

IEPA Leach Tests

In 1978, the Illinois EPA requested that a set of samples of the solid waste stored in the Disposal Site be subjected to leach tests using IEPA procedures. As a result, 26 samples were taken on waste piles at the location and depths noted in Table 3.2.3c.

A portion of each sample was leached in accordance with the IEPA method (Appendix A). This method requires the digestion of the solid in concentrated nitric acid and subsequently concentrated hydrochloric acid for a period of 30 minutes. This extremely severe test would be expected to dissolve all potentially soluble material. In fact, it is estimated that approximately 75% of all sample material was dissolved; the undissolved material was mainly silicates and silica. The results are reported in Table 3.2.3c.

A second portion of each sample was subjected to the requirements of another IEPA method (Appendix B). This method requires leaching at a pH of 4.0 to 5.2, maintained by dilute hydrochloric acid or sodium hydroxide. As the results in Table 3.2.3d indicate, these leaching conditions produce a leachate acceptable to the U. S. EPA under rules and regulations published May 19, 1980, §261.24, which implement the Resource Conservation and Recovery Act. These regulations provide that materials will not be considered hazardous if leachable constituents produce a leachate that does not exceed 100 times the drinking water standards. None of the metal constituents shown exceed 100 times the respective standard for drinking water.

U. S. EPA-RCRA Leach Tests

Kerr-McGee performed additional laboratory tests on the 26 sludge and residue samples using the leaching method described by U. S. EPA under RCRA.

July 22, 1980

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The specific contaminants which are listed under the extraction procedure of RCRA and the acceptable extract concentration levels, as published in the Federal Register that are based on 100 times drinking water standards are as follows:

<u>Contaminants</u>	<u>Extract Level, mg/l</u>
Arsenic	5
Barium	100
Cadmium	1
Chromium	5
Lead	5
Mercury	0.2
Selenium	1
Silver	5

Results of the EPA-RCRA tests are found in Tables 3.2.3f and 3.2.3g. The overall average concentration for each contaminant showed that the average concentration of all parameters met the criteria of 100 times the drinking water standard.

In other tests, leachate produced from a composite of samples from each pile (#28, 29) was chemically neutralized to a pH of 8. Analysis of this leachate for heavy metals showed concentrations well below the RCRA extraction level.

Also a composite of (#30) 36 sump residue samples (Table 3.2.3j) collected from pond #1 was treated by the U.S. EPA-RCRA method, with results of the soluble constituents showing acceptable levels for heavy metal contaminants. This composite sample was not neutralized, since results met RCRA standards.

In performing these additional tests and subsequently compositing the material for neutralization, the procedure was examined and a specific choice made in regard to the composites. The RCRA testing procedure specifies that it apply to as received material. As a consequence, each individual sample was selected from a significant amount of sample in 10 gram quantities and individually tested for leaching with a similar 10 gram quantity dried for solid analysis. In order to composite samples for

7.6 RADIOLOGICAL STANDARDS

Neither the EPA nor NRC have established radiological standards for stabilized wastes containing thorium source material residues and measurable uranium daughter concentrations such as contemplated in this Plan. Other proposed standards have been examined to determine if interpolation from suggested standards could be applied to the material matrix expected at the West Chicago Disposal Site.

In consultation with the NRC, it was determined that criteria (average 5 pCi/gm, 8 feet deep) established for decontamination of a property in Missouri containing uranium residues would be most nearly applicable to the West Chicago Site. However, since this Missouri site contained only natural uranium daughters, a method of interpolation would be required to determine the dose equivalent concentration for a mixture of Th-232 daughters and U-238 daughters.

Consideration of the permissible level of Ra-226 and Ra-224 occurring simultaneously in the material buried at the Disposal Site leads to a slightly different conclusion. However, from the 5 pCi/dm proposed for the normal site, the following data are applicable to the conversion of these standards to the standard for the West Chicago Site.

1. Rn-222 exhales at a rate of 77.5 times that of Rn-220 under identical conditions.
2. Rn-220 equals .11 of Rn-222 at constant equivalent flux concentration due to Pb-212 half life of 10.6 hour.
3. Residues at West Chicago contain 8.9 times as much Ra-224 as Ra-226.
4. Therefore, Pb-212 flux from Rn-220 would be approximately the same as Rn-222 (8.9 times .11 = .98).

The main lung dose extrapolation must consider the following:

1. Mean lung dose equivalent of Th daughters is 60 urad/hr/pCi/l.
2. For Ra daughter, the mean lung dose equivalent is 9 urad/hr/pCi/l.

3. Thus, the Rn-220 daughters would contribute a dose 6.7 times the Rn-222 dose.

Using the flux relationships and dose ratio described above, the criteria for combined Ra-224 and Ra-226 would be constructed to produce an equivalent dose rate to that from 5 pCi Ra-226/gm as follows:

$.15 C \text{ Ra-224} + .2 C \text{ Ra-226}$ is equal to or less than 1.

If the activity ratio of Ra-224 to Ra-226 represented by the residues is maintained on the West Chicago Factory Site, the limiting concentrations would, therefore, be 5.7 pCi Ra-224/gm and .65 pCi Ra-226/gm.

Kerr-McGee establishes this standard for the terminal level of contamination of the two component matrix which may exist at the Factory Site.

Calculations presented in Appendix II indicate that the planned clay and soil cover will limit radon emissions to a $.49 \text{ pCi m}^2 \text{ sec}$ which is significantly below flux standards proposed for other applications. This cover will provide sufficient attenuation of gamma radiation to meet the dose rate (5 $\mu\text{R/hr}$ to 10 $\mu\text{R/hr}$) proposed for the Site referenced above.

by establishing a compacted clay surface where the material can be protected from the intrusion of water. Area #2 would contain the waste currently piled on the Site. Area #3 would contain the rubble of the building demolition. The entire Site would be graded to an appropriate contour and covered with two feet of compacted clay and at least three feet of fill and topsoil. The accomplishment of this preferred alternate would involve moving approximately nine million cubic feet of material. This requires 24,079 truckloads, with 18,063 truckloads going off or onto the Site, and 16,600 of the total carrying materials onto the Sites for the final cover.

11.3 OFFSITE DISPOSAL

The options for offsite disposal are restricted by limited availability of a disposal Sites. However, for any offsite location, it is clear that the basic approach to waste disposal would be similar to that proposed in the Company's preferred Plan for onsite burial of the waste. Within this framework, location must be evaluated with respect to many site-specific variables including licensing problems, distance from West Chicago, availability, treatment/facilities, population, and the physical condition of the site. It is assumed for the purposes of this Plan that all disposal offsite would require clay and soil cover whether the proposal was for above or below ground burial.

11.3.1 ALTERNATE OFFSITE LOCATIONS

Licensed Storage Sites

Several licensed storage sites have been constructed for handling low level waste, however, none are designed for high volume LSA material, such as located on the West Chicago site. These storage sites are located on State or Federal lands and are licensed by the NRC to receive, bury and monitor the disposal of low level radioactive waste. Four such sites are discussed below.

- a) Sheffield, Illinois - This disposal site in southern Illinois is closest to the West Chicago site. Approximately 20,000 cubic feet of material were transported from the West Chicago site to Sheffield in 1977. This site is no longer accepting waste because it ran out of space and could not expand due to opposition of the State of Illinois to continued operation.
- b) Barnwell, South Carolina - This site is located near the Savannah River nuclear site of the federal government and is licensed to Chem-Nuclear Systems, Inc., for the purposes of storing waste. It provides the service of receiving and storing material under continual supervision and monitoring. It is currently limited to the amount it can receive by space considerations and, therefore, restricts its total receipts each year. While 52,000 cubic feet of the low specific activity waste from the West Chicago plant will be disposed at the Barnwell site under the Kerr-McGee Plan (see Section 4.4.7), that site can not accept the entire 4.8 million cubic feet of the West Chicago low specific activity material.
- c) Beatty, Nevada - This site is licensed by the State of Nevada for radioactive waste burial and is operated by NECO, Inc. No previous arrangements are required to use this licensed site except a contract arranged with NECO for the burial under current policy. However, the Governor of Nevada joined with the governors of South Carolina and Washington in a letter dated July 10, 1979 to the NRC suggesting that the present availability of sites in their states might be curtailed. Transportation costs and burial fees involving the West Chicago wastes would be very high. The cost of this alternative is set forth in Section 12.0 using truck transport. Railroad transportation is not feasible.
- d) Hanford, Washington - This site is located on the government reservation and operated by Chem-Nuclear and NECO. While no difficulty would be expected with arranging for burial at this site under current policies of the State of Washington, the July 10, 1979 letter signed by its Governor suggests availability of the site may be curtailed. If the decision were made to haul the material from West Chicago by rail, arrangements would have to be made

for the unloading of rail cars and moving the materials by truck to the site. The cost of this alternative, using truck transport from West Chicago directly to the sites, is set forth in Section 12.0.

Sites Not Currently Licensed

- a) City officials suggested that consideration be given to burial on the site of the Fermi National Accelerator Laboratory (Fermilab) which is located a few miles south of the Disposal Site. Fermilab is a government owned accelerator laboratory operated by Universities Research Association, Inc., under contract to DOE. The property occupies approximately 6,800 acres on which is located the central laboratory, an accelerator and cluster of buildings. In addition, there is the former village of Weston, Illinois, and other houses where many of the scientists who work at Fermilab live.

To use Fermilab, a disposal site would need to be constructed and an environmental impact statement prepared. It would have to be funded by the DOE with appropriations approved by Congress. Presumably, it would also have to accept wastes from other sources.

Although approximately 5000 cubic feet of low level radioactive material is currently stored on the Fermilab property, the topography of the property is not attractive as a disposal site for large quantities of materials. Topographical maps of the quadrangle show marshes on the western side and eastern side at an elevation of 735 and 715 feet, respectively. The highest elevation is 790 feet, and is an area of significant archeological interest because Indian artifacts have been found on this high ground. The remainder of the Fermilab property is not suitable for below-ground burial because of the presence of groundwater. Approximately 273 acres are occupied by marshes, forcing the placement of any surface disposal site near the current installation or residences on the property.

Transportation routes and methods to a disposal site at Fermilab are uncertain. It might be possible to piggyback trucks out of West Chicago to an existing siding on the railroad where they could proceed to the Fermilab property by state highway. Significant expense would be added by this arrangement.

By letter dated July 23, 1979 to Kerr-McGee, the DOE stated that Fermilab was not available as a disposal site.

- b) An alternate to the Fermilab is the Argonne National Laboratory site located approximately 15 miles southeast by highway from West Chicago. The Argonne site has extensive land holdings. While the environmental impact might be measurably less than Fermilab, all transportation would of necessity be by truck. The DOE letter of July 23, 1979 to Kerr-McGee also stated that Argonne was not available as a disposal site.
- c)* During the period of June, 1979, to April, 1980, Kerr-McGee geologists/hydrologists visited 21 of the 23 clay/shale quarries, 60 of the 220 lime-stone/dolomite quarries, and 3 of the 8 major surface coal mining areas (identified in the Illinois State Geological Survey Minerals Note #64) in an effort to locate a suitable below grade alternative disposal site for the West Chicago wastes. For each site, information related to geologic and hydrologic settings, mineral and land use resources, and present quarry conditions was tabulated. These tabulations are presented in Appendix IV.

The preliminary field investigation revealed the following:

- 1) The abandoned surface coal mines are not suitable for waste disposal because of ponded water conditions and fracture permeability persistent in all coal beds. It was concluded that high permeability and high groundwater level probably would not be suitable.
- 2) The limestone/dolomite quarries typically exhibited prominent fracture and joint characteristics which would contribute

*Balance of Chapter is new.

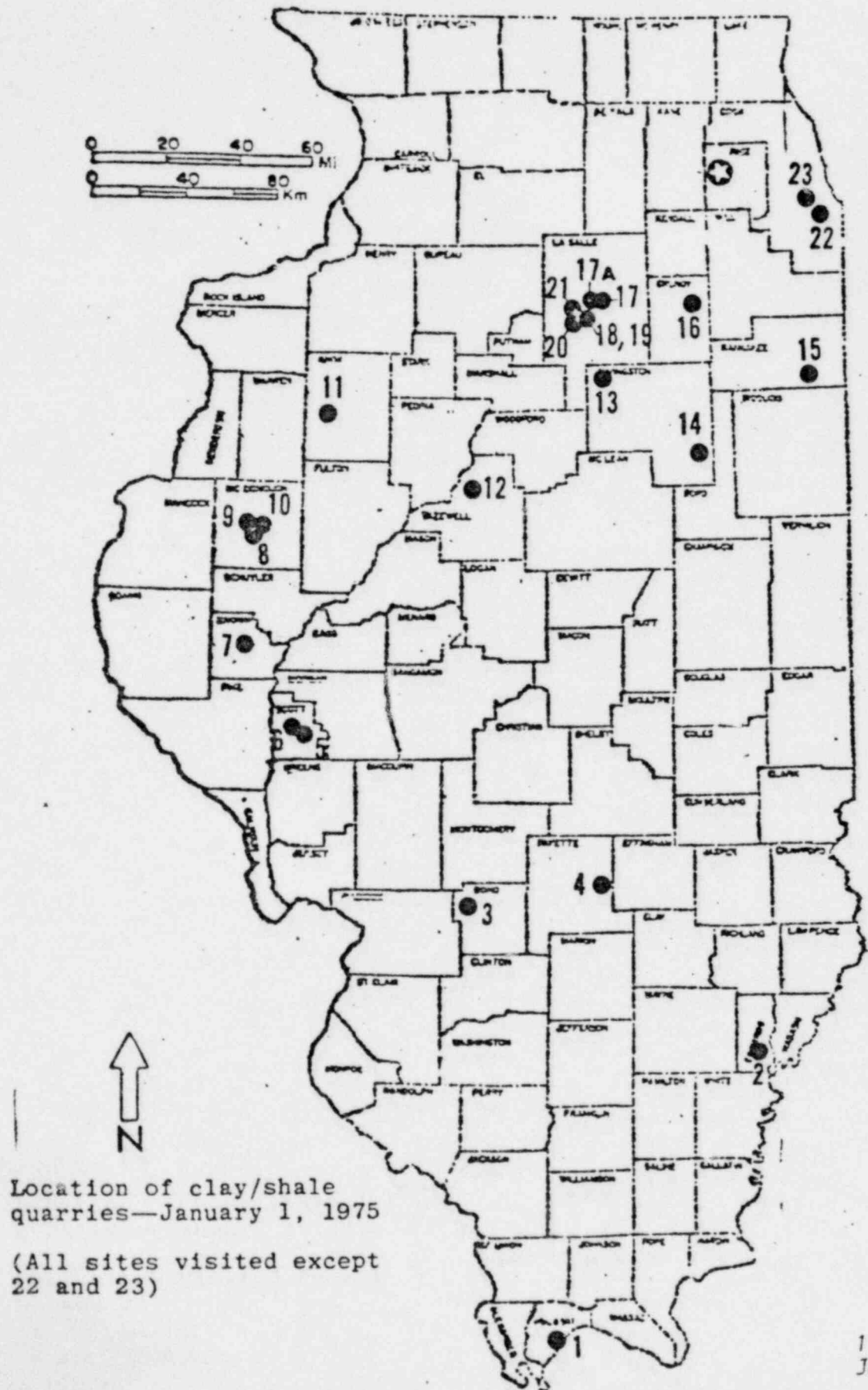
to a serious and unpredictable permeability problem. Even the quarries which were topographically high, and therefore above the water table, showed evidence of groundwater passage through fractures. This water would have to be controlled if wastes were to be protected from infiltrating and percolating groundwater.

Groundwater presence and low or uncertain permeability might result in a saturated burial zone resulting in higher probability of migration of waste components. On this basis, limestone-dolomite sites were eliminated.

- 3) The clay/shale quarries offered the best opportunity for low-permeability conditions. Where glacially-derived clays or deeply-weathered shales of the bedrock were observed, the probability of an acceptably low permeability appeared to be the greatest. Only in those shale quarries where excavation has been deep enough to reach unweathered, fractured shales would the desired permeability not be present.

It was decided, therefore, to concentrate efforts on the clay and shale quarries in the state in the search for an alternative site which would be clearly superior to the existing West Chicago site. Of the 23 clay and shale quarries identified by the Illinois State Geological Survey Minerals Note #64 (Figure 11.1), Kerr-McGee geologists/hydrologists visited 21 sites. (Two sites--#22 and #23--in the Chicago area were not considered as legitimate alternatives. Detailed site-specific data were then developed on these sites. Following this phase of investigation, a Site Evaluation Matrix was developed as a guide to the selection of those sites which would be appropriate for the next phase of investigation. This matrix, shown on Figure 11.2, rates the 23 sites with respect to 13 factors dealing with physical conditions related to population, land use, geology, hydrology, accessibility, resources, and distance to West Chicago.

