REGIONAL COPPER-NICKEL STUDY

HEALTH CARE FACILITIES IN NORTHEAST MINNESOTA

Minnesota Environmental Quality Board
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ABSTRACT

Northeast Minnesota has 20 hospitals, including four in the East Range study area. These hospitals range in size from 14 to 546 licensed beds. Compared to federal recommended guidelines, the hospitals of this region are not being utilized to capacity.

The northeast region has almost 3,000 licensed long-term beds in convalescent and nursing care units and nursing homes combined, and over 300 licensed boarding care beds. Occupancy rates for these beds average over 95 percent, which is higher than the state average. Relative to the population over 65, northeast Minnesota has over 20 percent fewer beds than the state average.

Twenty-three supervised living facilities, which provide care for the mentally retarded, chemically dependent, adult mentally ill, or physically handicapped, are located in the northeast region and have 295 licensed beds.

Emergency medical services appear to be sufficient to meet federal guidelines; however, a new mining industry could place a severe burden on these facilities from time to time if prior arrangements are not made for additional trained manpower and emergency facilities.

Long-term care facilities, which are currently filled to capacity, would probably not be immediately affected by a population influx due to copper-nickel development since virtually all of the immigrants would be under 65. Delayed effects might show up sometime in the future.

Promixity of industrial development to health facilities should be considered because the population in health facilities are more susceptible to environmental pollutants than the general population.

INTRODUCTION TO THE REGIONAL COPPER-NICKEL STUDY

The Regional Copper-Nickel Environmental Impact Study is a comprehensive examination of the potential cumulative environmental, social, and economic impacts of copper-nickel mineral development in northeastern Minnesota. This study is being conducted for the Minnesota Legislature and state Executive Branch agencies, under the direction of the Minnesota Environmental Quality Board (MEQB) and with the funding, review, and concurrence of the Legislative Commission on Minnesota Resources.

A region along the surface contact of the Duluth Complex in St. Louis and Lake counties in northeastern Minnesota contains a major domestic resource of copper-nickel sulfide mineralization. This region has been explored by several mineral resource development companies for more than twenty years, and recently two firms, AMAX and International Nickel Company, have considered commercial operations. These exploration and mine planning activities indicate the potential establishment of a new mining and processing industry in Minnesota. In addition, these activities indicate the need for a comprehensive environmental, social, and economic analysis by the state in order to consider the cumulative regional implications of this new industry and to provide adequate information for future state policy review and development. In January, 1976, the MEQB organized and initiated the Regional Copper-Nickel Study.

The major objectives of the Regional Copper-Nickel Study are: 1) to characterize the region in its pre-copper-nickel development state; 2) to identify and describe the probable technologies which may be used to exploit the mineral resource and to convert it into salable commodities; 3) to identify and assess the impacts of primary copper-nickel development and secondary regional growth; 4) to conceptualize alternative degrees of regional copper-nickel development; and 5) to assess the cumulative environmental, social, and economic impacts of such hypothetical developments. The Regional Study is a scientific information gathering and analysis effort and will not present subjective social judgements on whether, where, when, or how copper-nickel development should or should not proceed. In addition, the Study will not make or propose state policy pertaining to copper-nickel development.

The Minnesota Environmental Quality Board is a state agency responsible for the implementation of the Minnesota Environmental Policy Act and promotes cooperation between state agencies on environmental matters. The Regional Copper-Nickel Study is an ad hoc effort of the MEQB and future regulatory and site specific environmental impact studies will most likely be the responsibility of the Minnesota Department of Natural Resources and the Minnesota Pollution Control Agency.

INTRODUCTION

One component needed for assessing potential impacts on public health is an understanding of the health facilities within the region. This understanding includes the location, services provided, and available resources of health care facilities. This paper will present information for hospitals, convalescent and nursing care units, nursing homes, boarding care homes, and supervised-living facilities in northeast Minnesota. Adequacy of existing services and the ability of the region to cope with expected changes in population and needs of the population will be discussed.

EXISTING FACILITIES

The information in this section is based upon data supplied by the Minnesota Department of Health (1977) for the year ending October 30, 1976.

Hospitals*

There were 20 hospitals in the seven-county area of northeast Minnesota in 1976. Ten of these were in St. Louis County and four hospitals were located within the East Range study area (Figure 1). These hospitals ranged in size from 14 licensed beds in Cook to 546 licensed beds at St. Luke's hospital in Duluth (Table 1). Of the regional total of 1,991 licensed beds, St. Louis County had 1,540 (77 percent) and the East Range

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* See Appendix for legal definition of a hospital.

study area had 250 (13 percent). Utilization of hospital services can be estimated by bed occupancy data. "Bed occupancy" measures the proportion of time beds are in use to the total possible time the beds could be used and, hence, ranges from 0 to 100 percent. In northeast Minnesota, bed occupancy ranged from 22 percent in Bigfork to 77 percent at St. Mary's hospital in Duluth. Both the East Range study area and the northeast region as a whole had bed occupancies slightly below the state average of 64.4 percent (Table 1). Some of the services provided by the hospitals are indicated in Table 2. In general, the larger hospitals provide a wider range of services than the smaller ones. Within the East Range study area, the hospitals in Virginia and Ely provide the widest range of services. Other statistics relating to volume of services provided--average length of stay, number of operations, and emergency department visits--are presented in Table 1.

Long-term Care: Complete Services

Long-term care facilities with complete services are licensed by the Minnesota Department of Health and include convalescent and nursing care units* and nursing homes*. Convalescent and nursing care (C&NC) units are essentially hospital nursing home units where a direct physical connection between the unit and the hospital provides services without going outside the building involved. Fourteen hospitals in the northeast region, of which four are in the East Range study area, have convalescent and nursing care units (Figure 2). Statistics about the number of beds

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* See Appendix for legal definitions of C&NC units and nursing homes.

and percent occupancy are shown in Table 3. Of the 796 beds in the region, 289 are in the East Range study area. These units appear to be used at near capacity levels (95 percent for northeast Minnesota) and above the state average occupancy level of 91 percent.

