

Minnesota Attorney General: Administrative Rules Proceedings

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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).

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).

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.

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 cost, 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 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. 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. 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; $Btu/(hr \cdot ft^2 \cdot F^\circ)$. 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.

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.

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.

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. This determination shall be performed according to the following procedures.

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).

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.

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 five 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 eight energy efficiency standards.

Equation A*:

$$\Delta E = \Delta H \times \frac{D \times 21.7}{N \times V}$$

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 (2MCAR1.16205.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 ΔH 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 ΔH for energy efficiency standard 3 (2MCAR1.16205.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 ΔH for energy efficiency standard 4 (2MCAR1.16205.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 ΔH for energy efficiency standard 5 (2MCAR1.16205.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 ΔH for energy efficiency standard 6 (2MCAR1.16205.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. The following equation shall be used to calculate ΔH for energy efficiency standard 7 (2MCAR1.16205.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. The following equation shall be used to calculate ΔH for energy efficiency standard 8 (2MCAR1.16205.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:

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, ΔE. 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.

APPROVED AS TO FORM AND LEGALITY
FEB. 13 1979 19
WARREN SPANNAUS, ATTORNEY GENERAL
BY
SPECIAL ASSISTANT ATTORNEY GENERAL

STATE OF MINNESOTA
DEPARTMENT OF STATE
FILED
FEB 14 1979
Secretary of State
11:50 AM

#501- Building Code Div.

RULES REVIEW CHECKLIST

DATE RULES RECEIVED 1-19-79 Temporary Rule —

Resubmitted and Received 2-7

DUE DATE 2-8-79/2/16

a. Returned to Agency w/o filing w/Secy of State 2-6
b. Approved 2/5 Date Sent Back to Agency _____

- -

1. Rules as Adopted ✓
2. Rules as Proposed ✓
3. Certificate of Board's Authorizing Resolution, where applicable N.A.
4. Order for Hearing ✓
5. Notice of Hearing ✓
   (i) Sufficiency ✓
6. Secretary of State's List ✓
7. Certificate of Acquisition of Secretary of State's List ✓
8. Affidavit of Mailing ✓
   (i) At least 30 days prior to hearing ✓
9. Statement of Need and Evidence ✓
10. Hearing Examiner's Report ✓
11. Agency's Findings of Fact ✓
12. Certificate of Board's Resolution Adopting Rules, where applicable N.A.
13. Order Adopting ✓
14. Report of Chief Hearing Examiner ✓
    (i) Finding of No Substantial Change ✓
    (ii) Permission to Incorporate by Reference, where applicable N.A.
15. Certificate of Compliance with Rulemaking Procedures ✓
16. Copy of Notice of Intent to Solicit Outside Opinion, where applicable N.A.
17. Petition by Public, where applicable N.A.

BC 501

STATE OF MINNESOTA

DEPARTMENT OF ADMINISTRATION

BUILDING CODE DIVISION

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

FINDINGS OF FACT, AND CONCLUSIONS

The above-entitled matter came on for hearing before Hearing Examiner Natalie L. Gaull, of the State Hearing Examiners Office on the 8th day of November, 1978, after proper notice required by Minn. Stat. Section 15.0412 (1978) was served upon all persons, associations, 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, the Hearing Examiner has made his findings, attached hereto. Upon review of the Hearing Examiner's findings and the evidence and statements submitted by interested parties, I find the following:

The Report of the Hearing Examiner is hereby adopted as the findings of fact, conclusions and decision of the Department of Administration, Building Code Division except as noted below.

A. Hearing Examiner's Finding, Item 5 under Statutory Authority, Paragraph 3. The Agency accepts the Hearing Examiner's finding that the statutory mandate regarding inflation and interest was met in the proposed rules, but rejects the recommendation that inflation and interest should be stated somewhere within the rules.

B. Hearing Examiner's Finding, Item 7 under discussion of the rules as proposed. The Agency has revised the enforcement section as recommended to specify that random inspections only apply to certain rental residences in that those residences rented only during the months of May through October are exempt. The Agency finds this clarification essential.

C. Hearing Examiner's Finding, Item 9 under discussion of the rules as proposed. The agency rejects the Hearing Examiner's recommendation that the statute be paraphrased in further detail for the following reasons:

1. The agency finds that paraphrasing may be misleading and result in confusion.

2. The agency finds that a specific citation to a statute will make the rule <u>not</u> vague or misleading.

D. Hearing Examiner's Finding, Item 10 under discussion of the rules as proposed. The agency accepts the Hearing Examiner's recommendation regarding the definition of degree day and has modified the definition of degree day for clarification except that reference to celsius degrees has been retained to maintain uniformity with the definition in ASHRAE Standard 90-75.

E. Hearing Examiner's Finding, Item 10. The agency rejects the Hearing Examiner's recommendation to change the definition of residence. The definition expressly states that a part of a multi-family dwelling is construed to be a residence for application of the statute and these rules.

F. Hearing Examiner's Finding, Item 10. The agency finds that the definition of single glazed is clear. The second sentence was recommended for inclusion in the definition by lay persons on the committee which drafted these rules for clarity.

G. Hearing Examiner's Finding Item 11 under discussion of the rules as proposed.

1. Standard Number 1. The agency finds that it is not possible to include a standard for tightness of fit of weatherstripping in the minimal standards because of the statutory limitations and extreme complexity needed to accomplish this and because the agency finds that the phrase is commonly understood and no further definition is needed.