ILLINOIS CLAY/SHALE QUARRY SITES



Location of clay/shale quarries—January 1, 1975

(All sites visited except 22 and 23)

11.9
July 22, 1980

FIGURE 11.1 Clay/Shale Quarry Sites in Illinois

FIGURE 11.2 SITE EVALUATION MATRIX FOR CLAY/SHALE QUARRY SITES

KERR-McGEE CHEMICAL CORPORATION
SITE EVALUATION MATRIX

	CONCERNS*						
	1	2	3	4	5	6	7
	Population	Active Reclaimed	Bedrock Aquifer Flood Hazard Groundwater Erosion	Shale Gravel	By Rail By Road	Oil and Gas Coal	Distance
1. Olmsted	X	X	X X		X		X
2. Albion	X	X	X	X	X	X X	X
3. New Douglas		X	X		X	X X	X
4. St. Elmo	X	X	X	X	X	X X	X
5. "			X X	X	X X	X	X
6. Exeter**			X X X		X X	X	X
7. Mt. Sterling		X	X	X	X X	X	X
8. Tennessee-west		X	X		X X	X X	X
9. Tennessee-north					X X	X X	X
10. Colchester	X	X X	X		X X	X X	X
11. East Galesburg	X	X	X		X	X	
12. East Peoria	X	X	X	X	X	X	
13. Streator	X	X	X	X	X X	X	
14. Chatsworth	X	X X	X		X		
15. St. Anne	X	X	X X		X		
16. Coal City		X	X	X		X	
17. Ottawa-east		X	X X	X	X	X	
17a. Ottawa-west	X		X X		X	X	
18. Utica-south		X	X X	X	X X	X	
19. Utica-north			X X	X X	X X	X	
20. Lowell	X	X	X X X	X	X	X	
21. Oglesby	X	X	X X	X	X X	X	
22. Dalton	X	X	X X X		X		
23. Blue Island	X	X	X X		X		
West Chicago	X		X X	NA			

X indicates presence of concern

NA - Not Applicable

FIGURE 11.2

*CONCERNS

1. Population - site is within a mile of a population center of more than 500 people
2. Land Use
 - Active - mining activities are current or at least seasonal
 - Reclaimed - site not active but vicinity now reclaimed for other uses
3. Hydrology
 - Bedrock aquifer - significant aquifer lies immediately below glacial sediments
 - Flood hazard - on or very near flood plain of river
 - Groundwater - quarry is pit-type, high probability of shallow groundwater
 - Erosion - quarry is hillside-type, high potential for erosion
4. Geology
 - Shale - quarry exposes fractured shale which may not have required low permeability
 - Gravel - field survey indicated significant gravel mixed with clay
5. Accessibility
 - By rail - nearest existing railroad greater than 0.5 miles from site
 - By road - road traffic would be required to go through one or more small communities
6. Resources
 - Oil and gas - oil or gas resources in immediate vicinity of site
 - Coal - stripable or subsurface coal reserve beneath site
7. Distance - site is greater than 150 miles from West Chicago

**Exeter site located on posted lands; specific location not known.

Six of the 23 sites were selected by Kerr-McGee as having the least significant concerns. These are sites #3, #5, #9, #16, #17 and #18. Subsurface geologic and hydrologic data for these sites were reviewed and summarized from the Illinois State Water Survey and Illinois State Geological Survey files. Site-specific data and a summary of hydrogeologic conditions for each of these sites are given below. No specific site characteristics were determined since Kerr-McGee did not have a basis for legal entry into sites.

POTENTIAL DISPOSAL SITES (Below Grade)

1. Site #3--New Douglas--Bond County (Figure 11.3 and 11.4)

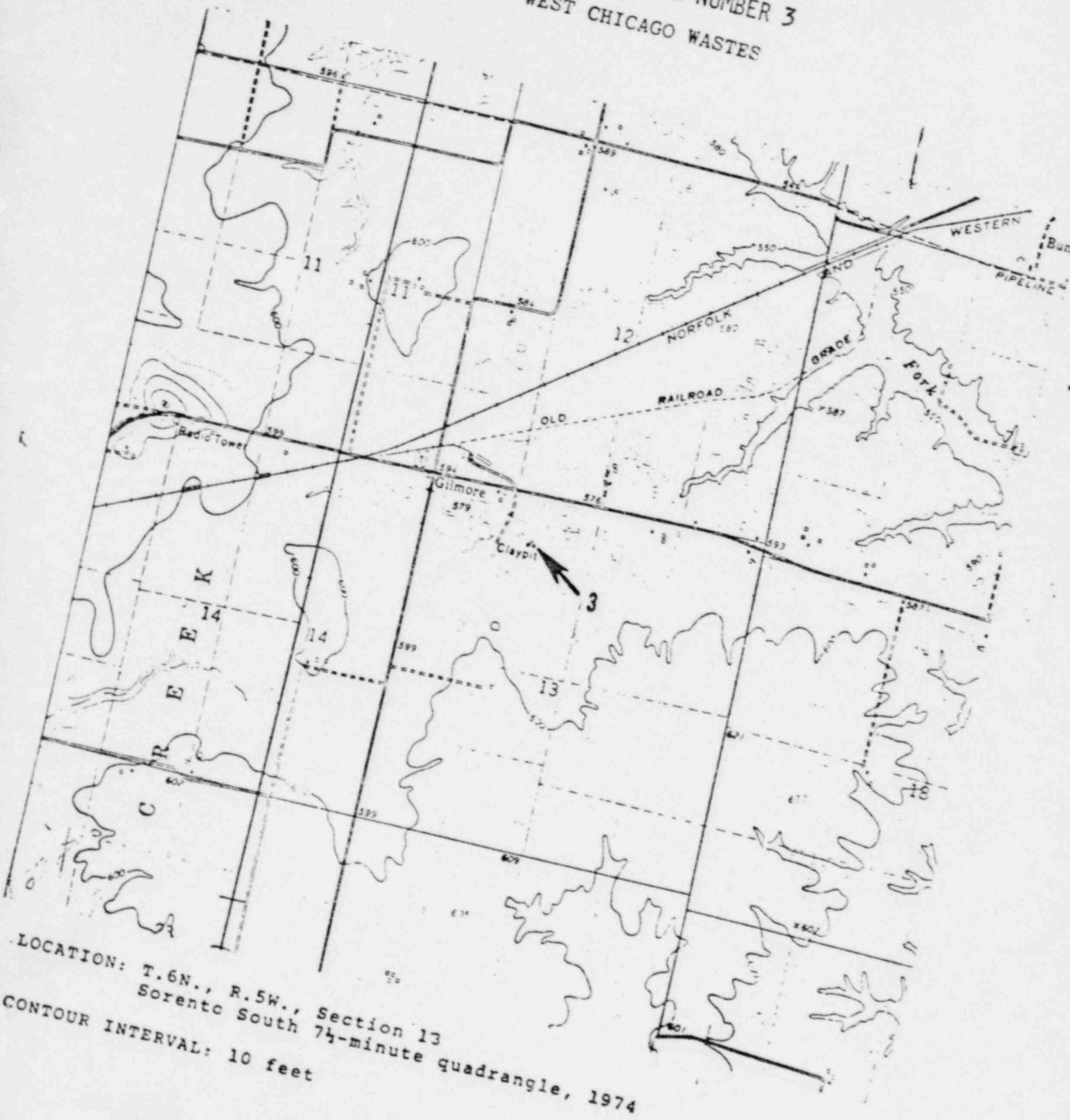
The site is characterized by generally flat terrain with minor relief noted near the major drainages. The surrounding area is generally cleared and developed as farmland.

The quarry operation is located on the south side of a paved county road approximately three miles east of the community of New Douglas. In 1970, population of New Douglas was reported to be 378.

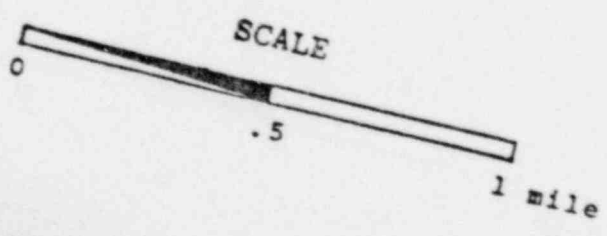
The site was visited in December 1979, and April 1980, and noted to be inactive at those times. However, some earth-moving equipment was at the site. The area was posted and the entrance gate locked. On the north side of the county road, a railroad-car loading area is present--which appears to be the primary method of clay transport from the site.

Data available from the Illinois State Water Survey indicate that within a mile of the site there are several shallow wells in glacial sediments used for domestic water supplies. Generally, the wells are less than 35 feet in depth and completed with 30-inch diameter concrete casings. Drillers' logs typically report clay as the predominant soil type. Water levels in these wells are reported to be about 15 to 30 feet from the surface. During periods of drought, some wells are reported to go dry. The groundwater is typically hard with some elevated iron concentrations.

ALTERNATE SITE NUMBER 3
WEST CHICAGO WASTES



LOCATION: T.6N., R.5W., Section 13
Sorento South 74-minute quadrangle, 1974
CONTOUR INTERVAL: 10 feet



11.13
July 22, 1980

ILLINOIS
CLAY/SHALE QUARRIES

Location Name New Douglas (Bond County) Site No. 3

Location Description:

Section NW $\frac{1}{4}$ of 13 Township T6N Range R5W

Land Ownership: *Land Atlas and Plat Book--Bond County, 1980*
Richards Brick
Edwardsville, IL (Quarry site and rail siding)

Topographic Map Information: *Sorento South*

Date: *1974*

Coverage: *7 $\frac{1}{2}$ minute*

Glacial Thickness: *± 50 feet*

Groundwater Conditions:

Glacial: *Poor, sand and gravel aquifers absent*

Bedrock: *Pennsylvanian--shales, sandstones, limestones, and coal--
small supplies*

Distances:

Direct to West Chicago: *215 miles*

Site to railroad: *Siding on site; Norfolk and Western Railroad*

By road to West Chicago: *270 miles*

Site to interstate highway: *8 miles to Interstate 55*

Site to state highway: *.15 miles to unnamed secondary road*

Nearest Community: *New Douglas*

Distance: *3 miles*

Population: *378 (1970 census)*

Nearest Stream: *Dry Fork of Shoal Creek*

Distance: *1.2 miles*

Flow Information: *Probably Low*

Remarks:

Road traffic through community (New Douglas)
Surrounding topography generally flat
Pit operation

11.14

July 22, 1980

FIGURE 11.4 Site Data for New Douglas Quarry

The Pennsylvanian-age bedrock consists of shale with thin beds of limestone and sandstone. If fractured, these limestone and sandstone beds are reported to contain minor supplies of groundwater. In the area, this groundwater is generally found to be mineralized. No significant bedrock aquifer is known to be present in the vicinity of this quarry site.

Data available from the Illinois State Geological Survey indicate that in the general vicinity of the site, six oil and gas exploration wells were drilled in the 1930's and 1940's--typically to a depth of 2000 to 3000 feet.

One nearby test hole for coal was drilled to a depth of 482 feet in 1909. In 1930, six core holes in the shallow sediments (approximately 70 feet in depth) were reported in the immediate vicinity of the clay pit. The driller's logs have numerous references to good blue clay. This clay is believed to be of low permeability providing good characteristics for liners and covers.

Logs in the area indicate that the glacial sediments are 50 to 70 feet in thickness above the weathered bedrock.

The watershed above the site is approximately one square mile. Perennial flow is not indicated on the topographic map to be present near the site but is noted in Dry Fork of Shoal Creek about one mile downstream of the site.

2. Site #5--Alsey--Scott County (Figure 11.5 and 11.6)

The site is characterized by hilly terrain which is largely uncleared of native vegetation. Some nearby small parcels of land have been cleared for farm land.

The quarry is presently abandoned with two large ponds of water remaining. Some waste-rock mounds are evident, however, much of the site is being reclaimed by vegetation. The quarry is off

of a dirt road, which is impassible during wet weather. The community of Alsey, population about 400, is located approximately one and one-half miles southwest of the quarry. The nearest railroad to the quarry site is through this community.

Data available from the Illinois State Water Survey indicate that there are in excess of 50 dug wells in glacial sediments and weathered bedrock within a couple of miles of the quarry. These wells were inventoried in the 1930's as part of a WPA program. The wells are typically 20 to 35 feet in depth with water levels reported to be 10 to 20 feet in diameter with bedrock used for walls. Typically, the water is hard with some elevated concentrations of iron.

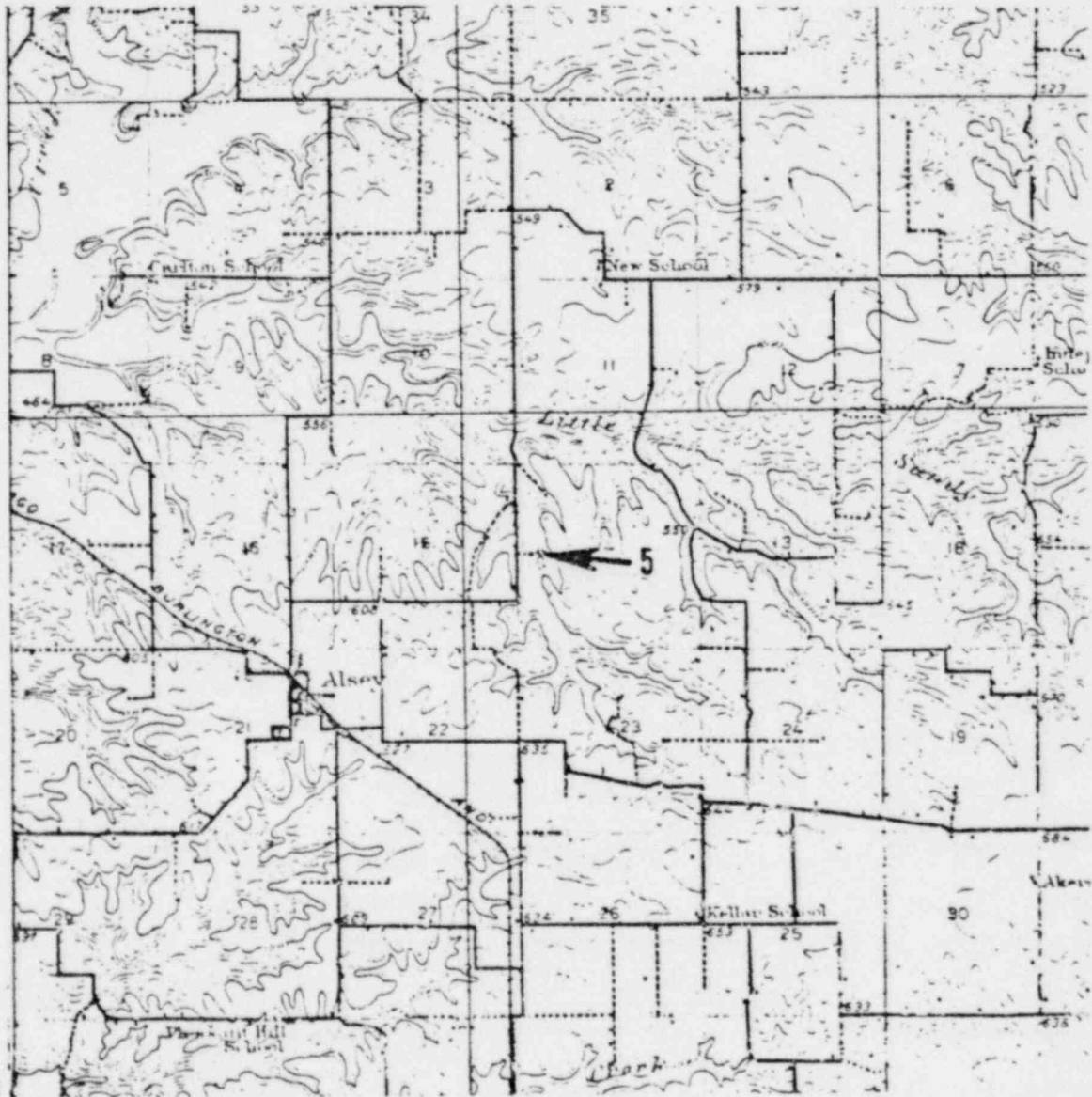
The Mississippian-age bedrock is primarily limestone with varying degrees of crevices and solution channels. Well yields depend on the intersection of these features. The water quality is similar to that found in the overlying glacial sediments. While the limestone aquifer is known in the area, no major water supply near the site has been developed from this zone.

Data available from the Illinois State Geological Survey indicate that four oil and gas exploratory holes were drilled in the area in the 1960's. Depths were approximately 500 feet with minor shows of oil reported. Logs in the area indicate that the glacial sediments are approximately 30 feet in thickness. At the quarry site, some shaley bedrock material was noted in the spoil and in the pond banks.

The quarry site is next to a tributary of the Little Sandy Creek. In April, 1980, flow of several cubic feet per second was noted in this tributary which has a watershed of about four square miles above the quarry. The topographic map shows this tributary to be ephemeral.

FIGURE 11.5 Alsey Quarry

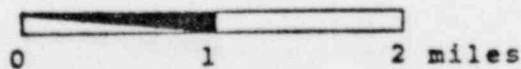
ALTERNATE SITE NUMBER 5
WEST CHICAGO WASTES



LOCATION: T.13N., R.12W., Section 14
Winchester 15-minute quadrangle, 1924

CONTOUR INTERVAL: 20 feet

SCALE



11.17
July 22, 1980.

ILLINOIS
CLAY/SHALE QUARRIES

Location Name Alsey (Scott County) Site No. 5

Location Description:

Section SW $\frac{1}{4}$ of 14 Township T13N Range R12W

Land Ownership: *Land Atlas and Plat Book--Scott County, 1979*
Alsey Refractories Co.
Alsey, IL

Topographic Map Information:

Date: *1924*

Coverage: *15 minute*

Glacial Thickness: *±30 feet*

Groundwater Conditions:

Glacial: *Poor, sand and gravel aquifers absent*

Bedrock: *Mississippian-Keokuk-Burlington Limestone (good aquifer)*

Distances:

Direct to West Chicago: *200 miles*

Site to railroad: *1.5 miles to Burlington Northern Railroad*

By road to West Chicago: *240 miles*

Site to interstate highway: *12 miles to Interstate 72*

Site to state highway: *1.4 miles to State Highway 106*

Nearest Community: *Alsey*

Distance: *1.2 miles*

Population: *Approximately 400*

Nearest Stream: *Little Sandy Creek--tributary across site*

Distance: *On site*

Flow Information: *Probably low*

Remarks:

Road traffic through community (Winchester, 1788)
Surrounding topography generally hilly
Pit and hill-side cut

11.18

July 22, 1980

3. Site #9--Tennessee-north--McDonough County (Figure 11.7 and 11.8)

The site is characterized by hilly terrain associated with the major drainage of the area and extensive mining operations for many years. Outside of the major drainage areas, the land is relatively flat and is used as farmland. Argyle Lake State Park is located about one mile northeast of the quarry.

