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CACHE
LOCATION
EVALUATION

by

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Cache Location Evaluation

OBJECTIVE:

Collect information on the following cities to determine where the most efficient and cost effective location would be for the Northeast Interagency Fire Cache to meet its mission. The cities to be studied are: Ely, MN; Duluth, MN; Grand Rapids, MN; and Rhinelanders, WI. The Kepner-Tregoe Decision Analysis or like system will be utilized. Each decision factor will be evaluated for each city and given a score. A weighted score will be developed by multiplying the weight, times the score. The data will be placed on a K-T Decision Analyst's Form with background data recorded as reference.

Any location must:

1. Have adequate warehouse space (25,000-30,000 sq. ft.) which would include unheated storage, heated storage and a pump repair shop.
2. Have adequate outside space for employee parking, vehicle storage, hose washing facilities and an area for loading trucks.

Decision Factors (wants):

1. Warehouse/Work Space Weight 10
Space must be at a reasonable price range, within a one hour drive of an airport capable of handling a C-130. It would be advantageous to have the cache located at an airport.
2. Reliable Utilities Weight 10
Must have a good power supply and good quality phone service, which is needed to operate cache equipment and computer systems. Power outages must be kept to a minimum.
3. Travel Distance and Time Weight 9
The cache should be located near the area of most use. Each city should be rated relative to the time it takes to deliver supplies to the bulk of the users.
4. Computer Support Services Weight 8
A main component of the NFES cache system is the "Computer Inventory System" (CIS), which provides programs for inventory, shipping, ordering, billing and exchange of information. All eleven NFES caches must have and use the CIS system.
Security and management of the presently used Forest Service Data General computer must be managed by a Forest Service computer specialist. Service to the cache should be within one hour.
5. Reliable/Available Help Weight 8
A work force is needed to operate the cache. The work force varies daily and ranges from 2-10 people per shift. This work force works at stocking shelves, loading trucks, washing hose, delivering supplies, etc. Some of the work is scheduled and a lot is of the work is emergency in nature, with a response time of within an hour.

6. Agency Administrative Unit Weight 7
 It was determined the Forest Service should be responsible for the cache. The cache should be located where administrative support could be provided by a District Office, Supervisor's Office, Regional Office or research unit. It is felt the best support would be given by an agency involved with fire protection responsibilities. This needs to be a strong commitment, since it involves a lot of people including contracting, budget, finance, personnel, etc.
7. Ground Transportation Weight 6
 The cache should be located where there is good access to a highway network to serve users, based on past and projected use.
8. Rental Trucks Weight 6
 Rental trucks (U-Haul and Ryder) are used extensively to move supplies. Some of these trucks are rented on a long term basis and many are rented under emergency conditions for short time periods. As many as 10-15 trucks have been used at one time. Two trucks are used for each project fire to move a 100 person camp and a mobile cache van.
9. Commercial Truck Freight Weight 5
 Commercial trucks are used to move equipment long distances and at some times, shorter distances. In the past, trips have consisted of trips to Idaho, Kentucky, Michigan, etc. The commercial service should be fairly accessible.
10. Parking and Loading Weight 5
 Parking space must be available for cache vehicles, rental vehicles and employee vehicles. Space must be available for loading vehicles with a forklift and direct loading from a platform.
11. Commercial Air Freight Weight 4
 Each year a number of shipments are received and sent by air freight. The cache should be located within one hour of the air freight facilities. The number of available flights each day at an airport has some bearing on its service to users.
12. Support to Mobilization Center Weight 3
 The cache provides considerable support to the Duluth Mobilization Center. When the mobilization center is in operation, one to two shipments a day are delivered. The cache should be located within two hours of the mobilization center.
13. Restocking Consumables Weight 2
 Some items in the cache are purchased locally. Locally purchased items include gas, oil, batteries, lumber, tools, etc. These items should be conveniently located and readily available to the cache.

REPORT:

To accomplish this task the Bureau of Business and Economic Research developed a procedure for collecting the desired information by three different methods. These methods included direct phone contact with knowledge people, development of secondary data information, and contact with U.S. Forest Service Personnel. The initial review of all four areas uncovered that fact that none possessed the needed warehouse space as configured. Therefore, the evaluation of the four location proceeded on the presumption that the facility would have to be built. After contact with knowledge developers it was concluded that a warehouse facility could be built at any of the four locations at roughly the same financial cost. Therefore, the cost of building does not appear to be a factor in location selection.