Nursing homes provide services similar to the convalescent and nursing care units, with the exception that nursing homes have no physical link with hospitals. Nineteen licensed nursing homes are located in the northeast region, of which two are in the East Range study area (Figure 3). These nursing homes have 2,187 and 174 beds in the northeast region and the East Range study area, respectively (Table 3). Like the convalescent and nursing care units, nursing homes in northeast Minnesota have very high bed occupancy rates (average of 97.5 percent), which again are higher than the state average of 94 percent.

Based upon population estimates from the State Demographer (State Planning Agency, 1975), the numbers of long-term complete care beds per 1,000 population 65 and over have been calculated (Table 3). These figures range from 37 to 90 beds per 1,000 65 and over compared to the state rate of 90; population data were not available to calculate a comparable figure for the East Range study area. Average length of stay ranged from 46 to 596 days for convalescent and nursing care units and from 65 to 3,026 days for nursing homes (data not shown; Minnesota Department of Health, 1977).

Long-term Care: Partial Services

Long-term care facilities with partial services and licensed by the Minnesota Department of Health include boarding care homes* and supervised-

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* See Appendix for legal definition of boarding care homes.

living facilites*. Boarding care homes provide room, board, and some other services, but do not provide skilled nursing care. Supervised-living facilities provide services similar to boarding care homes; however, while boarding care homes provide care for the aged or infirm, supervised-living facilities provide care for the mentally retarded, chemically dependent, adult mentally ill, or physically handicapped.

There are seven licensed boarding care homes in the northeast region, one of which is in the East Range study area (Figure 4). Together these facilities account for 313 licensed beds, 26 of which are in Aurora on the East Range (Table 4). Bed occupancy rates are, with the exception of Aitkin County, very high and above the state average (Table 4). Average length of stay ranged from 161 to 949 days.

Twenty-three supervised-living facilities are located in the northeast region, and three of these are located in the East Range (Figure 5). These facilities contain 295 and 66 licensed beds in the northeast region and East Range area, respectively.

As a whole, the northeast region has an average of 7.5 licensed boarding care beds per 1,000 population 65 and over, ranging from none in Cook and Koochiching counties to 29.6 in Lake County (Table 4). The regional average of 7.5 licensed beds per 1,000 population 65 and over is well below the state average of 16.9.

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* See Appendix for legal definition of supervised-living facilities.

Emergency Medical Services

Emergency medical services have developed to help victims of accidents or sudden illnesses survive and recover from emergencies by providing them with the necessary treatment in as short a time as possible (Public Technology, 1977). Two federal guidelines have been issued by the Department of Health, Education and Welfare: first, that at least 95 percent of the calls for emergency medical assistance should be answered within ten minutes in urban areas and 30 minutes in rural areas; and second, there should be at least one emergency department (not necessarily in a hospital) within 60 minutes' travel time of emergency scene for at least 95 percent of the cases (Public Technology, 1977). Thus, an efficient emergency medical services system contains two components: the ability to rapidly respond to emergency, and facilities for treating victims.

Information concerning ambulance services was collected from telephone directories for Carlton, Cook, Lake, and St. Louis counties. In these four counties there are three major categories of providers of ambulance services. First is provision by the private sector, which occurs in Duluth (three companies) and Nashwauk. Second, some hospitals provide services as is the case in Aurora, Ely, Grand Marais, Moose Lake, and Two Harbors. Third, municipalities provide services usually through police or fire departments, and this occurs in Babbitt, Buhl, Carlton, Chisholm, Cloquet, Cook, Eveleth, Hibbing, Hoyt Lakes, Tower, and Virginia. In addition, air ambulances operate out of Ely and Eveleth.

Hospitals with emergency rooms are well distributed with regard to population throughout the seven counties of northeast Minnesota (Figure 1). In the year ending October 30, 1976, these hospitals had a total of over 107,000 emergency room visits, including 14,000 visits to hospitals in the East Range study area (Table 1). In addition to these hospitals, there are clinics in Babbitt and Hoyt Lakes which handle many emergencies.

Although hard data are not available, it would appear from the distribution of hospitals and clinics, and the provision of ambulance services, that both the seven-county region and the East Range study area have emergency medical services resources sufficient to meet the federal guidelines.

An adequate supply of trained personnel are needed for both initial response and for administering care at the emergency treatment facility. Conversations with Wayne Johnson, Minnesota Department of Health's Northeastern District representative in Duluth for Emergency Medical Services, elicited the opinions that outside of Duluth, ambulance personnel do not have adequate training, and that emergency staff at existing hospitals and clinics are barely adequate for existing needs. A new mining industry, such as copper-nickel, could place a severe burden on existing emergency services from time to time because of the hazardous nature of the minerals industry, especially underground mining.

DISCUSSION

Both the northeast region of Minnesota and the East Range study area contain a number of health facilities (summarized in Figure 6), which provide

a wide variety of services. Although the widest range of hospital services are available in Duluth, the East Range area appears to be well equipped to handle the majority of the health care needs of its local population. Using bed occupancy rates as a guide of hospital usage, both the East Range (63.8 percent) and the entire northeast region (63.4 percent) hospitals are well below the minimum level of 80 percent occupancy recommended by the Department of Health, Education and Welfare (Minneapolis Tribune, 1977). When the number of beds per 1,000 population is used as an indicator of hospital capacity, the northeast region (6.0) is well above the Department of Health, Education and Welfare recommended level of 4.0 (Minneapolis Tribune, 1977); however, this excess can be attributed predominantly to Duluth. A 1977 survey found 48,700 people living in the East Range (Donaldson, Regional Copper-Nickel Study) giving a crude estimate of slightly more than five hospital beds per 1,000 population (260 beds divided by 48,700 population). It should be noted that some of the hospitals serve areas outside the East Range study area.

