

Minnesota Attorney General: Administrative Rules Proceedings

Copyright Notice:

This material may be protected by copyright law (U.S. Code, Title 17). Researchers are liable for any infringement. For more information, visit www.mnhs.org/copyright.

Version 3
August 20, 2018

Our File No. 940

RULE REVIEW CHECKLIST

DATE RULE RECEIVED 8-16-83
DATE FOR REVIEW 8-25-83
DATE DUE 8-30-83

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

Approved 8-30-83 Disapproved _____ Returned to Agency _____

Resubmitted _____ Due _____
Approved _____ Disapproved _____ Returned to Agency _____

Date filed w/Secretary of State 9-7-83 Revisor approved 8.22.83 disapproved _____

✓ Rule as Adopted

_____ Rule as Proposed

✓ Order Adopting 8.15.83 Date combined with Findings Fact

✓ Notice of Intent to Solicit Outside Opinion SR. 5.12.80

✓ Order for rulemaking
N/A date of Hearing

N/A Certificate of Board's Authorizing Resolution

✓ Notice of rulemaking
✓ Sufficiency

✓ Affidavit of Mailing Notice or rulemaking
3.31.82 At least 30 days prior to ~~hearing~~/adoption

✓ Mailing list Certificate

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

N/A Hearing Examiner's Report

_____ Chief Hearing Examiner's Report(s)
_____ Approving H.E.'s Report
_____ Approving agency action

✓ Agency's Findings of Fact

N/A LCRAR Report or agency Affidavit

N/A Certificate of Board's Resolution Adopting Rules

✓ 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

N/A Notice of Submission to the Attorney General

JUDITH WEHRWEIN A G

MINNESOTA DEPARTMENT OF ENERGY AND ECONOMIC DEVELOPMENT

ENERGY DIVISION

980 AMERICAN CENTER BUILDING
150 EAST KELLOGG BOULEVARD
ST. PAUL, MINNESOTA 55101
(612) 296-5120

1983 August 23

Paul Wittkopf
Public Service
Hill Reference Library
80 W. 4th St.
St. Paul, MN 55102

RECEIVED
AUG 26 1983
ATTORNEY GENERAL
ADMINISTRATIVE AGENCIES

Sub: Standards for Certification of Solar Collectors

Dear Mr. Wittkopf:

The Minnesota Legisture has required the Department of Energy and Economic Development to certify solar collectors in order for them to be eligible expenditures for the renewable energy tax credit. The proposed rules are currently under final review by the Attorney General's office.

The Department has incorporated national standards and certification procedures into the rules for the operation of this program. Those standards and procedures need to be available to the public for their use. We have designated the Hill Reference Library as the primary source for the public to have access to these documents.

I have checked with your reference department, and the following documents in the certification rules are currently in your collection:

ASTM E380-81
Standard for Metric Practice

ASHRAE Standard 93-77
Methods of Testing to Determine the Thermal Performance of Solar Collectors

ASHRAE Standard 95-1981
Methods of Testing to Determine the Thermal Performance of Solar Domestic Water Heating Systems

ASHRAE Standard 96-1980
Methods of Testing to Determine the Thermal Performance of Unglazed Flat Plate Liquid Type Solar Collectors

15 USC, Section 2301-2312
Magnuson-Moss Warranty--Federal Trade Commission Improvement Act of 1976
16 Code of Federal Regulations, Subchapter G (1981)

Our Department has securred the remaining documents referenced in the rules, and would like to donate them to your library to be available to the public. Those documents are as follows:

Document	Number of Copies
SRCC Standard 200-82 Test Methods and Minimum Standards for Certifying Solar Water Heating Systems Solar Rating and Certification Corp. Washington, DC, 1982	2
Standard Plumbing Code Section 1213.9 Southern Building Code Congress International Birmingham, AL 1979	1
NBSIR 1305A, Test 7.3 Provisional Flat Plate Solar Collector Testing Procedures National Bureau of Standards Washington, DC, 1978	1
SRCC Standard RM-1 Methodology for Determining the Thermal Performance Rating for Solar Collectors Solar Rating and Certification Corporation Washington, DC 1981	2

Thank you for your cooperation in this project. Please let me know if there are any questions about providing this service.

Sincerely,

John R. Dunlop
Solar Programs

cc: Rick Sands, Office of the Revisor of Statutes
Judith Wehrwein, Office of the Attorney General
Mark B. Dayton, Commissioner

SF-00006-02

STATE OF MINNESOTA

DEPARTMENT ATTORNEY GENERAL

Office Memorandum

TO Mark B. Dayton, Commissioner

Attn: Thomas Barrett, Special Assistant Attorney General

DATE: 8/30/83

FROM: Ted A. Martinez TAM
Special Assistant
Attorney General

PHONE: 296-4692

SUBJECT: In the Matter of the Proposed Adoption of Rules of the Department of Energy and Ecomonic Development Governing the Certification of Solar Collectors .

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;

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.

Encs.

TAM/ls

cc: Ms. Kathy Burek
Mr. Duane Harves

Department of Energy, Planning and Development

Energy Division

Adopted Rules of the Department of Energy, Planning and Development Governing Certification and Registration of Solar Collectors to Qualify Renewable Energy Source Expenditures for the Minnesota Individual Income Tax Residential Energy Credit (6 MCAR SS 2.1501-2.1512)

Rules as Adopted

6 MCAR S 2.1501 Purpose and authority. Certain renewable energy source expenditures qualify for income tax credit treatment by the Minnesota Department of Revenue. After December 31, 1980, expenditures for a solar collector qualify for the individual income tax residential energy credit only if the Minnesota Department of Energy, Planning and Development has certified the solar collector, pursuant to Minn. Stat. S 290.06, subd. 14. The purpose of 6 MCAR SS 2.1501-2.1512 is to establish the criteria for certification of solar collectors and the procedures for obtaining certification.

6 MCAR S 2.1502 Definitions. For purposes of 6 MCAR SS 2.1501-2.1512, the following definitions apply.

A. Absorber. "Absorber" means the part of the solar collector that receives the incident solar radiation and transforms it into thermal energy. It usually is a solid surface through which energy is transmitted to the transfer fluid; however, the transfer fluid itself could be the absorber in certain configurations.

B. Ambient air. "Ambient air" means the outdoor air in the vicinity of the solar collector being tested.

C. Approved. "Approved" means accepted, in writing, by the department.

D. Certification. "Certification" means the act of attesting officially to something as being true and as meeting a standard.

E. Collector. "Collector" means a solar collector.

F. Collector enclosure. "Collector enclosure" means the structural frame that supports the components of the collector and protects internal components from the environment.

G. Concentrating collector. "Concentrating collector" means a solar collector that uses reflectors, lenses, or other optical elements to concentrate the radiant energy passing through the aperture onto an absorber that has a surface area smaller than the aperture.

H. Concentrator. "Concentrator" means the part of the concentrating collector that directs the incident solar radiation onto the absorber.

I. Corrosion. "Corrosion" means the deterioration of a substance or its properties caused by a chemical or electrochemical reaction with its environment.

J. Cover plate. "Cover plate" means the material or materials covering the aperture and most directly exposed to the solar radiation. These materials generally are used to reduce the heat loss from the absorber to the surroundings and to protect the absorber.

K. Crazing. "Crazing" means the formation of minute surface cracks in a major component or subassembly.

L. Credit. "Credit" means the residential energy credit authorized by Minn. Stat. S 290.06, subd. 14.

M. Custom-built solar collector. "Custom-built solar collector" means a site-dependent collector fabricated from components that do not constitute a solar collector kit.

N. Deformation. "Deformation" means a change in shape or form of any material in the collector from the conditions that existed before testing.

O. Delamination. "Delamination" means separation into constituent layers.

P. Department. "Department" means the Minnesota Department of Energy, Planning and Development.

Q. Domestic hot water. "Domestic hot water" means heated tap water, as distinguished from water heated by a hydronic hot

water space heating system.

R. Express warranty. "Express warranty" means an affirmation of fact or promise made in connection with the sale or installation of a solar collector or component to a customer that relates to the nature of the material or workmanship and affirms or promises that the material or workmanship is defect free or will meet a specified level of performance over a specified period of time. "Express warranty" also means an undertaking in connection with the sale or installation of a solar system or component to refund, repair, replace, or take other remedial action with respect to the solar system or component. To be an express warranty, the affirmation, promise, or undertaking must become part of the basis of the bargain resulting in the purchase or installation of a solar collector by a customer.

S. Gross collector area. "Gross collector area" means the maximum projected area of the complete collector module, including integral mounting means.

T. Home-built solar collector. "Home-built solar collector" means a collector built by the owner according to purchased plans or the owner's own design from supplies or components that do not constitute a solar collector kit.

U. Inch-pound units. "Inch-pound units" means measurement units that have traditionally been used in the United States, including but not limited to foot, gallon, pound-mass, hour, ampere, degree Fahrenheit and British thermal unit (Btu).

V. Innovative collector. "Innovative collector" means a solar collector that, because of its design, cannot be evaluated fairly and adequately by the test methods described in 6 MCAR S 2.1507.

W. Instantaneous efficiency. "Instantaneous efficiency" of a solar collector means the amount of energy removed by the transfer fluid over a given measuring period divided by the total solar radiation incident onto the gross collector area during the measuring period.

X. Integrity of construction. "Integrity of construction"

means the physical and mechanical properties of a solar collector that collectively are responsible for the overall thermal performance and physical structure of the solar collector.

Y. International System of Units. "International System of Units" means the measurement system defined in the 'Standard for Metric Practice,' issued by the American Society for Testing and Materials as ASTM E380-81 (Philadelphia, 1981). It is commonly referred to as the "metric system," though it does not include many metric terms in use before 1960.

Z. Irradiance. "Irradiance" means the rate of solar radiation received by a unit surface area.

AA. Irradiation. "Irradiation" means incident energy per unit area on a surface over a specified time.

BB. Material category. "Material category" means a class of materials of the same generic type; for instance, glass, fiberglass, and plexiglass are materials in the category of collector glazings.

CC. Manufactured solar collector. "Manufactured solar collector" means a solar collector made of components that have been fitted together at an assembly plant. None of the components needs to have been fabricated by the assembly plant for the collector to be classified a manufactured collector.

DD. Model. "Model" means a solar collector distinguishable by a specified size, set of materials, construction, and performance. A change in any of these basic characteristics constitutes a new model.

EE. Nonpublic data. "Nonpublic data" means "trade secret information" as that term is defined in Minn. Stat. S ~~15.1673~~ 13.37, subd. 1, clause (b), that is, government data, including a formula, pattern, compilation, program, device, method, technique, or process:

1. That was supplied by the affected individual or organization;

2. That is the subject of efforts by the individual or organization that are reasonable under the circumstances to

maintain its secrecy; and

3. That derives independent economic value, actual or potential, from not being generally known to, and not being readily ascertainable by proper means by, other persons who can obtain economic value from its disclosure or use.

FF. Outgassing. "Outgassing" means the generation of vapors from materials during exposure to elevated temperature or reduced pressure.

GG. Performance rating. "Performance rating" means the rating values based on thermal output characteristics of solar collectors as determined by tests specified in 6 MCAR S 2.1507.

HH. Reference collector. "Reference collector" means a solar collector currently certified by the department to which a second collector is being compared for the purposes of certification under the similar collector rules found in 6 MCAR S 2.1506 B. and 6 MCAR S 2.1508 B.

II. Reflector or reflective surface. "Reflector" or "reflective surface" means a surface intended primarily to reflect radiant energy.

JJ. Registered. "Registered" means recorded as an eligible expenditure for Minnesota income tax credit.

KK. Revoke certification. "Revoke certification" means to withdraw certification from a solar collector. When certification is revoked, the collector is no longer eligible for the credit. A new application is required to certify a collector for which certification has been revoked.

LL. Service hot water. "Service hot water" means heated tap water in nonresidential applications.

MM. Severe corrosion. "Severe corrosion" means corrosion that impairs the function of a collector or that exhibits evidence that it will progress to the point where it will impair the function of the collector.

NN. Severe deformation. "Severe deformation" means deformation that impairs the function of a collector or that exhibits evidence that it will progress to the point where it will impair the function of the collector.

OO. Similar solar collector. "Similar solar collector" means a collector that is substantially identical to a certified reference collector manufactured by the same firm. The criteria to be used to determine eligibility as a similar collector are found in 6 MCAR S 2.1508 B.

PP. Site-dependent collector. "Site-dependent collector" means a collector intended to be assembled only at the site of application because parts of the building, such as rafters or insulation, are part of the collector or because the size of the collector makes delivery impractical.

QQ. Solar collector. "Solar collector" means a device designed to absorb incident solar radiation, to convert it to thermal energy, and to transfer the thermal energy to a fluid in contact with it through either forced or natural convection. For purposes of 6 MCAR SS 2.1501-2.1512, solar collector refers to one specific model of solar collector.

RR. Solar collector kit. "Solar collector kit" means a collection of substantially all major components required to assemble a solar collector which is sold as a unit for the purpose of making a solar collector.

SS. Solar system. "Solar system" means an assembly of solar collectors installed or intended to be installed at a single site, all of which perform a uniform function.

TT. Solar energy. "Solar energy" means the photon energy originating from the sun's radiation primarily encountered in the wavelength region from 0.3 to 2.7 micrometers.

UU. Standard. "Standard" means a document that specifies the performance, durability, or safety requirements for a product.

VV. Standard solar collector. "Standard solar collector" means a solar collector that can be fairly and adequately evaluated under the test sequence identified in 6 MCAR S 2.1507.

WW. State business day. "State business day" means a week day, Monday through Friday, except a holiday listed in Minn. Stat. S 645.44, subd. 5.

XX. Suspend certification. "Suspend certification" means to

temporarily withdraw certification of a solar collector. A collector purchased while its certification is suspended is not eligible for the credit. Certification may be reinstated by complying with 6 MCAR SS 2.1501-2.1512.

YY. Time constant. "Time constant" means the time required for the fluid leaving a solar collector to attain 63.2 percent of its steady state value following a step change in irradiation or inlet fluid temperature.

ZZ. Transfer fluid. "Transfer fluid" means the medium such as air, water, or other fluid that passes through or in contact with the solar collector and carries the thermal energy away from the collector.

6 MCAR S 2.1503 Applicability of rules.

A. Generally. All solar collectors must be certified or registered according to 6 MCAR SS 2.1501-2.1512 <u>at the time of sale</u> to be eligible for the credit. If certification is required for a collector but the collector has not been certified, neither the collector nor other solar system components are eligible for the credit. The collector certification requirements apply no matter who installs the system, whether homeowner, contractor, solar installer, or dealer. <u>All solar collectors which are exempted, registered, or certified by the Minnesota Department of Energy, Planning and Development are deemed certified for the purposes of the Individual Income Tax Residential Energy Credit Solar Collector Certification, pursuant to Minnesota Statutes, section 290.06, subdivision 14.</u>

B. Exceptions.

1. Home-built solar collectors are exempt from certification.

2. Custom-built solar collectors are exempt from the test requirements but must be registered by the department to be eligible for the credit.

3. Solar collector kits or manufactured solar collectors of a single model used in systems with sales in Minnesota of 20 or fewer solar systems in any consecutive 12-month period are

exempt from the certification test requirements, but solar systems using these collectors must be registered by the department to be eligible for the credit. The department shall deny registration of more than 20 solar systems in any consecutive 12-month period unless the collectors used in the system have been certified under the provisions of 6 MCAR SS 2.1501-2.1512.

4. A manufacturer of a solar collector required to be certified which has had the collector tested or contracted to be tested before the effective date of 6 MCAR SS 2.1501-2.1512 may use the results of that test in its application for certification instead of the test procedures outlined in 6 MCAR S 2.1507. The tests must have been performed at a department-approved laboratory in accordance with ASHRAE Standard 93-77, 'Methods of Testing to Determine the Thermal Performance of Solar Collectors,' issued by the Standards Committee of the American Society of Heating, Refrigerating, and Air Conditioning Engineers (New York, 1978); ASHRAE Standard 95-~~82~~ 95-1981, 'Method of Testing to Determine Thermal Performance of Solar Domestic Water Heating Systems,' issued by the Standards Committee of the American Society of Heating, Refrigerating, and Air Conditioning Engineers (New York, 1982); or ASHRAE Standard 96-~~80~~ 96-1980, 'Method of Testing the Thermal Performance of Unglazed Flat Plate Liquid Type Solar Collectors,' issued by the Standards Committee of the American Society of Heating, Refrigerating, and Air Conditioning Engineers (New York, 1980).

5. Solar collectors that have been certified by the California Energy Commission, the State of Florida, the Solar Rating and Certification Corporation, the Solar Energy Industry Association, or the ~~American~~ Air-Conditioning and Refrigeration Institute before the expiration of the grace period specified in 6., or by a national organization that meets the criteria in 6 MCAR SS 2.1501-2.1512, are eligible for automatic certification by the department. However, the manufacturer must file an application with the department in order to receive Minnesota

solar collector certification.

6. A blanket exception is granted for a period of ~~six~~ nine months following the effective date of 6 MCAR SS 2.1501-2.1512 to provide for timely and orderly testing, rating, and certification of solar collectors. All expenditures for solar collectors after the expiration of the grace period must be in accordance with 6 MCAR SS 2.1501-2.1512 to be eligible for the credit.

7. Any solar collector included in a renewable energy source expenditure after February 3, 1982, and before the effective date of 6 MCAR SS 2.1501-2.1512 shall be deemed certified by the Department of Energy, Planning and Development for the purposes of Minnesota Statutes 1980, section 290.06, subdivision 14, so long as the expenditure qualifies for the federal renewable energy source residential credit of Section 44C of the Internal Revenue Code of 1954 (26 U.S.C. SS 44C), as amended through December 31, 1978, and any regulation promulgated pursuant thereto.

6 MCAR S 2.1504 Application fees. Fees for processing an application are:

A. $300 for an application for certification of a standard or innovative collector based on new or previous testing;

B. $100 for an application to certify a similar collector;

C. $50 for an application based on previous certification by the Solar Rating and Certification Corporation, Solar Energy Industry Association, ~~American~~ Air-Conditioning and Refrigeration Institute, California Energy Commission, or the State of Florida as authorized by 6 MCAR S 2.1503 B.5.;

D. $50 for an application to certify a collector manufactured under license to a previous recipient of certification on the collector;

E. $50 for a resubmitted application after the 180-day time limit; and

F. $10 for an application for registration of a solar system using a custom-built collector or registration of a solar system using a solar collector kit or a manufactured solar collector

with sales in Minnesota of 20 or fewer solar systems in any consecutive 12-month period.

Checks in payment of fees must be made payable to "Treasurer, State of Minnesota."

6 MCAR S 2.1505 Units of measure. The International System of Units is the preferred measurement system for purposes of certification.

The information in the certification label must be in the International System of Units specified in Exhibit 6 MCAR S 2.1512-1. Values in inch-pound units, if included, must be placed in parentheses following the value in the International System of Units. Note that the measurements in 6 MCAR S 2.1507 and succeeding rules are given in the International System of Units followed by the measurements in inch-pound units in parentheses, as illustrated by 6 MCAR S 2.1507 C.3.b.

Inch-pound units may be used in the application for certification until further notice. If inch-pound units are used, however, the applicant is encouraged to include the values in the International System of Units in parentheses following the values in inch-pound units to facilitate the use of the information in the application after the transition to the International System of Units has been completed. Contact the department for assistance with measurement units.

6 MCAR S 2.1506 Certification procedure.

A. Standard solar collector. The provisions of 1.-8. govern certification procedures for standard solar collectors.

1. The manufacturer shall request the department to select a solar collector from the manufacturer's stock.

2. Within two weeks of the request, or at a mutually agreeable time, a representative of the department shall randomly select one solar collector sample from an existing stock of at least five units at the manufacturer's plant or at a distribution point.

3. The manufacturer shall have the designated sample tested in accordance with the test procedures contained in 6

MCAR S 2.1507 at a department-approved laboratory of the manufacturer's choice and at the manufacturer's expense.

