

Technical Justification for a Request to Reclassify the Former CCC/USDA Facility at Canada, Kansas

Environmental Science Division



United States Department of Agriculture

Work sponsored by Commodity Credit Corporation,
United States Department of Agriculture

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by
Applied Geosciences and Environmental Management Section
Environmental Science Division, Argonne National Laboratory

August 2007



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Notation

AMSL	above mean sea level
BER	Bureau of Environmental Remediation (KDHE)
BGL	below ground level
CCC	Commodity Credit Corporation
CERCLIS	Comprehensive Environmental Response, Compensation, and Liability Information System
CGS	Cooperative Grain and Supply
DCA	1,1-dichloroethane
EDB	ethylene dibromide
ft	foot (feet)
FSA	Farm Service Agency
gpm	gallon(s) per minute
IGA	Intergovernmental Agreement
ISL	Identified Sites List (KDHE)
KDHE	Kansas Department of Health and Environment
KGS	Kansas Geological Survey
µg/kg	microgram(s) per kilogram
µg/L	microgram(s) per liter
MCL	maximum contaminant level
mg/L	milligram(s) per liter
mi	mile(s)
MTBE	methyl <i>tert</i> -butyl ether
RWD	Rural Water District
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USGS	U.S. Geological Survey
WWC-5	water well record form

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Executive Summary

Contamination in groundwater at Canada, Kansas, was discovered in 1997, during limited private well sampling near former grain storage facilities of the Commodity Credit Corporation, U.S. Department of Agriculture (CCC/USDA). Subsequent investigations by the Kansas Department of Health and Environment (KDHE) confirmed carbon tetrachloride and nitrate concentrations in groundwater above the respective maximum contaminant levels (MCLs) of 5.0 µg/L and 10.0 mg/L. The KDHE investigations identified both the former CCC/USDA grain storage facility and a private grain storage facility as likely sources for the carbon tetrachloride contamination. The CCC/USDA funded extension of a rural water district line to provide a permanent alternate water supply, and the KDHE has conducted long-term monitoring under the State Water Plan.

This document presents an analysis of the available information for the Canada site, acquired in previous investigations and the long-term KDHE monitoring. This analysis forms the technical justification for a request to reclassify the former CCC/USDA grain storage facility at Canada as a site requiring no further action under the Intergovernmental Agreement (IGA) between the KDHE and the USDA's Farm Service Agency.

The KDHE's long-term water level monitoring results indicate a consistent groundwater flow direction to the east-southeast. Consequently, the wells with the highest overall concentrations of carbon tetrachloride are downgradient from the private grain storage facility but not downgradient from the former CCC/USDA facility.

The KDHE criterion for reclassification of a site is that contamination there should not pose an unacceptable risk, on the basis of analytical results for four consecutive, equally timed, sequenced sampling episodes over a period of no less than two years. In seven KDHE sampling events over a period of six years (2001-2007), the concentrations of carbon tetrachloride in the monitoring well on the former CCC/USDA property at Canada have ranged from 0.63 µg/L to 2.9 µg/L. These seven results are all below the MCL of 5.0 µg/L, and they demonstrate that groundwater on the former CCC/USDA property has met the standard for carbon tetrachloride in drinking water since 2001 and does not pose a significant human health threat. Except for a two-year interval between sampling events in December 2003 and December 2005, the monitoring

occurred at approximately annual intervals. The results warrant a request for reclassification of the Canada site to *Resolved* status on the KDHE's Identified Sites List, under Section III (Other Considerations) of KDHE policy BER-RS-024, Rev. 2001.

1 Introduction

Contamination at the grain storage facility formerly operated by the Commodity Credit Corporation of the U.S. Department of Agriculture (CCC/USDA) at Canada, Kansas, was discovered in October 1997, during limited private well sampling in conjunction with an inventory of such facilities. The Kansas Department of Health and Environment (KDHE) conducted investigations at Canada in 1998–2001 and confirmed carbon tetrachloride and nitrate concentrations in groundwater above the respective maximum contaminant levels (MCLs) of 5.0 µg/L and 10 mg/L. The affected private lawn and garden wells are no longer used to supply drinking water, and carbon tetrachloride impacts above the MCL are localized.

The KDHE investigations identified both the former CCC/USDA grain bin location and a private grain storage facility as likely sources of the carbon tetrachloride contamination. After the identification of carbon tetrachloride and nitrate contamination at concentrations above the respective MCLs, the CCC/USDA funded extension of the Marion Rural Water District (RWD) #4 line to provide a permanent alternate water supply to affected residents.

Because of the limited exposure risk, the KDHE assigned the Canada site to long-term monitoring status under the State Water Plan. The site is presently classified under the Intergovernmental Agreement (IGA) between the USDA's Farm Service Agency (FSA) and the KDHE as a site that the FSA considers to require no further action on its part, but for which the KDHE has not yet made a determination.

This report presents an analysis of long-term monitoring results for 2001–2007 (KDHE 2007a) and results of prior site investigations. The analysis indicates that the former CCC/USDA grain storage facility in the southern portion of town is not the most plausible source of the carbon tetrachloride contamination at levels above the MCL. Rather, the analytical data and the associated groundwater flow direction data indicate that the private grain storage locations in the northern portion of town are the more likely source of the downgradient carbon tetrachloride contamination. The information presented here forms the technical justification for a request to reclassify the former CCC/USDA grain storage facility at Canada as a site requiring no further action under the IGA.

2 Background

2.1 Site Location and Description

Canada, Kansas, is a small, unincorporated rural community in Marion County, in central Kansas (Figure 2.1). Canada is located near U.S. Highway 56, approximately 5 mi east of Hillsboro (population 2,704) and 5 mi west of Marion (population 1,906). Wichita is about 40 mi to the south. Canada lies within Section 33, Township 19 South, Range 3 East, at approximate latitude 38°21'16" North and longitude 97°06'41" West (USGS 1985).

Canada has a population of approximately 24. The Canada facility of Cooperative Grain and Supply (CGS), Hillsboro, Kansas, currently occupies the co-op property in the central portion of the community and provides seasonal grain storage for area farmers (Figure 2.2). A spur of the Atchison, Topeka, and Santa Fe Railroad (now removed) was formerly located north of the co-op. The CCC/USDA formerly operated a grain storage facility on what is now the southern portion of the co-op property. Ten homes are adjacent to the co-op, to the east and west. A gasoline station and bait shop are west of the co-op.

Canada lies within the Cottonwood River drainage basin (Figure 2.1), approximately 1 mi west of the confluence of the North Cottonwood River (north of town) and the South Cottonwood River (south of town). An intermittent stream flows south-southeast through the town, discharging into the South Cottonwood River. No surface water targets were identified within the 15-mi downstream target distance limit (KDHE 1999a). Until the construction of Marion Lake, approximately 1 mi north of Canada, the town was within the 100-year floodplain of the river.

At Canada, screened intervals of domestic wells for which records are available (Appendix A) are in the range of 45–65 ft BGL (below ground level). One well (DW24 [Schroeder] Figure 2.2) is also screened in an upper zone at 25–35 ft BGL. Water is potentially produced from solution joints in the limestone units of the Permian Nolans Formation. The screened depths suggest that multiple water-bearing zones are present at Canada. A review of the geology of Marion County, Kansas, in the Canada area, is in Appendix B.

Evidence gathered from earlier interviews with local residents suggested a groundwater flow direction to the east-southeast (KDHE 1998). This flow direction is consistent with data

collected during the KDHE's long-term monitoring (2001-2007), as discussed in detail in Section 3.2. Topographic features in the area also support this interpretation. For example, a local flow direction to the southeast is consistent with the erosion by the South Cottonwood River of Permian rocks 1.25 mi southeast of Canada. Downcutting by the river extends to about 40–50 ft below the typical elevation of the ground surface at Canada. Another factor contributing to the southeasterly groundwater flow direction would be potential mounding of groundwater 1 mi north of Canada due to increased recharge from Marion Lake (Figure 2.1; Appendix B).

2.2 Grain Storage Operations and Property History

Grain storage operations at Canada have changed considerably since the CCC/USDA facility was in operation, in 1954 to 1974 (Figures 2.3, 2.4, and 2.5). Harry Helmer of Hillsboro, Kansas, purchased the CCC/USDA bins in 1974 and removed them to begin a private grain storage business elsewhere (FSA 1997). Subsequently, the co-op expanded southward and installed the storage structures now located on the former CCC/USDA property. Other co-op grain storage structures (now removed) were north of the former CCC/USDA facility. Understanding grain storage operations at Canada before and after the CCC/USDA's period of operation (1954-1974) is critical to evaluating the potential source areas for the carbon tetrachloride contamination. The available leases for the former CCC/USDA property are reproduced in Appendix C.

In 1954, to supplement the co-op's available grain storage capacity to the north, the CCC/USDA leased approximately 1 acre of land in the southern portion of the town from Aaron Burkholder. The leased property included Lots 7–18 on Block 11 (Figure 2.2; Figure C.1 in Appendix C). Fifteen circular steel bins with cement floors were erected (Figure 2.3). Each bin had a storage capacity of 3,200 bushels, for a total storage capacity of 48,000 bushels. This initial 1954 CCC/USDA lease of the property was for a period of ten years. In 1964 the lease was extended until 1974 (Figure C.2 in Appendix C).

In 1965, early in the second lease period, Burkholder sold the leased property on which the CCC/USDA was operating its facility to Canada Grain Company of Marion, Kansas (Figure C.3 in Appendix C). In the absence of a lease termination agreement (which has not been found), the CCC/USDA is assumed to have continued its operation on the leased property until 1974, when Harry Helmer purchased and removed the CCC/USDA bins.

With its 1965 purchase from Burkholder, the property owned by Canada Grain Company expanded to include the following (Figure 2.2):

- Block 3: Lots 1–6
- Block 4: Lots 1–6
- Block 6: Lots 1–2, Lots 7–12, the western half of Lots 13–15, Lots 16–18
- Block 11: Lots 7–18 (the former CCC/USDA facility)

Except for the eastern half of Lots 13–15 on Block 6, occupied by the Mueller residence garage, this land sale gave the Canada Grain Company title to the central portion of Canada, from Third Street north to the Atchison, Topeka, and Santa Fe Railroad spur. The capacity of the grain storage facility currently at this location is 416,811 bushels (CGS 2007).

Ownership of the grain storage operation changed several times in the years that followed. Ownership history for the property cited by the KDHE as part of its pre-CERCLIS site reconnaissance and evaluation (KDHE 1998) includes the following:

- Canada Grain — 1965–1977 (Figure C.3 in Appendix C)
- Cooperative Grain and Supply, Hillsboro — January 1977–May 1978 (Figure C.4 in Appendix C; property transferred included the former CCC/USDA facility)
- D&R Trucking/D&R Grain, Hillsboro — May 1978–October 1978 (Figure C.5 in Appendix C)
- Countryside Grain — October 1978–September 1985 (Figure C.5 in Appendix C)
- Daniel P. Janzen/Janzen Farm Service — September 1985–January 1991 (Figure C.6 in Appendix C)

- Cooperative Grain and Supply, Hillsboro — 1991–present (Figure C.6 in Appendix C)

Aerial photos showing the changing grain storage structures over the decades are as follows:

- A 1956 aerial photo (Figure 2.3) shows the former CCC/USDA grain storage facility as consisting of 15 circular bins in the southern portion of town. Large storage structures of unknown use are visible on the co-op property, just north of the former CCC/USDA facility. Wooden grain elevators are visible in the northern portion of the co-op property, immediately south of the former railroad.
- A 1991 aerial photo (Figure 2.4) shows co-op structures on the former CCC/USDA property (which the CCC/USDA vacated in 1974). Changes are also evident in 1991 (Figure 2.4) on the central portion of the co-op property. Two large storage structures of unknown use appearing just north of the former CCC/USDA property in 1956 (peach highlights in Figure 2.4) are absent in 1991 (compare to gray highlights in Figure 2.4). One circular storage bin and one circular bin foundation are visible in the 1991 photo (gray highlights in Figure 2.4) on the co-op property, just north of the former CCC/USDA property. The foundation of a flat storage building is seen farther north. The door of the flat storage building appears to have been at the southern end of the building. The photographs in Figures 2.3 and 2.4 demonstrate that this flat storage building was installed after 1956 and removed before 1991.
- The 2002 aerial photograph (Figure 2.5) shows the current configuration of the grain storage operations at Canada. Most of the structures visible in the 1991 photograph (Figure 2.4) remain.

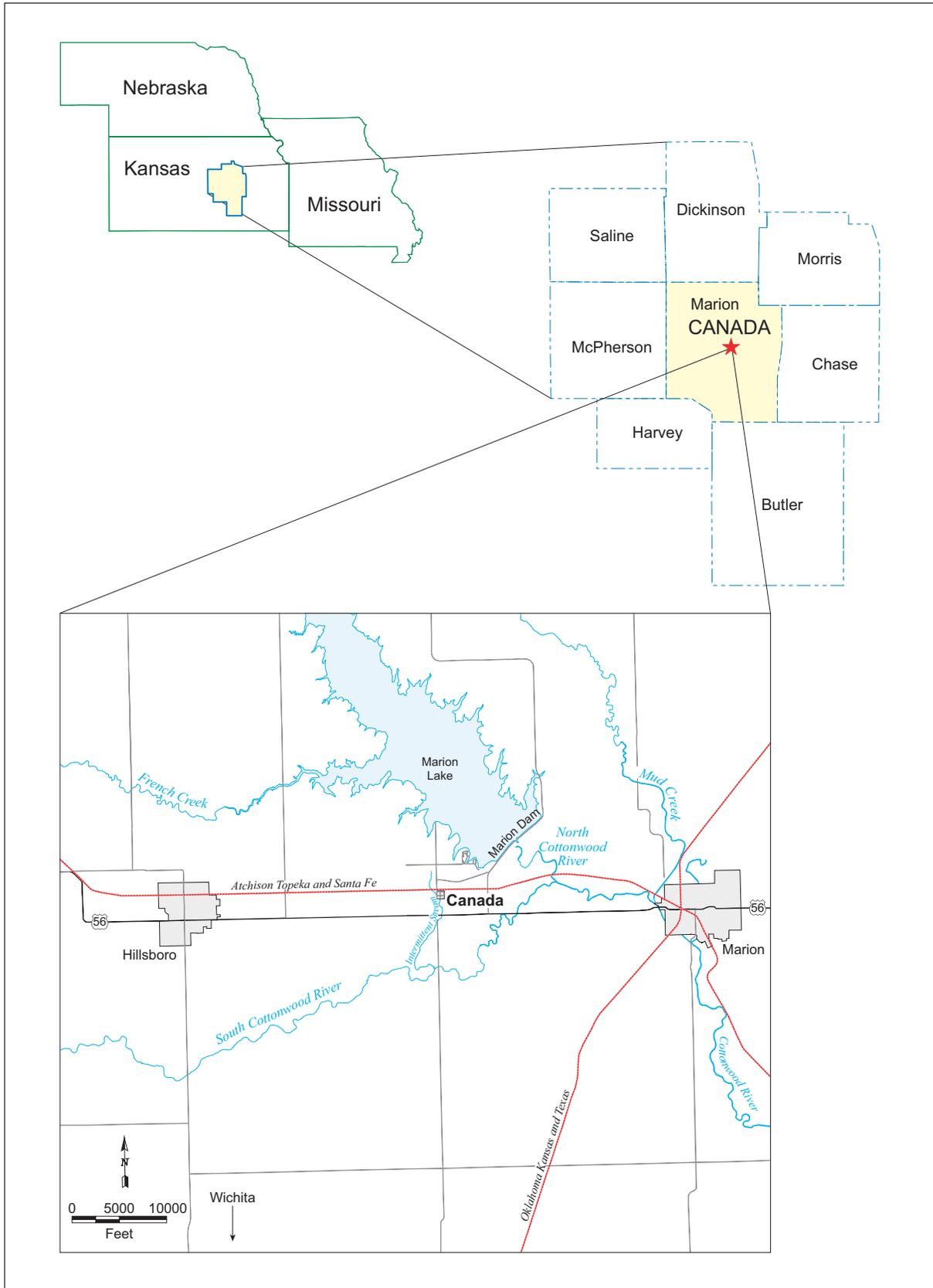


FIGURE 2.1 Location of Canada, Kansas.



FIGURE 2.2 Plat of Canada, Kansas. Sources of data: State of Kansas (1883), KDHE (1998).

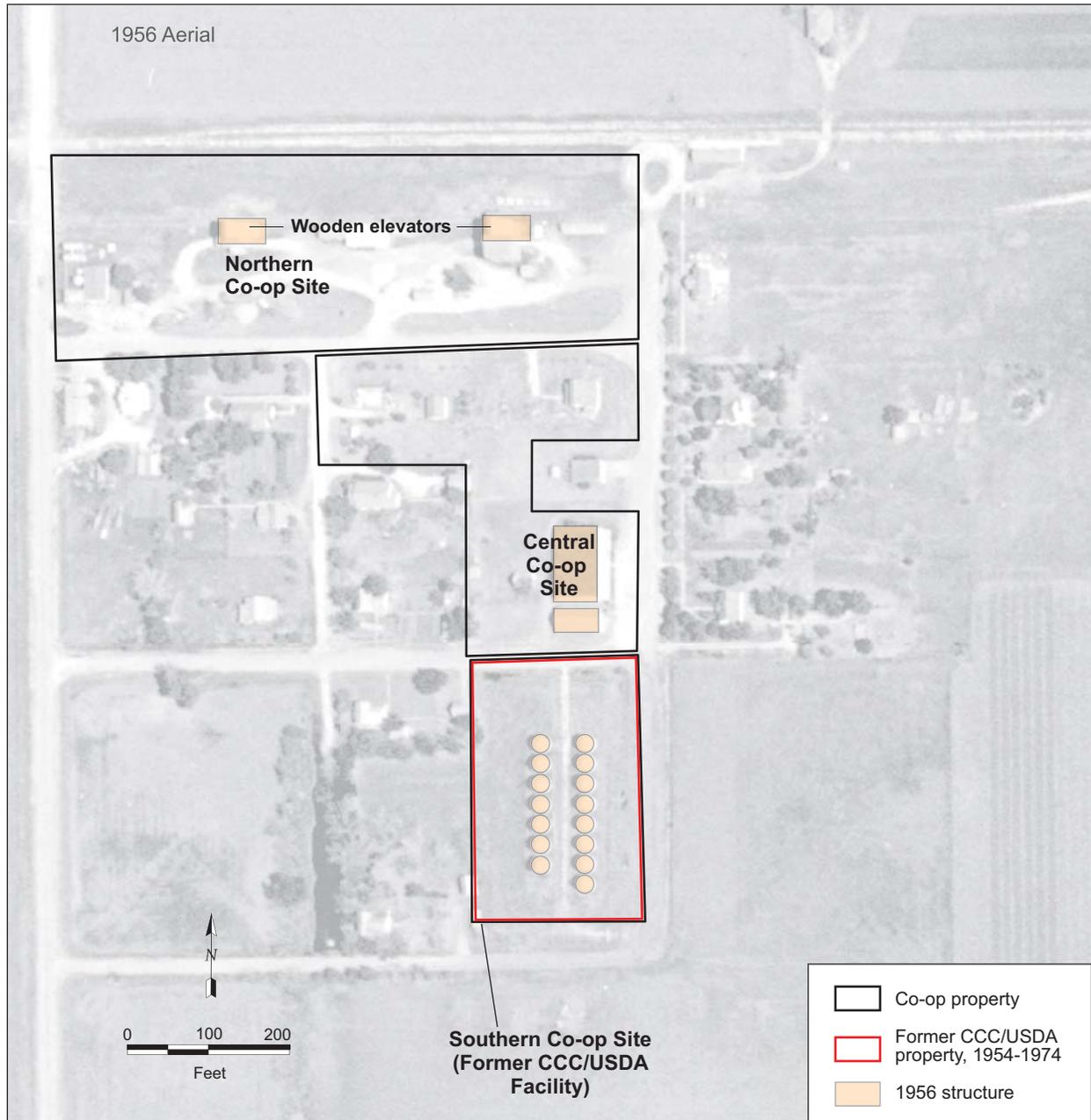


FIGURE 2.3 Grain storage structures at Canada in 1956, with property boundaries. Source of photograph: USDA (1956).

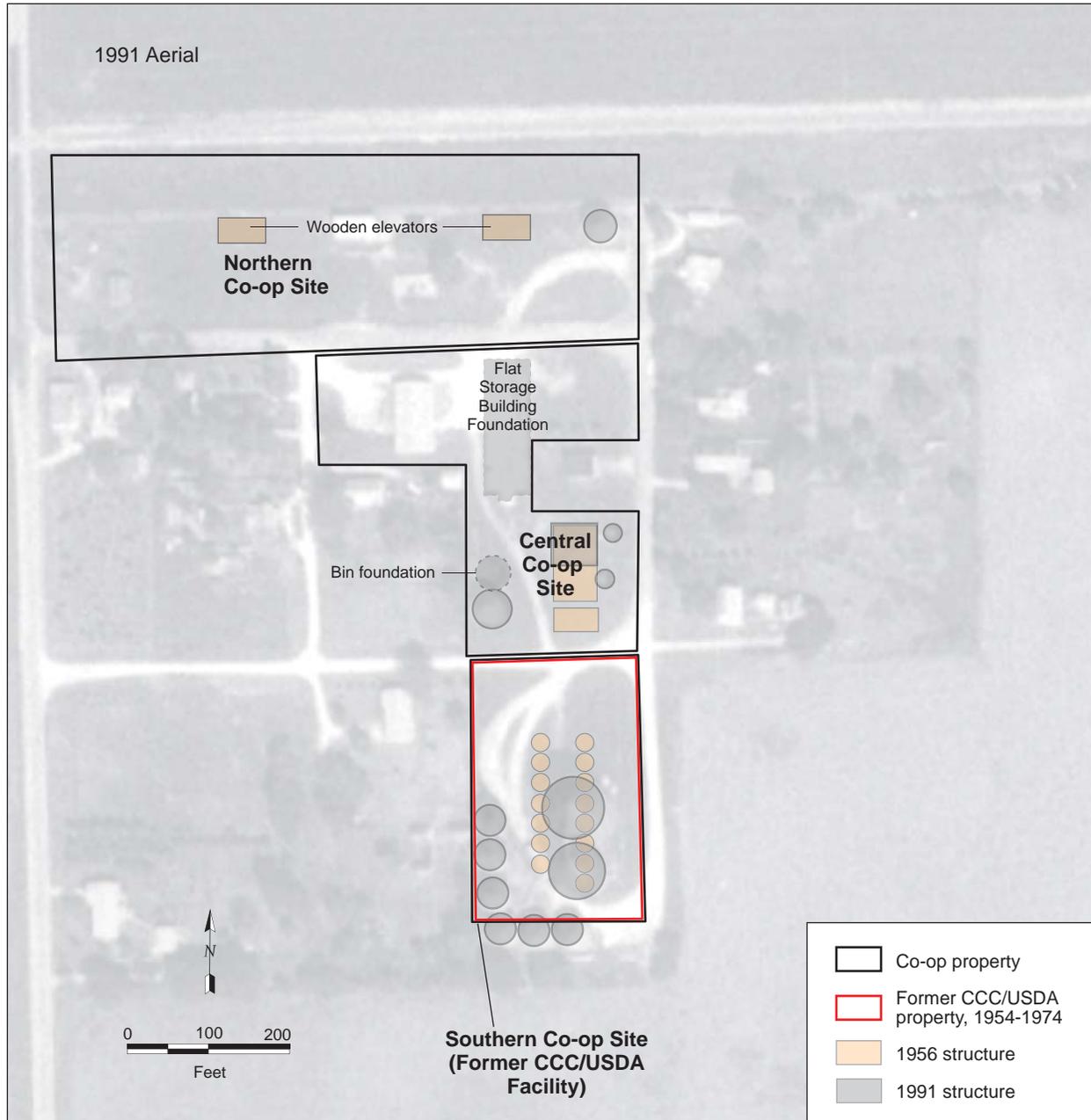


FIGURE 2.4 Grain storage structures at Canada in 1991, with locations of 1956 structures shown in Figure 2.3 and property boundaries. Source of photograph: USGS (1991).