Long-term facilities show slightly different trends. While many of these facilities are concentrated in Duluth, a substantial number are dispersed throughout the East Range study area and the northeast region in general. These facilities appear to be utilized to near-capacity, suggesting a possible existing need for additional units. Relating long-term care beds to population, the seven-county region has fewer beds (nursing home, C&NC, and boarding care) per 1,000 population 65 and over than the state, which also suggests a possible shortage.

In evaluating potential impacts on human health of copper-nickel development, the proximity of these health facilities to the proposed activity may be important. Occupants of these facilites tend to be much more susceptible to environmental pollutants than the general population--their body defenses are weaker, they are more likely to have chronic lung diseases or heart diseases which may be aggravated by environmental pollutants (Waldbott, 1973), and they have less mobility (Kasl, 1977).

Emergency services appear to be adequate for existing needs. A new mining industry, such as copper-nickel, could place a severe burden on existing emergency services from time to time because of the hazardous nature of the minerals industry, especially underground mining. A new industry should make provisions for emergency facilities and manpower to be adequately prepared for accidents. It would be best if such services were established at the work site; however, other arrangements could be satisfactory.

Northeast Minnesota and the East Range study area appear to have sufficient hospital facilities to accommodate the needs of more people than are currently served. Based upon the proposed federal guidelines, ten thousand additional people could be handled by existing hospitals. The possible shortage of long-term care facilities, discussed above, would probably not be affected much in the short term by a population influx because mobile populations tend to be younger and healthier. Delayed effects of the population influx might show up sometime in the future as the population ages and would have to be dealt with.

TABLE 1

SELECTED STATISTICS ABOUT HOSPITAL CAPACITY AND USAGE FOR THE YEAR ENDING OCTOBER 30, 1976

County	Location	Licensed Bed Capacity	Bed Occupancy Level (Percent)		County Bed Occupancy Level		Licensed Beds Per 1,000 Population**	Average Length of Stay (Days)	Number of Operations	Emergency Department Visits
Aitkin	Aitkin	38	66		66		3.1	6.8	399	11,337
Carlton	Cloquet	77	60	}	61	}	4.1	5.2	816	9,465
	Moose Lake	41	64					5.7	161	2,207
Cook	Grand Marais	16	47		47		4.6	3.9	105	1,537
Itasca	Bigfork	20	22	}	62	}	4.3	N/A***	24	501
	Deer River	20	61					5.5	197	1,215
	Grand Rapids	116	69					6.3	1,984	9,600
Koochiching	International Falls	64	61	}	63	}	4.9	5.5	817	4,020
	Little Fork	22	70					6.0	348	671
Lake	Two Harbors	37	50		50		2.7	6.3	587	1,825
St. Louis	Aurora	16	44	}	64	}	7.0	4.8	131	1,558
	Chisholm	30	45					6.5	362	1,500
	Cook	14	37					7.2	-	847
	Duluth	118	50					7.9	2,780	-
	Duluth	546	60					7.8	24,441	23,204
	Duluth	396	77					7.6	9,892	21,369
	Ely	45	66					5.8	331	4,120
	Eveleth	26	24					7.0	287	205
	Hibbing	176	63					5.7	2,478	3,501
	Virginia	173	71					5.7	4,178	8,122
Total - NE Minnesota		1,991	63.4		-		6.0	-	50,318	107,074
Total - East Range*		260	63.8		-		-	-	4,927	14,005
Total - Minnesota		19,322	64.4		-		4.9	6.7	-	-

*Includes Aurora, Ely, Eveleth, and Virginia

***Not Available

** Based upon 1975 estimates (State Planning Agency, 1975)

SOURCE: Minnesota Department of Health (1977).

TABLE 2

SELECTED SERVICES PROVIDED BY HOSPITALS 1976

County	Location	Histopathology Laboratory	Dental Services	Pharmacy with Registered Pharmacist	Occupational Therapy Department	Physical Therapy Department	Premature Nursery	Emergency Department	Psychiatric Inpatient Unit	Postoperative Recovery Room	Social Work Department	X-Ray Therapy	Blood Bank	Home Care Department	Alcoholic and Detoxification Unit	Hospital Auxiliary	Medical Rehabilitation Inpatient Unit
Aitkin	Aitkin			x		x		x				x					
Carlton	Cloquet	x	x	x	x	x	x	x		x	x		x			x	
	Moose Lake		x	x	x	x		x		x						x	
Cook	Grand Marais		x	x				x				x				x	
Itasca	Bigfork					x		x								x	
	Deer River					x		x								x	
	Grand Rapids	x	x	x		x	x	x		x	x		x			x	
Koochiching	International Falls			x		x		x		x			x			x	
	Little Fork			x	x	x		x				x	x			x	
Lake	Two Harbors			x		x		x		x			x			x	
St. Louis	Aurora	x		x		x		x					x			x	
	Chisholm	x		x				x		x			x			x	
	Cook			x		x		x								x	
	Duluth (Miller/Dwan)	x	x	x	x	x			x	x	x	x	x		x	x	x
	Duluth (St. Luke's)		x	x	x	x	x	x	x	x	x	x	x			x	x
	Duluth (St. Mary's)	x	x	x	x	x	x	x	x	x	x	x	x		x	x	x
	Ely	x	x	x	x	x		x		x	x		x			x	
	Eveleth			x				x		x			x			x	
	Hibbing	x		x	x	x		x	x	x	x		x		x	x	x
	Virginia	x	x	x	x	x	x	x		x	x	x	x			x	
Totals		9	9	18	9	17	5	19	4	13	8	6	15	0	3	19	4
Total - East Range*		3	2	4	2	3	1	4	0	3	2	1	4	0	0	4	0

*Includes Aurora, Ely, Eveleth, and Virginia

SOURCE: Minnesota Department of Health (1977)

Table 3

NUMBERS OF BEDS AND OCCUPANCY RATES FOR CONVALESCENT AND NURSING CARE UNITS AND NURSING HOMES, YEAR ENDING OCTOBER 30, 1976

