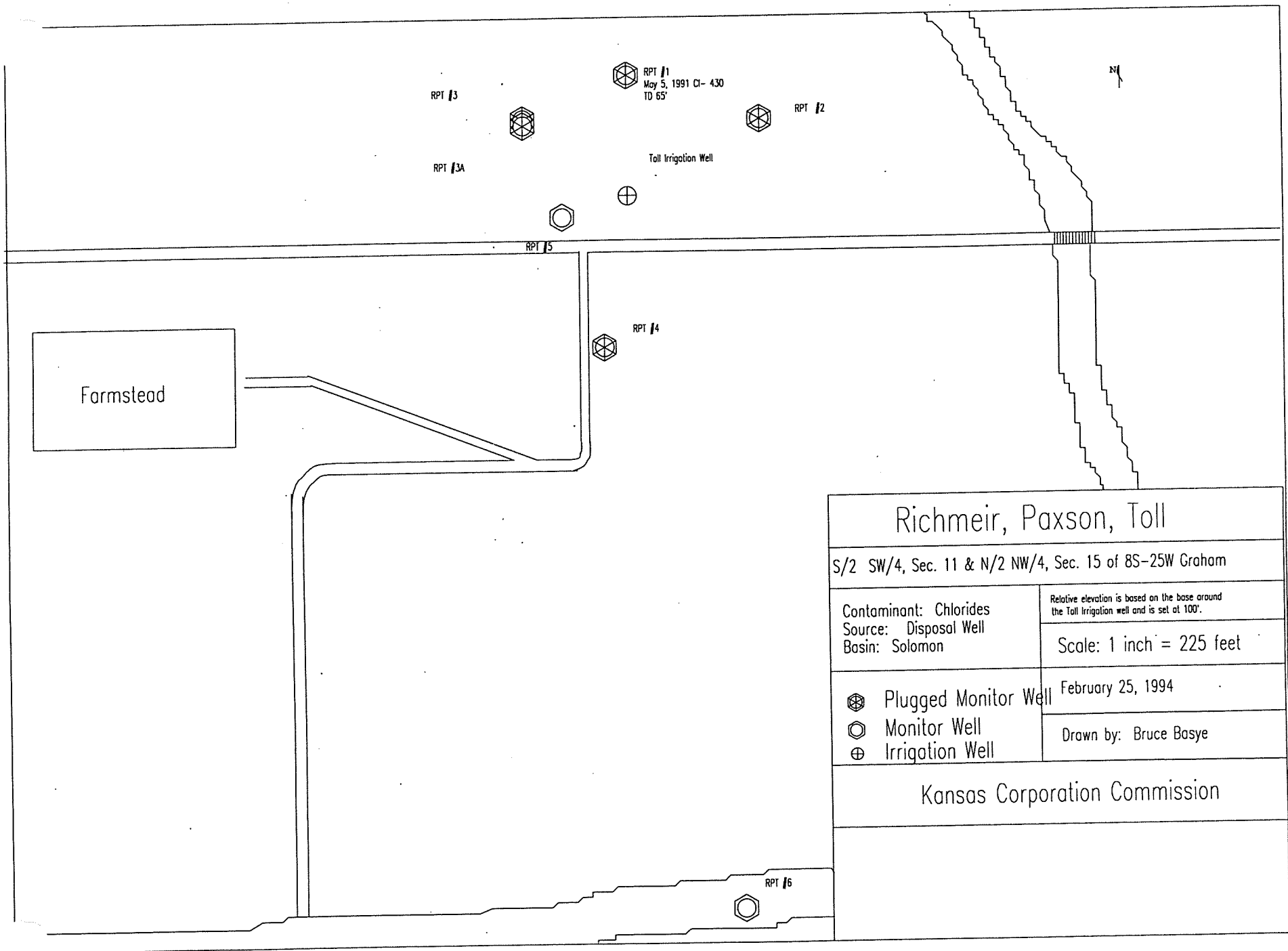
Recommendations for Future Work:

1. KCC district staff will continue to monitor site.
2. Samples will be collected every 6 months and tested for chloride content.
3. Review of sample results, if results indicate stabilization or decrease of chloride concentration, then possible closure of site within 12 months.

Costs:

\$500 Labor costs to perform site inspection and to collect water sample and run chloride analysis.

