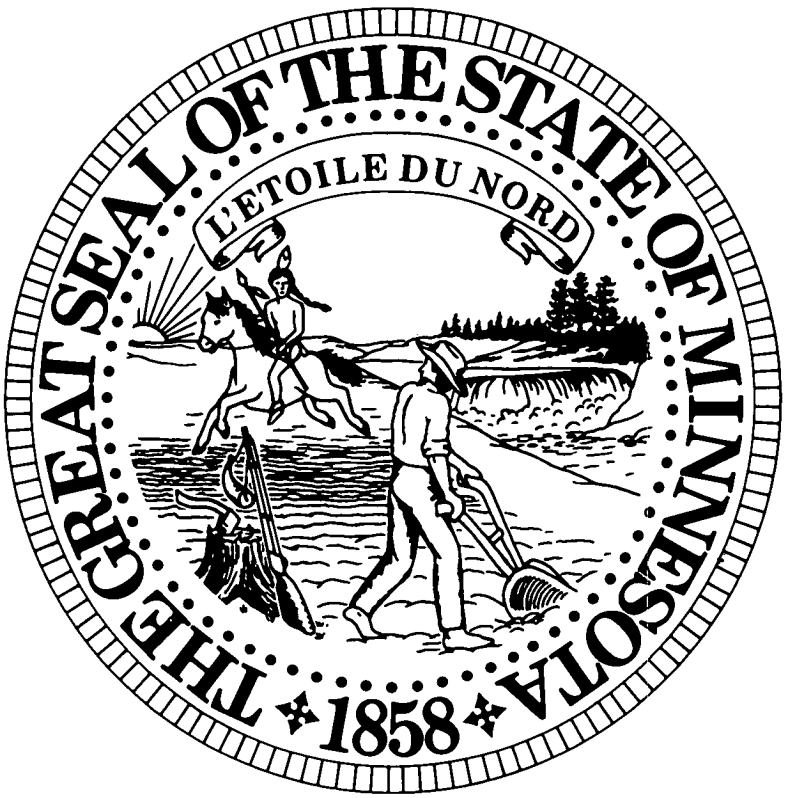
The Minnesota
State Register

Department of Administration—Print Communications Division



Rules edition
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State Register

Judicial Notice Shall Be Taken of Material Published in the *State Register*

The *State Register* is the official publication of the State of Minnesota, containing executive and commissioners' orders, proposed and adopted rules, official notices, state and non-state contracts, contract awards, grants, and announcements.

***A Contracts Supplement* is published every Thursday and contains additional state contracts and advertised bids, and the most complete source of state contract awards available in one source.**

Printing Schedule and Submission Deadlines

Vol. 15 Issue Number	*Submission deadline for Adopted and Proposed Rules, Commissioners' Orders**	*Submission deadline for Executive Orders, Contracts, and Official Notices**	Issue Date
37	Monday 25 February	Monday 4 March	Monday 11 March
38	Monday 4 March	Monday 11 March	Monday 18 March
39	Monday 11 March	Monday 18 March	Monday 25 March
40	Monday 18 March	Monday 25 March	Monday 1 April

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

**Notices of public hearings on proposed rules and notices of intent to adopt rules without a public hearing are published in the Proposed Rules section and must be submitted two weeks prior to the issue date.

Instructions for submission of documents may be obtained from the ***State Register*** editorial offices, 504 Rice Street, St. Paul, Minnesota 55103, (612) 296-4273.

The ***State Register*** is published every Monday (Tuesday when Monday is a holiday) by the State of Minnesota, Department of Administration, Print Communications Division, 117 University Avenue, St. Paul, Minnesota 55155, pursuant to *Minnesota Statutes* § 14.46. A ***State Register*** *Contracts Supplement* is published every Thursday. The Monday edition is the vehicle for conveying all information about state agency rulemaking, including official notices; hearing notices; proposed, adopted and emergency rules. It also contains executive orders of the governor; commissioners' orders; state contracts and advertised bids; professional, technical and consulting contracts; non-state public contracts; state grants; decisions of the supreme court; a monthly calendar of scheduled cases before the supreme court; and other announcements. The Thursday edition contains additional state contracts and advertised bids, and the most complete listing of contract awards available in one source.

In accordance with expressed legislative intent that the ***State Register*** be self-supporting, the following subscription rates have been established: the Monday edition costs $140.00 per year and includes an index issue published in August (single issues are available at the address listed above for $3.50 per copy); the combined Monday and Thursday editions cost $195.00 (subscriptions are not available for just the *Contracts Supplement*); trial subscriptions are available for $60.00, include both the Monday and Thursday edition, last for 13 weeks, and may be converted to a full subscription anytime by making up the price difference. No refunds will be made in the event of subscription cancellation.

Both editions are delivered postpaid to points in the United States, second class postage paid for the Monday edition at St. Paul, MN, first class for the Thursday edition. Publication Number 326630 (ISSN 0146-7751).

Subscribers who do not receive a copy of an issue should notify the ***State Register*** circulation manager immediately at (612) 296-0931. Copies of back issues may not be available more than two weeks after publication.

FOR LEGISLATIVE NEWS

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

SENATE

Briefly-Preview—Senate news and committee calendar; published weekly during legislative sessions.

Perspectives—Publication about the Senate.

Session Review—Summarizes actions of the Minnesota Senate.

Contact: Senate Public Information Office
Room 231 State Capitol, St. Paul, MN 55155
(612) 296-0504

HOUSE

Session Weekly—House committees, committee assignments of individual representatives; news on committee meetings and action. House action and bill introductions

This Week—weekly interim bulletin of the House.

Session Summary—Summarizes all bills that both the Minnesota House of Representatives and Minnesota Senate passed during their regular and special sessions.

Contact: House Information Office
Room 175 State Office Building, St. Paul, MN 55155
(612) 296-2146

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NOTICE: How to Follow State Agency Rulemaking in the *State Register*

The ***State Register*** is the official source, and only complete listing, for all state agency rulemaking in its various stages. State agencies are required to publish notice of their rulemaking action in the ***State Register***. Published every Monday, the ***State Register*** makes it easy to follow and participate in the important rulemaking process. Approximately 75 state agencies have the authority to issue rules. Each agency is assigned specific ***Minnesota Rule*** chapter numbers. Every odd-numbered year the ***Minnesota Rules*** are published. This is a ten-volume bound collection of all adopted rules in effect at the time. Supplements are published to update this set of rules. Proposed and adopted emergency rules do not appear in this set because of their short-term nature, but are published in the ***State Register***.

If an agency seeks outside opinion before issuing new rules or rule amendments, it must publish a NOTICE OF INTENT TO SOLICIT OUTSIDE OPINION in the ***Official Notices*** section of the ***State Register***. When rules are first drafted, state agencies publish them as **Proposed Rules**, along with a notice of hearing, or notice of intent to adopt rules without a hearing in the case of noncontroversial rules. This notice asks for comment on the rules as proposed. Proposed emergency rules and withdrawn proposed rules are also published in the ***State Register***. After proposed rules have gone through the comment period, and have been rewritten into their final form, they again appear in the ***State Register*** as **Adopted Rules**. These final adopted rules are not printed in their entirety in the ***State Register***, only the changes made since their publication as Proposed Rules. To see the full rule, as adopted and in effect, a person simply needs two issues of the ***State Register***, the issue the rule appeared in as proposed, and later as adopted. For a more detailed description of the rulemaking process, see the ***Minnesota Guidebook to State Agency Services***.

The ***State Register*** features partial and cumulative listings of rules in this section on the following schedule: issues 1-13 inclusive; issues 14-25 inclusive; issue 26, cumulative for issues 1-26; issues 27-38 inclusive; issue 39, cumulative for 1-39; issues 40-51 inclusive; and issue 52, cumulative for 1-52. An annual subject matter index for rules appears in August. For copies of the ***State Register***, a subscription, the annual index, the ***Minnesota Rules*** or the ***Minnesota Guidebook to State Agency Services***, contact the Print Communications Division, 117 University Avenue, St. Paul, MN 55155 (612) 297-3000 or toll-free in Minnesota 1-800-9747.

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Proposed Rules

Pursuant to Minn. Stat. §§ 14.22, 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 25 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 the modifications are supported by the data and views submitted.

If, during the 30-day comment period, 25 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 §§ 14.14-14.20, which state that if an agency decides to hold a public hearing, it must publish a notice of intent in the *State Register*.

Pursuant to Minn. Stat. §§ 14.29 and 14.30, agencies may propose emergency rules under certain circumstances. Proposed emergency rules are published in the *State Register* and, for at least 25 days thereafter, interested persons may submit data and views in writing to the proposing agency.

Department of Health

Proposed Permanent Rules Relating to Ionizing Radiation

Notice of Intent to Adopt Rules Without a Public Hearing, Notice of Intent to Adopt Rules With a Public Hearing if 25 or More Persons Request a Hearing, and Notice of Intent to Cancel Hearing on the Proposed Rules if Fewer Than 25 Persons Request a Hearing

I. Explanation of Alternative Notices

The Minnesota Department of Health (hereinafter "Department") hereby proposes to adopt rules without a public hearing under the rulemaking procedure of *Minnesota Statutes*, sections 14.22 to 14.28. However, if 25 or more persons request a hearing on the proposed rules, one will be held according to *Minnesota Statutes*, section 14.25. To expedite the rulemaking process should that occur, the Department is at the same time giving notice of hearing on the proposed rules according to *Minnesota Statutes*, sections 14.131 to 14.20. The hearing on the proposed rules will be cancelled if 25 or more persons do not request that one be held. With the comment period closing at 4:30 p.m. on April 10, 1991, there will be fifteen days before the scheduled hearing date. This fifteen-day period will give interested persons time to contact the Department to find out whether the hearing will be cancelled.

II. Notice of Intent to Adopt Proposed Rules Without a Public Hearing

NOTICE IS HEREBY GIVEN that the Minnesota Department of Health (hereinafter "Department") proposes to adopt the above-captioned rules without a public hearing unless 25 or more persons submit written requests for a public hearing with respect to the proposed rules. The Department has elected to follow the procedures set forth in *Minnesota Statutes*, sections 14.22 to 14.28.

Interested persons shall have 30 days from the date this notice is published in the *State Register* to submit comment in support of or in opposition to the proposed rules. The 30 days will expire at 4:30 p.m. on April 10, 1991. Comment is encouraged. Each comment should identify the portion of the proposed rules being addressed, the reason for the comment, and any change proposed to the rules by the commentor. 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.

In addition to submitting comments, interested persons may request, in writing, during the 30-day comment period that a hearing be held on the proposed rules. Any person requesting a hearing should state his or her name, address, and telephone number and is encouraged to identify the portions of the proposed rules addressed, the reason for the request, and any changes the commentor wants made to the proposed rules. If a person desires that a hearing be held on only a portion of the proposed rules, it is requested that the Department be informed of the specific portion of the rules on which a hearing is being requested at the time that the hearing request is made. This will enable the Department to limit the hearing, if one is held, to the specific issues of concern. A public hearing will be held only if 25 or more persons submit in writing requests for a hearing on the proposed amendments or a portion thereof by 4:30 p.m. on April 10, 1991, thus necessitating that one be held with respect to the proposed rules. If a hearing is required, it will be held in accordance with the provisions of *Minnesota Statutes*, sections 14.131 to 14.20 and the hearing notice provided in section III below.

Comments or written requests for a public hearing should be submitted to:

William Breitenstein
Radiation Control Section
Environmental Health Division
Minnesota Department of Health
925 S.E. Delaware Street
P.O. Box 59040
Minneapolis, Minnesota 55459-0040
(612) 627-5063

The statutory authority of the Department to adopt the proposed rules is contained in *Minnesota Statutes*, sections 144.05, paragraph (c); 144.12, subdivision 1, clause (15); and 144.121.

The proposed rules are published immediately following this notice in the *State Register* on March 11, 1991, and a free copy of the rules may be obtained from the Department by writing or telephoning William Breitenstein at the address or telephone number listed above.

The proposed rules include provisions relating to ionizing radiation equipment and radioactive material and the uses of ionizing radiation. Rule provisions address precautionary procedures; permissible doses, levels and concentrations; determination of accumulated occupational dose; exposure to minors; permissible levels in unrestricted areas; registration requirements for a person having a source of ionizing radiation; testing requirements; reports of theft, loss, incidents, overexposures and excessive levels and concentrations; worker notifications; prohibited uses; healing arts screening including mammography; violations; opportunity to inspect; variances; safety requirements; records; ordering of radiographic examinations; shielding requirements for medical, dental, chiropractic, podiatric, osteopathic, veterinary medicine and therapeutic facilities; quality assurance including safety surveys, calibrations, spot checks, tests, exposure time control limits; diagnostic and therapeutic equipment requirements; technical clean up amendments to standards governing industrial x-ray installations and radium use; and specification of the concentrations in air and water above the natural background.

A STATEMENT OF NEED AND REASONABLENESS that describes the need for and reasonableness of each provision of the proposed rules and identifies the data and information relied upon to support the proposed rules has been prepared and may be obtained from the Department by writing or telephoning William Breitenstein at the address or telephone number listed above.

After the close of the comment period on the proposed rules, if no hearing is required, the Department will submit to the Attorney General the proposed rules and notice as published, the rules as proposed for adoption, any written comments received by the Department, the statement of need and reasonableness, and a statement explaining any modifications to the proposed rules. The

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.

Attorney General will approve or disapprove the rules as to their legality and their form, including the issue of substantial change and determine whether the Department has the authority to adopt the rules and whether the record demonstrates a rational basis for the need for and reasonableness of the proposed rules. The Department will give notice to all persons who request to be informed that these materials have been submitted to the Attorney General. Persons who wish to be advised of the submission of these materials to the Attorney General should submit a written request to William Breitenstein at the address listed above. If the proposed rule has been modified, the notice will also state that fact and will state that a free copy of the proposed rule, as modified, will be available upon request from the Department.

Local Government Considerations

The Department's evaluation of the impact of the proposed rules on local agencies and school districts and state public agencies is addressed in the statement of need and reasonableness and a separate fiscal note. It is estimated that the cost of implementing the proposed requirements to state facilities will be $154,412 for each of the two years following implementation of the proposed rules. The total estimated cost of implementing the proposed quality assurance procedures on non-accredited facilities supported by local government is estimated to be $148,441 for each year following implementation of the proposed rule.

Agricultural Land

The proposed rule amendments will not have an impact on agricultural land; therefore, no further information need be provided under *Minnesota Statutes*, section 14.11.

Small Business Considerations

The Department is subject to *Minnesota Statutes*, section 14.115 regarding small business considerations in rulemaking. The Department's evaluation of the applicability of the methods contained in *Minnesota Statutes*, section 14.115, subdivision 2, for reducing the impact of the proposed rules is addressed in the statement of need and reasonableness.

III. Notice of Intent to Adopt Rules With a Public Hearing if 25 or More Persons Request a Hearing on the Proposed Rules

Please Note That if 25 or More Persons Submit Written Requests for a Public Hearing on the Proposed Rules Within the 30-Day Comment Period Pursuant to the Notice Given in Part II above, a Hearing Will be Held on April 26, 1991, in Accordance With the Following Notice of Public Hearing.

NOTICE IS HEREBY GIVEN that a public hearing in the above-captioned matter will be held under *Minnesota Statutes*, sections 14.131 to 14.20, in the Chesley Room of the Minnesota Department of Health, 717 Delaware Street Southeast, Minneapolis, Minnesota, on April 26, 1991, commencing at 9:00 a.m. The hearing will continue, if necessary, at additional times and places determined during the hearing by the Administrative Law Judge.

All interested or affected persons, including representatives of associations or other interested groups, will have an opportunity to participate. Such persons may present their views either orally at the hearing or in writing at any time prior to the close of the hearing record. All evidence presented should be pertinent to the matter at hand. Written material not submitted at the time of hearing which is to be included in the hearing record may be mailed to Phyllis A. Reha, Administrative Law Judge, Office of Administrative Hearings, 500 Flour Exchange Building, 310 Fourth Avenue South, Minneapolis, Minnesota 55415, telephone (612) 349-2514.

Unless a longer period not to exceed 20 calendar days is ordered by the administrative law judge at the hearing, the hearing record will remain open for the inclusion of written material for five working days after the hearing ends. Written material received during this period will be available for review at the Office of Administrative Hearings. The Department and interested persons may respond in writing within three business days after the submission period ends to any new information submitted. No additional evidence may be submitted during the three-day period. This rule hearing procedure is governed by *Minnesota Statutes*, sections 14.131 to 14.20 and by *Minnesota Rules*, parts 1400.0200 to 1400.1200. Questions about procedure may be directed to the administrative law judge.

The statutory authority for the Department to adopt the proposed rules is contained in *Minnesota Statutes*, sections 144.05, paragraph (c); 144.12, subdivision 1, clause (15); and 144.121.

The proposed rules are published immediately following this notice in the *State Register* on March 11, 1991, and a free copy of the rules may be obtained from the Department by writing or telephoning William Breitenstein at the address and telephone number listed above in Part II of this notice.

The proposed rules include provisions relating to ionizing radiation equipment and radioactive material and the uses of ionizing radiation. Rule provisions address precautionary procedures; permissible doses, levels and concentrations; determination of accumulated occupational dose; exposure to minors; permissible levels in unrestricted areas; registration requirements for a person having a source of ionizing radiation; testing requirements reports of theft, loss, incidents, overexposures and excessive levels and concentrations; worker notifications; prohibited uses; healing arts screening including mammography; violations; opportunity to inspect; variances; safety requirements; records; ordering of radiographic examinations; shielding requirements for medical, dental, chiropractic, podiatric, osteopathic, veterinary medicine and therapeutic facilities; quality assurance including safety surveys, calibrations, spot checks, tests, exposure time control limits; diagnostic and therapeutic equipment requirements; technical clean up amendments to standards governing industrial x-ray installations and radium use; and specification of the concentrations in air and water above the natural background.

The proposed rules may be modified as a result of the rule hearing process. Persons who are potentially affected in any manner by the substance of the proposed rules are therefore advised to participate in the process.

Minnesota Statutes, Chapter 10A requires each lobbyist to register with the State Ethical Practices Board within five days after he or she commences lobbying. Questions should be directed to the Ethical Practices Board, 625 North Robert Street, St. Paul, Minnesota 55101-2520, telephone: (612) 296-5148.

NOTICE IS HEREBY GIVEN THAT A STATEMENT OF NEED AND REASONABLENESS is now available for review at the Department and at the Office of Administrative Hearings. This statement of need and reasonableness includes a summary of all the evidence which the Department anticipates presenting at the hearing justifying both the need for and the reasonableness of the proposed rules. Copies of the statement of need and reasonableness may be reviewed at the Department or the Office of Administrative Hearings and copies may be obtained from the Office of Administrative Hearings at the cost of reproduction.

Please note that any person may request notification of the date on which the administrative law judge's report will be available, after which date the Department may not take any final action on the proposed rules for a period of five working days. If you desire to be so notified, you may so indicate at the hearing. After the hearing, you may request notification by sending a written request to the administrative law judge. Any person may request notification of the date on which the rules were adopted and filed with the Secretary of State. The notice must be mailed on the same day that the rules are filed. If you want to be so notified, you may so indicate at the hearing or send a request in writing to the Department at any time prior to the filing of the rules with the Secretary of State.

Local Government Considerations

The Department's evaluation of the impact of the proposed rules on local agencies and school districts and state public agencies is addressed in the statement of need and reasonableness and a separate fiscal note. It is estimated that the cost of implementing the proposed requirements to state facilities will be $154,412 for each of the two years following implementation of the proposed rules. The total estimated cost of implementing the proposed quality assurance procedures on non-accredited facilities supported by local government is estimated to be $148,441 for each year following implementation of the proposed rule.

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IV. Notice of Intent to Cancel Hearing on the Proposed Rules if Fewer than 25 Persons Request a Hearing on the Proposed Rules

Please Note that the Hearing, Notice of Which is Given in Part III Above, Will be Cancelled on the Proposed Rules if Fewer than 25 Persons Request a Hearing on the Proposed Rules in Response to the Notice Given in Part II Above.

To be informed whether a hearing noticed in Part III above will be held, please call or write William Breitenstein at the address or telephone number listed above before April 10, 1991, and leave your name, address, and telephone number. You will be notified after April 10, 1991, if the hearing has been cancelled. You may also call William Breitenstein at (612) 627-5063 after April 10, 1991, for oral confirmation about the scheduled hearing.

Dated: 22 February 91

John F. McCally
Commissioner of Health

Rules as Proposed

4730.0100 DEFINITIONS.

Subpart 1. **Scope.** For purposes of this chapter, the terms in this part have the meanings given them.

Subp. 2. **Absorbed dose.** "Absorbed dose" means the mean energy imparted by ionizing radiation to matter of a known volume

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and mass. The special unit of absorbed dose is the rad under the conventional system of measurement and is the gray under the SI system of measurement.

Subp. 4. **Accelerator.** "Accelerator" means a device that accelerates charged subatomic particles or nuclei to energies useful for research and therapy.

Subp. 5. **Accelerator-produced material.** "Accelerator-produced material" means material made radioactive by a particle accelerator.

Subp. 6. **Added filtration.** "Added filtration" means filtration that is in addition to the inherent filtration.

Subp. 7. **Aluminum equivalent.** "Aluminum equivalent" means the thickness of type 1100 aluminum alloy affording the same attenuation, under specified conditions, as the material in question.

Subp. 8. **Applicator.** "Applicator" means an added device that determines the extent of the treatment field at a given distance from the virtual source.

Subp. 9. **Appropriate limit.** "Appropriate limit" or "appropriate limits" means the maximum permissible dose or doses of radiation that may be administered to the whole body or a given part of a human being. ~~See "maximum permissible concentrations," "maximum permissible doses," and "maximum permissible neutron radiation."~~

Subp. 10. **Arc therapy.** "Arc therapy" means rotation of the beam during irradiation.

Subp. 11. [See Repealer.]

Subp. 12. **Assembler.** "Assembler" means a person engaged in the business of assembling, replacing, or installing one or more components into an x-ray system or subsystem. Assembler includes the owner of an x-ray system or the owner's employee or agent who assembles components into an x-ray system that is subsequently used to provide professional or commercial services.

Subp. 2. [Renumber as Subp. 13.]

Subp. 14. **Attenuation block.** "Attenuation block" means a block or stack, having dimensions 20 centimeters by 20 centimeters by 3.8 centimeters, of type 1100 aluminum alloy or other materials having equivalent attenuation.

Subp. 15. **Automatic exposure control (AEC).** "Automatic exposure control" or "(AEC)" means a device that automatically controls one or more technique factors to obtain a required quantity of radiation at a preselected location.

Subp. 16. **Beam axis.** "Beam axis" means a line from the source through the centers of the x-ray fields.

Subp. 17. [See repealer.]

Subp. 18. **Beam-limiting device (BLD).** "Beam-limiting device" or "(BLD)" means a device used to restrict the dimensions of the x-ray field.

Subp. 19. **Beam monitoring system.** "Beam monitoring system" means a system designed to detect and measure the radiation present in the useful beam.

Subp. 20. **Beam scattering filter.** "Beam scattering filter" means a filter used to scatter a beam of electrons.

Subp. 21. [See repealer.]

Subp. 22. **Becquerel (Bq).** "Becquerel" or "(Bq)" means a unit of measurement of radioactivity. One becquerel is equal to one disintegration per second. One curie is equal to 3.7×10^{10} becquerels. Multiples included in these regulations are kilobecquerel (kBq), megabecquerel (MBq), gigabecquerel (GBq), terabecquerel (TBq), and petabecquerel (PBq). The conventional system equivalent is the curie.

Subp. 23. **Bucky.** "Bucky" means an apparatus under the x-ray table or in a vertical cassette holder that holds the grid and cassette during the radiographic exposure.

Subp. 24. **By-product material.** "By-product material" means:

A. any radioactive material, except special nuclear material, yielded in or made radioactive by exposure to the radiation incident to the process of producing or using special nuclear material; and

B. the tailings or wastes produced by the extraction or concentration of uranium or thorium from ore processed primarily for its source material content.

Subp. 25. **C-arm.** "C-arm" means an x-ray system in which the image receptor and the x-ray tube housing assembly are connected by a common mechanical support system to maintain a desired spatial relation.

Subp. 26. **Calibration.** "Calibration" means the determination of:

A. the response or reading of an instrument relative to a series of known radiation values over the range of the instrument;

B. the strength of a source of radiation relative to a standard; or

C. the radiation dose rate at a designated distance from a radiation source under specified conditions of measurement.

For therapeutic systems, the units of calibration shall be cGy (rads) per minute or cGy (rads) per monitor unit.

Subp. 27. [See repealer.]

Subp. 27a. **Central axis of the beam.** "Central axis of the beam" means a line passing through the virtual source and the center of the plane figure formed by the edge of the first beam-limiting device.

Subp. 28. **Cephalometric device.** "Cephalometric device" means a device intended for the radiographic visualization and measurement of the dimensions of the human head.

Subp. 29. [See repealer.]

Subp. 30. **Certified components.** "Certified components" means components of x-ray systems that are subject to the x-ray equipment performance standards adopted under Public Law Number 90-602, the Radiation Control for Health and Safety Act of 1968.

Subp. 31. [See repealer.]

Subp. 32. **Certified system.** "Certified system" means an x-ray system that has one or more certified components.

Subp. 33. **Changeable filter.** "Changeable filter" means a filter, exclusive of inherent filtration, that can be removed from the useful beam through any electronic, mechanical, or physical process.

Subp. 34. **Clinical range.** "Clinical range" means the range of control console technique settings that a facility would use in its routine x-ray projections. Quality assurance tests are performed over clinical ranges.

Subp. 35. **Coefficient of variation or C.** "Coefficient of variation" or "C" means the ratio of the standard deviation to the mean value of a population of observations.

Subp. 36. **Cold flow.** "Cold flow" means the viscous flow of a solid at ordinary temperatures; or, the distortion of a solid under sustained pressure especially with an accompanying inability to return to its original dimensions when pressure is removed.

Subp. 4. [Renumber as Subp. 37.]

Subp. 38. **Collimator.** "Collimator" means a mechanism connected to the x-ray tube housing that controls the dimensions of the primary radiation beam. Types of collimators are cones, diaphragms, and variable-aperture beam-limiting devices.

Subp. 5. [Renumber as Subp. 39.]

Subp. 40. **Computed tomography (CT).** "Computed tomography" or "(CT)" means the production of a tomogram by the acquisition and computer processing of x-ray transmission data.

Subp. 41. [See repealer.]

Subp. 42. **Contact therapy system.** "Contact therapy system" means an x-ray system used for therapy with the x-ray tube port placed in contact with or within five centimeters of the surface being treated.

Subp. 43. **Control panel.** "Control panel" means the part of the x-ray control located behind a protective barrier upon which are mounted the switches, knobs, pushbuttons, and other hardware necessary for manually setting the technique factors.

Subp. ~~6~~ 44. **Controlled area.** "Controlled area" means a defined area in which the exposure of persons to radiation is under the supervision of a radiation ~~protection supervisor~~ safety officer. (This implies that a controlled area is one that requires control of access, occupancy, and working conditions for radiation protection purposes.)

Subp. 45. **Coulomb per kilogram (C/kg).** "Coulomb per kilogram" or "(C/kg)" means the unit of exposure. One roentgen is equal to 2.58 x 10^{-4} coulomb per kilogram. Submultiples of this unit are the millicoulomb per kilogram (mC/kg) and the microcoulomb per kilogram (uC/kg).

Subp. 46. **CT conditions of operation.** "CT conditions of operation" means all selectable parameters governing the operation of a CT system including, but not limited to, nominal tomographic section thickness, filtration, and the technique factors as defined in subpart 196.

Subp. 47. **CT dose index (CTDI).** "CT dose index" or (CTDI)" means the integral from minus 7T to plus 7T of the dose profile along a line perpendicular to the tomographic plane divided by the product of the nominal tomographic section thickness (T) and the

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number of tomograms produced in a single scan (n), that is:

$$CTDI = \frac{1}{nT} \int_{-7T}^{+7T} D(z)\, dz$$

where:
z = position along a line perpendicular to the tomographic plane;
D(z) = dose at position z;
T = nominal tomographic section thickness; and
n = number of tomograms produced in a single scan.

This definition assumes that the dose profile is centered around z = 0 and that, for a multiple tomogram system, the scan increment adjacent scans is nT.

Subp. 48. **CT gantry.** "CT gantry" means the tube housing assemblies, beam-limiting devices, detectors, and supporting structures and frames that hold these components.

Subp. 49. **CT number.** "CT number" means the number used to represent the x-ray attenuation associated with each elemental area of the CT image.

Subp. ~~7~~ 50. **Curie (CI).** "Curie" or "(Ci)" means ~~the special~~ a unit of ~~activity equal to a disintegration rate of 37 billion disintegrations per second. One millicurie (mCi) equals 0.001 curie; one microcurie (uCi) equals 0.000001 curie~~ radioactivity. One curie (Ci) is the quantity of radioactive material that decays at the rate of 3.7 x 10^{10} disintegrations per second (dps). Commonly used submultiples of the curie are the millicurie and the microcurie. One millicurie (mCi) equals 0.001 curie = 3.7 x 10^{7} dps. One microcurie (μCi) equals 0.000001 curie = 3.7 x 10^{4} dps. The SI equivalent is the becquerel.

Subp. ~~8~~ 51. **Dead-man switch.** "Dead-man switch" means a switch so constructed that a circuit-closing contact can be maintained only by continuous pressure on the switch by the operator.

Subp. 52. **Densitometer.** "Densitometer" means an instrument that measures the density of a film by measuring the amount of light transmitted through the film.

Subp. 53. **Diagnostic source assembly.** "Diagnostic source assembly" means the tube housing assembly with a beam-limiting device attached.

Subp. 9. [Renumber as Subp. 54.]

Subp. 55. **Diagnostic radiographic imaging system.** "Diagnostic radiographic imaging system" means an assemblage of components for the generation, transmission, and reception of an x-ray and the transformation, storage, and visual display of the resultant radiographic image.

Subp. 56. **Diagnostic radiographic system.** "Diagnostic radiographic system" means an x-ray system designed for irradiation of any part of the human or animal body for diagnosis or visualization.

Subp. 57. **Dose.** "Dose" means absorbed dose or dose equivalent as appropriate.

Subp. 58. **Dose commitment.** "Dose commitment" means the total radiation dose to a part of the body that will result from retention in the body of radioactive material. For purposes of estimating the dose commitment, it is assumed that from the time of intake the period of exposure to retained material will not exceed 50 years.

Subp. ~~10~~ 59. **Dose equivalent (DE).** "Dose equivalent" or "(DE)" means a quantity used for radiation protection purposes that expresses on a common scale for all radiations the irradiation incurred by exposed persons. It is defined as the product of the absorbed dose ~~in rads~~ and ~~certain modifying factors~~ the quality factor. ~~The unit of dose equivalent is the rem. (The modifying factors are: 1 for gamma and X rays and beta particles; ten for alpha particles and for neutrons; ten for protons with energies up to ten million electron volts; 20 for heavy ions.~~ For ~~X~~ x rays and gamma rays, the dose equivalent in rems ~~may be~~ is usually assumed to be numerically ~~equivalent~~ equal to either the exposure in roentgens ~~and~~ or the absorbed dose in rads.~~)~~ The special unit dose equivalent is the rem under the conventional measurement system and is the sievert under the SI measurement system.

Subp. 60. **Dose monitoring system.** "Dose monitoring system" means a system of devices for the detection, measurement, and display of quantities of radiation that can be related to the absorbed dose at a given location within a defined geometry.

Subp. 61. **Dose monitor unit.** "Dose monitor unit" means a unit response from the dose monitoring system from which the absorbed dose has been calculated.

Subp. 62. **Dose profile.** "Dose profile" means the dose as a function of position along a particular plane.

Subp. 63. **Effective dose equivalent.** "Effective dose equivalent" means the sum over specified tissues of the products of the dose equivalent in a tissue and the weighting factor for that tissue.

Subp. 64. **Electron-beam generator.** "Electron-beam generator" means a type of electron accelerator in which the electron beam is brought out into the atmosphere for irradiation purposes.

Subp. 65. **Elemental area.** "Elemental area" means the smallest area within a tomogram for which the x-ray attenuation properties of a body are depicted.

Subp. 66. **Entrance exposure rate.** "Entrance exposure rate" means the exposure per unit of time at the point where the center of the useful beam enters the patient.

Subp. 67. **ESE.** "ESE" means the entrance skin exposure that is measured free in air.

Subp. 68. **Exposure.** For purposes of part 4730.2150, "exposure" means the quotient of dQ by dm where dQ is the absolute value of the total charge of the ions of one sign produced in air when all the electrons (negatrons and positrons) liberated by photons in a volume element of air having mass (dm) are completely stopped in air.

Subp. 69. **Exposure rate.** "Exposure rate" means the exposure per unit of time, such as roentgen per minute and milliroentgen per hour.

Subp. 70. **Facility.** "Facility" means the location at which one or more sources of radiation are installed or located within one building, vehicle, or under one roof, and are under the same administrative control.

Subp. 71. **Field emission equipment.** "Field emission equipment" means equipment that uses an x-ray tube in which electron emission from the cathode is due solely to the action of an electric field.

Subp. 72. **Field-flattening filter.** "Field-flattening filter" means a permanent filter used to provide dose uniformity over the area of a useful beam of x-rays at a specified depth.

Subp. 73. **Filter or filtration.** "Filter" or "filtration" means material placed in the useful beam to absorb preferentially selected radiations.

Subp. 74. **Fluoroscopic imaging assembly.** "Fluoroscopic imaging assembly" means a subsystem in which x-ray photons produce a fluoroscopic image. It includes image receptors such as the image intensifier and spot-film device, electrical interlocks, if any, and structural material providing linkage between the image receptor and diagnostic source assembly.

Subp. 75. **Focal spot.** "Focal spot" means the area of the anode from which x-rays originate.

Subp. 76. **Gantry.** "Gantry" means the part of the system supporting and allowing possible movements of the radiation head.

Subp. 77. **General purpose radiographic x-ray system.** "General purpose radiographic x-ray system" means a radiographic x-ray system that, by design, is not limited to radiographic examination of specific anatomical regions.

Subp. 78. **Gonad shield.** "Gonad shield" means a protective barrier for the testes or ovaries.

Subp. 79. **Gray (Gy).** "Gray" or "(Gy)" means the unit of absorbed dose equal to one joule per kilogram. One rad is equal to 1 x 10^{-2} gray. Submultiples included in these regulations are the milligray (mGy), the microgray (μGy) and the centigray (cGy). The conventional system equivalent is the rad.

Subp. ~~12~~ 80. **Half-value layer (HVL).** "Half-value layer" or "(HVL)" means the thickness of a specified ~~substance which, when introduced into the path of a given beam of radiation, reduces the exposure rate by one-half~~ material that attenuates the beam of radiation to such an extent that the exposure rate is reduced to one-half of its original value. The contribution of all scattered radiation, other than any that might be present initially in the beam concerned, is considered excluded.

Subp. ~~13~~ 81. **Healing arts.** "Healing arts" means health professions for diagnostic and/or healing treatment of human and animal maladies including but not limited to the following which are duly licensed by the state of Minnesota for the lawful practice of: medicine ~~and its associated specialties~~, dentistry, veterinary medicine, osteopathy, chiropractic, and podiatry.

Subp. 82. **Healing arts screening or screening.** "Healing arts screening" or "screening" means the testing of individuals using x-ray equipment to detect or evaluate health conditions when the tests are not specifically and individually ordered by a licensed practitioner of the healing arts who is legally authorized to prescribe the tests for the purpose of diagnosis or treatment.

Subp. 14. [Renumber as Subp. 83.]

Subp. 84. **Human use.** "Human use" means the internal or external administration of radiation or radioactive material to an individual.

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Subp. 85. **Image intensifier.** "Image intensifier" means a device, installed in its housing, that instantaneously converts an x-ray pattern into a corresponding light image of higher energy density or higher luminance.

Subp. 86. **Image receptor.** "Image receptor" means a device, such as a fluorescent screen or radiographic film, that transforms incident x-ray photons either into a visible image or into another form that can be made into a visible image by further transformations.

Subp. 87. **Image receptor support.** "Image receptor support" means, for mammographic systems, the part of the system designed to support the image receptor during mammography.

Subp. 88. **Individual.** "Individual" means a human being.

Subp. 15. [Renumber as Subp. 89.]

Subp. 16. [Renumber as Subp. 90.]

Subp. 91. **Inherent filtration.** "Inherent filtration" means the filtration of the useful beam provided by the permanently installed components of the tube housing assembly.

Subp. 92. **Inspection.** "Inspection" means an official examination or observation including but not limited to tests, surveys, and monitoring to determine compliance with rules, regulations, orders, requirements, and conditions of the commissioner.

Subp. ~~18~~ 93. **Interlock.** "Interlock" means a device which automatically causes a reduction of the exposure rate upon entry by personnel into a high radiation area. Alternatively, an interlock may prevent entry into a high radiation area, or a device arranged or connected so the occurrence of an event or condition is required before a second event or condition can occur or continue to occur.

Subp. ~~19~~ 94. **Ionizing radiation.** "Ionizing radiation~~,~~" ~~see radiation~~ means gamma rays, x-rays, alpha particles, beta particles, high speed electrons, neutrons, protons, and other nuclear particles, capable of producing ions directly or indirectly, by interaction with matter.

Subp. 95. **Irradiation.** "Irradiation" means the exposure of matter to ionizing radiation.

Subp. 96. **Isocenter.** "Isocenter" means a fixed point in space through which pass the central axes of radiation beams for all possible beam orientations and field sizes.

Subp. 20. [Renumber as Subp. 97.]

Subp. ~~21~~ 98. **Kilovolt peak (kVp).** "Kilovolt peak" or "(kVp)" means the ~~crest~~ maximum value in kilovolts of the potential difference of ~~a pulsating potential~~ an x-ray generator. When only one half of the wave is used, the value refers to the useful half of the cycle.

Subp. 99. **Kilowatt second (kWs).** "Kilowatt second" or "(kWs)" means the equivalent of 10^3 kV X mA X s.

Subp. ~~22~~ 100. **Lead equivalence or lead equivalent.** "Lead equivalence" or "lead equivalent" means the thickness of lead affording the same attenuation, under specified conditions, as the material in question.

Subp. ~~23~~ 101. **Leakage radiation.** "Leakage radiation~~,~~" ~~see radiation~~ means all radiation coming from within the source or tube housing except the useful beam. Leakage radiation includes the portion of the direct radiation not absorbed by the protective source or tube housing as well as the scattered radiation produced within the housing.

Subp. 102. **Leakage technique factors.** "Leakage technique factors" means the technique factors associated with the diagnostic or therapeutic source assembly that are used in measuring leakage radiation, as defined in items A to C.

A. For diagnostic source assemblies intended for capacitor energy storage equipment, the maximum-rated kVp and the maximum-rated number of exposures in an hour for operation at the maximum-rated kVp with the quantity of charge per exposure being ten millicoulombs, for example, ten milliampere seconds, or the minimum obtainable from the unit, whichever is larger.

B. For diagnostic source assemblies intended for field emission equipment for pulsed operation, the maximum-rated kVp and the maximum-rated number of x-ray pulses in an hour for operation at the maximum-rated kVp.

C. For all other diagnostic or therapeutic source assemblies, the maximum-rated kVp and the maximum-rated continuous milliamperage for the maximum-rated kVp.

Subp. 103. **Licensed practitioner of the healing arts.** "Licensed practitioner of the healing arts" means health professionals for diagnostic or healing treatment of human and animal maladies including but not limited to the following, which are licensed by the state of Minnesota for the lawful practice of medicine, dentistry, veterinary medicine, osteopathy, chiropractic, and podiatry.

Subp. 104. **Light field.** "Light field" means the area of the intersection of the light beam from the beam-limiting device and one of the set of planes parallel to and including the plane of the image receptor whose perimeter is the locus of points at which the illumination is one-fourth of the maximum in the intersection.

Subp. 105. **Line-voltage regulation.** "Line-voltage regulation" means the difference between the no-load and the load line potentials expressed as a percent of the load line potential. It is calculated using the following equation:

Percent line-voltage regulation = 100 (V_n - V_l/V_l

where:

V^n = no-load line potential; and

V_l = load line potential.

Subp. 106. **Linear attenuation coefficient or μ.** "Linear attenuation coefficient" or "μ" means the quotient of dN/N divided by dl when dN/N is the fraction of uncharged ionizing radiation that experience interactions in traversing a distance dl in a specified material. The linear attenuation coefficient is the photon fraction attenuated per centimeter for small thicknesses of the attenuator.

Subp. 107. **mA.** "mA" means milliampere.

Subp. 108. **mAs.** "mAs" means milliampere-second.

Subp. 109. **Maximum line current.** "Maximum line current" means the root-mean-square current in the supply line of an x-ray system operating at its maximum rating.

Subp. 110. **Medical particle accelerator.** "Medical particle accelerator" means a system capable of accelerating electrons, protons, or other charged particles in a vacuum and of discharging the resultant particulate or other radiation into a medium at energies usually in excess of one MeV.

Subp. ~~24~~ 111. **Maximum permissible concentrations (MPC).** "Maximum permissible concentrations" or "(MPC)" means those amounts listed as maximum permissible concentrations in Handbook 69, Maximum Permissible Body Burdens and Maximum Permissible Concentrations of Radionuclides in Air and in Water for Occupational Exposure, U.S. Department of Commerce, National Bureau of Standards (NBS), June 5, 1959, and in the Code of Federal Regulations, title 10, part 20, appendix B. The NBS report is incorporated by reference, may be viewed at the Biomedical Library of the University of Minnesota, Minneapolis, Minnesota, and is available through the Minitex interlibrary loan system. This report is not subject to frequent change.

Subp. ~~25~~ 112. **Maximum permissible dose or dose equivalent (MPD).** "Maximum permissible dose" or "dose equivalent (MPD)" means, for radiation protection purposes, the maximum dose equivalents that persons shall be allowed to receive in a stated period of time (see ~~part 4730.3300~~ parts 4730.0310 to 4730.0380). This excludes patients receiving radiation for diagnostic or therapeutic purposes under supervision of licensed practitioners of the healing arts.

Subp. 26. [Renumber as Subp. 113.]

Subp. 114. **NCRP.** "NCRP" means the National Council on Radiation Protection and Measurements. Specific NCRP reports are incorporated by reference in this chapter. The reports may be viewed at the Biomedical Library of the University of Minnesota, Minneapolis, Minnesota, are available through the Minitex interlibrary loan system, and are not subject to frequent change.

Subp. 115. **NARM.** "NARM" means a naturally occurring or accelerator produced radioactive material. It does not include by-product, source, or special nuclear material.

Subp. 116. **Neutron generator.** "Neutron generator" means a type of accelerator in which the ion beam is used mainly for the production of neutrons. Neutron generation is also possible for high energy photon producing equipment.

Subp. 117. **Nominal tomographic section thickness.** "Nominal tomographic section thickness" means the full width at half-maximum at the center of the cross-sectional volume over which x-ray transmission data are collected.

Subp. 118. **Nonstochastic effects.** "Nonstochastic effects" means effects for which the severity of the effect in affected individuals varies with the dose, and for which a threshold usually exists.

Subp. 119. **Nominal treatment distance.** "Nominal treatment distance" means:

A. for electron irradiation, the virtual source to surface distance along the central axis of the useful beam as specified by the manufacturer for the applicator; and

B. for x-ray irradiation, the virtual source to isocenter distance along the central axis of the useful beam. For nonisocentric equipment, this distance shall be specified by the manufacturer.

Subp. 120. **Occupational dose.** "Occupational dose" means exposure of an individual to radiation (1) in a restricted area; or (2) in the course of employment in which the individual's duties involve exposure to radiation; provided that occupational dose does not include exposure of an individual to radiation for the purpose of diagnosis or therapy of the individual.

Subp. 121. **Optical density or O.D.** "Optical density" or "O.D." means the logarithm of the reciprocal of the transmitted light.

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Subp. 122. **Patient.** "Patient" means an individual or animal subjected to healing arts examination, diagnosis, or treatment.

Subp. 123. **Peak tube potential.** "Peak tube potential" means the maximum value of the potential difference across the x-ray tube during an exposure.

Subp. 124. **Permanent radiographic installation.** "Permanent radiographic installation" means an installation or structure designed or intended for radiography and in which radiography is regularly performed.

Subp. 28. [Renumber as Subp. 125.]

Subp. 126. **Personnel monitoring equipment.** "Personnel monitoring equipment" means devices such as film badges, pocket dosimeters, and thermoluminescent dosimeters designed to be worn or carried by an individual for the purpose of estimating the dose received by the individual.

Subp. 127. **Phantom.** "Phantom" means a volume of material behaving in a manner similar to tissue with respect to the attenuation and scattering of radiation.

Subp. 128. **Phototimer.** "Phototimer" means a method for controlling radiation exposures to image receptors by measuring the amount of radiation that reaches a radiation monitoring device. The radiation monitoring device is part of an electronic circuit that controls the duration of time the tube is activated. See automatic exposure control.

Subp. 30. [Renumber as Subp. 129.]

Subp. 130. **Pixel.** "Pixel" means an elemental area of a digital image.

Subp. 131. **Port film.** "Port film" means a diagnostic film taken with a therapeutic x-ray system to verify proper setup of the treatment field.

Subp. 132. **Position indicating device (PID).** "Position indicating device" or "(PID)" means a device on dental radiographic x-ray equipment used to indicate the beam position and to establish the source-to-skin distance.

Subp. 133. **Primary dose monitoring system.** "Primary dose monitoring system" means a system that will monitor the useful beam during irradiation and will terminate irradiation when a preselected number of dose monitor units have been acquired.

Subp. ~~32~~ 134. **Primary protective barrier.** "Primary protective barrier," ~~see protective barrier~~ means the material, excluding filters, placed in the useful beam for protection purposes to reduce the radiation exposure.

Subp. 33. [Renumber as Subp. 135.]

Subp. ~~34~~ 136. **Protective barrier or barrier.** "Protective barrier" or "barrier" means a barrier of radiation absorbing material(s) used to reduce radiation exposure. Types of protective barriers are primary protective barriers and secondary protective barriers.

~~A. Primary protective barrier means a barrier sufficient to attenuate the useful beam to the required degree.~~

~~B. Screening means the testing with X-ray machines of human beings or human population groups for the detection or evaluation of health conditions when such X-ray tests are not specifically and individually ordered by a licensed healing arts practitioner, legally authorized to order such X-ray tests, for the purpose of diagnosis or treatment or as part of a physical examination conducted by a licensed practitioner. Screening does not include research protocols utilizing X-ray procedures when such protocols are part of research projects sponsored or financed by agencies of the federal government, conducted by educational institutions training practitioners of the healing arts or, conducted in hospitals, when such research is authorized by or under control of the governing body of that hospital.~~

~~C. Secondary protective barrier means a barrier sufficient to attenuate stray radiation to the required degree.~~

Subp. 35. [Renumber as Subp. 137.]

Subp. 138. **Quality assurance program.** "Quality assurance program" means the program and procedures contained in parts 4730.1655 to 4730.1695.

Subp. 139. **Quality factor.** "Quality factor" means a factor used for radiation protection purposes that accounts for differences in biological effectiveness between different radiations. The quality factors are: one for gamma rays, x-rays, beta particles, and electrons; five for thermal neutrons; and 20 for neutrons other than thermal, protons, alpha particles, and multiple-charged particles of unknown energy.

Subp. ~~36~~ 140. **Rad.** "Rad" means a the special unit of absorbed dose ~~equal to 100 ergs per gram~~. One rad equals one one-hundredth of a joule per kilogram of any material. One millirad (mrad) equals 0.001 rad. The SI equivalent is the gray.

Subp. ~~37~~ 141. **Radiation ~~(ionizing)~~.** ~~"Radiation (ionizing)" means any electromagnetic or particulate radiation capable of producing ions directly or indirectly, by interaction with matter. (This includes gamma rays and X rays, alpha and beta particles, high-speed electrons, neutrons, protons, and other nuclear particles, but does not include sound or radio waves, or visible, infrared, or ultraviolet light.)~~

~~A. "Leakage radiation" means all radiation coming from within the source or tube housing except the useful beam. (Note: "Leakage radiation" includes the portion of the direct radiation not absorbed by the protective source or tube housing as well as the scattered radiation produced within the housing.)~~

~~B. "Scattered radiation" means radiation that, during passage through matter, has been deviated in direction. (It may have been modified also by a decrease in energy.)~~

~~C. "Secondary radiation" means radiation emitted by an irradiated material such as bone or tissue and all inanimate objects.~~

~~D. "Stray radiation" means the sum of leakage and scattered radiation.~~

~~E. "Useful beam" means radiation which passes through the window, aperture, cone, or other collimating device of the source housing. Sometimes called "primary beam."~~ "Radiation" means ionizing radiation.

Subp. 142. **Radiation area.** "Radiation area" means an area accessible to individuals in which there exists radiation at such levels that a major portion of the body could receive in one hour a dose equivalent in excess of five millirems (0.05 millisievert), or in five consecutive days a dose equivalent in excess of 100 millirems (one millisievert).

Subp. 143. **Radiation detector or detector.** "Radiation detector" or "detector" means a device that in the presence of radiation provides a signal or other indication suitable for use in measuring one or more quantities of incident radiation.

Subp. 38. [Renumber as Subp. 144.]

Subp. 145. **Radiation head.** "Radiation head" means the structure from which the useful beam emerges.

Subp. 39. [Renumber as Subp. 146.]

Subp. 40. [Renumber as Subp. 147.]

Subp. 42. [Renumber as Subp. 148.]

Subp. 149. **Radiation safety officer.** "Radiation safety officer" means an individual who has the knowledge and responsibility to apply appropriate radiation protection regulations, who has been designated by the facility in compliance with part 4730.0400, item B.

Subp. 150. **Radiation therapy simulation system.** "Radiation therapy simulation system" means a radiographic or fluoroscopic x-ray system intended for localizing the volume to be exposed during radiation therapy and confirming the position and size of the therapeutic irradiation field.

Subp. 43. [Renumber as Subp. 151.]

Subp. 152. **Radioactivity.** "Radioactivity" means the transformation of unstable atomic nuclei by the emission of radiation.

Subp. 153. **Radiograph.** "Radiograph" means an image that is created directly or indirectly by x-rays resulting in a permanent record or image.

Subp. 154. **Radiography.** "Radiography" means the process of making an image on a radiosensitive surface, such as a photographic film, by radiation other than visible light, especially by x-rays passed through an object or by photographing a fluoroscopic image.

Subp. 44. [Renumber as Subp. 155.]

Subp. 156. **Rating.** "Rating" means the operating limits as specified by the component manufacturer.

Subp. 157. **Recording.** "Recording" means producing a permanent form of an image resulting from x-ray photons.

Subp. 158. **Reference plane.** "Reference plane" means a plane that is displaced from and parallel to the tomographic plane.

Subp. 45. [Renumber as Subp. 159.]

Subp. 160. **Registration.** "Registration" means registration with the commissioner according to parts 4730.0400 to 4730.0700.

Subp. ~~46~~ 161. **Rem.** "Rem" means ~~the~~ a special unit of dose ~~equivalent~~ equivalence. One millirem (mrem) equals 0.001 rem. The SI equivalent is the sievert. For the purpose of this chapter, any of the following is considered to be equal to one rem:

A. an exposure of one roentgen of x or gamma radiation;

B. an absorbed dose of one rad due to x, gamma, or beta radiation;

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C. an absorbed dose of 0.05 rad due to particles heavier than protons and with sufficient energy to reach the lens of the eye; or

D. an absorbed dose of 0.1 rad due to neutrons or high energy protons.

Note: If it is more convenient to measure the neutron flux or equivalent than to determine the neutron absorbed dose in rads, one rem of neutron radiation may, for purposes of this chapter, be assumed to be equivalent to 14 million neutrons per square centimeter incident upon the body; or, if there exists sufficient information to estimate with reasonable accuracy the approximate distribution in energy of the neutrons, the incident number of neutrons per square centimeter equivalent to one rem may be estimated from the neutron flux dose equivalence table.

Neutron Flux Dose Equivalence

Neutron energy (MeV)	Number of neutrons per square centimeter for a dose equivalent of 1 rem (10 millisieverts) (neutrons/cm^2)	Average flux density to deliver 100 millirems (one millisievert) in 40 hours (neutrons/ cm^2 per second)
Thermal	970 x 10^6	670
0.0001	720 x 10^6	500
0.005	820 x 10^6	570
0.02	400 x 10^6	280
0.1	120 x 10^6	80
0.5	43 x 10^6	30
1.0	26 x 10^6	18
2.5	29 x 10^6	20
5.0	26 x 10^6	18
7.5	24 x 10^6	17
10.0	24 x 10^6	17
10 to 30	14 x 10^6	10

Subp. 162. **Response time.** "Response time" means the time required for an instrument system to reach 90 percent of its final reading when the radiation-sensitive volume of the instrument system is exposed to a step change in radiation flux from zero sufficient to provide a steady state midscale reading.

Subp. 47. [Renumber as Subp. 163.]

Subp. 48. [Renumber as Subp. 164.]

Subp. 165. **Scan.** "Scan" means the complete process of collecting x-ray transmission data for the production of a tomogram. Data can be collected simultaneously during a single scan for the production of one or more tomograms.

Subp. 166. **Scan increment.** "Scan increment" means the amount of relative displacement of the patient with respect to the CT system between successive scans measured along the direction of the displacement.

Subp. 167. **Scan sequence.** "Scan sequence" means a preselected set of two or more scans performed consecutively under preselected CT conditions of operation.

Subp. 168. **Scan time.** "Scan time" means the time between the beginning and end of x-ray transmission data accumulation for a single scan.

Subp. ~~49~~ 169. **Scattered radiation.** "Scattered radiation~~,~~" ~~see radiation~~ means radiation that, during passage through matter, has been deviated in direction and may have also been modified by a decrease in energy.