The general site was noted to be inactive in late 1979 and early 1980, however, considerable mining activity was seen nearby in sites #8 and #10 (Figure 11.1). A large area of mining could be seen from the nearby roads with very little ponded water evident. Vegetation which has reclaimed much of the area indicates that portions of the site have been abandoned for many years.

The site is approximately one mile due north of the community of Tennessee and two miles northwest of the community of Colchester with 1970 population of 179 and 1747 respectively. Roads on the north, east and west sides of the quarries are paved county roads. The nearest railroad is through Tennessee, however, the major drainage of the area separates this railroad from the quarry.

Data available from the Illinois State Water Survey indicate that virtually no groundwater is found in the glacial material near the site. This material is generally less than 10 feet in thickness and is often absent. Wells into the Pennsylvanian/Mississippian-age bedrock are generally 80 to 300 feet in limestone and sandstone beds. The water is typically hard and high in iron content. Abundant clay of varying colors is reported in driller's logs in the shallowest zones. No major bedrock aquifers are developed in the immediate area of the quarry.

The Illinois State Water Survey records indicate that there are abandoned shaft mines in the area and that much sewage had been discharged into them. For this reason, many local people had their wells cased to a depth below the level of these mines.

FIGURE 11.7 Tennessee-north Quarry

ALTERNATE SITE NUMBER 9

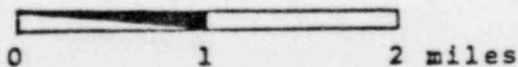
WEST CHICAGO WASTES



LOCATION: T.5N., R.4W., Section 10 and 11
Colchester 15-minute quadrangle, 1913, 1949

CONTOUR INTERVAL: 20 feet

SCALE



11.20

July 22, 1980

ILLINOIS
CLAY/SHALE QUARRIES

Location Name Tennessee-north (McDonough County) Site No. 9

Location Description:

Section NE $\frac{1}{4}$ of 10 & NW $\frac{1}{4}$ of 11 Township TSN Range R4W

Land Ownership: *Land Atlas and Plat Book--McDonough County, 1979
Colchester Stone Co.
Carl E. Teel, Dorothy E. Grisby*

Topographic Map Information: *Colchester Quadrangle*

Date: *1913, Reprinted with corrections 1949*

Coverage: *15 minute*

Glacial Thickness: *± 10 feet*

Groundwater Conditions:

Glacial: *Poor, sand and gravel aquifers absent*

Bedrock: *Permian, shales, sandstones, and limestones; sandstones and limestones yield small supplies; underlying*

Distances: *St. Louis limestone is good aquifer*

Direct to West Chicago: *171 miles*

Site to railroad: *1.6 miles to Burlington Northern Railroad*

By road to West Chicago: *240 miles*

Site to interstate highway: *50 miles to Interstate 74*

Site to state highway: *1.5 miles to State Highway 136*

Nearest Community: *Tennessee*

Distance: *1.5 miles*

Population: *Approximately 200*

Nearest Stream: *East Fork of the LaMoine River*

Distance: *.20 miles*

Flow Information: *Probably moderate*

Remarks:

*Road traffic through several small communities
Surrounding topography generally hilly
Pits and hillside cuts
Considerable abandoned areas*

11.21

July 22, 1980

The Illinois State Geological Survey records indicate that several oil and gas exploration wells were drilled in the area in the 1930's and again in the 1960's. The depths were generally less than 1000 feet, with some minor shows of oil reported. |

The watershed above the site varies from less than one square mile to three square miles depending on the quarry site selected. The East Fork of the LaMoine River is within one-third mile of the mining area. Flow in the river is perennial and is of a fairly large volume.

4. Site #6--Coal City--Grundy County (Figure 11.9 and 11.10)

The area is characterized by low relief hills, most of which are the result of spoil piles from strip mining operations. The general vicinity of the quarry is lowland and marshy. The Goose Lake Prairie State Park lies immediately west of the site.

The site is approximately five miles north of the communities of Coal City and Eileen with 1970 populations of 3040 and 371 respectively. A spur of the Elgin, Joliet and Eastern Railroad extends into the western portion of the quarry.

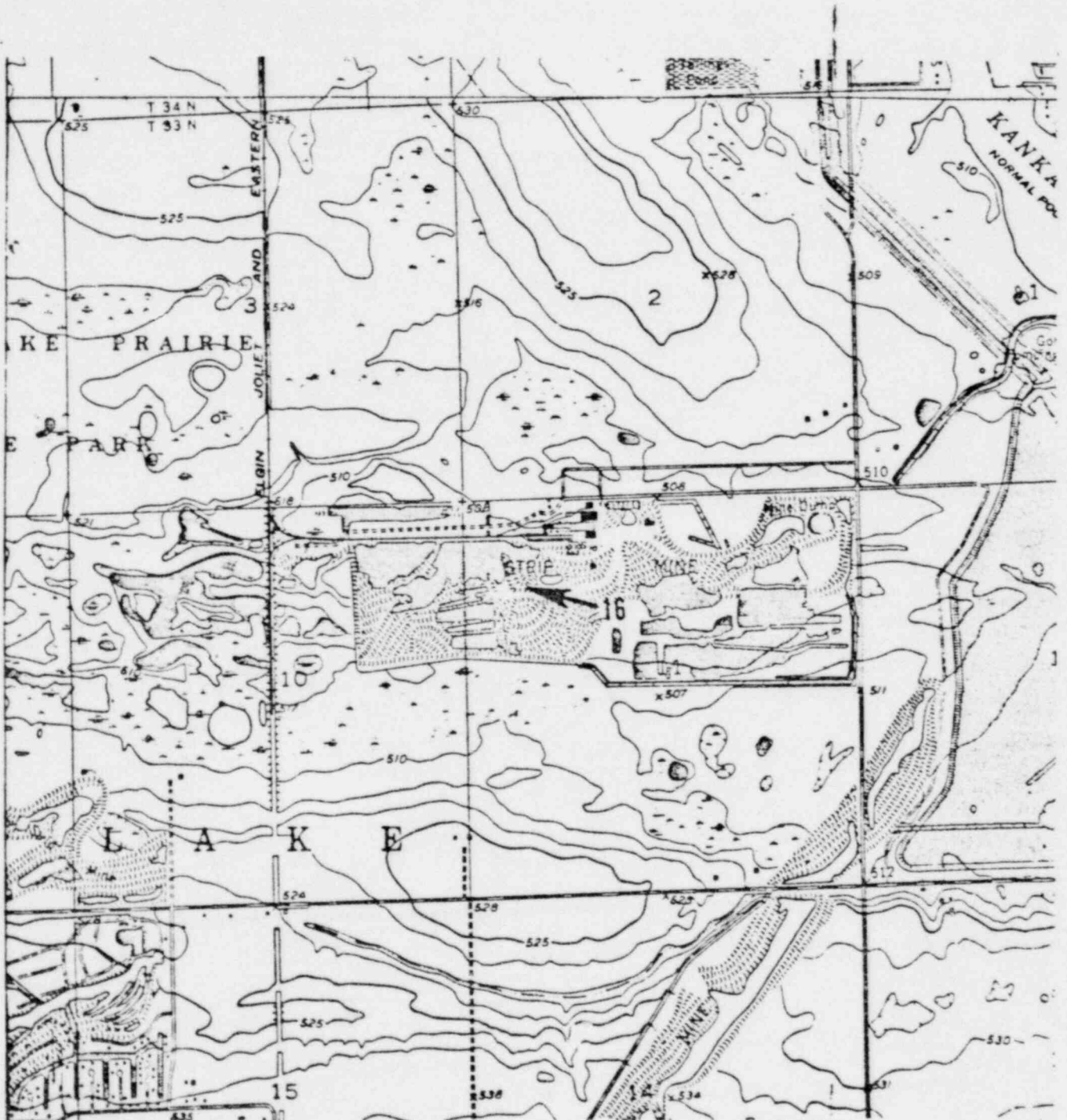
The quarry is presently active under the operation of the A.P. Green Refractories Co. The site is posted and generally inaccessible for inspection. On a visit in March 1980, permission to view the pit from near the front office was hesitantly granted without an explanation for the purpose of the visit.

Data available from the Illinois State Water Survey indicate that there are many groundwater wells in the general vicinity of the quarry site. The glacial sediments are less than 35 feet in thickness, and few wells have been completed at this shallow depth. Most wells are completed to a depth of 100 to 200 feet into the Pennsylvanian-age bedrock where limestone and sandstone beds are present within the thicker shale units. A few wells in

FIGURE 11.9 Coal City Quarry

ALTERNATE SITE NUMBER 16

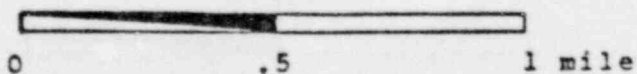
WEST CHICAGO WASTES



LOCATION: T.33N., R.8E., Section 11
Coal City 7 1/2-minute quadrangle, 1953, 1973

CONTOUR INTERVAL: 5 feet

SCALE



11.23
July 22, 1980

ILLINOIS
CLAY/SHALE QUARRIES

Location Name Coal City (Grundy County) Site No. 16

Location Description:

Section NW $\frac{1}{4}$ of 11 Township T33N Range R8E

Land Ownership: *Land Atlas and Plat Book--Grundy County, 1975*
A. P. Green Refractories Co.
Morris, IL

Topographic Map Information: *Coal City Quadrangle*

Date: *1953, Photorevised 1973*

Coverage: *7 $\frac{1}{2}$ minute*

Glacial Thickness: *± 35 feet*

Groundwater Conditions:

Glacial: *Fair to good possibilities for the occurrence of water-bearing sand and gravel*

Bedrock: *Pennsylvanian, shales and sandstones; sandstones poor-to-fair aquifers, locally developed. Galesville sandstone*

Distances: *developed at depth, wells 1400-1600 feet deep*

Direct to West Chicago: *38 miles*

Site to railroad: *On site siding; Elgin, Joliet, and Eastern Railroad*

By road to West Chicago: *60 miles*

Site to interstate highway: *5 miles to Interstate 55*

Site to state highway: *3.8 miles to State Highway 6*

Nearest Community: *Coal City*

Distance: *4.2 miles*

Population: *3040 (1970 census)*

Nearest Stream: *Kankakee River*

Distance: *1.5 miles*

Flow Information: *Probably high*

Remarks:

Surrounding topography slightly hilly
Pit operation

11.24

July 22, 1980

FIGURE 11.10 Site Data for Coal City Quarry

the area have found and developed groundwater from the Ordovician- and Cambrian-age sediments at depths of approximately 250 feet and 1500 feet respectively. Water-quality data are not available for most wells, however, the general quality of the area is reported to be good. Some hydrogen-sulfide gas is reported from zones at depth. Considerable good-to-fair quality groundwater is believed to be present in the bedrock aquifers in the area of the quarry.

Data available from the Illinois State Geological Survey indicate that in the 1920's, numerous shallow exploration holes were drilled for coal. The drillers' logs for these wells gives considerable information about the shallow clay beds.

The quarry site is located in a marshy lowland and, therefore, experiences very little stream flow in the area. The Kankakee River is approximately one mile to the northeast of the site.

5. Site #17--Ottawa-east--LaSalle County (Figure 11.11 and 11.12)
The site is characterized by hilly terrain developed on the north erosional slope of the Illinois River. The surrounding land to the north, east and west has been partially cleared for farm land. To the south of the site, State Highway 6 is situated at the base of the escarpment. South of the highway, the floodplain of the Illinois River is used extensively for farming.

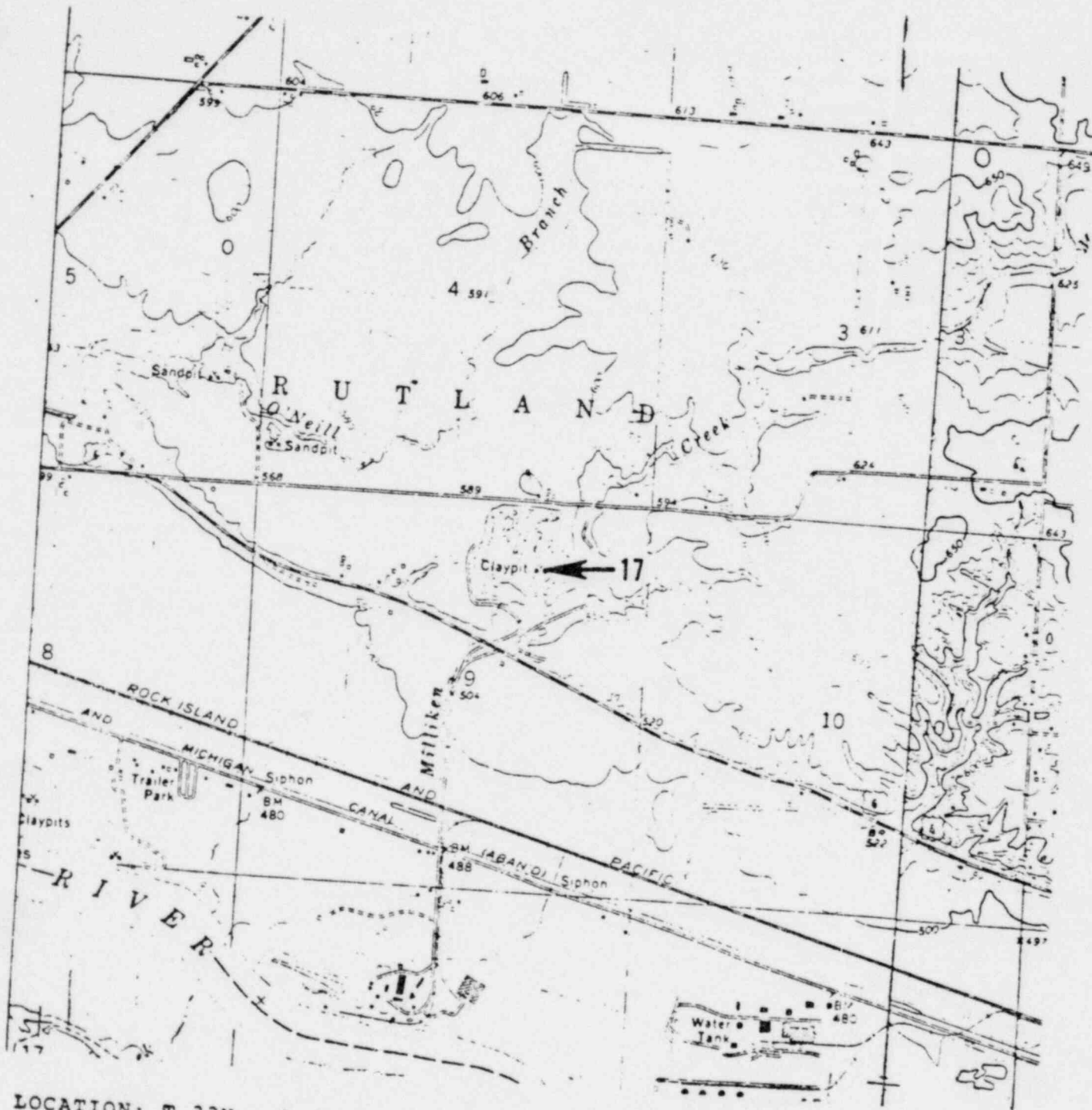
The site is approximately three miles east of Ottawa, which had a reported population of 18,000 in 1970. The nearest railroad is located on the floodplain, about one-half mile south of the site.

Considerably more excavation has been made at the site since 1970 topographic map was made. The site is posted, however, a view of the quarry is possible from near the highway. Spoils piles of unweathered shales could be seen, suggesting that excavations

FIGURE 11.11 Ottawa-east Quarry

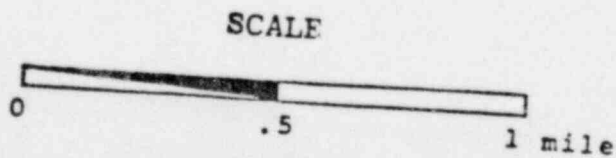
ALTERNATE SITE NUMBER 17

WEST CHICAGO WASTES



LOCATION: T.33N., R.4E., Section 9
Ottawa 7½-minute quadrangle, 1970

CONTOUR INTERVAL: 10 feet



11.26
July 22, 1980
N

ILLINOIS
CLAY/SHALE QUARRIES

Location Name Ottawa-east (LaSalle County) Site No. 17

Location Description:

Section NE $\frac{1}{4}$ of 9 Townsh..p T33N Range R4E

Land Ownership: *LaSalle County Farm Bureau and Affiliated Companies
1977 Plat Book
Material Service Corporation
Chicago, IL*

Topographic Map Information: *Ottawa Quadrangle*

Date: *1970*

Coverage: *7 $\frac{1}{2}$ minute*

Glacial Thickness: *± 30 feet*

Groundwater Conditions:

Glacial: *Poor, sand and gravel aquifers absent or discontinuous*

Bedrock: *Pennsylvanian, shales, sandstones, and limestones. Sandstones and limestones may yield small water supplies. Underlying Ordovician, Glenwood, and St. Peter Sandstone aquifers developed. Wells 50-300 feet deep.*

Distances:

Direct to West Chicago: *44 miles*

Site to railroad: *0.6 miles to Chicago, Rock Island, and Pacific Railroad*

By road to West Chicago: *80 miles*

Site to interstate highway: *2 miles to Interstate 80*

Site to state highway: *0.2 miles to State Highway 6*

Nearest Community: *Ottawa*

Distance: *3 miles*

Population: *18,000 (1970 census)*

Nearest Stream: *Milliken Creek*

Distance: *.1 miles*

Flow Information: *Probably Low*

Remarks:

*Illinois River 1.2 miles to the south
Surrounding topography generally hilly
Pit and hillside cuts*

11.27

July 22, 1980

FIGURE 11.12 Site Data for Ottawa-east Quarry

are into fractured shales and below the weathered zone. During the visits in late 1979 and early 1980, no activity was noted, however, several large pieces of earth-moving equipment could be seen.

