**Technical Action Plan at Former Commodity
Credit Corporation Grain Storage Sites
in Nebraska, Kansas, Iowa, and Missouri
(Revision 2)**

**Environmental
Research Division
Argonne National Laboratory**

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Technical Action Plan at Former Commodity Credit Corporation Grain Storage Sites in Nebraska, Kansas, Iowa, and Missouri (Revision 2)

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Notation

ARAR	Applicable or Relevant and Appropriate Requirement
AWSS	Alternate Water Supply Study
BER	Bureau of Environmental Remediation (of KDHE)
BOW	Bureau of Water (of KDHE)
CCC/USDA	Commodity Credit Corporation, U.S. Department of Agriculture
CCl ₄	carbon tetrachloride
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CHCl ₃	chloroform
EPA	U.S. Environmental Protection Agency
ESC	Expedited Site Characterization
ft	foot
KDHE	Kansas Department of Health and Environment
MCL	maximum concentration level
mi	mile
µg/L	microgram per liter
NA	not available
ND	not detectable (levels of carbon tetrachloride)
NDEQ	Nebraska Department of Environmental Quality
NDOH	Nebraska Department of Health
NPL	National Priorities List
PA	Preliminary Assessment
PWS	Public Water Supply
RWD	Rural Water District
SDWA	Safe Drinking Water Act
SI	Site Investigation
VOC	volatile organic compound

**Technical Action Plan at Former Commodity Credit
Corporation Grain Storage Sites in Nebraska,
Kansas, Iowa, and Missouri (Revision 2)**

1 Introduction

This document has been prepared for the Commodity Credit Corporation of the U.S. Department of Agriculture (CCC/USDA), to provide an outline for a multiyear plan for technical investigations at sites in Kansas and Nebraska that have been identified as having groundwater contamination. Carbon tetrachloride is the primary contaminant of concern at sites in Nebraska and Kansas where former CCC/USDA grain storage facilities were located. At this time, no former CCC/USDA grain bin sites in Iowa and Missouri have been determined to have contamination at or above the maximum concentration level (MCL). This document represents a second revision to an original plan proposed by the CCC/USDA in January 1992 (*Technical Action Plan at Former Commodity Credit Corporation Grain Storage Sites in Nebraska and Kansas*).

The CCC/USDA recognizes the need to address the reported groundwater contamination problems in a timely manner. Doing so will protect public drinking water supplies, public health, and the environment. To address these groundwater contamination problems, the CCC/USDA has committed and continues to commit resources and funding to investigate the contaminated sites further.

2 Purpose and Scope of Document

This *Technical Action Plan (Revision 2)* attempts to address comments on previous plans received from the Environmental Protection Agency (EPA) and Nebraska state agencies. In addition, the plan incorporates an approach consistent with equitable treatment for all communities in terms of time and dollars.

This revision is based on the premise that all of the CCC/USDA sites will be treated as Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) sites by the EPA regardless of actions taken by the CCC/USDA to supply permanent alternate drinking water supplies. Therefore, unlike previous plans, this revision does not provide for Alternate Water Supply Studies (AWSSes) as such. An ongoing program will be conducted to closely track drinking water levels with state agencies and the EPA, to assure that the CCC/USDA can respond in a timely manner in providing interim water supplies to communities that may have been affected by the CCC/USDA former grain storage program and where carbon tetrachloride values are $\geq 5 \mu\text{g/L}$ (micrograms per liter; equivalent to parts per billion). Subject to the availability of funds, all known former CCC/USDA sites with groundwater carbon tetrachloride values $\geq 5 \mu\text{g/L}$ will be subjected to a site characterization to determine the need for remediation under CERCLA. At the end of that characterization, if the CCC/USDA, EPA, state agencies, and communities conclude that it is preferable to provide a permanent alternate source of drinking water to a community rather than to proceed with extensive aquifer remediation, then such action may be taken.

The hazardous waste management activities are subject to annual appropriations. Therefore, no funds may be obligated unless sufficient funds are provided through the appropriations process. It follows that no such activity can be conducted until sufficient funds are available.

Other major features of this revised plan are the following:

- Sites are classified into action categories on the basis of carbon tetrachloride levels in water. A value of $5 \mu\text{g/L}$ for carbon tetrachloride in water supplies was chosen as the trigger value for action levels because this is the MCL under CERCLA. Although the Nebraska Department of Environmental Quality (NDEQ) has suggested that other factors be considered in triggering action categories, no other established values for soils and other media exist to

allow the objective categorization of sites under either CERCLA or the Safe Drinking Water Act (SDWA). If such objective criteria become available, the action categories could be reevaluated on the basis of data available from the EPA and the states.

- Sites are divided into three action categories: (1) *Deferred Action*, with carbon tetrachloride $< 5 \mu\text{g/L}$; (2) *Interim Water Supply*, with carbon tetrachloride $\geq 5 \mu\text{g/L}$ and no alternate source of drinking water readily available; and (3) *Expedited Site Characterization (ESC) for CERCLA evaluation*, for all sites with carbon tetrachloride contamination of $\geq 5 \mu\text{g/L}$.
- To facilitate the characterization process, one major work plan covering general material common to all sites will be written for each state and submitted to the EPA and the appropriate state regulatory agencies for review. Site work plans will be issued under the guidelines of the general state work plan for each site, with specific site history and setting, technical plans, site specific environmental protection controls and performance standards (ARARs or Applicable or Relevant and Appropriate Requirements), and schedules. Such an approach will facilitate review and approval by all vested authorities.
- Former sites have been placed in groups for ESC action for CERCLA evaluation on the basis of common features such as geology/hydrogeology and logistic feasibility. These groups will be treated as a unit for planning and initiating field programs, to facilitate the process and control costs. In this way, the field work for one group from each state can be completed each year. The expectation is that up to five sites per year can be evaluated under this strategy.
- Schedules are attached for ESC groups. However, the actual groups for FY 1995-FY 2000 have not been selected. These groups will be chosen, subject to the availability of funds, each year on the basis of the updated priorities of the EPA and the affected states. The groups for FY 1994 have been selected on the basis of discussions with or actions by the EPA and state agencies.

Details of site categorization, site tracking, scheduling, and FY 1994 activities are given in Section 3 of this document.

3 Site Classification and Proposed Technical Action

3.1 Site Review and Classification

As part of the initial phase of the revised strategy, a detailed review has been completed of all former CCC/USDA grain bin sites in Nebraska and Kansas with known levels of carbon tetrachloride in the water. The sites included in this review were taken from the original CCC/USDA inventory and data from "A List of Sites with Carbon Tetrachloride Contamination Based on Available Data as of May 17, 1993." The latter list was provided to the CCC/USDA by the EPA.

In addition to the information derived from the two sources mentioned above, Argonne held numerous discussions with officials from the Nebraska Department of Health (NDOH), the NDEQ, the Kansas Department of Health and Environment (KDHE), and the EPA's Region VII Water Management Division.

The KDHE's Bureau of Environmental Remediation (BER) and Bureau of Water (BOW) provided a significant amount of additional information. The KDHE currently operates under an interagency agreement with the EPA Region VII, which allows the BER to conduct Preliminary Assessments (PAs) and Site Investigations (SIs). During the past several years, the BER has conducted a substantial number of PAs and SIs at sites with carbon tetrachloride contamination. The BER staff were very cooperative and provided much additional data from the appropriate PAs and SIs, including test results from private wells in affected communities. The BOW personnel were also very helpful in providing data on public wells contaminated with carbon tetrachloride and other volatile organic compounds, as well as the status of the affected wells.

