STATE OF MINNESOTA

MINNESOTA ENERGY AGENCY

In the Matter of the Proposed Adoption of Rules of the Minnesota Energy Agency Governing Implementation of the State Energy Supply Emergency Conservation and Allocation Plan During a Petroleum Shortage, 6 MCAR §§ 2.3101 - 2.3121.

Docket No. 81-005-AK

Statement of Need And Reasonableness

The above-captioned rules are proposed by the Minnesota Energy Agency ("MEA" or "Agency") to make permanent a set of temporary rules regarding fuel oil shortages, 6 MCAR §§ 2.3101 - 2.3108 (5 S.R. 1091 - 1099, January 5, 1981) and a set of rules published in Draft as the Emergency Motor Fuel Conservation Plan, 6 MCAR §§ 2.3120 - 2.3132 (5 S.R. 1375 -1387, March 9, 1981), revised and combined into the Petroleum Supply Emergency Rules.

The Agency recognizes its statutory obligation at the public hearings to make an affirmative presentation of facts establishing the need for and reasonableness of the rules proposed for adoption. (Minn. Stat. § 15.0412, subd. 4 (c) (1980)). This statement constitutes all or most of the Agency's affirmative presentation. The Agency may supplement this statement at the hearing if necessary, but will not raise any new issues or propose any additional conservation measures.

Authority

The MEA was directed in the original version of the Minnesota Energy Agency Act, Minn. Stat. Ch. 116H (1974) to promulgate an energy supply emergency conservation and allocation plan. The Agency first prepared and issued an Emergency Conservation and Allocation Plan in 1976. This plan was subsequently amended in a manner set forth in Minn. Stat. §§ 116H.07(b) and 116H.09.

In 1979 the Legislature amended section 116H.09 to require that revisions of the emergency conservation and allocation plan be made according to the Chapter 15 rulemaking procedures rather than the procedures set out in subdivision 2 of section 116H.09 (Minn. Laws 1979, Ch. 2, § 17). This amendment also authorized plan revisions by temporary rulemaking to provide authority to implement the Fuel Oil Emergency Plan pending promulgation of final rules.

Further authority for the proposed rules is found in the Federal Emergency Energy Conservation Act of 1979, Pub. L. 96 - 102, 42 U.S.C. § 6201 (1980).

Other rules which will be cited are:

Minn. Rule MUSHC 41f and 6 Minn. Rule APC 1, 4, 32.

MEA Exh 9

One or more of the following expert witnesses employed by the Minnesota Energy Agency may be called upon to testify: Abigail E. McKenzie, Oil Analyst; David Miller, Emergency Rules Analyst; David Buller, Manager Supply and Demand Analysis; Richard Wallen, Assistant Director, Data and Analysis Division. The above named individuals played a substantial role in developing the proposed rules or are experts on the topic of petroleum fuels. They will be available to testify on the need for and reasonableness of the proposed rules and to respond to public inquiry.

The justification of the need and reasonableness of the proposed rules is established in the following paragraphs.

The proposed rules specify the actions to be taken in the event of a petroleum fuels supply emergency. The need to adopt such rules arises, in part, from legislative mandate.

> It shall be the duty of the director to: ...
> (b) Prepare and adopt an emergency allocation plan specifying actions to be taken in the event of an impending serious shortage of energy, or a threat to public safety or welfare.

Minn. Stat. § 116H.07 (b) (1980).

> Subdivision 1. Within nine months after March 29, 1974, the director shall prepare and issue an emergency conservation and allocation plan in the matter set forth in subdivision 2. Such plan shall provide a variety of strategies and staged conservation measures to reduce energy use and in the event of an energy supply emergency, shall establish guidelines and criteria for allocation of fuels to priority users. The plan shall contain alternative conservation actions and allocation plans to reasonably meet various foreseeable shortage circumstances and allow a choice of appropriate responses.

Minn. Stat. § 116H.09, subd. 1 (a)-(g) (1980).

The rules are needed to prescribe the plan of actions that will be taken by the State during an energy supply emergency. The rules will inform the citizens of the State, especially petroleum fuels suppliers and consumers, of the action plan and of their responsibilities with regard to these actions. These rules are intended to minimize the personal, social, and economic disruption resulting from a petroleum fuels shortage and ensure the equitable distribution of petroleum supplies during such a shortage.

Rules 2.3101 and 2.3102 express the Energy Agency's authority to promulgate these rules, the purpose that the rules are intended to serve, and the circumstances during which the rules will be used.

INTRODUCTION

Both the Congress and the Minnesota Legislature have recognized the vulnerability of the United States to petroleum shortages. This recognition and concern spawned legislation that mandates State emergency conservation plans. These rules have been developed and are proposed to satisfy these legislative requirements.

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The Rules

2.3104 Definitions

Rule 2.3104 provides definitions of the terms which are significant in understanding the State's energy supply emergency response mechanism and applying the rules. Terms which have special significance to the emergency plan or for which there is no common understanding are explained in greater detail in this section. These term descriptions are intended to support and prove the need for and reasonableness of these definitions.

Agriculture includes generally all activities of establishments that are primarily engaged in food production, processing, and distribution. The Standard Industrial Classification Manual, 1972 edition, is used to define establishments according to the industry codes listed therein. Agricultural activities are first priority uses of both fuel oil and motor fuel and thereby qualify for preferences and exemptions under these rules.

The definition for agriculture and its first priority status is a recognition of the importance of a steady food supply for the welfare of the people of the State. A substantial portion of agricultural activities must be accomplished in a relatively short and critical time period. Spring planting must be done when weather allows. Pesticide applications are often made only to prevent total destruction to crops. Dairy herds must be milked everyday and the milk processed regularly. Perishable fruits and vegetable have to be harvested and distributed quickly and directly to ultimate consumers. Veterirnarians, fertilizer and herbicibe distributors, farm machine mechanics, and wholesale distributors of food products, just to name a few, are necessary auxilliary services in the food production system. A few exlusions have been made to the broad industry groups set forth in the S.I.C. manual. These establishments have little or no connection to food production, processing, or distribution. Non-essential "food stuffs" e.g. beverages and candy and confectionary products for instance, have been excluded. The S.I.C. Industry code definitions which comprise this definition of "Agriculture" are listed in Appendix A.

The Assistant Director of the Minnesota Energy Agency is defined and included because it is the responsible position in the Agency for seeing that employer and school district emergency motor fuel conservation plans are reviewed, and if acceptable, certified as provided in 6 MCAR § 2.3121 B.

Baseline consumption is an estimate of the motor fuel consumed incident to the operation of a business or a school, including employees' travel to and from work. An employer's (or school's) baseline consumption includes the motor fuel consumed by employees and students in the work or school trip plus the motor fuel consumtpion directly attributable to business or school sponsored travel.

Major employers and school districts would be required to calculate their baseline consumption if they choose the self-stlyed conservation plan option in lieu of adopting strategies as provided in the rules. The need for a computation of baseline consumption is to provide a benchmark against which proposed conservation actions can be measured.

The collection of consumption data may be accomplished through direct employee surveys or sample surveys of daily commuting patterns. The formula for arriving at a business' baseline consumption is; (1) the sum of employee's average daily work trip (roundtrip) by mode divided by the average mpg for the transportation mode (i.e., 15 mpg for automobiles) plus (2) the motor fuel consumed in travel for business purposes. Mathematically expressed as follows:

$$B = \sum_{j=1}^{n} \frac{Mij}{mpgj} + \frac{Whi}{mpg}$$

j = types of transportation
Mij = miles traveled by mode j
mpgj = efficiency of mode j
Whi = business travel

The following is an example of how the baseline consumption might be calculated for a worksite.

STEP ONE: Survey the employees as to commuting patterns
STEP TWO: Compile a table of data generated from the survey. A worksite profile was made for the Minnesota Energy Agency providing the following information.

see attached TABLE 1

For the Energy Agency then, baseline consumption is the sum of:

(1) single occupant auto travel consumption:		48	gal/wk
(2) carpool consumption:		83	gal/wk
(3) vanpool consumption:		25	gal/wk
(4) motorcycle:	+	.6	gal/wk
	=	156.6	gal/wk
X 50 weeks	=	7800	gal/yr
Plus Agency travel amounting to		7650	gal/yr

The annual average commuting consumption of 7800 gallons plus annual average agency consumption of 7,650 gallons yields a total baseline consumption of 15,450 gallons a year.

For the Agency to qualify as having an emergency conservation plan, it would have to implement strategies now or in an emergency which would have the combined effect of reducing baseline consumption by 15 percent. Thus, the 15,450 gallons a year normally used would have to be reduced to 13,132 gallons on an adjusted annual basis.

Three methods for determining the period for estimating the annual baseline consumption are permitted.

The first method is simply an estimate of the past year's consumption. This method was illustrated by the employee commuting survey in the previous example. Employees were asked to estimate their commuting patterns for the past year.

TABLE 1

Commuter Profile for the

Minnesota Energy Agency, March 1, 1981

Transportation Type	The number of employees using this type/ percent of total	Ave. dist. (miles)	Ave. Vehicle Occupancy	Ave. Weekly Vehicle Miles	Pass. Miles per gallon	Ave. fuel use (gallon) per person per week	Ave. fuel (gallons) consumption by type
Single Occ. auto/ truck	14 / 12.5%	11.5	1	720	15	3.4	48
Carpool	36 / 32%	19.7	2.75	1212	40	2.5	83*
Vanpool	5 / 4.5%	46.2	11.5	250	96	2.1	25**
Bus	50 / 45%	11.2	-	-	-	-	-
Bicycle	5 / 4.5%	5.5	1	27.5	-	-	0
Pedestrian	1 / 1%	3.5	-	-	-	-	0

Total employees responding 112 out of a total workforce of 130. This will increase the Agency commuter consumption estimate by a factor of 1.16.

* The carpool consumption estimate is based on the fuel use of 13 vehicles traveling 98.5 miles per week with an average fuel efficiency of 15 mpg.

**The vanpool consumption estimate is based on the fuel use of one van traveling 250 miles per week with a fuel efficiency of 10 mpg.

A second method provided for calculating baseline is a three-year average. This method was used in estimating the Agency's business travel. The Agency travel by state and private autos for the past three years is displayed in the following table:

	STATE CAR (VMT)	PRIVATE AUTO (VMT)	TOTAL
1978	65,664	56,647	122,311
1979	77,063	35,214	112,277
1980	87,944	21,692	109,636
Average	76,890	37,851	114,741

The annual average vehicle miles divided by 15 mpg average fuel economy yields 7,650 gallons.

The third method is a "rolling average" based on a 12-month period. In using the rolling average, the latest month for which data is available is added to the "base" and the thirteenth month's data is dropped. The method permits an accurate estimate of the ongoing consumption patterns of a business and would be preferred for those businesses experiencing a continuous decrease in fuel use because it reduces the amount of baseline consumption and therefore the absolute amount equal to 15 percent thereof.

Cargo, freight and mail hauling, including newspaper delivery is a broad category of transportation classified as priority motor fuel consumers. This category includes both intrastate and interstate registered-for-hire motor carriers, local cartage carriers, postal carriers, and newspaper delivery vehicles. Information on "for-hire" motor carriers supplied by the Public Utilities Commission gives the following profile of commercial trucking under this definition:

828 Contract carriers
671 Livestock carriers
1101 Irregular route carriers
600 Local cartage carriers
250 Courier services
100 Charter carriers
90 Regular route carriers (Mn/DOT estimates these firms operate over 835 trucks across Minnesota)

and 10,000 registered Interstate carriers traversing the State of Minnesota.

In addition, vehicles of the U.S. Postal Service and newspaper delivery vehicles fall under this definition.

The designation of a special category of transportation energy consumers recognizes the essential service these firms provide in the State's economy. Commercial trucking is the linch pin between sellers and purchasers of raw materials in the market.

A trucking stoppage due to the unavailability of fuel would have a debilitating effect of the state's economy, forcing the closing of industries and causing the layoff of thousands of workers whose jobs are tied to the constant influx of materials which trucks provide.

The priority assignment of "for-hire" trucking and the measures contained in these rules enables the State to take action to ensure that this vital class of operators are kept running during a motor fuel shortage.

Carpool is defined simply to establish the minimum number of passengers per vehicle required before an employer can certify a carpool under the Employer based conservation measure.

Commercial vehicles are defined to establish a specific class of vehicles exempt from the odd-even fuel purchase restriction. Commercial vehicles include those vehicles licensed commercial class with the Division of Driver and Vehicle Services and all other vehicles being used for commercial purposes.

Emergency vehicle is defined to include: law enforcement activities, fire fighting, ambulance services, emergency utility repairs, emergency road or traffic signal repair, snow removal, search and rescue operations, and vehicles designated by the county sheriff or Division Director as emergency services vehicles. Emergency vehicles are priority motor fuel consumers because of the essential services they provide in protecting and preserving the health and welfare of the citizens of the State.

Energy production is defined to include all activities necessary to provide continuous sources of heat and power to the citizens of the State. Electrical generation driven by petroleum power is excluded because it uses the fuel source that is presumed to be in short supply in these rules. Energy production is a priority motor fuel consumer and under the rules will be given allocation preference and exemptions from demand-restraint measures.

Essential government services encompasses all constitutionally required services of the State, especially judicial services. In addition, services providing income maintenance to the poor and elderly are included. As a result, groups dependent on these sources of income will not have them interrupted during the shortage. Essential government services include both use of motor fuels for vehicles providing services and use of fuel oils in heating buildings used to conduct activities of government.

Forecast is defined as a projection of future demand for or supply of petroleum supplies. Forecasts may rely on econometric techniques but are not solely limited to scientific methods. Firsthand reports from suppliers, refiners and consumers throughout the State or news of national or international significance relating to world petroleum markets may also be taken into account. The information used in making these projections will include, but is not limited to, petroleum product inventories, pipeline capacity, refinery yield, effect of conservation measures, product prices, relevant weather conditions, and level of economic activity.

Fuel oil is defined as middle distillates used in home heating and residual oils used largely in industrial power generation. The definition is needed to specify the fuel type for which certain emergency conservation measures apply.

Health and residential care services include all facilities whose occupants are in residence for health or security reasons.

Jitney is defined because it is an optional employer conservation strategy under the Employer based conservation measure.

Military uses is defined to make allowance for emergency military operations as a priority motor fuel consumer. While standard National Guard maneuvers, for instance, may not qualify as necessary for perserving the health and safety of the citizens of the State, the use the Guard to ensure delivery of energy supplies clearly is.

Motor fuel is defined simply a mixture of volatile hydrocarbons. Motor fuel is broadly defined so has to permit the application of the motor fuel emergency conservation rules to whatever transportation fuel is or could become in short supply.

Passenger transportation services are priority motor fuel consumers under the rules. Passenger transportation services are defined to include air, rail, water, and bus passenger transportation services. The applicability of the priority assignment of air services is limited to aviation ground support vehicles, jet fuel not being considered a motor fuel. Passenger transportation services are important links between large numbers of people and the jobs and services they provide. The interruption in public transportation due to the unavailability of fuel would undoubtedly force many transit users to other much less energy efficient means of tranportation. Passenger transportation additionally contains less traditional passenger services such as vanpools, subscription buses, and taxicabs.

Plant protection includes those actions necessary to prevent damage to buildings or property, such as frozen pipes, resulting from cold weather, rain or high winds. It also includes measures necessary to secure buildings from robbery or vandalism, such as operation of electronic warning devices and lighting. Plant protection activities are exempt from compressed workweek orders and mandatory driving bans.

Residence is a first priority use of fuel oil. Hotels and motels are included because people frequently live in such places. Furthermore, people who are traveling may be considered to be living in hotels and motels.

Sanitation services are services necessary for sewage treatment, solid, liquid and hazardous waste disposal and treatment and purification of water for public consumption. Sanitation services are essential to maintain the health and safety of the citizens of the State and are designated first priority fuel oil and priority motor fuel consumers.

Telecommunications is defined because it is a first priority use of fuel oil and a priority consumer of motor fuel. Telecommunications includes services necessary to insure that information can be transmitted to the citizens of the State. It also includes repair and maintenance of such services so that disruption from mechanical failure is minimized.

2.3105 Energy Supply Alert

In most instances, the Energy Agency will have anticipated a petroleum product shortfall well in advance of an actual emergency. During this interim period between the date an impending shortfall can be reasonably foreseen and the actual manifestations of a shortage, public information efforts will be undertaken to educate the citizens of the state about the impending shortfall and conservation efforts that could prevent or mitigate a crisis situation. Public awareness of the situation and perception of the seriousness of the situation will determine the effectiveness of these early conservation efforts. If Minnesotans perceive the shortage as real, compliance with voluntary conservation measures will be much greater.

Declaration of a Energy Supply Alert will forcefully bring an impending shortage to the attention of the public and heighten their awareness of the situation. Furthermore, it will encourage voluntary conservation by the public.

The Energy Supply Alert gives no State department or agency new authority. Public information tools currently available to the Energy Agency will be used to encourage conservation and educate Minnesotans of the potential petroleum fuel shortage. Therefore use of the Alert does not adversely affect any individual or group and may benefit many by averting a petroleum product shortage.