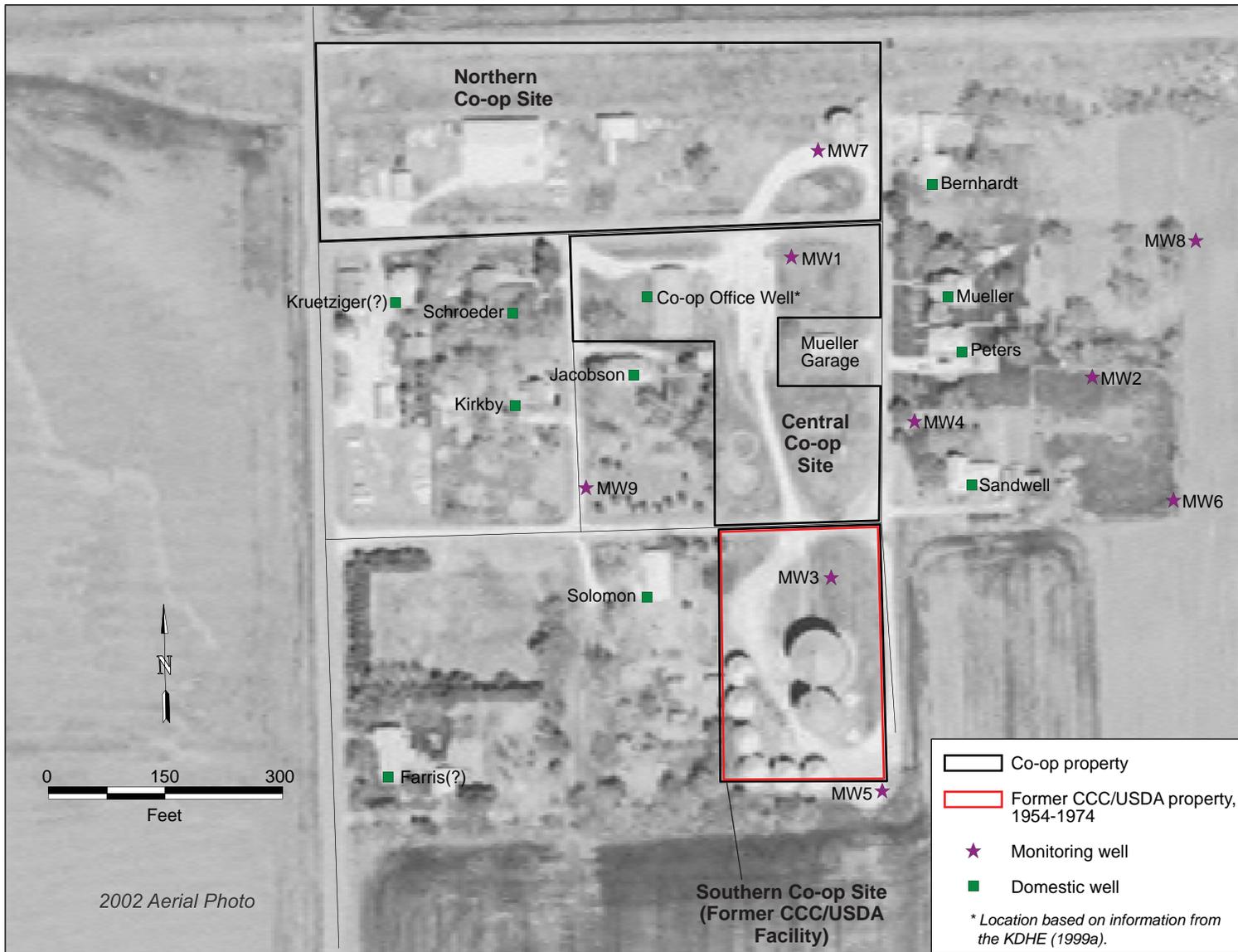


FIGURE 2.5 Current configuration of the Canada site. Source of photograph: USDA (2002).

3 Carbon Tetrachloride Contamination at Canada

3.1 Identification of Contamination and Removal Action

Carbon tetrachloride contamination was initially identified at Canada in October 1997 (KDHE 1997), in conjunction with the private well sampling program conducted by the KDHE at former CCC/USDA facilities. Contamination was detected in two of the four wells sampled (24.2 µg/L in the Mueller private well and 1.1 µg/L in the Cooperative Grain and Supply well; Table 3.1). In subsequent KDHE investigations, including a site reconnaissance and evaluation in 1997–1998 (KDHE 1998) and a preliminary assessment/screening site inspection in 1999 (KDHE 1999a), all private wells in Canada were sampled.

The Mueller well has continued to exhibit carbon tetrachloride at levels above the MCL of 5.0 µg/L. The Peters wells has also contained levels of carbon tetrachloride near and above the MCL. Both the Mueller and Peters wells are to the east of the co-op property. The results of the most recent sampling are in Figure 3.1.

In addition to the carbon tetrachloride contamination, pervasive nitrate contamination above the MCL of 10 mg/L has been present (Table 3.1). The nitrate contamination is not associated with activities of the CCC/USDA.

All residents of Canada formerly obtained their water from private wells. On the basis of the 1997–1999 KDHE results, the CCC/USDA instituted two removal actions to provide affected residents with alternate water supplies:

- The CCC/USDA provided a temporary alternate water supply of bottled water to the Mueller and Peters residences after the 1998 site reconnaissance and evaluation (KDHE 1999a). This action was in response to the detection of carbon tetrachloride in these residences' wells at concentrations above the MCL of 5.0 µg/L for drinking water.
- The Marion RWD #4 line was extended into Canada as a permanent whole-house alternate water supply in April 1999. The CCC/USDA provided funding to connect the Mueller residence to the RWD supply line (Shewey

1999). Mr. Peters elected to pay for the connection of his residence to the RWD water supply line.

The KDHE concluded in its preliminary removal site evaluation (KDHE 1999b) that no further removal site evaluation, removal response, or removal action in Canada was warranted, in view of the provision of the permanent alternate water supply.

3.2 Contaminant History and Previous Investigations

In 1999, the KDHE (1999a,c) conducted soil sampling to identify the source of the carbon tetrachloride contamination at Canada. Figure 3.2 shows the soil sample locations, plotted by using (x, y) measurements reported by the KDHE (1999a).

Samples collected at four of seven locations north of the former CCC/USDA bins contained carbon tetrachloride at 0.2 µg/kg (at location SP7), 0.3 µg/kg (at SP4 and SP8), and 0.9 µg/kg (at SP12) (Figure 3.2). Carbon tetrachloride was not detected at SP3, SP9, and SP10, also north of the former CCC/USDA bins. In contrast, carbon tetrachloride was found in only one of five soil samples collected between and adjacent to the former CCC/USDA bins (0.2 µg/kg at SP6); the contaminant was not detected in samples from locations SP1, SP2, SP5, and SP11, in this same area. This finding is significant, because contamination resulting from CCC/USDA activities would be most likely in the doorways and around foundations of CCC/USDA bins. Contamination elsewhere on the former CCC/USDA property could have resulted from either CCC/USDA or co-op activities. The co-op has occupied the property since at least 1974.

During a comprehensive investigation completed in 2001 (KDHE 2001), the KDHE installed nine monitoring wells. Since that time, the KDHE has conducted long-term monitoring of these wells and four private wells. A chronological summary of the analytical results for groundwater sampling at Canada is in Table 3.1. The carbon tetrachloride results for the KDHE's 2007 monitoring are displayed in Figure 3.1.

The KDHE's long-term water level measurements (Table 3.2) and reported survey coordinates (Table 3.3) were used to generate the maps of groundwater flow direction in

Figures 3.3–3.6. These figures indicate a consistent groundwater flow direction to the east or east-southeast during the 2001–2007 monitoring, though the water levels have fluctuated.

Table 3.4 shows the historical analytical results for carbon tetrachloride in individual wells. Carbon tetrachloride levels in the Mueller and Peters private wells have generally declined since 1997 (from 24.2 µg/L to 9.0 µg/L [2007] in the Mueller well and from 12.7 µg/L to 2.8 µg/L [2005] in the Peters well). In contrast, the absence of a declining trend in contaminant levels in MW2 (with values of 10.0–22.0 µg/L; Table 3.4) in 2001–2007 suggests an ongoing source in the vicinity of the co-op’s former flat storage building, upgradient from this well (Figure 3.3). For comparison, the level of carbon tetrachloride in MW3, at the north end of the former CCC/USDA facility (east-southeast of the two circular co-op storage structures visible on the 1991 aerial photo in Figure 3.3) has varied between 0.63 µg/L and 2.9 µg/L in 2001–2007.

The fumigant compounds 1,2-dichloroethane, ethylene dibromide, and tetrachloroethylene have been detected at trace concentrations (Table 3.4) at monitoring locations MW4 (downgradient from the co-op’s former flat storage building) and MW7 (downgradient from the former wooden elevators at the north end of the co-op property). These compounds have not been detected in monitoring wells MW3 and MW5, located on and downgradient from the former CCC/USDA property, respectively.

Fuel-related compounds (benzene, 1,1-dichloroethane [DCA], ethylbenzene, methyl *tert*-butyl ether [MTBE], *sec*-butylbenzene, trimethylbenzene, xylene) were identified at low concentrations in the Sandwell private well in 1998 and in monitoring wells MW1, MW4, and MW8 in 2003 and 2005 (Table 3.4). These wells lie east (downgradient) of the co-op (Figure 2.5). A documented release of diesel fuel occurred on May 28, 1991, on the northeast corner of the co-op (at that time the Janzen Farm Service), when a ten-year-old, 9,000-gal underground storage tank was being removed. A slight odor of diesel fuel was evident on a lower sidewall of the tank excavation, but no staining was observed. Contaminated soil was removed for aeration (KDHE 2007b).

The KDHE noted in an internal memorandum that the fuel-related compounds discussed above, plus ethylene dibromide [EDB], had been found in wells downgradient from the co-op. The memorandum (KDHE 2004) stated the following: “Benzene, DCA, *sec*-butylbenzene, MTBE, and EDB are contaminants associated with gasoline releases. EDB is also used as a grain fumigant. A closed [leaking underground storage tank] site is located within the subject area

[where long-term monitoring is being conducted] and EDB was detected downgradient of current and former grain storage locations; however, reported impacts associated with these contaminants appear to be highly localized, do not affect private wells, and do not exceed MCLs.” The 2003 results for ethylene dibromide to which the KDHE memorandum referred are in Table 3.4. None of the compounds mentioned have been detected in monitoring wells MW3 and MW5, located on and downgradient from the former CCC/USDA property, respectively.

TABLE 3.1 Chronological history of groundwater sampling and analysis at Canada.^a

Date	Location	Concentration (µg/L)				Nitrate Concentration (mg/L)	Other VOCs ^b
		Carbon Tetra- chloride	Chloro- form	1,2-Dichloro- ethane	Ethylene Dibromide		
10/21/97	Carr	< 0.5	< 0.5	< 0.5	< 0.01	NA ^c	
	Co-op	1.1	< 0.5	< 0.5	< 0.01	NA	
	Mueller	24.2	4.7	< 0.5	< 0.01	NA	
	Schroeder	< 0.5	< 0.5	< 0.5	< 0.01	NA	
11/14/97	Bernhardt	2.5	0.7	< 0.5	< 0.01	NA	
	Mueller	21.8	3.9	< 0.5	< 0.01	NA	
12/03/97	Farris	< 0.5	< 0.5	< 0.5	< 0.01	14.26	
	Jacobson	< 0.5	< 0.5	< 0.5	< 0.01	11.48	
	Kirby	< 0.5	< 0.5	< 0.5	< 0.01	12.42	
	Peters	12.7	8.2	0.5	< 0.01	66.8	
	Sandwell	1.7	< 0.5	< 0.5	< 0.01	15.79	
	Solomon	< 0.5	< 0.5	< 0.5	< 0.01	13.01	
04/21/98	Sandwell	2.0	0.6	< 0.5	< 0.01	NA	A
02/08/99	Bernhardt	< 0.5	< 0.5	< 0.5	< 0.01	19.1	
	Mueller	10.7	1.4	< 0.5	< 0.01	29.38	
	Peters	14.0	7.0	< 0.5	< 0.01	52.13	
01/05/01	MW1	< 1.0	< 1.0	< 1.0	< 1.0	NS ^d	
	MW2	10.0	3.8	< 1.0	< 1.0	NS	
	MW3	1.6	< 1.0	< 1.0	< 1.0	NS	
03/20/01	MW1	2.6	< 1.0	< 1.0	< 1.0	NS	
	MW2	22.0	6.4	< 1.0	< 1.0	NS	
	MW3	1.4	< 1.0	< 1.0	< 1.0	NS	
10/25/01	MW1	< 1.2	< 0.5	< 0.5	< 0.5	NS	
	MW2	15.0	5.1	< 0.5	< 0.5	NS	
	MW3	1.9	< 0.5	< 0.5	< 0.5	NS	
	MW4	3.8	1.9	0.57	< 0.5	NS	
	MW5	1.3	< 0.5	< 0.5	< 0.5	NS	
	MW6	4.3	0.63	< 0.5	< 0.5	NS	
	MW7	8.1	1.7	0.58	< 0.5	NS	
	MW8	7.0	1.7	< 0.5	< 0.5	NS	
	MW9	< 1.2	< 0.5	< 0.5	< 0.5	NS	
12/12/02	MW1	< 0.5	NR ^e	NR	NR	NS	
	MW2	21.0	NR	NR	NR	NS	
	MW3	2.9	NR	NR	NR	NS	
	MW4	7.6	NR	NR	NR	NS	
	MW5	NS	NS	NS	NS	NS	
	MW6	4.0	NR	NR	NR	NS	
	MW7	8.2	NR	NR	NR	NS	
	MW8	8.3	NR	NR	NR	NS	
	MW9	NS	NS	NS	NS	NS	
	Mueller Peters	11.0 4.3	NR NR	NR NR	NR NR	NR NR	NS NS

TABLE 3.1 (Cont.)

Date	Location	Concentration (µg/L)				Nitrate Concentration (mg/L)	Other VOCs ^b
		Carbon Tetra- chloride	Chloro- form	1,2-Dichloro- ethane	Ethylene Dibromide		
12/29/03	MW1	< 0.5	< 0.5	< 0.5	< 0.01	NS	B
	MW2	15.0	5.5	< 0.5	< 0.01	NS	C
	MW3	1.9	< 0.5	< 0.5	< 0.01	NS	
	MW4	4.4	4.3	2.2	< 0.01	NS	D
	MW5	1.3	< 0.5	< 0.5	< 0.01	NS	
	MW6	3.7	< 0.5	< 0.5	< 0.01	NS	E
	MW7	8.0	1.4	< 0.5	0.022	NS	F
	MW8	6.9	1.5	< 0.5	< 0.01	NS	G
	MW9	NS	NS	NS	NS	NS	
	Bernhardt	2.0	< 0.5	< 0.5	< 0.01	12.0	H
	Mueller	10.0	1.0	< 0.5	< 0.01	19.0	
	Peters	4.7	0.84	< 0.5	< 0.01	20.0	
Sandwell	1.1	< 0.5	< 0.5	< 0.01	16.0		
12/02/05	MW1	1.0	< 0.5	< 0.5	< 0.01	NS	
	MW2	13.0	4.4	< 0.5	< 0.01	NS	
	MW3	0.63	< 0.5	< 0.5	< 0.01	NS	
	MW4	5.6	2.0	1.4	< 0.01	NS	I
	MW5	NS	NS	NS	NS	NS	
	MW6	2.1	< 0.5	< 0.5	< 0.01	NS	
	MW7	4.0	0.92	< 0.5	0.022	NS	
	MW8	4.4	1.4	< 0.5	< 0.01	NS	J
	MW9	NS	NS	NS	NS	NS	
	Bernhardt	NS	NS	NS	NS	NS	
	Mueller	16.0	3.2	< 0.5	< 0.01	28	
	Peters	2.8	1.0	< 0.5	< 0.01	22.0	
Sandwell	1.9	0.57	< 0.5	< 0.01	13.0		
02/20/07	MW1	< 0.5	< 0.5	< 0.5	< 0.01	NS	
	MW2	18	6.4	0.62	< 0.01	NS	
	MW3	1.1	< 0.5	< 0.5	< 0.01	NS	
	MW4	2.8	1.1	1.6	< 0.01	NS	
	MW5	NS	NS	NS	NS	NS	
	MW6	4.7	0.62	< 0.5	< 0.01	NS	
	MW7	6.2	1.0	< 0.5	< 0.01	NS	
	MW8	6.3	1.5	< 0.5	< 0.01	NS	
	MW9	NS	NS	NS	NS	NS	
	Bernhardt	2.1	0.71	< 0.5	< 0.01	12	K
	Mueller	9.0	1.9	< 0.5	< 0.01	20	
	Peters	NS	NS	NS	NS	NS	
Sandwell	0.6	< 0.5	< 0.5	< 0.01	16		

TABLE 3.1 (Cont.)

- ^a Results are from off-site laboratories. Sources of data: Dallen 1998, 1999; KDHE 1997, 1998, 1999a, 2001, 2004, 2006, 2007a.
- ^b Codes for other volatile organic compounds (concentrations in µg/L):
- A: 04/21/98, Sandwell: ethylbenzene = 1.0; xylene = 3.9; 1,3,5-trimethylbenzene = 0.5; 1,2,4-trimethylbenzene = 0.7.
 - B: 12/29/03, MW1: chloromethane = 12; *sec*-butylbenzene = 8.3; methyl *tert*-butyl ether = 6.4.
 - C: 12/29/03, MW2: chloromethane = 5.8; 1,1-dichloroethane = 0.75.
 - D: 12/29/03, MW4: benzene = 1.7; tetrachloroethylene = 0.57; chloromethane = 4.3.
 - E: 12/29/03, MW6: chloromethane = 1.6.
 - F: 12/29/03, MW7: chloromethane = 14.
 - G: 12/29/03, MW8: chloromethane = 7.5.
 - H: 12/29/03, Bernhardt: chloromethane = 0.72.
 - I: 12/02/05, MW4: benzene = 0.51.
 - J: 12/02/05, MW8: 1,1-dichloroethane = 0.52.
 - K: 02/20/07, Bernhardt: chloromethane = 0.71.
- ^c NA, not analyzed for this constituent.
- ^d NS, monitoring location not sampled for this constituent in this event.
- ^e NR, result not reported in the investigation reports on file.

TABLE 3.2 Water Level data for the Canada site. Source of data: KDHE (2001, 2004, 2006, 2007a).

Well	Top of Casing Elevation (ft AMSL)	Water Surface Depth or Elevation in Year Indicated							
		2007		2005		2003		2001	
		Depth (ft BGL)	Elevation (ft AMSL)	Depth (ft BGL)	Elevation (ft AMSL)	Depth (ft BGL)	Elevation (ft AMSL)	Depth (ft BGL)	Elevation (ft AMSL)
MW1	1363.05	20.85	1342.2	15.34	1347.71	17.71	1345.34	17.10	1345.95
MW2	1361.55	19.71	1341.84	14.74	1346.81	16.84	1344.71	16.18	1345.37
MW3	1360.33	18.13	1342.2	12.14	1348.19	15.04	1345.29	14.31	1346.02
MW4	1362.44	20.45	1341.99	15.28	1347.16	17.55	1344.89	16.88	1345.56
MW5	1360.65	NS ^a	NS	NS ^a		15.33	1345.32	14.65	1346.00
MW6	1360.32	18.5	1341.82	13.65	1346.67	15.65	1344.67	15.00	1345.32
MW7	1364.54	21.55	1342.99	16.36	1348.18	18.44	1346.10	17.87	1346.67
MW8	1361.01	19.2	1341.81	14.30	1346.71	16.36	1344.65	15.67	1345.34
MW9	1358.01	NS	NS	NS		NS		11.00	1347.01

^a NS, not sampled.

TABLE 3.3 Survey data for the Canada site. Source of data:
KDHE (2001).

Location	North ^a	West ^a	Latitude ^b	Longitude ^b
MW1	2348.84	4707.25	38-21-17	97-06-42
MW2	2235.35	4306.89	38-21-15	97-06-38
MW3	1953.59	4665.80	38-21-12	97-06-41
MW4	2174.83	4575.79	38-21-15	97-06-39
MW5	1659.27	4601.71	38-21-10	97-06-39
MW6	2035.95	4239.72	38-21-14	97-06-36
MW7	2509.07	4672.34	38-21-18	97-06-41
MW8	2400.49	4207.03	38-21-16	97-06-36
MW9	2059.19	4971.87	38-21-15	97-06-44

^a The Canada site is located in Section 33, Township 19 South, Range 3 East of the Sixth Principal Meridian, Marion County, Kansas. The southeast corner of Section 33 was assigned coordinates of 00.00 North and 00.00 West.

^b Latitude and longitude were scaled from a 7.5-minute quadrangle map (USGS 1985).

TABLE 3.4 Historical results of groundwater sampling and analysis for individual wells at Canada.^a

Location	Date	Concentration (µg/L)				Nitrate Concentration (mg/L)	Other VOCs ^b
		Carbon Tetra- chloride	Chloro- form	1,2-Dichloro- ethane	Ethylene Dibromide		
Bernhardt	11/14/97	2.5	0.7	< 0.5	< 0.01	NA ^c	
	02/08/99	< 0.5	< 0.5	< 0.5	< 0.01	19.1	
	12/29/03	2.0	< 0.5	< 0.5	< 0.01	12.0	A
	12/02/05	NS ^d	NS	NS	NS	NS	
	02/20/07	2.1	0.71	< 0.5	< 0.01	12	B
Carr	10/21/97	< 0.5	< 0.5	< 0.5	< 0.01	NA	
Co-op	10/21/97	1.1	< 0.5	< 0.5	< 0.01	NA	
Farris	12/03/97	< 0.5	< 0.5	< 0.5	< 0.01	14.26	
Jacobson	12/03/97	< 0.5	< 0.5	< 0.5	< 0.01	11.48	
Kirby	12/03/97	< 0.5	< 0.5	< 0.5	< 0.01	12.42	
Mueller	10/21/97	24.2	4.7	< 0.5	< 0.01	NA	
	11/14/97	21.8	3.9	< 0.5	< 0.01	NA	
	02/08/99	10.7	1.4	< 0.5	< 0.01	29.38	
	12/12/02	11.0	NR ^e	NR	NR	NS	
	12/29/03	10.0	1.0	< 0.5	< 0.01	19.0	
	12/02/05	16.0	3.2	< 0.5	< 0.01	28	
02/20/07	9.0	1.9	< 0.5	< 0.01	20		
Peters	12/03/97	12.7	8.2	0.5	< 0.01	66.8	
	02/08/99	14.0	7.0	< 0.5	< 0.01	52.13	
	12/12/02	4.3	NR	NR	NR	NS	
	12/29/03	4.7	0.84	< 0.5	< 0.01	20.0	
	12/02/05	2.8	1.0	< 0.5	< 0.01	22.0	
	02/20/07	NS	NS	NS	NS	NS	
Sandwell	12/03/97	1.7	< 0.5	< 0.5	< 0.01	15.79	
	04/21/98	2.0	0.6	< 0.5	< 0.01	NA	C
	12/29/03	1.1	< 0.5	< 0.5	< 0.01	16.0	
	12/02/05	1.9	0.57	< 0.5	< 0.01	13.0	
	02/20/07	0.6	< 0.5	< 0.5	< 0.01	16	
Schroeder	10/21/97	< 0.5	< 0.5	< 0.5	< 0.01	NA	
Solomon	12/03/97	< 0.5	< 0.5	< 0.5	< 0.01	13.01	
MW1	01/05/01	< 1.0	< 1.0	< 1.0	< 1.0	NS	
	03/20/01	2.6	< 1.0	< 1.0	< 1.0	NS	
	10/25/01	< 1.2	< 0.5	< 0.5	< 0.5	NS	
	12/12/02	< 0.5	NR	NR	NR	NS	
	12/29/03	< 0.5	< 0.5	< 0.5	< 0.01	NS	D
	12/02/05	1.0	< 0.5	< 0.5	< 0.01	NS	
	02/20/07	< 0.5	< 0.5	< 0.5	< 0.01	NS	

TABLE 3.4 (Cont.)