Subp. 170. **Secondary dose monitoring system.** "Secondary dose monitoring system" means a system that will terminate irradiation if the primary system fails.

Subp. ~~50~~ 171. **Secondary protective barrier.** "Secondary protective barrier~~,~~" ~~see protective barrier~~ means a barrier sufficient to attenuate stray radiation to the required degree.

Subp. ~~51~~ 172. **Secondary radiation.** "Secondary radiation~~,~~" ~~see radiation~~ means radiation emitted by an irradiated material such as bone or tissue and all inanimate objects.

Subp. 173. **Sensitometer.** "Sensitometer" means an instrument designed to produce a series of exposures with known ratios to each other.

Subp. 174. **Shadow tray.** "Shadow tray" means a device attached to the radiation head to support auxiliary beam limiting material.

Subp. 175. **Shutter.** "Shutter" means a device attached to the tube housing assembly that can totally intercept the useful beam and has a lead equivalency not less than that of the tube housing assembly.

Subp. 176. **SI equivalent.** "SI equivalent" means units that conform to the international system of units.

Subp. 177. **Sievert (Sv).** "Sievert" or "(Sv)" means the unit of dose equivalent that is equal to one joule per kilogram. One rem is equal to 0.01 sievert or ten millisievert (mSv). Submultiples included in this chapter are the millisievert (mSv) and the microsievert (μSv).

Subp. 52. [Renumber as Subp. 178.]

Subp. 179. **Source of radiation.** "Source of radiation" means a radioactive material, device, or equipment which emits, or is capable of producing, radiation.

Subp. 180. **Source-to-image distance (SID).** "Source-to-image distance" or "SID" means the distance from the source to the center of the input surface of the image receptor.

Subp. 181. **Source-to-skin distance (SSD).** "Source-to-skin distance" or "SSD" means the distance between the source and the skin of the patient.

Subp. 182. **Spot check.** "Spot check" means a procedure that is performed to assure that a previous calibration continues to be valid.

Subp. 183. **Spot film.** "Spot film" means a radiograph that is made during a fluoroscopic examination.

Subp. 184. **Spot-film device.** "Spot-film device" means a device intended to transport and/or position a radiographic image receptor between the x-ray source and fluoroscopic image receptor. It includes a device intended to hold a cassette over the input end of an image intensifier to make a radiograph.

Subp. 185. **Stationary beam therapy.** "Stationary beam therapy" means radiation therapy without relative displacement of the useful beam and the patient during irradiation.

Subp. 186. **Stepless adjustment.** "Stepless adjustment" means a method of adjusting collimator blades continuously rather than in fixed increments.

Subp. 187. **Stochastic effects.** "Stochastic effects" means effects, the probability of which, rather than their severity, is a function of radiation dose without threshold. More generally, stochastic means random in nature.

Subp. 53. [Renumber as Subp. 188.]

Subp. ~~54~~ 189. **Stray radiation.** "Stray radiation~~,~~" ~~see radiation~~ means the sum of leakage radiation and scattered radiation.

Subp. ~~55~~ 190. **Survey or radiation safety survey.** "Survey" or "radiation safety survey" means an evaluation of the adequacy of radiation protection and assessment of the situation incident to the production, use, release, disposal, or presence of sources of ionizing radiation under a specific set of conditions. When appropriate, such evaluation includes a physical survey of the location of materials and equipment, and measurements of levels of radiation or concentrations of radioactive material present in and around the ~~installation~~ facility.

Subp. 191. **Target.** "Target" means the part of a radiation head that by design intercepts a beam of accelerated particles with subsequent emission of other radiation.

Subp. 192. **Technique factors.** "Technique factors" means the conditions of operation, specified as follows:

A. for capacitor energy storage equipment, peak tube potential in kV and quantity of charge in mAs;

B. for field emission equipment rated for pulsed operation, peak tube potential in kV and number of x-ray pulses;

C. for CT x-ray systems designed for pulsed operation, peak tube potential in kV, scan time in seconds, and either tube current in mA, x-ray pulse width in seconds, and the number of x-ray pulses per scan, or the product of milliamperage, x-ray pulse width, and the number of x-ray pulses in mAs;

D. for CT x-ray systems not designed for pulsed operation, peak tube potential in kV, and either tube current in mA and scan time in seconds, or the product of milliamperage and exposure time in mAs and the scan time when the scan time and exposure time are equivalent;

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E. for phototimed or automatic exposure controlled equipment, all necessary indicators including anatomical, if applicable, that must be activated before exposure; and

F. for all other equipment, peak tube potential in kV and either tube current in mA and exposure time in seconds, or the product of milliamperage and exposure time in mAs.

Subp. 56. [Renumber as Subp. 193.]

Subp. 194. **Teratogenic effects.** "Teratogenic effects" means effects occurring in offspring as a result of insults sustained in-utero.

Subp. 195. **Termination of irradiation.** "Termination of irradiation" means the stopping of irradiation in a fashion that will not permit continuance of irradiation without the resetting of operating conditions at the control panel.

Subp. 196. **Therapeutic field size.** "Therapeutic field size" means the dimensions along the major axes of an area in a plane perpendicular to the specified direction of the beam of incident radiation at the normal therapy treatment distance and defined by the intersection of the major axes and the 50 percent isodose line. Material shall be placed in the beam so that dose maximum is produced at the normal treatment distance when field size is being determined.

Subp. 57. [Renumber as Subp. 197.]

Subp. 198. **Tomogram.** "Tomogram" means an x-ray image of a thin section of the body.

Subp. 199. **Tomographic plane.** "Tomographic plane" means the geometric plane that is identified as corresponding to the output tomogram.

Subp. 200. **Tomographic section.** "Tomographic section" means the volume of an object whose x-ray attenuation properties are imaged in a tomogram.

Subp. 201. **Traceable to a standard.** "Traceable to a standard" means a comparison, either directly or indirectly, to a standard maintained by the National Institute of Standards and Technology (NIST) and that all comparisons have been documented.

Subp. 202. **Tube housing assembly.** "Tube housing assembly" means the tube housing with tube installed.

Subp. 203. **Tube rating chart.** "Tube rating chart" means the set of curves that specify the rated limits of operation of the tube in terms of the technique factors.

Subp. 204. **Type 1100 aluminum alloy.** "Type 1100 aluminum alloy" means an alloy of aluminum that has a nominal chemical composition of 99 percent minimum aluminum and 0.12 percent copper.

Subp. ~~58~~ 205. **Unit of exposure.** "Unit of exposure" means the roentgen in the conventional system of measurement or the coulomb per kilogram in the SI system of measurement.

Subp. ~~59~~ 206. **Unit of radioactivity.** "Unit of radioactivity" means the curie under the conventional system of measurement or the becquerel in the SI system of measurement.

Subp. ~~60~~ 207. **Units of radiation dose.** "Units of radiation dose" means the rad (unit of absorbed dose) and the rem (radiation to body tissues in terms of its estimated biological effect relative to an exposure of one roentgen of x ray). Under the SI measurement system the equivalent is the gray and the sievert.

Subp. 208. **Unrestricted area.** "Unrestricted area" means an area, the access to which is not controlled by the registrant for purposes of protection of individuals from exposure to radiation and radioactive material, and any area used for residential quarters.

Subp. ~~61~~ 209. **Useful beam.** "Useful beam~~,~~" ~~see radiation~~ means radiation that passes through the window, aperture, cone, or other collimating device of the source housing by a direct path from the x-ray tube or a radioactive source located in the radiation source housing.

Subp. 210. **Variable-aperture beam-limiting device.** "Variable-aperture beam-limiting device" means a beam-limiting device that has a capacity for stepless adjustment of the x-ray field size at a given SID.

Subp. 211. **Virtual source.** "Virtual source" means a point from which radiation appears to originate.

Subp. 212. **Visible area.** "Visible area" means the portion of the input surface of the image receptor over which incident x-ray photons are producing a visible image.

Subp. 213. **Wedge filter.** "Wedge filter" means an added filter effecting continuous progressive attenuation on all or part of the useful beam.

Subp. 214. **X-ray control.** "X-ray control" means a device that controls input power to the x-ray high-voltage generator and/or the x-ray tube. It includes components such as timers, phototimers, automatic brightness stabilizers, and similar devices that control the technique factors of an x-ray exposure.

Subp. 215. **X-ray equipment.** "X-ray equipment" means an x-ray system, subsystem, or component. Types of x-ray equipment are listed in items A to C.

A. "Mobile x-ray equipment" means x-ray equipment mounted in a self-contained transport vehicle.

B. "Portable x-ray equipment" means x-ray equipment designed to be brought to the patient.

C. "Stationary x-ray equipment" means x-ray equipment that is installed in a fixed location within a facility.

Subp. 216. **X-ray field.** "X-ray field" means the area of the intersection of the useful beam and any one of the set of planes parallel to and including the plane of the image receptor, whose perimeter is the locus of points at which the exposure rate is one-fourth of the maximum in the intersection.

Subp. 217. **X-ray generator.** "X-ray generator" means a type of electron accelerator in which the electron beam is used mainly for the production of x-rays.

Subp. 218. **X-ray high-voltage generator.** "X-ray high-voltage generator" means a device that transforms electrical energy from the potential supplied by the x-ray control to the tube operating potential. The device may also include means for transforming alternating current to direct current filament transformers for the x-ray tube, high-voltage switches, electrical protective devices, and other appropriate elements.

Subp. 219. **X-ray subsystem.** "X-ray subsystem" means a combination of two or more components of an x-ray system.

Subp. 220. **X-ray system.** "X-ray system" means an assemblage of components for the controlled production of x-rays. It includes minimally an x-ray high-voltage generator, an x-ray control, a tube housing assembly, a beam-limiting device, and the necessary supporting structures. Additional components that function with the system are considered integral parts of the system.

Subp. 221. **X-ray tube or tube.** "X-ray tube" or "tube" means an electron tube designed to be used primarily for the production of x-rays.

4730.0200 PURPOSE AND SCOPE.

Whereas, ionizing radiation can be instrumental in the improvement of health, welfare, and productivity of the public if properly ~~utilized~~ used, and may impair the health of the people and the industrial and agricultural potentials of the state if improperly ~~utilized~~ used, and the commissioner of health has the statutory authority and duty to adopt, alter, and enforce regulations for the preservation of the public health and thereby to control sources of ionizing radiation and the handling, storage, transportation, use, and disposal of radioactive isotopes and fissionable materials within this state, and to observe their effect upon human health, it is hereby declared to be the purpose of the commissioner of health in ~~parts 4730.0100 to 4730.3600~~ this chapter to secure information concerning the nature and extent of the employment of ~~radiation-emitting~~ ionizing radiation equipment and radioactive materials within this state, and to control or prevent dangers to health from ionizing radiation without limiting or interfering with the constructive uses of ionizing radiation consistent with a policy of reducing ionizing radiation exposure to persons and the general public by all practical means. The scope of ~~parts 4730.0100 to 4730.3600~~ this chapter does not include, except for the provision of registration, those sources of ionizing radiation known as by-product materials, source materials, or special nuclear material.

4730.0300 PRECAUTIONARY PROCEDURES.

Subpart 1. **Radiation symbol and labeling.** Each radiation sign or label shall bear the standard symbol specified in these rules and the specified printed warning in capital block letters. The warning CAUTION RADIATION AREA or DANGER RADIATION AREA shall appear on signs in an area in which a radiation hazard may exist. The warning CAUTION, RADIOACTIVE MATERIAL(S) or DANGER, RADIOACTIVE MATERIAL(S) shall appear on containers containing radioactive materials greater than the applicable quantities listed in parts 4730.3500 and ~~4730.3600~~ 4730.3605. The standard symbol for designating any radiation hazard shall be a circle with three propeller-like blades arranged around it as illustrated:

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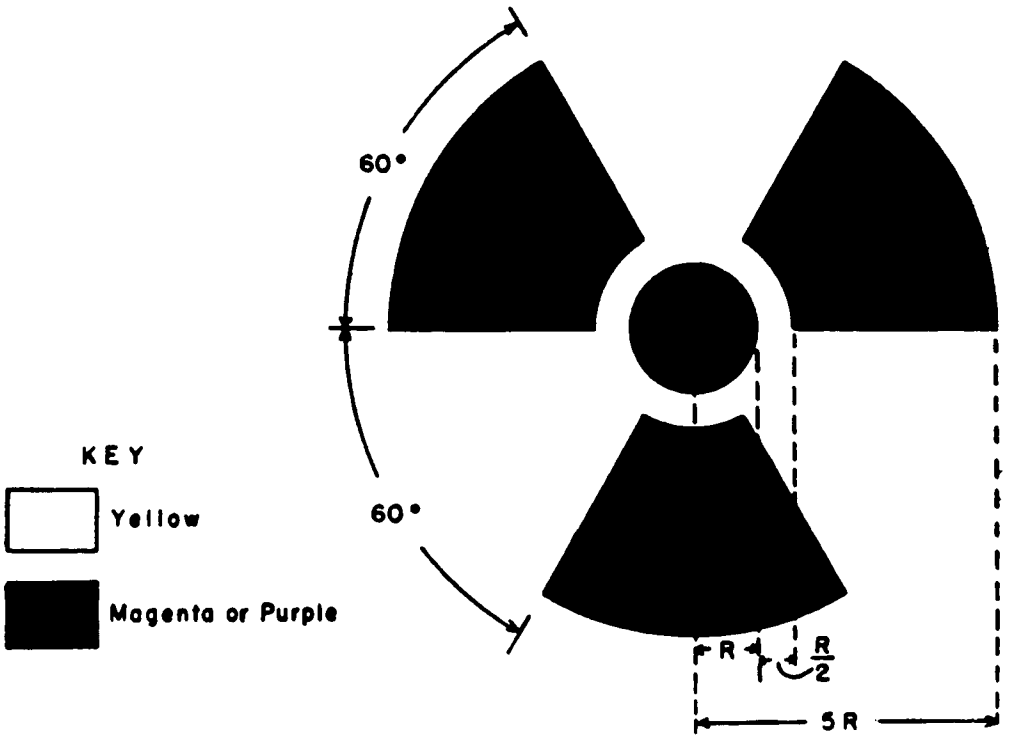

The boundaries of the three blades of the propeller-like symbol shall be confined within a 60-degree sector of the circle delineated by their outer edges, and said blades shall be symmetrically distributed 60 degrees apart. The radius (R) of the central circle of the symbol shall be the standard for its other dimensions as follows: Overall radius of symbol = 5R, shortest distance from circumference of central circle to inner edge of nearest blade = R/2. The standard color specifications shall be a background of yellow with lettering and distinctive symbol in magenta or purple. The symbol and lettering shall be as large as practical, consistent with the size of the equipment or material upon which they appear.

[For text of subps 2 and 3, see M.R.]

Subp. 4. [See repealer.]

Rules as Proposed (all new material)

4730.0310 PERMISSIBLE DOSES, LEVELS, AND CONCENTRATIONS.

Subpart 1. **Applicability.** This part applies to all registrants.

Subp. 2. **Radiation dose standards for individual workers in restricted areas.** To determine the doses specified in item A, a dose from x-rays or gamma rays up to ten million electron volts (MeV) may be assumed to be equivalent to the exposure measured by a properly calibrated appropriate instrument in air at or near the body surface in the region of the highest dose rate.

A. According to part 4730.0340, and except as provided in item C, no registrant shall possess, use, receive, or transfer sources of radiation in such a manner as to cause any individual in a restricted area to receive in any period of one calendar quarter from all sources of radiation a total occupational dose in excess of the standards specified in the following table:

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Radiation limits per calendar quarter:

(1) Effective dose equivalent limit (stochastic effects)... 1-1/4 rem (12.5 mSv);

(2) Dose equivalent limits for tissues and organs (nonstochastic effects):

(a) Lens of eyes... 3-3/4 rem (37.5 mSv);

(b) All others (red bone marrow, breast, lungs, gonads, skin, and extremities)... 12-1/2 rem (125 mSv).

(3) Cumulative exposure... one rem X age in years (ten mSv X age in years).

B. A registrant may permit an individual worker in a restricted area to receive a planned special occupational exposure to the whole body, including gonads, red bone marrow, breast, lungs, head and trunk, or lens of eye, provided:

(1) the individual worker receives an effective dose equivalent (sum of external and internal effective dose equivalent, if both exist) of no more than ten rems (100 mSv) in a single planned event in a year;

(2) the effective dose equivalent received in all special planned exposures does not exceed 25 rems (250 mSv) over the individual's working lifetime;

(3) the registrant has determined the individual worker's accumulated occupational dose to the whole body and has otherwise complied with the requirements of this subpart;

(4) all planned special exposures are authorized in writing by the registrant or the radiation safety officer before exposure;

(5) individual workers who are without procreative potential and have low lifetime effective dose equivalents are selected whenever possible; and

(6) exposures resulting from planned special exposures are included in the lifetime record of exposure for each individual worker but are separately identified.

C. No registrant shall possess, use, receive, or transfer sources of radiation in such a manner as to cause any woman working in a restricted area to receive a total dose equivalent limit, excluding medical exposure, of five mSv (0.5 rem) to the woman's embryo and fetus. Once a pregnancy becomes known, exposure of the embryo and fetus shall be no greater than 0.5 mSv (0.05 rem) in any month, excluding medical exposure. Special attention is required to ensure that, if occupational exposures are received, they are distributed uniformly with time so the embryo and fetus does not receive more than its limit before pregnancy is known.

4730.0340 DETERMINATION OF ACCUMULATED OCCUPATIONAL DOSE.

Subpart 1. **Disclosure before first entry into registrant's restricted area.** Before an individual starts work in the registrant's restricted area where the individual will receive or is likely to receive in one calendar quarter an occupational dose in excess of 25 percent of the applicable standards specified in part 4730.0310, subpart 2, item A, subitem (1), the registrant must require that the individual disclose in a written, signed statement, either:

A. that the individual had no prior occupational dose during the current calendar quarter; or

B. the nature and amount of any occupational dose which the individual may have received during the specifically identified current calendar quarter, from sources of radiation possessed or controlled by another person.

The registrant must maintain records of the statements for the lifetime of the individual worker or a minimum of 20 years after termination of employment with the facility, whichever is less.

Subp. 2. **Disclosure before entry into registrant's area exceeding occupational limits.** Before allowing an individual worker to be exposed in a restricted area to limits in excess to those in part 4730.0310, subpart 2, item C, the registrant must:

A. calculate, using the information in subpart 1, item B, the accumulated dose to those individual workers who will be exposed to radiation in the registrant's restricted area; and

B. calculate the additional dose allowed for that individual worker under part 4730.0310, subpart 2, item C.

Subp. 3. **Preparation of accumulated dose records.** In preparing accumulated dose records, the registrant must make a reasonable effort to obtain reports of the individual's previously accumulated occupational dose. For each period for which the registrant obtains such reports, the dose shown in the report must be used. In any case where a registrant is unable to obtain reports of the individual's occupational dose for a previous complete calendar quarter, it must be assumed that the individual worker has received the occupational dose specified in whichever of the following columns that applies:

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Part of Body	Column 1 Assumed dose in rems (mSv) for calendar quarters before January 1, 1961	Column 2 Assumed dose in rems (mSv) for calendar quarters beginning on or after January 1, 1961
Whole body, gonads active blood-forming organs, head and trunk, lens of eye	3-3/4 (37.5 mSv)	1-1/4 (12.5 mSv)

The registrant must retain and preserve records used in preparing the accumulated dose record for the lifetime of the individual worker or a minimum of 20 years after the individual's termination of employment with the facility, whichever is less. If calculation of the individual worker's accumulated occupational dose for all periods before January 1, 1961, yields a result higher than the applicable accumulated dose value for the individual as of that date, as specified in part 4730.0310, subpart 2, item B, the excess may be disregarded.

4730.0360 EXPOSURE OF MINORS.

No registrant shall possess, use, or transfer sources of radiation in such a manner as to cause any individual within a restricted area who is under 18 years of age to receive any occupational radiation dose except for training purposes. Notwithstanding the limits in parts 4730.0310 and 4730.0380, the occupational exposure limit for training purposes for a minor shall be no more than 0.1 rem (1.0 mSv) per year.

4730.0380 PUBLIC PERMISSIBLE LEVELS OF RADIATION FROM EXTERNAL SOURCES IN UNRESTRICTED AREAS.

No registrant shall possess, use, or transfer sources of radiation in a manner that creates in any unrestricted area from the sources of radiation in the registrant's possession:

A. radiation levels which:

(1) if an individual were continuously present in the area, could result in the individual receiving an annual effective dose equivalent in excess of 0.1 rem (1.0 mSv) [sum of external and internal exposures]; or

(2) if an individual were periodically present in the area, could result in the individual receiving an annual effective dose equivalent in excess of 0.5 rem (5.0 mSv) [sum of external and internal exposures]; and

B. radiation levels which, if an individual were present in the area, could result in the individual receiving an annual effective dose for the lens of the eye, skin, and extremities in excess of 5.0 rem (50 mSv) [sum of external and internal exposures].

Rules as Proposed

4730.0400 REGISTRATION REQUIREMENTS.

The owner or person having possession of any source of ionizing radiation except those specifically exempted under this part or under part 4730.0800 or in the case of nuclear facilities which are registered ~~in accordance with~~ according to the special procedures required by part 4730.3000, shall:

[For text of item A, see M.R.]

B. Designate an individual who will be responsible for radiation protection from the source. ~~Such~~ The individual~~,~~ who is the radiation ~~protection~~ safety officer, shall:

(1) be qualified by training and experience concerning all hazards and precautions involved in operating or in using the source for which ~~he~~ the radiation safety officer is responsible;

(2) establish a detailed program of radiation safety for effective compliance with the applicable requirements of ~~parts 4730.0100 to 4730.3600~~ this chapter;

(3) give instructions concerning hazards and safety practices to individuals under ~~his~~ the radiation safety officer's supervision who may be exposed to radiation from the source; and

(4) make surveys and carry out other procedures as required by ~~parts 4730.0100 to 4730.3600~~ this chapter.

When, in the opinion of the commissioner of health, the individual designated to be responsible for radiation safety does not have qualifications sufficient to ~~insure~~ ensure safe ~~operating~~ operation or ~~using~~ use of the source, the commissioner of health may require the registrant to designate another individual who meets the requirements of this item ~~B~~.

[For text of items C to E, see M.R.]

F. The registrant shall be subject to all applicable requirements of ~~parts 4730.0100 to 4730.3600~~ this chapter.

G. The registration requirements specified in parts 4730.0400 to 4730.0700 shall not apply to facilities subject to part 4730.3000, nor to sources or conditions exempted under part 4730.0800, nor to by-product materials, source materials, or special nuclear materials licensed by the ~~U.S. Atomic Energy~~ United States Nuclear Regulatory Commission not in excess of the kind and quantity specified in parts 4730.3500 and ~~4730.3600~~ 4730.3605.

4730.0500 RENEWAL OF REGISTRATION.

Subpart 1. **Biennial renewal of registration.** Each registration pursuant to ~~parts 4730.0100 to 4730.3600~~ this chapter shall be renewed biennially according to the staggered schedule specified in subpart 2 so long as the activity requiring registration continues. If there has been no substantial change in the matters described in the last prior registration or renewal, the renewal of the registration shall so state. If there has been any accession of additional radiation sources or other substantial change in the matters described in the preceding registration or renewal, the renewal shall state the accession or other change and give the information relating to ~~such~~ the accession or other change that would be required upon original registration.

Subp. 2. **Staggered schedule for renewal of registration.** Each registration pursuant to ~~parts 4730.0100 to 4730.3600~~ this chapter shall be renewed on or before the first day of the calendar quarter specified in items A to H. The schedule is based on the registrant's business address within the state.

[For text of items A to H, see M.R.]

[For text of subps 3 and 4, see M.R.]

4730.0700 ~~RECORDS, INSPECTIONS, AND TESTS~~ PERIODIC TESTING REQUIREMENTS.

Subpart 1. and 2. [See repealer.]

Subp. 3. **Periodic testing requirements.** Each owner, renter, or other person in possession of a source of radiation shall perform or cause to be performed such reasonable procedures as are necessary to assure radiation safety including, but not limited to, tests of:

A. sources of radiation;

B. facilities ~~wherein~~ where sources of radiation are used or stored; and

C. radiation detectors, monitoring instruments, and other equipment and devices used in connection with ~~utilization~~ use or storage of sources of radiation.

Results of such tests shall be available for submission to the commissioner of health when requested.

4730.0800 EXEMPTIONS.

~~Parts 4730.0100 to 4730.3600~~ This chapter shall not apply to the following sources or conditions:

[For text of items A to H, see M.R.]

4730.0900 VENDOR RESPONSIBILITY.

Subpart 1. **Generally.** No person shall make, sell, lease, transfer, lend, or install x-ray or fluoroscopic imaging assembly equipment or the supplies used in connection with such equipment unless ~~such~~ the supplies and equipment, when properly placed in operation and properly used, ~~will~~ meet the requirements of ~~parts 4730.0100 to 4730.3600~~ this chapter. This includes, but is not restricted to, responsibility for the delivery of cones or collimators, filters, adequate timers, and fluoroscopic shutters (where applicable).

[For text of subp 2, see M.R.]

Rules as Proposed (all new material)

4730.1110 REPORTS OF THEFT OR LOSS OF RADIATION SOURCES.

A registrant must report to the commissioner the theft or loss of any radiation source immediately after the theft or loss becomes known. The report must be made by telephone or facsimile. After normal business hours or on weekends, this report must be made through the Minnesota Department of Public Safety's duty officer.

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4730.1120 REPORTS OF INCIDENTS INVOLVING RADIATION SOURCES.

Subpart 1. **Immediate notification.** During normal business hours a registrant must immediately notify the commissioner by telephone or facsimile, and after normal business hours or on weekends through the Minnesota Department of Public Safety's duty officer, of any incident involving any source of radiation possessed by the registrant which may have caused or threatens to cause an unintended or unprescribed:

A. dose to the whole body of any individual of 25 rems (250 mSv) or more of radiation;

B. dose to the skin of the whole body of any individual of 150 rems (1.50 Sv) or more of radiation;

C. dose to the feet, ankles, hands, or forearms of any individual of 375 rems (3.75 Sv) or more of radiation;

D. release of radioactive material in concentrations which, if averaged over a period of 24 hours, would exceed 5,000 times the limits specified for the material in part 4730.3605;

E. loss of one working week or more of the operation of any facility affected; or

F. damage to property in excess of $200,000.

Subp. 2. **Notification within 24 hours.** A registrant possessing any source of radiation must notify the commissioner by telephone or facsimile within 24 hours of any incident involving that source which may have caused or threatens to cause an unintended or unprescribed:

A. dose to the whole body of any individual of five rems (50 mSv) or more of radiation;

B. dose to the skin of the whole body of any individual of 30 rems (300 mSv) or more of radiation;

C. dose to the feet, ankles, hands, or forearms of any individual of 75 rems (750 mSv) or more of radiation;

D. release of radioactive material in concentrations which, if averaged over a period of 24 hours, would exceed 500 times the limits specified for the material in part 4730.3605;

E. loss of one day or more of the operation of any facility affected; or

F. damage to property in excess of $2,000.

4730.1130 MANDATORY REPORTS OF OVEREXPOSURES AND EXCESSIVE LEVELS AND CONCENTRATIONS.

Subpart 1. **Additional reports.** In addition to any notification required by part 4730.1120, a registrant must submit a written report within 30 days to the commissioner of:

A. each exposure of an individual to radiation in excess of the applicable standards in part 4730.0310, subpart 2, or 4730.0360;

B. any incident for which notification is required by part 4730.1120; and

C. levels of radiation or concentrations of radioactive material, whether or not any individual is excessively exposed, if in an unrestricted area and the exposure is in excess of ten times any applicable limit specified by part 4730.0380 or 4730.3605.

Subp. 2. **Reports on individuals.** In the report required under subpart 1 the registrant must describe the extent of exposure of any individual to radiation or to radioactive material, including:

A. estimates of each individual's exposure as required by subpart 3;

B. the levels of radiation and concentrations of radioactive material involved;

C. the cause of the exposure, levels, or concentrations; and

D. corrective steps taken or planned to assure against a recurrence.

Subp. 3. **Report of individual dose.** Any report filed with the commissioner under this part must include, for each individual exposed, the individual's name, date of birth, and an estimate of the individual's dose.

4730.1140 NOTIFICATIONS AND REPORTS TO INDIVIDUAL WORKERS.

Subpart 1. **Report to individual worker.** The registrant must report to an exposed individual worker the radiation exposure data for that individual and the results of any measurements, analyses, and calculations of radioactive material deposited or retained in the body of that individual worker. The information reported must include the exposure data and results obtained under this chapter, as shown in records maintained by the registrant pursuant to part 4730.1520, subpart 4. Each notification and report must:

A. be in writing;

B. include appropriate identifying data such as the name of the registrant or the name of the exposed individual worker; and

C. include the individual worker's exposure information.

Subp. 2. **Quarterly exposure report.** A registrant must advise each worker at least quarterly of the worker's exposure to radiation or radioactive material as shown in records maintained by the registrant under part 4730.1520, subpart 4.

Subp. 3. **Report at end of employment.** A registrant must furnish to a worker who is terminating employment, or to a worker who, while employed by another person, is terminating a work assignment involving radiation dose in the registrant's facility within a calendar quarter, a report of the worker's exposure to radiation or radioactive material. The report must be furnished within 30 days from the time of termination of employment or within 30 days after the exposure of the worker has been determined by the registrant, whichever is later. The report must cover each calendar quarter in which the worker's activities involved exposure to radiation sources and must include the dates and locations of work under the registrant in which the worker participated.

Subp. 4. **Report to worker of exposure.** When a registrant is required under part 4730.1130 to report to the commissioner any exposure of an individual to radiation, the registrant must also provide the worker with a report of the worker's exposure data. The reports must be transmitted at a time no later than the transmittal to the commissioner.

4730.1210 PROHIBITED USES OF RADIATION.

Subpart 1. **General provision.** No individual shall be exposed to the useful beam except for healing arts purposes and only if the exposure has been authorized by a licensed practitioner of the healing arts. Any exposure of an individual for the following other purposes is prohibited:

A. exposure for nonhealing arts training, instruction, or demonstration, or other purposes;

B. exposure for the purpose of healing arts screening except as authorized by part 4730.1310;

C. exposure for healing arts training except as specified in part 4730.0360; and

D. occupational or training exposure except as specified in part 4730.0310.

Subp. 2. **Prohibited radiation producing equipment and procedures.** The equipment specified in this subpart shall not be used nor the specified procedures performed:

A. fluoroscopic devices for fitting shoes;

B. photofluorographic equipment;

C. dental fluoroscopic imaging assemblies;

D. hand-held radiographic or fluoroscopic imaging devices;

E. the use of fluoroscopy for positioning a patient for general radiographic imaging;

F. the use of fluoroscopy and c-arm fluoroscopes by a person other than a licensed practitioner of the healing arts;

G. the use of direct exposure x-ray film (without intensifying screens) for all procedures other than intraoral dental radiography, therapeutic portal imaging, and industrial radiography;

H. nonimage intensified fluoroscopic x-ray equipment;

I. dental intraoral radiography with kilovoltages less than 50 kVp; and

J. the use of x-ray equipment not specifically designed by the manufacturer for imaging of the breast.

Subp. 3. **Unauthorized exposure of personnel monitoring equipment.** Exposure of personnel monitoring equipment to deceptively indicate a dose delivered to an individual is prohibited.

4730.1310 HEALING ARTS SCREENING.

Subpart 1. **General.** Any person who desires to perform diagnostic x-ray screening in Minnesota must seek commissioner approval before x-ray screening may proceed. All applicants must meet the requirements specified in parts 4730.0100 to 4730.1950 and 4730.2150 to 4730.2250. In addition:

A. all applicants must be registered with the commissioner before application for screening is initiated; and

B. the registrant must submit an application to the commissioner requesting permission to perform diagnostic x-ray screening.

Subp. 2. **Content of application.** In the application for screening the registrant must:

A. Provide his or her business name and address. If the registrant is a corporation or other business or nonbusiness association, the name of the person and phone number representing the association must be given.

B. Give the location of the proposed screening and the name and telephone number of a contact person at each location.

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.

C. State the purpose of the proposed screening program planned. The purpose must include a detailed statement specifying the compelling health reasons, health benefits, and health emergency, if any, that justifies the radiation exposure to which any individual will be subjected by the proposed screening.

D. Explain why alternate screening methods that do not require the use of ionizing radiation are not being used.

E. Name all practitioners of the healing arts who will interpret the radiographic images.

F. State the proposed interval for which permission to perform screening is requested.

G. List the radiographic projections or views being proposed in the screening program.

H. Specify the x-ray equipment to be used in connection with the proposed x-ray screening.

I. Describe the retention or disposition of the images and other records pertaining to the screening x-ray examinations after the screening project is completed.

J. Describe the population to be examined in the screening program, including age, sex, and physical condition. For mammography, the selection of the screening population must meet the criteria specified by the Conference of Radiation Control Program Directors, Inc. in "Mammography Screening Guide," publication 87-4, February 1987, published in conjunction with the Food and Drug Administration's Center for Devices and Radiological Health. This publication is incorporated by reference, is not subject to frequent change, and is available at the Minnesota Department of Health library, Minneapolis, or through the Minitex interlibrary loan system.

K. Provide exposure measurements of the exposure at skin entrance (ESE) and specific organ doses, for the type of screening proposed. These exposures must be consistent with those produced with state-of-the-art techniques. If no guidelines are available for exposure measurements, the commissioner may request peer review to establish such guidelines.

L. Provide a written evaluation of the radiation safety survey and the quality assurance program as required by parts 4730.1655, 4730.1670, 4730.1675, 4730.1690, and 4730.1691. This must have been performed within three months prior to the application.

M. Any individual screened must be personally informed by the registrant of the results, interpretation, or findings. The screening application must:

(1) describe how this information will be communicated to the individual who has been screened;

(2) describe where the results, interpretation, or findings will be sent; and

(3) describe what arrangements will be made to ensure that the individual who has been screened will be informed as to the need for further medical and health care evaluation or treatment.

Subp. 3. **Additional information.** The commissioner may request the submission of additional information and data subsequent to the submission of the original or renewal application.

Subp. 4. **Notification of commissioner's decision.** The registrant shall be notified in writing of the commissioner's decision. If an application is granted, the notification shall specify the time, not to exceed one year, for which the application will be effective.

Subp. 5. **Changes in screening program.** The registrant is responsible for informing the commissioner of any changes in the screening program from that which was described in the content of the application in subpart 2. The registrant must obtain commissioner approval of the changes before the commencement of the requested changes in the screening program.

Subp. 6. **Denial of approval.** The commissioner may deny or revoke approval of any healing arts screening program if the registrant fails to or refuses to comply with this chapter.

Subp. 7. **Appeal procedure.** The registrant may appeal the denial, revocation, or refusal to approve an application or renewal application by requesting a contested case hearing under the provisions of the Administration Procedure Act, *Minnesota Statutes*, chapter 14. The registrant shall submit, within 15 days of the receipt of the department's decision, a written request for a hearing. The request for a hearing shall set forth in detail the reasons why the registrant contends the decision of the department should be reversed or modified.

Subp. 8. **Renewal of screening application.** Any request for the renewal of a screening program application shall be submitted in writing before its expiration date. Renewal requests shall contain the information specified in subpart 2.

Rules as Proposed

4730.1400 VIOLATIONS.

Subpart 1. **Prohibition of violation.** If in the opinion of the commissioner~~,~~ it is necessary to ~~do so to~~ protect ~~persons~~ any individual from ~~hazards of~~ a radiation hazard, an injunction or other court order may be obtained prohibiting any violation of any provision of any regulation or order issued thereunder. Any person who willfully violates any provision of any regulation or order issued thereunder may be guilty of a crime, and, upon conviction, may be punished by fine or imprisonment or both, as provided by law.

Subp. 2. **Commissioner approved healing arts screening.** The commissioner ~~or his representative~~ may inspect the healing arts screening program while in progress to assure that it is being carried out as described in the application in part 4730.1310 and in compliance with ~~parts 4730.0100 to 4730.3600 relating to ionizing radiation~~ this chapter.

[For text of subp 3, see M.R.]

Subp. 4. **Withdrawal of approval for noncompliance with application.** Approval for healing arts screening may be withdrawn if, after an inspection, the commissioner finds discrepancies between the screening program as implemented and as described in the application in part 4730.1310 or for violation of ~~parts 4730.0100 to 4730.3600 relating to ionizing radiation~~ this chapter. A hearing shall be held if requested by the applicant within three days after the receipt of the notice of withdrawal of approval. The hearing may be held upon granting the applicant three days' notice. If a hearing is requested, withdrawal of approval shall not take effect until a final order is issued by the commissioner.

Rules as Proposed (all new material)

4730.1450 OPPORTUNITY TO INSPECT.

Each registrant, owner, renter, or other person possessing a radiation source subject to registration or exempted under part 4730.0400 or 4730.0800 must allow the commissioner at all reasonable times and during the hours of operation to inspect radiation sources and the premises and facilities where these radiation sources are used or stored, and must make available to the commissioner records required by this chapter.

4730.1475 VARIANCES.

The commissioner shall grant a variance on the requirements of this chapter, except parts 4730.0400 and 4730.0600, only according to the criteria and procedures specified in parts 4717.7000 to 4717.7050 as proposed at 15 *State Register* 985 (October 29, 1990), and as later adopted.

4730.1510 REGISTRANT'S SAFETY REQUIREMENTS.

Subpart 1. **Registrant responsibility.** The registrant is responsible for directing the operation of all x-ray systems under the registrant's administrative control. The registrant or the registrant's agent shall assure that the requirements specified in this part are met in the operation of all x-ray systems.

Subp. 2. **X-ray system compliance.** An x-ray system that does not meet the provisions of this chapter shall not be operated for diagnostic, therapeutic, or industrial purposes.

Subp. 3. **Individuals who may apply radiation.** Only those individuals who are licensed practitioners of the healing arts, or individuals who are qualified by training and experience and who are under the direct supervision of a licensed practitioner of the healing arts, may intentionally apply radiation to an individual.

Subp. 4. **Procedure and safety instruction.** All individuals who operate an x-ray system shall be initially instructed and annually retrained in safe operating procedures, emergency procedures for malfunctioning equipment, and quality assurance procedures. Written safety procedures shall be provided by the registrant to the individuals specified in subpart 3 including:

A. information on the effects of radiation exposure to the human body and the embryo-fetus;

B. projections where holding devices cannot be used; and

C. any restrictions of the operating technique required for the safe operation of the particular x-ray system.

Subp. 5. **Radiographic technique chart.** A radiographic technique chart shall be provided in the vicinity of the diagnostic x-ray system's control panel which specifies, for all examinations performed with that system, the following information:

A. the patient's anatomical size and corresponding technique factors to be used;

B. the type and size of the screen-film combination, or direct exposure x-ray film for dental intraoral radiography, to be used;

C. the type and focal distance of the grid to be used, if any;

D. the source-to-image distance to be used; and

E. the size, type, and proper placement of gonad shielding, if it can be used.

For computed tomography systems, a current technique chart for each routine examination, and the computed tomography conditions of operation must be provided.

Subp. 6. **Exposure of individuals other than the patient.** All diagnostic radiographic procedures and therapeutic x-ray procedures must meet the requirements of this subpart.

A. Except for the patient only the staff and ancillary personnel required for the medical, dental, and veterinary medicine procedure or training shall be in the room during the radiographic exposure.

B. All staff and ancillary personnel required for assistance with the diagnostic radiographic procedures shall be positioned so no part of the body, including the hands, will be struck by the useful beam unless protected by 0.5 millimeter lead equivalent material.

C. All staff and ancillary personnel who must remain in the room to assist during diagnostic radiographic and computed tomography procedures must be protected from scattered radiation by protective aprons or whole body protective barriers of not less than 0.5 millimeter lead equivalence.

D. Patients and individuals who are not involved in diagnostic radiographic procedures using either stationary or portable x-ray equipment, who cannot leave the room and who cannot be protected by adequate distance for the exam being performed must be protected from scattered radiation by protective aprons or whole body protective barriers of at least 0.25 millimeters lead equivalence.

E. During any radiographic or fluoroscopic exposure, any door which is part of the protective barrier must be closed.

F. No individual other than the patient shall be in a therapy treatment room during exposures from a therapeutic x-ray system.

Subp. 7. **Gonad protection.** Except for cases in which it would interfere with the diagnostic procedure, during radiographic procedures in which the gonads are in or within two inches (5cm) of the useful beam, gonad shielding of not less than 0.25 millimeter lead equivalence must be used for patients who have procreative potential.

Subp. 8. **Holding.** When a patient, film cassette, or intraoral film must be provided with auxiliary support during a radiation exposure, items A to E apply.

A. Mechanical holding devices shall be used when the technique permits. The written safety procedures, required by part 4730.1510, subpart 4, must list individual projections where holding devices cannot be used.

B. Written safety procedures, as required by part 4730.1510, subpart 4, must indicate the requirements for selecting the individual holding and the procedure that individual shall follow.

C. The human holder must be protected as required by part 4730.1510, subpart 6.

D. No individual shall be used routinely to hold intraoral film, film cassettes, or patients. In those cases where the patient must hold the film cassette or intraoral film, any portion of the body other than the area of clinical interest struck by the useful beam shall be protected by not less than 0.5 millimeter lead equivalent material.

E. If a patient must be held in position during therapeutic x-ray treatment, mechanical supporting or restraining devices shall be used.

Subp. 9. **Prevention of unauthorized use.** Therapy x-ray systems shall not be left unattended unless they are secured against unauthorized use.

Subp. 10. **Radiological practice standards.** Procedures and auxiliary equipment designed to minimize patient and personnel exposure commensurate with the needed diagnostic information shall be used.

A. The speed of screen-film combinations, or direct exposure x-ray film in intraoral dental radiography, shall be the fastest speed consistent with the diagnostic objective of the examinations.

B. Intensifying screens shall be used in combination with the compatible film, with the exception of dental intraoral films and radiation therapy port films.

C. The radiation exposure to the patient shall be the minimum exposure required to produce images of good diagnostic quality.

D. The darkroom for film development must be free of extraneous light so fog is not added to film during handling and processing.

E. Darkroom safelight filters must be compatible with the films being processed.

F. The darkroom for film development must be tested for film fog at least every three months; any time fog is suspected; whenever there is a change in film speed or a change of safelight bulb or filters; or any time the integrity of any seal around the processor, other equipment, or the darkroom may have been compromised. The amount of fog (increase in optical density) for a two-minute fog test must not exceed 0.04 for facilities doing mammographic film development and 0.08 for all other radiographic film development.

G. Portable x-ray equipment shall be used only for examinations where it is impractical to transfer the patient to a stationary x-ray system.

H. X-ray systems subject to part 4730.1850 shall not be used in procedures where the source-to-skin distance is less than 30 centimeters (11.8 inches).

I. Protective aprons and gloves shall be monitored annually for lead protection integrity. A record of the monitoring shall be maintained until the next inspection by the commissioner.

Subp. 11. **Personnel monitoring.** Each registrant shall supply the personnel specified in items A and B with personnel monitoring equipment and shall require the personnel to use the equipment.

A. Each individual who enters a restricted area under such circumstances that the individual receives, or is likely to receive, a dose in any calendar quarter over 25 percent of the applicable value specified in part 4730.0310, subpart 2, item A, subitem (1).

B. Each individual who enters a high radiation area.

Subp. 12. **Placement of personnel monitoring equipment.** When protective clothing or personnel monitoring equipment is worn on portions of the body and personnel monitoring equipment is required, at least one such piece of personnel monitoring equipment shall be used, according to items A to C.

A. When a protective apron is worn, the personnel monitoring equipment shall be worn at the collar outside of the protective apron.

B. When more than one piece of personnel monitoring equipment is used and a record is made of the data, the record must identify the location of the monitor on the body and must state whether it was worn outside or under the protective clothing. The dose to the whole body based on the maximum dose attributed to the most critical organ shall be recorded in the reports required by part 4730.1520, subpart 4.

C. The control devices which accompany personnel monitoring equipment during shipment to the registrant must be kept in a nonradiation area at the facility between shipments of personnel monitoring equipment.

Subp. 13. **Facility design requirements.** The registrant must assure that the applicable structural shielding requirements as specified in parts 4730.1610 to 4730.1630 are met. If an analysis of operating conditions indicates the possibility of an individual receiving a dose over the limits in part 4730.0310, the commissioner may require that structural shielding modifications be made.

4730.1520 RECORDS TO BE MAINTAINED BY THE REGISTRANT.

Subpart 1. **Individual x-ray systems.** The registrant must maintain the following information for each x-ray system for inspection by the commissioner.

A. The maximum rating of the x-ray tube and generator.

B. The model and serial numbers of all components.

C. The maximum technique factors used on the x-ray equipment.

D. The type of examinations or treatments which will be performed with the equipment including the average technique factors (kVp, mA, and time settings or mAs settings).

E. Information on the anticipated workload of each x-ray system in number of examinations or treatments per week, or alternatively, mA-minutes per week of examinations or treatments.

F. The half-value layer of the x-ray beam and the kVp at which the half-value layer was measured.

G. Records of radiation safety surveys, radiation leakage measurements, calibrations, quality control measurements, maintenance, and equipment modifications performed on the x-ray system with the names of individuals who performed the services.

H. A floor plan of the room in which a stationary therapeutic or diagnostic x-ray system is located.

(1) The scale drawing must indicate the use of areas adjacent to the x-ray room and an estimate of their occupancy.

(2) The scale drawing must include the normal location of the x-ray system's radiation port, the port's travel and traverse limits, all directions of the useful beam, the location of any windows and doors, the location of the operator's booth, the location of the x-ray control panel, and the location of any upright cassette holder.

(3) The scale drawing must include the results of a survey for radiation levels present at the x-ray system operator's position and at pertinent points outside the room at specified test conditions or the type and thickness of materials, or lead equivalency, of each protective barrier.

(4) The plan must be revised when necessary to reflect any change in the room or system which may affect shielding or the safety of individuals.

If all walls, doors, and viewing windows in a diagnostic exposure room are shielded with a minimum of 1.6 millimeter lead or lead equivalent material (1/16th inch or four pounds per square foot) including the protective barrier, then it is not necessary to provide the information required in this item.

Subp. 2. **Mammographic image retention.** All original mammographic images must be maintained for seven years. If no additional mammographic images of the patient are taken during this period, the original images may be discarded.

Subp. 3. **Facilities.** The registrant must maintain records of personnel monitoring, radiation safety surveys, and quality control measurements for inspection by the commissioner.

A. Each registrant must maintain records of personnel monitoring required by subpart 4, and information required by parts 4730.1655 to 4730.1695 in the radiation measurement units used in this chapter.

B. Each registrant must maintain records in any of the following forms: the original, a computer file, a reproduced copy, or microfilm. A reproduced copy or microfilm must be duly authenticated by the registrant and must be clear and legible.

C. At all times, the registrant is responsible for record retention required by this chapter. If the registrant ceases operation for any reason, provision must be made for record retention required by this chapter.

Subp. 4. **Personnel monitoring records.** Each registrant shall maintain records showing the radiation exposures of all individuals for whom personnel monitoring is required under part 4730.1510, subpart 11. The records must be clear and legible. The doses entered on the records shall be for periods of time not exceeding one calendar quarter or the period covered in the personnel monitoring reports.

A. Records of individual exposure to radioactive material as specified in part 4730.0340, subpart 1, and the personnel monitoring records in this subpart shall be preserved for the lifetime of the individual worker or a minimum of 20 years after termination of employment with the facility, whichever is less.

B. In the absence of personnel monitoring data, records of the results of incident exposure surveys to determine external radiation dose shall be preserved indefinitely.

C. A registrant must advise each worker at least quarterly of the worker's exposure to radiation or radioactive material as shown in records maintained by the registrant pursuant to this subpart.

D. The results of radiation safety surveys of medical particle accelerators and records of the results of surveys used to evaluate the release of radioactive effluents to the environment must be preserved until the next inspection by the commissioner.

4730.1530 ORDERING OF RADIOGRAPHIC EXAMINATIONS.

The registrant shall be responsible for assuring that the following requirements on ordering radiographic examinations are met except when the radiographic examination is part of a healing arts screening program approved by the commissioner.

A. The request for a radiographic examination must be in writing and signed by a practitioner of the healing arts.

B. The written request for a radiographic examination must include clearly stated clinical indications for the examination.

4730.1610 GENERAL SHIELDING REQUIREMENTS FOR MEDICAL, CHIROPRACTIC, PODIATRIC, OSTEOPATHIC, AND VETERINARY MEDICINE FACILITIES.

Subpart 1. **Applicability.** This part applies to all medical, chiropractic, podiatric, osteopathic, and veterinary medicine facilities.

Subp. 2. **General shielding requirements for diagnostic radiographic facilities constructed or structurally remodeled six months after the effective date of this chapter.** For diagnostic radiographic facilities constructed or structurally remodeled six months after the effective date of this chapter, the requirements of this part apply. In addition, these facilities must meet the criteria for the particular type of installation as presented in:

A. NCRP Report Number 36, "Radiation Protection in Veterinary Medicine" (1970);

B. NCRP Report Number 38, "Protection Against Neutron Radiation" (1971);

C. NCRP Report Number 49, "Structural Shielding Design and Evaluation for Medical Use of X-rays and Gamma Rays of Energies Up to Ten MeV" (1976); and

D. NCRP Report Number 51, "Radiation Protection Design Guidelines for 0.1-100 MeV Particle Accelerator Facilities" (1977).

The NCRP reports in this subpart are incorporated by reference, are not subject to frequent change, and are available at the Biomedical Library of the University of Minnesota, Minneapolis, Minnesota, or through the Minitex interlibrary loan system.

Subp. 3. **Requirements for lead or lead equivalent shielding for a diagnostic radiographic facility constructed or structurally remodeled six months after the effective date of this chapter.** The requirements specified in this subpart apply to a diagnostic radiographic facility constructed or structurally remodeled six months after the effective date of this chapter.

A. Sheet lead must be installed so it is supported to prevent cold flow.

B. All lead lining must extend to a height of seven feet (2.1 meters).

C. If the wall containing a door is shielded, the door must have the same lead equivalency as the adjoining walls.

D. All lead must be installed so that adjoining pieces of lead are overlapped by a minimum of one-half inch (1.3 centimeters). The shielding of the diagnostic radiographic room must be constructed so the protection is not impaired by joints; openings such as ducts and pipes passing through the barriers; or conduits or service boxes embedded in the barriers.

E. All protective barriers that attenuate the primary x-ray beam must be shielded as primary protective barriers. This includes, but is not limited to, areas of walls containing chest cassette holders and upright buckys.

Subp. 4. **Design requirements for a diagnostic radiographic facility.** For a diagnostic radiographic facility constructed or structurally remodeled six months after the effective date of this chapter, the design requirements specified in subparts 5 to 8 apply.

Subp. 5. **Space requirements for an operator's booth in a diagnostic radiographic facility.** The requirements in items A to D are required for an operator's booth in a diagnostic radiographic facility.

A. The operator must be allotted not less than 7.5 square feet (0.7 square meters) of unobstructed floor space in the operator's booth.

B. The operator's booth may be any geometric configuration provided no dimension is less than two feet (0.6 meters).

C. Space allocated for the operator's booth must exclude any space occupied by the x-ray control panel, including an overhang, cables, or other encroachments.

D. The booth must be located and constructed so the unattenuated direct scattered radiation originating on the examination or treatment table, or at the upright cassette position does not reach the operator's station in the booth and does not exceed the exposure limits specified in part 4730.0310.

Subp. 6. **Structural requirements for an operator's booth in a diagnostic radiographic facility.** The requirements in items A to D apply to an operator's booth in a diagnostic radiographic facility:

A. The booth walls must be permanently fixed barriers of at least seven feet (2.1 meters) high.

B. The booth must not be used as a primary barrier.

C. When a door or movable panel is used as an integral part of the booth structure, it must have an interlock which prevents the exposure when the door or panel is not closed.

D. Shielding must be provided to meet the requirements of part 4730.0310. If a facility's workload does not exceed 100 milliampere-minutes per week and all walls in the diagnostic exposure room are shielded with a minimum of 1.6 millimeter lead (1/16th inch or four pounds per square foot) including the protective barrier, then it is not necessary to estimate the shielding requirements necessary to meet the requirements of part 4730.0310.

Subp. 7. **X-ray control placement for an operator's booth in a diagnostic radiographic facility.** The x-ray control must be fixed within the booth so:

A. the exposure button is at least 39 inches (one meter) from any open edge of the control booth wall which is nearest to the examining table; and

B. the operator is able to use the full viewing window.

Subp. 8. **Viewing system requirements for an operator's booth in a diagnostic radiographic facility.** An operator's booth in a diagnostic radiographic facility must meet the requirements in items A and B.

A. A booth must have at least one viewing device which is placed so the operator:

(1) can view the patient during any exposure;

(2) has full view of any occupant of the room; and

(3) can view any entry into the room.

B. When the viewing system is a window, the requirements in subitems (1) to (4) apply.

(1) The window must have the same lead equivalency as the surrounding barrier.

(2) The viewing area must be at least eight inches (20.32 cm) by ten inches (25.4 cm).

(3) The booth must be designed so the operator's expected viewing position is at least 18 inches (0.46 meters) from the edge of the booth.

(4) In diagnostic radiographic facilities constructed or structurally remodeled after the effective date of this chapter, the minimum window size must be 18 inches high (0.46 meters) X 24 inches wide (0.61 meters) and placed on a five foot two inch (1.57 meters) center with the long dimension of the window in the vertical direction.

4730.1620 GENERAL SHIELDING REQUIREMENTS FOR DENTAL RADIOGRAPHIC FACILITIES.

Dental radiographic facilities constructed or structurally remodeled six months after the effective date of this chapter must meet the shielding requirements in this part.

A. For an intraoral dental radiographic facility, the facility must meet the criteria in NCRP Report Number 35, "Dental X-Ray Protection," (1970).