Limited information was obtained from the Nebraska agencies. Public well information was obtained through a personal visit to the Lincoln, Nebraska, office of the NDOH. As was the case with the Kansas BOW, the NDOH did not have private well data, and Argonne was referred to the NDEQ for that information. Officials at NDEQ stated that their department had very limited information on private wells and suggested that the EPA Region VII office might have more complete information. However, only limited private well data were available from Region VII's Water Management Division.

Unlike the KDHE, the NDEQ does not operate under an interagency agreement with the EPA Region VII. Therefore, PA and SI activities in Nebraska are limited to those performed by the EPA Region VII, and related information, including any data about private wells, is not available through the NDEQ. The most complete and recent information available on Nebraska communities appears to be held by EPA Region VII. Argonne is in the process of obtaining additional PAs, SIs, and other necessary information from the EPA Region VII Office of Public Affairs, to ensure that future technical actions are based on the most complete and recent information on affected Nebraska communities.

3.1.1 CCC/USDA Site Database

The major objectives of the site review survey were the following: (1) to update the list of communities where carbon tetrachloride contamination is 5 µg/L or greater in groundwater, (2) to identify communities that still have contaminated drinking water versus communities where clean water is being supplied, (3) to determine the manner in which the clean water is supplied (i.e., bottled water, filters, rural water system hookups, etc.) (4) to determine whether contaminated water wells are being used for other purposes (i.e., irrigation, lawn watering, washing, etc.), (5) to obtain additional analytical data for contaminated wells (where available), and (6) to establish sources/contacts in Nebraska and Kansas regulatory agencies and EPA Region VII in order to set up a mechanism for obtaining ongoing analytical testing data on communities where former CCC/USDA bin sites existed.

As part of the review and updating process, Argonne has begun to develop a comprehensive database of all CCC/USDA sites with carbon tetrachloride contamination in Nebraska and Kansas. The database will include site history, well data, the status of water supplies, geologic and geographic information, and any other relevant data generated by the survey.

The database will be updated and maintained as new information becomes available. It has been designed as a reference tool and will assist the CCC/USDA in making necessary determinations about the need for immediate alternate water supply actions at affected communities, as well as in monitoring the communities currently listed under the Deferred Action category. Ongoing communication with the EPA and various state agencies will be critical to success in maintaining this resource.

As stated earlier, one of the objectives of the survey was to establish sources or contacts in both states and with EPA Region VII in order to obtain data from ongoing analytical tests regarding affected communities. By conducting the survey, Argonne has been able to make the necessary contacts that will enable this objective to be met. By monitoring and gathering data on an ongoing basis, Argonne can provide the CCC/USDA with updates on any communities that may experience inadequately safe drinking water supplies in the future and with recommendations on necessary technical actions.

3.1.2 Site Classification

All of the sites identified in the survey have been classified for technical action by using the maximum carbon tetrachloride concentrations in the water supply. The classification process is as follows.

- *Deferred Action* — carbon tetrachloride less than 5 µg/L
- *Interim Water Supply* — carbon tetrachloride greater than or equal to 5 µg/L, with no alternate drinking water supply
- *Expedited Site Characterization* — carbon tetrachloride greater than or equal to 5 µg/L

The value of 5 µg/L for the maximum carbon tetrachloride concentration was chosen as the threshold value separating the Deferred Action category and the Expedited Site Characterization and Interim Water Supply categories. This value was established by CERCLA as the MCL for carbon tetrachloride in drinking water. For the purpose of this classification, although the practice is not required by regulation, all values of 4.5-4.9 µg/L were rounded up to 5 µg/L to ensure a conservative margin for error.

3.2 Technical Action Categories

This *Technical Action Plan (Revision 2)*, as mentioned above, proposes three technical action categories. The details of these categories are discussed below. Tables summarizing the results of the site classification are also included.

3.2.1 Deferred Action Category

All sites that have a maximum carbon tetrachloride concentration falling below the MCL of 5 µg/L will be placed in the Deferred Action category. These sites are listed in Table 1. The CCC/USDA, in conjunction with the EPA and appropriate state agencies, will continue to monitor carbon tetrachloride concentrations at the Deferred Action sites to ensure the continuing health and safety of these communities. If at any time the concentration should exceed the MCL, the affected sites may be reevaluated and a new technical action recommended.

All sites that are not included in the Deferred Action category will be scheduled for ESCs. Within this grouping, the sites have been screened to identify those that may need some type of interim water supply, before actual implementation of the ESC activities. The next section outlines this process.

3.2.2 Interim Water Supply Category

Known CCC/USDA sites with a maximum carbon tetrachloride concentration greater than or equal to the MCL (5 µg/L) and with no readily available alternate source of drinking water have been identified. For communities with the potential for an immediate health hazard, as demonstrated by carbon tetrachloride concentrations, appropriate interim drinking water supplies will be identified. If the CCC/USDA chooses to implement any temporary solutions for drinking water supplies, Argonne will provide advice about the appropriateness of the remedy (charcoal filtration, bottled water, etc.).

Preliminary results of the survey indicate that, on the basis of available information, only two communities in Nebraska currently demonstrate a need for immediate action to assure an adequately safe drinking water supply. Both Hordville and Hartington have levels of carbon tetrachloride in the drinking water either at or above the MCL (see Table 2). Appendix A contains further background information on the maximum contaminant data, including the date (if known) of the sample and the information source.

Hartington, Nebraska, lies in the Cedar-Knox Rural Water District (RWD). In 1991, the water in the treatment plant contained 4.7 µg/L of carbon tetrachloride. (For the purpose of this classification, all values of 4.5-4.9 µg/L were rounded up to 5 µg/L to ensure a conservative

TABLE 1 Sites Identified for the Deferred Action Category (carbon tetrachloride < 4.5 µg/L)

Site	Carbon Tetrachloride (µg/L)	Site	Carbon Tetrachloride (µg/L)
<i>Nebraska Sites</i>		Rising City	3.3
Alexandria	0.3	Springfield	0.2
Alliance	0.5	Sterling	0.2
Arapahoe	1.6	Stromsberg	1.0
Ashland	1.3	Tobias	3.2
Auburn	0.8	Valentine	2.5
Bradshaw	0.7	Waco	0.3
Brownville	1.3	Wahco	0.3
Bruning	0.8	<i>Kansas Sites</i>	
Chester	0.4	Barnes	2.5
Coleridge	0.4	Brewster	1.0
Columbus	2.0	Cedarville	2.0
Dakota City	1.4	Cheney	1.1
Edgar	0.5	Concordia	1.0
Emerald	1.2	Country Side	0.9
Geneva	1.5	Ellis	0.2
Grand Island	0.3	Haddam	1.0
Hemingford	0.3	McPherson	2.7
Laurel	1.5	Minneapolis	1.2
Lincoln	1.1	Morrowville	1.8
Loomis	0.3	Ness City	2.2
Mason City	1.6	Perry	4.3
Newman Grove	0.3	Powhatton	4.0
Omaha ^a	0.3	Salina	1.1
Omaha ^a	0.2	Sharon	1.0
Orleans	0.4	White City	0.8
Paxton	0.2	Woodbine	2.4
Pierce	3.4		
Raymond	0.6		

^a Separate CCC sites.