County	Licensed C&NC Beds	Percent Occupancy	Licensed Nursing Home Beds	Percent Occupancy	Total Beds Per 1,000 Population 65 and Over*
Aitkin	48	97	66	99	43
Carlton	142	99	95	99	70
Cook	46	82	-	-	90
Itasca	140	90	186	93	70
Koochiching	40	93	118	95	82
ke	50	100	-	-	37
St. Louis	330	97	1,722	98	75
East Range	289	97	174	98	NA
Total - NE Minnesota	796	95	2,187	97.5	72
Total-Minnesota	4,520	91	34,374	94	90

N/A = Not Available

*Based upon 1975 estimates (State Planning Agency, 1975)

SOURCE: Minnesota Department of Health (1977)

Table 4

NUMBERS OF BEDS AND OCCUPANCY RATES FOR BOARDING CARE HOMES AND SUPERVISED LIVING FACILITIES. YEAR ENDING OCTOBER 30, 1976

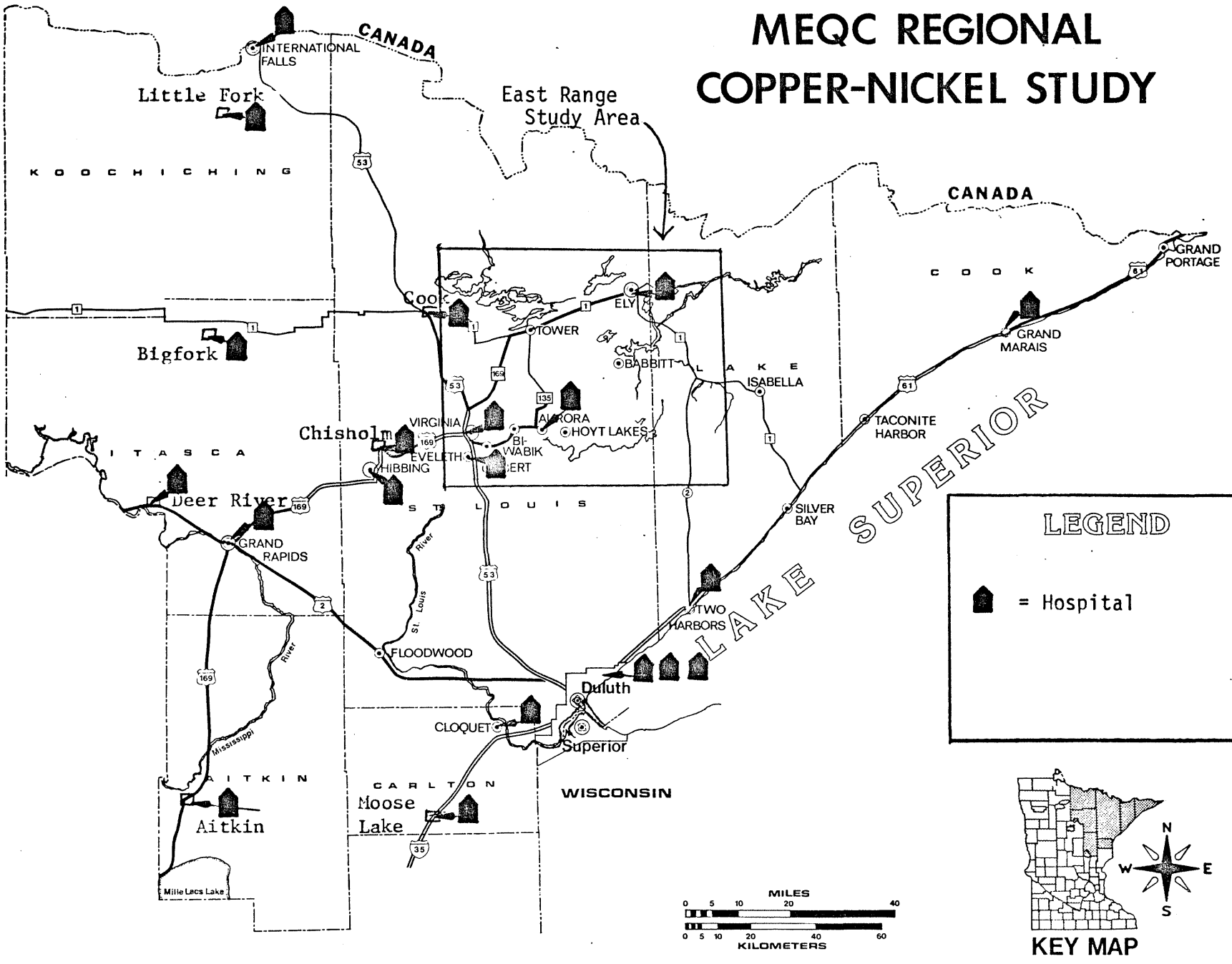
County	Licensed Boarding Care Beds	Percent Occupancy	Boarding Care Beds Per 1,000 Population 65 and Over*	Licensed Supervised Living Facility Beds
Aitkin	6	55	2.3	-
Carlton	50	94	14.8	12
Cook	-	-	-	-
Itasca	58	98	12.5	33
Koochiching	-	-	-	-
Lake	40	92	29.6	-
St. Louis	159	96	5.8	250
-East Range	26	99	N.A.	66
Total- NE Minnesota	313	95	7.5	295
Total- Minnesota	7,279	85	16.9	6,549

N/A = Not Available

*Based upon 1975 estimates (State Planning Agency, 1975)

