

Minnesota Attorney General: Administrative Rules Proceedings

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Version 3
August 20, 2018

SF-00006-01

STATE OF MINNESOTA

DEPARTMENT ATTORNEY GENERAL

Office Memorandum

TO : JAMES J. HINIKER, JR., Commissioner
Department of Administration

DATE: 1/12/81

Attn: ALLEN GILES
Special Assistant
Attorney General

FROM : H. THEODORE GRINDAL HTG
Special Assistant
Attorney General

PHONE: 7-3471

SUBJECT: In the Matter of Proposed Amendments to Energy Conservation Standards For Existing Residences

The rules in the above-entitled matter have not been approved by this office for the following reasons:

1. In 2 MCAR § 1.16204 J, the degree sign, "°", is missing between the number "24" and the letter "C", in the last line of the section.

N.OK 2. In 2 MCAR § 1.16204, the definitions in the Rules as Proposed to "Floor Insulation," "Storm Doors" and "Storm Windows" are missing. They were labeled "J, V and X" in the Rules as Proposed. The Hearing Examiner's report approves the use of these definitions. If it is an error that these definitions are not included in the Rules as Adopted, then these definitions should be added to the Rules as Adopted. If the omission was intentional, then the Building Code must document through its Findings of Fact the rationale for not including these definitions.

OK 3. In 2 MCAR § 1.16204 B, the definition of "Attic," in the next to last line the word "not" is included between the words "shall" and "be." In the Rules as Proposed and the Hearing Examiner's report, however, the word "not" in this line is deleted. Perhaps, again, this is a typographical error. If it is not a typographical error, then the agency should document in Findings of Fact the rationale for including this language wnen it differs from the Rules as Proposed language and was approved by the Hearing Examiner.

4. In 2 MCAR § 1.16207, in the section beginning with "V=" the letters "E" and "H" are used, but without a Δ symbol that is seemingly appropriate for this usage. This again appears to be a typographical error.

5. 2 MCAR § 1.16208 is not part of the Rules as Proposed or the Hearing Examiner s report. It is cited in the Chief Hearing Examiner's report, but only for a typographical error. This section should either be omitted or added through revised Findings of Fact by the agency. However, this addition of this material would be subject to substantial change review by the Chief Hearing Examiner.

Upon consideration of the issues set forth in this memorandum, these rules may be resubmitted. Please be advised that the Chief Hearing Examiner requests that any changes other than those that are merely typographical or those that go only to form and subsequent to his review, be submitted to that office. At the time of resubmission to this office, please insure that the original and two copies of the Order Adopting and the Rules as Adopted are submitted as they are necessary for filing with the Secretary of State. Subsequent to changes as noted above, our office will require a new Order Adopting the Rules that is dated subsequent to these changes. This office has retained copies of all other jurisdictional documents. For administrative convenience, please designate the rules as resubmitted rules at the time of resubmission If you have any questions in regard to this memorandum, please feel free to contact me.

HTG/bw

ADMIN 1000 (Rev. 1/78)
SF-00006-01

STATE OF MINNESOTA

Office Memorandum

DEPARTMENT of Administration
BUILDING CODES & STANDARDS

TO : Ted Grindahl
Special Asst. Attorney General

DATE: 1/12/81

FROM : Don Pates

PHONE: 6-4626

SUBJECT: ENERGY CONSERVATION STANDARDS FOR EXISTING RESIDENCES

As per our telephone conversation this afternoon there appears to be some confusion regarding "Rules as Adopted" and Findings of Fact dated 11/18/80.

The Hearing Examiners Office Findings of Fact dated 9/2/80 prohibits us from adopting the rules as proposed but does allow the 10 year pay back amendment. The action of the Building Code Division was in compliance with the Hearing Examiner's report in not adopting the main body of the proposed rules.

You commented that "definitions: J, V and X" were reasonable." We chose to not include these definitions because they are "common knowledge", much like the term "wall" and are adequately covered in the standards. The pay back equation "B" in 1.16208 is unchanged.

The change (amendment) to the 1978 published rules is a change in 1.16206 G from 5 years to 10 years and in 1.16207 equation A from 21.7 to 20.4.

The typo's are being corrected. New copies are being transmitted herewith along with the printed copy (10 pages) of the 1978 rules.

DP:p

enclosures

RECEIVED
JAN 13 19[illegible]
ATTORNEY GENERAL
ADMINISTRATIVE AGENCIES

ADMIN 1000 (Rev. 1/78)
SF-00006-01

STATE OF MINNESOTA

DEPARTMENT of Administration
BUILDING CODES & STANDARDS

Office Memorandum

TO : H. Theodore Grindal
Special Assistant Attorney General

DATE: 1/20/81

FROM : Don Pates

PHONE: 6-4626

SUBJECT: PROPOSED AMENDMENT TO ENERGY CONSERVATION STANDARDS
(YOUR MEMO DATED 1/12/81)

We have reviewed your memo of 1/12/81 and have amended our proposed rules to include:

1. 2MCAR 1.16204: degree sign

2. 2MCAR 1.16204: definition of "Floor Insulation", "Storm Door" and "Storm Window"

3. 2MCAR 1.16204 B: the word "not" is retained in the rule. Please see amended Findings of Fact.

4. 2MCAR 1.16207: delta symobls are included.

5. 2MCAR 1.16208: is part of the original rule. See 2MCAR 1.16201 dated 1978 Edition page 10 (see memo to you dated 1/12/81.

Enclosed is the original and two copies of the amended Findings of Fact and the amended Order Adopting Rules.

Since there are no substantial changes we have not resubmitted these amended rules to the Chief Hearing Examiner. Please advise us if you determine a submission to the Chief Hearing Examiner is required.

DP:p

enclosures

cc: Allan Giles, Special Asst. Attorney General

ADMIN. 1000A (REV. 8/76)

STATE OF MINNESOTA

Office Memorandum

DEPARTMENT of Administration
BUILDING CODES & STANDARDS

TO : James J. Hiniker, Jr.
Commissioner, Dept. of Administration

DATE: 1/20/81

FROM : Don Pates

PHONE: 6-4626

SUBJECT: ENERGY CONSERVATION STANDARDS FOR EXISTING RESIDENCES

Enclosed please find Amended Findings of Fact and Amended Order Adopting Rules for the above subject for your review and signature.

DP:p
enclosures

Our File No. 660

RULE REVIEW CHECKLIST

DATE RULE RECEIVED 12/22/80
DATE FOR REVIEW _____
DATE DUE ~~12/11/81~~ 1/11/81

Adopted w/a hearing X
Adopted w/o a hearing _____
Temporary rule _____

Approved _____ Disapproved 1/11/81 Returned to Agency _____

Resubmitted ~~1/12/81~~ 1/20 Due ~~1/22/81~~ 1/30/81
Approved _____ Disapproved _____ Returned to Agency _____

Date filed w/Secretary of State _____

✓ Rule as Adopted

✓ Rule as Proposed (see S.R. copy).

___ Order Adopting

N/A Notice of Intent to Solicit Outside Opinion

1/2/81 - BCD requested to send Original Order Ad. 1/5 - at HE's office - Peggy O. will get recd 1/5.

✓ Order for rulemaking
7.3.80 Date of Hearing

N/A Certificate of Board's Authorizing Resolution

✓ Notice of rulemaking
✓ Sufficiency but see HE II

✓ Affidavit of Mailing Notice of rulemaking
✓ 5.29.80 At least 30 days prior to hearing/adoption

✓ Mailing list Certificate (Secy. State Cert. + List)

✓ Publication in State Register
✓ 6.2.80 At least 30/20 days prior to hearing/adoption

✓ Hearing Examiner's Report

✓ Chief Hearing Examiner's Report(s)
✓ 9.2.80 Approving H.E.'s Report
✓ 12.4.80 Approving agency action

✓ Agency's Findings of Fact

N/A LCRAR Report or agency Affidavit

N/A Certificate of Board's Resolution Adopting Rules

N/A Order Approving Incorporation by Reference

✓ Statement of Need and Reasonableness

N/A Petition for Adoption of a Rule

✓ Record (includes transcript or tape, exhibits, comments received by agency, requests for a hearing, and other relevant materials)

✓ Certificate of Compliance w/Rulemaking Procedures

— Affidavit of Mailing Notice of Submission to Attorney General

✓ Notice of Submission to the Attorney General

SF-00006-01

STATE OF MINNESOTA

DEPARTMENT ATTORNEY GENERAL

Office Memorandum

TO : James J. Hiniker, Jr.
Attn. Allen Giles

DATE: January 30, 1981

FROM : H. Theodore Grindal HTG
Special Assistant
Attorney General

PHONE: 6-1288

SUBJECT: In the Matter of Proposed Amendments to Energy Conservation Standards for Existing Residences.

Enclosed herewith are the rules you have submitted for approval. These rules have been approved by this office and filed with the Secretary of State. Please note that they have not been filed with the State Register; this must be done promptly by your agency.

Upon receipt and before transmittal to your agency, however, it is important that you recheck these rules as to:

1. Affixation of stamps of the Attorney General and Secretary of State to the last page of the rules;

2. Coverage by these stamps of all rules submitted; and

3. Inclusion of all pages to the rules in the approved set.

If you have any questions in this regard, please contact me.

AG. copy.

RULES AS ADOPTED

Underlining, strike-outs indicate changes from Rules as Proposed

DEPARTMENT OF ADMINISTRATION

BUILDING CODE DIVISION

RULES FOR ENERGY CONSERVATION STANDARDS FOR EXISTING RESIDENCES

2MCAR Sec. 1.16201. Authority. These rules are promulgated pursuant to Minn. Stat. Sec. 116H.129 (1978) and (1979 supp.).

2MCAR Sec. 1.16202. Enforcement. The Minnesota Energy Agency shall conduct random inspections of certain renter occupied residences as provided in Minn. Stat. Sec. 116H.129, Subds. 3 and 4 (1978).

2MCAR Sec. 1.16203. Purpose and Scope. The purpose of these rules is to establish minimum energy efficiency standards for existing residences. Such standards shall be utilized in the energy disclosure program required by Minn. Stat. Sec. 116H.129, Subds. 5, 6, and 7 (1978), and shall be applicable to certain rental residences as provided in Minn. Stat. Sec. 116H.129, Subds. 3 and 4 (1978). HE 15

The scope of these standards addresses two areas of energy savings:

A. The reduction of air infiltration as it relates to air leakage through the exterior envelope.

CAUTION: When infiltration is reduced it may be necessary to provide combustion air by other means as provided for in the Minnesota State Building Code.

B. The improvement of the thermal efficiency of the structure as it relates to the transfer of heat through the exterior envelope.

The rules also contain the methods for calculating energy savings and determining the economic feasibility of each minimum energy efficiency standard for each residence.

2MCAR Sec. 1.16204. Definitions.

A. Accessible. Shall mean exposed, without the removal of permanent parts of the structure.

B. Attic. The space between the ceiling joists and the rafters immediately above. The space between rafters formed where interior finish material is affixed directly to the rafters shall not be construed to be an attic space. HE 16

C. Conditioned space. [redacted]ace enclosed within a building [redacted]at is heated or cooled by an energy-using system.

D. Degree Day. Shall mean degree day, heating. A unit, based upon temperature difference and time, used in estimating fuel consumption and specifying nominal heating load of a building in winter. For any one day, when the mean temperature is less than 65°F (18° C) there exist as many Degree Days as there are Fahrenheit (Celsius) degrees difference in temperature between the mean temperature for the day and 65° F (18° C).

E. Economic Feasibility. For the purpose of these rules, the test of economic feasibility is met when the savings in energy procurement costs, based on residential energy costs as certified by the Minnesota Energy Agency director in the State Register, exceed the cost of acquiring and installing each energy conserving item required to meet the minimum energy conservation standards as set forth at 2MCAR1.16205, amortized over the subsequent 10-year period.

F. Exterior Envelope. The elements of a building which enclose conditioned spaces and through which thermal energy may be transferred to or from the exterior.

G. Fireplace Stove. A chimney-connected, solid fuel-burning stove having part of its fire chamber open to the room.

H. Insulation. Any material or assembly of materials used primarily to provide resistance to heat flow in building structures, including but not limited to mineral fibrous, mineral cellular, organic fibrous, organic cellular, or reflective materials, whether in loose fill, flexible, or semi-rigid form.

I. Positive Shut-Off. A manual shut-off device which can be utilized to produce a seal to inhibit the flow of air when a fireplace or fireplace stove is not operating. i.e. damper in fireplace, damper at top of flue, damper in connector pipe, or doors (glass or other) on fireplace or fireplace stove.

J. "R" Value. The measure of resistance to heat flow through a material or the reciprocal of the heat flow through a material expressed in British thermal units per hour per square foot per degree Farenheit at 75 degrees Farenheit (24 C) mean temperature.

K. Residence. Means any dwelling for habitation either seasonally, meaning all or a portion of the months of December through March, or permanently by one or more persons. A residence may be owned or rented and may be part of a multi-family dwelling or multi-purpose building, but shall not include buildings such as hotels, hospitals, motels, dormitories, sanitariums, nursing homes, schools and other buildings used for educational purposes, or correctional institutions. A mobile home as defined in Minn. Stat. Sec. 168.011, Subd. 8, shall be a residence for purposes of these Rules.

L. Rim Joist. That portion of the exterior envelope between the top of the foundation wall and the sub-floor immediately above. The perimeter of the floor joists.

M. Seasonal Operating Efficiency shall mean the quotient obtained by dividing the useful energy provided by a system to the residence during the entire season divided by the heating value of the fuel used. The useful heat provided by a combustion heating system to the residence shall include subtractions for heat lost due to air infiltration induced by any vents, draft hoods or barometric dampers attached to the system.

HE 16 at p. 9

N. Single Glazed. Windows with one sheet of glazing separating the conditioned space from the exterior. For the purposes of these rules non-conditioned enclosed porches, vestibules, or other appurtenances are considered the equivalent of one layer of glazing.

O. U-Value (U-Factor or U = Thermal Transmittance). The thermal transmission of heat in unit time through unit area of a particular body or assembly, including its boundary films divided by the difference between the environmental temperatures on either side of the body or assembly; $Btu/(hr \cdot ft^2 \cdot F^o)$. Also the reciprocal of total R-Value.

P. Weatherstripping. Material permanently affixed to limit infiltration of air, usually made of metal, wood, felt, neoprene, expanded foam, or a combination thereof.

2MCAR Sec. 1.16205. Minimum Energy Efficiency Standards.

A. Where demonstrated to be economically feasible pursuant to 2MCAR1.16206, 2MCAR1.16207, and 2MCAR1.16208 the following shall be standards for existing residences. Pursuant to Minn. Stat. Sec. 116H.129, Subds. 3 and 5 (1978) residential rental buildings built before January 1, 1976, which are not in compliance with these standards shall be modified to be in compliance within the economic feasibility defined in 2MCAR1.16204 by January 1, 1980 with respect to caulking and weatherstripping and by July 1, 1983 with respect to all provisions herein. These standards shall also provide a basis for evaluation of residences at time of sale.

1. Install weatherstripping between exterior operable window sash and frames and between exterior doors and frames.

   EXCEPTION: Weatherstripping not required on storm doors or storm windows.

2. Caulk, gasket or otherwise seal accessible exterior joints between foundation and rim joist, around window and door frames, between wall and roof, between wall panels, at penetrations for utility services through walls, floors, and roofs and all other openings in the exterior envelope.

3. Install positive shut-offs for all fireplaces or fireplace stoves.

4. Install insulation in accessible attics to achieve a minimum total "R" value of 19. see HE 19

5. Install insulation in all accessible rim joist areas to achieve a minimum total "R" value of 11.

6. Install insulation in accessible walls and/or floors enclosing conditioned spaces to achieve a minimum total "R" value of 11. Accessible Walls shall include above-grade foundation walls of basements, cellars or crawl spaces. see HE 19

7. Install storm windows and/or thermal windows on all single glazed exterior window units enclosing conditioned space.

8. Install storm doors and/or thermal doors on all exterior door openings into conditioned spaces unless a single door, enclosed porch, vestibule, or other appurtenance provides a double door effect or provides an "R" value of 2 or more.

2MCAR Sec. 1.16206. Procedures for Calculating Energy Savings and Determining Economic Feasibility. The calculation of the energy savings and the determination of the economic feasibility for each of the minimum energy efficiency standards shall be computed in a manner specific to each residence, i.e., on a case by case basis. Equal interest and inflation factors are assumed. This determination shall be performed according to the following procedures. HE 13

A. Determine the values of the general energy savings equation (2MCAR1.16207) which are specific to each residence. These values include degree days, heating system efficiency and the heating value of the fuel but do not include the design heat loss per degree Fahrenheit (Δ H). See HE 23

B. Calculate design heat per degree Fahrenheit (Δ H) for the standard under consideration using the equations outlined in 2MCAR1.16207.A. through 2MCAR1.16207.H.

C. Calculate the quantity of annual energy savings for the standard under consideration by substituting the calculated value of Δ H into the general energy savings equation and solving for energy savings (Δ E).

D. Determine the price per unit of energy (P) for the annual energy savings quantity.

E. Determine the cost of the energy saving improvement (C) proposed to meet the standard under consideration. HE 23

F. Calculate the payback period (T) for the standard under consideration by substituting the values of P, C and Δ E into the general payback equation (2MCAR1.16208) and solving for the payback period in years.

G. If the payback period is less than ten years the energy saving improvement meets the economic feasibility requirement.

H. Repeat the above procedure for each of the energy efficiency standards.

2MCAR Sec. 1.16207. General Energy Savings Equations. The following equations shall be used to calculate energy savings for each of the energy efficiency standards.

Equation A*:

$$\Delta E = \Delta H \times \frac{D \times 20.4}{N \times V}$$

HE 24 at pp. 14, 15

Where

ΔE = The quantity of annual energy savings in the appropriate energy units, e.g. hundreds of cubic feet of natural gas, gallons of fuel oil, or kilowatt hours of electricity.

ΔH = The difference in design heat loss per degree Fahrenheit between the improved condition and the existing condition for infiltration and/or thermal transmission. Equations for calculating H are listed in subsequent subsections.

D = The normalized annual degree days as published by the National Oceanic and Atmospheric Administration (NOAA).

N = The seasonal operating efficiency of the heating system.

V = The heating value of the fuel type, consistent with E and H.

* Equation (A) is derived from the ASHRAE Handbook, 1976 Systems, pp. 43.1 - 43.18.

A. Install Window and Door Weatherstripping. The following equation shall be used to calculate ΔH for energy efficiency standard 1 (2MCAR Sec. 1.16205 A.).

Equation #1:

$$\Delta H = 1.08 \times (q_0 - q_1) \times L$$

Where:

q_0 = The infiltration value in cubic feet per minute per lineal foot of crack, $\frac{CFM}{FT.}$, for the existing window or door weatherstripping condition before improvement;

q_1 = The infiltration value in cubic feet per minute per lineal foot of crack, $\frac{CFM}{FT.}$, for the proposed window or door weatherstripping condition after improvement;

L = The length of the crack in feet which is under consideration for weatherstripping.

B. Caulk, Gasket or Seal Joints. The following equation shall be used to calculate Δ H for energy efficiency standard 2 (2MCAR1.16205.A.).

Equation #2:

$$\Delta H = 1.08 \times (q_0 - q_1) \times L$$

Where:

q_0 = The infiltration value in cubic feet per minute per lineal foot of crack, $\frac{CFM}{FT.}$, for the existing crack before improvement;

q_1 = The infiltration value in cubic feet per minute per lineal foot of crack, $\frac{CFM}{FT.}$, for the proposed crack seal after improvement;

L = The crack length in feet for the crack under consideration.

C. Install Positive Shut-Offs. The following equation shall be used to calculate Δ H for energy efficiency standard 3 (2MCAR Sec. 1.16205.A.).

Equation #3:

$$\Delta H = 1.08 \times (q_0 - q_1) \times A$$

Where:

q_0 = The infiltration value in cubic feet per minute per square foot, $\frac{CFM}{(FT.)^2}$, for the existing condition before improvement;

q_1 = The infiltration value in cubic feet per minute per square foot, $\frac{CFM}{(FT.)^2}$, for the proposed condition after improvement with a positive shut-off;

A = The cross sectional area of the flue or connector in square feet.

D. Install Attic Insulation. The following equation shall be used to calculate Δ H for energy efficiency standard 4 (2MCAR Sec. 1.16205.A.).

Equation #4:

$$\Delta H = \left(\frac{1}{R_0} - \frac{1}{R_1} \right) \times A$$

Where:

R_0 = The total R-Value of the attic/ceiling/roof assembly including existing insultation before improvement;

R_1 = The total R-Value of the proposed attic/ceiling/roof assembly including existing insulation and additional insulation after improvement;

A = The area of the attic/ceiling/roof assembly in square feet separating conditioned spaced from unconditioned space.

E. Install Rim Joist Insulation. The following equation shall be used to calculate Δ H for energy efficiency standard 5 (2MCAR Sec. 1.16205.A.).

Equation #5:

$$\Delta H = \left(\frac{1}{R_0} - \frac{1}{R_1} \right) \times A$$

Where:

R_0 = The total R-Value of the rim joist assembly including existing insulation before improvement;

R_1 = The total R-Value of the rim joist assembly including existing and additional insulation after improvement;

A = The area of the rim joist assembly in square feet separating conditioned space from unconditioned space.

F. Install Wall and/or Floor Insulation. The following equation shall be used to calculate Δ H for energy efficiency standard 6 (2MCAR Sec. 1.16205.A.).

Equation #6:

$$\Delta H = \left(\frac{1}{R_0} - \frac{1}{R_1} \right) \times A$$

Where:

R_0 = The total R-Value of the existing wall or floor assembly including existing insulation before improvement;

R_1 = The total R-Value of the proposed wall or floor assembly including existing and additional insulation after improvement;

A = The area of the wall or floor assembly in square feet separating conditioned space from unconditioned space.

G. Install Storm Windows and/or Thermal Windows. The following equation shall be used to calculate Δ H for energy efficiency standard 7 (2MCAR Sec. 1.16205.A.).

Equation #7:

$$\Delta H = (U_0 - U_1) \times A$$

Where:

U_0 = The U-Value for the existing window assembly before improvement;

U_1 = The U-Value for the proposed window assembly after improvement;

A = The area of the window assembly in square feet separating conditioned space from exterior.

H. Install Storm Doors and/or Thermal Doors. The following equation shall be used to calculate Δ H for energy efficiency standard 8 (2MCAR Sec. 1.16205.A.).

Equation #8:

$$\Delta H = (U_0 - U_1) \times A$$

Where:

U_0 = The U-Value for the existing door assembly before improvement;

U_1 = The U-Value for the proposed door assembly after improvement;

A = The area of the door assembly in square feet separating conditioned space from exterior.

2MCAR Sec. 1.16208. General Payback Equation. The payback period in years shall be calculated by dividing the cost of the energy-saving improvement by the product of the price per unit of energy and the quantity of annual energy savings. The payback equation shall be:

this rule does not appear in SR + there is no ref. to it in HE. Is referenced in CHE

Equation B:

$$T = \frac{C}{(P) \times (\Delta E)}$$

Where

T = payback period in years;

C = the total cost of purchasing and installing energy saving improvements minus applicable federal and/or state tax credits, grants or subsidies;

P = price per unit of energy, this unit being the same as the unit of annual energy savings, Δ E. The appropriate values of P shall be those certified by the director of the Minnesota Energy Agency in the State Register, pursuant to Minn. Stat. Sec. 116H.129, Subd. 1 (1978);

Δ E = the quantity of annual energy savings in the appropriate energy units, e.g., hundreds of cubic feet of natural gas, gallons of fuel oil, or kilowatt-hours of electricity, as calculated for each of the energy efficiency standards.

STATE OF MINNESOTA

DEPARTMENT OF ADMINISTRATION

BUILDING CODES & STANDARDS

In the Matter of Proposed
Amendments to Energy Conservation
Standards for Existing Residences

AMENDED ORDER ADOPTING RULES

The above entitled matter came on for hearing before Richard C. Luis, Hearing Examiner on the 3rd day of July, 1980 after proper notice required by Minn. Stats. 15.0412 (1978), was served upon all persons, associations, municipalities and other interested groups registered with the Secretary of State for that purpose.

After affording interested persons an opportunity to present written and oral data, statements and arguments, having heard all of the testimony, having considered all the evidence adduced and upon the records, files and proceedings herein, and having confirmed the need for the above captioned rules,

NOW THEREFORE IT IS ORDERED, that these rules identified as Amendments to Energy Conservation Standards for Existing Residences are adopted this day of January, 1981 pursuant to the authority vested in me by Minn. Stat. 116H.129, subds. 5, 6 and 7 (1979).

STATE OF MINNESOTA
DEPARTMENT OF ADMINISTRATION

James J. Hiniker, Jr.
Commissioner

1-26-81
Date

STATE OF MINNESOTA

DEPARTMENT OF ADMINISTRATION

BUILDING CODES & STANDARDS DIVISION

In the Matter of Proposed
Amendments to Energy Conservation
Standards for Existing Residences

ORDER ADOPTING RULES

The above entitled matter came on for hearing before Richard C. Luis, hearing examiner on the 3rd day of July, 1980 after proper notice required by Minn. Stats. 15.0412 (1978), was served upon all persons, associations, municipalities and other interested groups registered with the Secretary of State for that purpose.

After affording interested persons an opportunity to present written and oral data, statements and arguments, having heard all of the testimony, having considered all the evidence adduced and upon the records, files and proceedings herein, and having confirmed the need for the above captioned rules,

NOW THEREFORE IT IS ORDERED, that these rules identified as Amendments to Energy Conservation Standards for Existing Residences are adopted this 18th day of November, 1980 pursuant to the authority vested in me by Minn. Stat. 116H.129, subds. 5, 6 and 7 (1979).

STATE OF MINNESOTA
DEPARTMENT OF ADMINISTRATION

James J. Hiniker, Jr.
Commissioner

Date: 11-18-80

STATE OF MINNESOTA

DEPARTMENT OF ADMINISTRATION

BUILDING CODE DIVISION

IN THE MATTER OF THE PROPOSED
RULES FOR ENERGY CONSERVATION STANDARDS
FOR EXISTING RESIDENCES.

AND

ORDER FOR HEARING

THE PROPOSED RULES FOR
CERTIFICATION OF EVALUATORS
FOR ENERGY DISCLOSURE PROGRAM

IT IS HEREBY ORDERED that a public hearing on the above-captioned rules be held in the Conference Room, 408 Metro Square Building, 7th and Robert Streets, St. Paul, Minnesota on July 3, 1980, commencing at 9:00 a.m. and continuing until all persons have had an opportunity to be heard.

IT IS FURTHER ORDERED that a Notice of Hearing be mailed to all persons or representatives of associations or other interested groups who have registered their names with the Secretary of State for that purpose.

IT IS FURTHER ORDERED that Notice of Hearing and applicable proposed rules be published in the State Register.

STATE OF MINNESOTA
DEPARTMENT OF ADMINISTRATION

by Daniel B. Wagner, Deputy Comm't.

James J. Hiniker, Jr.
Commissioner

5/16/80
Date

STATE OF MINNESOTA

DEPARTMENT OF ADMINISTRATION

BUILDING CODE DIVISION

IN THE MATTER OF THE PROPOSED
AMENDMENTS TO THE RULES FOR
ENERGY CONSERVATION STANDARDS FOR
EXISTING RESIDENCES

NOTICE OF HEARING

AND

THE PROPOSED RULES FOR
CERTIFICATION OF EVALUATORS
FOR ENERGY DISCLOSURE PROGRAM

NOTICE IS HEREBY GIVEN that a public hearing in the above-entitled matter will be held in the Conference Room, 408 Metro Square Building, 7th and Robert Street, St. Paul, Minnesota on July 3, 1980, commencing at 9:00 a.m. and continuing until all persons have had an opportunity to be heard.

All interested or affected persons will have an opportunity to participate. Statements may be made orally and written materials may be submitted at the hearing. In addition, written materials may be submitted by mail to Richard Luis, Office of Hearing Examiners, Room 300, 175 University Avenue, St. Paul, Minnesota 55105, either before the hearing or within 5 working days after the close of the hearing. The Hearing Examiner may extend the time for receipt of written comments for a period not to exceed twenty (20) calendar days from the date of the hearing.

The hearing will commence with the matter of proposed amendments to Rules for Energy Conservation Standards for Existing Residences. These rules add additional mandatory standards for residential rental property if economically feasible pursuant to Minn. Stat. Sec. 116H.129, subd. 3. In addition the proposed rules provide for 22 standards, which will be used as a basis for evaluation of residences at the time of sale. The proposed rules incorporate methods for calculating energy savings and determining economic feasibility. Generally the amendments expand the rules to include requirements for reduction of energy usage by mechanical or electrical systems.

The hearing will also consider proposed Rules for Certification of Evaluators for Energy Disclosure Program. These rules provide proceedures for a disclosure program; outline requirements for certification and performance of energy evaluators, including revocation; and, further, provide provisions regarding conflict of interest, non-endorsement, certification fees, and bonding requirements for energy evaluators.

The proposed rules are subject to change as a result of the rules hearing process. The agency therefore strongly urges those who are potentially affected in any manner by the substance of the proposed rules to participate in the rules hearing process.

Copies of the proposed rules will be available at the door on the date of the hearing and one free copy can be obtained by writing to the Building Code Division, 408 Metro Square Building, 7th and Robert Streets, St. Paul, Minnesota 55101. The agency's authority to promulgate the proposed rules is contained in Minn. Stat., Section 116H.129 subds. 1, 5, 6 and 7 (1978).

Notice is hereby given that 25 days prior to the hearing, a Statement of Need and Reasonableness will be available for review at the agency and at the Office of Hearing Examiners. This Statement of Need and Reasonableness will include a summary of all the evidence which will be presented by the agency at the hearing justifying both the need for and the reasonableness of the proposed rules. Copies of the Statement of Need and Reasonableness may be obtained from the Office of Hearing Examiners at a minimal charge.

Any person may request notification of the date on which the Hearing Examiner's Report will be available, after which date the agency may not take any final action on the rules for a period of five working days. Any persons may request notification of the date on which the hearing record has been submitted (or resubmitted) to the Attorney General by the agency. If you desire to be so notified, you may so indicate at the hearing. After the hearing, you may request notification by sending a written request to the Hearing Examiner (in the case of the Hearing Examiner's Report), or to the agency (in the case of the agency's submission or resubmission to the Attorney General).

Please be advised that pursuant to Minn. Stat. 10A.01, Subd. 11 (1978) any individual: (a) engaged for pay or other consideration, or authorized by another individual or association to spend money, who spends more than five hours in any month or more than $250, not including his own travel expenses and membership dues, in any year, for the purpose of attempting to influence legislative or administrative action by communicating or urging others to communicate with public officials; or (b) who spends more than $250, not including his own traveling expenses and membership dues, in any year for the purpose of attempting to influence legislative or administrative action by communiating or urging others to communicate with public officials must register with the State Ethical Practices Board as a lobbyist within five days of the commencement of such activity by the individual. The state provides certain exceptions. Questions should be directed to the State Ethical Practices Board, 41 State Office Building, St. Paul, Minnesota 55155, phone (612) 296-5615.

Adoption of the proposed rules by the agency will not require the expenditure of public monies by local public bodies.

STATE OF MINNESOTA
DEPARTMENT OF ADMINISTRATION

by Daniel B. Magraw Deputy Comm.
James J. Hiniker, Commissioner

Date: 5/16/80

STATE OF MINNESOTA

DEPARTMENT OF ADMINISTRATION

BUILDING CODE DIVISION

In the Matter of Proposed
Rules for Energy Conservation Standards

and

AFFIDAVIT OF MAILING

The Proposed Rules for
Certification of Evaluators
for Energy Disclosure Program

Margaret Opalinski, being first duly sworn, deposes and says:

That on the 29th day of May, 1980, at the City of St. Paul, County of Ramsey, State of Minnesota, she served the attached Notice of Hearing by depositing in the United States mail at said City of St. Paul, a true and correct copy thereof, properly enveloped, with postage prepaid, to all persons and associations at the addresses listed on the attached Certificate of the Secretary of State.