Location	Date	Concentration (µg/L)				Nitrate Concentration (mg/L)	Other VOCs ^b
		Carbon Tetra- chloride	Chloro- form	1,2-Dichloro- ethane	Ethylene Dibromide		
MW2	01/05/01	10.0	3.8	< 1.0	< 1.0	NS	
	03/20/01	22.0	6.4	< 1.0	< 1.0	NS	
	10/25/01	15.0	5.1	< 0.5	< 0.5	NS	
	12/12/02	21.0	NR	NR	NR	NS	
	12/29/03	15.0	5.5	< 0.5	< 0.01	NS	E
	12/02/05	13.0	4.4	< 0.5	< 0.01	NS	
	02/20/07	18.0	6.4	0.62	< 0.01	NS	
MW3	01/05/01	1.6	< 1.0	< 1.0	< 1.0	NS	
	03/20/01	1.4	< 1.0	< 1.0	< 1.0	NS	
	10/25/01	1.9	< 0.5	< 0.5	< 0.5	NS	
	12/12/02	2.9	NR	NR	NR	NS	
	12/29/03	1.9	< 0.5	< 0.5	< 0.01	NS	
	12/02/05	0.63	< 0.5	< 0.5	< 0.01	NS	
	02/20/07	1.1	< 0.5	< 0.5	< 0.01	NS	
MW4	10/25/01	3.8	1.9	0.57	< 0.5	NS	
	12/12/02	7.6	NR	NR	NR	NS	
	12/29/03	4.4	4.3	2.2	< 0.01	NS	F
	12/02/05	5.6	2.0	1.4	< 0.01	NS	G
	02/20/07	2.8	1.1	1.6	< 0.01	NS	
MW5	10/25/01	1.3	< 0.5	< 0.5	< 0.5	NS	
	12/12/02	NS	NS	NS	NS	NS	
	12/29/03	1.3	< 0.5	< 0.5	< 0.01	NS	
	12/02/05	NS	NS	NS	NS	NS	
	02/20/07	NS	NS	NS	NS	NS	
MW6	10/25/01	4.3	0.63	< 0.5	< 0.5	NS	
	12/12/02	4.0	NR	NR	NR	NS	
	12/29/03	3.7	< 0.5	< 0.5	< 0.01	NS	H
	12/02/05	2.1	< 0.5	< 0.5	< 0.01	NS	
	02/20/07	4.7	0.62	< 0.5	< 0.01	NS	
MW7	10/25/01	8.1	1.7	0.58	< 0.5	NS	
	12/12/02	8.2	NR	NR	NR	NS	
	12/29/03	8.0	1.4	< 0.5	0.022	NS	I
	12/02/05	4.0	0.92	< 0.5	0.022	NS	
	02/20/07	6.2	1.0	< 0.5	< 0.01	NS	
MW8	10/25/01	7.0	1.7	< 0.5	< 0.5	NS	
	12/12/02	8.3	NR	NR	NR	NS	
	12/29/03	6.9	1.5	< 0.5	< 0.01	NS	J
	12/02/05	4.4	1.4	< 0.5	< 0.01	NS	K
	02/20/07	6.3	1.5	< 0.5	< 0.01	NS	
MW9	10/25/01	< 1.2	< 0.5	< 0.5	< 0.5	NS	
	12/12/02	NS	NS	NS	NS	NS	
	12/29/03	NS	NS	NS	NS	NS	
	12/02/05	NS	NS	NS	NS	NS	
	02/20/07	NS	NS	NS	NS	NS	

TABLE 3.4 (Cont.)

- ^a Results are from off-site laboratories. Sources of data: Dallen 1998, 1999; KDHE 1997, 1998, 1999a, 2001, 2004, 2006, 2007a.
- ^b Codes for other volatile organic compounds (concentrations in µg/L):
- A: 12/29/03, Bernhardt: chloromethane = 0.72.
 - B: 02/20/07, Bernhardt: chloromethane = 0.71.
 - C: 04/21/98, Sandwell: ethylbenzene = 1.0; xylene = 3.9; 1,3,5-trimethylbenzene = 0.5; 1,2,4-trimethylbenzene = 0.7.
 - D: 12/29/03, MW1: chloromethane = 12; *sec*-butylbenzene = 8.3; methyl *tert*-butyl ether = 6.4.
 - E: 12/29/03, MW2: chloromethane = 5.8; 1,1-dichloroethane = 0.75.
 - F: 12/29/03, MW4: benzene = 1.7; tetrachloroethylene = 0.57; chloromethane = 4.3.
 - G: 12/02/05, MW4: benzene = 0.51.
 - H: 12/29/03, MW6: chloromethane = 1.6.
 - I: 12/29/03, MW7: chloromethane = 14.
 - J: 12/29/03, MW8: chloromethane = 7.5.
 - K: 12/02/05, MW8: 1,1-dichloroethane = 0.52.
- ^c NA, not analyzed for this constituent.
- ^d NS, monitoring location not sampled for this constituent in this event.
- ^e NR, result not reported in the investigation reports on file.

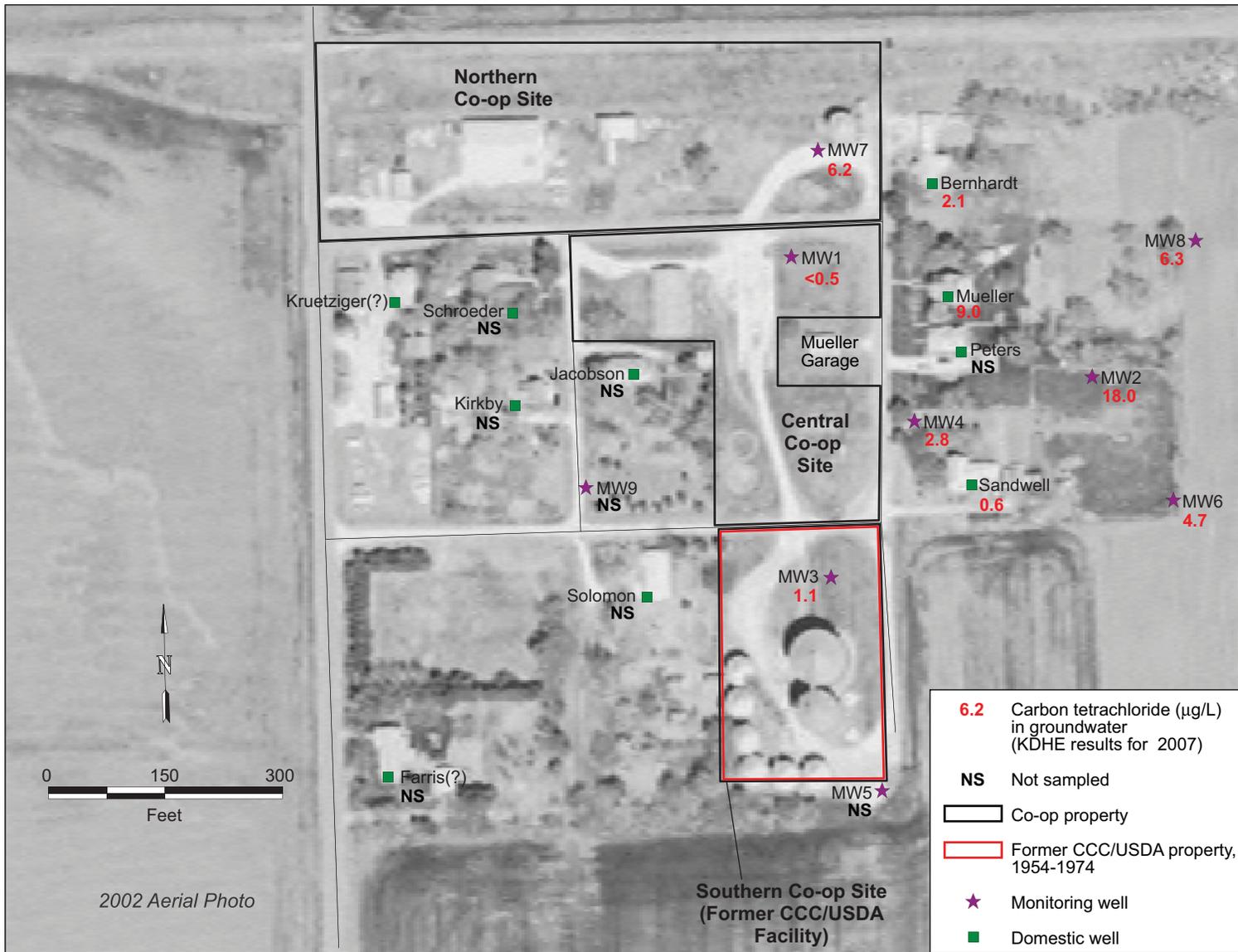


FIGURE 3.1 Analytical results for carbon tetrachloride in groundwater samples collected in 2007. Well locations are approximate. Source of data: KDHE (2007a). Source of photograph: USDA (2002).

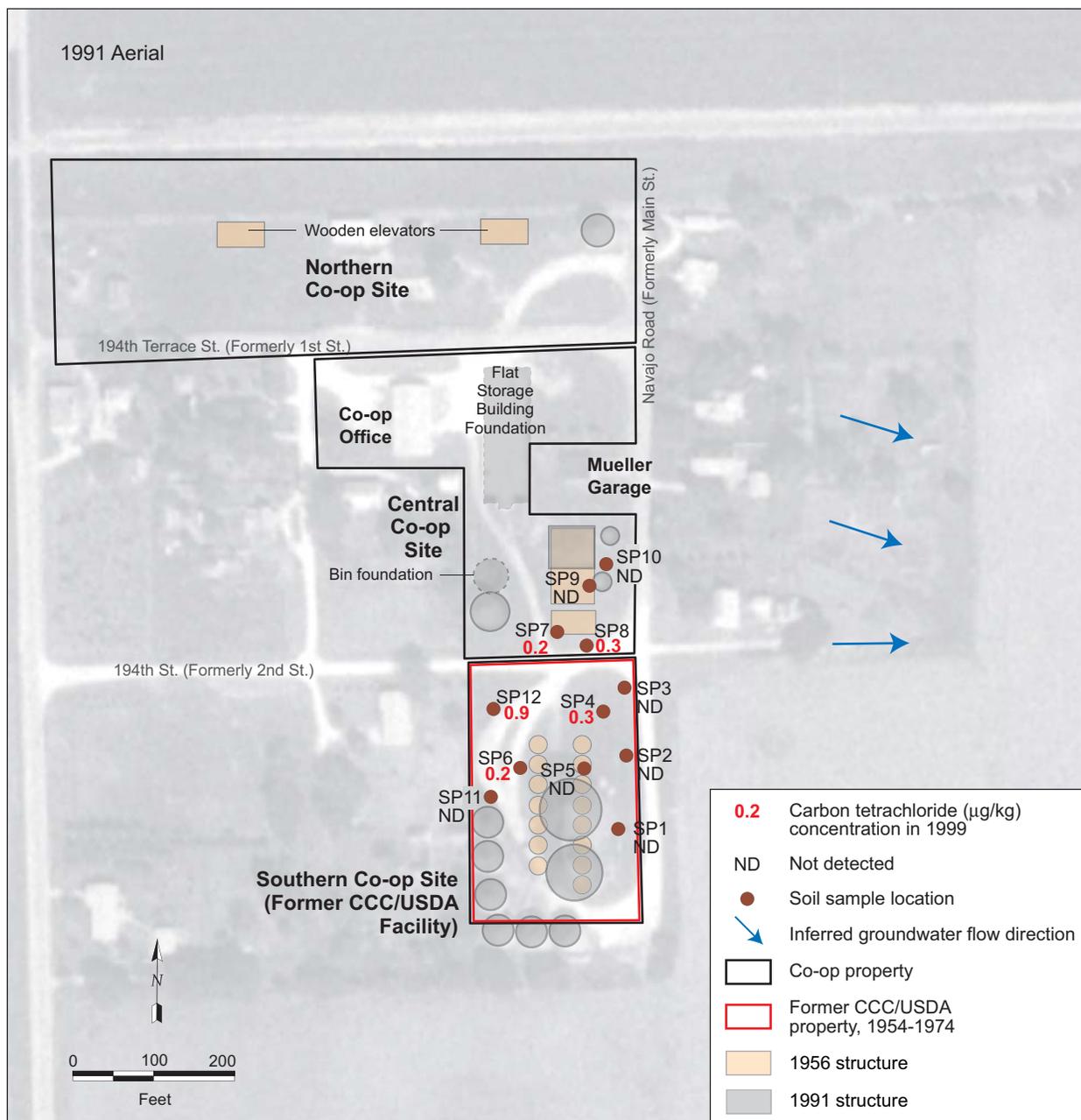


FIGURE 3.2 Analytical results for soil samples collected in November 1999. Source of data: KDHE (1999c). Source of photograph: USGS (1991).

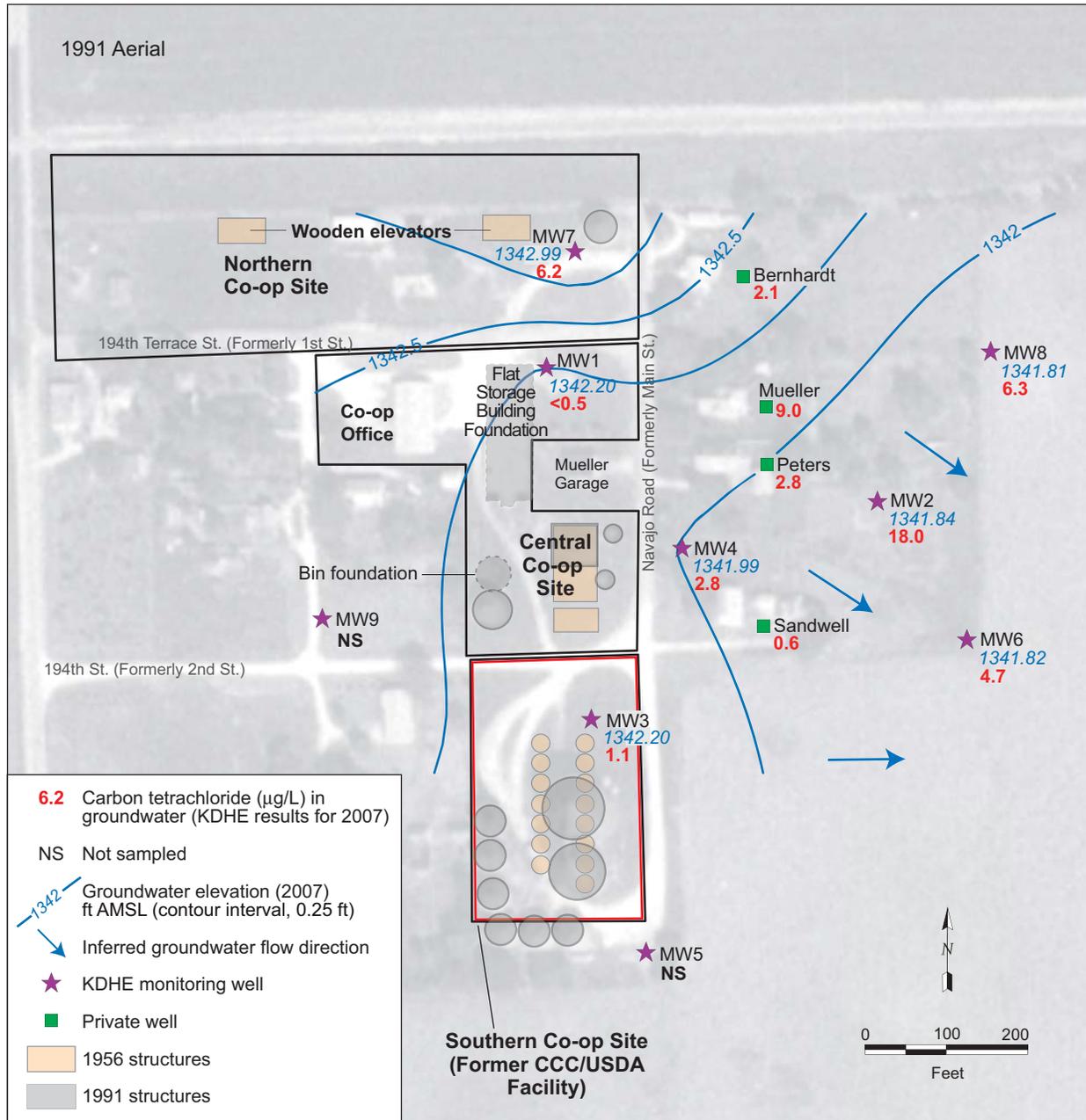


FIGURE 3.3 Structures at the Canada site, 2007 groundwater elevations with interpreted flow direction, and approximate locations of KDHE monitoring wells and private wells with 2007 monitoring results. Source of data: KDHE (2007a). Source of photograph: USGS (1991).

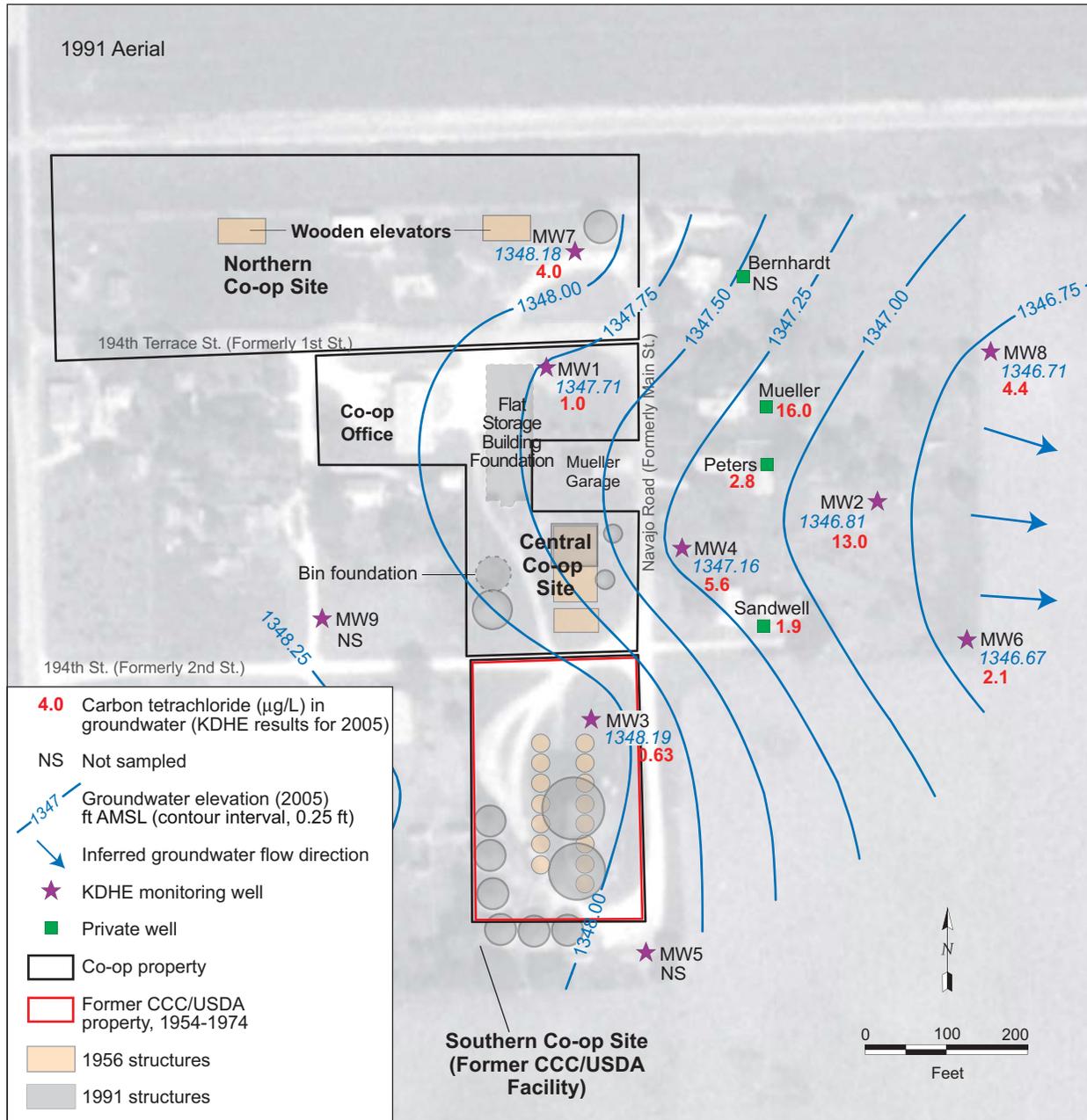


FIGURE 3.4 Structures at the Canada site, 2005 groundwater elevations with interpreted flow direction, and approximate locations of KDHE monitoring wells and private wells with 2005 monitoring results. Source of data: KDHE (2006). Source of photograph: USGS (1991).

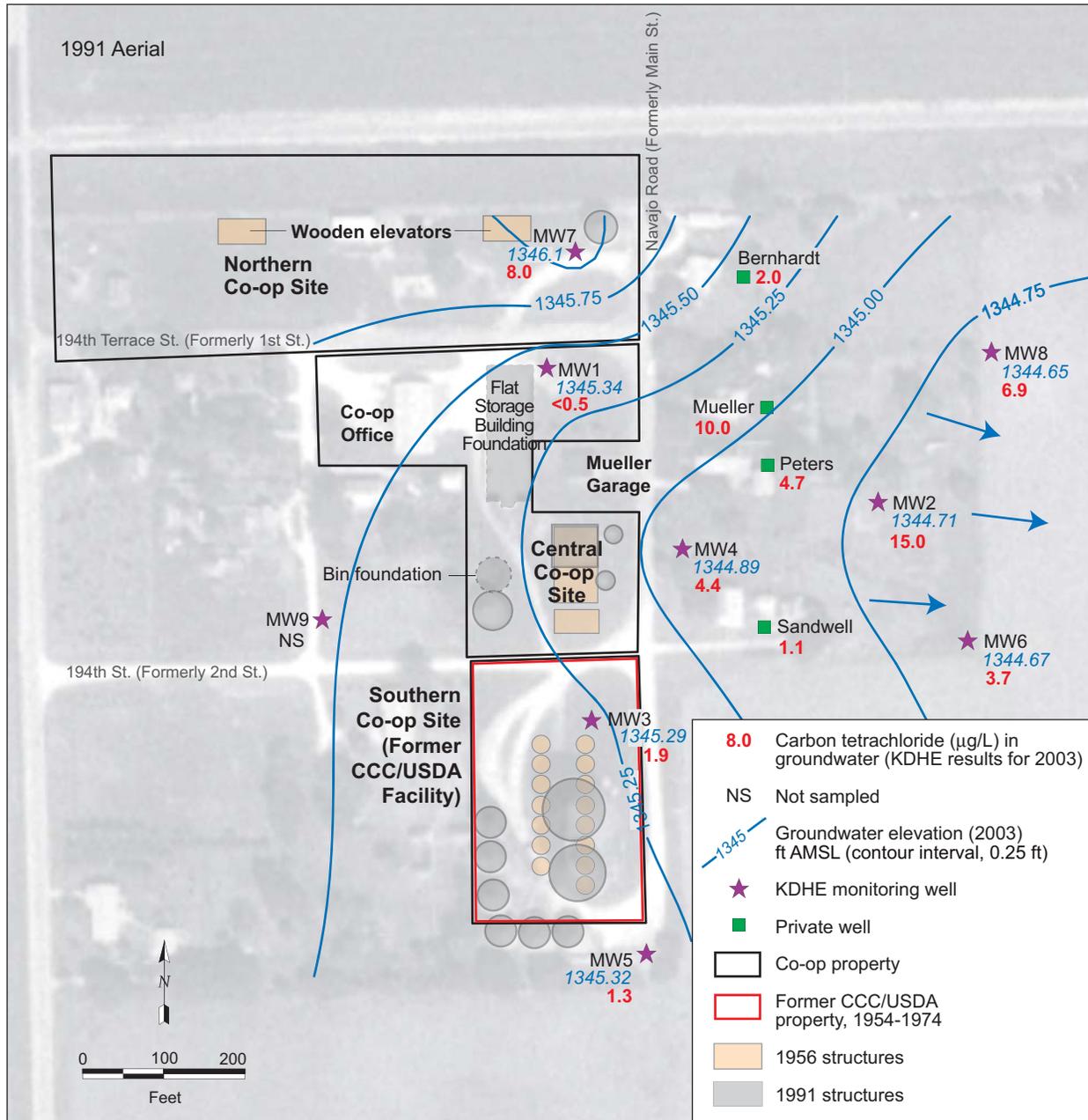


FIGURE 3.5 Structures at the Canada site, 2003 groundwater elevations with interpreted flow direction, and approximate locations of KDHE monitoring wells and private wells with 2003 monitoring results. Source of data: KDHE (2004). Source of photograph: USGS (1991).