4. If the sample completes the prescribed series of performance and durability tests and passes the inspection, the manufacturer may submit an application for certification. The application must be signed and dated by an authorized agent of the company and two witnesses. The manufacturer may designate information submitted to the department as nonpublic data by requesting that designation plainly and legibly on the application. Test results required for certification shall be considered public only if certification is granted. The application must contain the following:

a. It must contain product label information in the format provided by Exhibit 6 MCAR S 2.1512-1.

b. It must contain the product warranty.

c. It must contain a test report including: thermal performance curve; incident angle modifier; collector time constant; conditions used to establish performance such as flow rate and fluid; exposure or stagnation test results; and results from final inspection after disassembly.

d. It must describe the following products or materials by type and commercial designations: cover plates; absorber plate; absorber coatings; reflectors or lenses; collector enclosure; insulation; caulking, sealants, and gaskets; thermal and mechanical bonds, including the bonding used for reflecting materials that are not the same material as the reflector backing; trim, retaining strips, mounting brackets, or other hardware; connecting hoses; control system sensors; and reflector mounting frame. Upon request by the department, the applicant shall furnish information relating to the reflector mounting frame's thermal or flame spread properties, electrical corrosion resistance, ultraviolet radiation, pollutants, or optical characteristics, as specified by the supplier. The application must also contain a component-by-component declaration of combustibility, including the rating, the rating method, and the test standard used.

e. It must contain collector drawings of sufficient detail to accurately represent: aperture cover plate dimension and mounting detail; absorber plate dimensions including thickness, location, and spacing of fluid flow paths, cross-section dimensions and shape of flow channels, tube wall thickness, and plate-to-tube heat transfer provisions; collector enclosure dimensions, provisions for attaching absorber and plate, and size and location of holes; collector assembly detail specifying fasteners and other attachment methods indicating overall dimensions; and for concentrator type, a cross-sectional view, dimensions, and mounting detail.

f. It must contain working fluid or flow rate recommendations or restrictions. If a heat transfer fluid other than water is to be used, fluid properties of specific heat, density, viscosity, thermal conductivity, and toxicity must be provided.

g. It must contain installation, operation, and maintenance considerations.

h. It must contain the following statement of commitment by the manufacturer:

"As the manufacturer (importer) of the solar collector described in this application, I (we) affirm that all of the information contained herein is correct. Furthermore, if certification for this collector is granted, I (we) agree to: represent a collector as certified only when it is manufactured of the same materials and specifications as the collector that was originally certified; permanently affix the certification label to all production units of the certified collector sold in Minnesota; notify the department of changes in collector materials or construction; provide copies of the department's solar collector certificate to the consumer upon request; permit the department to select, at any time, a certified collector offered for sale or on display for a retest of the collector to verify its compliance to the original specifications and performance; notify the department of licenses awarded to manufacture this collector and other model or brand names under

which this collector is marketed; and honor the warranty expressed in the application for certification for the full term of the warranty."

5. The department shall evaluate the application and notify the manufacturer in writing of the approval or rejection of the application within 40 state business days after receiving the application.

a. If certification is granted, the department shall calculate the thermal performance rating and provide a signed Solar Collector Certificate as provided in Exhibit 6 MCAR S 2.1512-1 and photo-ready copies of the certification symbol.

b. If certification is denied, the department shall specify the reasons for rejection and identify the necessary corrective action. If all identified corrections are made and the manufacturer has resubmitted the application to the department within 180 days after the date of the rejection notice, the department shall approve the application and certify the collector without additional fees. After that time a resubmittal fee must accompany the application. If the manufacturer has resubmitted the application and the department has made a final decision to deny certification, the manufacturer may initiate the appeal process of 6 MCAR S 2.1511.

6. The manufacturer shall permanently affix the certification symbol and the required label information, in a form approved by the department, to all production units of the certified model and not to any other piece of the solar system.

a. The manufacturer may produce labels from the certification symbol and label design provided by the department; design its own label that includes the certification symbol and required label information; or include the certification symbol and required label information in the manufacturer's nameplate.

b. The manufacturer shall submit a sample of the proposed label or nameplate and written request for approval to the department before using the label or nameplate. The department shall grant approval if all the required label

information is presented clearly and legibly, the certification symbol is accurately presented, and the label or nameplate material will reasonably withstand exposure to the climate.

c. The department shall send the manufacturer written approval or rejection of the sample and, if appropriate, the reasons for rejection within 15 state business days after receiving the sample and written request.

d. The certification symbol may be used in advertising, catalogs, or sales promotion material. The symbol must clearly refer only to certified collectors.

7. The manufacturer shall promptly notify the department of licenses awarded to manufacture this collector and other model or brand names under which the solar collector is marketed.

8. The department shall maintain a list of all certified collectors and provide the product label information to consumers.

B. Similar solar collector. A collector that is substantially identical to a certified or reference collector manufactured by the same firm is eligible for certification based upon the test results from the reference collector. The following procedure must be used:

1. The manufacturer shall provide to the department the following material:

a. A copy of the application for certification of the reference collector;

b. An application in accordance with A.4. for certification of the similar collector;

c. A statement completely describing all physical differences between the reference and similar collectors;

d. A statement projecting any changes in performance, reliability, or durability that are expected because of the change in physical properties;

e. The data, assumptions, and procedures used to develop the projections in d.; and

f. The appropriate application fees.

The manufacturer may designate new information submitted to

the department as nonpublic data by requesting the designation plainly and legibly at the time the information is supplied.

2. The department shall evaluate the application for certification of the similar model and supporting documentation and notify the manufacturer in writing of the approval or rejection of the application within 40 state business days after receiving the application.

a. If certification is granted, the department shall calculate the thermal performance rating and provide a signed collector certificate and photo-ready copies of the certification symbol.

b. If certification is denied, the department shall specify the reasons for rejection. The manufacturer may develop additional supporting arguments and request a review by the department. The department shall send written notification of its final decision to the manufacturer within 20 state business days after receiving the request for review. If certification has been denied, the collector may be tested and a new application, with appropriate fees, may be filed with the department. The department's final decision is subject to the appeal process under 6 MCAR S 2.1511.

3. The manufacturer of a collector certified under B. shall follow the labeling, other model number, and brand name requirements of the procedures for a standard solar collector required by A.6. and A.7.

C. Innovative solar collector. The provisions of 1. and 2. govern certification procedures for innovative solar collectors.

1. The manufacturer shall describe the collector and explain why it cannot be fairly and adequately evaluated by the standard solar collector procedure contained in A. The manufacturer shall propose a procedure to the department for testing and evaluating the innovative collector. The detail of both the description and the procedure should be sufficient to allow the department to fairly assess the validity of the proposed evaluation criteria. The manufacturer may designate information submitted to the department as nonpublic data by

requesting the designation plainly and legibly at the time the information is supplied.

2. The department shall evaluate the proposed procedure and notify the manufacturer of its decision on the proposal within 40 state business days after receiving the proposal.

a. If the proposal is accepted, the manufacturer shall follow the process outlined in the proposal. The appropriate fees must be included in the formal application for certification.

b. If the proposal is rejected, the department shall specify the reasons for its decision. The manufacturer may revise the criteria or procedure or both and resubmit the proposal to the department. If the department makes a final decision to reject the proposal, or if it denies certification in a final decision under the terms of the accepted evaluation procedures, the manufacturer may appeal.

D. Collector manufactured by licensee. A certified collector that is also manufactured and sold under license is eligible for certification by the department to the licensee without additional testing. The following procedure must be used:

1. The licensee shall provide the department with the following material:

a. A copy of the application submitted by the original manufacturer for original certification of the collector;

b. An application in accordance with A.4. for certification of the collector; and

c. Appropriate application fees.

The licensee may designate new information submitted to the department as nonpublic data by requesting the designation plainly and legibly at the time the information is supplied.

2. The licensee shall request the licensor to send to the department a written authorization to certify the licensed collector and a declaration that the collector is identical in all respects to the originally certified collector.

3. The department shall review the application and letter

of authorization and notify the licensee in writing of the approval or rejection of the application within 40 state business days after receiving the application.

a. If certification is granted, the department shall provide a signed collector certificate and photo-ready copies of the certification symbol.

b. If certification is denied, the department shall specify the reasons for rejection. The licensee may request a review by the department and offer additional material in support of the application. The department shall send the manufacturer written notification of its final decision within 20 state business days after receiving the request for review. The department's final decision is subject to the appeal process of 6 MCAR S 2.1511.

4. The manufacturer of a licensed collector certified by the department shall follow the labeling, other model number, and brand name requirements of the procedures for a standard solar collector required by A.6. and A.7.

E. Custom-built solar collectors.

1. The contractor of a custom-built solar collector shall apply to the department for tax credit registration for the solar system the contractor intends to build. Though custom-built solar collectors are not required to be tested, the contractor must supply sufficient information about the collector to allow the department to register it as a unique collector. The application must include the following information:

a. Name, firm, and address of the contractor;

b. Name and address of the customer;

c. Gross collector area;

d. Collector dimensions;

e. Cover plate material;

f. Absorber plate material;

g. Insulation;

h. Framing material;

i. Sealants;

j. Heat transfer fluid;

k. Mounting surface type;

l. Orientation;

m. Slope angle from horizontal;

n. Product warranty, if any;

o. Owner's manual or instructions, if any; and

p. Thermal performance estimates, if any.

2. If the necessary information has been provided, the department shall assign a registration number and send a solar system registration document to the customer, with a copy to the contractor, within ten state business days after receiving the application.

F. Solar collector kit or manufactured solar collector. A solar system using a model of a solar collector kit or a manufactured solar collector is eligible for registration for the tax credit if 20 or fewer solar systems using the collector have been registered by the department during a consecutive 12-month period. If 20 solar systems have been registered during a 12-month period, additional solar systems are eligible for registration only if the department has approved a grace period in accordance with 2.a.

1. Sale of 20 solar systems or fewer.

a. If 20 or fewer solar systems using a model of a solar collector kit or manufactured solar collector have been registered during a consecutive 12-month period, the manufacturer or dealer of the solar collector kit or manufactured solar collector must apply to the department for registration in order for the solar system to be eligible for the credit. The application must include the following information: product label information required by Exhibit 6 MCAR S 2.1512-1 excluding information on the thermal performance efficiency and performance rating; name and address of purchaser; description of the major components in the kit or manufactured solar collector, including glazing material, absorber material and surface, insulation, enclosure, and sealants; and working fluid and flow rate recommendations or

restrictions.

b. If the manufacturer has complied with the requirements in a., the department shall assign a registration number and send a solar system registration document to the customer, with a copy to the dealer or manufacturer, within ten state working days after receiving the application.

2. Sale of more than 20 solar systems in Minnesota.

a. The manufacturer of a solar collector kit or manufactured solar collector may apply to the department for a six-month grace period in order to complete testing and certification requirements. The application must include evidence that a collector sample has been selected by the department and submitted to an accredited laboratory for Minnesota certification testing.

b. The department shall review the application. If the criteria have been met, the department shall approve the grace period. All systems using the model of solar collector kit or manufactured solar collector sold during the grace period are eligible for tax credit registration by the department.

c. The manufacturer shall follow the steps for certification as a standard solar collector.

6 MCAR S 2.1507 Test methods and minimum standards for certifying solar collectors.

A. Purpose. Rule 6 MCAR S 2.1507 specifies the test methods to be followed and the standards to be met in determining the thermal performance and the durability of solar collectors used for space heating and cooling and water heating. Only collector models meeting the standards are eligible for the certification label.

B. Scope.

1. Rule 6 MCAR S 2.1507 applies to liquid and air collectors. It provides a means for evaluating the maintainability and structural integrity of solar collectors and data for determining a thermal performance rating for solar collectors.

2. The procedures in C.8.-C.10. cannot be followed for

devices meeting the following description:

a. The device is intended for solar domestic water heating systems;

b. Its collectors cannot be appropriately tested under the requirements of ASHRAE Standard 93-77, 'Methods of Testing to Determine the Thermal Performance of Solar Collectors,' issued by the Standards Committee of the American Society of Heating, Refrigerating, and Air Conditioning Engineers (New York, 1978); and

c. Its collection function cannot be separated from the system function, commonly referred to as an integral collector storage (ICS) device.

For these devices, the procedures in C.8.-C.10. must be replaced by the procedures contained in ASHRAE Standard ~~95-82~~ 95-1981, 'Method of Testing to Determine Thermal Performance of Solar Domestic Water Heating Systems,' issued by the Standards Committee of the American Society of Heating, Refrigerating, and Air Conditioning Engineers (New York, 1982), and SRCC Standard 200-82, 'Test Methods and Minimum Standards for Certifying Solar Water Heating Systems,' issued by the Solar Rating and Certification Corporation (Washington D.C., March 1982).

C. Test methods for solar collectors.

1. Solar collector testing shall be performed in the following sequence:

a. Receiving inspection;

b. Static pressure test;

c. Thirty-day exposure test;

d. Thermal shock/water spray test;

e. Thermal shock/cold fill test;

f. Static pressure test;

g. Collector time constant determination test;

h. Thermal performance test;

i. Incident angle modifier test; and

j. Disassembly and final inspection.

2. Upon receiving a collector for tests, the test laboratory shall inspect and document the condition of the

collector.

3. The laboratory shall conduct a static pressure test before exposure testing.

a. The test method must be specific to the type of collector. Collectors are categorized as follows: street pressure solar collectors (collectors which, by virtue of their installation in a municipal water system, will be directly subjected to variations in street water pressure and hot water tank pressure); low pressure service hot water collectors (collectors which, by virtue of their installation, will not have a direct fluid interchange with an auxiliary heater or street pressure, but use an appropriate heat exchanger); or alternate fluid solar collectors (collectors which, by virtue of design, are not intended to have a direct fluid connection to a solar water heating system). Alternate fluid solar collectors may or may not be designed to accept street pressure.

b. The test pressure must be 1100 kPa gauge (160 psig) for street pressure collectors. This test pressure is two times the allowable street pressure, 550 kPa gauge (80 psig), in a dwelling as set out in Section 1213.9 of the 'Standard Plumbing Code,' issued by the Southern Building Code Congress International (Birmingham, Alabama, 1976) and exceeds the required pressure-temperature valve relief setting on hot water tanks, which is 1030 kPa gauge (150 psig).

c. Collectors specified for positive operating pressure less than street pressure 550 kPa gauge (80 psig) must be pressure-tested at one and one-half times the manufacturer's rated operating gauge pressure, but at a minimum of 170 kPa gauge (25 psig).

d. Collectors specified for operating pressures greater than 550 kPa gauge (80 psig) must be pressure tested at 1.5 times the manufacturer's rated operating gauge pressure or 1100 kPa gauge (160 psig), whichever is greater.

e. Collectors specified for operation at atmospheric pressure or below must be pressure tested at the discretion of the test director, but at no greater than 170 kPa gauge (25

psig).

f. Determination of test pressure must be based on documentation supplied by the manufacturer in the application for certification as specified in 6 MCAR S 2.1506 A.4.

g. For liquid collectors, either hydrostatic or pneumatic pressure sources may be used. The test laboratory shall follow the following test procedures: a pressure gauge must be attached to read pressure at the exit port of the collector, the collector completely filled with unheated fluid, and the exit port closed off. Hydraulic pressure must be applied via the inlet port until the gauge indicates the test pressure. After stable test pressure has been reached, the exit port must be closed and the pressure monitored for 15 minutes.

h. Pneumatic pressure sources must be used for air collectors. The following test procedures must be followed: a pressure tap of pipe or tubing must be sealed into the exit port of the test specimen and connected to a manometer which can be read directly to 2.5 Pa (0.01 inch water column) or to a pressure gauge of equivalent accuracy. An air volume meter accurate to within 150 mL (±0.5 cubic feet) must be placed in the air supply system between the supply source and the collector. Pressure of 125 Pa gauge (0.5 inch water column) must be applied via the inlet port and the pressure monitored for one hour. The volume of air added or removed in order to maintain the required pressure must be documented.

4. The test laboratory shall conduct an exposure test to verify integrity of construction after at least 30 days of exposure to adverse conditions. The following methods must be followed:

a. Liquid collectors must be filled completely with clean liquid, following which the liquid must be allowed to gravity-drain for 15 minutes with the collector mounted at a 45 degree tilt angle. The collector inlet and outlet must be loosely sealed.

b. Exposure conditions must consist of 30 days of cumulative exposure to a minimum daily incident solar radiation

flux of 17 MJ/m^2.day (1500 Btu/ft^2.day) as measured in the plane of the collector aperture. The exposure conditions must include at least one consecutive four-hour period with a minimum instantaneous flux of 950 W/m^2(300 Btu/ft^2.hr). The average baseline ambient temperature must be 27 degrees Celsius (80 degrees Fahrenheit) or higher during the four-hour period.

c. Data recorded and reported during exposure testing must include integrated daily solar radiation data. A regularly scheduled weekly visual inspection must also be made, and a record of changes in the physical appearance of the collector must be kept.

5. The laboratory shall conduct a thermal shock/water spray test. During a five minute period on three different days of the exposure test, the collector must be subjected to heavy spray from above or in front of the collector. Spray testing must be conducted after at least one hour of direct sun at a minimum intensity of 850 W/m^2(270 Btu/ft^2.hr) and within two hours of solar noon. These three spray tests must be conducted during the last 10 days of the exposure test.

Water delivery must be at a rate not less than 20 mL/s per square meter of collector (1.8 gallons/ft^2.hr) (2.9 inches of rainfall per hour), with the spray pattern designed to wet the surface that would be wet during a normal rain shower. Temperature of the water must be between 19 and 29 degrees Celsius (65 and 85 degrees Fahrenheit) during the spray test. The procedure of NBSIR 1305A, test 7.3, in 'Provisional Flat Plate Solar Collector Testing Procedures' by D. Waksman et al., first revision, issued by the National Bureau of Standards (Washington D.C., June 1978) must be used.

6. The laboratory shall conduct a thermal shock/cold fill test for liquid collectors. At one time during the test sequence the unfilled collector must be exposed to full sun, not less than 950 W/m^2 (300 Btu/ft^2.hr), for one hour. While the collector is still so exposed, liquid must be circulated through the collector for five minutes at a flow rate of approximately 17 mL/s per square meter of collector (1.5 gallons/hr.ft^2). The

temperature of the entering liquid must be between 19 and 29 degrees Celsius (65 and 85 degrees Fahrenheit) during this test. The procedure of NBSIR 1305A, test 7.4 must be used.

Solar collectors may be certified without the thermal shock/cold fill if their designs are such that cold refill of a hot collector is not allowed. The manufacturer shall state this limitation in writing and the limitation must be included in the test report.

7. The laboratory shall conduct a static pressure test following the provisions of 3. after exposure and before thermal performance testing.

8. The laboratory shall conduct a time constant test to determine the time required for the outlet fluid temperature to attain 63.2 percent of its steady state value following a step change in the input. This figure is used to determine the time period over which temperature and irradiance data are integrated to obtain the computed efficiency values for the thermal performance test. The test method must conform to ASHRAE Standard 93-77, 'Methods of Testing to Determine the Thermal Performance of Solar Collectors,' issued by the Standards Committee of the American Society of Heating, Refrigerating and Air Conditioning Engineers (New York, 1978).

9. The laboratory shall conduct a thermal performance test on those collectors that have met the criteria of D.1.-5. and for which the collector time constant has been determined. The thermal performance test determines "instantaneous" efficiency of the solar collector over a wide range of operating temperatures. Efficiency is defined as the ratio of collected energy to the total available energy falling upon the entire collector area. Collected energy is determined by the product of fluid mass flow, specific heat, and integrated temperature gain across the collector. Available energy is determined by the integrated solar irradiance. Typically, four data points of at least five minutes duration are taken at each of four different inlet fluid temperatures. For unglazed collectors, the inlet fluid temperatures include test temperatures below and

above ambient air temperature. Glazed collectors are normally tested over a range of inlet fluid temperatures from near ambient to approximately 70 degrees Celsius (126 degrees Fahrenheit) above ambient temperature.

The test method used for glazed collectors must conform to ASHRAE Standard 93-77, 'Methods of Testing to Determine the Thermal Performance of Solar Collectors,' issued by the Standards Committee of the American Society of Heating, Refrigerating, and Air Conditioning Engineers (New York, 1978). The test method used for unglazed collectors must conform to ASHRAE Standard 96-80, 'Method of Testing the Thermal Performance of Unglazed Flat Plate Liquid Type Solar Collectors,' issued by the Standards Committee of the American Society of Heating, Refrigerating, and Air Conditioning Engineers (New York, 1980). Any deviations from either standard must be delineated in the test report. Normal incidence data must be taken as specified by ASHRAE Standard 93-77 or 96-80. Test data must be taken within plus or minus five degrees Celsius (nine degrees Fahrenheit) of the maximum temperature differential for which a rating is desired.

10. A collector incident angle modifier determination must be made. The thermal performance curve for a collector is determined when the irradiance incident on the collector is within 30 degrees of normal to the aperture of the collector. To predict collector performance over a wide range of conditions, the test laboratory shall conduct tests to determine the collector incident angle modifier. This is used to modify the efficiency curve (determined within 30 degrees of normal incidence) to account for changes in performance as a function of the sun's incidence angle. The test method used must conform to ASHRAE Standard 93-77, 'Methods of Testing to Determine the Thermal Performance of Solar Collectors,' issued by the Standards Committee of the American Society of Heating, Refrigerating, and Air Conditioning Engineers (New York, 1978) or ASHRAE Standard 96-80, 'Methods of Testing to Determine the Thermal Performance of Unglazed Flat Plate Liquid Type Solar

Collectors,' issued by the Standards Committee of the American Society of Heating, Refrigerating and Air Conditioning Engineers (New York, 1980).