Margaret Opalinski

Margaret Opalinski
Building Code Division

Subscribed and sworn to before
me this 29th day of May, 1980

Cynthia L. Craason

CYNTHIA L. [illegible]
NOTARY PUBLIC - MINNESOTA
RAMSEY COUNTY
My Commission Expires [illegible], 1982

STATE OF MINNESOTA

DEPARTMENT OF ADMINISTRATION

BUILDING CODE DIVISION

In the Matter of the Proposed
Rules for Energy Conservation Standards
for Existing Residences

and

AFFIDAVIT OF RECEIPT

The Proposed Rules for
Certification of Evaluators
for Energy Disclosure Program

Margaret Opalinski, being duly sworn on oath, deposes and says:

1. That she is an employee of the Building Code Division, Department of Administration, State of Minnesota;

2. That on the 20th day of May, 1980, she went to the Secretary of State's Office of the State of Minnesota and requested a current list of all representatives and associations or other interested groups or persons who had registered their names with the Secretary of State for the purpose of obtaining notices of public hearing relating to the promulgation of rules pursuant to Minn. Stat. 15.0412;

3. That on the 20th day of May, 1980, in response to the above request, the Secretary of State provided her with such a list.

Further affiant sayeth not.

Margaret Opalinski

Margaret Opalinski
Building Code Division

Subscribed and sworn to before
me this 20th day of May, 1980

Cynthia L. Claason

CYNTHIA L. CLAASON
NOTARY PUBLIC-MINNESOTA
RAMSEY COUNTY
My Commission Expires Feb. 23, 1982

STATE OF MINNESOTA

DEPARTMENT OF ADMINISTRATION

BUILDING CODE DIVISION

In the Matter of the Proposed
Rules for Energy Conservation Standards
for Existing Residences

and

The Proposed Rules for
Certification of Evaluators
for Energy Disclosure Program

CERTIFICATE OF DELIVERY
OF THE SECRETARY
OF STATE LIST

I hereby certify that the attached 347 labels and 10 sheets constitute the complete list of persons, associations, and other interested groups who as of 9:45 o'clock AM, this 20th day of May, 1980 have requested pursuant to Minn. Stats. 1974, Section 15.0412 that their names be placed on file with the Secretary of State for the purpose of receiving notice of public hearing on proposed rules on the subject captioned above.

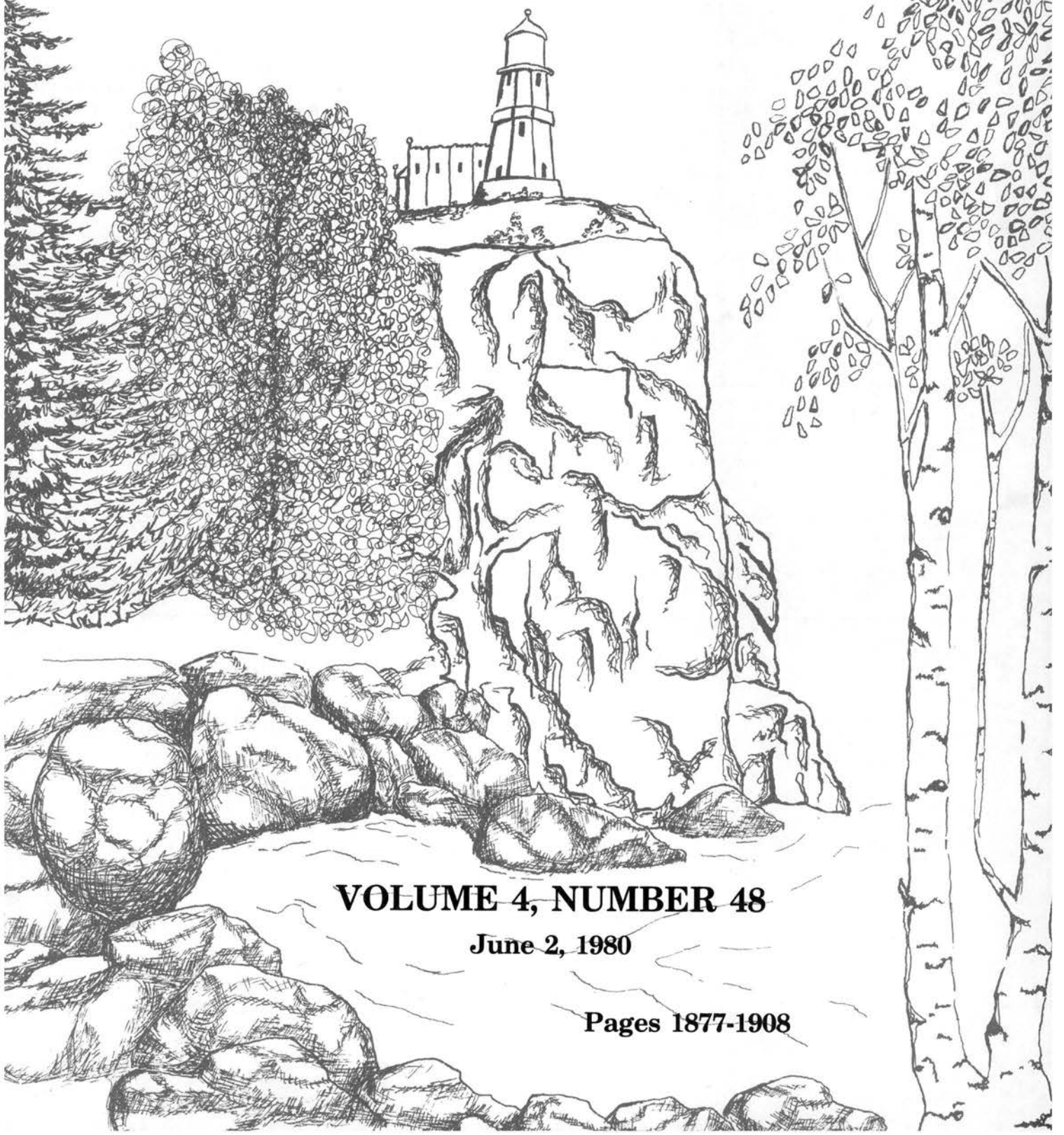
SECRETARY OF STATE

Joan Anderson Growe

BY: [illegible]

STATE REGISTER

STATE OF MINNESOTA



VOLUME 4, NUMBER 48

June 2, 1980

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STATE REGISTER

Volume 4 Printing Schedule for Agencies

Issue Number	*Submission deadline for Executive Orders, Adopted Rules and **Proposed Rules	*Submission deadline for State Contract Notices and other **Official Notices	Issue Date
	SCHEDULE FOR VOLUME 4		
49	Friday May 23	Monday June 2	Monday June 9
50	Monday June 2	Monday June 9	Monday June 16
51	Monday June 9	Monday June 16	Monday June 23
52	Monday June 16	Monday June 23	Monday June 30

*Deadline extensions may be possible at the editor's discretion; however, none will be made beyond the second Wednesday (12 calendar days) preceding the issue date for rules, proposed rules and executive orders, or beyond the Wednesday (5 calendar days) preceding the issue date for official notices. Requests for deadline extensions should be made only in valid emergency situations.

**Notices of Public Hearings on proposed rules are published in the Proposed Rules section and must be submitted two weeks prior to the issue date.

Instructions for submission of documents may be obtained from the Office of the State Register, Suite 415, Hamm Building, 408 St. Peter Street, St. Paul, Minnesota 55102.

The *State Register* is published by the State of Minnesota, Office of the State Register, Suite 415, Hamm Building, 408 St. Peter Street, St. Paul, Minnesota 55102, pursuant to Minn. Stat. § 15.0411. Publication is weekly, on Mondays, with an index issue in August. In accordance with expressed legislative intent that the *State Register* be self-supporting, the subscription rate has been established at $118 per year, postpaid to points in the United States. Second class postage paid at St. Paul, Minnesota, Publication Number 326630. (ISSN 0146-7751) No refunds will be made in the event of subscription cancellation. Single issues may be obtained at $2.25 per copy.

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The *State Register* is the official publication of the State of Minnesota, containing executive orders of the governor, proposed and adopted rules of state agencies, and official notices to the public. Judicial notice shall be taken of material published in the *State Register*.

Albert H. Quie
Governor

James J. Hiniker, Jr.
Commissioner
Department of Administration

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State agencies must publish notice of their rulemaking action in the *State Register*. If an agency seeks outside opinion before promulgating new rules or rule amendments, it must publish a **NOTICE OF INTENT TO SOLICIT OUTSIDE OPINION.** Such notices are published in the **OFFICIAL NOTICES** section. Proposed rules and adopted rules are published in separate sections of the magazine.

The PROPOSED RULES section contains:

- Proposed new rules (including Notice of Hearing).
- Proposed amendments to rules already in existence in the Minnesota Code of Agency Rules (MCAR).
- Proposed temporary rules.

The ADOPTED RULES section contains:

- Notice of adoption of new rules and rule amendments (those which were adopted without change from the proposed version previously published).
- Adopted amendments to new rules or rule amendments (changes made since the proposed version was published).
- Notice of adoption of temporary rules.
- Adopted amendments to temporary rules (changes made since the proposed version was published).

All ADOPTED RULES and ADOPTED AMENDMENTS TO EXISTING RULES published in the *State Register* will be published in the Minnesota Code of Agency Rules (MCAR). Proposed and adopted TEMPORARY RULES appear in the *State Register* but are not published in the MCAR due to the short-term nature of their legal effectiveness.

The *State Register* publishes partial and cumulative listings of rule action in the MCAR AMENDMENTS AND ADDITIONS list on the following schedule:

Issues 1-13, inclusive
Issues 14-25, inclusive
Issue 26, cumulative for 1-26
Issue 27-38, inclusive
Issue 39, cumulative for 1-39
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PROPOSED RULES

Pursuant to Minn. Stat. § 15.0412, subd. 4, agencies must hold public hearings on proposed new rules and/or proposed amendment of existing rules. Notice of intent to hold a hearing must be published in the *State Register* at least 30 days prior to the date set for the hearing, along with the full text of the proposed new rule or amendment. The agency shall make at least one free copy of a proposed rule available to any person requesting it.

Pursuant to Minn. Stat. § 15.0412, subd. 5, when a statute, federal law or court order to adopt, suspend or repeal a rule does not allow time for the usual rulemaking process, temporary rules may be proposed. Proposed temporary rules are published in the *State Register*, and for at least 20 days thereafter, interested persons may submit data and views in writing to the proposing agency.

Department of Administration Building Code Division

Proposed Amendments to Rules for Energy Conservation Standards for Existing Residences, and Proposed Rules for Certification of Evaluators for Energy Disclosure Program

Notice of Hearing

Notice is hereby given that a public hearing in the above-entitled matter will be held in the Conference Room, 408 Metro Square Building, 7th and Robert Street, St. Paul, Minnesota on July 3, 1980, commencing at 9:00 a.m. and continuing until all persons have had an opportunity to be heard.

All interested or affected persons will have an opportunity to participate. Statements may be made orally and written materials may be submitted at the hearing. In addition, written materials may be submitted by mail to Richard Luis, Office of Hearing Examiners, Room 300, 175 University Avenue, St. Paul, Minnesota 55105, either before the hearing or within 5 working days after the close of the hearing. The Hearing Examiner may extend the time for receipt of written comments for a period not to exceed twenty (20) calendar days from the date of the hearing.

The hearing will commence with the matter of proposed amendments to rules for Energy Conservation Standards for Existing Residences. These rules add additional mandatory standards for residential rental property if economically feasible pursuant to Minn. Stat. § 116H.129, subd. 3. In addition the proposed rules provide for 22 standards, which will be used as a basis for evaluation of residences at the time of sale. The proposed rules incorporate methods for calculating energy savings and determining economic feasibility. Generally the amendments expand the rules to include requirements for reduction of energy usage by mechanical or electrical systems.

The hearing will also consider proposed rules for Certification of Evaluators for Energy Disclosure Program. These rules provide procedures for a disclosure program; outline requirements for certification and performance of energy evaluators, including revocation; and, further, provide provisions regarding conflict of interest, non-endorsement, certification fees, and bonding requirements for energy evaluators.

The proposed rules are subject to change as a result of the rules hearing process. The agency therefore strongly urges those who are potentially affected in any manner by the substance of the proposed rules to participate in the rules hearing process.

KEY: RULES SECTION — Underlining indicates additions to proposed rule language. ~~Strike outs~~ indicate deletions from proposed rule language. **PROPOSED RULES SECTION —** Underlining indicates additions to existing rule language. ~~Strike outs~~ indicate deletions from existing rule language. If a proposed rule is totally new, it is designated "all new material."

Copies of the proposed rules will be available at the door on the date of the hearing and one free copy can be obtained by writing to the Building Code Division, 408 Metro Square Building, 7th and Robert Streets, St. Paul, Minnesota 55101. The agency's authority to promulgate the proposed rules is contained in Minn. Stat. § 116H.129, subds. 1, 5, 6 and 7 (1978).

Notice is hereby given that 25 days prior to the hearing, a Statement of Need and Reasonableness will be available for review at the agency and at the Office of Hearing Examiners. This Statement of Need and Reasonableness will include a summary of all the evidence which will be presented by the agency at the hearing justifying both the need for and the reasonableness of the proposed rules. Copies of the Statement of Need and Reasonableness may be obtained from the Office of Hearing Examiners at a minimal charge.

Any person may request notification of the date on which the Hearing Examiner's Report will be available, after which date the agency may not take any final action on the rules for a period of five working days. Any persons may request notification of the date on which the hearing record has been submitted (or resubmitted) to the Attorney General by the agency. If you desire to be so notified, you may so indicate at the hearing. After the hearing, you may request notification by sending a written request to the hearing examiner (in the case of the Hearing Examiner's Report), or to the agency (in the case of the agency's submission or resubmission to the Attorney General).

Please be advised that pursuant to Minn. Stat. § 10A.01, subd. 11 (1978) any individual: (a) engaged for pay or other consideration, or authorized by another individual or association to spend money, who spends more than five hours in any month or more than $250, not including *his own* travel expenses and membership dues, in any year, for the purpose of attempting to influence legislative or administrative action by communicating or urging others to communicate with public officials; or (b) who spends more than $250, not including *his own* traveling expenses and membership dues, in any year for the purpose of attempting to influence legislative or administrative action by communicating or urging others to communicate with public officials must register with the State Ethical Practices Board as a lobbyist within five days of the commencement of such activity by the individual. The state provides certain exceptions. Questions should be directed to the State Ethical Practices Board, 41 State Office Building, St. Paul, Minnesota 55155, phone (612) 296-5615.

Adoption of the proposed rules by the agency will not require the expenditure of public monies by local public bodies.

May 16, 1980

James J. Hiniker, Commissioner
Department of Administration

Amendments as Proposed (Energy Conservation Standards for Existing Residences)

2 MCAR § 1.16201 Authority. These rules are promulgated pursuant to Minn. Stat. § 116H.129 (1978).

2 MCAR § 1.16202 Enforcement. The Minnesota Energy Agency shall conduct random inspections of certain renter occupied residences as provided in Minn. Stat. § 116H.129, subds. 3 and 4 (1978).

2 MCAR § 1.16203 Purpose and scope. The purpose of these rules is to establish minimum energy efficiency standards for existing residences. Such standards shall be applicable to certain rental residences as provided in Minn. Stat. § 116H.129, subds. 3 and 4 (1978) and shall be utilized in the energy disclosure program required by Minn. Stat. § 116H.129, subds. 5, 6, and 7 (1978), ~~and shall be applicable to certain rental residences as provided in Minn. Stat. Sec. 116H.129, Subds. 3 and 4 (1978).~~

The scope of these standards addresses ~~two~~ the following areas of energy savings:

A. The reduction of air infiltration as it relates to air leakage through the exterior envelope.

Caution: When infiltration is reduced it may be necessary to provide combustion air by other means as provided for in the Minnesota State Building Code.

B. The improvement of the thermal efficiency of the structure as it relates to the transfer of heat through the exterior envelope.

~~C. Reduction of energy usage by mechanical or electrical systems.~~

The rules also contain the methods for calculating energy savings and determining the economic feasibility of each minimum energy efficiency standard for each residence.

2 MCAR § 1.16204 Definitions.

A. Accessible. Shall mean exposed, without the removal of permanent parts of the structure.

B. Attic. The space between the ceiling joists and the rafters immediately above. The space between rafters formed where interior finish material is affixed directly to the rafters shall ~~not~~ be construed to be an attic space.

~~C. Clock thermostats. Shall mean a device which is designed to reduce energy consumption by regulating the demand on the heating or cooling system in which it is installed, and uses:~~

~~1. A temperature control device for interior spaces incorporating more than one temperature control level, and~~

~~2. A clock or other automatic mechanism for switching from one control level to another.~~

D.~~C.~~ Conditioned space. Space enclosed within a building that is heated or cooled by an energy-using system.

E.~~D.~~ Degree day. Shall mean degree day, heating. A unit, based upon temperature difference and time, used in estimating fuel consumption and specifying nominal heating load of a building in winter. For any one day, when the mean temperature is less than 65°F (18°C) there exist as many Degree Days as there are Fahrenheit (Celsius) degrees difference in temperature between the mean temperature for the day and 65°F (18°C).

F.~~E.~~ Economic feasibility. For the purpose of these rules, the test of economic feasibility is met when the savings in energy procurement costs, based on residential energy costs as certified by the Minnesota Energy Agency director in the *State Register,* exceed the cost of acquiring and installing each energy conserving item required to meet the minimum energy conservation standards as set forth at 2 MCAR § 1.16205, amortized over the subsequent ~~5~~ 10-year period.

~~G. Electric load management devices. Shall mean customer owned or leased devices that reduce the maximum kilowatt demand on an electric utility and which are either:~~

~~1. Part of a radio, ripple or other utility controlled load switching system on the customer's premises;~~

~~2. Clock-controlled load switching devices;~~

~~3. Interlocks, and other load actuated, load-limiting devices; or~~

~~4. Energy storage devices with control systems.~~

H.~~F.~~ Exterior envelope. The elements of a building which enclose conditioned spaces and through which thermal energy may be transferred to or from the exterior.

I.~~G.~~ Fireplace stove. A chimney-connected, solid fuel-burning stove having part of its fire chamber open to the room.

~~J. Floor insulation. A material as described in definition M which is installed between the first level conditioned area of a building and an unconditioned basement, a crawl space or the outside beneath it.~~

~~K. Flow restrictors. A device placed in a shower head to limit the maximum flow to three gallons per minute, or a shower head with built in provisions for limiting the maximum flow to three gallons per minute.~~

~~L. Furnace efficiency modification. Shall mean:~~

~~1. Replacement furnace or boiler, including a heat pump, which replaces an existing furnace or boiler of the same fuel type and which reduces the amount of fuel consumed due to an increase in combustion efficiency, improved heat generation or reduced heat losses.~~

~~2. Furnace replacement burner (oil) means a device which atomizes the fuel oil, mixes it with air, and ignites the fuel-air mixture, and is an integral part of an oil-fired furnace or boiler including the combustion chamber, and which because of its design, achieves a reduction in the oil used from that used by the device which it replaces.~~

~~3. Vent dampers, means an automatically operated damper installed in the vent connector of a gas fired furnace, water heater, or boiler which:~~

~~a. Is installed downstream from the drafthood; and~~

~~b. Conserves energy by substantially reducing the flow of heated air through the chimney when the furnace or heater is not in operation.~~

~~4. Electronic ignition system, means a device which, when installed on a natural gas fired, force air furnace, automatically ignites the gas burner and replaces a gas pilot light.~~

M.~~H.~~ Insulation. Any material or assembly of materials used primarily to provide resistance to heat flow in building structures, including but not limited to mineral fibrous, mineral cellular, organic fibrous, organic cellular, or reflective materials, whether in loose fill, flexible, or semi-rigid form.

~~N. Passive solar. Shall mean systems that make the most efficient use of, or enhance the use of, natural forces—including solar insolation, winds, night time coolness and opportunity to lose heat by radiation to the night sky—to heat or cool living space by the use of conductive, convective or radiant energy transfer. Passive solar systems include only:~~

~~1. Direct gain glazing system. A system using south-facing (+ or – 45 deg. of true south) panels of insulated glass, plastic, or other transparent substances that admit the sun's rays into the living space where the heat is retained. Glazing is either double or single equipped with moveable insulation.~~

~~2. Indirect gain system. A system using panels of insulated glass, plastic, or other (similar) transparent substances that direct the sun's rays onto specially constructed thermal walls, floors, ceilings, rockbeds, or containers of water or other fluids where heat is stored and radiated.~~

~~3. Solaria/sunspace system. A structure primarily of glass, plastic, or (similar) transparent material which is attached to the south-facing (+ or – 45 deg. of true south) wall of a structure which allows for air circulation to bring heat into the residence, and which is able to be closed off from the residential structure during periods of low solar insolation.~~

~~4. Window heat gain retardant. Shall mean those mechanisms which significantly reduce summer heat gain through south facing (+ or – 45 deg. of true south) windows by use of devices such as awnings, insulated rollup shades (external or internal), metal or plastic solar screen, or moveable rigid insulation.~~

O.~~I.~~ Positive shut-off. A manual shut-off device which ~~will~~ can be utilized to produce a seal to inhibit the flow of air when a fireplace or fireplace stove is not operating. i.e. damper in fireplace, damper at top of flue, damper in connector pipe, or doors (glass or other) on fireplace or fireplace stove.

P.~~J.~~ "R" value. The measure of resistance to heat flow through a material or the reciprocal of the heat flow through a material expressed in British thermal units per hour per square foot per degree Fahrenheit at 75 degrees Fahrenheit (24°C) mean temperature.

KEY: RULES SECTION — Underlining indicates additions to proposed rule language. ~~Strike outs~~ indicate deletions from proposed rule language. **PROPOSED RULES SECTION —** Underlining indicates additions to existing rule language. ~~Strike outs~~ indicate deletions from existing rule language. If a proposed rule is totally new, it is designated "all new material."

~~Q. Replacement solar swimming pool heaters. Shall mean devices which are used solely for the purpose of using the sun's energy to heat swimming pool water and which replaces a swimming pool heater which uses electricity, gas or other fossil fuel.~~

R.~~K.~~ Residence. Means any dwelling for habitation either seasonally, meaning all or a portion of the months of December through March, or permanently by one or more persons. A residence may be owned or rented and may be part of a multi-family dwelling or multi-purpose building, but shall not include buildings such as hotels, hospitals, motels, dormitories, sanitariums, nursing homes, schools and other buildings used for educational purposes, or correctional institutions. A mobile home as defined in Minn. Stat. § 168.011, subd. 8, shall be a residence for purposes of these rules.

S.~~L.~~ Rim joist. That portion of the exterior envelope between the top of the foundation wall and the sub-floor immediately above. The perimeter of the floor joists.

T.~~M.~~ Single glazed. Windows with one sheet of glazing separating the conditioned space from the exterior. For the purposes of these rules non-conditioned enclosed porches, vestibules, or other appurtenances are considered the equivalent of one layer of glazing.

~~U. Solar domestic water heater. Shall mean equipment designed to absorb the sun's energy and to use this energy to heat water for use in a residential building other than for space heating, including thermosiphon hot water heaters.~~

~~V. Storm door. Shall mean a second door, installed outside or inside a primary door, creating an insulating air space.~~

~~W. Thermal door shall mean:~~

~~1. A door with enhanced resistance to heat flow through the glass area by affixing two or more sheets of glazing material, or~~

~~2. A primary exterior door with an "R" value of at least 2.~~

~~X. Storm window. Shall mean a window or glazing material placed outside or inside of a window sash (prime window) creating an air space, to provide greater resistance to heat flow than the glazed window sash alone.~~

~~Y. Thermal duct insulation. Shall mean a material primarily designed to resist heat flow which is installed on a heating or cooling duct within unconditioned space or area of a building.~~

~~Z. Thermal pipe insulation. Shall mean a material primarily designed to resist flow which is installed on a heating or cooling pipe within unconditioned space or area of a building.~~

AA.~~N.~~ U-value (U-factor or U = thermal transmittance). The thermal transmission of heat in unit time through unit area of a particular body or assembly, including its boundary films divided by the difference between the environmental temperatures on either side of the body or assembly; Btu/(hr·ft^2·F). Also the reciprocal of total R-Value.

~~BB. Water heater insulation. Shall mean a material primarily designed to resist heat flow which is suitable for wrapping around the exterior surface of the water heater casing.~~

~~CC. Wall insulation. Shall mean insulation installed within or on the walls between conditioned spaces of a building and unconditioned spaces of a building or the outside.~~

DD.~~O.~~ Weatherstripping. Material permanently affixed to limit infiltration of air, usually made of metal, wood, felt, neoprene, expanded foam, or a combination thereof.

~~EE. Wind energy device. Shall mean equipment that uses wind energy to produce energy in any form for personal residential purposes.~~

2 MCAR § 1.16205 Minimum energy efficiency standards.

A. Where demonstrated to be economically feasible pursuant to 2 MCAR ~~§~~ 1.16206, 2 MCAR ~~§~~ 1.16207, and 2 MCAR ~~§~~ 1.16208 the following shall be standards for existing residences. Pursuant to Minn. Stat. § 116H.129, subds. 3 and 5 (1978) residential rental buildings built before January 1, 1976, which are not in compliance with these standards shall be modified to be in compliance within the economic feasibility defined in 2 MCAR § 1.16204 by January 1, 1980 with respect to caulking and weatherstripping and by July 1, 1983 with respect to all provisions herein. ~~A partial attainment of these standards shall be required if shown by calculations to be economically feasible even though full compliance will not meet criteria of economic feasibility.~~ These standards shall also provide a basis for evaluation of residences at time of sale.

~~B. The following standards 1 thru 10 shall apply to residential rental buildings as described in Minn. Stat. § 116H.129, subd. 3.~~

1. Install weatherstripping between exterior operable window sash and frames and between exterior doors and frames.

Exception: Weatherstripping not required on storm doors or storm windows.

2. Caulk, gasket or otherwise seal accessible exterior joints between foundation and rim joist, around window and door frames, between wall and roof, between wall panels, at penetrations for utility services through walls, floors, and roofs and all other openings in the exterior envelope.

3. Install positive shut-offs for all fireplaces or fireplace stoves.

4. Install insulation in accessible attics to achieve a minimum total "R" value of 19.

5. Install insulation in all accessible rim joist areas to achieve a minimum total "R" value of 11.

6. Install insulation in accessible walls and/or floors enclosing conditioned spaces to achieve a minimum total "R" value of 11. Accessible walls shall include above-grade foundation walls of basements, cellars or crawl spaces.

7. Install storm windows and/or thermal windows on all single glazed exterior window units enclosing conditioned space.

8. Install storm doors and/or thermal doors on all exterior door openings into conditioned spaces unless a single door, enclosed porch, vestibule, or other appurtenance provides a double door effect or provides an "R" value of 2 or more.

~~9. Install clock thermostat in tenant dwelling unit where such thermostat controls the tenants heating or cooling systems, and the tenant directly purchases fuel.~~

~~10. Install flow restrictors on all shower heads.~~

C. The following standards 1 thru 22 shall be applicable to those residences requiring disclosure of certain energy characteristics pursuant to Minn. Stat. § 116H.129, subds. 5 and 7.

1. Caulk, gasket or otherwise seal accessible exterior joints between foundation and rim joist, around windows and door frames, between wall and roof, between wall panels, at penetrations for utility services through walls, floors, and roofs and all other openings in the exterior envelope. Caulking, gasketing or sealing may be accomplished either on the exterior or interior of the exterior envelope.

2. Install weatherstripping between exterior openable window sash and frames and between exterior doors and frames.

Exception: Weatherstripping not required on storm doors or storm windows.

3. Furnace efficiency modifications.

a. Install replacement energy efficient system if furnace and or boiler is older than 5 years.

b. Install replacement burner, if oil fired furnace or boiler is older than 5 years.

c. Install vent dampers on gas fired furnace, waterheaters, and boilers, if the combustion air or draft dilution air is taken from a conditioned space.

d. Install electronic ignition systems on natural gas fired forced air heating systems.

4. Replace central air conditioner with energy efficient model if older than five (5) years.

5. Install insulation in attic to achieve a minimum total "R" value of R-44 and provide ventilation as per current State Building Code. (Applicable if existing is R-30 or less.)

6. Install insulation in or on walls to achieve a minimum "R" value of 11.

7. Install floor insulation in floors over unconditioned spaces to achieve a minimum "R" value of 19. (Applicable if existing is R-9 or less.)

8. Install insulation in accessible rim joist areas to achieve a minimum "R" value of 19. (Applicable if existing is R-9 or less.)

9. Install insulation on or in foundation walls above grade to achieve a minimum "R" value of 11.

10. Install thermal duct insulation on all ducts, and or plenums installed in unconditioned spaces to achieve a minimum "R" value of 3.

11. Install thermal pipe insulation on all piping, containing heated water in unconditioned spaces, having a temperature difference exceeding 50 degrees F. (10C) between ambient temperature and piping temperature to achieve a minimum "R" value of 4.

12. Install water heater insulation on water heaters. Water heater insulation shall have a minimum "R" value of 3.

13. Install storm windows on all single glazed exterior window units enclosing conditioned space.

or

Install thermal windows on all single glazed exterior window units enclosing conditioned space, where primary window is in need of replacement.

14. Install storm or thermal doors on all exterior door openings into conditioned spaces unless a single door, enclosed porch, vestibule, or other appurtenance provides a double door effect or provides a "R" value of 2 or more.

15. Electric load management devices—applicable if such devices are available through the electric utility.

a. Radio or ripple control system.

b. Clock-controlled load switching.

c. Interlocks and other load switching devices.

d. Energy storage devices.

16. Install clock thermostat—applicable if house has a thermostat and existing heating or cooling system is compatible.

17. Install positive shut-off's for all fireplaces or fireplace stoves.

18. Install solar domestic hot water heater—applicable if a site exists which is free of major obstruction to solar radiation.

19. Install wind energy systems—applicable if lot is larger than .75 acres, there is no major wind obstruction and the tower is sited at least (50) fifty feet from property line or right of way for electrical transmission or distribution lines.

20. Install solar swimming pool heater to replace or supplement existing fossil fuel heater. Applicable where site is free of obstruction to solar radiation.

21. Passive solar/install

a. Direct gain glazing systems—applicable if residence has a south facing wall or roof which is free of obstruction to solar radiation.

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b. Indirect gain—applicable if site is free of obstruction to solar radiation.

c. Solar/sunspace systems—applicable if living space has a south-facing wall and is free of major obstruction to solar radiation.

Caution: Sleeping rooms must have exterior egress windows or doors—refer to UBC Sec. 1204.

d. Window heat gain retardants—applicable if residence has a south-facing window that is not shaded from summer sunshine, and space is mechanically cooled.

22. Install thermal shutters, shades and/or draperies on exterior windows and glass doors. Devices shall have a minimum "R" value of 2.

2 MCAR § 1.16206 Procedures for calculating energy savings and determining economic feasibility. The calculation of the energy savings and the determination of the economic feasibility for each of the minimum energy efficiency standards shall be computed in a manner specific to each residence, i.e., on a case by case basis. This determination shall be performed according to the following procedures.

A. Determine the values of the general energy savings equation (2 MCAR § 1.16207) which are specific to each residence. These values include degree days, heating system efficiency and the heating value of the fuel but do not include the design heat loss per degree Fahrenheit (△H).

B. Calculate design heat per degree Fahrenheit (△H) for the standard under consideration using the equations outlined in 2 MCAR § 1.16207.A. through 2 MCAR § 1.16207.~~H.~~ U.

C. Calculate the quantity of annual energy savings for the standard under consideration by substituting the calculated value of △H into the general energy savings equation and solving for energy savings (△E).

D. Determine the price per unit of energy (P) for the annual energy savings quantity.

E. Determine the cost of the energy saving improvement (c) proposed to meet the standard under consideration.

F. Calculate the payback period (T) for the standard under consideration by substituting the values of P, C and △ E into the general payback equation (2 MCAR § 1.16208) and solving for the payback period in years.

G. If the payback period is less than ~~five~~ ten years the energy saving improvement meets the economic feasibility requirement.

H. Repeat the above procedure for each of the energy efficiency standards.

2 MCAR § 1.16207 General energy savings equations. The following equations shall be used to calculate energy savings for each of the energy efficiency standards.

Equation A*:

$$\triangle E = \triangle H \times \frac{D \times \cancel{21.7}\ 14.4}{N \times V}$$

Where

△ E = The quantity of annual energy savings in the appropriate energy units, e.g. hundreds of cubic feet of natural gas, gallons of fuel oil, or kilowatt hours of electricity.

△H = The difference in design heat loss per degree Fahrenheit between the improved condition and the existing condition for infiltration and/or thermal transmission. Equations for calculating △H are listed in subsequent subsections.

D = The normalized annual degree days as published by the National Oceanic and Atmospheric Administration (NOAA).

N = The ~~rated full load~~ seasonal operating efficiency of the heating system.

V = The heating value of the fuel type, consistent with ~~△E~~ and ~~△H~~.