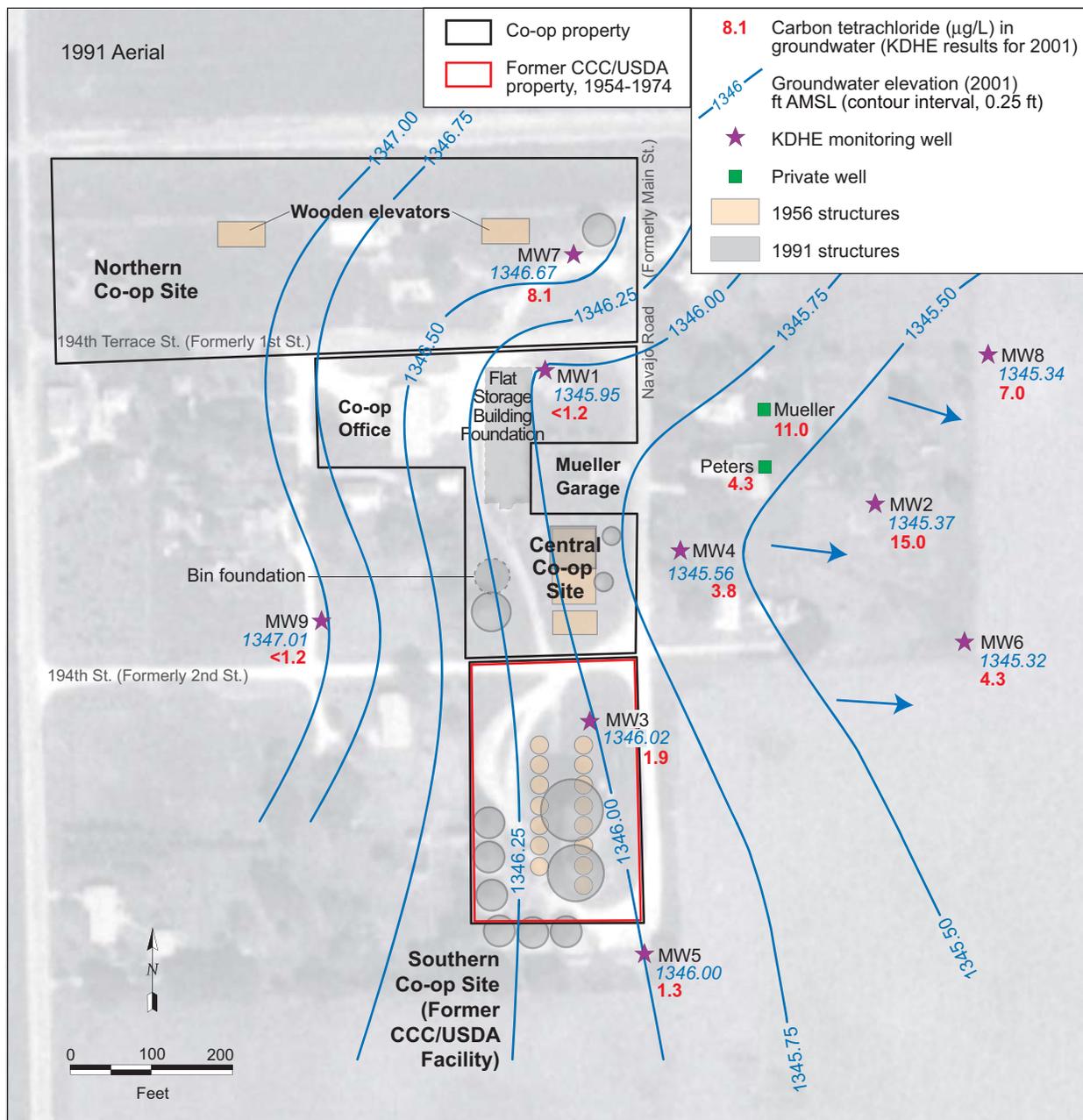


FIGURE 3.6 Structures at the Canada site, 2001 groundwater elevations with interpreted flow direction, and approximate locations of KDHE monitoring wells and private wells with 2001 monitoring results. Source of data: KDHE (2001). Source of photograph: USGS (1991).

4 Conclusions

This evaluation of the KDHE's long-term monitoring data for the period 2001–2007, along with prior investigational data, indicates that the former CCC/USDA facility is an unlikely source for the carbon tetrachloride contamination persistently detected at levels above the MCL at the Canada site. This conclusion is based on the following findings:

- The groundwater flow direction has been persistently measured by the KDHE (2001–2007) as being to the east or east-southeast. This flow direction places the wells with the overall highest concentrations of carbon tetrachloride (e.g., the Mueller and Peters private wells and monitoring wells MW2, MW7, and MW8) downgradient from the northern and central co-op sites, but not downgradient from the former CCC/USDA property. (See Figures 3.3–3.6.)
- During the KDHE's six-year monitoring period (2001–2007), the contaminant level in MW3 (on the former CCC/USDA property) remained well below the MCL of 5.0 µg/L, with a concentration of 1.1 µg/L measured in the most recent sampling in February 2007.
- In KDHE soil sampling in 1999, carbon tetrachloride was detected in only one of five soil samples collected between and next to the rows of former CCC/USDA grain bins, at the very low level of 0.2 µg/kg (the method detection limit). Contamination around bin doorways and foundations would most likely be due to CCC/USDA activities. The absence of such a contamination pattern suggests a different source. Carbon tetrachloride was identified with greater frequency (in four of seven samples) and at higher levels (0.2, 0.3, 0.3, and 0.9 µg/kg) in soil samples collected north of the former CCC/USDA grain bin array. The co-op has occupied the property to the north of the former CCC/USDA property for an extended period and has occupied the former CCC/USDA property since at least 1974.
- The relatively stable levels of carbon tetrachloride in monitoring wells MW2, MW4, and MW8, downgradient from the flat storage building formerly on the co-op property, suggest the presence of a soil source in the vicinity of that building.

- The fumigant compounds 1,2-dichloroethane, ethylene dibromide, and tetrachloroethylene were detected in wells downgradient from the central co-op grain storage structures (specifically the now-demolished flat storage building), but not on or downgradient from the former CCC/USDA property. The distribution of these compounds is consistent with a contaminant source other than the former CCC/USDA facility.
- The unique detection of the fumigant compound ethylene dibromide, found only in well MW7 in the KDHE's 2003 and 2005 sampling (Table 3.4), is a potentially significant finding. Well MW7 is downgradient from the former wooden elevators on the northern co-op site, but it is not downgradient from the co-op's former flat storage building or from the former CCC/USDA property (Figures 3.3-3.6). The relatively stable levels of carbon tetrachloride at MW7 (Table 3.4) suggest the presence of a soil source in the vicinity of the former wooden elevators. The presence of ethylene dibromide *at only this location* further suggests that a different fumigant mixture was used at the former wooden elevators than was used subsequently at the former flat storage building.
- Fuel-related compounds identified at trace levels in the Sandwell private well in 1998 and in monitoring wells MW1, MW4, and MW7 in 2003 and 2005 could be related to a documented release from an underground storage tank at the co-op in 1991 (KDHE 2004, 2007b). Such a connection would demonstrate the viability of a contaminant migration pathway from the co-op to wells to the east.
- KDHE policy BER-RS-024, Rev. 2001, Section I (Groundwater and Surface Water Criteria), indicates the following: "Status reclassification may be granted after monitoring demonstrates cleanup goals have been achieved and maintained for four (4) consecutive, equally time-sequenced sampling episodes conducted under KDHE oversight over a period of no less than two (2) years. . . ." The KDHE policy, Section III (Other Considerations), further provides the following: "If the above six (6) criteria do not apply to a site, the PRP may elect to submit to KDHE/BER a Reclassification Petition, including a Reclassification Report as outlined below, that identifies and justifies a

rationale for reclassifying the site to *Resolved* status on the ISL despite failure to satisfy the criteria identified above. KDHE will make the final determination concerning reclassification of the site on the ISL and will document that decision accordingly.”

The KDHE has conducted seven sampling events at the Canada site over a period of six years, at approximately annual intervals (except for the two-year gap between the December 2003 and December 2005 events). In this KDHE sampling, monitoring well MW3, on the former CCC/USDA property, has exhibited the following carbon tetrachloride concentrations:

1.6 µg/L (January 5, 2001)

1.4 µg/L (March 20, 2001)

1.9 µg/L (October 25, 2001)

2.9 µg/L (December 12, 2002)

1.9 µg/L (December 29, 2003)

0.63 µg/L (December 2, 2005)

1.1 µg/L (February 20, 2007)

These results, which are all well below the MCL of 5.0 µg/L, demonstrate that groundwater on the former CCC/USDA property at Canada has met the standard for carbon tetrachloride in drinking water since 2001 and does not pose a significant human health threat. The results warrant a request for reclassification of the Canada site to *Resolved* status on the KDHE's Identified Sites List, under Section III (Other Considerations) of KDHE policy BER-RS-024, Rev. 2001.

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Appendix A:

**Well Registration Forms and Drilling Records
for Canada Area Wells**

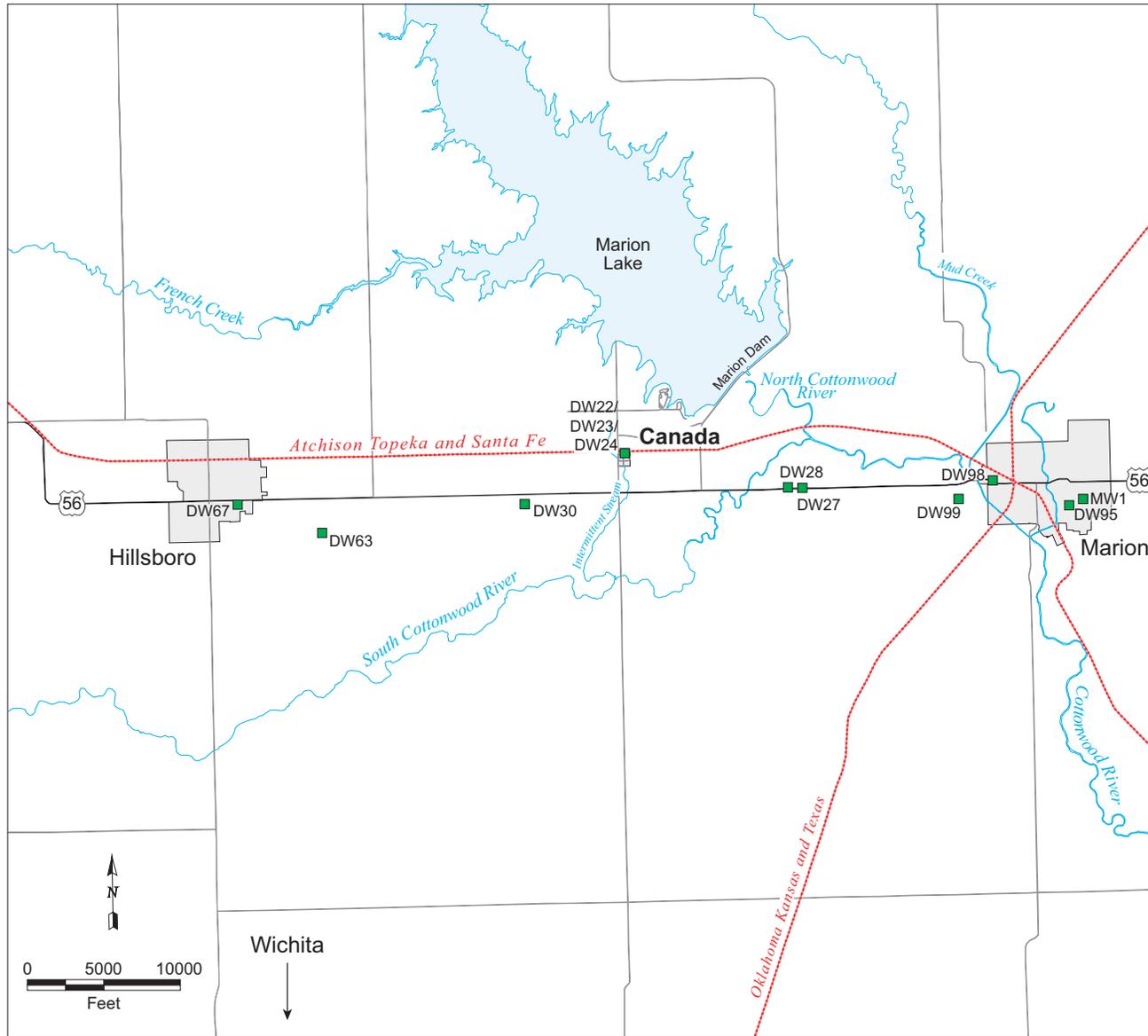


FIGURE A.1 Locations of registered wells in the Canada area.

USE TYPEWRITER OR BALL
POINT PEN-PRESS FIRMLY,
PRINT CLEARLY.

WATER WELL RECORD
KSA 82a-1201-1215

DW22
Kansas Department of Health and
Environment-Division of Environment
(Water well Contractors)
Topeka, Kansas 66620

1. Location of well:		County Marion	Fraction SW 1/4 SW 1/4 NW 1/4	Section number 33	Township number T 19 S R 3 E	Range number 3
2. Distance and direction from nearest town or city: SE 1/2 N Hillsboro			3. Owner of well: George Galliant R.R. or street: BR City, state, zip code: Marion, Mo.			
4. Locate with "X" in section below:		Sketch map:		6. Bore hole dia. _____ in. Completion dgte Well depth 60 ft. 10-16-78		
				7. <input checked="" type="checkbox"/> Cable tool <input type="checkbox"/> Rotary <input type="checkbox"/> Driven <input type="checkbox"/> Dug <input type="checkbox"/> Hollow rod <input type="checkbox"/> Jetted <input type="checkbox"/> Bored <input type="checkbox"/> Reverse rotary		
5. Type and color of material		From	To	8. Use: <input checked="" type="checkbox"/> Domestic <input type="checkbox"/> Public supply <input type="checkbox"/> Industry <input type="checkbox"/> Irrigation <input type="checkbox"/> Air conditioning <input type="checkbox"/> Stock <input type="checkbox"/> Lawn <input type="checkbox"/> Oil field water <input type="checkbox"/> Other		
				9. Casing: Material Styrene Above <input type="checkbox"/> Below <input type="checkbox"/> Threaded _____ Welded _____ Surface 72 in. RMP _____ PVC _____ Weight _____ lbs./ft. Dia. 5 in. to 60 ft. depth Wall Thickness: inches or Dia. _____ in. to _____ ft. depth Gage No. 200 wall		
				10. Screens: Manufacturer's name _____ Type Styrene Dia. 5" Slot/gauze 10 Length 15 Set between 4.5 ft. and 60 ft. ft. and _____ ft. Gravel pack? <input checked="" type="checkbox"/> Size range of material 1/4-2		
				11. Static water level: _____ mo./day/yr. 12 ft. below land surface Date 10-16-78		
				12. Pumping level below land surfaces: _____ ft. after _____ hrs. pumping _____ g.p.m. _____ ft. after _____ hrs. pumping _____ g.p.m. Estimated maximum yield _____ g.p.m.		
				13. Water sample submitted: _____ mo./day/yr. <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Date _____		
				14. Well head completion: <input checked="" type="checkbox"/> Pitless adapter _____ inches above grade		
				15. Well grouted? _____ With: <input checked="" type="checkbox"/> Neoprene <input type="checkbox"/> Bentonite <input type="checkbox"/> Concrete Depth: From 3 ft. to 13 ft.		
				16. Nearest source of possible contamination: Sept. tank ft. 70 Direction NE Type Tank Well disinfected upon completion? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		
				17. Pump: Manufacturer's name _____ <input checked="" type="checkbox"/> Not installed Model number _____ HP _____ Volts _____ Length of drop pipe _____ ft. capacity _____ g.p.m. Type: <input type="checkbox"/> Submersible <input type="checkbox"/> Turbine <input type="checkbox"/> Jet <input type="checkbox"/> Reciprocating <input type="checkbox"/> Centrifugal <input type="checkbox"/> Other		
18. Elevation:		19. Remarks:		20. Water well contractor's certification: This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief. Backhus Drilling Business name _____ License No. _____ Address Jamba, Mo. Signed Paul Backhus Date 10-16-78 Authorized representative		
Topography: <input type="checkbox"/> Hill <input type="checkbox"/> Slope <input checked="" type="checkbox"/> Upland <input type="checkbox"/> Valley						

Forward the white, blue and pink copies to the Department of Health and Environment

Form WWC-5

USE TYPEWRITER OR BALL POINT PEN-PRESS FIRMLY, PRINT CLEARLY.

DW23

WATER WELL RECORD
KSA 82a-1201-1215

Kansas Department of Health and Environment-Division of Environment
(Water well Contractors)
Topeka, Kansas 66620

1. Location of well:		County <i>Marion</i>	Fraction <i>SW 1/4 Sec 33 T 19 S R 3</i>	Section number <i>33</i>	Township number <i>T 19 S</i>	Range number <i>R 3 E</i>
2. Distance and direction from nearest town or city: Street address of well location if in city:		<i>5 E 1/2 N Hillsboro</i>		3. Owner of well: R.R. or street: City, state, zip code:		
4. Locate with "X" in section below: Sketch map:				6. Bore hole dia. _____ in. Completion date Well depth <i>67</i> ft. <i>10-13-78</i>		
5. Type and color of material		From	To	7. <input checked="" type="checkbox"/> Cable tool _____ Rotary _____ Driven _____ Dug _____ Hollow rod _____ Jetted _____ Bored _____ Reverse rotary		
<i>Top Soil</i>		<i>0</i>	<i>2</i>	8. Use: <input checked="" type="checkbox"/> Domestic _____ Public supply _____ Industry _____ Irrigation _____ Air conditioning _____ Stock _____ Lawn _____ Oil field water _____ Other		
<i>Yellow Clay + Shale</i>		<i>2</i>	<i>34</i>	9. Casing: Material <i>Styrene</i> _____ Weight _____ lbs./ft. Threading _____ Welded _____ Surface _____ in. RMP _____ PVC _____ Weight _____ lbs./ft. Dia. <i>5</i> in. to _____ ft. depth Wall Thickness: inches or Dia. _____ in. to _____ ft. depth Gage No. <i>200 wall</i>		
<i>Some Water</i>		<i>34</i>	<i>35</i>	10. Screen: Manufacturer's name _____ Type <i>Styrene</i> Dia. <i>5"</i> Slot/gauze _____ Length <i>10</i> Set between <i>59</i> ft. and <i>69</i> ft. ft. and _____ ft. Gravel pack? <input checked="" type="checkbox"/> Size range of material <i>4-30</i>		
<i>Blue Shale</i>		<i>35</i>	<i>62</i>	11. Static water level: _____ mo./day/yr. _____ ft. below land surface Date _____		
<i>Water</i>		<i>62</i>	<i>63</i>	12. Pumping level below land surfaces: _____ ft. after _____ hrs. pumping _____ g.p.m. _____ ft. after _____ hrs. pumping _____ g.p.m. Estimated maximum yield _____ g.p.m.		
<i>Rock</i>		<i>63</i>	<i>64</i>	13. Water sample submitted: _____ mo./day/yr. Yes _____ No _____ Date _____		
(Use a second sheet if needed)				14. Well head completion: <input checked="" type="checkbox"/> Pitless adapter _____ inches above grade		
				15. Well grouted? <input checked="" type="checkbox"/> With: <input checked="" type="checkbox"/> Neat cement _____ Bentonite _____ Concrete Depth: From <i>3</i> ft. to <i>13</i> ft.		
				16. Nearest source of possible contamination: _____ Septic ft. <i>60</i> Direction <i>E</i> Type <i>Septic</i> Well disinfected upon completion? <input checked="" type="checkbox"/> Yes _____ No		
				17. Pump: Manufacturer's name _____ Not installed Model number _____ HP _____ Volts _____ Length of drop pipe _____ ft. capacity _____ g.p.m. Type: _____ Submersible _____ Turbine _____ Jet _____ Reciprocating _____ Centrifugal _____ Other		
18. Elevation:	19. Remarks:		20. Water well contractor's certification: This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief. <i>Backhus Drg. 180</i> Business name _____ License No. _____ Address <i>Jampa, Ia</i> Signed <i>Paul Backhus</i> Date <i>10-16-78</i> Authorized representative			

Forward the white, blue and pink copies to the Department of Health and Environment

Form WWC-5

WATER WELL RECORD Form WWC-5 KSA 82a-1212 DW24

LOCATION OF WATER WELL	Fraction	Section Number	Township Number	Range Number
County: <u>Marion</u>	<u>SW 1/4 SW 1/4 NW 1/4</u>	<u>33</u>	T <u>19</u> S	R <u>3</u> E <u>10</u>
State and direction from nearest town or city?		Street address of well if located within city?		
WATER WELL OWNER: <u>Jay Dean Schroder</u>				
Rt. #, St. Address, Box # : <u>RR 4</u>		Board of Agriculture, Division of Water Resources		
City, State, ZIP Code : <u>Marion, KS 66861</u>		Application Number:		
DEPTH OF COMPLETED WELL: <u>64</u> ft. Bore Hole Diameter: <u>9</u> in. to <u>15</u> ft., and <u>7</u> in. to <u>68</u> ft.				
Well Water to be used as:				
<input type="checkbox"/> 1 Domestic <input type="checkbox"/> 3 Feedlot <input type="checkbox"/> 6 Oil field water supply <input type="checkbox"/> 9 Dewatering <input type="checkbox"/> 12 Other (Specify below) <input type="checkbox"/> 2 Irrigation <input type="checkbox"/> 4 Industrial <input checked="" type="checkbox"/> 7 Lawn and garden only <input type="checkbox"/> 10 Observation well				
Well's static water level: <u>15</u> ft. below land surface measured on <u>10</u> month <u>6</u> day <u>79</u> year				
Pump Test Data: Well water was _____ ft. after _____ hours pumping _____ gpm				
St. Yield <u>40</u> gpm: Well water was _____ ft. after _____ hours pumping _____ gpm				
TYPE OF BLANK CASING USED:				
<input type="checkbox"/> 1 Steel <input type="checkbox"/> 3 RMP (SR) <input type="checkbox"/> 6 Asbestos-Cement <input type="checkbox"/> 9 Other (specify below) Casing Joints: <input checked="" type="checkbox"/> Glued <input type="checkbox"/> Clamped <input type="checkbox"/> 2 PVC <input type="checkbox"/> 4 ABS <input type="checkbox"/> 7 Fiberglass <input type="checkbox"/> 8 Concrete tile <input type="checkbox"/> Welded <input type="checkbox"/> 5 Wrought iron <input type="checkbox"/> 10 Observation well <input type="checkbox"/> Threaded				
Blank casing dia: <u>5</u> in. to <u>2.5</u> ft., Dia <u>5</u> in. to <u>5.0</u> ft., Dia _____ in. to _____ ft.				
Casing height above land surface: <u>13</u> in., weight <u>1.2</u> lbs./ft. Wall thickness or gauge No. <u>200 wall</u>				
TYPE OF SCREEN OR PERFORATION MATERIAL:				
<input type="checkbox"/> 1 Steel <input type="checkbox"/> 3 Stainless steel <input type="checkbox"/> 5 Fiberglass <input type="checkbox"/> 8 RMP (SR) <input type="checkbox"/> 10 Asbestos-cement <input type="checkbox"/> 2 Brass <input type="checkbox"/> 4 Galvanized steel <input type="checkbox"/> 6 Concrete tile <input type="checkbox"/> 9 ABS <input type="checkbox"/> 11 Other (specify) <u>Styrene</u> <input type="checkbox"/> 12 None used (open hole)				
Screen or Perforation Openings Are:				
<input type="checkbox"/> 1 Continuous slot <input type="checkbox"/> 3 Mill slot <input type="checkbox"/> 5 Gauzed wrapped <input type="checkbox"/> 8 Saw cut <input type="checkbox"/> 11 None (open hole) <input type="checkbox"/> 2 Louvered shutter <input type="checkbox"/> 4 Key punched <input type="checkbox"/> 6 Wire wrapped <input type="checkbox"/> 9 Drilled holes <input type="checkbox"/> 10 Other (specify)				
Screen-Perforation Dia: <u>5</u> in. to _____ ft., Dia _____ in. to _____ ft.				
Screen-Perforated Intervals: From <u>2.5</u> ft. to <u>3.5</u> ft., From _____ ft. to _____ ft.				
From <u>3.0</u> ft. to <u>6.4</u> ft., From _____ ft. to _____ ft.				
Gravel Pack Intervals: From _____ ft. to _____ ft., From _____ ft. to _____ ft.				
From <u>14</u> ft. to <u>64</u> ft., From _____ ft. to _____ ft.				
GROUT MATERIAL:				
<input type="checkbox"/> 1 Neat cement <input type="checkbox"/> 2 Cement grout <input type="checkbox"/> 3 Bentonite <input type="checkbox"/> 4 Other <input type="checkbox"/> 5 Wrought iron <input type="checkbox"/> 6 Wire wrapped <input type="checkbox"/> 7 Sewage lagoon <input type="checkbox"/> 8 Fuel storage <input type="checkbox"/> 9 Abandoned water well <input type="checkbox"/> 10 Observation well <input type="checkbox"/> 11 Other (specify below)				
Grouted Intervals: From <u>4</u> ft. to <u>14</u> ft., From _____ ft. to _____ ft., From _____ ft. to _____ ft.				
What is the nearest source of possible contamination:				
<input type="checkbox"/> 1 Septic tank <input type="checkbox"/> 4 Cess pool <input type="checkbox"/> 7 Sewage lagoon <input type="checkbox"/> 10 Fuel storage <input type="checkbox"/> 14 Abandoned water well <input type="checkbox"/> 2 Sewer lines <input type="checkbox"/> 5 Seepage pit <input type="checkbox"/> 8 Feed yard <input type="checkbox"/> 11 Fertilizer storage <input type="checkbox"/> 15 Oil well/Gas well <input type="checkbox"/> 3 Lateral lines <input type="checkbox"/> 6 Pit privy <input type="checkbox"/> 9 Livestock pens <input type="checkbox"/> 12 Insecticide storage <input type="checkbox"/> 16 Other (specify below)				
Direction from well: <u>SW</u> How many feet: <u>50</u> ft. ? Water Well Disinfected? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>				
Was a chemical/bacteriological sample submitted to Department? Yes _____ No <input checked="" type="checkbox"/> If yes, date sample submitted: _____ month _____ day _____ year: Pump Installed? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>				
Yes: Pump Manufacturer's name _____ Model No. _____ HP _____ Volts _____				
Depth of Pump Intake _____ ft. Pumps Capacity rated at _____ gal./min.				
Type of pump: <input type="checkbox"/> 1 Submersible <input type="checkbox"/> 2 Turbine <input type="checkbox"/> 3 Jet <input type="checkbox"/> 4 Centrifugal <input type="checkbox"/> 5 Reciprocating <input type="checkbox"/> 6 Other				
CONTRACTOR'S OR LANDOWNER'S CERTIFICATION: This water well was (1) constructed, (2) reconstructed, or (3) plugged under my jurisdiction and was completed on <u>10</u> month <u>6</u> day <u>79</u> year				
and this record is true to the best of my knowledge and belief. Kansas Water Well Contractor's License No. <u>100</u>				
This Water Well Record was completed on <u>10</u> month <u>15</u> day <u>79</u> year under the business name of <u>Backhus Drilling</u> by (signature) <u>Paul Backhus</u>				
LOCATE WELL'S LOCATION WITH AN "X" IN SECTION BOX:		LITHOLOGIC LOG		
		FROM	TO	LITHOLOGIC LOG
		0	3	Top Soil
		3	22	Yellow Clay
		22	23	Some water
		23	35	Blue Shale
		55	56	Water
56	64	Blue Shale		
ELEVATION:				
Depth(s) Groundwater Encountered 1. _____ ft. 2. _____ ft. 3. _____ ft. 4. _____ ft. (Use a second sheet if needed)				

INSTRUCTIONS: Use typewriter or ball point pen, please press firmly and PRINT clearly. Please fill in blanks, underline or circle the correct answers. Send top three copies to Kansas Department of Health and Environment, Division of Environment, Water Well Contractors, Topeka, KS 66620. Send one to WATER WELL OWNER and retain one for your records.