TABLE 2 Summary of Alternate Water Supply Needs at Former CCC/USDA Sites in Nebraska and Kansas^a

Town	Population	CCl ₄ Concentration (µg/L)		Contami- nated Wells in Use	Use for Contaminated Water	Supplier of Clean Water	Additional Data or Comments
		Highest Value	Latest Data				
Nebraska Sites in Need of Interim Drinking Water Supplies							
Hartington	1,500	4.7	4.7	Yes	Drinking	PWS	CHCl ₃ = 137 µg/L. Other VOCs are present. Data are for treatment plant. No well information is available.
Hordville	164	36.3	11.6	Yes	Drinking	PWS	CHCl ₃ = 1 µg/L. Other VOCs are present. Possible nitrate problem.
Nebraska Sites (5 µg/L or more) to be Grouped for Future Expedited Site Characterization							
Adams	472	13.1	13.1	Yes (< MCL)	Unknown	PWS	City has two other wells in use with 0.3 µg/L and ND. ^a
Aurora	3,810	84	ND	No	-	PWS	Other VOCs are present. City has three other wells in use with ND. Contaminated well now also tests ND.
Bloomfield	1,181	7.8	1.9	Yes (< MCL)	Drinking?	PWS	City has two other wells in use with ND. Contaminated well now tests below MCL and is in use.
Bruno	154	40.1	40.1	No	-	PWS	Two new city wells installed in 1990. Currently proposed for listing on the Superfund NPL.
Ceresco	836	8.7	0.6	Yes (< MCL)	Drinking?	PWS	City has four other wells in use with ND. Contaminated well now tests below MCL and is in use.
Clay Center	825	18.2	18.2	Yes	Emergency only	PWS	City has one other well in use with ND.
Cortland	380	5.6	5.6	No	-	PWS	Data taken from EPA report dated 5/17/93.
Deshler	937	7	ND	No	-	PWS	Latest sampling by NDOH (5/11/92) showed ND.

TABLE 2 (Cont.)

Town	Population	CCl ₄ Concentration (µg/L)		Contami- nated Wells in Use	Use for Contaminated Water	Supplier of Clean Water	Additional Data or Comments
		Highest Value	Latest Data				
Nebraska Sites (5 µg/L or more) to be Grouped for Future Expedited Site Characterization (Cont.)							
Funk	198	10.1	ND	No	-	PWS	City has one other well, use uncertain. Contaminated well now tests ND but is abandoned.
Gladstone	50	109	109	No	-	RWD	Affected residences were connected to an uncontaminated rural water system by 10/92.
Hastings	2,000	48	48	Yes	Emergency only	PWS	Other VOCs are present in city's one active well. City has a third well, use uncertain.
Hubbard	199	22	2.2	Yes (< MCL)	Drinking	PWS	City has a second well for emergency, which tests ND. CHCl ₃ = 1.1 µg/L. Contaminated well now tests below MCL and is in use.
Humphrey	799	12	1.7	Yes (< MCL)	Drinking?	PWS	City is currently blending wells to get below the MCL. NDOH sampled Well 65-1 in 5/92 and found 1.7 µg/L.
Johnson	341	5.9	5.9	Yes	Emergency only	PWS	City has two other wells in use, which test ND. In the past, one of these had CHCl ₃ (1.6 µg/L) and other VOCs.
Kenesaw	854	10.2	1.1	Yes (< MCL)	Emergency only	PWS	City has two other wells in use with ND. Contaminated well is below MCL but sees emergency use only.
Marquette	211	7.4	7.4	Yes	Emergency only	PWS	City has one other well in use with ND.
Martell	100	19	19	No	-	RWD	Data taken from EPA report, dated 5/7/93.
Ruskin	224	6	3.6	Yes (< MCL)	Drinking?	PWS	City's two contaminated wells are now below MCL and in use.

TABLE 2 (Cont.)

Town	Population	CCl ₄ Concentration (µg/L)		Contaminated Wells in Use	Use for Contaminated Water	Supplier of Clean Water	Additional Data or Comments
		Highest Value	Latest Data				
Nebraska Sites (5 µg/L or more) to be Grouped for Future Expedited Site Characterization (Cont.)							
Tamora	51	107	107	No	-	Bottled water	USDA is scheduled to provide a filtration system.
Walton	60	38	38	No	-	RWD 1991 (?)	Initially on bottled water. Scheduled to be connected to Cass County RWD 2 in 1991.
Kansas Sites (5 µg/L or more) to be Grouped for Future Expedited Site Characterization							
Agenda	105	15.4	15.4	Yes	Drinking	Air stripper	KDHE to install air stripper.
Agra	321	92.1	92.1	Yes (private)	Lawns only	PWS	Contaminated wells taken out of service. Emergency use with KDHE approval only.
Bendena	100	62.9	62.9	Yes (both)	PWS, drinking	Air stripping, county RWD	Private wells have CCl ₄ > MCL. Public well with air stripper has CCl ₄ < MCL.
Frankfort	963	12.1	12.1	No	-	?	Contaminated well taken out of service. Emergency use with KDHE approval only.
Glasco	709	10.3	10.3	Yes (< MCL)	Drinking	PWS/private	The well above MCL is no longer in service.
Hilton	298	910	910	No	-	Private	Contaminated well near milling company and CCC site is now out of service. No residential community is at the site.
Hutchinson	40,244	17.3	17.3	No	-	PWS	Most contaminated well was taken out of service, and new well sites are being investigated.
Leoti	1,869	32.5	32.5	Yes (< MCL)	Drinking	PWS	The well above MCL is no longer in service.
Morrill	1,097	184	184	Yes (private)	Lawns only	City of Sabetha	RWD 1 is available for backup.

TABLE 2 (Cont.)

Town	Population	CCl ₄ Concentration (µg/L)		Contaminated Wells in Use	Use for Contaminated Water	Supplier of Clean Water	Additional Data or Comments
		Highest Value	Latest Data				
Kansas Sites (5 µg/L or more) to be Grouped for Future Expedited Site Characterization (Cont.)							
Moundridge	1,453	8.6	8.6	Yes (both)	Private lawns	PWS below MCL	Other VOCs. CCl ₄ in monitoring well analyzed at 359 µg/L.
Plainville	1,483	350	350	Yes (private)	Lawns only	PWS	Contaminated wells taken out of service. All affected residences connected to RWD. Fourteen additional PWS wells < MCL.
Potwin	558	61.3	61.3	No	-	El Dorado PWS	Contaminated well taken out of service.
Ramona	116	45.5	45.5	Yes (private)	Drinking	Carbon filters	Other VOCs. No PWS; domestic supplies from private wells only. Carbon filters provided as required.
Randall	156	6.4	6.4	No	-	PWS	Contaminated wells taken out of service.
Lanham (Washington County)	2,096	5	1.9	Yes (< MCL)	Drinking	PWS?	Two CCl ₄ analyses in Well 4 of 1.9 and 0.7 µg/L.
Wright	240	25.2	25.2	Yes (private)	Drinking	Carbon filters or bottled water	No public wells, other VOCs. Cooperative provides water supply arrangements.
Yoder	150	181	181	No	-	PWS	Other VOC contamination from Naval Air Base. PWS well installed as EPA removal action.

^a Abbreviations: CCC/USDA, Commodity Credit Corporation, U.S. Department of Agriculture; CCl₄, carbon tetrachloride; CHCl₃, chloroform; EPA, U.S. Environmental Protection Agency; KDHE, Kansas Department of Health and Environment; MCL, maximum concentration level; NA, not available; ND, not detectable (levels of carbon tetrachloride); NDOH, Nebraska Department of Health; NPL, National Priorities List; µg/L, micrograms per liter; PWS, Public Water Supply; RWD, Rural Water District; VOC, volatile organic compound.

margin for error.) More recent data are not yet available. In addition to carbon tetrachloride contamination, the water supply also has been shown to contain high levels of chloroform and other volatile organics.