*Equation (A) is derived from the ASHRAE Handbook, 1976 Systems, pp. 43.1-43.18, ~~and Department of Energy, Residential Conservation Service Model Audit.~~

A. Install window and door weatherstripping. The following equation shall be used to calculate △H for energy efficiency standards ~~B-1 & C-2~~ (2 MCAR § 1.16205 ~~A.~~).

Equation #1:

$$\triangle H = 1.08 \times (q_0 - q_1) \times L$$

Where:

q_0 = The infiltration value in cubic feet per minute per lineal foot of crack, $\frac{CFM}{ft.}$, for the existing window or door weatherstripping condition before improvement;

q_1 = The infiltration value in cubic feet per minute per lineal foot of crack, $\frac{CFM}{ft.}$, for the proposed window or door weatherstripping condition after improvement;

L = The length of the crack in feet which is under consideration for weatherstripping.

B. Caulk, Gasket or Seal Joints. The following equation shall be used to calculate △H for energy efficiency standards ~~B-2 & C-1~~ (2 MCAR § 1.16205~~A.~~).

Equation #2:

$$\triangle H = 1.08 \times (q_0 - q_1) \times L$$

Where:

q_0 = The infiltration value in cubic feet per minute per lineal foot of crack, $\frac{CFM}{ft.}$, for the existing crack before improvement;

q_1 = The infiltration value in cubic feet per minute per lineal foot of crack, $\frac{CFM}{ft.}$, for the proposed crack seal after improvement;

L = The crack length in feet for the crack under consideration.

C. Install positive shut-offs. The following equation shall be used to calcuate $\triangle H$ for energy efficiency standards ~~B-3 & C-17~~ (2 MCAR § 1.16205~~A.~~).

Equation #3:

$$\triangle H = 1.08 \times (q_0 - q_1) \times A$$

Where:

q_0 = The infiltration value in cubic feet per minute per square foot, $\frac{CFM}{ft.^2}$, for the existing condition before improvement;

q_1 = The infiltration value in cubic feet per minute per square foot, $\frac{CFM}{ft.^2}$, for the proposed condition after improvement with a positive shut-off;

A = The cross sectional area of the flue or connector in square feet.

D. Install attic insulation. The following equation shall be used to calculate $\triangle H$ for energy efficiency standards ~~B-4 & C-5~~ (2 MCAR § 1.6205~~A.~~).

Equation #4:

$$\triangle H = (\frac{1}{R_0} - \frac{1}{R_1}) \times A$$

Where:

R_0 = The total R-value of the attic/ceiling/roof assembly including existing insulation before improvement;

R_1 = The total R-value of the proposed attic/ceiling/roof assembly including existing insulation and additional insulation after improvement;

A = The area of the attic/ceiling/roof assembly in square feet separating conditioned spaced from unconditioned space.

E. Install Rim Joist Insulation. The following equation shall be used to calculate $\triangle H$ for energy efficiency standards B-5 & C-8 (2 MCAR § 1.6205~~A.~~).

Equation #5:

$$\triangle H = (\frac{1}{R_0} - \frac{1}{R_1}) \times A$$

Where:

R_0 = The total R-value of the rim joist assembly including existing insulation before improvement;

R_1 = The total R-value of the rim joist assembly including existing and additional insulation after improvement;

A = The area of the rim joist assembly in square feet separating conditioned space from unconditioned space.

F. Install wall and/or floor insulation. The following equation shall be used to calculate $\triangle H$ for energy efficiency standards ~~B-6, C-6, C-7 & C-9~~ (2 MCAR § 1.16205~~A.~~).

Equation #6:

$$\triangle H = (\frac{1}{R_0} - \frac{1}{R_1}) \times A$$

Where:

R_0 = The total R-value of the existing wall or floor assembly including existing insulation before improvement;

R_1 = The total R-value of the proposed wall or floor assembly including existing and additional insulation after improvement;

A = The area of the wall or floor assembly in square feet separating conditioned space from unconditioned space.

G. Install storm windows and or thermal windows. The following equation shall be used to calculate $\triangle H$ for energy efficiency standards ~~B-7 & C-13~~ (2 MCAR § 1.16205~~A.~~).

Equation #7:

$$\triangle H = (U_0 - U_1) \times A$$

Where:

U_0 = The U-value for the existing window assembly before improvement;

U_1 = The U-value for the proposed window assembly after improvement;

A = The area of the window assembly in square feet separating conditioned space from exterior.

H. Install storm doors and or thermal doors. The following equation shall be used to calculate $\triangle H$ for energy efficiency standards ~~B-8 or C-14~~ (2 MCAR § 1.16205~~A.~~).

Equation #8:

$$\triangle H = (U_0 - U_1) \times A$$

Where:

U_0 = The U-value for the existing door assembly before improvement;

U_1 = The U-value for the proposed door assembly after improvement;

A = The area of the door assembly in square feet separating conditioned space from exterior.

~~I. Install clock thermostats. The following equation shall be used to calculate $\triangle E$ for efficiency standards B-9 & C-16 (2 MCAR § 1.16205).~~

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Equation #9:

The equation is based upon a single eight (8) hour nighttime setback.

9-a: $\triangle E = .07E_h$ for 5F setback

9-b: $\triangle E = .10E_h$ for 10F setback

9-c: $\triangle E = .11E_h$ for 15F setback

Where:

E_h = Total annual energy used for space heating, in units of fuel.

J. Install flow restrictors. The following equation shall be used to calculate $\triangle H$ for efficiency standard B10 (2 MCAR § 1.16205).

Equation #10:

$$\triangle E \quad \frac{6100\ (F_1 - F_0)\quad (100\ F - T)}{N_r\ V}$$

Where:

F_0 = The shower flow rate in gallons per minute before installing restrictor.

F_1 = The flow rate after installing restrictor.

T = Average cold water supply temperature.

N_r = Recovery efficiency of water heater.

V = Heating value of the fuel type in Btu's per unit of fuel.

K. Furnace efficiency modifications. The following equations shall be used to calculate $\triangle E$ for efficiency standard C-3 (2 MCAR § 1.16205).

Equation #11:

a. $$\triangle E = E_h\left(1 - \frac{N_0}{N_1}\right)$$

Where:

E_h = Total annual energy used for spaced heating, in units of fuel.

N_0 = The seasonal operating efficiency of the existing heating system.

N_1 = The seasonal operating efficiency of the proposed heating system.

b. If the heating system already has a retention head burner, rotary cup burner, or if it is a wet base boiler, the energy savings shall be estimated as 0.

Low estimate of $\triangle E = .10E_h$

High estimate of $\triangle E = .18E_h$

Where:

E_h = Total annual energy used for space heating, in units of fuel.

c. Low estimate of $\triangle E = .07E_h$

High estimate of $\triangle E = .10\ E_h$

d. If pilot is turned off each summer—

$$\triangle E = \frac{3600\ F_p}{V}$$

If pilot is left on in the summer—

$$\triangle E = \frac{7300\ F_p}{V}$$

Where:

F_p = Rate at which pilot uses energy, in Btu per hour. (typically 800-1000 Btu per hour.)

V = Heating value of the fuel type in Btu per unit of fuel.

L. Replace central air conditioner. The following equation shall be used to calculate $\triangle E$ for efficiency standard C-4 (2 MCAR § 1.16205).

Equation #12.

$$\triangle E = E_c\ [1 - (PSE/NSE)]$$

Where:

E_c = Annual energy used by existing central air conditioner in units of fuel.

PSE = Present Seasonal Efficiency.

NSE = New unit Seasonal Efficiency.

M. Install thermal duct insulation. The following equation shall be used to calculate $\triangle E$ for efficiency standard C-10. (2 MCAR § 1.16205.)

Equation #13.

$$\triangle E = \frac{\left(\frac{1}{R_0} - \frac{1}{R_1}\right) \times A \times (T_2 - T_1) \times HRS}{N \times V}$$

Where:

R_0 = The total R-value of ducts before improvement.

R_1 = The total R-value of ducts after addition of duct insulation.

A = Area of ducts to be insulated in square feet.

T_2 = Temperature inside ducts during on cycle of heating system.

T_1 = Average temperature on outside of ducts.

HRS = Number of hours per year furnace is operating.

N = Seasonal operating efficiency of heating system.

V = Heating value of fuel.

N. Install thermal pipe insulation. The following equation shall be used to calculate $\triangle E$ for efficiency standard C-11 (2 MCAR § 1.16205).

Equation #14.

$$\triangle E = \frac{(Q_1 - Q_0) \times L \times HRS}{N \times V}$$

Where:

Q_0 = Heat loss in Btu/hr. ft. before improvement, (from charts).

Q_1 = Heat loss in Btu/hr. ft. after addition of pipe insulation. (from charts)

L = Length of un-insulated pipes in unconditioned space.

HRS = Number of hours per year furnace is operating.

N = Seasonal operating efficiency of heating system.

V = Heating value of fuel.

O. Install water heater insulation. The following equation shall be used to calculate $\triangle E$ for efficiency standard C-12 (2 MCAR § 1.16205).

Equation #15.

a. If water heater is in an unconditioned space.

$$\triangle E. = \frac{\left(\frac{1}{R_0} - \frac{1}{R_1}\right) \times A \times (T_w - T_a) \times 8760}{N_r \times V}$$

If water heater is in an conditioned space.

$$\triangle E. = \frac{\left(\frac{1}{R_0} - \frac{1}{R_1}\right) \times A \times (T_w - T_a) \times H_{65}}{N_r \times V}$$

Where:

R_0 = Total R-value of water heater assembly before improvement.

R_1 = Total R-value of water heater assembly after insulation added.

A = Area of water heater that could be insulated in square feet.

T_w = Temperature of hot water.

T_a = Average air temperature in area surrounding water heater.

N_r = Recovery efficiency of water heater.

V = Heating value of fuel type in Btu per unit of fuel.

H_{65} = Number of hours per year that the outside temperature is above 65 degrees F. (19° C).

P. Install load management devices. Standard C-15 (2 MCAR § 1.16205).

Equation #16.

Calculation procedures to determine installation costs and savings in energy costs must be obtained from the local electric utility, if the utility offers a residential rate which reflects any differences in the utility's cost of service between peak and off-peak periods.

Q. Install solar domestic water heater. The following shall be used to calculate $\triangle E$ for energy efficiency Standard C-18 (2 MCAR § 1.16205).

Equation #17.

The residence will be examined to determine if a collector site exists that would supply 60% of the annual domestic hot water heating energy.

$\triangle E = .6E_{dhw}$

Where:

E_{dhw} is the annual energy used for heating domestic hot water.

R. Install wind energy systems. The following shall be used to determine if energy savings may be accomplished. Standard C-19 (2 MCAR § 1.16205).

Procedure #18.

Wind energy devices.

An evaluation of the site shall be made, including an approximation of the average annual wind speed and accessibility to an undisturbed wind stream at a 30 foot height. An energy savings estimate will be made for 2 types of systems:

1. Wind systems that deliver utility quality power for residential appliance loads and discretionary loads (including domestic hot water and space heating). Cost and savings estimates shall be made for typical systems sized to provide 40% to 80% of the residential electric load.

2. Wind systems dedicated to delivering thermal energy for space heating and domestic hot water heating. Cost and savings estimates shall be made for typical systems sized to provide 40% to 80% of the annual energy used for space and water heating.

S. Install Solar Swimming Pool Heater. The following shall be used to calculate $\triangle E$ for efficiency standard C-20 (2 MCAR § 1.16205).

Procedure #19.

The residence will be examined to determine if a collector site exists that would supply 30% to 75% of the energy used to heat the swimming pool for the months of May thru September.

$\triangle E = .3E_{sp}$ to $.75E_{sp}$

Where:

E_{sp} = The energy used to heat the swimming pool for the months of May thru September.

T. Install Passive Solar Systems. The following shall be used to determine if energy savings may be accomplished. Standard C-21 (2 MCAR § 1.16205).

Procedure #20.

The residence shall be examined to determine if an acceptable site exists for the addition of:

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1. Direct gain glazing.

2. Indirect gain glazing,

3. Passive solar sunspace, and

4. Window heat gain retardants.

U. Install thermal shades, shutters or draperies. The following shall be used to calculate $\triangle H$ for efficiency Standard C-22 (2 MCAR § 1.16205).

Equation #21.

$\triangle H = (U_a - U_e) \times A$

Where:

U_a = Total "U" value of window assembly after addition of Thermal Shades, Shutters or Draperies.

U_e = Total "U" value of window assembly as it exists.

A = Total area of windows.

Rules as Proposed (Certification of Evaluators for Energy Disclosure Program)

2 MCAR § 1.16220 Authorization. These rules are promulgated pursuant to Minn. Stat. § 116H.129, subds. 5, 6 and 7. (1978)

2 MCAR § 1.16221 Purpose and scope. The purpose of these rules is to establish procedures for a residential energy disclosure program and for certification of evaluators.

2 MCAR § 1.16222 Disclosure program. Effective October 1, 1980. Prior to time of sale, as required by § 116H.129, subds. 5, 6 and 7 an evaluation and report disclosing the extent of compliance with Energy Conservation Standards for Existing Residences (2 MCAR § 1.16205 C.1. through 22.) shall be made for all residences constructed prior to January 1, 1976, unless the buyer waives the disclosure report.

Evaluators shall use the appended disclosure report form approved by the Building Code Division in consultation with the Minnesota Energy Agency or a form which is substantially similar to that appended to these rules. Evaluators calculations shall be made on forms prepared by the Building Code Division and/or the Minnesota Energy Agency. Evaluators shall maintain copies of completed disclosure reports which shall be available for review by the Building Code Division or the Minnesota Energy Agency. Evaluators shall submit an annual summary of evaluations to the Building Code Division. Copies of completed disclosure reports shall be retained by evaluators for a period of not less than 5 years.

Prior to time of sale the potential buyer of any residence constructed prior to January 1, 1976, shall be furnished with a disclosure report signed by a certified evaluator, which shall indicate the extent of compliance with the Energy Conservation Standards for Existing Residences (2 MCAR § 1.16205 C.1. through C.22.). If the buyer chooses to waive the disclosure report he may do so by signing a waiver provision on the disclosure report form. Completed disclosure reports and evaluators calculations shall be submitted to the owners by evaluators within 30 days of request for evaluation.

2 MCAR § 1.16223 Certification. A certification shall be issued to qualified applicants successful upon completion of an examination evidencing knowledge of structural and energy use characteristics of residences and proficiency in evaluation of buildings, submittal of a copy of a bond required under 2 MCAR § 1.16226, and payment of fee required under 2 MCAR § 1.16227.

2 MCAR § 1.16224 Standards for certification, prerequisites. Persons possessing the following qualifications shall be eligible to be admitted for examination:

A. Building officials, certified by examination by the Building Code Division.

B. Architects and mechanical engineers registered in the State of Minnesota.

C. Truth in Housing Evaluators and Truth in Sale of Housing Evaluators certified by examination by the cities of Minneapolis and St. Paul.

D. Individuals experienced in weatherization procedures who have completed a minimum of twenty-five (25) audits and six (6) months satisfactory work with a non-profit weatherization program.

E. Employees of participating utility companies trained to perform audits under the Federal Residential Conservation Program.

F. Persons who have successfully completed a prescribed course or courses of training for residential evaluators, sponsored by the Minnesota Energy Agency.

G. Persons who have successfully completed a course or courses of training for residential evaluators sponsored by the University of Wisconsin Extension Division, or similar courses, with prior approval of the Building Code Division.

Said persons shall be required to attend an orientation program prior to examination.

2 MCAR § 1.16225 Examinations. Examinations shall be conducted at least once a year, or based upon receipt of request for examination more often, at locations determined by the Building Code Division. Notice of time and place of examination shall be provided by the Building Code Division by publication in the *State Register* and *Building Code Newsletter* published at regular intervals or to persons upon request. Applications for examination with required fee must be received by the Building Code Division two (2) weeks prior to established examination dates.

2 MCAR § 1.16226 Bond required. Evaluators must provide a bond to the State in the sum of $5,000.00 conditioned upon the faithful and lawful performance of all work done pursuant to these rules and Minn. Stat. § 116H.129, and such bond shall be for the benefit of persons injured or suffering financial loss by reason of failure of such performance. The bond shall be filed with the Building Code Division and must be continuously

applicable for the period of the certificate. Such bond shall be written by a corporate surety licensed to do business in the State of Minnesota. Bonds shall not be required for evaluators in the employ of Municipal Governments.

2 MCAR § 1.16227 Certification fees. Application for evaluator certification must be accompanied by a fee of $50.00 remitted to the Building Code Division; payable to the State of Minnesota.

2 MCAR § 1.16228 Conflict of interest. Evaluators shall not be engaged in nor have an interest in the sale of products referenced in the standards.

Evaluators shall not own nor have an interest in properties that they evaluate. Holding of a listing for sale by a person or persons employing firm constitutes an interest in property.

Public Utilities evaluation programs such as Residential Conservation Services (RCS) are not to be considered a conflict of interest.

2 MCAR § 1.16229 Non-endorsement. The evaluator shall not endorse the use of specific materials, brand names of material or product, or methods which may be used to meet any specific standard, nor shall any statement relating to the standards be interpreted as an endorsement of any specific material or product.

2 MCAR § 1.16230 Revocation. Certification shall be revoked upon cancellation or expiration of bond. When reasonable evidence discloses a conflict of interest, unethical practices or negligent performance of duties by the evaluator, the Building Code Division shall notify the evaluator of its intent to revoke the certificate and provide for a contested case proceeding in accordance with the provisions of Minn. Stat. §§ 15.041 *et seq.*

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Department of Public Service
Public Service Commission

Notice of Public Participation Meeting Concerning Standards for Information to Consumers as Set Forth in Section 115(f) of the Federal Public Utility Regulatory Policies Act (PURPA)

Notice is hereby given that the Public Service Commission will conduct a public participation meeting in the Commission Meeting Room, 7th Floor, American Center Building, 160 East Kellogg Boulevard, St. Paul, Minnesota, on Monday, June 23, 1980 commencing at 11:00 a.m. and continuing until all persons have had an opportunity to be heard.

The purpose of this meeting is to consider the standards for information to consumers as set forth in Section 115(f) of the Federal Public Utility Regulatory Policies Act (PURPA) and more specifically, the adequacy of the present PSC rules 281 and 313.

PURPA Section 113(b) (3) requires the commission to consider Section 115(f) whereby utilities must transmit to its electric consumers information regarding rate schedules.

PURPA Section 115(f) states the following:

115(f) Information to Consumers.—

(1) For purposes of the standard for information to consumers established by section 113(b) (3), each electric utility shall transmit to each of its electric consumers a clear and concise explanation of the existing rate schedule and any rate schedule applied for (or proposed by a nonregulated electric utility) applicable to such consumer. Such statement shall be transmitted to each such consumer—

(A) not later than 60 days after the date of commencement of service to such consumer or 90 days after the standard established by section 113(b) (3) is adopted with respect to such electric utility, whichever last occurs, and

(B) not later than 30 days (60 days in the case of an electric utility which uses a bimonthly billing system) after such utility's application for any change in a rate schedule applicable to such consumer (or proposal of such a change in the case of a nonregulated utility).

(2) For purposes of the standard for information to consumers established by section 113(b) (3), each electric utility shall transmit to each of its electric consumers not less frequently than once each year—

(A) a clear and concise summary of the existing rate schedules applicable to each of the major classes of its electric consumers for which there is a separate rate, and

(B) an identification of any classes whose rates are not summarized. Such summary may be transmitted together with such consumer's billing or in such other manner as the State regulatory authority or nonregulated electric utility deems appropriate.

(3) For purposes of the standard for information to consumers established by section 113(b) (3), each electric utility, on request of an electric consumer of such utility, shall transmit to such consumer a clear and concise statement of the actual consumption (or degree-day adjusted consumption) of electric energy by such consumer for each billing period during the prior year (unless such consumption data is not reasonably ascertainable by the utility).

The current PSC rules which regulate information to consumers are as follows:

PSC 281 Customer information. The utility is responsible for informing its customers of the following information as prescribed by following provisions:

A. A sign or notice, which shall be approved by the commission, posted prominently and conspicuously at all utility office locations open to the general public. The sign or notice shall state where, when, and to whom a complaint is to be directed, and the address of the Public Service Commission and its availability for mediation upon written request.

B. The utility shall, at its expense, publish ''customer information,'' that will be offered to each new customer, and upon request, to any existing customer. This ''customer information'' must be submitted to the Commission for approval. This ''customer information'' must, at a minimum, include the following:

1. The utility's own customer policies governing the following areas.

a. bill collections,

b. notice of disconnection,

c. disconnection of service,

d. reconnection of service,

e. deposit and guarantee requirements, and

f. meter reading procedures.

2. The rate schedule pertaining to the customers of that area. The current rate schedule as required by PSC 310 C. may be attached to the ''information'' to meet this requirement.

3. The title, addresses and phone numbers of the department(s) of the utility to which complaints should be directed, including a telephone number for customers to call in emergency situations or a concise statement as to where such information can be obtained.

4. The information contained in PSC 282 B. and PSC 303.

5. This statement: ''The Minnesota Public Service Commission regulates this utility and is available for mediation

upon written request,'' and the address of the Minnesota Public Service Commission.

C. The utility's billing statements to its customers must contain this information:

1. This statement: ''Register any inquiry or complaint at . . .'' (and list the address and telephone number of the utility, designating where the customer may initiate an inquiry or a complaint, or a concise statement as to where such information can be obtained).

2. A notice to customers of the availability upon request of the ''customer information.''

PSC 313 Billing content.

A. Bills rendered periodically to customers for electric and gas service shall include, but are not limited to, the following information:

1. The present and last preceding meter readings;

2. The date of the present reading;

3. Identification of the applicable rate schedule;

4. The number and kinds of units metered;

5. A complete itemization of all charges incurred at each level of customer usage;

6. The amount of the bill;

7. The date on which the bill will become delinquent;

8. If an estimated bill, clear and conspicuous language identifying the bill as an estimated bill;

10. The amount of state and local taxes separately itemized;

11. Fuel or power adjustment clause separately itemized, if applicable;

12. The information required by PSC 281 C.

B. If a utility is unable to comply with any provisions of PSC 313 A. within twelve (12) months of the effective date of the rule, the utility shall petition the commission for either a temporary exception or a permanent exemption. The petition shall include the justification for noncompliance, the duration of the desired exception, and the plan for compliance.

Please be advised that pursuant to Minn. Stat. § 10A.01, subd. 11 (1978) any individual: (a) Engaged for pay or other consideration, or authorized by another individual or association to spend money, who spends more than five hours in any month or more than $250, not including *his own* travel expenses and membership dues, in any year, for the purpose of attempting to influence legislative or administrative action by communicating or urging others to communicate with public officials; or (b) Who spends more than $250, not including *his own* traveling expenses and membership dues, in any year for the purpose of attempting to influence legislative or administrative action by communicating or urging others to communicate with public officials must register with the State Ethical Practices Board as a lobbyist within five days of the commencement of such activity by the individual. The statute provides certain exceptions. Questions should be directed to the State Ethical Practices Board, 41 State Office Building, St. Paul, Minnesota 55155, phone (612) 296-5615.

Mary L. Harty
Executive Secretary

Department of Public Welfare
Support Services Bureau

Proposed Temporary Rule Governing Limitation of Nursing Hours in the Nursing Home Reimbursement Rule (12 MCAR § 2.049)

Request for Public Comment

Notice is hereby given that the following amendment to 12 MCAR § 2.049 (DPW 49) governing the maximum reimbursable nursing hours allowed to selected skilled nursing facilities and intermediate care facilities as required by Minn. Stat. § 184, ch. 614 (1980), is proposed for adoption as a temporary rule as authorized by Minn. Stat. § 15.0412, subd. 5 (1978), pending completion of a full hearing and adoption of a permanent rule. Comments from interested and affected persons are requested. Comments must be received at the address given below within 20 days of the date of this publication to be considered. The temporary rule may be revised on the basis of comments received.

Comments on the proposed rule should be sent to:

Robert Rau
1st Floor
Centennial Office Building
St. Paul, Minnesota 55155

Temporary Rule as Proposed

12 MCAR § 2.049 D.2. Nursing care and attendant limitations.

a. Nursing care. Nursing-care costs will be limited by a maximum number of nursing hours per patient day as follows:

Skilled—2.9 hours
ICF I—2.3 hours

KEY: RULES SECTION — Underlining indicates additions to proposed rule language. ~~Strike-outs~~ indicate deletions from proposed rule language. **PROPOSED RULES SECTION** — Underlining indicates additions to existing rule language. ~~Strike outs~~ indicate deletions from existing rule language. If a proposed rule is totally new, it is designated ''all new material.''

If the actual average nursing hours per patient day exceed the above limit, the reasonable cost limitation will be calculated by multiplying the ratio of the above stated limit to the average actual nursing hours per patient day for the year times the actual cost per patient day. This limitation will not apply to facilities that qualify for exception under D.8.d.(3) or facilities mandated by a correction order from the Department of Health to provide additional nursing care.

b. Attendants (ICF II facilities only). Reasonable costs for attendants in ICF II facilities will be limited to one hour per patient day. If the actual average attendant hours per patient day exceeds this limit, the reasonable cost limitation will be calculated by multiplying the ratio of the stated limit to the average actual attendant hours per patient day for the year times the actual cost per patient day.

c. Nursing care exceptions. Facilities in which the nursing hours exceeded 2.8 hours per day for skilled nursing care and 2.2 hours per day for intermediate care during calendar year 1979 shall be limited to maximum of 3.2 hours per day for skilled nursing care and 2.45 hours per day for intermediate care. The cost of additional nursing hours in excess of 2.8 hours for skilled care and 2.2 hours for intermediate care shall be exempted from the rate provision of B.4.b. This provision is effective for facilities with fiscal years ending after May 31, 1980 and before June 30, 1981.

State Planning Agency Human Resources Division

Proposed Rules Regarding Provision of State Grants for Human Services Management and Planning Improvement

Notice of Hearing

Notice is hereby given that a public hearing in the above-titled matter will be held in Conference Room 101, Capitol Square Building, 550 Cedar Street, St. Paul, Minnesota 55101 on July 10, 1980, commencing at 8:30 a.m. and continuing until all persons have had an opportunity to be heard.

All interested or affected persons will have an opportunity to participate. Statements may be made orally and written material may be submitted at the hearing. In addition, written materials may be submitted by mail to: Richard Luis, Office of Hearing Examiners, Room 300, 1745 University Avenue, St. Paul, Minnesota 55104, (612) 296-8114. Unless a longer period not to exceed twenty calendar days is ordered by the hearing examiner at the hearing, the hearing record will remain open for the inclusion of written material for five working days after the hearing ends. The hearing shall be conducted in accordance with the rules of the Office of Hearing Examiners, 9 MCAR § 2.101 *et seq.*, Minn. Stat. §§ 15.0411-15.0417 and 15.052.

The proposed rules, if adopted, would guide the State Planning Agency, Human Resources Division, in administering grants for Human Services Management and Planning Improvement. As part of grants administration, the rule would define the procedures for applying for funding, the criteria for evaluating projects for funding and requirements for grant disbursement and for reporting on the project.

Copies of the proposed rules are now available and one free copy may be obtained by writing to Linda Sutherland, State Planning Agency, Room 101 Capitol Square Building, St. Paul, Minnesota 55101.

The statutory authority to promulgate the proposed rules is contained in Minn. Stat. §§ 4.17, 402.046 and Laws of 1979, ch. 533, § 16, subd. 3.

Notice: The proposed rules are subject to change as a result of the rules hearing process. The agency therefore strongly urges those who are potentially affected in any manner by the substance of the proposed rules to participate in the hearing process.

Please be advised that pursuant to Minn. Stat. § 10A.02, subd. 1 (1978) as amended by Laws of 1979, § 3, lobbyists must register with the State Ethical Practices Board within five (5) days after becoming lobbyists.

"Lobbyist" means any individual:

(a) Engaged for pay or other consideration, or authorized by another individual or association to spend money, who spends more than five hours in any month or more than $250, not including *his own* travel expenses and membership dues, in any year, for the purpose of attempting to influence legislative or administrative action by communicating or urging others to communicate with public officials;

or

(b) Who spends more than $250, not including *his own* traveling expenses and membership dues, in any year, for the purpose of attempting to influence legislative or administrative action by communicating or urging others to communicate with public officials.

"Lobbyist" does not include any:

(a) Public official or employee of the state or any of its political subdivisions or public bodies acting in his official capacity;

(b) Party or his representative appearing in a proceeding before a state board, commission or agency of the executive branch unless the board, commission or agency is taking administrative action;

(c) Individual while engaged in selling goods or services to be paid for by public funds;

(d) News media or their employees or agents while engaged in the publishing or broadcasting of news items, editorial comments or paid advertisements which directly or indirectly urge official action;

(e) Paid expert witness whose testimony is requested by the

body before which he is appearing, but only to the extent of preparing or delivering testimony;

(f) Stockholder of a family farm corporation as defined in § 500.24, subd. 1, who does not spend over $250, excluding *his own* travel expenses, in any year in communicating with public officials; or

(g) Party or his representative appearing to present a claim to the legislature and communicating to legislators only by the filing of a claim form and supporting documents and by appearing at public hearings on the claim.

Questions concerning lobbyists or their required registration should be directed to the State Ethical Practices Board, Room 41, State Office Building, Wabasha Street, St. Paul, Minnesota 55155, at telephone number (612) 296-5615.

Notice is hereby given that 25 days prior to a hearing, a Statement of Need and Reasonableness will be available for review at the Human Resources Division of the State Planning Agency and at the Office of Hearing Examiners. This Statement of Need and Reasonableness will include a summary of all of the evidence which will be presented by the State Planning Agency at the hearing justifying the need for and the reasonableness of the proposed rules. Copies of the Statement of Need and Reasonableness may be obtained from the Office of Hearing Examiners at a minimal charge.

NOTICE: Any person may request notification of the date on which the Hearing Examiner's Report will be available, after which date the State Planning Agency may not take any final action on the rules for a period of five (5) working days. Any person may request notification of the date on which the hearing record has been submitted (or resubmitted) to the Attorney General by the State Planning Agency. If you desire to be notified, you may so indicate at the hearing. After the hearing, you may request notification by sending a written request to the hearing examiner (in the case of the Hearing Examiner's Report), or to the State Planning Agency, (in the case of the agency's submission or resubmission to the Attorney General).

May 20,1980

Arthur Sidner, Director
State Planning Agency

Rules as Proposed (all new material)

10 MCAR § 1.320 Authority and purpose.

A. Authority. The rules contained herein are prescribed pursuant to authority granted in Minn. Stat. §§ 4.17 and 402.046 and Laws of 1979, ch. 333, § 16, subd. 3 and subsequent applicable laws.

B. Purpose of the rules. These rules are set forth to provide the procedures for awarding human services management and planning improvement grants.

10 MCAR § 1.321 Definitions. The following terms as used in these rules have the following meanings:

A. Human services—shall have the meaning established in Minn. Stat. § 402.02, subd. 2(d).

B. Division—means the Human Resources Planning Division of the State Planning Agency.

C. "SPA"—means the State Planning Agency.

D. Management and planning improvement—means those activities focused at providing procedures, methods of actions and guidance for the administration of human services programs.

E. Grant agreement—means a signed written agreement between the state, acting by and through the SPA, and the county which specifies the terms of the funding to the county.

10 MCAR § 1.322 Application process.

A. Submission of application.

1. Eligibility. Any Minnesota county is eligible to apply for the grants described herein.

2. Notice. Annually the division shall provide notice of the time period during which applications will be accepted. The duration of the application period shall not be less than 30 days. Notices will be sent to:

a. Chairman of county boards;

b. Directors of human services boards established pursuant to Minn. Stat. § 402;

c. Directors of community health services programs established pursuant to Minn. Stat. §§ 145.911 to 145.922;

d. Directors of community social services programs established pursuant to Minn. Stat. §§ 256E.01 to 256E.12;

e. Directors of community corrections programs established pursuant to Minn. Stat. § 401;

f. Others who request notification.

3. Eligible projects. A project whose goals are to improve the management or planning capacity of a county to deliver human services programs is eligible for funding.

B. Application procedures. Applications, on forms supplied by the SPA, must be received by the division before 5 p.m. on the last day of the application period or be postmarked not later than the last day of the application period.

10 MCAR § 1.323 Distribution of grants.

A. Criteria—priority counties. Consistent with priorities established in applicable appropriations law, priority status shall be given counties who have not previously received funding for the improvement of their management or planning capacity.

KEY: RULES SECTION — Underlining indicates additions to proposed rule language. ~~Strike outs~~ indicate deletions from proposed rule language. **PROPOSED RULES SECTION —** Underlining indicates additions to existing rule language. ~~Strike outs~~ indicate deletions from existing rule language. If a proposed rule is totally new, it is designated "all new material."