DW27

WATER WELL RECORD Form WWC-5 KSA 82a-1212

LOCATION OF WATER WELL: County: <u>Marion</u>	Fraction: <u>Ne 1/4 NW 1/4 NW 1/4</u>	Section Number: <u>2</u>	Township Number: <u>T 20 S</u>	Range Number: <u>R 3 E</u>
--	---------------------------------------	--------------------------	--------------------------------	----------------------------

Address and direction from nearest town or city street address of well if located within city?
234 W Marion

WATER WELL OWNER: Lawrence Winkley
R#, St. Address, Box #: BRI
City, State, ZIP Code: Marion, KS, 66261

Board of Agriculture, Division of Water Resources
Application Number:

LOCATE WELL'S LOCATION WITH AN "X" IN SECTION BOX:

N		E	
X			
NW	NE		
W			E
		SW	SE
S			

DEPTH OF COMPLETED WELL: 52 ft. ELEVATION: _____
 Depth(s) Groundwater Encountered: 1. 47 ft. 2. _____ ft. 3. _____ ft.
 WELL'S STATIC WATER LEVEL: 35 ft. below land surface measured on mo/day/yr 9-5-20
 Pump test data: Well water was _____ ft. after _____ hours pumping _____ gpm
 Est. Yield: 20 gpm Well water was _____ ft. after _____ hours pumping _____ gpm
 Bore Hole Diameter: 2 1/2 in. to 52 ft., and _____ in. to _____ ft.
 WELL WATER TO BE USED AS:
 1 Domestic 3 Feedlot 6 Oil field water supply 9 Dewatering 12 Other (Specify below) _____
 2 Irrigation 4 Industrial 7 Lawn and garden only 10 Monitoring well

Was a chemical/bacteriological sample submitted to Department? Yes _____ No If yes, mo/day/yr sample was submitted _____
 Water Well Disinfected? Yes No _____

TYPE OF BLANK CASING USED:
 1 Steel 3 RMP (SR) 6 Asbestos-Cement 9 Other (specify below) _____
 2 PVC 4 ABS 7 Fiberglass _____
 Casing diameter: 5 in. to 40 in. Dia. _____ in. to _____ ft. Dia. _____ in. to _____ ft.
 Casing height above land surface: 12 in., weight: C1099160 lbs./ft. Wall thickness or gauge No. 214

TYPE OF SCREEN OR PERFORATION MATERIAL:
 1 Steel 3 Stainless steel 5 Fiberglass 8 RMP (SR) 11 Other (specify) _____
 2 Brass 4 Galvanized steel 6 Concrete tile 9 ABS 12 None used (open hole) _____

SCREEN OR PERFORATION OPENINGS ARE:
 1 Continuous slot 3 Mill slot 6 Wire wrapped 9 Drilled holes 11 None (open hole) _____
 2 Louvered shutter 4 Key punched 7 Torch cut 10 Other (specify) _____

SCREEN-PERFORATED INTERVALS: From 40 ft. to 52 ft., From _____ ft. to _____ ft.
 From _____ ft. to _____ ft., From _____ ft. to _____ ft.
 GRAVEL PACK INTERVALS: From 23 ft. to 52 ft., From _____ ft. to _____ ft.
 From _____ ft. to _____ ft., From _____ ft. to _____ ft.

GROUT MATERIAL: 3 Neat cement 2 Cement grout 3 Bentonite 4 Other Hole Plug
 Grout intervals: From 23 ft. to _____ ft., From _____ ft. to _____ ft.

What is the nearest source of possible contamination:
 1 Septic tank 4 Lateral lines 7 Pit privy 11 Fuel storage 14 Abandoned water well
 2 Sewer lines 5 Cess pool 8 Sewage lagoon 12 Fertilizer storage 15 Oil well/Gas well
 3 Watertight sewer lines 6 Seepage pit 9 Feedyard 13 Insecticide storage 16 Other (specify below) _____

Direction from well? SE How many feet? 50 +

FROM	TO	LITHOLOGIC LOG	FROM	TO	PLUGGING INTERVALS
<u>0</u>	<u>2</u>	<u>Clay</u>			
<u>2</u>	<u>18</u>	<u>Lime</u>			
<u>18</u>	<u>28</u>	<u>Blue Shale</u>			
<u>28</u>	<u>36</u>	<u>yellow Shale</u>			
<u>36</u>	<u>42</u>	<u>Red Shale</u>			
<u>42</u>	<u>47</u>	<u>yellow "</u>			
<u>47</u>	<u>48</u>	<u>Water</u>			
<u>48</u>	<u>52</u>	<u>Gray Rock</u>			

CONTRACTOR'S OR LANDOWNER'S CERTIFICATION: This water well was (1) constructed, (2) reconstructed, or (3) plugged under my jurisdiction and was completed on (mo/day/year) 9-5-20 and this record is true to the best of my knowledge and belief. Kansas Water Well Contractor's License No. 100 This Water Well Record was completed on (mo/day/yr) 9-13-20 under the business name of Backhus Drilling by (signature) Paul H. Backhus

INSTRUCTIONS: Use typewriter or ball point pen. PLEASE PRESS FIRMLY and PRINT clearly. Please fill in blanks, underline or circle the correct answers. Send top three copies to Kansas Department of Health and Environment, Bureau of Water Protection, Topeka, Kansas 66620-7320. Telephone: 913-296-5514. Send one to WATER WELL OWNER and retain one for your records.

WATER WELL RECORD Form WWC-5 KSA 82a-1212 DW28

LOCATION OF WATER WELL: County: <u>Marion</u>	Fraction: <u>NW 1/4 NW 1/4 NW 1/4</u>	Section Number: <u>2</u>	Township Number: <u>T 20 S</u>	Range Number: <u>R 3 E</u>
Address and direction from nearest town or city street address of well if located within city? <u>3 W 1/2 S Marion</u>				
WATER WELL OWNER: <u>Ed Schreder</u>				
R#, St. Address, Box # : <u>520 N Locust</u>			Board of Agriculture, Division of Water Resources	
City, State, ZIP Code : <u>Marion KS, 66861</u>			Application Number:	

LOCATE WELL'S LOCATION WITH AN "X" IN SECTION BOX:

N		E	
W	X		
S			

4) DEPTH OF COMPLETED WELL: 6.5 ft. ELEVATION: _____

Depth(s) Groundwater Encountered 1 _____ ft. 2 _____ ft. 3 _____ ft.

WELL'S STATIC WATER LEVEL: 4.0 ft. below land surface measured on 8-10-01

Pump test data: Well water was _____ ft. after _____ hours pumping _____ gpm

Est. Yield: 2.5 gpm; Well water was _____ ft. after _____ hours pumping _____ gpm

Bore Hole Diameter: 9 in. to 1.5 ft. and 7 in. to 6.5 ft.

WELL WATER TO BE USED AS:

1 Domestic	3 Feedlot	6 Oil field water supply	9 Dewatering	12 Other (Specify below)
2 Irrigation	4 Industrial	7 Lawn and garden only	10 Observation well	

Was a chemical/bacteriological sample submitted to Department? Yes _____ No X; If yes, mo/day/yr sample was submitted _____

Water Well Disinfected? Yes X No _____

TYPE OF BLANK CASING USED:

1 Steel	3 RMP (SR)	6 Asbestos-Cement	9 Other (specify below)	Welded _____
2 PVC	4 ABS	7 Fiberglass		Threaded _____

CASING JOINTS: Glued X Clamped _____

Blank casing diameter: 5 in. to 4.5 in. Dia _____ ft. Dia _____ ft.

Casing height above land surface: 12 in. weight 16.0 lbs./ft. Wall thickness or gauge No. 160

TYPE OF SCREEN OR PERFORATION MATERIAL:

1 Steel	3 Stainless steel	5 Fiberglass	8 RMP (SR)	11 Other (specify) _____
2 Brass	4 Galvanized steel	6 Concrete tile	9 ABS	12 None used (open hole)

SCREEN OR PERFORATION OPENINGS ARE:

1 Continuous slot	3 Mill slot	5 Gauzed wrapped	8 Saw cut	11 None (open hole)
2 Louvered shutter	4 Key punched	6 Wire wrapped	9 Drilled holes	
		7 Torch cut	10 Other (specify) _____	

SCREEN-PERFORATED INTERVALS: From 4.5 ft. to 6.5 ft., From _____ ft. to _____ ft.

GRAVEL PACK INTERVALS: From 10 ft. to 6.5 ft., From _____ ft. to _____ ft.

FROM _____ ft. to _____ ft., From _____ ft. to _____ ft.

GRAVEL PACK INTERVALS: From _____ ft. to _____ ft., From _____ ft. to _____ ft.

FROM _____ ft. to _____ ft., From _____ ft. to _____ ft.

GROUT MATERIAL: 1 Neat cement 2 Cement grout 3 Bentonite 4 Other _____

Grout intervals: From 0 ft. to 10 ft., From _____ ft. to _____ ft.

What is the nearest source of possible contamination:

1 Septic tank	4 Lateral lines	7 Pit privy	11 Fuel storage	15 Oil well/Gas well
2 Sewer lines	5 Cess pool	8 Sewage lagoon	12 Fertilizer storage	16 Other (specify below)
3 Watertight sewer lines	6 Seepage pit	9 Feedyard	13 Insecticide storage	<u>In Pressure</u>

10 Livestock pens 14 Abandoned water well

How many feet? _____

FROM	TO	LITHOLOGIC LOG	FROM	TO	LITHOLOGIC LOG
0	4	Clay			
4	22	Rock			
22	45	Yellow Shale			
45	55	Red Shale			
55	56	Water			
56	65	Red Shale			

CONTRACTOR'S OR LANDOWNER'S CERTIFICATION: This water well was (1) constructed, (2) reconstructed, or (3) plugged under my jurisdiction and was completed on (mo/day/year) 8-10-01 and this record is true to the best of my knowledge and belief. Kansas Water Well Contractor's License No. 180 This Water Well Record was completed on (mo/day/yr) 8-29-01 under the business name of Backhoe Drilling by (signature) Paul Goethel

INSTRUCTIONS: Use typewriter or ball point pen, PLEASE PRESS FIRMLY and PRINT clearly. Please fill in blanks, underline or circle the correct answers. Send top three copies to Kansas Department of Health and Environment, Division of Environment, Environmental Geology Section, Topeka, KS 66620. Send one to WATER WELL OWNER and retain one for your records.

WATER WELL RECORD Form WWC-5 KSA 82a-1212 DW30

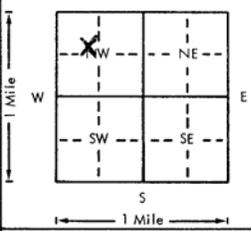
1 LOCATION OF WATER WELL:	Fraction	Section Number	Township Number	Range Number
County: Marion	NW ¼ NE ¼ NE ¼	6	T 20 S	R 3 E/W
Distance and direction from nearest town or city street address of well if located within city? 4 miles East of Hillsboro, KS				
2 WATER WELL OWNER: Linford Funk				
RR#, St. Address, Box # : Rt. 2, Box 100			Board of Agriculture, Division of Water Resources	
City, State, ZIP Code : Hillsboro, KS 67063			Application Number: N/A	
3 LOCATE WELL'S LOCATION WITH AN "X" IN SECTION BOX:		4 DEPTH OF COMPLETED WELL 55 ft. ELEVATION:		
		Depth(s) Groundwater Encountered 1. ft. 2. ft. 3. ft.		
		WELL'S STATIC WATER LEVEL 22 ft. below land surface measured on mo/day/yr 3/23/98		
Pump test data: Well water was ft. after hours pumping gpm				
Est. Yield 10 gpm: Well water was ft. after hours pumping gpm				
Bore Hole Diameter 9 in. to 58 ft., and in. to ft.				
WELL WATER TO BE USED AS:				
<input checked="" type="checkbox"/> Domestic 3 Feedlot 6 Oil field water supply 9 Dewatering 12 Other (Specify below)				
<input type="checkbox"/> 2 Irrigation 4 Industrial 7 Lawn and garden only 10 Monitoring well				
Was a chemical/bacteriological sample submitted to Department? Yes No <input checked="" type="checkbox"/> If yes, mo/day/yr sample was submitted				
Water Well Disinfected? Yes <input checked="" type="checkbox"/> No				
5 TYPE OF BLANK CASING USED:				
<input type="checkbox"/> 1 Steel 3 RMP (SR) 5 Wrought iron 8 Concrete tile CASING JOINTS: Glued Clamped				
<input checked="" type="checkbox"/> 2 PVC 4 ABS 6 Asbestos-Cement 9 Other (specify below) Welded				
<input type="checkbox"/> 7 Fiberglass Threaded.				
Blank casing diameter 5 in. to 45 ft., Dia in. to ft., Dia in. to ft.				
Casing height above land surface 12 in., weight 2.37 lbs./ft. Wall thickness or gauge No. 214				
TYPE OF SCREEN OR PERFORATION MATERIAL:				
<input checked="" type="checkbox"/> PVC 10 Asbestos-cement				
<input type="checkbox"/> 1 Steel 3 Stainless steel 5 Fiberglass 8 RMP (SR) 11 Other (specify)				
<input type="checkbox"/> 2 Brass 4 Galvanized steel 6 Concrete tile 9 ABS 12 None used (open hole)				
SCREEN OR PERFORATION OPENINGS ARE:				
<input type="checkbox"/> 1 Continuous slot <input checked="" type="checkbox"/> Mill slot 5 Gauzed wrapped 8 Saw cut 11 None (open hole)				
<input type="checkbox"/> 2 Louvered shutter 4 Key punched 6 Wire wrapped 9 Drilled holes				
<input type="checkbox"/> 7 Torch cut 10 Other (specify)				
SCREEN-PERFORATED INTERVALS: From 45 ft. to 55 ft., From ft. to ft.				
GRAVEL PACK INTERVALS: From 20 ft. to 55 ft., From ft. to ft.				
6 GROUT MATERIAL: 1 Neat cement 2 Cement grout <input checked="" type="checkbox"/> Bentonite 4 Other				
Grout Intervals: From 0 ft. to 20 ft., From ft. to ft., From ft. to ft.				
What is the nearest source of possible contamination:				
<input checked="" type="checkbox"/> Septic tank 4 Lateral lines 7 Pit privy 10 Livestock pens 14 Abandoned water well				
<input type="checkbox"/> 2 Sewer lines 5 Cess pool 8 Sewage lagoon 11 Fuel storage 15 Oil well/Gas well				
<input type="checkbox"/> 3 Watertight sewer lines 6 Seepage pit 9 Feedyard 12 Fertilizer storage 16 Other (specify below)				
13 Insecticide storage				
Direction from well? West How many feet? 150				
FROM		TO		LITHOLOGIC LOG
FROM		TO		PLUGGING INTERVALS
0	2	Top Soil		
2	3	White Shale		
3	16	Tan Clay		
16	35	Soft Gray Shale		
35	55	Fractured Shale		
55	58	Hard Gray Shale		
7 CONTRACTOR'S OR LANDOWNER'S CERTIFICATION: This water well was <input checked="" type="checkbox"/> constructed, (2) reconstructed, or (3) plugged under my jurisdiction and was completed on (mo/day/year) 3/23/98 and this record is true to the best of my knowledge and belief. Kansas Water Well Contractor's License No. 138 This Water Well Record was completed on (mo/day/yr) 4/3/98 under the business name of Peterson Irrigation, Inc. by (signature) <i>Mike Peters</i>				
INSTRUCTIONS: Use typewriter or ball point pen. PLEASE PRESS FIRMLY and PRINT clearly. Please fill in blanks, underline or circle the correct answers. Send top three copies to Kansas Department of Health and Environment, Bureau of Water, Topeka, Kansas 66620-0001. Telephone: 913-296-5545. Send one to WATER WELL OWNER and retain one for your records.				

USE TYPEWRITER OR BALL
POINT PEN-PRESS FIRMLY,
PRINT CLEARLY.

DW63

WATER WELL RECORD
KSA 82a-1201-1215

Kansas Department of Health and
Environment-Division of Environment
(Water well Contractors)
Topeka, Kansas 66620

1. Location of well:		County Marion	Fraction SE 1/4 NW 1/4 NW 1/4	Section number 2	Township number T 20 S R 2	Range number 2	EW
2. Distance and direction from nearest town or city: Street address of well location if in city:		1 mile east of Hillboro		3. Owner of well: R.R. or street: City, state, zip code:			
4. Locate with "X" in section below: N W E S 1 Mile 1 Mile		Sketch map: 		6. Bore hole dia. <u>24</u> in. Completion date _____ Well depth <u>98</u> ft. <u>10/24/77</u>			
5. Type and color of material		From	To	7. <input type="checkbox"/> Cable tool <input type="checkbox"/> Rotary <input type="checkbox"/> Driven <input type="checkbox"/> Dug <input type="checkbox"/> Hollow rod <input type="checkbox"/> Jetted <input type="checkbox"/> Bored <input checked="" type="checkbox"/> Reverse rotary			
Top soil		0	6	8. Use: <input type="checkbox"/> Domestic <input type="checkbox"/> Public supply <input type="checkbox"/> Industry <input checked="" type="checkbox"/> Irrigation <input type="checkbox"/> Air conditioning <input type="checkbox"/> Stock <input type="checkbox"/> Lawn <input type="checkbox"/> Oil field water <input type="checkbox"/> Other			
Brown clay		6	35	9. Casing: Material <u>transit bands</u> Height: Above or below _____ Threaded _____ Welded _____ Surface <u>12</u> in. RMP _____ PVC _____ Weight <u>34</u> lbs./ft. Dia. <u>16</u> in. to _____ ft. depth Wall Thickness: inches or _____ Dia. _____ in. to _____ ft. depth gage No. <u>3/4</u>			
Buff clay and blue shale		35	93	10. Screen: Manufacturer's name _____ <u>Johnson Well Casing</u> Type _____ Dia. <u>16</u> Slot/gauze <u>1/8</u> Length <u>10'</u> Set between <u>88</u> ft. and <u>98</u> ft. Gravel pack? <u>Yes</u> Size range of material <u>1" to 2"</u>			
Gypsum rock (solid)		96	98	11. Static water level: _____ mo./day/yr. <u>24</u> ft. below land surface Date _____			
				12. Pumping level below land surfaces: _____ ft. after _____ hrs. pumping _____ g.p.m. _____ ft. after _____ hrs. pumping _____ g.p.m. Estimated maximum yield <u>340</u> g.p.m.			
				13. Water sample submitted: _____ mo./day/yr. <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Date _____			
				14. Well head completion: <input type="checkbox"/> Pitless adapter <u>12</u> inches above grade			
				15. Well grouted? <u>Yes</u> With: <input checked="" type="checkbox"/> Neat cement <input type="checkbox"/> Bentonite <input type="checkbox"/> Concrete Depth: From <u>0</u> ft. to <u>10</u> ft.			
				16. Nearest source of possible contamination: ft. <u>200'</u> Direction <u>east</u> Type <u>corral</u> Well disinfected upon completion? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No			
				17. Pump: <input checked="" type="checkbox"/> Not installed Manufacturer's name _____ Model number _____ HP _____ Volts _____ Length of drop pipe _____ ft. capacity _____ g.p.m. Type: <input type="checkbox"/> Submersible <input type="checkbox"/> Turbine <input type="checkbox"/> Jet <input type="checkbox"/> Reciprocating <input type="checkbox"/> Centrifugal <input type="checkbox"/> Other			
		(Use a second sheet if needed)					
18. Elevation:	19. Remarks:		20. Water well contractor's certification: This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief. <u>Rader Drilling Co.</u> <u>194</u> Business name License No. Address <u>Carlton, Kansas 67429</u> Signed <u>Bruce E. Rader</u> Date <u>6-22-78</u> Authorized representative				

Forward the white, blue and pink copies to the Department of Health and Environment

Form WWC-5

WATER WELL RECORD Form WWC-5 KSA 82a-1212

DW67

LOCATION OF WATER WELL	Fraction	Section Number	Township Number	Range Number
County: MARION	NE 1/4 NW 1/4 NW 1/4	3	T 20 S	R 2 EW
Distance and direction from nearest town or city? In Hillsboro		Street address of well if located within city?		

WATER WELL OWNER: **TABOR COLLEGE**
 R#, St. Address, Box # :
 City, State, ZIP Code : **Hillsboro, Kas**
 Board of Agriculture, Division of Water Resources
 Application Number:

DEPTH OF COMPLETED WELL: **94** ft. Bore Hole Diameter: **12 1/2** in. to **9.4** ft. and in. to ft.
 Well Water to be used as:
 1 Domestic 3 Feedlot 5 Public water supply 8 Air conditioning 11 Injection well
 2 Irrigation 4 Industrial 6 Oil field water supply 9 Dewatering 12 Other (Specify below)
 7 **Lawn and garden only** **Football Field** 10 Observation well
 Well's static water level: **37** ft. below land surface measured on **6** month **30** day **81** year
 Pump Test Data: Well water was **40** ft. after **3** hours pumping **40** gpm
 St. Yield: Well water was ft. after hours pumping gpm

TYPE OF BLANK CASING USED:
 1 Steel 3 RMP (SR) 5 Wrought iron 8 Concrete tile Casing Joints: Glued Clamped
 2 **PVC** 4 ABS 6 Asbestos-Cement 9 Other (specify below) Welded
 7 Fiberglass Threaded
 Blank casing dia: **8** in. to **4.8/9.4** in. Dia. in. to ft. Dia. in. to ft.
 Casing height above land surface: **18** in., weight lbs./ft. Wall thickness or gauge No.

TYPE OF SCREEN OR PERFORATION MATERIAL:
 1 Steel 3 Stainless steel 5 Fiberglass 8 RMP (SR) 10 Asbestos-cement
 2 Brass 4 Galvanized steel 6 Concrete tile 9 ABS 11 Other (specify)
 12 None used (open hole)
 Screen or Perforation Openings Are:
 1 Continuous slot 3 Mill slot 5 Gauzed wrapped **0.30** 8 **Saw cut** **shop** 11 None (open hole)
 2 Louvered shutter 4 Key punched 6 Wire wrapped 9 Drilled holes
 7 Torch cut 10 Other (specify)
 Screen-Perforation Dia: **8** in. to **8.8** ft. Dia. in. to ft. Dia. in. to ft.
 Screen-Perforated Intervals: From **4.8** ft. to **8.8** ft. From ft. to ft. From ft. to ft.
 Travel Pack Intervals: From **10** ft. to **9.4** ft. From ft. to ft. From ft. to ft.