The phrase 'reasonable likelihood' was used as the indicator for declaration of an alert rather than a numerical probability. A single probability could not take into account such contributing factors as: the anticipated severity of a shortfall, the immediacy of the shortfall, and the expected duration of the shortfall. For example, a change in political power in Saudi Arabia may not affect the oil flow from this key importer, but if a disruption did occur it could result in a very severe shortage for the U.S. In this case, the Agency may need to call an alert to mobilize emergency operations and encourage conservation. Thus the phrase 'reasonable likelihood' gives the Agency the necessary flexibility to adequately respond to a variety of potential shortage situations.

The forecasts used to determine the need for an Energy Supply Alert are limited to 6 month projections. Longer forecasts are generally not accurate enough to determine a 'reasonable likelihood.' Furthermore, the longer the alert remains in effect the more difficult, both economically and psychologically, it is for citizens to continue to conserve. This rule, then, protects the citizens from overuse of declaration of an Energy Alert as a public information tool.

The Director of the Energy Agency is given the sole responsibility for the declaration of an Alert. The Director was chosen because it is a position of authority, appointed by the Governor and is

therefore accountable for his/her actions to the citizens of Minnesota. The Energy Agency was selected because it possesses the information upon which determination of a potential shortage is based.

2.3106 Energy Supply Emergency

This rule delineates the responsibilities of the Energy Agency, the Legislature and the Executive Council in the declaration of a Petroleum Supply Emergency. This rule sets out the responsibilities for an orderly analysis of the fuel situation, for declaration of the emergency situation, and for bringing the emergency declaration to the attention of the public.

2.3106 A.

Determination of a petroleum supply emergency will be based on the Agency's forecasts of supply and demand. The Agency is responsible for these forecasts because Agency staff is trained in energy issues, has developed information systems, and maintains econometric models.

The forecasts which support the declaration of an energy supply emergency must show that a significant supply imbalance will occur in the next 3 months. Longer projections can not take into account ameliorating events and are inherently less accurate. The forecasting period for an energy supply emergency is limited to 3 months rather than 6 months, as in an Alert, because an emergency declaration enables the Governor to use extraordinary measures.

The Director of the Agency is designated as the person to recommend that an energy supply emergency be declared. As in an Alert, the Director is the appropriate person because, as an appointee of the Governor, he/she is accountable to Minnesota citizens.

The criterion for declaration of an Energy Supply Emergency is simply that forecasts of demand exceed forecasts of supply, rather than a supply imbalance of a specific level or proportion. This criterion was selected, similar to the case of an Energy Alert, because other factors such as the time of year during which a shortage occurs and the expected duration of the shortfall may affect the seriousness of a shortfall.

For example, a very small forecasted shortfall of 3 to 4 percent that is projected to last 3 or 4 months may require an emergency level response. In contrast, a serious shortage lasting only a few days may require no State intervention. Rule 2.3106 A. allows the Agency to consider the many factors which affect the seriousness of a fuel shortage in determining whether an emergency should be declared.

This rule protects citizens from overuse of emergency powers by requiring that the Agency be able to demonstrate that forecasts indicate a shortage within 3 months of the declared emergency. Thus, a recommendation that an emergency be declared must be based on documentable evidence of shortage conditions.

2.3106 B.

Responsibility for declaration of an emergency, duration and renewal of the emergency declaration, and dissemination of the declaration are set out in Minnesota Statute § 116H.09, subdivision 5. The Agency has repeated these responsibilities in 2.3106 B. so that all State procedures and responsibilities regarding an energy supply emergency will be set out in one place.

We believe that this document will be more clear and useful to Minnesota citizens if it completely delineates the actions and authority relating to an energy supply emergency. The decision to include this material was based on the responses to a preliminary review of rules that did not contain this material. Respondents generally suggested this material be included or raised procedural questions relating to the declaration and duration of an energy supply emergency.

Rule 2.3107 Operating Organization for Energy Supply Emergencies

Minn. Stat. s116H.09, Subd. 5. states, in part, that; " * * * [T]he governor and the division of emergency services in consultation with the director, shall implement and enforce the emergency conservation and allocation plan and any part thereof."

The Minnesota Civil Defense Act further provides that:

> "The governor has general direction and control of emergency services and has the power and duty to carry-out the provisions of this chapter and, during the existence of a civil defense emergency declared as existing under section 12.31, or during the existence of an energy supply emergency as declared under section 116H.09, * * * , may assume direct operational control over any part of the emergency services functions within the State." Minn. Stat. s12.21, Subd. 1 (1980).

Based on the preceding statutes, Rule 2.3107 specifies that upon declaration of an energy supply emergency, the responsibility for conducting and coordinating the emergency operations of the state rests with the Governor and the Division of Emergency Services. The Governor upon the advice of the Energy Agency, will select the emergency conservation measures that the state will impose.

The Energy Agency will continue to monitor and analyze the fuel supply situation and advise the Governor on the need for emergency actions. The Agency, in determining the recommended emergency measures, will evaluate alternative courses of action that lessen, shorten, or eliminate a shortage. Rule 2.3107 B. 2. provides that the Agency shall select the "least restrictive" measures capable of eliminating the fuel shortage. This criterion requires that measures which generally rely on voluntary conservation be recommended for implementation first in the early stages of an energy supply emergency. Mandatory measures, curtailments, and driving restrictions would be considered only after voluntary or "in-place" conservation programs had been tried and exhausted and priority consumers are reporting difficulty in maintaining services due to the unavailability of fuel. "Least restrictive" measures

are those that compared with alternative actions give people the choice or option of benefiting from a conservation program. Ridesharing programs illustrate a conservation measure that provides the option of participation.

The Agency will also adminster Rules 2.3120 B. and C., the employer-based and school conservation measures. The involvement of the Energy Agency in the development of these pre-emergency programs is to provide the continuity and technical resources necessary to advance the preparation of these large consumers for energy emergencies.

Division of Emergency Services

The Division of Emergency Services will become the executive arm for impolementation and enforcement of the emergency conservation and allocation plan. Rule 2.3107 A.2. states that the Division Director shall establish an emergency operating center for conducting emergency operations under an energy supply emergency. Establishment of an emergency operting center is a standard procedure for Chapter 12 emergencies.

Rule 2.3107 C.3. requires that the Division prepare an internal operations plan for energy supply emergencies, specifically designed to implement the measures contained in these rules. This plan is necessary to designate the planning and emergency implementation responsibilities for emergency measures. For example, program details for the vehicle permit-sticker plan would be logically assigned to the Division of Driver and Vehicle Services, the agency most likely to adminster the program.

The coordination of emergency operations will be handled by the Division of Emergency Services. The power to assume direct control or assign responsiblities for emergency operations resides with the Governor. The emergency conservation and allocation plan depends upon a number of state and local agencies to perform emergency tasks. Rule 2.3107 D. refers to the statute that grants the Governor the authority to utilize state personnel and resources for emergency purposes.

The Appeals System Rules 2.3108 and 2.3109

The appeals system is an essential part of a comprehensive energy emergency conservation system. An appeals system is authorized and required by Minn. Stat. § 116H.09, Subd. 1(g) (1980) which states that [The Agency] shall: "Establish procedures for fair and equitable review of complaints and requests for special exemptions regarding emergency conservation measures or allocations."

The appeals system that has been proposed to comply with this directive consists of a system of county appeals boards (municipal boards for cities of the first class, including Duluth, Minneapolis, and St. Paul), the State Hearings Examiners, and the Director of the Minnesota Energy Agency (soon to become the Commissioner of the Department of Energy, Planning and Development). In most circumstances, the county appeals boards, referred to as Local Energy Conservation Boards, shall be the initial reviewer of appeals taken from emergency measures. In special circumstances the State Office of Administrative Hearings shall be the forum for initial review. The power to make the final determination on the outcome of all appeals to the petroleum supply emergency rules resides with the Director. (Provided that the timing provisions found under 6 MCAR § 2.3109E.3 are adhered to)

The large majority of emergency rules appeals will likely be disposed of by the Local Energy Conservation Boards or the Hearing Examiner and their recommended decisions will stand without action by the Director.

The primary purpose of placing the power of final determination in the Director is to ensure that decisions remain consistent throughout the State. If exceptions are being granted in one part of the state for individuals conducting a type of activity for which individuals in another part of the state are being denied, there arises a need to reconcile the differing interpretations of a rule to provide for its uniform and consistent application.

The following diagram displays the appeals system under the Petroleum Supply Emergency Rules.

see next page

Admin Hearings

The Office of Hearing Examiners shall hear appeals taken from the following measures:

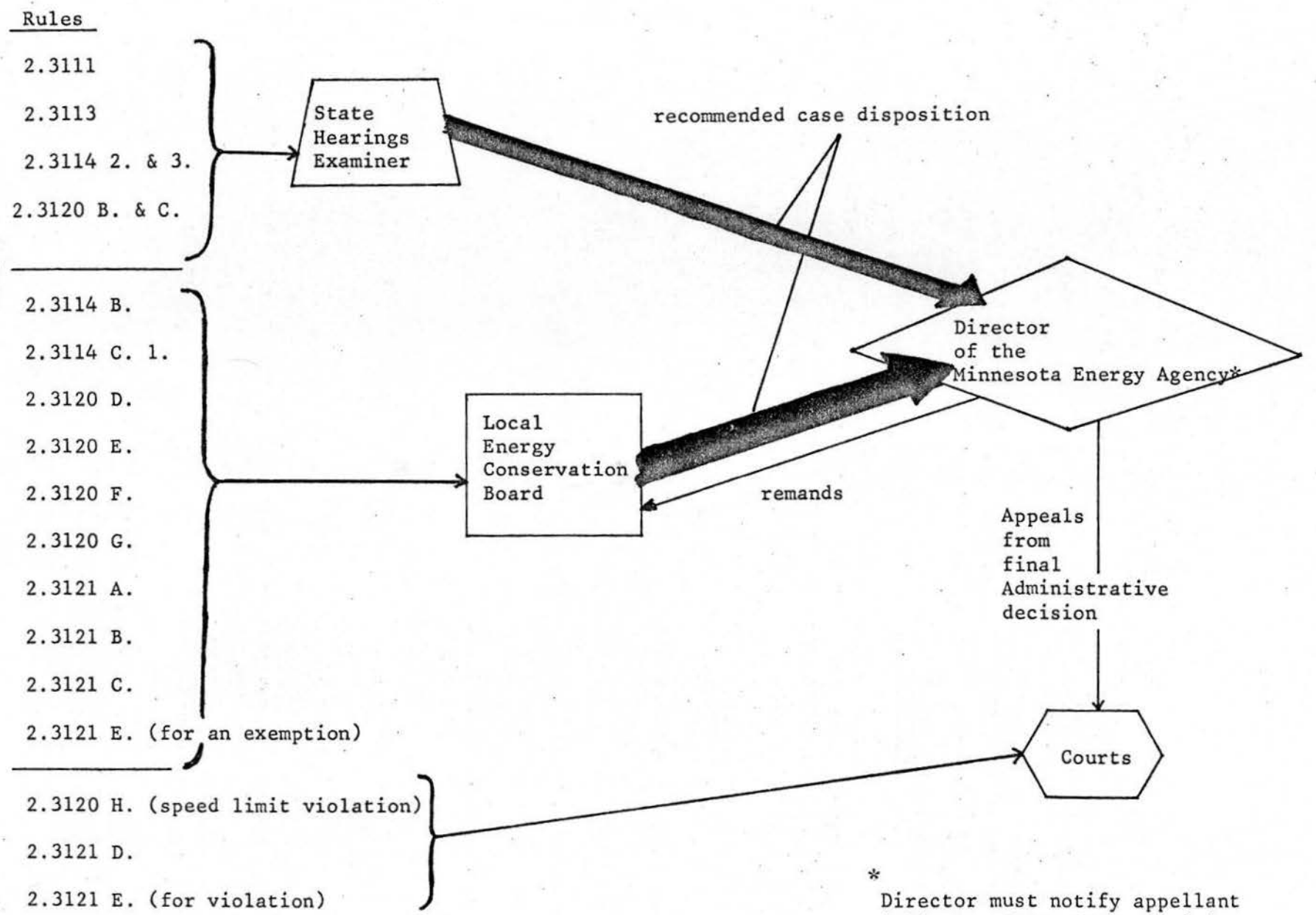
Rule 2.3111 Priority use of Fuel Oil
Rule 2.3112 Priority use of Motor Fuel
Rule 2.3113 Priority user curtailment
Rule 2.3114 C. 2. Relaxation of Environmental Standards
Rule 2.3114 C. 3. Fuel oil user curtailment
Rule 2.3120 B. Employer-based conservation plan
Rule 2.3120 C. School Conservation Plan

State Hearings Examiners were chosen to hear and decide on appeals taken from these measures due to the probable complexity of hearings, the potential that an appeal might arise before establishment of Local Energy Conservation Boards, and the likelihood that a decision adverse to the Agency's will alter the rules' application to other priority users or impair the State's power to determine and enforce the priority system which has been established.

Rules 2.3111, 2.3112, and 2.3113 rank priority consumers of fuel oil and motor fuel. Appeals under these rules may challenge the State's criteria for making priority assignments. Appeals of this nature could alter the future applicability and effect of the rules and thereby affect the relationship between other priority consumers.

Priority appeals are also likely to become complex and time consuming. Because the Local Energy Conservation Boards are obligated to hear and rule on appeals otherwise not reserved to the Office of Administrative Hearings, a time-consuming hearing in the midst of an energy emergency may cause a systems overload. A backlog of appeals defeats the essential purpose of local appeals system, which is the speedy resolution of appeals.

The Energy Supply Emergency Appeals System



* Director must notify appellant within two days after receiving a recomended decision from a Hearings Examiner or LECB to effect reversal.

Rules 2.3114 C. 2 and 3 are also to be heard by a Hearing Examiner. An Agency order to the Pollution Control Agency to promulgate temporary air quality rules (Rule 2.3114 C. 2.) necessarily involves an action with statewide consequences and potentially multiple appellants. No single Local Energy Conservation Board could appropriately deal with an appeal from this rule. Appeals from Rule 2.3114C. 3., orders to curtail fuel oil deliveries, will be closely related to the priority user assignment and for the same reasons given for priority appeals will be heard by a State Hearing Examiner.

Appeals from Rules 2.3120 B. and C. are to be heard by a Hearing Examiner because these claims may arise before the establishment of the Local Energy Conservation Boards. Appeals from these rules during an energy emergency will continue to be directed to the Office of Administrative Hearings because they too may raise issues of the general enforceability and applicability of the measure and involve a time-consuming hearing.

Rule 2.3108 Local Energy Conservation Boards

The Local Energy Conservation Boards, one per county plus Duluth, Minneapolis and St. Paul, basically comprise the first level of review for appeals in an energy emergency. The county system allows for "local control" over energy conservation measures. "Control" in the sense that exceptions and exemptions may be granted based on real need and merit and applied uniformly to all others similarly situated.

The composition of the Local Energy Conservation Boards (two elected public officials, a health professional, the county fuel coordinator, and a member of the public) is designed to afford a degree of political responsiveness and accountability yet maintain a degree of independence needed for impartiality. The Local Energy Conservation Boards are to carry out their duties and treat claims in a fair, consistent, and speedy manner.

Timing

The rules set time limits for the handling of appeals. Time periods set filing/notice deadlines, hearing deadlines, decision deadlines, and performance deadlines.

Filing/notice time limits.

Rule 2.3109 C. 10. limits the right to an appeal of emergency measures to ten working days after termination of an Energy Supply Emergency.

Rule 2.3109 E. 3. requires the Director to give notice to the appellant within two working days after receipt of the recommended decision of the Local Energy Conservation Board or Hearing Examiner of his/her intention to reverse or remand their decision.

Rule 2.3109 C. 1. states that the Local Energy Conservation Board or the Office of Administrative Hearings must set a hearing date within three working days after receipt of a written appeal and must notify all parties to the appeal of the hearing two days prior to the hearing.

Hearing time limits.

Rule 2.3109 C. 1. places a seven-working-day time limit between the receipt of an appeal and the actual conduct of a hearing. The Appellant may waive this requirement and request a hearing to be set and held at a later time.

Decision deadlines.

Rule 2.3109 E. 2. provides that the Local Energy Conservation Board or the Office of Administrative Hearings must issue a written decision including findings of fact and the recommended disposition of the appeal within two working days after the hearing on the matter has closed.

Rule 2.3109 E. 3. states that the Director must issue a written statement to the appellant setting forth the gounds for reversing a recommended decision no later than five working days after receipt of the recommended decision.

Performance time limits.

A performance deadline requires action by a person within the designated time period. The Director of the Emergency Operating Center is required under Rule 2.3121 B. 2. c. and C. 2. c. to issue exempt stickers to RV users within three days after receipt of a favorable recommendation by a Local Energy Conservation Board.

These time periods are relatively short because the imposition of measures on people will be sudden and in some cases will cause an unintended hardship.

Transportation is a basic necessity of everyday life. Restrictions imposed on travel exact a toll on mobility, affecting activities of everyday life. Similarily, interuption of the availability of fuel oil for commercial heating or power generation will cause economic hardship. Any system of appeals therefore should be as streamlined as possible to minimize those instances where the measures cause undue hardship.