Biaxial incident angle modifiers are required on collectors which are nonsymmetrical in their response to irradiance as solar altitude and azimuth change. These types of collectors have optical characteristics that depend on direction in the aperture plane, so that the incident angle modifier depends on both the solar azimuth in the aperture plane and the angle of incidence. Examples of this type of collector include tubular collectors and collectors employing trough structures, mirrors, or lenses such that the geometries are characterized by biaxial symmetry.

In the case of anisotropic collectors, data must be taken in each of the two perpendicular planes that characterize the collector geometry.

In all cases, the test laboratory shall take enough incident angle modifier data to describe adequately the relationship between the incidence angle and the incident angle modifier.

11. Disassembly and final inspection. The test laboratory shall disassemble the collector and shall visually inspect the major components and subassemblies and shall report their condition. All abnormalities must be reported and accompanied by a photograph. The test laboratory shall use the guide in Exhibit 6 MCAR S 2.1507 C.11.-1 to identify conditions to be reported.

Exhibit 6 MCAR S 2.1507 C.11.-1
Guide for Collector Inspection

Major Components or Subassemblies	Conditions to be Reported
a. Collector case and enclosure fasteners	Cracking, warping, corrosion
b. Mounting means (mounting brackets, flanges, etc.)	Loss of mounting integrity

c. Seals, gaskets	Cracking, loss of elasticity or adhesion
d. Covers and reflectors	Cracking, crazing, buckling, delamination, warping
e. Absorber:	
Coating	Crazing, cracking, blistering
Inlet and outlet tubes	Deformation, corrosion, leakage
Flow tubes	Deformation, corrosion, leakage, loss of bonding
Headers	Deformation, corrosion, leakage
Absorber Mountings	Loss of mounting integrity
f. Insulation	Water retention, swelling, outgassing

D. Collector standards. The following criteria represent the requirements for durability in collector design and construction in order to qualify for certification.

1. All glass cover plates must be of a nonshattering or tempered type.

2. The collector must be designed to prevent condensate buildup. The use of desiccants to control condensation is permitted. The test report should note any unusual condensate buildup.

3. Pressure test results criteria must be as follows:

a. Liquid collectors after testing must be considered passable if: a loss of pressure does not occur; there is no evidence of fluid leakage; and there is no evidence of fluid path deterioration such as by swelling or stretching.

b. Air collectors after testing must be considered

passable if there is no evidence of fluid path deterioration such as swelling or stretching.

4. Thermal shock/water spray test results must show that the collector structure and performance are not degraded by moisture penetration. There must be no cracking, crazing, warping, or buckling of the cover plate.

5. The test laboratory shall terminate the test if it is apparent without collector disassembly that the unit no longer meets the quality requirements of 6.

6. The department may deny certification if the tests show disassembly and final inspection conditions that, in its judgment, may lead to an abnormally short collector life. The conditions are:

a. Severe deformation of the absorber;

b. Severe deformation of the fluid flow passages;

c. Loss of bonding between fluid flow passages and absorber plate;

d. Leakage from fluid flow passages or connections;

e. Loss of mounting integrity;

f. Severe corrosion or other deterioration caused by chemical action;

g. Crazing, cracking, blistering, or flaking of the absorber coating or delamination of reflective surfaces;

h. Retention of water in the insulation;

i. Swelling, severe outgassing, or other detrimental changes in collector insulation that adversely affect collector performance;

j. Cracking, loss of elasticity, or loss of adhesion of gaskets and sealants;

k. Leakage or damage to hoses used inside the collector enclosure or leakage from mechanical connections;

l. Cracking, crazing, permanent warping, or buckling of the cover plate; and

m. Cracking or warping of the collector enclosure materials.

6 MCAR S 2.1508 Evaluation criteria, ratings, and warranties.

A. Standard solar collector. The department shall certify a standard solar collector if:

1. The collector sample has successfully completed the specified testing;

2. The collector has passed the evaluation of the disassembly and final inspection;

3. The application for certifiction is complete;

4. The warranty meets the minimum requirements; and

5. The appropriate application fee is included.

B. Similar solar collector.

1. A collector is eligible for certification as a similar collector only if all materials and construction techniques are identical to the reference collector except that:

a. The collector size has been increased;

b. The cover plates are in the same material category but of a different material;

c. The cover plates are of the same material but of minor differences in thickness; or

d. There are other changes in material or techniques that the manufacturer deems to be insignificant.

2. If the application is based on either 1.b. or 1.c., the thermal performance of a similar collector must be calculated from the test results of the reference collector and the difference in transmissivity between the two cover plates.

3. The department shall grant certification if:

a. The application for certification is complete and all required supporting documents have been provided;

b. The performance and durability of the collector can be accurately and reliably described by the information submitted on and with the application for certification;

c. The warranty meets the minimum requirements; and

d. The appropriate application fee is included.

C. Innovative solar collector. The manufacturer shall propose an evaluation procedure that will fairly and adequately test and evaluate the innovative solar collector and that will result in reliable information about the performance and

durability of the collector. The procedure must include:

1. Testing of a random sample of a production collector for reliability, durability, and thermal performance by an independent laboratory;

2. An application form that adequately describes the collector, its operation, and performance;

3. A procedure for performance rating the collector; and

4. The procedure from the rules for certifying standard collectors specifying the requirements for the manufacturer's commitment, 6 MCAR S 2.1506 A.4.h.; the department's decision, 6 MCAR S 2.1506 A.5.; labeling, 6 MCAR S 2.1506 A.6.; and marketing, 6 MCAR S 2.1506 A.7.

D. Collector manufactured by licensee. A collector manufactured and sold by a licensee of a firm that has previously received certification for the collector must be certified upon:

1. Verification by the licensor that the collector manufactured under its license is identical in materials and construction to the collector already certified;

2. Written authorization from the licensor for the department to certify the collector being manufactured under its license; and

3. Payment of appropriate fees.

E. Rating. The thermal performance of the collector must be rated by using 'Standard RM-1: Methodology for Determining the Thermal Performance of Solar Collectors,' as adopted by the Solar Rating and Certification Corporation (Washington D.C., 1981). Rating values must be provided in at least two adjacent categories specified by "Performance Rating" in the Solar Collector Label Information in Exhibit 6 MCAR S 2.1512-1.

F. Warranty. The intent of the warranty is to encourage the use of solar energy and promote the development of a viable solar industry by providing purchasers with effective, well-designed, carefully manufactured solar collectors and by providing warranty protection for certified solar collectors in accordance with the standards, terms, and conditions specified

in the Magnuson-Moss Warranty -- Federal Trade Commission Improvement Act, 15 United States Code, Sections 2301-2312 (1976), and the regulations promulgated thereunder as found in 16 Code of Federal Regulations, Subchapter G (1981).

1. The manufacturer of a certified solar collector shall give a full warranty against defects in materials, manufacture, or design of a the solar collector for a period equal to at least one year, which begins on the date of sale. In addition, the manufacturer shall provide a limited warranty on the collector for at least 20 percent of the claimed collector design life, beginning one year after the date of sale.

2. The full warranty and any additional express warranties must be in writing and must clearly and conspicuously disclose the following information in readily understood language:

a. The identity of persons to whom the warranty is extended;

b. A clear description and identification of products, parts, characteristics, components, or properties covered by the warranty;

c. A statement of what the warrantor will do in the event of a defect, malfunction, or failure, as provided in 3.;

d. When the warranty term begins and how long it lasts;

e. A step-by-step procedure that the customer should follow to obtain performance of warranty obligations, including a list of the class of persons authorized to perform warranty obligations;

f. If applicable, information concerning the availability of an informal dispute settlement mechanism that the consumer is required to use;

g. If applicable, any exclusion or limitation on incidental or consequential damages, and the statement: "Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you"; and

h. The statement: "This warranty gives you specific

legal rights, and you may also have other legal rights that vary from state to state."

3. The manufacturer, as a warrantor, has the following duties:

a. In the case of a defect, malfunction, or failure of the solar collector to conform with the express warranty, the warrantor shall repair or replace the solar collector within a reasonable time and without charge.

b. If the solar collector contains a defect or malfunction after a reasonable number of attempts by the warrantor to remedy defects or malfunctions, the warrantor shall permit the customer to choose a refund or a replacement of the solar system or component as appropriate. A replacement must include reinstallation without charge.

c. The warrantor need not perform the duties specified in a. and b. if the warrantor can show that the defect, malfunction, or failure was caused by unreasonable use, or that the defect, malfunction, or failure resulted from improper or faulty installation of the solar system.

d. The warrantor may not require a customer to return a warranty registration card as a prerequisite of warranty coverage and performance. The warrantor may not impose any other duty as a condition of obtaining a remedy unless the warrantor can demonstrate that the other duty is reasonable.

e. The warrantor may not limit the duration of any implied warranty on the solar system.

f. The warrantor shall extend the warranty obligations during the term of the express warranty to any person to whom the solar system, or the building on which the solar system is installed, is transferred.

G. Laboratory approval. The department shall approve all laboratories accredited by the Solar Rating and Certification Corporation for solar collector certification testing. The department shall maintain a list of approved laboratories.

6 MCAR S 2.1509 Verification retest. To verify that a certified solar collector being marketed has the same physical and

performance characteristics as the sample that was tested during the initial certification procedures, the department may require that the collector be reevaluated or retested or both. The following procedure must be used.

A. Sampling and testing. The department shall select a sample of the certified collector from the manufacturer's existing stock and examine the materials and design or require that it be tested according to the procedures contained in 6 MCAR S 2.1506 A.1.-A.3. The manufacturer shall pay all fees and charges and submit the results of the retest to the department.

1. If the sample is constructed of the same materials and design as the originally certified collector and passes the retest, if performed, no change shall be made in the certification status and the department shall reimburse the manufacturer for testing and shipping charges actually incurred for the collector retest.

2. If the sample is constructed of different materials or design than the originally certified collector or fails the retest, the department shall suspend certification for the collector and shall notify the manufacturer of the suspension in writing. The collector shall pass the verification retest only if the retest thermal performance ratings are no less than 90 percent of the ratings in any of the categories completed for the certified collector.

B. Challenging results. The manufacturer may challenge the results of the retest and evaluation by requesting, within 20 state business days after the date of the suspension notification, the department to select an additional sample for testing from the manufacturer's stock in accordance with the procedures contained in 6 MCAR S 2.1506 A.1.-A.3. and by submitting the results of the retest to the department.

1. If the second sample passes the retest and evaluation, the department shall promptly reinstate certification.

2. If the second sample fails the retest or evaluation, the department shall formally revoke certification. The results from either test may be used, however, in a subsequent

application for certification as a new collector model.

6 MCAR S 2.1510 Terminating certification. Certification may be terminated in the following ways.

A. Voluntary termination. The manufacturer of a certified product may voluntarily terminate certification by giving written notice to the department. The notice must state the effective termination date and reason for termination.

B. Revocation or suspension of certification. The department may revoke or suspend certification of a solar collector in the event of:

1. Material misrepresentation in the application for certification;

2. Misrepresentation that a collector certification applies to other collector models that have not been certified;

3. Failure to notify the department of changes in materials or designs used in a certified collector;

4. A sample of the collector failing the verification retest; or

5. Failure to comply with a condition of certification or labeling.

If certification is suspended, the department shall notify the manufacturer in writing, including the reasons for suspension and the necessary corrective action. If certification is revoked, a new application is required to recertify the collector.

C. Notification of suspension, termination, or revocation of certification. The department shall notify appropriate state and local agencies and states cooperating with the Solar Rating and Certification Corporation certification program of collectors for which certification has been revoked, suspended, or terminated.

6 MCAR S 2.1511 Appeal process. An applicant aggrieved by a final decision may file a written request for review with the department. The request must be filed within 20 state business days after the date of the final decision. The department shall

appoint an advisory review board made up of two representatives from the solar collector industry and one representative each from the Consumer Service Division of the Department of Commerce, a solar energy technical training institute, and a technical college or university to reconsider the evidence on file. The department shall affirm, modify, or reverse the initial decision based upon the recommendation of the advisory review board and shall inform the applicant of the board's recommendation and the department's action.

6 MCAR S 2.1512 Solar Collector Certificate. The solar collector certificate issued under 6 MCAR SS 2.1501-2.1511 must be in the form in Exhibit 6 MCAR S 2.1512-1.

Exhibit 6 MCAR S 2.1512-1
Solar Collector Certificate

The solar collector identified and described in the Solar Collector Label Information below is certified by the Minnesota Department of Energy, Planning and Development as having met the testing, disclosure, and warranty requirements of the State of Minnesota for solar collector certification.

This certificate entitles the manufacturer or its agent to:

1. Publicize this collector as certified by the State of Minnesota and eligible for the Minnesota residential energy tax credit; and

2. ~~Affix the certification label to each production unit of this collector; and~~

3. Use the certification symbol and label information in advertising, catalogs, or sales promotion material, provided the symbol clearly refers only to certified collectors.

In the application for collector certification the manufacturer agreed to comply with the rules for collector certification. Certification for this solar collector may be revoked or suspended in the event of:

1. Material misrepresentation in the application for certification;

2. Misrepresentation that a collector certification applies to other collector models which have not been certified;

3. Failure to notify the department of changes in materials or designs used in a certified collector;

4. A sample of the collector failing in the verification retest; or

5. Failure to comply with a condition of certification or labeling.

Solar Collector Label Information

Manufactured by: Name_____

Address_____

_____

Model #_____ Serial #_____

Gross Collector Area_____m^2(ft^2) Cover Plate_____

Collector Dimensions

length_____m (ft)

width _____m (ft)

Collector Weight_____kg (lbs)

Fluid Types_____

Fluid Capacity_____L (Gal)

Max. Flow Rate_____Liquid mL/s (Gpm)

Air L/s (SCFM)

Max. Operating Pressure_____kPa gauge (Psi)

Max. Operating Temperature_____ °C (°F)

Thermal Performance Efficiency (ASHRAE 93-77 or 96-80)

Slope_____$W/m^2.°C$ ($Btu/hr.ft^2.°F$)

Y Intercept_____

Incident Angle Modifier, Axis 1_____

Incident Angle Modifier, Axis 2_____

(Not required on all models)

Design Life _____years

Full Warranty _____years

Other Express Warranties _____years

Performance Rating at irradiation of 17 $MJ/m^2.day$

(1500 Btu/ft^2.day)

Delta t (inlet temp.-ambient temp.)	Rating (Energy supplied per panel per day)
+5 °C (+9 °F)	_____MJ (thousand Btu)
+20 °C (+36 °F)	_____MJ (thousand Btu)
+50 °C (+90 °F)	_____MJ (thousand Btu)

Use Restrictions: _____

Minnesota Tax Credit Approval: The label shall contain the statement, "This collector is certified by the State of Minnesota for the Minnesota Residential Energy Credit."

As the duly authorized representative of the State of Minnesota, I hereby grant certification for the solar collector described in this document.

Signature_____

Name_____

Commissioner, Department of Energy, Planning and Development

Date_____

APPROVED AS TO LEGALITY

August 30 19 83

HUBERT H. HUMPHREY, III
ATTORNEY GENERAL

BY Ted A. Mathews
SPECIAL ASSISTANT ATTORNEY GENERAL

STATE OF MINNESOTA
DEPARTMENT OF STATE
FILED
SEPT 7 1983 4:10 P.M.
Joan Anderson Growe
Secretary of State

STATE OF MINNESOTA
Department of Energy and Economic Development

In the Matter of the Proposed Adoption of Rules of the Department of Energy and Economic Development Governing the Certification of Solar Collectors

FINDINGS OF FACT, CONCLUSIONS AND ORDER ADOPTING RULES

In 1980 the legislature required in Laws of 1980, ch. 512 that solar collectors must be certified by the Energy Agency in order to be eligible for the tax credit. Rules for the operation of the certification program were to be developed by the agency. The Energy Agency has since become the Department of Energy and Economic Development, hereinafter called the department.

A Notice of Intent to Solicit Outside Opinions Regarding Rules Concerning the Certification of Solar Collectors was published in the State Register on 1980 May 12 at page 1782.

On 1982 April 05, a Notice of Intent to Adopt Rules Governing the Certification and Registration of Solar Collectors without a Public Hearing was published in the State Register on page 1669. The proposed rules were published in the State Register following the Notice of Intent and copies were sent to all persons requesting them. No comments were received by the department during the comment period.

After affording interested persons an opportunity to submit comments on the proposed rules for 30 days after notice, receiving fewer than seven

written requests for a public hearing within the 30-day comment period, having considered all the evidence adduced upon the records, files and proceedings herein, I find the following:

FINDINGS

1. Though no comments were received during the comment period, certain changes to the proposed rules are being recommended by the department. The deparment believes that the proposed changes are needed and reasonable as proposed, and as modified by these findings, for the reasons set forth in the Statement of Need and Reasonableness and these findings. Furthermore, the department contends that the changes contained in these findings do not substantially change the proposed rules as published.

The form of these Findings of Fact will be to 1) identify the rule number, 2) state the title or a short description, 3) specify the proposed changes by ~~striking~~ unwanted portions and underlining portions to be added, and 4) state the reasons for recommending the change.

2. Recommended changes to the proposed rules:

a. 6MCAR ss 2.1502 QQ. Solar Collector.

"Solar collector" means a device designed to absorb incident solar radiation, to convert it to thermal energy, and to transfer the thermal energy to a fluid in contact with it through either forced or natural convection. For the purposes . . .

Passive solar systems are defined separately in the rules for the tax credit. However, there is a class of solar collectors which require no fans or pumps for their operation, called thermosiphon air panels. Some manufacturers prefer to call these devices "passive solar collectors." To clarify that these types of panels must be certified, the term "natural convection" is added to the definition of the term "solar collector."

b) 6MCAR ss 2.1502 RR. Solar ~~collection~~ collector kit. . . .

This change corrects a misprint in the State Register.

c) 6MCAR ss 2.1503 Applicability of rules.

A. Generally. All solar collectors must be certified or registered according to 6MCAR ss 2.1501-2.1512 at the time of sale to be eligible for the credit. If certification is required for a collector but the collector has not been certified, neither the collector nor other solar system components are eligible for the credit. The collector certification requirements apply no matter who installs the system, whether homeowner, contractor, solar installer, or dealer. All solar collectors which are exempted, registered or certified by the Minnesota Department of Energy, Planning and Development are deemed certified for the purposes of the Individual Income Tax Residential Energy Credit Solar Collector Certification, pursuant to Minn. Stat ss 290.06, sbd. 14.

The first statement requires that the collector be cer-

tified at the time the product is being sold to the customer. If sales people were allowed to market uncertified collectors and project that the collector model will receive certification at a later date, the taxpayer would be basing their decision to purchase the product on speculation. To avoid the problems of speculative sales and to provide positive assurance to the taxpayer that the collector will qualify for the credit, the rules now require that the product must be certified at the time of sale.

The second change assures that the tax credit will be provided to persons with collectors fitting into any of the three categories: certification, registration and exemption. The law states that only certified collectors will be eligible for the credit. However, the term "certified," as used nationally, means that the collector has undergone rigorous testing and has documented performance. It would be inappropriate to "certify" an untested custom built collector, just as it would be to provide certification for a home built collector. To retain the clarity and importance of the terms "certified," "registered," and "exempted," all solar collectors falling into any of the three categories are simply declared certified for the purposes of the tax credit. It is the intent of the department to make it clear in publicity and on the income tax forms that collectors falling in any one of the three categories will qualify for the credit.

d) 6MCAR ss 1.1503 Applicability of rules.

B.4. A manufacturer . . . ASHRAE Standard ~~95-82~~ 95-1981, . . . ASHRAE Standard ~~96-80~~ 96-1980,. . .

ASHRAE decided to assign a four digit year to their standards. In addition, a 1981 date, rather than the expected 1982, was assigned to standard 95.

e) 6MCAR ss 2.1503.B.5. Solar collectors that have been certified . . . or the ~~American~~ Air-Conditioning and Refrigeration Institute . . .

Corrects an error in the interpretation of ARI, the more common term.

f) 6MCAR ss 2.1503.B.6 A blanket exception is granted for a period of ~~six~~ nine months following the effective date . . .