Data available from the Illinois State Water Survey indicate that glacial sediments are quite variable in thickness, depending on proximity to the Illinois River. Drillers' reports show glacial sediments of less than 30 feet across the highlands and up to 135 feet nearer the river. Most shallow domestic water wells are completed into the Pennsylvania-age bedrock to a depth of 80 to 150 feet. Larger-capacity wells are completed into the Ordovician and Cambrian sandstones 400 to 1400 feet deep. Groundwater is generally hard with elevated concentrations of iron. No major groundwater supply is developed near the quarry site, however, the bedrock-aquifer potential in the area is widely recognized.

Data from the Illinois State Geological Survey indicate that numerous shallow exploration holes were drilled for coal in the 1930's in the general area of the quarry. Drillers' logs typically give detailed information on the clays present.

The quarry site is adjacent to Milliken Creek which empties into the Illinois River about one mile south of the site. The topographic map shows Milliken Creek to be ephemeral with a watershed of about three square miles above the site.

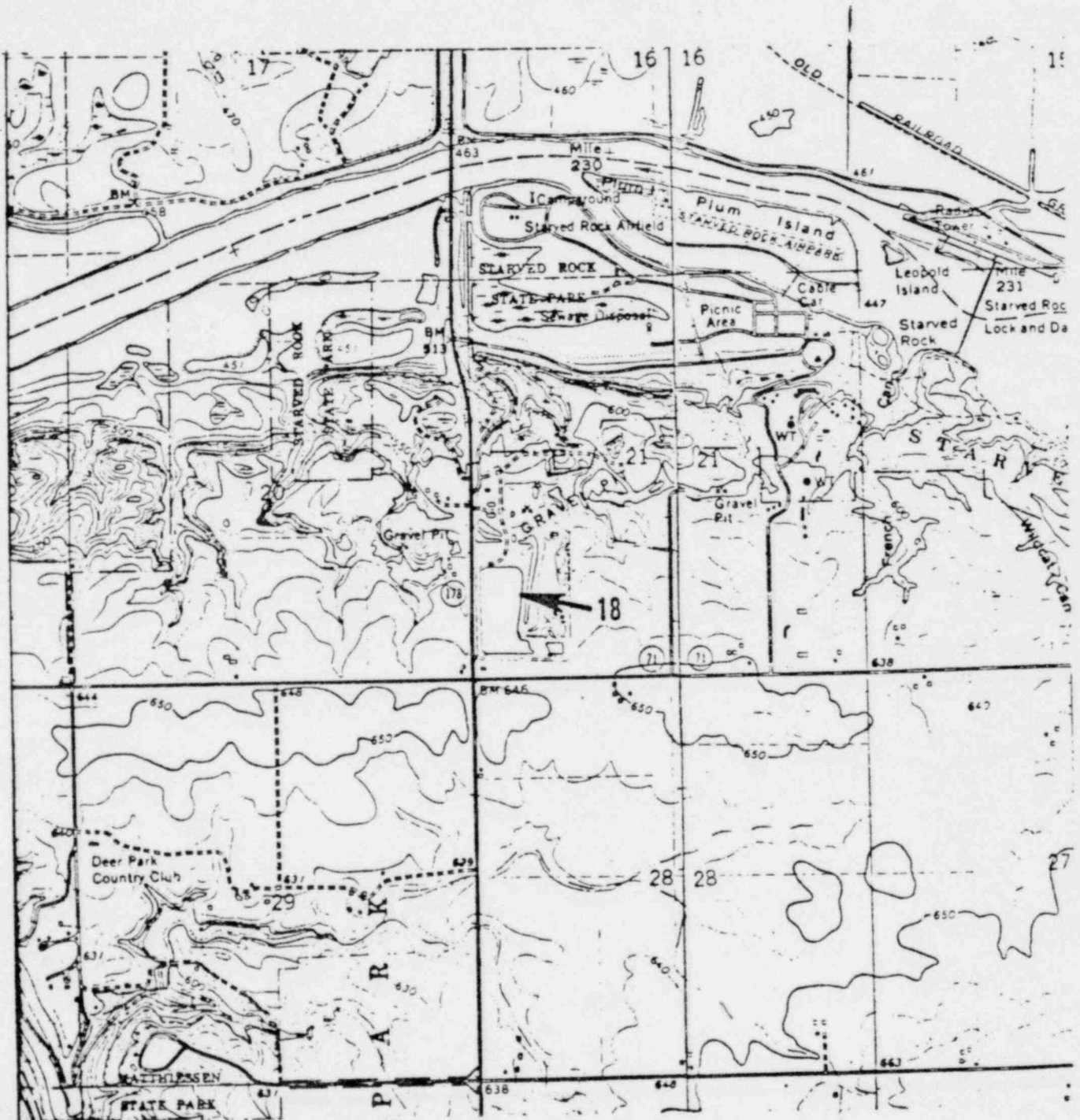
6. Site #18--Utica-south--LaSalle County (Figure 11.13 and 11.14)

The site is characterized by generally flat terrain which has been cleared for farmland. Within one-half mile to the north of the site, the topography breaks sharply downward to the Illinois River with relief of more than 150 feet. The Starved Rock State Park lies one-half mile north of the site on the floodplain of the Illinois River.

FIGURE 11.13 Utica-south Quarry

ALTERNATE SITE NUMBER 18

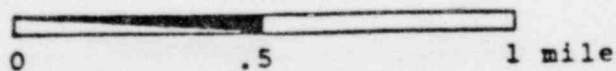
WEST CHICAGO WASTES



LOCATION: T.33N., R.2E., Section 21
La Salle 7 1/2-minute quadrangle, 1966

CONTOUR INTERVAL: 10 feet

SCALE



11.29
July 22, 1980
N

ILLINOIS
CLAY/SHALE QUARRIES

Location Name Utica-south (LaSalle County) Site No. 18

Location Description:

Section SW $\frac{1}{4}$ of 21 Township T33N Range R2E

Land Ownership: *LaSalle County Farm Bureau and Affiliated Companies
1977 Plat Book
Ristocrat Clay Products*

Topographic Map Information: *LaSalle Quadrangle*

Date: *1966*

Coverage: *7 $\frac{1}{2}$ minute*

Glacial Thickness: *± 40 feet*

Groundwater Conditions:

Glacial: *Poor, sand and gravel aquifers absent or discontinuous*

Bedrock: *Pennsylvanian shales, not a dependable water supply.
Underlying this shale are the Ordovician, Glenwood, and
St. Peter sandstones, good-to-excellent aquifers, highly
developed.*

Distances:

Direct to West Chicago: *55 miles*

Site to railroad: *1.8 miles to Chicago, Rock Island, and Pacific
Railroad*

By road to West Chicago: *85 miles*

Site to interstate highway: *3.8 miles to Interstate 80*

Site to state highway: *.1 mile to State Highway 178*

Nearest Community: *Utica*

Distance: *1.4 miles*

Population: *974 (1970 census)*

Nearest Stream: *Illinois River*

Distance: *1 mile*

Flow Information: *Very high*

Remarks:

*Road traffic through Utica
Surrounding topography generally flat
Pit operation*

11.30

July 22, 1980

FIGURE 11.14 Site Data for Utica-south Quarry

The nearest community to the site is Utica, 1.4 miles north, which had a 1970 population 974. The site is located at the northeast intersection of State Highways 178 and 71. The nearest railroad is through the community of Utica.

The quarry appeared to be inactive during visits in late 1979 and early 1980. However, the owner of the property in Streator, Illinois, advised that some clay is occasionally mined at the site. The field inspection revealed that considerable gravel is present which is probably the reason the topographic map shows the site as a gravel quarry.

Data available from the Illinois State Water Survey indicate that several older wells in the area obtained water from the shallow glacial sediments, generally less than 40 feet in depth. More recent wells have been completed into the bedrock. The shallowest bedrock is comprised of sandstones, limestones and shales of Pennsylvanian age, which are generally unreliable for significant quantities of water. Most bedrock wells in the area are reported to be completed into the St. Peters Sandstone of Ordovician age. A driller's log for a well near the quarry site reports the St. Peters sandstone to be at a depth of 85 feet.

Data available from the Illinois State Geological Survey confirm that several wells in the general area have encountered water in the limestone and stonestone at a depth of less than 325 feet. Very little log data are available describing the nature of the shallow sediments which are being mined at the quarry site.

The site sits on a topographic high and therefore has virtually no watershed above it. Runoff from the vicinity which does not get ponded moves rapidly to the Illinois River floodplain.

11.4 EVALUATION OF ALTERNATE SITES

The alternate sites described in paragraph 11.3 must be evaluated by subjective and objective means to select the most desirable alternative of the several possibilities. The following characteristics should be evaluated:

- Hydrological - Geological Setting
- Ecological Impact
- Socioeconomic Impact

Some of these characteristics can be evaluated on a quantitative basis; others, at the current state of the applicants knowledge must be evaluated qualitatively. Where possible, quantitative judgements have been made on competing alternatives to reduce the comparisons to a quantitative difference.

Licensed Sites

The Beatty, Nevada and Hanford, Washington sites are the only alternative sites to location in West Chicago which provide an assurance that hydrological - geological conditions are favorable for disposal, if space is available, and ecological impacts are acceptable at the site. However, distance traveled are vastly increased over Illinois sites. Cost of these alternatives are discussed in Section 12 and it is evident that these sites are not cost effective when compared to the Kerr-McGee preferred plan.

Non-licensed Sites in Illinois

Review of the individual site data resulted in elimination of sites #5 and 17 due to accessibility of less favorable geology/hydrology.

The four remaining candidate sites have been listed on Figure 11.15 with their primary advantages and disadvantages noted. Sites 16 and 18 were then eliminated due to the shallow groundwater indicated

FIGURE 11.15
SPECIFIC SITE COMPARISONS

Site #3
New Douglas

Site #9
Tennessee-north

Site #16
Coal City

Site #18
Utica-south

ADVANTAGES RELATIVE TO WEST CHICAGO

Low population density

No significant bedrock aquifer

No significant bedrock potential

Good clay available

Good Railroad

Low population density

No significant bedrock aquifer

No gravel in disposal area

Low population density

No gravel in disposal area

Moderate population density

Low potential for erosion

DISADVANTAGES RELATIVE TO WEST CHICAGO

Oil & gas potential resources...

Significant distance from West Chicago

Moderate flooding potential--proximity to stream

Poor road accessibility

Poor railroad accessibility

Significant distance from West Chicago

Active mine

Shallow groundwater present

Fractured shale bedrock --site modification required

Poor railroad accessibility

Poor road accessibility

Shallow groundwater present

11.33

July 22, 1980

on the topographical map and drillers logs even though they were attractive in terms of distance. Study of the to remaining choices results in the conclusion that Site #13 is most favorable from geological and hydrological viewpoint with no topographical features that would make flooding a possibility.

As can be seen from this discussion, sequential consideration of the sites to arrive at a final choice is highly subjective and subject to alternative weighing of various characteristics. As a result of this examination, Site #3 at New Douglas appears to Kerr-McGee to be the most favorable alternate site.

Impact on Biota

In the alternative case, the ground required to be disturbed and subsequently reclaimed would be approximately equal to West Chicago. It is judged that, dependent upon the site specific soil thickness and characteristics, approximately the same area would be required. If such a site could be located in a mined-out area with available low permeability material, placing and covering would result in generally improved appearance and wildlife habitat. Construction of a burial site near one of the sites examined would result in a temporary disturbance of wildlife and vegetative growth but terminal reclamation would restore the site to its initial or superior usefulness.

Socioeconomic Impact

The impact of the use of the alternate site on the socioeconomic fabric of Illinois would consist of the following factors.

- A. The following items would be subject to quantification: accident rate, cost of highway maintenance and fuel consumption. Examination of the site (Figure 11.4) indicates that the total miles required are approximately 270. The net result of evaluation shows the following:

ADDITIONAL IMPACT OVER WEST CHICAGO FOR NEW DOUGLAS

270 mi.

Accident rate*	32.14
Cost of highway maintenance**	\$1,490,400
Fuel consumed	767,124 gallons

- B. Other socioeconomic features such as the impact of funds spent for contractors and hauling will change but should not impact entirely in one place.

The wages paid a sizeable construction crew, i.e., a pit already constructed or excavation and filling up a pit to be constructed would be approximately the same. Covering and completion of reclamation again should be approximately the same since the pit dimensions will be determined by the total amount. The benefit of salaries paid will move from West Chicago and its environment to New Douglas but would be approximately the same.

- C. The greatest socioeconomic impact is the public acceptability of the designation of an alternate. Currently, the acceptability of such waste disposal operations at any point in Illinois is subject to serious question. The rejection of the waste pit in the Wilsonville area through a series of legal actions would undoubtedly be duplicated by alternate siting of the waste under consideration.⁽¹⁾ Acceptability in West Chicago will be examined through further development of the current procedure and input from the public as deemed appropriate by the NRC.

*Accident Facts, 1979 Edition, National Safety Council

**Factor Obtained From Illinois State Highway Department
(Single lane mileage, 540 miles)

It is believed by Kerr-McGee that disposal by the preferred plan is acceptable to the general public of the West Chicago area.

Conclusions

In view of the examination made, not including on-site study, and the general quality of selected alternate site in terms of biotic and socioeconomic impact, it is concluded that the New Douglas site is not clearly superior to West Chicago. The stabilization at the West Chicago site continues to be the preferred method of disposal in Kerr-McGee's opinion.

REFERENCES TO SECTION 11.0

1. EPA - Siting of Hazardous Waste Management Facilities and Public Opposition. Page 303

12.0 COST-BENEFIT SUMMARY

The cost and benefits of the proposed Plan do not conveniently fit the normal matrix of evaluation for this type of summary. Therefore, this summary is examined on an item by item basis. The order is arranged in an appropriate manner with each of the parameters examined.

12.1 NO ACTION

The West Chicago Facility constitutes a continual problem for Kerr-McGee, its neighbors in West Chicago and City and State officials. Kerr-McGee believes that action must be taken promptly.

The deteriorated physical condition of the Factory Site has an adverse aesthetic effect on the neighborhood. Consequently, residents have requested that appropriate action be taken promptly to improve the aesthetic values.

In its current state, the Factory and Storage Sites are subject to further deterioration. There is a risk of further collapse of buildings. Therefore, Kerr-McGee has determined that some action will be taken promptly under the decontamination phase (Phase I-A) discussed in the Plan, and that the Plan itself will be implemented as soon as approved.

12.2 KERR-McGEE'S PLAN

Air

Any action will result in a temporary increase in particulate concentrations in the surrounding air. Difference in quantities released between onsite and offsite storage would not be great, but the offsite alternatives alone involve significant transport of low specific activity material.

As will be noted on Table 5.1, a significant reduction in estimated dose will result from the implementation of the Kerr-McGee Plan, which should be considered a positive benefit resulting from its adoption. Adoption of an offsite alternate would increase the estimated dose during implementation.

Water

The Plan will eliminate any potential chemical water contamination. However, the information presented in Section 2.0, Water Contamination, indicates that this is not currently a problem.

Biota

Currently, the Factory and Disposal Sites have a detrimental aesthetic effect on the appearance of the community. Any action taken will tend to improve it. Any action planned in demolishing the buildings and cleaning the Disposal Site will result in significantly improved appearance due to the revegetation included in the Plan. The increase in birds should be measurable in the community as a result of the overall revegetation. However, the Plan will discourage small ground animals reestablishing themselves on the Disposal Site due to lack of cover.

Fuel

The demolition of buildings and movement of material contemplated by the Plan, and every alternative, consume significant amounts of fuel. Kerr-McGee cannot see a method of reclamation which would result in no fuel use. The following quantities are estimated for truck movement without use of railroads:

Onsite (Kerr-McGee Plan)	96,630 gallons
Offsite - Illinois (270 miles)	767,124 gallons
Beatty, Nevada	9,877,000 gallons
Hanford, Wash.	10,377,000 gallons

The additional benefit, if any, from offsite disposal is not justified based on the use of fuel.

Cost

Disposal offsite would be more expensive than the Kerr-McGee Plan, depending particularly on the distance from West Chicago and the one-time charge for burial at a particular site.

The licensed low level radioactive site at Sheffield, Illinois, has been closed after opposition by the State to its expansion, Kerr-McGee has prepared cost estimates for moving all low specific activity material to the most favorable site 270 miles from West Chicago, as well as cost estimates for offsite disposal at Beatty, Nevada, and Hanford, Washington, and for onsite disposal. Estimates have been made for all costs, in 1979 dollars, without taking inflation into account. The estimates below are detailed in Table 12.2:

Onsite (Kerr-McGee Plan)	\$ 5,382,000
Offsite - Illinois (270 miles)	20,414,000
Beatty, Nevada	61,391,000
Hanford, Wash.	62,881,000

Socioeconomic Cost-Benefits

Any action on the Factory and Disposal Sites of a kind like that contemplated will result in a certain degree of temporary annoyance to the near residents. While mitigation plans will reduce the various impacts, they cannot be totally eliminated. Some dust will be unavoidable, the noise level will be noticeable at times, and traffic in the area will increase significantly, particularly during Phase III if truck transport is necessary.

As a result of adopting the Plan, however, significant improvements in the aesthetic appearance of the Factory, Intermediate and Disposal Sites will be noted and will more than balance the temporary disturbance of the local residents.

An as yet undefinable impact may well be the potential damage to the streets and the highways used for the hauling. These potential problems may lead to much concern by the City and State authorities charged with the responsibility for maintenance.