The appeals system establishes an immediate post-deprivation hearing on the merits of an appeal and guarantees a resolution of that appeal in a matter of days. The entire system is an attempt to strike a balance between an appellant's urgent need for relief in some cases and the minimum time necessary for administration of a fair and impartial hearing.

2.3111 Priority Uses of Fuel Oil

The need for a priority ranking of uses arises, in part, from legislative mandate:

> Such plan shall provide a variety of strategies and staged conservation measures to reduce energy use and in the event of an energy supply emergency shall establish guidelines and criteria for allocation of fuels to priority uses. Minn. Stat. s116H.09 Subd. 1. B.1. (1980).

Uses within each category are not ranked. Under even the most severe fuel oil shortage, there would be adequate supplies to meet the needs of first priority users. If the shortage was so severe the fuel oil suppliers were not able to provide minimum operating levels of fuel oil to third priority users, the Governor would impose curtailment of fuel oil supplies according to rule 2.3114 C.3. The scheme of required allocation to priority users, and curtailment of lower priority users was chosen because the State does not have the resources to develop or operate a direct allocation system like rationing.

Rule 2.3111 B.1. The Agency defined first priority uses as those whose continued operation was necessary to maintain the health and safety of the citizens of the State. Included are services which supply basic physical needs for food, shelter, health services, and security. Telecommunication services is included as a first priority service because it will be necessary to maintain communication systems to notify Minnesotans of the status of the emergency, and of mandatory measures. Plant protection is included to minimize the damage done to the state's capital stock during an emergency. This will reduce the overall economic disruption caused by the fuel oil shortage. Finally, essential government services are included to ensure that citizens' constitutional right of due process is not violated during the shortage and to guarantee income maintenance for the poor, unemployed and elderly. The precise definitions of first priority uses are contained in rule 2.3104.

Rule2.3111 B.2 Cargo and freight hauling is a second priority use of fuel oil. Because cargo and freight hauling provides all industries with their supplies, disruption of this industry will have serious secondary economic consequences. Conversely, as other industries reduce production as a result of the shortage cargo and freight hauling will automatically decline.

Personal motor transportation is also a second priority use of motor fuel. Although use of fuel oil to meet the essential health and safety needs of citizens is higher priority, it is important for citizens, especially in rural areas, to be able to drive. Second priority status will help insure that citizens are able to commute to and from work and generally continue to conduct everday activities as usual.

Rule 2.3111 B.3. Third priority uses are all fuel oil users not included in B.1. and 2. These uses were considered not essential for the immediate health and safety of the citizens of the state. Although the loss of supply for third priority commercial consumers would certainly cause some economic disruption, the extent and magnitude of the loss would not be as substantial as the loss of cargo and freight hauling.

Rule 2.3111.4 The Agency has chosen the method set out in this rule to allocate supplies to higher priority users because it does not have the resources to develop or operate a direct governmental allocation system such as rationing. Furthermore the Agency believes that individual suppliers have the greatest capability to assess the immediacy of the needs and the priority of uses of individual consumers, and to judge the availability of local fuel oil supplies.

Fuel Oil suppliers demonstrated their ability to distribute supplies among users and provide amounts necessary to meet minimum needs during the 1976-1977 shortage. Although suppliers were not operating with a specific priority ranking of users during 1976-1977 shortage, their success in managing supplies indicates the capability to fulfill the requirements of this rule.

Rule 2.3112 Priority Uses of Motor Fuel

The priority assignment of motor fuel consumers is intended to exempt those users from demand-restraint/supply management restrictions, and provide allocations preference through preferred purchase status. The Agency recognizes these priority uses of motor fuel as necessary to protect and preserve the health and safety of the citizens of the state, or crucial to maintaining primary transportation services for the movement of people and goods.

Emergency Measures

The Governor is given sole responsibility for selecting measures used to manage supply and restrain demand during an energy supply emergency. Mandatory measures restrict the actions of firms, and individuals and so the person requiring these actions should be directly answerable to the citizens of the State. This rule also is consistent with Minnesota Statute § 116H.09 subdivision 5 which states:

> Upon declaration of an energy supply emergency by the executive council or the legislature, the governor and the division of emergency services, in consultation with the director, shall implement and enforce the emergency conservation and allocation plan.

These rules are structured to provide a set of measures in response to fuel oil shortages, and a set of measures to manage a motor fuel shortage. Fuel oil being broadly defined as No. 1, 2, 3, and 4 fuel oils and residual oil. Motor fuel includes, but is not limited to, motor gasoline, gasohol, and No. 1 and 2 diesel fuel. The exigencies of a petroleum shortage may however blur this distinction requiring actions which simultaneously reduce demand or ensure supply for both major fuel types. The rules therefore, permit the selection of fuel oil conservation measures or motor fuel conservation measures in a petroleum supply emergency.

The measures included in this rule are either intended to restrain demand or increase and manage available supplies of petroleum. The Governor may select among these measures with the advice of the Agency, as the situation demands. This gives the State a broad and flexible capability to appropriately respond to the numerous potential petroleum shortage scenarios. This structure is intended to fulfill the requirements of Minn. Stat. § 116H.09, subdivision 1 which states:

> The plan shall contain alternative conservation actions and allocation plans to reasonably meet various foreseeable shortage circumstances and allow a choice of appropriate responses.

Given this structure, the Agency has attempted to include all reasonable actions that might relieve a shortfall situation. An action was considered reasonable if it met three basic criteria: 1) Demand restraint measures would yield substantial fuel savings; or supply management measures would substantially ease the disruption resulting from the shortage; 2) The measures would be efficient, acting to minimize the economic disruption resulting from the shortage and allowing normal market mechanisms to work when ever possible; 3) The measures should be equitable, and avoid placing undue burden on any single group or individual.

The following measures will be discussed within the framework of these criteria.

Fuel Oil Emergency Measures

Rule 2.3114 A. Voluntary conservation, encouraged and taught through state education and information outreach are reasonable because they allow the individual consumer of fuel oil the choice of selecting from among a number of conservation measures.

Rule 2.3114 A.1. Reduction of thermostat settings has the largest potential for fuel oil savings of any single demand restraint measure short of curtailment of fuel oil supplies to industry. The Energy Agency estimates that the average residential thermostat is set at 68°F. Thus, if theremostats are requested to be lowered to 65°F, this will be a reduction of 3°. A 3° reduction in thermostats will yield an approximate nine percent savings in fuel oil. The Minnesota Energy Agency estimates that 10.0 million barrels of fuel oil were used in 1980 for residential space heating, nearly 40 percent of total fuel oil consumption, and 40 percent of that was used during the months of January and February. Nine percent of this is approximately 360,000 barrels. If approximately ten percent of homes are exempted from this measure for health reasons (i.e. the elderly) and another ten percent decline to comply with the measure, the savings is reduced to 290,000 barrels. This savings is two and one quarter percent of the fuel oil used during the months of January and February. This is a very significant saving, causing no economic disruption with all residential consumers equally sharing the sacrifice.

During the public comment period several people expressed concern that the elderly and sick would suffer from this action. In order to prevent potential hypothermia problems, the Emergency Operating Center will specifically warn the elderly, sick, and families with children under the age of one not to participate in this measure. These groups were selected upon the advice of the Minnesota Department of Health.

The Governor may also request that residential waterheater thermostats be set back to between 105° and 115° or the lowest possible setting. This would represent a 10° to 20° reduction from the current assumed settings of 120° to 140°. The expected savings from an average 15° thermostat setback will yield an estimated seven and a half percent energy savings according to "Electric Price Statistics" published by the Department of Energy. An estimated 2,309,000 barrels of fuel oil was used to generate electricity in 1978 and approximately 16 percent of electricity goes to water heating, or 369,000 barrels. We further assume 40 percent of this occurs during the months of Janaury and February or 147,791 barrels. The 7.5 percent savings from reduced themostat settings would yield 9,980 barrels of fuel oil, assuming 90 percent participation. This is approximately .2 percent of the fuel oil used in January and February.

In addition to this saving, temperature reductions on gas water heaters will provide natural gas for customers who now have their natural gas supply interrupted and burn residual oil for part of the winter. A 15° setback in thermostat settings will result in approximately 7

pecent natural gas savings, according to a study by the Oak Ridge National Laboratory (ORNL), "Residential Water Heaters: Energy and Cost Analysis." Estimating that 17 percent of natural gas consumption is for water heaters, this measure may reduce natural gas consumption by 211 million cubic feet. If all of this was used by commercial customers who would use fuel oil when interrupted from natural gas this would save 36,320 barrels of fuel oil, assuming a 90 percent compliance rate, or .6 percent of the fuel consumed during that period (based on 1978 estimates).

In total, reduction of thermostat settings by 15° would save an estimated .8 percent of the fuel oil consumed in January and February. Similar to space heating thermostat setbacks, this measure causes no economic disruption and equally burdens all groups.

Rule 2.3114 A.2. Rather than implementing specific measures the govenor may establish voluntary conservation targets for various industrial, and governmental groups, and residential targets. These targets could be reached in any way the consumer chose: reduction of thermostats, increased insulation, use of alternative heating, reduction of truck travel, etc. The Emergency Operating Center would then monitor fuel consumption to determine the effectiveness of their efforts. Thus, this measure gives consuming groups the most flexibility in reducing consumption and, so, should cause the least personal and economic hardships.

Electricity and natural gas will be included in these measures for the reasons discussed in the analysis of the water heater thermostat reductions. Electricity is frequently generated with petroleum products during peak periods. Thus, reduction of peak electricity use will save fuel oil. Saved natural gas may be used by interrupted commerical customers whose alternative fuel is fuel oil. Thus, in periods of fuel oil shortages it is important to conserve all major energy sources.

Rule 2.3114 A.3. This measure might include such strategies as a compressed work week, closing of recreational facilities, and weekend or evening closings of businesses. The objective of this measure is to cut energy consumption in commerical buildings by reducing the periods of occupancy.

Industrial and commercial use (except transportation) of fuel oil represents approximately 17.3 percent of fuel oil consumption in Minnesota. During the month of January and February this is approximately 2,200,000 barrels. DOE estimates that as much as 33.3 percent of this is used in provision of essential services such as hospitals, sanitation services, etc. This reduces the potential pool of fuel oil to about 2,000,000 barrels. We assume that unoccupied hours may be increased by 6 percent (or by eight hours in an average work week), from 64 percent to 70 percent of the time. Assuming a 10° thermostat setback during unoccupied times, this measure could result in 1.5 percent decrease in commercial fuel oil consumption. This is a savings of 30,000 barrels or .2 percent of fuel oil consumed in January and February.

This measure may cause some minimal economic disruption. Because it is voluntarily undertaken, however, we assume that it will be less than the economic disruption resulting from the shortage of fuel oil. Furthermore, because it is voluntary it will not place undue burden on any single group.

Rule 2.3114 A.4. If it is determined that a fuel oil shortage will last only a relatively short period of time, release of fuel oil from large inventories may provide necessary supplies to ease shortage conditions. Results from a 1979 survey indicate that 26 percent of users have storage capacity over 50,000 gallons.

Average consumption for the period January and February is 52,000 gallons per week for this group. Thus, approximately 25 percent of commercial users have fuel oil that might be released for consumption.

These inventory releases would be compensated in a manner similar to any private sector transaction. The firm releasing the fuel oil would arrange with the fuel oil jobber to be paid the market value of the fuel oil released, or reimbursed in fuel oil when supplies of fuel oil become available.

This rule also specifies the way in which released fuel oil will be used during the emergency. This is specified to ensure that it is allocated to the priority uses set forth in the emergency rules. These procedures will, in effect, cause released fuel oil to be distributed like state-set-aside, through the Fuel Allocation Rules of Procedure. The state has had six years of experience in use of this or similar procedures to manage shortage situations.

Rule 2.3114 A.5. Business, industrial and government use represents 56.7 percent of fuel oil consumption or approximately 18,000,000 million barrels during January and February. If even 1 percent of this consumption could be saved by closing buildings and heating them at levels to maintain minimal plant safety, 180,000 barrels could be saved. Buildings that potentially could be closed include warehouses, garages, and unoccupied buildings.

As with all voluntary measures the personal and economic disruption is minimized using this measure. Each consumer determines the appropriate level of sacifice for their individual situation.

Rule 2.3114 A.6. Public information efforts will be conducted to educate Minnesotans about methods to conserve fuel, and inform citizens about the severity of the shortage. Informing citizens of the dimensions of the shortage will raise citizens' awareness of the shortage. This measure is intended to gain Minnesotans' commitment to voluntary efforts to reduce fuel consumption. Education efforts will then instruct citizens in ways to achieve this fuel consumption.

The fuel savings gained from this measure are difficult to calculate. If use of this measure, however, increases compliance with voluntary measures by 5 percent, the savings would be significant.

As with the other voluntary measures, use of public information efforts will only burden people to the extent they personally determine justifiable. This measure should cause no economic disruption. It will, however, require communication services to provide broadcast time and newspaper space for these information efforts.

Mandatory Measures

Mandatory measures will be implemented in the event that voluntary efforts do not or apparently will not reduce the shortage or are not appropriate for use at this stage. Voluntary conservation is the key to this plan and measures that restrict the behavior of Minnesota residents will be used cautiously. As a result, mandatory measures are broken up into two groups. Mandatory measures contained in rule 2.3114 B. are considered less obtrusive and result in little or no economic or environmental disruption. In contrast, the mandatory measures included in 2.3114 C. are more severe and will only be selected after the measures in 2.3114 B. have failed or will fail to alleviate the situation.

Rule 2.3114 B.1. Reduction of thermostat settings to save natural gas and fuel oil is the single most important demand restraint measure included in the fuel oil plan.

The Emergency Building Temperature Restrictions (EBTR) set maximum heating and cooling temperature for all buildings. They require that thermostats for space heating not be raised above 65°F during occupied periods of the day and 55°F during unoccupied periods of the day. Hot water heater temperatures must be set at 105°F according to the EBTR.

Although the Federal Emergency Building Temperature Restrictions regulations are no longer in effect, the 1979 regulations are cited to as the stamdards required under this rule. These standards have been tested through actual implementation, and are familiar both to state enforcement officials and to building owners and operators.

These regulations exempt residential buildings, hotels, hospitals and health care facilities, elementary schools, nursery schools and day care centers. Additional exemptions are extended as follows:

(1) Where a "manufacturer's warranty", service manual or equipment service contract requires specific temperature levels to prevent damage to special equipment.

(2) Where maintenance of certain temperature and humidity levels is critical to materials and equipment used in manufacturing, industrial or commerical processes.

(3) Where maintenance of certain temperature and humidity levels is required for the proper storage or handling of food or other agricultural commodities, raw materials, goods in process and finished goods.

(4) Any other circumstances where special environmental conditions are required to protect plant, life, or are essential to the operation of a business.

(5) Where maintenance of certain temperature levels is required for health reasons.

(6) Where the structure or insulation of the building will be damaged.

(7) Where nutritional, recreational, and other facilities are specifically designated for use by senior citizens, the thermostat may be adjusted to raise the dry-bulb temperature to 70 degrees F. during the heating season.

The complete Emergency Building Temperature Restrictions are attached in Appendix B. It is estimated that this measure will save 2

percent of the fuel oil consumed during January and February, or nearly 200,000 barrels, assuming a 90 percent compliance rate and a 3° thermostat reduction.

This measure yields substantial fuel oil savings and does not disrupt economic activity or limit personal activity in anyway.

Rule 2.3114 B.2. Most heating, ventilating and air cooling systems in commercial buildings in Minnesota are required by the State building code to conform to ASHRAE 62-73. This ASHRAE standard varies by type of building use but generally requires intake of 25 cubic feet per minute (CFM) of outside air per person. A lesser level is allowed in areas where smoking is prohibited. This mandatory conservation measure restricts intake levels to five CFM per person. In order to control odors and air quality, smoking would be prohibited in buildings which conform to the reduced ventilation levels. During the hours in which a building is closed (unoccupied), intake of outside air would be prohibited.

A study of three Minnesota industrial operations was conducted for MEA by FluiDyne corporation in 1978. This study estimated that a reduction of 10 to 23 percent in energy use for space heating was possible by decreasing outside air intake for ventilation through a variety of steps.

Based on these studies, we believe that this measure is likely to produce sufficient savings to justify its use during an emergency. For planning purposes, such savings should be estimated at approximately ten percent of fuel used for commerical space heating over the entire heating season. This represents 550,000 barrels or 1.7 percent of fuel oil consumption that might be saved from this measure.

Certainly, this measure would prove burdensome to tobacco smokers However, the significant savings that would be achieved without environmental or economic side effects, justifies the use of this measure during an emergency.

Rule 2.3114 B.3. Electric utilities with oil-fired generating facilities used 1,055,500 barrels of middle distillates and 1,253,500 barrels of residual oil in electricity generation during 1979. The proportion of these petroleum products used during winter heating months could be used for home and commercial heating during a fuel oil shortage. According to the DOE publication "Cost and Quality of Fuel for Electric Utilities" approximately 40 percent of fuel oil burned is used during the winter heating months of December through February. Thus, of the 1 million barrels of middle distillate burned, 400,000 barrels are used during these winter months. If 20 percent of this is burned indirectly through purchase from the Mid-Continent Area Power Pool, nearly 338,000 barrels of fuel oil is conserved that might be used for home heating or a saving of 1 percent.