In order to provide time to publicize the collector certification program, the grace period has been extended by three months. The time for initial publicity on the program was not properly considered at the time the proposed rules were drafted.

g) 6MCAR ss 2.1503.B [New paragraph, all new material]

7. Any solar collector included in a renewable energy source expenditure after 1982 February 03 and before the effective date of 6MCAR ss 2.1501-2.1512 shall be deemed certified by the Department of Energy, Planning and Development for the purposes of Minn. Stat. ss 290.06, Sbd. 14(1980), so long as the expenditure qualifies for the federal renewable energy source residential credit of Section 44C of the Internal Revenue Code of 1954 (26 U.S.C. ss 44C), as amended through 1978 December 31, and any regulation promulgated pursuant thereto.

Without this change, there would be a gap between the period of time covered by the temporary rule certifying collectors and the effective date of the permanent rules. The language is taken from the temporary rule, which also automatically qualified collectors for the credit.

h) 6MCAR ss 2.1504.C $50 for an . . . ~~American~~ Air-Conditioning and Refrigeration Institute . . .

Again, corrects an error in the proposed rules.

i) 6MCAR ss 2.1506.E.1

n. Product warranty~~;~~ if any;

It is the intent that registered collectors need not meet the minimum warranty requirments. However, requiring a custom builder to provide a statement on the warranty of a registered collector incorrectly implies that a warranty is required. The added language removes that impression.

j) 6MCAR ss 2.1506 Certification procedure.

F. Solar collector kit or manufactured solar collector.

2. Sale of more than 20 solar systems in Minnesota.

~~C. The manufacturer shall follow the steps for certification as a standard solar collector.~~

c. The manufacturer shall follow the steps for certification as a standard solar collector.

Corrects a format error in the State Register.

k) 6MCAR ss 2.1507.B.2

c. Its collection function cannot be separated from the system function, commonly referred to as an integral collector storage (ICS) device.

Since the draft rules were written, the devices described in this paragraph have come to be known as integral collector storage devices. The change will make the reference to these devices more clear.

l) 6MCAR ss 2.1507.B.2.c.

. . . For these devices, the procedures in C.8. - C.10. must be replaced by the procedures contained in ASHRAE ~~95-82~~ 95-1981, 'Method of Testing to Determine . . . '

This change again refers to the change in ASHRAE procedures.

m) 6MCAR ss 2.1508.F.

1. The manufacturer of a certified solar collector shall give a full warranty against defects in materials, manufacture, or design of ~~a~~ the solar collector for a period . . .

As originally written, the proposed rules may have required that all solar collectors receiving the tax credit would need to meet the minimum warranty requirment. However, it was not intended that exempted or registered collectors must include the minimum warranty. The added phrase is intended to clarify that only collectors achieving full certification are required to meet the warranty requirments.

n) 6MCAR ss 2.1508.G. Laboratory approval. The department . . .

A title was inadvertently omitted from this paragraph.

o) 6MCAR ss 2.1510.B. Revocation or suspension of certification . . .

Adding the preposition adds clarity to the title.

p) 6MCAR ss 2.1512-1 Solar Collector Certificate [paragraph no. 2]

This certificate entitles the manufacturer or its agent to:

1. Publicize this collector as certified by the State of Minnesota and eligible for the Minnesota residential energy tax credit; and

~~2. Affix the certification label to each production unit of this collector, and~~

~~3.~~ 2. Use the certification symbol and label information in advertising, catalogs, or sales promotion materials, provided the symbol clearly refers only to certified collectors.

A label is required to be affixed to the collector. The statement on the certificate that the certificate "entitles" the manufacturer to affix the label to the collector incorrectly implies that affixing the label is optional. Immediately following this section in the collector certificate is a statement that failure to comply with a condition of certification labeling is grounds for suspension or revocation of the certification, which clearly makes labeling manditory. Therefore, removing the labeling statement from the "optional" section removes the confusion.

q) 6MCAR ss 2.1512-1

3. Use of the . . . ~~materials~~ material, provided . . .

Corrects misprint in State Register.

r) 6MCAR ss 2.1512-1 Solar Collector Label Information

Max. Flow Rate_____Liquid mL/s (Gpm)

Air L/s ~~(SCEM)~~ (SCFM)

Corrects error in State Register.

s) 6MCAR ss 2.1512-1

Performance Rating at irradiation of 17 MJ/m2.day (1500 Btu/ft2.day)

Delta t	Rating
(inlet temperature - ambient temperature)	(Energy supplied per panel per day)

The Delta t has a common meaning in context with the performance rating. However, the actual meaning is not stated elsewhere in these rules, so the added parenthetical phrase will specify the temperatures used to calculate the Delta t.

Based on the foregoing findings, I make the following:

CONCLUSIONS

1. The department gave proper notice of its intent to adopt the proposed rules without public hearing.

2. The department has fulfilled the procedural requirements of Minnesota Statutes 14.14, subdivision 1, and all other procedural requirements of law or rule.

3. The department has statutory authority to adopt the proposed rules and fulfilled all other substantive requirements of law or rule within the meaning of the Minnesota Administrative Procedures Act.

4. The department has demonstrated the need for and reasonableness of its proposed rules in its Statement of Need and Reasonableness and the foregoing findings.

ORDER

Notice of the Commissioner's intent to adopt the above-entitled rules without a public hearing was published in the State Register on April 05, 1982 and was sent by United States mail to all persons on the list maintained by the department pursuant to Minnesota Statutes section § MSA 14.14, subdivision 1, on March 31, 1982. After affording interested and affected persons an opportunity to submit comments for a public hearing within the 30-day comment period, reviewing and considering the comments, and determining the need for and reasonableness of the above-captioned rules,

NOW, THEREFORE IT IS ORDERED that these rules identified as 6MCAR 2.1501 - 2.1512 are adopted this 15th day of August, 1983 pursuant to authority invested in me by Minnesota Statutes section 290.06, subdivision 14 (1980).

STATE OF MINNESOTA

Mark B. Dayton
Commissioner of the Department of
Energy and Economic Development

Energy Agency
Alternative Energy Division

Notice of Intent to Solicit Outside Opinions Regarding Rules Concerning the Certification of Solar Collectors

The Alternative Energy Development Division of the Energy Agency is beginning to draft rules concerning the certification of solar collectors for purposes of eligibility for the renewable energy tax credit contained in Laws of 1980, ch. 512.

The department invites interested persons or organizations to provide information, comments and advice on the subject. Comments should be submitted in writing or orally within 30 days to:

John Dunlop, Manager
State Solar Office
Minnesota Energy Agency
980 American Center Building
150 East Kellogg Boulevard
Saint Paul, Minnesota 55101
or call (612) 296-4737.

Recommendations will be made part of the public hearing record.

Energy Agency
Conservation Division

Program Announcement for Institutional Buildings Grants Program

The application deadline for the second program cycle of the Institutional Buildings Grants Program is June 30, 1980.

The Minnesota Energy Agency will accept applications for Federal grants for:

- maxi-audits (technical assistance from schools, hospitals, local government and public care institutions).
- energy conservation measures (ECMs) from schools and hospitals.

The application period will open on May 15, 1980.

There will be one more grant program cycle for schools and hospitals following this one. This is the final grant program cycle for units of local government and public care institutions.

All institutions must complete a mini-audit before applying for maxi-audit funding. A maxi-audit must be completed prior to applying for energy conservation measures funds. The Federal grants are competitive and institutions must provide non-Federal matching funds. In some cases these matching funds will come from a concurrent state program. Work contracted for or conducted before a grantee receives an official notice of grant award is not eligible for funding.

Incomplete applications will not be accepted.

To order an application package for Federal maxi-audit or ECM funding during the second cycle, please write to:

Commercial and Institutional Programs
MEA, Conservation Division
980 American Center Bldg.
150 East Kellogg Blvd.
St. Paul, MN 55101
Telephone: (612) 297-2103

Ethical Practices Board

Request for Advisory Opinion Regarding Contributions and Expenditures on Behalf of Ballot Questions

Summary

The Ethical Practices Board has received a lengthy advisory opinion request from Rep. Jerry Knickerbocker concerning contributions and expenditures on behalf of ballot questions. A copy of the opinion can be obtained by writing or calling: Minnesota Ethical Practices Board, 41 State Office Building, St. Paul, MN 55155—telephone 612-296-5148. The opinion will be discussed at the next board meeting scheduled for May 30th, 9:30 a.m., Room 51, State Office Building, St. Paul, MN.

Department of Health
Community Services Division

Notice of Public Hearing Regarding Fiscal Year 1981 Minnesota State Plan of Program Operations and Administration for the Special Supplemental Food Program for Women, Infants, and Children (WIC)

Pursuant to the requirement of regulations issued by the United States Department of Agriculture under Section 3 of Public Law 95-627 which amends Section 17 of the Child Nutrition Act of 1966, the Minnesota Department of Health will sponsor one public meeting to enable the general public to participate in the development of the Fiscal Year 1981 Minne-

STATE OF MINNESOTA

DEPARTMENT OF ENERGY, PLANNING AND DEVELOPMENT

In the Matter of the Proposed Adoption of Rules of the Department of Energy, Planning and Development Governing Certification and Registration of Solar Collectors to Qualify Renewable Energy Source Expenditures for the Minnesota Individual Income Tax Residential Energy Credit, 6 MCAR §§ 2.1501-2.1512.

ORDER FOR NOTICE OF INTENT TO ADOPT RULES WITHOUT PUBLIC HEARING

IT IS ORDERED this twenty-third day of March, 1982, that a Notice of Intent to Adopt Rules Without Public Hearing in the above-entitled matter be given to all persons who have registered their names with the Department of Energy, Planning and Development for that purpose and be published in the State Register.

DEPARTMENT OF ENERGY, PLANNING AND DEVELOPMENT

Kent Eklund

KENT EKLUND
Commissioner

STATE OF MINNESOTA

DEPARTMENT OF ENERGY, PLANNING AND DEVELOPMENT

In the Matter of the Proposed Adoption of Rules of the Department of Energy, Planning and Development Governing Certification and Registration of Solar Collectors to Qualify Renewable Energy Source Expenditures for the Minnesota Individual Income Tax Residential Energy Credit, 6 MCAR §§ 2.1501-2.1512.

NOTICE OF INTENT TO ADOPT RULES WITHOUT PUBLIC HEARING

NOTICE IS HEREBY GIVEN that the Department of Energy, Planning and Development proposes to adopt the above-entitled rules without a public hearing. The Commissioner has determined that the proposed adoption of these rules will be noncontroversial in nature and has elected to follow the procedures set forth in Minn. Stat. § 15.0412, subd. 4h (Supp. 1981).

Persons interested in these rules shall have 30 days to submit comments on the proposed rules. The proposed rules may be modified if the modifications are supported by the data and views submitted to the department and do not result in a substantial change in the proposed language.

Unless seven or more persons submit written requests for a public hearing on the proposed rules within the 30-day comment period, a public hearing will not be held. In the event a public hearing is required, the department will proceed according to the provisions of Minn. Stat. § 15.0412, subds. 4.-4f.

Persons who wish to submit comments or a written request for a public hearing should submit such comments or request to John R. Dunlop, Manager, Renewable Resource Programs, Energy Division, Department of Energy, Planning and Development, 980 American Center Building, 160 East Kellogg Boulevard, Saint Paul, Minnesota 55101.

Authority for the adoption of these rules is contained in Minn. Stat. § 290.06, subd. 14 (Supp. 1981). Additionally, a Statement of Need and Reasonableness that describes the need for and reasonableness of the rules and of each provision of the proposed rules and identifies the data and information relied upon to support the proposed rules has been prepared and is available from Mr. Dunlop upon request.

Upon adoption of the final rules without a public hearing, the proposed rules, this Notice, the Statement of Need and Reasonableness, all written comments received, and the final Rules as

Adopted will be delivered to the Attorney General for review as to form and legality, including the issue of substantial change. Persons who wish to be advised of the submission of this material to the Attorney General, or who wish to receive a copy of the final Rules as Adopted, should submit a written statement of such request to Mr. Dunlop.

The rules proposed for adoption relate to certification and registration of solar collectors. Only those expenditures for solar collectors which may be deemed "renewable energy source expenditures" qualify those expenditures for the residential energy credit under the Minnesota individual income tax laws. Minn. Stat. § 290.06, subd. 14. The rules establish the criteria for certification of solar collectors which are characterized in several ways, i.e., standard, innovative, similar, kits, custom built, and home built.

Included in the proposed rules is a system for rating collectors as to performance. These ratings must be disclosed to purchasers and may be used to compare collectors' expected performance similar to the use of EPA mileage ratings for comparison, not performance guarantee. It also should be noted that the rules would require that home built collectors, collectors custom built by contractors, and low volume sales collectors need only be registered, not tested and certified.

Copies of this Notice and the proposed rules are available and may be obtained by contacting Mr. Dunlop at the address given above; the rules will also appear in the State Register on April 5, 1982.

Dated: March 24, 1982.

DEPARTMENT OF ENERGY, PLANNING
AND DEVELOPMENT

Kent Eklund
Commissioner

In the Matter of the Proposed Adoption
of Rules of the State Department of Energy
and Economic Development Governing Certification
of Solar Collectors

AFFIDAVIT OF
MAILING

STATE OF MINNESOTA)
)ss.
COUNTY OF RAMSEY)

Debra Ellis, being first duly sworn deposes and says:

That on the 31 day of March, of 1982, at the City of St. Paul, County of Ramsey, State of Minnesota, she served the attached Notice of Intent to Adopt Rules Without Public Hearing by depositing in the State of Minnesota Central Mail System for the United States mailing at said City of St. Paul, a copy thereof, properly enveloped, with postage prepaid, on all persons and associations who have requested that their names be placed of file with the State Department of Energy and Economic Development for the purpose of receiving notice of the proposed adoption of rules by this Department.

Debra Ellis
Debra Ellis
Office of Solar Programs

Subscribed and sworn to before me
this 9th day of AUGUST,
1983.

Dennis M. Devereaux

DENNIS M. DEVEREAUX
NOTARY PUBLIC-MINNESOTA
RAMSEY COUNTY
My Comm. Expires April 1, 1988

STATE OF MINNESOTA

COUNTY OF RAMSEY

CERTIFICATE

In the Matter of the Proposed Adoption
of Rules of the State Department of Energy
and Economic Development Governing Certification
of Solar Collectors

I hereby certify that the list of persons, associations, and other interested groups who have requested, pursuant to Minn. Stat. § MSA 14.14, subdivision 1, that their names be placed on file with and maintained by the State Department of Energy and Economic Development for the purpose of receiving notice of the proposed adoption of rules by this Department is accurate and complete as of 4:00 p.m., this 29 day of March, 1982.

Mary Anderson

Mary Anderson
Data System

Pursuant to Minn. Laws of 1980, § 15.0412, subd. 4h, an agency may propose to adopt, amend, suspend or repeal rules without first holding a public hearing, as long as the agency determines that the rules will be noncontroversial in nature. The agency must first publish a notice of intent to adopt rules without a public hearing, together with the proposed rules, in the *State Register*. The notice must advise the public:

1. that they have 30 days in which to submit comment on the proposed rules;
2. that no public hearing will be held unless seven or more persons make a written request for a hearing within the 30-day comment period;
3. of the manner in which persons shall request a hearing on the proposed rules;

and

4. that the rule may be modified if modifications are supported by the data and views submitted.

If, during the 30-day comment period, seven or more persons submit to the agency a written request for a hearing of the proposed rules, the agency must proceed under the provisions of § 15.0412, subds. 4 through 4g, which state that if an agency decides to hold a public hearing, it must publish in the *State Register* a notice of its intent to do so. This notice must appear at least 30 days prior to the date set for the hearing, along with the full text of the proposed rules. (If the agency has followed the provisions of subd. 4h and has already published the proposed rules, a citation to the prior publication may be substituted for republication.)

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 Energy, Planning and Development Energy Division

Proposed Rules of the Department of Energy, Planning and Development Governing Certification and Registration of Solar Collectors to Qualify Renewable Energy Source Expenditures for the Minnesota Individual Income Tax Residential Energy Credit (6 MCAR §§ 2.1501-2.1512)

Notice of Intent to Adopt Rules without a Public Hearing

Notice is hereby given that the Department of Energy, Planning and Development proposes to adopt the above-entitled rules without a public hearing. The commissioner has determined that the proposed adoption of these rules will be noncontroversial in nature and has elected to follow the procedures set forth in Minn. Stat. § 15.0412, subd. 4h (Supp. 1981).

Persons interested in these rules shall have 30 days to submit comments on the proposed rules. The proposed rules may be modified if the modifications are supported by the data and views submitted to the department and do not result in a substantial change in the proposed language.

Unless seven or more persons submit written requests for a public hearing on the proposed rules within the 30-day comment period, a public hearing will not be held. In the event a public hearing is required, the department will proceed according to the provisions of Minn. Stat. § 15.0412, subds. 4.-4f.

Persons who wish to submit comments or a written request for a public hearing should submit such comments or request to John R. Dunlop, Manager, Renewable Resource Programs, Energy Division, Department of Energy, Planning and Development, 980 American Center Building, 160 East Kellogg Boulevard, Saint Paul, Minnesota 55101.

Authority for the adoption of these rules is contained in Minn. Stat. § 290.06, subd. 14 (Supp. 1981). Additionally, a statement of need and reasonableness that describes the need for and reasonableness of the rules and of each provision of the proposed rules and identifies the data and information relied upon to support the proposed rules has been prepared and is available from Mr. Dunlop upon request.

Upon adoption of the final rules without a public hearing, the proposed rules, this notice, the statement of need and reasonableness, all written comments received, and the final rules as adopted will be delivered to the Attorney General for review as to form and legality, including the issue of substantial change. Persons who wish to be advised of the submission of this material to the Attorney General, or who wish to receive a copy of the final rules as adopted, should submit a written statement of such request to Mr. Dunlop.

KEY: 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." ADOPTED RULES SECTION — Underlining indicates additions to proposed rule language. ~~Strike outs~~ indicate deletions from proposed rule language.

The rules proposed for adoption relate to certification and registration of solar collectors. Only those expenditures for solar collectors which may be deemed "renewable energy source expenditures" qualify those expenditures for the residential energy credit under the Minnesota individual income tax laws. Minn. Stat. § 290.06, subd. 14. The rules establish the criteria for certification of solar collectors which are characterized in several ways, i.e., standard, innovative, similar, kits, custom built, and home built.

Included in the proposed rules is a system for rating collectors as to performance. These ratings must be disclosed to purchasers and may be used to compare collectors' expected performance similar to the use of EPA mileage ratings for comparison, not performance guarantee. It also should be noted that the rules would require that home built collectors, collectors custom built by contractors, and low volume sales collectors need only be registered, not tested and certified.

Copies of this notice and the proposed rules are available and may be obtained by contacting Mr. Dunlop at the address given above.

Kent Eklund, Commissioner

Rules as Proposed (all new material)

6 MCAR § 2.1501 Purpose and authority. Certain renewable energy source expenditures qualify for income tax credit treatment by the Minnesota Department of Revenue. After December 31, 1980, expenditures for a solar collector qualify for the individual income tax residential energy credit only if the Minnesota Department of Energy, Planning and Development has certified the solar collector, pursuant to Minn. Stat. § 290.06, subd. 14. The purpose of 6 MCAR §§ 2.1501-2.1512 is to establish the criteria for certification of solar collectors and the procedures for obtaining certification.

6 MCAR § 2.1502 Definitions. For purposes of 6 MCAR §§ 2.1501-2.1512, the following definitions apply.

A. Absorber. "Absorber" means the part of the solar collector that receives the incident solar radiation and transforms it into thermal energy. It usually is a solid surface through which energy is transmitted to the transfer fluid; however, the transfer fluid itself could be the absorber in certain configurations.

B. Ambient air. "Ambient air" means the outdoor air in the vicinity of the solar collector being tested.

C. Approved. "Approved" means accepted, in writing, by the department.

D. Certification. "Certification" means the act of attesting officially to something as being true and as meeting a standard.

E. Collector. "Collector" means a solar collector.

F. Collector enclosure. "Collector enclosure" means the structural frame that supports the components of the collector and protects internal components from the environment.

G. Concentrating collector. "Concentrating collector" means a solar collector that uses reflectors, lenses, or other optical elements to concentrate the radiant energy passing through the aperture onto an absorber that has a surface area smaller than the aperture.

H. Concentrator. "Concentrator" means the part of the concentrating collector that directs the incident solar radiation onto the absorber.

I. Corrosion. "Corrosion" means the deterioration of a substance or its properties caused by a chemical or electrochemical reaction with its environment.

J. Cover plate. "Cover plate" means the material or materials covering the aperture and most directly exposed to the solar radiation. These materials generally are used to reduce the heat loss from the absorber to the surroundings and to protect the absorber.

K. Crazing. "Crazing" means the formation of minute surface cracks in a major component or subassembly.

L. Credit. "Credit" means the residential energy credit authorized by Minn. Stat. § 290.06, subd. 14.

M. Custom-built solar collector. "Custom-built solar collector" means a site-dependent collector fabricated from components that do not constitute a solar collector kit.