B. For a facility using dental radiographic equipment for extraoral radiographs including but not limited to cephalometric, temporomandibular joint and panoramic radiographs, the general lead or lead equivalent shielding requirements in part 4730.1610, subpart 2, apply. In addition, the facility must meet the criteria presented in NCRP Report Number 49, "Structural Shielding Design and Evaluation for Medical Use of X-rays and Gamma Rays of Energies up to Ten MeV" (1976).

The NCRP reports specified in this part are incorporated by reference, are not subject to frequent change, and are available at the Biomedical Library of the University of Minnesota, Minneapolis, Minnesota, or through Minitex interlibrary loan system.

4730.1630 GENERAL REQUIREMENTS FOR THERAPEUTIC X-RAY FACILITIES.

Subpart 1. **Applicability.** All therapeutic x-ray facilities must meet the criteria for the particular type of installation as presented in:

A. NCRP Report Number 38, "Protection Against Neutron Radiation" (1971);

B. NCRP Report Number 49, "Structural Shielding Design and Evaluation for Medical Use of X rays and Gamma Rays of Energies Up to Ten MeV" (1976);

C. NCRP Report Number 51, "Radiation Protection Design Guidelines for 0.1-100 MeV Particle Accelerator Facilities" (1977);

D. NCRP Report Number 69, "Dosimetry of X Ray and Gamma Ray Beams for Radiation Therapy in the Energy Range Ten keV to 50 MeV (1981);

E. NCRP Report Number 72, "Radiation Protection and Measurement for Low Voltage Neutron Generators" (1983);

F. NCRP Report Number 79, "Neutron Contamination from Medical Electron Accelerators (1984); and

G. NCRP Report Number 102, "Medical X-ray, Electron Beam and Gamma Ray Protection for Energies Up To 50 MeV (Equipment Design, Performance and Use)" (1989).

The NCRP reports in items A to G are incorporated by reference, are not subject to frequent change, and are available at the Biomedical Library of the University of Minnesota, Minneapolis, Minnesota, or through the Minitex interlibrary loan system.

Subp. 2. **Shielding requirements for therapeutic x-ray systems and medical particle accelerators.** Each therapeutic x-ray system and medical particle accelerator system installed in a facility must be provided with primary and secondary barriers to assure compliance with parts 4730.0310, 4730.0340, 4730.0360, and 4730.0380.

Subp. 3. **Facility design requirements for therapeutic x-ray systems with energies of 50 kVp and above.** Therapeutic x-ray systems with energies of 50 kVp and above:

A. must have two-way audio communication between the patient and the operator at the control panel;

B. must provide for patient observation;

C. must have a window containing the appropriate lead equivalence so the operator at the control panel may directly observe the patient, any other individual in the room, and any doorways into the room; and

D. may have a closed circuit television system as a means of observing the patient.

Subp. 4. **Additional requirements for therapeutic x-ray systems with energies of 150 kVp and above, and medical particle accelerators.** In addition to the requirements specified in subpart 3, therapeutic x-ray systems with energies of 150 kVp and above and medical particle accelerators must have protective barriers which are fixed except for entrance doors or beam interceptors and the control panel must be located outside the treatment room.

Subp. 5. **Additional requirements for medical particle accelerators.** In addition to the requirements specified in subparts 3 and 4, facilities with a medical particle accelerator must meet the standards in items A to D.

A. Closed-circuit television, or an equivalent system, must be provided to permit continuous observation of the patient during irradiation and must be located so the operator may observe the patient from the control panel.

B. Two-way audio communication between the patient and the operator must be provided at the control panel. However, where excessive noise levels or treatment requirements make audio communication impractical, other methods of communication must be used.

C. Treatment room entrances must be provided with warning lights in readily observable positions near the outside of all access doors to indicate when the useful beam is in the on position.

D. Interlocks must be provided so all entrance doors close before treatment is initiated or continued. If the useful radiation beam is interrupted by any door opening, it must not be possible to restore the system to operation without closing the door and reinitiating irradiation by manual action at the control panel.

4730.1655 REQUIRED QUALITY ASSURANCE PROGRAM PROCEDURES.

Subpart 1. **General.** Within three months after the effective date of this chapter, each registrant must implement a quality assurance program which includes:

A. the quality assurance measurements specified in parts 4730.1655 and 4730.1665;

B. radiation safety surveys as specified in part 4730.1670;

C. calibrations as required in part 4730.1675;

D. in-service education for employees as specified in parts 4730.1510, subpart 4, and 4730.1688; and

E. the records required in part 4730.1690.

In addition to items A to E, each registrant with therapeutic x-ray equipment must also make spot checks as specified in part 4730.1680. Medical particle accelerators must have separate quality assurance procedures as specified in part 4730.1685.

Subp. 2. **General quality assurance program procedures.** Each registrant conducting diagnostic radiographic procedures or therapeutic x-ray procedures must implement a quality assurance program. The program must include:

A. a quality assurance manual that contains written policies and procedures for radiation protection and describes the quality assurance program;

B. the performance of quality assurance tests and the correction of any deficiencies as specified in the quality assurance manual; and

C. the calibration record of any electronic equipment used in the quality assurance tests within the preceding two years. The calibration of any electronic equipment must be traceable to its calibration standard at the National Institute of Standards and Technology (NIST).

Subp. 3. **Quality assurance measurements for all diagnostic x-ray facilities.** Each registrant operating a diagnostic radiographic facility must implement the quality assurance measures specified in items A to C.

A. The quality assurance manual described in subpart 2 must include the required tests and the minimum performance criteria specified in part 4730.1691 for the registrant's diagnostic radiographic equipment and processing equipment. The registrant is not limited to the quality assurance tests required in part 4730.1691 but may also include tests from item C.

B. The manual must specify the minimum frequency of performance for the quality assurance tests. In addition, the tests must be done after any change in the facility or equipment which might cause an increase in radiation hazard.

C. The registrant and the registrant's employees must be familiar with the contents and recommendations of the NCRP report 99, "Quality Assurance for Diagnostic Imaging Equipment" and may incorporate portions of the NCRP report 99 into the facility's quality assurance manual described in subpart 2, item A. NCRP report 99, "Quality Assurance for Diagnostic Imaging Equipment," (December 30, 1988) is incorporated by reference, is not subject to frequent change, and is available at the Biomedical Library of the University of Minnesota, Minneapolis, Minnesota, or through the Minitex interlibrary loan system.

4730.1665 COMPUTED TOMOGRAPHY QUALITY ASSURANCE MEASUREMENTS.

Subpart 1. **Applicability.** This part applies to computed tomography facilities and must be done in addition to the requirements in part 4730.1655.

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Subp. 2. **General quality assurance measurements.** The registrant must ensure that the quality assurance measurements and calibration procedures specified in this part are performed. The quality assurance measurements and calibration procedures must be in writing and include:

A. Those measurements and calibration procedures specified in part 4730.1691 for CT scanners at the frequency specified and those aspects of processing at the frequency specified. In addition, the quality assurance measurements and calibration procedures must be done after any change in the facility or equipment which might cause a significant increase in radiation hazard.

B. The computed tomography dose index in the two positions in item D, subitem (3)(b). The CT dosimetry phantom must be oriented so that the measurement point of 1.0 centimeter beneath the surface is in the angular location where the computed tomography dose index is maximum. For the purpose of determining the computed tomography dose index, the manufacturer's statement as to the nominal tomographic section thickness for that particular system may be used.

C. The procedures specified in subpart 3, item A.

D. Radiation output measurements.

(1) Measurements of radiation output from a computed tomography x-ray system must be performed as specified in part 4730.1691 and after any change or replacement of components which could cause a change in the radiation output.

(2) The measurement of the radiation output of the computed tomography x-ray system must be performed with a calibrated dosimetry system. The calibration of the dosimetry system must be traceable to its calibration standard at the National Institute of Standards and Technology (NIST). The dosimetry system must have been calibrated within the preceding two years.

(3) Computed tomography dosimetry phantoms must be used in determining the radiation output of the computed tomography x-ray system. The phantoms must comply with *Code of Federal Regulations*, title 21, section 1020.33.

(a) All dose measurements must be performed with the computed tomography dosimetry phantom placed on the patient couch or support device without additional attenuation materials present.

(b) Computed tomography dosimetry phantoms must provide a means for the placement of a dosimeter along the axis of rotation and along a line parallel to the axis of rotation 1.0 centimeter from the outer surface and within the phantom. Means for the placement of dosimeters or alignment devices at other locations may be provided.

(c) Any effects on the doses measured due to the removal of phantom material to accommodate dosimeters must be accounted for through appropriate corrections to the reported data or included in the statement of maximum deviation for the values obtained using the phantom.

(4) The dose measurements must be made for the head and body technique used at the facility. The image quality measurements must be made using a typical clinical technique in the head and body scan modes of operation.

Subp. 3. **Additional operator quality assurance measurements.** In addition to the quality assurance measurements described in subpart 2, the quality assurance measurements specified in items A and B must be performed by an operator.

A. The operator's computed tomography quality assurance procedures must be those with the monthly or daily frequencies in part 4730.1691, and include all processing procedures noted in part 4730.1691.

B. The registrant or radiation safety officer must review and initial all of the operator's quality assurance measurements at least quarterly. An operator's quality assurance measurements must include acquisition of images obtained with the CT dosimetry phantoms using the same processing mode and CT conditions of operation as are used to perform the quality assurance measurements required by subpart 2.

4730.1670 RADIATION SAFETY SURVEYS.

Subpart 1. **Applicability.** Each registrant conducting diagnostic and therapeutic x-ray procedures must ensure that the radiation safety surveys specified in this part are performed.

Subp. 2. **General radiation safety survey requirements for all diagnostic radiography systems.** Each registrant must make or have made the radiation safety surveys necessary for establishing compliance with these regulations. A survey must be performed at the time of initial installation and at least once annually after that. In addition, a survey must be done after any change in the facility or system which might cause a significant increase in radiation hazard. A report of each survey must be prepared, maintained at the facility according to the record requirements in part 4730.1520, and made available to the commissioner upon request.

Subp. 3. **Radiation safety survey requirements for computed tomography systems.** The registrant must ensure that all computed tomography systems have a radiation safety survey performed at the time of initial installation and at least once annually after that. In addition, a survey must be done after any change in the system or equipment which might cause a significant increase in radiation hazard. The registrant must generate a written report of the radiation safety survey. A copy of the report must be maintained at the facility in accordance with the record requirements in part 4730.1520, and shall be made available to the commissioner on request.

Subp. 4. **Radiation safety survey requirements for therapeutic x-ray systems.** All therapeutic x-ray systems must have a radiation safety survey performed at the time of initial installation and at least once annually after that. In addition, a radiation safety survey must be done after any change in the facility or system which might cause a significant increase in radiation hazard. The registrant must generate a written report of the radiation safety survey. A copy of the report must be maintained at the facility in accordance with the requirements in part 4730.1520, and must be made available to the commissioner on request.

4730.1675 CALIBRATIONS.

Subpart 1. **Diagnostic radiographic system calibrations.** The registrant must ensure that calibrations are performed on a diagnostic radiographic system whenever that system does not meet the minimum performance criteria specified in part 4730.1691 and when there is any change or replacement of components which could cause a change in the radiation output of that system.

Subp. 2. **Therapeutic x-ray system calibrations for systems of less than one MeV.** Each registrant operating a therapeutic x-ray system of less than one MeV must ensure that the calibrations specified in this subpart are performed.

A. The calibration of the radiation output of a therapeutic x-ray system must be performed:

(1) at intervals not to exceed 12 months;

(2) after any change or replacement of components which could cause a change in the radiation output; and

(3) with a calibrated dosimetry system. The calibration of the dosimeter must be traceable to its calibration standard at the National Institute of Standards and Technology (NIST). Verification of the dosimeter calibration must be performed every two years.

B. The calibration of the therapeutic x-ray system must include, but not be limited to:

(1) the exposure rates as a function of field size, technique factors, filter, and treatment distance used;

(2) the degree of congruence between the radiation field and the field indicated by the localizing device if the device is present; and

(3) an evaluation of the uniformity of the largest radiation field used.

C. A copy of the current therapeutic x-ray system's dosimetry table must be available in the area of the control panel.

Subp. 3. **Calibrations for therapeutic x-ray systems greater than one MeV.** Each registrant operating a therapeutic x-ray system of greater than one MeV must ensure that the calibrations specified in this subpart are performed.

A. The calibration of systems subject to part 4730.2450 must be performed according to the protocol endorsed by the American Association of Physicists in Medicine. The protocol known as TG-21 is titled "A protocol for the determination of absorbed dose from high energy photon and electron beams" and is published in Medical Physics, volume 10, number 6, pages 741 to 771, (1983). The TG-21 protocol is incorporated by reference and is available at the Biomedical Library of the University of Minnesota, Minneapolis, Minnesota, or through the Minitex interlibrary loan system. This publication is not subject to frequent change. This calibration protocol must be performed:

(1) before the system is first used for the irradiation of a patient;

(2) at time intervals which do not exceed 12 months; and

(3) after any change which might significantly alter the calibration, spatial distribution, or other characteristics of the therapy beam.

B. Calibration radiation measurements required by item A must be performed using a dosimetry system traceable to its calibration standard at the National Institute of Standards and Technology (NIST). The dosimetry system must:

(1) have a calibration factor for cobalt-60 gamma rays traceable to a standard maintained by the National Institute of Standards and Technology (NIST);

(2) have a calibration which has been verified every two years;

(3) be calibrated after any servicing that may have affected its calibration;

(4) be calibrated so an accuracy can be stated for the radiation quantities monitored by the system; and

(5) have constancy checks as specified in part 4730.1695, subpart 1, item B.

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C. Calibration of radiation beam output must be performed at a reference point under specified conditions in soft tissue that may be calculated to within an accuracy of two percent.

D. The calibration of the therapy beam must include, but not be limited to, the following determinations:

(1) verification that the equipment is operating in compliance with the design specifications for the light localizer, side light, and back-pointer alignment with the isocenter, when applicable, variation in the axis of rotation for the table, gantry, and jaw system, and beam flatness and symmetry at the specified depth;

(2) the absorbed dose rate at various depths of water for the range of field sizes used, for each effective energy, that will verify the accuracy of the dosimetry of all therapy procedures used with that therapy beam;

(3) the uniformity of the radiation field and any dependency on the direction of the useful beam;

(4) verification that existing depth-dose data and isodose charts applicable to the specific system continue to be valid or are updated to existing system conditions; and

(5) verification of transmission for all accessories such as wedges, shadow trays, and compensators.

E. A copy of the latest calibration performed under item A shall be available in the area of the control panel.

4730.1680 THERAPEUTIC X-RAY SYSTEM SPOT CHECKS.

Subpart 1. **Spot checks for therapeutic x-ray systems of less than one MeV.** The registrant must ensure that spot checks are performed on therapeutic x-ray systems capable of operation at greater than 150 kVp. Spot checks must be performed at a minimum frequency of every six months and meet the requirements specified in this subpart.

A. Spot-check procedures must be in writing, must be maintained in the facility in accordance with part 4730.1520, and must be available to the commissioner on request.

B. Parameters exceeding the tolerance specified in part 4730.1695 must be corrected to within the tolerance specified before the system is used for patient irradiation.

C. Whenever a spot check indicates a change in the operating level of a system which exceeds the minimum tolerance level specified in part 4730.1695, the system must be recalibrated as required in part 4730.1675, subpart 2.

Subp. 2. **Spot checks for therapeutic x-ray systems greater than one MeV.** The registrant must ensure that spot checks are performed on systems subject to part 4730.2450 during calibrations and at intervals not to exceed one month. Spot checks must meet the requirements specified in items A to G:

A. Spot-check procedures must be in writing.

B. The spot-check procedures must specify the frequency at which tests or measurements are to be performed and the acceptable tolerance for each parameter measured in the spot check when compared to the value for that parameter determined in the calibration.

C. At intervals not to exceed one month, spot checks must be made of absorbed dose measurements at a minimum of two depths in a phantom.

D. Where a system has built-in devices that provide a measurement of any parameter during irradiation, the measurement must not be used as a spot-check measurement.

E. A parameter exceeding a tolerance level specified in part 4730.1695 must be corrected to within the tolerance level before the system is used for patient irradiation.

F. Whenever a spot check indicates a change in the tolerance level of a system which exceeds the minimum tolerance level as specified in part 4730.1695, the system must be recalibrated as required in part 4730.1675, subpart 3.

G. Where a spot check involves a radiation measurement, the measurement must be obtained using a dosimetry system satisfying the requirements of part 4730.1675, subpart 3, item B, or dosimetry system which has been compared with a dosimetry system meeting those requirements within the previous year.

4730.1685 MEDICAL PARTICLE ACCELERATOR QUALITY ASSURANCE.

Subpart 1. **Radiation monitoring equipment.** At each medical particle accelerator facility, portable monitoring equipment designed for the types of radiation produced at the facility must be available. The portable monitoring equipment must be operable and calibrated for the radiation being produced at the facility. The equipment must be tested for proper operation prior to each use and calibrated at intervals not to exceed one year and after each servicing or repair.

Subp. 2. **Radiation safety survey.** The registrant must ensure that a radiation safety survey is performed at the time of initial installation, at least annually after that, and when changes are made in shielding, operation, equipment, or occupancy of areas adjacent to the facility. A report of each survey must be prepared, maintained at the facility according to the record requirements in part 4730.1520, and made available to the commissioner on request.

Subp. 3. **Written procedures.** The registrant must ensure that all surveys specified in this part are performed according to written procedures established by the radiation safety officer and are in accordance with part 4730.1670.

4730.1688 IN-SERVICE EDUCATION IN QUALITY ASSURANCE.

Each registrant must provide the in-service training program on quality assurance for employees specified in part 4730.1510, subpart 4.

4730.1690 QUALITY ASSURANCE RECORDS.

Subpart 1. **Diagnostic radiographic facility records.** The registrant must ensure that diagnostic radiographic equipment records are maintained for each diagnostic imaging system, including test results, requests for repairs and service, records of diagnostic radiographic equipment repairs and service, and other information specified in part 4730.1520.

Subp. 2. **Computed tomographic x-ray facility records.** The registrant must ensure that records of computed tomographic x-ray system calibrations performed and the quality control measurements for computed tomographic systems are recorded, plotted, and maintained until the next inspection by the commissioner.

Subp. 3. **Therapeutic x-ray facility records.** The registrant must ensure that the following records are maintained for therapeutic x-ray systems until the next inspection by the commissioner:

A. calibration records for therapeutic x-ray systems less than one MeV;

B. calibration records of measurements for therapeutic x-ray systems greater than one MeV as required under part 4730.1675, subpart 3, item A, and dosimetry system calibrations as required by part 4730.1675, subpart 3, item B;

C. spot-check measurements and any necessary corrective actions for therapeutic x-ray systems less than one MeV; and

D. spot-check measurements and any necessary corrective actions for therapeutic x-ray systems greater than one MeV.

Subp. 4. **Medical particle accelerator facility records.** The registrant must ensure that records of all radiation safety surveys, calibrations, and instrumentation tests are maintained for a medical particle accelerator at the facility until the next inspection by the commissioner.

4730.1691 MINIMUM DIAGNOSTIC QUALITY ASSURANCE TESTS FOR ALL FACILITIES.

Subpart 1. **Image receptors.**

TEST TYPE	MINIMUM TEST INTERVAL	MINIMUM PERFORMANCE CRITERIA
A. Screen-film contact	Annually	No significant areas of poor contact
B. Screen-film-cassette speed match	Annually	Densities within ± 0.10 O.D. for all cassettes used for each diagnostic task

Subp. 2. **Automatic processing.**

TEST TYPE	MINIMUM TEST INTERVAL	MINIMUM PERFORMANCE CRITERIA
A. Darkroom fog	Quarterly	≧ 0.08 O.D. increase in density (measured at approximately 1.00 O.D.) after 2 minutes using preexposed film. For mammography the O.D. increase must be ≧ 0.04.

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TEST TYPE	MINIMUM TEST INTERVAL	MINIMUM PERFORMANCE CRITERIA
B. Sensitometry and densitometry	Daily	Density ± 0.15 O.D.
C. Temperature check	Daily	Follow manufacturer's recommendations.

Subp. 3. **Manual processing.**

TEST TYPE	MINIMUM TEST INTERVAL	MINIMUM PERFORMANCE CRITERIA
A. Darkroom fog	Quarterly	≧ 0.08 O.D. increase in density (measured at approximately 1.00 O.D.) after 2 minutes using preexposed film
B. Sensitometry and densitometry	Daily	Density ± 0.15 O.D.
C. Temperature check	Before processing any film	Follow manufacturer's time and temperature chart

Subp. 4. **All diagnostic radiographic tubes; required when applicable.**

TEST TYPE	MINIMUM TEST INTERVAL	MINIMUM PERFORMANCE CRITERIA
A. SID accuracy	Annually	± 2% of measured value
B. X-ray and light field alignment	Annually	± 2% of SID any one direction, ± 3% of SID, both directions (total)
C. X-ray and bucky alignment	Annually	± 2% of SID
D. Collimator dial accuracy	Annually	± 2% of SID
E. Reproducibility	Annually	± 5% of the average of a set of exposures
F. mR/mAs	Annually	± 10% of baseline (Baseline should be as low as reasonably achievable without degrading image quality)
G. Linearity	Annually	± 10% over clinical range
H. Timer accuracy	Annually	Single Phase - Use Table 4730.1692 Three Phase - ± 5% of setting
I. Half-value layer	Annually	Use part 4730.1750, subpart 6, item A
J. kVp accuracy	Annually	± 5% of indicated kVp
K. Phototimer reproducibility, if present	Annually	± 5% of average exposure

Subp. 5. **For facilities with fluoroscopes and C-arm fluoroscopes.**

TEST TYPE	MINIMUM TEST INTERVAL	MINIMUM PERFORMANCE CRITERIA
A. Maximum output at tabletop or equivalent minimum SSD	Annually and every tube change	≧ 5 R (1.3 mC kg^{-1}) per minute for manual; ≧ 10 R (2.6 mC kg^{-1}) per minute for automatic brightness control systems
B. High level control maximum output at tabletop or equivalent minimum SSD	Annually and every tube change	≧ 20 R (5.0 mC kg^{-1}) per minute
C. Image size	Annually	Error between fluorographic beam size and observed image size must be no more than ± 3% of SID for all modes and at any tower height
D. Actual spot-film size vs indicated	Annually	Error between actual fluorographic beam size at image receptor and indicated image size must be no more than ± 3% of SID for all modes and at any tower height
E. Spot-film reproducibility	Annually	± 5% of average exposure
F. Phototimer reproducibility, if present	Annually	± 5% of average exposure

Subp. 6. **For facilities with mammography systems.**

TEST TYPE	MINIMUM TEST INTERVAL	MINIMUM PERFORMANCE CRITERIA
A. Same test types and minimum performance criteria as Diagnostic Radiographic Tubes as specified in subpart 4, unless listed below		
B. kVp accuracy	Annually	± 1 kVp of indicated kVp
C. Glandular dose (50% glandular and 50% adipose tissue composition)	Annually	A. ≧ 400 millirads for a single screen film 4.5 cm compressed breast; cranial caudal view; or B. ≧ 100 millirads for a single screened film without grid

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TEST TYPE	MINIMUM TEST INTERVAL	MINIMUM PERFORMANCE CRITERIA
D. Mammographic low and high contrast resolution (phantom image quality)	Quarterly	No noticeable deterioration in performance
E. Phototimer reproducibility	Annually	± 5% of average exposure

Subp. 7. **For facilities with tomography systems other than computed tomography.**

TEST TYPE	MINIMUM TEST INTERVAL	MINIMUM PERFORMANCE CRITERIA
A. Section level	Annually	± 5 mm
B. Level incrementation	Annually	± 2 mm
C. Section thickness	Annually	Follow manufacturer's specifications

Subp. 8. **For facilities with computed tomography scanners.**

TEST TYPE	MINIMUM TEST INTERVAL	MINIMUM PERFORMANCE CRITERIA
A. Accuracy of scout localization view	Annually	± 1 mm
B. Accuracy of distance measurements	Annually	± 1 mm
C. Patient dosimetry	Annually	± 20%
D. CT number dependence on slice thickness	Semi-annually	Mean ± 3 CT numbers averaged over 100 pixels
E. CT number calibration	Monthly	Air: -1,000 % 3 CT numbers; Water: 0 % 1.5 CT numbers
F. Low contrast resolution	Monthly	0.5 cm holes
G. CT number uniformity	Monthly	Variation ± 5 CT numbers among a mean of 100 pixels
H. Hard copy output and visual display	Daily	Luminance and contrast not significantly different

Subp. 9. **For facilities with cinefluorographic systems.**

TEST TYPE	MINIMUM TEST INTERVAL	MINIMUM PERFORMANCE CRITERIA
A. Cinefluorographic exposure rates	Semi-annually	Approximately 10 to 20 uR (2.6 to 5.0 nC/kg) per frame at intensifier for nine inch (23 cm) mode; approximately 20 to 30 uR (5 to 8 nC/kg) per frame at intensifier for six inch (15 cm) mode

TEST TYPE	MINIMUM TEST INTERVAL	MINIMUM PERFORMANCE CRITERIA
B. Cinefluorographic film exposure	Semi-annually	Approximately 15 uR (4 nC kg^{-1}) per frame at intensifier for nine inch (23 cm) mode; approximately 27 uR (7 nC kg^{-1}) per frame at intensifier for six inch (15 cm) mode
C. Cinefluorographic image size and beam limitation	Semi-annually	Within ± 3% of SID for all modes and at any tower height

Subp. 10. **For facilities with cardiac catheterization systems.**

TEST TYPE	MINIMUM TEST INTERVAL	MINIMUM PERFORMANCE CRITERIA
A. Same test types and minimum performance criteria as Diagnostic Radiographic Tubes as specified in subpart 4, unless indicated in this subpart		
B. Same test types and minimum performance criteria as fluoroscopes and C-arm fluoroscopes as specified in subpart 5, unless indicated in this subpart		
C. Film changer screen-film contact	Semi-annually	No significant difference between static and dynamic conditions
D. Low and high contrast resolution	Semi-annually	No significant difference between static and dynamic conditions
E. Optical density of films over duration of filming run	Semi-annually	< ± 0.2 O.D. difference
F. Cinefluorographic exposure rates (use cinefluorographic tests, minimum frequency and minimum performance criteria in subpart 9, item A)		

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TEST TYPE	MINIMUM TEST INTERVAL	MINIMUM PERFORMANCE CRITERIA
G. Cinefluorographic low and high contrast resolution	Semi-annually	No degradation from fluoroscopic measurements
H. Ancillary special procedures equipment	Follow recommen-dations of equipment manufacturer	Meet recommendations of equipment manufacturer

Subp. 11. **For facilities with dental intraoral systems.**

TEST TYPE	MINIMUM TEST INTERVAL	MINIMUM PERFORMANCE CRITERIA
A. Film processing	Use automatic and manual processing as specified in subparts 2 and 3.	
B. Filtration (HVL)	Annually	Use part 4730.1750, subpart 6, item A
C. Radiation exposure at end of cone	Annually	Use part 4730.1950, subpart 4, item F
D. Timer reproducibility	Annually	± 10% of indicated timer setting

Subp. 12. **For facilities with dental extraoral systems including panoramic systems.**

TEST TYPE	MINIMUM TEST INTERVAL	MINIMUM PERFORMANCE CRITERIA
A. Film processing	Use automatic and manual processing as specified in subparts 2 and 3.	
B. Same test types and minimum performance criteria as Diagnostic Radiographic Tubes in subpart 4.		

Source: Derived from NCRP 99, Tables A.1 to A.10.

4730.1692 EXPOSURE TIME CONTROL LIMITS FOR SINGLE PHASE FULL-WAVE RECTIFIED GENERATORS.

Exposure time (seconds)	Acceptance limits
1/5	24 ± 1 dot
1/10	12 ± 1 dot
1/20	6 ± 0 dots
1/30	4 ± 0 dots

Note: when using a spinning top, the x-ray pulses are imaged as dots on the film as the small hole in the top is moved rapidly (rotated) over the film. Source: National Council on Radiation Protection, Report No. 99, Table 7.3, December 30, 1988.

4730.1693 THERAPY QUALITY ASSURANCE.

PARTIAL LISTING OF MINIMUM QUALITY ASSURANCE TESTS AND LIMITS FOR MEASUREMENT EQUIPMENT

Subpart 1. **Local standard (Loc. Std.).**

TEST	MINIMUM TEST INTERVAL*	TOLERANCE**
(1) AAPM - accredited Dosimetry Calibration Laboratory calibration	Every two years	D

TEST	MINIMUM TEST INTERVAL*	TOLERANCE**
(2) Linearity	Every four years	0.5 percent
(3) Venting	Every four years	D
(4) Extra-cameral signal	Initial use	0.5 percent
(5) Leakage	Each use	0.5 percent
(6) Radionuclide check	Each use	2 percent
(7) Recombination	Initial use	0.5 percent
(8) Collecting potential	Each use	D

Subp. 2. **Other field instruments.**

TEST	MINIMUM TEST INTERVAL*	TOLERANCE**
(1) Local standard Comparison	Every year	2 percent
(2) Linearity	Every four years	D
(3) Venting	Every four years	D
(4) Extra-cameral signal	Every four years	D
(5) Leakage	Each use	0.5 percent
(6) Radionuclide check	Each use	2 percent
(7) Recombination	Initial use	0.5 percent
(8) Collecting potential	Each use	D

Subp. 3. **Relative dosimetric equipment.**

TEST	MINIMUM TEST INTERVAL*	TOLERANCE**
(1) Thermoluminescent Dosimeter		
(a) Calibration	Each batch or box	D
(b) Linearity	Initial use	D
(c) Electronic sensitivity	Each use	3 percent
(2) Film		
(a) Dose and response	Each batch or box	D
(b) Densitometer linearity	Every year	D
(c) Position sensitivity	Initial Use	D
(3) Air Ionization Chamber system		
(a) Linearity	Every year	D
(b) Extra-cameral signal	Initial use	1 percent
(4) Diode System		
(a) Energy dependence	Initial use	D
(b) Extra-cameral signal	Initial use	D
(c) Linearity	Initial use	D

Subp. 4. **Survey instruments.**

TEST	MINIMUM TEST INTERVAL*	TOLERANCE**
(1) Calibration	Every year	D

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TEST	MINIMUM TEST INTERVAL*	TOLERANCE**
(2) Linearity	Every year	D
(3) Constancy	Each use	5 percent
(4) Battery voltage	Each use	D
(5) Time constant	No suggestion	No suggestion
(6) Radiofrequency interference	No suggestion	D

Subp. 5. **Positioning equipment.**

TEST	MINIMUM TEST INTERVAL*	TOLERANCE**
(1) Accuracy	Each use	2 mm
(2) Hysteresis	Each use	2 mm

Subp. 6. **Phantoms and attenuators.**

TEST	MINIMUM TEST INTERVAL*	TOLERANCE**
(1) Thickness	Initial use	D
(2) Density	Initial use	D
(3) Phantom stacked density	Initial use	D
(4) Integrity	Each use	No suggestion
(5) Detector fit	No suggestion	D

Subp. 7. **Accessory equipment.**

TEST	MINIMUM TEST INTERVAL*	TOLERANCE**
(1) Thermometer (a) Calibration	Initial use	0.5 percent
(2) Barometer (mercury) (a) Calibration Hg	Initial use	1 mm Hg

* Initial use = Initial use for each mode of use or following malfunction and repairs.

Each use = Each use (measurement sequence) or ongoing evaluation.

Each batch or box = Each batch or box at appropriate energy (dosimeter element precision also should be considered).

y or mo = number preceding y = year or mo = month indicates frequency between tests, example: 4 y means once every four years.

** D = Documented and correction applied or noted in report of measurement, when appropriate.

Source: Derived from American Association of Physicists in Medicine, Report No. 13, Table I, pp. 21-22, 1984.

4730.1695 QUALITY ASSURANCE CRITERIA FOR EXTERNAL BEAM TELETHERAPY AND SIMULATION SYSTEMS.

Subpart 1. **Dosimetry.**

	MINIMUM TEST INTERVAL	TOLERANCE
A. General axis dose calibration	Annually	2 percent
B. Constancy checks		
(1) Dose per monitor unit along central axis	Weekly	3 percent
(2) Depth dose	Monthly	2 percent
(3) Beam uniformity	Monthly	3 percent
(4) Dose monitor	No suggestion	No suggestion
(5) Timer constancy	No suggestion	No suggestion

Subp. 2. **Geometry.**

	MINIMUM TEST INTERVAL	TOLERANCE
A. Field positioning aids		
(1) Light field and radiation field agreement	Weekly	3 mm
(2) Mechanical distance pins, lasers, and SSD lights	Monthly	2 mm
(3) Scale readouts	Monthly	No suggestion
B. Machine alignment		
(1) Focal spot position	Annually	No suggestion
(2) Jaw symmetry	Annually	2 mm
(3) Coincidence of collimator (jaw) and gantry axes with isocenter	Annually	2 mm
(4) Stability of gantry arm and bearing under rotation	Annually	2 mm
(5) Couch motion and table-top sag	Annually	No suggestion

Subp. 3. **Electron beam equipment.**

	MINIMUM TEST INTERVAL	TOLERANCE
A. Dose calibration	Annually	3 percent
B. Beam uniformity	Weekly	5 percent
C. Depth dose	Monthly	3 mm at 80%
D. X-ray contamination	Annually	No suggestion
E. Dosimetry reproducibility and linearity	Annually	No suggestion
F. Dose per monitor unit constancy check	Weekly	3 percent

Subp. 4. **Treatment accessories.** *

	MINIMUM TEST INTERVAL	TOLERANCE
A. Wedges and standard compensation	Annually	No suggestion
B. Field shaping blocks	Annually	No suggestion

Subp. 5. **Simulators.**

	FREQUENCY	TOLERANCE
A. Geometry, follow subpart 2	—	—
B. Accessories	Annually	No suggestion

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Subp. 6. **Emergency off.**

	MINIMUM TEST INTERVAL	TOLERANCE
A. Emergency off system	No suggestion	No suggestion

* Attenuation in blocks, wedge factors, and compensator data must be checked annually. A visual inspection of the mechanical integrity of these accessories must be done monthly.

Source: Derived from American Association of Physicists in Medicine, Report No. 13, Table II, page 29, 1984.

4730.1750 GENERAL EQUIPMENT REQUIREMENTS FOR ALL DIAGNOSTIC RADIOGRAPHIC SYSTEMS.

Subpart 1. **Applicability.** All diagnostic radiographic systems must meet the requirements in this part.

Subp. 2. **Warning label.** The control panel containing the main power switch must bear the warning statement which is legible and accessible to view: "WARNING: This x-ray unit may be dangerous to patient and operator unless safe exposure factors and operating instructions are observed."

Subp. 3. **Battery charge indicator.** On battery-powered x-ray generators, visual means must be provided on the control panel to indicate whether the battery is adequately charged for proper operation.

Subp. 4. **Leakage radiation from the diagnostic source assembly.** The leakage radiation from the diagnostic source assembly measured at a distance of one meter (39.4 inches) in any direction from the source must not exceed 100 milliroentgens (25.8 uC/kg) in one hour when the x-ray tube is operated at its leakage technique factors. Compliance must be determined by measurements averaged over an area of 100 square centimeters (15.5 square inches) with no linear dimension greater than 20 centimeters (7.9 inches).

Subp. 5. **Radiation from components other than the diagnostic source assembly.** The radiation emitted by a component other than the diagnostic source assembly must not exceed two milliroentgens (0.516 uC/kg) in one hour at five centimeters (1.97 inches) from any accessible surface of the component when it is operated in an assembled x-ray system under any conditions for which it was designed. Compliance must be determined by measurements averaged over an area of 100 square centimeters (15.5 square inches) with no linear dimension greater than 20 centimeters (7.9 inches).

Subp. 6. **Beam quality, half-value layer.** The half-value layer of the useful beam for a given kVp must not be less than the values shown in item A. If it is necessary to determine a half-value layer at a kVp which is not listed in item A, linear interpolation or extrapolation may be made.

A. Values for half-value layer of useful beam for x-ray tube:

Design Operating range (kVp)	Measured kVp	Half-value layer (millimeter of aluminum) Other X-ray Systems	Specified Dental Systems
Below 50	30	0.3	1.5
	40	0.4	1.5
	50	0.5	1.5
51-70	51	1.2	1.5
	60	1.3	1.5
	70	1.5	1.5
Above 70	71	2.1	2.1
	80	2.3	2.3
	90	2.5	2.5
	100	2.7	2.7
	110	3.0	3.0
	120	3.2	3.2
	130	3.5	3.5
	140	3.8	3.8
	150	4.1	4.1

B. All intraoral dental radiographic systems installed on and after December 1, 1980, must have a minimum half-value layer not less than 1.5 millimeters aluminum.

C. For capacitor energy storage equipment, compliance with the requirements of this subpart must be determined with the capacitors fully charged and with a technique which discharges at least half of the energy stored in the capacitors (half of the maximum milliampere-second).

D. The half-value layer of the useful beam must be measured with all the materials in the beam which are always present between the source and the patient.

Subp. 7. **Beam quality, filtration controls.** For x-ray systems which have variable kVp and variable filtration for the useful beam, means must be provided to prevent an exposure unless the filtration required to obtain the half-value layer specified in subpart 6, item A, is in the useful beam for the given kVp which has been selected.

Subp. 8. **Multiple tubes.** Where two or more x-ray tubes are controlled by one exposure switch, the tube or tubes which have been selected must be clearly indicated before initiation of the exposure. The indication must be both on the x-ray control panel and at or near the tube housing assembly which has been selected.

Subp. 9. **Mechanical support of tube head.** The tube housing assembly supports must be adjusted so it remains stable during an exposure unless tube housing movement is a designed function of the x-ray system.

Subp. 10. **Technique factors.** The technique factors in items A to C apply to all diagnostic radiographic systems.

A. The technique factors to be used during an exposure must be indicated before an exposure begins. If automatic exposure controls are used, the technique factors which are set before exposure must be indicated.

B. If automatic exposure controls are used in a system installed after the effective date of this chapter, in addition to the requirements of item A:

(1) the exposure time or milliampere-second must be displayed for x-ray generators with a constant milliamperage; and

(2) the milliampere-second must be displayed for falling load generators.

C. The requirement of item A may be met by permanent markings on systems having fixed technique factors. Indication of technique factors must be visible from the operator's position except in the case of spot films made by the fluoroscopist.

Subp. 11. **Timers.** The requirements in this subpart for timers apply to all general radiographic, intraoral dental, and veterinary medicine radiographic systems.

A. A means must be provided to terminate the exposure at a preset time interval, a preset product of milliamperage and time, a preset number of pulses, or a preset radiation exposure to the image receptor.

B. An exposure must not be possible when the timer is set to a zero or off position, if either position is provided.

C. Except for dental panoramic systems, termination of the exposure must cause automatic resetting of the timer to its initial setting or to zero.

Subp. 12. **Reproducibility.** With a timer setting of 0.5 seconds or less, the difference between the maximum exposure time (T_{max}) and the minimum exposure time (T_{min}) must be less than or equal to 20 percent of the average exposure time (T) when four timer tests are performed:

$(T_{max} - T_{min}) \geq 0.2\ T.$

Subp. 13. **X-ray control.** The x-ray control must meet the requirements in this subpart.

A. The exposure control switch must be a dead-man type which requires continuous pressure to complete the exposure.

B. Each x-ray control console other than dental intraoral systems must be located in such a way as to meet the requirements in this item.

(1) Stationary x-ray systems must have the x-ray control permanently mounted behind the protective barrier so the operator remains behind that barrier during the entire exposure.

(2) Portable x-ray systems that produce more than 25 milliamperes-minutes per week at the same location must meet the requirement of subitem (1).

(3) Portable x-ray systems that produce less than 25 milliamperes-minutes per week at the same location, must meet the requirement of subitem (1), or be provided with a 6.5 foot (2.0 m) high protective barrier which is placed at least six feet (1.8 m) from the tube housing assembly and at least six feet (1.8 m) from the patient.

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C. The x-ray control console must provide visual indication observable at or from the operator's protected position whenever x-rays are produced.

Subp. 14. **Exposure reproducibility.** The coefficient of variation must not exceed 0.10 when all technique factors are held constant. This requirement shall be met if, when four exposures are made, the difference between the maximum exposure (E_{max}) and the minimum exposure (E_{min}) is less than or equal to 20 percent of the average exposure (E).

$(E_{max} - E_{min}) \geq 0.2\ E.$

Subp. 15. **Additional requirements applicable only to certified x-ray systems.** Only diagnostic radiographic systems incorporating one or more certified components must comply with the requirements in this subpart which relate to those certified components.

A. The radiographic system must be operated on an adequate power supply as specified by the manufacturer. The coefficient of variation of radiation exposures must be no greater than 0.05 for any specific combination of selected technique factors.

B. When the radiographic system allows a choice of x-ray milliamperage settings and is operated on a power supply as specified by the manufacturer according to the requirements of applicable federal performance standards for any fixed kVp within the range of 40 to 100 percent of the maximum rating, the average ratios of exposure to the milliampere-seconds product obtained at any two consecutive milliamperage settings must not differ by more than 0.10 times their sum:

$|\bar{X}_1 - \bar{X}_2| \geq 0.10\ (\bar{X}_1 + \bar{X}_2),$

where $\bar{X}_1$ and $\bar{X}_2$ are the average mR/mAs values obtained at each of two consecutive milliamperage settings.

C. Deviation of technique factors from indicated values must not exceed the limits specified for that system by its manufacturer.

D. The x-ray control console must provide a signal audible to the operator that the exposure has terminated.

E. A certified diagnostic radiographic system and its associated certified components used on humans must be maintained in compliance with applicable requirements of the Federal X-ray Equipment Performance Standard, *Code of Federal Regulations*, title 21, subchapter J, in effect at the time of manufacture.

4730.1850 DIAGNOSTIC RADIOGRAPHIC SYSTEMS OTHER THAN FLUOROSCOPIC, DENTAL INTRAORAL, VETERINARY MEDICINE, OR COMPUTED TOMOGRAPHY SYSTEMS.

Subpart 1. **Applicability.** This part applies to all diagnostic x-ray systems certified according to standards provided by United States Code, title 42, section 263f, and to diagnostic x-ray systems installed before those standards were established. This part does not apply to fluoroscopic, dental intraoral, veterinary medicine, or computed tomography x-ray systems. The requirements in this part are in addition to the requirements in parts 4730.0100 to 4730.1750.

Subp. 2. **Beam limitation.** The useful beam must be limited to the patient's area of clinical interest.

Subp. 3. **General purpose stationary x-ray systems.** General purpose stationary x-ray systems must meet the standards in items A to E.

A. A means for stepless adjustment of the size of the x-ray field must be provided.

B. A method must be provided for visually defining the perimeter of the x-ray field. The total misalignment of the edges of the visually defined field with the respective edges of the x-ray field along either the length or width of the visually defined field must not exceed two percent of the distance from the source to the center of the visually defined field when the surface upon which it appears is perpendicular to the axis of the x-ray beam.

C. A method must be provided to:

(1) indicate when the axis of the x-ray beam is perpendicular to the plane of the image receptor;

(2) align the center of the x-ray field with respect to the center of the image receptor to within two percent of the SID; and

(3) indicate the SID to within two percent.

D. The beam-limiting device must numerically indicate the field size at the plane of the image receptor to which it is adjusted.

E. The indication of field size dimensions and SIDs must be:

(1) specified in inches or centimeters; and

(2) such that aperture adjustments result in x-ray field dimensions at the plane of the image receptor which correspond to those indicated by the beam-limiting device to within two percent or less of the SID when the beam axis is perpendicular to the plane of the image receptor.

Subp. 4. **Diagnostic radiographic systems designed for one image receptor size.** Diagnostic radiographic systems designed for only one image receptor size at a fixed SID must be provided with means to limit the field at the plane of the image receptor to dimensions no greater than those of the image receptor, and must align the center of the x-ray field with the center of the image

receptor to within two percent of the SID. Alternatively, such systems must be provided with means to both size and align the x-ray field so the x-ray field at the plane of the image receptor does not extend beyond any edge of the image receptor.

Subp. 5. **Diagnostic radiographic systems designed only for mammography.** Diagnostic radiographic systems designed only for mammography must be provided with means to limit the useful beam so the x-ray field at the plane of the image receptor does not extend beyond any edge of the image receptor at any designated SID. For the edge of an image receptor designed to be adjacent to the chest wall, the x-ray field must not extend beyond this edge by more than two percent of the SID. This requirement can be met with a system which performs according to subpart 6, item C. When the beam-limiting device and image receptor support device are designed to be used to compress the breast during a mammographic procedure and the SID may vary, the SID indication specified in subpart 6, item C, must be the maximum SID for which the beam-limiting device or aperture is designed. In addition, each image receptor support intended for installation on a system designed only for mammography must have clear and permanent markings to indicate the image receptor size for which it is designed.

Facilities providing mammography must comply with the standards in items A to G.

A. Radiographic equipment used for either screen-film or xeroradiographic imaging of the breast must be designed specifically for mammographic imaging.

B. The x-ray tube target material must be molybdenum or tungsten-molybdenum alloy for screen-film systems, or tungsten for xeroradiographic systems.

C. The half-value layer must be a minimum of 0.3 mm of aluminum at 30 kVp for screen-film systems. The half-value layer must be a minimum of 1.5 mm of aluminum at 45 kVp for xeroradiographic systems.

D. The kilovoltage must be less than 34 kVp for screen-film systems and between 40 to 55 kVp for xeroradiographic systems for a 4.5 cm thick compressed breast, comprised of 50 percent glandular, 50 percent adipose tissue.

E. A screen-film system designed for mammographic purposes must be used for screen-film imaging. Direct x-ray exposed film or any other film exposed directly to x-rays must not be used.

F. The mean glandular dose for a two view screen-film mammography with grid or for a two view xeroradiography for a patient with 4.5 cm thick compressed breasts must be no more than 0.8 rad.

G. The mean glandular dose for a two view screen-film mammography without grid, for the patient with 4.5 cm thick compressed breasts must be no more than 0.2 rad.

Subp. 6. **Other noncertified general purpose x-ray systems.** A facility with a noncertified general purpose x-ray system must comply with items A to C.

A. Means must be provided to limit the x-ray field in the plane of the image receptor so the field does not exceed each dimension of the image receptor by more than two percent of the SID when the axis of the x-ray beam is perpendicular to the plane of the image receptor.

B. Means must be provided to align the center of the x-ray field with the center of the image receptor to within two percent of the SID, or means must be provided to both size and align the x-ray field so the x-ray field at the plane of the image receptor does not extend beyond any edge of the image receptor.

C. The requirements of items A and B may be met with a system that meets the requirements for a general purpose x-ray system as specified in subpart 3. When alignment means are also provided, the requirements of items A and B may be met with either:

(1) an assortment of removable, fixed-aperture, beam-limiting devices sufficient to meet the requirement for each combination of image receptor size and SID for which the system is designed with each device having clear and permanent markings to indicate the image receptor size and SID for which it is designed; or

(2) a beam-limiting device having multiple fixed apertures sufficient to meet the requirement for each combination of image receptor size and SID for which the system is designed. Permanent, clearly legible markings must indicate the image receptor size and SID for which each aperture is designed and must indicate which aperture is in position for use.

Subp. 7. **Radiation exposure, x-ray controls.** An x-ray control must be incorporated into each x-ray system so an exposure can be terminated by the operator at any time during exposures of greater than one-half second. During serial radiography means must be provided to permit completion of any single exposure of the series in process before terminating the series.

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Subp. 8. **Radiation exposure, automatic exposure controls.** When an automatic exposure control is provided:

A. indication must be made on the control panel when this mode of operation is selected;

B. the minimum exposure time for all radiographic systems, other than that specified in item E, must be equal to or less than 1/60 second or a time interval required to deliver five milliamperes-second, whichever is greater;

C. either the product of the kVp, milliamperage, and exposure time must be limited to not more than 60 kWs per exposure, or the product of x-ray milliamperage and exposure time must be limited to not more than 600 mAs per exposure;

D. a visible signal must indicate when an exposure has been terminated at the limits required by item C, and manual resetting must be required before further automatically timed exposures can be made; and

E. if the kVp is equal to or greater than 50 kVp, the minimum exposure time for field emission equipment rated for pulsed operation must be equal to or less than a time interval equivalent to two pulses.

Subp. 9. **Source-to-skin distance.** All portable x-ray systems must be provided with means to maintain a minimum source-to-skin distance equal to or greater than 30 centimeters (11.8 inches).

Subp. 10. **Radiation from capacitor energy storage equipment in standby status.** Radiation emitted from the x-ray tube when the exposure switch or timer is not activated must not exceed a rate of two milliroentgens (0.5 uC/kg) per hour at five centimeters (1.97 inches) from any accessible surface of the diagnostic source assembly, with the beam-limiting device fully open.

Subp. 11. **Additional requirements for certified systems only.** The standards in items A to D are applicable to certified x-ray systems only.

A. Stationary and portable general purpose x-ray systems must have means to limit the useful beam.

(1) There must be provided a means of stepless adjustment of the size of the x-ray field. The minimum field size at a SID of 100 centimeters (39.4 inches) must be equal to or less than five by five centimeters (1.97 by 1.97 inches).

(2) When a light localizer is used to define the x-ray field, it must provide an average illumination of not less than 160 lux (15.0 foot candles) above ambient at 100 centimeters (39.4 inches) or at the maximum SID, whichever is less. The average illumination must be based upon measurements made in the approximate center of each quadrant of the light field. Radiation therapy simulation systems installed on and after May 27, 1980, are exempt from this requirement.

(3) The edge of the light field at 100 centimeters (39.4 inches) or at the maximum SID, whichever is less, must have a contrast ratio, corrected for ambient lighting, of not less than four in the case of beam-limiting devices designed for use on stationary x-ray systems, and a contrast ratio of not less than three in the case of beam-limiting devices designed for use on portable x-ray systems. The contrast ratio is defined as I_1/I_2 where I_1 is the illumination three millimeters (0.12 inches) from the edge of the light field toward the center of the field; and I_2 is the illumination three millimeters (0.12 inches) from the edge of the light field away from the center of the field. Compliance must be determined with a measuring instrument aperture of one millimeter (0.04 inches) in diameter.

B. The useful beam limitation for portable x-ray systems must meet the beam limitation requirements of item A and subpart 3.

C. This item applies to those general purpose x-ray systems which contain a tube housing assembly, an x-ray control, and a table (if so equipped). The system must be certified according to *Code of Federal Regulations*, title 21, section 1020.30(c). The system must meet the standards in subitems (1) to (6).

(1) Positive beam limitation must be provided according to the criteria in units (a) to (f).

(a) The image receptor must be inserted into a permanently mounted cassette holder.

(b) The image receptor length and width must each be less than 50 centimeters (19.7 inches).

(c) The x-ray beam axis must be within plus or minus three degrees of vertical and the SID must be 90 centimeters to 130 centimeters (35.4 inches to 51.2 inches) inclusive; or the x-ray beam axis must be within plus or minus three degrees of horizontal and the SID must be 90 centimeters to 205 centimeters (35.4 inches to 80.7 inches) inclusive.

(d) The x-ray beam axis must be perpendicular to the plane of the image receptor to within plus or minus three degrees.

(e) Neither tomographic nor stereoscopic radiography shall be performed.

(f) The positive beam limitation system must not be intentionally overridden. This override provision is subject to the provisions of item C, subitem (3).

(2) Positive beam limitation must prevent the production of x-rays when:

(a) the length or width of the x-ray field in the plane of the image receptor differs from the corresponding image receptor dimensions by more than three percent of the SID except as permitted by subitem (4); or

(b) the sum of the length and width differences as stated in unit (a) without regard to sign exceeds four percent of the SID.

(3) If a method of overriding the positive beam limitation system exists, that method must be designed for use only in the event of positive beam limitation system failure or if the system is being serviced. If the positive beam limitation system is in a position that the operator considers part of the operational controls or if it is referenced in the operator's manual or in other materials intended for the operator:

(a) a key must be used to override the positive beam limitation;

(b) the key must remain in place during the entire time the positive beam limitation system is overridden; and

(c) that the key or key switch must be clearly and durably labeled as follows: "FOR X-RAY FIELD LIMITATION SYSTEM FAILURE."

(4) Compliance with item C, subitem (2), must be determined when the equipment indicates the beam axis is perpendicular to the plane of the image receptor and the provisions of item C, subitem (1), are met. Compliance must be determined no sooner than five seconds after insertion of the image receptor.

(5) The positive beam limitation system must be capable of operation, at the discretion of the operator, so that the size of the field may be made smaller than the size of the image receptor through stepless adjustment of the field size. The minimum field size at an SID of 100 centimeters (39.4 inches) must be equal to or less than five centimeters by five centimeters (1.97 inches by 1.97 inches).

(6) The positive beam limitation system must be designed so that if a change in image receptor does not cause an automatic return to positive beam limitation function as described in item C, subitem (2), then any change of image receptor size of SID must cause the automatic return.

D. For x-ray systems installed after September 5, 1978, designed only for mammography, the transmission of the primary beam through any image receptor support provided with the system must be limited so the exposure five centimeters (1.97 inches) from any accessible surface beyond the plane of the image receptor supporting device does not exceed 0.1 milliroentgen (25.8 nC/kg) for each activation of the tube. Exposure must be measured with the system operated at the minimum SID for which it is designed. Compliance must be determined at the maximum kVp for the system and at the maximum rated product of milliamperage and exposure time (milliampere-seconds) for that kVp. Compliance must be determined by measurements averaged over an area of 100 square centimeters (15.5 square inches) with no linear dimension greater than 20 centimeters (7.9 inches).

4730.1950 INTRAORAL DENTAL RADIOGRAPHIC SYSTEMS.

Subpart 1. **Applicability.** This part applies to x-ray systems used for intraoral dental radiography. Requirements for extraoral dental radiographic systems are covered in part 4730.1850. This part applies in addition to the requirements in parts 4730.0100 to 4730.1750.