As a result, the location decision depends on the decision factors or wants and the wight of importance of each. The Cache location committee provided thirteen decision factors weighted from 10 to 2 for evaluation. The BBER selected two objective measures and developed two sub indexes for each of the 13 factors and then created a weighted index from each of the two sub indices. Then each of the four locations were rated based on each of the 13 factors (see Table 1). These factors were weighted as required and then summed. A location with a perfect score of 1 for all 13 factors would display a weighted score of 83. The analysis in Table 1 shows that Duluth's score is 115, Ely 232, Grand Rapids 257 and Rhinelander 226. Based on the decision factor list provided, Duluth would appear to be the location for the proposed Fire Cache.

In Table 2 through Table 13, the various factors are shown and the construction of each sub index is also shown. In Table 2, Warehouse, for example, the two sub-index centered on the evaluation of the airport capacity and runway accessibility. As might be expected, Duluth's airport is by far the best of the four runways with two runways, instrument landing capabilities and one 10,152 foot dual tandem capabilities. Rhinelander was second, Grand Rapids was third, and Ely fourth. However, in runway accessibility, Ely was the only cite that could nearly guarantee that the warehouse could be built near the runway with taxi way access. This potential meant that Ely had the lowest total score for this factor (see Total) and, therefore, earned a one for the factor. Duluth was second, Rhinelander was third and Grand Rapids fourth. The information was gained through FAA data and various phone calls to knowledgeable persons about local airports. Sub-index reliable help is based on size of work force and availability of existing personnel.

Each of the remaining factors were evaluated in a similar fashion and are shown in Tables 3-13. If a factor is evaluated for only one sub index then the other sub index is shown as all zeros (see Table 9, 10, 12 and 13).

TABLE 1
WANTS EVALUATION

ROW	FACTOR	DULUTH		ELY		GRAND R		RHINEL		
		W	RAW	IND	RAW	IND	RAW	IND	RAW	IND
1	WAREHOUSE	10	2	20	1	10	4	40	3	30
2	UTILITIES	10	1	10	2	20	4	40	3	30
3	TRAVEL T&D	9	2	18	3	27	1	9	4	36
4	COMPUTER	8	2	16	4	32	3	24	1	8
5	HELP	8	1	8	2	16	4	32	3	24
6	AGENCY ADM	7	1	7	3	21	4	28	2	14
7	GROUND TRA	6	1	6	4	24	2	12	3	18
8	RENTAL TRU	6	1	6	4	24	3	18	2	12
9	TRUCK COMM	5	1	5	4	20	2	10	3	15
10	PARKING LO	5	2	10	1	5	4	20	3	15
11	AIR COMM	4	1	4	4	16	3	12	2	8
12	SUPPORT M.	3	1	3	3	9	2	6	4	12
13	RESTOCK	2	1	2	4	8	3	6	2	4
TOTAL		83		115		232		257		226

TABLE 2
WAREHOUSE

ROW	PLACE	AIRPORT	RUN AC	TOTAL	INDEX
		SUB IND	SUB IND		
1	DULUTH	1	4	5	2
2	ELY	4	0	4	1
3	GRAND RAPIDS	3	4	7	4
4	RHINELANDER	2	4	6	3

TABLE 3
UTILITIES

ROW	PLACE	POWER	TELE	TOTAL	INDEX
		SUB IND	SUB IND		
1	DULUTH	1	1	2	1
2	ELY	2	2	4	2
3	GRAND RAPIDS	4	4	8	4
4	RHINELANDER	3	3	6	3

TABLE 4
TRAVEL

ROW	PLACE	FOR	FIRES	TOTAL	INDEX
		SUB IND	SUB IND		
1	DULUTH	3	1	4	2
2	ELY	2	3	5	3
3	GRAND RAPIDS	1	2	3	1
4	RHINELANDER	4	4	8	4

TABLE 5
COMPUTER

ROW	PLACE	COMPU	PERS	TOTAL	INDEX
		SUB IND	SUB IND		
1	DULUTH	4	1	5	2
2	ELY	3	4	7	4
3	GRAND RAPIDS	2	3	5	3
4	RHINELANDER	1	2	3	1