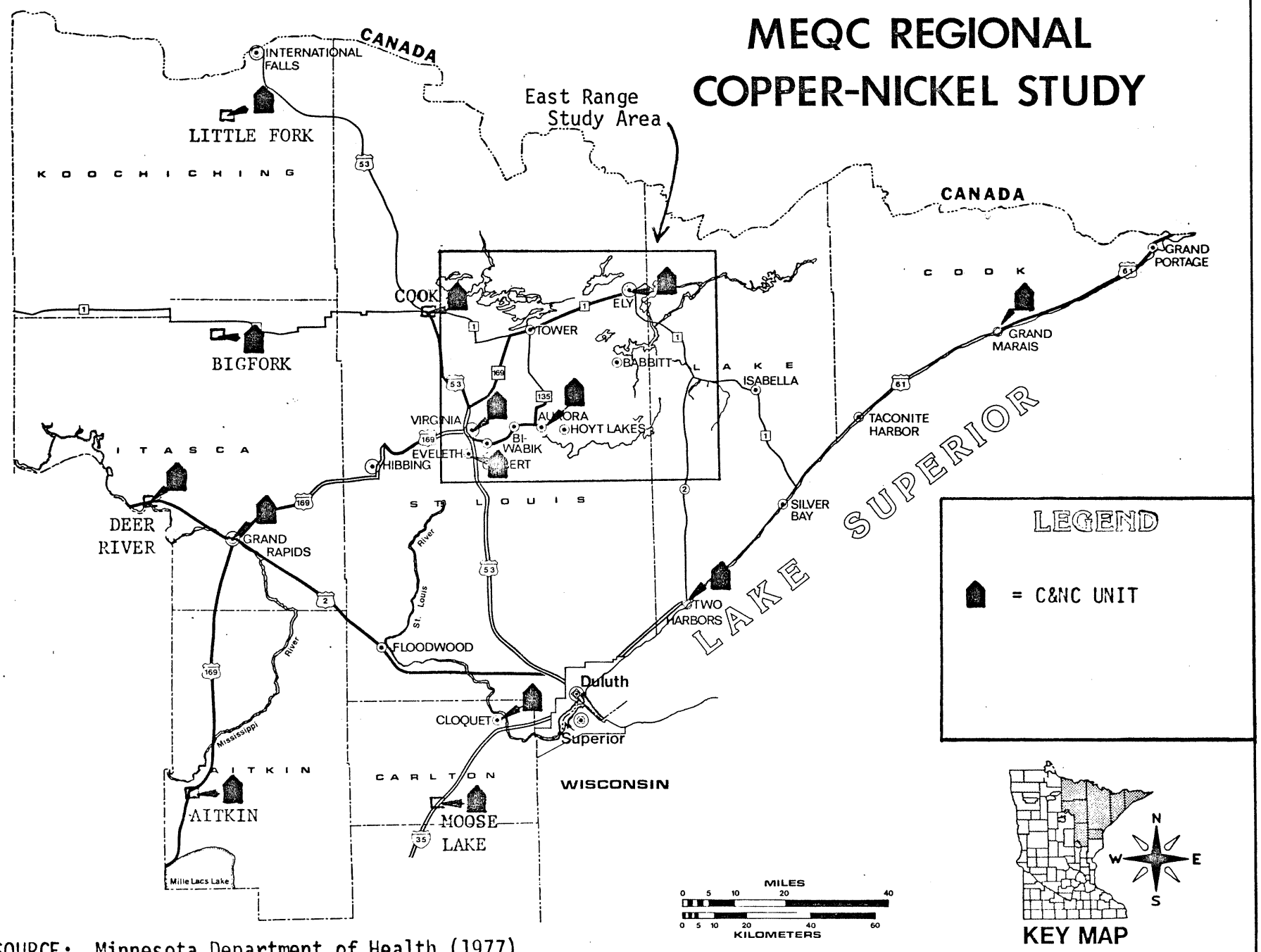
SOURCE: Minnesota Department of Health (1977)

Figure 1. Hospitals in Northeastern Minnesota



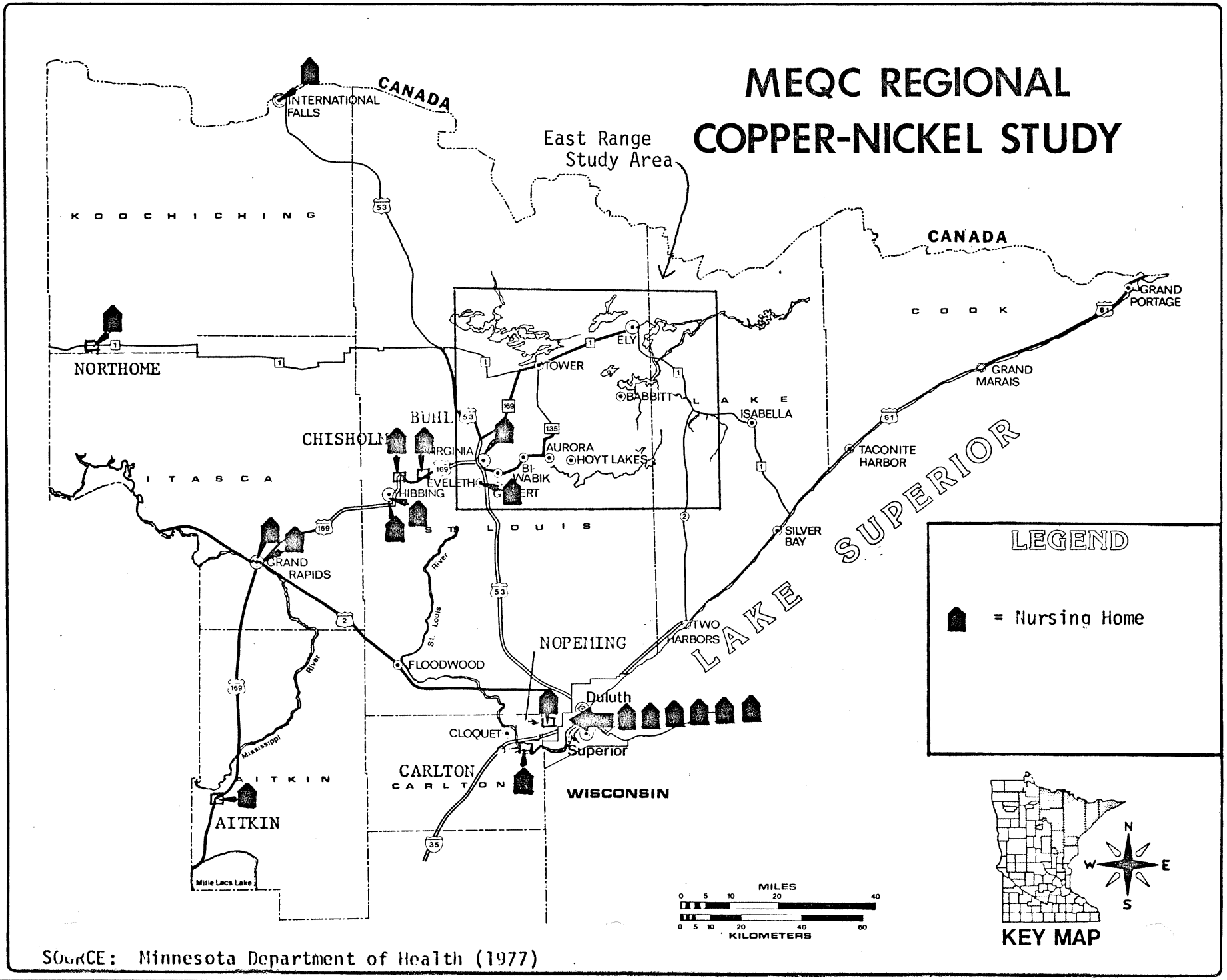
SOURCE: Minnesota Department of Health (1977)