N. Deformation. "Deformation" means a change in shape or form of any material in the collector from the conditions that existed before testing.

O. Delamination. "Delamination" means separation into constituent layers.

P. Department. "Department" means the Minnesota Department of Energy, Planning and Development.

Q. Domestic hot water. "Domestic hot water" means heated tap water, as distinguished from water heated by a hydronic hot water space heating system.

R. Express warranty. "Express warranty" means an affirmation of fact or promise made in connection with the sale or installation of a solar collector or component to a customer that relates to the nature of the material or workmanship and affirms or promises that the material or workmanship is defect free or will meet a specified level of performance over a specified period of time. "Express warranty" also means an undertaking in connection with the sale or installation of a solar system or component to refund, repair, replace, or take other remedial action with respect to the solar system or component. To be an express warranty, the affirmation, promise, or undertaking must become part of the basis of the bargain resulting in the purchase or installation of a solar collector by a customer.

S. Gross collector area. "Gross collector area" means the maximum projected area of the complete collector module, including integral mounting means.

T. Home-built solar collector. "Home-built solar collector" means a collector built by the owner according to purchased plans or the owner's own design from supplies or components that do not constitute a solar collector kit.

U. Inch-pound units. "Inch-pound units" means measurement units that have traditionally been used in the United States, including but not limited to foot, gallon, pound-mass, hour, ampere, degree Fahrenheit and British thermal unit (Btu).

V. Innovative collector. "Innovative collector" means a solar collector that, because of its design, cannot be evaluated fairly and adequately by the test methods described in 6 MCAR § 2.1507.

W. Instantaneous efficiency. "Instantaneous efficiency" of a solar collector means the amount of energy removed by the transfer fluid over a given measuring period divided by the total solar radiation incident onto the gross collector area during the measuring period.

X. Integrity of construction. "Integrity of construction" means the physical and mechanical properties of a solar collector that collectively are responsible for the overall thermal performance and physical structure of the solar collector.

Y. International System of Units. "International System of Units" means the measurement system defined in the 'Standard for Metric Practice,' issued by the American Society for Testing and Materials as ASTM E380-81 (Philadelphia, 1981). It is commonly referred to as the "metric system," though it does not include many metric terms in use before 1960.

Z. Irradiance. "Irradiance" means the rate of solar radiation received by a unit surface area.

AA. Irradiation. "Irradiation" means incident energy per unit area on a surface over a specified time.

BB. Material category. "Material category" means a class of materials of the same generic type; for instance, glass, fiberglass, and plexiglass are materials in the category of collector glazings.

CC. Manufactured solar collector. "Manufactured solar collector" means a solar collector made of components that have been fitted together at an assembly plant. None of the components needs to have been fabricated by the assembly plant for the collector to be classified a manufactured collector.

DD. Model. "Model" means a solar collector distinguishable by a specified size, set of materials, construction, and performance. A change in any of these basic characteristics constitutes a new model.

EE. Nonpublic data. "Nonpublic data" means "trade secret information" as that term is defined in Minn. Stat. § 15.1673, subd. 1, clause (b), that is, government data, including a formula, pattern, compilation, program, device, method, technique, or process:

1. That was supplied by the affected individual or organization;

2. That is the subject of efforts by the individual or organization that are reasonable under the circumstances to maintain its secrecy; and

3. That derives independent economic value, actual or potential, from not being generally known to, and not being readily ascertainable by proper means by, other persons who can obtain economic value from its disclosure or use.

FF. Outgassing. "Outgassing" means the generation of vapors from materials during exposure to elevated temperature or reduced pressure.

GG. Performance rating. "Performance rating" means the rating values based on thermal output characteristics of solar collectors as determined by tests specified in 6 MCAR § 2.1507.

KEY: 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." ADOPTED RULES SECTION — Underlining indicates additions to proposed rule language. ~~Strike outs~~ indicate deletions from proposed rule language.

HH. Reference collector. "Reference collector" means a solar collector currently certified by the department to which a second collector is being compared for the purposes of certification under the similar collector rules found in 6 MCAR § 2.1506 B. and 6 MCAR § 2.1508 B.

II. Reflector or reflective surface. "Reflector" or "reflective surface" means a surface intended primarily to reflect radiant energy.

JJ. Registered. "Registered" means recorded as an eligible expenditure for Minnesota income tax credit.

KK. Revoke certification. "Revoke certification" means to withdraw certification from a solar collector. When certification is revoked, the collector is no longer eligible for the credit. A new application is required to certify a collector for which certification has been revoked.

LL. Service hot water. "Service hot water" means heated tap water in nonresidential applications.

MM. Severe corrosion. "Severe corrosion" means corrosion that impairs the function of a collector or that exhibits evidence that it will progress to the point where it will impair the function of the collector.

NN. Severe deformation. "Severe deformation" means deformation that impairs the function of a collector or that exhibits evidence that it will progress to the point where it will impair the function of the collector.

OO. Similar solar collector. "Similar solar collector" means a collector that is substantially identical to a certified reference collector manufactured by the same firm. The criteria to be used to determine eligibility as a similar collector are found in 6 MCAR § 2.1508 B.

PP. Site-dependent collector. "Site-dependent collector" means a collector intended to be assembled only at the site of application because parts of the building, such as rafters or insulation, are part of the collector, or because the size of the collector makes delivery impractical.

QQ. Solar collector. "Solar collector" means a device designed to absorb incident solar radiation, to convert it to thermal energy, and to transfer the thermal energy to a fluid in contact with it. For purposes of 6 MCAR §§ 2.1501-2.1512, solar collector refers to one specific model of solar collector.

RR. Solar collection kit. "Solar collector kit" means a collection of substantially all major components required to assemble a solar collector which is sold as a unit for the purpose of making a solar collector.

SS. Solar system. "Solar system" means an assembly of solar collectors installed or intended to be installed at a single site, all of which perform a uniform function.

TT. Solar energy. "Solar energy" means the photon energy originating from the sun's radiation primarily encountered in the wavelength region from 0.3 to 2.7 micrometers.

UU. Standard. "Standard" means a document that specifies the performance, durability, or safety requirements for a product.

VV. Standard solar collector. "Standard solar collector" means a solar collector that can be fairly and adequately evaluated under the test sequence identified in 6 MCAR § 2.1507.

WW. State business day. "State business day" means a week day, Monday through Friday, except a holiday listed in Minn. Stat. § 645.44, subd. 5.

XX. Suspend certification. "Suspend certification" means to temporarily withdraw certification of a solar collector. A collector purchased while its certification is suspended is not eligible for the credit. Certification may be reinstated by complying with 6 MCAR §§ 2.1501-2.1512.

YY. Time constant. "Time constant" means the time required for the fluid leaving a solar collector to attain 63.2 percent of its steady state value following a step change in irradiation or inlet fluid temperature.

ZZ. Transfer fluid. "Transfer fluid" means the medium such as air, water, or other fluid that passes through or in contact with the solar collector and carries the thermal energy away from the collector.

6 MCAR § 2.1503 Applicability of rules.

A. Generally. All solar collectors must be certified or registered according to 6 MCAR §§ 2.1501-2.1512 to be eligible for the credit. If certification is required for a collector but the collector has not been certified, neither the collector nor other solar system components are eligible for the credit. The collector certification requirements apply no matter who installs the system, whether homeowner, contractor, solar installer, or dealer.

B. Exceptions.

1. Home-built solar collectors are exempt from certification.

2. Custom-built solar collectors are exempt from the test requirements but must be registered by the department to be eligible for the credit.

3. Solar collector kits or manufactured solar collectors of a single model used in systems with sales in Minnesota of 20 or fewer solar systems in any consecutive 12-month period are exempt from the certification test requirements, but solar systems using these collectors must be registered by the department to be eligible for the credit. The department shall deny registration of more than 20 solar systems in any consecutive 12-month period unless the collectors used in the system have been certified under the provisions of 6 MCAR §§ 2.1501-2.1512.

4. A manufacturer of a solar collector required to be certified which has had the collector tested or contracted to be tested before the effective date of 6 MCAR §§ 2.1501-2.1512 may use the results of that test in its application for certification instead of the test procedures outlined in 6 MCAR § 2.1507. The tests must have been performed at a department-approved laboratory in accordance with ASHRAE Standard 93-77, 'Methods of Testing to Determine the Thermal Performance of Solar Collectors,' issued by the Standards Committee of the American Society of Heating, Refrigerating, and Air Conditioning Engineers (New York, 1978); ASHRAE Standard 95-82, 'Method of Testing to Determine Thermal Performance of Solar Domestic Water Heating Systems,' issued by the Standards Committee of the American Society of Heating, Refrigerating, and Air Conditioning Engineers (New York, 1982); or ASHRAE Standard 96-80, 'Method of Testing the Thermal Performance of Unglazed Flat Plate Liquid Type Solar Collectors,' issued by the Standards Committee of the American Society of Heating, Refrigerating, and Air Conditioning Engineers (New York, 1980).

5. Solar collectors that have been certified by the California Energy Commission, the State of Florida, the Solar Rating and Certification Corporation, the Solar Energy Industry Association, or the American Refrigeration Institute before the expiration of the grace period specified in 6., or by a national organization that meets the criteria in 6 MCAR §§ 2.1501-2.1512, are eligible for automatic certification by the department. However, the manufacturer must file an application with the department in order to receive Minnesota solar collector certification.

6. A blanket exception is granted for a period of six months following the effective date of 6 MCAR §§ 2.1501-2.1512 to provide for timely and orderly testing, rating, and certification of solar collectors. All expenditures for solar collectors after the expiration of the grace period must be in accordance with 6 MCAR §§ 2.1501-2.1512 to be eligible for the credit.

6 MCAR § 2.1504 Application fees. Fees for processing an application are:

A. $300 for an application for certification of a standard or innovative collector based on new or previous testing;

B. $100 for an application to certify a similar collector;

C. $50 for an application based on previous certification by the Solar Rating and Certification Corporation, Solar Energy Industry Association, American Refrigeration Institute, California Energy Commission, or the State of Florida as authorized by 6 MCAR § 2.1503 B.5.;

D. $50 for an application to certify a collector manufactured under license to a previous recipient of certification on the collector;

E. $50 for a resubmitted application after the 180-day time limit; and

F. $10 for an application for registration of a solar system using a custom-built collector or registration of a solar system using a solar collector kit or a manufactured solar collector with sales in Minnesota of 20 or fewer solar systems in any consecutive 12-month period.

Checks in payment of fees must be made payable to "Treasurer, State of Minnesota."

6 MCAR § 2.1505 Units of measure. The International System of Units is the preferred measurement system for purposes of certification.

The information in the certification label must be in the International System of Units specified in Exhibit 6 MCAR § 2.1512-1. Values in inch-pound units, if included, must be placed in parentheses following the value in the International System of Units. Note that the measurements in 6 MCAR § 2.1507 and succeeding rules are given in the International System of Units followed by the measurements in inch-pound units in parentheses, as illustrated by 6 MCAR § 2.1507 C.3.b.

Inch-pound units may be used in the application for certification until further notice. If inch-pound units are used, however, the applicant is encouraged to include the values in the International System of Units in parentheses following the values in

KEY: 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." ADOPTED RULES SECTION — Underlining indicates additions to proposed rule language. ~~Strike outs~~ indicate deletions from proposed rule language.

inch-pound units to facilitate the use of the information in the application after the transition to the International System of Units has been completed. Contact the department for assistance with measurement units.

6 MCAR § 2.1506 Certification procedure.

A. Standard solar collector. The provision of 1.-8. govern certification procedures for standard solar collectors.

1. The manufacturer shall request the department to select a solar collector from the manufacturer's stock.

2. Within two weeks of the request, or at a mutually agreeable time, a representative of the department shall randomly select one solar collector sample from an existing stock of at least five units at the manufacturer's plant or at a distribution point.

3. The manufacturer shall have the designated sample tested in accordance with the test procedures contained in 6 MCAR § 2.1507 at a department-approved laboratory of the manufacturer's choice and at the manufacturer's expense.

4. If the sample completes the prescribed series of performance and durability tests and passes the inspection, the manufacturer may submit an application for certification. The application must be signed and dated by an authorized agent of the company and two witnesses. The manufacturer may designate information submitted to the department as nonpublic data by requesting that designation plainly and legibly on the application. Test results required for certification shall be considered public only if certification is granted. The application must contain the following:

a. It must contain product label information in the format provided by Exhibit 6 MCAR § 2.1512-1.

b. It must contain the product warranty.

c. It must contain a test report including: thermal performance curve; incident angle modifier; collector time constant; conditions used to establish performance such as flow rate and fluid; exposure or stagnation test results; and results from final inspection after disassembly.

d. It must describe the following products or materials by type and commercial designations: cover plates; absorber plate; absorber coatings; reflectors or lenses; collector enclosure; insulation; caulking, sealants, and gaskets; thermal and mechanical bonds, including the bonding used for reflecting materials that are not the same material as the reflector backing; trim, retaining strips, mounting brackets, or other hardware; connecting hoses; control system sensors; and reflector mounting frame. Upon request by the department, the applicant shall furnish information relating to the reflector mounting frame's thermal or flame spread properties, electrical corrosion resistance, ultraviolet radiation, pollutants, or optical characteristics, as specified by the supplier. The application must also contain a component-by-component declaration of combustibility, including the rating, the rating method, and the test standard used.

e. It must contain collector drawings of sufficient detail to accurately represent: aperture cover plate dimension and mounting detail; absorber plate dimensions including thickness, location, and spacing of fluid flow paths, cross-section dimensions and shape of flow channels, tube wall thickness, and plate-to-tube heat transfer provisions; collector enclosure dimensions, provisions for attaching absorber and plate, and size and location of holes; collector assembly detail specifying fasteners and other attachment methods indicating overall dimensions; and for concentrator type, a cross-sectional view, dimensions, and mounting detail.

f. It must contain working fluid or flow rate recommendations or restrictions. If a heat transfer fluid other than water is to be used, fluid properties of specific heat, density, viscosity, thermal conductivity, and toxicity must be provided.

g. It must contain installation, operation, and maintenance considerations.

h. It must contain the following statement of commitment by the manufacturer:

"As the manufacturer (importer) of the solar collector described in this application, I (we) affirm that all of the information contained herein is correct. Furthermore, if certification for this collector is granted, I (we) agree to: represent a collector as certified only when it is manufactured of the same materials and specifications as the collector that was originally certified; permanently affix the certification label to all production units of the certified collector sold in Minnesota; notify the department of changes in collector materials or construction; provide copies of the department's solar collector certificate to the consumer upon request; permit the department to select, at any time, a certified collector offered for sale or on display for a retest of the collector to verify its compliance to the original specifications and performance; notify the department of licenses awarded to manufacture this collector and other model or brand names under which this collector is marketed; and honor the warranty expressed in the application for certification for the full term of the warranty."

5. The department shall evaluate the application and notify the manufacturer in writing of the approval or rejection of the application within 40 state business days after receiving the application.

a. If certification is granted, the department shall calculate the thermal performance rating and provide a signed Solar Collector Certificate as provided in Exhibit 6 MCAR § 2.1512-1 and photo-ready copies of the certification symbol.

b. If certification is denied, the department shall specify the reasons for rejection and identify the necessary corrective action. If all identified corrections are made and the manufacturer has resubmitted the application to the department within 180 days after the date of the rejection notice, the department shall approve the application and certify the collector without additional fees. After that time a resubmittal fee must accompany the application. If the manufacturer has resubmitted the application and the department has made a final decision to deny certification, the manufacturer may initiate the appeal process of 6 MCAR § 2.1511.

6. The manufacturer shall permanently affix the certification symbol and the required label information, in a form approved by the department, to all production units of the certified model and not to any other piece of the solar system.

a. The manufacturer may produce labels from the certification symbol and label design provided by the department; design its own label that includes the certification symbol and required label information; or include the certification symbol and required label information in the manufacturer's nameplate.

b. The manufacturer shall submit a sample of the proposed label or nameplate and written request for approval to the department before using the label or nameplate. The department shall grant approval if all the required label information is presented clearly and legibly, the certification symbol is accurately presented, and the label or nameplate material will reasonably withstand exposure to the climate.

c. The department shall send the manufacturer written approval or rejection of the sample and, if appropriate, the reasons for rejection within 15 state business days after receiving the sample and written request.

d. The certification symbol may be used in advertising, catalogs, or sales promotion material. The symbol must clearly refer only to certified collectors.

7. The manufacturer shall promptly notify the department of licenses awarded to manufacture this collector and other model or brand names under which the solar collector is marketed.

8. The department shall maintain a list of all certified collectors and provide the product label information to consumers.

B. Similar solar collector. A collector that is substantially identical to a certified or reference collector manufactured by the same firm is eligible for certification based upon the test results from the reference collector. The following procedure must be used:

1. The manufacturer shall provide to the department the following material:

a. A copy of the application for certification of the reference collector;

b. An application in accordance with A.4. for certification of the similar collector;

c. A statement completely describing all physical differences between the reference and similar collectors;

d. A statement projecting any changes in performance, reliability, or durability that are expected because of the change in physical properties;

e. The data, assumptions, and procedures used to develop the projections in d.; and

f. The appropriate application fees.

The manufacturer may designate new information submitted to the department as nonpublic data by requesting the designation plainly and legibly at the time the information is supplied.

2. The department shall evaluate the application for certification of the similar model and supporting documentation and notify the manufacturer in writing of the approval or rejection of the application within 40 state business days after receiving the application.

a. If certification is granted, the department shall calculate the thermal performance rating and provide a signed collector certificate and photo-ready copies of the certification symbol.

b. If certification is denied, the department shall specify the reasons for rejection. The manufacturer may develop additional supporting arguments and request a review by the department. The department shall send written notification of its final decision to the manufacturer within 20 state business days after receiving the request for review. If certification has been denied, the collector may be tested and a new application, with appropriate fees, may be filed with the department. The department's final decision is subject to the appeal process under 6 MCAR § 2.1511.

KEY: 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." ADOPTED RULES SECTION — Underlining indicates additions to proposed rule language. ~~Strike outs~~ indicate deletions from proposed rule language.

3. The manufacturer of a collector certified under B. shall follow the labeling, other model number, and brand name requirements of the procedures for a standard solar collector required by A.6. and A.7.

C. Innovative solar collector. The provisions of 1. and 2. govern certification procedures for innovative solar collectors.

1. The manufacturer shall describe the collector and explain why it cannot be fairly and adequately evaluated by the standard solar collector procedure contained in A. The manufacturer shall propose a procedure to the department for testing and evaluating the innovative collector. The detail of both the description and the procedure should be sufficient to allow the department to fairly assess the validity of the proposed evaluation criteria. The manufacturer may designate information submitted to the department as nonpublic data by requesting the designation plainly and legibly at the time the information is supplied.

2. The department shall evaluate the proposed procedure and notify the manufacturer of its decision on the proposal within 40 state business days after receiving the proposal.

a. If the proposal is accepted, the manufacturer shall follow the process outlined in the proposal. The appropriate fees must be included in the formal application for certification.

b. If the proposal is rejected, the department shall specify the reasons for its decision. The manufacturer may revise the criteria or procedure or both and resubmit the proposal to the department. If the department makes a final decision to reject the proposal, or if it denies certification in a final decision under the terms of the accepted evaluation procedures, the manufacturer may appeal.

D. Collector manufactured by licensee. A certified collector that is also manufactured and sold under license is eligible for certification by the department to the licensee without additional testing. The following procedure must be used:

1. The licensee shall provide the department with the following material:

a. A copy of the application submitted by the original manufacturer for original certification of the collector;

b. An application in accordance with A.4. for certification of the collector; and

c. Appropriate application fees.

The licensee may designate new information submitted to the department as nonpublic data by requesting the designation plainly and legibly at the time the information is supplied.

2. The licensee shall request the licensor to send to the department a written authorization to certify the licensed collector and a declaration that the collector is identical in all respects to the originally certified collector.

3. The department shall review the application and letter of authorization and notify the licensee in writing of the approval or rejection of the application within 40 state business days after receiving the application.

a. If certification is granted, the department shall provide a signed collector certificate and photo-ready copies of the certification symbol.

b. If certification is denied, the department shall specify the reasons for rejection. The licensee may request a review by the department and offer additional material in support of the application. The department shall send the manufacturer written notification of its final decision within 20 state business days after receiving the request for review. The department's final decision is subject to the appeal process of 6 MCAR § 2.1511.

4. The manufacturer of a licensed collector certified by the department shall follow the labeling, other model number, and brand name requirements of the procedures for a standard solar collector required by A.6. and A.7.