GROUT MATERIAL:
 1 Neat cement 2 Cement grout 3 **Bentonite** 4 Other
 Grouted Intervals: From **0** ft. to **10** ft. From ft. to ft. From ft. to ft.

What is the nearest source of possible contamination:
 1 Septic tank 4 Cess pool 7 Sewage lagoon 11 Fertilizer storage 15 Oil well/Gas well
 2 **Sewer lines** 5 Seepage pit 8 Feed yard 12 Insecticide storage 16 Other (specify below)
 3 Lateral lines 6 Pit privy 9 Livestock pens 13 Watertight sewer lines

Direction from well: **EAST** How many feet: **450'** Water Well Disinfected? Yes No
 Has a chemical/bacteriological sample submitted to Department? Yes **No** If yes, date sample
 was submitted month day year: Pump Installed? Yes **No**
 Yes: Pump Manufacturer's name Model No. HP Volts
 Depth of Pump Intake ft. Pumps Capacity rated at gal./min
 Type of pump: 1 Submersible 2 Turbine 3 Jet 4 Centrifugal 5 Reciprocating 6 Other

CONTRACTOR'S OR LANDOWNER'S CERTIFICATION: This water well was **(1)** constructed, (2) reconstructed, or (3) plugged under my jurisdiction and was
 completed on **7** month **5** day **81** year
 and this record is true to the best of my knowledge and belief. Kansas Water Well Contractor's License No. **175**
 This Water Well Record was completed on **8** month **25** day **81** year under the business
 name of **Pauls Inc.** by (signature)

LOCATE WELL'S LOCATION WITH AN "X" IN SECTION BOX:	FROM	TO	LITHOLOGIC LOG	FROM	TO	LITHOLOGIC LOG
	0	5	LOAM TO CLAY			
	5	10	YELLOW-TAN CLAY			
	10	25	BR-LIGHT CLAY			
	25	35	SOFT-GREEN GREY SHALE			
	35	40	SOFT SHALE-GRY			
	40	50	SOFT GRAY-SANDY-CLAY SHALE			
	50	56	DARK WENNINGTON SHALE			
	56	58	FAULTS			
	58	65	WENNINGTON SHALE - Chl. ovoides			
	65	75	" "			
ELEVATION:	25	95	WENNINGTON SHALE	(Faulted from 75' to 85')		

Depth(s) Groundwater Encountered 1. ft. 2. ft. 3. ft. 4. ft. (Use a second sheet if needed)
 INSTRUCTIONS: Use typewriter or ball point pen, please press firmly and PRINT clearly. Please fill in blanks, underline or circle the correct answers. Send top three copies to Kansas Department of Health and Environment, Division of Environment, Water Well Contractors, Topeka, KS 66620. Send one to WATER WELL OWNER and retain one for your records.

WATER WELL RECORD Form WWC-5 KSA 82a-1212 DW95

LOCATION OF WATER WELL:	Fraction	Section Number	Township Number	Range Number
County: <u>MARION</u>	<u>NE 1/4 SW 1/4 NE 1/4</u>	<u>5</u>	<u>T 20 S</u>	<u>R 4</u> <u>EW</u>

Distance and direction from nearest town or city street address of well if located within city?
1014 East Melvin

WATER WELL OWNER: St. Luke's Hospital
 RR#, St. Address, Box # : 1014 East Melvin
 City, State, ZIP Code : MARION, KS 67114
 Board of Agriculture, Division of Water Resources
 Application Number:

LOCATE WELL'S LOCATION WITH AN "X" IN SECTION BOX:

N

NW	NE
SW	SE

S

DEPTH OF COMPLETED WELL: 113.5 ft. ELEVATION:

Depth(s) Groundwater Encountered 1. 51 ft. 2. ft. 3. ft.

WELL'S STATIC WATER LEVEL ft. below land surface measured on mo/day/yr

Pump test data: Well water was ft. after hours pumping gpm

Est. Yield gpm: Well water was ft. after hours pumping gpm

Bore Hole Diameter 10 in. to 75 ft., and 6 in. to 113.5 ft.

WELL WATER TO BE USED AS: 5 Public water supply 8 Air conditioning 11 Injection well
 1 Domestic 3 Feedlot 6 Oil field water supply 9 Dewatering 12 Other (Specify below)
2 Irrigation 4 Industrial 7 Lawn and garden only 10 Monitoring well Back Up Water Supply

Was a chemical/bacteriological sample submitted to Department? Yes.....No.....; If yes, mo/day/yr sample was submitted

Water Well Disinfected? Yes No

3] TYPE OF BLANK CASING USED:

1 Steel	3 RMP (SR)	6 Asbestos-Cement	9 Other (specify below)	CASING JOINTS: Glued <input checked="" type="checkbox"/> Clamped
2 PVC	4 ABS	7 Fiberglass		Welded

Blank casing diameter 6 in. to 77 ft., Dia in. to ft., Dia in. to ft.

Casing height above land surface 19 in., weight lbs./ft. Wall thickness or gauge No. Sch. 40

TYPE OF SCREEN OR PERFORATION MATERIAL:

1 Steel	3 Stainless steel	5 Fiberglass	8 RMP (SR)	10 Asbestos-cement	11 Other (specify)
2 Brass	4 Galvanized steel	6 Concrete tile	9 ABS	12 None used (open hole)	

SCREEN OR PERFORATION OPENINGS ARE:

1 Continuous slot	3 Mill slot	6 Wire wrapped	9 Drilled holes	11 None (open hole)
2 Louvered shutter	4 Key punched	7 Torch cut	10 Other (specify)	

SCREEN-PERFORATED INTERVALS: From ft. to ft., From ft. to ft., From ft. to ft.

GRAVEL PACK INTERVALS: From ft. to ft., From ft. to ft., From ft. to ft.

3] GROUT MATERIAL: 1 Neat cement 2 Cement grout 3 Bentonite 4 Other

Grout Intervals: From 00 ft. to 77 ft., From ft. to ft., From ft. to ft.

What is the nearest source of possible contamination:

1 Septic tank	4 Lateral lines	7 Pit privy	10 Livestock pens	14 Abandoned water well
2 Sewer lines	5 Cess pool	8 Sewage lagoon	11 Fuel storage	15 Oil well/Gas well
3 Watertight sewer lines	6 Seepage pit	9 Feedyard	12 Fertilizer storage	16 Other (specify below)
			13 Insecticide storage	

Direction from well? FROM TO LITHOLOGIC LOG FROM TO PLUGGING INTERVALS

FROM	TO	LITHOLOGIC LOG	FROM	TO	PLUGGING INTERVALS
00	1.0	Grass & topsoil			
1.0	15.0	Silty clay, brn. to dk. brn, stiff			
15.0	25.0	Limestone, lt grey, dry			
25.0	35.5	Shale, tan to lt. brown, moist			
35.5	40.0	Limestone, lt grey, dry			
40.0	45.0	Shale, tan to lt brown, very moist			
45.0	46.5	Limestone, lt grey, dry			
46.5	48.0	Shale, lt brown to tan, very moist			
48.0	69.0	Shale, lt brown to tan, to grey, moist			
69.0	75.0	Limestone			
75.0	113.5	Shale			

7] CONTRACTOR'S OR LANDOWNER'S CERTIFICATION: This water well was (1) constructed, (2) reconstructed, or (3) plugged under my jurisdiction and was completed on (mo/day/year) ... 4/25/96 and this record is true to the best of my knowledge and belief. Kansas Water Well Contractor's License No. 549 This Water Well Record was completed on (mo/day/yr) ... 4/30/96 under the business name of J S R DRILLING SERVICES, INC. by (signature) [Signature]

INSTRUCTIONS: Use typewriter or ball point pen. PLEASE PRESS FIRMLY and PRINT clearly. Please fill in blanks, underline or circle the correct answers. Send top three copies to Kansas Department of Health and Environment, Bureau of Water, Topeka, Kansas 66620-0001. Telephone: 913-296-5545. Send one to WATER WELL OWNER and retain one for your records.

USE TYPEWRITER OR BALL
POINT PEN-PRESS FIRMLY,
PRINT CLEARLY.

DW98

WATER WELL RECORD
KSA 82a-1201-1215

Kansas Department of Health and
Environment-Division of Environment
(Water well Contractors)
Topeka, Kansas 66620

1. Location of well:		County <u>Marion</u>	Fraction <u>NW 1/4 NW 1/4 NE 1/4</u>	Section number <u>6</u>	Township number T <u>20</u> S R <u>4</u>	Range number <u>EW</u>
2. Distance and direction from nearest town or city: <u>in city</u>			3. Owner of well: <u>Henry Skienam</u>			
Street address of well location if in city: <u>Marion</u>			R.R. or street: <u>404 Arbor</u>			
			City, state, zip code: <u>Marion Ks. 66861</u>			
4. Locate with "X" in section below:		Sketch map:		6. Bore hole dia. <u>4</u> in. Completion date <u>4-12-77</u>		
				Well depth <u>60</u> ft.		
				7. <input type="checkbox"/> Cable tool <input checked="" type="checkbox"/> Rotary <input type="checkbox"/> Driven <input type="checkbox"/> Dug <input type="checkbox"/> Hollow rod <input type="checkbox"/> Jetted <input type="checkbox"/> Bored <input type="checkbox"/> Reverse rotary		
				8. Use: <input type="checkbox"/> Domestic <input type="checkbox"/> Public supply <input type="checkbox"/> Industry <input type="checkbox"/> Irrigation <input type="checkbox"/> Air conditioning <input type="checkbox"/> Stock <input checked="" type="checkbox"/> Lawn <input type="checkbox"/> Oil field water <input type="checkbox"/> Other		
				9. Casing: Material <u>Pvc</u> Height: <u>above</u> or below Threading: <input type="checkbox"/> Welded <input checked="" type="checkbox"/> Surface <u>TP</u> in. RMP: <input type="checkbox"/> PVC <input checked="" type="checkbox"/> Weight <u>340</u> lbs./ft. Dia. <u>5</u> in. to <u>60</u> ft. depth; Wall Thickness: inches or Dia. <u>5</u> in. to <u>60</u> ft. depth; gauge No. <u>1258</u>		
5. Type and color of material		From	To	10. Screens: Manufacturer's name <u>APEM</u>		
<u>Top Soil</u>		<u>0</u>	<u>2</u>	Type <u>Pvc</u> Dia. <u>5 1/4</u>		
<u>Yellow Clay</u>		<u>2</u>	<u>30</u>	Slot/gauze <u>1/4</u> Length <u>10'</u>		
<u>fine Sand</u>		<u>30</u>	<u>42</u>	Set between <u>30</u> ft. and <u>60</u> ft. ft. and _____ ft.		
<u>Whize Rock</u>		<u>42</u>	<u>46</u>	Gravel pack? <input checked="" type="checkbox"/> Size range of material <u>30</u>		
<u>Red Clay</u>		<u>46</u>	<u>53</u>	11. Static water level: _____ mo./day/yr. <u>23</u> ft. below land surface Date <u>4-12-77</u>		
<u>Medium Sand</u>		<u>53</u>	<u>57</u>	12. Pumping level below land surfaces: _____ ft. after _____ hrs. pumping _____ g.p.m. _____ ft. after _____ hrs. pumping _____ g.p.m. Estimated maximum yield _____ g.p.m.		
<u>Shale</u>		<u>57</u>	<u>60</u>	13. Water sample submitted: _____ mo./day/yr. <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Date _____		
				14. Well head completion: <input checked="" type="checkbox"/> Pitless adapter _____ Inches above grade		
				15. Well grouted? <input checked="" type="checkbox"/> With: <input type="checkbox"/> Neat cement <input type="checkbox"/> Bentonite <input checked="" type="checkbox"/> Concrete Depth: From <u>0</u> ft. to <u>10</u> ft.		
				16. Nearest source of possible contamination: _____ City ft. <u>70</u> Direction <u>S</u> Type <u>Sewerline</u> Well disinfected upon completion? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		
				17. Pump: <input checked="" type="checkbox"/> Not installed Manufacturer's name _____ Model number _____ HP _____ Volts _____ Length of drop pipe _____ ft. capacity _____ g.p.m. Type: <input type="checkbox"/> Submersible <input type="checkbox"/> Turbine <input type="checkbox"/> Jet <input type="checkbox"/> Reciprocating <input type="checkbox"/> Centrifugal <input type="checkbox"/> Other		
		(Use a second sheet if needed)				
18. Elevation:	19. Remarks:		20. Water well contractor's certification: This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief. <u>Baakhos Drgl. 180</u> Business name _____ License No. _____ Address <u>Tampa Ks.</u> Signed <u>Paul Baakhos</u> Date <u>4-12-77</u> Authorized representative			
Topography: <input type="checkbox"/> Hill <input type="checkbox"/> Slope <input type="checkbox"/> Upland <input checked="" type="checkbox"/> Valley						

20' - 4" W
 Sec 6
 NW 1/4 NE 1/4

Forward the white, blue and pink copies to the Department of Health and Environment

Form WWC-5

DW99

WATER WELL RECORD Form WWC-5 KSA 82a-1212

1 LOCATION OF WATER WELL: County: <u>Marion</u>		Fraction <u>SW 1/4 NW 1/4 SW 1/4</u>	Section Number <u>6</u>	Township Number T <u>20</u> S	Range Number R <u>4</u> <u>EW</u>
Distance and direction from nearest town or city street address of well if located within city? <u>6 W 3/4 N Florence</u>					
2 WATER WELL OWNER: <u>Rodney Just</u>		RR#, St. Address, Box # : <u>RR1</u>			
City, State, ZIP Code : <u>Marion, KS, 66861</u>		Board of Agriculture, Division of Water Resources Application Number:			
3 LOCATE WELL'S LOCATION WITH AN "X" IN SECTION BOX:		4 DEPTH OF COMPLETED WELL: <u>76</u> ft. ELEVATION:			
		Depth(s) Groundwater Encountered 1. <u>72</u> ft. 2. _____ ft. 3. _____ ft.			
		WELL'S STATIC WATER LEVEL <u>30</u> ft. below land surface measured on mo/day/yr <u>6-5-97</u>			
		Pump test data: Well water was _____ ft. after _____ hours pumping _____ gpm			
		Est. Yield <u>20</u> gpm: Well water was _____ ft. after _____ hours pumping _____ gpm			
		Bore Hole Diameter: <u>8 1/2</u> in. to <u>7.6</u> ft., and _____ in. to _____ ft.			
		WELL WATER TO BE USED AS: 1 Domestic 3 Feedlot 5 Public water supply 8 Air conditioning 11 Injection well 2 Irrigation 4 Industrial 6 Oil field water supply 9 Dewatering 12 Other (Specify below)			
		Was a chemical/bacteriological sample submitted to Department? Yes _____ No <u>X</u> ; If yes, mo/day/yr sample was submitted _____			
5 TYPE OF BLANK CASING USED:		Water Well Disinfected? Yes <u>X</u> No _____			
1 Steel 3 RMP (SR)		5 Wrought iron 8 Concrete tile CASING JOINTS: Glued <u>X</u> Clamped _____			
2 PVC 4 ABS		6 Asbestos-Cement 9 Other (specify below) Welded _____			
Blank casing diameter <u>5</u> in. to <u>5.6</u> ft., Dia _____ in. to _____ ft., Dia _____ in. to _____ ft.		7 Fiberglass Threaded _____			
Casing height above land surface <u>12</u> in., weight <u>Class 160</u> lbs./ft. Wall thickness or gauge No. <u>219</u>					
TYPE OF SCREEN OR PERFORATION MATERIAL:		7 PVC 10 Asbestos-cement			
1 Steel 3 Stainless steel 5 Fiberglass 8 RMP (SR) 11 Other (specify) _____					
2 Brass 4 Galvanized steel 6 Concrete tile 9 ABS 12 None used (open hole)					
SCREEN OR PERFORATION OPENINGS ARE:		5 Gauzed wrapped 8 Saw cut 11 None (open hole)			
1 Continuous slot 3 Mill slot 6 Wire wrapped 9 Drilled holes					
2 Louvered shutter 4 Key punched 7 Torch cut 10 Other (specify) _____					
SCREEN-PERFORATED INTERVALS: From <u>5.6</u> ft. to <u>7.6</u> ft., From _____ ft. to _____ ft.					
GRAVEL PACK INTERVALS: From <u>2.2</u> ft. to <u>7.6</u> ft., From _____ ft. to _____ ft.					
6 GROUT MATERIAL: 1 Neat cement 2 Cement grout 3 Bentonite 4 Other _____					
Grout Intervals: From <u>0</u> ft. to <u>2.2</u> ft., From _____ ft. to _____ ft., From _____ ft. to _____ ft.					
What is the nearest source of possible contamination:		10 Livestock pens 14 Abandoned water well			
1 Septic tank 4 Lateral lines 7 Pit privy 11 Fuel storage 15 Oil well/Gas well					
2 Sewer lines 5 Cess pool 8 Sewage lagoon 12 Fertilizer storage 16 Other (specify below)					
3 Watertight sewer lines 6 Seepage pit 9 Feedyard 13 Insecticide storage					
Direction from well? <u>E</u>		How many feet? <u>100 +</u>			
FROM	TO	LITHOLOGIC LOG	FROM	TO	PLUGGING INTERVALS
<u>0</u>	<u>6</u>	<u>Lime Rock</u>			
<u>6</u>	<u>21</u>	<u>yellow Shale</u>			
<u>21</u>	<u>35</u>	<u>lime</u>			
<u>35</u>	<u>45</u>	<u>yellow Shale</u>			
<u>45</u>	<u>62</u>	<u>Red "</u>			
<u>62</u>	<u>72</u>	<u>Lime</u>			
<u>72</u>	<u>73</u>	<u>Water</u>			
<u>73</u>	<u>76</u>	<u>Gray Rock</u>			
7 CONTRACTOR'S OR LANDOWNER'S CERTIFICATION: This water well was (1) <u>constructed</u> (2) reconstructed, or (3) plugged under my jurisdiction and was completed on (mo/day/year) <u>6-5-97</u> and this record is true to the best of my knowledge and belief. Kansas Water Well Contractor's License No. <u>128</u> This Water Well Record was completed on (mo/day/yr) <u>6-12-97</u> under the business name of <u>Backhus Drilling</u> by (signature) <u>Paul Backhus</u>					

INSTRUCTIONS: Use typewriter or ball point pen. PLEASE PRESS FIRMLY and PRINT clearly. Please fill in blanks, underline or circle the correct answers. Send top three copies to Kansas Department of Health and Environment, Bureau of Water, Topeka, Kansas 66620-0001. Telephone: 913-296-5545. Send one to WATER WELL OWNER and retain one for your records.

WATER WELL RECORD Form WWC-5 KSA 82a-1212 **MW-1** Page 1

1 LOCATION OF WATER WELL: County: <u>Marion</u>	Fraction <u>NE 1/4 SW 1/4 NE 1/4</u>	Section Number <u>5</u>	Township Number <u>T 20 S</u>	Range Number <u>R 4 E</u>
---	---	----------------------------	----------------------------------	------------------------------

Distance and direction from nearest town or city street address of well if located within city?

2 WATER WELL OWNER: St. Luke's Hospital
RR#, St. Address, Box # : 1014 East Melvin
City, State, ZIP Code : Marion, KS 67114

Board of Agriculture, Division of Water Resources
Application Number:

3 LOCATE WELL'S LOCATION WITH AN "X" IN SECTION BOX:

N

NW	NE
X	
SW	SE

S

1 Mile

4 DEPTH OF COMPLETED WELL: 58.5 ft. **ELEVATION:**

Depth(s) Groundwater Encountered 1. ft. 2. ft. 3. ft.

WELL'S STATIC WATER LEVEL ft. below land surface measured on mo/day/yr

Pump test data: Well water was ft. after hours pumping

Est. Yield gpm: Well water was ft. after hours pumping

Bore Hole Diameter in. to ft., and in. to

WELL WATER TO BE USED AS: 5 Public water supply 8 Air conditioning 11 Injection well
1 Domestic 3 Feedlot 6 Oil field water supply 9 Dewatering 12 Other (Specify below)
2 Irrigation 4 Industrial 7 Lawn and garden only 10 Monitoring well

Was a chemical/bacteriological sample submitted to Department? Yes.....No.....; If yes, mo/day/yr sample was mitted

Water Well Disinfected? Yes No

5 TYPE OF BLANK CASING USED:

1 Steel	3 RMP (SR)	5 Wrought iron	8 Concrete tile	CASING JOINTS: Glued Clamped
2 PVC	4 ABS	6 Asbestos-Cement	9 Other (specify below)	Welded
		7 Fiberglass		Threaded

Blank casing diameter in. to ft., Dia in. to ft., Dia in. to

Casing height above land surface in., weight lbs./ft. Wall thickness or gauge No. Sch. 40

TYPE OF SCREEN OR PERFORATION MATERIAL:

1 Steel	3 Stainless steel	5 Fiberglass	7 PVC	10 Asbestos-cement
2 Brass	4 Galvanized steel	6 Concrete tile	8 RMP (SR)	11 Other (specify)
			9 ABS	12 None used (open hole)

SCREEN OR PERFORATION OPENINGS ARE:

1 Continuous slot	3 Mill slot	5 Gauzed wrapped	8 Saw cut	11 None (open hole)
2 Louvered shutter	4 Key punched	6 Wire wrapped	9 Drilled holes	
		7 Torch cut	10 Other (specify)	

SCREEN-PERFORATED INTERVALS: From ft. to ft., From ft. to

GRAVEL PACK INTERVALS: From ft. to ft., From ft. to

6 GROUT MATERIAL: 1 Neat cement 2 Cement grout 3 Bentonite 4 Other

Grout Intervals: From (3) 34 ft. to 39 ft., From (2) 1 ft. to 34 ft., From ft. to

What is the nearest source of possible contamination:

1 Septic tank	4 Lateral lines	7 Pit privy	10 Livestock pens	14 Abandoned water well
2 Sewer lines	5 Cess pool	8 Sewage lagoon	11 Fuel storage	15 Oil well/Gas well
3 Watertight sewer lines	6 Seepage pit	9 Feedyard	12 Fertilizer storage	16 Other (specify below)
			13 Insecticide storage	

Direction from well? FROM TO LITHOLOGIC LOG FROM TO PLUGGING INTERVALS

FROM	TO	LITHOLOGIC LOG	FROM	TO	PLUGGING INTERVALS
00	5.5	Clay - Brown, Tight, Stiff, low plasticity, dry, no odor			
5.5	10.5	Clay - Brown to lt. brown, tight, dry, very stiff, no odor			
10.5	12.0	Clay - Lt. brown, very stiff, dry, no odor, limestone fragments			
12.0	16.5	Limestone - Lt. Grey, highly weathered, grading, intermixed with clay, dry			
16.5	21.0	Shale - Tan, Medium hardness, mod. weathered, dry, no odor			
21.0	23.0	Alt. Limestone & Shale, very thin layers, limestone-grey, hard, dry, Shale - tan			
23.0	30.0	Shale - Tan, highly weathered, soft, dry, no odor			
30.0	31.0	Shale - Lt. tan, moderately weathered, med. hardness, dry, no odor			
31.0	35.0	Shale - tan, highly weathered, very soft, dry no odor			
35.0	35.5	Limestone - Grey, Mod. Weathered, Dry			
35.5	40.0	Shale - Tan, highly weathered, soft, dry, no odor			
40.0	42.0	Shale - Lt. tan, mod. weathered, med. hardness, dry, no odor			
42.0	48.5	Shale - Tan, highly weathered, soft, dry, small limestone fragments			
48.5	50.0	Shale - Lt. Brown, highly weathered, soft, slightly moist, no odor			

7 CONTRACTOR'S OR LANDOWNER'S CERTIFICATION: This water well was (1) constructed, (2) reconstructed, or (3) plugged under my jurisdiction and completed on (mo/day/year) 10/12/95 and this record is true to the best of my knowledge and belief. Kc
Water Well Contractor's License No. 549 This Water Well Record was completed on (mo/day/yr) 4/30/96
under the business name of J & R Drilling Services Inc. by (signature) [Signature]

INSTRUCTIONS: Use typewriter or ball point pen. PLEASE PRESS FIRMLY and PRINT clearly. Please fill in blanks, underline or circle the correct answers. Send top three copies to Kansas Department of Health and Environment, Bureau of Water, Topeka, Kansas 66620-0001. Telephone: 913-296-5545. Send one to WATER WELL OWNER and retain one for your records.