Figure 2. Convalescent and Nursing Care Units in Northeastern Minnesota



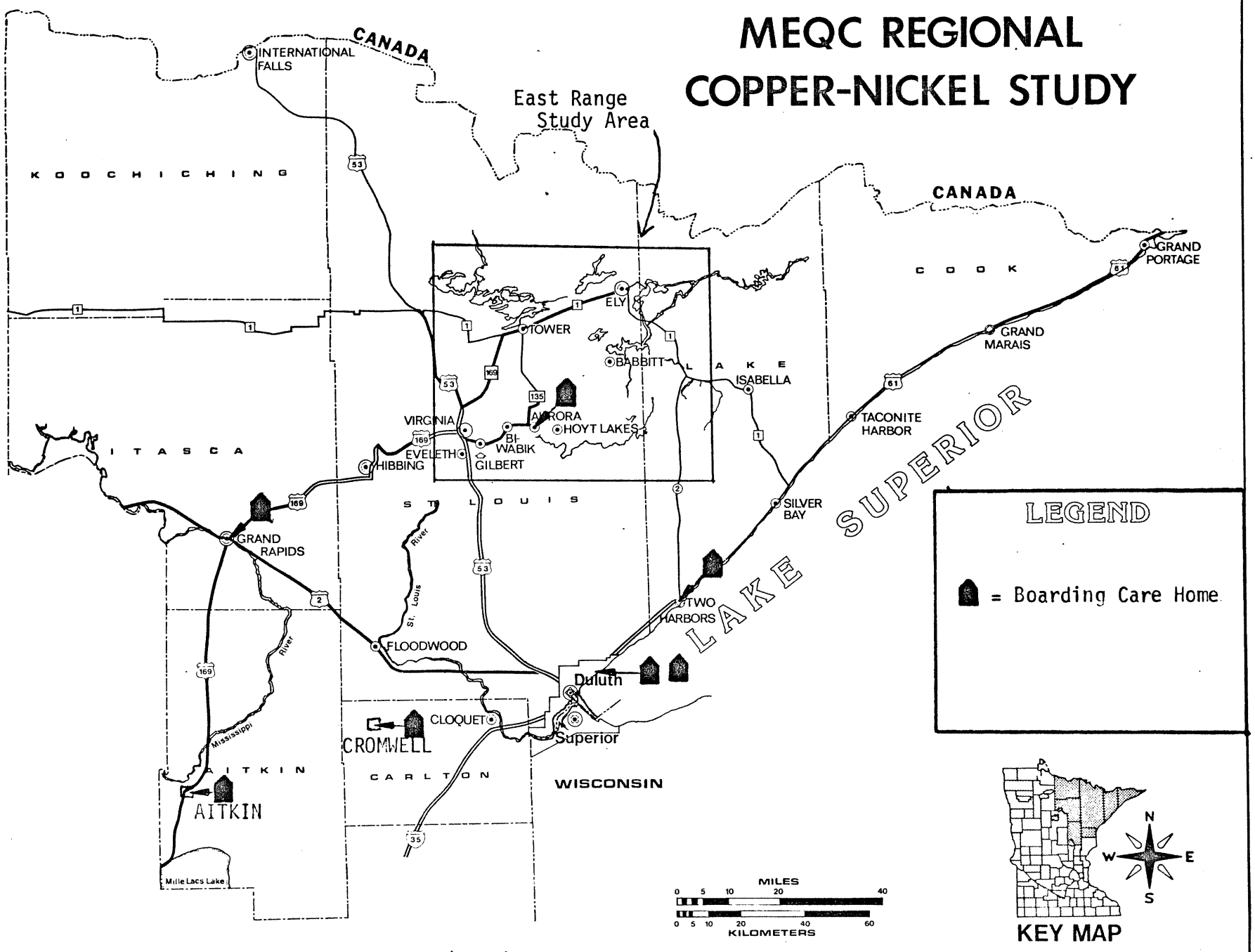
SOURCE: Minnesota Department of Health (1977).