Estimated KCC expenditure to date is \$10,000



Farmstead

RPT #1
May 5, 1991 Cl- 430
TD 65'

RPT #3

RPT #2

RPT #3A

Toll Irrigation Well

RPT #5

RPT #4

RPT #6

Richmeir, Paxson, Toll

S/2 SW/4, Sec. 11 & N/2 NW/4, Sec. 15 of 8S-25W Graham

Contaminant: Chlorides
Source: Disposal Well
Basin: Solomon

Relative elevation is based on the base around
the Toll Irrigation well and is set at 100'.

Scale: 1 inch = 225 feet

⊗ Plugged Monitor Well

February 25, 1994

○ Monitor Well

Drawn by: Bruce Basye

⊕ Irrigation Well

Kansas Corporation Commission

Project: *Schruben Contamination Site*

Site Location: Legal location is SW/4 of Section 18, Township 07 South, Range 17 West, Rooks County.

Impact: Groundwater, domestic water well.

Site Description: The groundwater was contaminated by oilfield brine. The site is located within terrace alluvium of the South Fork of the Solomon River. Land use in the area is agricultural and oil field production. Area wells consist of domestic water wells.

Site History: The source of the groundwater contamination is believed to be from saltwater spills at the tank battery. Original chloride concentration was 8800 ppm in 1986.

Status of Project: KDHE drilled monitor wells in an effort to delineate the problem. The area had nearly reached background levels for chlorides, 400 ppm in 1991. A sample taken in January of 1992 showed levels up to 4000 ppm chloride. Investigation found that spill contained within the bentonite lined pits surrounding the tank battery area had occurred. The spills were the source of contamination. Continued sampling throughout the spring and summer of 1992 showed a steady decrease of chlorides, from 1700 ppm on March 23rd to 975 ppm on August 11, 1992. Samples taken on November 1, 1994, and October 12, 1995, tested at 750 ppm and 250 ppm chloride, respectively.

Recommendations for Future Work:

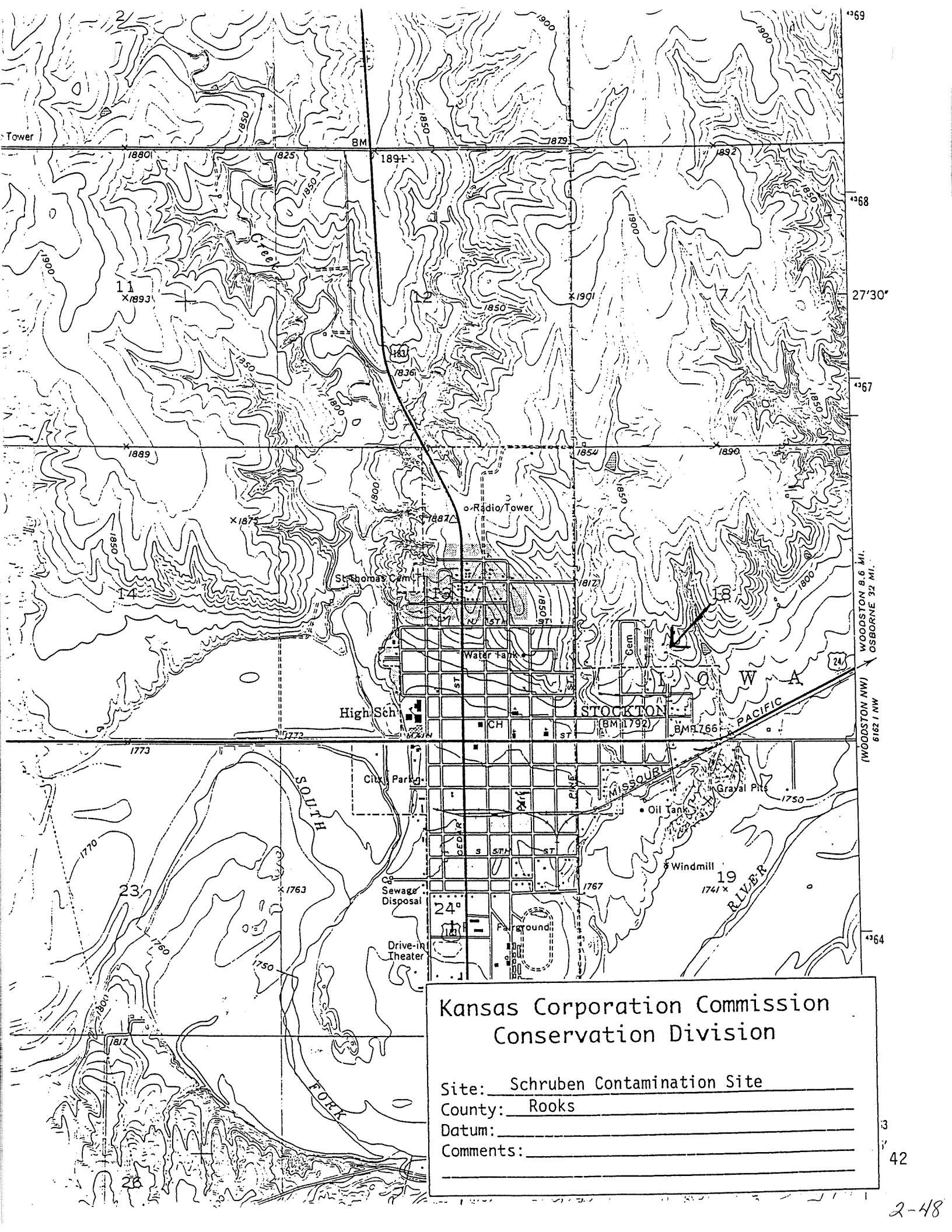
1. KCC district staff will continue to monitor site.
2. Samples will be collected every 6 months and tested for chloride content.