Upon the completion of the Kerr-McGee Plan, approximately 16 acres of land (the Factory and Intermediate Sites) will be released for unre-

TABLE 12.2

COST ESTIMATES FOR ALTERNATIVES
(\$1,000)

	ONSITE WEST CHICAGO	NEW DOUGLAS, ILLINOIS (270 miles)	BEATTY NEV	HANFORD WA
LABOR	\$ 1,949	\$ 1,488	\$ 1,488	\$ 1,488
SUPV.	330	330	330	330
HP MONITOR	330	330	330	330
EQUIPMENT	839	684	684	684
HAULING TO:				
Barnwell	314	314	314	314
Landfill	84	84	84	84
Burial	NA	4,529	38,930	40,902
BACKFILL & COVER	1,536	655	655	655
BURIAL FEE	NA	12,000*	18,576	18,094
TOTAL	\$ 5,382	\$20,414	\$61,391	\$62,881

*Estimated, actual cost of burial has not been developed on this alternate burial site.

NA means Not Applicable.

APPENDIX 4

ALTERNATIVE SITE DATA

KERR-McGEE — WEST CHICAGO WASTES
ALTERNATIVE SITE DATA

LIMESTONE/DOLOMITE QUARRIES

No.	Mine Type	Location Area	Geology	Topography/Surface Hydrology	Ground-Water Hydrology	Present Condition	Mineral Resources	Land-use Resources	Ownership
1	Limestone	3 miles south-east of Iola (Clay County)	Omega Member. Pennsylvanian. Fractured and jointed. Almost 15 feet thick, is argillaceous and sandy.	Relatively flat area. No surface waters apparent in the area.	Pond water at bottom of pit (ground water). Limestone ore is wet. Small ground-water supplies are available from the upper Pennsylvanian sandstone and limestone unit in the area. Small domestic supply obtained from this limestone unit where fractures and crevices exist at shallow depths.	Active, large spoil piles present from overburden removal. Now revegetated.	Limestone, 1000 tons per day capacity. Major economy of town.	Farmland surrounds quarry. Rural farm homes dot the landscape.	Iola Stone and Materials, Athens Division, P.O. Box 669, Salem, IL 62881 <u>VISITED:</u> 12/11/79--BJS
2	Limestone	2.5 miles southwest of Omega, Shufeldt Quarry (Marion County)	As above (#1)	Ponded water in quarry, now a small lake. Relatively flat area. There are two small lakes in this area with a radius of about 50 feet each. No other surface waters in the area.	As above (#1)	Abandoned. Small spoil piles (large limestone blocks)	Limestone, 800 tons per day capacity.	Farmland surrounds quarry. Several rural farm homes dot the landscape.	Shoats Stone Quarry, R.R. 1 Juka, IL 62849 <u>VISITED:</u> 12/11/79--BJS

KERR-McGEE — WEST CHICAGO WASTES
ALTERNATIVE SITE DATA

LIMESTONE/DOLOMITE QUARRIES

No.	Mine Type	Location Area	Geology	Topography/Surface Hydrology	Ground-Water Hydrology	Present Condition	Mineral Resources	Land-use Resources	Ownership
3	Limestone	3 miles east of Ocoya, Arnold Quarry? (Livingston County)	Pennsylvanian. Shoal Creek. Fractured and jointed limestone. Commonly 6 to 8 feet thick but up to 20 feet thick. Light gray, thick bedded, fine grained, and fossiliferous.	Very flat area. Ponded water in the quarry.	Ponded water in quarry is probably ground water. Ground water derived from thin shale, limestone and coal beds that are fractured or creviced. Only good for small domestic supplies. Not a major aquifer in the area.	Abandoned	Limestone, 1500 tons per day.	Farmland and grazing land surround the quarry. Several farm homes in the general area.	Arnold, Howard Construction, Inc P.O. Box 140, 106 South First St. Fairbury, IL 61739 VISITED: 12/16/79--BJS
4	Limestone	LaSalle Quarry (LaSalle County)	As above (#3)	Tamahawk River close by, approximately 1000 yards. Approximately 1/2 mile north of Illinois River--slope to river. Relatively flat area.	As above (#3) Dry mine.	Active, very large operation. Pit type.	Limestone, 2000 tons per day.	Farmland surrounds the quarry. Southeast side of LaSalle. Several farm homes in the area.	Illinois Cement Co., Cortex Corp. P.O. Box 442, LaSalle, IL 61301 VISITED: 7/11/79--DMS 12/16/79--BJS 3/19/79--WJG & BJS
5	Limestone	North side of Oglesby (LaSalle County)	As above (#3)	Quarry in a topographic low. Close to Vermillion River and approximately 1 mile south of Illinois River. No obvious surface problem in quarry area.	As above (#3) Dry quarry.	Active, very large operation. Pit quarry.	Limestone	In town of Oglesby. Residential area around quarry.	Marquette Cement Manufacturing Co. First American Center, Nashville TN 37238 COMMENTS: Inaccessible for thorough examination VISITED: 12/16/79--BJS

KERR-McGEE — WEST CHICAGO WASTES
ALTERNATIVE SITE DATA

LIMESTONE/DOLOMITE QUARRIES

No.	Mine Type	Location Area	Geology	Topography/Surface Hydrology	Ground-Water Hydrology	Present Condition	Mineral Resources	Land-use Resources	Ownership
6	Limestone	1 mile north of Pontiac, Raube Quarry (Livingston County)	<p>Pennsylvanian. Shoal Creek.</p> <p>Fractured and jointed limestone.</p> <p>Commonly 6 to 8 feet thick but up to 20 feet thick.</p> <p>Light gray, thick bedded, fine grained, and fossiliferous.</p>	<p>Some surface water ponded in quarry.</p> <p>Relatively flat area.</p> <p>No surface water in quarry area.</p>	<p>Ponded water in quarry is probably ground water.</p> <p>Ground water derived from thin shale, limestone and coal beds that are fractured or creviced. Only good for small domestic supplies. Not a major aquifer in the area.</p> <p>No inflow into mine.</p>	<p>Active.</p> <p>Cliff-side, very large.</p>	<p>Limestone, 4000 tons per day.</p>	<p>Surrounded by farmland.</p> <p>Several residents in the area.</p> <p>Close to major highway.</p> <p>Edge of town of Pontiac.</p>	<p>Pontiac Stone Co., P.O. Box 412, Pontiac, IL 61764</p> <p>VISITED: 12/16/79--BJS</p>
7	Limestone	3 miles east of Ocoya, Minda Quarry (Livingston County)	As above (#6)	<p>Very flat area.</p> <p>Possibly in the flood plain of the Vermillion River. (?)</p>	<p>Probably ground-water inflow to pit, but uncertain for sure.</p> <p>As above (#6)</p>	Active.	Limestone, 3200 tons per day.	<p>Farmland and grazing land surrounds the pit. A few farm homes in the area.</p>	<p>Ocoya Stone Co. Route 4, P.O. Box 577 Pontiac, IL</p> <p>COMMENTS: Inaccessible for thorough examination</p> <p>VISITED: 12/16/79--BJS</p>
8	Limestone	3 miles north-east of Chenoa, Chenoa Quarry (Livingston County)	As above (#6)	<p>Flat area.</p> <p>Several small streams in the area.</p> <p>There are several pits in the area. Almost all are abandoned and filled with water.</p>	<p>The pits that are full of water probably intersect the ground-water table.</p> <p>Active pits probably have ground-water problems.</p> <p>As above (#6)</p>	<p>Active, majority abandoned.</p>	Limestone, 1500 tons per day.	<p>Farm and grazing land in the area of the pits.</p> <p>Farm home in the area.</p> <p>Brushwood and small trees surround the pits.</p>	<p>Chenoa Stone Quarry, Chenoa IL 61726</p> <p>VISITED: 12/16/79--BJS</p>

KERR-McGEE — WEST CHICAGO WASTES
ALTERNATIVE SITE DATA

LIMESTONE/DOLOMITE QUARRIES

No.	Mine Type	Location Area	Geology	Topography/Surface Hydrology	Ground-Water Hydrology	Present Condition	Mineral Resources	Land-use Resources	Ownership
9	Limestone	7 miles north of St. Elms, Ben Winter Quarry (Fayette County)	Millersville limestone member Pennsylvanian. Light gray, fine-grained limestone that contains diversified open-marine fauna.	Flood plain adjacent to small stream, and possibly in its flood plain. Possible erosion from slopes around the site.	Limestone extensively developed as small domestic water supply. Limestone is generally water yielding and creviced.	Active. The pit is continuously being reclaimed by filling in with dirt and contouring the surface.	Limestone, 2000 tons per day capacity.	Rural, farm land surrounds the quarry site. Large oil field in the vicinity.	Winter Stone Quarry, R.R. 1 Altamont, IL 62411 <u>COMMENTS:</u> Inaccessible for thorough evaluation. <u>VISITED:</u> 12/11/79--BJS

KERR-McGEE — WEST CHICAGO WASTES
ALTERNATIVE SITE DATA

LIMESTONE/DOLOMITE QUARRIES

No.	Mine Type	Location Area	Geology	Topography/Surface Hydrology	Ground-Water Hydrology	Present Condition	Mineral Resources	Land-use Resources	Ownership
10	Limestone	Northeast edge of Anna (Union County)	<p>St. Geneviene Formation, St. Louis Formation, Mississippian.</p> <p>St. Geneviene Overlies St. Louis Formation.</p> <p>Light gray limestone. Colitic, chert is common. Thin beds of sandstone and sandy limestone are common, and some are traceable for miles.</p> <p>St. Louis</p> <p>Generally a fine grained, micritic to lithographic, cherty limestone with beds of chrystallyne limestone, fossiliferous limestone, and evaporates. Outcrop areas characterized by abundant sink holes. The St. Louis overlies the Salem limestone.</p>	<p>Dry mine, no water.</p> <p>Area around mine is relatively flat.</p>	<p>Dry quarry, no ground water seeping into quarry.</p> <p>Sinks holes.</p> <p>Fractured limestone.</p> <p>Ground water developed in the upper Mississippian bedrock from water yielding crevices and joints in the limestone, enough to support small domestic supplies.</p>	<p>Active mining</p> <p>Pit is approximately 100 feet deep.</p>	<p>Known limestone reserves</p> <p>Probable coal reserves beneath the quarry.</p> <p>Possible oil beneath quarry at depth.</p>	<p>Near northeast edge of Anna.</p> <p>Near downtown businesses and residential areas.</p> <p>Some of land in immediate area is row cropped.</p> <p>Sparsely vegetated area, grassland, cultivated fields, and a few small trees and shrubbery.</p>	<p>Anna Quarries</p> <p>P.O. Box 180</p> <p>Anna, IL 62906</p> <p>COMMENTS:</p> <p>Viewed quarry from 100 feet away.</p> <p>VISITED:</p> <p>12/11/79--BJS</p>

Limestone appears to be highly fractured. Possibly secondary due to blasting.

KERR-McGEE — WEST CHICAGO WASTES
ALTERNATIVE SITE DATA

LIMESTONE/DOLOMITE QUARRIES

No.	Mine Type	Location Area	Geology	Topography/Surface Hydrology	Ground-Water Hydrology	Present Condition	Mineral Resources	Land-use Resources	Ownership
11	Limestone	16th and Albany St., Alton (Madison County)	St. Louis Formation. Mississippian. Highly fractured limestone. Same as No. 10	Possibly in flood plain of Mississippi River. Located in a topographic low.	Ground water seepage from wall of quarry. Sinkholes visible in sidewall cuts. Same as No. 10	Active.	Limestone, 1600 tons per day capacity.	Residential area. Small grove of trees surround the quarry.	Reliance-Stone Quarry, P.O. Box 434, 16th and Alby Sts. Alton, IL 62002 <u>VISITED:</u> 12/11/79--BJS
12	Limestone	2 miles north-east of Columbia (St. Clair County)	Salem and St. Louis formation. Mississippian. <u>Salem Formation</u> The Salem formation is a biacal carenite consisting of rounded, broken fossil fragments and whole small fossils, commonly with banded, oolitic-like overgrowths that are imbedded in a matrix that ranges from micrite to sparite.	Located on the side and at the mouth of a large canyon. Located in the flood plain of small unnamed tributary to the Mississippi River.	Dry mine. Same as No. 10	Active, cliff-side quarry.	Limestone, 7000 tons per day capacity.	Rural, residential area. Some farmland and grassland in quarry area.	Columbia Quarry Co., P.O. Box 1000, Dupu, IL 62239 <u>COMMENTS:</u> Inaccessible for thorough examination. <u>VISITED:</u> 12/11/79--BJS

KEOR-McGEE -- WEST CHICAGO WASTES
ALTERNATIVE SITE DATA

LIMESTONE/DOLOMITE QUARRIES

No.	Mine Type	Location Area	Geology	Topography/Surface Hydrology	Ground-Water Hydrology	Present Condition	Mineral Resources	Land-use Resources	Ownership
13	Limestone	3 miles south-east of East Hardin (Jersey County)	<p>Chouteau-Burlington Formation. Mississippian.</p> <p><u>Chouteau Limestone.</u> Irregular beds of lithographic to very fine-grained limestone with wavy bedding planes. Geodes are common.</p> <p><u>Burlington Limestone.</u> Very pure, coarsely crystalline, limestone in medium to thick beds. Limestone becomes locally dolomitic. Chert nodules and fossils are common in this formation.</p>	<p>Quarry is on the edge of the Illinois River flood plain.</p> <p>Quarry is at the head of a small valley.</p> <p>High potential for soil erosion due to runoff.</p>	<p><u>Bedrock</u> Mine appears to be dry.</p> <p>Creved and water yielding.</p> <p>Main aquifer for domestic supplies in area.</p> <p>The K-B 6.5 is fairly well creviced at most places in the region and is usually a dependable source of ground water for farm supplies.</p> <p><u>Surface</u> Good to excellent aquifer.</p> <p>Highly permeable.</p>	Active, cliff-side quarry.	Limestone, 550 tons per day capacity.	<p>Farmland surrounding the quarry.</p> <p>Some farm homes in the area.</p> <p>Land immediately around quarry contains small trees and shrubbery.</p> <p>Woods, brush-woods.</p>	<p>East Hardin Seivers Bros. Quarry, Michael IL 62065</p> <p><u>VISITED:</u> 12/11/79--BJS</p>

KERR-McGEE — WEST CHICAGO WASTES
ALTERNATIVE SITE DATA

LIMESTONE/DOLOMITE QUARRIES

No.	Mine Type	Location Area	Geology	Topography/Surface Hydrology	Ground-Water Hydrology	Present Condition	Mineral Resources	Land-use Resources	Ownership
14	Limestone	1 mile north of Florence (Pike County)	Keokuk and Burlington Formations. Mississippian. Keokuk Formation. A biocalcarenite composed of beds of fossiliferous, crinoidal limestone interbedded with fine-grained limestone, argillaceous dolomite, and calcareous gray shale. Burlington Formation. Same as above (#13)	Located in flood plain of the Illinois River. River about 300 feet away.	Dry?	Active, pit operation?	Limestone	Farmland surrounds the quarry.	Missouri Gravel Subsidiary of Moline Consumers Co., 313 16th St Moline, IL 62165 COMMENTS: Inaccessible for thorough examination. VISITED: 12/12/79--BJS
15	Limestone	2 miles south of Loraine (Adams County)	Keokuk and Burlington Formations. Mississippian. Same as above (#14)	Small stream flow through the quarry site. Near a topographic high. Some of the pits (there are several) are filled with water. Near a fork of Bear Creek, but out of the flood plain.	Probable ground-water inflow into the pits.	Active, pit operation	Limestone	Much of the land in the quarry area is farmland. A few farm homes in the area.	Western Illinois Stone Co., P.O. Box 9, La Grange MO 63448 COMMENTS: Inaccessible for thorough examination VISITED: 12/12/79--BJS
16	Limestone	1 mile east of Kinderhook (Pike County)	Keokuk and Burlington Formations. Same as above (#14)	Flat area. Surface water will pond in this quarry after a heavy rain.	There is water in all of the pits. The water is from ground water inflow into the pits.	Active, pit operation (several)	Limestone	Farmland surrounds the quarry.	Missouri Gravel Subsidiary of Moline Consumers Co., 313 16th St., Moline, IL 62165 VISITED: 12/12/79--BJS

KERR-McGEE — WEST CHICAGO WASTES
ALTERNATIVE SITE DATA

LIMESTONE/DOLOMITE QUARRIES

No.	Mine Type	Location Area	Geology	Topography/Surface Hydrology	Ground-Water Hydrology	Present Condition	Mineral Resources	Land-use Resources	Ownership
17	Limestone	2 miles south of Fieldon (Jersey County) (#3 of Valstad Quarries)	Chooteau-Burlington Formations. Mississippian. As above (#13)	Located in a small valley. High potential for erosion. Located in flood plain of the South Fork of Otter Creek and possibly the Illinois River.	Dry mine?	Active.	Limestone, 600 tons per day capacity.	Some of the land in the vicinity of quarry is planted in corn. A few farm residents in the area. Land around quarry has small trees and brush-wood.	Valstad Quarries R.R. 2 Carrollton, IL 62016 COMMENTS: Could not see quarry clearly. VISITED: 12/11/79--BJS
18	Limestone	1 mile southwest of Valley City (Pike County)	Burlington Formation. Mississippian. As above (#13)	Flat area. At the bottom of a valley where several streams meet. Small stream is very close to quarry.	Dry pit.	Cliff-side quarry, active. Lot of large rock spoil around the area.	Limestone, 1200 tons per day capacity.	Farm homes surround the quarry.	Callender Construction, 819 West Washington St., Pittsfield IL 62363 VISITED: 12/12/79--BJS
19	Limestone	3 miles west of Pearl (Pike County)	Burlington Formation. Mississippian. As above (#13)	Located near small stream in a large valley--subject to flooding.	Dry quarry.	Active, cliff-side quarry.	Limestone.	Farmland surrounds the quarry.	Lacey and Baver Quarry, R.R. 1 Pearl, IL 62361 COMMENTS: Inaccessible for thorough examination VISITED: 12/12/79--BJS
20	Limestone.	2 miles south and 1 mile west of Smithshire (Henderson County)	Burlington and Keokuk Formation. Mississippian. As above (#13 and #14)	Located in a topographic low.	Dry mine?	Active, pit operation.	Limestone.	Farmland surrounds the quarry.	Big Dollar Quarries, Sciota, IL 61475 COMMENTS: Inaccessible VISITED: 12/12/79--BJS