TABLE 6
AGENCY

ROW	PLACE	FIRE	SIZE	TOTAL	INDEX
		SUB IND	SUB IND		
1	DULUTH	1	1	1	1
2	ELY	2	3	2.6	3
3	GRAND RAPIDS	3	4	3.6	4
4	RHINELANDER	3	2	2.4	2

TABLE 7
GROUND TRANSPORTATION

ROW	PLACE	HIGH	IS	TOTAL	INDEX
		SUB IND	SUB IND		
1	DULUTH	1	1	3	1
2	ELY	3	4	10	3
3	GRAND RAPIDS	2	4	8	2
4	RHINELANDER	4	4	12	4

TABLE 8
RENTAL TRUCK

ROW	PLACE	TOTAL	U HAUL	TOTAL	INDEX
		SUB IND	SUB IND		
1	DULUTH	1	1	3	1
2	ELY	4	2	10	4
3	GRAND RAPIDS	3	3	9	2
4	RHINELANDER	2	4	8	3

TABLE 9
COMMERCIAL TRUCK FREIGHT

ROW	PLACE	BLANK	NUMBER	TOTAL	INDEX
		SUB IND	SUB IND		
1	DULUTH	0	1	1	1
2	ELY	0	4	4	4
3	GRAND RAPIDS	0	2	2	2
4	RHINELANDER	0	3	3	3

TABLE 10
PARKING

ROW	PLACE	BLANK	NUMBER	TOTAL	INDEX
		SUB IND	SUB IND		
1	DULUTH	0	2	2	2
2	ELY	0	2	2	2
3	GRAND RAPIDS	0	2	2	2
4	RHINELANDER	0	2	2	2

TABLE 11
AIR FREIGHT

ROW	PLACE	SERVI	NUMBER	TOTAL	INDEX
		SUB IND	SUB IND		
1	DULUTH	1	1	3	1
2	ELY	4	4	12	4
3	GRAND RAPIDS	2	2	6	3
4	RHINELANDER	3	3	9	2

TABLE 12
SUPPORT MOBIL CENTER

ROW	PLACE	BLANK	NUMBER	TOTAL	INDEX
		SUB IND	SUB IND		
1	DULUTH	0	1	1	1
2	ELY	0	4	3	3
3	GRAND RAPIDS	0	2	2	2
4	RHINELANDER	0	3	4	4

TABLE 13
RESTOCK

ROW	PLACE	BLANK	NUMBER	TOTAL	INDEX
		SUB IND	SUB IND		
1	DULUTH	0	1	1	1
2	ELY	0	4	3	4
3	GRAND RAPIDS	0	3	3	3
4	RHINELANDER	0	2	4	2

Table A1

**DG Facilities and Support Personnel at
Selected Northern Minnesota and Wisconsin Sites**

<u>Site</u>	<u>DG Facility</u>			<u>Personnel</u>		
	<u>Processor</u>	<u>Memory</u>	<u>Storage</u>	<u>Comp Spec</u>	<u>Comp Asst</u>	<u>Other</u>
Duluth	MV/10000	16 mb	900 mb	3	2	0
Ely	MV/7800	14	354	0	0	1
Grand Rapids	MV/7800	14	700	0	0	1
Rhineland	MV/15000	16	1600	1.5	1	0

NOTE: "Other" personnel category is a clerical or other non-computer person performing DG system management as a collateral duty.

<u>Site</u>	<u>Facility</u>	<u>Ranking</u>	
		<u>Personnel</u>	<u>Combined</u>
Duluth	4	1	2
Ely	3	3	4
Grand Rapids	2	4	3
Rhineland	1	2	1

Table A2
Agency Administration Unit

CRITERIA

Full Time Fire Positions

<u>40%</u>	<u>Duluth</u>	<u>Ely</u>	<u>Grand Rapids</u>	<u>Rhineland</u>
	4	2	0	0

Size of Administration Unit

<u>60%</u>	<u>Duluth</u>	<u>Ely</u>	<u>Grand Rapids</u>	<u>Rhineland</u>
	35	6	2	18

Rating

<u>Duluth</u>	<u>Ely</u>	<u>Grand Rapids</u>	<u>Rhineland</u>
1	3	4	2