2. Standard Number 8. The agency finds this standard to be clear in intent and application.

H. The agency finds that use of the term "conditioned space" in the explanation of Equation #7 and Equation #8 of the rules is unclear and therefore misleading. The agency finds it reasonable to substitute the term "exterior" which is not a substantial change, since the term is contained within energy efficiency standards #7 and #8 as previously published.

STATE OF MINNESOTA
DEPARTMENT OF ADMINISTRATION

William G. Strusinski

William G. Strusinski
Acting Commissioner

STATE OF MINNESOTA

DEPARTMENT OF ADMINISTRATION

BUILDING CODE DIVISION

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

ORDER ADOPTING RULES

The above-entitled matter came on for hearing before Hearing Examiner Natalie L. Gaull, of the State Hearing Examiners Office on the 8th day of November, 1978, after proper notice required by Minn. Stat. Section 15.0412 (1978) was served upon all persons, associations, 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 considered all the evidence adduced and upon the records, files and proceedings herein, and applicable statutory standards or criteria, and having considered the Findings of Fact and Recommendations of the Hearing Examiner,

NOW, THEREFORE, IT IS ORDERED, that these rules identified as the Rules for Energy Conservation Standards for Existing Residences, and as amended as set forth in the findings of fact and conclusions attached herewith, are adopted the 29th day of December, 1978, pursuant to the authority vested in me by Minn. Stats. 16.86 (1978).

STATE OF MINNESOTA
DEPARTMENT OF ADMINISTRATION

William G. Strusinski

William G. Strusinski
Acting Commissioner

STATE OF MINNESOTA
OFFICE OF HEARING EXAMINERS

FOR THE DEPARTMENT OF ADMINISTRATION
BUILDING CODE DIVISION

In the Matter of the Proposed Adoption of Rules of the Department of Administration Governing Energy Conservation Standards for Existing Residences.

REPORT OF HEARING EXAMINER

The above-entitled matter came on for hearing before Natalie L. Gaull, duly appointed as Hearing Examiner, on November 8, 1978, in Room 83, State Office Building, Saint Paul, Minnesota 55155, at 9:30 a.m.

This proceeding is a rules hearing held pursuant to Minn. Stat. Ch. 15, to determine whether the proposed rules should be adopted. Copies of this Report are available for review from the Department of Administration and from the Office of Hearing Examiners.

Members of the agency panel included: Sheila Fishman, Special Assistant Attorney General; Don Pates, Director of the Building Code Division of the Department of Administration (hereinafter "the Department"); Sivert Hendrickson, Section Chief of the Department; John Armstrong, Assistant Director, Minnesota Energy Agency (hereinafter "the Agency"); Robert Gish, Building Technical Services Manager, the Agency; Jesus Dumagen, Economic Analyst, the Agency; and Lynn Olsson, Energy Audit Program Coordinator, the Agency.

Thirty-six persons were present at the hearing and signed the register. These included 15 persons who were agency personnel, members of the subcommittee which drafted the rules, or members of the panel. Three members of the public spoke at the hearing. Five written comments were received by the Examiner subsequent to the issuance of the Order for Hearing and prior to the close of the record on November 22, 1978. There was no comment as to any rule unless otherwise noted in this Report.

Pursuant to Minn. Stat. Sec. 15.0412, subd. 4, this Report shall be available for review to all affected individuals upon request for at least five days.

The Department shall, if it proposes to adopt the rules as originally proposed or amended, submit the complete hearing record, including its Findings and Order, to the Chief Hearing Examiner no earlier than five days subsequent to the receipt of this Report. This submission shall clearly indicate any changes made to the rules as originally proposed, preferably in the format that will be submitted to the State Register for publication. The Chief Hearing Examiner shall complete his review and submit his report to the Department on the issues of substantial changes in the rule and compliance with Minn. Stat. Sec. 15.0412 within ten calendar days. Thereafter, the Department shall be responsible for filing the rules with the Attorney General and for notifying persons who have indicated that they wish to be notified of such filing.

Based upon all the testimony, exhibits and written comments, the Hearing Examiner makes the following:

FINDINGS OF FACT

1. On October 13, 1978, the Department filed the following documents with the Chief Hearing Examiner:

(a) Order for Hearing;
(b) Notice of Hearing as mailed;
(c) Certificate of Delivery of Secretary of State's list;
(d) Affidavit of Receipt of the Secretary of State's list;
(e) Affidavit of Mailing;
(f) Statement of Need and Reasonableness; and
(g) The proposed rules.

The documents were available for inspection at the Office of Hearing Examiners from the date of filing to the date of the hearing.

2. On October 2, 1978, a Notice of Hearing and a copy of the proposed rules were published at 3 State Register 675.

3. On September 18, 1978, the Department mailed the Notice of Hearing to all persons and associations who had registered their names with the Secretary of State.

4. The record remained open through November 22, 1978, for the receipt of written comments and statements.

Statutory Authority

5. The Department cites as authority for the proposed rules Minn. Stat. Sec. 116H.129, subd. 1 (1977 Supp.), as amended by Laws of 1978, Ch. 786, Sec. 2. That statute provides as follows:

Section 116H.129 Energy conservation standards for existing residences

> Subdivision 1. Before January 1, 1979, the commissioner of administration, in consultation with the director and the appropriate standing committees of the legislature, shall promulgate minimum energy efficiency standards for existing residences. The standards shall be economically feasible in that the resultant savings in energy procurement costs, based on current and projected average residential energy costs in Minnesota as certified by the director in the state register, will exceed the cost of the energy conserving requirements amortized over the five-year period subsequent to the incurring of such cost. The costs computed under this section shall include reasonable inflation and interest factors.