E. Custom-built solar collectors.

1. The contractor of a custom-built solar collector shall apply to the department for tax credit registration for the solar system the contractor intends to build. Though custom-built solar collectors are not required to be tested, the contractor must supply sufficient information about the collector to allow the department to register it as a unique collector. The application must include the following information:

a. Name, firm, and address of the contractor;

b. Name and address of the customer;

c. Gross collector area;

d. Collector dimensions;

e. Cover plate material;

f. Absorber plate material;

g. Insulation;

h. Framing material;

i. Sealants;

j. Heat transfer fluid;

k. Mounting surface type;

l. Orientation;

m. Slope angle from horizontal;

n. Product warranty;

o. Owner's manual or instructions, if any; and

p. Thermal performance estimates, if any.

2. If the necessary information has been provided, the department shall assign a registration number and send a solar system registration document to the customer, with a copy to the contractor, within ten state business days after receiving the application.

F. Solar collector kit or manufactured solar collector. A solar system using a model of a solar collector kit or a manufactured solar collector is eligible for registration for the tax credit if 20 or fewer solar systems using the collector have been registered by the department during a consecutive 12-month period. If 20 solar systems have been registered during a 12-month period, additional solar systems are eligible for registration only if the department has approved a grace period in accordance with 2.a.

1. Sale of 20 solar systems or fewer.

a. If 20 or fewer solar systems using a model of a solar collector kit or manufactured solar collector have been registered during a consecutive 12-month period, the manufacturer or dealer of the solar collector kit or manufactured solar collector must apply to the department for registration in order for the solar system to be eligible for the credit. The application must include the following information: product label information required by Exhibit 6 MCAR § 2.1512-1 excluding information on the thermal performance efficiency and performance rating; name and address of purchaser; description of the major components in the kit or manufactured solar collector, including glazing material, absorber material and surface, insulation, enclosure, and sealants; and working fluid and flow rate recommendations or restrictions.

b. If the manufacturer has complied with the requirements in a., the department shall assign a registration number and send a solar system registration document to the customer, with a copy to the dealer or manufacturer, within ten state working days after receiving the application.

2. Sale of more than 20 solar systems in Minnesota.

a. The manufacturer of a solar collector kit or manufactured solar collector may apply to the department for a six-month grace period in order to complete testing and certification requirements. The application must include evidence that a collector sample has been selected by the department and submitted to an accredited laboratory for Minnesota certification testing.

b. The department shall review the application. If the criteria have been met, the department shall approve the grace period. All systems using the model of solar collector kit or manufactured solar collector sold during the grace period are eligible for tax credit registration by the department.

C. The manufacturer shall follow the steps for certification as a standard solar collector.

6 MCAR § 2.1507 Test methods and minimum standards for certifying solar collectors.

A. Purpose. Rule 6 MCAR § 2.1507 specifies the test methods to be followed and the standards to be met in determining the thermal performance and the durability of solar collectors used for space heating and cooling and water heating. Only collector models meeting the standards are eligible for the certification label.

B. Scope.

1. Rule 6 MCAR § 2.1507 applies to liquid and air collectors. It provides a means for evaluating the maintainability and structural integrity of solar collectors and data for determining a thermal performance rating for solar collectors.

KEY: 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." ADOPTED RULES SECTION — Underlining indicates additions to proposed rule language. Strike outs indicate deletions from proposed rule language.

2. The procedures in C.8.-C.10. cannot be followed for devices meeting the following description:

a. The device is intended for solar domestic water heating systems:

b. Its collectors cannot be appropriately tested under the requirements of ASHRAE Standard 93-77, "Methods of Testing to Determine the Thermal Performance of Solar Collectors," issued by the Standards Committee of the American Society of Heating, Refrigerating, and Air Conditioning Engineers (New York, 1978): and

c. Its collection function cannot be separated from the system function.

For these devices, the procedures in C.8.-C.10. must be replaced by the procedures contained in ASHRAE Standard 95-82, "Method of Testing to Determine Thermal Performance of Solar Domestic Water Heating Systems," issued by the Standards Committee of the American Society of Heating, Refrigerating, and Air Conditioning Engineers (New York, 1982), and SRCC Standard 200-82, "Test Methods and Minimum Standards for Certifying Solar Water Heating Systems," issued by the Solar Rating and Certification Corporation (Washington D.C., March 1982).

C. Test methods for solar collectors.

1. Solar collector testing shall be performed in the following sequence:

a. Receiving inspection:

b. Static pressure test:

c. Thirty-day exposure test:

d. Thermal shock/water spray test:

e. Thermal shock/cold fill test:

f. Static pressure test:

g. Collector time constant determination test;

h. Thermal performance test;

i. Incident angle modifier test: and

j. Disassembly and final inspection.

2. Upon receiving a collector for tests, the test laboratory shall inspect and document the condition of the collector.

3. The laboratory shall conduct a static pressure test before exposure testing.

a. The test method must be specific to the type of collector. Collectors are categorized as follows: street pressure solar collectors (collectors which, by virtue of their installation in a municipal water system, will be directly subjected to variations in street water pressure and hot water tank pressure); low pressure service hot water collectors (collectors which, by virtue of their installation, will not have a direct fluid interchange with an auxiliary heater or street pressure, but use an appropriate heat exchanger); or alternate fluid solar collectors (collectors which, by virtue of design, are not intended to have a direct fluid connection to a solar water heating system). Alternate fluid solar collectors may or may not be designed to accept street pressure.

b. The test pressure must be 1100 kPa gauge (160 psig) for street pressure collectors. This test pressure is two times the allowable street pressure, 550 kPa gauge (80 psig), in a dwelling as set out in Section 1213.9 of the "Standard Plumbing Code," issued by the Southern Building Code Congress International (Birmingham, Alabama, 1976) and exceeds the required pressure-temperature valve relief setting on hot water tanks, which is 1030 kPa gauge (150 psig).

c. Collectors specified for positive operating pressure less than street pressure 550 kPa gauge (80 psig) must be pressure-tested at one and one-half times the manufacturer's rated operating gauge pressure, but at a minimum of 170 kPa gauge (25 psig).

d. Coilectors specified for operating pressures greater than 550 kPa gauge (80 psig) must be pressure tested at 1.5 times the manufacturer's rated operating gauge pressure or 1100 kPa gauge (160 psig), whichever is greater.

e. Collectors specified for operation at atmospheric pressure or below must be pressure tested at the discretion of the test director, but at no greater than 170 kPa gauge (25 psig).

f. Determination of test pressure must be based on documentation supplied by the manufacturer in the application for certification as specified in 6 MCAR § 2.1506 A.4.

g. For liquid collectors, either hydrostatic or pneumatic pressure sources may be used. The test laboratory shall follow the following test procedures: a pressure gauge must be attached to read pressure at the exit port of the collector, the collector completely filled with unheated fluid, and the exit port closed off. Hydraulic pressure must be applied via the inlet port

until the gauge indicates the test pressure. After stable test pressure has been reached, the exit port must be closed and the pressure monitored for 15 minutes.

h. Pneumatic pressure sources must be used for air collectors. The following test procedures must be followed: a pressure tap of pipe or tubing must be sealed into the exit port of the test specimen and connected to a manometer which can be read directly to 2.5 Pa (0.01 inch water column) or to a pressure gauge of equivalent accuracy. An air volume meter accurate to within 150 mL (±0.5 cubic feet) must be placed in the air supply system between the supply source and the collector. Pressure of 125 Pa gauge (0.5 inch water column) must be applied via the inlet port and the pressure monitored for one hour. The volume of air added or removed in order to maintain the required pressure must be documented.

4. The test laboratory shall conduct an exposure test to verify integrity of construction after at least 30 days of exposure to adverse conditions. The following methods must be followed:

a. Liquid collectors must be filled completely with clean liquid, following which the liquid must be allowed to gravity-drain for 15 minutes with the collector mounted at a 45 degree tilt angle. The collector inlet and outlet must be loosely sealed.

b. Exposure conditions must consist of 30 days of cumulative exposure to a minimum daily incident solar radiation flux of 17 MJ/m^2.day (1500 Btu/ft^2.day) as measured in the plane of the collector aperture. The exposure conditions must include at least one consecutive four-hour period with a minimum instantaneous flux of 950 W/m^2(300 Btu/ft^2.hr). The average baseline ambient temperature must be 27 degrees Celsius (80 degrees Fahrenheit) or higher during the four-hour period.

c. Data recorded and reported during exposure testing must include integrated daily solar radiation data. A regularly scheduled weekly visual inspection must also be made, and a record of changes in the physical appearance of the collector must be kept.

5. The laboratory shall conduct a thermal shock/water spray test. During a five minute period on three different days of the exposure test, the collector must be subjected to heavy spray from above or in front of the collector. Spray testing must be conducted after at least one hour of direct sun at a minimum intensity of 850 W/m^2(270 Btu/ft^2.hr) and within two hours of solar noon. These three spray tests must be conducted during the last 10 days of the exposure test.

Water delivery must be at a rate not less than 20 mL/s per square meter of collector (1.8 gallons/ft^2.hr) (2.9 inches of rainfall per hour), with the spray pattern designed to wet the surface that would be wet during a normal rain shower. Temperature of the water must be between 19 and 29 degrees Celsius (65 and 85 degrees Fahrenheit) during the spray test. The procedure of NBSIR 1305A, test 7.3, in 'Provisional Flat Plate Solar Collector Testing Procedures' by D. Waksman et al., first revision, issued by the National Bureau of Standards (Washington D.C., June 1978) must be used.

6. The laboratory shall conduct a thermal shock/cold fill test for liquid collectors. At one time during the test sequence the unfilled collector must be exposed to full sun, not less than 950 W/m^2(300 Btu/ft^2.hr), for one hour. While the collector is still so exposed, liquid must be circulated through the collector for five minutes at a flow rate of approximately 17 mL/s per square meter of collector (1.5 gallons/hr.ft^2). The temperature of the entering liquid must be between 19 and 29 degrees Celsius (65 and 85 degrees Fahrenheit) during this test. The procedure of NBSIR 1305A, test 7.4 must be used.

Solar collectors may be certified without the thermal shock/cold fill if their designs are such that cold refill of a hot collector is not allowed. The manufacturer shall state this limitation in writing and the limitation must be included in the test report.

7. The laboratory shall conduct a static pressure test following the provisions of 3. after exposure and before thermal performance testing.

8. The laboratory shall conduct a time constant test to determine the time required for the outlet fluid temperature to attain 63.2 percent of its steady state value following a step change in the input. This figure is used to determine the time period over which temperature and irradiance data are integrated to obtain the computed efficiency values for the thermal performance test. The test method must conform to ASHRAE Standard 93-77, 'Methods of Testing to Determine the Thermal Performance of Solar Collectors,' issued by the Standards Committee of the American Society of Heating, Refrigerating and Air Conditioning Engineers (New York, 1978).

9. The laboratory shall conduct a thermal performance test on those collectors that have met the criteria of D.1.-5. and for which the collector time constant has been determined. The thermal performance test determines "instantaneous"

KEY: 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." ADOPTED RULES SECTION — Underlining indicates additions to proposed rule language. ~~Strike outs~~ indicate deletions from proposed rule language.

efficiency of the solar collector over a wide range of operating temperatures. Efficiency is defined as the ratio of collected energy to the total available energy falling upon the entire collector area. Collected energy is determined by the product of fluid mass flow, specific heat, and integrated temperature gain across the collector. Available energy is determined by the integrated solar irradiance. Typically, four data points of at least five minutes duration are taken at each of four different inlet fluid temperatures. For unglazed collectors, the inlet fluid temperatures include test temperatures below and above ambient air temperature. Glazed collectors are normally tested over a range of inlet fluid temperatures from near ambient to approximately 70 degrees Celsius (126 degrees Fahrenheit) above ambient temperature.

The test method used for glazed collectors must conform to ASHRAE Standard 93-77, 'Methods of Testing to Determine the Thermal Performance of Solar Collectors,' issued by the Standards Committee of the American Society of Heating, Refrigerating, and Air Conditioning Engineers (New York, 1978). The test method used for unglazed collectors must conform to ASHRAE Standard 96-80, 'Method of Testing the Thermal Performance of Unglazed Flat Plate Liquid Type Solar Collectors,' issued by the Standards Committee of the American Society of Heating, Refrigerating, and Air Conditioning Engineers (New York, 1980). Any deviations from either standard must be delineated in the test report. Normal incidence data must be taken as specified by ASHRAE Standard 93-77 or 96-80. Test data must be taken within plus or minus five degrees Celsius (nine degrees Fahrenheit) of the maximum temperature differential for which a rating is desired.

10. A collector incident angle modifier determination must be made. The thermal performance curve for a collector is determined when the irradiance incident on the collector is within 30 degrees of normal to the aperture of the collector. To predict collector performance over a wide range of conditions, the test laboratory shall conduct tests to determine the collector incident angle modifier. This is used to modify the efficiency curve (determined within 30 degrees of normal incidence) to account for changes in performance as a function of the sun's incidence angle. The test method used must conform to ASHRAE Standard 93-77, 'Methods of Testing to Determine the Thermal Performance of Solar Collectors,' issued by the Standards Committee of the American Society of Heating, Refrigerating, and Air Conditioning Engineers (New York, 1978) or ASHRAE Standard 96-80, 'Methods of Testing to Determine the Thermal Performance of Unglazed Flat Plate Liquid Type Solar Collectors,' issued by the Standards Committee of the American Society of Heating, Refrigerating and Air Conditioning Engineers (New York, 1980).

Biaxial incident angle modifiers are required on collectors which are nonsymmetrical in their response to irradiance as solar altitude and azimuth change. These types of collectors have optical characteristics that depend on direction in the aperture plane, so that the incident angle modifier depends on both the solar azimuth in the aperture plane and the angle of incidence. Examples of this type of collector include tubular collectors and collectors employing trough structures, mirrors, or lenses such that the geometries are characterized by biaxial symmetry.

In the case of anisotropic collectors, data must be taken in each of the two perpendicular planes that characterize the collector geometry.

In all cases, the test laboratory shall take enough incident angle modifier data to describe adequately the relationship between the incidence angle and the incident angle modifier.

11. Disassembly and final inspection. The test laboratory shall disassemble the collector and shall visually inspect the major components and subassemblies and shall report their condition. All abnormalities must be reported and accompanied by a photograph. The test laboratory shall use the guide in Exhibit 6 MCAR § 2.1507 C.11.-1 to identify conditions to be reported.

Exhibit 6 MCAR § 2.1507 C.11.-1
Guide for Collector Inspection

Major Components or Subassemblies	Conditions to be Reported
a. Collector case and enclosure fasteners	Cracking, warping, corrosion
b. Mounting means (mounting brackets, flanges, etc.)	Loss of mounting integrity
c. Seals, gaskets	Cracking, loss of elasticity or adhesion
d. Covers and reflectors	Cracking, crazing, buckling, delamination, warping
e. Absorber:	
Coating	Crazing, cracking, blistering
Inlet and outlet tubes	Deformation, corrosion, leakage
Flow tubes	Deformation, corrosion, leakage, loss of bonding
Headers	Deformation, corrosion, leakage
Absorber Mountings	Loss of mounting integrity
f. Insulation	Water retention, swelling, outgassing

D. Collector standards. The following criteria represent the requirements for durability in collector design and construction in order to qualify for certification.

1. All glass cover plates must be of a nonshattering or tempered type.

2. The collector must be designed to prevent condensate buildup. The use of desiccants to control condensation is permitted. The test report should note any unusual condensate buildup.

3. Pressure test results criteria must be as follows:

a. Liquid collectors after testing must be considered passable if: a loss of pressure does not occur; there is no evidence of fluid leakage; and there is no evidence of fluid path deterioration such as by swelling or stretching.

b. Air collectors after testing must be considered passable if there is no evidence of fluid path deterioration such as swelling or stretching.

4. Thermal shock/water spray test results must show that the collector structure and performance are not degraded by moisture penetration. There must be no cracking, crazing, warping, or buckling of the cover plate.

5. The test laboratory shall terminate the test if it is apparent without collector assembly that the unit no longer meets the quality requirements of 6.

6. The department may deny certification if the tests show disassembly and final inspection conditions that, in its judgment, may lead to an abnormally short collector life. The conditions are:

a. Severe deformation of the absorber;

b. Severe deformation of the fluid flow passages;

c. Loss of bonding between fluid flow passages and absorber plate;

d. Leakage from fluid flow passages or connections;

e. Loss of mounting integrity;

f. Severe corrosion or other deterioration caused by chemical action;

g. Crazing, cracking, blistering, or flaking of the absorber coating or delamination of reflective surfaces;

h. Retention of water in the insulation;

i. Swelling, severe outgassing, or other detrimental changes in collector insulation that adversely affect collector performance;

j. Cracking, loss of elasticity, or loss of adhesion of gaskets and sealants;

k. Leakage or damage to hoses used inside the collector enclosure or leakage from mechanical connections;

l. Cracking, crazing, permanent warping, or buckling of the cover plate; and

m. Cracking or warping of the collector enclosure materials.

6 MCAR § 2.1508 Evaluation criteria, ratings, and warranties.

A. Standard solar collector. The department shall certify a standard solar collector if:

1. The collector sample has successfully completed the specified testing;

2. The collector has passed the evaluation of the disassembly and final inspection;

3. The application for certification is complete;

4. The warranty meets the minimum requirements; and

5. The appropriate application fee is included.

B. Similar solar collector.

1. A collector is eligible for certification as a similar collector only if all materials and construction techniques are identical to the reference collector except that:

KEY: 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." ADOPTED RULES SECTION — Underlining indicates additions to proposed rule language. ~~Strike outs~~ indicate deletions from proposed rule language.

a. The collector size has been increased;

b. The cover plates are in the same material category but of a different material;

c. The cover plates are of the same material but of minor differences in thickness; or

d. There are other changes in material or techniques that the manufacturer deems to be insignificant.

2. If the application is based on either 1.b. or 1.c., the thermal performance of a similar collector must be calculated from the test results of the reference collector and the difference in transmissivity between the two cover plates.

3. The department shall grant certification if:

a. The application for certification is complete and all required supporting documents have been provided;

b. The performance and durability of the collector can be accurately and reliably described by the information submitted on and with the application for certification;

c. The warranty meets the minimum requirements; and

d. The appropriate application fee is included.

C. Innovative solar collector. The manufacturer shall propose an evaluation procedure that will fairly and adequately test and evaluate the innovative solar collector and that will result in reliable information about the performance and durability of the collector. The procedure must include:

1. Testing of a random sample of a production collector for reliability, durability, and thermal performance by an independent laboratory;

2. An application form that adequately describes the collector, its operation, and performance;

3. A procedure for performance rating the collector; and

4. The procedure from the rules for certifying standard collectors specifying the requirements for the manufacturer's commitment, 6 MCAR § 2.1506 A.4.h.; the department's decision, 6 MCAR § 2.1506 A.5.; labeling, 6 MCAR § 2.1506 A.6.; and marketing, 6 MCAR § 2.1506 A.7.

D. Collector manufactured by licensee. A collector manufactured and sold by a licensee of a firm that has previously received certification for the collector must be certified upon:

1. Verification by the licensor that the collector manufactured under its license is identical in materials and construction to the collector already certified;

2. Written authorization from the licensor for the department to certify the collector being manufactured under its license; and

3. Payment of appropriate fees.

E. Rating. The thermal performance of the collector must be rated by using 'Standard RM-1: Methodology for Determining the Thermal Performance of Solar Collectors,' as adopted by the Solar Rating and Certification Corporation (Washington D.C., 1981). Rating values must be provided in at least two adjacent categories specified by "Performance Rating" in the Solar Collector Label Information in Exhibit 6 MCAR § 2.1512.-1.

F. Warranty. The intent of the warranty is to encourage the use of solar energy and promote the development of a viable solar industry by providing purchasers with effective, well-designed, carefully manufactured solar collectors and by providing warranty protection for certified solar collectors in accordance with the standards, terms, and conditions specified in the Magnuson-Moss Warranty—Federal Trade Commission Improvement Act, 15 United States Code, Sections 2301-2312 (1976), and the regulations promulgated thereunder as found in 16 Code of Federal Regulations, Subchapter G (1981).

1. The manufacturer shall give a full warranty against defects in materials, manufacture, or design of a solar collector for a period equal to at least one year, which begins on the date of sale. In addition, the manufacturer shall provide a limited warranty on the collector for at least 20 percent of the claimed collector design life, beginning one year after the date of sale.