Yearly Costs:

\$1000 Labor costs to perform site inspection and to collect water sample and run chloride analysis.

KCC Expenditures to date:

Approximately \$2,000 - KCC has been monitoring site.



Kansas Corporation Commission
Conservation Division

Site: Schruben Contamination Site
 County: Rooks
 Datum: _____
 Comments: _____

**Site Assessment
Brine / Hydrocarbon Contamination**

A Technical / Hydrogeologic Approach

Kansas Corporation Commission
Conservation Division

The accurate definition of the nature, source, extent and impact of contamination to the water resources of the State of Kansas by oil and gas exploration and production activities at a given site is critical to the design and implementation of effective remedial measures. The initial site study will involve researching historical data and performing a detailed site inspection. This information combined with more sophisticated hydrogeologic investigations will form the basis of what remedial efforts will be necessary.

- **Nature:** The physical character of the contamination and the media contaminated will ultimately control the remediation options available for use in developing a site work plan. (Brine contamination will require different strategies than hydrocarbon contamination; and contamination to groundwaters must be approached differently than surface waters.)
- **Source:** The determination of the source of the contamination is important as a first step in insuring that ongoing or active sources are stopped or controlled. Source identification is also significant with regard to the final determination of liability for remedial activity. In cases where the source of the contamination can be accurately associated with a given operating entity then the Commission can either order remediation or cause remediation to be under taken and then assess costs. When no responsible source or party can be identified, then the Commission must fund monitoring and / or remediation costs from the Conservation Fee Fund.
- **Extent:** The extent of the contamination is a measure of the size and degree of contamination. The size, in the case of contamination to groundwaters, must be measured both vertically and horizontally within aquifer system. The degree of contamination must be measured with relation to clean water standards and background values. These measures are not only important in developing a site remediation design, but also in prioritizing the site.
- **Impact:** What is the impact of the contamination? Is the water resource a valuable and vulnerable supply? What population and water use category is being effected by this contamination? Is the time frame for impact immediate or long term?

Site Assessment
Kansas Corporation Commission

Site assessment with respect to the nature and source of the contamination is generally accomplished utilizing the following techniques:

1. A site inventory which includes both a physical inventory and an inventory of the available production, ownership, geological, hydrological, and historical records associated with the site.
2. Water quality sampling and testing of available wells or locations within the boundaries of the site.
3. Installation, sampling and gaging of water quality monitoring wells as necessary.

Based on the performance of these techniques the following data can be gathered in an effort to define the extent and impact of the contamination.

1. Site geology and hydrogeology, including ground water flow conditions.
2. The magnitude, distribution, and concentration of contamination at the site.
3. Changes in the contamination plume over time.

The proper evaluation and analysis of this data will ultimately result in a cost effective and efficient:

1. Determination of site responsibility
2. Remediation design and implementation

A scientifically sound and technically based approach to assessing site conditions is crucial if the Division is to properly fulfill its statutory requirements as to the protection of the waters of the State of Kansas.