The standards contained in these rules were prepared jointly by the Energy Conservation Standards Subcommittee of the Building Code Standards Committee, the Department and the Agency. The Department consulted with the Senate Committee on Energy and Housing and the House Committee on Environment and Natural Resources prior to the hearing. There is no specific evidence in the record indicating consultation with the director of the Energy Agency. However, there is sufficient involvement by the Agency, including that of John Armstrong, Assistant Director, to constitute substantial compliance with that portion of Subdivision 1.

Subdivision 1 also requires that the standards must be economically feasible as defined by producing savings in energy procurement costs which exceed the cost of compliance amortized over five years (hereinafter "five

year payback"). The procedures established by the Department do permit calculation of the payback period resulting from the specific improvement and provide for a comparison with the five year payback standard. Subdivision 1 also provides that the costs computed under the statute shall include reasonable inflation and interest factors. The rules do not on their face take interest or inflation into account. However, the Department has established through lengthy discussion in its Statement of Need and Reasonableness, that it is reasonable to assume equal and offsetting inflation and interest factors in a payback period of less than five years. Based upon the Statement of Need and Reasonableness, the Examiner finds that the rules as drafted do meet the statutory mandate regarding inflation and interest. However, the Examiner suggests that the assumption of equal and offsetting inflation and interest should be stated somewhere within the rules so that they are clearly in compliance with the legislative mandate on their face.

The Examiner also urges the Department to include Minn. Stat. Sec. 116H.129 (1977 Supp.) as amended by Laws of 1978, Ch. 786, Sec. 3 as part of its statement of authority for promulgating the rules. Although it it true that Section 3, which includes subdivisions 2-8 of Minn. Stat. Sec. 116H.129 does not contain specific authority for promulgation of the rules, it is part of an overall statutory scheme of which these rules are a part and which is necessary for a proper understanding of their scope and purpose. These subdivisions contain relevant definitions, requirements for rental property, authority for inspections, a description of the residential energy disclosure program, the certification of building evaluators, and disclosure reports.

Alternatively, the Examiner suggests that all citations to the relevant statutory section should be revised so as to read, "Minn. Stat. Sec. 116H.129 (1978)". This would be a far simpler method of citation and is also technically correct since the 1978 Minnesota Statutes should be published soon. It would also permit the agency to refer to specific subdivisions with the statute more easily.

The Examiner finds that the Department has complied with all statutory requirements of Minn. Stat. Sec. 116H.129, subd. 1 (1977 Supp.) as amended by Laws of 1978, Ch. 786, Sec. 2, and that the Commissioner has authority to promulgate the proposed rules pursuant thereto.

Discussion of the Rules as Proposed

6. 2 MCAR Sec. 1.16201 sets forth the statute under which these rules are authorized to be promulgated. As noted in the previous section, if the Agency chooses to cite the Laws of 1978, the citation to the Laws of 1978, Ch. 786 should be expanded to include both Section 2 and Section 3. The Examiner also notes that the language contained following the statutory citation is surplusage which does not logically relate to the issue of authority. It is more directly related to the purpose or scope of the rules as covered in other rules. The Examiner finds that this language could be deleted without constituting substantial change.

The Examiner also suggests that the title of the rule should be changed to "Authority" rather than "Authorization". This term more accurately reflects the concept of statutory authority to which the rule is addressed. The Examiner finds that this rule is reasonable and necessary in order to clearly indicate the statutory authority for promulgation of these rules.

7. 2 MCAR Sec. 1.6202 deals with enforcement of the rules and provides as follows:

> The Minnesota Energy Agency shall conduct random inspections as provided in Minn. Stat. Sec. 116H.129, subd. 1 (1977 Supp.) as amended by Laws of 1978, Ch 786, Sec. 2.

First, the Examiner notes that the statutory section cited does not give the Minnesota Energy Agency any authority to conduct random inspections. Minn. Stat. Sec. 116H.129, subd. 4 provides for inspections by the Energy Agency. This section is contained within Laws of 1978, Ch. 786, Sec. 3, rather than Section 2. However, as previously noted, a more simplified method of citation would obviate this problem. Either method of correction would not constitute substantial change.

Second, Minn. Stat. Sec. 116H.129, subd. 4, provides that the Energy Agency shall conduct inspections on a random basis for compliance with the provisions of subdivision 3. Subdivision 3 deals with only rental properties and requires them to be in compliance with caulking, weatherstripping and other sealing of the building envelope standards by January 1, 1980, and with all standards by July 1, 1983. Thus, the Energy Agency may only conduct inspections on rental property and those inspections may only be for the purpose of determining compliance with the mandatory requirements previously stated. The Examiner notes that this rule does not contain any enforcement mechanism as regards non-rental residential properties. However, as noted in the Memorandum attached hereto, this omission is a result of the statute. The Examiner finds that this rule is vague and misleading in that it implies that the Energy Agency has the power to conduct random inspections on any property. Unless a person reading the rule has access to the Minnesota Statutes, he or she would be unable to determine the scope of the permissible inspections. Although this rule is necessary to provide some enforcement for the mandatory portions of the compliance requirements, it is unreasonable as written because it is vague and misleading. However, the Examiner also believes that the rule can be amended to avoid this problem without constituting substantial change if the Department incorporates the language as stated in the statute so that it is clear that inspections apply only to rental property and only as regards compliance with Minn. Stat. Sec. 116H.129, subd. 3 (1978). The Examiner suggests that the standards contained in that subdivision ought to be paraphrased in the rule. Alternatively, they are sufficiently crucial to an understanding of the rule so that the language could be quoted.