The following criteria shall be used by the division to evaluate projects for funding:

1. The extent to which the project is likely to be transferable to other counties.

2. The extent to which the project is likely to result in a significant improvement in management systems, organizations or services integration.

3. A project which is undertaken by a group of counties or by multiple disciplines or programs within a single county.

4. The extent to which the project can demonstrate a high cost-effectiveness result.

B. Ranking of applications. The division will rank applications from highest to lowest based on the stated criteria and will award funds in order of ranking.

C. Applications from other counties. If funds remain after awards are made to counties who have priority status as specified in 10 MCAR § 1.323 A., the remaining money shall be available to other counties and will be evaluated and distributed on the basis of criteria stated in 10 MCAR § 1.323 A.1.-4. and 10 MCAR § 1.323 B.

D. Limit on grants. Total grants to any county during the biennium shall not exceed the limit set in applicable appropriations laws.

E. Grant disbursement. The SPA shall disburse the grants according to the following procedures:

1. A grant agreement shall be entered into by the SPA and the county once the grants are awarded.

2. The grant agreement shall specify:

a. the amount of the funding to be awarded the county for the management and planning improvement;

b. the manner and process for making payments to the county; and

c. the requirements for accounting, auditing and reporting required of the county by the SPA.

10 MCAR § 1.324 Final report. Within 60 days of completion of the project, each grantee shall submit to the division a final report. The report shall address the following:

1. description of the project;

2. participants in the project;

3. staffing of the project, including consultants;

4. results of the project;

5. an assessment of the effect of the project on future events or issues in the county;

6. plans for continuation of the project, if any;

7. source and amount of funds, if any, used in addition to state grant.

10 MCAR § 1.325 Availability of funding. Grants under the rule are subject to continuing availability of funds appropriated for such purposes.

TAX COURT

Pursuant to Minn. Stat. § 271.06, subd. 1, an appeal to the tax court may be taken from any official order of the Commissioner of Revenue regarding any tax, fee or assessment, or any matter concerning the tax laws listed in § 271.01, subd. 5, by an interested or affected person, by any political subdivision of the state, by the Attorney General in behalf of the state, or by any resident taxpayer of the state in behalf of the state in case the Attorney General, upon request, shall refuse to appeal. Decisions of the tax court are printed in the *State Register*, except in the case of appeals dealing with property valuation, assessment, or taxation for property tax purposes.

State of Minnesota — Tax Court

Robert R. and Helen Truex, — **Appellants,**

v.

The Commissioner of Revenue, — **Appellee.**

Docket No. 2505 — **Dated May 16, 1980**

Taxpayer appeals from the commissioner's Order of September 27, 1977. The commissioner found that the taxpayers were domiciliaries of the State of Minnesota and therefore residents of Minnesota for income tax purposes for the period from July 1, 1974, through December 31, 1975. Accordingly, the commissioner found that all of Appellants' income, for such period, was assignable to the state for income tax purposes under Minn. Stat. (1974) 290.17(1). Appellant claims that they were domiciliaries of the State of Florida for the period in question. Therefore,

according to Appellants, it was improper for the commissioner to assign Appellants' income for such period to Minnesota.

Harold Farnes appeared for the Appellants

Richard Davis, Special Assistant Attorney General, appeared for the Appellee.

Decision

The commissioner's Order is hereby affirmed.

Findings of Fact

John Knapp

1. The Appellants, Robert R. and Helen Truex, were legal residents and domiciliaries of the State of Minnesota from May, 1943, until at least June 30, 1974.

2. Appellants have four children. Two of the children, Richard and Joan, were dependent upon Appellants for support during the period in question, July 1, 1974, through December 31, 1975. There is no question that Richard and Joan were residents of the State of Minnesota throughout the period in question. While Joan attended college at the University of Miami at Coral Gables, Florida, during the 1974-1975 school year, she returned to Minnesota during her summer vacation and lived at her parents' home and worked in a supermarket. After completion of the 1975-1976 school year, Joan once again returned to Minnesota, lived in her parents' home, attended business school and thereafter worked in Minnesota. From that time on, she did not return to school in Florida.

3. Appellant, Robert R. Truex, has been employed as an airline pilot for Northwestern Orient Airlines, Inc. since March, 1943. All flight schedules flown by Robert Truex during the period in question began in Minnesota and ended in Minnesota. During the period in question, Northwestern Airlines sent all its mailings directed to Robert Truex, including his W-2 statement.

4. During the period in question, and for 24 years prior thereto, Appellants owned the home at 2835 Inner Road, Wayzata, Minnesota. Robert Truex built the house himself in 1950. On an application for homeowner's insurance submitted on October 16, 1975, Appellant Robert Truex claimed that the market value of the structure alone was $45,000, and the contents were valued at $22,500. The home is situated on land leased from the Methodist Lakeside Assembly.

5. In order to buy or build a home on land owned by the Lakeside Methodist Assembly, Appellants were required to be members in good standing of a church. During the period in question, Appellants were members of the Excelsior Methodist Church of Excelsior, Minnesota. During the period in question, Appellants' ground lease had three years to run before it expired. Appellants, on January 1978, signed a new 25-year lease and as of July 1979, still owned the home at 2835 Inner Road, Wayzata, Minnesota.

6. Appellants applied for, and were granted, a homestead classification for the home located at 2835 Inner Road, Wayzata, Minnesota, in 1974. They did not apply for homestead classification in 1975, and therefore did not receive the $325.00 property tax credit.

7. The income tax savings to Appellants which would result from a determination that they were Florida residents during the period in question is over $10,000.

8. In May, 1972, Appellants purchased Apartment No. 22 in the 3900 Condominium Apartments, 3930 North Ocean Drive, Riviera Beach, Florida. Appellants paid $32,000 for the apartment. They made a $16,000 down payment and assumed the prior owners' mortgage.

9. During the period in question, Appellant Robert R. Truex owned and actively operated a business named Hangar Services. Appellant Helen Truex was a co-owner of Hangar Services and also its bookkeeper. Hangar Services was in the business of renting aircraft hangars at Flying Cloud Airport in Eden Prairie, Minnesota. The Truexes had operated the business since 1964, and during the period in question had 47 separate hangar stalls. Robert Truex was active in the business, including the repair and maintenance of the hangars. He had a machine shop located in the basement of his home at 2835 Inner Road, Wayzata, Minnesota, for the use in connection with the hangar business. The lessees of the hangars sent their monthly rent payments to 2835 Inner Road in Wayzata. All billing statements for utilities, taxes and supplies, etc. associated with the hangar business were sent to 2835 Inner Road, Wayzata. Appellants have thought of the business as something to pass on to their children. Hangar Services' checking account was located at the Wayzata Bank and Trust Company in Wayzata, Minnesota, during the period in question. The address printed on the check blanks of Hangar Services was 2835 Inner Road, Wayzata, and the statements of account for Hangar Services' checking account were sent to Appellants at 2835 Inner Road, Wayzata, during the period in question.

10. Appellants did not own or operate a business in the State of Florida during the period in question.

11. Appellants' joint personal checking account was located at the Wayzata Bank and Trust Company, Wayzata, Minnesota, during the period in question. The address printed on Appellants' check blanks was 2835 Inner Road, Wayzata. All checking account statements and cancelled checks for the account were sent to the Appellants at their Wayzata, Minnesota, home.

12. Appellants did not have a checking account in Florida during the time in question.

13. Appellants had a joint personal savings account at the Wayzata Bank and Trust Company during the entire period in question. Statements of account for the personal savings account were sent to the Appellants' Wayzata address by the bank.

14. Appellant Robert Truex had a savings account at the Northwest Airlines Employees' Credit Union during the entire period in question. All statements of account were sent by the Credit Union to Appellant at 2835 Inner Road, Wayzata. The vast majority of Appellants' savings during the period in question were deposited in three Minnesota savings institutions.

15. In November, 1974, Appellants opened a joint savings account at the First National Bank and Trust Company of Riviera Beach, Florida. The balance in said account was minimal during the period in question. Appellants opened the savings account in Florida only because it afforded them the privilege of cashing checks at the Florida bank written on their Minnesota checking account. The First National Bank and Trust Company of Riviera Beach sent all account statements for the Truex's Florida savings account to their Minnesota address.

16. The Appellants purchased and sold common stock during the period in question through the Minneapolis office of Piper, Jaffray & Hopwood. All monthly statements mailed to the Truexes during the period in question by Piper, Jaffray & Hopwood were mailed to their Wayzata, Minnesota, address.

17. On or about June 30, 1974, Appellants invested $5,000 in the Centuria Petroleum Fund 1974, a limited partnership involved in oil and gas leases. The records of Centuria Petroleum Fund 1974 indicate that the Truex's address was 2835 Inner Road, Wayzata, Minnesota. In 1975 the Appellants invested another $5,000 in Centuria Petroleum Fund 1975. Once again the address was indicated for Appellants on the records of the Petroleum Fund was their Minnesota address.

18. Appellants maintained charge accounts and/or credit privileges with numerous businesses located in the State of Minnesota during the period in question. Appellants during the period in question regularly purchased goods and services from these local businesses. In all cases, the billing statements were sent to the Wayzata, Minnesota, address.

19. During the period in question, the Appellants had numerous charge accounts with national businesses. In each case, the billing statements for goods purchased from these businesses were sent to Appellants' Minnesota address.

20. During the period in question, Appellants licensed and registered a 1971 Lincoln automobile and 1973 Ford Pickup in the State of Minnesota. Appellants purchased two used cars in the State of Florida.

21. Appellants were members of the Minneapolis, Minnesota, branch of the American Automobile Association and the Bel Aire Yacht Club in Minnesota during the entire period in question. They were not members of any social or athletic clubs in the State of Florida.

22. Appellants were treated by numerous doctors, dentists and clinics and a chiropractor in the State of Minnesota during the period in question. Appellant Robert Truex testified that during the period in question he was treated by a chiropractor in Florida but could not recall his name.

23. Appellant Robert Truex owned an interest in Family Flyers, Inc., a Minnesota non-profit corporation, which owned an airplane during the period in question. The airplane was hangared in a hangar owned by the Truexes at Flying Cloud Airport in Eden Prairie, Minnesota. The Appellants' son maintained the airplane during the period in question.

24. While Appellants maintained Florida drivers' licenses in 1974, the Minnesota Department of Public Safety records indicate that they had valid Minnesota drivers' licenses in effect throughout the period in question. In fact, the Truexes listed their Minnesota driver's license numbers on an application for car insurance in November, 1974.

25. In June, 1974, Appellants purchased a new 140 horsepower inboard-outboard speed boat for their own use and that of their family. The boat was, and still is, kept at the Minnesota home.

26. In December, 1974, Appellant Robert Truex made application for homeowners' insurance for his Minnesota home. Appellants' mailing address was indicated as 2835 Inner Road in Wayzata, Minnesota. The application indicated that the owner of the home lived in the house. The agent who took the application was Appellants' son, Thomas. Appellant Robert Truex admitted that Thomas knew more about Appellant's personal life and whereabouts than would an agent who was not related to Appellants.

27. In November, 1974, Appellant Robert Truex made application for automobile insurance. On the application he indicated his address was 2835 Inner Road, Wayzata. The application was signed by Robert Truex. Once again, the application was taken by his son, Thomas, as agent. On the application, the Minnesota driver's license numbers of Robert and Helen Truex were listed, not their Florida driver's license numbers. While the application indicated that the Appellants would be spending part of the year in Florida, Appellants estimated that they would drive each of their vehicles that were registered in the State of Minnesota, a 1971 and 1973 Ford Pickup, 7,000 miles annually. Appellant Robert Truex, on the application, indicated that his current home address was 2835 Inner Road and that he had been at that address since 1951.

28. Appellant Robert Truex made application in May, 1975, for insurance for his 1974 140-horsepower inboard-outboard speed boat. Robert Truex signed the application which indicated his home address to be 2835 Inner Road in Wayzata, Minnesota. In response to a question of how long he had been at his current address, Truex indicated 25 years. Once again, the agent who took the application was Appellants' son, Thomas Truex.

29. Insurance premium notices in connection with all of the foregoing insurance policies were mailed to the Appellants at 2835 Inner Road, Wayzata, Minnesota.

30. Appellant Robert Truex signed his daughter's 1975 Minnesota income tax return as the "preparer" on April 6, 1976. Robert Truex on the blanks provided for the preparer of the return, indicated that his address at that time was 2835 Inner Road, Wayzata.

31. During the period from July 1, through December 31, 1974, Appellant Robert Truex spent sixty-one days in the performance of his duties as a pilot for Northwest Airlines. Appellant Robert Truex, upon cross-examination and presentation of documentary evidence by Appellee's counsel, admitted that during the same period of time, July 1, through December 31, 1974, he spent at least forty-one days in the State of Minnesota. On the other hand, Appellant Robert Truex is unable to establish with certainty, either through documentation or testimony, more than a few specific days upon which he was physically present in the State of Florida during the period from July 1, through December 1, 1974.

32. During the period from January 1, 1975, through December 31, 1975, Appellant Robert Truex spent 119 days in the performance of his duties as a pilot for Northwest Airlines. Appellant, upon cross-examination and presentation of documentary evidence by Appellee's counsel, admitted that he spent at least 99 days during the 1975 calendar year in the State of Minnesota. He was unable to establish with certainty, either through documentation or testimony, more than a few specific days upon which he was physically present in the State of Florida during the 1975 calendar year.

33. Appellant Helen Truex had no idea when she was in Minnesota or Florida during the period from July 1, 1974, through December 31, 1974, or during the period from January 1, 1975, through December 31, 1975.

34. In addition, Appellant spent from three weeks to seven weeks in the State of Ohio visiting relatives during the period from July 1, through December 31, 1974. Appellant spent three weeks or more in the State of Ohio visiting relatives during the calendar year of 1975.

35. By their own admission, Appellants did not make much effort to establish their physical presence in Florida during the period in question.

Conclusion of Law

During the taxable periods of 1974 and 1975, Appellants remained domiciled in Minnesota within the meaning of Minn. Stat. § 290.01, subd. 7. Therefore, Appellant's entire income for the period is assignable to Minnesota under Minn. Stat. § 290.17(1).

Memorandum

Minn. Stat. § 290.17(1) (1974), provides that the entire income of all resident taxpayers shall be assigned to this state for income tax purposes. The term ''resident'' is defined in Minn. Stat. § 290.01, subd. 7, as follows:

''Resident. The term ''resident'' means any individual domiciled in Minnesota and any other individual maintaining an abode therein during any portion of the tax year who shall not, during the whole of such year, have been domiciled outside the state''

A further definition of ''resident'' is found in income tax regulations 2001(7), which reads in relevant part as follows:

''*Residence, as defined in the Act, is practically synonymous with domicile*. The residence of any person is held to be in that place in which his habitation is fixed, without any present intentions of removing therefrom, and to which, whenever he is absent, he intends to return.

A person who leaves his home to go into another state for temporary purposes only is not considered to have lost his residence. But if a person removes to another state with the intention of remaining there for an indefinite time as a place of permanent residence, he shall be considered to have lost his residence in this State.

*****

The mere intention to acquire a new residence, without the fact of removal, does not change the status of the taxpayer, *nor does the fact of removal, without the intention to remain, change his status. The presumption is that one's domicile is the place where he lives. A domicile once shown to exist is presumed to continue until the contrary is shown*. An absence of intention to abandon a residence is equivalent to an intention to retain the existing one. No positive rule can be adopted with respect to the evidence necessary to prove an intention to change a domicile but such intention may be proved by acts and declarations, and *of the two forms of evidence, acts are generally conceded more weight than declarations*. A person who is temporarily employed within the state does not require a residence in the state, if during such period he is domiciled without the state.

While the exercise of one's voting franchise is presumptive evidence of residence, such evidence may be overcome by a showing of the facts involved in the determination of residence. Casting an illegal vote does not of itself establish residence for income tax purposes. (Emphasis added)

The relevant authorities on the subject make it clear that once a domicile is established in Minnesota, it is presumed to continue to exist until another domicile is proven to have been established elsewhere. This rule on the continuing nature of a domicile is clearly set forth in American Law Institute, Restatement, Conflict of Laws, Chapter 2, Section 23, as follows:

A domicile, once established, continues until it is superceded by a new domicile.

See also, *McCutchin v Commissioner of Taxation*, Docket No. 563 (January 20, 1956).

The legal test for establishing domicile requires bodily presence in a given jurisdiction coupled with an intention to make such place one's home. In re *Estate of Smith*, 242, Minn. 85, 64 N.W. 2d, 129, 1954; *Miller's Estate v Commissioner of Taxation*, 240 Minn. 18, 59 N.W. 2d, 925, 1953. In the case at bar, it is undisputed that Appellants were bodily present in the State of Florida at various times during the period from July 1, 1974, through December 31, 1975. Therefore, the precise issue to be resolved on this appeal is whether the facts established the required intention to make Florida the Appellants' permanent home after July 1, 1974.

The issue of intent in establishing one's domicile is one of fact. *In re Estate of Smith*, 242 Minn. 85, 64 N.W. 2d, 129, 1954. In analyzing the intent of the parties, the Court must consider all of the facts of the case at hand. The intent of the party may be gathered from both acts and declarations. *Seecomb v Bovey* 135 Minn. 353 160 N.W. 10 18 1917. Acts are considered more persuasive than declarations, and written declarations are considered more persuasive than oral ones. *Seecomb v Bovey, Supra*.

Thus, to transfer one's domicile to another state, it is necessary to show by actions as well as words that the person intends to make a new home in the new community. A few incidental contacts are not enough. As this Court stated in *Coulter v Commissioner of Taxation*, Docket No. 257, (October 8, 1946):

"Domicile is not something either easily abandoned or accidentally changed. It is a reflection of the true situation which prevails in the life of a man or of a family. *A domicile is not lost with a changed abode when deep roots remain embedded in the social and economic life of the old community*. Nor is a new domicile acquired unless and until actual residence has been supplemented by good faith intent, and, as time passes, *intent must be implemented by action, which in fact, integrates one's life with the new community*. (Emphasis added)

Prior to July 1, 1974, there is no question that Appellants were domiciled in Minnesota and had been since 1943. During this period of time Appellants established many social, financial and employment contacts in this state. The facts clearly indicate that the vast majority of these contacts remained fully intact throughout the period in question.

Throughout the period in question, Appellants owned a home at 2835 Inner Road, Wayzata, Minnesota. The structure, which is situated on land leased from the Methodist Lakeside Assembly, is valued at $45,000.00. Appellants received the benefit of a homestead classification for that home for the year 1974. However, they did not apply for such classification in 1975.

Appellant Robert Truex maintained his long-standing employment with a Minnesota employer, Northwestern Orient Airlines, Inc. throughout the entire period in question. All flight schedules flown by Truex during the period in question began and ended in Minnesota. During the period in question Northwest Airlines sent all of its mailings directed to Truex, including his W-2 statements, to his Wayzata, Minnesota, home. In fact, Northwest Airlines typed Truex's Wayzata address on his W-2 statement.

Appellants also maintained business contacts with the State of Minnesota for the period in question. They owned and actively operated a business named Hangar Services. The lessees of the hangars at such business sent their monthly rent payments to the Wayzata home. Additionally, billing statements for utilities, taxes and supplies, etc. associated with the hangar business were sent to the Wayzata home. The Wayzata Bank and Trust Company handled the checking account for the hangar business. The address printed on the checks was that of the Wayzata home, and the checking account statements were sent to the Wayzata home. Appellants did not own or operate a business in the State of Florida during the period in question.

The majority of personal savings accounts and checking accounts during the time in question were located in Minnesota. Additionally, all accounts statements for Truex's *only* Florida savings account were mailed to their Wayzata home.

Other than a blanket declaration of intention to make Florida their domicile, Appellants have given the Court meager evidence to substantiate that claim. The only evidence of note are the purchase of two used cars in the State of Florida and the purchase of a condominium in the State of Florida during 1974.

Once a domicile is established in Minnesota, it is presumed to continue until another domicile is proven to have been established elsewhere. *Sarek v Commissioner of Revenue*, Docket No. 2524 (April 19, 1979). To establish a new domicile, the taxpayer must establish actual physical presence in the new jurisdiction and must establish his intention to make the new jurisdiction his home. *In re Estate of Smith, Supra*. Therefore, the burden of proof is upon Appellants in this case. In balancing the evidence in this case, it is clear to the Court that Appellant has fallen short of meeting that burden. The Court therefore must find Appellant for the periods in question was a domicile of the State of Minnesota. And therefore, the Court affirms the decision of the Commissioner.

John Knapp, Chief Judge

STATE CONTRACTS

Pursuant to the provisions of Minn. Stat. § 16.098, subd. 3, an agency must make reasonable effort to publicize the availability of any consultant services contract or professional and technical services contract which has an estimated cost of over $2,000.

Department of Administration procedures require that notice of any consultant services contract or professional and technical services contract which has an estimated cost of over $10,000 be printed in the *State Register*. These procedures also require that the following information be included in the notice: name of contact person, agency name and address, description of project and tasks, cost estimate, and final submission date of completed contract proposal.

Minnesota Community College System
North Hennepin Community College
Notice of Availability of Contract for Consultant to Develop Contract Learning Agreements

North Hennepin Community College requires the services of a qualified consultant to develop contract learning agreements between the college and individual profit-making organizations.

Developing contract learning agreements shall include the following:

1. The consultant will organize, coordinate, and direct a program of courses offered to area business and industry.

2. The courses are to be taught at off-campus locations, probably on private sites.

3. The courses offered are to be both credit and non-credit. The consultant will teach a minimum of ten credit courses from the college curricula related to management and supervision.

4. The consultant may teach approximately 30% of the non-credit courses he/she arranges, but the schedule for these activities will be negotiated with the community service director of the college to whom the consultant will report.

5. The length of the contract with the consultant will be from July 1, 1980 through June 30, 1981.

6. Firms/individuals desiring consideration should submit a resume of their office and work before June 16, 1980 to:

Don McGuire
Director of Community Services
North Hennepin Community College
7411 85th Avenue North
Brooklyn Park, Minnesota 55445
Telephone (612) 425-4541

Department of Corrections
Minnesota Correctional Facility/Lino Lakes
Contract Available for Certified Clinical Psychologist

The Minnesota Correctional Facility—Lino Lakes announces its intention to contract with a certified clinical psychologist to provide the following services:

1) Provide psychological evaluation on institution residents as requested by classification teams and the Minnesota Corrections Board. Advise program staff concerning treatment needs of residents and be available for consultation and/or ongoing treatment of designated residents when arranged.

2) Consulting sessions to consist of two 5-hour visits per week at $175 per visit, however a limit of 90 visits per year is maintained.

Department of Health
Family Planning Section
Notice of Availability of Funds for Family Planning Special Project Grants

Any eligible agency interested in administering a Family Planning Special Project in calendar year 1981 shall contact the Minnesota Department of Health by June 27, 1980.

Purpose and Eligibility

Family planning is voluntary planning and action by individuals to *attain* or *prevent pregnancy*. Family Planning Special Project Grants will be made available to local government agencies and non-profit corporations to develop or expand pre-pregnancy family planning services to Minnesota residents in accordance with the Family Planning Services Act (Minn. Stat. § 145.925) and the family planning rule (ch. 27, Part II: 7 MCAR § 1.457).

How To Apply For Funds

A potential applicant should submit a letter of intent to apply for funds to the Commissioner of Health. The letter of intent must be received by the department no later than 4:30 p.m. Friday, June 27, 1980 and must include the name of the applicant agency, name and telephone number of an agency contact person and an estimate of the amount of funds to be requested for calendar year 1981.

Because the amount of grant funds available for 1981 may be the same as for 1980, agencies awarded Family Planning Special Project funds for 1980 may not request a sum which exceeds their January, 1980 grant award.

An agency expressing an intent to apply will be provided with a copy of the Family Planning Act, the family planning rule,

application materials, information on the review and award process, and the name and telephone number of a family planning consultant available to provide technical assistance concerning preparation of the grant application. The completed application must be submitted to the appropriate Regional Development Commission(s), Health Systems Agency(s), and local board(s) of health *prior* to submission to the commissioner. The completed application must be received by the department on or prior to 4:30 p.m., August 15, 1980.

Award of Funds

Applications will be reviewed and grants awarded in accordance with the Criteria for Award of Family Planning Special Project Grants found in the family planning rule (7 MCAR § 1.457E.). For 1981, award priority will be given to agencies whose applications meet the criteria for award and propose all family planning components in counties with no family planning services as of December 31, 1978 (7 MCAR § 1.457 E.1.). All other agency applications shall be funded in rank order based on the criteria for award (7 MCAR § 1.457E.) as funds are available. Applicant agencies will be notified in writing of the status of the application by December 31, 1980.

Further information regarding family planning and application for Family Planning Special Project Grants may be obtained by contacting Ms. Judi Kapuscinski, Supervisor, Family Planning Unit, 717 Delaware Street S.E., Minneapolis, Minnesota 55440, (612) 296-5285.

Duration of Funding

Funds for approved grants for these purposes will be awarded for the period of January 1, 1981 through December 31, 1981. The second half of the funding period is, however, dependent upon favorable action by the Minnesota Legislature relative to the Department's biennial budget request for family planning funds.

Department of Public Safety Office of Planning and Analysis

Notice of Request for Proposal for Traffic Records System Project Planning and Project Management Assistance

The Department of Public Safety is seeking a qualified consultant to assist the Traffic Records Integration Project (TRIP) team. The project is developing an integrated data base and information system for the areas of motor vehicle, driver license, and accident records.

The project employs Structured Systems Analysis using data flow diagrams and transform-centered structured design techniques. The consultant must be familiar with this methodology.

The contract will be for the duration of the project, currently scheduled to end August 31, 1982. Estimated cost of the project is up to $35,000. The deadline for submission of proposals is June 23, 1980.

Details are contained in a Request for Proposal. Copies of the Request for Proposal may be obtained by contacting:

Mr. Fred Logman, Director
Office of Planning and Analysis
Department of Public Safety
314 Transportation Building
St. Paul, MN 55155
(612) 296-2017

Department of Public Welfare Systems and Data Flow Division

Notice of Request for Proposal for Data Entry Service

Notice is hereby given that the Systems and Data Flow Division, Department of Public Welfare is seeking proposals for data entry operator(s) and a system compatible with the Department's Nixdorff/Entrex 480A entry system. This service is to be available to the Systems Division during overload periods. All data will be entered at the contractor's site on his equipment using the data entry programs of the Department of Public Welfare. The agreement shall be for the period from July 1, 1980 through June 30, 1981. The estimated amount of the contract will not exceed $24,000. Responses must be received by June 23, 1980.

To receive a copy of the Request For Proposal (RFP) or for further information contact:

G. Warren Peterson
Department of Public Welfare
Systems and Data Flow Division
P.O. Box 43170
1st Floor, Space Center Bldg.
444 Lafayette Road
St. Paul, MN 55164

Department of Public Welfare Willmar State Hospital

Notice of Request for Proposals for Psychiatric Services

Notice is hereby given that the Willmar State Hospital, Men-

tal Health Division, Department of Public Welfare, is seeking the following services for the period July 1, 1980 through June 30, 1981; these services to be performed as requested by the Administration of the Willmar State Hospital:

Services of Psychiatrist, trained in General Psychiatry, to provide consultation to newly admitted mentally ill and chemically dependent patients; also, related educational guidance to Staff Personnel.

The estimated amount of the contract will not exceed $25,500.

Responses for the above services must be received by June 23, 1980. Direct inquiries to:

Mae Forstrom, Sr. Accounting Officer
Willmar State Hospital
Box 1128
Willmar, MN 56201
(612) 235-3322, Ext. 396

SUPREME COURT

Decisions Filed Friday, May 23, 1980

Compiled by John McCarthy, Clerk

50186/211 Gordon Eugene Mondt, et al., vs. Sexter Realty Company, et al., Appellants. Hennepin County.

Treble damages are recoverable under Minn. Stat. § 548.05 (1978) only when the personal property taken during trespass is property such as is "produced by and grown upon land." *Berg vs. Baldwin*, 31 Minn. 541, 542-43, 18 N.W. 821, 822 (1884). Home furnishings, toys, and clothing are not such personal property.

Affirmed in part, reversed in part. Otis, J.

50267/145 Robert J. Johnson, et al., Plaintiffs, vs. McGough Construction Co., Inc., defendant and third party plaintiff, vs. Hankee Heating Co., Inc., third party defendant, Appellant, Acme Sheet Metal Co. Ramsey County.

A subcontract provision requiring the subcontractor to "assume entire responsibility and liability for all damages" and to "indemnify and save harmless the Contractor * * * from all such claims including * * * claims for which the Contractor may be, or may be claimed to be, liable" is an express provision to indemnity the indemnitee for liability occasioned by its own negligence.

Affirmed. Rogosheske, J.

49993/459 In the Matter of the Welfare of Charles Sweats. Hennepin County.

The juvenile court is divested of jurisdiction in a juvenile delinquency proceeding upon the prosecutor's filing of notice of intent to prosecute pursuant to Minn. Stat. § 260.125, subd. 1 (1978).

Affirmed. Peterson, J.

49334, 49525/4 Lee Ann Gryc, by her mother and natural guardian, Jacquelyn Gryc, and Jacquelyn Gryc, individually, vs. Dayton-Hudson Corp., et al, Riegel Textile Corp., Appellant. Ramsey County.

Puntive damages may properly be awarded in an appropriate strict liability case.

Appellant's compliance with an applicable federal safety standard does not preclude a punitive damages award as a matter of law.

The preemption provision of the federal Flammable Fabrics Act and the Supremacy Clause of the United States Constitution do not prohibit the imposition of punitive damages on a defendant who has complied with that Act.

Since appellant failed to object below to the trial court's instruction to the jury on the issue of punitive damages, the instruction became the law of the case and is not subject to review on appeal.

There was sufficient evidence to support the award of punitive damages.

Policy considerations do not dictate against an award of punitive damages in this case.

The award of $1,000,000 in punitive damages is not clearly excessive as a matter of law.

There was sufficient evidence to support the finding that appellant manufactured a defective product and that respondents were not aware of the defect.

The jury verdict was not perverse when it found appellant to have caused respondents' injuries while at the same time finding that the other defendants in the stream of commerce did not cause those injuries.

Appellant was not prejudiced by the trial court's dismissal of appellant's counterclaim against Jacquelyn Gryc when the jury found that Jacquelyn Gryc was not at fault.

The trial court did not err in finding that 4-year-old child, Lee Ann Gryc, could not be comparatively at fault as a matter of law.

There is no merit to appellant's contention that the trial court committed cumulative errors and that respondents' counsel engaged in misconduct which denied appellant a fair trial.

The award of $750,000 in compensatory damages is not clearly excessive as a matter of law.

Affirmed. Todd, J.

50173/153 Richard Walter Marben, petitioner, Appellant, vs. State of Minnesota, Department of Public Safety. Stearns County.

Consistent with the Fourth Amendment of the United States Constitution, a peace officer who has a specific and articulable suspicion of a violation is justified in stopping a motorist.

In this case the trooper saw the motorist driving his vehicle and, after a proper stop under the Fourth Amendment, immediately thereafter observed that the motorist was under the influence of alcohol. An arrest then was lawfully made.

Affirmed. Scott, J.

50210/188 State of Minnesota vs. Norman Junior Howard, Appellant. Hennepin County.

Identification procedures used by police did not create a "very substantial likelihood of irreparable misidentification" and evidence of defendant's guilt, which included positive eyewitness identification testimony, was not, as defendant contends, legally insufficient.

Trial court did not commit prejudicial error in refusing to grant a mistrial because the prosecutor elicited testimony that a knife not connected to the crime was seized from defendant when he was arrested, or in refusing to admit evidence deemed cumulative.

Defendant, by failing to object, is deemed to have forfeited his right to have his claim of prosecutorial misconduct in closing argument considered on appeal.

Affirmed. Scott, J.

50305/248 State of Minnesota vs. Michael Jerome Kaminski, Appellant. St. Louis County.

Trial court did not err in denying motion to suppress evidence seized pursuant to warranted search of defendant's automobile.

Affirmed. Scott, J.

51080/Sp. In the Matter of the Application between Finley W. Markley, Thomas Benham, Raymond M. Lukes and Medical Incorporated. Hennepin County.

Effective appellate review of the trial court's decision cannot be made until the trial court issues detailed findings relating to the scope of authority granted to the arbitration panel by the agreement of the parties and to the court's determination as to whether that authority was exceeded.

Remanded with instructions. Per Curiam.