If residual oil was in short supply, utilities could be asked to refrain from burning this oil. Of the 1,250,000 barrels of residual oil burned, approximately 400,000 could be freed-up during the months of December through February, or another 1 percent fuel oil savings.

This measure does require exceptional sacrifice on the part of electric utility companies. Electricity that is purchased from the power pool will usually be more expensive than self-generated power. However, this measure frees-up, two percent of the state's annual fuel oil use

Rule 2.3114 B. 4. In a 1979 survey of fuel oil users, the Minnesota Energy Agency found that the commercial and industrial users that were surveyed used, on average, about 1,000,000 gallons of middle distillates a year. This is approximately 52,000 gallons per week during the winter heating months of January and February. Twenty-five percent of the users surveyed had storage capacity larger than this weekly consumption, up to a capacity of 5,000,000 gallons. The average storage capacity was over 260,000 gallons according to this survey.

This indicates a great capability, in the state, for industrial and commercial users to operate from their own fuel oil supplies during a shortage. Thus, by not delivering supplies to users with large storage capacity the fuel oil is made available to other users. Although this measure does restrain demand or increase total supplies, during a shortage lasting only a few weeks or a month, such a measure could ease shortage conditions.

This measure should not cause significant disruption for users who are required to draw on their storage supplies. The measure specifies that the jobbers will provide supplies when the user has less than one week's supply remaining. Furthermore, it does not require the commercial or industrial user to release any inventories, rather it requires that these users consume their existing supplies.

Rule 2.3114 B.5. In most cases the Agency anticipates that home heating oil, referred to as middle distillate, will be the fuel oil product in short supply. Lower grade fuels such as residual oils are anticipated to be in adequate supply in all but the most severe petroleum disruption. As a result, groups of users such as natural gas and propane consumers who are ordered to burn residual oil, will be freeing-up other home heating fuels. The MEA knows that there are many schools and hospitals in the state with the capacity to burn residual oil who are now burning middle distillate. Taking this into account, this measure could result in a significant amount of middle distillate being made available for residential and other first priority users.

The clause specifying that the PCA may exempt individual consumers from this measure was included to protect the environment. Residual oil has more air pollutants that natural gas or middle distillate. Thus, burning residual oil may violate environmental standards. If PCA indentifies such a case it may order that the user be exempted from this measure.

In most cases, switching to residual oil from middle distillate will not cause severe economic hardship. Although more costly for storage and maintenance, the residual oil itself is substantially less expensive than middle distillates.

Propane and natural gas users may in some circumstances find that switching to residual oil an economic burden. MEA staff in determining "the least restrictive" measures necessary to eliminate a fuel shortage will weigh the economic costs against the severity of the shortage.

Rule 2.3114 C. If the measures of 2.3114 B. do not ameliorate the shortage, or if the Agency determines that these measures will not be adequate to manage a fuel oil situation, this rule proposes a set of very severe actions that may be taken. These measures are separated from the previous measures and require additional documentation of need, because of their very severe nature. They are included, however, because in the event that a shortfall of greater than 15 percent or one of sustained duration occurs, the previously described actions will probably not be adequate to control the situation.

Rule 2.3114 C.1. Buildings not required by Minnesota Statutes to maintain a minimum temperature of 65°F while occupied will be required to lower thermostats, by approximately 3° to 62°F. Approximately 80 percent of worksites are covered by Minnesota Rules MOSHC 41f. Furthermore, all buildings would be required to lower thermostats to 50°F during unoccupied periods. Assuming 10% of buildings will be exempted from participation and a 90% compliance rate for the evening temperature reductions, this measure would reduce overall commercial fuel oil use by 6.8 percent or 376,176 barrels. This represents 1 percent of total fuel oil consumption.

This measure, however, poses a potential health hazard. Temperatures below 65°F can cause hypothermia if individuals do not dress warmly. In addition, there is evidence that productivity drops at temperatures below 65°F. As a result, this measure may cause some economic disruption and personal discomfort..

Temperature reductions at this stage of a fuel oil shortage are made necessary because some areas of the state may not have adequate supplies to maintain even minimal and safe building temperatures and normal economic activity has been interrupted for some time. In light of these kinds of situations, additional thermostat reduction becomes a reasonable request.

Rule 2.3114 C.2. Certain environmental standards may be relaxed where fuel oil savings result. For example, the temporary relaxation of sulfur dioxide emissions standards for users of residual oil would generate additional distillate supply by permitting refineries to blend less distillate stock with residual quantities. The "blending" or "cutting" of residual fuels with higher grade distillate stocks serve to reduce the average sulfur content of the residual oil. The cutting is necessary to market residual oil in areas where the maximum allowable emissions of sulfur dioxide for liquid fuels is 1.6 lbs. per million BTU. By permitting refineries to market higher sulfur content residual oil and relaxing the sulfur standard for large stationary source users of this residual oil, distillate stocks become "freed-up" for high priority distillate users.

The responsibility and authority to protect Minnesota's air resources is vested with the Minnesota Pollution Control Agency. Any suspension or relaxation of air standards must be approved by the Air Pollution Control Board and in instances where State Implementation Plan (SIP) provisions are subject to temporary suspension, the Environmental Protection Agency must also approve the proposed measure.

Refinery managers indicated several constraints in maximizing distillate output at the expense of the quality of residual fuels.

The type of crude oil refined determines to a large degree the quantities of lighter fuels (gasoline, jet fuels), heavier fuels (bunker oil, residual), and middle distillates (diesel fuel and home and commercial heating fuel), comprising the product yield.

Crude oils also vary in their latent sulfur content. The type of crude used as input determines to a large extent the sulfur content of the bottom of barrel distillates, typically residual oil. It then becomes necessary to "blend" lower sulfur residuals in order to produce a residual oil with a permissible sulfur content.

To the extent this "blending" is performed to lower the sulfur content of the residual oil to enable the refinery to market the product in areas with more stringent emissions limitations (2.0 lbs. per million BTU), a relaxation of such standards permits increased yield of middle distillates.

An estimate of the resulting savings is approximated 1000 barrels a day (b/d) of No. 2 home heating oil. A production of 1000 b/d is approximately .7% of the average daily consumption of diesel fuel during the heating season (October - April). On a percentage basis this estimate of product yield seems small, however, the adoption of this measure would probably only occur in the final phases of a fuel oil emergency. In the severe case scenario during which this measure is adopted, it is likely that fuel for homes would be in short supply. The 1000 b/d is sufficient fuel to heat 8400 single family dwellings during a winter fuel oil shortage.

This measure adversely affects the air quality in an area where a substantial number of point sources are permitted to burn higher sulfur content residual oils. The consequences of air pollution are well known and documented. Polluted air poses a chronic health threat for all people.

Despite this, the immediate health and safety of our citizens during a severe fuel oil emergency will be better served by providing fuel for heating homes during the heating season as compared to the marginal increase in sulfur dixoide emissions during the declared emergency. PCA estimates taken from area ambient air quality models based on the 1000 b/d increase in quantity of greater than 2% sulfur fuels moreover, indicate no deleterious effect on ambient air quality.

The Minnesota Energy Agency will request the PCA to explore the fuel oil savings that might result from relaxing other environmental standards and developing procedures for effecting these changes during a fuel oil emergency. In this way, both the environmental damage and the fuel oil savings will be evaluated prior to an emergency situation.

Rule 2.3114 C.3. In most severe fuel oil shortages this rule gives the State the power to curtail delivery of fuel oil supplies to specific industries. Using this method fuel oil supplies would be freed-up so that first and second priority users may receive adequate supplies. Some economic disruption from industry curtailment is imminent. However, the orderly termination of fuel oil supplies will minimize the economic and social disruption incident to severe energy shortages and is much prefered over the random effect of an unmanaged emergency.

This rule specifies that fuel oil suppliers and firms in the affected industry will be notified by registered mail. This assures that fuel oil suppliers and firms have the necessary information to comply

with the measure. In addition, such notification will allow firms to begin appeal of the order, if they so choose, as soon as possible.

The criterion to determine the order of curtailment is the minimization of employment layoffs and the maximization of fuel oil . The indicator for the order of curtailment, (Rule 2.3111 C.3.a.), is the ratio of an industry's consumption (in BTU's) of fuel oil and natural gas per employee per year. Industries with relatively small workforces as compared to energy consumption will be the first to have supplies curtailed.

The indicator is based on both natural gas and fuel oil consumption because many industrial and commerical users use natural gas on an interruptible basis. When interrupted from natural gas supplies, these consumers use fuel oil. Thus consumption of fuel oil alone does not reflect their true energy intensity. If an industry with a very high energy-labor ratio had been interrupted from natural gas and was using fuel oil, that industry would have its fuel oil curtailed in the appropriate order. If the industry was still using natural gas, then it would not be disrupted by having fuel oil supplies curtailed. The ranking of industrial groups by Energy Agency estimates of energy-labor ratios are as follows:

Natural Gas & Fuel Oil (10^6 BTUs)
Per Employee

1976 (Actual)		1980 (Estimate)	
*Petrol Refining	(17,672)	*Petrol Refining	(17,690)
Iron Mining, Ferrous	(3,048)	Iron Mining, Ferrous	(1,640)
Pulp, Paper	(1,194.4)	*Electric Utilities	(1,127)
*Electric Utility	(1,148.29)	Pulp, paper	(1,094.7
*Trucking	(1,141.6)	*Trucking	(962.8
*Other Utilities	(898)	*Other Utilities	(956.3
Primary Metal	(775.13)	Primary Metal	(691.6
Lumber, Furniture	(594.59)	Lumber, Furniture	(624.6
Chemicals, etc.	(480.13)	Chemicals, etc.	(494.2
Railroad	(463.42)	*Food Kindred	(476.5
Stone, Clay, Gl	(455.5)	Stone, Clay, Gl	(472)
*Gas Utilities	(425.4)	*Gas Utilities	(467.8)
*Food Kindred	(404.11)	Railroad	(384.2
Non Ferrous Mining	(240.6)	Non-Ferrous Mining	(257.9)
Other, Quarry	(239)	Other, Quarry	(230.6
Other, Services	(218.93)	Other, Services	(214.0
*State/Loc. Gov.	(187.54)	*State/Loc. Gov.	(186.5
Other Trans.	(173.71)	Fed. Government	(150.8
*Medical, Ed.	(158.44)	Other Trans	(144.6
Fabric·Metal	(154.93)	Fabric·Metal	(142.1
Fed. Government	(147.37)	Electrical	(112.8
Electrical	(122.52)	*Medical, Ed.	(107.0
Finance (F.I.R.E.)	(110.18)	Finance (F.I.R.E.)	(102.7
Machinery	(75.61)	Hotels, Personal Services	(65.0
Hotels, Personal	(69.33)	*Livestock	(60.8
*Print, Publishing	(61.69)	Machinery	(58.5
*Livestock	(60.35)	*Print, Publishing	(57.4
Retail	(50.53)	Retail	(49.8
Business Services	(49.52)	Wholesale	(48.4
Wholesale	(48.91)	Business Services	(48.3
Other MFG	(27.45)	Other MFG	(26.7
Construction	(5.95)	Construction	(5.7

*Some or all of the firms in this industry are first or second priority users.

Rule 2.3114 C.3.b. First priority users of fuel oil are necessary for the continued health and safety of the citizens of the state. Curtailment of these groups would contravene the fundamental purpose of energy emergency preparedness: to minimize the personal and social disruption resulting from a fuel oil shortage. Thus, first priority users will be last to be curtailed.

Similarly, second priority users of fuel oil are considered to be necessary for the health and safety of the citizens of the state or critical to minimizing economic disruption resulting from the shortage. This group will be curtailed from fuel oil supplies only after third priority users have been curtailed.

Rule 2.3114 C.3.c. An exemption from curtailment of fuel oil deliveries is provided for firms who have demonstrated significant conservation efforts. This exemption is granted, in part, to satisfy Minn. Stat. §116H.09 Subd. 1. which states:

> The plan ... shall: (a) Give priority to individuals, institutions, agriculture and businesses which demonstrate they have engaged in energy saving measures ...

Moveover, the Agency wishes to encourage energy conservation. If Minnesota is successful in reducing its energy consumption, the chances of a fuel oil disruption are greatly reduced. We hope this measure will encourage firms to take fuel oil saving actions before an energy emergency arises.

Rule 2.3114 C.3.d. During the public comment period the Agency received several suggestions that an individual firm's energy-labor ratio should somehow include consideration of the number of degree-days in its area. Firms in the northern part of the state would have difficulty proving that their fuel consumption per employee was lower than the industry average, not because of any lack of conservation effort, but rather because it is colder in those areas.

Thus, this rule requires that firms divide their energy-labor ratio by the ratio of local degree days to statewide degree days. For example, if a firm in Hibbing estimated its energy labor ratio as $1,200 \times 10^6$, it would divide this number by $\frac{\text{Hibbing degree days}}{\text{statewide degree days}}$ or 9,600/840 or 1.143. This would reduce the firm's energy labor ratio to $1,050 \times 10^6$.

Similarly this rule removes any advantage firms in the southern part of the state might have had. This rules allows all firms in an

industry equal opportunity to successfully appeal an order to curtail fuel oil deliveries based on conservation efforts.

Rule 2.3114 C.3.e. The Agency will publish its estimates of energy-labor ratios so that an industry-wide effort to reduce the ratio may be conducted or the Agency's estimates may be contested. In addition, this information will give individual firms a target for conservation efforts. The ratios will be published annually because the ratios and the rank order of curtailment will change as industries conserve, or develop alternative fuel sources, etc. The energy-labor ratios will be published in October so that industries will be put on notice before the peak heating months of December through February, the period during which the state is most susceptible to fuel oil shortages.

Rule 2.3114 C.4. In the event that there are not adequate fuel oil supplies available to continue to heat residences, the State will request that citizens move in with friends or relatives or into emergency shelters. This measure will be undertaken to prevent death or illness from hypothermia and will only be done with the voluntary participation of the citizens of the state.

The Emergency Operating Center, using its traditional sources such as the Red Cross, local law enforcement officals, and the National Guard, will provide evacuation assistance. This assistance will include designation of and transportation of citizens to emergency shelters so that the process it orderly and does not result in panic. These groups will also provide assistance and information about closing homes in order to minimize the damage done from inclement weather.

This is clearly a measure that will cause extensive personal and social disruption. It will be done only to maintain the health of the citizens of the state. It must be evident to the Agency, that in a shortage of such serious proportions, actions to secure heated places for temporary residences will be desired by the citizens of the state. This measure would be necessary to prevent death or illness from hypothermia.

Rule 2.3120 Motor Fuel Emergency Measures

The following measure descriptions are intended to support and prove the need for and reasonableness of the measures described. The demand reduction measures presented and analyzed in this section are:

Rule 2.3120 A. Public Information/Voluntary Conservation

Rule 2.3120 B. Employer-Based Conservation Measure

Rule 2.3120 C. School Conservation Program

Rule 2.3120 H.
& Rule 2.3121 D. Speed Limit Measures

Rule 2.3120 D. Odd-Even Purchase Restriction

Rule 2.3121 A. Vehicle Permit-Sticker Plan

Rule 2.3121 B.
& Rule 2.3121 C. Recreational Vehicle Bans

Rule 2.3121 E. Driving Ban

The following supply management measures are also treated in this section:

Rule 2.3120 E. Minimum Purchase Requirement

Rule 2.3120 F. The Flag System

Rule 2.3120 G. Motor Fuel Availability Measure

Rule 2.3120 A. Public Information/Voluntary Conservation

Description of Measure

Minnesota's gasoline emergency plan relies heavily on the public's voluntary efforts to reduce gasoline consumption. Immediately prior to an emergency the state will step up efforts to educate citizens about simple measures that will yield substantial gasoline savings and about the impending shortage. In the past, citizens have responded conscientiously to state requests for cooperation during energy shortages. We anticipate a similar response in future shortages.

Energy saving measures that will be promoted are improved vehicle maintenance (primarily tune-ups and oil changes), improved driving habits such as smooth acceleration, engine breaking-in and speed reduction, reduced use of air conditioning, and reduced discretionary driving.

The purpose of this measure is to conserve motor fuel by providing for the widest practical dissemination of information on a regular and continuing basis to consumers about no or low-cost conservation actions. This plan relies heavily, especially in the early stages of an energy supply emergency, on the public's voluntary efforts in reducing motor fuel consumption. Direct appeals to the motoring public to conserve fuel have resulted in substantial energy savings.

Energy Savings

The energy savings resulting from voluntary conservation activity are difficult to predict. The public's perception of the seriousness of the shortage, the cause of the shortage, and the government's or industry's ability to manage and allocate supply during a shortage is the key to voluntary conservation. Furthermore, actual savings resulting from any one conservation action performed by the public is not clearly identifiable from among the number of conservation options available to individuals.

MIT analysis suggests that as little as .5% reduction in consumption can be gained from public information/education measures. The MEA believes voluntary conservation in response to public information and education to be significantly greater during an energy emergency.