LITHOLOGIC LOG CONTINUED ON PAGE ~~XX~~ 2

Appendix B:

Geology of the Canada Area, Marion County

Appendix B:

Geology of the Canada Area, Marion County

B.1 Geologic Data

Subsurface geologic data are generally sought from well registration forms and drilling records of test holes and irrigation, domestic, monitoring, and municipal wells. Irrigation is not a general farming practice in the region, and the Kansas Geologic Survey (KGS) has not drilled test holes in the study area. Therefore, the only available lithologic logs are in records of domestic, municipal, and monitoring wells. The water well record (WWC-5 form) is a standard form that all licensed water well contractors are required to complete for each water well drilled in Kansas. The available water well log data were examined critically for completeness and consistency. Most log descriptions were too brief to determine the lithologic units accurately. Although several lithologic logs from WWC-5 forms exist for water wells in Canada and the surrounding area, their inconsistent quality makes interpretation and correlation of the geologic units difficult, if not impossible. A lack of consistency in the quality of lithologic logs in Marion County is a recognized problem (Chaffee 1988). In addition, well locations are described in general terms (township and range) and persistently identify the individual domestic wells within the town inadequately. No well records exist for most domestic wells, and the names and addresses of the original listed owners frequently do not match those of any current well owner.

Documents consulted include reports published by the U.S. Geological Survey (USGS) and the USDA Soil Conservation Service, open-file reports of the KGS, and an environmental impact statement from the U.S. Army Corps of Engineers (USACE). Information on the regional geology and physiography was also obtained directly from the KGS World Wide Web site at <http://www.kgs.ukans.edu>. Because of the absence of reliable geologic logs of boreholes in central Marion County, the surface geologic maps generated by the USGS (Byrne et al. 1959) provided the only reliable source of geologic data. This information was used to extrapolate the subsurface geology. The established stratigraphic column (giving the sequence and thicknesses of the shales and limestones) was extrapolated from the nearest outcropping geologic sequence by using a regional dip and strike computed from the intersection of the contact with the topography. The computed apparent dip in the direction of each segment of the cross section was then used to extend the surface outcrop section to the location and depth of the drillers' logs. Because the log descriptions bear little resemblance to the actual lithologies, validation of the

interpretive geologic sections relied on correlation between (1) the locations of changes in major lithologic type as described in the drillers' logs and (2) the locations of stratigraphic contacts predicted from the USGS surface geology (Figure B.1; Byrne et al. 1959).

B.2 Geologic Setting

Marion County is largely within the Flint Hills region of east central Kansas. The county includes a small area of the Smoky Hills region in the northwest and the Wellington-McPherson Lowlands in the southwest. The eastern portion of the county is characteristic of the Flint Hills region, with well-dissected topography, deeply incised valleys, thin soils, and many limestone outcrops. The western part of the county is predominantly shale beds containing a few relatively thin, soft limestones. Such units tend to form a gently rolling to nearly flat topography that is amenable to agriculture. Few good natural rock outcrops are present in this area. The major drainage from Marion County is southeastward via the Cottonwood River, forming the upper reaches of the Neosho River drainage basin. The Cottonwood River was dammed in 1968 to form Marion Lake in the central part of the county (for location see Figure B.2). The 10,800-acre lake is used for flood control, water quality control, water supply, recreation, and fish and wildlife conservation (Jordan and Hart 1985).

The surface geology of Marion County has been described by Byrne et al. (1959). Figure B.2 illustrates the generalized surface geology. The bedrock of Marion County is largely Lower Permian shale with interbedded chalky and cherty limestone. These beds dip gently westward with a slope of about 15-20 ft/mi (O'Connor and Chaffee 1992). Limestones and shales of the Chase Group, exposed throughout the eastern part of the county, are the oldest Lower Permian rocks present. In Marion County, the Chase Group is overlain by about 450 ft of Wellington Formation shales, part of the Lower Permian Sumner Group. Lower Cretaceous shale and sandstone unconformably overlie Permian strata in the northwest corner of the county. Unconsolidated Cenozoic sediments of late Tertiary and Pleistocene age also unconformably overlie the Permian beds in the southwest part of the county (Figure B.2).

The oldest rocks that outcrop in the central part of Marion County in the vicinity of Canada are from the Lower Permian Chase Group, made up of about 300 ft of limestone and dolomitic limestone alternating with shale in repetitive sequences called cyclotherms (Terman and Aber 1994). These cyclotherms are the products of repeated transgressions and regressions by shallow seas over a nearly flat depositional surface in the early Permian. Younger Wellington

Formation shales of the Sumner Group conformably overlie the Chase Group and outcrop throughout the central and western region of the county, including the area surrounding the town of Canada. These rocks represent a change to more continental, extremely arid conditions during the Permian. The shale is variously colored gray, green, and red and contains thin beds of limestone and gypsum.

The Quaternary system is represented in the vicinity of Canada by scattered thin silt and sand deposits that may be erosional remnants of an eastward extension of the Early Pleistocene McPherson valley alluvium. Byrne et al. (1959) called these deposits the Sanborn Formation. Younger Pleistocene terrace deposits occur along major streams, and the valley floors are filled with Recent alluvium. Alluvial deposits are thickest in the valleys of the larger streams and are known to exceed a thickness of 30 ft on the Cottonwood River at the town of Marion (USACE 1974). Soils in the central part of the county are derived from the weathering of limestone, cherty limestone, calcareous and noncalcareous shale, alluvium, and colluvium.

The location of an interpretive regional cross section passing through Canada is shown in Figure B.3. Stratigraphic relationships within the shallow bedrock, the elevation of the ground surface, and relief on the bedrock surface are illustrated schematically in west-to-east section A-A' (Figure B.4). Copies of the drillers' logs from which this section was constructed are in Appendix A.

Cross section A-A' (Figure B.4) shows that the Permian formations dip from east to west. The strike and dip can be computed by transposing the geologic contacts from the geologic map (Byrne et al. 1959) to the 1:24,000-scale topographic base (USGS 1985) and measuring the elevation of a single stratigraphic horizon at three locations. On the basis of the intersection of the top of the Nolans limestone with the topography, the beds strike N 30° W and dip S 60° W at an angle of 0.2° (about 17 ft/mi) in central Marion County. Note that the vertical exaggeration of the cross section (1) makes the westward slope of the bedrock strata appear to be far steeper than the shallow angle actually observed in the field and (2) enhances subtle changes in the surface topography. This reconstruction indicates that the shallow geologic section at Canada should be composed of soil 2-3 ft thick, developed from loess and weathered shale at the surface and overlying weathered Wellington shale. The shale weathers to clay that has been variously recorded in drillers' logs to depths of 11-42 ft BGL. The top of the Nolans Formation (Herington limestone member) is projected to occur at a depth of approximately 25 ft BGL. This unit is routinely described as "blue shale" in drillers' logs at this depth. However, the KDHE reported

refusal of the conductivity probe at a hard layer postulated to be limestone at 13 ft BGL (KDHE 1999a). The stratigraphic data available suggest that this postulated limestone might be one of the relatively thin dolomitic limestones known to occur within the Pearl shale member at the base of the Wellington Formation. The top of the underlying Odell shale, projected from outcrop and drill holes to the east, should occur at about 65 ft BGL.

B.3 Hydrogeology

The principal aquifers in the Flint Hills are the Nolans, Winfield, and Barneston limestones of the Lower Permian Chase Group. The Nolans and Winfield limestones are shown on cross section A-A' (Figure B.4). Sinkholes are common where these limestones crop out in the uplands, and springs emerge where the aquifers are exposed in valleys and stream channels. Most wells produce from 10 to 100 gpm, with some producing as much as 500 gpm (Terman and Aber 1994). Relatively impermeable shale units separate the bedrock aquifers, setting up confined conditions in which each aquifer might have a different hydraulic head.

Where the Wellington Formation overlies the Chase Group limestones to the west of the Flint Hills, groundwater is also produced from fractured shale and several thin beds of impure limestone within the Wellington. The formation yields small quantities of highly mineralized water to many stock and domestic wells. Moderately large water supplies of highly mineralized but usable groundwater are available from solution zones in gypsum beds.

Groundwater generally flows from east to west in the limestone aquifers. Recharge takes place where the aquifers outcrop to the east, and water moves down the regional bedrock dip toward the west. However, local variations in the regional groundwater flow direction are common because of lowering of the potentiometric surface in the limestone aquifers by seepage along valleys and stream channels (O'Connor and Chaffee 1992). The multiple aquifers, the absence of monitoring wells, and the many local topographic effects preclude construction of meaningful regional potentiometric surfaces from available data for any of the identifiable aquifers. The KGS hydrogeologic database as of 1999 contained no water levels for Marion County.

At Canada, screened intervals for domestic wells for which records are available are 45-60 ft BGL and 54-64 ft BGL in DW22 and DW23, respectively, and an upper zone at 25-35 ft

BGL and a lower zone at 50-64 ft BGL in DW24 (Figure B.4). Logs for DW22, DW23, and DW24 are in Appendix A. Water is generally produced from solution-jointed limestone units of the Nolans Formation, and the screened depths suggest that more than one of these water-bearing zones are present at Canada. Anecdotal evidence gathered from interviews with local residents suggests that groundwater flows to the east-southeast (KDHE 1998). Topographic features in the area support this conclusion. For example, a local flow direction to the southeast is consistent with the fact that the South Cottonwood River has eroded the Permian rocks to a level of about 1,310–1,320 ft above mean sea level (AMSL) 1.25 mi southeast of Canada, 40–50 ft below the elevation of the ground at Canada. Static water levels recorded when the wells were installed in 1978 and 1979 were 15–18 ft BGL (1,345–1,343 ft AMSL), substantially above the base level (1,310–1,320 ft AMSL) at the South Cottonwood River. Another factor contributing to the southeasterly groundwater flow direction would be mounding of groundwater 1 mi to the north of Canada due to recharge from Marion Lake.

System	Group	Section	Average thickness (feet)	Symbol on pl. 3	Formation	Member	Description	Construction materials
QUATERNARY			20	Qal	Alluvium		Dark gray to dark-brown clayey silt containing lenses of sand and gravel	Aggregate and fill material
			50	Qt	Terrace deposits		Dark gray to brownish-gray clayey silt containing lenses of sand and gravel	Mineral filler and fill material
			20	Os	Sanborn		Reddish-brown to light-gray silt and clay containing lenses of buff to orange, fine to medium well-sorted quartz sand and thin lenses of poorly sorted gravel	Mineral filler, aggregate, road metal, and fill material
CRETACEOUS			30	Kd	Dakota sandstone		Red, brown, tan, soft to hard, and fine- to medium-grained sandstone, composed predominantly of quartz and interbedded with clayey and silty shale ranging from light gray through dark gray and tan, and from massive to thin-bedded	Aggregate, road metal, and fill material
			100	Kk	Kiowa shale		Shale with clayey, silty, and sandy zones; massive in the upper part, thin-bedded and fissile in the lower part, containing plant fossils, thin layers of bentonite and gypsum, and abundant concretions of limonite and hematite	
PERMIAN	Sumner		30			Afton shale	Red, green, gray, thin-bedded to blocky clayey calcareous shale containing thin beds of gray-tan limestone and lime concretions	
			10			Slate Creek shale	Dark-gray thin-bedded clayey shale	
			40			Highland shale	Gray-green, maroon, and red thin-bedded clayey shale	
			70			Corlton limestone	Gray to buff soft partly clayey limestone that splits into thin plates; interbedded with gray to tan-gray soft thin-bedded calcareous shale; contains fossil plants and insects	Road metal and fill material
			40	Pwe	*Wellington	Chisholm Creek shale	Light-green, maroon, and red soft clayey thin-bedded shale	
			20			Annelly gypsum	Gray and pink massive contorted and coarsely crystalline gypsum; shale partings	
			200			Geuda Springs shale	Two beds of white chalky limestone separated by shale; Prairie Creek bed limestone Greenish-gray clayey shale interbedded with light-buff soft thin-bedded limestone and a hard gray anhydrite	

FIGURE B.1 Stratigraphic units that crop out in Marion County, Kansas, and the construction materials of each. Source: Byrne et al. (1959).

System	Group	Section	Average thickness (feet)	Symbol on pl 3	Formation	Member	Description	Construction materials
PERMIAN	Sumner		8	Pwe	*Wellington	Hollenberg limestone	Tan-gray cellular coarsely crystalline limestone with dolomitic zones	Road metal and fill material
			40			Pearl shale	Light tan-gray to faintly varicolored thin-bedded calcareous clayey shale with limy concretions and some thin tan-gray crystalline dolomitic limestone	
	Chase		18	Pn	Nolans limestone	Herington limestone	Tan to gray fairly hard massive thick-bedded fossiliferous dolomitic limestone with geodes locally abundant	Structural stone, road metal, aggregate, and riprap
			10			Paddock shale	Tan to gray thin-bedded to blocky calcareous shale with fossils locally abundant	Fill material
			2			Kridar limestone	Tan to gray soft clayey limestone	
		30	Po	Odell shale	Gray, tan, and green blocky silty and clayey shale with thin limy zones; a red zone near the top	Fill material		
		28	Pw	Winfield limestone	Crasswell limestone	Gray to buff locally soft and dolomitic fossiliferous limestone with abundant geodes: platy and thin bedded in upper part, massive and thick bedded in lower part	Structural stone, road metal, aggregate, riprap, and fill material	
					10	Grant shale	Gray to tan silty calcareous fossiliferous shale	Fill material
		2	Stovall limestone	Hard gray massive cherty fossiliferous limestone				
		45	Pd	Doyle shale	Gage shale	Thin-bedded to massive fossiliferous shale; greenish gray to tan and calcareous in upper part, and green, maroon, and clayey in lower part	Fill material	
					10	Towanda limestone	Hard tan to gray platy to blocky limestone	Structural stone, road metal, aggregate, riprap, and fill material
					25	Holmesville shale	Greenish-gray silty clayey and partly calcareous shale with a thin reddish bed and local lenses of limestone	Fill material
					39	Pb	Borneston limestone	Fort Riley limestone
		2	Oketo shale	Gray calcareous fossiliferous silty shale				Fill material
		39		Florence limestone	Gray to tan thick-bedded fossiliferous limestone with many beds and nodules of chert and a thin shale parting	Structural stone, road metal, aggregate, riprap, and fill material		
		35	Pm	Matfield shale	Blue Springs shale	Banded maroon, gray, and green, massive to blocky clayey silty poorly exposed shale	Fill material	
					5	Kinney limestone		Tan to gray hard massive fossiliferous limestone with few good outcrops
	30				Wymore shale	Tan, green, and maroon, thin-bedded to blocky silty and calcareous shale		
	10				Pwr	Wreford limestone		Schroyer limestone

* Subdivisions of Wellington formation modified from Ver Wiebe (1937, p 4 and 5)

FIGURE B.1 (Cont.)

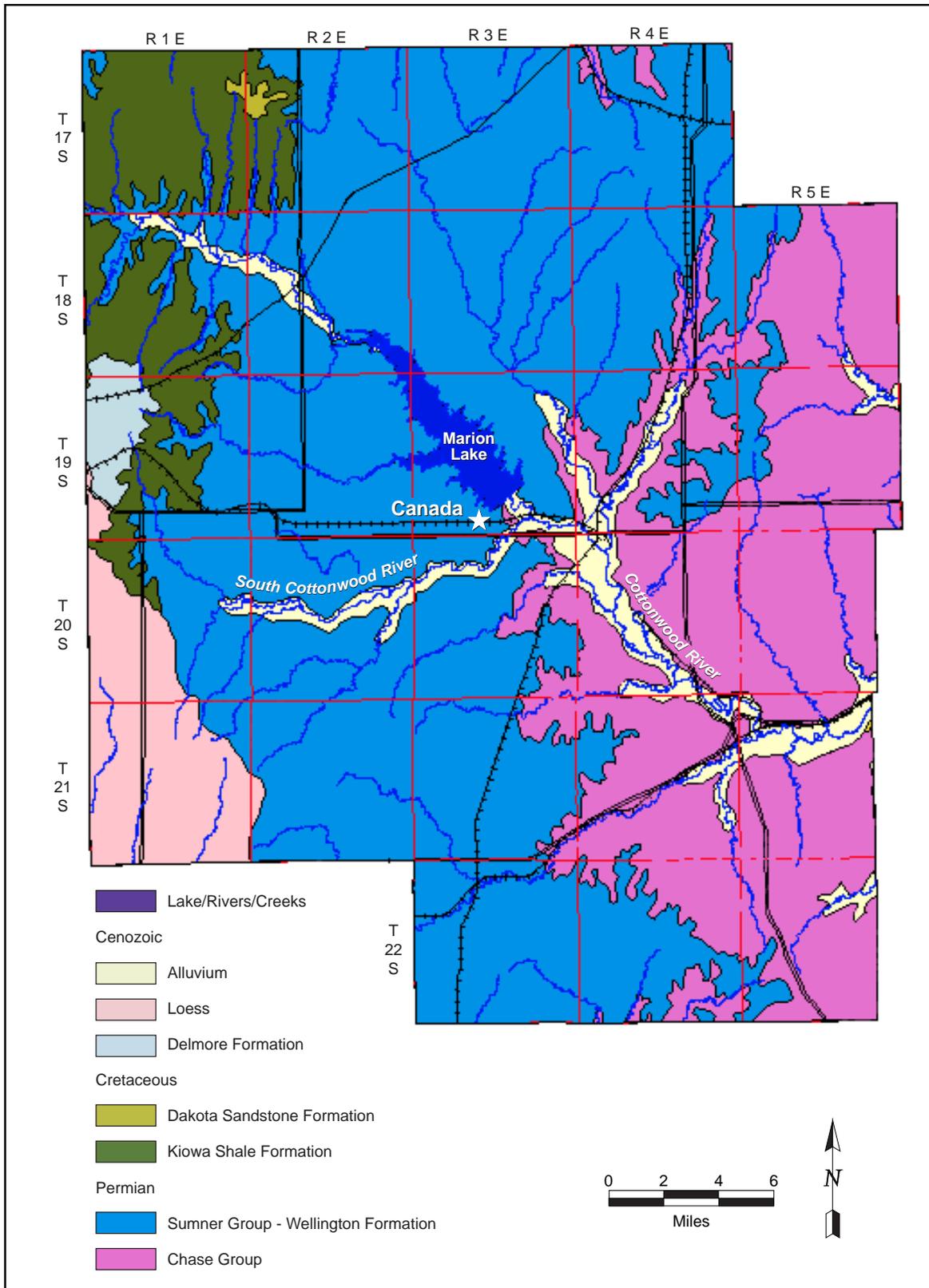


FIGURE B.2 Generalized surface geologic map of Marion County, showing the location of the town of Canada. Source: Byrne et al. (1959).

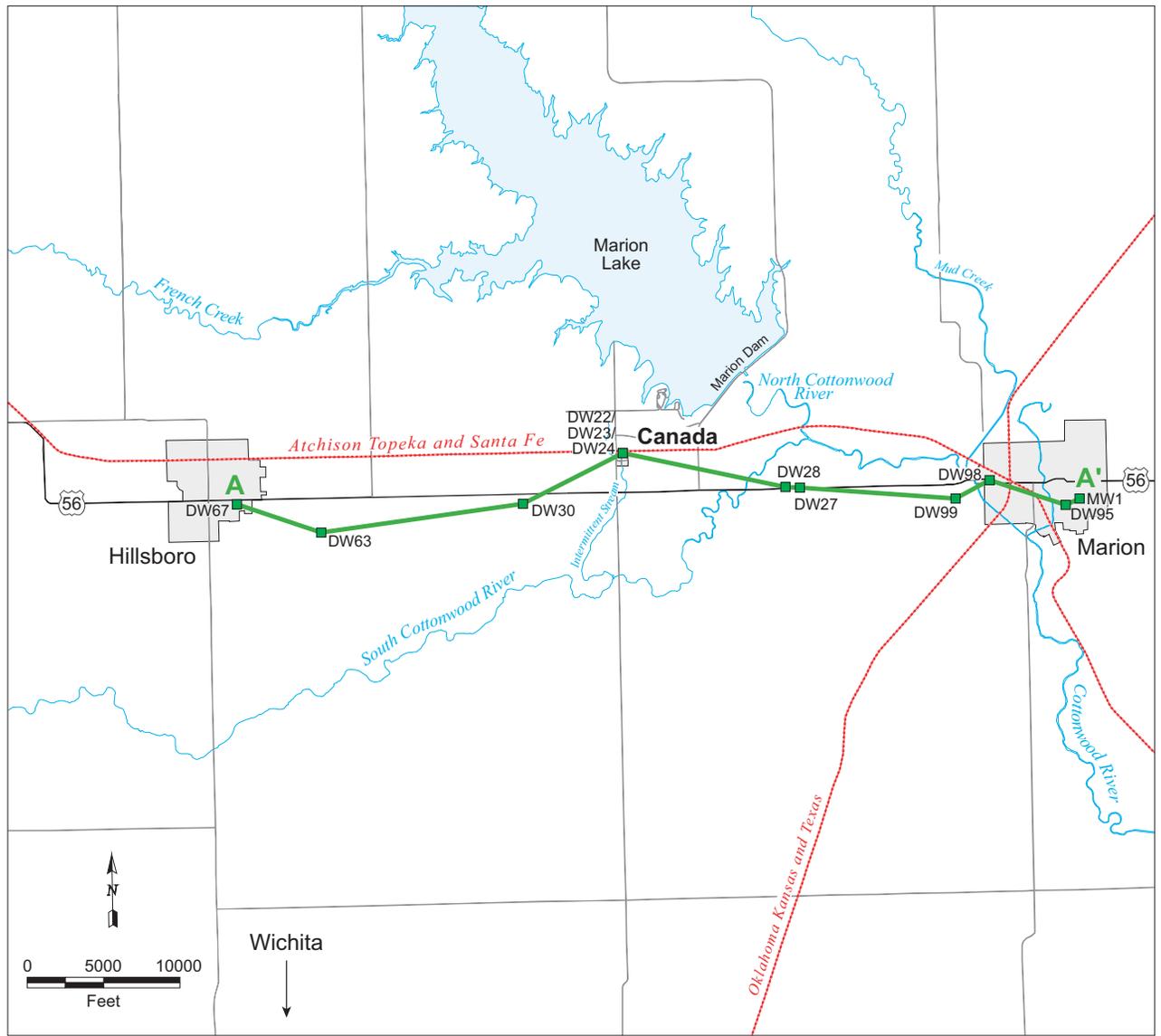


FIGURE B.3 Location of geologic cross section A-A' in central Marion County.

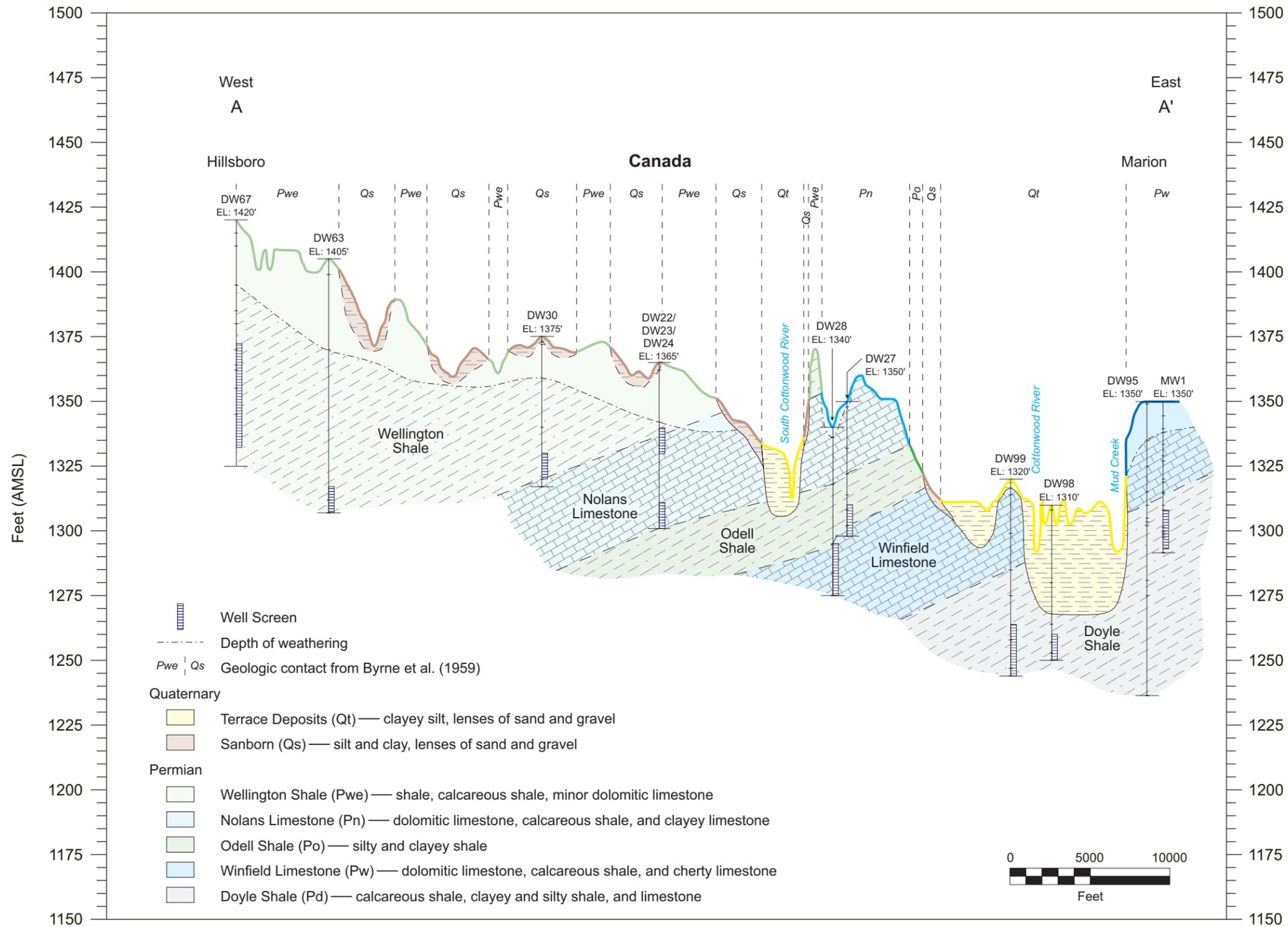


FIGURE B.4 Interpretive west-to-east geologic cross section A-A' (vertically exaggerated), Marion County, Kansas. Source of geologic contacts: Byrne et al. (1959).