Decision Filed Tuesday, May 20, 1980

50950, 51067/319 State of Minnesota, Appellant, 50950 vs. Nate Baxter Compton, and State of Minnesota, Plaintiff, 51067 vs. Eugene Elmer Compton. Cass County.

Held, law officer who observed property in open view in box of pickup truck properly concluded that surrounding circumstances that he had probable cause to believe the property was stolen, and, accordingly, he was justified in arrresting defendants, in seizing the property, and in searching the truck.

State vs. Nate Baxter Compton, No. 50950, reversed and remanded; State vs. Eugene Elmer Compton, No. 51067, appeal dismissed and case remanded. Sheran, C. J.

OFFICIAL NOTICES

Pursuant to the provisions of Minn. Stat. § 15.0412, subd. 6, an agency, in preparing proposed rules, may seek information or opinion from sources outside the agency. Notices of intent to solicit outside opinion must be published in the *State Register* and all interested persons afforded the opportunity to submit data or views on the subject, either orally or in writing.

The *State Register* also publishes other official notices of state agencies, notices of meetings, and matters of public interest.

Energy Agency
Certificate of Need Activity

Notice of Change in Hearing Room for the Public Hearings on the Certificate of Need Application of Northern States Power Company to Increase the Storage Capacity of the Spent Fuel Pool at The Prairie Island Nuclear Generating Facility

Notice is hereby given that the June 24 evening session, originally scheduled to be held in Room 584, Federal Courthouse, St. Paul, Minnesota 55101, will be held instead at the Large Hearing Room, Department of Public Service, Seventh Floor, American Center Building, 150 East Kellogg Boulevard, St. Paul, Minnesota 55101. The evening session will commence at 7:00 p.m. and will be devoted to public testimony only.

For further information, contact Arthur L. Adiarte at the Minnesota Energy Agency, 980 American Center Building, 150 East Kellogg Boulevard, St. Paul, Minnesota 55101, telephone number (612) 296-8279.

Ethical Practices Board

Request for Advisory Opinion Re: Campaign Expenditure

The Minnesota State Ethical Practices Board solicits opinions and comments to the following request for an advisory opinion which will be discussed at its June board meeting. Written comments concerning the opinion request should be forwarded to arrive at the board's office prior to June 13, 1980.

May 22, 1980

Mr. B. Allen Clutter, III
Executive Director
Ethical Practices Board
Room 41
State Office Building

Dear Mr. Clutter and Members of the Board:

I am a member of the Board of Directors of Minnesota Christian Radio, Incorporated. Each year in August we have a three-day sharathon in which we raise the funds to operate the station for the following year. Last year, I participated in the sharathon and provided some commentary to the listening audience.

This year, I have been asked to participate in the sharathon all three days. I will provide some commentary, some encouragement, and some devotional material for the listening audience.

I will be referred to simply as Glen Sherwood, a member of the Board of Directors of Minnesota Christian Radio. I will in no way be referred to as Representative Glen Sherwood. Nor, will I be making any political comments of any kind. My comments will relate entirely to the needs of the radio station and to spiritual matters.

Will my participation in this sharathon be considered as a campaign expenditure?

I would appreciate an advisory opinion on this question. Thank you.

Sincerely yours,

Glen Sherwood
State Representative

Office of the Governor

Notice of Appointment of Department Head

In accordance with Minn. Stat. § 15.06, notice is hereby given of the appointment of Kent E. Eklund as Commissioner of the Minnesota Department of Economic Development on May 19, 1980.

Metropolitan Council

Public Hearing on a Revised Metropolitan Development Guide/Policy Plan for Recreation Open Space

The Metropolitan Council will hold a public hearing on Thursday, June 26, 1980, at 7 p.m. in the Metropolitan Council Chambers, 300 Metro Square Building, 7th and Robert Sts., St. Paul, MN (use Jackson St. entrance) for the purpose of receiving public comment on a revised Metropolitan Development Guide/Policy Plan for Recreation Open Space. This draft plan deals in detail with policies for the development of regional recreation facilities and funding for operations and maintenance. Copies of the proposed Development Guide/Policy Plan are available free of charge from the Metropolitan Council's Public Information Office at (612) 291-6464. Persons wishing to speak at the public hearing may register to do so in advance by contacting the Council's public hearing coordinator at 291-6482.

Charles Weaver
Chairman

STATE OF MINNESOTA
OFFICE OF THE STATE REGISTER

Suite 415, Hamm Building
408 St. Peter Street
St. Paul, Minnesota 55102
(612) 296-8239

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FOR LEGISLATIVE NEWS

Publications containing news and information from the Minnesota Senate and House of Representatives are available free to concerned citizens and the news media. To be placed on the mailing list, write or call the offices listed below:

Briefly/Preview—Senate news and committee calendar; published weekly during legislative sessions. Contact Senate Public Information Office, Room B29 State Capitol, St. Paul MN 55155, (612) 296-0504.

Perspectives—Publication about the Senate. Contact Senate Information Office.

Weekly Wrap-Up—House committees, committee assignments of individual representatives, news on committee meetings and action, House action and bill introductions. Contact House Information Office, Room 8 State Capitol, St. Paul, MN, (612) 296-2146.

This Week—weekly interim bulletin of the House. Contact House Information Office.

STATE OF MINNESOTA
OFFICE OF ADMINISTRATIVE HEARINGS

FOR THE DEPARTMENT OF ADMINISTRATION
BUILDING CODE DIVISION

In the Matter of Proposed Amendments to Energy Conservation Standards for Existing Residences and In the Matter of Proposed Rules for the Certification of Evaluators for the Energy Disclosure Program.

REPORT OF THE HEARING EXAMINER

Pursuant to an Order for and Notice of Hearing issued by James J. Hiniker, Commissioner, Department of Administration, on May 16, 1980, the above-entitled matter came on for hearing before Richard C. Luis, duly appointed as Hearing Examiner by the Chief Hearing Examiner, at 9:00 a.m. on July 3, 1980, in the Conference Room, 408 Metro Square Building, Seventh and Robert Streets, St. Paul, Minnesota.

This Report is part of a rule-making process held pursuant to Minn. Stat. ch. 15, to determine whether the proposed rules for Certification of Evaluators for the Energy Disclosure Program and Amendments to Existing Rules for Energy Conservation Standards for Existing Residences should be adopted by the Building Code Division, Department of Administration.

Sheila Fishman, Special Assistant Attorney General, appeared as counsel for the Department of Administration, Building Code Division. Members of the agency panel included: Don Pates, Assistant Director of the Building Code Division of the Department of Administration (hereinafter "the Department"); Sivert Hendrickson, Section Chief in the Building Code Division; John Armstrong, Assistant Director for Conservation, Minnesota Energy Agency (hereinafter "MEA"); Frank Altman, Conservation Policy Analyst, MEA; and Gary Nelson, Residential Engineer, MEA.

Fifty-three persons signed the hearing register. These included six persons who were agency personnel, three of whom were members of the panel; and four members of the Energy Conservation Standards Subcommittee which contributed to the drafting of the proposed rules and rule amendments. Six members of the public spoke at the hearing. The Department submitted 17 exhibits. The public submitted six exhibits. Several written comments, many of which included attachments, were received by the Hearing Examiner subsequent to the hearing and prior to the close of the record, which remained open through July 18, 1980, by order of the Hearing Examiner.

An Interim Report covering only the second set of rules as proposed (In the Matter of Proposed Rules for the Certification of Evaluators for the Energy Disclosure Program) was issued under separate cover on August 22, 1980. The within matter therefore addresses only the Proposed Amendments to Energy Conservation Standards for Existing Residences.

The Agency must wait at least five working days before taking any final action on the rule; during that period, this Report must be made available to

all interested persons upon request. This Report has been submitted to the Chief Hearing Examiner for his approval. If the Chief Hearing Examiner approves the findings of this Report, he will advise the Agency of actions which will correct the defects and the Agency may not adopt the rule until the Chief Hearing Examiner determines that the defects have been corrected. However, in the cases where the Chief Hearing Examiner identifies defects which relate to the issues of need or reasonableness, the Agency may either adopt the Hearing Examiner's recommendations to cure the defects or, in the alternative, if the Agency does not elect to adopt the recommendations, it may submit the proposed rule to the Legislative Commission to Review Administrative Rules for the Commission's advice and comment. Provisions relating to this submission to the Commission may be found in Laws of Minnesota 1980, Chapter 615, § 6, subd. 4d.

If the Agency elects to adopt the recommendations of the Hearing Examiner and makes no other changes, then it shall submit the rule to the Attorney General for his review of form and legality. However, if the Agency makes changes in the rule other than those recommended by the Hearing Examiner, then it shall submit the rule, with the complete record, to the Chief Hearing Examiner for a review of the changes before adopting it and submitting it to the Attorney General. Procedures relating to this subsequent review by the Chief Hearing Examiner are set forth in subdivision 4e of the same statute.

Then, whenever the Agency finally submits the rule to the Attorney General, it shall give notice on the day of submission, to all persons who requested that they be informed of the submission to the Attorney General.

Based on all the records and proceedings herein, the Hearing Examiner makes the following:

FINDINGS OF FACT

Procedural Requirements

1. On May 15, 1980, the Department filed the following documents with the Chief Hearing Examiner:

(a) A copy of the proposed rule amendments and of the proposed rules.
(b) The Order for Hearing proposed to be issued.
(c) The Notice of Hearing proposed to be issued.
(d) A Request for Hearing, including a statement of the number of persons expected to attend and estimated length of their presentation.

2. On May 29, 1980, the Department mailed the Notice of Hearing to all persons and associations who had registered their names with the Secretary of State for the purpose of receiving such notice.

3. On June 2, 1980, a Notice of Hearing and copy of the proposed rule amendments and proposed rules were published at 4 State Register 1881.

4. On June 2, 1980, the Department filed the Notice of Hearing as mailed.

5. On June 6, 1980, the Department filed the following documents with the Hearing Examiner:

(a) The Affidavit of Receipt of the Secretary of State's list.
(b) The Certificate of Delivery of the Secretary of State's list.
(c) Affidavit of Mailing the Notice of Hearing to all persons on the Secretary of State's list.
(d) The Statement of Need and Reasonableness.
(e) Letter confirming consultation with MEA.
(f) Letter from Chairman of the House Energy and Utilities Subcommittee acknowledging receipt of information.
(g) Copy of an agenda of the Senate Energy and Housing Committee.
(h) Copy of proposed disclosure report form.

6. On June 9, 1980, the Department filed a signed copy of the Order for Hearing. This filing was one day later than the time required for filing under 9 MCAR § 2.105 A. The Hearing Examiner finds that this tardiness did not prejudice any interested party and therefore was a technical rather than substantial non-compliance.

7. The documents listed above were available for inspection at the Office of Hearing Examiners (Office of Administrative Hearings) from the date of filing to the date of the hearing.

8. On July 3, 1980, at the hearing in this matter, the Department introduced into evidence as exhibits the following documents:

(1) Order for Hearing.
(2) Notice of Hearing.
(3) A copy of Volume 4, No. 48, of the State Register, in which were published at 1881-1891 the Notice of Hearing and proposed rules and rule amendments.
(4) Affidavit of Mailing of Notice of Hearing to persons on the Secretary of State's list.
(5) Affidavit of Receipt of the Secretary of State's list.
(6) Certificate of Delivery of Secretary of State's List.
(7) Statement of Need and Reasonableness for proposed rules for certification of evaluators for the energy disclosure program.
(7a) Statement of Need and Reasonableness for proposed amendments to energy conservation standards for existing residences.
(8) Errata to proposed amendments.
(9) Modifications to proposed rules for certification of evaluators.
(10) Copy of letter confirming consultation with MEA.
(11) Copy of an agenda of the Senate Energy and Housing Committee, and letter from the Chairman of the House Energy and Utilities Committee.
(12) Written testimony of the Minnesota Energy Agency.
(13) Copy of MEA Energy Conservation Service Plan published June, 1980.
(14) Copy of disclosure report form, revised. Form EN-00107-01.
(15) List of members of the Energy Conservation Standards Subcommittee.
(16) A copy of Federal Register, Volume 44, No. 217, published November 7, 1979, containing rules from the United States Department of Energy on the Residential Conservation Service Program.

9. The record remained open through July 18, 1980, for the receipt of written comments and statements. On August 18, 1980, the Chief Hearing Examiner granted the Hearing Examiner's request for an extension through September 3, 1980, for completion of this Report.

10. The Notice of Hearing as published at 4 State Register 1881 incorrectly gave the address of the Office of Hearing Examiners as 175 University Avenue. The Hearing Examiner announced the correct address on the record of the public hearing on three different occasions. If any written statements or comments arrived originally sent to the wrong address, the Hearing Examiner considered them timely if they were mailed before July 18, 1980. After the hearing, and prior to the close of the record, the Hearing Examiner received at least four comments which had been sent to the incorrectly published address. The Hearing Examiner finds that the publication error was not prejudicial to those who had an interest in the hearing and was not a fatal defect as to the legality of the notice. It was a technical defect and does not undermine the procedure or prejudice the rights of those intended to be protected.

See, City of Minneapolis v. Wurtele, et al., 291 N.W.2d 386 (Minn. 1980).

In the event that comments are subsequently received by the Hearing Examiner or the Department bearing a postmark prior to July 18, 1980 but sent to 175 University Avenue, or if persons come forward with evidence that their written comments were so postmarked and addressed but returned by the U. S. Postal Service, those comments will be considered, and if appropriate, new findings may be issued relating to the rules commented upon.

Statutory Authority

11. The Department cites Minn. Stat. § 116H.129, subds. 1, 5, 6, and 7 (1978) as authority for proposed rule amendments to energy conservation standards. Authority for the amendments is granted specifically in subdivision 1 of that statute. Although subdivisions 2-8 do not contain specific authority for promulgation of the energy conservation standards or their amendments, these subdivisions are part of the overall statutory scheme. Since all of the subdivisions are important for a proper understanding of the scope and purpose of the standards, it is appropriate for the Department to cite the whole of Minn. Stat. § 116H.129 as the relevant statutory authority. The legislature amended subdivision 1 of the statute in 1979, to require the Department to amend the rules no later than January 1, 1981 to provide that economic feasibility of the energy conservation measures be determined by a 10-year, rather than a five-year amortization period. The Department refers to this statutory amendment in its Statement of Need and Reasonableness, but the citation published in the Notice of Hearing at 4 State Register 1881 makes no mention of the extended payback period and fails to cite "1979 Supp." as statutory authority for promulgation. If the reader limited a search to the Minnesota Statutes (1978), the intent to amend the rules due to the extended payback period would not be apparent. However, if the reader looked up Minn. Stat. § 116H.129 in Minnesota Statutes Annotated, where the 1979 change is incorporated, the intent is apparent. In the absence of any evidence of prejudice to potentially interested parties or any objection to the Department's failure to add (1979 Supp.) instead of (1978) after the statutory citation in the Notice of Hearing as published, the Hearing Examiner is persuaded that this defect in the Notice is not jurisdictionally fatal to the proceedings. The proposed amendment of these rules to reflect a larger payback period is apparent at proposed rules 2 MCAR §§ 1.16204 F. and 1.16206 G., which were published at 4 State Register 1883 and 1886, respectively.

12. The enabling legislation requires consultation with the Director of the Energy Agency and appropriate standing committees of the legislature in promulgating the energy conservation standards. The Department had extensive consultation with the MEA. The Energy Agency played a major role in developing the proposed rule amendments. The record discloses consultation with the Senate Energy and Housing Committee and the House Energy and Utilities Committee prior to the hearing in the form of a letter from Rep. Ken Nelson, Chairman of the House Committee, and a copy of the Senate Committee's agenda. The Hearing Examiner finds that the Department complied substantially with the consultation requirement of the statute.

13. Minn. Stat. § 116H.129, subd. 1 (1979 Supp.), requires that the rules for energy conservation standards for existing residences be amended by January 1, 1981, so as to require economic feasibility to be determined based

on a ten-year, rather than a five-year amortization period. The Department has amended the standards throughout to adjust for this payback period. However, subdivision 1 also provides that the costs computed under the statute shall include reasonable inflation and interest factors. The proposed rules, on their face, do not take interest or inflation into account. At the hearing, the Department stated that it is reasonable to assume equal offsetting of interest and inflation factors. Some members of the public commented that while this may be reasonable for paybacks of five years or less, payback periods longer than five years should be calculated using these factors.

The Hearing Examiner finds that the rules as drafted do meet the statutory mandate in this regard. However, the Hearing Examiner suggests that the assumption of equal offsetting inflation and interest factors should be stated (probably at 2 MCAR §§ 1.16206 and 1.16207) so that the rules on their face are clearly in compliance with the legislative mandate.

see p. 7

14. In the proposed rule amendments, the Department presents two sets of standards, one, 2 MCAR § 1.16205 B.1.-10., for existing residences to be applied on a mandatory basis to rental residences, and the other, 2 MCAR § 1.16205 C.1.-22., to be used for evaluating residences at the time of sale. These latter 22 standards correspond to the Minnesota Energy State Plan for the Residential Conservation Services (RCS) Program, a federal program which will be administered in the state by the MEA. This federal program, authorized by the National Energy Conservation Policy Act of 1978, (NECPA), 42 U.S.C. §§ 8201-8226 (1978), requires "covered" utilities to establish programs which will encourage and facilitate the installation of energy conservation measures and renewable resource measures, and to provide energy audits to customers requesting them. 10 C.F.R. § 456.105(c) defines a "covered utility" as one which had natural gas sales exceeding ten billion cubic feet or electric energy sales exceeding 750 million kilowatt hours during the "second proceeding calendar year". While the programs are mandatory for these utilities, they are totally voluntary for customers.

In the Statement of Need and Reasonableness for this hearing, the Department and MEA state that in the proposed rule amendments, they coordinated the federal program with the disclosure program required by Minn. Stat. § 116H.129, subds. 5-7, so that "citizens of Minnesota will not be subjected to two different sets of standards and the resulting costs for evaluation of residences." Additionally, the MEA in its Supplementary Statement of Need and Reasonableness repeatedly refers to the program required by the Minnesota Statute and the 22 standards proposed for its implementation as a "Home Disclosure Program". However, the 22 standards proposed in 2 MCAR § 1.16205 C. will apply not only to homeowners but also to owners of rental residences if the amendments are adopted as proposed. Thus, owners of rental residences would in fact be subjected to two different sets of standards, one which mandates compliance and subject to inspection, and one which, absent waiver by a buyer, mandates information to be disclosed at the time of sale. For the reasons stated below, the Hearing Examiner finds that such a result goes beyond legislative intent.

The federal program applies only to residences of four or fewer dwelling units. See 44 Fed. Reg. 64602, 64664 (1979). This means that owners of larger rental residential buildings and apartment complexes will not be able

to benefit from the low cost energy audits available through the utility program. See Minn. Laws 1980, ch. 579, § 17 (to be codified as Minn. Stat. § 216B.165, subd. 1), which provides that customers asking a "covered" utility to perform an energy audit under NECPA need only pay $10 for that audit. It was further admitted at the hearing by Frank Altman of the MEA that utilities' auditors will only be able to collectively cover a portion of the eligible residences at any particular time during the first few years of the program. Any persons who want to sell their residences after October 1, 1980, must undergo a disclosure inspection unless waived by the potential buyer. If the conveyance is to be accomplished, a substantial energy auditing expense may result if the seller cannot find a buyer willing to waive the disclosure. The record reveals (Tr. p. 75 et seq.) that 20% of the residences in Minnesota, covering thousands of square miles outside the Twin Cities' Metropolitan Area, are served by cooperative utilities which are not subject to the federal law because the volume of their business is insufficient to make them "covered" utilities. In addition, homes receiving their primary source of heat from oil or sources other than natural gas or electricity are not covered. At the time of sale of these residences, owners would be required to pay the full cost of the extensive energy evaluation proposed by 2 MCAR § 1.16205 C. Finally, utilities that must comply with the federal program will not be required to offer energy audits until six months after the United States Department of Energy (DOE) approves the state implementation plan. This approval has not yet been given to the Minnesota plan. Until the time that these audits are available, all persons would have to pay the full cost of the extensive evaluation at the time of sale of their residences, absent a waiver by the buyer, since the disclosure required by Minn. Stat. § 116H.129, subd. 7, becomes effective October 1, 1980.

The cost of such an extensive evaluation was not definitely determined at the time of the hearing (it will vary with each home), but on-the-record estimates for an energy audit of this nature for a single-family home ranged from $50 to $200. No specific estimates for audits of buildings with multiple dwelling units were submitted, but it was stated that the cost would increase according to the number of units. It must be kept in mind that the audit available through "covered" utilities under the plan proposed for the federal program in Minnesota is informational only, and is designed to encourage investment in energy conservation measures and renewable resource measures on the part of home owners. These audits are not designed to provide a basis for required disclosure to potential buyers. The Hearing Examiner is not persuaded that the legislature intended that persons who sell residences after October 1, 1980, be subjected mandatorily, unless waived by the buyer, to an inspection for any energy characteristics beyond the minimum energy efficiency standards applicable to all existing residences (mandatory for rental property).

The Hearing Examiner finds that the Department does not have the authority to adopt two different sets of Energy Conservation Standards, one applicable to all existing residences and mandatory for rental residences, and another applicable to residences at the time of sale for disclosure purposes.

The Hearing Examiner is influenced toward this conclusion because Minn. Stat. § 116H.129, subd. 1, only authorizes the Department to adopt minimum

energy efficiency standards. Minn. Stat. § 116H.12[redacted] subd. 5, authorizes disclosure only to the "extent of compliance with standards adopted pursuant to § 116H.129, subd. 1." However, the federal program to which the standards in 2 MCAR § 1.16205 C. conform, is a comprehensive program audit which addresses all program measures and all energy conserving practices. See 44 Fed. Reg. 64602, 64668 (1979). The definition of "minimum" is "least attainable or possible", while the definition of "comprehensive" is "covering a matter under consideration completely or nearly completely, accounting for, or comprehending all, or virtually all, pertinent considerations." Webster's Third New International Dictionary (1971). It may be that some of the standards proposed in 2 MCAR § 1.16205 C., for example, a given level of furnace efficiency, could be adopted as minimum standards under subdivision 1. Any such change, however, would be substantially different from current proposed amendments and could be adopted only after compliance with the procedures required under the Minnesota Administrative Procedure Act, including a new Notice of Hearing, publication in the State Register, and another public hearing.

The Hearing Examiner finds that the rule amendments proposed in 2 MCAR § 1.16205 C. are a comprehensive, not a minimum, set of standards and as such may not be adopted with respect to any standards beyond the minimum energy efficiency standards applicable to all existing residences and mandatory for rental residences listed (1-10) in 2 MCAR § 1.16205 B.

The Hearing Examiner finds that the Department has the authority to amend the energy conservation standards to provide that economic feasibility of each standard be determined on a ten-year, rather than a five-year amortization period, and that this authority includes adding such standards to those originally published as would be considered "minimum" given the longer payback time. However, the Department does not have the authority to adopt two different sets of standards. Nor does it have the authority to adopt a "comprehensive" set of standards for purposes of disclosure at the time of sale of a residence. In other words, the disclosure standards and the minimum energy efficiency standards applicable to all existing residences and mandatory for rental residences must be the same if legislative intent is to be honored. The standards may be set out in the rules under separate categories (such as energy efficiency standards and disclosure requirements) as a matter of form, but their content under such a format must be identical.

The Hearing Examiner finds that the Department is authorized by statute to exercise its expertise and propose additional minimum energy efficiency standards for existing residences, which standards would be mandatory for rental residences. If those minimum standards are shown to be necessary and reasonable by an affirmative presentation of facts, the Department may adopt them by rule. In order to accomplish this, the Department must initiate a new rulemaking proceeding, complying with all substantive and procedural requirements imposed on it by law or rule. These requirements include a new Notice of Hearing, republication of the proposals in the State Register, and another public hearing. This process is the only way to adopt any additional residential energy disclosure requirements within the meaning and intent of Minn. Stat. § 116H.129, subd. 5 (1978).

Discussion of the Amendments to Energy Conservation Standards as Proposed.

15. 2 MCAR § 1.16203 - Purpose and Scope.

The first [redacted] amendments constitute an editorial rearrangement which is reasonable and needed for consistent format. The addition of C. expands the scope of the standards to include mechanical and electrical systems. This addition is reasonable and needed to make the statement of scope conform to the actual scope of the standards.

16. 2 MCAR § 1.16204 Definitions.

These amendments change some definitions and add some new definitions needed for the understanding of additional conservation standards.

Definition B. This amendment changes the definition of "attic" to include the space between rafters formed where interior finished material is affixed directly to the rafters. This is a reasonable change given the extended payback time.

Definition C. This amendment adds a definition of clock thermostats. This addition is reasonable and needed for understanding the newly added standard in 2 MCAR § 1.16205 B.9.

Definition F. "Economic feasibility" is amended to reflect the amortization period of ten, rather than five, years. This amendment is reasonable and needed to conform to the enabling statute.

Definitions J. and CC. These new definitions of "floor insulation" and "wall insulation" are reasonable and necessary to clarify the standards related to insulation.

Definition K. This new definition of "flow restrictors" is reasonable and necessary for the understanding of the additional standard in 2 MCAR § 1.16205 B.10.

Definitions G., L., N., Q., U., Y., Z., BB., and EE. These proposed new definitions may not be adopted since they relate to standards in 2 MCAR § 1.16205 C. which, if adopted at this time in this form would exceed statutory authority as discussed in Finding 14. In order for these definitions to be adopted, they must be republished in the State Register as relating to "minimum" energy efficiency standards applicable to existing residences and required for rental residences, with a new Notice of Hearing and another public hearing. Minn. Laws 1980, ch. 615, § 6, subd. 4d (to be codified as Minn. Stat. § 15.0412, subd. 4d), requires submission of the Hearing Examiner's Report to the Chief Hearing Examiner when the Hearing Examiner finds that the agency proposing the rules has not met the requirements of subdivisions 4 through 4f of that same statute. It was found at Finding 14 that the Department has proposed rule amendments which exceed statutory authority. Minn. Laws 1980, ch. 615, § 6, subd. 4c (to be codified as Minn. Stat. § 15.09412, subd. 4d), requires an agency seeking to adopt rules to fulfill any relevant, substantive or procedural requirements imposed on it by law or rule. One such requirement is found at Minn. Stat. § 15.0412, subd. 1 (1978), which allows amendment or adoption of rules "only pursuant to authority delegated by law." Since the Hearing Examiner has found that the Department is proposing to adopt rules going beyond "authority delegated by law", this Report will be submitted to the Chief Hearing Examiner for approval.

In the event the Chief Hearing Examiner rejects the Hearing Examiner's finding that the Department has exceeded its statutory authority, the need and reasonableness of definitions G., L., N., Q., U., Y., Z., BB., and EE. must be addressed. The Hearing Examiner finds it necessary to define the terms

"Electric load management devices", "Furnace efficiency modification", "Passive solar", "Replacement solar swimming pool heaters", "Solar domestic water heater", "Thermal duct insulation", "Thermal pipe insulation", "Water heater insulation", and "Wind energy device", respectively, if it is ultimately determined that the Department has not exceeded its statutory authority. Although the Department made no showing as to the reasonableness of the definitions themselves, the Hearing Examiner finds them to be self-explanatory, and reasonable, on their face.

Definitions V., "Storm door"; W., "Thermal door"; and X., "Storm window".

These new definitions are reasonable and needed for understanding the amendments to standards in 2 MCAR §§ 1.16205 B.7. and B.8. The Hearing Examiner suggests that, to make definition V. consistent with the standard for storm door, the word "exterior" should be inserted between the words "primary" and "door". This would not be a substantial change, but would merely clarify the intent of the definition. The Hearing Examiner also suggests the addition of a definition for "Thermal window" for consistency and clarity.

Definition O. This definition for "Positive shut-off" contains a typographical error. The word "will" in the first line should be deleted. This is not a substantial change, but merely conforms to the rule as it was originally published.

Additional New Definition. At the hearing, Gary Nelson, Residential Conservation Engineer, MEA, recommended the addition of a definition for "Seasonal Operating Efficiency" as follows:

> Seasonal Operating Efficiency shall mean the quotient obtained by dividing the useful energy provided by a system to the residence during the entire season divided by the heating value of the fuel used. The useful heat provided by a combustion heating system to the residence shall include subtractions for heat lost due to air infiltration induced by any vents, draft hoods or barometric dampers attached to the system.

The Hearing Examiner finds that adding this definition would not be a substantial change, and is reasonable and necessary to clarify the change in the meaning of the variable "N" in Equation A., 2 MCAR § 1.16207, where it is proposed that the term "seasonal operating efficiency" be substituted for "rated full load efficiency" (discussed in more detail below). The definition is consistent with that used by the US Department of Energy's Residential Conservation Service. This definition may be inserted after the definition for "Rim joist".

Since the Hearing Examiner found that some definitions must be deleted in the final rules, the remaining definitions should be re-lettered in proper order. This change would not be substantial but merely editorial, and reasonable and necessary for proper form. Also, due to the re-lettering necessitated by deletion of a definition which exceeds statutory authority, the letter "L" should be substituted for "M" in the body of proposed definition J. The validity of these final remarks assumes agreement on the part of the Chief Hearing Examiner with the prior finding regarding the Department's exceeding statutory authority.

17. 2 MCAR § 1.16205 A.

The Department proposes to add the following sentence to this subsection:

A partial attainment of these standards shall be required if shown by calculations to be economically feasible even though full compliance will not meet criteria of economic feasibility.

Several members of the public pointed out that the meaning of this sentence is vague and the manner of its application unclear. If the statement means that a partial attainment of each standard shall be required, it would seem that a partially attained standard is less than the minimum authorized by the enabling statute. Moreover, none of the subsequent sections of the proposed rule amendments indicate which portion of the standard must be met, how that would be decided or how such partial attainment would be calculated. The Hearing Examiner finds that if this is the meaning of the statement, it appears to be unreasonable.

If the statement means that even though all the standards are not found to be economically feasible, those standards which are shall be required to be installed, the statement is not necessary, since according to the statute itself, "applicable energy efficiency standards" means those standards which are economically feasible. See Minn. Stat. § 116H.129, subd. 2(d). The mandatory directive in Minn. Stat. § 116H.129, subd. 3, requires rental property to be in compliance with "all applicable energy efficiency standards", and there is no suggestion of "partial attainment" in that subdivision's language. The proposed amendment seems to imply a consideration outside the clear, unambiguous statutory language, which requires full compliance.

The Hearing Examiner finds that the Department has failed to establish either the need for or the reasonableness of this proposed amendment. In order to correct this problem, the Hearing Examiner recommends that the proposed addition not be adopted. complied p.6

18. 2 MCAR § 1.16205 B.

Since the Hearing Examiner has found that two different sets of standards may not be adopted, the introductory sentence to B. which is proposed in the rule amendments (or the heading "B" itself) must either be eliminated or revised to indicate the dual purpose of the standards. This observation assumes agreement by the Chief Hearing Examiner with the above Finding regarding the Department's exceeding statutory authority. not adopted

19. Standards B.4. and B.6.

At the hearing, the Department proposed the elimination of the word "accessible" in these two standards relating to the insulation of attics, walls and floors. In the rules as originally adopted in 1978, only accessible attics, walls and floors were required to have insulation installed. The deletion of the word "accessible" was not published in the State Register. However, it was discussed in the Statement of Need and Reasonableness available prior to the hearing. It was also the subject of considerable discussion and controversy both at the hearing and in written comments submitted following the hearing. While this change is technically a deletion of a word, the result is the addition of a substantial number of components to the standards. The Hearing Examiner finds that this results in a substantial change in the rules, since they would be "fundamentally different" from the rules as published in the State Register. The proposed change would affect a large class of persons not represented at the public hearing, namely, ordinary owners of residential rental property. See, 9 MCAR § 2.111 A.-D.