Subp. 2. **Source-to-skin distance.** X-ray systems designed for use with an intraoral image receptor must be provided with a position-indicating-device to limit source-to-skin distance to not less than 18 centimeters (7.1 inches).

Subp. 3. **Field limitation.** Radiographic systems designed for use with an intraoral image receptor must be provided with and used with collimation to limit the x-ray field such that:

A. if the minimum source-to-skin distance is 18 centimeters (7.1 inches) or more, the x-ray field, at the minimum, must be containable in a circle having a diameter of no more than seven centimeters (2.76 inches); or

B. with rectangular position-indicating-devices, the longer side must not exceed 5.1 centimeters (two inches); and

C. the x-ray system must be operated so the useful beam at the patient's skin does not exceed the requirements of this subpart.

Subp. 4. **Safety controls.** The registrant must ensure that the safety controls in this subpart are followed.

A. Intraoral film holders and bite blocks must be used. Film must not be held by hand.

B. The tube housing and the position-indicating-device must not be hand-held during an exposure and must be stable before the exposure is initiated and during the exposure.

C. Adults of reproductive age and children must be provided with gonadal protection when a full mouth series of exposures are made with intraoral radiography.

D. Structural shielding in addition to the requirements of part 4730.1620 must be provided.

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(1) Dental rooms containing intraoral radiographic systems must be provided with barriers at all areas struck by the useful beam. In many cases structural materials of ordinary walls suffice as a protective barrier without the addition of special shielding material.

(2) When dental intraoral radiographic systems are installed in adjacent rooms or areas, protective barriers must be provided between the rooms or areas.

E. Each installation must be provided with a protective barrier for the operator or must be so arranged that the operator can stand at least six feet from the patient and the tubehead and not in the path of the useful beam.

F. The exposure at the end of the cone must not exceed the values listed in Table 4730.1950:

TABLE 4730.1950

kVp	"D" Speed Film ESE (milliroentgens)	"E Speed Film" ESE (milliroentgens)
50	425 - 575	220 - 320
55	350 - 500	190 - 270
60	310 - 440	165 - 230
65	270 - 400	140 - 200
70	240 - 350	120 - 170
75	170 - 260	100 - 140
80	150 - 230	90 - 120
85	130 - 200	80 - 105
90	120 - 180	70 - 90
95	110 - 160	60 - 80
100	100 - 140	50 - 70

Notes:

(1) Exposures are specified as free-in-air exposures without backscatter.

(2) The indicated kVp is often significantly different from the actual kVp. The kVp must be tested at the time the output per film is measured to determine the correct exposure range to be applied.

4730.2050 VETERINARY MEDICINE RADIOGRAPHIC INSTALLATIONS.

Subpart 1. **Applicability.** This part applies to x-ray systems used for diagnostic veterinary medicine radiography and applies in addition to the requirements in parts 4730.0100 to 4730.1750. Requirements for fluoroscopic veterinary medicine systems are covered in part 4730.2150. Requirements for therapeutic veterinary medicine shall be the same as those in parts 4730.2350, 4730.2450, and 4730.2475.

Subp. 2. **Beam limitation.** Collimators must be provided to restrict the useful beam to the area of clinical interest and must provide the same degree of protection as is required of the tube housing.

A. If a variable-aperture beam limiting collimator is available, the projected light and x-ray field must not exceed the dimensions of the x-ray film cassette by greater than two percent of the distance of the x-ray tube to the film SID in any direction.

B. If a fixed dimension beam limiting collimator is used, it must meet the additional requirements in subitems (1) to (3).

(1) The collimator must be labeled to indicate the field size and the SID for which it is designed.

(2) The collimator must be used only for the field size and the SID for which it is designed.

(3) The x-ray field must not exceed the x-ray film cassette by greater than two percent of the distance of the x-ray tube to the film SID in the x-ray film cassette's smallest dimension.

C. In the case of horizontal beam x-rays a mechanical cassette holding device must be used to ensure that no part of the body of the individual steadying the cassette is exposed to primary beam x-rays.

D. If necessary, and any involved individual is properly attired in protective apron and gloves of at least 0.5 mm lead equivalency, this does not preclude the operation of the radiographic system by one of the individuals holding the animal patient using a foot switch.

Subp. 3. **Operating procedures.** The registrant must ensure that the operating procedures in this subpart are applied.

A. The operator must not stand in the path of the useful beam during radiographic exposures.

B. No individual other than the operator must be in the radiographic room while exposures are being made unless the individual's assistance is required.

C. When an animal must be held in position during radiography, mechanical support, restraint devices, or chemical restraint must be used. If the animal must be held by an individual, that individual must wear protective gloves and apron of at least 0.5 mm lead equivalency, and the individual must be positioned so no part of the body, protected or unprotected, will be struck by the useful beam.

4730.2150 FLUOROSCOPIC X-RAY SYSTEMS.

Subpart 1. **Applicability.** This part applies to all fluoroscopic x-ray systems in addition to the requirements in parts 4730.0100 to 4730.1750.

Subp. 2. **Limitation of useful beam, primary barrier.** For all fluoroscopes, the requirements in items A and B must be met.

A. The fluoroscopic imaging assembly must be provided with a primary protective barrier which intercepts the entire cross section of the useful beam at any SID.

B. The x-ray tube used for fluoroscopy must not produce x-rays unless the barrier is in position to intercept the entire useful beam.

Subp. 3. **Limitation of useful beam, x-ray field.** All fluoroscopes must be provided with image intensification equipment to view the fluoroscopic images.

A. For image-intensified fluoroscopic equipment, neither the length nor the width of the x-ray field in the plane of the image receptor must exceed that of the visible area of the image receptor by more than three percent of the SID. The sum of the excess length and the excess width must be no greater than four percent of the SID. In addition, means must be provided to permit further limitations of the field:

(1) Beam-limiting devices installed after May 22, 1979, and incorporated in equipment with either a variable SID or a visible area of greater than 300 square centimeters (46.5 square inches), must be provided with means for the stepless adjustment of the x-ray field.

(2) All equipment with a fixed SID and a visible area of 300 square centimeters (46.5 square inches) or less must be provided with either stepless adjustment of the x-ray field or with means to further limit the x-ray field size at the plane of the image receptor to 125 square centimeters (19.4 square inches) or less. Stepless adjustment must, at the greatest SID, provide continuous field sizes from the maximum obtainable to a field size of five by five centimeters (1.97 by 1.97 inches) or less.

(3) For fluoroscopic x-ray systems installed after February 25, 1978, when the angle between the image receptor and beam axis is variable, means must be provided to indicate when the axis of the x-ray beam is perpendicular to the plane of the image receptor.

(4) Compliance must be determined with the beam axis indicated to be perpendicular to the plane of the image receptor. For rectangular x-ray fields used with circular image reception, the error in alignment must be determined along the length and width dimensions of the x-ray field which pass through the center of the visible area of the image receptor.

B. Spot-film devices which are certified components must meet the additional requirements in subitems (1) to (4):

(1) Means must be provided between the source and the patient for adjustment of the x-ray field size in the plane of the film to the size of that portion of the film which has been selected on the spot-film selector. Such adjustment must be automatically accomplished, except when the x-ray field size in the plane of the film is smaller than that of the selected portion of the film. For spot-film devices installed after June 21, 1979, if the x-ray field size is less than the size of the selected portion of the film, the means for adjustment of the field size must be only at the operator's option.

(2) It must be possible to adjust the x-ray field size in the plane of the film to a size smaller than the selected portion of the film. The minimum field size at the greatest SID must be equal to, or less than, five by five centimeters (1.97 by 1.97 inches).

(3) The center of the x-ray field in the plane of the film must be aligned with the center of the selected portion of the film to within two percent of the SID.

(4) On spot-film devices installed after February 25, 1978, if the angle between the plane of the image receptor and beam axis is variable, means must be provided to indicate when the axis of the x-ray beam is perpendicular to the plane of the image receptor. Compliance must be determined with the beam axis indicated to be perpendicular to the plane of the image receptor.

C. If a means exists to override any of the automatic x-ray field size adjustments required in this subpart, that means must:

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(1) be designed for use only in the event of system failure;

(2) incorporate a signal visible at the fluoroscopist's position which indicates whenever the automatic field size adjustment is overridden; and

(3) be clearly and durably labeled as follows: "FOR X-RAY FIELD LIMITATION SYSTEM FAILURE."

Subp. 4. **Activation of the fluoroscopic tube.** X-ray production in the fluoroscopic mode must be controlled by a device which requires continuous pressure by the fluoroscopist for the entire time of any exposure. When recording serial fluoroscopic images, the fluoroscopist must be able to terminate the x-ray exposure at any time, but means may be provided to permit completion of any single exposure of the series in process.

Subp. 5. **Entrance exposure rate allowable limits.** The registrant must ensure that the entrance exposure rate allowable limits in this subpart are applied to a fluoroscopic x-ray system.

A. The exposure rate measured at the point where the center of the useful beam enters the patient must not exceed ten roentgens (2.6 mC/kg) per minute, except during recording of fluoroscopic images or when provided with optional high level control. Under optional high level control, except during recording of fluoroscopic images, the maximum entrance exposure rate must not exceed 20 roentgens (5.2 mC/kg) per minute.

B. In addition to the other requirements of this part, certified systems which do not incorporate an automatic exposure rate control must not be operable at any combination of kVp and milliamperage, which will result in an exposure rate in excess of five roentgens (1.3 mC/kg) per minute at the point where the center of the useful beam enters the patient. This requirement must not apply during recording of fluoroscopic images, or when an optional high level control is activated.

C. When provided with optional high level control, the fluoroscopic x-ray system must not be operable at any combination of kVp and milliamperage which results in an exposure rate in excess of five roentgens (1.3 mC/kg) per minute at the point where the center of the useful beam enters the patient unless the high level control is activated.

(1) Special means of activation of high level controls must be required. The high level control must only be operable when continuous manual activation is provided by the fluoroscopist.

(2) A continuous signal, audible to the fluoroscopist, must indicate that the high level control is being employed.

D. Compliance with the requirements of subpart 5 must be determined as specified in this item:

(1) A one-eighth inch (3 mm) thick sheet of lead that covers the entire cross section of the primary beam must be placed in the beam at a minimum distance of 15 centimeters (5.9 inches) from the point of measurement on the image receptor side of the patient.

(2) If the source is below the tabletop or cradle, the exposure rate must be measured one centimeter (0.4 inch) above the tabletop or cradle.

(3) If the source is above the tabletop or cradle, the exposure rate must be measured at 30 centimeters (11.8 inches) above the tabletop or cradle with the end of the beam-limiting device or spacer positioned as close as possible to the point of measurement.

(4) All C-arm fluoroscopes, both stationary and portable, must meet the entrance exposure rate limits in subpart 5, items A and B, at a point 30 centimeters (11.8 inches) from the input surface of the fluoroscopic imaging assembly, with the source positioned at any available SID provided so that the end of the spacer assembly or beam-limiting device is not closer than 30 centimeters (11.8 inches) from the input surface of the fluoroscopic imaging assembly.

E. Periodic measurement of the maximum and clinical exposure rate must be performed as specified in this item:

(1) The measurements must be made annually or after any maintenance of the system which might affect the exposure rate.

(2) The results of these measurements must be posted where any fluoroscopist may have ready access to them while using the fluoroscope and in the record required in part 4730.1520, subpart 1, item D. The measurement results must be stated in roentgens or mC/kg per minute and must include the technique factors used in determining such results. The name of the individual performing the measurements and the date the measurements were performed must be included in the results.

(3) The conditions for the periodic measurement of the clinical entrance exposure rate are as follows:

(a) the measurement must be made under the conditions that satisfy the requirements of item D, subitems (2), (3), and (4);

(b) the kVp must be the kVp typical of clinical use of the x-ray system;

(c) the x-ray system that incorporates the automatic exposure rate control must have sufficient material placed in the useful beam to produce a kilovoltage and milliamperage typical of the use of the x-ray system; and

(d) the x-ray system that does not incorporate an automatic exposure rate control must use a kilovoltage and milliamperage typical of the clinical use of the x-ray system.

(e) Materials must be placed in the useful beam when conducting these periodic measurements to protect the imaging system.

(4) The periodic measurement of the maximum entrance exposure rate must be made under the conditions that satisfy the requirements of item D. For x-ray systems that do not incorporate an automatic exposure rate control, the kilovoltage and milliamperage must be manually adjusted to produce the maximum entrance exposure rate.

Subp. 6. **Barrier transmitted radiation rate limits.** The exposure rate due to transmission through the primary protective barrier with the attenuation block in the useful beam, combined with radiation from the image intensifier, must not exceed two milliroentgens (0.5 uC/kg) per hour at ten centimeters (3.9 inches) from any accessible surface of the fluoroscopic imaging assembly beyond the plane of the image receptor for each roentgen per minute or millicoulomb per kilogram per minute of entrance exposure rate.

Subp. 7. **Measuring compliance of barrier transmission.** Compliance with subpart 6 shall be determined according to this subpart.

A. The exposure rate due to transmission through the primary protective barrier combined with radiation from the image intensifier must be determined by measurements averaged over an area of 100 square centimeters (15.5 square inches) with no linear dimension greater than 20 centimeters (7.9 inches).

B. If the source is below the tabletop or cradle, the measurement must be made with the input surface of the fluoroscopic imaging assembly positioned 30 centimeters (11.8 inches) above the tabletop or cradle.

C. If the source is above the tabletop or cradle and the SID is variable, the measurement must be made with the end of the beam-limiting device or spacer as close to the tabletop as it can be placed, provided that it must not be closer than 30 centimeters (11.8 inches).

D. The attenuation block must be positioned in the useful beam ten centimeters (3.9 inches) from the point of measurement of entrance exposure rate and between this point and the input surface of the fluoroscopic imaging assembly.

Subp. 8. **Indication of potential and current.** For fluoroscopic x-ray systems manufactured and installed after February 25, 1978, during fluoroscopy and cinefluorography, the kilovoltage and the milliamperage must be continuously indicated.

Subp. 9. **Source-to-skin distance.** The source-to-skin distance must not be less than:

A. 38 centimeters (15 inches) on stationary fluoroscopes;

B. 35.5 centimeters (14 inches) on stationary fluoroscopes manufactured prior to August 1, 1974;

C. 30 centimeters (11.8 inches) on all portable fluoroscopes; and

D. 20 centimeters (7.9 inches) for image intensified fluoroscopes used for specific surgical applications. The written safety procedures must provide precautionary measures to be adhered to when image intensified fluoroscopes are used for specific surgical applications.

The 20 centimeter (7.9 inch) spacer cone must be replaced with the 30 centimeter (11.8 inch) spacer cone immediately after the end of the fluoroscopic surgical procedure.

Subp. 10. **Fluoroscopic timer.** Means must be provided to preset the cumulative on-time of the fluoroscopic x-ray tube. The maximum cumulative time of the timing device must not exceed five minutes without resetting. A signal audible to the fluoroscopist must indicate the completion of any preset cumulative on-time. The signal must continue to sound while x-rays are produced, until the timing device is reset.

Subp. 11. **Control of scattered radiation.** The procedures in this subpart must be used to control scattered radiation from all fluoroscopes.

A. When a fluoroscopic table with an undertable x-ray tube is used, the bucky opening must be attenuated by 0.25 millimeter lead equivalent. Drapes must be attached to the intensifier tower to attenuate scattered radiation. The drapes must provide 0.25 millimeter lead equivalent attenuation of the scattered radiation.

B. For other undertable configurations, provisions must be made through equipment design or radiation protection measures to assure that individuals do not receive a dose in excess of the allowable dose limits listed in part 4730.0310.

(1) Any individual who must be in the room during a fluoroscopic procedure must wear a protective apron of not less than 0.5 millimeter lead equivalence.

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(2) All fluoroscopic x-ray systems must be provided with a bucky-slot cover panel and either drapes on self-supporting curtains of not less than 0.5 millimeter lead equivalent material.

C. For single-tube above table combination radiographic and fluoroscopic x-ray systems used in the fluoroscopic mode, protective aprons of not less than 0.5 millimeter lead equivalence must be used to assure that any individual who must be in the room during a fluoroscopic procedure does not receive a dose greater than the allowable dose limits listed in part 4730.0310. In addition, portable lead shields, barriers, or aprons of not less than 0.5 millimeter lead equivalence must be used.

D. For portable C-arm fluoroscopes, provision must be made through the use of protective aprons of not less than 0.5 millimeter lead equivalence to assure that any individual other than the patient who may be exposed during a fluoroscopic procedure does not receive a dose in excess of the allowable dose limits listed in part 4730.0310.

Subp. 12. **Radiation therapy simulation systems.** A radiation therapy simulation system is exempt from the requirements of subpart 5, provided:

A. the system is designed and used so no individual other than the patient is in the simulation room when the system is producing x-rays; and

B. a system which does not meet the requirements of subpart 10 has a means to indicate the cumulative time that an individual patient has been exposed to x-rays. Procedures must require in such cases that the timer be reset between examinations.

4730.2250 COMPUTED TOMOGRAPHY SYSTEMS.

Subpart 1. **Applicability.** This part applies to all computed tomography systems in addition to the requirements in parts 4730.0100 to 4730.1750.

Subp. 2. **Termination of exposure.** A visible signal must indicate when the x-ray exposure has been terminated. The operator must be able to terminate the x-ray exposure at any time during a scan, or series of scans under CT x-ray system control, of greater than one-half second duration.

Subp. 3. **Tomographic plane indication and alignment.** The provisions in items A to C apply.

A. For any single slice tomogram system, means must be provided to permit visual determination of the tomographic plane or a reference plane offset from the tomographic plane.

B. For any multiple slice tomogram system, means must be provided to permit visual determination of the location of a reference plane. This reference plane can be offset from the location of the tomographic planes.

C. If a device using a light source is used to satisfy either item A or B, the light source must provide illumination levels of not less than 160 lux (15.0 foot candles) above the room ambient illumination level.

Subp. 4. **Beam-on and shutter status indicators.** The x-ray control and gantry must visually indicate whenever x-rays are produced and, if applicable, whether the shutter is open or closed. All emergency buttons or switches must be clearly labeled as to their functions.

Subp. 5. **Indication of computed tomography conditions of operation.** The computed tomography x-ray system must be designed so the computed tomography conditions of operation to be used during a scan or a scan sequence are indicated prior to the initiation of the scan or a scan sequence. On equipment having all or some of these conditions of operation at fixed values, this requirement may be met by permanent markings. Indication of computed tomography conditions of operation must be visible from any position from which scan initiation is possible.

Subp. 6. **Extraneous radiation.** When data is not being collected for image production, the radiation adjacent to the tube port must not exceed the leakage radiation from the diagnostic source assembly that is measured at a distance of one meter (39.4 inches) in any direction from the source. That leakage must not exceed 100 milliroentgens (26 uC/kg) in one hour when the x-ray tube is operated at its leakage technique factors. Compliance must be determined by a measurement averaged over an area of 100 square centimeters (15.5 square inches) with no linear dimension greater than 20 centimeters (7.9 inches).

Subp. 7. **Maximum surface computed tomography dose index identification.** The angular position where the maximum surface computed tomography dose index occurs must be identified to allow for reproducible placement of a computed tomography dosimetry chamber.

Subp. 8. **Additional requirements.** Items A to D are applicable to computed tomography x-ray systems containing a gantry manufactured after September 3, 1985.

A. The total error in the indicated location of the tomographic plane or reference plane must not exceed five millimeters (0.2 inches).

B. If the x-ray production period is less than one-half second, the indication of x-ray production must be actuated for at least one-half second. Indicators at or near the patient side of the gantry must be discernible to the operator.

C. The deviation of indicated scan increment versus actual increment must not exceed plus or minus one millimeter (0.04

inches) with a mass of 100 kilograms (220 pounds) resting on the support device. The patient support device must be incremented from a typical starting position to the maximum incremented distance or 30 centimeters (11.8 inches), whichever is less, and then returned to the starting position. Measurement of actual versus indicated scan increment may be taken anywhere along this incremented distance.

D. Premature termination of the x-ray exposure by the operator must necessitate resetting of the computed tomography conditions of operation before the initiation of another scan.

Subp. 9. **Audio communication.** Within the computed tomography area, provision must be made for two-way audio communication between the patient and operator at the control panel.

Subp. 10. **Patient observation.** Within the computed tomography area, provision must be made for a shielded window containing the same lead equivalence as the adjoining walls so the operator at the control panel may directly observe the patient, any other individual in the room, and any doorways into the room. A closed circuit television system may be used as a secondary means of observing the patient.

Subp. 11. **Location of control panel and x-ray control.** The control panel and x-ray control must be mounted in a permanently protected area outside the computed tomography room. The operator is required to remain in that protected area during the entire exposure.

Subp. 12. **Operating procedure information.** Information about the operation, radiation safety surveys, and quality control measurements of the system must be available at the control console. This information must contain:

A. the dates of the last radiation safety survey and quality control measurements;

B. written results of the most recent radiation safety survey and quality control measurements including:

(1) those specified in part 4730.1665, subparts 2 and 3;

(2) photographic images obtained from the photographic image recording device; and

(3) images stored in digital form.

C. instructions on the use of the computed tomography phantoms, including a schedule of quality control checks appropriate for the system, allowable variations for the indicated measurements, and the results of the last two years' quality control measurements in addition to the original quality control and acceptance test measurements, images, and digital data; and

D. the distance in millimeters between the tomographic plane and the reference plane if a reference plane is used.

Subp. 13. **Corrective action.** If the quality assurance measurements required by part 4730.1665, subparts 2 and 3, of the computed tomography systems identify that a measurement has exceeded a tolerance specified in part 4730.1691, the registrant must correct the measurement to within the tolerances specified in part 4730.1691. Correction of the problem must take place within five working days and must be verified by performing the quality assurance measurements specified in part 4730.1665, subparts 2 and 3.

4730.2350 THERAPEUTIC X-RAY SYSTEMS OF LESS THAN ONE MeV.

Subpart 1. **Applicability.** In addition to the requirements in parts 4730.0100 to 4730.1695, this part applies to all therapeutic x-ray systems of less than one MeV.

Subp. 2. **Leakage radiation.** When the tube is operated at its leakage technique factors, the instantaneous exposure rate leakage radiation must not exceed the value specified at the distance specified in this subpart for the classification of that x-ray system.

A. Leakage radiation for contact therapeutic x-ray systems must not exceed 100 milliroentgens (25.8 uC/kg) per hour at five centimeters (1.97 inches) from the surface of the tube housing assembly.

B. Zero to 150 kVp systems installed prior to the effective date of this chapter must have a leakage radiation which does not exceed one roentgen (0.258 mC/kg) in one hour at one meter (39.4 inches) from the source.

C. Zero to 150 kVp systems installed on or after the effective date of this chapter must have a leakage radiation which does not exceed 100 milliroentgens (25.8 uC/kg) in one hour at one meter (39.4 inches) from the source.

D. 151 to 999 kVp systems must have leakage radiation which does not exceed one roentgen (0.258 mC/kg) in one hour at one meter (39.4 inches) from the source. However, systems that operate in excess of 500 kVp may have a leakage radiation at one meter (39.4 inches) from the source not to exceed 0.1 percent of the useful beam one meter (39.4 inches) from the source.

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Subp. 3. **Leakage from permanent beam limiting devices.** Permanent fixed diaphragms or cones used for limiting the useful beam must provide the same or a higher degree of protection as required for the tube housing assembly in subpart 2.

Subp. 4. **Removable beam limiting devices.** Removable beam limiting devices must, for the portion of the useful beam to be blocked by these devices, transmit not more than five percent of the useful beam at the maximum kilovoltage and maximum treatment filter. This requirement does not apply to auxiliary blocks or materials placed in the useful beam to shape the useful beam to the individual patient.

Subp. 5. **Adjustable beam limiting devices.** Adjustable beam limiting devices installed after the effective date of this chapter must meet the requirements of subpart 4. Adjustable beam limiting devices installed before the effective date of this chapter must, for the portion of the x-ray beam to be blocked by these devices, not transmit more than five percent of the useful beam at the maximum kilovoltage and maximum treatment filter.

Subp. 6. **Filter system.** The filter system must be designed so:

A. the filters cannot be accidentally displaced at any possible tube orientation;

B. the radiation at five centimeters (1.97 inches) from the filter insertion slot opening does not exceed 30 roentgens (7.74 mC/kg) per hour under any operating condition; and

C. each filter is marked as to its material of construction and its thickness. For wedge filters, the wedge angle must appear on the wedge or wedge tray.

Subp. 7. **Tube immobilization.** The tube housing assembly must be capable of being immobilized for stationary treatments.

Subp. 8. **Focal spot marking.** The tube housing assembly must be marked so it is possible to determine the location of the focal spot to within five millimeters (0.2 inches), and such marking must be readily accessible for use during calibration procedures.

Subp. 9. **Beam block.** If the x-ray tube of a contact therapeutic x-ray system is hand-held during irradiation, the operator must wear protective gloves and apron. When practical, a cap of at least 0.5 millimeters lead equivalence must cover the aperture window of the tube housing of such apparatus when the apparatus is not being used.

Subp. 10. **Timer.** A timer which has a display must be provided at the treatment control panel. The timer must:

A. have a preset time selector and an elapsed time indicator;

B. be a cumulative timer which activates with the production of radiation and retains its reading after the irradiation is interrupted or terminated;

C. terminate irradiation when a preselected time has elapsed if any dose monitoring system present has not previously terminated irradiation;

D. permit accurate presetting and determination of exposure times within an accuracy of one second;

E. not permit an exposure if set at zero; and

F. not activate until the shutter is opened when irradiation is controlled by a shutter mechanism.

Subp. 11. **Control panel functions.** The control panel must have:

A. an indication of whether electrical power is available at the control panel and if activation of the x-ray tube is possible;

B. an indication of whether x-rays are being produced;

C. meters that indicate kVp and mA;

D. means for terminating an exposure at any time;

E. a locking device which will prevent unauthorized use of the x-ray system; and

F. for x-ray systems installed after the effective date of this chapter, a positive display of all specific filters in the beam.

Subp. 12. **Multiple tubes.** A control panel may energize more than one x-ray tube if the x-ray tubes are located in the same room. In this situation, the following must apply:

A. it must be possible to activate only one x-ray tube at any time;

B. there must be an indication at the control panel identifying which x-ray tube is energized; and

C. there must be an indication at the tube housing assembly when that tube is energized.

Subp. 13. **Source-to-skin distance.** There must be means of determining the source-to-skin distance to within two millimeters (0.08 inches).

Subp. 14. **Shutters.** Unless it is possible to bring the x-ray output to the prescribed exposure parameters within five seconds, the beam must be automatically attenuated by a shutter having a lead equivalence of not less than that of the tube housing assembly. In addition:

A. after the system is at operating parameters, the shutter must be controlled electrically by the operator from the control panel; and

B. an indication of the shutter position must appear at the control panel.

Subp. 15. **Low-filtration x-ray tubes.** Each x-ray system equipped with a beryllium or other low-filtration window must be clearly labeled as "beryllium window" or "low-filtration window" on the tube housing assembly and at the control panel.

Subp. 16. **Entrance interlocks.** For therapeutic x-ray systems capable of operation above 150 kVp, interlocks must be provided so all entrance doors to the radiation therapy room are closed before treatment can be initiated or continued. If the radiation beam is interrupted by any door opening, it must not be possible to restore the system to operation without closing the door and reinitiating irradiation by manual action at the control panel. When any entrance door is opened while the x-ray tube is activated, the exposure at a distance of one meter (39.4 inches) from the source must be reduced to less than 100 milliroentgens (0.001 sieverts or one millisievert) per hour.

Subp. 17. **Operating procedures.** The tube housing assembly must not be held by hand during operation unless the system is designed to require such holding and the kVp of the system does not exceed 50 kVp. In such cases, the holder must wear protective gloves and apron of not less than 0.5 millimeter lead equivalence at 100 kVp.

Subp. 18. **Additional requirements.** The x-ray system must not be used in the administration of radiation therapy unless the requirements of parts 4730.1675, subpart 2, and 4730.1680, subpart 1, item C, have been met.

4730.2450 X-RAY AND ELECTRON THERAPY SYSTEMS WITH ENERGIES OF ONE MeV AND ABOVE.

Subpart 1. **Applicability.** In addition to the requirements in parts 4730.0100 to 4730.1695, the requirements in this part shall apply to the use of therapeutic x-ray systems with energies of one MeV and above.

Subp. 2. **System requirements; leakage radiation to the patient area.** All x-ray and electron therapy systems or any part of a system must meet the requirements in this subpart.

A. Systems or any part of a system installed after the effective date of this chapter must meet the following requirements:

(1) For operating conditions producing maximum leakage radiation, the absorbed dose in rads (cGy) due to any leakage radiation component, including x-rays, electrons, and neutrons, at any point in a circular plane of two meters (78.7 inches) radius centered on or perpendicular to the central axis of the beam at the isocenter (patient plane), or nominal treatment distance and outside the maximum useful beam size must not exceed 0.1 percent of the maximum absorbed dose in rads (grays) of the unattenuated useful beam measured at the point of intersection of the central axis of the beam and the circular plane surface.

Measurements, excluding those for neutrons, must be averaged over an area up to but not exceeding 100 square centimeters (15.5 square inches) at the positions specified in this item. Measurements of the portion of the leakage radiation dose contributed by neutrons must be averaged over an area up to but not exceeding 200 square centimeters (31 square inches).

(2) For each system, the registrant must determine or obtain from the manufacturer the leakage radiation existing at the positions specified in subitem (1) for the operating conditions specified in that subitem.

B. Systems installed before the effective date of this chapter must meet the following requirements:

(1) For operating conditions producing maximum leakage radiation, the absorbed dose in rads (cGy) due to leakage radiation, excluding neutrons, at any point in a circular plane of a two meter (78.7 inch) radius centered on a plane perpendicular to the central axis of the beam two meters (78.7 inches) from the virtual source, and outside the maximum size useful beam, must not exceed 0.1 percent of the maximum absorbed dose in rads (grays) of the unattenuated useful beam measured at the point of intersection of the central axis of the beam and the surface of the circular plane. Measurements must be averaged over an area up to but not exceeding 100 square centimeters (15.5 square inches) at the positions specified in this item.

(2) For each system, the registrant must determine or obtain from the manufacturer the leakage radiation existing at the positions specified in subitem (1) for the operating conditions specified in that subitem.

Subp. 3. **Leakage of radiation outside the patient area for systems or any part thereof installed after the effective date of this chapter.** For systems or any part of a system installed after the effective date of this chapter, the system must meet the requirements in this subpart.

A. The absorbed dose in rads (cGy) due to leakage radiation, except in the area specified in subpart 2, item A, subitem (1),

when measured at any point one meter (39.4 inches) from the path of the charged particle, before the charged particle strikes the target or window, must not exceed 0.1 percent of the maximum absorbed dose in rads (cGy) of the neutrons and must not exceed 0.1 percent of the maximum absorbed dose in rads (cGy) of the photons of the unattenuated useful beam measured at the point of intersection of the central axis of the beam and the circular plane specified in subpart 2, item A, subitem (1).

B. The registrant must determine or obtain from the manufacturer, the actual leakage radiation existing at the positions specified in item A for specified operating conditions. Radiation measurements, excluding neutrons, must be averaged over an area up to but not exceeding 100 square centimeters (15.5 square inches). Neutron measurements must be averaged over an area up to but not exceeding 200 square centimeters (31 square inches).

Subp. 4. **Beam limiting devices.** Adjustable or interchangeable beam limiting devices must be provided, and the devices must transmit no more than five percent of the useful beam at the nominal treatment distance for the portion of the useful beam which is to be attenuated by the beam limiting device. This requirement does not apply to auxiliary blocks or materials placed in the useful beam to shape the useful beam to the individual patient. The neutron component of the useful beam must be excluded from the calculation of the five percent limitation.

Subp. 5. **Filters.** All x-ray and electron therapy systems must have filters that meet the requirements in this subpart.

A. All compensating removable filters must be clearly identified. Documentation available at the control panel must contain a description of the filter. For wedge filters, the wedge angle must appear on the wedge or wedge tray.

B. If the absorbed dose rate data required by subpart 17 relates exclusively to operation with a field flattening or beam scattering filter in place, the filter must be removable only with the use of tools.

C. For systems or any part of a system installed after the effective date of this chapter, which uses a system of wedge filters, interchangeable field flattening filters, or interchangeable beam scattering filters:

(1) irradiation must not be possible until a selection of a filter has been made at the treatment control panel;

(2) an interlock system must be provided to prevent irradiation if the filter selected is not in the correct position;

(3) a display must be provided at the treatment control panel showing the filters in use; and

(4) an interlock must be provided to prevent irradiation if any filter selection operation carried out in the treatment room does not agree with the filter selection operation carried out at the treatment control panel.

Subp. 6. **Beam quality.** The registrant must determine, or obtain from the manufacturer, data sufficient to assure that the beam quality requirements specified in this subpart are met.

A. The absorbed dose resulting from x-rays in a useful electron beam at a point on the central axis of the beam ten centimeters (3.94 inches) greater than the practical range of the electrons must not exceed the values stated in Table 4730.2450. Linear interpolation must be used for values not stated.

TABLE 4730.2450

Maximum Energy of Electron Beam in MeV	X-Ray Absorbed Dose as a Fraction of Maximum Absorbed Dose
1	0.03
15	0.05
35	0.10
50	0.20

B. Compliance with item A must be determined using:

(1) a measurement within a phantom with the incident surface of the phantom at the nominal treatment distance and normal to the central axis of the beam;

(2) the largest field size available which does not exceed 15 by 15 centimeters (5.9 by 5.9 inches);

(3) all clinically relevant collimation systems; and

(4) a phantom whose cross-sectional dimensions exceed the measurement radiation field by at least five centimeters (1.97 inches) and whose depth is sufficient to perform the required measurement.

C. The registrant must determine, or obtain from the manufacturer, the maximum percentage absorbed dose in the useful beam due to neutrons, excluding stray neutron radiation, for specified operating conditions.

Subp. 7. **Radiation detectors.** All therapeutic x-ray systems must be provided with radiation detectors in the radiation head.

A. Systems or any part of a system installed after the effective date of this chapter must measure all therapeutic radiation beams with at least two radiation detectors. The radiation detectors must be incorporated into two separate dose monitoring systems.

B. Systems installed prior to the effective date of this chapter must be provided with at least one radiation detector. This radiation detector must be incorporated into a primary dose monitoring system.

C. The radiation detector and the dose monitoring system into which that radiation detector is incorporated must meet the following requirements:

(1) Each radiation detector must be removable only with tools and must be interlocked to prevent incorrect positioning.

(2) Each radiation detector must form part of a dose monitoring system from whose readings in dose monitor units the absorbed dose at a reference point in the treatment volume can be calculated.

(3) Each dose monitoring system must be capable of independently monitoring, interrupting, and terminating irradiation.

(4) For dose monitoring systems installed after the effective date of this chapter, the design of the dose monitoring system must assure that:

(a) the malfunctioning of one dose monitoring system does not affect the correct functioning of the second dose monitoring system; and

(b) the failure of any element common to both dose monitoring systems which could affect the correct function of both dose monitoring systems terminates irradiation.

(5) Each dose monitoring system must have a legible display at the treatment control panel. For dose monitoring systems installed after the effective date of this chapter, each display must:

(a) maintain a reading until intentionally reset to zero;

(b) have only one scale and no scale multiplying factors;

(c) use a design so that any increased dose is displayed by increasing numbers and must be so designed that, in the event of an overdosage of radiation, the absorbed dose may be accurately determined; and

(d) display the dose monitoring information required by this subitem at the control panel and be retrievable in at least one dose monitoring system for a five-minute period of time in the event of a power failure.

(6) The internal dose monitoring system must be capable of delivering a dose that varies by less than two percent over a 12-hour period.

Subp. 8. **Beam symmetry.** For any system installed after the effective date of this chapter that has the capacity to produce useful beams with asymmetry exceeding five percent, the asymmetry of the radiation beam in two orthogonal directions must be monitored before the beam passes through the beam limiting device. The asymmetry must be measured for a 30 square centimeter (4.65 square inch) field at a depth of ten centimeters (3.9 inches) at the points that correspond to 80 percent of the full width half maximum (FWHM) of central axis value.

Capabilities must be provided so that, if the difference in dose rate between one region of the body and another region of the body symmetrically displaced from the central axis of the beam exceeds five percent of the central axis dose rate, indication of the dose rate difference is made at the control panel; and if the dose rate difference exceeds five percent, the irradiation is terminated.

Subp. 9. **Selection and display of dose monitor units.** All x-ray and electron therapy systems must provide for the selection and display of dose monitor units according to this subpart.

A. Irradiation must not be possible until a selection of a number of dose monitor units has been made at the treatment control panel.

B. The preselected number of dose monitor units must be displayed at the treatment control panel until reset manually for the next irradiation.

C. On systems installed after the effective date of this chapter, it must be necessary to manually reset the preselected dose monitor units after irradiation is terminated and before irradiation can be reinitiated.

Subp. 10. **Termination of irradiation by the dose monitoring system or systems during stationary beam therapy.** All x-ray

and electron therapy systems must meet the requirements in this subpart regarding termination of irradiation by dose monitoring systems during stationary beam therapy.

A. Each primary system must terminate irradiation when the preselected number of dose monitor units has been detected by the system.

B. If original design of the system included a second dose monitoring system, that system must be capable of terminating irradiation when not more than 15 percent or 40 dose monitor units, whichever is smaller, above the preselected number of dose monitor units set at the treatment control panel has been detected by the second dose monitoring system.

C. Systems installed after the effective date of this chapter must have a second dose monitoring system which terminates irradiation when not more than ten percent or 25 dose monitor units, whichever is smaller, above the preselected number of dose monitor units set at the treatment control panel has been detected by the second dose monitoring system.

D. Systems installed after the effective date of this chapter must have an indicator on the control panel that shows which dose monitoring system has terminated irradiation.

Subp. 11. **Interruption switches.** All x-ray and electron therapy systems must have switches that allow the interruption of irradiation and meet the requirements in this subpart.

A. It must be possible to interrupt irradiation and equipment movement at any time from the operator's position at the treatment control panel.

B. Emergency off switches must be placed on the treatment console, and on a wall outside the treatment room. Inside the treatment room, emergency off switches must be placed on the treatment couch, on walls to the right and left of the couch, in front of the primary beam, and in the gantry stand.

Subp. 12. **Termination switches.** All x-ray and electron therapy systems must have termination switches that make it possible to terminate irradiation and equipment movements, or go from an interruption condition to termination conditions, at any time from the operator's position at the treatment control panel.

Subp. 13. **Timer.** All x-ray and electron therapy systems must have a timer that meets the requirements in this subpart.

A. A timer which has a visual display must be provided at the treatment control panel. The timer must have a preset time selector and an elapsed time indicator.

B. The timer must be a cumulative timer which activates with the production of radiation and returns its reading after irradiation is interrupted or terminated. After irradiation is terminated and before irradiation can be reinitiated, it must be necessary to reset the elapsed time indicator to zero.

C. For systems installed after the effective date of this chapter, after termination of irradiation and before irradiation can be reinitiated, it must be necessary to manually reset the preset time selector.

D. The timer must terminate irradiation when a preselected time has elapsed if the dose monitoring systems have not previously terminated irradiation.

E. For systems installed after the effective date of this chapter, if the backup timer is automatically set by control circuitry, the additional time must not be more than ten percent above the time determined by dividing the number of monitor units (MU) by the monitor unit irradiation rate.

Subp. 14. **Selection of radiation type.** Therapy systems capable of emitting both x-rays and electrons must allow for the selection of the radiation type according to the requirements in this subpart.

A. Irradiation must not be possible until a selection of radiation type has been made at the treatment control panel.

B. An interlock system must be provided to ensure that the equipment can emit only the radiation type which has been selected.

C. An interlock system must be provided to prevent irradiation if any selected operations carried out in the treatment room do not agree with the selected operations carried out at the treatment control panel.

D. An interlock system must be provided to prevent irradiation with x rays except to obtain a port film when electron applicators are fitted.

E. The radiation type selected must be displayed at the treatment control panel before and during irradiation.

Subp. 15. **Selection of energy.** Systems capable of generating radiation beams of different energies must allow for the selection of the energy value according to the requirements in this subpart.

A. Irradiation must not be possible until a selection of energy has been made at the treatment control panel.

B. An interlock system must be provided to prevent irradiation if any selected operations carried out in the treatment room do not agree with the selected operations carried out at the treatment control panel.

C. The nominal energy value and photon or electron modality selected must be displayed at the treatment control panel before and during irradiation.

Subp. 16. **Selection of stationary beam therapy or moving beam therapy.** Systems capable of both stationary beam therapy and moving beam therapy must allow for the selection of stationary beam therapy or moving beam therapy according to the requirements in this subpart.

A. Irradiation must not be possible until a selection of stationary beam therapy or moving beam therapy has been made at the treatment control panel.

B. An interlock system must be provided to ensure that the equipment can operate only in the mode which has been selected.

C. An interlock system must be provided to prevent irradiation if any selected operations carried out in the treatment room do not agree with the selected operations carried out at the treatment control panel.

D. The mode of operation must be displayed at the treatment control panel.

E. For systems installed after the effective date of this chapter, an interlock system must be provided to terminate irradiation if:

(1) movement of the gantry occurs during stationary beam therapy; or

(2) movement of the gantry stops during moving beam therapy unless such stoppage is a preplanned function.

F. Moving beam therapy must be controlled to provide accurate total dose and arc angle.

(1) For systems installed after the effective date of this chapter, where the angle of rotation terminates the radiation, the maximum difference between the delivered and expected monitor units (MU) must not exceed three percent or one monitor unit, whichever is greater. The expected MU is calculated by multiplying the set value of MU/degree by the set value of total gantry rotation angle. The observed terminal gantry angle must be within plus or minus two degrees of expected. This requirement applies for all arcs of 45 degrees or more at all MU/degree values indicated as "clinically usable" by the manufacturer.

(2) For systems installed after the effective date of this chapter, where the dose monitoring system terminates the irradiation, the maximum difference between the observed and expected angle of rotation of the gantry shall not exceed plus or minus two degrees. The expected angle of rotation is calculated by dividing the set value of monitor units by the set value of MU/degree. The agreement of elapsed MU to MU set must be three percent, or one MU, whichever is greater. This requirement applies for all arcs of 45 degrees or more at all MU/degree values indicated as "clinically usable" by the manufacturer.

Subp. 17. **Absorbed dose rate.** Systems installed after the effective date of this chapter must have a component from which readings of the absorbed dose rate at a reference point in the treatment volume can be calculated. The radiation detectors in subpart 7 may form a portion of this system. The requirements in items A and B also apply.

A. The dose monitor unit rate must be displayed at the treatment control panel.

B. If the system can deliver under any conditions an absorbed dose rate at the nominal treatment distance of more than ten percent above the value specified by the manufacturer for any equipment parameters used, a device must be provided which terminates irradiation when the absorbed dose rate exceeds a value twice the specified maximum. The value at which the irradiation will be terminated must be in a record maintained by the registrant.

Subp. 18. **Location of virtual source and beam orientation.** The registrant shall determine, or obtain from the manufacturer, the location, with reference to an accessible point on the radiation head, of:

A. the x-ray target or the virtual source of electrons; and

B. the electron window or the virtual source of electrons if the system has electron beam capabilities.

Subp. 19. **System checking facilities.** Capabilities shall be provided so all radiation safety interlocks can be checked for correct operation. When preselection of any of the operating conditions requires action in the treatment room and at the treatment control panel, selection at one location shall not give a display at the other location until the requisite selected operations in both locations have been completed.

Subp. 20. **Operating procedures.** Any therapy system with energies greater than one MeV shall not be used in the administration of radiation therapy unless the requirements of parts 4730.1670, subpart 4; 4730.1675, subpart 3; and 4730.1680, subpart 2, have been met.

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.

4730.2475 RADIATION SAFETY REQUIREMENTS FOR THE USE OF MEDICAL PARTICLE ACCELERATORS.

Subpart 1. **Applicability.** In addition to the requirements of parts 4730.0100 to 4730.1695, this part applies to medical particle accelerators used in the treatment of humans.

Subp. 2. **Medical committee to evaluate and approve medical particle accelerators.** The registrant shall appoint a medical committee of at least three members to evaluate and approve uses of a medical particle accelerator for diagnosis, research, and therapy on a person. Membership of the committee must include the facility radiation safety officer and a physician expert in therapeutic radiology. Membership may include physicians who are experts in internal medicine and hematology.

Subp. 3. **Controls and interlock systems.** All medical particle accelerators used in the treatment of humans must meet the requirements for controls and interlock systems in this subpart.

A. Instrumentation, readouts, and controls on the medical particle accelerator control console must be clearly identified and easily discernible.

B. Each entrance into a treatment room or other high radiation area must be provided with a safety interlock that shuts down the system under conditions of barrier penetration.

C. Each safety interlock must be on a circuit which allows it to operate independently of all other safety interlocks.

D. All safety interlocks must be designed so any defect or component failure in the safety interlock system prevents operation of the medical particle accelerator.

E. When a safety interlock system has been triggered, it must be possible to resume operation of the medical particle accelerator only by manually resetting controls at the position where the safety interlock has been tripped and, lastly, at the main control console.

F. Emergency "off" switches must be placed on the treatment console and on a wall outside the treatment room. Inside the treatment room, emergency "off" switches must be placed on the treatment couch, on walls to the right and left of the couch, in front of the primary beam, and in the gantry stand.

Subp. 4. **Warning devices.** All medical particle accelerators used in the treatment of humans must meet the requirements for warning devices in this subpart.

A. Each location designated as high radiation area, and each entrance to such location, must be equipped with easily observable warning lights that operate when, and only when, radiation is produced.

B. Barriers and pathways leading to high radiation areas must be posted according to part 4730.0300.

Subp. 5. **Operating procedures.** All medical particle accelerators used in the treatment of humans must be operated according to the procedures in this subpart.

A. Medical particle accelerators, when not in operation, must be secured to prevent unauthorized use.

B. All safety and warning devices, including interlocks, must be checked for proper operation at intervals not to exceed one month. Results of such tests must be recorded in writing and be available at the medical particle accelerator facility for inspection by the commissioner. These records must be maintained until the next inspection by the commissioner.

C. Electrical circuit diagrams of the medical particle accelerator and the associated safety interlock systems must be kept current and maintained for inspection by the commissioner and the operator at each medical particle accelerator facility.

D. If, for any reason, it is necessary to intentionally bypass a safety interlock or interlocks, such action must require:

(1) prior authorization by the radiation safety committee or radiation safety officer;

(2) a record in a permanent log and a notice posted at the medical particle accelerator control console; and

(3) termination as soon as possible.

E. A copy of the current operating and the emergency procedures must at all times be available at the medical particle accelerator control panel.

Rules as Proposed

4730.2500 INDUSTRIAL X-RAY INSTALLATIONS.

[For text of subps 1 and 2, see M.R.]

Subp. 3. **Class A operating and emergency procedures.** In Class A installations:

A. A written manual of operating and emergency procedures shall be in the possession of the operator and the person responsible for each installation. The operating procedures shall be so designed that every practicable means have been employed to minimize

exposure and that no person is likely to be exposed to radiation doses that exceed the maximum permissible doses specified in ~~part 4730.3300~~ parts 4730.0310 to 4730.0380.

[For text of items B to E, see M.R.]

[For text of subps 4 to 8, see M.R.]

4730.2600 RADIUM USE IN HEALING ARTS.

Subpart 1. **Requirements.** The following special provisions of this part apply to all registrants who use radium in the healing arts and are in addition to, and not in substitution for, other applicable provisions of ~~the parts 4730.0100 to 4730.3600~~ this chapter.

[For text of subps 2 to 7, see M.R.]

Subp. 8. **Procedure.** The registrant shall ensure that:

[For text of item A, see M.R.]

B. The patient's room shall be identified as a radiation area and all individuals entering the room shall comply with the requirements of part ~~4730.0300, subpart 4~~ 4730.1510.

[For text of items C and D, see M.R.]

E. Loss of radium sources shall be reported to the commissioner of health ~~in accordance with part 4730.1100~~ according to parts 4730.1110 to 4730.1140.

[For text of subp 9, see M.R.]

4730.2700 ~~INDUSTRIAL~~ RADIUM ~~INSTALLATION~~ USED FOR INDUSTRIAL PURPOSES.

[For text of subps 1 to 3, see M.R.]

Subp. 4. **Leak tests.** Sources shall have leak tests performed as follows:

[For text of items A to E, see M.R.]

F. Leaking or lost sources shall be reported to the commissioner of health ~~in accordance with part 4730.1100~~ according to parts 4730.1110 to 4730.1140.

[For text of subp 5, see M.R.]

4730.2900 SPECIAL USES OF ELECTRIC EQUIPMENT.

Subpart 1. **Accelerators, X-ray diffraction ~~units~~ systems, and electron microscopes.** Accelerators, X-ray diffraction ~~units~~ systems, and electron microscopes shall be installed, shielded, and operated in such a manner that no one shall be exposed beyond the appropriate limits ~~as defined~~ specified in part ~~4730.0300, subpart 4~~ 4730.0310.

[For text of subp 2, see M.R.]

Subp. 3. **Research and teaching institutions.** The following special provisions of this part apply to all registrants who use ionizing radiation in research and teaching institutions and are in addition to, and not in substitution for, other applicable provisions of ~~these rules~~ this chapter:

[For text of items A and B, see M.R.]

C. Students under 18 years of age shall not receive in any period of one calendar quarter a whole body exposure exceeding ten percent of the limits specified in ~~part 4730.3300~~ parts 4730.0310 and 4730.0360.

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.