Hordville, Nebraska, also has contamination in its water supply. Both of the Hordville public wells were tested and have shown concentrations of carbon tetrachloride and other volatile organics above the MCL. An AWSS was completed in March of 1993. Of the options discussed in the AWSS report, the CCC/USDA and the community agreed to pursue installation of an air stripper. The community and the NDOH are conducting negotiations regarding an alternate water supply. The NDOH issued a consent order to Hordville requiring the community to submit a plan for a safe drinking water supply by September 30, 1993. The CCC/USDA will stay in contact with local government officials from Hartington and Hordville, as well as the EPA and Nebraska agencies, to determine the current status of these drinking water supplies.

In numerous cases in both Nebraska and Kansas, public wells with concentrations above the MCL for carbon tetrachloride have been removed from service. The communities now obtain most or all of their drinking water from either RWDs or neighboring community water systems. In Kansas, in some cases where the KDHE has identified carbon tetrachloride contamination above the MCL in public wells, air strippers have been installed on the well systems. In most cases, the wells have been removed from service.

The survey results for Kansas indicate, according to the KDHE, that Agenda is the only community where a public water supply well with carbon tetrachloride contamination above the MCL is still in service for drinking. The well has tested as high as 15.4 µg/L. The KDHE purchased an air stripper that is now being installed, so Agenda has not been included in the Interim Water Supply category.

For several other communities in both states, more information is needed before a determination can be made about the need for alternate water supplies. Argonne will continue to monitor these sites and provide information to the CCC/USDA as new data become available.

3.2.3 Expedited Site Characterization for CERCLA Evaluation

All sites with maximum carbon tetrachloride concentrations greater than or equal to the MCL (5 µg/L) will be evaluated, grouped, and prioritized for further ESC activities. As mentioned in Section 1, this revised plan is based on the premise that all of the CCC/USDA sites will be treated as CERCLA sites by the EPA regardless of actions taken by the CCC/USDA to supply permanent alternate drinking water supplies. Therefore, all sites will be subjected to the ESC process in order to determine the need for remediation under CERCLA. At the end of that characterization, the CCC/USDA, EPA, state agencies, and communities will have the necessary information to select the most appropriate type of remedial action for each community.

The sites that were identified in the survey as meeting the criteria for an ESC are summarized in Table 2, which includes information on the current status of the drinking water supplies. These sites have been grouped within each state, in terms of geologic similarities and geographic proximity, to facilitate the field logistics. The following section describes this grouping process in detail.

3.3 Site Groupings

Under the previous *Revised Technical Action Plan* (January 1993), CCC/USDA sites were selected for characterization on the basis of contaminant levels in public water supplies. This *Technical Action Plan (Revision 2)* establishes a process whereby the remaining 39 sites in Kansas and Nebraska will be investigated in groups based on geography and geology. As mentioned above, this approach will provide enhanced technical, logistic, budgetary, and scheduling benefits when compared with the single-site ESC process, while it continues to maintain the consistently high technical standards.

The technical knowledge acquired in the course of a site investigation will be used at the next site in a group for maximum impact. The technical experience acquired during Phase I for each group can also be used in conjunction with the interpretation of the work at the earlier sites to benefit later phases of work and the final site characterization. This learning process is particularly important for the development of conceptual local and regional hydrogeologic models and for the refinement of technical work plan protocols. This grouping will simplify and shorten contract preparation because the equipment and services required will largely be the

same within each group. Grouping will also realize reductions in costs and project length through shorter travel times and distances.

General geographic and hydrogeologic data have been assessed during the planning phase of this new technical action strategy. For the purpose of grouping the sites, the major characteristics of contaminant transport were assumed to be governed by the primary features of the hydrogeologic regime: the physiography, the aquifer type (bedrock or unconsolidated and confined, semiconfined, or unconfined), the configuration and lithology of the hydrogeologic units, and the groundwater hydrology. The current contaminant distribution is also recognized to be a function of the source conditions (soil type, carbon tetrachloride concentrations, volumes, etc.), but in the absence of specific information about these factors, these variables were not used for this initial grouping or for setting priorities.

The groups are composed of sites with similar hydrogeologic regimes, which, in turn, are assumed to be associated with similar dominant physical/chemical characteristics and processes. The sites within a group are not identical in all respects, but the differences are not of a nature or an extent that would imply significant differences in the ambient physical and chemical systems.

The specific factors considered in the grouping task were the aquifer type, the aquifer and bedrock lithology, the depth to bedrock, and the depth to the water table. Local pedological conditions were not used as a criterion for the initial geologic grouping, because soils, although locally variable, will not significantly alter the types of tools required for drilling and sampling. Further, although soils and their effect on contaminant transfer will be very important on a site-specific basis, the larger depositional and geologic history provides the best information on the groundwater regime and potential contaminant plumes. Detailed studies of the vadose environment will be included in the site-specific work plans.

Table 3 lists the sites and their geologic characteristics alphabetically (within states), and Table 4 lists the sites by the groupings defined below.

3.3.1 Descriptions of Nebraska Groups

The geologic/geographic groups that were formed from the Nebraska sites are briefly described below.

TABLE 3 Geologic Setting at Former CCC/USDA Sites in Nebraska and Kansas Selected for Expedited Site Characterizations

Site	Bedrock Depth (ft)	Water Table Depth (ft)	Aquifer Type	Aquifer Material	Bedrock Material	Nearby Sites (mi)	Group
<i>Nebraska Sites</i>							
Adams	100	26	Consolidated and unconsolidated	Fractured Dakota sandstone and unconsolidated sandstone/gravel	Dakota sandstone/Permian Council Grove shale	Cortland (10) Martell (20) Walton (26)	NE-C
Aurora	330-370	75	Unconsolidated	Pleistocene sand and gravel	Niobrara limestone	Hordville (17) Hastings (20) Clay Center (22)	NE-E
Bloomfield ^b	Presently unknown	Presently unknown	Unconsolidated ^c	Pleistocene sands and gravels ^c	Niobrara limestone ^c	Hubbard (75) Hartington (20) Humphrey (100)	U ^a
Bruno	150-300	22-65	Unconsolidated	Sand and gravel, clay and silt	Cretaceous Carlisle shale or Cretaceous Greenhorn Graneros limestone/shale	Ceresco (22) Tamora (30) Emerald (32)	NE-A
Ceresco	33-46	50	Consolidated and unconsolidated	Fractured Dakota sandstone and unconsolidated sandstone/gravel	Dakota sandstone and Cretaceous Carlisle shale	Walton (19) Emerald (20) Bruno (22)	NE-B
Clay Center	235	95	Unconsolidated	Sandy silt and gravel	Niobrara limestone	Hastings (19) Aurora (22) Ruskin (28)	NE-D

TABLE 3 (Cont.)