Appendix C:

**Property Records Related to the
Former CCC/USDA Facility at Canada**

311

CL Form-58 (4-2-54) U. S. DEPARTMENT OF AGRICULTURE AGRICULTURE STABILIZATION AND CONSERVATION COMMODITY CREDIT CORPORATION

This instrument was filed for record on the 4 day of May, 1954 at 4 o'clock P.M. and duly recorded in book 10 on page 360

Lillian Kiere REGISTER OF DEEDS

6-162
LEASE OF PROPERTY

THIS LEASE, made and entered into this 4th day of May, 1954, by and between Aaron S. Burkholder of Canada, Kansas, 2053 Lessor, and Commodity Credit Corporation, Lessee.

WITNESSETH THAT:

1. The Lessor leases to the Lessee, and the Lessee hereby leases from the Lessor, upon the terms and conditions hereinafter stated, the following described real estate (hereinafter called "property") situated in the County of Marion and state of Kansas:
Lots 7 to 18 inclusive on Block 11 in Canada, Kansas
containing 1 acres, more or less.
2. The term of the lease shall be for a period of 10 years, commencing the 4th day of May, 1954, and ending the 4th day of May, 1964, with the right of the Lessee, during such term or any extension thereof, to terminate said lease, and liability for any further rent, on the 4th day of May of any year, by giving 30 days' previous notice in writing to the Lessor.
3. As rent for said property, the Lessee shall pay the Lessor Ninety and 00/100 dollars (\$ 90.00) per year, such rent to be payable in advance, but to be apportionable in the event the lease is terminated as provided in paragraph 2 hereof:
4. The Lessor warrants that he is the owner of the property, has the right to give the Lessee possession under this lease, and will, so long as this lease remains in effect, warrant and defend the Lessee's possession against any and all persons whomsoever.
5. The Lessee shall have the right, during this lease, to erect storage structures, or facilities, make alterations, install scales, fences, or signs, in or upon the premises hereby leased and, at the expiration of said lease or any renewal or extension thereof or at any time this lease is in effect, may remove said storage structures, facilities, scales, fences, or signs or any part thereof, whether or not such structures, facilities, scales, fences or signs have become legally a fixture.
6. The Lessee shall not assign this lease without the written consent of the Lessor. The Lessee, may, however, sublet the structures on the premises leased hereunder, or any one or more of them for the term of the lease or any part thereof upon such terms and conditions as Lessee may wish to so sublet.
7. The Lessee, if required by the Lessor, shall upon the expiration of this lease, or renewal thereof, restore the premises to the same condition as that existing at the time of entering upon the same under this lease, reasonable and ordinary wear and tear and damages by the elements or by circumstances over which the Lessee has no control excepted: Provided, however, That if the Lessor requires such restoration, the Lessor shall give written notice thereof to the Lessee 30 days before the termination of the lease.

3-31-54

FIGURE C.1 CCC/USDA lease, 1954 to 1964.

552.

CL Form - 58 (Reverse)
(4-2-54)

LEASE OF PROPERTY

8. The Lessor grants and gives the Lessee the option as a consideration of this lease and for the further consideration of one dollar, the receipt of which is hereby acknowledged, to renew said lease for a period of ___ years from the Lessor, his heirs, executors, administrators, and assigns, for the sum of _____ Dollars (\$ _____) per year.

9. As a consideration of this lease and for the further consideration of one dollar, the receipt of which is hereby acknowledged, the Lessor grants and gives the Lessee the option, at any time while this lease is in effect, to purchase said property from the Lessor, his heirs, executors, administrators, and assigns, for the sum of _____ Dollars (\$ _____). In the event the Lessee shall exercise this option to purchase said property, the Lessor agrees to furnish at his own expense an abstract of title, certificate of title or other evidence of title satisfactory to CCC and to execute a good and sufficient warranty deed conveying fee simple title to said property free and clear of all taxes, liens, or encumbrances except for the following, and no others.

10. In the event any increased tax assessment is made against the Lessor or the property by virtue of the erection of storage structures and facilities thereon by the Lessee, the Lessor agrees to cooperate fully in any contest of such increased assessment which the Lessee feels should be made. The Lessee agrees that the rental hereunder shall be adjusted upward by the amount of any such increased tax assessment which the Lessor and Lessee mutually agree to be proper or which is determined to be legally valid in court proceedings.

11. No member of or Delegate to Congress or Resident Commissioner, shall be admitted to any share or part of this lease or purchase or to any benefit that may arise therefrom, but this provision shall not be construed to extend to this lease or purchase if made with a corporation for its general benefit.

12. The Lessor warrants that he has not employed any person to solicit or secure this lease upon any agreement for a commission, percentage, brokerage, or contingent fee and that no such consideration or payment has been or will be made. Breach of this warranty shall give CCC the right to annul the lease, or, in its discretion, to deduct from the rental or purchase price the amount of such commission, percentage, brokerage or contingent fees. This warranty shall not apply to commissions payable by the Lessor if the lease is secured or made through a bona-fide agent maintained by the Lessor for the purpose of leasing or selling his property.

(Seal) Arnon S. Burkholder LESSOR

COMMODITY CREDIT CORPORATION, LESSEE

(Seal) Elmer E. Burkholder LESSOR

By Arnon S. Burkholder

(Seal) _____, LESSOR



State of Kansas Vice-Chairman, Marion County
Marion County ASC Committee

Subscribed and sworn to before me this 4th day of May, 1954
(To be produced in ASC State Office)

Erna Reih Notary Public
My Comm. expires Jan. 14-1958

FIGURE C.1 (Cont.)

M141 ⁴ e 463

FORM CCC GRAIN-19
(6-10-59)

U. S. DEPARTMENT OF AGRICULTURE
COMMODITY STABILIZATION SERVICE
COMMODITY CREDIT CORPORATION

LEASE OF PROPERTY

THIS LEASE, made and entered into this 9th day of September, 19 63, by and between Aaron S. Burkholder of Canada, Kansas (hereinafter called the "Lessor"), and Commodity Credit Corporation, (hereinafter called the "Lessee").

WITNESSETH THAT:

1. The Lessor leases to the Lessee, and the Lessee hereby leases from the Lessor, upon the terms and conditions hereinafter stated, the following described real estate (hereinafter called "property") situated in the County of Marion and State of Kansas
(Enter here a complete legal description of the site)

6-163

lots 7 to 18 inclusive on Block 11 in Canada, Kansas

State of Kansas, Marion County, KS
This instrument was filed for record on
the 10th day of Sept. 1963
at 10 o'clock AM and duly recorded
in book 5313 page 27

Alma Wiebe
RECORDED

5313 23.75 27

containing 1 acres, more or less.
2. The term of the lease shall be for a period of 10 years, commencing the 5th day of May, 19 64 and ending the 4th day of May, 19 74, with the right of the Lessee, during such term or any extension thereof, to terminate said lease, and liability for any further rent, on the 4th day of May of any year, by giving 60 days' previous notice in writing to the Lessor.

3. As rent for said property, the Lessee shall pay the Lessor One Hundred & no/100 Dollars (\$ 100.00) per year, such rent to be payable in advance, but to be apportionable in the event the lease is terminated as provided in paragraph 2 hereof.

4. The Lessor warrants that he is the owner of the property, has the right to give the Lessee possession under this lease, and will, so long as this lease remains in effect, warrant and defend the Lessee's possession against any and all persons whomsoever.

5. The Lessee shall have the right, during this lease, to erect storage structures or facilities, make alterations, install scales, fences, or signs, in or upon the premises hereby leased and, at the expiration of said lease or any renewal or extension thereof or at any time this lease is in effect, may remove said storage structures, facilities, scales, fences or signs or any part thereof, whether or not such structures, facilities, scales, fences or signs have become legully a fixture.

6. The Lessee shall not assign this lease without the written consent of the Lessor. The Lessee, may, however, sublet the structures on the premises leased hereunder, or any one or more of them for the term of the lease or any part thereof upon such terms and conditions as Lessee may wish to so sublet.

7. The Lessee, if required by the Lessor, shall upon the expiration of this lease, restore the premises to the same condition as that existing at the time of entering upon the same under this lease, reasonable and ordinary wear and tear and damages by the elements or by circumstances over which the Lessee has no control excepted; Provided, however, that if the Lessor requires such restoration, the Lessor shall give written notice thereof to the Lessee 60 days before the termination of the Lease.

8. The Lessor grants and gives the Lessee the option as a consideration of this lease and for the further consideration of one dollar, the receipt of which is hereby acknowledged, to renew said lease for a period of 5 years from the Lessor, his heirs, executors, administrators, and assigns, for the sum of One Hundred and no/100 Dollars (\$ 100.00) per year.

9. As a consideration of this lease and for the further consideration of one dollar, the receipt of which is hereby acknowledged, the Lessor grants and gives the Lessee the option, at any time while this lease is in effect, to purchase said property from the Lessor, his heirs, executors, administrators, and assigns, for the sum of One Thousand Dollars (\$ 1,000.00). In the event the Lessee shall exercise this option to purchase said property, the Lessor agrees to furnish at his own expense an abstract of title, certificate of title, or other evidence of title satisfactory to CCC and to execute a good and sufficient warranty deed conveying fee simple title to said property free and clear of all taxes, liens, or encumbrances except for the following, and no others.

FIGURE C.2 CCC/USDA lease, 1964 to 1974.

454

T

FORM CCC GRAIN-13 (REVERSE)

10. In the event any increased tax assessment is made against the Lessor or the property by virtue of the erection of storage structures and facilities thereon by the Lessee, the Lessor agrees to cooperate fully in any contest of such increased assessment which the Lessee feels should be made. The Lessee agrees that the rental hereunder shall be adjusted upward by the amount of any such increased tax assessment which the Lessor and Lessee mutually agree to be proper or which is determined to be legally valid in court proceedings.

11. No member of or Delegate to Congress or Resident Commissioner, shall be admitted to any share or part of this lease or purchase or to any benefit that may arise therefrom, but this provision shall not be construed to extend to this lease or purchase if made with a corporation for its general benefit.

12. The Lessor warrants that he has not employed any person to solicit or secure this lease upon any agreement for a commission, percentage, brokerage, or contingent fee and that no such consideration or payment has been or will be made. Breach of this warranty shall give CCC the right to annul the lease, or, in its discretion, to deduct from the rental or purchase price the amount of such commission, percentage, brokerage, or contingent fees. This warranty shall not apply to commissions payable by the Lessor if the lease is secured or made through a bona-fide agent maintained by the Lessor for the purpose of leasing or selling his property.

(Seal) Edna E. Burkholder LESSOR
(Seal) Edna E. Burkholder LESSOR
_____ . WITNESS

COMMODITY CREDIT CORPORATION, LESSEE
By Warren R. Mueller
Chairman, Warren ASC County Committee
Contracting Officer

ACKNOWLEDGMENT

I, Sherry E. Williamson, do hereby certify that Mr. and Mrs. Aaron Burkholder to me known to be the person (or persons) who executed the foregoing instrument, personally appeared before me and acknowledged that he (she or they) executed the same as his (her or their) free act and deed and, in case said instrument was executed on behalf of a corporation, that he (she or they) as _____ (insert name of officer(s) and his (her or their) official title(s)) _____ was (were) duly authorized by the Board (Name of Corporation) _____ of Directors of said corporation to execute the said instrument on behalf of said corporation and to affix the corporate seal thereto. Given under my official hand and seal this day of September 2, 1963. My commission expires September 24, 1966.

Sherry E. Williamson
Notary Public

CERTIFICATION OF TRUE COPY

The undersigned hereby certifies that the foregoing Lease of Property is true, correct and authentic copy of an original lease duly executed by the lessor as above set forth.

Recording Official or Notary Public

RECEIPT OF COUNTY RECORDING OFFICIAL

The above Lease of Property or a true copy thereof was recorded or filed for record on _____, 19____, in _____, Volume _____ (Chattel Mortgage or real estate records, or other) Page _____ No. _____ (If Filed) State of _____, County of _____

County Recording Official

Mrs. R.R.O. Office Warren, KS

FIGURE C.2 (Cont.)

10 e

5117

DEED—Quitclaim 331-2T.W. C. C. & Co., Stationery, Office Equipments, Legal Blanks, etc., Kansas

THIS INDENTURE, Made this 3th day of June , 19 65 , between

Aaron Burkholder, and Elba E. Burkholder, his wife,

of Marion County, in the State of Kansas. , of the first part, and

~~Sept~~ Canada Grain Company, Inc,
Marion, Kansas.

of Marion County, in the State of Kansas. , of the second part,

WITNESSETH, That said parties of the first part, in consideration of the sum of

nine hundred - - - - - and 100 DOLLARS,

the receipt of which is hereby acknowledged, do by these presents, REMISE, RELEASE AND QUIT-
CLAIM, unto said parties of the second part, its heirs and assigns, all the following-described
REAL ESTATE, situated in the County of Marion
and State of Kansas. , to wit:

Lot 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, and 18,
in Block 11, in the City of Canada Kansas, according to the plat thereof.



DOCUMENTARY
NOTARY PUBLIC
STATE OF KANSAS
100 DOLLARS
EXPIRES 12/31/65

TO HAVE AND TO HOLD THE SAME, Together with all and singular the tenements, hereditaments
and appurtenances thereunto belonging, or in any wise appertaining, forever.

IN WITNESS WHEREOF, The said parties of the first part have hereunto set their hands,
the day and year first above written.

Executed and delivered in presence of X Aaron Burkholder,

FIGURE C.3 Sale of property by Burkholder to Canada Grain Co., 1965.

STATE OF Kansas Marion COUNTY, ss.

BE IT REMEMBERED, That on this 16th day of June, A. D. 19 65
before me, the undersigned, a Notary Public in and for the County and State
aforesaid, came Aaron Burkholder, and Elba E. Burkholder, his wife,

who are personally known to me to be the same persons who executed
the within instrument of writing, and such persons duly acknowl-
edged the execution of the same.

IN TESTIMONY WHEREOF, I have hereunto set my hand and affixed my
notarial seal, the day and year last above written.

L. R. ...
Notary Public.
(Term expires August 27, 1967.)

Carol Green By
Mason, Attorney

DEED
FROM
TO

Entered in Transfer Record in my office, this
16 day of June, A. D. 19 66
D. ...
County Clerk.

STATE OF Kansas Marion COUNTY, ss.
Mason

This instrument was filed for record on the
16 day of June, A. D. 19 66
at 11 o'clock A. M., and duly recorded in
Book on page
Fee \$ 4.00

31-517-31-6314
Cano & Co. Inc.

FIGURE C.3 (Cont.)

Entered in Transfer Record in my office
Date 15 day of March A.D. 1976
Richard L. Haly County Clerk
his instrument was filed for record at
10:15 day of March 1977
at 3:00 clock P.M. and duly recorded
in book 327 page 140
8115
Alma Jean Wacker
By Ellen J. ... Deputy

UNITED STATES MARSHAL'S DEED

KNOW ALL MEN BY THESE PRESENTS, That

WHEREAS, on the 21st day of May, 1976, in the United States District Court for the District of Kansas, in a certain action then pending in said court, numbered 76-27-C6, wherein the United States of America was plaintiff, and Canada Grain, et al., were defendants, a Journal Entry of Judgment and Foreclosure was rendered in said court foreclosing the mortgage in favor of the plaintiff, United States of America, in and upon the property hereinafter described; and it was further ordered that said property be sold by the United States Marshal for the payment of said judgment and costs, according to law, and that no parties were entitled to or granted rights of redemption in said property; and

WHEREAS, afterward, there was issued by the Clerk, an Order of Sale pursuant to said judgment, and in accordance with law, directed to the United States Marshal for the District of Kansas, commanding him to advertise and sell said property according to law, and that the proceeds thereof be applied as follows:

1. To the costs of this action and said sale;
2. All taxes unpaid and matured, and special assessments levied against said land and real estate that are due and unpaid at the date of sale and that have priority over the mortgage herein being foreclosed;
3. The expenses, interest and indebtedness found heretofore to be owing from the defendants Canada Grain Co., Inc., Harry Helmer, Frances Helmer, Elmer E. Rempel and Edith Rempel, to the plaintiff and also found to be a lien upon the property in question;
4. The balance thereof, if any, be brought into the court to await its further order.

and that he make return of the Order of Sale within sixty (60) days from the date thereof, with his proceedings endorsed thereon, which Order of Sale was delivered to and received by the said United States Marshal on June 7, 1976, and the said United States Marshal by virtue thereof, then advertised said property for sale

FIGURE C.4 Foreclosure on Canada Grain Co., 1976. The property includes the former CCC/USDA facility.

by causing a notice that he would on the 13th day of July, 1976, at the front door of the Marion County Courthouse, Marion, Kansas, offer said lands and tenements at public sale, and sell the same to the highest bidder at the time of sale, the said notice being published in a newspaper printed in Marion County, Kansas, and of general circulation in said county, the Marion County Record, which said newspaper has been continuously and uninterruptedly published in said county during the period of fifty-two (52) consecutive weeks immediately prior to the first publication of the Notice of this sale, said notice being published for more than thirty (30) days immediately prior to the date of said sale; and

WHEREAS, on the date so named in said notice and at the time designated therein, the United States Marshal did publicly offer for sale and sell the hereinafter described real estate, tenements and fixtures thereon, to Cooperative Grain and Supply, Hillsboro, Kansas, for the price of \$2,000.00, to wit:

5:38
6-23-76

- Item 17: Lots 7-12 inclusive and Lots 16-18 inclusive, all in Block 6, Canada, Kansas (Marion County);
- Item 18: Lots 7-18 inclusive in Block 11 in the City of Canada, Kansas, according to the plat thereof. (Marion County);
- Item 19: Lots 1-6 inclusive of Block 3 and Lots 1-6 inclusive of Block 4 in Original Town of Canada, Kansas. (Marion County);
- Item 20: Lots 1 and 2 and the West 1/2 of Lots 13, 14 and 15, Block 6, Canada, Kansas. (Marion County).

and

WHEREAS, the said United States Marshal duly returned said Order of Sale to said court, with his proceedings thereunder endorsed thereon, and thereafter, and on the 21st day of January, 1976, the Court duly confirmed said sale as having been made in all respects

FIGURE C.4 (Cont.)

Corporation Deed (General Warranty)

4423

STATE OF KANSAS, }
Marion County, } ss.

This instrument was filed for record on the 21 day of Oct, A.D. 1978, at 4 o'clock P. M., and duly recorded in Book 327 of Deeds, at page 234.

Anna Jane Welch
Register of Deeds.
By *Angela Moore* Deputy.

FEES
Register of Deeds, \$
for recording, \$
County Clerk, for Transfer
Total, \$

Entered in Transfer Record in my office this 27 day of October, A.D., 1978.
Arthur D. Gandy
County Clerk.

THIS INDENTURE, Made this 23rd day of October A. D., 1978, between
D & R Grain, Inc.
a corporation duly organized, incorporated and existing under and by virtue of the laws of the State of Kansas and having its principal place of business at Hillsboro in the State of Kansas of the first part, and
Countryside Grain, Inc.
of Marion County, in the State of Kansas of the second part:

WITNESSETH, That said part Y of the first part, in consideration of the sum of One and 00 DOLLARS the receipt of which is hereby acknowledged, do CS by these presents, Grant, Bargain, Sell, and convey unto said part Y of the second part, its heirs and assigns, all the following-described real estate, situated in Marion County and State of Kansas to wit:

Lots 7-12 inclusive and Lots 16-18 inclusive, all in Block 6, Canada, Kansas;
Lots 7-18 inclusive in Block 11 in the City of Canada, Kansas;
Lots 1-6 inclusive in Block 3 and Lots 1-6 inclusive in Block 4, Original Town of Canada, Kansas;
Lots 1 and 2 and the west 1/4 of Lots 13, 14 and 15, Block 6, Canada, Kansas.

TO HAVE AND TO HOLD THE SAME, Together with all and singular the tenements, hereditaments and appurtenances thereunto belonging or in anywise appertaining, forever

And said grantor for itself, its successors and assigns, does hereby covenant, promise and agree, to and with said part Y of the second part, that at the delivery of these presents it is lawfully seized in its own right, of an absolute and indefeasible estate of inheritance, in fee simple, of and in all and singular the above granted and described premises, with the appurtenances; that the same are free, clear, discharged and unincumbered of and from all former and other grants, titles, charges, estates, judgments, taxes, assessments and incumbrances, of what nature or kind soever;

and that it will warrant and forever defend the same unto said part Y of the second part, its heirs and assigns, against said party of the first part, its successors and assigns, and all and every person or persons whomsoever, lawfully claiming or to claim the same

IN WITNESS WHEREOF, the said party of the first part has hereunto caused this Deed to be signed on its behalf by its _____ President thereunto duly authorized so to do, and has caused its corporate seal to be hereunto affixed the day and year first above written

(Corporate Seal) ^

D & R GRAIN, INC.
By *Raymond Chasman*
President

8-7846-142+1-41



(This form is printed by the Kansas Bar Association solely for the use of its Members)

FIGURE C.5 Warranty deed, D&R Grain to Countryside Grain, 1978.

WARRANTY DEED (Kansas Statutory Form)

Entered in Transfer Record in my office this
18th day of July, A. D., 1991
Maquette
County Clerk.

DANIEL P. JANZEN and SUSAN A. JANZEN, husband and wife

CONVEY AND WARRANT TO
COOPERATIVE GRAIN & SUPPLY
Hillsboro, Kansas
all the following described REAL ESTATE in the County of Marion
and the State of Kansas, to-wit:

Lots 1 to 6, both inclusive, Block 3;
Lots 1 to 6, both inclusive, Block 4;
Lots 1 and 2, and Lots 7 to 12, both inclusive,
Lots 16, 17 and 18, and West 1/2 of Lots 13, 14
and 15, Block 6; Lots 7 to 18, both inclusive,
Block 11, all in Original Town, Canada, Kansas.

for the sum of One (\$1.00) Dollar and Other Valuable Consideration

EXCEPT AND SUBJECT TO: Easements and Rights of Way of record, if any.

Dated. 18th day of July, 1991
STATE OF KANSAS, MARION COUNTY, ss

BE IT REMEMBERED, That on this 18th day of
A. D. 1991 before me, the undersigned, a notary public
in and for the County and State aforesaid, came
Daniel P. Janzen and Susan A. Janzen,
husband and wife,

Daniel P. Janzen
Daniel P. Janzen

Susan A. Janzen
Susan A. Janzen

STATE OF KANSAS County, Marion ss

This instrument was filed for record on the
18 day of July, A. D., 1991
at 11:00 o'clock A. M., and duly recorded
in book 337 of Maquette
at page 137
Robert E. Janzen
Register of Deeds.

Fees \$ 6.00 Deputy.

who is personally known to me to be the same person S who
executed the within instrument of writing and such person S duly
acknowledged the execution of the same.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed
my seal, the day and year last above written.

Lyle K. Lepper
Notary Public
State of Kansas
My Appt. Expires 1992
Notary Public.

990 (This form is printed by the Bar Association of the State of Kansas solely for the use of its Members)

FIGURE C.6 Warranty deed, Janzen Farm Service to Cooperative Grain and Supply, 1991.



Environmental Science Division

Argonne National Laboratory
9700 South Cass Avenue, Bldg. 203
Argonne, IL 60439-4843
www.anl.gov



UChicago ►
Argonne_{LLC}

A U.S. Department of Energy laboratory
managed by UChicago Argonne, LLC