Rules as proposed (all new material)

4730.3605 CONCENTRATIONS IN AIR AND WATER ABOVE NATURAL BACKGROUND.

Isotope[1]		Table I Column 1 Air (μCi/ml)	Table I Column 2 Water (μCi/ml)	Table II Column 1 Air (μmCi/ml)	Table II Column 2 Water (μmCi/ml)
A. *Actinium (89):*					
Ac-227	S	$2X10^{-12}$	$6X10^{-5}$	$8X10^{-14}$	$2X10^{-6}$
	I	$3X10^{-11}$	$9X10^{-3}$	$9X10^{-13}$	$3X10^{-4}$
Ac-228	S	$8X10^{-8}$	$3X10^{-3}$	$3X10^{-9}$	$9X10^{-5}$
	I	$2X10^{-8}$	$3X10^{-3}$	$6X10^{-10}$	$9X10^{-5}$
B. *Americium (95):*					
Am-241	S	$6X10^{-12}$	$1X10^{-4}$	$2X10^{-13}$	$4X10^{-6}$
	I	$1X10^{-10}$	$8X10^{-4}$	$4X10^{-12}$	$3X10^{-5}$
Am-242m	S	$6X10^{-12}$	$1X10^{-4}$	$2X10^{-13}$	$4X10^{-6}$
	I	$3X10^{-10}$	$3X10^{-3}$	$9X10^{-12}$	$9X10^{5}$
Am-242	S	$4X10^{-8}$	$4X10^{-3}$	$1X10^{-9}$	$1X10^{-4}$
	I	$5X10^{-8}$	$4X10^{-3}$	$2X10^{-9}$	$1X10^{-4}$
Am-243	S	$6X10^{-12}$	$1X10^{-4}$	$2X10^{-13}$	$4X10^{-6}$
	I	$1X10^{-10}$	$8X10^{-4}$	$4X10^{-12}$	$3X10^{-5}$
Am-244	S	$4X10^{-6}$	$1X10^{-1}$	$1X10^{-7}$	$5X10^{-3}$
	I	$2X10^{-5}$	$1X10^{-1}$	$8X10^{-7}$	$5X10^{-3}$
C. *Antimony (51):*					
Sb-122	S	$2X10^{-7}$	$8X10^{-4}$	$6X10^{-9}$	$3X10^{-5}$
	I	$1X10^{-7}$	$8X10^{-4}$	$5X10^{-9}$	$3X10^{-5}$
Sb-124	S	$2X10^{-7}$	$7X10^{-4}$	$5X10^{-9}$	$2X10^{-5}$
	I	$2X10^{-8}$	$7X10^{-4}$	$7X10^{-10}$	$2X10^{-5}$
Sb-125	S	$5X10^{-7}$	$3X10^{-3}$	$2X10^{-8}$	$1X10^{-4}$
	I	$3X10^{-8}$	$3X10^{-3}$	$9X10^{-10}$	$1X10^{-4}$
D. *Argon (18):*					
Ar-37	Sub[2]	$6X10^{3}$	———	$1X10^{-4}$	———
AR-41	Sub	$2X10^{-6}$	———	$4X10^{-8}$	———
E. *Arsenic (33):*					
As-73	S	$2X10^{-6}$	$1X10^{-2}$	$7X10^{-8}$	$5X10^{-4}$
	I	$4X10^{-7}$	$1X10^{-2}$	$1X10^{-8}$	$5X10^{-4}$
As-74	S	$3X10^{-7}$	$2X10^{-3}$	$1X10^{-8}$	$5X10^{-5}$
	I	$1X10^{-7}$	$2X10^{-3}$	$4X10^{-9}$	$5X10^{-5}$
As-76	S	$1X10^{-7}$	$6X10^{-4}$	$4X10^{-9}$	$2X10^{-5}$
	I	$1X10^{-7}$	$6X10^{-4}$	$3X10^{-9}$	$2X10^{-5}$
As-77	S	$5X10^{-7}$	$2X10^{-3}$	$2X10^{-8}$	$8X10^{-5}$
	I	$4X10^{-7}$	$2X10^{-3}$	$1X10^{-8}$	$8X10^{-5}$
F. *Astatine (85):*					
At-211	S	$7X10^{-9}$	$5X10^{-5}$	$2X10^{-10}$	$2X10^{-6}$
	I	$3X10^{-8}$	$2X10^{-3}$	$1X10^{-9}$	$7X10^{-5}$
G. *Barium (56):*					
Ba-131	S	$1X10^{-6}$	$5X10^{-3}$	$4X10^{-8}$	$2X10^{-4}$
	I	$4X10^{-7}$	$5X10^{-3}$	$1X10^{-8}$	$2X10^{-4}$
Ba-140	S	$1X10^{-7}$	$8X10^{-4}$	$4X10^{-9}$	$3X10^{-5}$
	I	$4X10^{-8}$	$7X10^{-4}$	$1X10^{-9}$	$2X10^{-5}$
H. *Berkelium (97):*					
Bk-249	S	$9X10^{-10}$	$2X10^{-2}$	$3X10^{-11}$	$6X10^{-4}$
	I	$1X10^{-7}$	$2X10^{-2}$	$4X10^{-9}$	$6X10^{-4}$

Isotope[1]		Table I Column 1 Air (μCi/ml)	Table I Column 2 Water (μCi/ml)	Table II Column 1 Air (μmCi/ml)	Table II Column 2 Water (μmCi/ml)
Bk-250	S	$1X10^{-7}$	$6X10^{-3}$	$5X10^{-9}$	$2X10^{-4}$
	I	$1X10^{-6}$	$6X10^{-3}$	$4X10^{-8}$	$2X10^{-4}$
I. *Beryllium (4):*					
Be-7	S	$6X10^{-6}$	$5X10^{-2}$	$2X10^{-7}$	$2X10^{-3}$
	I	$1X10^{-6}$	$5X10^{-2}$	$4X10^{-8}$	$2X10^{-3}$
J. *Bismuth (83):*					
Bi-206	S	$2X10^{-7}$	$1X10^{-3}$	$6X10^{-9}$	$4X10^{-5}$
	I	$1X10^{-7}$	$1X10^{-3}$	$5X10^{-9}$	$4X10^{-5}$
Bi-207	S	$2X10^{-7}$	$2X10^{-3}$	$6X10^{-9}$	$6X10^{-5}$
	I	$1X10^{-8}$	$2X10^{-3}$	$5X10^{-10}$	$6X10^{-5}$
Bi-210	S	$6X10^{-9}$	$1X10^{-3}$	$2X10^{-10}$	$4X10^{-5}$
	I	$6X10^{-9}$	$1X10^{-3}$	$2X10^{-10}$	$4X10^{-5}$
Bi-212	S	$1X10^{-7}$	$1X10^{-2}$	$3X10^{-9}$	$4X10^{-4}$
	I	$2X10^{-7}$	$1X10^{-2}$	$7X10^{-9}$	$4X10^{-4}$
K. *Bromine (35):*					
Br-82	S	$1X10^{-6}$	$8X10^{-3}$	$4X10^{-8}$	$3X10^{-4}$
	I	$2X10^{-7}$	$1X10^{-3}$	$6X10^{-9}$	$4X10^{-5}$
L. *Cadmium (48):*					
Cd-109	S	$5X10^{-8}$	$5X10^{-3}$	$2X10^{-9}$	$2X10^{-4}$
	I	$7X10^{-8}$	$5X10^{-3}$	$3X10^{-9}$	$2X10^{-4}$
Cd-115m	S	$4X10^{-8}$	$7X10^{-4}$	$1X10^{-9}$	$3X10^{-5}$
	I	$4X10^{-8}$	$7X10^{-4}$	$1X10^{-9}$	$3X10^{-5}$
Cd-115	S	$2X10^{-7}$	$1X10^{-3}$	$8X10^{-9}$	$3X10^{-5}$
	I	$2X10^{-7}$	$1X10^{-3}$	$6X10^{-9}$	$4X10^{-5}$
M. *Calcium (20):*					
Ca-45	S	$3X10^{-8}$	$3X10^{-4}$	$1X10^{-9}$	$9X10^{-6}$
	I	$1X10^{-7}$	$5X10^{-3}$	$4X10^{-9}$	$2X10^{-4}$
Ca-47	S	$2X10^{-7}$	$1X10^{-3}$	$6X10^{-9}$	$5X10^{-5}$
	I	$2X10^{-7}$	$1X10^{-3}$	$6X10^{-9}$	$3X10^{-5}$
N. *Californium (98):*					
Cf-249	S	$2X10^{-12}$	$1X10^{-4}$	$5X10^{-14}$	$4X10^{-6}$
	I	$1X10^{-10}$	$7X10^{-4}$	$3X10^{-12}$	$2X10^{-5}$
Cf-250	S	$5X10^{-12}$	$4X10^{-4}$	$2X10^{-13}$	$1X10^{-5}$
	I	$1X10^{-10}$	$7X10^{-4}$	$3X10^{-12}$	$3X10^{-5}$
Cf-251	S	$2X10^{-12}$	$1X10^{-4}$	$6X10^{-14}$	$4X10^{-6}$
	I	$1X10^{-10}$	$8X10^{-4}$	$3X10^{-12}$	$3X10^{-5}$
Cf-252	S	$6X10^{-12}$	$2X10^{-4}$	$2X10^{-13}$	$7X10^{-6}$
	I	$3X10^{-11}$	$2X10^{-4}$	$1X10^{-12}$	$7X10^{-6}$
Cf-253	S	$8X10^{-10}$	$4X10^{-3}$	$3X10^{-11}$	$1X10^{-4}$
	I	$8X10^{-10}$	$4X10^{-3}$	$3X10^{-11}$	$1X10^{-4}$
Cf-254	S	$5X10^{-12}$	$4X10^{-6}$	$2X10^{-13}$	$1X10^{-7}$
	I	$5X10^{-12}$	$4X10^{-6}$	$2X10^{-13}$	$1X10^{-7}$

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Isotope[1]		Table I Column 1 Air (μCi/ml)	Table I Column 2 Water (μCi/ml)	Table II Column 1 Air (μmCi/ml)	Table II Column 2 Water (μmCi/ml)
O. *Carbon (6):*					
C-14	S	$4X10^{-6}$	$2X10^{-2}$	$1X10^{-7}$	$8X10^{-4}$
CO_2	Sub[2]	$5X10^{-5}$	———	$1X10^{-6}$	———
P. *Cerium (58):*					
Ce-141	S	$4X10^{-7}$	$3X10^{-3}$	$2X10^{-8}$	$9X10^{-5}$
	I	$2X10^{-7}$	$3X10^{-3}$	$5X10^{-9}$	$9X10^{-5}$
Ce-143	S	$3X10^{-7}$	$1X10^{-3}$	$9X10^{-9}$	$4X10^{-5}$
	I	$2X10^{-7}$	$1X10^{-3}$	$7X10^{-9}$	$4X10^{-5}$
Ce-144	S	$1X10^{-8}$	$3X10^{-4}$	$3X10^{-10}$	$1X10^{-5}$
	I	$6X10^{-9}$	$3X10^{-4}$	$2X10^{-10}$	$1X10^{-5}$
Q. *Cesium (55):*					
Cs-131	S	$1X10^{-5}$	$7X10^{-2}$	$4X10^{-7}$	$2X10^{-3}$
	I	$3X10^{-6}$	$3X10^{-2}$	$1X10^{-7}$	$9X10^{-4}$
Cs-134m	S	$4X10^{-5}$	$2X10^{-1}$	$1X10^{-6}$	$6X10^{-3}$
	I	$6X10^{-6}$	$3X10^{-2}$	$2X10^{-7}$	$1X10^{-3}$
Cs-134	S	$4X10^{-8}$	$3X10^{-4}$	$1X10^{-9}$	$9X10^{-6}$
	I	$1X10^{-8}$	$1X10^{-3}$	$4X10^{-10}$	$4X10^{-5}$
Cs-135	S	$5X10^{-7}$	$3X10^{-3}$	$2X10^{-8}$	$1X10^{-4}$
	I	$9X10^{-8}$	$7X10^{-3}$	$3X10^{-9}$	$2X10^{-4}$
Cs-136	S	$4X10^{-7}$	$2X10^{-3}$	$1X10^{-8}$	$9X10^{-5}$
	I	$2X10^{-7}$	$2X10^{-3}$	$6X10^{-9}$	$6X10^{-5}$
Cs-137	S	$6X10^{-8}$	$4X10^{-4}$	$2X10^{-9}$	$2X10^{-5}$
	I	$1X10^{-8}$	$1X10^{-3}$	$5X10^{-10}$	$4X10^{-5}$
R. *Chlorine (17):*					
Cl-36	S	$4X10^{-7}$	$2X10^{-3}$	$1X10^{-8}$	$8X10^{-5}$
	I	$2X10^{-8}$	$2X10^{-3}$	$8X10^{-10}$	$6X10^{-5}$
Cl-38	S	$3X10^{-6}$	$1X10^{-2}$	$9X10^{-8}$	$4X10^{-4}$
	I	$2X10^{-6}$	$1X10^{-2}$	$7X10^{-8}$	$4X10^{-4}$
S. *Chromium (24):*					
Cr-51	S	$1X10^{-5}$	$5X10^{-2}$	$4X10^{-7}$	$2X10^{-3}$
	I	$2X10^{-6}$	$5X10^{-2}$	$8X10^{-8}$	$2X10^{-3}$
T. *Cobalt (27):*					
Co-57	S	$3X10^{-6}$	$2X10^{-2}$	$1X10^{-7}$	$5X10^{-4}$
	I	$2X10^{-7}$	$1X10^{-2}$	$6X10^{-9}$	$4X10^{-4}$
Co-58m	S	$2X10^{-5}$	$8X10^{-2}$	$6X10^{-7}$	$3X10^{-3}$
	I	$9X10^{-6}$	$6X10^{-2}$	$3X10^{-7}$	$2X10^{-3}$
Co-58	S	$8X10^{-7}$	$4X10^{-3}$	$3X10^{-8}$	$1X10^{-4}$
	I	$5X10^{-8}$	$3X10^{-3}$	$2X10^{-9}$	$9X10^{-5}$
Co-60	S	$3X10^{-7}$	$1X10^{-3}$	$1X10^{-8}$	$5X10^{-5}$
	I	$9X10^{-9}$	$1X10^{-3}$	$3X10^{-10}$	$3X10^{-5}$
U. *Copper (29):*					
Cu-64	S	$2X10^{-6}$	$1X10^{-2}$	$7X10^{-8}$	$3X10^{-4}$
	I	$1X10^{-6}$	$6X10^{-3}$	$4X10^{-8}$	$2X10^{-4}$
V. *Curium (96):*					
Cm-242	S	$1X10^{-10}$	$7X10^{-4}$	$4X10^{-12}$	$2X10^{-5}$
	I	$2X10^{-10}$	$7X10^{-4}$	$6X10^{-12}$	$2X10^{-5}$
Cm-243	S	$6X10^{-12}$	$1X10^{-4}$	$2X10^{-13}$	$5X10^{-6}$
	I	$1X10^{-10}$	$7X10^{-4}$	$3X10^{-12}$	$2X10^{-5}$

Isotope[1]		Table I Column 1 Air (μCi/ml)	Table I Column 2 Water (μCi/ml)	Table II Column 1 Air (μmCi/ml)	Table II Column 2 Water (μmCi/ml)
Cm-244	S	$9X10^{-12}$	$2X10^{-4}$	$3X10^{-13}$	$7X10^{-6}$
	I	$1X10^{-10}$	$8X10^{-4}$	$3X10^{-12}$	$3X10^{-5}$
Cm-245	S	$5X10^{-12}$	$1X10^{-4}$	$2X10^{-13}$	$4X10^{-6}$
	I	$1X10^{-10}$	$8X10^{-4}$	$4X10^{-12}$	$3X10^{-5}$
Cm-246	S	$5X10^{-12}$	$1X10^{-4}$	$2X10^{-13}$	$4X10^{-6}$
	I	$1X10^{-10}$	$8X10^{-4}$	$4X10^{-12}$	$3X10^{-5}$
Cm-247	S	$5X10^{-12}$	$1X10^{-4}$	$2X10^{-13}$	$4X10^{-6}$
	I	$1X10^{-10}$	$6X10^{-4}$	$4X10^{-12}$	$2X10^{-5}$
Cm-248	S	$6X10^{-13}$	$1X10^{-5}$	$2X10^{-14}$	$4X10^{-7}$
	I	$1X10^{-11}$	$4X10^{-5}$	$4X10^{-13}$	$1X10^{-6}$
Cm-249	S	$1X10^{-5}$	$6X10^{-2}$	$4X10^{-7}$	$2X10^{-3}$
	I	$1X10^{-5}$	$6X10^{-2}$	$4X10^{-7}$	$2X10^{-3}$
W. *Dysprosium (66):*					
Dy-165	S	$3X10^{-6}$	$1X10^{-2}$	$9X10^{-8}$	$4X10^{-4}$
	I	$2X10^{-6}$	$1X10^{-2}$	$7X10^{-8}$	$4X10^{-4}$
Dy-166	S	$2X10^{-7}$	$1X10^{-3}$	$8X10^{-9}$	$4X10^{-5}$
	I	$2X10^{-7}$	$1X10^{-3}$	$7X10^{-9}$	$4X10^{-5}$
X. *Einsteinium (99):*					
Es-253	S	$8X10^{-10}$	$7X10^{-4}$	$3X10^{-11}$	$2X10^{-5}$
	I	$6X10^{-10}$	$7X10^{-4}$	$2X10^{-11}$	$2X10^{-5}$
Es-254m	S	$5X10^{-9}$	$5X10^{-4}$	$2X10^{-10}$	$2X10^{-5}$
	I	$6X10^{-9}$	$5X10^{-4}$	$2X10^{-10}$	$2X10^{-5}$
Es-254	S	$2X10^{-11}$	$4X10^{-4}$	$6X10^{-13}$	$1X10^{-5}$
	I	$1X10^{-10}$	$4X10^{-4}$	$4X10^{-12}$	$1X10^{-5}$
Es-255	S	$5X10^{-10}$	$8X10^{-4}$	$2X10^{-11}$	$3X10^{-5}$
	I	$4X10^{-10}$	$8X10^{-4}$	$1X10^{-11}$	$3X10^{-5}$
Y. *Erbium (68):*					
Er-169	S	$6X10^{-7}$	$3X10^{-3}$	$2X10^{-8}$	$9X10^{-5}$
	I	$4X10^{-7}$	$3X10^{-3}$	$1X10^{-8}$	$9X10^{-5}$
Er-171	S	$7X10^{-7}$	$3X10^{-3}$	$2X10^{-8}$	$1X10^{-4}$
	I	$6X10^{-7}$	$3X10^{-3}$	$2X10^{-8}$	$1X10^{-4}$
Z. *Europium (63):*					
Eu-152	S	$4X10^{-7}$	$2X10^{-3}$	$1X10^{-8}$	$6X10^{-5}$
(Tr = 9.2 hrs)	S	$3X10^{-7}$	$2X10^{-3}$	$1X10^{-8}$	$6X10^{-5}$
Eu-152	S	$1X10^{-8}$	$2X10^{-3}$	$4X10^{-10}$	$8X10^{-5}$
(Tr = 13 yrs)	I	$2X10^{-8}$	$2X10^{-3}$	$6X10^{-10}$	$8X10^{-5}$
Eu-154	S	$4X10^{-9}$	$6X10^{-4}$	$1X10^{-10}$	$2X10^{-5}$
	I	$7X10^{-9}$	$6X10^{-4}$	$2X10^{-10}$	$2X10^{-5}$
Eu-155	S	$9X10^{-8}$	$6X10^{-3}$	$3X10^{-9}$	$2X10^{-4}$
	I	$7X10^{-8}$	$6X10^{-3}$	$3X10^{-9}$	$2X10^{-4}$
AA. *Fermium (100):*					
Fm-254	S	$6X10^{-8}$	$4X10^{-3}$	$2X10^{-9}$	$1X10^{-4}$
	I	$7X10^{-8}$	$4X10^{-3}$	$2X10^{-9}$	$1X10^{-4}$

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Isotope[1]		Table I Column 1 Air (μCi/ml)	Table I Column 2 Water (μCi/ml)	Table II Column 1 Air (μmCi/ml)	Table II Column 2 Water (μmCi/ml)
Fm-255	S	$2X10^{-8}$	$1X10^{-3}$	$6X10^{-10}$	$3X10^{-5}$
	I	$1X10^{-8}$	$1X10^{-3}$	$4X10^{-10}$	$3X10^{-5}$
Fm-256	S	$3X10^{-9}$	$3X10^{-5}$	$1X10^{-10}$	$9X10^{-7}$
	I	$2X10^{-9}$	$3X10^{-5}$	$6X10^{-11}$	$9X10^{-7}$
BB. *Fluorine (9):*					
F-18	S	$5X10^{-6}$	$2X10^{-2}$	$2X10^{-7}$	$8X10^{-4}$
	I	$3X10^{-6}$	$1X10^{-2}$	$9X10^{-8}$	$5X10^{-4}$
CC. *Gadolinium (64):*					
Gd-153	S	$2X10^{-7}$	$6X10^{-3}$	$8X10^{-9}$	$2X10^{-4}$
	I	$9X10^{-8}$	$6X10^{-3}$	$3X10^{-9}$	$2X10^{-4}$
Gd-159	S	$5X10^{-7}$	$2X10^{-3}$	$2X10^{-8}$	$8X10^{-5}$
	I	$4X10^{-7}$	$2X10^{-3}$	$1X10^{-8}$	$8X10^{-5}$
DD. *Gallium (31):*					
Ga-72	S	$2X10^{-7}$	$1X10^{-3}$	$8X10^{-9}$	$4X10^{-5}$
	I	$2X10^{-7}$	$1X10^{-3}$	$8X10^{-9}$	$4X10^{-5}$
EE. *Germanium (32):*					
Ge-68*	S	$4X10^{-6}$	$2X10^{-2}$	$1X10^{-7}$	$8X10^{-4}$
	I	$1X10^{-8}$	———	$5X10^{-10}$	———
Ge-71	S	$1X10^{-5}$	$5X10^{-2}$	$4X10^{-7}$	$2X10^{-3}$
	I	$6X10^{-6}$	$5X10^{-2}$	$2X10^{-7}$	$2X10^{-3}$
FF. *Gold (79):*					
Au-195*	S	$8X10^{-6}$	$4X10^{-2}$	$3X10^{-7}$	$1X10^{-3}$
	I	$6X10^{-8}$	$6X10^{-3}$	$2X10^{-9}$	$2X10^{-4}$
Au-196	S	$1X10^{-6}$	$5X10^{-3}$	$4X10^{-8}$	$2X10^{-4}$
	I	$6X10^{-7}$	$4X10^{-3}$	$2X10^{-8}$	$1X10^{-4}$
Au-198	S	$3X10^{-7}$	$2X10^{-3}$	$1X10^{-8}$	$5X10^{-5}$
	I	$2X10^{-7}$	$1X10^{-3}$	$8X10^{-9}$	$5X10^{-5}$
Au-199	S	$1X10^{-6}$	$5X10^{-3}$	$4X10^{-8}$	$2X10^{-4}$
	I	$8X10^{-7}$	$4X10^{-3}$	$3X10^{-8}$	$2X10^{-4}$
GG. *Hafnium (72):*					
Hf-181	S	$4X10^{-8}$	$2X10^{-3}$	$1X10^{-9}$	$7X10^{-5}$
	I	$7X10^{-8}$	$2X10^{-3}$	$3X10^{-9}$	$7X10^{-5}$
HH. *Holmium (67):*					
Ho-166	S	$2X10^{-7}$	$9X10^{-4}$	$7X10^{-9}$	$3X10^{-5}$
	I	$2X10^{-7}$	$9X10^{-4}$	$6X10^{-9}$	$3X10^{-5}$
II. *Hydrogen (1):*					
H-3	S	$5X10^{-6}$	$1X10^{-1}$	$2X10^{-7}$	$3X10^{-3}$
	I	$5X10^{-6}$	$1X10^{-1}$	$2X10^{-7}$	$3X10^{-3}$
	Sub[2]	$2X10^{-3}$	———	$4X10^{-5}$	———
JJ. *Indium (49):*					
In-113m	S	$8X10^{-6}$	$4X10^{-2}$	$3X10^{-7}$	$1X10^{-3}$
	I	$7X10^{-6}$	$4X10^{-2}$	$2X10^{-7}$	$1X10^{-3}$
In-114m	S	$1X10^{-7}$	$5X10^{-4}$	$4X10^{-9}$	$2X10^{-5}$
	I	$2X10^{-8}$	$5X10^{-4}$	$7X10^{-10}$	$2X10^{-5}$
In-115m	S	$2X10^{-6}$	$1X10^{-2}$	$8X10^{-8}$	$4X10^{-4}$
	I	$2X10^{-6}$	$1X10^{-2}$	$6X10^{-8}$	$4X10^{-4}$
In-115	S	$2X10^{-7}$	$3X10^{-3}$	$9X10^{-9}$	$9X10^{-5}$
	I	$3X10^{-8}$	$3X10^{-3}$	$1X10^{-9}$	$8X10^{-5}$

Isotope[1]		Table I Column 1 Air (μCi/ml)	Table I Column 2 Water (μCi/ml)	Table II Column 1 Air (μmCi/ml)	Table II Column 2 Water (μmCi/ml)
KK. *Iodine (53):*					
I-125	S	$5X10^{-9}$	$4X10^{-5}$	$8X10^{-11}$	$2X10^{-7}$
	I	$2X10^{-7}$	$6X10^{-3}$	$6X10^{-9}$	$2X10^{-4}$
I-126	S	$8X10^{-9}$	$5X10^{-5}$	$9X10^{-11}$	$3X10^{-7}$
	I	$3X10^{-7}$	$3X10^{-3}$	$1X10^{-8}$	$9X10^{-5}$
I-129	S	$2X10^{-9}$	$1X10^{-5}$	$2X10^{-11}$	$6X10^{-8}$
	I	$7X10^{-8}$	$6X10^{-3}$	$2X10^{-9}$	$2X10^{-4}$
I-131	S	$9X10^{-9}$	$6X10^{-5}$	$1X10^{-10}$	$3X10^{-7}$
	I	$3X10^{-7}$	$2X10^{-3}$	$1X10^{-8}$	$6X10^{-5}$
I-132	S	$2X10^{-7}$	$2X10^{-3}$	$3X10^{-9}$	$8X10^{-6}$
	I	$9X10^{-7}$	$5X10^{-3}$	$3X10^{-8}$	$2X10^{-4}$
I-133	S	$3X10^{-8}$	$2X10^{-4}$	$4X10^{-10}$	$1X10^{-6}$
	I	$2X10^{-7}$	$1X10^{-3}$	$7X10^{-9}$	$4X10^{-5}$
I-134	S	$5X10^{-7}$	$4X10^{-3}$	$6X10^{-9}$	$2X10^{-5}$
	I	$3X10^{-6}$	$2X10^{-2}$	$1X10^{-7}$	$6X10^{-4}$
I-135	S	$1X10^{-7}$	$7X10^{-4}$	$1X10^{-9}$	$4X10^{-6}$
	I	$4X10^{-7}$	$2X10^{-3}$	$1X10^{-8}$	$7X10^{-5}$
LL. *Iridium (77):*					
Ir-190	S	$1X10^{-6}$	$6X10^{-3}$	$4X10^{-8}$	$2X10^{-4}$
	I	$4X10^{-7}$	$5X10^{-3}$	$1X10^{-8}$	$2X10^{-4}$
Ir-192	S	$1X10^{-7}$	$1X10^{-3}$	$4X10^{-9}$	$4X10^{-5}$
	I	$3X10^{-8}$	$1X10^{-3}$	$9X10^{-10}$	$4X10^{-5}$
Ir-194	S	$2X10^{-7}$	$1X10^{-3}$	$8X10^{-9}$	$3X10^{-5}$
	I	$2X10^{-7}$	$9X10^{-4}$	$5X10^{-9}$	$3X10^{-5}$
MM. *Iron (26):*					
Fe-55	S	$9X10^{-7}$	$2X10^{-2}$	$3X10^{-8}$	$8X10^{-4}$
	I	$1X10^{-6}$	$7X10^{-2}$	$3X10^{-8}$	$2X10^{-3}$
Fe-59	S	$1X10^{-7}$	$2X10^{-3}$	$5X10^{-9}$	$6X10^{-5}$
	I	$5X10^{-8}$	$2X10^{-3}$	$2X10^{-9}$	$5X10^{-5}$
NN. *Krypton (36):*					
Kr-85m	Sub[2]	$6X10^{-6}$	———	$1X10^{-7}$	———
Kr-85	Sub	$1X10^{-5}$	———	$3X10^{-7}$	———
Kr-87	Sub	$1X10^{-6}$	———	$2X10^{-8}$	———
Kr-88	Sub	$1X10^{-6}$	———	$2X10^{-8}$	———
OO. *Lanthanum (57):*					
La-140	S	$2X10^{-7}$	$7X10^{-4}$	$5X10^{-9}$	$2X10^{-5}$
	I	$1X10^{-7}$	$7X10^{-4}$	$4X10^{-9}$	$2X10^{-5}$
PP. *Lead (82):*					
Pb-203	S	$3X10^{-6}$	$1X10^{-2}$	$9X10^{-8}$	$4X10^{-4}$
	I	$2X10^{-6}$	$1X10^{-2}$	$6X10^{-8}$	$4X10^{-4}$
Pb-210	S	$1X10^{-10}$	$4X10^{-6}$	$4X10^{-12}$	$1X10^{-7}$
	I	$2X10^{-10}$	$5X10^{-3}$	$8X10^{-12}$	$2X10^{-4}$
Pb-212	S	$2X10^{-8}$	$6X10^{-4}$	$6X10^{-10}$	$2X10^{-5}$
	I	$2X10^{-8}$	$5X10^{-4}$	$7X10^{-10}$	$2X10^{-5}$

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Isotope[1]		Table I Column 1 Air (μCi/ml)	Table I Column 2 Water (μCi/ml)	Table II Column 1 Air (μmCi/ml)	Table II Column 2 Water (μmCi/ml)
QQ. *Lutetium (71):*					
Lu-177	S	$6X10^{-7}$	$3X10^{-3}$	$2X10^{-8}$	$1X10^{-4}$
	I	$5X10^{-7}$	$3X10^{-3}$	$2X10^{-8}$	$1X10^{-4}$
RR. *Manganese (25):*					
Mn-52	S	$2X10^{-7}$	$1X10^{-3}$	$7X10^{-9}$	$3X10^{-5}$
	I	$1X10^{-7}$	$9X10^{-4}$	$5X10^{-9}$	$3X10^{-5}$
Mn-54	S	$4X10^{-7}$	$4X10^{-3}$	$1X10^{-8}$	$1X10^{-4}$
	I	$4X10^{-8}$	$3X10^{-3}$	$1X10^{-9}$	$1X10^{-4}$
Mn-56	S	$8X10^{-7}$	$4X10^{-3}$	$3X10^{-8}$	$1X10^{-4}$
	I	$5X10^{-7}$	$3X10^{-3}$	$2X10^{-8}$	$1X10^{-4}$
SS. *Mercury (80):*					
Hg-197m	S	$7X10^{-7}$	$6X10^{-3}$	$3X10^{-8}$	$2X10^{-4}$
	I	$8X10^{-7}$	$5X10^{-3}$	$3X10^{-8}$	$2X10^{-4}$
Hg-197	S	$1X10^{-6}$	$9X10^{-3}$	$4X10^{-8}$	$3X10^{-4}$
	I	$3X10^{-6}$	$1X10^{-2}$	$9X10^{-8}$	$5X10^{-4}$
Hg-203	S	$7X10^{-8}$	$5X10^{-4}$	$2X10^{-9}$	$2X10^{-5}$
	I	$1X10^{-7}$	$3X10^{-3}$	$4X10^{-9}$	$1X10^{-4}$
TT. *Molybdenum (42):*					
Mo-99	S	$7X10^{-7}$	$5X10^{-3}$	$3X10^{-8}$	$2X10^{-4}$
	I	$2X10^{-7}$	$1X10^{-3}$	$7X10^{-9}$	$4X10^{-5}$
UU. *Neodymium (60):*					
Nd-144	S	$8X10^{-11}$	$2X10^{-3}$	$3X10^{-12}$	$7X10^{-5}$
	I	$3X10^{-10}$	$2X10^{-3}$	$1X10^{-11}$	$8X10^{-5}$
Nd-147	S	$4X10^{-7}$	$2X10^{-3}$	$1X10^{-8}$	$6X10^{-5}$
	I	$2X10^{-7}$	$2X10^{-3}$	$8X10^{-9}$	$6X10^{-5}$
Nd-149	S	$2X10^{-6}$	$8X10^{-3}$	$6X10^{-8}$	$3X10^{-4}$
	I	$1X10^{-6}$	$8X10^{-3}$	$5X10^{-8}$	$3X10^{-4}$
VV. *Neptunium (93):*					
Np-237	S	$4X10^{-12}$	$9X10^{-5}$	$1X10^{-13}$	$3X10^{-6}$
	I	$1X10^{-10}$	$9X10^{-4}$	$4X10^{-12}$	$3X10^{-5}$
Np-239	S	$8X10^{-7}$	$4X10^{-3}$	$3X10^{-8}$	$1X10^{-4}$
	I	$7X10^{-7}$	$4X10^{-3}$	$2X10^{-8}$	$1X10^{-4}$
WW. *Nickel (28):*					
Ni-59	S	$5X10^{-7}$	$6X10^{-3}$	$2X10^{-8}$	$2X10^{-4}$
	I	$8X10^{-7}$	$6X10^{-2}$	$3X10^{-8}$	$2X10^{-3}$
Ni-63	S	$6X10^{-8}$	$8X10^{-4}$	$2X10^{-9}$	$3X10^{-5}$
	I	$3X10^{-7}$	$2X10^{-2}$	$1X10^{-8}$	$7X10^{-4}$
Ni-65	S	$9X10^{-7}$	$4X10^{-3}$	$3X10^{-8}$	$1X10^{-4}$
	I	$5X10^{-7}$	$3X10^{-3}$	$2X10^{-8}$	$1X10^{-4}$
XX. *Niobium (41):*					
Nb-93m	S	$1X10^{-7}$	$1X10^{-2}$	$4X10^{-9}$	$4X10^{-4}$
	I	$2X10^{-7}$	$1X10^{-2}$	$5X10^{-9}$	$4X10^{-4}$
Nb-95	S	$5X10^{-7}$	$3X10^{-3}$	$2X10^{-8}$	$1X10^{-4}$
	I	$1X10^{-7}$	$3X10^{-3}$	$3X10^{-9}$	$1X10^{-4}$
Nb-97	S	$6X10^{-6}$	$3X10^{-2}$	$2X10^{-7}$	$9X10^{-4}$
	I	$5X10^{-6}$	$3X10^{-2}$	$2X10^{-7}$	$9X10^{-4}$
YY. *Osmium (76):*					
Os-185	S	$5X10^{-7}$	$2X10^{-3}$	$2X10^{-8}$	$7X10^{-5}$
	I	$5X10^{-8}$	$2X10^{-3}$	$2X10^{-9}$	$7X10^{-5}$

Isotope[1]		Table I Column 1 Air (μCi/ml)	Table I Column 2 Water (μCi/ml)	Table II Column 1 Air (μmCi/ml)	Table II Column 2 Water (μmCi/ml)
Os-191m	S	$2X10^{-5}$	$7X10^{-2}$	$6X10^{-7}$	$3X10^{-3}$
	I	$9X10^{-6}$	$7X10^{-2}$	$3X10^{-7}$	$2X10^{-3}$
Os-191	S	$1X10^{-6}$	$5X10^{-3}$	$4X10^{-8}$	$2X10^{-4}$
	I	$4X10^{-7}$	$5X10^{-3}$	$1X10^{-8}$	$2X10^{-4}$
Os-193	S	$4X10^{-7}$	$2X10^{-3}$	$1X10^{-8}$	$6X10^{-5}$
	I	$3X10^{-7}$	$2X10^{-3}$	$9X10^{-9}$	$5X10^{-5}$
ZZ. *Palladium (46):*					
Pd-103	S	$1X10^{-6}$	$1X10^{-2}$	$5X10^{-8}$	$3X10^{-4}$
	I	$7X10^{-7}$	$8X10^{-3}$	$3X10^{-8}$	$3X10^{-4}$
Pd-109	S	$6X10^{-7}$	$3X10^{-3}$	$2X10^{-8}$	$9X10^{-5}$
	I	$4X10^{-7}$	$2X10^{-3}$	$1X10^{-8}$	$7X10^{-5}$
AAA. *Phosphorus (15):*					
P-32	S	$7X10^{-8}$	$5X10^{-4}$	$2X10^{-9}$	$2X10^{-5}$
	I	$8X10^{-8}$	$7X10^{-4}$	$3X10^{-9}$	$2X10^{-5}$
BBB. *Platinum (78):*					
Pt-191	S	$8X10^{-7}$	$4X10^{-3}$	$3X10^{-8}$	$1X10^{-4}$
	I	$6X10^{-7}$	$3X10^{-3}$	$2X10^{-8}$	$1X10^{-4}$
Pt-193m	S	$7X10^{-6}$	$3X10^{-2}$	$2X10^{-7}$	$1X10^{-3}$
	I	$5X10^{-6}$	$3X10^{-2}$	$2X10^{-7}$	$1X10^{-3}$
Pt-193	S	$1X10^{-6}$	$3X10^{-2}$	$4X10^{-8}$	$9X10^{-4}$
	I	$3X10^{-7}$	$5X10^{-2}$	$1X10^{-8}$	$2X10^{-3}$
Pt-197m	S	$6X10^{-6}$	$3X10^{-2}$	$2X10^{-7}$	$1X10^{-3}$
	I	$5X10^{-6}$	$3X10^{-2}$	$2X10^{-7}$	$9X10^{-4}$
Pt-197	S	$8X10^{-7}$	$4X10^{-3}$	$3X10^{-8}$	$1X10^{-4}$
	I	$6X10^{-7}$	$3X10^{-3}$	$2X10^{-8}$	$1X10^{-4}$
CCC. *Plutonium (94):*					
Pu-238	S	$2X10^{-12}$	$1X10^{-4}$	$7X10^{-14}$	$5X10^{-6}$
	I	$3X10^{-11}$	$8X10^{-4}$	$1X10^{-12}$	$3X10^{-5}$
Pu-239	S	$2X10^{-12}$	$1X10^{-4}$	$6X10^{-14}$	$5X10^{-6}$
	I	$4X10^{-11}$	$8X10^{-4}$	$1X10^{-12}$	$3X10^{-5}$
Pu-240	S	$2X10^{-12}$	$1X10^{-4}$	$6X10^{-14}$	$5X10^{-6}$
	I	$4X10^{-11}$	$8X10^{-4}$	$1X10^{-12}$	$3X10^{-5}$
Pu-241	S	$9x10^{-11}$	$7X10^{-3}$	$3X10^{-12}$	$2X10^{-4}$
	I	$4X10^{-8}$	$4X10^{-2}$	$1X10^{-9}$	$1X10^{-3}$
Pu-242	S	$2X10^{-12}$	$1X10^{-4}$	$6X10^{-14}$	$5X10^{-6}$
	I	$4X10^{-11}$	$9X10^{-4}$	$1X10^{-12}$	$3X10^{-5}$
Pu-243	S	$2X10^{-6}$	$1X10^{-2}$	$6X10^{-8}$	$3X10^{-4}$
	I	$2X10^{-6}$	$1X10^{-2}$	$8X10^{-8}$	$3X10^{-4}$
Pu-244	S	$2X10^{-12}$	$1X10^{-4}$	$6X10^{-14}$	$4X10^{-6}$
	I	$3X10^{-11}$	$3X10^{-4}$	$1X10^{-12}$	$1X10^{-5}$
DDD. *Polonium (84):*					
Po-210	S	$5X10^{-10}$	$2X10^{-5}$	$2X10^{-11}$	$7X10^{-7}$
	I	$2X10^{-10}$	$8X10^{-4}$	$7X10^{-12}$	$3X10^{-5}$

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Isotope[1]		Table I Column 1 Air (μCi/ml)	Table I Column 2 Water (μCi/ml)	Table II Column 1 Air (μmCi/ml)	Table II Column 2 Water (μmCi/ml)
EEE. *Potassium (19):*					
K-42	S	$2X10^{-6}$	$9X10^{-3}$	$7X10^{-8}$	$3X10^{-4}$
	I	$1X10^{-7}$	$6X10^{-4}$	$4X10^{-9}$	$2X10^{-5}$
FFF. *Praesodymium (59):*					
Pr-142	S	$2X10^{-7}$	$9X10^{-4}$	$7X10^{-9}$	$3X10^{-5}$
	I	$2X10^{-7}$	$9X10^{-4}$	$5X10^{-9}$	$3X10^{-5}$
Pr-143	S	$3X10^{-7}$	$1X10^{-3}$	$1X10^{-8}$	$5X10^{-5}$
	I	$2X10^{-7}$	$1X10^{-3}$	$6X10^{-9}$	$5X10^{-5}$
GGG. *Promethium (61):*					
Pm-147	S	$6X10^{-8}$	$6X10^{-3}$	$2X10^{-9}$	$2X10^{-4}$
	I	$1X10^{-7}$	$6X10^{-3}$	$3X10^{-9}$	$2X10^{-4}$
Pm-149	S	$3X10^{-7}$	$1X10^{-3}$	$1X10^{-8}$	$4X10^{-5}$
	I	$2X10^{-7}$	$1X10^{-3}$	$8X10^{-9}$	$4X10^{-5}$
HHH. *Protactinium (91):*					
Pa-230	S	$2X10^{-9}$	$7X10^{-3}$	$6X10^{-11}$	$2X10^{-4}$
	I	$8X10^{-10}$	$7X10^{-3}$	$3X10^{-11}$	$2X10^{-4}$
Pa-231	S	$1X10^{-12}$	$3X10^{-5}$	$4X10^{-14}$	$9X10^{-7}$
	I	$1X10^{-10}$	$8X10^{-4}$	$4X10^{-12}$	$2X10^{-5}$
Pa-233	S	$6X10^{-7}$	$4X10^{-3}$	$2X10^{-8}$	$1X10^{-4}$
	I	$2X10^{-7}$	$3X10^{-3}$	$6X10^{-9}$	$1X10^{-4}$
III. *Radium (88):*					
Ra-223	S	$2X10^{-9}$	$2X10^{-5}$	$6X10^{-11}$	$7X10^{-7}$
	I	$2X10^{-10}$	$1X10^{-4}$	$8X10^{-12}$	$4X10^{-6}$
Ra-224	S	$5X10^{-9}$	$7X10^{-5}$	$2X10^{-10}$	$2X10^{-6}$
	I	$7X10^{-10}$	$2X10^{-4}$	$2X10^{-11}$	$5X10^{-6}$
Ra-226	S	$3X10^{-11}$	$4X10^{-7}$	$3X10^{-12}$	$3X10^{-8}$
	I	$5X10^{-11}$	$9X10^{-4}$	$2X10^{-12}$	$3X10^{-5}$
Ra-228	S	$7X10^{-11}$	$8X10^{-7}$	$2X10^{-12}$	$3X10^{-8}$
	I	$4X10^{-11}$	$7X10^{-4}$	$1X10^{-12}$	$3X10^{-5}$
JJJ. *Radon (86):*					
Rn-220	S	$3X10^{-7}$	_____	$1X10^{-8}$	_____
Rn-222[3]	S	$3X10^{-8}$	_____	$3X10^{-9}$	_____
KKK. *Rhenium (75):*					
Re-183	S	$3X10^{-6}$	$2X10^{-2}$	$9X10^{-8}$	$6X10^{-4}$
	I	$2X10^{-7}$	$8X10^{-3}$	$5X10^{-9}$	$3X10^{-4}$
Re-186	S	$6X10^{-7}$	$3X10^{-3}$	$2X10^{-8}$	$9X10^{-5}$
	I	$2X10^{-7}$	$1X10^{-3}$	$8X10^{-9}$	$5X10^{-5}$
Re-187	S	$9X10^{-6}$	$7X10^{-2}$	$3X10^{-7}$	$3X10^{-3}$
	I	$5X10^{-7}$	$4X10^{-2}$	$2X10^{-8}$	$2X10^{-3}$
Re-188	S	$4X10^{-7}$	$2X10^{-3}$	$1X10^{-8}$	$6X10^{-5}$
	I	$2X10^{-7}$	$9X10^{-4}$	$6X10^{-9}$	$3X10^{-5}$
LLL. *Rhodium (45):*					
Rh-103m	S	$8X10^{-5}$	$4X10^{-1}$	$3X10^{-6}$	$1X10^{-2}$
	I	$6X10^{-5}$	$3X10^{-1}$	$2X10^{-6}$	$1X10^{-2}$
Rh-105	S	$8X10^{-7}$	$4X10^{-3}$	$3X10^{-8}$	$1X10^{-4}$
	I	$5X10^{-7}$	$3X10^{-3}$	$2X10^{-8}$	$1X10^{-4}$
MMM. *Rubidium (37):*					
Rb-86	S	$3X10^{-7}$	$2X10^{-3}$	$1X10^{-8}$	$7X10^{-5}$
	I	$7X10^{-8}$	$7X10^{-4}$	$2X10^{-9}$	$2X10^{-5}$

Isotope[1]		Table I Column 1 Air (μCi/ml)	Table I Column 2 Water (μCi/ml)	Table II Column 1 Air (μmCi/ml)	Table II Column 2 Water (μmCi/ml)
MMM. *Rubidium (37):*					
Rb-86	S	$3X10^{-7}$	$2X10^{-3}$	$1X10^{-8}$	$7X10^{-5}$
	I	$7X10^{-8}$	$7X10^{-4}$	$2X10^{-9}$	$2X10^{-5}$
Rb-87	S	$5X10^{-7}$	$3X10^{-3}$	$2X10^{-8}$	$1X10^{-4}$
	I	$7X10^{-8}$	$5X10^{-3}$	$2X10^{-9}$	$2X10^{-4}$
NNN. *Ruthenium (44):*					
Ru-97	S	$2X10^{-6}$	$1X10^{-2}$	$8X10^{-8}$	$4X10^{-4}$
	I	$2X10^{-6}$	$1X10^{-2}$	$6X10^{-8}$	$3X10^{-4}$
Ru-103	S	$5X10^{-7}$	$2X10^{-3}$	$2X10^{-8}$	$8X10^{-5}$
	I	$8X10^{-8}$	$2X10^{-3}$	$3X10^{-9}$	$8X10^{-5}$
Ru-105	S	$7X10^{-7}$	$3X10^{-3}$	$2X10^{-8}$	$1X10^{-4}$
	I	$5X10^{-7}$	$3X10^{-3}$	$2X10^{-8}$	$1X10^{-4}$
Ru-106	S	$8X10^{-8}$	$4X10^{-4}$	$3X10^{-9}$	$1X10^{-5}$
	I	$6X10^{-9}$	$3X10^{-4}$	$2X10^{-10}$	$1X10^{-5}$
OOO. *Samarium (62):*					
Sm-147	S	$7X10^{-11}$	$2X10^{-3}$	$2X10^{-12}$	$6X10^{-5}$
	I	$3X10^{-10}$	$2X10^{-3}$	$9X10^{-12}$	$7X10^{-5}$
Sm-151	S	$6X10^{-8}$	$1X10^{-2}$	$2X10^{-9}$	$4X10^{-4}$
	I	$1X10^{-7}$	$1X10^{-2}$	$5X10^{-9}$	$4X10^{-4}$
Sm-153	S	$5X10^{-7}$	$2X10^{-3}$	$2X10^{-8}$	$8X10^{-5}$
	I	$4X10^{-7}$	$2X10^{-3}$	$1X10^{-8}$	$8X10^{-5}$
PPP. *Scandium (21):*					
Sc-46	S	$2X10^{-7}$	$1X10^{-3}$	$8X10^{-9}$	$4X10^{-5}$
	I	$2X10^{-8}$	$1X10^{-3}$	$8X10^{-10}$	$4X10^{-5}$
Sc-47	S	$6X10^{-7}$	$3X10^{-3}$	$2X10^{-8}$	$9X10^{-5}$
	I	$5X10^{-7}$	$3X10^{-3}$	$2X10^{-8}$	$9X10^{-5}$
Sc-48	S	$2X10^{-7}$	$8X10^{-4}$	$6X10^{-9}$	$3X10^{-5}$
	I	$1X10^{-7}$	$8X10^{-4}$	$5X10^{-9}$	$3X10^{-5}$
QQQ. *Selenium (34):*					
Se-75	S	$1X10^{-6}$	$9X10^{-3}$	$4X10^{-8}$	$3X10^{-4}$
	I	$1X10^{-7}$	$8X10^{-3}$	$4X10^{-9}$	$3X10^{-4}$
RRR. *Silicon (14):*					
Si-31	S	$6X10^{-6}$	$3X10^{-2}$	$2X10^{-7}$	$9X10^{-4}$
	I	$1X10^{-6}$	$6X10^{-3}$	$3X10^{-8}$	$2X10^{-4}$
SSS. *Silver (47):*					
Ag-105	S	$6X10^{-7}$	$3X10^{-3}$	$2X10^{-8}$	$1X10^{-4}$
	I	$8X10^{-8}$	$3X10^{-3}$	$3X10^{-9}$	$1X10^{-4}$
Ag-110m	S	$2X10^{-7}$	$9X10^{-4}$	$7X10^{-9}$	$3X10^{-5}$
	I	$1X10^{-8}$	$9X10^{-4}$	$3X10^{-10}$	$3X10^{-5}$
Ag-111	S	$3X10^{-7}$	$1X10^{-3}$	$1X10^{-8}$	$4X10^{-5}$
	I	$2X10^{-7}$	$1X10^{-3}$	$8X10^{-9}$	$4X10^{-5}$

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Isotope[1]		Table I Column 1 Air (μCi/ml)	Table I Column 2 Water (μCi/ml)	Table II Column 1 Air (μmCi/ml)	Table II Column 2 Water (μmCi/ml)
TTT. *Sodium (11):*					
Na-22	S	$2X10^{-7}$	$1X10^{-3}$	$6X10^{-9}$	$4X10^{-5}$
	I	$9X10^{-9}$	$9X10^{-4}$	$3X10^{-10}$	$3X10^{-5}$
Na-24	S	$1X10^{-6}$	$6X10^{-3}$	$4X10^{-8}$	$2X10^{-4}$
	I	$1X10^{-7}$	$8X10^{-4}$	$5X10^{-9}$	$3X10^{-5}$
UUU. *Strontium (38):*					
Sr-85m	S	$4X10^{-5}$	$2X10^{-1}$	$1X10^{-6}$	$7X10^{-3}$
	I	$3X10^{-5}$	$2X10^{-1}$	$1X10^{-6}$	$7X10^{-3}$
Sr-85	S	$2X10^{-7}$	$3X10^{-3}$	$8X10^{-9}$	$1X10^{-4}$
	I	$1X10^{-7}$	$5X10^{-3}$	$4X10^{-9}$	$2X10^{-4}$
Sr-89	S	$3X10^{-8}$	$3X10^{-4}$	$3X10^{-10}$	$3X10^{-6}$
	I	$4X10^{-8}$	$8X10^{-4}$	$1X10^{-9}$	$3X10^{-5}$
Sr-90	S	$1X10^{-9}$	$1X10^{-5}$	$3X10^{-11}$	$3X10^{-7}$
	I	$5X10^{-9}$	$1X10^{-3}$	$2X10^{-10}$	$4X10^{-5}$
Sr-91	S	$4X10^{-7}$	$2X10^{-3}$	$2X10^{-8}$	$7X10^{-5}$
	I	$3X10^{-7}$	$1X10^{-3}$	$9X10^{-9}$	$5X10^{-5}$
Sr-92	S	$4X10^{-7}$	$2X10^{-3}$	$2X10^{-8}$	$7X10^{-5}$
	I	$3X10^{-7}$	$2X10^{-3}$	$1X10^{-8}$	$6X10^{-5}$
VVV. *Sulfur (16):*					
S-35	S	$3X10^{-7}$	$2X10^{-3}$	$9X10^{-9}$	$6X10^{-5}$
	I	$3X10^{-7}$	$8X10^{-3}$	$9X10^{-9}$	$3X10^{-4}$
WWW. *Tantalum (73):*					
Ta-182	S	$4X10^{-8}$	$1X10^{-3}$	$1X10^{-9}$	$4X10^{-5}$
	I	$2X10^{-8}$	$1X10^{-3}$	$7X10^{-10}$	$4X10^{-5}$
XXX. *Technetium (43):*					
Tc-96m	S	$8X10^{-5}$	$4X10^{-1}$	$3X10^{-6}$	$1X10^{-2}$
	I	$3X10^{-5}$	$3X10^{-1}$	$1X10^{-6}$	$1X10^{-2}$
Tc-96	S	$6X10^{-7}$	$3X10^{-3}$	$2X10^{-8}$	$1X10^{-4}$
	I	$2X10^{-7}$	$1X10^{-3}$	$8X10^{-9}$	$5X10^{-5}$
Tc-97m	S	$2X10^{-6}$	$1X10^{-2}$	$8X10^{-8}$	$4X10^{-4}$
	I	$2X10^{-7}$	$5X10^{-3}$	$5X10^{-9}$	$2X10^{-4}$
Tc-97	S	$1X10^{-5}$	$5X10^{-2}$	$4X10^{-7}$	$2X10^{-3}$
	I	$3X10^{-7}$	$2X10^{-2}$	$1X10^{-8}$	$8X10^{-4}$
Tc-99m	S	$4X10^{-5}$	$2X10^{-1}$	$1X10^{-6}$	$6X10^{-3}$
	I	$1X10^{-5}$	$8X10^{-2}$	$5X10^{-7}$	$3X10^{-3}$
Tc-99	S	$2X10^{-6}$	$1X10^{-2}$	$7X10^{-8}$	$3X10^{-4}$
	I	$6X10^{-8}$	$5X10^{-3}$	$2X10^{-9}$	$2X10^{-4}$
YYY. *Tellurium (52):*					
Te-125m	S	$4X10^{-7}$	$5X10^{-3}$	$1X10^{-8}$	$2X10^{-4}$
	I	$1X10^{-7}$	$3X10^{-3}$	$4X10^{-9}$	$1X10^{-4}$
Te-127m	S	$1X10^{-7}$	$2X10^{-3}$	$5X10^{-9}$	$6X10^{-5}$
	I	$4X10^{-8}$	$2X10^{-3}$	$1X10^{-9}$	$5X10^{-5}$
Te-127	S	$2X10^{-6}$	$8X10^{-3}$	$6X10^{-8}$	$3X10^{-4}$
	I	$9X10^{-7}$	$5X10^{-3}$	$3X10^{-8}$	$2X10^{-4}$
Te-129m	S	$8X10^{-8}$	$1X10^{-3}$	$3X10^{-9}$	$3X10^{-5}$
	I	$3X10^{-8}$	$6X10^{-4}$	$1X10^{-9}$	$2X10^{-5}$
Te-129	S	$5X10^{-6}$	$2X10^{-2}$	$7X10^{-8}$	$8X10^{-4}$
	I	$4X10^{-6}$	$2X10^{-2}$	$1X10^{-7}$	$8X10^{-4}$

Isotope[1]		Table I Column 1 Air (μCi/ml)	Table I Column 2 Water (μCi/ml)	Table II Column 1 Air (μmCi/ml)	Table II Column 2 Water (μmCi/ml)
Te-131m	S	$4X10^{-7}$	$2X10^{-3}$	$1X10^{-8}$	$6X10^{-5}$
	I	$2X10^{-7}$	$1X10^{-3}$	$6X10^{-9}$	$4X10^{-5}$
Te-132	S	$2X10^{-7}$	$9X10^{-4}$	$7X10^{-9}$	$3X10^{-5}$
	I	$1X10^{-7}$	$6X10^{-4}$	$4X10^{-9}$	$2X10^{-5}$
ZZZ. *Terbium (65):*					
Tb-160	S	$1X10^{-7}$	$1X10^{-3}$	$3X10^{-9}$	$4X10^{-5}$
	I	$3X10^{-8}$	$1X10^{-3}$	$1X10^{-9}$	$4X10^{-5}$
AAAA. *Thallium (81):*					
Tl-200	S	$3X10^{-6}$	$1X10^{-2}$	$9X10^{-8}$	$4X10^{-4}$
	I	$1X10^{-6}$	$7X10^{-3}$	$4X10^{-8}$	$2X10^{-4}$
Tl-201	S	$2X10^{-6}$	$9X10^{-3}$	$7X10^{-8}$	$3X10^{-4}$
	I	$9X10^{-7}$	$5X10^{-3}$	$3X10^{-8}$	$2X10^{-4}$
Tl-202	S	$8X10^{-7}$	$4X10^{-3}$	$3X10^{-8}$	$1X10^{-4}$
	I	$2X10^{-7}$	$2X10^{-3}$	$8X10^{-9}$	$7X10^{-5}$
Tl-204	S	$6X10^{-7}$	$3X10^{-3}$	$2X10^{-8}$	$1X10^{-4}$
	I	$3X10^{-8}$	$2X10^{-3}$	$9X10^{-10}$	$6X10^{-5}$
BBBB. *Thorium (90):*					
Th-227	S	$3X10^{-10}$	$5X10^{-4}$	$1X10^{-11}$	$2X10^{-5}$
	I	$2X10^{-10}$	$5X10^{-4}$	$6X10^{-12}$	$2X10^{-5}$
Th-228	S	$9X10^{-12}$	$2X10^{-4}$	$3X10^{-13}$	$7X10^{-6}$
	I	$6X10^{-12}$	$4X10^{-4}$	$2X10^{-13}$	$1X10^{-5}$
Th-230	S	$2X10^{-12}$	$5X10^{-5}$	$8X10^{-14}$	$2X10^{-6}$
	I	$1X10^{-11}$	$9X10^{-4}$	$3X10^{-13}$	$3X10^{-5}$
Th-231	S	$1X10^{-6}$	$7X10^{-3}$	$5X10^{-8}$	$2X10^{-4}$
	I	$1X10^{-6}$	$7X10^{-3}$	$4X10^{-8}$	$2X10^{-4}$
Th-232	S	$3X10^{-11}$	$5X10^{-5}$	$1X10^{-12}$	$2X10^{-6}$
	I	$3X10^{-11}$	$1X10^{-3}$	$1X10^{-12}$	$4X10^{-5}$
Th-natural	S	$6X10^{-11}$	$6X10^{-5}$	$2X10^{-12}$	$2X10^{-6}$
	I	$6X10^{-11}$	$6X10^{-4}$	$2X10^{-12}$	$2X10^{-5}$
Th-234	S	$6X10^{-8}$	$5X10^{-4}$	$2X10^{-9}$	$2X10^{-5}$
	I	$3X10^{-8}$	$5X10^{-4}$	$1X10^{-9}$	$2X10^{-5}$
CCCC. *Thullium (69):*					
Tm-170	S	$4X10^{-8}$	$1X10^{-3}$	$1X10^{-9}$	$5X10^{-5}$
	I	$3X10^{-8}$	$1X10^{-3}$	$1X10^{-9}$	$5X10^{-5}$
Tm-171	S	$1X10^{-7}$	$1X10^{-2}$	$4X10^{-9}$	$5X10^{-4}$
	I	$2X10^{-7}$	$1X10^{-2}$	$8X10^{-9}$	$5X10^{-4}$
DDDD. *Tin (50):*					
Sn-113	S	$4X10^{-7}$	$2X10^{-3}$	$1X10^{-8}$	$9X10^{-5}$
	I	$5X10^{-8}$	$2X10^{-3}$	$2X10^{-9}$	$8X10^{-5}$
Sn-125	S	$1X10^{-7}$	$5X10^{-4}$	$4X10^{-9}$	$2X10^{-5}$
	I	$8X10^{-8}$	$5X10^{-4}$	$3X10^{-9}$	$2X10^{-5}$
EEEE. *Tungsten (74):*					
W-181	S	$2X10^{-6}$	$1X10^{-2}$	$8X10^{-8}$	$4X10^{-4}$
	I	$1X10^{-7}$	$1X10^{-2}$	$4X10^{-9}$	$3X10^{-4}$