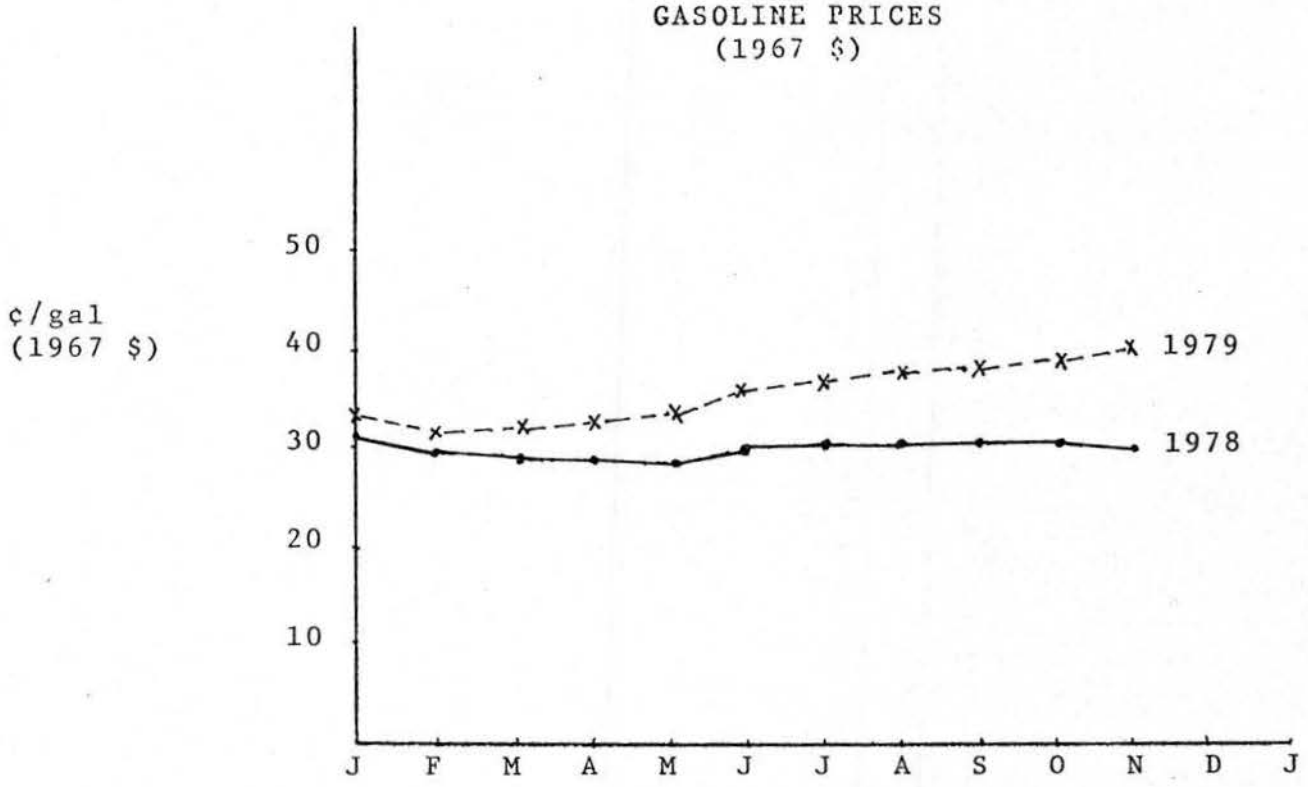
The 1979 gasoline shortage in Minnesota provided empirical proof that voluntary conservation results in substantial savings. Gasoline consumption in Minnesota had increased at an annual rate of 3.4% between 1976 and 1978, primarily due to increases in vehicle miles traveled and stable real prices of gasoline. Rising incomes and stable gasoline prices induced a 3.7% annual growth in total vehicle miles, yielding an annual growth of 3.4% in the consumption of gasoline (slightly less than the growth of vehicle miles traveled (VMT) due to the rising fuel efficiency of new cars).

In 1979, gasoline prices rose rapidly (see Figure III-1) which, combined with spot supply shortages, casued a reduction in VMT and gasoline consumption compared to 1978. Had it not been for rapid price increases and product shortages, consumption would have been expected to increase at least 3% in 1979. Instead, actual consumption dropped to 2,213 million gallons, a reduction of 4.4% from 1978 and a 7.2 downturn from the projected 2,384 million gallons for 1979.

Figures 2 and 3 show the dramatic reductions in VMT and gasoline sales beginning in June of 1979. Product supplies were tight and prices were already 30% higher than the same month in 1978. Between June and October of 1979, consumption dropped 8% compared to the same period in 1978. This is equivalent to an 11% drop from trended consumption for 1979. An estimated price elasticity of -.22 would predict that a 36% real price increase would result in a 8% reduction from projected consumption.

FIGURE III - 1

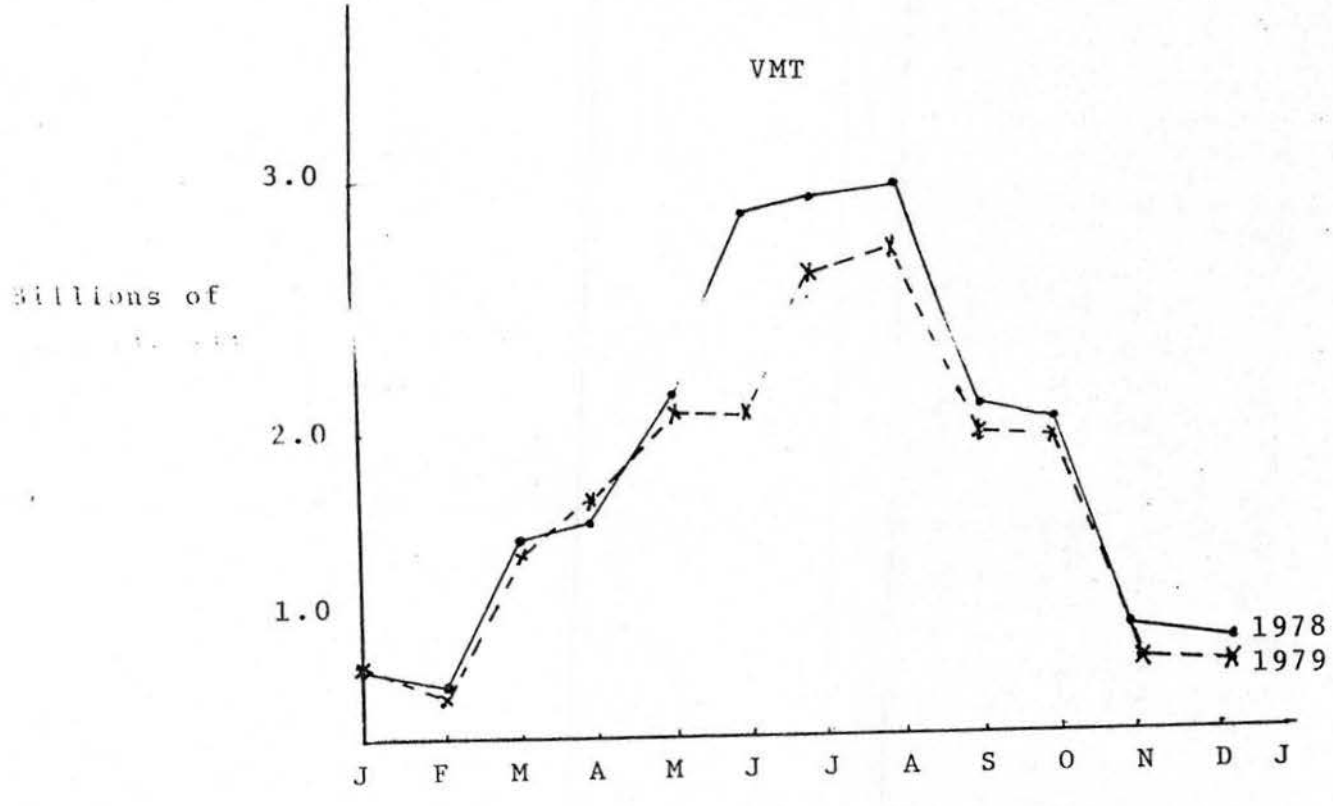
GASOLINE PRICES
(1967 $)



1978 Gasoline Prices: o——o——o——o

1979 Gasoline Prices: X- - -X- - - -X- - -X

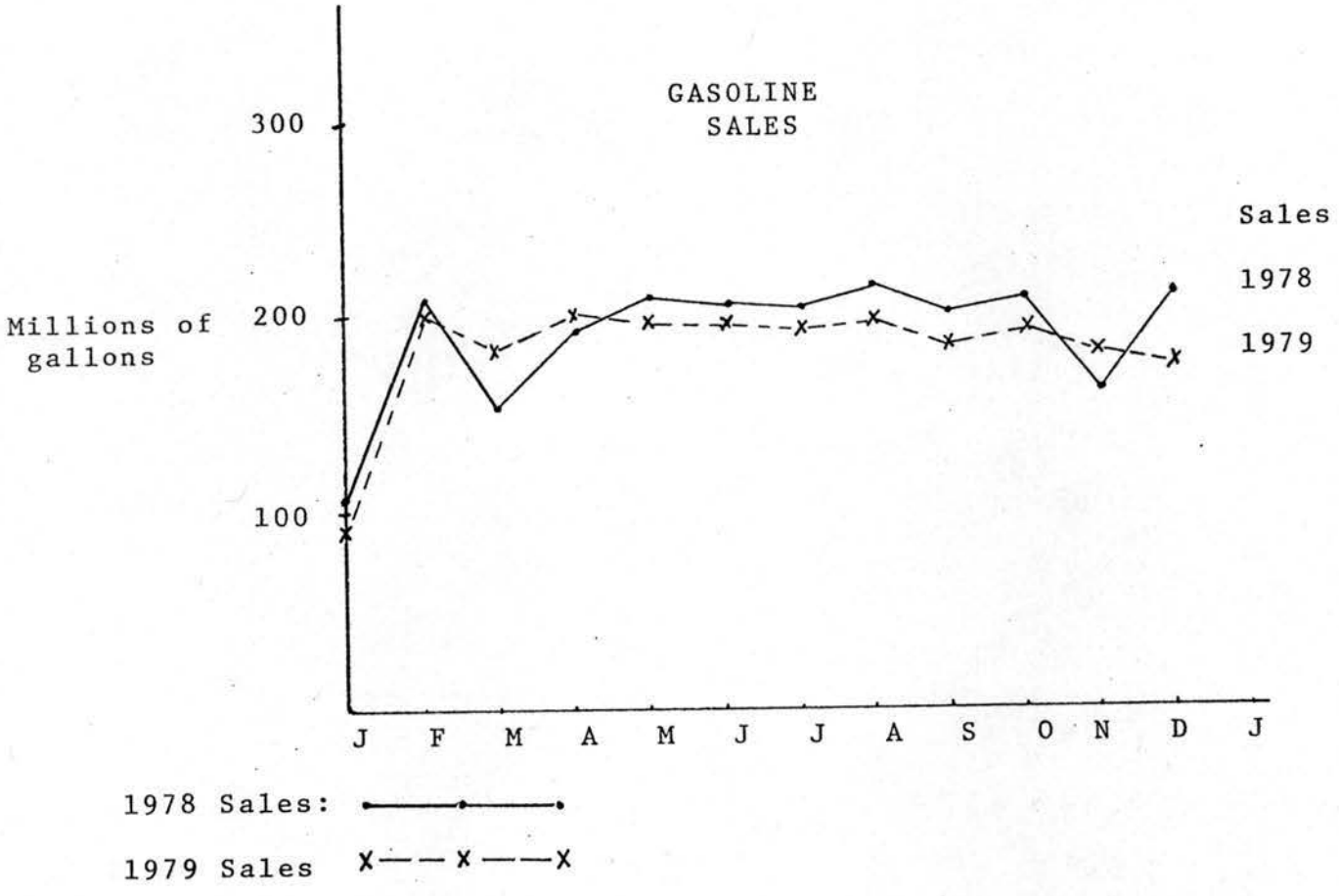
FIGURE III - 2



1978 VMT: ●——●——●

1979 VMT: X— —X— —X

FIGURE III -3



The 11% actual decrease in consumption, less the estimated price effect of 8%, yields a 3% decline in consumption that is attributable to voluntary conservation. Assuming a slower growth in consumption resulting from higher mpg in new cars, the savings due to voluntary actions may be lower, perhaps in the order of 2.5%.

The 1979 gasoline shortage was an episode where Minnesotans, presumably with the educational assistance of the State, voluntarily reduced consumption beyond that expected from the price increase.

We believe that future emergencies will yield similar savings of between 2.5 - 3% from voluntary efforts to conserve.

Employer-based Conservation Measure

Rule 2.3120 B. is intended to induce large employers, colleges, universities and trade schools, and local and state governments to plan and prepare for motor fuel shortages.

The employer-based conservation measure is an attempt to tap the energy conservation potential of a large consuming sector through delegation of planning responsibilities to large private employers, colleges and local governments.

The persons subject to these rules are encouraged to institute conservation programs prior to an emergency which would be too administratively cumbersome, and have no impact, if put in place simply for the duration of an emergency.

The employer-based conservation measure applies to three categories of employers. The first category includes all private, corporate, or institutional employers who maintain a workplace where 100 or more persons are employed over a 24-hour period. There are over 2100 major employers throughout the state in this category, employing an estimated 500,000 people, or a third of the total employed. This group is a cross section of manufacturing, banking and finance, insurance, mining, and construction enterprises.

The second category comprises all post-secondary educational institutions in Minnesota that have a combined student/faculty/staff population of 200 or more. There are over 135 such institutions in the state employing 14,500 people and having a combined enrollment of 212,000 students.

The third category under this rule embraces all municipal, county and state worksites at which more than 50 persons are employed. The State of Minnesota alone employs 25,000 people. Eighty counties in the State maintain at least one worksite of 50 people or more. And 82 municipalities maintain worksites of 50 or more employees with a combined total employment of 21,000 people.

Pre-emergency conservation programs initiated to fulfill requirements of the employer measure could enhance the ridesharing, transit, or low energy transportation opportunities for three-quarters of a million employees and students at these employment sites.

Fifty-five percent of the daily average motor fuel consumption is attributable to work trips. Another 15 percent is attributable to commercial trips in automobiles, and light trucks. Unlike personal discretionary travel, these trips cannot be "limited" by choice when gasoline becomes in short supply or very expensive. The work trip and the business trip are the lifeblood of the State's economy and of individual economies.

The inflexible nature of the work trip and business travel does not, however, rule out the potential for conservation. Studies show that the work trip remains the area of greatest potential conservation savings. The Minnesota Dept. of Transportation (Mn/DOT) conducted vehicle occupancy surveys in the spring of 1980 which showed that the average vehicle occupancy between the peak morning "work trip" hours was only 1.25 persons per car, and that 75% of all vehicles were single occupant.

Emergency motor fuel conservation programs at the worksite, once in place, will aid employees and commuting students in responding to emergency shortage conditions. Employees not participating in a carpool in normal conditions may find a carpool both economical and time saving in emergency conditions. The capability to match employees to ridesharing vehicles takes preparation, planning, and lead time. Therefore it is reasonable to assume that ongoing conservation programs will have higher demand during fuel shortages.

Ridesharing and paratransit programs are generally regarded as having small potential if first attempted once a shortage has developed, but could yield significant motor fuel savings through increased use during an emergency.

Energy Savings Analysis

A probable range of motor fuel savings has been estimated for two employer conservation strategies; (1) the employer-sponsored rideshare program, and (2) the mandatory compressed work week.

1. Employer-sponsored rideshare program.

Motor fuel savings from increased employee ridesharing may be calculated by using the following formula:

$$(1)\quad GS(CP) = \left[\frac{CPOR}{AOR}\left(\frac{ART}{MPG} - H\right) - \frac{CRT}{CMPG}\right]$$

where:

GS(CP) = carpool motor fuel savings per day;
CPOR = carpool occupancy rate (average number of passengers per car);
AOR = automobile occupancy rate (average number of passengers per automobile);
ART = daily average round-trip miles traveled by automobiles to be replaced by a carpool;
AMPG = average automobile efficiency in miles per gallon;
H = daily average automobile consumption in gallons of motor fuel by a car left at home due to carpooling;
CRT = daily average round-trip miles traveled by a carpool; and
CMPG = average carpool efficiency in miles per gallon

For the purpose of the above calculation, the following values were used for Minnesota:

CPOR = 2.5 passengers/carpool
AOR = 1 passenger/automobile
ART = 0.9 X CRT = 27 miles
AMPG = 14.5 miles/gallon
H = 0.38 gallons
CRT = 30 miles
CMPG = 14.27 miles/gallon

Given that CRT = 30 miles, ART is assumed to be 90 percent of CRT to allow for the fact that a carpool will travel a slightly longer distance than the average distance traveled by the cars that the carpool replaces. The value for H of .38 gallons is taken from "Guidelines for Travel Demands Analysis & Program Measures to Promote Carpools, Vanpools and Public Transportation," prepared for the U.S. Dept. of Energy by Cambridge Systematics, Inc., Cambridge, Mass., November, 1976. Using an estimate of H = .38 gallons, the daily motor fuel savings per carpool is:

$$GS(CP) = \left[\frac{2.5}{1}\left(\frac{27}{14.5} - .38\right) - \frac{30}{14.27}\right]$$

$$= 1.6 \text{ gallons}$$

Assuming a 5 day work week, the weekly savings is 5 X 1.6 or 8 gallons per carpool.