8. 2 MCAR Sec. 1.16203 deals with the purpose of the rules and provides as follows:

> The purpose of these rules is to establish minimum energy efficiency standards that are economically feasible for existing residences.

The Examiner finds that the language of this section does not, in fact, accurately convey the purpose of the rules when seen within the statutory scheme of Minn. Stat. Sec. 116H.129. The Statement of Need and Reasonableness incorrectly states the long range goal of alleviating potential shortages of critical fuel supplies as the purpose of the rules. The Examiner finds that the purpose of these rules is first, to establish minimum energy efficiency standards which will be used by certified evaluators in preparing energy disclosure reports regarding specific residences and second, to establish standards with which rental properties must comply in part by 1980 and in whole by July 1, 1983. The rule as it is currently written implies that the standards contained in the rule must be complied with by all existing residences. This is incorrect. This misconception could easily be avoided by a specific statement of the method of operation of the rules. The Examiner suggests that the clearest way of dealing with this revision would be to combine 2 MCAR Sec. 1.16203 and 2 MCAR Sec. 1.16204 into a single rule entitled Scope and Purpose. This is discussed in greater detail in Paragraph 9. The Examiner finds that this rule is reasonable and necessary to explain the purpose of the rules. However, redrafting the rule as suggested would amplify and clarify the purpose of the rules.

9. 2 MCAR Sec. 1.16204 deals with the scope of the rules. At the hearing, the Department moved to amend this section of the rule as follows:

The scope of these rules addresses ~~two~~ three areas:

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

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

C. These rules incorporate the methods for calculating energy savings and determining economic feasibility of each minimum energy efficiency standards.

The Examiner finds that this rule describes the substantive scope of the rules, but does not define the scope of those persons or groups upon whom the rules will have an effect. This is an important part of the concept of scope and would additionally help to decrease any confusion. As previously noted, the Examiner suggests that 2 MCAR Sec. 1.16203 should be combined with 2 MCAR Sec. 1.16204 as a single rule entitled, Scope and Purpose. The Examiner suggests language that the Agency may wish to use.

> The purpose of these rules is to establish minimum energy efficiency standards for existing residences. These rules affect rental and non-rental residences. Pursuant to Minn. Stat. Sec. 116H.129, subd 3 (1978) rental properties constructed prior to January 1, 1976 must comply with standards pertaining to caulking and weatherstripping of exterior joints and sealing of other openings in the building envelope by January 1, 1980 and with all other standards by January 1, 1983. Pursuant to Minn. Stat. Sec. 116H.129, subd. 7 (1978), these standards will form the basis for an energy disclosure report which will be required after October 1, 1979 on the sale of any non-rental residential property built prior to January 1, 1976 unless said report is waived by the buyer. No standard will apply to either rental or non-rental residential property unless it is determined to be economically feasible as defined at 2 MCAR Sec. 1.16205 D.

These standards address two areas:

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

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

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

The Examiner finds that it is necessary and reasonable to have a rule explaining the scope of the rules. The proposed rule is not so incomplete as to be unreasonable, but could be much improved without constituting substantial change.

10. 2 MCAR Sec. 1.16205 contains definitions. The definitions contained in the rule are taken from the Minnesota Building Code, from the American Society of Heating, Refrigerating and Air Conditioning Engineers, Inc. publications or from Minn. Stat. Sec. 116H.129 (1978). These definitions represent the concensus of the subcommittee. Those definitions which are taken directly from the statute are crucial so that persons affected by these rules who do not have access to the statute may clearly understand the legislative intent and purpose of the rules. The Examiner has no comment with regard to definitions A. Accessible; B. Attic; E. Exterior Envelope; F. Fireplace Stove; G. Insulation; I. "R" Value; K. Rim Joist; M. U-Value.

The Examiner finds that 2 MCAR Sec. 1.16205 C. which defines "Degree day, heating" would be more clear if the term defined were changed to "Degree day". At the hearing, the Department testified that the term "heating" was included since it applies only to winter and, thus, to heating. However, the term as used in the rule is degree day and it is confusing to have a different term in the definitions. The Examiner also suggests that the reference to Celsius degrees in the definition should be deleted as the rule utilizes Fahrenheit degrees only. These changes could be made without constituting substantial change.

2 MCAR Sec. 1.16205 D. purports to define "economic feasibility". The Examiner suggests that the language as written is cumbersome and, in fact, does not constitute a definition. The Examiner suggests that the definition should be redrafted and suggests the following language:

> For purposes of these rules, the test of economic feasibility is met when the savings in energy procurement cost, based on residential energy costs as certified by the Minnesota Energy Agency Director and 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 Sec. 1.16206, amortized over the subsequent five year period.

2 MCAR Sec. 1.16205 H. defines "positive shut-off" as follows:

> A shut-off device which will 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.

The Examiner believes that the definition as stated implies that the shut-off device will close automatically when a fireplace or fireplace stove is not operating. Clearly, a damper in either a fireplace or in the top of a flue will not produce a seal to inhibit the flow of air unless it is shut off by someone. The Examiner believes that the language should reflect that the shut-off device can be utilized so as to produce a seal to inhibit the flow of air when a fireplace or a fireplace stove is not operating, so as to avoid confusion.

2 MCAR Sec. 1.16205 J. defines "residence". The Examiner notes that it is unclear whether a duplex or triplex in which one unit is occupied by the owner is considered rental property in whole or in part for purposes of this rule. This would be an appropriate place to clarify that issue.