2. The full warranty and any additional express warranties must be in writing and must clearly and conspicuously disclose the following information in readily understood language:

a. The identity of persons to whom the warranty is extended;

b. A clear description and identification of products, parts, characteristics, components, or properties covered by the warranty;

c. A statement of what the warrantor will do in the event of a defect, malfunction, or failure, as provided in 3.;

d. When the warranty term begins and how long it lasts;

e. A step-by-step procedure that the customer should follow to obtain performance of warranty obligations, including a list of the class of persons authorized to perform warranty obligations;

f. If applicable, information concerning the availability of an informal dispute settlement mechanism that the consumer is required to use;

g. If applicable, any exclusion or limitation on incidental or consequential damages, and the statement: "Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you"; and

h. The statement: "This warranty gives you specific legal rights, and you may also have other legal rights that vary from state to state."

3. The manufacturer, as a warrantor, has the following duties:

a. In the case of a defect, malfunction, or failure of the solar collector to conform with the express warranty, the warrantor shall repair or replace the solar collector within a reasonable time and without charge.

b. If the solar collector contains a defect or malfunction after a reasonable number of attempts by the warrantor to remedy defects or malfunctions, the warrantor shall permit the customer to choose a refund or a replacement of the solar system or component as appropriate. A replacement must include reinstallation without charge.

c. The warrantor need not perform the duties specified in a. and b. if the warrantor can show that the defect, malfunction, or failure was caused by unreasonable use, or that the defect, malfunction, or failure resulted from improper or faulty installation of the solar system.

d. The warrantor may not require a customer to return a warranty registration card as a prerequisite of warranty coverage and performance. The warrantor may not impose any other duty as a condition of obtaining a remedy unless the warrantor can demonstrate that the other duty is reasonable.

e. The warrantor may not limit the duration of any implied warranty on the solar system.

f. The warrantor shall extend the warranty obligations during the term of the express warranty to any person to whom the solar system, or the building on which the solar system is installed, is transferred.

G. The department shall approve all laboratories accredited by the Solar Rating and Certification Corporation for solar collector certification testing. The department shall maintain a list of approved laboratories.

6 MCAR § 2.1509 Verification retest. To verify that a certified solar collector being marketed has the same physical and performance characteristics as the sample that was tested during the initial certification procedures, the department may require that the collector be reevaluated or retested or both. The following procedure must be used.

A. Sampling and testing. The department shall select a sample of the certified collector from the manufacturer's existing stock and examine the materials and design or require that it be tested according to the procedures contained in 6 MCAR § 2.1506 A.1.-A.3. The manufacturer shall pay all fees and charges and submit the results of the retest to the department.

1. If the sample is constructed of the same materials and design as the originally certified collector and passes the retest, if performed, no change shall be made in the certification status and the department shall reimburse the manufacturer for testing and shipping charges actually incurred for the collector retest.

2. If the sample is constructed of different materials or design than the originally certified collector or fails the retest, the department shall suspend certification for the collector and shall notify the manufacturer of the suspension in writing. The collector shall pass the verification retest only if the retest thermal performance ratings are no less than 90 percent of the ratings in any of the categories completed for the certified collector.

B. Challenging results. The manufacturer may challenge the results of the retest and evaluation by requesting, within 20 state business days after the date of the suspension notification, the department to select an additional sample for testing from the manufacturer's stock in accordance with the procedures contained in 6 MCAR § 2.1506 A.1.-A.3. and by submitting the results of the retest to the department.

KEY: 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." ADOPTED RULES SECTION — Underlining indicates additions to proposed rule language. ~~Strike outs~~ indicate deletions from proposed rule language.

1. If the second sample passes the retest and evaluation, the department shall promptly reinstate certification.

2. If the second sample fails the retest or evaluation, the department shall formally revoke certification. The results from either test may be used, however, in a subsequent application for certification as a new collector model.

6 MCAR § 2.1510 Terminating certification. Certification may be terminated in the following ways.

A. Voluntary termination. The manufacturer of a certified product may voluntarily terminate certification by giving written notice to the department. The notice must state the effective termination date and reason for termination.

B. Revocation or suspension certification. The department may revoke or suspend certification of a solar collector in the event of:

1. Material misrepresentation in the application for certification;

2. Misrepresentation that a collector certification applies to other collector models that have not been certified;

3. Failure to notify the department of changes in materials or designs used in a certified collector;

4. A sample of the collector failing the verification retest; or

5. Failure to comply with a condition of certification or labeling.

If certification is suspended, the department shall notify the manufacturer in writing, including the reasons for suspension and the necessary corrective action. If certification is revoked, a new application is required to recertify the collector.

C. Notification of suspension, termination, or revocation of certification. The department shall notify appropriate state and local agencies and states cooperating with the Solar Rating and Certification Corporation certification program of collectors for which certification has been revoked, suspended, or terminated.

6 MCAR § 2.1511 Appeal process. An applicant aggrieved by a final decision may file a written request for review with the department. The request must be filed within 20 state business days after the date of the final decision. The department shall appoint an advisory review board made up of two representatives from the solar collector industry and one representative each from the Consumer Service Division of the Department of Commerce, a solar energy technical training institute, and a technical college or university to reconsider the evidence on file. The department shall affirm, modify, or reverse the initial decision based upon the recommendation of the advisory review board and shall inform the applicant of the board's recommendation and the department's action.

6 MCAR § 2.1512 Solar Collector Certificate. The solar collector certificate issued under 6 MCAR §§ 2.1501-2.1511 must be in the form in Exhibit 6 MCAR § 2.1512-1.

Exhibit 6 MCAR § 2.1512-1
Solar Collector Certificate

The solar collector identified and described in the Solar Collector Label Information below is certified by the Minnesota Department of Energy, Planning and Devlopment as having met the testing, disclosure, and warranty requirements of the State of Minnesota for solar collector certification.

This certificate entitles the manufacturer or its agent to:

1. Publicize this collector as certified by the State of Minnesota and eligible for the Minnesota residential energy tax credit;

2. Affix the certification label to each production unit of this collector; and

3. Use the certification symbol and label information in advertising, catalogs, or sales promotion materials, provided the symbol clearly refers only to certified collectors.

In the application for collector certification the manufacturer agreed to comply with the rules for collector certification. Certification for this solar collector may be revoked or suspended in the event of:

1. Material misrepresentation in the application for certification;

2. Misrepresentation that a collector certification applies to other collector models which have not been certified;

3. Failure to notify the department of changes in materials or designs used in a certified collector;

4. A sample of the collector failing in the verification retest; or

5. Failure to comply with a condition of certification or labeling.

Solar Collector Label Information

Manufactured by: Name _____
Address _____
_____

Model # _____ Serial # _____
Gross Collector Area _____ m^2(ft^2) Cover Plate _____
Collector Dimensions
length _____ m (ft)
width _____ m (ft)
Collector Weight _____ kg (lbs)
Fluid Types _____
Fluid Capacity _____ L (Gal)
Max. Flow Rate _____ Liquid mL/s (Gpm)
Air L/s (SCEM)
Max. Operating Pressure _____ kPa guage (Psi)
Max. Operating Temperature _____ °C (°F)
Thermal Performance Efficiency (ASHRAE 93-77 or 96-80)
Slope _____ $W/m^2.°C$ ($Btu/hr.ft^2.°F$)
Y Intercept _____
Incident Angle Modifier, Axis 1 _____
Incident Angle Modifier, Axis 2 _____

(Not required on all models)

Design Life _____ years
Full Warranty _____ years
Other Express Warranties _____ years

Performance Rating at irradiation of 17 MJ/m^2.day (1500 Btu/ft^2.day)

Delta t	Rating (Energy supplied per panel per day)
+ 5 °C (+ 9 °F)	_____ MJ (thousand Btu)
−20 °C (−36 °F)	_____ MJ (thousand Btu)
−50 °C (−90 °F)	_____ MJ (thousand Btu)

Use Restrictions: _____

Minnesota Tax Credit Approval: The label shall contain the statement, "This collector is certified by the State of Minnesota for the Minnesota Residential Energy Credit."

As the duly authorized representative of the State of Minnesota, I hereby grant certification for the solar collector described in this document.

Signature _____

Name _____

Commissioner, Department of Energy, Planning and Development

Date _____

KEY: 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." ADOPTED RULES SECTION — Underlining indicates additions to proposed rule language. ~~Strike outs~~ indicate deletions from proposed rule language.

STATE OF MINNESOTA
Department of Energy and Economic Development

In the Matter of the Proposed Adoption of Rules of the Department of Energy and Economic Development Governing the Certification of Solar Collectors

FINDINGS OF FACT, CONCLUSIONS AND ORDER ADOPTING RULES

In 1980 the legislature required in Laws of 1980, ch. 512 that solar collectors must be certified by the Energy Agency in order to be eligible for the tax credit. Rules for the operation of the certification program were to be developed by the agency. The Energy Agency has since become the Department of Energy and Economic Development, hereinafter called the department.

A Notice of Intent to Solicit Outside Opinions Regarding Rules Concerning the Certification of Solar Collectors was published in the State Register on 1980 May 12 at page 1782.

On 1982 April 05, a Notice of Intent to Adopt Rules Governing the Certification and Registration of Solar Collectors without a Public Hearing was published in the State Register on page 1669. The proposed rules were published in the State Register following the Notice of Intent and copies were sent to all persons requesting them. No comments were received by the department during the comment period.

After affording interested persons an opportunity to submit comments on the proposed rules for 30 days after notice, receiving fewer than seven

written requests for a public hearing within the 30-day comment period, having considered all the evidence adduced upon the records, files and proceedings herein, I find the following:

FINDINGS

1. Though no comments were received during the comment period, certain changes to the proposed rules are being recommended by the department. The deparment believes that the proposed changes are needed and reasonable as proposed, and as modified by these findings, for the reasons set forth in the Statement of Need and Reasonableness and these findings. Furthermore, the department contends that the changes contained in these findings do not substantially change the proposed rules as published.

The form of these Findings of Fact will be to 1) identify the rule number, 2) state the title or a short description, 3) specify the proposed changes by ~~striking~~ unwanted portions and <u>underlining</u> portions to be added, and 4) state the reasons for recommending the change.

2. Recommended changes to the proposed rules:

a. 6MCAR ss 2.1502 QQ. Solar Collector.

"Solar collector" means a device designed to absorb incident solar radiation, to convert it to thermal energy, and to transfer the thermal energy to a fluid in contact with it <u>through either forced or natural convection.</u> For the purposes . . .

p.6

Passive solar systems are defined separately in the rules for the tax credit. However, there is a class of solar collectors which require no fans or pumps for their operation, called thermosiphon air panels. Some manufacturers prefer to call these devices "passive solar collectors." To clarify that these types of panels must be certified, the term "natural convection" is added to the definition of the term "solar collector."

b) 6MCAR ss 2.1502 RR. Solar ~~collection~~ collector kit. . . .

This change corrects a misprint in the State Register.

c) 6MCAR ss 2.1503 Applicability of rules.

A. Generally. All solar collectors must be certified or registered according to 6MCAR ss 2.1501-2.1512 at the time of sale to be eligible for the credit. If certification is required for a collector but the collector has not been certified, neither the collector nor other solar system components are eligible for the credit. The collector certification requirements apply no matter who installs the system, whether homeowner, contractor, solar installer, or dealer. All solar collectors which are exempted, registered or certified by the Minnesota Department of Energy, Planning and Development are deemed certified for the purposes of the Individual Income Tax Residential Energy Credit Solar Collector Certification, pursuant to Minn. Stat ss 290.06, sbd. 14.

The first statement requires that the collector be cer-

tified at the time the product is being sold to the customer. If sales people were allowed to market uncertified collectors and project that the collector model will receive certification at a later date, the taxpayer would be basing their decision to purchase the product on speculation. To avoid the problems of speculative sales and to provide positive assurance to the taxpayer that the collector will qualify for the credit, the rules now require that the product must be certified at the time of sale.

The second change assures that the tax credit will be provided to persons with collectors fitting into any of the three categories: certification, registration and exemption. The law states that only certified collectors will be eligible for the credit. However, the term "certified," as used nationally, means that the collector has undergone rigorous testing and has documented performance. It would be inappropriate to "certify" an untested custom built collector, just as it would be to provide certification for a home built collector. To retain the clarity and importance of the terms "certified," "registered," and "exempted," all solar collectors falling into any of the three categories are simply declared certified for the purposes of the tax credit. It is the intent of the department to make it clear in publicity and on the income tax forms that collectors falling in any one of the three categories will qualify for the credit.

d) 6MCAR ss 1.1503 Applicability of rules.

B.4. A manufacturer . . . ASHRAE Standard ~~95-82~~ 95-1981, . . . ASHRAE Standard ~~96-80~~ 96-1980,. . . p.8

ASHRAE decided to assign a four digit year to their standards. In addition, a 1981 date, rather than the expected 1982, was assigned to standard 95.

e) 6MCAR ss 2.1503.B.5. Solar collectors that have been certified . . . or the ~~American~~ Air-Conditioning and Refrigeration Institute . . . p.8

Corrects an error in the interpretation of ARI, the more common term.

f) 6MCAR ss 2.1503.B.6 A blanket exception is granted for a period of ~~six~~ nine months following the effective date . . . p.9

In order to provide time to publicize the collector certification program, the grace period has been extended by three months. The time for initial publicity on the program was not properly considered at the time the proposed rules were drafted.

g) 6MCAR ss 2.1503.B [New paragraph, all new material]

7. Any solar collector included in a renewable energy source expenditure after 1982 February 03 and before the effective date of 6MCAR ss 2.1501-2.1512 shall be deemed certified by the Department of Energy, Planning and Development for the purposes of Minn. Stat. ss 290.06, Sbd. 14(1980), so long as the expenditure qualifies for the federal renewable energy source residential credit of Section 44C of the Internal Revenue Code of 1954 (26 U.S.C. ss 44C), as amended through 1978 December 31, and any regulation promulgated pursuant thereto. ✓ p. 9

Without this change, there would be a gap between the period of time covered by the temporary rule certifying collectors and the effective date of the permanent rules. The language is taken from the temporary rule, which also automatically qualified collectors for the credit.

h) 6MCAR ss 2.1504.C $50 for an . . . ~~American~~ Air-Conditioning and Refrigeration Institute . . . ✓ p. 9

Again, corrects an error in the proposed rules.

i) 6MCAR ss 2.1506.E.1

n. Product warranty~~;~~ if any; ✓ p. 18

It is the intent that registered collectors need not meet the minimum warranty requirments. However, requiring a custom builder to provide a statement on the warranty of a registered collector incorrectly implies that a warranty is required. The added language removes that impression.

j) 6MCAR ss 2.1506 Certification procedure.

F. Solar collector kit or manufactured solar collector.

2. Sale of more than 20 solar systems in Minnesota.

~~C. The manufacturer shall follow the steps for certification as a standard solar collector.~~

c. The manufacturer shall follow the steps for certification as a standard solar collector.

p.19

Corrects a format error in the State Register.

k) 6MCAR ss 2.1507.B.2

c. Its collection function cannot be separated from the system function, commonly referred to as an integral collector storage (ICS) device.

p. 20

Since the draft rules were written, the devices described in this paragraph have come to be known as integral collector storage devices. The change will make the reference to these devices more clear.

l) 6MCAR ss 2.1507.B.2.c.

. . . For these devices, the procedures in C.8. - C.10. must be replaced by the procedures contained in ASHRAE ~~95-82~~ 95-1981, 'Method of Testing to Determine . . . '

p.20

This change again refers to the change in ASHRAE procedures.

m) 6MCAR ss 2.1508.F.

1. The manufacturer <u>of a certified solar collector</u> shall give a full warranty against defects in materials, manufacture, or design of ~~a~~ <u>the</u> solar collector for a period . . . p.31

As originally written, the proposed rules may have required that all solar collectors receiving the tax credit would need to meet the minimum warranty requirment. However, it was not intended that exempted or registered collectors must include the minimum warranty. The added phrase is intended to clarify that only collectors achieving full certification are required to meet the warranty requirments.

n) 6MCAR ss 2.1508.G. <u>Laboratory approval.</u> The department . . . p.32

A title was inadvertently omitted from this paragraph.

o) 6MCAR ss 2.1510.B. Revocation or suspension <u>of</u> certification . . . p-34

Adding the preposition adds clarity to the title.

p) 6MCAR ss 2.1512-1 Solar Collector Certificate [paragraph no. 2]

This certificate entitles the manufacturer or its agent to:

1. Publicize this collector as certified by the State of Minnesota and eligible for the Minnesota residential energy tax credit; and

~~2. Affix the certification label to each production unit of this collector, and~~ p.35

~~3.~~ 2. Use the certification symbol and label information in advertising, catalogs, or sales promotion materials, provided the symbol clearly refers only to certified collectors.

A label is required to be affixed to the collector. The statement on the certificate that the certificate "entitles" the manufacturer to affix the label to the collector incorrectly implies that affixing the label is optional. Immediately following this section in the collector certificate is a statement that failure to comply with a condition of certification labeling is grounds for suspension or revocation of the certification, which clearly makes labeling manditory. Therefore, removing the labeling statement from the "optional" section removes the confusion.

q) 6MCAR ss 2.1512-1

3. Use of the . . . ~~materials~~ material, provided . . . p.35

Corrects misprint in State Register.

r) 6MCAR ss 2.1512-1 Solar Collector Label Information

Max. Flow Rate_____Liquid mL/s (Gpm)

Air L/s ~~(SCEM)~~ (SCFM)

Corrects error in State Register.

s) 6MCAR ss 2.1512-1

Performance Rating at irradiation of 17 MJ/m2.day (1500 Btu/ft2.day)

Delta t Rating

(inlet temperature - ambient temperature) (Energy supplied per panel per day)

The Delta t has a common meaning in context with the performance rating. However, the actual meaning is not stated elsewhere in these rules, so the added parenthetical phrase will specify the temperatures used to calculate the Delta t.

Based on the foregoing findings, I make the following:

CONCLUSIONS

1. The department gave proper notice of its intent to adopt the proposed rules without public hearing.

2. The department has fulfilled the procedural requirements of Minnesota Statutes § 14.14, subdivision 1, and all other procedural requirements of law or rule.

3. The department has statutory authority to adopt the proposed rules and fulfilled all other substantive requirements of law or rule within the meaning of the Minnesota Administrative Procedures Act.

4. The department has demonstrated the need for and reasonableness of its proposed rules in its Statement of Need and Reasonableness and the foregoing findings.

ORDER

Notice of the Commissioner's intent to adopt the above-entitled rules without a public hearing was published in the State Register on April 05, 1982 and was sent by United States mail to all persons on the list maintained by the department pursuant to Minnesota Statutes section § MSA 14.14, subdivision 1, on March 31, 1982. After affording interested and affected persons an opportunity to submit comments for a public hearing within the 30-day comment period, reviewing and considering the comments, and determining the need for and reasonableness of the above-captioned rules,

NOW, THEREFORE IT IS ORDERED that these rules identified as 6MCAR 2.1501 - 2.1512 are adopted this 15th day of August, 1983 pursuant to authority invested in me by Minnesota Statutes section 290.06, subdivision 14 (1980).

STATE OF MINNESOTA

Mark B. Dayton
Commissioner of the Department of
Energy and Economic Development

STATEMENT OF NEED AND REASONABLENESS

SOLAR COLLECTOR CERTIFICATION

DEPARTMENT OF ENERGY, PLANNING AND DEVELOPMENT

INTRODUCTION

Minnesota adopted the Residential Energy Credit of 1979 for certain renewable energy equipment and earth sheltered homes. Active solar systems for space and/or water heating, wind energy systems and geothermal energy conversion devices automatically qualify for the state tax credit since they are eligible for the federal tax credit. Specific rules define passive solar systems, earth sheltered homes and biomass conversion equipment that qualify for the state tax credit.

In 1980, the legislature became concerned that these tax credits could be applied to solar equipment that could not perform as claimed by the seller. Occasionally the misrepresentations were due to errors or misunderstandings, but others were due to outright fraud. As the solar collector is the least understood component of most active solar systems, the 1980 legislature passed legislation requiring that solar collectors sold in the state after 1981 January 01 be certified for durability and performance by the Energy Division of the Department of Energy, Planning and Development in order to qualify for the state tax credit. The law included specific measures for the certification process.

Collector certification programs had been operating in other states prior to 1980. Most notably, the states of California and Florida had well developed programs. Unfortunately, those programs were not compatable with each other, and there was no assurance that other states adopting collector certification requirements would develop procedures consistent with any of the previously operating programs. A number of states interested in promoting the use of solar energy, including Minnesota, formed a group of state government representatives in 1979 to develop national guidelines for the operation and test procedures for collector certification programs. With U.S. Department of Energy assistance, the group represented 36 states and became known as the Interstate Solar Coordination Council (ISCC).