KERR-McGEE — WEST CHICAGO WASTES
ALTERNATIVE SITE DATA

LIMESTONE/DOLOMITE QUARRIES

No.	Mine Type	Location Area	Geology	Topography/Surface Hydrology	Ground-Water Hydrology	Present Condition	Mineral Resources	Land-use Resources	Ownership
21	Limestone	4.5 miles east of Carthage (Hancock County)	Burlington and Keokuk Formation. Mississippian. As above (#13 and #14)	Large stream runs just north of the quarry.	Dry?	Active.	Limestone, 1500 tons per day capacity.	Farmland surrounds the quarry.	Colchester Stone Subsidiary of Moline Construction Co., 313 16th St., Moline, IL 61265 COMMENTS: Inaccessible for thorough examination VISITED: 12/12/79--BJS
22	Limestone	3 miles southwest of Glasgow (Scott County)	Burlington Formation. Mississippian. As above (#13)	Relatively flat area. Quarry located at the mouth of a large valley.	Dry mine?	Active.	Limestone.	Farmland surrounds the quarry.	Callender Construction, 819 West Washington St., Pittsfield, IL 62363 COMMENTS: Inaccessible for thorough examination VISITED: 12/12/79--BJS
23	Limestone	1.5 miles northwest of Hecker (St. Clair County)	Fraileys Formation. Mississippian. The Fraileys Formation is predominately shale, but there are lenticular limestone beds that occur sporadically throughout.	Rolling Hills, near the crest of one of these hills, no surface water problems.	Dry quarry. The limestone lenses are creviced and may yield water for small domestic supplies. Glacial till is thin and normally will not yield water to a drilled well.	Inactive, used as a storage yard.	Limestone, 1200 tons per day capacity.	Area around the quarry is intensively farmed with several farm homes nearby.	Quality Stone Co. 306 North Market St., New Athens, IL 62264 VISITED: 12/11/79--BJS

KERR-McGEE — WEST CHICAGO WASTES
ALTERNATIVE SITE DATA

LIMESTONE/DOLOMITE QUARRIES

No.	Mine Type	Location Area	Geology	Topography/Surface Hydrology	Ground-Water Hydrology	Present Condition	Mineral Resources	Land-use Resources	Ownership
24	Limestone	1.5 miles northwest of Ullin (Pulaski County) Ullin Quarry #8)	Ullin Formation. Mississippian. Fractured and jointed limestone. Fine-to-coarse grained limestone that is very fossiliferous.	Flat area. No apparent surface water problems.	No apparent ground-water problems. This limestone is well-creviced and water yielding and is a good source of ground water for industrial or municipal supplies.	Cliff-side quarry. Active, large operation.	Limestone, 2500 tons per day capacity.	Farmland surrounds the quarry.	Columbia Quarry P.O. Box 1000 DuPo, IL 62239 <u>COMMENTS:</u> Inaccessible for thorough examination. <u>VISITED:</u> 12/11/79--BJS
25	Limestone	1.5 miles northwest of Roots (Randolph County) (Randolph Quarry)	Haney and Glen Dean Formation. Mississippian. Highly fractured and jointed. The Haney and Glen Dean Formations are coarse-grained, oolitic, and fossiliferous limestones that are interbedded with small shale units.	Relatively flat area. In the flood plain of a major river (Kaskaskia).	Limestone is creviced and water yielding. Small domestic ground water supplies developed from the upper bedrock units in the area.	Appears to be abandoned. Cliff-type quarry with pit.	Limestone, 1500 tons per day capacity.	Farmland and grazing land surround the quarry. Small trees and shrubbery is abundant in the area.	Randolph Quarries Inc., P.O. Box 175 Ellis Grove, IL 62241 <u>COMMENTS:</u> Inaccessible for thorough examination. <u>VISITED:</u> 12/11/79--BJS
26	Limestone	6 miles northwest of Campbell Hill (Jackson County)	KinKaid Formation. Mississippian. Fractured and jointed limestone. Fine-to-coarse grained limestone. Both a shale and limestone unit.	Small stream adjacent to the quarry. Quarry is located in a topographic low.	Dry quarry. Ground water extensively developed from the bedrock aquifers including the KinKaid limestone. Aquifer obtains water from crevices and joints.	Active, small operation.	Limestone, 2000 tons per day capacity.	Farmland surrounds the quarry. Located in Shawnee National Forest.	State owned, leased to: Illinois Quarry Co., R.R. 2 Ava, IL 62907 <u>VISITED:</u> 12/11/79--BJS

KERR-McGEE — WEST CHICAGO WASTES
ALTERNATIVE SITE DATA

LIMESTONE/DOLomite QUARRIES

No.	Mine Type	Location Area	Geology	Topography/Surface Hydrology	Ground-Water Hydrology	Present Condition	Mineral Resources	Land-use Resources	Ownership
27	Dolomite	3 miles south of Albany (Whiteside County) (McMahon Quarry)	Racine Formation Silurian. Racine reef rock is a very pure dolomite, largely vesicular to coarsely vuggy, medium grained, and highly fossiliferous.	About 20 feet from the Illinois River and therefore in its flood plain. Very flat area.	Shallow water table, dry pit, but not a very deep pit. Most ground-water supplies in the area are obtained from bedrock aquifers. The major aquifer in this region is the Silurian dolomite. Lower aquifers are also extensively developed. Water from the dolomites is best obtained from the highly fractured and vesicular dolomite.	Active, open pit quarry.	Dolomite, 1800 tons per day capacity.	Light industry in the area. Some farming also in the area. Brushwood surrounds the pit.	Moline Consumers 313 16th St. Moline, IL 61265 <u>VISITED:</u> 12/14/79--BJS
28	Dolomite	3 miles east of Fulton (Whiteside County) (Akker Quarry)	Racine Formation Silurian. As above (#27)	Located in a topographic low. No surface water in the area.	Dry mine. As above (#27)	Active, large pit operation	Dolomite, 1500 tons per day capacity.	Quarry surrounded by farm land. Small brushwood and trees abundant in the area.	Whiteside Quarries, P.O. Box 8 Morrison, IL 61270 <u>COMMENTS:</u> Inaccessible for thorough examination <u>VISITED:</u> 12/14/79--BJS
29	Dolomite	1 mile west of Pearl City (Stephenson County)	Racine Formation? Silurian Fractured and jointed dolomite As above (#27)	Located in a slight topographic depression. Small stream approximately 200 feet from quarry.	Dry Quarry. As above (#27)	Active, cliff side quarry.	Dolomite, 1000 tons per day capacity.	Farmland surrounds the quarry.	Freeport Blacktop Construction Co. R.R. 1, Freeport IL 61032 <u>VISITED:</u> 12/15/79--BJS

KERR-McGEE — WEST CHICAGO WASTES
ALTERNATIVE SITE DATA

LIMESTONE/DOLomite QUARRIES

No.	Mine Type	Location Area	Geology	Topography/Surface Hydrology	Ground-Water Hydrology	Present Condition	Mineral Resources	Land-use Resources	Ownership
29	Dolomite	1 mile west of Pearl City (Stephenson County)	Racine Formation? Silurian. Fractured and jointed dolomite As above (#27)	Located in a slight topographic depression. Small stream approximately 200 feet from quarry.	Dry quarry.	Active, cliffside quarry.	Dolomite, 1000 tons per day capacity.	Farmland surrounds the quarry.	Freeport Blacktop Construction Co., R.R. 1, Freeport, IL 61032 <u>VISITED:</u> 12/15/79--BJS
30	Dolomite & limestone	.5 miles east of Grafton (Jersey County)	Racine Formation? Silurian and Devonian. As above (#27)	Mine is approximately 200 feet from Mississippi River and is in its flood plain.	Mine is dry.	Inactive, cliffside quarry.	Limestone and dolomite.	A few residents nearby. Small trees and brushwood in the quarry area.	Grafton Quarry Co., P.O. Box 216 Grafton, IL <u>VISITED:</u> 12/11/79--BJS
31	Dolomite	2 miles east of Thomson (Carroll County)	Racine Formation? Silurian. As above (#27)	Flat area. In the flood plain of the Illinois River.	Dry mine.	Active, pit operation.	Dolomite, 800 tons per day capacity	Farmland surrounds the quarry. Light industry in the general area.	Nelson Quarry Products, 115 S. Westside Avenue, Lanark, IL 61046 <u>COMMENTS:</u> Inaccessible for thorough examination <u>VISITED:</u> 12/14/79--BJS
32	Dolomite	3 miles north east of Savanna (Carroll County)	Racine Formation? Silurian. As above (#27)	Probably in Illinois River flood plain.	Unable to inspect.	Inactive? cliffside quarries.	Dolomite, 800 tons per day capacity	Area is state recreational area.	Nelson Quarry Products, 115 S. Westside Avenue, Lanark, IL 61046 <u>COMMENTS:</u> Inaccessible for thorough examination <u>VISITED:</u> 12/14/79--BJS

KERR-McGEE — WEST CHICAGO WASTES
ALTERNATIVE SITE DATA

LIMESTONE/DOLomite QUARRIES

No.	Mine Type	Location Area	Geology	Topography/Surface Hydrology	Ground-Water Hydrology	Present Condition	Mineral Resources	Land-use Resources	Ownership
33	Dolomite	South side of Cordova (Rock Island County)	Racine Formation Silurian. As above (#27)	In the flood plain of the Illinois River. Flat area.	Could not see quarry.	Active?	Dolomite, 1000 tons per day capacity	Residential area.	Collinson Stone Co., Subsidiary of Moline Consumer Co., 313 16th St. Moline, IL 61265 COMMENTS: Inaccessible for thorough examination VISITED: 12/14/79--BJS
34	Dolomite	6 miles north east of Momence (Kankakee County)	Racine Formation? Silurian. Highly fractured dolomite. Reef rock, pure dolomite, largely vesicular to coarsely vuggy, medium grained.	Flat area. No surface water problems.	Dry quarry. Ground-water yield from crevices in the dolomite. Good for small domestic supplies.	Active, pit operation.	Dolomite	Farmland surrounds the pit. Several farm homes in the area.	Western Materials Co. VISITED: 12/18/79--BJS
35	Dolomite	3 miles north east of Cortland (DeKalb County) (Sears Quarry)	Alexandrian Series Elwood Formation Silurian. Very jointed and fractured. Slightly argillaceous, brownish gray, thin to medium bedded, fine grained dolomite that contains layers of dense white	Relatively flat area. No surface water problems. South branch of the Kishwaukee River flows approximately 1/8 mile east of quarry, but the quarry does not appear to be in the flood plain.	Dry mine. Dolomite is generally creviced and water yielding. Widely used as a domestic water source	Active, large open pit operation. Very little spoil evident.	Dolomite, 2000 tons per day capacity.	Farmland surrounds the pit. Several farm homes in the area. Grazing is also a land use in the mine area.	Larson, Elmer Inc., P.O. Box 305, DeKalb, IL 60115 VISITED: 12/18/79--BJS

KERR-McGEE — WEST CHICAGO WASTES
ALTERNATIVE SITE DATA

LIMESTONE/DOLOMITE QUARRIES

No.	Mine Type	Location Area	Geology	Topography/Surface Hydrology	Ground-Water Hydrology	Present Condition	Mineral Resources	Land-use Resources	Ownership
36	Dolomite	6 miles west of Askum (Iroquois County)	Silurian, Niagran ?	Flat area. Ponded water in the quarry. No surface stream or creek evident in the area.	Probable ground water inflow into quarry. Water-yielding from crevice, good for domestic water supply. St. Peter sandstone underlies this formation and is a good aquifer in the area.	Inactive, pit operation.	Dolomite	Farmland surrounds the quarry. Several farm homes in the area.	Pontiac Stone Co. P.O. Box 412 Pontiac, IL 61764 COMMENTS: Inaccessible for thorough examination. VISITED: 12/18/79--BJS
37	Dolomite	2 miles northwest of Stockton (Jo Davies County)	Wise Lake and Dunleith Formation. Ordavician. Fractured dolomite. <u>Wise Lake Formation.</u> A non-cherty, medium to thick bedded, vuggy, pure dolomite. <u>Dunleith Formation.</u> A shaly dolomite. The dolomite is fine grained and argillaceous. Somewhat vuggy.	Small perennial stream flows about 10 feet away from the entrance to the quarry. The quarry is about 3 feet below the level of this stream. Subject to flooding.	Dry mine, cliff-side quarry. "Water-yielding limestone and dolomites are present in the upper part of the Maquoketa (includes Wise Lake and Dunleith Formations) in some places." Water obtained from crevices within the limestone or dolomites. Small domestic supplies are obtained from the Wise Lake and Dunleith in the area.	Abandoned.	Dolomite, 2500 tons per day capacity.	Farmland and grazing land surround the quarry. A few farm homes dot the landscape.	Rein, Schultz, & Dahl, 6217 Nesbitt Road, Madison, WI 53719 VISITED: 12/15/79--BJS

KERR-McGEE — WEST CHICAGO WASTES
ALTERNATIVE SITE DATA

LIMESTONE/DOLomite QUARRIES

No.	Mine Type	Location Area	Geology	Topography/Surface Hydrology	Ground-Water Hydrology	Present Condition	Mineral Resources	Land-use Resources	Ownership
38	Dolomite	1 mile west of Elizabeth	Wise Lake Formation. Ordovician. Highly fractured dolomite. As above (#37)	Small stream flow through the area and the quarry could possibly be in its flood plain. Hilly Country, high erosion potential.	Dry mine.	Active, cliff-side quarry.	Dolomite, 1000 tons per day capacity.	Farmland surrounds the quarry. Farm homes dot the landscape in the area.	E. Weinen & Sons Construction Co. 308 South St., Galena, IL 61036 <u>VISITED:</u> 12/15/79--BJS
39	Dolomite	.5 miles south of Galena (Jo Davies County) (E. Virtue Quarry)	Wise Lake and Dunleith Formation. Ordovician. Highly fractured dolomite. As above (#37)	Located on the side of a small stream valley. A small intermittent stream is located at the bottom of the valley about 200 feet from quarry.	Dry mine.	Active, cliff-side quarry.	Dolomite, 1000 tons per day capacity.	Area around the quarry is farmland. Farm homes dot the landscape in the area.	E. Weinen & Sons Construction Co. 308 South St., Galena, IL 61036 <u>VISITED:</u> 12/15/79--BJS
40	Dolomite	2 miles south west of Sheridan (La Salle County) (Troup Quarry)	Ordovician. Prairie de Chien group. Shakopee. Argillaceous to pure, very fine grained dolomite with some thin beds of medium grained, cross bedded sandstone, medium grained dolomite, shale and siltstone. Some beds are brecciated or conglomeratic	Relatively flat area. Fox River nearest river--no problem.	Dry pit. Ground water source for small domestic supplies, generally creviced and water yielding.	Active, pit operation.	Dolomite, 500 tons per day capacity.	Farmland and grazing land surrounds the mine. Several farm homes in the area.	Garrow Gravel Service, Serena IL 60549 <u>VISITED:</u> 12/16/79--BJS

KERR-McGEE — WEST CHICAGO WASTES
ALTERNATIVE SITE DATA

LIMESTONE/DOLomite QUARRIES

No.	Mine Type	Location Area	Geology	Topography/Surface Hydrology	Ground-Water Hydrology	Present Condition	Mineral Resources	Land-use Resources	Ownership
41	Dolomite	Southwest side of Utica (La Salle County) (Utica Stone Quarry)	Slightly fractured, massive limestone. Shakopee. Ordovician. As above (#40)	Flat area. In flood plain of the Illinois River. Illinois River approximately 200 yards away.	Dry limestone mine.	Active, pit operation.	Dolomite.	South side of Utica, brushwood and small trees surround the quarry. Farmland in the area. Residential areas in quarry area.	Utica Stone Co. 111 North Spaulding St. Spring Valley, IL 61362 <u>VISITED:</u> 12/16/79--BJS
42	Limestone, Dolomite?	Utica (La Salle County) East side of town	? Limestone, probably Shakopee, Ordovician. As above (#40)	On a hillside, high erosion potential. Small river at the bottom of the hill (Clark run?) Illinois River is 1/2 mile south. Steep topography in the area.	Probably a dry quarry	Active, very large operation. Probably the major industry for Utica	Limestone, dolomite? cliffside quarry.	On edge of town Surrounded by residential areas.	P.Q. Corporation <u>VISITED:</u> 12/16/79--BJS
43	Dolomite	.5 miles north east of Lena (Stephenson County)	Galena & Platteville Group. Ordovician. Galena. Fine-grained dolomite with poorly preserved fossils. Platteville. Massive, slightly fractured limestone. Very fine grained, cherty dolomite.	Located in a topographic low. Difficult to tell if there are any surface water problems. However, the quarry is located in a large valley and therefore assume there must be a small stream or river nearby.	Appears to be dry. These dolomite groups are generally creviced and water yielding. They are extensively developed in northern Illinois and are a dependable ground-water supply for domestic and municipal sources.	Active, cliffside quarry.	Dolomite, 800 tons per day capacity.	Private farmland and grazing land surrounds the quarry.	R.E. Cox Quarry P.O. Box 46 Lena, IL 61048 <u>COMMENTS:</u> Inaccessible for thorough examination. <u>VISITED:</u> 12/15/79--BJS