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Isotope[1]		Table I Column 1 Air (μCi/ml)	Table I Column 2 Water (μCi/ml)	Table II Column 1 Air (μmCi/ml)	Table II Column 2 Water (μmCi/ml)
W-185	S	$8X10^{-7}$	$4X10^{-3}$	$3X10^{-8}$	$1X10^{-4}$
	I	$1X10^{-7}$	$3X10^{-3}$	$4X10^{-9}$	$1X10^{-4}$
W-187	S	$4X10^{-7}$	$2X10^{-3}$	$2X10^{-8}$	$7X10^{-5}$
	I	$3X10^{-7}$	$2X10^{-3}$	$1X10^{-8}$	$6X10^{-5}$
FFFF. *Uranium (92):*					
U-230	S	$3X10^{-10}$	$1X10^{-4}$	$1X10^{-11}$	$5X10^{-6}$
	I	$1X10^{-10}$	$1X10^{-4}$	$4X10^{-12}$	$5X10^{-6}$
U-232	S	$1X10^{-10}$	$8X10^{-4}$	$3X10^{-12}$	$3X10^{-5}$
	I	$3X10^{-11}$	$8X10^{-4}$	$9X10^{-13}$	$3X10^{-5}$
U-233	S	$5X10^{-10}$	$9X10^{-4}$	$2X10^{-11}$	$3X10^{-5}$
	I	$1X10^{-10}$	$9X10^{-4}$	$4X10^{-12}$	$3X10^{-5}$
U-234	S[4]	$6X10^{-10}$	$9X10^{-4}$	$2X10^{-11}$	$3X10^{-5}$
	I	$1X10^{-10}$	$9X10^{-4}$	$4X10^{-12}$	$3X10^{-5}$
U-235	S[4]	$5X10^{-10}$	$8X10^{-4}$	$2X10^{-11}$	$3X10^{-5}$
	I	$1X10^{-10}$	$8X10^{-4}$	$4X10^{-12}$	$3X10^{-5}$
U-236	S	$6X10^{-10}$	$1X10^{-3}$	$2X10^{-11}$	$3X10^{-5}$
	I	$1X10^{-10}$	$1X10^{-3}$	$2X10^{-11}$	$3X10^{-5}$
U-238	S[4]	$7X10^{-11}$	$1X10^{-3}$	$3X10^{-12}$	$4X10^{-5}$
	I	$1X10^{-10}$	$1X10^{-3}$	$5X10^{-12}$	$4X10^{-5}$
U-240	S	$2X10^{-7}$	$1X10^{-3}$	$8X10^{-9}$	$3X10^{-5}$
	I	$2X10^{-7}$	$1X10^{-3}$	$6X10^{-9}$	$3X10^{-5}$
U-nat	S[4]	$1X10^{-10}$	$1X10^{-3}$	$5X10^{-12}$	$3X10^{-5}$
	I	$1X10^{-10}$	$1X10^{-3}$	$2X10^{-12}$	$3X10^{-5}$
GGGG. *Vanadium (23):*					
V-48	S	$2X10^{-7}$	$9X10^{-4}$	$6X10^{-9}$	$3X10^{-5}$
	I	$6X10^{-8}$	$8X10^{-4}$	$2X10^{-9}$	$3X10^{-5}$
HHHH. *Xenon (54):*					
Xe-131m					
	Sub[2]	$2X10^{-5}$	—	$4X10^{-7}$	—
Xe-133m					
	Sub[2]	$1X10^{-5}$	—	$3X10^{-7}$	—
Xe-133					
	Sub[2]	$1X10^{-5}$	—	$3X10^{-7}$	—
Xe-135					
	Sub[2]	$4X10^{-6}$	—	$1X10^{-7}$	—
IIII. *Ytterbium (70):*					
Yb-175	S	$7X10^{-7}$	$3X10^{-3}$	$2X10^{-8}$	$1X10^{-4}$
	I	$6X10^{-7}$	$3X10^{-3}$	$2X10^{-8}$	$1X10^{-4}$
JJJJ. *Yttrium (39):*					
Y-88*	S	$3X10^{-7}$	$2X10^{-3}$	$6X10^{-9}$	$7X10^{-5}$
	I	$5X10^{-8}$	$3X10^{-3}$	$2X10^{-9}$	$9X10^{-5}$
Y-90	S	$1X10^{-7}$	$6X10^{-4}$	$4X10^{-9}$	$2X10^{-5}$
	I	$1X10^{-7}$	$6X10^{-4}$	$3X10^{-9}$	$2X10^{-5}$
Y-91m	S	$2X10^{-5}$	$1X10^{-1}$	$8X10^{-7}$	$3X10^{-3}$
	I	$2X10^{-5}$	$1X10^{-1}$	$6X10^{-7}$	$3X10^{-3}$
Y-91	S	$4X10^{-8}$	$8X10^{-4}$	$1X10^{-9}$	$3X10^{-5}$
	I	$3X10^{-8}$	$8X10^{-4}$	$1X10^{-9}$	$3X10^{-5}$
Y-92	S	$4X10^{-7}$	$2X10^{-3}$	$1X10^{-8}$	$6X10^{-5}$
	I	$3X10^{-7}$	$2X10^{-3}$	$1X10^{-8}$	$6X10^{-5}$

Isotope[1]		Table I Column 1 Air (μCi/ml)	Table I Column 2 Water (μCi/ml)	Table II Column 1 Air (μmCi/ml)	Table II Column 2 Water (μmCi/ml)
Y-93	S	$2X10^{-7}$	$8X10^{-4}$	$6X10^{-9}$	$3X10^{-5}$
	I	$1X10^{-7}$	$8X10^{-4}$	$5X10^{-9}$	$3X10^{-5}$
KKKK. *Zinc (30):*					
Zn-65	S	$1X10^{-7}$	$3X10^{-3}$	$4X10^{-9}$	$1X10^{-4}$
	I	$6X10^{-8}$	$5X10^{-3}$	$2X10^{-9}$	$2X10^{-4}$
Zn-69m	S	$4X10^{-7}$	$2X10^{-3}$	$6X10^{-8}$	$7X10^{-5}$
	I	$3X10^{-7}$	$2X10^{-3}$	$1X10^{-8}$	$6X10^{-5}$
Zn-69	S	$7X10^{-6}$	$5X10^{-2}$	$2X10^{-7}$	$2X10^{-3}$
	I	$9X10^{-6}$	$5X10^{-2}$	$3X10^{-7}$	$2X10^{-3}$
LLLL. *Zirconium (40):*					
Zr-93	S	$1X10^{-7}$	$2X10^{-2}$	$4X10^{-9}$	$8X10^{-4}$
	I	$3X10^{-7}$	$2X10^{-2}$	$1X10^{-8}$	$8X10^{-4}$
Zr-95	S	$1X10^{-7}$	$2X10^{-3}$	$4X10^{-9}$	$6X10^{-5}$
	I	$3X10^{-8}$	$2X10^{-3}$	$1X10^{-9}$	$6X10^{-5}$
Zr-97	S	$1X10^{-7}$	$5X10^{-4}$	$4X10^{-9}$	$2X10^{-5}$
	I	$9X10^{-8}$	$5X10^{-4}$	$3X10^{-9}$	$2X10^{-5}$
MMMM. Any single radionuclide not listed in items A to LLLL with decay mode other than alpha emission or spontaneous fission and with radioactive half-life less than two hours:					
	Sub[2]	$1X10^{-6}$	—	$3X19^{-8}$	—
NNNN. Any single radionuclide not listed in items A to LLLL with decay mode other than alpha emission or spontaneous fission and with radioactive half-life greater than two hours:		$3x10^{-9}$	$9x10^{-5}$	$1X10^{-10}$	$3X10^{-6}$
OOOO. Any single radionuclide not listed in items A to LLLL that decays by alpha emission or spontaneous fission:		$6X10^{-13}$	$4X10^{-7}$	$2X10^{-14}$	$3X10^{-8}$

* The values of Ge-68, Au-195, and Y-88 have been calculated using the committed dose equivalent values of ICRP Publication 30 for the controlling organ.

[1] Soluble (S); Insoluble (I)

[2] "Sub" means that values given are for submersion in a semispherical infinite cloud of airborne material.

[3] These radon concentrations are appropriate for protection from radon-222 combined with its short-lived daughters. Alternatively, the value in Table I may be replaced by one-third "working level." A working level is any combination of short-lived radon-222 daughters, polonium-218, lead-214, bismuth-214, and polonium-214, in one liter of air, without regard to the degree of equilibrium, that will result in the ultimate emission of 1.3×10^5 MeV of alpha particle energy. The Table II value may be replaced by one-thirtieth of a working level. The limit on radon-222 concentrations in restricted areas may be based on an annual average.

[4] For soluble mixtures of U-238, U-234, and U-235 in air, chemical toxicity may be the limiting factor. If the percent by weight (enrichment) of U-235 is less than five, the concentration value for a 40-hour workweek, Table I, is 0.2 milligrams uranium per cubic meter of air average. For any enrichment, the product of the average concentration and time of exposure during a 40-hour workweek shall not exceed $8X10^{-3}$ SA uCi-hr/ml, where SA is the specific activity of the uranium inhaled. The concentration value for Table II is 0.007 milligrams uranium per cubic meter of air. The specific activity for natural uranium is 6.77×10^{-7} curies per gram uranium. The specific activity for other mixtures of U-238, U-235, and U-234, if not known, shall be:

$SA = 3.6 \times 10^{-7}$ curies/gram U — U-depleted

$SA = (0.4 + 0.38\,E + 0.0034\,E^2)10^{-6}$ — $E \geq 0.72$

where E is the percentage by weight of U-235, expressed as percent.

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Note: In any case where there is a mixture in air or water of more than one radionuclide, the limiting values for the purpose of this Appendix shall be determined according to subitems (1) to (5).

(1) If the identity and concentration of each radionuclide in the mixture are known, the limiting values shall be derived as follows: determine, for each radionuclide in the mixture, the ratio between the quantity present in the mixture and the limit otherwise established in Appendix A for the specific radionuclide when not in a mixture. The sum of the ratios for all the radionuclides in the mixture may not exceed one.

Example: If the radionuclides a, b, and c are present in concentrations C_a, C_b, and C_c, and if the applicable maximum permissible concentrations (MPC's) are MPC_a, MPC_b, and MPC_c, respectively, then the concentrations shall be limited so that the following relationship exists:

$$\frac{C_a}{MPC_a} + \frac{C_b}{MPC_b} + \frac{C_c}{MPC_c} \geq 1$$

(2) If either the identity or the concentration of any radionuclide in the mixture is not known, the limiting values for purposes of Appendix A shall be:

(a) for purposes of Table I, Column 1, $6X10^{-13}$;

(b) for purposes of Table I, Column 2, $4X10^{-7}$;

(c) for purposes of Table II, Column 1, $2X10^{-14}$; and

(d) for purposes of Table II, Column 2, $3X10^{-8}$.

(3) If any of the conditions in units (a) to (c) are met, the corresponding values may be used in lieu of those in subitem (2).

(a) If the identity of each radionuclide in the mixture is known but the concentration of one or more of the in the mixture is not known, the concentration limit for the mixture is the limit in Appendix A for the radionuclide in the mixture having the lowest concentration limit.

(b) If the identity of each radionuclide in the mixture is not known but it is known that certain radionuclides in Appendix A are not present in the mixture, the concentration limit for the mixture is the lowest concentration limit in Appendix A for any radionuclide that is not known to be absent from the mixture.

(c) Radionuclide

	Table I		Table II	
	Column 1 Air (μCi/ml)	Column 2 Water (μCi/ml)	Column 1 Air (μCi/ml)	Column 2 Water (μCi/ml)
i. If it is known that Sr-90, I-125, I-126, I-129, I-131, (I-133 Table II only), Pb-210, Po-210, At-211, Ra-223, Ra-224, Ra-226, Ac-227, Ra-228, Th-230, Pa-231, Th-232, Th-natural, Cm-248, Cf-254, and Fm-256 are not present:	—	$9X10^{-5}$	—	$3X10^{-6}$.
ii. If it is known that Sr-90, I-125, I-126, I-129, (I-131, I-133 Table II only), Pb-210, Po-210, Ra-223, Ra-226, Ra-228, Pa-231, Th-natural, Cm-248, Cf-254, and Fm-256 are not present:	—	$6X10^{-5}$	—	$2X10^{-6}$.
iii. If it is known that Sr-90, I-129, (I-125, I-126, I-131, Table II only), Pb-210, Ra-226, Ra-228, Cm-248, and Cf-254 are not present:	—	$2X10^{-5}$	—	$6X10^{-7}$.
iv. If it is known that (I-129, Table II only), Ra-226, and Ra-228 are not present:	—	$3X10^{-6}$	—	$1X10^{-7}$.
v. If it is known that alpha emitters and Sr-90, I-129, Pb-210, Ac-227, Ra-228, Ac-230, Pu-241, and Bk-249 are not present:	$3X10^{-9}$	—	$1X10^{-10}$	—.
vi. If it is known that alpha emitters and Pb-210, Ac-227, Ra-228, and Pu-241 are not present:	$3X10^{-10}$	—	$1X10^{-11}$	—.
vii. If it is known that alpha emitters and Ac-227 are not present:	$3X10^{11}$	—	$1X10^{-12}$	—.

viii. If it is known that Ac-227, Th-230, Pa-231, Pu-238, Pu-239, Pu-240, Pu-242, Pu-244, Cm-248, Cf-249, and Cf-251 are not present:

$3X10^{-12}$ — $1X13^{-13}$ —.

(4) If a mixture of radionuclides consists of uranium and its daughters in ore dust before chemical separation of the uranium from the ore, the values in units (a) and (b) may be used for uranium and its daughters through radium-226, instead of those in subitems (1) to (3).

(a) For purposes of Table I, Column 1, $1X10^{-10}$ μCi/ml gross alpha activity; $5X10^{-11}$ μCi/ml natural uranium; or 75 micrograms per cubic meter of air natural uranium.

(b) For purposes of Table II, Column I, $3X10^{-12}$ μCi/ml gross alpha activity; $2X10^{-12}$ μCi/ml natural uranium; or 3 micrograms per cubic meter of air natural uranium.

(5) For purposes of this note, a radionuclide may be considered as not present in a mixture if:

(a) the ratio of the concentration of that radionuclide in the mixture (C_a) to the concentration limit for that radionuclide specified in Table II of Appendix A (MPC_a) does not exceed 1/10, for example $C_a/MPC_a \geq 1/10$; and

(b) the sum of the ratios for all radionuclides considered as not present in the mixture does not exceed 1/4, for example $C_a/MPC_a + C_b/MPC_b + \ldots\ldots \geq 1/4$.

Note: To convert mCi/ml to SI units of megabecquerels per liter multiply the values in subitem (5) by 37.

Example: Zirconium (40) Zr-97 S (Table I, Column 1-Air) ($1X10^{-7}$ μCi/ml multiplied by 37 is equivalent to $37X10^{-7}$ MBq/1.)

REPEALER. *Minnesota Rules*, parts 4730.0100, subparts 11, 17, 21, 27, 29, 31, and 41; 4730.0300, subpart 4; 4730.0700, subparts 1 and 2; 4730.1100; 4730.1200; 4730.1300; 4730.1500; 4730.1600; 4730.1650; 4730.1660; 4730.1700; 4730.1800; 4730.1900; 4730.2000; 4730.2100; 4730.2200; 4730.2300; 4730.2400; 4730.3300; and 4730.3600, are repealed.

EFFECTIVE DATE. *Minnesota Rules*, parts 4730.0100 to 4730.3605, shall be effective five working days after publication of the adopted rules in the *State Register*.

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Department of Human Services

Proposed Permanent Rules Relating to the Prepaid Medical Assistance Program (PMAP)

Notice of Hearing

NOTICE IS HEREBY GIVEN that a public hearing on the above-entitled matter will be held in the Veterans Service Building, Fifth Floor, Room D, 20 West 12th Street, St. Paul, Minnesota 55155 on April 24, 1991, commencing at 9:00 a.m. and continuing until all interested or affected persons have an opportunity to participate. The proposed rules may be modified as a result of the hearing process. Therefore, if you are affected in any manner by the proposed rules, you are urged to participate in the rule hearing process.

Following the agency's presentation at the hearing, all interested or affected persons will have an opportunity to participate. Such persons may present their views either orally at the hearing or in writing at any time prior to the close of the hearing record. All evidence presented should be pertinent to the matter at hand. Written material not submitted at the time of the hearing which is to be included in the hearing record may be mailed to George A. Beck, Administrative Law Judge, Office of Administrative Hearings, 500 Flour Exchange Building, 310 Fourth Avenue South, Minneapolis, Minnesota 55415; telephone (612) 341-7601, either before the hearing or within five working days after the public hearing ends. The Administrative Law Judge may, at the hearing, order the record be kept open for a longer period not to exceed 20 calendar days. Any written material or responses must be received at the office no later than 4:30 p.m. on the final day. The comments received during the comment period shall be available for review at the Office of Administrative Hearings. Following the close of the comment period the agency and all interested persons have three business days to respond in writing to any new information submitted during the comment period. During the three-day period, the agency may indicate in writing whether there are amendments suggested by other persons which the agency is willing to adopt. No additional evidence may be submitted during the three-day period. Any written material or responses must be received at the office no later than 4:30 p.m. on the final day. The written responses shall be added to the rulemaking record. Upon the close of the record the Administrative Law Judge will write a report as provided for in *Minnesota Statutes*, section 14.50. The rule hearing is governed by *Minnesota Statutes*, section 14.14 to 114.20 and by *Minnesota Rules*, parts 1400.0200 to 1400.1200. Questions about procedure may be directed to the Administrative Law Judge.

The Prepaid Medical Assistance Program is a continuation of the former Medical Assistance Prepaid Demonstration Project (MAPDP) under *Minnesota Rules*, parts 9500.1450 to 9500.1464. Counties participating in the Prepaid Medical Assistance Program are Dakota, Hennepin, and Itasca.

Amendments to the rule are necessary to comply with legislative changes in the program; to correct rule cites no longer accurate due to revisions in the Medical Assistance rule; and to provide more efficient administration of the program. Since promulgation of the original rule, the legislature has changed the grievance and appeals process; changed the method of determining capitation rates; added groups that are exempt from the program; and modified provider selection requirements if a provider ends participation. Statutory requirements governing prepaid medical assistance programs are set forth under *Minnesota Statutes*, sections 256.045, 256B.031, and 256B.69.

Minnesota Rules, parts 9500.1450 to 9500.1464 govern the prepaid medical assistance program (PMAP). Amendments to the rule define the use of terms; identify Medical Assistance (MA) recipients who are not eligible to participate in the prepaid program; permit participating counties to exclude certain MA recipients from participating in the prepaid program, subject to the approval of the commissioner; provide Hennepin County a phase-in period for new enrollees; provide elective enrollment in PMAP for certain individuals; authorize the delivery of health services under either a multiple health plan model or a primary care provider model; establish program requirements under the multiple health plan and primary care provider models; establish requirements for changing health plans or primary care providers; identify third party liability; identify services covered by PMAP; set forth capitation policies; identify health plan requirements; set forth second medical opinion requirements; establish complaint and appeal procedures; and repeal obsolete rule parts.

The agency's authority to adopt the proposed rules is contained in *Minnesota Statutes*, sections 256B.04, subdivision 2; and 256B.69, subdivision 17.

In preparing these rules, the agency has considered the requirements of *Minnesota Statutes*, section 14.115 in regard to the impact

of the proposed rules on small businesses. The agency believes that *Minnesota Statutes*, section 14.115 does not apply to these rules but in the event that section 14.115 does apply, the agency invites public comment at the public hearing. Furthermore, if any person knows of anyone who may be affected as a small business, the person may address this concern at the public hearing.

Adoption of these rules will not result in additional spending by local public bodies in the excess of $100,000 per year for the first two years following adoption under the requirements of *Minnesota Statutes*, section 14.11. A fiscal note prepared according to the requirements of *Minnesota Statutes*, section 3.98, subdivision 2, estimating the fiscal impact of the rule is available upon request from Nancy Bishop, Department of Human Services, Rules and Bulletins Division, 444 Lafayette Road, St. Paul, Minnesota 55155-3816.

Copies of the proposed rules are now available and at least one free copy may be obtained by writing to Nancy Bishop, Rules and Bulletins Division, Department of Human Services, 444 Lafayette Road, St. Paul, Minnsota 55155-3816, telephone (612) 296-7454. A copy of the rule may also be viewed at any of the 87 county welfare agencies in the State of Minnesota.

Additional copies will be available at the hearing. If you have any questions on the content of the rule, contact Mary Jo Cairns, Health Care Management Division, Department of Human Services, 444 Lafayette Road, St. Paul, Minnesota 55155-3854, telephone (612) 296-2664.

NOTICE: Any person may request notification of the date on which the Administrative Law Judge's report will be available, after which date the agency may not take any final action on the rules for a period of five working days. If you desire to be notified, you may so indicate at the hearing. After the hearing, you may request notification by sending a written request to the Administrative Law Judge. Any person may request notification of the date on which the rules were adopted and filed with the secretary of state. The notice must be mailed on the same day the rules are filed. If you want to be so notified you may so indicate at the hearing or send a request in writing to the agency at any time prior to the filing of the rules with the secretary of state.

NOTICE IS HEREBY GIVEN THAT A STATEMENT OF NEED AND REASONABLENESS is now available for review at the agency and at the Office of Administrative Hearings. The Statement of Need and Reasonableness includes a summary of all the evidence and argument which the agency anticipates presenting at the hearing justifying both the need for and reasonableness of the proposed rules. Copies of the Statement of Need and Reasonableness may be reviewed at the agency or the Office of Administrative Hearings and copies may be obtained from the Office of Administrative Hearings at the cost of reproduction.

Lobbyists must register with the State Ethical Practices Board. Questions should be directed to the Ethical Practices Board, 625 North Robert Street, St. Paul, Minnesota 55101, telephone (612) 296-5148.

Natalie Haas Steffen
Commissioner

Rules as Proposed

ADMINISTRATION OF THE PREPAID MEDICAL ASSISTANCE ~~PREPAID DEMONSTRATION PROJECT~~ PROGRAM

9500.1450 INTRODUCTION.

Subpart 1. **Scope.** Parts 9500.1450 to 9500.1464 govern administration of the prepaid medical assistance ~~prepaid demonstration project (MAPDP)~~ program (PMAP) in Minnesota. Parts 9500.1450 to 9500.1464 shall be read in conjunction with title XIX of the Social Security Act, Code of Federal Regulations, title 42, and waivers approved by the Health Care Financing Administration, Minnesota Statutes, chapters 256 and 256B, and rules ~~promulgated~~ adopted under them, governing the administration of the title XIX program and ~~MAPDP~~ PMAP in Minnesota.

Subp. 2. **References.** Parts 9500.1450 to 9500.1464 shall be interpreted as necessary to comply with federal laws and regulations and state laws applicable to the prepaid medical assistance ~~prepaid demonstration project~~ program.

Subp. 3. **Geographic area.** ~~MAPDP~~ PMAP shall be operated in the counties of Dakota, Hennepin, and Itasca. The commissioner may expand the geographic area beyond the designated counties. If the geographic area is expanded beyond Dakota, Hennepin, and Itasca counties, participating counties in the expanded area shall receive timely notice from the commissioner and shall be governed by parts 9500.1450 to 9500.1464.

9500.1451 DEFINITIONS.

[For text of subpart 1, see M.R. 1989]

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Subp. 2. [See repealer.]

Subp. 2a. **Appeal.** "Appeal" means an enrollee's written request for a hearing, filed with the commissioner according to Minnesota Statutes, section 256.045, related to the delivery of health services or participation in a health plan.

Subp. 2b. **Authorization.** "Authorization" means a health plan provider's written referral for health services provided by a nonhealth plan provider. Authorization includes an admission request by a health plan provider, on behalf of a PMAP enrollee, following the established health plan admission procedures for inpatient health services.

Subp. 2c. **Authorized representative.** "Authorized representative" means a person authorized in writing by a PMAP consumer to act on the PMAP consumer's behalf in matters involving the prepaid medical assistance program.

Subp. 3. [See repealer.]

Subp. 4. **Capitation.** "Capitation" means a method of payment for health ~~care~~ services that involves a monthly per person rate paid on a prospective basis to a ~~medicaid~~ health plan.

Subp. 4a. **Case management.** "Case management" means a method of providing health care in which an individual or organization or an interdisciplinary team coordinates the provision of health services to an enrollee.

Subp. 4b. **Commissioner.** "Commissioner" means the commissioner of the Minnesota Department of Human Services or the commissioner's designated representative.

Subp. 4c. **Complaint.** "Complaint" means an enrollee's written or oral communication to a health plan expressing dissatisfaction with the provision of health services. The subject of the complaint may include, but is not limited to, the scope of covered services, quality of care, or administrative operations.

Subp. 5. [See repealer.]

[For text of subp 6, see M.R. 1989]

Subp. 7. **Enrollee.** "Enrollee" means a PMAP consumer who is enrolled in a ~~medicaid~~ health plan.

Subp. 7a. **Health plan.** "Health plan" means an organization contracting with the state to provide medical assistance health services to enrollees in exchange for a monthly capitation payment.

Subp. 8. **Health services.** "Health services" means the services and supplies given to a recipient by a provider for a health related purpose under Minnesota Statutes, section ~~256B.02, subdivision 8~~ 256B.0625.

Subp. 9. **Insolvency.** "Insolvency" means the condition in which a ~~medicaid~~ health plan is financially unable to meet the financial and health care service delivery obligations in the contract between the department and the ~~medicaid~~ health plan.

[For text of subp 10, see M.R.]

Subp. 11. [See repealer.]

Subp. 12. [See repealer.]

[For text of subp 13, see M.R. 1989]

Subp. 14. **Medical assistance population or MA population.** "Medical assistance population" or "MA population" means an aged, blind, disabled, or Aid to Families with Dependent Children (AFDC), AFDC related, medically needy children, or pregnant woman category of eligibility for the medical assistance program, the eligibility standards for which are in parts ~~9500.0780 to 9500.0860~~ 9505.0010 to 9505.0150.

Subp. 14a. **Multiple health plan model.** "Multiple health plan model" means a health services delivery system that allows PMAP consumers to enroll in one of two or more health plans.

Subp. 14b. **Ombudsperson.** "Ombudsperson" means an individual designated by the commissioner under Minnesota Statutes, section 256B.031, subdivision 6, to advocate for PMAP consumers and enrollees and to assist them in obtaining necessary health services.

Subp. 14c. **Open enrollment.** "Open enrollment" means the annual 30-day period during which PMAP enrollees in a multiple health plan model may change to another health plan.

Subp. 14d. **Personal care assistant.** "Personal care assistant" means a provider of personal care services prescribed by a physician, supervised by a registered nurse, and provided to a medical assistance recipient under Minnesota Statutes, section 256B.0627. A personal care assistant must not be the recipient's spouse, legal guardian, or parent if the recipient is a minor child.

Subp. 14e. **Personal care services.** "Personal care services" has the meaning given it in Minnesota Statutes, section 256B.0627, subdivision 4.

Subp. 14f. **Prepaid medical assistance program or PMAP.** "Prepaid medical assistance program" or "PMAP" means the prepaid medical assistance program authorized under Minnesota Statutes, section 256B.69.

Subp. 14g. **PMAP consumer.** "PMAP consumer" means a medical assistance recipient who is selected to participate in PMAP.

Subp. 14h. **Prepayment coordinator.** "Prepayment coordinator" means the individual designated by the local agency under Minnesota Statutes, section 256B.031, subdivision 9.

Subp. 14i. **Primary care provider health plan model.** "Primary care provider health plan model" means a health services delivery system that allows PMAP consumers to select a primary care physician and primary care dentist from a list of physicians and dentists under contract with the state or a county to provide health services to PMAP consumers.

Subp. 15. **Provider.** "Provider" means a person or entity providing health ~~care~~ services.

Subp. 16. **Rate cell.** "Rate cell" means a grouping of recipients by demographic characteristics, established by the ~~department~~ commissioner for use in determining capitation rates. Demographic characteristics may include ~~the~~, but are not limited to, a recipient's age, sex, medicare status, basis of medical assistance eligibility, and county of residence, and whether the recipient is a resident of a long-term care facility.

Subp. 16a. **Rate cell year.** "Rate cell year" means the period beginning on the date of enrollment in the health plan and ending on the date of the annual eligibility review or the date of enrollment in a new plan, whichever occurs sooner, and thereafter the 12-month period between eligibility reviews during which an enrollee's rate cell assignment is fixed.

[For text of subp 17, see M.R. 1989]

Subp. 17a. **Spend-down.** "Spend-down" means the process by which a person who has income in excess of the medical assistance income standard becomes eligible for medical assistance by incurring health services expenses, other than nursing home facility per diem charges, that are not covered by a liable third party and that reduce the excess income to zero.

Subp. 17b. **State institution.** "State institution" means all regional treatment centers as defined in Minnesota Statutes, section 245.0312, and all state operated facilities as defined in Minnesota Statutes, section 252.50.

Subp. 18. [See repealer.]

9500.1452 ELIGIBILITY TO ENROLL IN ~~MEDICAID~~ A HEALTH PLAN.

Subpart 1. **Medical assistance eligibility required for PMAP participation.** Only persons who have been determined eligible for medical assistance under parts ~~9500.0750 to 9500.1060~~ 9505.0010 to 9505.0150 shall be eligible to participate in the prepaid medical assistance ~~prepaid demonstration project~~ program.

~~"Personal care assistant" means a provider of personal care services prescribed by a physician and supervised by a registered nurse and provided to a medical assistance recipient. A personal care assistant must not be a relative or a family member of the medical assistance recipient. "Rate cell year" means the period beginning with the consumer's case open date or effective date of enrollment in the MHP, whichever is earlier, and ending one year from the consumer's case open date.~~

~~"State institution" means all regional treatment centers, as defined in Minnesota Statutes, section 245.0312, and state operated nursing homes Ah-gwah-ching and Oak Terrace.~~

Subp. 2. **Medical assistance categories ineligible for PMAP.** A person who belongs to a category listed in items A to ~~D~~ K is ineligible to enroll in a ~~medicaid~~ health plan under the prepaid medical assistance ~~prepaid demonstration project~~ program:

A. a person who is eligible for medical assistance ~~with a six-month spend-down under part~~ 9500.0810 on a spend-down basis as defined in part 9500.1451, subpart 17a;

B. a person who is currently receiving the services of a personal care assistant, or ~~MAPDP~~ PMAP enrollees who at the end of their rate cell year are using the services of one or more personal care assistants;

C. a person who is a resident of a state institution; ~~or~~

D. a person who is ~~a refugee and is~~ receiving benefits under the Refugee Assistance Program, established at United States Code, title 8, section 1522(e)~~.~~;

E. a person who is eligible for medical assistance through an adoption subsidy;

F. a person who is determined eligible for medical assistance due to blindness or disability as certified by the Social Security Administration or the state medical review team, unless the recipient is 65 years of age or older;

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G. a person who is eligible for medical assistance but currently has private health insurance coverage through a health maintenance organization licensed under Minnesota Statutes, chapter 62D;

H. a person who resides in Itasca county but who lives near the county border and who chooses to use a primary care provider located in a neighboring county;

I. a person who is a qualified medicare beneficiary, as defined in United States Code, title 42, section 1396(d), who is not otherwise eligible for medical assistance;

J. a person who is terminally ill as defined under part 9505.0297, subpart 2, item N, and who, at the time of notification of mandatory enrollment in PMAP, has a permanent relationship with a primary physician who is not part of any PMAP health plan; or

K. a person who is in Title IV-E foster placement.

Subp. 3. **Optional exclusions, commissioner approval.** Counties participating in PMAP may, subject to the approval of the commissioner, exclude one or more categories of persons listed in items A to C from participation in PMAP.

A. Children in out-of-home placements under:

(1) Rule 5, child caring institutions, parts 9545.0900 to 9545.1090; or

(2) Rule 8, group homes, parts 9545.1400 to 9545.1500.

B. Children determined to be severely emotionally disturbed pursuant to Minnesota Statutes, sections 245.487 to 245.4887, and who are coded as severely emotionally disturbed on the Minnesota welfare information system.

C. Children determined to be in need of protection pursuant to Minnesota Statutes, sections 626.556 to 626.5561, and who are identified to the state by the county social service agency.

Subp. 4. **Exclusions during phase-in period.** The 65 percent of medical assistance eligible persons in Hennepin county who were not randomly selected to participate in the former medical assistance prepaid demonstration project because they served as a control group must participate in PMAP. Hennepin county may temporarily exclude individuals' participation in PMAP in order to provide an orderly phase-in period for new enrollees. The phase-in period must be completed within one year from the start of the enrollment period for each category of eligible PMAP consumers.

Subp. 5. **Elective enrollment.** An individual categorically excluded from PMAP under subpart 2, item G, may enroll in PMAP on an elective basis if the private health insurance health plan is the same as the health plan the consumer will select under PMAP.

An individual categorically excluded from PMAP under subpart 3, items A to C, may enroll in the prepaid medical assistance program on an elective basis.

Program requirements are the same for elective and mandatory PMAP enrollees under Minnesota Statutes, section 256B.69.

9500.1453 MANDATORY PARTICIPATION; FREE CHOICE OF ~~MEDICAID~~ HEALTH PLAN.

Subpart 1. **Local agency enrollment of PMAP consumers.** ~~The department~~ Each local agency shall ~~select~~ enroll recipients to participate as PMAP consumers in the prepaid medical assistance ~~demonstration project and~~ program. Health services may be provided to PMAP consumers under a multiple health plan model or a primary care provider health plan model.

Subp. 2. **Counties using a multiple health plan model, choice.** In a county that uses a multiple health plan model, the local agency shall notify ~~the recipients~~ each PMAP consumer, in writing, of the ~~MHP~~ health plan choices available ~~to them. A recipient who is selected as a consumer must participate in a MHP. The recipient shall have the right to select the MHP of his or her choice. No reimbursement from the Medical Assistance Program shall be made for health services received by a recipient enrolled in a MHP that are not payable through the MHP. Consumers~~ The PMAP consumer shall be given no less than ten days after receiving ~~written~~ the notification ~~from the department to notify the department of their~~ to select a health plan and to inform the local agency of the health plan choice. ~~However, if the department is not notified of the consumer's choice, the department shall assign the consumer to a MHP.~~ If a PMAP consumer fails to select a health plan within the specified time, the local agency may provide additional assistance to the PMAP consumer in making a selection but must randomly assign the PMAP consumer to a health plan within the time limit established by the commissioner. The ~~department~~ commissioner shall notify ~~the recipient~~ each PMAP consumer in writing before the effective date of enrollment, of the ~~effective date of his or her enrollment, and the MHP~~ health plan in which the ~~recipient~~ PMAP consumer will be enrolled. ~~This notice must be given to the recipient before the effective date of enrollment.~~

Subp. 3. **Counties using primary care provider health plan model, provider choice.** In a county that uses a primary care provider health plan model, the local agency shall notify each PMAP consumer, in writing, of the primary care physicians and dentists available. The PMAP consumer shall be given no less than ten days after receiving the notification to select a primary care physician and dentist and to inform the local agency of the choice. If a PMAP consumer fails to select a primary care physician or dentist within the specified time, the local agency may provide additional assistance to the PMAP consumer in making a selection but must randomly assign the PMAP consumer to a primary care physician and dentist within the time limit established by the commissioner. The local

agency shall notify each PMAP consumer in writing of the assigned primary care physician or dentist before the effective date of enrollment.

Subp. 4. **Designation of prepayment coordinator.** To carry out its responsibilities under this part, each local agency shall designate a prepayment coordinator. The prepayment coordinator shall perform the duties set forth under Minnesota Statutes, section 256B.031, subdivision 9. The commissioner shall monitor the tasks performed by the prepayment coordinator.

Subp. 5. **Enrollment period in counties using a multiple health plan model; change.** In a county that uses a multiple health plan model, a PMAP consumer shall be enrolled in a ~~MHP~~ health plan for up to one year from the date of enrollment but shall have the right to change to another ~~MHP~~ health plan once within the first 60 days of initial enrollment in ~~MAPDP~~ PMAP. ~~A consumer shall have the right~~ In addition, when a PMAP consumer is enrolled in a health plan whose participation in PMAP is subsequently terminated for any reason, the PMAP consumer shall be provided an opportunity to select a new health plan and shall have the right to change health plans within the first 60 days of enrollment in the second health plan. An enrollee shall also have the opportunity to change to another ~~MHP~~ health plan during the annual 30-day ~~period of~~ open enrollment period. The ~~department~~ local agency shall notify ~~consumers~~ enrollees of the opportunity to change to another ~~MHP annually, at least 30 days~~ health plan before the start of ~~the~~ each annual open enrollment period. An enrollee may request to change health plans at other than the designated times by following the procedures under subpart 7.

Subp. 6. **Enrollment period in counties using primary care provider health plan model; change.** In a county that uses a primary care provider health plan model, an enrollee may select a new primary care physician or dentist during the first 60 days of initial enrollment. An enrollee shall also have the opportunity to change primary care physicians and dentists on an annual basis. The local agency shall notify an enrollee of this change option. An enrollee may request to change primary care providers at other than the designated times by following the procedure under subpart 7.

Subp. 7. **Changes between enrollment periods.** An enrollee in a county that uses a multiple health plan model may change ~~to another~~ ~~MHP~~ health plans and an enrollee in a county that uses a primary care provider health plan model may change primary care physicians or dentists between enrollment periods ~~on~~ for cause by demonstrating to the state ~~grievance panel~~ human services referee that the enrollee:

A. ~~requires substantially more travel time than is normally required by non-MAPDP participants in the same geographic area to travel to receive medical services;~~

~~B.~~ has not received satisfactory services from the ~~MHP~~ health plan or primary care physician or dentist; or

~~C.~~ B. has other good cause for changing to another ~~MHP~~ health plan or primary care physician or dentist.

Subp. 8. **Enrollment changes without a hearing, substantial travel time.** An enrollee in a multiple health plan model may change a health plan and an enrollee in a primary care provider health plan model may change a primary care provider without a hearing if the travel time to the enrollee's primary care provider is over 30 minutes from the enrollee's residence.

Subp. 9. **Enrollment changes without a hearing when agency error.** Upon an enrollee's request, the state may authorize the county to change an enrollee's health plan or primary care physician or dentist without a hearing when the enrollee's health plan or primary care physician or dentist choice was incorrectly designated due to local agency error.

Subp. 10. **Mandatory participation.** A recipient's mandatory participation in PMAP does not constitute a restriction of free choice of provider as provided under *Minnesota Statutes*, sections 256B.031, subdivision 5, and 256B.69, subdivision 4.

Subp. 11. **Authorized representative.** A PMAP consumer may designate an authorized representative to act on the PMAP consumer's behalf in matters involving the PMAP.

9500.1454 RECORDS.

A ~~MHP~~ health plan shall maintain fiscal and medical records as required in part ~~9500.0930~~ 9505.0205. A local agency shall comply with ~~parts 9500.0920 and 9500.0930~~ part 9505.0135 and maintain a list showing the enrollment choices of recipients who participate in the ~~medical assistance prepaid demonstration project~~ PMAP.

9500.1455 THIRD-PARTY LIABILITY.

~~A local agency and a MHP shall comply with part 9505.0211 [Emergency] in regard to third party payer liability.~~ To the extent required under *Minnesota Statutes*, section 62A.046 and part 9505.0070, the health plan shall coordinate benefits for or recover the cost of medical care provided to its enrollees who have private health care or Medicare coverage. Coordination of benefits includes paying applicable copayment or deductibles on behalf of an enrollee.

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9500.1457 SERVICES COVERED BY ~~MAPDP~~ PMAP.

Subpart 1. **In general.** Services currently available under the medical assistance program in *Minnesota Statutes*, ~~chapter 256B~~ section 256B.0625 and parts ~~9500.0750 to 9500.1080~~ 9505.0170 to 9505.0475 are covered under ~~MAPDP~~ PMAP. Chemical dependency services provided under this part must fully comply with the requirements of parts 9530.4100 to 9530.6655. The following services are not covered:

A. case management services for serious and persistent mental illness as defined in *Minnesota Statutes*, section 256B.0625, subdivision 20;

B. nursing home facility per diem services as defined in *Minnesota Statutes*, section 256B.0625, subdivision 2, and parts 9549.0010 to 9549.0080; and

C. services provided under home-based and community-based waivers authorized under United States Code, title 42, section 1396.

Subp. 2. **Additional services.** A ~~MHP~~ health plan may provide services in addition to those available under the medical assistance program.

Subp. 3. **Prior authorization of services.** A ~~MHP~~ health plan shall be exempt from the requirements of *Minnesota Statutes*, chapter 256B, parts ~~9500.0750 to 9500.1080~~ 9505.0170 to 9505.0475 and 9505.5000 to 9505.5030, that require prior authorization before providing health services to an enrollee.

9500.1458 DATA PRIVACY.

Under *Minnesota Statutes*, section 13.46, subdivisions 1 and 2, a ~~MHP~~ health plan under contract with the department is considered an agent of the department and shall have access to information on its enrollees to the extent necessary to carry out its responsibilities under the contract. The ~~MHP~~ health plan must comply with *Minnesota Statutes*, chapter 13, the Minnesota Government Data Practices Act.

9500.1459 CAPITATION POLICIES.

Subpart 1. **Rates.** ~~In demonstration counties designated by the department under *Minnesota Statutes*, section 256B.69, medical assistance payments for services included in the MAPDP will be made according to the contract between the MHP and the department. Capitation rates must be developed on an historical cost basis. Base rates must be determined by calculating an average per capita cost for each rate cell by county of participation. If rate cell population in a county is insufficient to support a statistically valid sample size, the average per capita cost for that rate cell shall be determined from statistics from the metropolitan area, consisting of Hennepin, Ramsey, Anoka, Scott, Carver, Dakota, and Washington counties, or from a group of contiguous or demographically similar rural counties. The actual rate offered under the contract must be a specified percentage of the county average per capita cost.~~

~~The historical cost basis of the rates must be from fiscal year 1982 for Itasca and Hennepin counties, and fiscal year 1983 for Dakota county, adjusted forward to the implementation year. This adjustment must not exceed the per capita cost increase based on department projections, taking into account changes in legislation, title XIX state plan, and rules affecting the medical assistance program. "Title XIX state plan" refers to the document submitted for approval to the United States Department of Health and Human Services. Health Care Financing Administration, defining the conditions of medical assistance program eligibility and services authorized by title XIX of the Social Security Act of 1965 and *Minnesota Statutes*, chapter 256B.~~

~~Rates must be adjusted on a state fiscal year basis, July 1 to June 30. The adjusted rates shall be effective on January 1 of the next state fiscal year. Rate cells shall also be adjusted to reflect differences in health status if analysis of historical costs and available survey data indicates that this adjustment is feasible.~~ On or before the tenth day of each month, the commissioner shall prepay each health plan the capitation rates specified in the contract between the health plan and the state. The capitation rates must be reviewed by an independent actuary with demonstrated experience in the health insurance rate setting area. The rates established must be less than the average per capita fee-for-service medical assistance costs for an actuarially equivalent population.

Subp. 2. to 4. [See repealer.]

9500.1460 ADDITIONAL REQUIREMENTS.

Subpart 1. **~~MHP~~ Health plan requirements.** An organization that seeks to participate as a ~~MHP~~ health plan under the ~~medical assistance prepaid demonstration project~~ PMAP shall meet the criteria in subparts 2 to ~~16~~ 17.

Subp. 2. **Medical assistance populations covered.** A ~~MHP~~ health plan may choose to serve ~~all medical assistance populations or a single medical assistance population. If the MHP chooses to serve a medical assistance population of AFDC or blind recipients, the MHP must serve at least one other medical assistance population~~ the medical assistance population defined in part 9500.1452 or the aged medical assistance population exclusively.

Subp. 3. **Services provided.** A ~~MHP~~ health plan shall provide or ensure its enrollees access to all health services eligible for medical

assistance payment under ~~part 9500.1070~~ *Minnesota Statutes*, section 256B.0625, and parts 9505.0170 to 9505.0475 except for services referenced in part 9500.1457, subpart 1.

Subp. 4. **Prohibition against co-payments.** A ~~MHP~~ health plan shall not charge its enrollees for any health service eligible for medical assistance payment under ~~part 9500.1070~~ parts 9505.0170 to 9505.0475 or for a medically necessary health service that is provided as a substitute for a health service eligible for medical assistance payment.

Subp. 5. **Plan organization.** A ~~MHP~~ health plan may choose to organize itself as either a profit or not-for-profit organization.

Subp. 6. **Contractual arrangements.** A ~~MHP~~ health plan shall contract with providers as necessary to meet the health service needs of its enrollees. ~~The MHP shall verify these contracts to the department by providing written summary information before a contract can be entered into between the MHP and the department.~~ Before contracting with the state, and on an annual basis after contracting with the state, the health plan shall give the commissioner a current list of the names and locations of the providers under contract with the health plan. These subcontracts may be reviewed by the commissioner upon request. The commissioner may require a health plan to terminate a subcontract when the commissioner determines that the subcontractor does not meet the department's quality assurance standards or department of health licensure standards under *Minnesota Statutes*, chapter 62D.

Subp. 7. ~~Service~~ **Enrollment capacity.** A ~~MHP~~ health plan shall accept~~, up to the limit of its enrollment capacity,~~ all PMAP consumers who choose or are assigned to the ~~MHP~~ health plan, regardless of the PMAP consumers' health conditions, if the PMAP consumers are from the medical assistance category or categories and the geographic area or areas specified in the contract between the ~~MHP~~ health plan and the ~~department~~ state. The commissioner may limit the number of enrollees in the health plan if, in the commissioner's judgment, the health plan cannot demonstrate a capacity to serve additional enrollees.

Subp. 8. **Financial capacity.** A ~~MHP~~ health plan shall demonstrate its financial risk capacity through a reserve fund or other mechanism agreed upon by the providers within the ~~MHP~~ health plan in the contract with the department. A ~~MHP~~ health plan that is licensed as a health maintenance organization under *Minnesota Statutes*, chapter 62D, or a nonprofit health plan licensed under *Minnesota Statutes*, chapter 62C, is not required to demonstrate a financial risk capacity beyond the financial risk capacity required to comply with the requirements of *Minnesota Statutes*, chapter 62C or 62D.

Subp. 9. **Insolvency.** A ~~MHP~~ health plan must have a plan approved by the ~~department~~ commissioner for transferring its enrollees to other sources of health services if the ~~MHP~~ health plan becomes insolvent.

Subp. 10. **Limited number of contracts.** The ~~department~~ commissioner may limit the number of ~~MHP~~ health plan contracts in effect under ~~MAPDP~~ PMAP.

Subp. 11. **Liability for payment for unauthorized services.** Except for emergency health services under *Minnesota Statutes*, section ~~256B.02, subdivision 8, clause (4)~~ 256B.0625, subdivision 4, or unless otherwise specified in contract, a ~~MHP~~ health plan shall not be liable for payment for unauthorized health services rendered by a provider who is not part of the ~~MHP~~ health plan. The department is not liable for payment for health services rendered by a provider who is not part of the ~~MHP~~ health plan.

A health plan shall be liable for payment for unauthorized services when the health plan enrollee has already received services from a nonparticipating provider if:

A. the service was ordered or recommended by a participating provider;

B. the service would otherwise be covered, or was part of a discharge plan of a participating provider; and

C. the enrollee was not given prior written notice stating that this service by a nonparticipating provider would not be covered, and a listing of participating providers of this service available in the enrollee's area.

Subp. 11a. **Payment for authorized services by nonparticipating health plan provider.** When a health plan authorizes services for out-of-plan care, the health plan shall reimburse the nonparticipating health plan provider for the out-of-plan care. The health plan is not required to reimburse the nonparticipating health plan provider more than the comparable medical assistance fee for service rate, unless another rate is otherwise required by law. A nonparticipating health plan provider shall not bill the PMAP enrollee for any portion of the cost of the authorized service.

Subp. 12. **Termination of participation as a ~~MHP~~ health plan.** The ~~department or a MHP~~ state may terminate a contract upon 90 days' written notice to the ~~other party unless the department and the MHP have agreed to a different notice requirement in the contract and except as set forth at part 9500.1459, subpart 4, item B, subitem (3). If a contract between the department and a MHP is going to be terminated~~ health plan. When the state issues a contract termination notice, the ~~entity terminating the contract~~ health plan must notify ~~the MHP's~~ its enrollees in writing at least ~~30~~ 60 days before the termination.

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Subp. 13. **Financial requirements placed on ~~MHP~~ health plan.** ~~The MHP shall accept the capitation rate and risk-sharing adjustments derived under part 9500.1459 as full payment for health services provided under the contract to enrollees. A MHP under contract with the department~~ Each health plan shall be accountable to the ~~department~~ commissioner for the fiscal management of the health services it provides enrollees. The ~~department~~ state and the health plan's enrollees shall be held harmless for the payment of obligations incurred by a ~~MHP~~ health plan if the ~~MHP~~ health plan or a provider contracted by the health plan to provide health services to enrollees becomes insolvent and if the ~~department~~ state has made the payments due the ~~MHP~~ health plan under part 9500.1459.

Subp. 14. **Required educational and enrollee materials.** When contracting with the ~~department~~ state, a ~~MHP~~ health plan must provide to the ~~department~~ commissioner educational materials to be given to the medical assistance population specified in the contract. The material should explain the services to be furnished to enrollees. No educational materials designed to solicit the enrollment of PMAP consumers shall be disseminated without the ~~department's~~ commissioner's prior approval. ~~A MHP and the department may agree, as a term of the contract, that a broker shall have the responsibility for developing and distributing the educational materials required in this subpart. If the contract specifies the use of a broker to develop and disseminate educational materials designed specifically for consumers, the broker must get the department's written approval of the educational materials before distributing them.~~

When a person enrolls in the health plan, the health plan shall provide each enrollee with a certificate of coverage, a health plan identification card, a listing of plan providers, and a description of the health plan's complaint and appeal procedure.

According to *Minnesota Statutes*, section 256.016, any educational materials, new enrollee information, complaint and appeal information, or other enrollee materials must be understandable to a person who reads at the seventh grade level as determined by the Flesch readability scale index defined in *Minnesota Statutes*, section 72C.09.

Subp. 15. **Required case management system.** ~~"Case management" means a method of providing health care in which one individual or organization or an interdisciplinary team coordinates the provision of health care services to a consumer.~~ A ~~MHP~~ health plan shall implement a system of case management ~~providing the enrollee~~ in which an enrollee's individual medical needs ~~assessment, development and implementation of an individual~~ are assessed, when medically necessary, to determine the appropriate plan of care ~~for the enrollee, and evaluation, monitoring, and revision of an individual plan of care~~. The individual plan of care shall be developed, implemented, evaluated, monitored, revised, and coordinated with other health care providers, as appropriate and necessary.

Subp. 16. **Required submission of information.** The contract between the ~~department~~ state and the ~~MHP~~ health plan shall specify the information the ~~medicaid~~ health plan shall submit to the ~~department~~ commissioner and the Health Care Financing Administration, and the form in which the information shall be submitted. The information submitted must enable the ~~department~~ commissioner to make the calculations required under part 9500.1459 and to carry out the requirements of parts 9505.1750 to 9505.2150 and the Health Care Financing Administration. ~~The MHP shall record complaints from enrollees and consumers applying for enrollment, actions taken to resolve the complaints, and results of the actions.~~ A ~~MHP~~ health plan shall make the required information available to the ~~department annually, or~~ commissioner at ~~other~~ times specified in the contract or, if the ~~department~~ commissioner requires additional information for the purposes in this subpart, within ~~ten~~ 30 days of the date of the ~~department's~~ commissioner's written request for the additional information.