According to "Motor Vehicle Facts and Figures 80" (at p. 49) approximately 70 percent of employed adults use single occupant auto transportation in getting to and from work. Auto occupancy counts conducted by the Traffic Management Center of the Minnesota Department of Transportation (Mn/DOT) similarly found 75 percent of vehicles between the hours of 6:30 to 8:30 a.m. to be single occupant. (See, Benke, "1980 Baseline Auto Occupancy Results") Ridesharing experts at Mn/DOT estimate however, that approximately 40 percent of the single-occupant commuters are unable to use mass transit or ridesharing because of the nature or location of their jobs.

Assuming this relationship (one out of three people can not or will carpool) holds true for employees at large worksites, out of a total working population of single occupant commuters of 600,000, 66 percent or 400,000 are potential ridesharers. At an average occupancy rate of 2.25 people per carpool, an additional 175,000 carpools could be formed statewide. In response to emergency conditions, a 70 percent employee participation rate might be expected, yielding an increase of 123,000 carpools. Seventy-five thousand foregone single occupant commuting trips would save 960,000 gallons per week. (120,000 new carpools X 8 gallons per week savings per carpool).

Savings = 960,000/44,000,000 gallons
This amounts to 2.2% of an average August week's gasoline consumption.

Other Effects and Considerations

The ridesharing strategy is particularly attractive because it causes no economic, personal, or social loss while yielding motor fuel savings. Furthermore, it may be undertaken at a relatively low cost to the participating employers.

Vanpooling was considered feasible as an emergency measure primarily because a vanpool delivers 100 passenger miles per gallon and in-place vanpool programs may be able to supplement the number of employee vanpools in an energy emergency. For the same reasons given for ridesharing programs, vanpool programs are more appropriately taken as a pre-emergency conservation measure. The calculation for energy savings from vanpools is the same as that for carpools, with the following value changes:

VPOR = 10.89 passengers/vanpool
AOR = 1.33 passengers/automobile
ART = (.9VRT) = 48.6 miles
AMPG = 14.5 miles/gallon
H = .38 gallons
VRT = 54 miles
VMPG = 10 miles/gallon

Thus, gasoline savings per day per vanpool would equal:

$$\left[\frac{10.89}{1.33}\left(\frac{48.6}{14.5} - .38\right) - \frac{54}{10}\right] = 21.66 \text{ gallons}$$

Compressed Work Week

If an employer does not have an approved emergency conservation plan and an energy emergency becomes severe, Rule 2.3120 B.9. provides that these employers may be required to institute a compressed work week. Analysis of this measure assumes that 50 percent of all major employers would opt for a four day work week under very serious shortage conditions rather than develop emergency plans.

Analysis

The gallons of motor fuel saved is equal to miles saved, divided by miles per gallon of motor fuel consumed The miles saved during a compressed work week equals the work trips made unnecessary because of a four day work week times the average work trip distance..

Miles saved = 320,000 work trips X 30 miles per average daily work trip (roundtrip)
= 9,600,000

Motor fuel savings equals the reduced vehicle miles divided by the average fuel economy less the added vehicle miles from increased discretionary driving.

Motor fuel savings = (9,600,000 - 14.5 mpg) - (216,000 - 14.5 mpg)
= 647,172 gallons

This is 1.5% of an average August week's gasoline consumption.

Legal and Equitable considerations.

The compressed work week measure is as a last resort strategy. A mandatory compressed work week necessarily interferes with normal business activity. Moreover, it will likely result in less than forty-hour a week for employees, unless ten hour days are established.

Before the Governor would consider imposition of such an onerous restriction on private sector activity, the following factors would have to be present:

1. A severe energy supply emergency exists which threatens priority services that protect the health and safety of the citizens of the state; and,

2. A substantial number of large employers already have met the requirement of the employer-based conservation measure by submitting to the Energy Agency an emergency motor fuel conservation plan and have been requested to implement strategies selected.

The State's ability to impose emergency measures which impair private contractual obligations otherwise prohibited under the Contract Clause of the U.S. Constitution, Art. I, § 10, Cl. 1 has been the subject of numerous constitutional challenges. The standard which a court might test the application of the compressed workweek measure was set forth in an opinion of the U.S. Supreme Court in Home Building and Loan Association v. Blaisdell 290 U.S. 398 (1934).

The Blaisdell standard for permissible exercise of state police power regulating private conduct in an emergency looks to whether the statute or (law):

1. Was enacted to protect a basic societal interest;
2. Is appropriately tailored to the emergency it was designed to meet;
3. Is temporary; and
4. Imposes conditions that are necessary and reasonable.

The Agency believes that the mandatory compressed work week measure meets the Blaisdell standard.

For the compressed workweek order to withstand an equal protection or 14th Amendment challenge, it must be determined to be rationally related to a legimate government objective. The objective of the employer-based conservation measure is to conserve motor fuel by requiring certain employers to adopt strategies which reduce employee commuting and business travel motor fuel consumption in an Energy Supply Emergency. The State has a compelling interest in energy emergencies to see that conservation is practiced to provide for the health and safety of the citizens of the State.

The size of the employer was determined important because of the feasibility and practicality of establishing rideshare programs at the worksite. Comments received from agencies providing ridesharing services supported the designated size criteria for establishing major employer categories, based on what was considered a minimum pool or population necessary to establish a viable worksite rideshare program. Group one employers, private employers with a worksite of 100 or more employees, number 2100[1]. There are an estimated 500,000 employees at these sites. Group two employers, post-secondary educational institutions with 200 or more commuting students, faculty, or staff number 135. There are as estimated 212,000 students attending these insitutions. And Group 3 employers, governments with a worksite of 50 or more employees, are comprised of state agencies, public corporations, counties and municipalities. There are estimated to be 220 government units meeting the minimum worksite standard and, who employ a combined workforce of 50,000.

The criteria used to designate major employers under the employer plan measure are reasonable standards for determining the minimum employment levels necessary to support ridesharing programs The employer selection by size of employment force also makes the decentralized planning more efficient and effective by reaching the greatest number of employees through a relatively few worksites.

The employer measure is expected to generate 1400 emergency motor fuel conservation plans. (Of this total, an estimated 1057 will come from large employers, 125 from post-secondary educational institutions 49 from state agencies, 82 from municipal governments, and 87 from county governments).

School Conservation Program Measure

Rule 2.3120 C. is designed to involve school administrators and students in emergency contingency planning and long term transportation conservation awareness. The school conservation program measure requires all school districts and private school authorities to submit conservation plans to the Energy Agency within 18 months after the effective date of the Petroleum Supply Emergency Rules or within 45 days after declaration of an Energy Supply Emergency, whichever comes first.

The school conservation measure is very similar in design and concept to the employer-based conservation measure. Again, the option of constructing a completely self-styled conservation plan that demonstrates the capability of reducing baseline consumption by 15 percent during an energy supply smergency is provided for in the rule.

The school conservation program differs in two important respects: (1) conservation plans are required under this rule, and (2) a different set and number of strategies are included.

The plan requirement is necessary because the measure contains no real inducements for emergency contingency planning and threatens no penalties if pre-emergency planning is not done. In order to ensure that school districts are minimally prepared for petroleum shortages and that equivalent conservation efforts are made statewide, the plan is made mandatory. The 18-month period for completing an emergency contingency plan spans two full academic years.

Schools, like large employers, are institutions which draw large numbers of people to a relatively few sites on a daily basis. There are 927,000 students enrolled in primary, intermediate, and secondary schools in Minnesota. In addition, there are approximately 20,000 employees, teachers, and administrators in the Minnesota public and private school system.

Conservation Strategies for Schools

The school conservation program measure is intended to reduce the motor fuel consumption incident to attending school for students and staff in an emergency. The measure is designed to meet this goal by decentralizing the decisions for emergency contingency strategies among the 436 school districts. By placing the planning and implementation responsibilities on the school districts, centralized decisions on energy conservation can be made at the state level, while allowing schools and school districts to take conservation actions most appropriate or acceptable to them.

The strategies contained in this rule are divided into Category I and Category II. Category I strategies include: (1) prohibiting student parking on and around school grounds, (2) postponement of all extra-curricular activities, and (3) cancelation of school for two days during a 30-day period. These actions will not be taken until an energy supply emergency has been declared and the school conservation program measure has been selected by the Governor. Category II strategies, generally, are actions which have the potential for reducing motor fuel consumption during an emergency if steps and organization has been undertaken prior to an emergency. Student/staff ridesharing programs, facilities for bicycle and moped parking, parking management, and bus and driver fuel economy education are the types of strategies that require

pre-emergency implementation to yield savings during an emergency In addition, elimination of the on-the-road portion of driver's education and selected extracurricular activities cancelations are included in category II strategies because of their potential to save some fuel, but are not substantial enough to rank as Category I strategies.

Because school districts will choose different combinations of strategies, the estimation of savings attributable to the two cases are merely illustrations. The total estimated savings however, assumes that each Category I strategy will be selected by an equal number of districts, thereby resulting in 33.3 percent of the districts prohibiting student driving, 33.3 percent cancelling extracurricular activities, and 33.3 percent closing school for two days a month.

The energy savings attributable to the full scale application of the school conservation measure ranges from 150,000 to 200,000 gallons a week or .4 to .6 percent of total consumption.

Measure Analysis

Case #1 Prohibiting student driving on or near school grounds for the duration of an energy supply emergency.

This measure is intended to reduce gasoline consumption by high school students who drive cars to school rather than ride regular route school buses. This strategy could be implemented as an outright ban on high school student parking on school grounds. In addition to reducing direct consumption of gasoline, this measure would serve to improve the overall operating efficiency of the pupil transportation system.

Energy savings which could result from statewide prohibition of student parking at and around schools appears to be significant. One might expect that the number of high school students driving would vary widely from one school district to another based upon varying levels of transit service and regular school bus service, as well as distances between schools and residences. However, the limited information available suggests that 30 to 40 percent of high school students typically travel to and from school in private automobiles. Of these students, a quarter need automobiles for activities such as on-the-job training, as no regular school bus transportation is usually provided for these purposes.

It is estimated that 75,000 high school students of legal driving age travel to school every day by private automobile. This number is derived by substracting the number of pupils using school-provided transportation from total enrollment. For 1977-78, total student enrollment in Minnesota was 927,000. Of this number, 813,000 students used school-provided transportation leaving 114,000 students arriving by other means. Assuming that two-thirds of these students are driving rather than being driven to school, an estimated 75,240 high school students are driving to school on a daily basis. (this amounts to half of the registered drivers between the age of 16 to 18 in Minnesota) Eliminating the 25 percent of those students who require auto transportation and who would be granted an exception to the parking prohibition, the remaining discretionary student driving to schools would

be 63,954 passengers. Applying the statewide average auto occupancy of 1.25 passengers per vehicle, this yields 53,295 student vehicles being driven to school each day. At an average round trip distance of 13 miles, 692,835 miles are driven daily, consuming 47,781 gallons per day.

Daily gallons	=	Total miles	average mpg
47,781	=	692,835	- 14.5

Student driving restrictions could save about a million gallons over a month's time. This would equal about .7% of an average February's total gasoline consumption.

Other Considerations

This measure would save gasoline normally consumed for an activity that is largely discretionary. Measures to reduce high school student driving would not only improve the efficiency of pupil transportation systems but also promote carpooling among students. If a fee system were imposed, parking fees collected by districts could be used to offset costs of supervision and administration of this measure.

Exemptions from driving restrictions could be granted to students who need vehicles for essential or work related trips during the day.

The obvious adverse effects of driving prohibitions to students is the inconvenience caused by these actions.

Case #2 Postponing extracurricular school events

Data necessary for analysis of the energy savings for this measure includes the following:

- -number of bus miles traveled,
- -breakdown of field trip versus extracurricular activities and athletic event miles,
- -historical seasonal/monthly breakdown of extra-curricular school bus miles,
- -fleet average mpg ratings for school buses,
- -gallons of fuel consumed, and
- -degree of switching of trips to private automobiles.

The table below displays statewide regular and extracurricular school bus miles traveled and fuel consumption from 1974 - 78. Authorized miles refers to the use of school buses to transport pupils to and from school. Extracurricular school bus use is categorized as "unauthorized" mileage and includes both field trips and athletic events.

TABLE III - 1

SCHOOL BUS FUEL CONSUMPTION

Year	# Of Buses	Authorized Mileage	Unauthorized Mileage	Total Mileage	Gallons of Fuel Consumed		
					Gasoline	Diesel	LPG
1974	7,880	80,159,167	7,656,848	87,816,015	20,272,373	139,067	11,992
1975	8,171	90,617,981	10,216,164	100,834,145	22,983,798	115,491	6,795
1976	9,362	94,001,243	11,276,903	105,278,146	22,177,077	152,308	72,683
1977	9,656	98,376,827	11,214,248	109,591,075	22,370,731	353,439	35,030
1978	8,333	99,045,987	11,067,525	110,113,512	22,694,600	344,779	91,384

Source: Minnesota Department of Education

The Department of Education estimates that 80% of the unauthorized mileage is for field trips and 20% is for athletic events. This mileage reflects school bus use during the period from September through early June each year.

Unauthorized mileage is spread evenly throughout the school year based upon 21 days/month, 9 months/year. The estimated fleet average mpg is 7 for gasoline-and propane-powered vehicles and 5.0 for diesel.

Estimated unauthorized miles driven using diesel fuel is calculated by multiplying the average diesel mpg by diesel gallons consumed during 1978.

Diesel Gallons x mpg = diesel miles
344,799 x 5 = 1,723,995 miles

$$\text{Total Diesel} \times \frac{\text{Unauthorized Mileage}}{\text{Total mileage}} = \text{Unauthorized diesel miles}$$

1,723,995 X .101 = 124,936 unauthorized miles

The resulting unauthorized miles traveled by gasoline and propane powered buses is calculated as follows:

total unauthorized bus miles - unauthorized diesel miles = gasoline miles
11,067,525 - 124,936 = 10,942,587 miles

Gallons of gasoline/propane saved is equal to miles saved divided by average mpg for school buses:

10,942,587/7 = 1,563,227 gallons
Of this 1,556,932 gallons are gasoline

This is .1% of the gasoline consumption for the period September through May. (71% of total annual VMT occurs during these months).

Other Considerations

The rule requires that the extracurricular event be cancelled or postponed during the energy emergency and not just that school bus transportation be discontinued. Otherwise, private auto use to transport students to these events may result in a net increase in gasoline consumption.

The relative educational benefit of field trips, athletic events and other extracurricular activities is a key concern. Cancellation of such activities will reduce the overall quality of the educational expericence and diminish the professional/economic opportunity for some students.

Speed Limit Measures

The speed limit measures include Rule 2.3120 H. Strict enforcement of posted highway speed limits, and Rule 2.3121 D. Reduction of maximum speed limits.

The speed limit measures are a part of the emergency conservation rules because driver compliance with the legal speed limits saves energy. Studies conducted by the U.S. Department of Transportation have shown that a large majority of automobiles get 20 percent better fuel economy at 55 mph than at 70 mph. A 5 percent savings is gained by slowing from 60 to 50 mph. The Voluntary Truck and Bus Fuel Economy Program has also found reduced speeds save fuel for diesel-powered 5-axle tractor-trailers and buses.

Measure Analysis

The energy savings estimates for these measures are based upon a methodology developed by the Minnesota Department of Transportation (MN/DOT). This methodology utilizes speed monitoring data compiled from 75 sites throughout the state. These sites are located on four different road systems, including interstate urban, interstate rural, multi-lane divided, and two-lane rural. Speed monitoring has been conducted since the 55 mph speed limit was enacted in 1973. The percentage of motorists exceeding the 55 mph limit has ranged from a high of 85 percent in 1973, to a low of 56 percent in 1979.

The analysis also used Mn/DOT vehicle miles traveled (VMT) data. Total VMT in Minnesota is estimated to be $28,680 \times 10^6$ miles annually. Nearly half of this mileage, or 52 percent, occurs at speeds above 45 mph.

Figure III - 4 below shows the relationship between speed and fuel consumption for automobiles. Figures III - 5 shows this relationship for diesel trucks.