Figure 3. Nursing Homes in Northeastern Minnesota



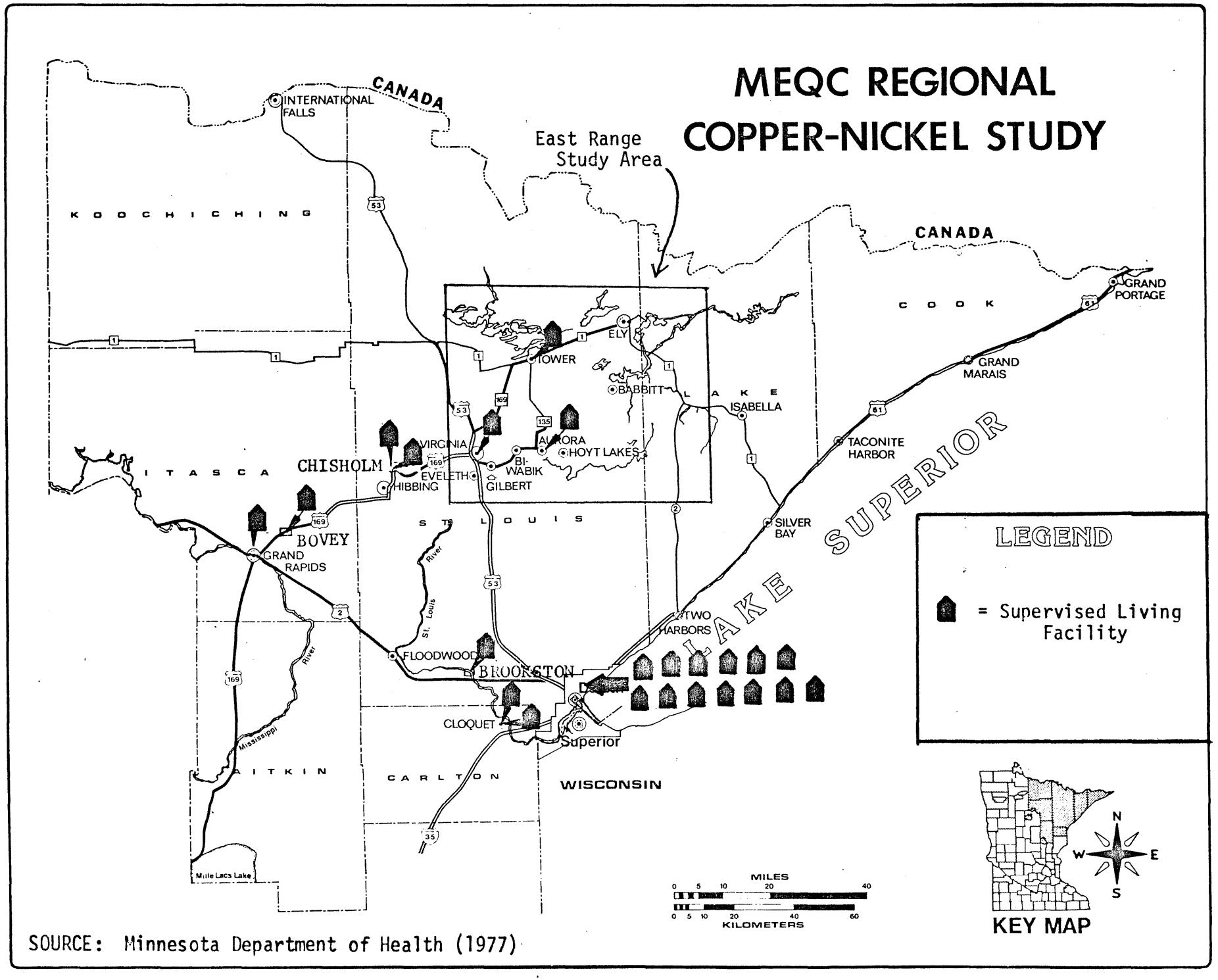
SOURCE: Minnesota Department of Health (1977)

Figure 4. Boarding Care Homes in Northeastern Minnesota



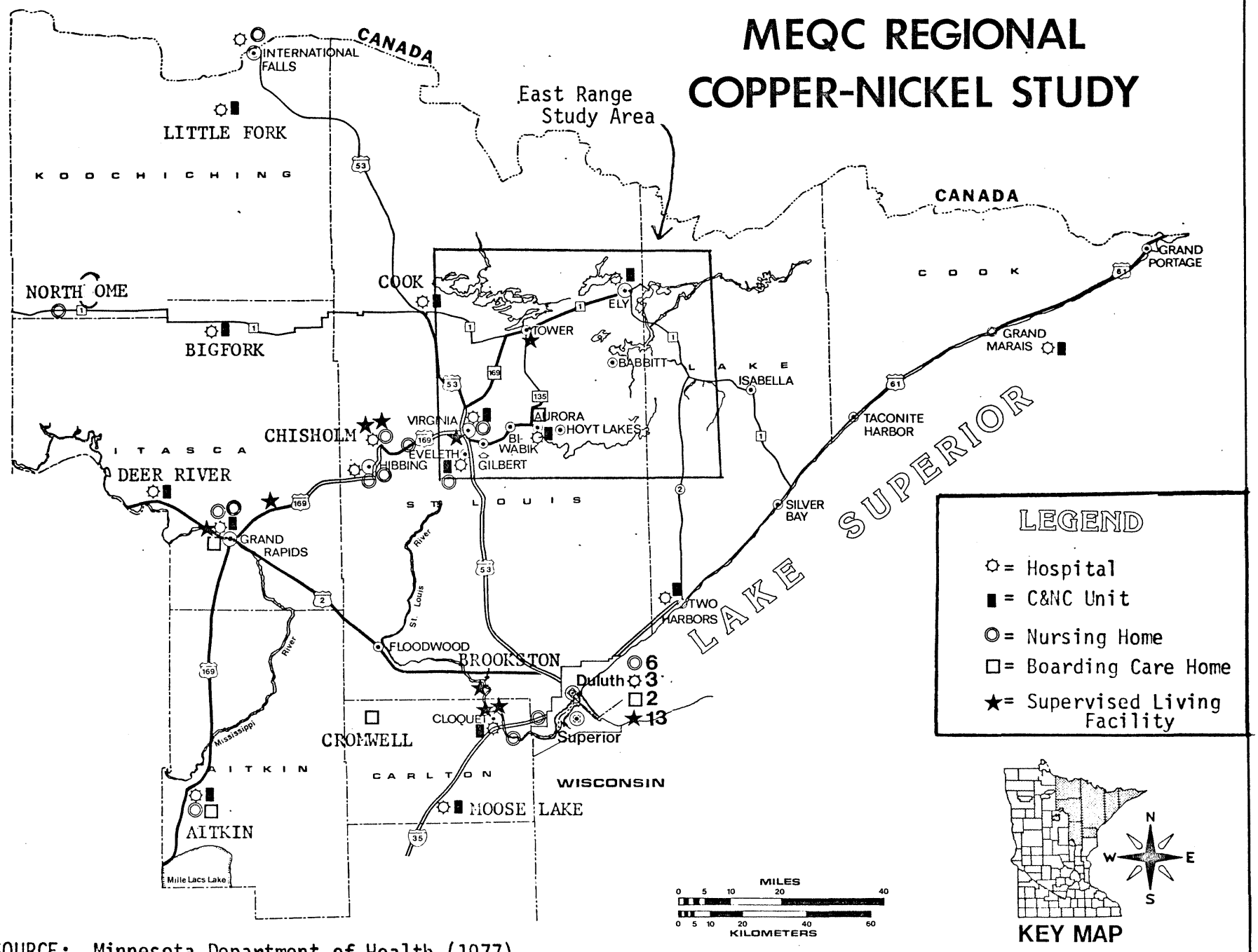
SOURCE: Minnesota Department of Health (1977)