2 MCAR Sec. 1.16205 L. defines "single glazed" as follows:

> 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.

The Examiner finds that the application of the second sentence of this definition is unclear, at least to the lay person. It would be preferable for that sentence to specifically relate to the standard or standards in which it would be applied, perhaps with a specific example.

The Examiner notes that the definition for "conditioned space" should be included as a definition in this section. At the hearing, the Department indicated that the term was one which was commonly understood and did not need definition in the rules. The Examiner takes exception to this position and suggests that a term which is used as extensively as "conditioned space" should be defined.

The Examiner finds that the definitions are reasonable and necessary so that persons reading the rules may have a common understanding of their meaning. The suggested changes are needed to clarify the definitions and may be made without constituting substantial change.

11. 2 MCAR Sec. 1.16206 sets forth the minimum energy efficiency standards to be considered as to economic feasibility under the rule. This rule specifically indicates that the standards are mandatory for compliance on rental properties and provide the basis for evaluation of residences at time of sale. As previously noted, this information should also be in earlier rules. However, the Examiner does not find it to be surplusage in this case.

Standard 1 is as follows:

> Install weatherstripping between operable window sash and frames and between doors and frames.
>
> EXCEPTION: Weatherstripping not required on storm doors or windows.

The Examiner notes that this section should be revised to specifically reflect exterior doors and frames only. As the standard now reads, it applies to both interior and exterior doors and frames. This is a ridiculous result which could not have been intended by the Department. In

addition, the Examiner suggests that the rule ought to include some standard as to tightness of fit when weatherstripping has been installed.

Standard 2 provides as follows:

> 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.

The Examiner notes that there should be a comma added as follows: "Between foundation and rim joist, around window and . . ." . This change is made in order to effectuate the intent of the Department with regard to the meaning of the rule.

Standard 3 provides as follows:

> 3. Install positive shut-offs for all fire places or fire place stoves.

The Examiner notes that for consistency "fire places" and "fire place" should be one word. If it is necessary to syllabify "fire place", there should be a hyphen at the end of "fire".

Standard 4 provides as follows:

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

Written comment by Earl Bartels on behalf of Minnegasco suggested that this standard should be amended by adding "floors" to this standard as well as attics, and deleting floors in Standard 6. The Department has responded that such a change would be unreasonable because it exceeds floor insulation standards for new construction.

Standard 7 provides as follows:

> 7. Install storm windows on all single glazed exterior window units exclosing conditioned space.

The Examiner notes that the Department has indicated that it wishes to change "exclosing" to "enclosing" within the definition.

Testimony submitted by Francis X. McGrath for Mon Ray Windows Inc. suggests adding the following language to this standard.

> The installed windows must achieve a minimum air infiltration rating of 0.50 CFM per lineal foot of net sash crack perimiter (sic) at a test pressure of 1.56 PSF (25 MPH wind) at both positive and negative pressure (ASTM 283-73). Must meet Minnesota Building Code SBC 6006 E, paragraph 2.

The Department has responded that such 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, and because the cost of storm windows meeting this standard is much greater than most storm windows sold in this state.

Standard 8 provides as follows:

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

The Examiner finds that it is unclear as to when a single door, vestibule or other appurtenance may provide a double door effect. If this is to

be a standard, it should be understandable by those persons to whom it applies.

The City of Winona submitted written testimony suggesting standards for energy efficiency. The Department has responded to those standards and declines to adopt them in lieu of the proposed rules.

The Examiner notes that 2 MCAR Sec. 1.16206 is not in proper outline form and should probably be revised. The Examiner also notes that the standards contain nothing with regard to insuring that a house is properly ventilated in order to provide sufficient air for proper combustion and, thus, to avoid possible hazards to people in the home. Although this subject may be addressed in the Building Code, the Examiner believes it is necessary to include standards regarding ventilation as part of the compliance/evaluation process since the results of improper ventilation can be far more serious than the results of improper insulation.

The Examiner finds that this rule as proposed is necessary and reasonable. The suggested changes can be made without constituting substantial change.

12. 2 MCAR Sec. 1.16207 deals with procedures for calculating energy savings and determining economic feasibility. This section sets forth the procedural steps to be followed in determining whether a specific standard will be economically feasible as defined by rule and statute for a particular residence. This procedure consists of six steps resulting in calculation of the general energy saving for each efficiency standard, calculation of the cost of the energy saving improvement, and calculation of the payback period for the improvement. In those instances where the payback period is less than five years, the energy saving improvement meets the economic feasibility requirement. The Department's Statement of Need and Reasonableness points out that it is necessary to go through this type of procedure because the legislation directs each standard to be economically feasible for each residence. Using these methods, the determination can be made on an individual case-by-case basis. The Examiner finds that an explanation of procedures such as that contained in 2 MCAR Sec. 1.16208 is necessary and reasonable to promote a general understanding of the methodology contained in the rules.

13. 2 MCAR Sec. 1.16208 contains the general energy savings equation for each of the eight energy efficiency standards contained in 2 MCAR Sec. 1.16206. At the hearing, the Department noted that certain changes should be made to the rule as printed. First, the heading 2 MCAR 1.16207.1. should be changed to read 2 MCAR Sec. 1.16208. Second, the explanations under equation A should be changed to read as follows:

Equation A*:

$$\Delta E = \Delta H \times \frac{D \times 21.7}{N \times V}$$

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.