Subp. 17. **Required quality assurance system.** Each health plan shall have an internal quality assurance system in operation that meets the requirements of title XIX of the Social Security Act. This quality assurance system shall encompass an ongoing review of:

A. use of services;

B. case review of all problem cases and a random sample of all cases, including review of medical records and an assessment of medical care provided in each case;

C. enrollee complaints and the disposition of the complaints; and

D. enrollee satisfaction, as monitored through an annual survey.

Based on the results of the review, the health plan shall develop an appropriate corrective action plan and monitor the effectiveness of the corrective action or actions taken.

The health plan shall permit the commissioner and United States Department of Health and Human Services or their agents to evaluate through inspection or other means the quality, appropriateness, and timeliness of services performed under its contract with the commissioner. If the commissioner or Department of Health and Human Services finds that the quality of services offered by the health plan is deficient in any area, the commissioner may, after giving the health plan at least 60 days in which to correct the deficiency, withhold capitation premiums until the problem is corrected to the satisfaction of the commissioner or the Department of Health and Human Services.

9500.1462 SECOND MEDICAL OPINION.

A health plan must indicate in the certificate of coverage that enrollees have a right to a second medical opinion according to items A to C.

A. A ~~MHP~~ health plan must provide, at its expense, a second medical opinion within the ~~MHP when the department or the enrollee requests a second medical opinion~~ health plan upon enrollee request.

B. According to *Minnesota Statutes*, section 62D.103, a health plan is required to provide a second medical opinion by a qualified nonhealth plan provider when it determines that an enrollee's chemical dependency or mental health problem does not require structured treatment.

C. According to *Minnesota Statutes*, section 256.045, subdivision 3a, paragraph (b), a health plan must provide, at its expense, a second medical opinion by a health plan or nonhealth plan provider when ordered by a state human services referee.

9500.1463 ~~GRIEVANCE~~ COMPLAINT AND APPEAL PROCEDURES.

Subpart 1. and 2. [See repealer.]

Subp. 3. **Health plan complaint procedure.** A health plan shall have a written procedure for reviewing enrollee complaints. This complaint procedure must be approved by the commissioner. The complaint procedure must include both an informal process, in which a determination is made within ten calendar days after the date a health plan receives a verbal complaint, and a formal process to handle written complaints. The formal process shall provide for an impartial hearing containing the elements in items A to E.

A. A person or persons with authority to resolve the case shall be designated to hear the complaint.

B. The enrollee has the right to be represented at the hearing by a representative of his or her choice, including legal counsel.

C. The enrollee and the health plan may call witnesses to provide relevant testimony.

D. A determination shall be made and written notice of the decision shall be issued to the enrollee within 30 days after the date the written complaint is received by the health plan. The written notice shall include notice of the enrollee's right to appeal to the state.

E. The health plan must notify the ombudsperson within three working days after any written complaint is filed by a PMAP enrollee.

Each health plan shall provide its enrollees with a written description of the health plan's complaint procedure and the state's appeal procedure at the time of enrollment. The written description shall clearly state that exhaustion of the health plan's complaint procedure is not required before appealing to the state. The health plan's complaint procedure and revisions to the complaint procedure must be approved by the commissioner. Approved revisions in the health plan's complaint procedure must be communicated, in writing, to its enrollees at least two weeks before the revisions are implemented.

Subp. 4. **Health plan notice requirements.** When a health plan denies, reduces, or terminates a health service, it must notify the enrollee or the enrollee's authorized representative in writing within the time period in its contract, of the right to file a complaint or appeal according to *Minnesota Statutes*, section 256.045, subdivision 3. The notice must be in a form acceptable to the commissioner and must explain:

A. the right to a second opinion within the plan;

B. how to file a complaint;

C. how to file a state appeal, including the name and telephone number of the state ombudsperson;

D. the circumstances under which health services may be continued pending an appeal; and

E. the right to request an expedited hearing under *Minnesota Statutes*, section 256.045, subdivision 3a, paragraph (c).

For purposes of this subpart, a health plan does not include the treating physician, second opinion physician, or other treating health care professional whether employed by, or contracting with, the health plan.

Subp. 5. **State appeal procedure.** An enrollee may appeal a health plan's or plan provider's denial, delay, reduction, or termination of health services or a health plan's resolution of a complaint by submitting a written request for a hearing as provided in *Minnesota Statutes*, section 256.045, subdivision 3. The enrollee may request an expedited hearing by contacting the appeals referee or ombudsperson. A state human services referee shall conduct a hearing on the matter and shall recommend an order to the commissioner. An enrollee is not required to exhaust the health plan's complaint system before filing a state appeal. An enrollee may request the assistance of the ombudsperson or other persons in the appeal process.

Subp. 6. **Services pending state appeal or resolution of complaint.** If an enrollee files a written complaint with the health plan

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or appeals in writing to the state under *Minnesota Statutes*, section 256.045, on or before the tenth day after the decision is communicated to the enrollee by the health plan to reduce, suspend, or terminate services the enrollee had been receiving on an ongoing basis, and the treating plan physician or another plan physician has ordered the services at the present level and is authorized by the contract with the health plan to order the services, the health plan must continue to provide services at a level equal to the level ordered by the plan physician until written resolution of the complaint is made by the health plan or a decision on the appeal is made by the human services referee. If the resolution is adverse, in whole or part, to the enrollee, the enrollee must be notified of the right to a state appeal. If the enrollee appeals a health plan's written resolution within ten days after it is issued, services must be continued pending a decision by the human services referee. A resolution is made or issued on the date it is mailed or the date postmarked, whichever is later. For the purposes of this subpart, "plan physician," where appropriate, includes a plan dentist, mental health professional, chiropractor, or osteopath, nurse practitioner, or nurse midwife.

Subp. 7. **State ombudsperson.** The commissioner shall designate a state ombudsperson to help enrollees resolve health plan service related problems. Upon an enrollee's request, the ombudsperson shall investigate the enrollee's case and shall attempt to resolve the problem in an informal manner by serving as an intermediary between the enrollee and the health plan. If the ombudsperson is unable to obtain a resolution of the problem, the ombudsperson shall explain to the enrollee what his or her complaint and appeal options are, how to file a complaint or appeal, and how the complaint or appeal process works. The ombudsperson must be available to help the enrollee file a written complaint or appeal request. The ombudsperson must notify the appropriate health plan of a state appeal within three working days after the state appeal is filed.

Subp. 8. **Record keeping and reporting requirements.** The health plan must maintain a record of all written complaints from enrollees, actions taken in response to those complaints, and the final disposition of the complaints. The health plan must report this information to the commissioner on a semiannual basis.

REPEALER. *Minnesota Rules*, parts 9500.1451, subparts 2, 3, 5, 11, 12, and 18; 9500.1459, subparts 2, 3, and 4; and 9500.1463, subparts 1 and 2, are repealed.

Department of Human Services

Proposed Permanent Rules Relating to Assessment of Nursing Home Residents

Notice of Intent to Adopt a Rule Without a Public Hearing

NOTICE IS HEREBY GIVEN that the State Department of Human Services intends to adopt the above-entitled rule without a public hearing following the procedures set forth in the Administrative Procedures Act for adopting rules without a public hearing in *Minnesota Statutes*, §§ 14.22 to 14.28. The statutory authority to adopt the rule is in *Minnesota Statutes*, § 256B. 41, subd.1.

All persons have 30 days or until 4:30 p.m. on April 10, 1991 in which to submit comment in support of or in opposition to the proposed amendment. Comment is encouraged. Each comment should identify the reason for the comment, and any change proposed.

Any person may make a written request for a public hearing on the rule within the 30-day comment period. If 25 or more persons submit a written request for a public hearing within the 30-day comment period, a public hearing will be held unless a sufficient number withdraw their request in writing. Any person requesting a public hearing should state his or her name and address, the reason for the request and any change proposed. If a public hearing is required, the agency will proceed pursuant to *Minnesota Statutes*, §§ 14.131 to 14.20.

Comments or written requests for a public hearing must be submitted to:

Kathy McDonough
Department of Human Services
Rules and Bulletins Division
444 Lafayette Road
St. Paul, MN 55155-3816
(612) 297-4997

The proposed amendment may be modified if modifications are supported by data and views submitted to the agency and do not result in a substantial change in the proposed rule as noticed.

Minnesota Rules, part 9549.0059 establishes the procedures used by the Department of Health, Quality Assurance and Review (QA&R) team to determine the rates paid by medical assistance for the care of nursing home residents. The proposed amendment would eliminate the requirement, under subpart 2C, that nursing homes submit the residents' plans of care at the semi-annual assessment. The QA&R team does not utilize the plans of care. There is a cost involved in copying, mailing, and storing the unused documents. This amendment would result in a cost savings for both the state and for nursing homes.

A free copy of the proposed amendment is available upon request from:

Nancy Bishop
Rules and Bulletins Division
Department of Human Services
444 Lafayette Road
St. Paul, MN 55155-3816
(612) 296-7494

A copy of the Rule may also be viewed at any of the 87 county welfare or human services agencies in the state of Minnesota.

A STATEMENT OF NEED AND REASONABLENESS that describes the need for and the reasonableness of the proposed amendment and identifies the data and information relied upon to support the proposed amendment has been prepared and is available from Kathy McDonough at the above address upon request.

Adoption of this amendment will not result in additional spending by local public bodies but rather will result in a cost savings for the state.

If no Hearing is required, upon adoption of the rule, the rule and required supporting documents will be submitted to the Attorney General for review as to legality. Any person may request notification of the date of submission of this material to the Attorney General, or who wish to receive a copy of the adopted rule must submit a written request to Nancy Bishop at the above address.

Natalie Haas Steffen
Commissioner

Rules as Proposed

9549.0059 RESIDENT ASSESSMENT.

[For text of subpart 1, see M.R.]

Subp. 2. **Semiannual assessment by nursing homes.** Semiannual assessments of residents by the nursing home must be completed in accordance with items A to D.

[For text of items A and B, see M.R.]

C. Within five working days of the completion of the nursing home's semiannual resident assessments, the nursing home must forward to the Department of Health requests for classification for all residents assessed for the semiannual assessment. These requests must include the assessment forms~~, the residents' plans of care,~~ and the nursing home's daily census for the date on which the assessments were completed including an explanation of any discrepancy between the daily census and the number of assessments submitted. The nursing home must provide additional information to the Department of Health if the Department of Health requests the information in order to determine a resident's classification.

[For text of item D, see M.R.]

[For text of subps 3 to 9, see M.R.]

Minnesota Pollution Control Agency

Proposed Rules Governing Open Burning Restrictions and Permitting Requirements, *Minnesota Rules* Parts 7005.0705 to 7005.0815

Notice of Hearing

NOTICE IS HEREBY GIVEN that the Minnesota Pollution Control Agency (MPCA) will hold a public hearing in the above-entitled matter at the Minnesota Pollution Control Agency Boardroom, 520 Lafayette Road, St. Paul, Minnesota, commencing at 9:00 a.m. on April 16, 1991. Additional days will be scheduled if necessary. All interested or affected persons will have an opportunity to participate by submitting either oral or written data, statements, or arguments. Statements or briefs may be submitted without appearing at the hearing.

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The matter will be heard before Administrative Law Judge Richard C. Luis, Office of Administrative Hearings, 500 Flour Exchange Building, 310 Fourth Avenue South, Minneapolis, Minnesota 55415, (612) 349-2542. The rule hearing procedure is governed by *Minnesota Statutes* §§ 14.131 to 14.20 (1990) and by the rules of the Office of Administrative Hearings, *Minnesota Rules* Parts 1400.0200 to 1400.1200 (1989). Questions concerning the rule hearing procedure should be directed to the Administrative Law Judge at the address and telephone number stated above.

The subject of the hearing will be the proposed rules governing Open Burning Restrictions and Permitting Requirements, *Minnesota Rules* parts 7005.0705 to 7005.0815. The proposed rules are authorized by *Minnesota Statutes* section 116.07, subd. 4 (1990). The text of the proposed rules was published in the *State Register*, Volume 15, Number 18, pages 993-999, on October 29, 1990. One free copy of the rule is available upon request from:

Norma L. Florell
Minnesota Pollution Control Agency
520 Lafayette Road N.
St. Paul, Minnesota 55155
(612) 296-7712

A copy of the rules as published in the *State Register* on October 29, 1990, was mailed on October 25, 1990, to all individuals on the MPCA's rule development and hearings mailing list, metro diseased shade tree site operators, outstate diseased shade tree site operators, State Fire Marshal's Office, Department of Natural Resources Forestry Division, Department of Agriculture, Minnesota farm organizations, local units of government, State delegated authorities to issue open burning permits, and interested and affected parties.

NOTICE IS HEREBY GIVEN THAT A STATEMENT OF NEED AND REASONABLENESS is available for review at the MPCA offices and at the Office of Administrative Hearings. The Statement of Need and Reasonableness includes a summary of all the evidence and argument which the MPCA anticipates presenting at the hearing justifying both the need for and reasonableness of the proposed rules. Copies of the Statement of Need and Reasonableness may be reviewed at the MPCA offices or at the Office of Administrative Hearings and copies may be obtained from the Office of Administrative Hearings at the cost of reproduction.

Any person may present his or her views on the proposed rules in one or more of the following ways: by submitting written data to the Administrative Law Judge at any time before the close of the hearing; by submitting oral or written data at the hearing; and by submitting written data to the Administrative Law Judge during the comment period following the hearing. The comment period will be not less than five working days after the public hearing ends. The comment period may be extended for a longer period not to exceed 20 calendar days if ordered by the Administrative Law Judge at the hearing. The written material received during the comment period shall be available for review at the Office of Administrative Hearings. Within three business days after the expiration of the comment period, the MPCA and interested persons may respond in writing to any new information received during the comment period; however, no additional evidence may be submitted during this three-day period.

The MPCA requests that any person submitting written views or data to the Administrative Law Judge prior to the hearing or during the comment period also submit a copy of the written data to Norma Florell at the address listed above.

The proposed rules may be modified if the data and views received during the hearing process warrant modification and the modification does not result in a substantial change in the proposed rules.

NOTICE: Any person may request notification of the date on which the Administrative Law Judge's report will be available, after which date the MPCA may not take any final action on the rules for a period of five working days. If you desire to be so notified, you may so indicate at the hearing. After the hearing, you may request notification by sending a written request to the Administrative Law Judge. Any person may request notification of the date on which the rules were adopted and filed with the Secretary of State. The notice must be mailed on the same day that the rules are filed. If you want to be so notified you may so indicate at the hearing or send a request in writing to the MPCA at any time prior to the filing of the rules with the Secretary of State.

You are hereby advised, pursuant to *Minnesota Statutes* § 14.115 (1990), "Small business considerations in rulemaking," that the proposed rules are not expected to have a significant impact on small businesses, including small farms. Open burning may be conducted for ground thawing for utility repair and construction, disposal of tree, brush, grass, and other vegetative matter in the development and maintenance of land, for the disposal of building material generated by construction, or for farm disposal of solid waste where regular pickup of solid waste is not available. The limits placed on open burning are not onerous. The rule encourages the use of alternative disposal methods such as chipping, composting or recycling prior to open burning because air pollutant emissions from open burning can have a negative impact on air quality. Allowing small businesses to operate under a different standard would not be easily understood by the affected public. Further, allowing a less stringent standard to be met would be unacceptable to the United States Environmental Protection Agency, as the open burning rule is part of Minnesota's State Implementation Plan.

Please be advised that *Minnesota Statutes* ch. 10A (1990) requires each lobbyist to register with the State Ethical Practices Board within five days after he or she commences lobbying. A lobbyist is defined in *Minnesota Statutes* § 10A.01, subd. 11 (1990) as any individual:

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

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

The statute contains certain exceptions. Questions should be directed to the Ethical Practices Board, 625 North Robert Street, St. Paul, Minnesota 55105-2520, telephone (612) 296-5148.

Charles W. Williams
Commissioner

Board of Vocational Technical Education

Proposed Permanent Rules Relating to Teacher License: Interpreter for the Hearing-Impaired

Notice of Intent to Adopt a Rule Without a Public Hearing

NOTICE IS HEREBY GIVEN that the State Board of Technical Colleges intends to adopt the above-entitled rule without a public hearing following the procedures set forth in the Administrative Procedure Act for adopting rules without a public hearing in *Minnesota Statutes*, Section 14.22 to 14.28. The statutory authority to adopt the rules is *Minnesota Statutes* 136C.04, Subdivision 9.

All persons have 30 days until 4:30 p.m., Friday, April 12, 1991, in which to submit comment in support of or in opposition to the proposed rule or any part or subpart of the rule. Comment is encouraged. Each comment should identify the portion of the proposed rule addressed, the reason for comment, and any change proposed.

Any person may make a written request for a public hearing on the rule within the 30-day comment period. If 25 or more persons submit a written request for a public hearing within the 30-day comment period, a public hearing will be held unless a sufficient number withdraw their request in writing. Any person requesting a public hearing should state his or her name and address, and is encouraged to identify the portion of the proposed rule addressed, the reason for the request, and any change proposed. If a public hearing is required, the agency will proceed pursuant to *Minnesota Statutes*, Sections 14.131 to 14.20.

Comments or written requests for a public hearing must be submitted to either:

Glenda Moyers, Supervisor
State Board of Technical Colleges
100 Capitol Square Building
550 Cedar Street
St. Paul, MN 55101
Telephone: 612-296-9446

Georgia Pomroy, License Revision Specialist
State Board of Technical Colleges
100 Capitol Square Building
550 Cedar Street
St. Paul, MN 55101
Telephone: 612-296-0680

The proposed rule may be modified if the modifications are supported by data and views submitted to the agency and do not result in a substantial change in the proposed rule as noticed.

A copy of the proposed rule is attached to this notice.

A STATEMENT OF NEED AND REASONABLENESS that describes the need for and reasonableness of each provision of the proposed rule and identifies the data and information relied upon to support the proposed rule has been prepared and is available from Glenda Moyers or Georgia Pomroy at the above address and phone, upon request.

If no hearing is required, upon adoption of the rule, the rule and the required supporting documents will be submitted to the Attorney General for review as to legality and form to the extent the form relates to legality. Any person may request notification of the date of submission to the Attorney General. Persons who wish to be advised of the submission of this material to the Attorney General, or wish to receive a copy of the adopted rule must submit the written request to either Glenda Moyers or Georgia Pomroy at the above-mentioned address.

Helen Henrie, Deputy Chancellor
State Board of Technical Colleges

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Rules as Proposed (all new material)

3700.1060 INTERPRETER FOR HEARING-IMPAIRED.

Subpart 1. **License required.** A person must be licensed as an interpreter for the hearing-impaired under this part if the person is responsible for any of the following activities:

A. classroom, shop, and laboratory interpretation for hearing-impaired students;

B. interpretation for activities related to course or program content for pre-enrolled or enrolled students in a technical college;

C. provision of communication services between individuals who are hearing-impaired and other individuals; or

D. service as a professional resource for information regarding hearing impairment.

Subp. 2. **Other requirements.** The applicant must meet the requirements in part 3700.0100, except that the applicant need not comply with part 3515.1400, items A to D.

Subp. 3. **Educational experience requirement.** An applicant for a license as an interpreter for the hearing-impaired must meet the following requirements:

A. must be certified by the Registry of Interpreters for the Deaf; or

B. must have completed one or more years of an interpreter training program resulting in a diploma or degree at an accredited postsecondary institution.

Subp. 4. **First license renewal.** An applicant must complete six hours of special needs inservice before the applicant's first renewal.

REPEALER. *Minnesota Rules*, part 3515.5500, subpart 10, is repealed. Part 3515.9942 no longer applies to a new license for interpreter for the deaf/hearing impaired. A person with a license for interpreter for the deaf/hearing impaired, previously issued under parts 3515.5500, subpart 9, and 3515.9942, who is using the license may keep and renew the license under those parts as long as the person remains employed by the person's employer on the effective date of this repealer.

Office of Waste Management

Proposed Permanent Rules Relating to Pollution Prevention Grant Program

Notice of Intent to Adopt Rules Without a Public Hearing

NOTICE IS HEREBY GIVEN that the Minnesota Office of Waste Management (Office) intends to adopt the above-entitled rule amendments without a public hearing following the procedures sent forth in the Administrative Procedures Act for adopting rules without a public hearing in *Minnesota Statutes* §§ 14.22 to 14.28 (1990). The authority of the Office to adopt the amendments is set forth in *Minnesota Statutes* §§ 115A.06, Subd. 2 and 115D.05, subd. 3(b).

All persons have until 4:30 p.m. on March 25, 1991, to submit comments in support or opposition to the amendments or any part or subpart of the proposed amendments. Comment is encouraged. Each comment should identify the portion of the proposed rules addressed, the reason for the comment, and any change proposed.

Any person may make a written request for a public hearing on the proposed amendments within the comment period. If 25 or more persons submit a written request for a public hearing within the comment period, a public hearing will be held unless a sufficient number withdraw their requests in writing. Any person requesting a public hearing should state his or her name and address and is encouraged to identify the portion of the proposed amendments addressed, the reason for the request, and any change proposed. If a public hearing is required, the Office will proceed pursuant to *Minnesota Statutes* §§ 14.131 to 14.20 (1990).

Comments or written requests for a public hearing must be submitted to:

Julie MacKenzie, Coordinator
Pollution Prevention Grant Program
Minnesota Office of Waste Management
1350 Energy Lane
Saint Paul, MN 55108
612-649-5494 or
1-800-652-9747 (MN Toll-Free)

The proposed amendments may be modified if the modifications are supported by data and views submitted to the Office and do not result in a substantial change in the proposed rules as noticed.

The proposed amendments, if adopted, will establish the criteria and procedures for awarding grants under the Office's Pollution Prevention Grant Program established by *Minnesota Statutes* § 115D.05 (1990). One free copy of the proposed rules is available upon request from the address and telephone number stated above.

A STATEMENT OF NEED AND REASONABLENESS that describes the need for and reasonableness of each provision of the proposed amendments and identifies the data and information relied upon to support the proposed amendments has been prepared and is available from the Office upon request.

You are hereby advised, pursuant to *Minnesota Statutes* § 14.115 (1990), "Small business considerations in rulemaking," that the proposed amendments will have no negative effect on small business, as the amendments to not limit the ability of small business to participate in this program.

If no hearing is required, upon adoption of amendments, the amendments and the required supporting documents will be submitted to the Attorney General for review as to legality and form to the extent form relates to legality. Any person may request notification of the date of submission of this material to the Attorney General. Persons who wish to be advised of the submission of this material to the Attorney General, or who wishes to receive a copy of the amendments as adopted, must submit a written request to the name and address stated above.

Dated: 25 February 1991

Linda Bruemmer
Acting Director

Rules as Proposed

~~WASTE REDUCTION GRANTS~~

POLLUTION PREVENTION GRANT PROGRAM

9205.0400 SCOPE AND AUTHORITY.

Parts 9205.0400 to ~~9205.0480~~ 9205.0445 govern the administration of grants for hazardous waste reduction under *Minnesota Statutes*, section 115A.154 and for the prevention of pollution under *Minnesota Statutes*, section 115D.05.

9205.0410 DEFINITIONS.

Subpart 1. **Scope.** ~~For the purposes of parts 9205.0400 to 9205.0480,~~ The ~~following~~ terms ~~have the meanings given them~~ defined in this part apply to parts 9205.0400 to 9205.0445. For terms not defined in this part, the definitions in *Minnesota Statutes*, section 115D.03, apply, unless the context requires otherwise.

Subp. 2. and 3. [See repealer.]

Subp. 4. ~~**Chair**~~ **Director.** "~~Chair~~ Director" means the ~~chair~~ director of the ~~board~~ Office of Waste Management.

Subp. 5. [See repealer.]

Subp. 5a. **Hazardous substance.** "Hazardous substance" has the meaning given it in *Minnesota Statutes*, section 115B.02, subdivision 8.

Subp. 6. **Hazardous waste.** "Hazardous waste" ~~means those wastes identified and listed in the rules of the Minnesota Pollution Control Agency, parts 7045.0100 to 7045.0141~~ has the meaning given it in *Minnesota Statutes*, section 116.06, subdivision 13.

Subp. 7. **Industrial waste.** "Industrial waste" has the meaning given it in *Minnesota Statutes*, section 115A.03, subdivision 13a.

Subp. 8. to 10. [See repealer.]

Subp. 10a. **Office.** "Office" means the Office of Waste Management established in *Minnesota Statutes*, section 115A.055.

[For text of subp 11, see M.R.]

Subp. 12. to 15. [See repealer.]

Subp. 16. **Pollution prevention or prevent pollution.** "Pollution prevention" or "prevent pollution" means eliminating or reducing at the source the quantity or toxicity of toxic pollutants, hazardous substances, hazardous wastes, or industrial wastes used, generated, or released. Examples of technologies or methods to prevent pollution include process modification, inventory control measures, feedstock substitutions, various housekeeping and management practices, and improved efficiency of machinery.

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Subp. 17. **Release.** "Release" has the meaning given it in *Minnesota Statutes*, section 115D.03, subdivision 10.

Subp. 18. **Toxic pollutant.** "Toxic pollutant" has the meaning given it in *Minnesota Statutes*, section 115D.03, subdivision 11.

9205.0420 ELIGIBILITY CRITERIA.

Subpart 1. **Eligible applicants.** ~~The following are~~ Eligible ~~to apply for a~~ applicants are persons who use, generate, or release toxic pollutants, hazardous substances, hazardous wastes, or industrial ~~waste reduction grant:~~

~~A. a generator; or~~

~~B. an association that consists of or represents two or more generators generating similar~~ wastes in Minnesota or associations that represent persons who use, generate, or release toxic pollutants, hazardous substances, hazardous wastes, or industrial wastes in Minnesota.

Subp. 2. **Eligible projects.** Eligible projects ~~designed to determine~~ are:

A. projects to study or demonstrate the feasibility of applying ~~specific~~ new technologies or methods ~~and technologies~~ to ~~reduce the generation of hazardous or industrial waste are eligible to receive a hazardous or industrial waste reduction grant. Eligible projects include projects to study the specific application of a method or technology already developed and projects to analyze a method or technology for which additional research is necessary to establish~~ prevent pollution; and

B. projects to study or demonstrate the feasibility of ~~the method or technology~~ applying existing technologies or methods to prevent pollution in previously untested applications. Decreases in quantity or toxicity are not reductions where the decrease is solely the result of a decrease in the output of the facility.

~~Application or research~~ Projects currently under development by the applicant and new projects are eligible; however, grant funds shall only be awarded for costs incurred after the effective date of the grant agreement.

Subp. 3. **Eligible costs.** Eligible costs are limited to the costs of conducting studies and analyses consistent with subpart 2. Eligible costs are limited to a maximum of two-thirds of the total cost of the project. Grant money awarded through this program may not be spent for capital improvements or the purchase of equipment.

Subp. 4. [See repealer.]

9205.0430 GRANT APPLICATION.

~~An applicant shall~~

Subpart 1. **Notification by director.** To initiate the process for awarding a pollution prevention grant, the director shall publish a notice in the *State Register* advising eligible applicants of the availability of pollution prevention grants. The notice shall describe the procedure for awarding grants and establish a deadline by which applications must be submitted. In the notice, the director may limit the types of projects for which a grant would be awarded in the funding round initiated by the notice and may specify the maximum amount of funding to be awarded to a project.

Subp. 2. **Applications.** Following the publication of a notice in the *State Register*, applicants that seek assistance must submit ~~an application~~ applications in the form specified by the ~~chair~~ director. ~~An~~ Applications must be received by the director by the deadline established in the notice. Upon the request of the applicant, the office shall handle specific information in the grant application as nonpublic data in accordance with the criteria established by *Minnesota Statutes*, section 115A.06, subdivision 13; however, all information developed as a result of a pollution prevention grant shall be public data. Each application must include the following ~~information~~:

A. the names, qualifications, and addresses of the applicant and other project participants;

B. a description of the ~~applicant's managerial and technical ability to undertake a hazardous or industrial waste reduction feasibility study~~ proposed project, including ~~any consultant help that may be anticipated.~~

~~B. A statement outlining the method or technology that will be studied by the applicant and the waste reduction that may result from application of the method or technology. This statement must include a discussion of the following items~~:

(1) a description of the method or technology proposed to be studied, with a list of project activities and an implementation schedule;

(2) a statement as to whether ~~the study involves the application of an existing~~ this method or technology~~, or original or continuing research on a~~ is new or existing, with a literature search or similar demonstration in support of this statement;

(3) a discussion of whether implementation of this method or technology ~~for which additional research~~ is ~~necessary~~ likely to ~~determine the feasibility of the method or technology~~ minimize the transfer of pollution from one environmental medium to another;

~~(3)~~ (4) a ~~description~~ listing of the toxic pollutants, hazardous ~~or~~ substances, hazardous wastes, or industrial ~~waste affected by~~ wastes that are the subject of the proposed project ~~that is generated by the applicant~~, ~~including~~ with a statement, in pounds, of the quantity of each of these pollutants, substances, or wastes that the applicant generated in the previous calendar year;

~~(4)~~ (5) an estimate, in pounds, of the decrease in the quantity of the toxic pollutants, hazardous substances, hazardous wastes, or industrial ~~waste generated~~ wastes that the applicant believes could be realized if the methods and technologies to be studied in the proposed project were implemented; and

~~(5)~~ (6) a statement of the current ~~method used to manage the hazardous or industrial waste generated by the applicant, and any anticipated change in management occurring after the reduction.~~ status of the proposed project;

C. information demonstrating that the project will comply with applicable regulations, including a list of permits required for the project;

D. a statement of ~~financial feasibility for the project must be included with the application, and must include a discussion of~~ the ~~following items~~ willingness of the applicant to implement the methods and technologies proposed to be studied, if those methods and technologies are found to be technically and economically feasible;

E. a statement of the willingness of the applicant to assist the director in disseminating information about the results of the project;

F. a statement describing the statewide significance of the information to be gained from the proposed project;

G. a project budget that:

(1) identifies the total cost of the proposed project and identifies each of the expenditures that make up this cost; and

(2) states the amount of grant funds being requested~~;~~ and

~~(2) an estimate of~~ the ~~total~~ amount of matching funds ~~needed to complete the study. This section should include a discussion of any financial support that might be available to the applicant from other sources, including both external and internal sources~~ being supplied by the applicant or others. If a person other than the applicant is providing matching funds, the application must identify the sources of the additional funds.

Subp. 3. **Eligibility and completeness review.** For all applications received by the director by the deadline established in the notice under subpart 1, the director shall determine the eligibility of the applicant, the proposed project, and the costs identified in the application and shall determine the completeness of the application.

Subp. 4. **Notice of determination of eligibility and completeness.** The director shall notify the applicant of the director's determination of eligibility and completeness of the application. If the director determines that the applicant or the project is ineligible, the director shall reject the application and notify the applicant. If the director determines that any of the project costs are ineligible or that the application is incomplete, the director shall notify the applicant of the ineligible portion of the costs or of the deficiency. The applicant has 14 days after receiving the notice to correct any inadequacies.

Subp. 5. **Evaluation of proposal.** In order to determine which projects should receive a pollution prevention grant, the director shall evaluate each application that is determined to be eligible and complete. In making this evaluation, the director shall consider whether:

A. the proposed project involves the study or analysis of a method or technology that has a significant potential to prevent pollution;

B. the proposed project involves the study or analysis of a method or technology that is consistent with the legislative goals and policies in *Minnesota Statutes*, sections 115A.02 and 115D.02;

C. the persons who will undertake the proposed project are qualified to perform the work described in the project;

D. implementation of the method or technology that is the subject of the proposed project is likely to minimize the transfer of pollution from one environmental medium to another;

E. the proposed project will comply with regulatory requirements;

F. the applicant is willing to implement methods and technologies that the proposed project finds to be feasible;

G. the applicant is willing to assist the director in disseminating information about the results of the project; and

H. the proposed project has statewide significance.

Subp. 6. **Award of grants.** The director shall award grants to those projects that the director determines best meets the evaluation criteria in subpart 5. The director shall promptly notify all applicants as to whether they have been awarded a grant.

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Subp. 7. **No grant awards.** If the director determines that no proposed project has sufficient potential to prevent pollution in Minnesota, the director shall not award any grants. The director may then reinitiate the process for awarding grants by publishing a notice under subpart 1.

Subp. 8. **Consultation.** In the director's evaluation of an application, the director may solicit and consider any recommendations provided by Office of Waste Management advisory councils, task forces, citizen groups, or any independent consultant hired by the director to assist in the review of applications.

9205.0435 LIMITATIONS.

Subpart 1. **Reduced grant awards.** The director shall ask an applicant to document the impacts of reduced financial assistance before finalizing an award for less than the eligible amount requested by an applicant or less than the maximum award established in the notice under part 9205.0430, subpart 1. Reduced funds shall be awarded where the director determines:

A. program resources are insufficient to provide full assistance to all applicant to which the director intends to award grants or loans; or

B. the applicant could operate the project at a reduced level and still achieve project objectives.

Subp. 2. **Limit on disbursal of funds.** No grant shall be disbursed until the director has:

A. determined the total estimated cost of the project;

B. ascertained that the provision of matching funds is assured by the recipient; and

C. executed a written grant agreement with the recipient meeting the requirements in part 9205.0445.

9205.0445 GRANT AGREEMENT.

A grant agreement shall:

A. establish a work plan and schedule and require that the recipient perform and complete project activities according to this work plan and schedule;

B. provide that any cost overruns incurred in the implementation of the proposed project shall be the sole responsibility of the recipient;

C. require that the recipient provide periodic written reports to the director on the progress and results of the project;

D. authorize the director to rescind the grant and require the grant recipient to repay the grant in full if the director determines that, due to the bad faith of the grant recipient, a project has not been conducted according to terms and conditions of the grant agreement;

E. authorize the director to cease making further disbursements to the recipient and to recover unspent funds if the director determines that, for reasons other than bad faith, a project has not made progress according to the terms and conditions of the grant agreement and an amendment to the agreement is not justified;

F. provide that the results of all studies or analyses performed under this agreement are public data;

G. require that a percentage of funds not be paid to the recipient until the director approves the recipient's final report;

H. require that the recipient maintain detailed records of all expenditures related to the agreement; and

I. establish other conditions or terms needed to manage or implement the grant agreement.

REPEALER. *Minnesota Rules*, parts 9205.0410, subparts 2, 3, 5, 8, 9, 10, 12, 13, 14, and 15; 9205.0420, subpart 4; 9205.0440; 9205.0450; 9205.0460; 9205.0470; and 9205.0480 are repealed.

Adopted Rules

The adoption of a rule becomes effective after the requirements of Minn. Stat. §14.14-14.28 have been met and five working days after the rule is published in *State Register*, unless a later date is required by statutes or specified in the rule.

If an adopted rule is identical to its proposed form as previously published, a notice of adoption and a citation to its previous *State Register* publication will be printed.

If an adopted rule differs from its proposed form, language which has been deleted will be printed with strikeouts and new language will be underlined. The rule's previous *State Register* publication will be cited.

An emergency rule becomes effective five working days after the approval of the Attorney General as specified in Minn. Stat. §14.33 and upon the approval of the Revisor of Statutes as specified in §14.36. Notice of approval by the Attorney General will be published as soon as practicable, and the adopted emergency rule will be published in the manner provided for adopted rules under §14.18.

Housing Finance Agency

Adopted Permanent Rules Relating to Single Family Mortgage Revenue Bond Authority

The rules proposed and published at *State Register*, Volume 15, Number 25, pages 1394-1398, December 17, 1990 (15 SR 1394) are adopted as proposed.

Minnesota Housing Finance Agency

Adopted Permanent Rules Relating to Mortgage Revenue Bonds for the Purchase of New Housing

The rules proposed and published at *State Register*, Volume 15, Number 25, pages 1391-1394, December 17, 1990 (15 SR 1391) are adopted as proposed.

Department of Human Services

Adopted Permanent Rules Relating to Licensing; Background Studies

The rules proposed and published at *State Register*, Volume 15, Number 9, pages 486-500, August 27, 1990, (15 SR 486) are adopted with the following modifications:

Rules as Adopted

9543.3000 PURPOSE.

The purpose of parts 9543.3000 to 9543.3090 is to establish procedures and standards for background studies of individuals affiliated with programs subject to licensure under *Minnesota Statutes*, chapter 245A, to ~~ensure~~ protect the health, safety, and rights of persons served by those programs. Parts 9543.3000 to 9543.3090 are not intended to govern personnel decisions of employers except that personnel decisions may be affected if an individual has a disqualification under part 9543.3070.

9543.3020 DEFINITIONS.

Subp. 3. **Commissioner.** "Commissioner" ~~means the commissioner of the Minnesota Department of Human Services, or the commissioner's designated representative including county agencies and private agencies~~ has the meaning given in *Minnesota Statutes*, section 245A.02, subdivision 5.

Subp. 4. **Contractor.** "Contractor" means any person, regardless of employer, who is providing program services for hire under the control of the provider.

Subp. 5. **County agency.** "County agency" has the meaning given in *Minnesota Statutes*, section 245A.02, subdivision 6.

Subp. ~~5~~ 6. **Direct contact.** "Direct contact" ~~means providing face-to-face care, training, supervision, counseling, consultation, or medication assistance to persons served by a program. Direct contact includes direct access to children in programs serving children and to persons receiving service in adult foster care programs.~~

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~~Subp. 6. **Disqualification or disqualified.** "Disqualification" or "disqualified" means an individual identified in part 9543.3030 has committed an act or has a characteristic identified in part 9543.3070~~ has the meaning given in *Minnesota Statutes*, section 245A.04, subdivision 3, paragraph (a).

Subp. 8. ~~Perpetrator. "Perpetrator" means a person responsible for the care of a child, as defined in *Minnesota Statutes*, section 626.556, subdivision 2, paragraph (b), or the caretaker of a vulnerable adult as defined in *Minnesota Statutes*, section 626.557, subdivision 2, paragraph (c), who is identified as having committed maltreatment of a minor or abuse or neglect of a vulnerable adult.~~

~~Subp. 9.~~ **Program.** "Program" means a residential or nonresidential program ~~as defined in~~ licensed under *Minnesota Statutes*, ~~section 245A.02, subdivision 10, or a residential program as defined in *Minnesota Statutes*, section 245A.02, subdivision 14~~ chapter 245A.

Subp. ~~10.~~ 9. **Provider.** "Provider" means an applicant as defined in *Minnesota Statutes*, section 245A.02, subdivision 3, or license holder as defined in *Minnesota Statutes*, section 245A.02, subdivision 9.

Subp. 10. **Serious injury.** "Serious injury" means any harm suffered by a person which reasonably requires the care of a physician whether or not the care of a physician was sought. For the purpose of parts 9543.3000 to 9543.3090, the following are deemed to be serious injuries:

A. bruises, bites, skin laceration, or tissue damage;

B. fractures;

C. dislocations;

D. evidence of internal injuries;

E. head injuries with loss of consciousness;

F. extensive second-degree or third-degree burns and other burns for which complications are present;

G. extensive second-degree or third-degree frostbite, and others for which complications are present;

H. irreversible mobility or avulsion of teeth;

I. injuries to the eyeball;

J. ingestion of foreign substances and objects that are harmful;

K. near drowning; and

L. heat exhaustion or sunstroke.

Subp. 11. **Subject.** "Subject" means an individual identified in part 9543.3030 ~~who~~ on whom a background study is required ~~to have a background study~~.

9543.3030 INDIVIDUALS WHO MUST BE STUDIED.

A background study must be conducted of the following persons:

A. individuals who are ~~applicants for licensure or license holders~~ providers of programs licensed by the commissioner;

C. current employees or contractors ~~of a provider~~ who have direct contact with persons being served by the program; and

D. ~~individuals who, even if employed or under contract with an individual or entity other than the provider, under the direction of the provider have direct contact with persons served by the provider's program; and~~

~~E.~~ volunteers who provide program services to persons served if:

(2) the volunteer is not directly supervised."Directly supervised" means ~~being~~ an individual listed in item A or C is within sight or hearing of ~~an~~ a volunteer to the extent that the individual ~~who has passed a background study and who~~ listed in item A or C is capable at all times of intervening to protect the health and safety of the persons ~~being~~ served by the program who have direct contact with the volunteer.

9543.3040 RESPONSIBILITIES OF PROVIDER.

Subp. 2. **Form submission.** A provider must submit each completed background study ~~forms~~ form to the commissioner:

Subp. 3. **Direct contact prohibited.** A provider must ensure that a subject who is disqualified by the commissioner does not have direct contact with persons receiving services from the program unless the conditions in item A or B are met.

A. The provider has:

(1) received notice from the commissioner that the subject may be in direct contact pending reconsideration;

(2) obtained documentation that the subject will submit or has submitted a timely request for reconsideration; and

(3) documented compliance with requirements in the commissioner's notice.

B. The provider has received notice from the commissioner that the subject's disqualification has been set aside.

Subp. 5. **Record retention.** The subject's personnel file must contain ~~a current~~ the most recent notice issued by the commissioner under part 9543.3060, subpart 5. ~~A~~ If the current notice ~~demonstrates~~ is more than 12 months old, the subject's personnel file must also include documentation that the provider has made a timely application for a background study ~~has been completed within at least 12 months~~ as required by *Minnesota Statutes*, section 245A.04.

9543.3050 RESPONSIBILITIES OF SUBJECT.

A subject must provide to the provider the information necessary to ensure an accurate background study, including:

E. sex; and

F. driver's license number or state identification number; ~~and~~

~~G. whether the subject has prior convictions for crimes listed in part 9543.3070 or substantiated reports of abuse or neglect of vulnerable adults or maltreatment of children~~.

9543.3060 RESPONSIBILITIES OF COMMISSIONER.

Subpart 1. **Negative licensing action.** In addition to other sanctions available to the commissioner under *Minnesota Statutes*, chapter 245A, the commissioner has reasonable cause to deny a license or to immediately suspend, suspend, or revoke a license if a provider:

Subp. 2. **Review of records.** In conducting the background study, the commissioner shall review:

A. conviction records of the Minnesota Bureau of Criminal Apprehension in which the last date of discharge from the criminal justice system is less than 15 years;

B. records of substantiated abuse or neglect of vulnerable adults and maltreatment of minors in licensed programs that are dated within seven years;

C. ~~juvenile court records on a subject identified in part 9543.3030, item B, that relate to delinquency proceedings within the five years preceding application or preceding the subject's 18th birthday, whichever period is longer; and~~

~~D.~~ any other information, including arrest and investigative information from the Minnesota Bureau of Criminal Apprehension, county attorneys, county sheriffs, courts, county agencies, local police, ~~and~~ the national record repository, ~~and~~ criminal records of other states, ~~if~~ and juvenile court records on a subject identified in part 9543.3030, item B, that relate to delinquency proceedings within the five years preceding application or preceding the subject's 18th birthday, whichever period is longer, provided that the commissioner has reasonable cause to believe that the information is pertinent to disqualification of a subject. "Reasonable cause to believe" means that information or circumstances exist which provide the commissioner with articulable suspicion that further pertinent information may exist concerning a subject.

Subp. 4. **Notice by commissioner to subject.** Within 15 working days, the commissioner shall notify the subject in writing of the results of the background study or that additional time is needed to complete the study. If the study indicates a subject is disqualified, the notice shall state:

A. the reason for disqualification and either:

(1) have attached a copy of the records relied upon by the commissioner; or

(2) state how to obtain the records relied upon by the commissioner;

Subp. 5. **Notice by commissioner to provider.** Within 15 working days, the commissioner shall notify the provider ~~in writing of the results of the subject's background study.~~ that:

A. ~~If a~~ the subject is not disqualified~~, the notice shall inform the provider that:~~

~~(1)~~;

B. more time is needed to complete the study; or

C. the study indicates the subject is disqualified; and

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~~(2)~~ (1) the subject has 30 days from receipt of the notice to request reconsideration of the disqualification and that the commissioner's decision will be issued within 15 working days after receipt of a request; and

~~(3)~~ (2) the provider may ~~request a variance to part 9543.3040, subpart 3. A variance request must meet the requirements of *Minnesota Statutes,* section 245A.04, subdivision 9, and rules governing the program.~~

~~B.~~ continue the subject in direct contact pending reconsideration if:

(a) the subject submits a timely request for reconsideration; and

(b) the provider takes actions specified by the commissioner to reduce the risk of harm to persons receiving services.

If the commissioner determines a subject who is disqualified presents a risk of imminent danger to persons receiving services from the program, the commissioner will notify the provider to immediately ensure the subject does not have direct contact with persons receiving services from the program.

Subp. 6. **Disclosure of information; conditions.** The commissioner shall not disclose the nature of the disqualification to the provider unless:

~~(1)~~ A. the subject consents to disclosure in writing; or

~~(2)~~ B. other law authorizes disclosure to the provider.

Subp. ~~6.~~ 7. **Record retention.** The commissioner shall maintain records of each study. The commissioner shall make the information in the records available only to the commissioner or the commissioner's designees for background study purposes. When the subject reaches age 23, the commissioner shall destroy juvenile court records obtained pursuant to the study.

9543.3070 DISQUALIFICATION STANDARDS.

Subpart 1. ~~**General prohibitions.** A subject who has a disqualification under subparts 2 to 5 must not have direct contact with persons served by a program.~~

~~Subp. 2.~~ **Disqualifications.** ~~Except as provided in subpart 4,~~ Items A to D disqualify an individual from programs serving children or adults.

A. The subject has been convicted of a crime or anticipatory crime against persons; or a crime or anticipatory crime reasonably related to the provision of services ~~or an anticipatory crime as defined in *Minnesota Statutes,* sections 609.17 and 609.175, including but not limited to:~~

~~(1) homicide, aiding suicide, or arson under Minnesota Statutes, sections 609.185 to 609.215, and 609.561 to 609.563;~~

~~(2) crimes against persons and unborn children under *Minnesota Statutes,* sections 609.221 to 609.224, 609.23 to 609.2691, and 609.228;~~

~~(3) sex crimes under *Minnesota Statutes,* sections 609.293, 609.294, 609.321 to 609.324, 609.33, 609.342 to 609.3451, and 609.352;~~

~~(4) crimes against the family under *Minnesota Statutes,* sections 609.355 to 609.365, and 609.377 to 609.378;~~

~~(5) public misconduct under *Minnesota Statutes,* sections 609.746, 609.79, and 609.795;~~

~~(6) obscenity involving children under *Minnesota Statutes,* sections 617.23 to 617.247, and 617.293; and~~

~~(7) prohibited drugs under *Minnesota Statutes,* chapter 152.~~ The following offenses have been deemed to be crimes against persons or reasonably related to the provision of services or both:

(1) *Minnesota Statutes,* section 609.17 (Attempts);

(2) *Minnesota Statutes,* section 609.175 (Conspiracy);

(3) *Minnesota Statutes,* section 609.185 (Murder in the first degree);

(4) *Minnesota Statutes,* section 609.19 (Murder in the second degree);

(5) *Minnesota Statutes,* section 609.195 (Murder in the third degree);

(6) *Minnesota Statutes,* section 609.20 (Manslaughter in the first degree);

(7) *Minnesota Statutes,* section 609.205 (Manslaughter in the second degree);

(8) *Minnesota Statutes,* section 609.21 (Criminal vehicular homicide and injury);

(9) *Minnesota Statutes,* section 609.215 (Suicide);

(10) *Minnesota Statutes,* section 609.221 (Assault in the first degree);

(11) *Minnesota Statutes,* section 609.222 (Assault in the second degree);

(12) *Minnesota Statutes*, section 609.223 (Assault in the third degree);

(13) *Minnesota Statutes*, section 609.2231 (Assault in the fourth degree);

(14) *Minnesota Statutes*, section 609.224 (Assault in the fifth degree);

(15) *Minnesota Statutes*, section 609.228 (Great bodily harm caused by distribution of drugs);

(16) *Minnesota Statutes*, section 609.23 (Mistreatment of persons confined);

(17) *Minnesota Statutes*, section 609.231 (Mistreatment of residents or patients);

(18) *Minnesota Statutes*, section 609.235 (Use of drugs to injure or facilitate crime);

(19) *Minnesota Statutes*, section 609.24 (Simple robbery);

(20) *Minnesota Statutes*, section 609.245 (Aggravated robbery);

(21) *Minnesota Statutes*, section 609.25 (Kidnapping);

(22) *Minnesota Statutes*, section 609.255 (False imprisonment);

(23) *Minnesota Statutes*, section 609.265 (Abduction);

(24) *Minnesota Statutes*, section 609.2661 (Murder of an unborn child in the first degree);

(25) *Minnesota Statutes*, section 609.2662 (Murder of an unborn child in the second degree);

(26) *Minnesota Statutes*, section 609.2663 (Murder of an unborn child in the third degree);

(27) *Minnesota Statutes*, section 609.2664 (Manslaughter of an unborn child in the first degree);

(28) *Minnesota Statutes*, section 609.2665 (Manslaughter of an unborn child in the second degree);

(29) *Minnesota Statutes*, section 609.267 (Assault of an unborn child in the first degree);

(30) *Minnesota Statutes*, section 609.2671 (Assault of an unborn child in the second degree);

(31) *Minnesota Statutes*, section 609.2672 (Assault of an unborn child in the third degree);

(32) *Minnesota Statutes*, section 609.268 (Injury or death of an unborn child in the commission of a crime);

(33) *Minnesota Statutes*, section 609.322 (Solicitation, inducement, and promotion of prostitution);

(34) *Minnesota Statutes*, section 609.323 (Receiving profit derived from prostitution);

(35) *Minnesota Statutes*, section 609.3232 (Protective order authorized; procedures; penalties);

(36) *Minnesota Statutes*, section 609.324, subdivisions 1 and 1a (Other prohibited acts);

(37) *Minnesota Statutes*, section 609.33 (Disorderly house);

(38) *Minnesota Statutes*, section 609.342 (Criminal sexual conduct in the first degree);

(39) *Minnesota Statutes*, section 609.343 (Criminal sexual conduct in the second degree);

(40) *Minnesota Statutes*, section 609.344 (Criminal sexual conduct in the third degree);

(41) *Minnesota Statutes*, section 609.345 (Criminal sexual conduct in the fourth degree);

(42) *Minnesota Statutes*, section 609.3451 (Criminal sexual conduct in the fifth degree);

(43) *Minnesota Statutes*, section 609.352 (Solicitation of children to engage in sexual conduct);

(44) *Minnesota Statutes*, section 609.365 (Incest);

(45) *Minnesota Statutes*, section 609.377 (Malicious punishment of a child);

(46) *Minnesota Statutes*, section 609.378 (Neglect or endangerment of a child);

(47) *Minnesota Statutes*, section 609.561 (Arson in the first degree);

(48) *Minnesota Statutes*, section 609.562 (Arson in the second degree);

(49) *Minnesota Statutes*, section 609.563 (Arson in the third degree);

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(50) *Minnesota Statutes*, section 609.713 (Terroristic threats);

(51) *Minnesota Statutes*, section 609.746 (Interference with privacy);

(52) *Minnesota Statutes*, section 609.79 (Obscene or harassing phone calls);

(53) *Minnesota Statutes*, section 609.795 (Letter, telegram, or package; opening; harassment);

(54) *Minnesota Statutes*, section 617.23 (Indecent exposure);

(55) *Minnesota Statutes*, section 617.241 (Obscene materials and performances);

(56) *Minnesota Statutes*, section 617.243 (Indecent literature, distribution);

(57) *Minnesota Statutes*, section 617.246 (Use of minors in sexual performance);

(58) *Minnesota Statutes*, section 617.247 (Possession of pictorial representations of minors);

(59) *Minnesota Statutes*, section 617.293 (Harmful materials; dissemination and display to minors); and

(60) felony convictions under *Minnesota Statutes*, chapter 152 (Prohibited drugs).

B. The subject has admitted to~~, or has been arrested and is awaiting trial for,~~ or a preponderance of the evidence indicates the individual has committed an act that meets the definition of a crime listed in item A.

D. The subject is identified as the perpetrator in a substantiated report of abuse or neglect of vulnerable adults and a preponderance of evidence indicates:

For purposes of this item "serious maltreatment, abuse, and neglect" is defined as a serious injury as set forth in part 9543.3020, subpart 10, whether intended or suffered as the result of neglect; sexual abuse; neglect or abuse which results in illness or harm which reasonably requires the attention of a physician; or death.

Subp. ~~3.~~ 2. **Terminated parental rights.** A subject who has had parental rights terminated under *Minnesota Statutes*, section 260.221, paragraph (b), is disqualified from programs serving children.

~~Subp. 4. Disqualification from programs providing chemical~~ **abuse or dependency services to adults.** ~~Items A and B apply to persons providing chemical abuse or dependency services to adults.~~

~~A. A subject is disqualified from direct contact with persons served in a Category I detoxification program if the subject has a disqualification under subpart 2, items A to D, or subpart 5.~~

~~B. A subject affiliated with any other program providing chemical abuse or dependency services to adults must not have had a felony conviction or have been incarcerated as a result of a felony conviction in the last three years.~~

Subp. ~~5.~~ 3. **Residential programs.** A subject in a residential program must not have a conviction for, must not have admitted to, or ~~have been arrested and be awaiting trial for theft and related crimes, including but not limited to crimes defined in *Minnesota Statutes*, sections 609.52 to 609.523, 609.582, and 609.625 to 609.635~~ a preponderance of the evidence must not indicate that the individual has committed an act of theft or related crimes. The following offenses have been deemed to be acts of theft or related crimes:

A. *Minnesota Statutes*, section 609.52 (Theft);

B. *Minnesota Statutes*, section 609.521 (Possession of shoplifting gear);

C. *Minnesota Statutes*, section 609.582 (Burglary);

D. *Minnesota Statutes*, section 609.625 (Aggravated forgery);

E. *Minnesota Statutes*, section 609.63 (Forgery);

F. *Minnesota Statutes*, section 609.631 (Check forgery; offering a forged check); and

G. *Minnesota Statutes*, section 609.635 (Obtaining signature by false pretense).

9543.3080 RECONSIDERATION OF DISQUALIFICATION.

Subp. 3. **Decision by commissioner.** The commissioner shall set aside the disqualification if the commissioner determines that:

B. the subject does not pose a risk of harm to persons served by the program. In making this determination the commissioner shall consider at least:

(5) ~~whether~~ the ~~disqualifying event is isolated~~ time elapsed without a repeat of the same or similar ~~events have occurred~~ event;

EFFECTIVE DATE. Parts 9543.3000 to 9543.3090 and the repealer are effective March 29, 1991.