Minnesota certification procedures were needed by June of 1980 to assure that certified collectors would be available to consumers by early 1981. However, the ISCC concensus procedure draft was not finalized until December of 1980. Thus, the department elected to adopt a brief, temporary rule which would automatically certify all collectors sold after 1980 December 31. Essentially, that rule extended the conditions for receiving the tax credit that had been in effect before the collector certification law was passed, i.e., all collectors qualifying for the federal credit would qualify for the state credit. Adopting a temporary rule gave department officials time to work with the ISCC to develop final national collector certification guidelines, and to adopt a Minnesota program based on the guidelines.

Both the ISCC and the department worked closely with the solar industry in developing the guidelines. Nationally, the Solar Energy Industry Association (SEIA) worked diligently with ISCC to assure that the

certification procedure would be acceptable to the industry. In Minnesota, the two major solar energy groups representing the design and manufacturing indurtries at the time, the Minnesota Solar Energy Association (MSEA) and the Solar Resource Advisory Panel (SRAP), contributed greatly to the form of the final rules being proposed.

SEIA began their own solar collector certification program in 1979. After ISCC formulated its recommended guidelines, SEIA dropped its program and joined ISCC to form a corporation dedicated to the testing and certification of solar equipment, called the Solar Rating and Certification Corporation (SRCC). The SRCC, based in Washington, DC, has members from both SEIA and ISCC on its Board of Directors. SRCC personnel assure that manufacturers comply with the requirements for certification, and grant SRCC Certification. All six states currently requiring collector certification will accept either SRCC certification or the testing required for SRCC certification.

Rules Concerning the Certification of Solar Collectors was published in the State Register on page 1782. On 1982 April 05, a Notice of Intent to Adopt Rules Governing the Certification and Registration of Solar Collectors without a Public Hearing was published in the State Register on page 1669. This notice allowed for comments on the proposed rules, which were published immediately following the notice, for a period of 30 days.

OUTLINE

The proposed rules will allow a manufacturer to use certification by SRCC, or other national organization meeting the criteria in the proposed

rules, for automatic certification in Minnesota. The testing and certification documents from the national program are simply submitted with application for Minnesota collector certification.

If the evaluation is performed by the department, the certification procedure can be summarized as follows:

1) Department randomly selects one collector from at least five in the manufacturers stock.

2) Manufacturer has sample collector tested at independent testing laboratory.

3) Manufacturer applies for certification by the Department.

4) Department calculates performance rating and evaluates safety and durability test results.

5) Department grants certification.

6) Manufacturer affixes certification label to units eligible for the tax credit.

Testing performed on the collector previous to the effective date of the rules may be sufficient testing for the Minnesota certification program.

Special procedures are used to certify collectors which are 1) similar to a collector model previously certified by the Department, 2) innovative and cannot be tested and evaluated according to the standard procedures or 3) manufactured under license to the holder of the original collector cer-

tification. All collectors certified by the Department must have a minimum warranty specified in the rules. A six month grace period is provided to allow for testing and certification of collectors.

Certain types of collectors or categories of collectors may be eligible for registration by the Department, which is much less rigorous than the certification process, but still qualifies the system for the tax credit. Custom built collectors, collectors with low volume sales and the initial collectors of a new model manufacturered by a firm may be eligible for registration. Collectors constructed by the taxpayer for their own use from components which do not comprise a kit are eligible for the credit but are exempt from either certification or registration.

This statement of need and reasonableness will explain why the steps in certifying collectors are required for an efficient, effective program. The proposed rules are identical in many respects to the procedures recommended by the ISCC and used by the SRCC. In addition, the Minnesota ISCC representative helped develop many of the ISCC procedures. Consequently, it is recommended that the proposed rules copied from the ISCC procedures be adopted without change in order to be consistent with national guidelines.

The format used in presenting this statement of needs and reasonableness will be to 1) identify the rule number, 2) state the title or a short description and 3) explain the intent and need of the proposed rule. Direct quotes from the rules will be underlined.

6 MCAR 1.1501 Purpose and authority.

This section is necessary to identify the statutory authority and requirements for the Department to promulgate these rules.

6 MCAR 1.1502 Definitions.

The terms included in this section are used in the following rules and may not be precisely understood by the reader. Some of the entries are simply definitions commonly used in the solar community, while others are precise statements to clarify terms which may have multiple definitions. Definitions of may of the technical terms are extracted directly from the ISCC guidelines.

6 MCAR 1.1503 Applicability of rules.

A. Generally.

This section identifies the generic types of solar collectors which are required to be certified in order to be eligible expenditures for the renewable energy tax credit.

Note sentence 2: If certification is required for a collector but the collector has not been certified, neither the collector nor other solar system components are eligible for the credit.

This statement is needed because a taxpayer may infer that only the collector must be excluded from eligibility for the tax credit if it is not certified, and may claim a credit on the other system components. Excluding all system components is reasonable since it is not possible to accurately represent the performance and durability of the collector, and hence the system, if the collector has not been properly tested and evaluated.

This section also states that all solar collectors need to be certified, regardless who installs the system. In general, for the purpose of these rules, a solar collector is considered independently from the system. Therefore, it is reasonable that the type of installer is not crucial to compliance with the requirements for solar collector certification.

B. Exceptions.

It is the intent of these rules to require that solar collectors which are mass produced and mass marketed--those which may have a major impact on

solar system sales--must be certified to assure that the collectors have met minimum durability standards and that the claimed performance can be documented. However, it is important not to inhibit individual or corporate innovation or the variety of marketed collectors.

The exceptions listed in this section attempt to provide maximum flexibility to manufacturers of solar collectors and to create alternative mechanisms to comply with these rules for persons building systems completely tailored to the requirments of the site and applications. In addition, it is intended that collectors which have previously been tested or certified will be able to use that information in complying with these rules. Those exceptions are as follows:

1) Home-built solar collectors. As the labor to build a solar collector cannot be claimed in the tax credit, and home built collectors are frequently made from conventional materials, home-built collectors tend to be low cost. In addition, an owner/builder tends to be more aware of the operation of their collector, so the collector tends to be quite reliable. Under the standard procedures, every taxpayer who builds their own system would need to have their collector tested and certified to be eligible for the tax credit. To avoid this unreasonable requirment, home-built collectors are exempt from certification.

2) Custom-built solar collectors. Some contractors build solar collectors which are completely tailored to the application and the site of installation. Each installation tends to be unique, with significant differences between the collectors used at different sites. These collectors would be eligible for registration. However, a contractor who uses a con-

sistent set of materials to build a collector at the site to a uniform design would be simply assembling a solar collector kit. Solar collector kits, even if assembled at the site, are required to be tested according to the full certification procedure.

The concept of "registration" is being established in these rules to allow the department to monitor the number and type of collectors receiving the tax credit without being certified. Registration is needed to assure both the taxpayer and the contractor that the device being constructed will be eligible for the tax credit, but will not require nor imply that the collector has been fully evaluated according to these rules. Registration simply means that a system using the collector has been noted by the Department and that the system will be an eligible expenditure for the tax credit. The collector is thoroughly described in the application for registration. If a contractor builds many (more than 20) systems a year using collectors which are identical from site to site, the contractor will need to have a sample of that collector tested and the contractor will need to apply for collector certification.

Though the registration process will entail paperwork for the contractor, it is a reasonable requirement since it is a positive method of assuring that the system will be eligible for the tax credit without needing to have the collector tested and evaluated. Contractors reviewing the draft of this provision indicated that the procedure appears to fit into their normal sales and installation cycle.

3) Low volume sales. As a collector design is developed, a manufacturer typically produces a few units of the model to evaluate the manufac-

turability and marketability of the product. In addition, even if a manufacturer applies for certification immediately after the collector design is finalized, testing and evaluation typically requires 4 to 6 months to complete. The intent of this exception is to allow a manufacturer to sell the first units of a new model as eligible for the tax credit even though the collector is not certified. The manufacturer, or their agent, will simply need to register each of the installations made using the new model. After consulting with the collector manufacturing community, it was decided that the sale of 20 systems using a particular new collector model was a reasonable limit within which the manufacturer can sufficiently explore all significant aspects of the new model.

4) Previous testing. As collector tests performed in accordance with the national test standard are repeatable, it is unnecessary to require that collectors must be retested to comply with the Minnesota collector certification program. This section allows manufacturers to use the results from tests performed previous to the effective date of these rules to satisfy the test requirements.

5) Previous certification. Various collector certification programs existed prior to the creation of the Interstate Solar Coordination Council (ISCC), the corsortium of state government representatives which developed the national certification guidelines. Though the specific requirments of those programs were not compatable with each other, each made a reasonable attempt to evaluate the quality and performance of the certified collector. In some cases, the testing was more expensive than that required in these rules. It is reasonable to allow manufacturers to use previous certification to comply with the Minnesota requirements. Each of the cer-

tification programs sited in this section required testing by an independent test laboratory in accordance with national standards. Most of the collectors expected to qualify for Minnesota certification under this section have been marketed for many years and withstood the test of the marketplace.

6) Grace Period. To allow for selection, testing, application and certification of solar collectors, it is necessary to postpone the implementation date for required certification until 6 months beyond the date of adoption of these rules.

6 MCAR Section 1.1504 Application fees.

It is the intent of these rules that persons benefitting by colletor certification will absorb a portion of the costs to administer the program. Therefore, fees will be charged for the services performed to certify products. The amount of the fee is based primarily on the estimated time and expense required to perform the different services. These fees have been compared to previous and other certification programs, and are in reasonable conformity.

6 MCAR Section 2.1505 Units of Measure.

The United States Congress passed the metric conversion act in 1975, which provides for voluntary conversion to the International System of Units (SI), or the "metric system." The guidelines for collector certification written by the ISCC and adopted by the SRCC are based on the SI system. By specifying metric units for use in the collector certification

program, the Minnesota program will be consistent with the national recommendations. In addition, the testing and rating information provided in metric units in the collector certification program will continue to be useful in the future.

Information provided in the application for certification in inch-pound units will continue to be accepted. This allows manufacturers more familiar with inch-pound units to avoid the cost and inconvenience of converting to SI nomenclature at this time.

6 MCAR Section 2.1506 Certification Procedure.

Solar collectors may be certified in the Minnesota program as a standard solar collector, a collector similar to a model previously certified, an innovative collector which cannot be tested under the standard procedures or a collector manufactured by a liscensee to a firm which has previously received certification for the collector model. In addition, custom-built collectors and collectors with low volume sales are eligible for registration to qualify for the tax credit. This section describes the procedures that need to be followed to secure certification or registration in the various categories. Each of these procedures follows the ISCC guidelines.

A. Standard solar collector.

Time constraints on the department and, where appropriate, the manufacturer, have been incorporated into these ISCC guidelines to assure that certification occurs in a timely manner. The time schedule has been

discussed with representatives from the solar community, and appears to impose reasonable requirments on the manufacturer and acceptable expectations of the department.

The random selection procedure, contained in steps 1 and 2 of this section, was accepted nationally in order to assure that a collector tested for certification is a representative sample of the manufactured collector model.

In paragraph 4, the manufacturer has the option of declaring the information submitted in the application as non-public data. This provision is necessary in order to assure manufacturers that their proprietary information is not inadvertently disclosed to competitors through the certification process.

The information requested from the manufacturer is designed to adequately identify the collector model and to assure compliance with the product certification and labeling provisions of certification. In addition, certain information, such as the working fluid and flow rate, are intended to assure that the collector is properly tested and applied.

The statement of commitment contained in paragraph 4.h. outlines the obligation of the manufacturer in order to secure certification for their collector. Each of those requirments is further explained in the rules.

In paragraph 6, the manufacturer is required to affix the certification symbol and required label information to each collector in order for it to be an eligible expenditure for the tax credit. Flexibility is provided to the manufacturer for the format and presentation of the label

information. The manufacturer may affix a separate Minnesota solar collector certification label on the collector or incorporate the label information and certification symbol in a label or information plate of the manufacturer's design. However, the label must accurately represent the required label information, and consequently is subject to approval by the department.

Information on certified collectors will be made available to consumers through the list distributed by the Energy Information Center operated by the Department, as indicated in paragraph 8.

B. Similar solar collector.

A manufacturer may elect to change minor components or materials of a certified collector to create a new model. The new collector may be certified by predicting the changes in performance and durability from those of the previous model. The manufacturer is required to document all changes, and as stated in paragraph B.1.c., provide an estimate of any changes in performance, reliability or durability that may occur (B.1.d.). If certification is granted, the manufacturer will be required to comply with all other provisions of collector certification.

C. Innovative solar collector.

In order to assure that unconventional solar collectors can be certified, and consequently qualify for the tax credit, it is necessary to have provisions to incorporate testing and certification based upon the peculiar qualities of the innovative collector. If a collector cannot be fairly or adequately tested and certified under the standard collector pro-

cedures, the manufacturer may state why the collector cannot be tested and instead propose a method of testing and certifying their particular type of collector. In order to assure flexibility to the manufacturer, few restrictions are placed on the proposed methodologies for testing and certification.

D. Collector manufactured by licensee.

This section provides a methodology to certify a solar collector manufactured by a firm under license to the original holder of collector certification. Certification is not automatically transferred to the licensee, and the licensee needs to secure certifiction under their own name.

E. Custom-built solar collector.

The information that is requested from the contractor about their custom-built collector is intended to document the design and components of the collector so that the collector qualifies as custom-built.

F. Solar collector kit or manufactured solar collector.

Manufacturers who produce only enough collectors for 20 or fewer systems per year or manufacturers who wish to market initial production units of a new model while it is being certified are eligible to register each of the systems sold. Though the manufacturer will be applying for registration only, they must include much of the same product information required for certified solar collectors. This information will allow the Department to assure that all systems using the registered collector are uniform in their materials and design.

The second paragraph of this section states that a manufacturer may apply for a grace period of 6 months in order to complete testing and certification requirements. This allows a manufacturer to sell prototypes and initial production runs of a collector under the low volume collector provisions, the continue to sell non-certified collectors that will qualify for the tax credit while certification procedures are being completed.

6 MCAR Section 2.1507 Test methods and minimum standards for certifying solar collectors.

All statements in this rule are copied verbatim from the ISCC guidelines. The rule specifies the procedures to be used by the independent testing laboratories to evaluate a solar collector. In order to assure that the instructions to the laboratory are identical to the requirments for the national program, it is recommended that this rule be adopted without modification.

6 MCAR Section 2.1508 Evaluation criteria, ratings and warranties.

The criteria which must be met under each of the four certification procedures is specified in paragraphs A through D. Those criteria are consistent with the ISCC recommended guidelines.

E. Rating.

The ISCC recommends rating the performance of a solar collector in up to 15 categories representing various combinations of solar radiation levels, climate and applications. Minnesota certification

ratings are based upon the same procedures. However, due to limits on the applications eligible for the tax credit (no swimming pools or commercial systems, for example) and the state climate, Minnesota certification requires performance ratings in only two adjacent categories of the three listed in Exhibit 6 MCAR Section 2.1512-1, which are sufficient to compare the performance of various collector models.

F. Warranty.

In order to establish minimum warranty requirements in the industry, the Minnesota Solar Energy Association recommended that a minimum warranty be required to receive collector certification. The department has accepted that recommendation, and in addition has incorporated their recommendation that the minimum warranty period be based on the expected design life of the collector. This procedure is particularly reasonable, since it requires a warranty of adequate length for long life time collectors, while allowing much shorter waranty periods on low-cost, short lifetime collectors. The provisions of the warranty are extracted from the Magnuson-Moss Warranty--Federal Trade Commission Improvement Act.

G. Laboratory approval.

The Solar Rating and Certification Corporation evaluates the capability of laboratories to perform collector testing under the procedures used in the SRCC certification program. As the Minnesota program will make the same tests on the collectors, it is reasonable to use the list of accredited laboratories from the SRCC, rather than attempting to evaluate the capabilities of the laboratories through an independent site visitation and analysis.

6 MCAR Section 2.1509 Verification retest.

This rule is to provide a methodology to assure that a collector marketed by the manufacturer is, indeed, the same collector that was originally certified by the Department. The prodecures are extracted from the ISCC guidelines.

The procedure provides that the manufacturer shall absorb the cost of retesting, if required. However, if the sample collector is determined to be constructed of the same materials and design as the orginally certified collector and passes the retest, the Department will be required to reimburse the manufacturer for actual shipping and testing charges. This protects the manufacturer from indiscriminately being required to retest their product at their own expense. However, if the challenge is valid, i.e. that changes have taken place, the manufacturer is not reimbursed and incurs the expense of retesting. In addition, the certification will be suspended. The cost of the retest can be considered to be the penalty for making unapproved changes in the design, materials or quality of the collector.

The manufacturer will have the option of having a second sample tested for compliance with the retest provision. In no case will the cost of the retest be absorbed by the Department. In fairness to the manufacturer, the test(s) performed under the retest provision may be used in a subsequent application for certification of the collector as a new model.

6 MCAR Section 2.1510 Terminating certification.

Certification may be voluntarily terminated by the manufacturer, or withdrawn by the department for any of a number of reasons. Each of the

reasons for termination is a violation of the agreement signed by the manufacturer upon receiving collector certification.

C. Notification of suspension, termination or revocation of certification.

The department will notify administrators of other collector certification programs that a certification has been revoked, as the same collector may be certified in their program or their certification could have been based upon previous certification by the department.

6 MCAR Section 2.1511 Appeal Process.

The manufacturer may disagree with a final ruling determined by the department. The manufacturer has one month (20 state business days) to file an appeal. The department will then set up an advisory review board to evaluate the certification application and subsequent decisions. The authority to make the final determination remains with the department, however, though the recommendation of the advisory review board will be used to make the final determination. It is reasonable to allow the authority to remain with the department in order to provide consistancy in the operation of the certification program. The department agrees with the ISCC and SRCC that it is unreasonable to delegate the final authority to persons not intimately involved in the certification program.

6 MCAR Section 2.1512 Solar Collector Certificate.

The department will provide a certificate to the manufacturer specifying the rights and obligations of the manufacturer. In addition, the

certificate will include the information from the test and evaluation of the sample collector. The design life and warranty terms are included in the certificate, along with the required rating information.

In the Matter of the Proposed Adoption
of Rules of the State Department of Energy
and Economic Development Governing Certification
of Solar Collectors

STATEMENT OF
COMPLIANCE WITH
RULEMAKING PROCEDURES

I, Special Assistant Attorney General Thomas Barrett, do hereby declare that I have examined the rules and all related documents and that, based on may examination and my personal familiarity with the applicable procedures, the Administrative Procedure Act, the rules of the Office of Administrative Hearings, and the rules of the Attorney General have been followed. Any exceptions are noted below.

Thomas Barrett
Special Assistant Attorney General

Dated: August 16, 1983

In the Matter of the Proposeed Adoption of Rules of the State Department of Energy and Economic Development Governing Certification of Solar Collectors

AFFIDAVIT OF MAILING NOTICE OF SUBMISSION TO THE ATTORNEY GENERAL

STATE OF MINNESOTA)
)SS.
COUNTY OF RAMSEY)

John R. Dunlop, being first duly sworn, deposes and says:

That the Department of Energy and Economic Development has received no requests from persons wishing to be notified that the rules in the above-entitled matter have been submitted to the Attorney General.

John R. Dunlop
Manager, Solar Programs

Suscribed and sworn before
me this 9th day of August, 1983.

Diane L. Johnson

DIANE L. JOHNSON
NOTARY PUBLIC - MINNESOTA
DAKOTA COUNTY
My Commission Expires March 2, 1989

STATE OF MINNESOTA

DEPARTMENT OF ENERGY AND ECONOMIC DEVELOPMENT

In the Matter of the Proposed Adoption
of Rules of the State Department of Energy
and Economic Development Governing Certification
of Solar Collectors

NOTICE OF
SUBMISSION TO THE
ATTORNEY GENERAL

Pursuant to your request and in accordance with Minnesota Statutes, section MSA 14.14, subdivision 1,

PLEASE TAKE NOTICE that the above-captioned rules have been submitted to the Office of the Attorney General on this date August 15th, 1983, for review as to form and legality. Pursuant to 1 MCAR § 1.206 B., the Attorney General will not approve the rules for at least 14 calendar days after receipt to allow any person or association time to comment on the legality of the rules, after which that Office will complete its review. If you desire to comment on the legality of the above-captioned rules, you should direct your comments to the Office of Attorney General, G-25 State Administration Building, 50 Sherburne Avenue, Saint Paul, Minnesota 55155, telephone (612) 296-7030. Please note that the above-cited rule of the Attorney General also provides that a copy of any written comments submitted to the Attorney General must also be submitted simultaneously to this agency.

If you are interested in determining what changes, if any, were made in the proposed rules after publication in the State Register and before submission to the Attorney General, you may contact John R. Dunlop, Manager, Solar Programs, Department of Energy and Economic Development, (612) 296-4737.

Mark B. Dayton
Commissioner Department of Energy
and Economic Development