The basic or primary thrust of the proposed rule amendments is to add minimum energy efficiency standards which are necessary and reasonable in light of the Legislature's decision to extend the payback period from five to ten years. While it may be true that the insulation of enclosed attics, walls or floors will usually pay for itself within ten years, the Hearing Examiner is not persuaded that this requirement can be added to the standards without a new Notice of Hearing, publication of this deletion in the State Register, and a re-convening of the public hearing. If this is not done, anyone who owns rental property will not have received notice of the fact that they may have to undertake the expense and effort of tearing up the ceilings, floors, and walls of the affected property in order to install insulation. In addition to the enormous direct expense involved, the installation may severely diminish the value of a property whose attics, walls or floors cannot be torn up without inflicting aesthetic damage. Even if such undertakings can be shown to be "economically feasible", they should not be mandated without more public notice. The Hearing Examiner therefore finds that deletion of the word "accessible" as proposed is a substantial change from the rules as originally published within the meaning of Minn. Laws 1980, ch. 615, § 6, subd. 4d. (to be codified as Minn. Stat. § 15.0412, subd. 4d). Since this defect cannot be corrected at this time, the proposed deletion of the word "accessible" from standards B.4. and B.6. cannot be adopted. In order for the Department to adopt these deletions, it is suggested that a new rule hearing be initiated, complying with all requirements of law or rule.

not adopted p. 7

20. Standards B.7. and B.8.

These proposed amendments add thermal windows and doors to the standards. There was no public opposition to these amendments. However, Francis X. McGrath of Mon-Ray Windows, Inc., suggested adding to B.7. the requirement that an air infiltration rate of no more than 0.5 CFM per lineal foot of net sash crack perimeter be allowed in each window opening. The Department has responded that such a requirement is not reasonable because it is more restrictive than the requirements for new residences; because the standard is intended to deal with thermal transmittance rather than infiltration; because determining compliance is excessively costly and time consuming; and because the cost of storm windows meeting this standard is much greater than the cost of most storm windows sold in this state.

The Department explained that thermal windows and/or doors are often installed when window sashes and/or doors are deteriorated and need replacement. The Hearing Examiner finds that the rule amemdments as proposed are reasonable and necessary and may be adopted.

21. Standards B.9. and B.10.

These proposed amendments add two new standards, installation of clock thermostats and installation of flow restrictors on shower heads. Several members of the public questioned whether it was reasonable to include these requirements as minimum standards. The Department stated that these measures result in significant energy savings at relatively little cost. Even though reasonable minds may be divided as to the wisdom of the standards, the proposals are not, on their face, arbitrary or capricious and are rationally related to the end sought of trimming energy use.

Russ Harju of the St. Paul Public Housing Agency, argued at the hearing

and through written testimony that these two requirements would be very costly in public housing dwellings, and therefore challenged the validity of the statement in the Notice of Hearing that adoption of the proposed rules will not require the expenditure of public monies by local public bodies. Mr. Harju was unable to give any estimate regarding costs which would be incurred by public bodies. The Department responded to Mr. Harju's objections by showing that the Public Housing Agency of St. Paul is not a public body within the meaning and intent of the Minnesota Administrative Procedure Act. Additionally, Minn. Stat. § 15.0412, subd. 7, requires notice to public bodies of expenditures only if those expenditures will exceed $100,000 in either of the two years following the effective date of the proposed rule.

The Hearing Examiner finds that the Public Housing Agency of the City of St. Paul has standing to raise the issue of public expenditure since it is an interested party, even though it is not a public body. However, since Mr. Harju was unable to establish that the cost to public bodies of the standards in question would exceed the statutory limit, the Hearing Examiner finds that the Notice of Hearing was not defective in this regard. The Hearing Examiner further finds that amendments B.9. and B.10. are needed and reasonable and may be adopted as proposed.

not adopted

22. 2 MCAR § 1.16205 C.

The Hearing Examiner finds that standards C.3., C.4., C.10., C.11., C.12., C.15., C.18., C.19., C.20., C.21., and C.22. relating to disclosure standards may not be adopted since they exceed statutory authority as discussed at Finding 14.

no section of 16205 C adopted

This finding assumes that the Chief Hearing Examiner will agree with Finding 14 regarding the Department's having exceeded statutory authority. Should that not be the case, the need for and reasonableness of the proposed amendments must be evaluated.

Prior to the close of the record, the Department submitted a proposal changing the language in the disclosure standards by adding the word "evaluate" at the beginning of each subsection and changing the word "install" to "installation of". Other changes were proposed consistent with an obvious intent to make 2 MCAR § 1.16205 C. appear to be an inspection procedure rather than a mandatory requirement. The Hearing Examiner finds that these language changes do not constitute a substantial change, but are merely an editorial change clarifying the intent of the section. Given that frame of reference, the proposed disclosure standards are needed and reasonable.

Standards C.5., C.7., and C.8. may only be adopted if the "R" values are changed to 19, 11, and 11, respectively, from 44, 19, and 19, or they will exceed statutory authority as discussed at Finding 14. If this is not done, the proposed disclsoure requirement will involve "R" values greater than the minimum energy efficiency standards applicable to residential rental property. Again, if the Chief Hearing Examiner does not approve the Hearing Examiner's Finding regarding the Department's exceeding statutory authority, the proposed standards are needed and reasonable as inspection procedures.

In standard C.6., the word "accessible" must be added between "on" and "walls" or statutory authority will be exceeded. See Findings 14 and 19 for discussion.

The remainder of this subsection may be adopted (or included under subsection B. of 2 MCAR § 1.16205, if that heading is retained), because its adoption is reasonable and necessary to ensure that legislative intent is followed by making the standards applicable to residences requiring disclosure of certain energy characteristics the same as the minimum energy efficiency standards for existing residences and required for rental property. See Finding 14 for discussion. In the alternative, the Department could simply not adopt "C." at all, since the last sentence of the introductory paragraph to 2 MCAR § 1.16205 provides that "These standards shall also provide a basis for evaluation of residences at time of sale."

23. 2 MCAR § 1.16206.

This proposed rule amendment changes the payback period from five to ten years. This amendment is reasonable and necessary to conform with the enabling statute.

The Hearing Examiner notes that A.-G. of this section sets forth the procedural steps to be followed in calculating energy savings and determining whether a specific standard will be economically feasible. Steps A. through C., however, do not apply to the calculations of energy savings for the installation of clock thermostats or the installation of shower head flow restrictors. According to 2 MCAR §§ 1.16207 I. and J., as proposed, for these conservation measures, the quantity of annual energy savings, [Δ E], is computed directly rather than by the use of Equation A. This also applies to the calculations in 2 MCAR §§ 1.16207 K.-U., but since the Hearing Examiner determined, in Finding 14 above, that promulgating the conservation measures corresponding to these equations exceeds statutory authority, the problem with those calculations is moot at this time. Regarding clock thermostats and shower head flow restrictors, however, the Hearing Examiner suggests the following addition to 2 MCAR § 1.16206 A. in order to clarify the appropriate procedure:

not added p.7

> For calculating the economic feasibility of clock thermostats and shower head flow restrictors, determine the annual energy savings, [Δ E], directly by use of equations 9 and 10 in 2 MCAR §§ 1.16207 I. and J. Then proceed to step D and the following steps to complete the calculation of economic feasibility.

The Hearing Examiner suggests this clarification of the procedures outlined in 2 MCAR § 1.16206 because of the addition of the two new standards. Such a clarification would be merely editorial, and would make this section consistent with 2 MCAR § 1.16205 and 2 MCAR § 1.16207, and would assist in understanding the procedures previously published.

The Hearing Examiner also notes that in part E. of this section the lower-case "(c)" in the first line should be upper-case "(C)" for purposes of consistency.

complied p.8

24. 2 MCAR § 1.16207.

Two proposed rule amendments would modify the general energy savings equation, Equation A., which is used to calculate the annual energy savings for most of the energy conservation standards promulgated at 2 MCAR § 1.16205. Equation A. reads:

$$E = H \times \frac{D \times 21.7}{N \times V}$$

This equation incorporates the variable factors which make each individual residence unique in its energy use. One of these factors is the efficiency of the heating system which is provided for in the equation by the variable N. In the equation as originally adopted, N denoted the rated full load efficiency of the heating system. The Department proposes to amend this by using the seasonal operating efficiency, rather than the rated full load efficiency. The Department has shown that two heating systems with the same full load efficiency can have significantly different seasonal efficiency. United States Department of Energy Tables can be used to determine seasonal efficiency. Using seasonal efficiency as the variable will increase the accuracy of the Equation A. and will make the equation easier to use.

The Hearing Examiner finds that the Department has established the need for and reasonableness of this rule amendment.

The second amendment proposed is a change in the constant in Equation A. The constant in the equation as originally adopted was 21.7. The proposed amendment as published changed the constant to 14.4. At the hearing, and in material submitted in a timely manner after the hearing, Gary Nelson, Residential Conservation Engineer with MEA, proposed that the constant be amended to 20.4. The Department concurs with this recommendation.

The original constant, 21.7, did not allow for a change in the Degree Day Correction Factor, the fraction of heat loss attributed to the heating system when a residence is modified to lose less heat. The constant, as published in the proposed rule amendments, 14.4, utilized a correction factor for converting full-load efficiency to seasonal efficiency. Since seasonal efficiency will be determined directly from DOE tables, this correction factor is not needed and erroneously makes the constant in the equation too low.

Lynn B. Olsson of Energy Technology Resources, Inc., in comments submitted in a timely manner after the hearing, contended that no amendment should be allowed since the change from 14.4, the published amendment, to 20.4 is a substantial change. Paybacks calculated using 20.4 as a constant will be shorter than those calculated using 14.4, resulting in more conservation measures being economically feasible. However, the Hearing Examiner notes that disallowing the amendment will result in the constant remaining at 21.7 as previously adopted, causing payback periods to be even shorter than those resulting from the use of either of the proposed amendments. Allowing the original constant to remain in the equation would result in more energy conservation measures being economically feasible than would the substitution of either of the constants (14.4 or 20.4) proposed as amendments. Thus, disallowing any amendment would adversely affect more persons not represented at the hearing than would the adoption of an amendment providing a constant which is lower than the one currently in effect.

The Hearing Examiner finds that allowing the constant 20.4 to be adopted as the amendment to the equation is not a substantial change from the proposed amendment as published. Since a proposed amendment was published, persons affected had notice that Equation A. was subject to some change. Public reaction was invited since the notice also stated that the proposed amendments were subject to change as a result of the rule-hearing process. The rule as published proposed a lowering of the existing standard as does the rule as

recommended for adoption herein. Adequate time was allowed following the hearing for additional review and comment. The constant 20.4 appears to be the one which would most accurately predict energy savings.

The Hearing Examiner finds that amending the constant in Equation A. to 20.4 is needed and reasonable, and this amendment may be adopted.

A third rule amendment published relating to Equation A. would add, as a source for the derivation of the equation, the Department of Energy, Residential Conservation Service Model Audit. At the hearing, the Department noted that this addition would not be an accurate description of the source of the equation, and that it should not be included in the final rules. The Hearing Examiner finds that this is merely a technical change, and the final rules may omit this proposed amemdment.

25. In material submitted after the hearing, the Department proposed to delete the word "install" for each of the energy equations in 2 MCAR § 1.16207. The Hearing Examiner finds that this is not a substantial change but merely editorial. It clarifies the purpose of the equations and is needed and reasonable.

Additionally, in the citation given for each of the equations, the reference should be to (2 MCAR § 1.16205), thus deleting the "A." This would accord with the proposed amendments as published, and would correct the errors at D. and E., in which the cite was given incorrectly as: (2 MCAR § 1.6205).

At 2 MCAR §§ 1.16207 G. and H., the Department proposes addition of "and/or thermal windows." and "and/or thermal doors.", respectively, after "storm windows" and "storm doors". The Hearing Examiner finds these additions to be necessary and reasonable to provide for consistency with the changes in 2 MCAR §§ 1.16205 B.7. and B.8.

26. 2 MCAR §§ 1.16207 I. and J.

These proposed rule amendments add equations for the calculation of energy savings for clock thermostats and shower head flow restrictors. They are needed since these two conservation measures have been added to those originally adopted.

The Hearing Examiner notes that there appear to be two errors in J. The first is in the introductory sentence. The equation is used to calculate [Δ E], not [Δ H] as stated in that sentence. The second is in equation 10. The equation as published is not truly an equation since it does not have an equality sign, and one should be placed after [Δ E]. These corrections are merely technical and editorial, and do not substantially change the proposed amendments as published.

The Hearing Examiner finds that the amendments proposed for subsections I. and J. are reasonable and needed for applying the additional minimum conservation standards.

27. Since the Hearing Examiner found that two different sets of standards may not be adopted for disclosure and energy conservation purposes, (see Finding 14), all references to any standards exceeding legislative intent must be deleted in the equations in 2 MCAR § 1.16207. Additionally, the equations and procedures in 2 MCAR §§ 1.16207 K.-U. must be deleted. They must be deleted because they relate to conservation standards that may not be adopted. In the event the Chief Hearing Examiner does not approve the Hearing Examiner's Finding regarding the exceeding of statutory authority by the Department, the need

for and reasonableness of the equations in 2 MCAR §§ 1.16207 K.-U will be addressed below.

The proposed equations are physics and engineering calculations from which actual audit forms and calculation aids are to be developed. It is not the intent of the Department to have evaluators use the equations which were published in the State Register. The Department's witness testified that draft forms, tables and graphs have been prepared which would enable a high school graduate with average math ability to adequately evaluate a residence after attending the planned training course. An evaluator's technical manual is under development which will give detailed instructions on how to carry out each portion of the proposed evaluations, using the draft forms and calculations aids. These "draft forms and calculation aids", which would illustrate the actual steps an evaluator would undertake during a disclosure inspection were not published in the State Register or presented as a proposal by the Department prior to the close of the record. The Department should have published the actual computation format which the evaluators will be using as they conduct these inspections so that the public will have notice of what to expect when they must submit to an energy disclosure. The complicated formulae upon which the evaluators' procedures will be based fail, standing alone, to notify the reader of this information. In addition, the calculations as they were published are based on many presumptions about "average" energy use, and these presumptions have not been established by an affirmative presentation of facts. For the above reasons, the Hearing Examiner finds that the need for and reasonableness of proposed 2 MCAR §§ 1.16207 K.-U. have not been demonstrated by an affirmative presentation of facts. In order to remedy this defect, the Hearing Examiner recommends that these sections not be adopted at this time. This recommendation is moot if the Chief Hearing Examiner agrees with Finding 14.

Based upon the foregoing Findings of Fact, the Examiner makes the following:

CONCLUSIONS

1. That due, timely and legally adequate notice of the hearing in this matter was properly served and published by the Department.

2. That the Department has met the procedural requirements of Minn. Laws 1980, ch. 615, § 6, subds. 4 - 4f (to be codified as Minn. Stat. § 15.0412, subds. 4 - 4f) and all other procedural requirements of law or rule; the procedural irregularities noted at Findings 6, 10 and 11 are technical in nature and no corrective action is needed in the absence of any evidence of prejudice to interested parties.

3. That the Department has demonstrated its statutory authority to adopt the proposed rules within the meaning of Minn. Laws 1980, ch. 615, § 6, subd. 4c (to be codified as Minn. Stat. § 15.0412, subd. 4c), and Minn. Stat. § 15.0412, subd. 1 (1978), except as noted at Finding 14 and as discussed throughout the remainder of this Report.

4. That the Department has demonstrated the need for and reasonableness of the proposed rules by an affirmative presentation of facts in the record within the meaning of Minn. Laws 1980, ch. 615, § 6, subd. 4c (to be codified as Minn. Stat. § 15.0412, subd. 4c), except as noted at Findings 17 and 27.

5. That the additions to the proposed rules which were proposed after publication of the rules in the State Register are not substantially different from the rules as published in the State Register within the meaning of Minn. Laws 1980, ch. 615, § 6, subd. 4d (to be codified as Minn. Stat. § 15.0412, subd. 4d), except as noted at Finding 19.

6. That the Hearing Examiner is not recommending any changes in the proposed rule within the meaning of Minn. Laws 1980, ch. 615, § 6, subd. 4e (to be codified as Minn. Stat. § 15.0412, subd. 4e).

7. That the Hearing Examiner has suggested action to correct the defects mentioned in Conclusions 3, 4, and 5, as noted at Findings 14, 17, 19, and 27.

8. That due to Conclusions 3, 4, 5 and 7, this Report has been submitted to the Chief Hearing Examiner for his approval pursuant to Minn. Laws 1980, ch. 615, § 6, subd. 4d (to be codified as Minn. Stat. § 15.0412, subd. 4d).

9. That any Findings which might properly be termed Conclusions, and any Conclusions which might properly be termed Findings, are hereby adopted as such.

RECOMMENDATION

IT IS HEREBY RECOMMENDED that the proposed rule amendments be adopted consistent with the Findings and Conclusions made above, except where those amendments exceed statutory authority as noted at Finding 14 and as discussed throughout the remainder of this Report.

Dated this 29th day of August, 1980.

Richard C. Luis

RICHARD C. LUIS
Hearing Examiner

BCD-80-004-RL

STATE OF MINNESOTA
OFFICE OF ADMINISTRATIVE HEARINGS

FOR THE DEPARTMENT OF ADMINISTRATION
BUILDING CODE DIVISION

In the Matter of Proposed
Amendments to Energy Conservation
Standards for Existing Residences
and in the Matter of Proposed Rules
for the Certification of Evaluators
for the Energy Disclosure Program.

ORDER OF THE
CHIEF HEARING EXAMINER

On August 29, 1980, Richard C. Luis, Hearing Examiner, issued his Report in the above-referenced matter. On September 2, 1980, pursuant to the provisions of Minn. Laws 1980, Chapter 615, § 6, subd. 4d, (to be codified as Minn. Stat. § 15.0412, subd. 4d.), the Chief Hearing Examiner issued his Report approving the Report of the Hearing Examiner.

On November 18, 1980, James J. Hiniker, Jr., Commissioner of the Department of Administration, signed his Findings of Fact and his Order Adopting Rules and, pursuant to the provisions of Minn. Laws 1980, Chapter 615, § 6, subds. 4d and 4e, submitted the rules to the Chief Hearing Examiner for a determination that the defects required to be corrected have been corrected and that any changes, other that those discussed by the Hearing Examiner, are not substantial changes.

In Rule 2 MCAR § 1.16204 as adopted, the definition of the terms "Clock thermostats" and "Flow restrictors" have been deleted. Rule 2 MCAR § 1.16205, as adopted, deleted the requirement for installation of these devices. These definitions and requirements were proposed by the Building Code Division and approved by the Hearing Examiner. The Department has now withdrawn its proposal to add the installation of these features to the eight existing "Minnesota Energy Efficiency Standards" in 2 MCAR §§ 1.16201-1.16208. The addition of the definitions and requirements were not for the purpose of curing a defect, and their non-inclusion would not result in a rule substantially different from that which had been proposed.

In 2 MCAR § 1.16207, the Building Code Division proposed the deletion of the word "Install" at the beginning of each "General Energy Savings Equation", which proposal was approved by the Hearing Examiner. In its final adoption, the Department has not deleted the word "install" as proposed. However, the purpose of this proposal was clarification only, and not for the curing of a defect (in fact, the language of the final adoption matches the currently existing rule), and non-deletion does not result in a rule substantially different than that which had been proposed.

Rule 2 MCAR § 1.16207, as proposed, and as approved by the Hearing Examiner, added "and/or thermal windows" and "and/or thermal doors" to §§ G. and

H. This was consistent with 2 MCAR §§ 1.16205 A.7. and 1.16205 A.8. as finally adopted. In its final adoption of § 1.16207, the Department has not inserted these clauses. Non-inclusion of these clauses results in an inconsistent rule which should not be submitted for final publication in the absence of some explanation of why the equations do not apply to thermal windows and doors. In order to cure the inconsistency, the agency should re-insert those clauses. However, if the clauses in question are not re-inserted by the Department, no substantial change from the proposed rule will result.

inserted in final form

At 2 MCAR §§ 1.16204 D. and J., as adopted, the degree signs (°) have been deleted. These deletions were not proposed on the record. Such deletions are, however, clerical and not substantial in nature.

reinserted in final form on p. 2

In the footnote to Equation A at 2 MCAR § 1.16207, a period (.) should replace the comma (,) that has been adopted. This change would be clerical only and not a substantial change from the rules as proposed.

corrected p. 9

Rule 2 MCAR § 1.16207 D., as adopted, contains a clerical error. The letter "s" after the word "standard" should be deleted. This would not be a substantial change from the rules as proposed.

corrected p. 11

At 2 MCAR § 1.16208, as adopted, the notation "Sec." has been substituted for the character "§". No such proposed change is on the record. This change is, however, clerical and not a substantial change from the rules as proposed.

p. 14

It is further found that all defects required to be cured have been cured.

NOW, THEREFORE, the Department shall have the responsibility of filing the rules and the entire record with the Attorney General and complying with all other pertinent requirements of Minn. Stat. § 15.0412.

Dated this 4th day
of December, 1980.

DUANE R. HARVES
Chief Hearing Examiner

BCD-80-004-RL

STATE OF MINNESOTA
OFFICE OF ADMINISTRATIVE HEARINGS

FOR THE DEPARTMENT OF ADMINISTRATION
BUILDING CODE DIVISION

In the Matter of Proposed Amendments to Energy Conservation Standards for Existing Residences and In the Matter of Proposed Rules for the Certification of Evaluators for the Energy Disclosure Program.

REPORT OF THE
CHIEF HEARING EXAMINER

The above-entitled matter came on for review by the Chief Hearing Examiner pursuant to the provisions of Minn. Laws 1980, Ch. 615, § 6, subd. 4d (to be codified as Minn. Stat. § 15.0412, subd. 4d) which provides in part:

> If the [hearing examiner's] report contains a finding that the proposed rule is substantially different from that which was proposed at the public hearing, or that the agency has not met the requirements of section 15.0412, subdivisions 4 through 4f, it shall be submitted to the chief hearing examiner for approval. If the chief hearing examiner approves the finding of the hearing examiner, he shall advise the agency of actions which will correct the defects, and the agency shall not adopt the rule until the chief hearing examiner determines that the defects have been corrected. If the chief hearing examiner determines that the need for and reasonableness of the rule has not been established pursuant to subdivision 4, clause (c), and if the agency does not elect to follow the suggested actions of the hearing examiner to correct that defect, then the agency shall submit the proposed rule to the legislative commission to review administrative rules for the commission's advice and comment. The agency shall not proceed to adopt the rule until it has received and considered the advice of the commission; provided, that the agency is not required to delay adoption longer than 30 days after the commission's receipt of the agency's submission.

Based upon a review of the record in this proceeding, the Chief Hearing Examiner hereby approves the Interim Report of the Hearing Examiner in all respects and specifically as to any finding of substantial change or of failure to comply with Minn. Laws 1980, Ch. 615, § 6 (to be codified as Minn. Stat. § 15.0412, subd. 4-4f), or of failure to establish need for and reasonableness of the proposed rule.

In order to correct the defects enumerated by the Hearing Examiner, the Agency shall either take the action recommended by the Hearing Examiner or reconvene the rule-hearing if appropriate. If the agency chooses to reconvene the rule-hearing, it shall do so as if it is initiating a new rule-hearing, complying with all substantive and procedural requirements imposed on the Agency by law or rule.

If the Agency chooses to take the action recommended by the Hearing Examiner, it shall, prior to submitting the rules to the Attorney General for review, submit to the Chief Hearing Examiner a copy of the rules as initially published in the State Register, a copy of the rules as proposed for final adoption in the form required by the State Register for final publication, and a copy of the Agency's Findings of Fact and Order Adopting Rules. The Chief Hearing Examiner will then make a determination as to whether the defect in regard to substantial change and the requirements of Minn. Laws 1980, Ch. 615, § 6 (to be codified as Minn. Stat. § 15.0412, subd. 4-4f) have been corrected.

Should the agency make changes in the rules other than those recommended by the Hearing Examiner, it shall also, prior to submitting the rule to the Attorney General, submit the complete record to the Chief Hearing Examiner for a review in regard to substantial changes.

In reviewing the Hearing Examiner's Report, the last paragraph of Finding 13 (page 5) may leave the reader in doubt with respect to what action it may or should take. It is the opinion of the Chief Hearing Examiner that the Hearing Examiner has found the rule to be reasonable as proposed but has "suggested" a clarifying amendment which would not be a substantial change requiring a new hearing. Thus, it appears that the Agency may either adopt the language as proposed or make the change suggested by the Hearing Examiner without the necessity of a further review by the Chief Hearing Examiner.

Dated this 2nd day of September, 1980.

DUANE R. HARVES
Chief Hearing Examiner

STATE OF MINNESOTA

DEPARTMENT OF ADMINISTRATION

BUILDING CODES & STANDARDS DIVISION

In the Matter of Proposed
Amendments to Energy Conservation
Standards for Existing Residences

AMENDED FINDINGS OF FACT

The above entitled matter came on for hearing before Richard C. Luis, Hearing Examiner on the 3rd day of July, 1980 after proper notice required by Minn. Stat. 15.0412 (1978) was served on all persons, associations, municipalities and other interested groups registered with the Secretary of State for that purpose.

After affording interested persons an opportunity to present written and oral data, statements and arguments, having heard all of the testimony, having considered all the evidence adduced and upon the records, files and proceedings herein, this agency hereby accepts and adopts the findings of fact, conclusions and recommendations of the hearing examiner as included in his report dated September 2, 1980 and herein incorporates them by reference with the following exceptions:

2MCAR Sec. 1.16204. Definitions C and K were necessary for the understanding of proposed standards numbers 9 and 10. These definitions are not necessary if their correlating standards are not adopted.

2MCAR 1.16204 B. The agency reverts to its original definition: "The space between rafters formed where interior finish material is affixed directly to the rafters shall not be construed to be attic space." because rooms installed in existing attics generally have sloping ceilings with finish material applied directly to the 2 x 4" rafters. Attaining an R-19 factor is not feasible in such installation especially if ventilation of insulation (in accordance with the State Building Code) is provided. Therefore, the findings of the Hearing Examiner on this issue should be voided and the original definition retained.

2MCAR Sec. 1.16205. The eight original minimum standards are retained with no additional ones as had been proposed. The original standards with the exception of No. 3 pertain to the building envelope or static characteristics of the structure, and therefore have paybacks that are readily calculated with accuracy. Compliance with each standard is visually determined without removal of any parts of the structure. Proposed standards numbers 9 and 10 directly relate to the living habits of the occupants and savings are difficult to predict with accuracy. In many cases determination of compliance with proposed standard No. 10 would require dismantling of some water piping in the shower. The term "install" is retained in the rule to describe that the material must be provided and placed into a specific location.

STATE OF MINNESOTA
DEPARTMENT OF ADMINISTRATION

James J. Hiniker, Jr.
Commissioner

1-26-81
Date

STATE OF MINNESOTA

DEPARTMENT OF ADMINISTRATION

BUILDING CODES & STANDARDS DIVISION

In the Matter of Proposed
Amendments to Energy Conservation
Standards for Existing Residences

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STATE OF MINNESOTA
DEPARTMENT OF ADMINISTRATION

Date: 11-18-80

James J. Hiniker, Jr.
Commissioner

STATE OF MINNESOTA

DEPARTMENT OF ADMINISTRATION

BUILDING CODE DIVISION

IN THE MATTER OF PROPOSED AMENDMENTS TO ENERGY CONSERVATION STANDARDS FOR EXISTING RESIDENCIES

STATEMENT OF NEED AND REASONABLENESS

The need for the proposed amendments to Rules for Energy Conservation Standards for Existing Residences was established in Minn. Stats. Sec. 116H.129, Subd. 1 (1979 supplement), which requires the rules to be amended to provide energy conserving requirements that may be amortized (pay back) in ten years, rather than a five year payback provided for in existing rules.

The existing rules were developed with the assistance of an advisory committee of diverse professions and experience representing an extensive range of expertise in energy conservation aspects of construction. The proposed amendments were also prepared with assistance of this committee and in consultation with the Director of the Minnesota Energy Agency.

Don Pates, Director and Sivert Hendrickson, Section Chief - Consultants of the Building Code Division, will appear in behalf of the proposed rules at the hearing. John Armstrong, Assistant Director for Conservation; Frank Altman, Conservation Policy Analyst; and Gary Nelson, Residential Engineer, will represent the Minnesota Energy Agency. They will testify regarding the need for and reasonableness of the proposed rules. The substance of the testimony is set forth herein.

A major consideration in development of the proposed amendments is an evaluation program for residences that will soon be implemented in Minnesota because of the National Energy Conservation Policy Act Pub. L. 95-819, 92 Stat. 3206 et. seq. The U.S. Department of Energy has published in the Federal Register Part II, Wednesday, November 7, 1979, Rules for a Residential Conservation Service Program (RCS) effective December 7, 1979. Under the provisions of these rules Public Utilities in Minnesota will be providing evaluations of residences to their customers upon request. The program applies to residences including multi-family residences of 4 units or less.

The Minnesota Energy Agency has prepared a State Plan for implementation of the Federal Regulations (RCS) and the Building Code Division and Minnesota Energy Agency with assistance of the advisory committee has developed these proposed amended rules so as to coordinate the Federal (RCS) and the two State Programs to eliminate duplication of programs.

It should be noted that the Rules for Energy Conservation Standards for Existing Residences are applicable for <u>two</u> purposes. They are applicable on a mandatory basis to rental residences persuant to Minn. Stat. Sec. 116H.129 Subd. 3 and also as a basis for evaluation of residences prior to sale pursuant to Minn. Stat. Sec. 116H.129 Sub. 5, 6 and 7. Subd. 7 provides for a waiver of evaluation by the buyer.

D.J. Exhibit No. 6 B

File No.

Date 2/3/80

The proposed amendments provide for ten (10) energy efficiency standards (2 MCAR 1.16205 B1 through 10) which will be applicable manditorily to rental residences and twenty-two (22) standards (2 MCAR 1.16205 C1 through 22) which will be used as a basis of evaluation of all residences at time of sale. The twenty-two standards correspond to the Minnesota Energy Agency State Plan for the Residential Conservation Services (RCS) Program. It is reasonable that there be one set of standards for both evaluation programs so that utility customers who have had their homes evaluated under the RCS program would not have to obtain an additional evaluation should they decide to sell their homes.

The efforts of the Building Code Division and the Energy Agency have been coordinated so that the citizens of Minnesota will not be subjected to two different sets of standards and resulting additional costs for evaluation of residences.

The Building Code Division has consulted with the Senate Committee on Energy and Housing and the House Committee on Energy and Utilities during development of the proposed amendments to these rules.

The following is the evidence and argument which supports the need for and the reasonableness of the proposed amendments.

Sec. 1.16203 - The first paragraph is editorially re-arranged to provide the same sequence as the rules.

The scope of the rules is broadened to provide for additional standards for energy conservation relating to energy usage by mechanical or electrical systems. Because of the increased pay back period, from 5 to 10 years, it is necessary and reasonable to include the additional standards.

Sec. 1.16204 Definitions. In order to correlate the two state programs this section has been amended by adding sixteen new definitions primarily obtained from the definitions section of the Minnesota Residential Conservation Service (RCS) Program. Reasons for amendments to existing definitions follows.

Definition B Attic. Because of the extended payback period provided for in the statute, there are additional effective ways of insulating these attic areas that will be economically feasible.

Definition F Economic Feasibility. The amendment is needed to comply with statutory change.

Sec. 1.16205 A. Minimum Energy Efficiency Standards. The additional language is needed to provide that although full compliance with a standard may not be economically feasible, it is reasonable to require partial compliance to the point of economic feasibility.

Sec. 1.16205 B. Minn. Stats. 116H.129 Subd. 3, provides that by July 1, 1983, residences which are renter occupied shall be in compliance with applicable energy efficiency standards. Since there are more standards which may be promulgated under Subd. 1 (see proposed rules Sec. 2 MCAR 1.16205 C.) it is reasonable to limit those applicable to rental residences to such minimum energy efficiency standards that can be readily accomplished in the majority of existing residences, are economically feasible and do not exceed the requirements for new buildings under the present building code.

Standard B-4 and B-6. The deletion of the word accessible is necessary because insulating of enclosed attics, walls or floors will usually be economically feasible because of the extended payback period.

Standard B-7 and B-8. The amendments to these standards have been added to provide for replacement of the prime window or door in lieu of adding storm windows or doors, which is often done when sash or doors are deteriorated and need replacement.

Standard B-9. This standard is needed to provide the capability of automatic reduction of energy usage for heating or cooling, during the night hours or when dwelling unit is to be un-occupied for a period of time. A clock thermostat may assure this capability and is a reasonable method of conserving energy.

Standard B-10. This standard is needed because heating of domestic water uses a large portion of the energy consumed in a residence. By reducing water flow from a shower head, less energy is needed.

Sec. 1.16205 C. This section has been added to delineate the portion of the rules which apply only to the Residential Disclosure Program. It is reasonable to provide additional standards to be evaluated in the event that they may prove to be economically feasible. The disclosure to the buyer may induce him to retrofit the residence due to resultant savings in energy costs.

This section includes standards from Sec. 1.16205 B, (1 through 9) with modifications, and additonal standards that may prove economically feasible and therefore should be evaluated.

Standard C-1. This standard is the same as B-2.

Standard C-2. This standard is the same as B-1.