Figure III - 4

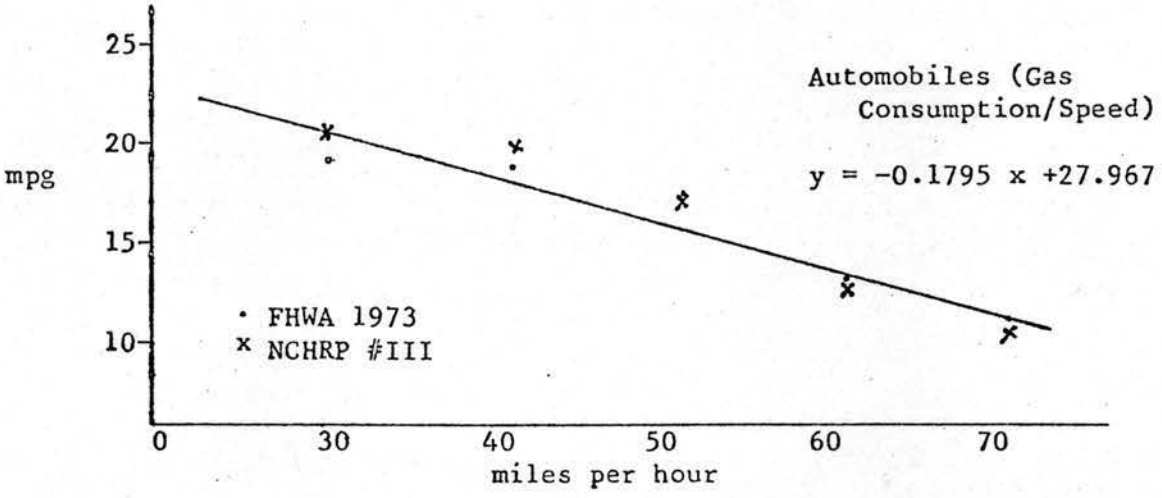
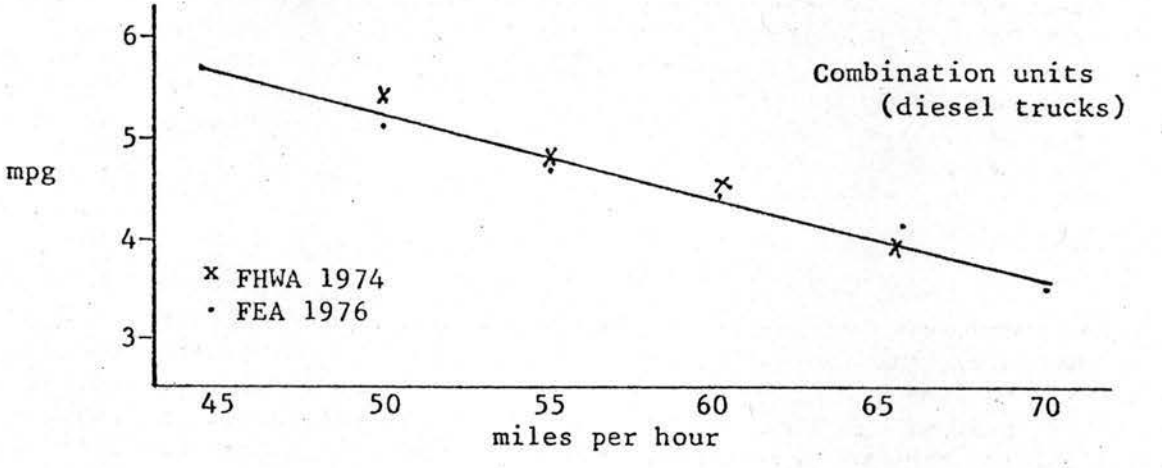


Figure III - 5



The above plotted fuel consumption/speed relationship yields the following representative tables for automobiles and diesel trucks.

TABLE III - 2

EFFICIENCY SPEED (MPG-AUTO)	FUEL EFFICIENCY (MPG-TRUCK)	FUEL
45	5.5	19.7
45-50	5.4	19.3
50	5.2	18.9
50-55	5.1	18.4
55	4.9	18.0
55-60	4.8	17.5
60-65	4.4	16.6
65-70	4.1	15.8

Table III - 3 shows the present vehicle speeds traveled by gasoline powered vehicles and by diesel trucks. Table III - 4 shows the present fuel use by these vehicles by speed range. Table III - 5 indicates what the fuel use would be, if vehicles traveling in excess of 55 mph were to reduce their speed to or below the legal limit. Table III - 5 estimates are based on the speed (fuel relationship) displayed earlier in Figures III - 4 & 5.

TABLE III - 3

PERCENTAGE OF VEHICLES IN SPEED RANGES
(composite of all highways)

	45-50	50-55	55-60	60-65	65-70	TOTAL
Automobiles	6	30	44	15.6	3.5	99
Trucks	10	32.8	40.3	13.6	1.9	98.6

TABLE III - 4

FUEL USED IN SPEED RANGES
(gallons/day)
(all highways)

	45-50	50-55	55-60	60-65	65-70	55+ TOTAL
AUTO & GAS TRUCK	160,916	669,593	902,697	345,152	82,104	1,329,953
DIESEL TRUCK	35,184	135,294	189,584	72,727	12,683	274,994

TABLE III - 5

FUEL USED IF VEHICLES TRAVELING IN EXCESS OF
55 MPH REDUCED THEIR SPEED TO OR BELOW 55 MPH
(for all highways)

	45-50	50-55	55-60	60-65	65-70	TOTAL
AUTO & GAS TRUCK	- - -	- - -	878,380	316,827	71,738	1,266,955
DIESEL TRUCK	- - -	- - -	185,715	59,796	10,612	256,123

Using the above data in the following general equation, fuel savings from strict compliance with the 55 mph speed limit can be estimated.

Fuel savings = Fuel used presently - Fuel used at lower speeds

1. Gasoline saved at 100% compliance with the 55 mph limit then equals:

Fuel presently used (see Table III - 4)	-	Fuel used at lower speeds (see Table III - 5)	
1,329,953 gallons	-	1,266,955 gallons	=

62,999 gallons per day

Converted to annual savings, strict compliance of 55 mph limit yields 23 million gallons a year or approximately 1% of the yearly total gasoline consumption of 2.2 billion gallons.

2. Diesel fuel savings from 100% compliance with the 55 mph limit is similarly arrived at:

Fuel Savings =	Fuel used presently (see Table III -4)	-	Fuel used at lower speeds (see Table III - 5)
Fuel Savings =	274,994 gallons	-	256,123 gallons

Fuel savings = 18,871 gallons per day

Converted to an annual figure, strict compliance with the 55 mph speed limit yields a savings of 6.9 million gallon or 2.7 perecent of a total annual highway diesel fuel consumption of 250 million gallons.

Speed Limit Reduction

The same methodology and data is used to estimate savings from a 50 mph speed limit

Reducing the speed limit to 50 mph would save 51.6 million gallons a year of gasoline or 2.75 percent of the annual average consumption and 11.3 million gallons a year of diesel fuel or 4.5 percent of the annual consumption of highway diesel fuel.

Other Considerations

A speed limit reduction is limited to severe shortage conditions, whereas increased enforcement and "energy fines" are potential actions in the early stages of a shortage.

Energy consumption impact from reduced speeds would be immediate, although increased enforcement and compliance would be necessary to realize the potential savings of this measure. Based upon cost estimates from the Division of Public Safety's "Project 55," statewide personnel costs would be approximately $90,000/month for stringent speed limit enforcement. This figure accounts for salaries for three additional officers per county. A speed limit change would require Mn/DOT and county highway departments to change signs and post the new limit. The expenses to the state and local governments of these speed limit measures would have to be weighed against the increases in revenues from fines and savings in fuel expenses to estimate true costs.

Reduction of the limit to 50 mph will increase the time needed to make a trip or ship goods. As approximately 75 percent of all passenger trips are under 50 miles, and over 50 percent are under 20 miles, travel time for most personal trips would not be significantly increased however, employees commuting long distances to work would have increased commuting times. Trucking firms claim that the measure would increase vehicle and driver time in the shipment of goods and consequently, the cost of shipping. Some shifts from bus and auto use to rail and air travel for long distance trips may be expected.

In other respects, it appears that this measure would be equitable. Major overall advantages of speed limit measures include the moderate fuel savings achieved without appreciable loss in mobility, and the accompanying benefits in traffic safety through reduced speeds. The inconvenience of added time in transit during a very severe shortage would be a minor irritant as compared to the serious problems incident to a serious shortage of the type necessary to require reduction of the speed limits.

Rule 2.3120 D. Odd/Even Motor Fuel Purchase Restriction Measure

Description of Measure

The odd/even restriction limits the purchase of motor fuel by vehicles with odd-numbered license plates to odd-numbered days of the month and vehicles with even-numbered license plates to even-numbered days. Vehicle users exempted from the alternating day purchase restriction include: energy production, emergency vehicles, agricultural production, sanitation services, telecommunications, commercial vehicles, cargo and freight hauling, including mail and newspaper delivery vehicles, passenger transportation vehicles, and out-of-state licensed vehicles.

Energy Savings

There are two ways in which an odd-even restriction will result in motor fuel savings. The first because demand reduction effect occurs when people forego trips because the distance traveled requires more than one tank of gas on the restricted purchase day. The second demand reduction effect of the restriction involves the added implicit cost of buying gasoline when a restriction is added.

Trip Reduction Effect

Eight percent of all gasoline is consumed by vehicles traveling over 300 miles (approximately one tankful) a day. It is estimated that 60 percent of this travel will be made impractical by the odd-even restriction. Of this travel, 50 percent will be eliminated entirely, and an additional 10 percent may be eliminated because the trip involves travel on the third, fifth, etc., day following departure.

Fifty percent of the 300 mile or longer trips will not be eliminated but rescheduled and taken on another day. It may be further assumed that households with more than one vehicle will use the unrestricted purchase vehicle to make the trip. Half of the multiple car households, or more than 25 percent of all auto-owning households will have at least one vehicle eligible for purchase on any given day of the week.

A fifth assumption is that one-eighth of the foregone trips by auto will be replaced by other means of transportation.

Finally, it is assumed that one-third of the long trips in the west, and two-thirds in the east (where states are smaller) will travel beyond bordering states, because odd-even restrictions are not usually applied to out-of-state cars from beyond bordering states.

The above-mentioned assumptions result in the following calculation:

Fuel Savings from
Odd/Even Restriction = 8% x .6 x .5 x .75 x .875 x .67, or
= 1 percent reduction in gasoline consumption
or 471,681 gallons in an average August week.

Price Effect

The inconvenience of the purchase restrictions implicitly raises the price of gasoline and so results in further demand reduction. MIT estimates

taken from "Estimation of Gasoline Demand Reduction from Odd-Even Sales Restriction," assigns a cost of 5¢ and 10¢ a gallon for this inconvenience in an 8% gasoline shortage. Minnesota's estimated short-term price elasticity of demand is -.229 (from FEA Regional Demand Interface Model, 1977 estimate for Region 5). A 5¢ rise in gasoline prices would result in a .9% drop in demand, or 396,500 gallons in an average August week.

Other Considerations

This measure is easy and quick to implement because it requires no extensive resource committments.

An odd-even purchase requirement would also reduce lines at gasoline stations in the event that price controls are reinstated. There is no evidence, however, that odd-even purchase restrictions reduce "panic buying" or "tank-topping."

The measure may have a negative impact on the tourist industry. Weekend trips of 250 miles or longer may be severely reduced. Shorter trips may also be reduced as a result of concern that gasoline will be needed on the restricted days.

As mentioned earlier, the measure may also cause some inconvenience. People will have to adjust their purchasing schedules to the permitted days. Gasoline station attendants will bear the major responsibility of enforcement of the restriction against noncomplying customers.

Rule 2.3121 A. Vehicle Permit-Sticker Program Measure

Description of the Measure

This measure would require all motor vehicle owners to forego use of their vehicles for one day per week (Monday-Sunday). The day selected would be identified by a sticker prominently displayed on each vehicle. The permit-sticker program would require a "no-driving" day selection based on vehicle ownership. This method of permit-sticker selection is intended to restrict most households to a concurrent "no-driving" day for all vehicles owned by the members of the household.

Exemptions from the permit-sticker requirement will be granted to emergency vehicles, common and contract carriers, single unit vehicles with a weight rating of 10,000 pounds or greater, fuel production vehicles, vehicles directly engaged in agricultural production, registered vanpools, vehicles propelled by fuels for which the energy emergency does not apply, motorcycles and mopeds, short term vehicle rentals, and other such users that the Governor may determine.

The Department of Public Safety would administer the permit application-issuance system. Provisions would also be made to change the selected day through an application process at certain intervals during the emergency.

Energy Saving Impact Analysis

Energy savings estimates for the vehicle sticker program measure are dependent upon the following:

-Level of enforcement and resulting compliance levels,
-Number of exempted vehicles, and
-Degree of switching trips (which normally would be taken) from the no-driving day to alternative days.

The methodology utilized to determine energy savings under this emergency measure is based upon work conducted by the Massachusetts Institute of Technology (MIT). The MIT analysis indicated that a one-day a week vehicle operation prohibition based upon the household owner as the sticker selection decision-making unit (i.e., all vehicles in the household must have the same day sticker) would reduce gasoline demand by 2 to 5%.

Energy savings calculations for Minnesota were derived based on several assumptions. First, a permit-sticker program is assumed to affect only work-related travel. Secondly, personal trips not made on a drive-less day will be deferred and made on another day.

The vehicle permit-sticker plan is designed to issue permits based on vehicle ownership and would restrict most households to a concurrent no driving day for all vehicles.

Assuming all personal and social VMT are switched to other days of the week, gasoline savings will equal the reduction in miles normally driven for the work trip by the fleet of vehicles subject to the one-day prohibition. Because one-fifth of the total week's savings will occur each working day, it can be assumed that the permit-sticker measure will save each week an amount equal to the reduction in work-related gasoline consumption of one day's travel times 5 days a week. Daily work related VMT approaches 38 million miles. Assuming a 90% compliance with the permit-sticker plan, this is reduced 35 million miles.

Of the 35 million daily work-related vehicle miles, 82% or 29 million miles are driven in single occupant vehicles and would be affected by the sticker plan. It is further assumed that the method of alternative transportation selected to commute to work will reflect those currently used (from Motor Vehicle Facts and Figures, 1979).

64% - Carpool
16% - Bus
2% - Bicycle and Motorcycle
.4% - Taxi
15% - Walk
3% - Other

The gasoline consumed by carpools would equal the percentage of total miles switched to carpool's divided by the occupancy of carpools, plus the increased driving arising from the need to pick people up (assumed to be 10%).

(.64 x 29,000,000/2.25) + .1 (.64 x 29,000,000/2.25) = VMT by carpool

8,250,000 + 825,000 = VMT
9,075,000 = VMT
9,075,000/14.5 = Gasoline Consumed
625,850 = Gasoline Consumed by carpools formed in response to sticker plan

The fuel consumed by switching to mass transit (van pools and buses) is derived similarly. Bus occupancy is assumed to average 40 people during the day time.

(.16 x 29,000,000/40) = VMT by mass transit vehicles
116,000 = VMT

Fuel efficiency of buses is assumed to be 7 mpg, resulting in the following:

116,000/7 = Gallons consumed
16,571 = Gallons consumed by buses due to increased ridership

Bicycle and motorcycle travel is assumed to be split equally. The fuel efficiency is a weighted average of 0 gallons per mile for bicycles and .01 gallons per mile for motorcycles or (.5 x 0) = (.5 x .01) = .005 gallons per mile or 200 mpg.

(.02 x 29,000,000/1) = VMT
580,000 = VMT by bicycle and motorcycles
580,000 - 200 mpg = 2900 gallons

Taxi miles driven include miles necessary to drive to pick up the rider, estimated to be 80% of the distance to work.

(.004 x 29,000,000/1) + (.8 x .004 x 29,000,000/1) = VMT
116,000 + 92,800 = VMT
208,800 = VMT

Fuel efficiency is assumed to be the same as other autos, 14.5 mpg.

208,800/14.5 = Gallons consumed
14,400 = Gallons consumed

We assumed walking and 'other' uses consume no gasoline.

Fuel saved, then, is equal to total fuel consumed less the fuel consumed by the alternative methods of transportation.

29,000,000/14.5 - (625,850 + 16,571 + 2,900 + 14,400)
1,240,279 = Gallons saved

This is 3% of the average August weekly consumption and 4.2% of the average February weekly consumption.

Economic/Other Impacts

The permit-sticker measure involves significant state resources, perhaps as much as 3 million dollars for nine months. The manufacturing and issuance of stickers, processing applications for exceptions, enforcement, public information and other necessary program elements add to the time required before such a system could be put into effect. The cost and time factors limit the potential of this measure in a short term energy supply emergency.

Once imposed however, this measure would affect the routine of persons who depend exclusively on their automobiles for mobility on a seven day per week basis and who would not qualify for exemptions or exceptions.

Individuals who have access to public transportation and ridesharing programs will generally sacrifice less than those who do not. Likewise, persons without access to these alternatives would be at a definite disadvantage.

Furthermore, transit systems are already experiencing greater than capacity ridership demands during peak periods, and further demands on the system could not be met without large capital expeditures.

The economic impacts of the sticker measure on the state's economy should not prove substantial, because of the alternating pattern of nondriving days and the exemption of the transportation and trucking industry from the requirement.

Rule 2.3121 B. and C. Recreational Vehicle Bans Measure

Introduction

Two types of recreational vehicle (RV) bans are included in this measure description. The type I ban applies only to self propelled vehicles with living quarters and to vehicle-trailers with living quarters. The Minnesota Division of Driver and Vehicle Services classifies and registers these vehicles as class R (1981 class RV), self propelled, and class RA (1981 class RL), recreational trailers. The license plates issued to these vehicles display these letters as a prefix to the license number. The type II ban applies to snowmobiles.

The selection of a type I or type II RV ban is dependent upon the season during which an energy emergency is declared and upon the severity of the shortage. Both type I and type II RV bans are stage IV - serious shortage measures. The significant gasoline savings resulting from a type I ban, compared with the major economic costs and impacts of other stage IV measures justify its inclusion into the state emergency conservation plan.