These changes are purely technical in nature and do not constitute substantial change. The general energy savings equation contained in this section is used to calculate the energy savings for each residence under each of the eight energy efficiency standards contained in 2 MCAR Sec. 1.16206. This equation incorporates all effects which made an individual residence unique. Earl Bartels of Minnegasco suggested the development of standardized values for the general energy savings formula to assist lay persons in using the formula. The Department responded that development of standardized values would develop as part of the training and certification program for evaluators. This rule, which utilizes a separate equation to evaluate each standard for each residence, is reasonable and necessary within the overall statutory scheme established by Minn. Stat. Sec. 116H.129 H (1978).

14. 2 MCAR Sec. 1.16209 is the rule which is used to determine the payback period for each energy saving improvement. It basically derives the payback period by dividing the cost of the improvement by the product of the price per unit of energy and the quantity of annual energy savings. As noted in the discussion of statutory authority at Paragraph 5, the Department has established that it is reasonable to assume that inflation and interest balance where a payback of less than five years is being considered. The Examiner finds that this formula is reasonable and necessary to determine the general payback period as required by statute.

Based upon the foregoing Findings of Fact, the Examiner makes the following:

CONCLUSIONS

1. That the Department of Administration gave proper notice of the promulgation of the proposed rules.

2. That the Department of Administration has statutory authority to take the action proposed, to wit the promulgation of the proposed rules.

3. That the Department of Administration has fulfilled all relevant, substantive and procedural requirements of law or rule.

4. That the Department of Administration has demonstrated the need for and reasonableness of the proposed rules by an affirmative presentation of facts in the record with the exceptions noted at Paragraph 7.

Based upon the foregoing Conclusions, the Hearing Examiner makes the following:

RECOMMENDATION

It is recommended that the proposed rules be adopted by the Department of Administration with consideration given to the Findings of Fact herein.

Dated: December 11, 1978.

NATALIE L. GAULL
Hearing Examiner

MEMORANDUM

The Examiner's evaluation of these rules has been much hindered by the lack of public participation, comment and criticism in the rule hearing process. Since these rules may potentially affect all owners of existing residences built prior to January 1, 1976, they should be subject to the strictest scrutiny by and/or on behalf of the public. The Examiner has attempted to provide this scrutiny, although there is no substitute for active public participation.

The Examiner finds that the Department has complied with the legislative mandate contained in Minn. Stat. Sec. 116H.129, subd. 1 (1978) in promulgating these rules. However, the Examiner does have serious concerns regarding the rules which, upon closer study, stem from problems or deficiencies in the underlying statute as a whole.

For example, the statute contains no enforcement scheme to determine compliance by owners of rental or non-rental residential property. Subdivision 4 provides for random inspections of rental property, but contains no provision governing penalties or procedures in the event an inspection results in the discovery of noncompliance by the owner of the rental property. There is no statutory provision whatsoever dealing with the enforcement of the standards as they apply to non-rental residences.

Another example is the complexity of the formulae contained within the rules. Although the Department has consistently maintained that the rules are sufficiently simple so that a person of average mathematical ability can understand and apply them, this is simply untrue. The Examiner who has a mathematical background which includes college calculus, understands the formulae with some difficulty and would have great difficulty applying them to her own residence. The Department bases its use of these formulae on the assumption that the statute requires a determination of economic feasibility for <u>each</u> standard and <u>each</u> residence. The Examiner's reading of the statute does not support this assumption because the statute does not contain specific language to that effect. A simple "chart type" system from which an individual could easily determine that for a given style of home containing a given range of square feet located in a given weather zone certain energy efficiency standards would be economically feasible is one alternative which would also seem to meet the legislative mandate. However, the method chosen by the Department represents a policy choice which should not be overturned by the Examiner in the absence of some showing that the method selected was arbitrary or capricious. Furthermore, the statute does not require that the methods chosen must be used or understood by the "average" person. It may seem reasonable that the standards and formulae should be sufficiently simple so that a homeowner can determine if his residence complies with the standards without having to undergo the expense of hiring a certified evaluator. But, unless it is required by statute, the rules as promulgated by the Department are not subject to challenge on that basis.

Also, despite comments made by the Examiner at Paragraph 11, with regard to including standards to insure adequate ventilation for combustion within the residence, this was not required by the statute. In the event that the Department chooses not to adopt that suggestion, it is imperative that the Legislature act to insure that the standards include ventilation standards. The recent death of one person and the near death of three other persons as reported by the media resulting from living quarters which did not provide adequate ventilation to insure internal combustion, underline the urgency of this problem.

The Examiner also notes that Minn. Stat. Sec. 116H.129 (1978) does not include any provision governing any sort of financial assistance for owners of rental property required to meet the standards under the rules. There may be some situations, where rental property such as a duplex, is owned by an elderly person who cannot afford the cash outlay necessary to meet the applicable energy efficiency standards. Although it is clear, that in the long run such a person would more than recoup the cost of these improvements, some program should be established to assist those persons.

It should be noted that the preceding have been suggestions for legislative amendment of Minn. Stat. Sec. 116H.129, which the Examiner feels would substantially improve the statutory scheme. The Department or others may wish to advocate these positions in the Legislature.

N.L.G.

OUR FILE NO. 501

ADMIN 1000 (Rev. 1/78)

STATE OF MINNESOTA

DEPARTMENT Attorney General

Office Memorandum

TO : Sheila S. Fishman
Special Assistant
Attorney General

DATE: February 6, 1979

FROM : Lee E. Sheehy
Special Assistant
Attorney General

PHONE: 296-6204

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

The above-captioned rules have not been approved by this office or filed with the Secretary of State for the reasons enumerated below.