Site	Bedrock Depth (ft)	Water Table Depth (ft)	Aquifer Type	Aquifer Material	Bedrock Material	Nearby Sites (mi)	Group
<i>Nebraska Sites (Cont.)</i>							
Cortland	200-260	150-160	Unconsolidated	Glacial drift; sand lenses, 2-50 ft thick	Dakota Formation	Martell (10) Adams (10) Walton (22)	NE-C
Deshler	130-180	50-80	Unconsolidated	Sand and gravel	Greenhorn limestone, Carlisle shale	Ruskin (8) Gladstone (22) Clay Center (32)	NE-D
Funk	200-350	60	Unconsolidated	Sand and gravel	Ogallala (partially unconsolidated)	Kenesaw (35) Hastings (50) Clay Center (65)	U
Gladstone	0-100	170	Consolidated	Bedrock	Carlisle shale, Cretaceous Greenhorn Graneros limestone/shale	Deshler (22) Ruskin (30) Cortland (42)	U
Hartington ^b	Presently unknown	Presently unknown	Unconsolidated ^c	Pleistocene sands and gravels ^c	Niobrara limestone ^c	Bloomfield (20) Hubbard (55) Humphrey (72)	U
Hastings	200+	75	Unconsolidated	Pleistocene sand and gravel	Niobrara limestone	Kenesaw (14) Clay Center (19) Aurora (23)	NE-E
Hordville	300-400	80-130	Unconsolidated	Gravel, sand, silt, clay	Niobrara/Ogallala	Aurora (17) Hastings (38) Tamora (38)	NE-A

TABLE 3 (Cont.)

Site	Bedrock Depth (ft)	Water Table Depth (ft)	Aquifer Type	Aquifer Material	Bedrock Material	Nearby Sites (mi)	Group
<i>Nebraska Sites (Cont.)</i>							
Hubbard	80-100	Presently unknown	Consolidated	Dakota	Graneros shale and Dakota	Humphrey (65) Bruno (80) Ceresco (95)	U
Humphrey	200 +/-	90-120	Unconsolidated	Glacial drift; sands, gravels; 5-70 ft lenses	Niobrara shale	Bruno (40) Hordville (50) Tamora (58)	U
Johnson	103	98	Consolidated	Bedrock limestone	Permian Council Grove shale/ limestone	Adams (29) Cortland (39) Walton (42)	U
Kenesaw	300	82	Unconsolidated	Pleistocene sand and gravel	Pierre shale	Hastings (14) Clay Center (33) Funk (35)	NE-E
Marquette ^b	Presently unknown	75 ^c	Unconsolidated ^c	Pleistocene sands and gravels ^c	Niobrara limestone ^c	Aurora (11) Hordville (12) York (30)	U
Martell	200 ?	40	Unconsolidated	Sand and gravel	Dakota sandstone	Cortland (10) Emerald (15) Walton (16)	NE-C
Ruskin	150-240	15-20 ?	Unconsolidated	Pleistocene sands and gravels with clays	Carlisle shale	Deshler (8) Clay Center (28) Gladstone (30)	NE-D

TABLE 3 (Cont.)

Site	Bedrock Depth (ft)	Water Table Depth (ft)	Aquifer Type	Aquifer Material	Bedrock Material	Nearby Sites (mi)	Group
<i>Nebraska Sites (Cont.)</i>							
Tamora	256-350	75	Unconsolidated	Sand and gravel	Limestone	Emerald (22) Martell (29) Bruno (30)	NE-A
Walton	100	< 50 (estimated)	Consolidated and unconsolidated	Dakota sandstone, sand, and gravel	Dakota sandstone	Emerald (13) Martell (16) Ceresco (20)	NE-B
<i>Kansas Sites</i>							
Agenda	< 30	175	Bedrock	Dakota Formation	Interbedded siltstone and sandstone	Randall (39) Glasco (47)	U
Agra	60-125	45-60	Unconsolidated	Clay, sand, gravel	Weathered shaley chalk and shale of Niobrara and Carlisle Formations	Plainville (47) Randall (65)	KS-B
Bendena	100	12-50	Unconsolidated	Sand and gravel below clay till	Silty clay till over Pennsylvanian Topeka limestone	Powhatton (20)	KS-F
Frankfort	50-110	10-60	Unconsolidated	Sand and gravel	200 ft of till over limestone/shale	Lanham (25) Powhatton (30)	U

TABLE 3 (Cont.)

Site	Bedrock Depth (ft)	Water Table Depth (ft)	Aquifer Type	Aquifer Material	Bedrock Material	Nearby Sites (mi)	Group
<i>Kansas Sites (Cont.)</i>							
Glasco	>58	18-20	Unconsolidated	Alluvial sand and gravel interbedded with clay	Dakota Formation	Agenda (47) Randall (49)	KS-G
Hilton	100-150	90-110	Unconsolidated	Sand and gravel in silt	Wells also in Ninnescah shale	Moundridge (24)	KS-C
Hutchinson	50-62	9-22	Unconsolidated	Sand	Weathered shale	Yoder (8) Potwin (35)	KS-E
Leoti	150-170	>140	Unconsolidated/ semiconsolidated	Clay, silt, sand, gravel, and caliche	Shale	Wright (128)	KS-D
Morrill	10-40	10-50	Weathered bedrock	Small valley alluvium and bedrock limestone and shale	Pennsylvanian limestone and shale	Powhatton (15) Bendena (30)	U
Moundridge	30-100	30-40	Unconsolidated	Sand and gravel channel and terrace	Wellington Formation shales	Potwin (35) Hilton (24)	KS-C
Plainville	40-80	30-40	Unconsolidated	Sanborn Formation clay; sand and gravel wells also in bedrock	Weathered Carlisle shale	Agra (47) Randall (100)	KS-B
Potwin	18 (?)	50	Weathered bedrock	Weathered limestone/shale	Chase Group limestone and shale	Hutchinson (45) Ramona (45)	KS-A

TABLE 3 (Cont.)

Site	Bedrock Depth (ft)	Water Table Depth (ft)	Aquifer Type	Aquifer Material	Bedrock Material	Nearby Sites (mi)	Group
<i>Kansas Sites (Cont.)</i>							
Ramona	10-80	30-70	Weathered bedrock	Limestone/shale	Wellington Formation (soft, thin limestone and shale)	Potwin (45) Moundridge (40)	KS-A
Randall	50	20	Unconsolidated	Alluvial sand and gravel in silt	Cretaceous limestone and shale	Agra (65)	KS-G
Lanham (Washington County)	< 100	30-40	Unconsolidated	Sand and gravel in till	Cherty limestone and shale of Chase Group	Frankfort (25)	KS-F
Wright	130/229	80/195	Unconsolidated/ semiconsolidated	Sand and silt with caliche	Shale over sandstone	Leoti (128)	KS-D
Yoder	60-80	30-40	Unconsolidated	Sand and gravel below clay	Weathered shale	Hutchinson (8)	KS-E

^a U, ungrouped.^b New site.^c Information based on adjacent CCC/USDA site.