KERR-McGEE — WEST CHICAGO WASTES
ALTERNATIVE SITE DATA

LIMESTONE/DOLOMITE QUARRIES

No.	Mine Type	Location Area	Geology	Topography/Surface Hydrology	Ground-Water Hydrology	Present Condition	Mineral Resources	Land-use Resources	Ownership
44	Dolomite?	1 mile north-east of Troy Grove (La Salle County)	Platteville, Ordovician. Massive, slightly fractured limestone. Very fine-grained cherty dolomite.	Relatively flat area. Small stream flows approximately 500 yards north of the quarry. Approximately 1/4 mile west of Vermillion River; not in flood plain.	Mine is dry. Generally creviced and water yielding. Dependable ground-water supply for domestic water sources Overlies St. Peter sandstone.	Active, large operation. Probably main economy for Troy Grove.	Dolomite.	Farmland surrounds quarry on three sides. Town on north side, residential area.	Manley of Indiana, Inc. VISITED: 12/16/79--BJS
45	Dolomite	4 miles east of Baileyville (Ogle County)	Galena and Platteville Group. Ordovician. Dolomite fractured and jointed. As above (#43)	Hilly area. No apparent surface water problems.	Dry quarry.	Abandoned, cliff-side quarry.	Dolomite.	Farmland surrounds the quarry.	Pine Creek Rock? c/o Alvin Sheely 501 S. Franklin Polo, IL 61064 COMMENTS: Inaccessible for thorough examination VISITED: 12/15/79--BJS
46	Limestone and Dolomite	1.5 miles northeast of Lena (Stephenson County)	Galena and Platteville Group. Ordovician. Fractured dolomite and limestone. As above (#43)	Topographic high. No surface water problems.	Dry mine.	Inactive, cliff-side quarry.	Limestone and dolomite, 2000 tons per day capacity.	Farmland surrounds the quarry.	Rein, Schultz, & Dahl 6217 Nesbitt Rd. Madison, WI 53719 VISITED: 12/15/79--BJS

KERR-McGEE — WEST CHICAGO WASTES
ALTERNATIVE SITE DATA

LIMESTONE/DOLOMITE QUARRIES

No.	Mine Type	Location Area	Geology	Topography/Surface Hydrology	Ground-Water Hydrology	Present Condition	Mineral Resources	Land-use Resources	Ownership
47	Dolomite	.5 miles west of Leaf River (Ogle County)	Galena and Platteville Group. Ordovician. Fractured and jointed limestone As above (#43)	Topographic high. No surface water in the area.	Dry quarry.	Abandoned.	Dolomite.	Farmland surrounds the quarry.	C. J. Kutz Co.? P.O. Box 488 Forreston, IL 61030 <u>COMMENTS:</u> Inaccessible for thorough examination <u>VISITED:</u> 12/15/79--BJS
48	Dolomite and limestone	1 mile north-east of Oregon (Ogle County)	Galena and Platteville Group. Ordovician. As above (#43)	Hilly, high erosion potential Possibly in Illinois River flood plain.	Pit appears to be dry.	Active.	Dolomite and limestone, 500 tons per day capacity.	Edge of town, residential. Some farmland surrounds the quarry.	Oregon Stone Quarries, P.O. Box 295, Oregon IL 61061 <u>COMMENTS:</u> Inaccessible for thorough examination <u>VISITED:</u> 12/15/79--BJS
49	Dolomite	1 mile west of Forreston (Ogle County)	Galena and Platteville Group. Ordovician. Slightly jointed. As above (#43)	In a slight topographic low. Small stream runs about 200 feet in front of quarry.	Dry mine.	Active, cliff-side quarry.	Dolomite, 800 tons per day capacity.	Farmland and grazing land surrounds this quarry.	Kutz Brothers P.O. Box 488 Forreston, IL 61030 <u>COMMENTS:</u> Inaccessible for thorough examination. <u>VISITED:</u> 12/15/79--BJS

KERR-McGEE — WEST CHICAGO WASTES
ALTERNATIVE SITE DATA

LIMESTONE/DOLOMITE QUARRIES

No.	Mine Type	Location Area	Geology	Topography/Surface Hydrology	Ground-Water Hydrology	Present Condition	Mineral Resources	Land-use Resources	Ownership
50	Dolomite	1 mile north-east of Monroe Center (Ogle County)	Galena and Platteville Group. Ordovician. Fractured limestone. As above (#43)	Hilly topography. No surface water problems.	Pit is now full of water, probably due to ground-water inflow.	Abandoned pit.	Dolomite, 1000 tons per day capacity when operational.	Farmland surrounds the quarry. A few residents and farm homes in the area.	Macklin Brothers, Inc., Steward, IL 60553 VISITED: 12/15/79--BJS
51	Dolomite	West side of Polo (Ogle County)	Galena and Platteville Group. Ordovician. Fractured and jointed. As above (#43)	Relatively flat area. Small stream about 100 feet from pit and the pit is probably prone to flood!	Dry pit.	Inactive.	Dolomite, 800 tons per day capacity.	Farmland surrounds the quarry.	Mt. Morris Stone 12 Orchard Lane Mt. Morris, IL 61054 COMMENTS: Inaccessible for thorough examination VISITED: 12/15/79--BJS
52	Dolomite	.5 miles northwest of Bryon (Ogle County)	Galena and Platteville Group. Ordovician. As above (#43)	In a slight topographic depression. Possibly in the flood plain of the Rock River.	Dry mine.	Active, cliff-side quarry.	Dolomite.	Farmland surround the quarry. Several farm homes in the area.	Byron Material Service, Division of Baeco, Inc. P.O. Box 236 Stillman Valley, IL 61084 COMMENTS: Inaccessible for thorough examination. VISITED: 12/15/79--BJS

KERR-McGEE — WEST CHICAGO WASTES
ALTERNATIVE SITE DATA

LIMESTONE/DOLOMITE QUARRIES

No.	Mine Type	Location Area	Geology	Topography/Surface Hydrology	Ground-Water Hydrology	Present Condition	Mineral Resources	Land-use Resources	Ownership
53	Dolomite	.5 miles north-west of Byron (Ogle County)	Galena and Platteville Group. Ordovician. As above (#43)	In a slight topographic depression. Possibly in flood plain of Rock River.	Dry quarry.	Active, pit operation.	Dolomite.	Farmland and residential area surround the quarry.	Byron Material Service, Division of Baeco, Inc. P.O. Box 236 Stillman Valley, IL 61084 <u>VISITED:</u> 12/15/79--BJS
54	Dolomite	2 miles west of Mt. Carroll (Carroll County)	Galena Group Ordovician. As above (#43)	Located near a topographic high, no surface water problems.	Dry quarry?	Active, pit quarry.	Dolomite, 2000 tons per day capacity.	Farmland surrounds the quarry. Several residents in general area.	Rein, Schultz, & Dahl, Inc., 6217 Nesbitt Road, Madison, WI 53719 <u>COMMENTS:</u> Inaccessible for thorough examination <u>VISITED:</u> 12/15/79--BJS
55	Dolomite	Southwest edge of Woodbine (Jo Davies County)	Galena Group Ordovician. Highly fractured and jointed dolomite. As above (#43)	Bottom of pit is full of water (probably from ground water inflow). Relatively flat area.	Ground-water inflow into abandoned pit.	Abandoned.	Dolomite.	Farmland surrounds the pit. Edge of woodbine. Residential area in vicinity.	E. Wiener and Sons Construction Co., 308 South St., Galena, IL 61036 <u>COMMENTS:</u> Inaccessible for thorough examination. <u>VISITED:</u> 12/14/79--BJS

KERR-McGEE -- WEST CHICAGO WASTES
ALTERNATIVE SITE DATA

LIMESTONE/DOLOMITE QUARRIES

No.	Mine Type	Location Area	Geology	Topography/Surface Hydrology	Ground-Water Hydrology	Present Condition	Mineral Resources	Land-use Resources	Ownership
56	Dolomite	1 mile north-west of Ashton (Lee County) Seitz Quarry	Oneota and Gunter Formation. Ordovician. Fractured and jointed dolomite. The Oneota dolomite is a fine-to-coarse grained cherty dolomite which contains minor amounts of sand and shale. Some small thin beds of fine-grained dolomite are also present in the overlying Gunter sandstone formation.	Relatively flat area. No apparent surface water bodies in the area.	Dry mine. The dolomite is generally creviced and water yielding. The overlying and underlying sandstone beds are also developed aquifers.	Active, cliff-side quarry.	Dolomite, 500 tons per day capacity.	Entire quarry surrounded by farmland. Many farm homes in the area.	Oregon Stone Quarries, P.O. Box 295, Oregon, IL 61061 <u>VISITED:</u> 12/16/79--BJS
57	Dolomite	2 miles south-east of Big Rock (Kane County) Big Rock Quarry	Ordovician. Ft. Atkinson Formation. Appears to be highly jointed and fractured. Fine-grained dolomite, very fossiliferous, interbedded shale at some localities.	Flat-to-slightly rolling topography. Nearest stream is the west fork of the Big Rock Creek, approximately 1/2 mile away.	Appears to be a dry mine. Dolomite yields ground water at most locations through open crevices and channels, and the yield is good enough for moderate domestic development of this aquifer in the area. Sandstones below this unit are widely used as municipal ground-water supplies in area.	Active.	Dolomite, 1600 tons per day.	Mine surrounded by farm and grazing land. Several farm homes in the area.	Meyer Material Co. 580 S. Wolf Rd. Des Plaines, IL 60017 <u>VISITED:</u> 12/17/79--BJS

KERR-McGEE — WEST CHICAGO WASTES
ALTERNATIVE SITE DATA

LIMESTONE/DOLomite QUARRIES

No.	Mine Type	Location Area	Geology	Topography/Surface Hydrology	Ground-Water Hydrology	Present Condition	Mineral Resources	Land-use Resources	Ownership
58	Dolomite	1 mile north-east of Plainfield (Will County) Romeo Quarry	? Formation and age unknown. Slightly fractured and jointed.	Relatively flat area. Several small streams in the area.	Appears to be ground-water inflow into mine. Based upon observing that there are water ponds on the property (settling ponds).	Active, pit operation.	Dolomite.	Farm and grazing land surrounds the pit. Recreational area nearby (private club) 200 yards away.	? Material Service 300 West Washington St., Chicago IL 60606 <u>VISITED:</u> 12/18/79--BJS
59	Limestone	2 miles south of Quincy (Adams County)	Burlington Formation. Mississippian. As above (#13)	About 200 feet from Mississippi River and is in its flood plain.	Dry mine.	Active, cliff-side quarries underground.	Limestone.	Flood plane of Mississippi River. Some farmland. Light industry.	Calcium Carbonate Co., Division of J.M. Huber Corp. <u>VISITED:</u> 12/12/79--BJS
60	Limestone	1.5 miles south of Oglesby, east of Highway 51 and west Vermillion River (La Salle County)	Pennsylvanian shale and limestone overlain by glacial gravel, sand, and silt. Penn. rocks dip west.	General flat area with trees and grass along banks of Vermillion River. Quarry 60 to 100 feet deep with spoil piles interspersed within quarry. Some water seepage at base of glacial cover.	Quarry generally dry. Where active mining, ground water seeps from base of glacial cover.	in operation, mining in two areas.	Limestone and coal reserves. Sand and gravel.	Quarry being actively mined, appears town of Oglesby dependent on operation.	Private. <u>VISITED:</u> 7/11/79--DMS

KERR-McGEE — WEST CHICAGO WASTES
ALTERNATIVE SITE DATA

Clay/Shale Quarries

No.	Mine Type	Location Area	Geology	Topography/Surface Hydrology	Ground-Water Hydrology	Present Condition	Mineral Resources	Land-use Resources	Ownership
1	Clay	.5 miles south of Olmsted (Pulaski County)	75 feet of loam- loess overburden Does not appear to be glacial clay deposits but lacustrine clay deposit. Tertiary in age. Either the Wilcox formation or Porters Creek Clay.	Two clay quarry sites. Both are located in a topographic low. Standing water in parts of the pits, probably from surface runoff. One pit is in the flood plain of the Ohio River, the other is not.	No seepage from sides of the pits. Limited development of ground-water resources in the area. Some development in the alluvial bedrock valleys and sparse development of the Pennsylvanian sand- stone and limestone.	Active pit operation.	Clay, 300 tons per day capac- ity.	Grazing land & farmland sur- round the pit. Major industry for town of Olmsted.	Southern Clay Co. Inc., Subsidiary of Lowe's, Inc. North Edward St. Cassapolis, MI 49031 VISITED: 12/11/79--BJS
2	Shale	1/4 mile south of Albion (Edwards County)	Pennsylvanian shale (weathered) within the Mattoon Forma- tion.	Two mining areas--one topo- graphically low and one high. Both pits have standing water.	Small ground-water supplies are available from the glacial till and underlying Penn- sylvanian sandstone and limestone aquif- ers.	Two pits inactive.	Clay. Probable coal and oil reserves underlie the area.	Light industry and residential areas nearby. Farmland in general area.	Moulding, Thos., Brick Co., Southern Illinois, Inc. North Terminal Albion, IL 62806 VISITED: 4/03/80--WJG
3	Shale	3 miles east of New Douglas (Bond County)	Pennsylvanian shale (weathered) within the Bond formation.	Relatively flat area. There may be standing water in parts of the clay pit.	Shale, small ground- water supplies are available from under- lying sandstone and limestone in the area.	Active.	Clay, 250 tons per day capac- ity. Probable coal and oil reserves underlie this shale unit.	Farmland sur- rounds the shale pit.	Richards Brick Co., 234 Springer Avenue, Edwardsville, IL 62055 VISITED: 12/12/79--BJS 4/13/80--WJG

KERR-McGEE — WEST CHICAGO WASTES
ALTERNATIVE SITE DATA

CLAY/SHALE QUARRIES

No.	Mine Type	Location Area	Geology	Topography/Surface Hydrology	Ground-Water Hydrology	Present Condition	Mineral Resources	Land-use Resources	Ownership
4	Shale	1/4 mile west of St. Elmo (Fayette County)	Brown loess-loam overburden approximately 50 feet thick. Gray, weathered shale seam approximately 20 feet thick. Pennsylvanian shale. Probably the Mattoon formation.	Standing water over most of the pit bottom that appears to be several feet deep. Appears to be surface rather than ground water. Small creek flows adjacent to the pit.	No ground-water seeps from pit sides. Underlying Mississippian sandstone and limestone aquifers sparsely developed.	Active, circular enclosed pit	Clay, 80 tons per day capacity. Probable coal and oil reserves underlie the area.	West edge of town of St. Elmo. Small trees and brush surround the pit.	Diller Shale Products Co., Chatsworth, IL 60921 <u>VISITED:</u> 12/12/79--BJS 4/03/80--WJG
5	Shale	1.2 miles northeast of Alsey (Scott County)	Surficial clay deposit or weathered shale. Underlain by the middle to lower Valmeyeran series of Mississippian age, specifically the Keokuk-Burlington limestone.	Good stream flow near pit entrance.	Glacial till developed for domestic use. Underlying Mississippian limestone developed for domestic and municipal ground-water supplies.	Abandoned and reclaimed. Bond released	Clay. Probable coal reserves underlie the area (strippable).	Farmland and grazing land in general area.	Alsey Refractories Co., subsidiary of Oswald Refractories Co., 8924 Manchester Road, St. Louis, MO 63144 <u>VISITED:</u> 12/12/77--BJS 4/01/80--WJG
6	Shale	2.8 miles northeast of Exeter (Scott County)	Pennsylvanian shale (weathered) within the Carbondale formation.	Very hilly area. Mauvaise Terre Creek flows near the pit. Possibly in its flood plain.	Ground water in the glacial till is developed for light domestic use. Underlying Pennsylvanian sandstone and limestone developed for domestic and municipal ground-water supplies.	Inactive or abandoned.	Clay. Probable coal reserves underlie the area (strippable).	Farmland surrounds the pit. A few farm houses in the general area.	Alsey Refractories Co., subsidiary of Oswald Refractories Co., 8924 Manchester Road, St. Louis, MO 63144 <u>COMMENT:</u> Inaccessible Could not see pit. <u>VISITED:</u> 12/12/79--BJS 4/01/80--WJG

KERR-McGEE — WEST CHICAGO WASTES
ALTERNATIVE SITE DATA

CLAY/SHALE QUARRIES

No.	Mine Type	Location Area	Geology	Topography/Surface Hydrology	Ground-Water Hydrology	Present Condition	Mineral Resources	Land-use Resources	Ownership
7	Shale	2.5 miles southwest of Mt. Sterling (Brown County)	Weathered shale approximately 50 feet thick. Pennsylvanian shale within the Carbondale formation. Underlain by the Keokuk and Burlington limestone formations.	Small valley runs into the quarry. Stream flows in the area near the mine. Possibly in the flood plain. High erosion potential, steep topography.	Dry quarry. Shale not developed as ground-water supply. Ground water developed in the underlying sandstone and limestone aquifers for light domestic use.	Active, cliff side quarry.	Clay, 80 tons per day capacity. Strippable coal reserves underlie the area.	Extensive farming in the area. Small trees and shrubs surround the mine.	Mt. Sterling Tile Co., c/o Diller Tile Co., Chatsworth IL 60921 <u>VISITED:</u> 12/12/79--BJS 4/01/80--WJG
8	Shale	1 mile north of Tennessee (McDonough County)	Mississippian Warsaw shale (weathered) underlain by the Keokuk limestone.	Many of the pits are abandoned and have since filled with water. They are used as private fishing and hunting areas. East Fork of the LaMoine River flows adjacent to the main pit. Area is swampy in appearance. High erosion potential.	Ground water appears to be seeping into many of the pits in the area. Ground-water supply developed in the glacial till and underlying limestone and sandstone aquifers of Mississippian age. Ground-water table is probably very close to surface.	Several pits, some active and others inactive.	Clay. Limestone is also quarried in this area. Probable coal (strippable) and oil reserves underlie the area.	Mostly small trees and brushwood in immediate vicinity of pits. Some farmland also surrounds these pits.	Booz and Co. P.O. Box 92 Macomb, IL 61455 <u>VISITED:</u> 12/13/79--BJS 4/01/80--WJG
9	Coal underclay	1.5 miles north of Tennessee (McDonough County)	Coal underclay, Lower Pennsylvanian. Spoon formation.	These clay pits are both located in water drainage ways. Extremely high potential for erosion.	Dry pits. Ground-water supplies are developed in the glacial till and the underlying Pennsylvanian and Mississippian sandstone and limestone aquifers.	Inactive. This area appears to be a major region of limestone and clay production.	Clay. Limestone mined in general area. Probable coal (strippable) and oil reserves underlie the area.	Farmland and grazing land surround the pit.	Unknown. <u>VISITED:</u> 12/13/79--BJS 4/01/80--WJG