The agency failed to submit sufficient copies of documents to permit proper processing of these rules by our office. Please feel free to contact me or have the agency personnel contact me if you wish to discuss the numbers of copies required.

Secondly, the Order Adopting was signed by an Assistant Commissioner. The agency must submit some evidence of authority for the signator of the Order Adopting given has lack of apparent authority.

If you have any questions, do not hesitate to call me.

LES:mb

Enclosure

cc: Duane Harves

ADMIN 1000

STATE OF MINNESOTA

DEPARTMENT ADMINISTRATION

Office Memorandum

TO : Lee Sheehy, Spec. Asst. Atty. Gen.

DATE: January 19, 1979

FROM : DarlaMae R. Hormann DarlaMae R.H.
Admin. Services Mgr.
Building Code Division

SUBJECT: RULES FOR ENERGY CONSERVATION STANDARDS IN EXISTING RESIDENCES

We are transmitting herewith the complete record and all applicable documents of the rulemaking hearing held November 8, 1978 regarding rules for energy conservation standards for existing residences.

Enclosures
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STATE OF MINNESOTA
OFFICE OF HEARING EXAMINERS

FOR THE DEPARTMENT OF ADMINISTRATION
BUILDING CODE DIVISION

In the Matter of the Proposed Adoption of Rules of the Department of Administration Governing Energy Conservation Standards for Existing Residences.

REPORT OF THE
CHIEF HEARING EXAMINER

WHEREAS, a hearing was held on November 8, 1978, before Natalie L. Gaull, a Hearing Examiner of the State Office of Hearing Examiners, on the above-entitled matter in compliance with Minn. Stat. Sec. 15.0412, subd. 4; and

WHEREAS, the Report of Hearing Examiner made pursuant to Minn. Stat. Sec. 15.052, subd. 3, was issued to the Department of Administration on December 11, 1978; and

WHEREAS, the Department of Administration has now determined to adopt rules pursuant to Minn. Stat. Sec. 15.0412, subd. 4; and

WHEREAS, the Department of Administration has submitted said rules to the Chief Hearing Examiner for review pursuant to Minn. Stat. Sec. 15.052, subd. 4, and Rule HE 107; and

WHEREAS, the Chief Hearing Examiner finds that the final proposed rules are not substantially different from those proposed at the public hearing and that the Department of Administration has met all requirements of Minn. Stat. Sec. 15.0412, subd. 4.

NOW, THEREFORE, upon receipt of this Report, the Department of Administration has the responsibility of submitting the complete hearing record and the rules as adopted by the Department to the Attorney General, notifying all persons who requested to be informed that the hearing record has been submitted to the Attorney General, and publishing in the State Register, all pursuant to Minn. Stat. Sec. 15.0412, subd. 4.

Dated: January 4th, 1979.

Duane R. Harves

DUANE R. HARVES
Chief Hearing Examiner

DEPARTMENT OF ADMINISTRATION

BUILDING CODE DIVISION

PROPOSED RULES FOR

ENERGY CONSERVATION STANDARDS FOR EXISTING RESIDENCES

2MCAR S 1.16201. Authorization. These rules are promulgated pursuant to Minn. Stat., Section 116H.129, Subdivision 1 (1977 Supplement), as amended by Minn. Laws 1978, c. 786, Section 2 and provide for rules relating to economically feasible energy conservation standards for existing residences.

2MCAR S 1.16202. Enforcement. The Minnesota Energy Agency shall conduct random inspections as provided in Minn. Stat., Section 116H.129, Subd. 1 (1977 Supplement), as amended by Minn. Laws 1978, c. 786, Section 2.

2MCAR S 1.16203. Purpose. The purpose of these rules is to establish minimum energy efficiency standards that are economically feasible for existing residences.

2MCAR S 1.16204. Scope. The scope of these rules addresses two areas:

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

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

C. These Rules incorporate the methods for calculating energy savings and determining economic feasibility of each minimum energy efficiency standard.

2MCAR S 1.16205. 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. 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 65F (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 65F (18°C).

D. Economic Feasibility. Shall occur when the savings in energy procurement cost, 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 2MCAR1.16206, amortized over the subsequent 5-year period.

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

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

G. 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.

H. Positive Shut-Off. A shut-off device which will 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.

I. "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.

J. 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 section 168.011, subdivision 8, shall be a residence for purposes of these Rules.

K. 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.

L. 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.

M. 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; $Btu/(hr \cdot ft^2 \cdot F)$. Also the reciprocal of total R-Value.

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

2MCAR S 1.16206. Minimum Energy Efficiency Standards. Where demonstrated to be economically feasible pursuant to 2MCAR1.16207, 2MCAR1.16208, and 2MCAR1.16209 the following shall be standards for existing residences. Pursuant to Minn. Stat. 116H.129, Subdivision 3 and Subdivision 5 (1977 Supplement) as amended Minnesota Laws 1978 Chapter 786, Section 2, 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 2MCAR1.16205 by January 1, 1980 with respect to caulking and weatherstripping and by July 1, 1983 with respect to all provisions herein; and shall provide a basis for evaluation of residences at time of sale.

1. Install weatherstripping between operable window sash and frames and between 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 fire places or fire place 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.

2MCAR S 1.16207. 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 (2MCAR1.16208) 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 (ΔH).

B. Calculate design heat per degree Fahrenheit (ΔH) for the standard under consideration using the equations outlined in 2MCAR1.16208.A. through 2MCAR1.16208.H.

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

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 ΔE into the general payback equation (2MCAR1.16209) 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.

2MCAR S 1.16207.1. General Energy Savings Equation. The following equation shall be used to calculate energy savings for each of the eight energy efficiency standards.