TABLE 4 Groupings of Former CCC/USDA Sites in Nebraska and Kansas

Group	Site	Maximum Carbon Tetrachloride Concentration ($\mu\text{g/L}$)	Population	Remarks ^a
<i>Nebraska Sites</i>				
NE-A	Bruno	40.1	154	Proposed for listing on NPL.
	Hordville	36.3	164	Public wells above MCL; other VOCs.
	Tamora	107	51	Bottled water; filters via USDA 9/1/93 (?).
NE-B	Ceresco	8.7	836	Public wells below MCL.
	Walton	38	60	Bottled water until connected to RWD.
NE-C	Adams	13.1	472	Public wells below MCL.
	Cortland	5.6	380	Data taken from EPA report dated 5/17/93.
	Martell	19	100	Served by RWD.
NE-D	Clay Center	18.2	962	Public wells below MCL.
	Deshler	7	937	Public wells below MCL.
	Ruskin	6	224	Public wells below MCL; other VOCs (no information).
NE-E	Aurora	84	3,810	Public wells below MCL; other VOCs.
	Hastings	48	1,200	Public wells below MCL (?); other VOCs.
	Kenesaw	10.2	854	Public wells below MCL.
Ungrouped Sites	Hubbard	22	199	Public well below MCL.
	Johnson	5.9	341	Public wells below MCL; other VOCs.
	Humphrey	12	799	Blended system to below MCL.
	Funk	10.1	198	Public well below MCL; contaminated well is abandoned.
	Gladstone	109	50	Served by RWD.
	Hartington ^b	4.7	1,500	Currently drinking contaminated water.
	Bloomfield ^b	7.8	1,181	Public wells below MCL.
	Marquette ^b	7.4	211	Public wells below MCL.
<i>Kansas Sites</i>				
KS-A	Potwin	61.3	558	Now on PWS water supply.
	Ramona	45.5	116	Private wells with filters in use; other contaminants.
KS-B	Agra	92.1	321	Contaminated wells taken out of service.
	Plainville	350	1,483	Fourteen other public wells below MCL; other contaminants.

TABLE 4 (Cont.)

Group	Site	Maximum Carbon Tetrachloride Concentration ($\mu\text{g/L}$)	Population	Remarks ^a
<i>Kansas Sites (Cont.)</i>				
KS-C	Hilton	910	298	One private well taken out of service; no town centered around CCC site.
	Moundridge	8.6	1,453	Monitoring well has carbon tetrachloride at 359 $\mu\text{g/L}$; other contaminants.
KS-D	Leoti	32.5	1,869	Contaminated well taken out of service.
	Wright	25.2	240	Two aquifers, all private wells, filters on five wells; other contaminants.
KS-E	Hutchinson	17.3	40,244	Polluted well taken out of service; other contaminants.
	Yoder	181	150	EPA installed public well. Contamination from Naval Air Base.
KS-F	Bendena	62.9	100	Connecting to RWD and installing air stripper.
	Washington County	5	2,096	Recent data show wells below MCL.
KS-G	Glasco	10.3	709	Contaminated public well taken out of service in the 1960s.
	Randall	6.4	156	Contaminated public well taken out of service.
Ungrouped Sites	Agenda	15.4	105	Increasing contaminant concentrations; air stripper being installed.
	Frankfort	12.1	963	Contaminated well out of service.
	Morrill	184	1,097	Now on RWD water supply.

^a Abbreviations: EPA, U.S. Environmental Protection Agency; MCL, maximum concentration level; NPL, National Priorities List; $\mu\text{g/L}$, micrograms per liter; PWS, Public Water Supply; RWD, Rural Water District; VOC, volatile organic compound; USDA, U.S. Department of Agriculture.

^b Evaluation is incomplete.

3.3.1.1 Group NE-A (Bruno, Hordville, and Tamora)

The aquifer at sites in Group NE-A consists of a 200- to 250-ft sequence of reworked Pleistocene sands, silts, clays, and gravel sand. This sequence is considered to be within the transition zone from a predominantly unconsolidated sand and gravel aquifer to the fractured Dakota sandstone aquifer. Conditions are expected to be similar to those at York, Nebraska. Water depths are reported to vary from 22 to 160 ft. Bedrock depth measurements indicate that Hordville directly overlies a buried paleovalley, the lower 200 ft of which is filled with a clay sequence. Groundwater elevation measurements indicate that the regional flow is to the northeast and that groundwater may discharge as base flow into the Platte River.

3.3.1.2 Group NE-B (Ceresco and Walton)

The depth to bedrock at sites in Group NE-B is approximately 100 ft, but paleovalleys may extend the depth to several hundred feet. During the 1970s, the depth to the surface aquifer was less than 40 ft, but local lowering of the water level due to withdrawal is to be expected. The surface aquifer consists of remnants and reworked remnants of Pleistocene glacial drift material. This material consists of interbedded clays, silts, sands, and gravel that may be partially discontinuous and may be hydraulically connected to both the surface and the bedrock aquifers. The bedrock aquifers may consist of fractures in the Dakota sandstone or other lower units.

3.3.1.3 Group NE-C (Cortland, Martell, and Adams)

At sites in Group NE-C, the depth to bedrock has been reported to be 200-260 ft. Bedrock consists of the Dakota Formation. The principal aquifer is interbedded sands, clays, silts, and gravels of glacial drift material and/or Dakota sandstone. The water table in the area is reported to be 150-160 ft below the surface. Unconfirmed regional groundwater flow is toward the Missouri River, to the east.

3.3.1.4 Group NE-D (Clay Center, Deshler, and Ruskin)

The sites in Group NE-D are in the southeastern part of the loess-plains region, immediately west of the glaciated region. The area is mantled by sand and gravels and associated silts and clay deposits of fluvial, lacustrine, colluvial, and eolian origin of Pleistocene and Tertiary age. Located within the units are lenses that can be 5-15 ft thick. The Pleistocene and Tertiary sequences overlie the westerly dipping Cretaceous Ogallala formation. The stratigraphic thickness of alluvium at the sites is approximately 150 ft, with bedrock consisting of either the Ogallala or Niobrara formation. Groundwater is 95 ft below the surface.

3.3.1.5 Group NE-E (Aurora, Hastings, and Kenesaw)

The principal aquifer at sites in Group NE-E is composed of reworked and lenticular remnants of Pleistocene glacial sands, silts, clays, and gravels. Clay lenses can be several tens of feet thick. The regional direction of groundwater flow is considered to be to the northwest, toward the Platte River. Aurora overlies the edge of a buried paleovalley that strikes west-northwest and is reported to be several thousands of feet wide. Bedrock can be either the Ogallala Formation or the Pierre shale and is generally about 300 ft below the surface.

3.3.2 Ungrouped Sites in Nebraska

The sites listed in the "ungrouped" category did not fit immediately into any of the selected geologic or geographic groupings. This fact will not affect the priority of these sites during the annual selection process. The ungrouped sites will be considered equally with the grouped sites, on the basis of appropriate regulatory priorities.

3.3.2.1 Hubbard

Hubbard is located in the extreme northeastern corner of Nebraska, within the High Plains aquifer system. Although 80-100 ft of glacial clays, silty clays, and clayey silts are present at Hubbard, the principal aquifer is the Dakota sandstone, which may be absent in portions of the area. Locally the Dakota may be overlain by remnants of the Graneros shale, which occurs intermittently throughout the area. A 1987 PA indicated that wells show the Dakota Formation as the primary aquifer, but that they may be open via gravel pack to the

overlying unconsolidated glacial material. Water levels appear to be contingent upon the depth to the Dakota Formation aquifer.

3.3.2.2 Johnson

The aquifer at Johnson consists of a sequence of sandy clays, sands, and fine to coarse gravels with interbedded clays, sands, and blue clays with pebbles and gravels. This entire unit may be overlain by about 35 ft of white/brown clay. Bedrock, which consists of white/gray limestone, is approximately 100 ft below the surface and is broken to 115 ft. Groundwater is reportedly at about 100 ft.

3.3.2.3 Humphrey

The aquifer at Humphrey consists of an interbedded glacial drift of sands, gravels, silts, and clays. The depth to bedrock is locally greater than 200 ft, with water levels reported at 100 ft. Blue clays reported to be present are of unknown thickness.