KERR-MCGEE — WEST CHICAGO WASTES
ALTERNATIVE SITE DATA

CLAY/SHALE QUARRIES

No.	Mine Type	Location Area	Geology	Topography/Surface Hydrology	Ground-Water Hydrology	Present Condition	Mineral Resources	Land-use Resources	Ownership
10	Coal underclay.	.5 miles northwest of Colchester (McDonough County)	Coal underclay, Lower Pennsylvanian. Abbott formation	Small unnamed intermittent stream runs through the area. High potential to receive runoff after large precipitation events.	Dry pit. Ground water in the glacial till and underlying Pennsylvanian and Mississippian sandstone and limestone aquifers are developed.	Abandoned. Clay sides and floors.	Clay. Probable coal (strippable) and oil reserves underlie the area.	Trees and brushwood surround the pit. Some farmland nearby. Several farm houses in the area.	Western Stoneware Co., 521 West 6th Ave., P.O. Box 228 Monmouth, IL 61462 <u>VISITED:</u> 12/13/79--BJS 4/01/80--WJG
11	Shale	Southeast edge of East Galesburg (Knox County)	Pennsylvanian shale (weathered) within the Carbondale formation.	Located in a topographic low. Surface water is ponded in some of the pits (there are several). Moderate potential for erosion. Court Creek runs adjacent to the pit areas. Pits are possibly in its flood plain.	Ground water does not appear to be seeping into any of the pits. Underlying Pennsylvanian sandstone and limestone aquifers are developed for domestic and municipal use.	Abandoned.	Clay. Strippable and underground coal reserves underlie the general area.	The pits are surrounded by trees and brushwood. About 300 feet west is a small residential area with new homes.	Galesburg Brick Co Subsidiary of Schottco Corp., P.O. Drawer 110 Galesburg, IL 61401 <u>VISITED:</u> 12/14/79--BJS 4/01/80--WJG
12	Shale	.2 miles east of East Peoria (Tazewell County)	Pennsylvanian shale (weathered) within the Carbondale formation.	Two small streams flow adjacent the pit areas. High potential for erosion. Extremely hilly area. Illinois River 1.5 miles to the north.	Quarry appears to be dry. Shale not a domestic ground-water source. Underlying Pennsylvanian sandstone and limestone aquifers sparsely developed.	Active. Large operation on the outskirts of East Peoria. There are several pits but most are of the cliff-side variety rather than "pits".	Clay. Probable coal reserves underlie the area.	Industrial and residential. Residential areas very close to the pits. Small trees and brushwood surround the pit areas.	Peoria Brick and Tile Co., P.O. Box 515, East Peoria, IL 61611 <u>VISITED:</u> 12/14/79--BJS 4/02/80--WJG

KERR-McGEE — WEST CHICAGO WASTES
ALTERNATIVE SITE DATA

CLAY/SHALE QUARRIES

No.	Mine Type	Location Area	Geology	Topography/Surface Hydrology	Ground-Water Hydrology	Present Condition	Mineral Resources	Land-use Resources	Ownership
13	Shale	1/4 mile south west of Streator (Livingston County)	Pennsylvanian shale (weathered) within the Carbondale formation.	Relatively flat area. Vermillion River close by, approximately 1/4 mile east.	Standing water in parts of the pits. Probably from surface runoff. Small domestic ground water developed from glacial till. The Pennsylvanian sandstone and limestone beds underlying the till are developed as domestic ground-water supplies. The Ordovician age St. Peter sandstone and the Cambrian-age Galesville sandstone aquifers are developed as municipal ground-water supplies in the area.	Active, pit operating. Clay floor and sides.	Clay, 400 tons per day capacity. Probable coal reserves underlie the general area.	Farm and grazing land surrounds the pit. Residential area 1/8 mile north.	Streaton Brick Systems, P.O. Box "E", Streaton IL 61364 VISITED: 12/14/79--BJS 3/19/80--WJG & BJS
14	Clay	Within town of Chatsworth (Livingston County)	Clay, glacial till. Underlain by the Carbondale formation of Pennsylvanian age.	There are 3 pits, all filled with water. Relatively flat area. No large streams in the area.	Pits are full of water probably as a result of ground-water inflow. Glacial Till developed as a domestic water source. Small ground-water supplies obtained from the Pennsylvanian sandstones, limestones, and fractured shale.	Abandoned.	Clay, 125 tons per day capacity. Probable coal reserves underlie the general area.	Residential areas surround the pits on two sides, farmland on the other two sides. Probably major industry for town.	Diller Tile Co., Inc. Chatsworth, IL 60921 VISITED: 12/16/79--BJS 3/20/80--WJG & BJS

KERR-McGEE — WEST CHICAGO WASTES
ALTERNATIVE SITE DATA

CLAY/SHALE QUARRIES

No.	Mine Type	Location Area	Geology	Topography/Surface Hydrology	Ground-Water Hydrology	Present Condition	Mineral Resources	Land-use Resources	Ownership
15	Clay	.1 to .2 miles south of St. Anne (Kankakee County)	Clay, glacial till. Silurian dolomite underlies the glacial till.	Relatively flat area. No apparent streams in the immediate area.	Glacial till and underlying Silurian dolomites sparsely developed. Ordovician-age St. Peter sandstone and Cambrian-age Galesville sandstone are developed for domestic and municipal ground-water supplies.	Active.	Clay.	Residential with some farmland in the general vicinity.	Eastern Illinois Clay Co., 499 S. Chicago St., St. Anne, IL 60964 VISITED: 12/17/79--BJS 3/19/80--WJG & BJS
16	Coal Under-clay	4.2 miles north of Coal City (Grundy County)	Clay, coal under clay. Pennsylvanian Spoon formation.	Relatively flat area. Several pits in the area. Pits appear to be dry.	Glacial till and Pennsylvanian sandstone and limestone are developed as domestic ground-water supplies. The deeper and older St. Peter and Galesville sandstone aquifers are also developed as domestic and municipal ground-water supplies.	Active.	Clay. Strippable coal reserves underlie the general area.	Farmland and private hunting, fishing, and recreational clubs surround the area. Old strip mine area.	Green, A.P. Refractories Co., Subsidiary of U.S. Gypsum Co., P.O. Box 64, Morris, IL 60540 VISITED 12/17/79--BJS 3/19/80--WJG & BJS
17	Shale	4 miles east of Ottawa (LaSalle County)	Pennsylvanian shale (weathered) Carbondale formation.	Topographic low, hilly area. 1.2 miles north of Illinois River, but probably not in its flood plain. Large amounts of spoil present. Standing water in portions of the pit, probably from surface runoff.	No domestic wells developed in shale. Municipal and domestic supplies are available from underlying aquifers in the area. These aquifers include the St. Peter and Galesville sandstones	Active pit operation.	Clay, 1500 tons per day capacity. Probable coal (strippable) reserves underlie the general area.	Farm and grazing land surrounds the pit. Small trees and brushwood surround the immediate periphery of the pit.	Material Service Div., 300 West Washington St. Chicago, IL 60606 VISITED: 12/16/79--BJS 3/19/80--WJG & BJS

KERR-McGEE — WEST CHICAGO WASTES
ALTERNATIVE SITE DATA

CLAY/SHALE QUARRIES

No.	Mine Type	Location Area	Geology	Topography/Surface Hydrology	Ground-Water Hydrology	Present Condition	Mineral Resources	Land-use Resources	Ownership
17A	Shale	.3 miles east of Ottawa (LaSalle County)	Pennsylvanian shale (weathered) Spoon formation.	Relatively flat area. Probably in or very near to the flood plain of both the Fox and Illinois Rivers. Water ponded in bottom of the southern-most pit.	N domestic wells developed in shale. Municipal and domestic supplies are available from underlying aquifers in the area. These aquifers include the St. Peter and Galesville sandstones.	Abandoned.	Clay. Probable strip-pable coal reserves underlie the general area.	Farmland and grazing land surround the pit. Near state highway.	Unknown. <u>VISITED:</u> 3/19/80--WJG & BJS
18	Shale	Starved Rock Mine, 1.4 miles south of Utica (LaSalle County)	Pennsylvanian shale (weathered) Spoon formation. Directly below is the Ordovician St. Peter sandstone.	Relatively flat area; slightly marshy in appearance. The Vermillion River is 1.5 miles southwest; Illinois River, 1 mile north.	Ground water close to land surface. Probably have ground-water inflow into the pit. Shale not developed as ground-water supply. Underlying sandstone and limestone aquifers developed. These aquifers include the St. Peter and Galesville sandstones.	Active pit operation.	Clay, 400 tons per day capacity. Probably coal (strippable) reserves underlie the general area.	Pit surrounded by small trees and brushwood. Farm and grazing land in the vicinity. Several farm homes in the area. State park nearby.	Streator Brick Co. P.O. Box "E" Streator, IL 61364 <u>VISITED:</u> 12/16/79--BJS 3/19/80--WJG & BJS
19	Shale	Starved Rock Mine, 1.1 miles south of Utica (LaSalle County)	Pennsylvanian shale (weathered) Spoon formation. Directly below is the Ordovician St. Peter sandstone.	Mine located in a topographic low. High erosion potential. Located close to Vermillion River (1.5 miles southwest) and Illinois River (1 mile north).	Bottom of pit is ponded, probably ground water. No domestic well developed in the shale. Small domestic supplies are available from underlying aquifers in the area. These aquifers include the St. Peter and Galesville sandstones.	Abandoned pit operation. Revegetated with brushwood.	Clay. Probable coal (strippable) reserves underlie the general area.	Farm and grazing land surround pit on three sides. Other side surrounded by brushwood.	Ristokrat Clay Prod. Co., P.O. Box 4, Tonica, IL 61370 <u>VISITED:</u> 12/16/79--BJS 3/19/80--WJG & BJS

KERR-McGEE — WEST CHICAGO WASTES
ALTERNATIVE SITE DATA

CLAY/SHALE QUARRIES

No.	Mine Type	Location Area	Geology	Topography/Surface Hydrology	Ground-Water Hydrology	Present Condition	Mineral Resources	Land-use Resources	Ownership
20	Shale	Clay Pit #4, .6 miles north west of Lowell (LaSalle County)	Pennsylvanian shale (weathered) Carbondale for- mation.	Pits located in a topographic low. Water ponded in many of the abandoned pits. Very close to and possibly in the flood plain of the Ver- million River. Slope is toward the Vermillion River.	Ground water looks to be close to the ground surface. Small domestic supplies yielded from the Glacial Till, under- lying sandstone and limestone aquifers developed. They include the St. Peter and Galesville sand- stone aquifers.	Several pits in the area. Some are active pits.	Clay, 200 tons per day. Probable coal (strippable) reserves under- lie the area.	Small residen- tial area near pits. Small trees and brushwood pre- dominate the area. Probably some hunting and fishing in the area.	Ristokrat Clay Prod Co., P.O. Box 4, Tonica, IL 61370 VISITED: 12/16/79--BJS 3/19/80--WJG & BJS
21	Shale	.1 miles south of Oglesby (LaSalle County)	Pennsylvanian shale (weathered) Modesto forma- tion.	Relatively flat area. 500 feet south of the Vermillion River, but not in its flood plain.	Glacial Till developed for small ground-water supplies. Underlying limestone and sandstones are developed as domestic and municipal ground- water supplies in the area. These include the St. Peter and Galesville sandstone aquifers.	Inactive?	Clay. Probable coal (strippable) reserves under- lie the area.	Surrounded by farmland, south edge of Oglesby	Marquette Cement Manufacturing Co. First American Cen- ter, Nashville, TN 37238 VISITED: 12/16/79--BJS 3/19/80--WJG & BJS

KERR-McGEE — WEST CHICAGO WASTES
ALTERNATIVE SITE DATA

CLAY/SHALE QUARRIES

No.	Mine Type	Location Area	Geology	Topography/Surface Hydrology	Ground-Water Hydrology	Present Condition	Mineral Resources	Land-use Resources	Ownership
22	Clay	Dolton, within corporate limits (Cook County)	Clay within the glacial till. Underlying bed-rock is the Silurian-age dolomite.	Relatively flat area. Standing water in portions of an abandoned pit just to the north of the active pit. Water is probably ground water. The abandoned pits are in the flood plain of the Little Calumet River, the active pit is just out of the 100-year flood plain. The Little Calumet River is located .4 miles to the north.	General area is swampy. The ground-water table is probably very close to the surface. Silurian dolomites constitute fair to good aquifers in the area. These dolomite aquifers are developed as domestic and municipal water supplies.	Active operation. Abandoned pits on property.	Clay, 750 tons per day capacity.	Located in an industrial area of Dolton. This area surrounded by residential areas.	American Brick Co. 6558 W. Fullerton Ave., Chicago, IL 60635 <u>COMMENTS:</u> Did not visit site
23	Clay	Blue Island, 127th and Grand Trunk Railroad. Portions of pit within the corporate limits of Blue Island, other portions are adjacent to the corporate boundary (Cook County)	Clay within the glacial till. Underlying bed-rock is Silurian-age dolomites.	Relatively flat area. No surface water problems apparent. Some standing water in portions of the pit, probably surface water.	Probably a shallow ground-water table in the area. Underlying Silurian dolomites are developed as domestic and municipal ground-water supplies.	Active.	Clay.	Area surrounded by industrial and/or residential areas.	Illinois Brick Co. 228 N. LaSalle St. Chicago, IL 60601 <u>COMMENTS:</u> Did not visit site

KERR-McGEE — WEST CHICAGO WASTES
ALTERNATIVE SITE DATA

COAL STRIP MINES

No.	Mine Type	Location Area	Geology	Topography/Surface Hydrology	Ground-Water Hydrology	Present Condition	Mineral Resources	Land-use Resources	Ownership
1	Coal Strip Mine	Ottawa--Junction of Highway 71 North and 6 West (LaSalle County)	Pennsylvanian; Carbondale formation.	Relatively flat area broken by spoil piles. The strip area is full of water, probably both ground water and surface water. Mine is approximately 1/8 mile north of Illinois River and is in its flood plain.	Strip area probably intercepts the shallow ground-water table in the area, resulting in a small lake.	Abandoned. Revegetated brushwood and small trees.	Coal. Reserves in the area.	Recreational areas--fishing, hunting, water sports. Edge of Ottawa Strip area surrounded by farm and grazing land. A few residential and farm homes in area.	Private <u>VISITED:</u> 12/17/79--BJS 3/19/80--WJG & BJS
2	Coal Strip Mine	Approximately 5 miles north of Coal City (Grundy County)	Pennsylvanian, Spoon formation.	Strip mine area. Most of the stripped areas are now full of water. No river in general area. Illinois and Kankakee Rivers approximately 3 to 5 miles north and east, respectively. Relatively flat area broken by large spoil piles giving area a hilly appearance.	Stripping activities probably intercepted the ground-water table creating many of the lakes now seen	Abandoned. Extensive spoil piles in area. Revegetated with brushwood and small trees.	Coal. Reserves in the area.	Area is now a private club that offers hunting, fishing, and recreational sports. Farm and grazing land surround the area. Several residents in area along with several farm homes.	Private <u>VISITED:</u> 12/17/79--BJS 3/19/80--WJG & BJS

KERR-McGEE — WEST CHICAGO WASTES
ALTERNATIVE SITE DATA

COAL STRIP MINES

No.	Mine Type	Location Area	Geology	Topography/Surface Hydrology	Ground-Water Hydrology	Present Condition	Mineral Resources	Land-use Resources	Ownership
3	Coal Strip Mine	2 to 4 miles west of Essex (Kankakee County)	Pennsylvanian overlain by glacial gravel clay and silt	Relatively flat area broken by spoil piles. Non-mined area farm land. Strip area is winrowed with intervening lakes and ponds. Surface water flows into the area. Locals indicate ponds are spring fed.	Strip area probably intercepts shallow ground-water table in area. Lake levels remain constant.	Abandoned. Partly revegetated with grass and brush.	Coal reserves in area.	Recreational area--hunting and water sports The areas of strip mining are being developed by private recreational clubs.	Private. VISITED: 6/07/79--DMS
4	Coal Strip Mine	East of Braidwood and bisected by highway 53 and 129. (Will County)	Pennsylvanian overlain by glacial gravel clay and silt.	Relatively flat farm and grazing land. Strip area covers about 4 square miles characterized by spoil piles interspersed with ponds.	Strip area probably intercepts shallow ground-water table in area. Lake levels remain constant.	Revegetated small with grass and brushwood.	Coal reserves in area.	Strip area now private recreational clubs. Town of Braidwood is west of spoil area.	Private. VISITED: 7/10/79--DMS 3/19/80--WJG & BJS
5	Coal Strip Mine	4 miles south of Elmwood (Peoria County)	Pennsylvanian, Modesto or Carbondale formation	Relatively flat area. All abandoned pits are ponded. Active pits are being pumped. Not near a major stream.	Pits are excavated to below the ground-water table. Pennsylvanian shales, sandstones, and limestone yield only small quantities of water. Underlying Keokak-Burlington limestone fair to good aquifer. Glacial till is a fair to poor aquifer in the area.	Many abandoned pits, some active.	Coal.	Surrounded by Farm land.	Private. VISITED: 4/02/80--WJG