Equation A*:

$$\Delta E = \Delta H \times \frac{D \times 21.7}{\eta \times \gamma}$$

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 Δ H are listed in subsequent subsections.

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

= The rated full-load efficiency of the heating system.

= The heating value of the fuel type, consistent with Δ E and Δ 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 Δ H for energy efficiency standard 1 (2MCAR1.16206.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 ΔH for energy efficiency standard 2 (2MCAR1.16206.B.).

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 ΔH for energy efficiency standard 3 (2MCAR1.16206.C.).

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 ΔH for energy efficiency standard 4 (2MCAR1.16206.D.).

Equation #4:

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

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 ΔH for energy efficiency standard 5 (2MCAR1.16206.E.).

Equation #5:

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

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 (2MCAR1.16206.F.).

Equation #6:

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

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 (2MCAR1.16206.G.).

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 unconditioned space.

H. Install Storm Doors. The following equation shall be used to calculate ΔH for energy efficiency standard 8 (2MCAR1.16206.H.).

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 unconditioned space.

2MCAR1.16209. 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:

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

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, ΔE. 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. Section 116H.129, Subd. 1 (1977 Supplement), as amended by Minn. Laws 1978, c. 786, Section 2;

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, as calculated for each of the energy efficiency standards.

STATE OF MINNESOTA

DEPARTMENT OF ADMINISTRATION

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

AFFIDAVIT OF MAILING

DarlaMae Hormann, being first duly sworn, deposes and says:

That on the 2nd day of October, 1978, 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.

DarlaMae Hormann

DarlaMae Hormann
Building Code Division

Subscribed and sworn to before
me this 2nd day of October, 1978.

Cynthia L. Claason

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

STATEMENT OF COMPLIANCE WITH

RULEMAKING PROCEDURES

I, Special Assistant Attorney General Sheila S. Fishman, do hereby declare that I have examined the proposed rules and all related documents and that, based upon them and my personal familiarity with the applicable procedures, all rulemaking procedures have been followed.

Sheila S. Fishman
Special Assistant
Attorney General

Dated: JAN 23 1979

ERRATA SHEET

The following are corrections that should be made to the proposed rules for energy conservation standards for existing residences.

2MCAR § 1.16204. Scope. The scope of these rules addresses ~~two~~ three areas:

2MCAR § 1.16207.1 should read 2MCAR § 1.16208

Under 2MCAR § 1.16208 the following should be corrected:

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 elecricity.

Δ 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 ΔH are listed in subsequent subsections.

N = The rated full-load efficiency of the heating system.

V = The heating value of the fuel type, consistent with ΔE and ΔH.

11/8/78
SH/d

STATE OF MINNESOTA

DEPARTMENT OF ADMINISTRATION

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

ORDER FOR HEARING

IT IS HEREBY ORDERED that a public hearing on the above-captioned rules be held in Room 83, State Office Building, Fuller and Aurora Streets, St. Paul, Minnesota on November 8, 1978, 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 the Notice of Hearing and applicable proposed rules be published in the State Register.

Date: 9/12/78

STATE OF MINNESOTA
DEPARTMENT OF ADMINISTRATION

Richard L. Brubacher
Commissioner

STATE OF MINNESOTA

DEPARTMENT OF ADMINISTRATION

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

NOTICE OF HEARING

NOTICE IS HEREBY GIVEN that a public hearing in the above-entitled matter will be held in Room 83, State Office Building, Fuller and Aurora Streets, St. Paul, Minnesota, on November 8, 1978, 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 Natalie Gaull, Office of Hearing Examiners, Room 300, 1745 University Avenue, St. Paul, Minnesota 55104, either before the hearing or within 5 working days after the public hearing ends, or for a longer period not to exceed 20 calendar days if ordered by the hearing examiner. Written material submitted within the above time limits will be recorded in the hearing record.

The proposed rules address two areas of energy conservation in existing residences: a) the reduction of air infiltration, and b) improvement of thermal efficiency of the structure. The proposed rules will be mandatory for residential rental properties if economically feasible. The proposed rules will be used as a basis for evaluation of owner-occupied residences at the time of sale. The proposed rules incorporate methods for caluculating energy savings and determining economic feasibility.

Copies of the proposed rules will be available at the door on the date of the hearing and one free copy can now 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, Subd. 1 (1977 Supplement), as amended by Minn. Laws 1978, c. 786, Section 2.

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 of the evidence which will be presented by the agency at the hearing justifying both the need for and the reasonableness of the proposed rule/rules. Copies of the Statement of Need and Reasonableness may be obtained from the Office of Hearing Examiner 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 person 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 (1976) as amended by Minn. Laws 1978, c. 463, Section 11, 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 commencment 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) 296-1723.

STATE OF MINNESOTA
DEPARTMENT OF ADMINISTRATION

Date: 9-18-78

Richard L. Brubacher
Commissioner

STATE OF MINNESOTA

DEPARTMENT OF ADMINISTRATION

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

CERTIFICATE OF DELIVERY
OF THE SECRETARY
OF STATE LIST

I hereby certify that the attached 582 labels and 9 sheets constitute the complete list of persons, associations, and other interested groups who as of 2:15 o'clock P.M., this 29th day of September, 1978, 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: Dana Reed

STATE OF MINNESOTA

DEPARTMENT OF ADMINISTRATION

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

AFFIDAVIT OF RECEIPT

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 29th day of September, 1978, 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 29th day of September, 1978, 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 29th day of September,
1978.

Cynthia L. Clawson

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