3.3.2.4 Funk

The aquifer at Funk consists of approximately 120-150 ft of interbedded sands, silts, silty sands, sands, and sandy gravels. This sequence overlies the Ogallala Formation, which is composed of consolidated and unconsolidated sand and gravels, silts, and volcanic ash. The unit may be locally cemented by calcium carbonate or silica. Water level information suggests that the regional water table slopes to the north 0.5 mi north of the city and that the groundwater beneath the town flows south.

3.3.2.5 Gladstone

Gladstone is located on the edge of the transition zone between the High Plains aquifer (of glacial drift) and the reworked remnants of glacial material. It is also located on the border of a shallow occurrence of the Dakota Formation. The principal aquifer is reported to be unconsolidated material. Bedrock is about 50 ft below surface, but outcrops of bedrock occur within 1 mi of the town.

3.3.2.6 Hartington, Bloomfield, and Marquette

The sites at Hartington, Bloomfield, and Marquette were added to the list after the geologic evaluation was complete. Argonne is currently awaiting additional background information. This information will allow these sites to be fully evaluated and added to the Nebraska groupings.

The CCC/USDA has indicated that the Hallam, Davenport, Carleton, Ohiowa, and Holmesville communities had no bin sites in their immediate vicinities.

3.3.3 Descriptions of Kansas Groups

The groups established on a geologic/geographic basis in Kansas have the general characteristics described below (Table 3).

3.3.3.1 Group KS-A (Potwin and Ramona)

The sites in Group KS-A occur in the Flint Hills Upland physiographic province, which extends north-south across the entire state. The hydrogeology is characterized by a surficial aquifer of weathered shale and limestone units of Permian age. The bottom of the aquifer is determined by the depth of significant bedrock weathering. The present water table depth is 30-70 ft.

3.3.3.2 Group KS-B (Agra and Plainville)

The sites in Group KS-B are characterized by their geographic location in north central Kansas, at the eastern margin of the outcrop of the Ogallala and the High Plains aquifer system. The sites are directly underlain by the Pleistocene Sanborn Formation. The aquifer comprises sand and gravel beds of the Sanborn and/or the Ogallala Formation. The lower boundary of the aquifer is formed by the shaley chalk of the Smoky Hill member of the Niobrara Formation.

3.3.3.3 Group KS-C (Hilton and Moundridge)

The sites in Group KS-C are situated in a lowland in south central Kansas. The sites occupy the previous path of the paleo McPherson valley. Pleistocene silt, sand, and gravel deposits of the McPherson Formation now fill this valley to form a regional aquifer. The bedrock shales of the Wellington Formation act as the base of the aquifer and deepen to the west. The water table has been lowered throughout this aquifer, and locally it may be located in the bedrock.

3.3.3.4 Group KS-D (Leoti and Wright)

The sites in Group KS-D are situated on the high plains of western Kansas. The uppermost aquifer is that of the Ogallala Formation, which is composed of a thick heterogeneous sequence of silts, sands, and gravel. Horizons with calcite and silica cementation are common. The water table has been lowered by pumping throughout this region. The saturated thickness of the aquifer within the Ogallala is now less than 40 ft, with a depth to the water table now in excess of 130 ft. Locally groundwater is extracted from small perched aquifers within the Ogallala. At Wright the Dakota Formation aquifer is also exploited by using wells exceeding 200 ft in depth. At Leoti the top of the Dakota Formation is about 800 ft below the surface.

3.3.3.5 Group KS-E (Hutchinson and Yoder)

The sites in Group KS-E are situated in the valley of the Arkansas River in south central Kansas. The alluvium is a productive surficial aquifer comprising unconsolidated silts, sands, and gravels. Yoder lies to the south of the alluvium on Pleistocene deposits of the McPherson Formation. The Arkansas River alluvium at Hutchinson is derived from the reworking of McPherson Formation. Lithologically the two units are indistinguishable, and they are considered to form a contiguous aquifer system where they are in contact. Ninnescah shale of the Permian period underlying the sites of this group at depths of 50 ft and more below the surface forms the base of the aquifer.

3.3.3.6 Group KS-F (Bendena and Washington County [Lanham])

The sites in Group KS-F are situated on upland, interfluvial areas in northeastern Kansas. The aquifer occurs in thick Pleistocene glacial deposits that overlie limestone and shale formations of Pennsylvanian to Permian age. The aquifer materials are permeable zones within till deposits of unstratified clay, silt, sand, gravel, cobbles, and boulders. Locally tills may be separated by units of outwash sand and gravel or by paleosols. Groundwater supplies are derived largely from these sand and gravel units, but less productive wells may also be in use, deriving small supplies from the till.

3.3.3.7 Group KS-G (Randall and Glasco)

The sites in Group KS-G occur in an alluvial aquifer overlying unconsolidated silts, sands, and gravels of the Pleistocene Sanborn Formation. These two units probably form a combined hydrologic system with a lower boundary formed by Cretaceous limestone and shale bedrock.

3.3.4 Ungrouped Sites in Kansas

As mentioned in Section 3.3.2, the sites listed in the "ungrouped" category did not fit immediately into any of the selected geologic or geographic groupings. This fact will not affect the priority of these sites during the annual selection process. The ungrouped sites will be considered equally with the grouped sites, on the basis of appropriate regulatory priorities.

3.3.4.1 Frankfort

Frankfort is situated in a valley of the glaciated region of northeastern Kansas. The aquifer is comprised alluvial and terrace silts, sand, and gravels deposited on the eroded tills of the Pleistocene glaciation. The alluvial aquifer varies in thickness across the valley. The underlying till is probably an aquitard overlying Pennsylvanian limestones and shales occurring at a depth of about 200 ft below the surface.

3.3.4.2 Morrill

Morrill, found in the previously glaciated region of northeastern Kansas, is situated on the flanks of a small valley. Groundwater is exploited both from narrow alluvial aquifers in the valley bottom and from weathered Pennsylvanian limestone and shales.

3.3.4.3 Agenda

Agenda has a bedrock aquifer situated in the rock-terraced plains of north central Kansas. The Dakota Formation aquifer is composed of fine-grained sandstone and siltstone with shale layers. The bedrock is encountered close to the surface, and the water table is very deep (175 ft).

3.4 Prioritization of ESC Groups and ESC Activities for FY 1994

In the absence of specific guidance on prioritization criteria from the EPA or state agencies, the CCC/USDA has selected sites for ESC action in Fiscal Year 1994 on the basis of actions by or discussions with these agencies. The CCC/USDA proposes to leave the groups as currently defined without further priority rating. Part of the strategy guiding this proposal is to remain open to the possibility that priorities will change in future years, and to provide for the possible later addition of new sites. It is hoped that the information provided here will be a basis for discussion between the CCC/USDA, the EPA, and the state agencies, for the prioritization and selection of the groups in the future. To maintain future flexibility, sites will be identified annually for work in the upcoming fiscal year. The choices for Fiscal Year 1994 are discussed here.

The Nebraska Group NE-A (Bruno, Hordville, and Tamora) has been chosen for investigation during 1994 on the basis of actions by the EPA and NDOH. Bruno has been proposed for placement on the National Priorities List by the EPA, and therefore it is an obvious priority. The NDOH has requested that the town of Hordville take expeditious action in obtaining a new water supply. Conducting the ESC process at Hordville will ensure that sufficient data are available for a complete evaluation of options. The third site, Tamora, is included in Group NE-A and will be investigated in conjunction with the other two sites. The

CCC/USDA will begin supplying an interim supply of water to Tamora in Fiscal Year 1994, and the ESC process will provide information on which to base a permanent solution. In keeping with the overall philosophy of the ESC program, a positive transfer of information is expected to aid in the Phase I investigations of these sites.