Figure 5. Supervised Living Facilities in Northeastern Minnesota



SOURCE: Minnesota Department of Health (1977)

Figure 6. Health Care Facilities in Northeastern Minnesota



SOURCE: Minnesota Department of Health (1977)

REFERENCES

Cole, R., W. R. Miller and J. Simmons. 1969. Profile of Regional Health Variables: Planning Area B. Northlands Regional Medical Program, Inc., St. Paul.

Kasl, S. V. 1977. The Effects of the Residential Environment on Health and Behavior: A Review. In: L. E. Hinkle and W. C. Loring (editors). The Effect of the Man-Made Environment on Health and Behavior, DHEW Publication No. (CDC) 77-8318. U. S. Government Printing Office, Washington, D.C. p. 90.

Minneapolis Tribune. 1977. Plans Offered on Cutting Unneeded Hospital Beds. September 27, 1977.

Minnesota Department of Health. 1977. Data Supplied by the Records and Information Unit, Division of Health Facilities, Minnesota Department of Health.

Public Technology. 1977. Emergency Medical Services: A Technical Guide for State and Local Governments (First Draft). Public Technology, Inc., Washington, D. C.

State Planning Agency. 1975. Minnesota Population Projections 1970-2000. Office of the State Demographer. Minnesota State Planning Agency.

Waldbott, G. L. 1973. Health Effects of Environmental Pollutants. C. V. Mosby. St. Louis. pp. 58-59.

APPENDIX - DEFINITIONS OF FACILIITES

The following Minnesota Department of Health rules and regulations provide legal definitions of the health facilities described in this document:

MHD 75 (a)(1) Hospital. A "hospital" is an institution adequately and properly staffed and equipped; providing services, facilities and beds for the reception and care for a continuous period longer than 14 hours for one or more non-related persons requiring diagnosis, treatment or care for illness, injury or pregnancy; and regularly making available clinical laboratory services, diagnostic x-ray services, and treatment facilities for (a) surgery or (b) obstetrical care or (c) other definitive medical treatment* of similar extent. The following are not "hospitals" within the meaning of these regulations: diagnostic or treatment centers, physicians' offices or clinics, and facilities for the foster care of children licensed by the Commissioner of Welfare.

MHD 44 (a) A "nursing home" shall mean a licensed facility or unit used to provide care for aged or infirm persons who require nursing care and related services in accordance with these regulations. A nursing home license is required for the facility if any of the persons therein need or receive nursing care. Examples of nursing care: bedside care, including administration of medications,

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* Definitive medical treatment may include psychiatric care, physical medicine and rehabilitation x-ray therapy and similar specialized treatment.

irrigations and catheterizations, applications of dressings or bandages; rehabilitative nursing techniques; and other treatments prescribed by a physician which require technical knowledge, skill and judgment as possessed by a registered nurse. In addition, the dietary, social, spiritual, educational, and recreational needs of these patients shall be fulfilled. The director of the nursing service shall be a registered nurse employed 40 hours per week during the day shift. In addition, a registered nurse or licensed practical nurse shall be employed so that on-site nursing coverage is provided eight hours per day, seven days a week during the day shift. Provision shall also be made for a registered nurse to be ON CALL during all hours when a registered nurse is not on duty.

MHD 44 (b) A "convalescent and nursing care (C&NC) unit" is a nursing home unit operated in conjunction with a hospital where there is a direct physical connection between such unit and the hospital, which permits the movement of patients and the provision of services without going outside the building or buildings involved. Such units are subject to these regulations.

MHD 44 (c) A "boarding care home" shall mean a licensed facility or unit used to provide care for aged or infirm persons who require only personal or custodial care and related services in accordance with these regulations. A boarding care home license is required if the persons need or receive personal or custodial care only. Nursing services are not required. Examples of personal or custodial care: board, room, laundry and person services; supervision

over medications which can be safely self-administered; plus a program of activities and supervision required by persons who are not capable of properly caring for themselves.

MHD 391 (a) "Supervised-living facility" means a facility in which there is provided supervision, lodging, meals and in accordance with provisions of Rules of the Department of Public Welfare, counseling and developmental habilitative or rehabilitative services to five or more persons who are mentally retarded, chemically dependent, adult mentally ill, or physically handicapped.