Description of Type I RV Ban

A type I RV ban imposed during an energy emergency would prohibit the use and operation of class R (RV) and RA (RL) vehicles on public roads for a period not exceeding 15 days for each 30-day declared

emergency period. The obvious purpose of this measure is to temporarily remove these vehicles from the fleet and eliminate their share of gasoline consumption. A type I RV ban presumes that owners and operators of these designated vehicles have an alternative means of transportation and therefore will not necessarily suffer a loss of mobility.

The decision to impose a type I ban would be the Governor's upon the recommendation of the staff of the Emergency Operating Center. If a type I ban is to be imposed, a minimum of five days advance notice will be given before the effective date of the ban.

Exceptions: RV owners may apply to the local conservation board for an exception.

Methodology

The type I recreational vehicle ban applies to class R (RV) and RA (RL) vehicles only.

In 1980, there were 36,079 self propelled RV's with living quarters and 81,817 RV's with living quarters (non-self propelled). RV's have an estimated annual mileage of 5,200 miles and a fuel efficiency of 6 miles/gallon (MN/DOT, "An Analysis of Minnesota's Vehicle Registration System and Other User Fees", January 1979). Self-propelled RV's and RV's pulled by another vehicle are assumed to have the same annual mileage and fuel efficiency. Annual mileage is assumed to be intrastate only. Out-of-state travel is assumed to be in equal portions travel away from Minnesota and travel to Minnesota. Therefore no adjustment is made for "pass through" RV travel.

Analysis

Gasoline Savings = (Vehicle Miles by RV's - RV fuel efficiency) x Total RV's

$$Gs = \frac{5200 \text{ miles per year}}{6 \text{ miles per gallon}} = 867 \text{ gallons/RV}$$

$$Gs = 867 \text{ gallons/RV} \times 117{,}895 = 1.02 \times 10^8 \text{ gallons per year}$$

Assume that 95% of RV travel occurs during the 6 summer months May through October.

$$1.02 \times 10^8 \text{ gal/yr} \times .95 = 9.69 \times 10^7 \text{ gal/summer season}$$

$$\frac{9.69 \times 10^7 \text{ gal}}{6 \text{ months}} = 1.615 \times 10^7 \text{ gallons per summer month}$$

$$\frac{1.615 \times 10^7 \text{ gal/month}}{4} = 4.03 \times 10^6 \text{ gallons per summer week}$$

The 4.03×10^6 gallons per summer week represents nearly 9% of the total gasoline consumption of 44 million gallons occurring over a summer week.

We assume, however, that 50% of RV travel will be switched to nonprohibited types of transportation. The alternative transportation

mode is assumed to have an average mpg of 14.5 or 2.4 times that of an RV. Thus energy savings would be reduced to

$$4.03 \times 10^6 - \frac{(.5 \times 4.03 \times 10^6)}{2.4} = 3.2 \times 10^6 ,$$

or approximately 7% of an average August week.

Description of a Type II Recreational Vehicle Ban

A type II RV ban, imposed during a winter period energy emergency, would prohibit the use and operation of snowmobiles upon state and other public lands and rights-of-way within Minnesota. The snowmobile prohibition could not exceed 15 days during a 30 day emergency ban period. The ban could, however, be renewed as energy emergencies are renewed.

Exceptions

The snowmobile ban is intended only to prohibit recreational use of snowmobiles. Users of snowmobiles for essential personal or commercial purposes, or where other means of transportation are impractical, are eligible for exceptions from this provision. Persons seeking an exception to the snowmobile ban must apply in writing to the local conservation board of appropriate jurisdiction. The board, upon a finding for the applicant, will recommend that an exception be granted and an exempt sticker issued.

Use of snowmobiles upon private property with the owner's permission is not prohibited. Use of snowmobile upon private property without the owner's permission is trespassing and currently a violation of state law.

Methodology

There are 276,000 registered snowmobiles in Minnesota (DNR figures). Snowmobile use is limited to the months where an adequate snow blanket covers traditional recreational sites. These months are usually January through March.

Snowmobiles are estimated to travel between 55-100 miles per season. This assumes at least two days per winter use at between 30-50 miles per day. The snowmobile average fuel efficiency is 15 mpg.

276,000 (snowmobiles) x 30 (miles per month)
= 8,280,000 miles per winter month
8,280,000 miles traveled by snowmobiles -
15 mpg (average snowmobile fuel efficiency)
= 552,000 gallons
552,000 gallons used by snowmobiles in a winter month -
1.28 billion gallons consumed over average February month
= .4%

It is assumed that 40% of snowmobile use, that which occurs on private property or by exceptions, will continue during ban. The net result of a type II RV ban is a gasoline savings of 331,200 gallons per month, or .25% of the gasoline consumed during an average winter month.

The strong case to be made for these stringent restrictions is the fact that the bans result in (1) significant fuel savings, (2) no loss in personal mobility for essential purposes, and (3) conservation of fuel for more economically productive uses. The "singling-out" of RV's places less a constraint on personal mobility than would other types of driving bans or work week cutbacks. An RV ban moreover aims at reducing recreational travel in fuel-inefficient vehicles, a lower priority use during an emergency where essential transportation, home to work trips and other more economically productive uses, are subject to cutbacks. Finally, the economic impacts of an RV ban on private and state resorts are not certain, as offsetting recreational demands may restore losses expected from these bans.

Economic Impacts

The RV ban is discriminatory in as much as it "singles" out a particular type of vehicle and use.

The adverse effects of a type I RV ban would most likely fall on private recreational parks and state parks which cater to campers. The loss of business of RV users would probably not have as large an impact as the total effect of voluntary travel cutbacks due to energy emergencies.

The impact of the RV bans on RV sales is difficult to assess. During the period of the ban, sales would probably suffer. The limited duration of such a prohibition should not, however, change consumers' preference for these vehicles in the long run.

The adverse effects of a snowmobile ban fall primarily on the users. The ban does not affect snowmobile use on private property, but it recognizes that a majority of snowmobile users depend upon trails provided on public lands to enjoy their snowmobiles. The ban is clearly aimed at eliminating this privilege and saving the gasoline incident to RV use. The merchants and lodges which cater to snowmobilers would experience losses during a ban due to the decrease in snowmobile clientele. Losses may be offset by increases in vacationers preferring nonmotorized recreational pursuits.

Rule 2.3121 E. One-Day Driving Ban Measure

Description of the Measure

A one day driving ban would reduce motor fuel consumption by prohibiting all vehicles from traveling for a specified 24-hour period. The driving ban could be imposed on a week day or a weekend day depending on the severity of the shortage. A week day ban, though yielding greater gasoline savings, would result in greater economic loss.

Exemptions from the driving ban would consist of a limited set of first priority uses and other uses necessary to protect and preserve human health and prevent extensive damage of plant equipment or industrial processes. Travel to and from the worksite for persons

maintaining first priority services such as utilities, telecommunications, emergency services, and news publication and delivery will be permitted under a ban. Hospital and residential health care facilities personnel, and persons requiring daily medical attention will be exempted from the ban for travel to and from the work or treatment site.

Additionally, persons assigned by an employer for minimum plant operation and maintenance, security services, or plant protection will be exempt from a driving ban.

All "exempt" travelers under a driving ban should be identified by personal identification and authorization provided by the employer. The form of such identification to the person and the vehicle will be recommended by the Agency prior to a driving ban.

Potential Energy Savings

The gasoline savings resulting from this measure is assumed to equal miles not driven as a result of the ban divided by the average fuel efficiency (mpg). Miles not driven are assumed to equal total miles driven on the banned day minus the miles driven by exempted vehicles, minus driving miles switched to other days, minus miles driven by ban violators.

Exempted miles are assumed to equal 9% of total daily auto miles (from U.S. DOE, "Standby Conservation Plan", 1979). Workday miles switched are estimated to be 44% of work miles (52% of total VMT), 58% of personal business miles (24.9% of total VMT), and 60% of social and recreational miles traveled (or 23.1% of total VMT), or an estimated 51.1% of weekday miles traveled will be switched. Weekend miles switched are calculated in a similar way.

Finally, miles driven by violators of the driving ban must be subtracted from the gasoline savings estimated. Minnesota and New Jersey surveys indicate there is high compliance with mandatory measures during emergency situations. Enforcement of this measure is made more difficult by the large number of exempted and excepted users, however, private vehicles will be presumed to be in violation and will be stopped and an inquiry will be made as to the purpose of the trip. If the motorist can not readily establish that he/she is among the class of users exempt from the ban, a citation will be issued. For these reasons there is expected to be a 90% compliance rate.

Gasoline savings calculation for an August work day is:

Exempted Miles = Fraction Exempted Travel X VMT per day for autos
= .092 (.866 x .00331 x 28,680 x 10^6)
= 7,563,327

Where .00331 = fraction of VMT for average August work day
.866 = fraction of VMT by autos
28,680 x 10^6 = total annual VMT in Minnesota
Miles Switched = ((% total miles traveled for work x % switched) + (% miles traveled for family x % switched) + (% miles traveled for social x % switched)) x VMT per day
= ((.52 x .44) + (.249 x .58) + (.231 x .61)) x (.00331) (.866) (28,860 x 10^6)
= .51 x (82,726,036)
= 42,531,937

Vehicle Miles Saved
= (Total VMT - Miles Switched - Exempted Miles) x Compliance Rate
= (82,726,036 - 42,531,937 - 7,563,327) x .9
= 29,367,695
Gallons saved = Miles saved/Miles per gallon
= 29,367,695/14.5
= 2,025,358
% Saved = Gallons Saved/Gallons Consumed per week
= 2,025,358/44,082,340
= 4.6%

Gasoline saved from driving ban on an average Sunday in August:
(See previous calculations for definitions of equations.)
Miles Exempted = 7,511,627
Miles Switched = ((.092 x .53) + (.202 x .6) + (.7 x .71)) x (.00303 x .866 x 28,680 x 10^6) = 50,192,573
Miles Saved = ((75,255,746 - (50,192,573 + 7,511,627) x .9
= 15,796,391
Gallons Saved = 15,796,391/14.5
= 1,089,406
% of weekly consumption saved = 1,089,406/44,082,340
= 2.5%

Other Considerations:

This measure could be implemented rapidly, although some lead time would be required to coordinate administration and enforcement. Once preliminary work is completed, implementation could occur within one to two weeks after announcement. This measure would not restrict interstate travel by out-of-state vehicles, except to the extent that fuel would be generally unobtainable during the ban.

Driving bans, especially a week day ban, would have significant adverse economic effects. Retail and manufacturing operations would be especially affected by this measure. Minnesota's tourist trade might also suffer from a one day ban.

A weekend ban would conflict with major religion's traditional day of worship.

SUPPLY MANAGEMENT

During a gasoline shortage, measures will be taken that do not actually free up any gasoline. Rather these measures are intended to reduce lines that may occur if price controls are reinstated, and generally minimize disruptions resulting from shortage. Extensive use will be made of state set-aside to ensure that major routes have some open gasoline stations and essential service vehicles have adequate gasoline supplies. These are on-going activities in the Energy Agency and will not be discussed further here.

The supply management tools to be used during motor fuel emergencies are the minimum purchase requirement, a flag system, and motor fuel availability and information program.

Rule 2.3120 E. Minimum Purchase Requirement Measure

A minimum purchase requirement is intended to stop 'tank topping' and reduce the waiting time for gasoline purchases by reducing the frequency of fillups. This requirement will also decrease the vehicle fleet's average gasoline storage level and provide a one time infusion of gasoline supplies.

Description of Measure

This measure requires a minimum purchase of:

5 gallons for all vehicles.

The retailer will not be in violation of federal price regulations to collect the minimum dollar amount specified by the requirement, even if the customer does not purchase sufficient quantities of gasoline at the seller's posted price to reach the minimum dollar amount.

First priority vehicles are exempted from this measure. In addition, motorcycles, mopeds, and similar two (or three) wheeled vehicles are exempted from this measure.

The gasoline retailer and the vehicle operator are separately required to comply with these provisions.

Analysis of Effects

A minimum purchase requirement works by limiting vehicle refills until tank storage has been reduced to some specified level. During the "shortage" of 1979 minimum purchase laws required that $5 be purchased for 4-cylinder v[illegible] and $7 be purchased for a vehicle with more than 4 cylinders.

There are approximately 2 million registered automobiles in Minnesota (MVF&F 1980). Assuming an average tank capacity of 15 gallons per vehicle, the total mobile reservoir could be 30 million gallons.

MIT estimates that 50 percent of the people only fill their tanks when below half a tank. This implies that 50 percent of all motorists fill when less than half a tank has been emptied.

The average mobile gasoline inventory might be estimated by assuming that one half of all autos fill when only 1/4 of a tank has been emptied. The following equation can be devised:

$$\left(.5 \times .5 \times (30 \times 10^6)\right) + \left(.5 \times .75 \times (30 \times 10^6)\right) =$$

mobile gasoline inventory

= 18.75 million gallons

A minimum purchase requirement would affect the purchasing habits of the 50% who normally fill with less than 5 or 7 gallons according to car-size.

The mobile storage of gasoline would be reduced through the minimum purchase by restricting the purchase of fuel to motorists who would normally fill with a lesser amount.

The mobile gasoline inventory would fall to 16.5 million gallons, calculated as follows:

(new proportion of tank holding motor fuel) x (total tank capacity)

$(.55) \times (30 \times 10^6)$

= 16.5 million gallons

Normal storage (18.75 million gallons) less minimum purchase level of storage (16.5 million gallons) yields a one-time infusion of 2.25 million gallons of gasoline or about one gallon per automobile.

MIT estimates that assuming 50% of people would follow this practice without any regulation. A minimum purchase requirement, however, would result in a storage reduction of one gallon per car. In Minnesota, this would yield a one-time savings of approximately 2,000,000 gallons.

This measure will also reduce lines. It is assumed that 50% of people are 'tank topping', or filling up when they use 1/4 of a tank (4 gallons on the average). Under the minimum purchase requirement, people would be allowed to fillup only when 1/2 of a tank has been emptied. Trips to the gas pump will be reduced by 50% for tank toppers. If 50% of drivers are tank toppers, this means a 25% reduction in total trips to the gas pump (.5 x .5).

Thus, the minimum purchase requirement will free up a small amount of gasoline, and significantly reduce trips to gasoline service stations, thereby reducing lines.

Rule 2.3120 F. Flag System Measure

The flag system requires gasoline retailers to post a green, yellow, or red flag to indicate the availability of motor fuel at that station. The purpose of the measure is to reduce discrimination and favoritism practiced by some station operators. It will also aid consumers in finding open gasoline stations.

Description of Measure

Each service station will clearly indicate its gasoline supply and servicing status by displaying a readily visible flag. The flag should be visible from 100 yards in either direction of the station. Flags will be provided by the gasoline retailer.

Flags shall be displayed as follows:

1) Green Flag - Gasoline is available for the general public. In critical situations, emergency vehicles will be allowed to move to the head of any existing gas line. An example of this might be an ambulance which is making a long distance emergency run and needs more gasoline to complete the trip. If a service station is flying a green flag, they cannot show any preferential treatment in the serving of non-emergency customers.
2) Yellow Flag - Gasoline is available only for priority vehicles. Automobile servicing may be available to the general public but the sale of motor fuel is limited to first priority users. If a service station is flying a yellow flag, they cannot preferentially serve nonpriority vehicles.
3) Red Flag - Out of gasoline and/or closed.

Discussion of the Measure

The flag system has no demand reduction potential, nor is it intended to. It can be implemented very quickly and at minimum cost to the state. The cost to retailers will also be small.

The measure makes the distribution of existing supplies of gasoline more equitable and efficient.

Compliance with this measure will be difficult to monitor. Violations by retailers will not be easily identifiable and consumers may not be aware that they are being discriminated against.

Rule 2.3120 G. Motor Fuel Availability Program Measure

The purpose of this program is two-fold:

1) To maximize the hours during which motor fuel is available to consumers; and
2) To publicize motor fuel availability information in order to encourage the efficient and equitable distribution of motor fuel.

Description of Program

The DES will seek the cooperation of motor fuel retailers who have provided 24-hour gasoline sales and road service in the past. The state will take action to ensure that gasoline is available for sale at key locations throughout the state. These locations will also provide 24-hour road service.

Fuel coordinators may assist communities in organizing a system whereby gasoline retailers will remain open evenings and weekends on a rotating basis. Credit card machines may be exchanged to provide maximum availability to consumers, with the agreement of area retailers.

Participating 24-hour service stations will be published regularly in local and/or statewide newspapers. This information will also be supplied to AAA (American Automobile Association) for distribution through their 24-hour hotline. The Emergency Operating Center will also work with the Department of Economic Development, Tourist Information Center to provide gasoline availability information service.

Discussion of Measure

This measure does not save any gasoline. It is rather, intended to ensure the efficient and equitable distribution of available motor fuel supplies. Coordinating retailers' hours of operation may actually cause an increase in gasoline consumption.

The benefits from such a program in minimizing the disruptions and hardship resulting from a shortage outweigh any disadvantages.

Respectfully submitted for the Minnesota Energy Agency on this 23rd day of July, 1981.

by:

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