Analysis of the available data for the Kansas groups did not indicate a strong priority for any single group. At Ramona (Group KS-A), however, the responsibility of the CCC for filter installation and maintenance is considered to be adequate justification for early commencement of site characterization work. The CCC is already incurring the costs of the alternate water supply, and there are benefits to be gained from early resolution of provisions for a permanent alternate supply. For this reason, action at the Group KS-A sites of Ramona and Potwin will be initiated in Fiscal Year 1994.

3.5 Technical Work Plans and Schedules

3.5.1 Technical Work Plans

To streamline the planning and approval process required at each site, Argonne will prepare a series of separate site-specific work plans that will be used under the umbrella of a single *Master Technical Work Plan* for either Nebraska or Kansas. Site-specific work plans will contain any and all site-specific material (site description, history, geology, geography, and hydrogeology), as well as a description of the planned work, including applicable ARARs and site-specific health and safety plans. The *Master Technical Work Plan* will include all material not specific to particular sites (quality assurance/quality control plans, generic health and safety procedures, and a series of standard operating procedures for all technical activities related to water sampling, drilling, cone penetrometer work, and geophysical methods). For each site, therefore, the technical work plan will now comprise the integrated combination of the *Master Technical Work Plan* and one of the series of site-specific work plans.

The adoption of this technical planning method will shift staff time commitments from office-related tasks to field, laboratory, and scientific duties.

3.5.2 Schedules

Appendix B includes the work schedules for this *Technical Action Plan (Revision 2)*. The Fiscal Year 1994 schedule shows the planned work for the groups identified in Nebraska and Kansas. For Fiscal Years 1995-2000, the schedules are nonspecific as to sites, which will be chosen before each fiscal year begins.

Appendix A:
Additional Carbon Tetrachloride Data

Appendix A: Additional Carbon Tetrachloride Data

Site	State	Maximum Value			Latest Value			Well Type
		CCl ₄ (µg/L)	Date	Source	CCl ₄ (µg/L)	Date	Source	
Agenda	KS	15.4	10/91	KDHE	8.1	10/92	KDHE	Public
Agra	KS	92.1	9/1/88	EPA	17.3	12/31/91	EPA	Public/private
Bendena	KS	62.9	5/17/93	EPA report	20.3	5/17/93	EPA report	Public/private
Frankfort	KS	12.1	Before 1986	KDHE/EPA	3.9	12/88	KDHE	Public
Glasco	KS	10.3	3/7/85	KDHE	2.4	5/17/93	EPA report	Public
Hilton	KS	910.0	5/12/92	KDHE	ND	11/30/92	KDHE	Private
Hutchinson	KS	17.3	1/1/84	KDHE/EPA	17.3	1/1/84	KDHE/EPA	Public
Leoti	KS	32.5	5/17/93	EPA report	30.2	12/1/92	KDHE report	Public
Morrill	KS	184.0	6/88	KDHE	73.2	11/13/85	KDHE	Public/private
Moundridge	KS	8.6	12/92	KDHE	8.6	12/92	KDHE	Public
Plainville	KS	350.0	11/20/92	KDHE report	320.0	5/17/93	EPA report	Public
Potwin	KS	61.3	5/24/85	KDHE	21.8	7/18/85	KDHE	Public
Ramona	KS	45.5	5/17/93	EPA report	45.5	5/17/93	EPA report	Private
Randall	KS	6.4	5/17/93	EPA report	6.4	5/17/93	EPA report	Public
Washington Co. Rural Water District No. 1	KS	5.0	5/17/93	EPA report	1.9	10/14/91	KDHE	Public
Wright	KS	25.2	5/17/93	EPA report	25.2	5/17/93	EPA report	Public/private
Yoder	KS	181.0	1986	KDHE	120.0	1993	EPA	Public/private
Adams	NE	13.1	3/2/90	NDOH	0.3	4/14/93	NDOH	Public
Aurora	NE	84.0	5/17/93	EPA report	ND	5/10/93	NDOH	Public
Bloomfield	NE	7.8	10/28/91	NDOH	1.9	4/29/93	NDOH	Public
Bruno	NE	40.1	5/17/93	EPA report	40.1	5/17/93	EPA report	Public
Ceresco	NE	8.7	10/30/90	NDOH	0.6	1/19/93	NDOH	Public
Clay Center	NE	18.2	1/15/90	NDOH	ND	3/3/93	NDOH	Public
Cortland	NE	5.6	5/17/93	EPA report	5.6	5/17/93	EPA report	Public
Deshler	NE	7.0	5/17/93	EPA report	7.0	5/17/93	EPA report	Public

Appendix A: (Cont.)

Site	State	Maximum Value			Latest Value			Well Type
		CCl ₄ (µg/L)	Date	Source	CCl ₄ (µg/L)	Date	Source	
Funk	NE	10.1	9/4/90	NDOH	ND	4/4/91	NDOH	Public
Gladstone	NE	109.0	5/17/93	EPA report	109.0	5/17/93	EPA report	Private
Hartington	NE	4.7	3/14/91	EPA, NDOH	4.7	3/14/91	EPA, NDOH	Public
Hastings	NE	48.0	6/26/90	NDOH	48	6/26/90	NDOH	Public
Hordville	NE	36.3	5/17/93	EPA report	11.6	8/9/93	NDOH	Public
Hubbard	NE	22.0	5/17/93	EPA report	2.2	4/5/93	NDOH	Public
Humphrey	NE	12.0	5/17/93	EPA report	1.7	?	NDOH	Public
Johnson	NE	5.9	9/26/90	NDOH	ND	5/27/92	NDOH	Public
Kenesaw	NE	10.2	11/28/90	NDOH	ND	3/23/93	NDOH	Public
Marquette	NE	7.4	1/4/93	NDOH	ND	4/27/93	NDOH	Public
Martell	NE	19.0	5/17/93	EPA report	19.0	5/17/93	EPA report	Public
Ruskin	NE	6.0	8/1/90	NDOH	3.6	5/27/92	NDOH	Public
Tamora	NE	107.0	5/17/93	EPA report	107.0	5/17/93	EPA report	Private
Walton	NE	38.0	5/17/93	EPA report	38.0	5/17/93	EPA report	Public

Appendix B:
Work Schedules

Date : 10/27/93
 Time Now : 9/16/93
 Project : AGEM Schedule
 Output : USDA Technical Action Plan
 Sheet : 1 of 7

Date : 10/27/93
 Time Now : 9/16/93
 Project : **AGEM Schedule**
 Output : **USDA Technical Action Plan**
 Sheet : 2 of 7

Date : 10/27/93
 Time Now : 9/16/93
 Project : **AGEM Schedule**
 Output : **USDA Technical Action Plan**
 Sheet : 3 of 7

Date : 10/27/93
 Time Now : 9/16/93
 Project : AGEM Schedule
 Output : USDA Technical Action Plan
 Sheet : 5 of 7

Date : 10/27/93
 Time Now : 9/16/93
 Project : AGEM Schedule
 Output : USDA Technical Action Plan
 Sheet : 6 of 7

Date : 10/27/93
 Time Now : 9/16/93
 Project : AGEM Schedule
 Output : USDA Technical Action Plan
 Sheet : 7 of 7

END

DATE
FILMED

3 / 28 / 94