Standard C-3. This standard is needed in that energy losses from inefficient mechanical systems is a recognized source of wasted energy in existing residences. Energy efficient models of various heating systems, energy efficient replacement burners and other energy conserving devices and are readily available. They may provide a reasonable method of conserving energy.

Standard C-4. Energy conservation models of air conditioning units are readily available that may significantly reduce electrical consumption per net btu/h of cooling. This is a reasonable method of conserving energy.

Standard C-5. This standard is the same as standard B-4 with the increased total "R" value of 44. This "R" value corresponds to the measure in the proposed Residential Conservation Service (RCS) Program.

Standard C-6. This standard is the same as a portion of B-6.

Standard C-7. This standard is the same as a portion of B-6, with revised "R" value, corresponding to the RCS Progam.

Standard C-8. This standard is the same as a portion of B-5 with increased "R" value corresponding to the RCS Program.

Standard C-9. This standard is the same as a portion of B-6.

Standard C-10 and C-11. These standards are necessary because it has not been common construction practice in Minnesota prior to January 1, 1976 to insulate heat ducts, plenums or piping carrying heated water, in unconditioned spaces. Ducts and pipes can be insulated to minimize heat loss, thus reducing energy usage.

Standard C-12. This standard is needed to minimize heat loss from uninsulated or under insulated water heaters. Heaters may be insulated, at a minimum cost, to achieve savings in energy usage.

Standard C-13. This standard is the same as a portion B-7.

Standard C-14. This standard is the same as a portion B-8.

Standard C-15. This standard is needed so that economic feasibility of these devices will be evaluated.

Standard C-16. This standard is the same as a portion B-9.

Standard C-17. This standard is the same as a portion B-3.

Standard C-18. This standard is needed so that evaluation of active solar systems will be conducted.

Standard C-19. This standard is needed so that evaluation of wind-energy systems will be conducted where feasible.

Standard C-20. This standard is needed to require evaluation of the use of solar water heating systems for swimming pools where feasible.

Standard C-21. This standard is needed to evaluate potential advantages of utilizing passive solar energy systems, and to evaluate solar gain retardants when air conditiong systems are used.

Standard C-22. This standard is needed as a major portion of heat loss via thermal transmittance is through glazed areas. Installation of thermal shutters, shades and/or draperies will reduce this loss, with resultant energy savings.

The Minnesota Energy Agency submits the following statement of need and reasonableness, to supplement the above.

The proposed amendments to the rules for energy conservation standards for existing residences were designed to be compatible with the standards which will be required by the federal Residential Conservation Services (RCS). The RCS program was mandated in the National Energy Conservation Policy Act of 1978 final rules were promulgated in November, 1979, and the program scheduled to be implemented in Minnesota no later than March 1, 1981.

The RCS program is a major federal program designed to provide detailed energy conservation information to homeowners about the specific energy use characteristics of their homes, and the cost-effectiveness of a variety of conservation measures. The program requires all publicly regulated electric utilities with annual sales in excess of 750 million kilowatt-hours and gas utilities with annual sales in excess of 10 billion cubic feet of

natural gas to provide on-site energy audits to any residential customer who requests one in the utility's service area. Over 80 percent of the households in Minnesota are served by covered utilities. The program is thus mandatory upon covered utilities, but voluntary on the part of homeowners who may elect either to have an audit or not to have one. Recent state legislation (Minnesota Laws 1980 H.F. 1710 amending MS 216B-165) limits to ten dollars the amount which a utility may charge directly to a homeowner for an RCS audit.

While the RCS program is federally mandated, each state has the authority to develop plans for implementing the federal program. The Minnesota Energy Agency has been designated as the lead agency in the development of the Minnesota RCS plan. The plan has been developed and submitted to the U.S. Department of Energy (DOE) for its approval. The plan will also be submitted to the Office of Hearing Examiners under the Administrative Procedures Act.

Planning for the RCS program is restricted by federal rules. The Department of Energy has established 22 measures which must be included in audits under all state plans. States may include additional audit measures with DOE approval, but states are not allowed to eliminate any federally mandated audit measures. The 22 measures proposed as amendments to the rules for energy conservation in existing residences under the home disclosure program (2 MCAR Sec. 1.16205(C)(1-22)) are therefore identical to the measures contained in the Minnesota RCS plan.

These measures were developed after extensive testing and are included in the Residential Conservation Service Model Audit (U.S. Department of Energy, February 1980). The Model Audit contains the measures and procedures for calculating energy savings related to each measure. The Minnesota RCS plan and the calculation procedures included in the plan are based upon the Model Audit. Research into the development of these standards and methods was conducted by the Oak Ridge National Laboratory, Oak Ridge, Tennessee; the Solar Energy Research Institute, Golden, Colorado; and the Rocky Flats Wind Energy Program operated by Rockwell International among others.

The RCS program will be a major element in the Federal residential conservation effort. Pending federal legislation will require all homeowners seeking federal financial assistance for conservation to obtain an RCS audit in order to be eligible for such assistance. Because the federal RCS program will require all covered utilities in Minnesota to offer on-site energy audits to residential customers on request and because Minnesota Statutes 116H.129 (1978) require sellers to provide buyers with an energy disclosure report (unless otherwise waived by the buyer), the Building Codes Division and its Energy Conservation Standards Subcommittee was faced with the choice of either developing its own state disclosure evaluation or adopting the audit measures required under the RCS program. After extensive consultation with the Energy Agency and members of the Energy Conservation Standards Subcommittee, the Building Codes Division has decided to amend the Energy Conservation Standards for existing residences to make all standards applicable to the Energy Conservation Disclosure Program identical with the standards included in the RCS program. This decision was made for the following reasons: first, had the Division decided not to adopt the RCS standards with respect to the home energy disclosure program, homeowners would be faced with the possibility of having to obtain two different audits in order to either sell their homes or to obtain federal energy conservation assistance. This duplication of audits appeared to be unnecessary and unreasonable.

Second, the development of a separate set of standards for the state disclosure program would require the development of a significantly different delivery system for energy disclosure evaluations than the delivery system for the RCS program. Under the RCS program, auditors must either be employees of the utility or under contract with the utility. Such auditors are prohibited by federal regulation from conducting audits which do not conform to the RCS plan. RCS auditors would in essence be precluded from providing audits in conjunction with the state disclosure program.

Third, state law limits the direct costs of an RCS audit to ten dollars. The remaining costs of the RCS audit (which may actually range up to $100) are to be included in the utility's rate base. There is no cost limit associated with the home energy disclosure program, a certified evaluator would be required to charge the homeowner the full price of the audit at the time of sale while a person receiving an RCS audit would only be required to pay ten dollars. This appeared to be an unreasonable inequity.

Fourth, by choosing to adopt the standards and calculation procedures included in the RCS plan, the Building Codes Division has eliminated the need for a duplicative delivery system, has reduced the inequities which arise with respect to the cost of an RCS audit versus a separate Home Energy Disclosure Evaluation, and has made it possible for buyers who purchase homes which have been audited under the RCS standards to qualify for future federal conservation programs.

Finally, although the RCS standards are more numerous than the eight standards initially promulgated with respect to the Home Energy Disclosure Program, the standards are merely advisory. An evaluation based upon the 22 RCS measures will provide detailed cost effectiveness information to homeowners and buyers. Buyers will be able to determine which conservation measures will pay back within a ten year period and which ones will not be as cost effective. In order to develop standards consistent with the RCS measures, it was necessary to establish separate standards to apply to existing residential rental buildings described in Minnesota Statutes 116H.129 Subd. 3. Separate standards for rental buildings were determined to be necessary and reasonable for several reasons. First, the RCS program is restricted to buildings containing four or fewer units. The measures developed under the RCS program are thus generally applicable to small residential structures. The rental housing stock in Minnesota is comprised of many large multi-unit buildings which may require significantly different conservation measures than those included in the RCS model audit. It did not appear reasonable to apply all 22 measures to many rental buildings.

Second, the Home Energy Disclosure Program requires a homeowner to have his or her home evaluated by a certified evaluator. The portion of the statute which establishes standards for rental units is silent with respect to the need for a formal energy audit or evaluation in rental housing. Since no energy audit is required as a provision of the rules pertaining to rental buildings, it would be unreasonable to require building owners to attempt to determine which measures are applicable to their buildings and which measures can be expected to be economically feasible within a ten year period.

Finally, while the measures included in the Home Energy Disclosure Program are advisory and may even be waived by the buyer, the measures for rental units are mandatory and must be implemented by specific dates included in the statute. Because of the mandatory nature of these rental standards, it

is reasonable to include only those measures which will result in significant energy savings and will virtually always pay back within ten years. The original eight standards (1 MCAR Sec. 1.16205(B)(1-8)) pertaining to rental units have thus been retained with only minor modifications to reflect the extension of the payback period from five years to ten years. Two additional standards (2 MCAR Sec. 1.16205(b)(9-10)) are included because they are both contained within the RCS standards and have been demonstrated to be very cost-effective.

2 MCAR Sec. 1.16207. General Energy Savings Equation. Equation A has been modified slightly to increase its accuracy and to make it easier to use. The seasonal efficiency will be used for the variable N in the denominater instead of full load efficiency. Seasonal efficiency will be estimated using Tables C3-1 and C3-2 attached. As can be seen from Table C3-2, two heating systems with the same steady state efficiency can have significantly different seasonal efficiencies. This is because seasonal efficiency consider energy lost up the chimney when the furnace is off, while steady state efficiency (or full load efficiency) does not. Equation A will now take this into account. The constant 21.7 in the numerator has been reduced to 14.4 because of the removal of a part-load correction factor of 1.51. 21.7 - 1.51 = 14.4. This part load correction is not needed when seasonal efficiency is used instead of full load efficiency.

Efficiency Standards B9 and C16 - Clock Thermostats.

Reducing temperatures in residences during the night and unoccupied periods is one method to reduce heating costs. Clock thermostats do this automatically and eliminate the disadvantage of having to get up or come home to a cold house. This encourages people to reduce temperatures more often and to a greater extent then they otherwise would.

Calculations of energy savings shall be based on equation 9.

Savings estimated by equation #9 are recommended by DOE for their RCS program audit. These estimates were based on the findings of references 6, 8, 9 and 10.

Example - Equation #9.

A natural gas heated home that consumes 147 million Btu per year for space heating will save about 15 million Btu per year by installing a clock thermostat and setting it back 10 degrees F for one eight hour period each night. A clock thermostat can be purchased for $40.00 to $100.00.

$$\Delta E = .10 \times 147 \text{ million Btu} = 14.7 \text{ million Btu.}$$

$$T = \frac{C}{(P)\ (\Delta E)}$$

$C = \$75.00$
$P = \$2.65$ mcf
$E = 14.7$ mcf

$$T = \frac{\$75}{(2.65)\ (14.7)} = 1.9 \text{ years}$$

Efficiency Standards B10 - Flow Restrictors for Showers.

Typical shower heads allow flow rates of 5 to 6 gallons per minute. Flow restricting shower heads are available that reduce flow to about 3 gallons per minute. The replacement of existing shower heads with flow restristing types is easy, inexpensive, and saves energy.

Calculations of energy savings shall be based on equation #10.

6100 x F is the number of pounds of water per year that a person uses if he/she takes a 2 minute shower every day.

$$2\ \frac{\text{min.}}{\text{day}} \times F\ \frac{\text{gal.}}{\text{min.}} \times 8.35\ \frac{\text{lb.}}{\text{gal.}} \times 365\ \frac{\text{days}}{\text{year}} = 6100 \times F\ \frac{\text{lb.}}{\text{year}}$$

6100 x $(F_1 - F_o)$ then represents the hot water savings in lbs. per year if the flow rate is reduced from F_1 to F_o and the shower is used 2 min. per day. Since it takes 1 Btu to raise 1 lb. of water 1 degree F, the numerator of equation #10 represents the number of Btu needed to raise the temperature of 6100 x $(F_1 - F_o)$ gallons of water from temperature T to 100 degrees F, the average shower temperature. N_r is in the denominator to calculate the amount of fuel energy needed to supply the necessary energy to the water. (For gas and oil fired water heaters it takes about 4 Btu of fuel to supply 3 Btu of heat to the water, so N_r is about .75. For N_r is close to 1.) The v in the denominator converts ΔE from Btu to units of fuel (ccf gas, gallons oil, or Kwh electricity).

Example - Equation #10.

A residence has a gas water heater with $N_r = .75$. F_1 is measured as 5 gal./min. and the average water supply temperature is estimated to be 50 degrees F. F_o is assumed to be 2 gal./min. for 2 min./day shower usage:

$$\Delta E = \frac{6100\ (5-2)\ (100^\circ - 50^\circ)}{(.75)\ (103{,}000\ \text{Btu/ccf})} = 12\ \text{ccf/yr.}$$

$$T = \frac{C}{P \times \Delta E}$$

$C = \$10$

$P = .265/\text{ccf}$

$\Delta E = 12\ \text{ccf}$

$$T = \frac{10}{3.18} = 3.1\ \text{years}$$

Efficiency Standard C3 - Furnace Efficiency Modifications.

Much research and development work has been done in the past few years on residential furnance and boiler efficiencies. Sophisticated computer programs have been developed that can accurately model the performance of residential heating systems under various operating conditions. (It is still very difficult to predict the actual performance of many systems when installed in a particular residence, due to the difficulty of measuring or estimating many of the variables necessary in modeling the interaction with the residence.) Many in site studies of residential heating system seasonal efficiencies have been done in Minnesota and throughout the United States.

There seems to be general agreement that a typical oil or gas-fired residential heating system in Minnesota has a seasonal efficiency of about 60%. Several furnaces and boilers are now available that have seasonal efficiences in the 80% to 90% range. It is clear that replacing a 60% efficient system with one that is 90% efficient will result in large energy savings.

Many existing oil-fired furnaces and boilers can be retrofitted with a new flame-retention type burner. This burner mixes fuel and air better than conventional burners. Combustion efficiency is improved because the better mixture requires less excess air for complete combustion. During the time when the burner is off, a flame retention burner allows less air to flow through the heat exchanger than a conventional burner. This reduces heat lost up the vent during the off-cycle and increases seasonal efficiency. Unless an oil-fired heating system already has an efficient burner or is a wet-base boiler, a large amount of fuel can be saved by installing a flame-retention burner.

When an atmospheric combustion gas-fired heating system is off, air continues to be drawn up the chimney. Some of this air enters at the combustion air inlet and passes though the heat exchanger, picking up heat on the way. The rest enters at the draft hood opening. If all this air has already been heated, much energy can be lost. Vent dampers can save about 60% of this wasted energy by closing off 90% of the vent area just downstream of the draft hood when the burner is off.

A typical pilot light in a gas heating system in Minnesota burns about 70 ccf of gas if left on all year. About 60 ccf is consumed when the main burner is off and provides little, if any, heat to the residence. This 60 ccf can be saved by the installation of an electronic iginition system which allows the pilot to burn only when the main burner is on. About half of the 60 ccf could be saved if the pilot is turned off in the summer. Turning the pilot off in the summer (either manually or with a electronic ignition device) may also lengthen the life of the heat exchanger by reducing the amount of moisture than can condense there.

Savings estimate for furnace efficiency modifications a., b., and c. are directly proportional to the amount of fuel used for heating. If other conservation measures are taken that significantly reduce fuel use, savings from the recommended furnace efficiency modifications will also be reduced. If a replacement heating system is planned, it should be sized to meet the demands of the residence after other conservation measures have been taken. This may allow a smaller, less expensive heating system to be used. These facts will be explained in the audit workbook and discussed in the auditor training program.

a.) Replacement heating system. Calculations of energy savings, Δ E, shall be based on the following equation.

Equation #11:

$$\Delta E = E_h \left(1 - \frac{N_o}{N_1}\right)$$

Where:

E_h = The total annual energy used for space heating, in units of fuel.

N_o = The seasonal operating efficiency of the existing heating system.

N_1 = The seasonal operating efficiency of the proposed heating sytem.

The present heating system consumer E_h units of energy per year, but only $N_o \times E_h$ units of energy are actually used to heat the residence, the rest being lost up the chimney. Another heating system, with seasonal efficiency N_1, will consume $N_o \times E_h$ units of energy to provide the same $N_o \times E_h$ units of energy to N_1 the residence. The difference between the amounts of energy consumed by the two systems is ΔE and is found from equation #11.

The auditor will estimate E_h from utility bills for the past heating season, if available. If the past heating season had more or fewer degree days than an average heating season, a correction will be made so the estimate of E_h will be for an average season. If utility bills are not available, E_h will be estimated from a heat load calculation performed by the auditor. Instructions for the heat load calculation will be in the audit workbook and discussed in auditor training workshops.

To determine the heating system's seasonal efficiency, the auditor will first determine the steady-state efficiency. The steady-state efficiency shall be determined by performing a flue gas analysis, obtaining a copy of a flue gas analysis performed by a qualified technician within the last 2 years, or using Table C3-1. Table C3-2 will than be used to find the system's seasonal efficiency. Savings will be calculated for one or more systems with seasonal efficiencies of at least 80%.

TABLE C3-1

DEFAULT

STEADY-STATE EFFICIENCIES

GAS-FIRED EQUIPMENT	
BOILERS	80%
DUCT FURNACE	80%
CENTRAL FURNACE (INDOOR INSTALLATION)	80%
CENTRAL FURNACE (OUTDOOR INSTALLATION)	75%
DIRECT VENT WALL FURNACE	75%
VENTED WALL FURNACE	70%
VENTED ROOM HEATER	70%

OIL-FIRED EQUIPMENT	CONVENTIONAL BURNER	IMPROVED BURNER
BOILER - DRY BASE	70%	75%
BOILER - WET BASE	80%	81%
CENTRAL FURNACE	73%	85%
FLOOR FURNACE	72%	75%
WALL FURNACE	72%	75%

Prepared by Oak Ridge National Laboratory for DOE's Residential Conservation Service audit.

TABLE C3-2

SEASONAL HEATING SYSTEM EFFICIENCIES

TYPE I: OIL-FIRED FURNACE/BOILER
GAS-FIRED FURNACE/BOILER WITH VENT DAMPERS AND INTERMITTENT IGNITION DEVICE

TYPE II: GAS-FIRED FURNACE/BOILER WITH VENT DAMPER AND PILOT LIGHT

TYPE III: GAS-FIRED FURNACE/BOILER WITH AN INTERMITTENT IGNITION DEVICE AND NO VENT DAMPER

TYPE IV: GAS-FIRED FURNACE/BOILER WITH PILOT LIGHT AND NO VENT DAMPER

HUD/MPS REGIONS 3, 4, 5, 6, 7, 8
HEATING DEGREE DAYS >2500

STEADY STATE EFFICIENCY	SEASONAL EFFICIENCY (%) TYPE I	II	III	IV
65	59	56	52	49
70	63	60	56	53
72	65	62	58	55
75	68	65	60	57
80	72	69	64	61
82	74	71	66	62
85	77	74	68	65
90	82	78	72	68

Prepared by Oak Ridge National Laboratory for DOE's Residential Conservation Service Audit.

Example - Equation #11.

The average single-family dwelling in Minnesota, consumes about 147 million Btu of heating fuel per year. If a home that consumes this average amount of fuel has a gas-fired central furnace with pilot and without a vent damper, the seasonal efficiency will be estimated at 61%. Savings will be estimated for a furnace with a seasonal efficiency of 80%.

$$\Delta E = 147 \text{ M Btu } \left(1 - \frac{.61}{.80} \right) = 34.9 \text{ M Btu}$$

b.) Efficient replacement burner for oil-fired heating systems.

Calculations of energy savings, ΔE, shall be based on the following equations.

Equation #11b:

$$\Delta E = .10\ E_h \qquad \text{(low estimate)}$$

$$\Delta E = .18\ E_h \qquad \text{(high estimate)}$$

Where:

E_h = The total annual energy (oil) used for space heating, in units of fuel (gallons of oil).

The auditor will estimate E_h as discussed under a.), above, for replacement heating systems. Savings estimates will not be made if the heating system already has a retention head burner, rotary cup burner, or if it is a wet base boilers, since savings would be very low or zero for these systems.

The 10% to 18% energy savings estimated by equation #11 is recommended by DOE for the RCS program audit. This range of savings is an average of the findings from references .

Example - equation #11.

An average Minnesota home that consumes 147 million Btu of fuel per year for heating will use about 1000 gallons of oil. Using E_h = 1000 gallons, we find from equation #11 that ΔE will be estimated between 100 and 180 gallons of fuel oil.

c.) Vent Damper

Calculations of energy savings, ΔE, shall be based on the following equations.

Equation #11c.

$$\Delta E = .07\ E_h \qquad \text{(low estimate)}$$

$$\Delta E = .10\ E_h \qquad \text{(high estimate)}$$

Where:

E_h = The total annual energy used for space heating, in units of fuel.

The auditor will estimate E_h as discussed under a.), above, for replacement heating systems. The 7% to 10% savings estimated by equation #11c is recommended by DOE for the RCS program audit. This range of savings is an average of the findings from references. The actual savings a homeowner will realize from the installation of a vent damper is very difficult to predict. Some of the variables that effect savings are: the height and diameter of the chimney liner, the length and diameter of vent connector pipes, the number of elbows in the vent connector, the amount the furnace is oversized, the mass of the heat exchanger, the temperature of the air used for combustion and dilution, how tightly the damper closes, how quickly the damper closes and whether or not a water heater is vented into the same vent as the furnace. The auditor workbook and auditor training course will discuss the dependence of savings on these variables and the auditor may estimate that savings are likly to be on the high or low end of the 7% to 10% range.

Example - equation #11c.

A two story home with a gas-fired boiler in the basement has an annual gas usage for heating of 1400 ccf. The basement temperature is estimated to be 65 degrees F due to the presence of a family room. From equation #11:

$$\Delta E = .07 \times 1400 \text{ ccf} = 98 \text{ ccf} \qquad \text{(low estimate)}$$

$$\Delta E = .10 \times 1400 \text{ ccf} = 140 \text{ ccf} \qquad \text{(high estimate).}$$

Due to the presence of a high chimney, a heated basement, and a heat exchanger with high thermal mass, the auditor may estimate $\Delta E = 140$ ccf.

d.) Electronic ignition for natural gas fired forced air furnaces.

Calculations of energy savings, ΔE, shall be based on the following equation.

Equation #11d.

$$\Delta E = \frac{3600\ F_p}{V}$$ if pilot is turned off for 5 months each summer.

$$\Delta E = \frac{7300\ F_p}{V}$$ if pilot is left on in the summer.

Where:

F_p = Rate at which pilot uses energy, in Btu/hr.

V = Heating value of fuel.

If the pilot is left on in the summer, the pilot will be on for approximately 7300 hours when the main burner is off. Turning the pilot off for 5 months reduces this value to about 3600 hours. The auditor will inspect the pilot light and estimate the pilot rate from the size of the flame and calculate E for the two cases. The audit workbook will discuss the benefits of turning off the pilot in the summer. This should not be done if it will require a service call to relight it in the fall. If the furnace ever needs a new main gas valve, installation of an electronic iginition device should be considered at that time (if not already done) since a significant part of the cost of installing such a device is the cost of replacing the main gas valve.

Example-equation #11d.

For a natural gas fired forced air heating system with an 800 btu/hr. standing pilot.

$$\Delta E = \frac{3600 \times 800}{103{,}000} = 28 \text{ ccf}$$ if pilot is turned off each summer.

$$\Delta E = \frac{7300 \times 800}{103{,}000} = 57 \text{ ccf}$$ if pilot is left on in the summer.

Efficiency standard C4 - Replacement central air conditioner.

A typical central air conditioner that is more than 8 years old has a seasonal efficiency of about 190%. New central air conditioners have seasonal efficiencies as high as 300% and can save considerable amounts of energy when installed in place of older, less efficient systems. Because air conditioning loads are generally quite small for Minnesota residences, payback periods for replacing a central air conditioner are usually, but not always, quite long. Information provided to the homeowner about air conditioner efficiency will be useful if the present system ever needs replacing. The importance of maintenance and thermostat setting will also be explained in the audit workbook.

Calculations of energy savings shall be based on the following equation.

Equation #12

$$\Delta E = E_c \left(1 - \frac{PSE}{NSE} \right)$$

Where:

E_c = Annual energy used by existing central air conditioner, in units of fuel.

PSE = Present seasonal efficiency.

NSE = New seasonal efficiency.

The auditor will estimate E_c from utility bills. He will then determine the conditioner's energy efficiency ratio, or EER, by dividing the cooling capacity by the total wattage rating of the compressor and fan motors. If there values can't be found, the default values in Table C4-1 will be used. Table C4-2 is then used to find the seasonal efficiencies of the present and proposed new conditioners and the calculation is completed.

TABLE C4-1

DEFAULT
EER VALUES FOR ELECTRIC
CENTRAL AIR CONDITIONERS

AGE OF EQUIPMENT (YEARS)	EER
NEW	7.2
0-2	6.8
2-8	6.5
8	6.1

TABLE C4-2
SEASONAL EFFICIENCIES
FOR ELECTRIC*
AIR CONDITIONES

EER	SEER	SEASONAL EFFICIENCY (%)
4.0	4.8	140
4.5	5.2	150
5.0	5.7	170
5.5	6.1	180
6.0	6.5	190
6.5	7.0	200
7.0	7.4	220
7.5	7.9	230
8.0	8.3	240
8.5	8.8	260
9.0	9.2	270
9.5	9.6	280
10.0	10.1	300
10.5	10.5	310
11.0	11.0	320

* FOR GAS AIR CONDITIONERS, ASSUME A SEASONAL EFFICIENCY OF 40%.

From DOE's Residential Conservation Service Audit.

Example - equation #12.

A large residence that is exposed to the sun all day has a 47,000 Btu/hr. central air conditioner with an EER of 6.0. It is determined from the electric bills that the air conditioner consumes about 4000 kwh per year. ΔE is calculated for a new conditioner with an EER of 10.5 PSE = 190% and NSE = 310% from Table C4-2.

$$\Delta E = 4000 \text{ kwh } (1 - \frac{190}{310}) = 1550 \text{ kwh.}$$

Cost = $1800

Payback calculation

T = Payback in years
P = $0.047/kwh

$$T = \frac{C}{P \times E} \qquad \frac{\$ \ 1800.00}{\$ \ 72.85} = 24.7 \text{ years}$$

Efficiency Standard C10 - Duct Insulation

Uninsulated ducts passing thru unconditioned crawl spaces or attics waste large amounts of energy that can be economically saved by installing duct insulation.

Calculations of energy savings shall be based on the following equation.

Equation #13.

$$\Delta E = \frac{\left(\frac{1}{R_o} - \frac{1}{R_1}\right)(T_2 - T_1) \times A \times HRS}{N \times V}$$

Where:

R_o = The R-value of duct before improvement.

R_1 = The R-value of duct after improvement.

T_2 = Average temperature of air inside duct during an on cycle of the furnace.

T_1 = Average air temperature of unconditioned space the ducts pass thru.

A = Duct area for which insulation is proposed.

HRS = Number of hours the heating system operates per year.

N = The seasonal efficiency of the furnace.

V = The heating value of the fuel, in Btu per unit of fuel.

For a material with thermal resistance R and area A, $\frac{1}{R} \times (T_2 - T_1) \times A \times HRS$ is the amount of heat, in Btu's tha conducts thru the material in HRS hours if the temperature of one side is T_2 and the other side is T_1. The numerator of equation 13 thus represents the difference in heat conducted thru the duct before and after improvement, in Btu. This amount is divided by the seasonal efficiency of the furnace to calculate how much fuel is saved. The V in the denominator converts the amount of fuel used from Btu to units of fuel. Tables or graphs will be developed to simplify calculations.

Example - equation #13.

Two 10 foot sections of uninsulated 3" x 12" hot air ducts are found to run thru an uninsulated crawl space. The supply air temperature is estimated to be 140 degrees F and the crawl space temperature is estimated at 40 degrees F. The present R-value of the duct and its surrounding air film is about 1. The installation of R-11 fiberglass batt is recommended so that R. = 12. A properly sized heating system operates about 1500 hours in Minnesota and this value is used for HRS. The furnace is natural gas with an estimated seasonal efficiency of .60 . V for natural gas is 103,000 Btu/ccf.

$$\Delta E = \frac{\left(\frac{1}{1} - \frac{1}{12}\right)\ (140 - 40)\ (2\tfrac{1}{2}\text{ ft. x } 20\text{ ft.})\ (1500)}{(.6)\ (103{,}000)}$$

ΔE = 111 ccf

T = Payback period in years

C = $7.50 / 50 sq. ft. of R-11 Fiberglass

P = $.263 / ccf Natural Gas

E = 111. ccf

$$T = \frac{C\ C}{(P)\ (\Delta E)} = \frac{7.5}{(.263)\ (111.)} = .3 = 4 \text{ months}$$

Efficiency Standard C11 - Pipe Insulation.

Much energy is lost if hot water in heating pipes passing thru unconditioned spaces are not insulated. Insulating these pipes with 1" pipe insulation is an inexpensive way to save most of the energy that would have been lost.

Calculations of energy savings shall be based on the following equation.

Equation #14

$$\Delta E = \frac{(Q_1 - Q_2) \times L \times HRS}{N \times V}$$

Where:

Q_1 = Heat loss in Btu/hr./ft. before improvement (from graph).

Q_o = Heat loss in Btu/hr./ft. after improvement (from graph).

L = The length of uninsulated pipes in the unconditioned space.

HRS = The number of hours the heating system operates per year.

N = The seasonal efficiency of the heating system.

V = The heating value of the fuel, in Btu per unit of fuel.

This equation is essentially the same as equation #13, except that heat loss per foot is determined directly from graphs C11-1 and 2.

Example - equation 14.

20 feet of 1 1/2" insulated hot water heating pipe pass thru an uninsulated crawl space. The temperature of the water is estimated at 140 degrees and the temperature of the crawl space at 40 degrees so that T = 100 degrees. HRS is estimated at 1500 hours. The boiler is a natural gas fired boiler with estimated seasonal efficiency, from tables C3-1 and 2, of .72. V = 103,000 Btu/ccf.

From graph C11-1 we find Q_1, is about 135 Btu/hr./ft. and Q_o is about 15 Btu/hr./ft., for 1" of insulation.

$$\Delta E = \frac{(135 - 15) \times 20 \times 1500}{(.72)\ (103{,}000)} = 50 \text{ ccf}$$

Efficiency Standard C12 - Water Heater Insulation.

Almost all gas or oil-fired water heaters that are not designated energy saving models on their labels only have about 1" of fiberglass insulation. Most electric water heaters have about 2" of fiberglass (R-6) or the equivalent. The installation of a water heater insulation jacket on a gas or oil water heater must be done properly to avoid possibly dangerous conditions. The jacket must not be allowed to cover the drafter diverter or the air intake. It must be fastened securely so that if cannot move around and block either the draft diverter or air intakes even if accidentally bumped. The temperature control unit must also be left uncovered and the heater pressure relief valve, must not be obstructed. It is easy to install a water heater jacket safely if instructions are available. Manufactured water heater jackets come with adequate instructions and instructions will be included in the audit workbook.

Calculations of energy savings shall be based on number 15 equation.

The derivation of equation #15 is the same as for equation #14 and will not be discussed here. 8760 is the number of hours in a year. When the water heater is in a conditioned space, heat lost during the heating season is assumed to all contribute to space heating, and only heat lost during the non heating season is considered. This is done by multiplying by H_{65} instead of 8760. H_{65} is about 2000 hours in Minnesota. No savings in air conditioning costs will be considered. Tables will be prepared for the audit workbook to simplify calculations.

Example - Equation #15.

A 40 gallon gas water heater is in a basement (conditioned space). Water Temperature is kept at 140 degrees F because of a dishwater that requires 140 degrees F water to wash satisfactorily. A 1 1/2", R5 jacket is available to cover about 18 square feet for $18.

$$\Delta E = \frac{\left(\frac{1}{3} - \frac{1}{8}\right)(18)(140 - 70)(2000)}{(.75)\ (103{,}000 \text{ Btu/ccf})} = 6.8 \text{ ccf}$$

$$T = \frac{C}{P \times \triangle E}$$

$C = 18$

$P = .265$ ccf

$\triangle E = 6.8$ ccf

$$T = \frac{18}{(.265)(6.8)} = 10 \text{ years}$$

Stanard C-15 - Electric Load Management Devices

Electric Load Management Devices are used to minimize peak loads on an electrical system. Widespread use of these devices was the potential to reduce the need for future peaking plants. In order to encourage widespread use of electric load management devices, some utilities are in the process of developing time-of-day rate structures which will lower the cost of electricity during off-peak hours. Electric Load Managment Devices automatically reduce peak power usage within a residence or save off-peak energy for use thereby reducing peak energy demand and consequently during peak periods reducing electrical costs to consumers using such devices. Some utilities are in the process of installing load managment devices in homes in their systems. The standard acknowledges that load management devices are not currently available on all electric systems in Minnesota. The standard is therefore applicable only where electric utilities will make such devices available to customers on their system.

Efficiency Standard C-18 - Solar Domestic Hot Water Systems.

The calculation procedure combines many factors specific to the site where a solar domestic hot water system is to be installed, with general assumptions to estimate the size and energy savings of a solar system. In many aspects, the calcultion procedure resembles that which is required for a full scale performance analysis of a solar domestic hot water system.

Average solar irradiation available in the region is reduced by shading on the proposed site of the installation. Water heating energy requirements are estimated by the number of occupants in the building. Finally, average solar system performance data is used to calculate the required area of the collector. The installed cost of the system is based on the calculated area and average installed prices of solar equipment in the state. Savings from the solar system are then based on the value of the fuel replaced by the solar heat.

By using the site specific qualities of the installation in conjunction with generalized performance and cost data, the accuracy of the analysis is retained while making a fairly rapid calculation.

As an example, consider a family of four using electricity to presently heat their water. The family uses 80 gallons of hot water per day, which would require 17/M Btu in a year. The solar system may be designed to supply 70% of the energy required to heat their water for one year. This means the system will be providing approximately 12 M Btu per year. If their electricity costs 5.2¢ per Kwh, the heat energy delivered to their water heater would cost $15/M Btu. As 12 M Btu are supplied by the solar system, the first year savings would be approximately $180.

The total cost of this type of system would be approximately $3200. With a 40% federal tax credit and a 20% state tax credit, the net cost to the homeowner would be only $1280. About 60% of the initial cost of a system is required for system components, with the remainder going toward installation. Much of the labor cost may be avoided by homeowners who are able to install themselves.

$$T = \frac{\$1,280}{\$180} = 7.1 \text{ years to payback}$$

Efficiency Standard C-19 - Wind Energy Devices.

Wind energy systems are currently practical and cost-effective sources of energy in Minnesota. Wind power can be used to provide electricity for appliance loads in residential applications and to provide thermal energy for water heating and space heating applications.

The installation of commercially available Wind Energy Devices is often economically feasible when the device is sited at a location with an average constant wind speed of at least 11 miles per hour at a height of 30 feet above the ground, and when the investment in the wind system is combined with the currently available 60 percent federal tax credit for wind conversion devices up to a maximum of $20,000.

An example of an actual cost-effective installation appears below:

- A 10 kw capacity wind energy device is installed in a 14 mile-per-hour average wind area.
- The cost of the 10 kw Wind Energy Device installed is $13,000.
- The Wind Energy Device will produce 30,000 KWH of electricity annually which will be used in the following manner:

  20,000 Kwh/year for space heating
  5,000 Kwh/year for water heating
  5,000 Kwh/year for efficiency losses.

- 20,000 KWH produces 68 x 10^6 Btu for space heat.
- 765 gallons of fuel oil would be required to produce a equivalent amount of Btu's with a furnace which is 60 percent efficient.
- 765 gallons of fuel oil at $1.00/gallon equals $765 annually.
- 5,000 KWH of electricity for water heating costs .05¢/KWH or $250 annually.

- The Wind Energy Device thus saves $1,015/year in fuel costs.

- When $10,000 of the $13,000 capital cost of the Wind Energy Device is offset by a 60 percent tax credit the actual cost of the wind device is $7,000.

- The payback is thus $\frac{\$7,000}{\$1,015} = 6.9$ years

The particular application illustrated above thus is cost effective in that it will pay for itself in less than 10 years. There are currently over 100 known Wind Energy Device installations and between 12 and 15 dealers or installers in Minnesota of the industry is growing quite rapidly and Wind Energy Devices are readily available in most areas of the state.

While generally available in Minnesota Wind Energy Devices are not currently widely installed in the state for several reasons. First, consumers have been unaware of the potential economic feasibility of the devices and have not had them installed; second, consumers have been unaware of the tax credits available in conjunction with the installation of Wind Devices and finally, many residencies are located on lots which are too small to be practical for Wind Energy Devices installation at this time.

The Energy Conservation Standard (2 MCAR Sec. 1.16205 (C)(19)) which pertains to wind energy systems addresses these issues. It provides the buyer with factual, accurate estimates of the energy contribution and conservation potential of wind energy devices in particular residential applications. The audit will refer to commercially available wind energy equipment which can be installed by existing dealers and manufacturers. It will be based upon average constant wind speeds at the particular location where the Wind Energy Devices may be installed and it will thus allow the buyer to evaluate the feasibility of an investment in a Wind Energy Device as an alternative to conventional fuel sources. The standard will only be applied on those locations which are large enough to safely accomodate a Wind Energy Device and where wind speeds are sufficient to make the installation of a Wind Energy Device potentially feasible.

Specific audit procedures are being developed which will incorporate on-site observations and generalized data on wind availability. The U.S. Department of Energy is currently developing residential wind audit procedures which will be adopted for use in Minnesota. This Minnesota Wind Audit and siting manual is currently under development at the Minnesota Energy Agency.

Efficiency Standard C-20 - Replacement Solar Pool Heating.

The pool surface area and the area available for the installation of collectors is first calculated. The area of the proposed collector is based on the average performance of pool-heating collectors and adjusted for any wind shelter at the pool location. Standardized tables are used to project the pool heating load. The savings from the pool heater are calculated from the projected energy saved by the solar heating system and the cost of conventional fuel. Solar system costs are based on the collector area, plus additions of a rack if required to mount the collectors.

Swimming pool solar-heating systems are generally very cost effective when used to replace natural gas pool heaters.

Efficiency Standard C22 - Thermal Shades, Shutters, or Draperies.

More than 5 times as much energy escapes through each square foot of double pane window than through a square foot of insulated wall. Many new devices are available at reasonable costs that can greatly reduce window heat loss. Many other devices can be made by the homeowner to reduce these losses even more economically. The audit workbook will describe several of these devices and the effect they can have on residential heating bills.

Calculations of energy savings shall be based on equation #21.

For a surface of area A, the heat transmitted through it per degree is U x A. Therefore, equation #21 represents the difference in heat loss per degree before and after addition of the shutter, shade or draperies. When Δ H from equation #21 is substituted into equation A, the amount of energy saved per year can be calculated. If the device is in place only at night, the Δ E calculated above should be multiplied by .75, since about 75% of the degree days occur at night in Minnesota. It is important to allow sunshine in whenever possible, since more heat is gained from sunlight shining in a window than is lost due to heat being conducted and radiated out the window.

Example - Equation #21.

A house with a 63% efficient oil-fired boiler has double pane windows. The heating season averages 9000 degree days. An R-3.25 shade is available for \$3.75/ft^2. The shade will be assumed open during the day and closed at night. The house has single glazed prime windows and storm windows (R = 2) for each square foot of window:

$$\Delta H = \left(\frac{1}{2} - \frac{1}{5.25}\right) = .31$$

Substitute into equation A and multiply by .75 for night use only:

$$E = \frac{(.75)(.31)(9000)(14.4)}{(.63)(138{,}000 \text{ Btu/gal})} = .35 \text{ gal./ft}^2$$

$$T = \frac{C}{P \times E}$$

$$C = \frac{3.75}{(1.00)(.35)} = 10.7 \text{ years}$$

References used by DOE in determining savings for vent dampers, oil burner replacements, and clock thermostats.

(1) Batey, J. E., et al, "Direct Measurement of Overall efficiency and Annual Fuel Consumption of Residential Oil-Fired Boilers," BNL 50853, Brookhaven National Laboratory, January 1978.

(2) Bonne, U., et al, "Analysis of New England Oil Burner Data. Effect of Reducing Excess Firing Rate on Seasonal Efficiency," NBS-514736, August 1975, Honeywell Corporate Research Center, Bloomington, Minnesota.

(3) Boone, U., et al, "Control of Overall Thermal Efficiency of Combustion Heating Systems," 16th (International) Symposium on Combustion, MIT, Cambridge, Massachusetts, August 1976.

(4) Bonne, U., et al, "Dynamic Computer and Laboratory Simulations of Gas Fired Central Heating Systems," International Symposium on SIMULATION MODELING AND DECISION IN ENERGY SYSTEMS, sponsored by IASTED, Montreux, Switzerland, June 1979.

(5) Gable, G. K., Koenig K., "Seasonal Operating Performance of Gas Heating Systems with Certain Energy-Saving Features," ASHRAE Transactions 1977, Vol. 83, Part I.

(6) Koenig, K., "Gas Furnace Size Requirements for Residential Heating Using Thermostat Night Setback," ASHRAE TRANSACTIONS 1978, Vol. 84, Part 2.

(7) Memorandum to Mr. J. A. Smith at the Department of Energy from Dr. G. E. Kelly of the National Bureau of Standards entitiled "Technical Analysis of Public Hearing Testimony Regarding Proposed Energy Efficiency Improvement Targets for Furnaces," March 30, 1978.

(8) Nelson, L. W., "Energy Savings Through Thermostat Setback," ASHRAE JOURNAL, Sept. 1978.

(9) Nelson, L. W., "Reducing Fuel Consumption with Night Setback," ASHRAE JOURNAL, August 1973.

(10) Quentzel, D., "Night-Time Thermostat Setback: Fuel Savings in Residential Heating," ASHRAE JOURNAL, March 1976.

(11) Richardson, D. L., et al, "An Assessment of Retrofit Automatic Vent Dampers for Residential Heating Systems," TID-29340, Arthur D. Little, Inc., November 1977.

1,2,3, and 7 for oil burner replacement
3,4,5,7, and 11 for vent dampers
6,8,9, and 10 for clock thermostats.

Graph C 11 - 1

FIGURE 44: HEAT LOSS FOR VARIOUS PIPE SIZES, INSULATION THICKNESSES AND WATER TEMPERATURES

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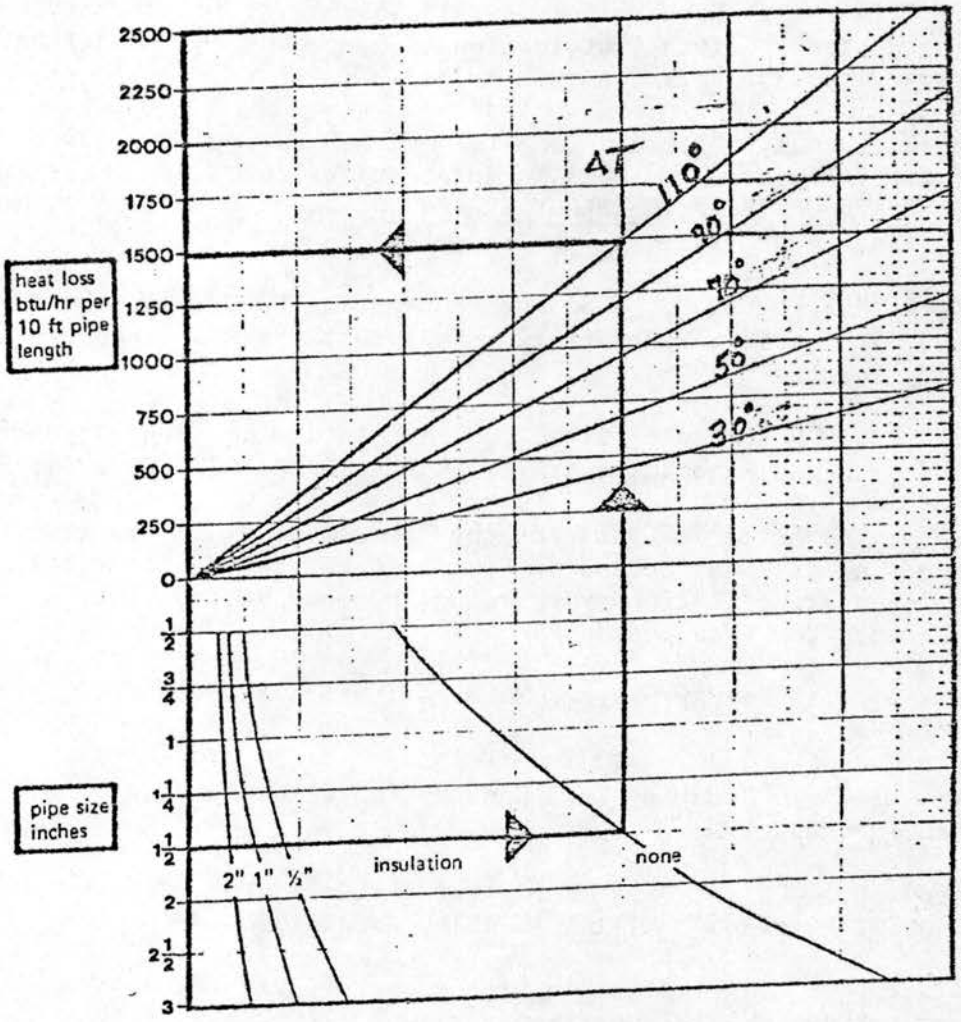
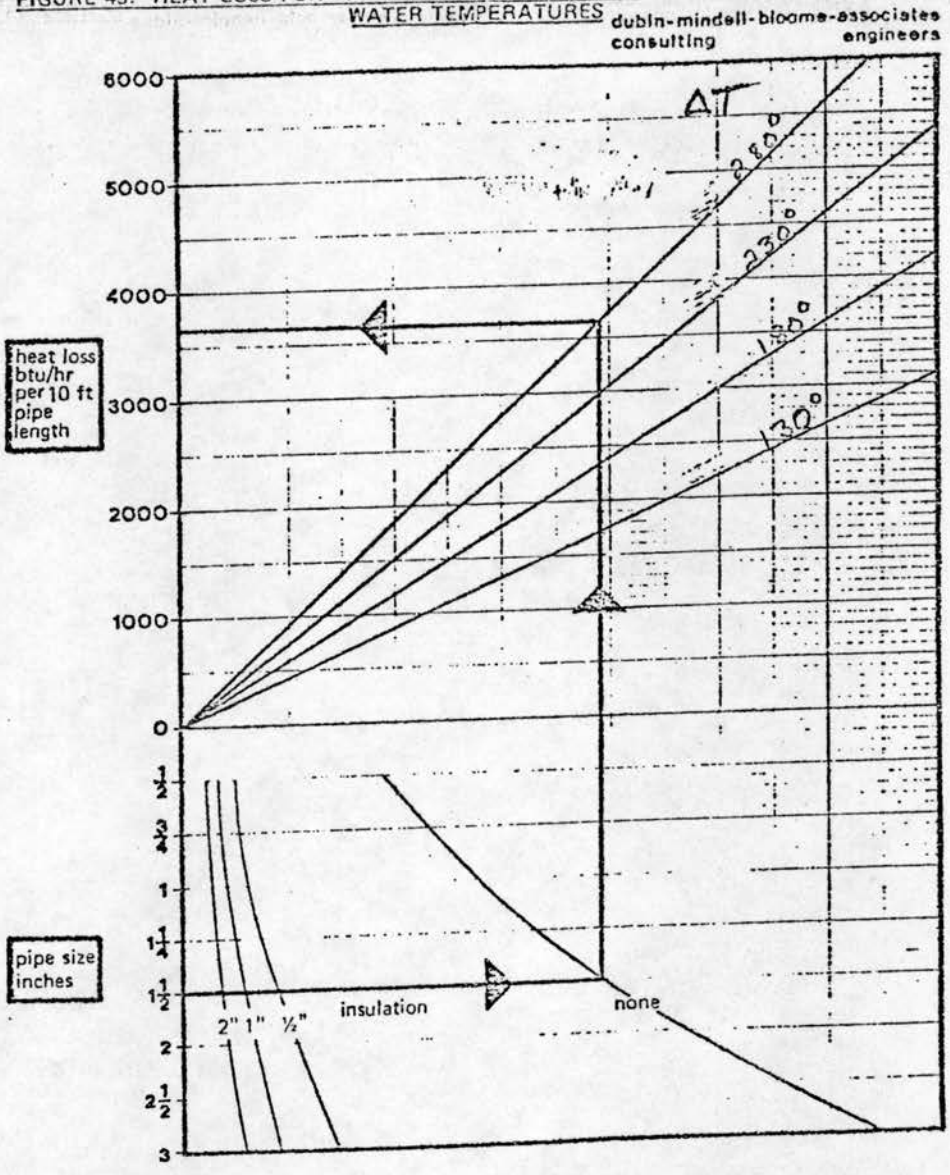


Graph C 11 - 2

FIGURE 45: HEAT LOSS FOR VARIOUS PIPE SIZES, INSULATION THICKNESSES AND WATER TEMPERATURES



STATE OF MINNESOTA
DEPARTMENT OF ADMINISTRATION

6-6-80
Date

James J. Hiniker, Jr.
Commissioner

STATE OF MINNESOTA

DEPARTMENT OF ADMINISTRATION

BUILDING CODE DIVISION

In the Matter of Proposed Amendments to the Rules for Energy Conservation Standards for Existing Residences

STATEMENT OF COMPLIANCE WITH RULEMAKING PROCEDURES

I, Special Assistant Attorney General Allen E. Giles, do hereby declare that I have examined the proposed rules and all related documents and that, based on them and my personal familiarity with the rulemaking procedures, the applicable rulemaking procedures have been followed.

Date: Jan 2, 1981

Allen E. Giles

ALLEN E. GILES

STATE OF MINNESOTA

DEPARTMENT OF ADMINISTRATION

SAINT PAUL

BUILDING CODE
DIVISION

408 METRO SQUARE
7TH AND ROBERT STS.
ST. PAUL, MN 55101

Phone: 612/296-4639

December 22, 1980

RE: IN THE MATTER OF PROPOSED AMENDMENTS TO ENERGY CONSERVATION STANDARDS FOR EXISTING RESIDENCES

To: All Interested Persons

Pursuant to your request and in accordance with Minnesota Statutes, Section 15.0412, subdivision 4 and Rule HE 102:

PLEASE TAKE NOTICE that the above-captioned rules have been submitted to the Attorney General's Office on December 22, 1980 for review as to form and legality. Pursuant to Rule ATTYGEN 305, any person may question the legality of the above-captioned rules within ten (10) days after receipt of the rule by the Attorney General. Thereafter, the Office of the Attorney General shall conduct its review. If you desire to question the legality of the above-captioned rules, you should direct your comments to the Attorney General's Office, G-25 State Administration Building, 50 Sherburne Avenue, St. Paul, Minnesota 55155.

If you are interested in determining what changes, if any, were made in the proposed rules after the hearing and before submission to the Attorney General you may contact:

Sivert Hendrickson
Building Codes & Standards Division
408 Metro Square Building
7th and Robert Streets
Saint Paul, Minnesota 55101

Norman R. Osterby

Norman R. Osterby
Director

NRO:p

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MINNESOTA CODE OF AGENCY RULES

DEPARTMENT OF ADMINISTRATION BUILDING CODE DIVISION

ENERGY CONSERVATION STANDARDS FOR EXISTING RESIDENCES

1978 Edition

Cite the Rule as:
(for example)

2 MCAR § 1.16201

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DEPARTMENT OF ADMINISTRATION

BUILDING CODE DIVISION

RULES FOR

ENERGY CONSERVATION STANDARDS
FOR EXISTING RESIDENCES

§ 1.16201 Authority. These rules are promulgated pursuant to Minn. Stat. § 116H.129 (1978).

§ 1.16202 Enforcement. The Minnesota Energy Agency shall conduct random inspections of certain renter occupied residences as provided in Minn. Stat. § 116H.129, subds. 3 and 4 (1978).

§ 1.16203 Purpose and scope. The purpose of these rules is to establish minimum energy efficiency standards for existing residences. Such standards shall be utilized in the energy disclosure program required by Minn. Stat. § 116H.129, subds. 5, 6, and 7 (1978), and shall be applicable to certain rental residences as provided in Minn. Stat. § 116H.129, subds. 3 and 4 (1978).

The scope of these standards addresses two areas of energy savings:

A. The reduction of air infiltration as it relates to air leakage through the exterior envelope.

CAUTION: When infiltration is reduced it may be necessary to provide combustion air by other means as provided for in the Minnesota State Building Code.

B. The improvement of the thermal efficiency of the structure as it relates to the transfer of heat through the exterior envelope.

The rules also contain the methods for calculating energy savings and determining the economic feasibility of each minimum energy efficiency standard for each residence.

§ 1.16204 Definitions.

A. Accessible. Shall mean exposed, without the removal of permanent parts of the structure.

B. Attic. The space between the ceiling joists and the rafters immediately above. The space between rafters formed where interior finish material is affixed directly to the rafters shall not be construed to be an attic space.

C. Conditioned space. Space enclosed within a building that is heated or cooled by an energy-using system.

D. Degree day. Shall mean degree day, heating. A unit, based upon temperature difference and time, used in estimating fuel consumption and specifying nominal heating load of a building in winter. For any one day, when the mean temperature is less than 65°F (18°C) there exist as many Degree Days as there are Fahrenheit (Celsius) degrees difference in temperature between the mean temperature for the day and 65°F (18°C).

E. Economic feasibility. For the purpose of these rules, the test of economic feasibility is met when the savings in energy procurement costs, based on residential energy costs as certified by the Minnesota Energy Agency director in the State Register, exceed the cost of acquiring and installing each energy conserving item required to meet the minimum energy conservation standards as set forth at 2 MCAR § 1.16205, amortized over the subsequent 5-year period.

F. Exterior envelope. The elements of a building which enclose conditioned spaces and through which thermal energy may be transferred to or from the exterior.

G. Fireplace stove. A chimney-connected, solid fuel-burning stove having part of its fire chamber open to the room.

H. Insulation. Any material or assembly of materials used primarily to provide resistance to heat flow in building structures, including but not limited to mineral fibrous, mineral cellular, organic fibrous, organic cellular, or reflective materials, whether in loose fill, flexible, or semi-rigid form.

I. Positive shut-off. A manual shut-off device which can be utilized to produce a seal to inhibit the flow of air when a fireplace or fireplace stove is not operating. i.e. damper in fireplace, damper at top of flue, damper in connector pipe, or doors (glass or other) on fireplace or fireplace stove.

J. "R" Value. The measure of resistance to heat flow through a material or the reciprocal of the heat flow through a material expressed in British thermal units per hour per square foot per degree Farenheit at 75 degrees Farenheit mean temperature.

K. Residence. Means any dwelling for habitation either seasonally, meaning all or a portion of the months of December through March, or permanently by one or more persons. A residence may be owned or rented and may be part of a multi-family dwelling or multi-purpose building, but shall not include buildings such as hotels, hospitals, motels, dormitories, sanitariums, nursing homes, schools and other buildings used for educational purposes, or correctional institutions. A mobile home as defined in Minn. Stat. § 168.011, subd. 8, shall be a residence for purposes of these Rules.

L. Rim joist. That portion of the exterior envelope between the top of the foundation wall and the sub-floor immediately above. The perimeter of the floor joists.

M. Single glazed. Windows with one sheet of glazing separating the conditioned space from the exterior. For the purposes of these rules non-conditioned enclosed porches, vestibules, or other appurtenances are considered the equivalent of one layer of glazing.

N. U-Value (U-Factor or U = Thermal Transmittance). The thermal transmission of heat in unit time through unit area of a particular body or assembly, including its boundary films divided by the difference between the environmental temperatures on either side of the body or assembly; Btu/ $(hr \cdot ft^2 \cdot F^o)$. Also the reciprocal of total R-Value.

O. Weatherstripping. Material permanently affixed to limit infiltration of air, usually made of metal, wood, felt, neoprene, expanded foam, or a combination thereof.

§ 1.16205 Minimum energy efficiency standards.

A. Where demonstrated to be economically feasible pursuant to 2 MCAR § 1.16206, 2 MCAR § 1.16207, and 2 MCAR § 1.16208 the following shall be standards for existing residences. Pursuant to Minn. Stat. § 116H.129, subds. 3 and 5 (1978) residential rental buildings built before January 1, 1976, which are not in compliance with these standards shall be modified to be in compliance within the economic feasibility defined in 2 MCAR § 1.16204 by January 1, 1980 with respect to caulking and weatherstripping and by July 1, 1983 with respect to all provisions herein. These standards shall also provide a basis for evaluation of residences at time of sale.

1. Install weatherstripping between exterior operable window sash and frames and between exterior doors and frames.

EXCEPTION: Weatherstripping not required on storm doors or storm windows.

2. Caulk, gasket or otherwise seal accessible exterior joints between foundation and rim joist, around window and door frames, between wall and roof, between wall panels, at penetrations for utility services through walls, floors, and roofs and all other openings in the exterior envelope.

3. Install positive shut-offs for all fireplaces or fireplace stoves.

4. Install insulation in accessible attics to achieve a minimum total "R.. value of 19.

5. Install insulation in all accessible rim joist areas to achieve a minimum total "R" value of 11.

6. Install insulation in accessible walls and/or floors enclosing conditioned spaces to achieve a minimum total "R" value of 11. Accessible walls shall include above-grade foundation walls of basements, cellars or crawl spaces.

7. Install storm windows on all single glazed exterior window units enclosing conditioned space.

8. Install storm doors on all exterior door openings into conditioned spaces unless a single door, enclosed porch, vestibule, or other appurtenance provides a double door effect or provides an "R" value of 2 or more.

§ 1.16206 Procedures for calculating energy savings and determining economic feasibility. The calculation of the energy savings and the determination of the economic feasibility for each of the minimum energy efficiency standards shall be computed in a manner specific to each residence, i.e., on a case by case basis. This determination shall be performed according to the following procedures.

A. Determine the values of the general energy savings equation (2 MCAR § 1.16207) which are specific to each residence. These values include degree days, heating system efficiency and the heating value of the fuel but do not include the design heat loss per degree Fahrenheit ($\triangle$H).

B. Calculate design heat per degree Fahrenheit ($\triangle$H) for the standard under consideration using the equations outlined in 2 MCAR § 1.16207 A. through 2 MCAR § 1.16207 H.

C. Calculate the quantity of annual energy savings for the standard under consideration by substituting the calculated value of $\triangle$ H into the general energy savings equation and solving for energy savings ($\triangle$E).

D. Determine the price per unit of energy (P) for the annual energy savings quantity.

E. Determine the cost of the energy saving improvement (C) proposed to meet the standard under consideration.

F. Calculate the payback period (T) for the standard under consideration by substituting the values of P, C and E into the general payback equation (2 MCAR § 1.16208) and solving for the payback period in years.

G. If the payback period is less than five years the energy saving improvement meets the economic feasibility requirement.

H. Repeat the above procedure for each of the energy efficiency standards.

§ 1.16207 General energy savings equations. The following equations shall be used to calculate energy savings for each of the eight energy efficiency standards.

Equation A*:

$$\triangle E = \triangle H \times \frac{D \times 21.7}{N \times V}$$

Where

ΔE = The quantity of annual energy savings in the appropriate energy units, e.g. hundreds of cubic feet of natural gas, gallons of fuel oil, or kilowatt hours of electricity.

ΔH = The difference in design heat loss per degree Fahrenheit between the improved condition and the existing condition for infiltration and/or thermal transmission. Equations for calculating ΔH are listed in subsequent subsections.

D = The normalized annual degree days as published by the National Oceanic and Atmospheric Administration (NOAA).

N = The rated full-load efficiency of the heating system.

V = The heating value of the fuel type, consistent with ΔE and ΔH.

*Equation (A) is derived from the ASHRAE Handbook, 1976 Systems, pp. 43.1 - 43.18.

A. Install window and door weatherstripping. The following equation shall be used to calculate ΔH for energy efficiency standard 1 (2 MCAR § 1.16205 A.).

Equation No. 1:

$$\Delta H = 1.08 \times (q_0 - q_1) \times L$$

Where

q_0 = The infiltration value in cubic feet per minute per lineal foot of crack, $\frac{CFM}{ft.}$, for the existing window or door weatherstripping condition before improvement;

q_1 = The infiltration value in cubic feet per minute per lineal foot of crack, $\frac{CFM}{ft.}$, for the proposed window or door weatherstripping condition after improvement;

L = The length of the crack in feet which is under consideration for weatherstripping.

B. Caulk, gasket or seal joints. The following equation shall be used to calculate ΔH for energy efficiency standard 2 (2 MCAR § 1.16205 A.).

Equation No. 2:

$$\Delta H = 1.08 \times (q_0 - q_1) \times L$$

Where

q_0 = The infiltration value in cubic feet per minute per lineal foot of crack, $\frac{CFM}{ft.}$, for the existing crack before improvement;

q_1 = The infiltration value in cubic feet per minute per lineal foot of crack, $\frac{CFM}{ft.}$, for the proposed crack seal after improvement;

L = The crack length in feet for the crack under consideration.

C. Install positive shut-offs. The following equation shall be used to calculate ΔH for energy efficiency standard 3 (2 MCAR § 1.16205 A.).

Equation No. 3:

$$\Delta H = 1.08 \times (q_0 - q_1) \times A$$

Where

q_0 = The infiltration value in cubic feet per minute per square foot, $\frac{CFM}{(ft)^2}$, for the existing condition before improvement;

q_1 = The infiltration value in cubic feet per minute per square foot, $\frac{CFM}{(ft)^2}$, for the proposed condition after improvement with a positive shut-off;

A = The cross sectional area of the flue or connector in square feet.

D. Install attic insulation. The following equation shall be used to calculate ΔH for energy efficiency standard 4 (2 MCAR § 1.16205 A.).

Equation No. 4:

$$\Delta H = \left(\frac{1}{R_0} - \frac{1}{R_1}\right) \times A$$

Where

R_0 = The total R-Value of the attic/ceiling/roof assembly including existing insulation before improvement;

R_1 = The total R-Value of the proposed attic/ceiling/roof assembly including existing insulation and additional insulation after improvement;

A = The area of the attic/ceiling/roof assembly in square feet separating conditioned space from unconditioned space.

E. Install rim joist insulation. The following equation shall be used to calculate ΔH for energy efficiency standard 5 (2 MCAR § 1.16205 A.).

Equation No. 5:

$$\Delta H = \left(\frac{1}{R_0} - \frac{1}{R_1}\right) \times A$$

Where

R_0 = The total R-Value of the rim joist assembly including existing insulation before improvement;

R_1 = The total R-Value of the rim joist assembly including existing and additional insulation after improvement;

A = The area of the rim joist assembly in square feet separating conditioned space from unconditioned space.

F. Install wall and/or floor insulation. The following equation shall be used to calculate ΔH for energy efficiency standard 6 (2 MCAR § 1.16205 § 1.16205 A.).

Equation No. 6:

$$\Delta H = \left(\frac{1}{R_0} - \frac{1}{R_1}\right) \times A$$

Where

R_0 = The total R-Value of the existing wall or floor assembly including existing insulation before improvement;

R_1 = The total R-Value of the proposed wall or floor assembly including existing and additional insulation after improvement;

A = The area of the wall or floor assembly in square feet separating conditioned space from unconditioned space.

G. Install storm windows. The following equation shall be used to calculate ΔH for energy efficiency standard 7 (2 MCAR § 1.16205 A.).

Equation No. 7:

$$\Delta H = (U_0 - U_1) \times A$$

Where

U_0 = The U-Value for the existing window assembly before improvement;

U_1 = The U-Value for the proposed window assembly after improvement.

A = The area of the window assembly in square feet separating conditioned space from exterior.

H. Install storm doors. The following equation shall be used to calculate $\triangle H$ for energy efficiency standard 8 (2 MCAR § 1.16205 A.).

Equation No. 8:

$$\triangle H = (U_0 - U_1) \times A$$

Where

U_0 = The U-Value for the existing door assembly before improvement;

U_1 = The U-Value for the proposed door assembly after improvement;

A = The area of the door assembly in square feet separating conditioned space from exterior.

§ 1.16208 General payback equation. The payback period in years shall be calculated by dividing the cost of the energy-saving improvement by the product of the price per unit of energy and the quantity of annual energy savings. The payback equation shall be:

Equation B:

$$T = \frac{C}{(P) \times (\triangle E)}$$

Where

T = payback period in years;

C = the total cost of purchasing and installing energy saving improvements minus applicable federal and/or state tax credits, grants or subsidies;

P = price per unit of energy, this unit being the same as the unit of annual energy savings, $\triangle E$. The appropriate values of P shall be those certified by the director of the Minnesota Energy Agency in the State Register, pursuant to Minn. Stat. § 116H.129, subd. 1 (1978);

E = the quantity of annual energy savings in the appropriate energy units, e.g., hundreds of cubic feet of natural gas, gallons of fuel oil, or kilowatt-hours of electricity, as calculated for each of the energy efficiency standards.