Office of Waste Management

Adopted Permanent Rules Relating to Waste Education Grants

The rules proposed and published at *State Register*, Volume 15, Number 24, pages 1356-1362, December 10, 1990 (15 SR 1356) are adopted as proposed.

Commissioners' Orders

Department of Natural Resources

Commissioner's Order No. 2407: Experimental Regulations Restricting Fishing in Lake Christina, Douglas and Grant Counties

PURSUANT TO AUTHORITY vested in me by *Minnesota Statutes* § 97C.001 and other applicable law, I, Rodney, W. Sando, Commissioner of Natural Resources, hereby prescribe the following experimental regulations restricting fishing in Lake Christina.

Section 1. FISHING.

(a) The taking of fish in Lake Christina, S. 3-11, 17 and 18, T. 130, R. 40 and S. 1, 12 and 13, T. 130, R. 41, Douglas and Grant Counties, is prohibited from the day after Labor Day through November 30. All other inland angling season regulations and limits apply.

(b) While upon or fishing in the waters of the above-described Lake Christina, the possession and use of minnows, except in a dried or pickled condition, is prohibited.

Sec. 2 The provisions of this order shall not be construed to supersede the provisions of any other order of the commissioner, except insofar as such other orders may be inconsistent with the provisions of this order.

Dated at St. Paul, Minnesota, this 5th day of March, 1991.

Rodney W. Sando, Commissioner
Department of Natural Resources

Official Notices

Pursuant to the provisions of Minnesota Statutes § 14.10, an agency, in preparing proposed rules, may seek information or opinion from sources outside the agency. Notices of intent to solicit outside opinion must be published in the *State Register* and all interested persons afforded the opportunity to submit data or views on the subject, either orally or in writing.

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

Department of Commerce

Notice of Activation of the Minnesota Joint Underwriting Association to Insure Specified Classes of Business and Public Hearing

NOTICE IS HEREBY GIVEN that, pursuant to *Minnesota Statutes*, section 62I.21, the Minnesota Joint Underwriting Association (MJUA) and the Market Assistance Plan (MAP) are activated to provide assistance to the following classes of business unable to obtain insurance from private insurers:

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- guardian ad litem
- asbestos abatement contractor
- non profit agency
- resort
- private security firm
- home security systems
- employment agency
- environmental consultant

The MJUA and MAP are activated to provide assistance to the above classes of business for a period of 180 days following publication of this notice. A public hearing will be held, for the purpose of determining whether activation should continue beyond 180 days, at the Office of Administrative Hearings, 310 - 4th Avenue South, 5th Floor, Flour Exchange Building, Minneapolis, Minnesota 55415 on April 8, 1991, at 9:30 a.m. and continuing until all interested persons and groups have had an opportunity to be heard. The hearing shall be governed by *Minnesota Statute* Sections 14.57-14.69 and by *Minnesota Rules* Parts 1400.1500-1400.8400, (1985). Questions regarding the procedure may be directed to Administrative Law Judge, Peter C. Erickson, 310 4th Avenue South, 4th Floor Summit Bank Building, Minneapolis, Minnesota 55415, telephone (612) 341-7600. The authority for this proceeding is found in Chapter 621 of *Minnesota Statutes*, specifically sections 621.21 and 621.22. (A copy of those sections follows this notice.)

Prior to the hearing a pre-hearing conference will be held at 9:30 a.m. on March 25, 1991, at the Office of Administrative Hearings, 310 4th Avenue South, 5th Floor, Flour Exchange Building, Minneapolis, Minnesota 55415.

Minnesota Statutes, Chapter 621, which governs the Minnesota Joint Underwriting Association provides for temporary activation for 180 days by the Commissioner of Commerce. To extend the Minnesota Joint Underwriting Association's authority beyond the 180 day period a hearing must be held. Those classes of business for which the Minnesota Joint Underwriting Association was temporarily activated, by this notice and by previously published notices, must prove, at the hearing, that they meet the statutory requirements for coverage by the Minnesota Joint Underwriting Association.

Among those requirements are:

(1) That members of those classes are unable to obtain insurance through ordinary means;

(2) That the insurance being sought is required by statute, ordinance, or otherwise required by law, or is necessary to earn a livelihood or conduct a business; and

(3) That the classes of business serve a public purpose.

The classes of business specified in this notice and previously published notices must be shown to meet the statutory requirements of the Minnesota Joint Underwriting Association's authority to provide coverage to them will end after 180 days from the date the notice of activation was published in the *State Register*.

Activation of a class of business does not guarantee coverage to any class member. Coverage of individual class members is determined by the Minnesota Joint Underwriting Association on a case by case basis once the class has been activated. The MJUA's address is: Pioneer Post Office Box 1760, St. Paul, Minnesota 55101. Their phone number is (612) 222-0484.

The Department strongly suggests that any persons affected by this hearing or otherwise interested in the proceedings familiarize themselves with the requirements of Chapter 621 and the contested case procedures prior to the hearing, that they take such other steps as are appropriate to protect their interest and that any questions they may have as to how to proceed or how to participate at the hearing be directed to the Administrative Law Judge prior to the hearing.

All interested or affected persons will have an opportunity to participate at the hearing. Questioning of agency representatives or witnesses, and of interested persons making oral statements will be allowed in the manner set forth in the Rules pertaining to contested cases (*Minnesota Rules* parts 1400.1500-1400.8400).

Anyone wishing to oppose activation beyond the 180 days for any particular class, must file a petition to intervene with the administrative law jduge at least 10 days before the hearing date. If no notice to intervene is filed for a class, then the class is activated beyond the 180 day period without further action.

Minnesota Statutes chapter 10A requires each lobbyist to register with the State of Ethical Practices Board within five days after he or she commences lobbying. A lobbyist is defined in *Minnesota Statute* Section 10A.01, subdivision 11 as an individual:

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

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

The statute provides certain exceptions. Questions should be directed to the Ethical Practices Board, 625 North Robert Street, St. Paul, Minnesota 55101, telephone (612) 296-5148.

Dated: 22 February 1991

621.21 ACTIVATION OF MARKET ASSISTANCE PLAN AND JOINT UNDERWRITING ASSOCIATION.

At any time the commissioner of commerce deems it necessary to provide assistance with respect to the placement of general liability insurance coverage on Minnesota risks for a class of business, the commissioner shall by notice in the *State Register* activate the market assistance plan and the joint underwriting association. The plan and association are activated for a period of 180 days from publication of the notice. At the same time the notice is published, the commissioner shall prepare a written petition requesting that a hearing be held to determine whether activation of the market assistance plan and the joint underwriting association is necessary beyond the 180-day period. The hearing must be held in accordance with section 621.22. The commissioner by order shall deactivate the market assistance program and the joint underwriting association at any time the commissioner finds that the market assistance program and the joint underwriting association are not necessary.

621.22 HEARING

Subdivision 1. ADMINISTRATIVE LAW JUDGE. The commissioner shall forward a copy of the petition to activate the market assistance plan and the joint underwriting association with respect to a class of business to the chief administrative law judge. The chief administrative law judge shall, within three business days or receipt of the copy of the petition, set a hearing date, assign an administrative law judge to hear the matter, and notify the commissioner of the hearing date and administrative law judge assigned to the matter. The hearing date must be no less than 60 days nor more than 90 days from the date of receipt of the petition by the chief administrative law judge.

Subd. 2. NOTICE. The commissioner of commerce shall publish notice of the hearing in the *State Register* at least 30 days before the hearing date. The notice should be that used for rulemaking under chapter 14. Approval by the administrative law judge of the notice prior to publication is not required. The notice must contain a statement that anyone wishing to oppose activation beyond 180 days for any particular class, must file a petition to intervene with the administrative law judge at least ten days before the hearing date. If no notice to intervene is filed for a class then the class is activated beyond the 180 day period without further action.

Subd. 3. CONTESTED CASE; REPORT. The hearing and all matters after the hearing are a contested case under chapter 14. Within 45 days from the commencement of the hearing and within 15 days of the completion of the hearing of the administrative law judge shall submit a report to the commissioner of commerce. The parties, or the administrative law judge, if the parties cannot agree, shall adjust all time requirements under the contested case procedure to conform with the 45 day requirement.

Subd. 4. DECISION. The commissioner shall make a decision within ten days of the receipt of the administrative law judge's report.

Subd. 5. WAIVER OF MODIFICATION. If all parties to the proceeding agree, any of the requirements of this section may be waived or modified.

Subd. 6. CASE PRESENTATION. The department of commerce, upon request by small businesses as defined by section 14.115, subdivision 1, shall assist small businesses in any specific class requesting continuation of coverage beyond the 180 day period, in coordinating the class and presenting the case in the contested hearing.

Department of Health

Notice of Intent to Solicit Outside Opinion Regarding a Proposed Rule Change to Permit American Red Cross Advanced First Aid Personnel to Enroll in An Approved Emergency Care Refresher Course and for Registration as a State Certified Emergency Medical Technician

NOTICE IS HEREBY GIVEN that the Minnesota Department of Health is seeking information or opinions from sources outside the agency in preparation to amend those portions of *Minnesota Rules*, Chapter 4690, relating to certification as an emergency medical technician. The promulgation of this proposed rule change is authorized by *Minnesota Statutes*, section 144.804, subdivision 3.

The proposed amendment to rule would permit a qualified person certified by the American Red Cross to apply to the Commissioner of Health for enrollment in an approved emergency care refresher course and for registration as a state-certified emergency medical technician. Applicants would qualify for enrollment in a refresher training program by providing evidence of the following: 1) A current American Red Cross Advanced First Aid Certificate; 2) Currently on the roster of a licensed ambulance service, with a minimum of three years experience as a driver or attendant; 3) Documentation by the medical advisor or medical director of the licensed ambulance service that the applicant has current knowledge and training in the use of all basic equipment required in a basic ambulance.

Upon successful completion of the approved emergency care refresher course, including written and practical examinations, the applicant would be eligible for state certification as an emergency medical technician.

Persons meeting the above listed requirements, currently enrolled in or having previously completed approved emergency care refresher courses, would be considered for registration as state-certified emergency medical technician status under provisions of this proposed rule.

Any person who would like a copy of the revisions to *Minnesota Rules*, Chapter 4690, currently under consideration should submit a request to Wayne Arrowood at the address listed below. All interested or affected parties are requested to submit information or comment regarding the proposals. Statements of information and comment may be made orally or in writing (preferred) until the formal rule-making notice to adopt rules with or without a public hearing is published. Oral statements will be received during regular business hours over the telephone at 1-800-747-2011 (Greater Minnesota) or (612) 623-5482 (Metro) and in person at the address listed below. Written statements of information and comment must be addressed to:

Wayne Arrowood, Assistant Chief
Emergency Medical Services
Minnesota Department of Health
717 Delaware Street S.E. Box 9441
Minneapolis, Minnesota 55440

Any written material received by the Department of Health shall become part of the record to be submitted to the Attorney General or administrative law judge in the event that the proposed rule amendments are adopted.

Dated: 5 March 1991

John F. McCally
Commissioner of Health

Higher Education Facilities Authority

Notice of Public Hearing on Proposal to Issue Revenue Bonds

NOTICE IS HEREBY GIVEN that a public hearing will be held by the Minnesota Higher Education Facilities Authority (the "Authority") with respect to a proposal to issue revenue bonds on behalf of the **College of Saint Scholastica, Inc.,** a Minnesota nonprofit corporation, as owner and operator of the College of St. Scholastica, an institution of higher education (the "College"), at the Authority's offices at Suite 450 Galtier Plaza, 175 East Fifth Street, St. Paul, Minnesota on March 27, 1991 at 2 o'clock p.m. Under the proposal, the Authority would issue its revenue bonds in an aggregate principal amount of up to approximately $4,500,000 to provide financing for a Project generally described as (a) (i) the acquisition, construction, furnishing and equipping of an approximately 21,300 square foot, 500 seat auditorium for performances, lectures, and seminars, with an approximately 13,900 square foot lower level addition for additional study, dining, mailroom and lounge use, and (ii) the acquisition, construction, furnishing and equipping of an approximately 5,900 square foot addition to Tower Hall for a new receiving dock, freight elevator, recycling center, and office space, and (iii) renovation, expansion, furnishing and equipping the existing student bookstore, and (iv) renovation, expansion, furnishing and equipping the existing theatre facility, each including site improvements, and (b) the refunding of the $1,065,000 Minnesota Higher Education Facilities Authority Revenue Bonds, Series Two-L, the proceeds of which were used to finance renovation, expansion, furnishing and equipping the College's library; and all to be located on the campus of the College, and owned and operated by the College, whose street address is College of St. Scholastica, 1200 Kenwood Avenue, Duluth, Minnesota, 55811. At said time and place the Authority shall give all parties who appear or submit comments in writing an opportunity to express their views with respect to the proposal to undertake and finance the Project.

BY ORDER OF THE MINNESOTA HIGHER EDUCATION FACILITIES AUTHORITY

Joseph E. LaBelle
Executive Director

Housing Finance Agency

Applications Accepted for the 1991 Federal Low Income Housing Tax Credit Program

Introduction

The Minnesota Housing Finance Agency (MHFA) is pleased to announce that it is accepting first competition applications for reservation and allocation of the Low Income Housing Tax Credits, authorized by the Federal Tax Reform Act of 1986 as revised.

Applications for the low income housing tax credits, administered by the MHFA, for the first competition must be received no later than 5:00 p.m. Monday, April 1, 1991. Refer to application package for additional requirements.

The Omnibus Budget Reconciliation Act of 1990 (1990 Act) extended the tax credit program through December 31, 1991. Section 42 of the Internal Revenue Code requires states to develop allocation plans which dictate that tax credits only be allocated to projects that serve stated housing priorities. The MHFA has developed such an allocation plan and it is part of the application package available from the MHFA.

The Low Income Housing Tax Credits offer a ten year reduction in tax liability to owners and investors in eligible low income, new construction, rehabilitation or existing rental housing with rehabilitation.

The total amount of the tax credit available for 1991 for Minnesota will be $7,525,455. See page two for the distribution of tax credits.

Credit Formula

The Minnesota Legislature designated the MHFA as the primary apportionment agency for low income housing tax credits for the state and also authorized eligible cities and counties to administer the tax credits in their respective jurisdictions based on the *Minnesota Statutes* Section 462A.222 Subd. 1a,2.

Local Administration of Tax Credit

The following eligible cities and counties have the authority to administer the tax credits locally:

Distribution of Low Income Tax Credits in Minnesota in 1991

GREATER MINNESOTA	1991	Restored 1990	Total for 1991
Duluth (85,493-4.09%)	$124,799	$29,519	$154,318
St. Cloud (48,812-2.33%)	$71,096	$16,123	$87,219
Rochester (70,745-3.38%)	$103,134	$23,082	$126,216
FmHA Set-Aside (25% not to exceed $600,000)	$600,000	0	$600,000
MHFA Administered	$1,542,023	$536,806	$2,078,829
Carryforward ($652,303 x 47.7%)*	$311,149	NA	$311,149
Subtotal	$2,752,201	$605,530	$3,357,731

METRO TWIN CITY AREA	1991	Restored 1990	Total for 1991
Minneapolis	$506,982	$84,645	$591,627
St. Paul	$366,659	$91,973	$458,632
Bloomington	$150,000	$30,241	$180,241
Washington County	$172,156	$48,496	$220,652
Dakota County	$329,887	$89,564	$419,451
MHFA Administered	$968,671	$230,408	$1,199,079
Carryforward ($652,303 x 52.3%)*	$341,154	NA	$341,154
Subtotal	$2,835,509	$575,327	$3,410,836
SUBTOTAL FOR PROFIT	$5,587,710	$1,180,857	$6,768,567

Nonprofit Set Aside

ADMINISTERED BY MHFA	1990 Carry Forward*	1991	Restored 1990	Total for 1991
Metro Twin Cities Area	$34,572	$277,151	$68,749	$380,472
Greater Minnesota Area	$37,906	$271,228	$67,282	$376,416
Subtotal	$72,478	$548,379	$136,031	$756,888
Total Tax Credits for State		$6,136,089	$1,316,888	$7,525,455

*1990 Carry Forward $724,781, ten percent reserved for nonprofit $72,478.

Applicants with eligible buildings located within the jurisdiction of the above local governments must apply to the local administrators for allocation of the low income housing tax credit. Any suballocation to local governments that is not committed by the end of the

first competition must be returned to the MHFA for statewide allocation. The MHFA will not make an allocation for projects located within the jurisdiction of the cities or counties that have elected to administer the credits until the amounts reserved have been allocated or returned to the MHFA for allocation, except for the nonprofit set-aside.

Total 1991 tax credits available for the State of Minnesota are based on U.S. Census Bureau estimates of population released December 1990. (4,387,029 population X $1.25 per capita credit amount = $5,483,786) To this total is added unused 1990 credits carried forward, and 1990 restored credits.

Greater Minnesota population 2,092,613, Twin Cities Metro population 2,294,416.

Population estimates for individual cities and counties as well as state total used to derive geographic distribution of credits are based on State Demographer and Census Bureau published report in January 1991.

MHFA Administration Tax Credits

Applicants with eligible buildings in the balance of the state, not within the jurisdiction of eligible local credit administrators, may apply to the MHFA for an allocation of low income housing tax credits.

In addition, the MHFA has been designated as the credit agency to provide low income housing credits for projects involving qualified 501(c)(3) and 501(c)(4) nonprofit organizations statewide. Ten percent of the state ceiling has been set aside for qualified nonprofits as required by Section 42 of the Internal Revenue Code of 1986. Qualified nonprofits can apply to the MHFA for the low income housing tax credit set-aside, regardless of the geographic location of the proposed low income housing building, as specified in the allocation plan.

For additional information or an application packet for buildings located in the MHFA jurisdiction, please write to MHFA at:

Minnesota Housing Finance Agency
Multi-Family Underwriting
Low Income Housing Tax Credit Program
400 Sibley Street, Suite 300
St. Paul, MN 55101-1998
or call (612) 297-3294.

Department of Human Services

Indian Child Welfare Advisory Task Force Vacancy

This task force assists the commissioner of the State Dept. of Human Services in formulating policies and procedures related to Indian Child Welfare Services within the State. The task force also makes recommendations regarding the approval of ICW grants. The 17 member task force has representation from all eleven reservations and three large urban Indian areas of Minnesota. One member represents Duluth, two represent St. Paul, and three represent Minneapolis.

Currently there is one (1) Minneapolis vacancy.

Representatives from the urban Indian communities are selected through an open appointment process.

Individuals interested in this position should submit an application to: Secretary of State Office, 180 State Office Building, St. Paul, MN 55102. Application forms may be obtained by calling 297-5845.

Minnesota Property Insurance Placement Facility

Notice of Meeting of the Board of Directors

NOTICE IS HEREBY GIVEN that a meeting of the Board of Directors of the Minnesota Property Insurance Placement Facility will be held at 8:30 a.m. on Wednesday, March 13, 1991, at its office located at 17 North Washington Avenue (Suite 300), Minneapolis, MN. For additional information please call 338-7584.

Minnesota Property Insurance Placement Facility

Notice of Meeting of the Data Processing Committee

NOTICE IS HEREBY GIVEN that a meeting of the Data Processing Committee of the Minnesota Property Insurance Placement Facility will be held at 2:30 p.m. on Tuesday, March 12, 1991 at its office located at 17 North Washington Avenue (Suite 300), Minneapolis, MN. For additional information please call 338-7584.

Public Employees Retirement Association (PERA)

Board of Trustees, Notice of Meetings

The next regular monthly meeting of the Board of Trustees of the Public Employees Retirement Association (PERA) is scheduled to be held on Friday, March 15, 1991, at 10:30 a.m. in the Association offices, 514 St. Peter Street, Suite 200, St. Paul, Minnesota.

A Legislative Committee meeting is scheduled to be held prior to the regular Board meeting on March 15 at 8:00 a.m. in the Association offices.

Meetings of the Public Safety Officers and Information Forum are scheduled to be held Wednesday, March 20, beginning at 1:00 p.m. in the Association offices.

Department of Trade and Economic Development

Minnesota Job Skills Partnership Program

Notice of Postponement of Board Meeting

The Minnesota Job Skills Partnership Board is postponing its next Board meeting from Monday, May 20, 1991 to MONDAY, JUNE 17, 1991, 1:00 p.m., Room 300 North of the State Office Building. The deadline date for grant proposal applications for this meeting will also be changed, from April 22, 1991 to MAY 20, 1991. Projects funded at this meeting will begin no earlier than July 1, 1991.

The Minnesota Job Skills Partnership Board solicits grant proposals from educational and other non-profit organizations for training programs designed for specific businesses. Please contact the Partnership office at 612/296-0388 for details regarding grant applications.

Following are the deadline dates and Board meeting dates for the remainder of 1991:

Deadline Dates for New Grant Applications	**MJSP Board Meeting Dates**
May 20, 1991	June 17, 1991
July 22, 1991	August 19, 1991
October 21, 1991	November 18, 1991 (Annual Meeting)

Department of Transportation

Notice of Appointment of a State Aid Variance Committee and Notice of Meeting

NOTICE IS HEREBY GIVEN that the Commissioner of Transportation has appointed a State Aid Variance Committee who will conduct a meeting on Thursday, March 28, 1991, at 9:00 a.m. in the second floor conference room at the St. Paul Downtown Airport, 644 Bayfield Street, St. Paul, MN 55107.

This notice is given pursuant to *Minnesota Statute* 47k.705.

The purpose of this open meeting is to investigate and determine recommendations for variances from minimum State Aid roadway standards and administrative procedures as governed by *Minnesota Rules* for State Aid Operations 8820.3400 adopted pursuant to *Minnesota Statutes* 161 and 162.

The agenda will be limited to these questions:

1. Petition of the City of Crystal for a variance from minimum standards as they apply to a proposed reconstruction project on MSAS 313 (36th Avenue North) between Douglas Drive and Welcome Avenue, so as to permit a street width of 48 feet; instead of the required minimum of 52 feet; four traffic lanes with no parking allowed on either side.

2. Petition of the City of Albert Lea for variances from minimum standards as they apply to a proposed reconstruction project on MSAS 128 (Sunset Street) between Luther Place and Lakeview Boulevard, so as to permit a design speed of 27 miles per hour for one vertical curve at engineers station 7+50 and to permit a design speed of 20 miles per hour for one vertical curve at engineers station 10+06; instead of the required minimum of 30 miles per hour; and to permit a right of way width of 56.59 feet instead of the required minimum width of 60 feet.

3. Petition of the City of Owatonna for a variance from rule as they apply to a proposed reconstruction project on MSAS 109 (Bridge Street) between Walnut Avenue and I-35 and on MSAS 110 (Main Street) between Oak Avenue and Bridge Street, so as to permit a street width of 48 feet; instead of the required minimum of 52 feet; four traffic lanes with no parking allowed on either side.

4. Petition of the County of Lac Qui Parle for a variance from rule as they apply to a proposed reconstruction project on CSAH 31 between Trunk Highway 212 and CSAH 33, so as to permit a 23 foot wide bridge over the Lac Qui Parle River (Bridge No. 5739); instead of the required minimum of 24 feet; to remain inplace.

5. Petition of the County of Fillmore for a variance from rules as they apply to a proposed resurfacing project on CSAH 28 between Trunk Highway 44 and Alpine Avenue in the City of Mabel; so as to permit a design speed of 25 miles per hour for one crest vertical curve near the north end of the project; instead of the required minimum of 30 miles per hour which is the posted speed limit.

6. Petition of the City of Fairmont for a variance from rule as they apply to a proposed reconstruction project on MSAS 111 (Blue Earth Avenue) between Prairie Avenue and Trunk Highway 15, so as to permit a street width of 56 feet; instead of the required minimum of 62 feet; four traffic lanes with parking allowed on one side.

7. Petition of the City of Morris for a variance on a proposed reconstruction project on MSAS 103 (Wyoming and Park Avenues) between 5th Street West and Pacific Avenue, so as to permit a design speed of 20 miles per hour for one horizontal curve at 8th Street; instead of the required minimum of 30 miles per hour.

8. Petition of the City of Mankato for a variance from rule as they apply to a proposed reconstruction project on MSAS 106 (North 4th Street) between Madison Avenue and May Street, so as to permit a one way street width of 40 feet; instead of the required minimum of 43 feet; two traffic lanes and parking allowed on both sides.

9. Petition of the County of Murray for a variance from rules as they apply to a proposed reconstruction project on CSAH 38 and CSAH 51 in the City of Currie, so as to permit 45 degree diagonal parking on both sides with a street width of 62 feet instead of the required minimum of 66 feet; on CSAH 38 between 2nd Street and 400 feet north of 1st Street; and on CSAH 51 between Des Moines Street and CSAH 38.

10. Petition of the County of Lyon for a variance from rule as they apply to a proposed reconstruction project on CSAH 5 (Washington Street) between a point 345 feet south of 4th Street and Trunk Highway 14 in the City of Balaton; so as to permit a street width of 38 feet; instead of the required minimum of 40 feet; two traffic lanes and parking allowed on both sides.

11. Petition of the County of St. Louis for a variance from rules as they apply to a proposed reconstruction project on CSAH 69 (W Tischer Road) between County Road 246 and CSAH 37, so as to permit a design speed of 35 miles per hour; instead of the required minimum of 40 miles per hour.

The cities and counties previously listed are requested to follow the following time schedule when appearing before the Variance Committee:

9:00 a.m.	City of Crystal
9:20 a.m.	City of Albert Lea
9:40 a.m.	City of Owatonna
10:00 a.m.	County of Lac Qui Parle
10:20 a.m.	County of Fillmore
10:40 a.m.	City of Fairmont
11:00 a.m.	City of Morris
11:20 a.m.	City of Mankato
11:40 a.m.	County of Murray
12:00 p.m.	County of Lyon
12:20 p.m.	County of St. Louis

Dated: 4 March 1991

John H. Riley
Commissioner
Minnesota Department of Transportation

Department of Transportation

Petition of the City of Crystal for a Variance from State Aid Requirements for STREET WIDTH

NOTICE IS HEREBY GIVEN that the City Council of the City of Crystal has made written request to the Commissioner of Transportation pursuant to *Minnesota Rules* 8820.3300 for a variance from rule as they apply to a proposed reconstruction project on MSAS 313 (36th Avenue North) between Douglas Drive and Welcome Avenue.

The request is for a variance from *Minnesota Rules* for State Aid Operations 8820.9912 adopted pursuant to *Minnesota Statutes* Chapter 161 and 162, so as to permit a street width of 48 feet; instead of the required minimum of 52 feet; four traffic lanes with no parking allowed on either side.

Any person may file a written objection to the variance request with the Commissioner of Transportation, Transportation Building, St. Paul, Minnesota 55155.

If a written objection is received within 20 days from the date of this notice in the *State Register*, the variance can be granted only after a contested case hearing has been held on the request.

Dated: 11 March 1991

John H. Riley
Commissioner

Department of Transportation

Petition of the City of Albert Lea for a Variance from Minimum State Aid Standards for DESIGN SPEED and RIGHT OF WAY WIDTH

NOTICE IS HEREBY GIVEN that the City Council of the City of Albert Lea made written request to the Commissioner of Transportation pursuant to *Minnesota Rules* 8820.3300 for variances from rules as they apply to a proposed reconstruction project on MSAS 128 (Sunset Street) between Luther Place and Lakeview Boulevard.

The request is for two variances from *Minnesota Rules* for State Aid Operations 8820.9912 adopted pursuant to *Minnesota Statutes* Chapter 161 and 162, so as to permit a design speed of 27 miles per hour for one vertical curve at engineers station 7+50 and to permit a design speed of 20 miles per hour for one vertical curve at engineers station 10+06; instead of the required minimum of 30 miles per hour; and for one variance from 8820.2500 so as to permit a right of way width of 56.59 feet instead of the required minimum width of 60 feet.

Any person may file a written objection to the variance request with the Commissioner of Transportation, Transportation Building, St. Paul, Minnesota 55155.

If a written objection is received within 20 days from the date of this notice in the *State Register*, the variance can be granted only after a contested case hearing has been held on the request.

Dated: 4 March 1991

John H. Riley
Commissioner

Department of Transportation

Petition of the City of Owatonna for a Variance from State Aid Requirements for STREET WIDTH

NOTICE IS HEREBY GIVEN that the City Council of the City of Owatonna has made written request to the Commissioner of Transportation pursuant to *Minnesota Rules* 8820.3300 for a variance from rule as they apply to a proposed reconstruction project on MSAS 109 (Bridge Street) between Walnut Avenue and I-35 and on MSAS 110 (Main Street) between Oak Avenue and Bridge Street.

The request is for a variance from *Minnesota Rules* for State Aid Operations 8820.9912 adopted pursuant to *Minnesota Statutes* Chapter 161 and 162, so as to permit a street width of 48 feet; instead of the required minimum of 52 feet; four traffic lanes with no parking allowed on either side.

Any person may file a written objection to the variance request with the Commissioner of Transportation, Transportation Building, St. Paul, Minnesota 55155.

If a written objection is received within 20 days from the date of this notice in the *State Register*, the variance can be granted only after a contested case hearing has been held on the request.

Dated: 4 March 1991

John H. Riley
Commissioner

Department of Transportation

Petition of the County of Lac Qui Parle for a Variance from State Aid Requirements for BRIDGE WIDTH

NOTICE IS HEREBY GIVEN that the County Board of the County of Lac Qui Parle has made written request to the Commissioner of Transportation pursuant to *Minnesota Rules* 8820.3300 for a variance from rule as they apply to a proposed reconstruction project on CSAH 31 between Trunk Highway 212 and CSAH 33.

The request is for a variance from *Minnesota Rules* for State Aid Operations 8820.9910 adopted pursuant to *Minnesota Statutes* Chapter 161 and 162, so as to permit a 23 foot wide bridge over the Lac Qui Parle River (Bridge No. 5739); instead of the required minimum of 24 feet; to remain inplace.

Any person may file a written objection to the variance request with the Commissioner of Transportation, Transportation Building, St. Paul, Minnesota 55155.

If a written objection is received within 20 days from the date of this notice in the *State Register*, the variance can be granted only after a contested case hearing has been held on the request.

Dated: 4 March 1991

John H. Riley
Commissioner

Department of Transportation

Petition of the County of Fillmore for a Variance from Minimum State Aid Standards for DESIGN SPEED

NOTICE IS HEREBY GIVEN that the County Board of the County of Fillmore has made written request to the Commissioner of Transportation pursuant to *Minnesota Rules* 8820.3300 for a variance from rules as they apply to a proposed resurfacing project on CSAH 28 between Trunk Highway 44 and Alpine Avenue in the City of Mabel.

The request is for a variance from *Minnesota Rules* for State Aid Operations 8820.9914 adopted pursuant to *Minnesota Statutes* Chapter 161 and 162, so as to permit a design speed of 25 miles per hour for one crest vertical curve near the north end of the project; instead of the required minimum of 30 miles per hour which is the posted speed limit.

Any person may file a written objection to the variance request with the Commissioner of Transportation, Transportation Building, St. Paul, Minnesota 55155.

If a written objection is received wtihin 20 days from the date of this notice in the *State Register*, the variance can be granted only after a contested case hearing has been held on the request.

Dated: 4 March 1991

John H. Riley
Commissioner

Department of Transportation

Petition of the City of Fairmont for a Variance from State Aid Requirements for STREET WIDTH

NOTICE IS HEREBY GIVEN that the City Council of the City of Fairmont has made written request to the Commissioner of Transportation pursuant to *Minnesota Rules* 8820.3300 for a variance from rule as they apply to a proposed reconstruction project on MSAS 111 (Blue Earth Avenue) between Prairie Avenue and Trunk Highway 15.

The request is for a variance from *Minnesota Rules* for State Aid Operations 8820.9912 adopted pursuant to *Minnesota Statutes* Chapter 161 and 162, so as to permit a street width of 56 feet; instead of the required minimum of 62 feet; four traffic lanes with parking allowed on one side.

Any person may file a written objection to the variance request with the Commissioner of Transportation, Transportation Building, St. Paul, Minnesota 55155.

If a written objection is received within 20 days from the date of this notice in the *State Register*, the variance can be granted only after a contested case hearing has been held on the request.

Dated: 4 March 1991

John H. Riley
Commissioner

Department of Transportation

Petition of the County of St. Louis for a Variance from Minimum State Aid Standards for DESIGN SPEED

NOTICE IS HEREBY GIVEN that the County Board of the County of St. Louis has made written request to the Commissioner of Transportation pursuant to *Minnesota Rules* 8820.3300 for a variance from rules as they apply to a proposed reconstruction project on CSAH 69 (W Tischer Road) between County Road 246 and CSAH 37.

The request is for a variance from *Minnesota Rules* for State Aid Operations 8820.9910 adopted pursuant to *Minnesota Statutes* Chapter 161 and 162, so as to permit a design speed of 35 miles per hour; instead of the required minimum of 40 miles per hour.

Any person may file a written objection to the variance request with the Commissioner of Transportation, Transportation Building, St. Paul, Minnesota 55155.

If a written objection is received within 20 days from the date of this notice in the *State Register*, the variance can be granted only after a contested case hearing has been held on the request.

Dated: 4 March 1991

John H. Riley
Commissioner

Department of Transportation

Petition of the County of Lyon for a Variance from State Aid Requirements for STREET WIDTH

NOTICE IS HEREBY GIVEN that the County Board of the County of Lyon has made written request to the Commissioner of Transportation pursuant to *Minnesota Rules* 8820.3300 for a variance from rule as they apply to a proposed reconstruction project on CSAH 5 (Washington Street) between a point 345 feet south of 4th Street and Trunk Highway 14 in the City of Balaton.

The request is for a variance from *Minnesota Rules* for State Aid Operations 8820.9912 adopted pursuant to *Minnesota Statutes* Chapter 161 and 162, so as to permit a street width of 38 feet; instead of the required minimum of 40 feet; two traffic lanes and parking allowed on both sides.

Any person may file a written objection to the variance request with the Commissioner of Transportation, Transportation Building, St. Paul, Minnesota 55155.

If a written objection is received within 20 days from the date of this notice in the *State Register*, the variance can be granted only after a contested case hearing has been held on the request.

Dated: 4 March 1991

John H. Riley
Commissioner

Department of Transportation

Petition of the County of Murray for a Variance from Minimum State Aid Standards for DIAGONAL PARKING

NOTICE IS HEREBY GIVEN that the County Board of the County of Murray has made written request to the Commissioner of Transportation pursuant to *Minnesota Rules* 8820.3300 for a variance from rules as they apply to a proposed reconstruction project on CSAH 38 and CSAH 51 in the City of Currie.

The request is for a variance from *Minnesota Rules* for State Aid Operations 8820.9916 adopted pursuant to *Minnesota Statutes* Chapter 161 and 162, so as to permit 45 degree diagonal parking on both sides with a street width of 62 feet instead of the required minimum of 66 feet; on CSAH 38 between 2nd Street and 400 feet north of 1st Street; and on CSAH 51 between Des Moines Street and CSAH 38.

Any person may file a written objection to the variance request with the Commissioner of Transportation, Transportation Building, St. Paul, Minnesota 55155.

If a written objection is received within 20 days from the date of this notice in the *State Register*, the variance can be granted only after a contested case hearing has been held on the request.

Dated: 4 March 1991

John H. Riley
Commissioner

Department of Transportation

Petition of the City of Mankato for a Variance from State Aid Requirements for STREET WIDTH

NOTICE IS HEREBY GIVEN that the City Council of the City of Mankato has made written request to the Commissioner of Transportation pursuant to *Minnesota Rules* 8820.3300 for a variance from rule as they apply to a proposed reconstruction project on MSAS 106 (North 4th Street) between Madison Avenue and May Street.

The request is for a variance from *Minnesota Rules* for State Aid Operations 8820.9912 adopted pursuant to *Minnesota Statutes* Chapter 161 and 162, so as to permit a one way street width of 40 feet; instead of the required minimum of 43 feet; two traffic lanes and parking allowed on both sides.

Any person may file a written objection to the variance request with the Commissioner of Transportation, Transportation Building, St. Paul, Minnesota 55155.

If a written objection is received within 20 days from the date of this notice in the *State Register*, the variance can be granted only after a contested case hearing has been held on the request.

Dated: 4 March 1991

John H. Riley
Commissioner

Department of Transportation

Petition of the City of Morris for a Variance from Minimum State Aid Standards for DESIGN SPEED

NOTICE IS HEREBY GIVEN that the City Council of the City of Morris made written request to the Commissioner of Transportation pursuant to *Minnesota Rules* 8820.3300 for a variance on a proposed reconstruction project on MSAS 103 (Wyoming and Park Avenues) between 5th Street West and Pacific Avenue.

The request is for a variance from *Minnesota Rules* for State Aid Operations 8820.9912 adopted pursuant to *Minnesota Statutes* Chapter 161 and 162, so as to permit a design speed of 20 miles per hour for one horizontal curve at 8th Street; instead of the required minimum of 30 miles per hour.

Any person may file a written objection to the variance request with the Commissioner of Transportation, Transportation Building, St. Paul, Minnesota 55155.

If a written objection is received within 20 days from the date of this notice in the *State Register*, the variance can be granted only after a contested case hearing has been held on the request.

Dated: 4 March 1991

John H. Riley
Commissioner

State Contracts and Advertised Bids

Pursuant to the provisions of Minn. Stat. § 14.10, an agency must make reasonable effort to publicize the availability of any services contract or professional and technical services contract which has an estimated cost of over $2,000.

Commodities contracts with an estimated value of $15,000 or more are listed under the Materials Management Division, Department of Administration. All bids are open for 7-10 days before bidding deadline. For bid specifics, time lines, and other general information, contact the appropriate buyers whose initials appear in parentheses next to the commodity for bid, by calling (612) 296-6152.

Awards of contracts and advertised bids for commodities and printing, as well as awards of professional, technical and consulting contracts, appear in the midweek STATE REGISTER Contracts Supplement, published every Thursday. Call (612) 296-0931 for subscription information.

Materials Management Division—Department of Administration:

Contracts and Requisitions Open for Bid

Call 296-2600 for information on a specific bid, or to request a specific bid.

Commodity: Carpeting and install
Contact: Linda Parkos 296-3725
Bid due date at 2pm: March 13
Agency: Community College
Deliver to: Brainerd
Requisition #: 02310-19051

Commodity: Ethernet adapter card
Contact: Bernadette Vogel 296-3778
Bid due date at 4:30pm: March 13
Agency: State Planning Agency
Deliver to: St. Paul
Requisition #: 30000-18386

Commodity: 80386 SX computers
Contact: Bernadette Vogel 296-3778
Bid due date at 4:30pm: March 13
Agency: Community College
Deliver to: Minneapolis
Requisition #: 27151-48055

Commodity: Lightboard
Contact: Joan Breisler 296-9071
Bid due date at 4:30pm: March 14
Agency: Community College
Deliver to: Minneapolis
Requisition #: 27151-48056

Commodity: Reader printer
Contact: John Bauer 296-2621
Bid due date at 4:30pm: March 15
Agency: State University
Deliver to: St. Cloud
Requisition #: 26073-22717

Commodity: Native grass and wildflower (FORB) seed for 1991 planting along Minnesota roadsides
Contact: Linda Parkos 296-3725
Bid due date at 4:30pm: March 15
Agency: Transportation Department
Deliver to: Various
Requisition #: 79050-14045

Commodity: Photogrammetric paint transfer instrument
Contact: John Bauer 296-2621
Bid due date at 2pm: March 15
Agency: Transportation Department
Deliver to: St. Paul
Requisition #: 79000-14005

Commodity: Outboard motor
Contact: Mary Jo Bruski 296-3772
Bid due date at 4:30pm: March 18
Agency: Natural Resources Department
Deliver to: Grand Rapids
Requisition #: 29000-55842

Commodity: White tractor-mower
Contact: Mary Jo Bruski 296-3772
Bid due date at 4:30pm: March 18
Agency: Natural Resources Department
Deliver to: New Ulm
Requisition #: 29004-14752

Commodity: Boat motor and trailer packages
Contact: Mary Jo Bruski 296-3772
Bid due date at 2pm: March 18
Agency: Natural Resources Department
Deliver to: Pickup
Requisition #: 29000-55843

Commodity: Preformed metal wall panels
Contact: Pamela Anderson 296-1053
Bid due date at 2pm: March 18
Agency: Transportation Department
Deliver to: St. Paul
Requisition #: 79000-13994

Commodity: Unleaded gasoline, gasohol, #1 and #2 regular diesel fuel
Contact: Dale Meyer 296-3773
Bid due date at 2pm: March 19
Agency: Transportation Department
Deliver to: St. Peter
Requisition #: Price Contract—Rebid

Commodity: Spiral ductwork/or dust collection system
Contact: Pamela Anderson 296-1053
Bid due date at 2pm: March 20
Agency: Corrections Department
Deliver to: Faribault
Requisition #: 78790-01818

Commodity: Native grass and wildflower (FORB) seed for 1991 planting along Minnesota roadsides
Contact: Linda Parkos 296-3725
Bid due date at 2pm: March 20
Agency: Transportation Department
Deliver to: St. Cloud
Requisition #: 79050-14043

Commodity: Native grass and wildflower (FORB) seed for 1991 planting along Minnesota roadsides
Contact: Linda Parkos 296-3725
Bid due date at 2pm: March 20
Agency: Transportation Department
Deliver to: Bemidji
Requisition #: 79050-14042

Commodity: Native grass and wildflower (FORB) seed for 1991 planting along Minnesota roadsides
Contact: Linda Parkos 296-3725
Bid due date at 2pm: March 20
Agency: Transportation Department
Deliver to: St. Paul
Requisition #: 79050-14040

Commodity: Native grass and wildflower (FORB) seed for 1991 planting along Minnesota roadsides
Contact: Linda Parkos 296-3725
Bid due date at 2pm: March 20
Agency: Transportation Department
Deliver to: Mankato
Requisition #: 79050-14041

Commodity: Native grass and wildflower (FORB) seed for 1991 planting along Minnesota roadsides
Contact: Linda Parkos 296-3725
Bid due date at 2pm: March 20
Agency: Transportation Department
Deliver to: Morris
Requisition #: 79050-14044

Department of Administration: Print Communications Division

Printing vendors for the following printing contracts must review contract specifications in printing buyers office at 117 University Avenue, Room 134-B, St. Paul, MN.

Printing vendors NOTE: Other printing contracts can be found in the Materials Management Division listing above, and in the Professional, Technical & Consulting Contracts section immediately following this section.

Commodity: Permission to administer medication form, 40M 2-part sets, 1-page, 8½"x6" overall includes ½" stub at top, negs available, 1-sided, blue repro
Contact: Printing Buyer's Office
Bids are due: March 14
Agency: Human Services Department
Deliver to: St. Paul
Requisition #: 14950

Commodity: Report to determine liability and succession form, 25M 4-part sets, 9"x11" includes ½" tear strips left/right, type to set + negs, 2-sided, carbon interleave
Contact: Printing Buyer's Office
Bids are due: March 14
Agency: Jobs & Training Department
Deliver to: St. Paul
Requisition #: 14947

Commodity: UI window envelopes, 1,000M 4⅜"x9⅝" + flap, camera ready, 2-sided
Contact: Printing Buyer's Office
Bids are due: March 14
Agency: Jobs & Training Department
Deliver to: St. Paul
Requisition #: 15040

Commodity: Change of Address, 5M 4-part sets, 8½"x6¼" includes ¾" stub at top, camera ready negs, 1-sided, carbon interleave, perf top
Contact: Printing Buyer's Office
Bids are due: March 14
Agency: Jobs & Training Department
Deliver to: St. Paul
Requisition #: 15041

Commodity: DDS-1 return envelope, 15M 11½"x5" + flap, camera ready
Contact: Printing Buyer's Office
Bids are due: March 14
Agency: Jobs & Training Department
Deliver to: St. Paul
Requisition #: 15038

Commodity: Printing and mailing of sales tax coupon books, envelopes and letterhead, 67M 70-page books 8" x 3⅔", return envelopes and letterhead, type to set, 2-sided
Contact: Printing Buyer's Office
Bids are due at 2pm: March 18
Agency: Revenue Department
Deliver to: St. Paul
Requisition #: 15047

Commodity: White envelopes, 60M 10"x13", open end, self-sealing, return address and logo in upper left corner
Contact: Printing Buyer's Office
Bids are due: March 14
Agency: Minnesota State Lottery
Deliver to: Roseville
Requisition #: 15016

Professional, Technical & Consulting Contracts

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

Department of Administration

Materials Management Division

Notice of Request for Proposals for Replacing the Information System of the State Treasurer's Office

The Department of Administration, Division of Materials Management, Contracts & Technical Services is processing a Request for Proposal (R.F.P.) describing the need to replace the current information system of the Minnesota State Treasurer's Office. Software, conversion and hardware needs are described within the R.F.P. A pre-proposal meeting is scheduled for March 15, 1991, at 2:30 p.m. to 3:30 p.m. in Room 116B, State Administration Building, 50 Sherburne Avenue, St. Paul, Minnesota 55155. Interested vendors must have expertise in installing banking software systems. Contract will be awarded to one prime contractor. Contact Donald Olson, Contract Administrator, at 612-296-3771 or 297-2729, for a draft copy of the proposal.

Dated: 26 February 1991

Department of Administration

Division of State Building Construction

Notice of Requests for Professional Services of Architects, Engineers, Landscape Architects, Professional Testers and Surveyors and Programmers and Designers

1) Contracts Available for Architects, Engineers and Landscape Architects

The Department of Administration (Admin) intends to retain the services of qualified professionally registered architects, engineers, and landscape architects to design, prepare construction drawings and monitor construction of a number of projects during the year commencing July 1, 1991. These projects will be varied in nature and scope and will involve new construction, remodeling projects and facility studies. The total cost of construction or remodeling projects will be less than $400,000.00 and the fees associated with facility studies will be less than $35,000.00. Particular emphasis will be placed on the background and experience of the firm on similar projects as well as the firm's geographic proximity to the project.

Firms wishing to be considered for these projects are asked to submit a short brochure or resume consisting of no more than 10 pages giving qualifications and experience of the firm. Qualified applicants will be contacted as the need arises and may be requested to appear in St. Paul for an interview. Firms which responded during the past year need only respond with a letter indicating continued interest as well as significant organization and experience changes since submission of their last brochure.

In submitting their brochures or resumes, firms shall indicate the area or areas shown below in which they possess qualifications.

1. Research and Programming
2. Educational
3. Health and Medical
4. Correctional
5. Restoration
6. Office and Administration
7. Recreational
8. Service and Industrial
9. Arts, including Performing Arts
10. Exhibition and Display
11. Landscape and Site Planning
12. Interiors
13. Water and Waste Facilities
14. Energy Supply and Distribution
15. Pollution Control
16. Acoustics
17. Hazardous Substance Disposition

In some cases, Admin may enter into annual contracts for investigative studies. These annual contracts will be prepared on the basis of the needs of Admin.

The names of firms responding will be provided to other agencies of the State and political subdivisions thereof having a need for the services described herein.

Names of qualified firms will be retained on file with Admin until June 30, 1992.

Designers for projects with estimated costs or fees in excess of those shown above will be selected by the State Designer Selection Board. Projects referred to the Board will be advertised in the ***State Register.***

2) Contracts Available for Registered Professional Testing and Surveying Services

The Department of Administration (Admin) intends to retain the services of qualified professionally registered individuals to conduct site surveys, materials testing, soil borings and tests and facility investigations during the year commencing July 1, 1991. These projects will be varied in nature and scope. The fees associated with these projects will generally be less than $2,000.00, although the fees for some projects may exceed this amount.

As projects arise, it is the intention of Admin to contact firms who have expressed an interest in providing such services to the State. The final selection will be made on the basis of the background and experience of the firm, the geographic proximity of the firm to the project site, and an estimate of the fees to be charged for the specific project, and the ability to meet given time frames.

Firms wishing to be considered for these projects are asked to submit a short brochure or resume consisting of no more than 10 pages outlining their background, qualifications, and fields of expertise.

Qualified applicants will be contacted as the need arises and may be requested to appear in St. Paul for an interview.

Firms which have previously responded to this request need only provide a letter expressing continued interest as well as significant organization and experience changes since submission of their last brochure.

Names of qualified firms will be retained on file with Admin until June 30, 1992. Names of firms will be provided to other agencies of the State and political subdivisions thereof having a need for the services described herein.

3) Contracts for Programming and Designing Furnishing Layouts for Public Facilities

The Department of Administration (Admin) intends to retain the services of qualified independent interior designers to program and design furnishing layouts for State facilities, both owned and leased, as well as for political subdivisions for the period July 1, 1991 through June 30, 1992. These projects would be varied in scope; however, in no case will the fees for an individual project exceed $35,000.00.

Firms wishing to be considered for these projects are asked to submit a brochure or resume outlining the following information:

1. Name, address, and contact person for the firm;
2. The number of staff involved in interior design and their classifications;
3. Whether the firm has CAAD capabilities;
4. A listing of the number of interior design projects in the past three years in each of the following categories;

to 5000 square feet
5001 to 10000 square feet
10001 to 15000 square feet
15001 + square feet

5. A listing of the firms past 10 projects indicating date completed and square footage.
6. An indication of the lines of modular furnishings with which the firm has familiarity.

Designers' Services and Responsibilities Will Include the Following Tasks:

1. Interview key personnel and survey existing facilities to collect programming data.
2. Inventory existing equipment and systems furnishings to be reused.
3. Develop prototype workstations.
4. Develop furnishings budget.
5. Prepare (as each individual project requires) space plans and/or furniture, modular furniture and related equipment layouts for Agency approval.
6. Investigate existing conditions and make all necessary field verifications and should they occur, resulting changes to plans.
7. Develop color and finishes for systems furnishings to coordinate with building finishes.
8. Prepare written specifications where applicable for all new furniture, new or refurbished.
9. Prepare a preliminary list cost estimate for all new modular furniture.
10. Based on the approved design, the Designer shall prepare for the Agency's approval, documents consisting of drawings, specifications indicating quantity, product number, description, and list price, and any other document(s) necessary to describe the quantity and the placement of the furnishings and related equipment. The modular furniture will require the following:

a. Panel plan(s) to indicate panel height, width, finish information, panel type (i.e.: acoustical, fabric wrapped, powered, etc.) and critical dimensions.

b. Electrical plan(s) to indicate dimensioned location of power entry points where panel system interfaces with building power and type of power entry (i.e.: power pole, base power entry, etc.). The plan must indicate the number, location and type of duplex receptacles to be used, and must also locate all voice and data locations.

c. Component plan(s) to indicate component size, type, finish information, and any instructions necessary for complete installation (i.e.: install heights, special conditions, etc.).

d. Reconfiguration plan(s) shall be developed when existing modular furniture is to be reused in a new floor plan(s), and when reconfigured in phases the phases must be indicated on the floor plan(s).

11. Documents shall be prepared to include, but not limited to:

a. Floor plans showing functional relationships between work units.

b. Floor plans indicating furniture types and arrangements.

c. Furniture specifications.

d. Furniture/furnishings installation schedule, including critical dimensions.

12. Prepare move documents indicating the location of all existing furniture to be reused and any special instructions necessary for moving and placement of existing furnishings. Where existing modular furniture is to be reused, a list must be provided to installers

indicating existing product to be reused, excess existing product, and new product required. If the reconfiguration is to be completed in phases the list must be broken down into their respective phases.

13. Review with the Dealer/Manufacturer the schedules for delivery and installation of the modular furniture. The Designer shall not be held responsible for any malfeasance, neglect or failure of the supplier or installer to meet completion schedules or to perform respective duties and responsibilities.

14. All interpretations necessary for the installation of those portions of the work where the Designer is responsible, shall be supplied by the Designer.

15. Review and respond to the suppliers submittals of shop drawings, product data, samples, etc., but only for those portions of the design for which the Designer is responsible, and for conformance only with the information given in the documents. The Designer's review of shop drawings, product data and samples shall not relieve the Agency and its suppliers and/or installers of responsibility for any deficiencies in, or deviations from the requirements of the Documents, unless written notice is given to the Designer at the time of submittal.

16. The Designer shall review the placement of all items to determine that the modular furniture and related equipment have been installed in accordance with the Documents, or shall provide directions to alter locations.

Firms wishing to be considered for one or more of the contracts described in this announcement may send their brochure and other pertinent information to Division of State Building Construction, Room G-10, State Administration Building, St. Paul, Minnesota 55155, Attn: George Iwan.

Department of Administration

Notice of Pre-Bid Meeting for Hazardous Waste Analysis, Transportation, Storage and Disposal Contract

NOTICE IS HEREBY GIVEN of a hazardous waste analysis, transportation, storage and disposal contract pre-bid meeting to be held March 20, 1991, 1:00 p.m. to 4:00 p.m. at the Minnesota Pollution Control Agency, ETC Bldg., East Entrance, 1450 Energy Park Drive, (off Snelling Avenue), St. Paul, Minnesota. Contact Person: Norma Cameron, State Department of Administration, 612-296-3779.

Department of Administration

Risk Management Division

Notice of Availability of a Request for Proposal on Provision of Insurance Agency and Risk Management Services to all State Departments and Agencies

The Department of Administration herein gives notice of the availability of a request for proposals on provision of insurance agency and risk management services to all state departments and agencies. In fiscal year 1990 the state spent $1.0 million on insurance.

The Department is seeking to contract with one or more "preferred" insurance agents or insurance companies in the interests of: (1) minimizing the total cost of risk to the state; (2) development of a comprehensive risk management approach to the handling of the state's risk, (3) effective procurement of insurance and, (4) the availability of risk management services (broad definition) to help the state to address these risk management issues.

An informational meeting for all potential proposers will be held on Wednesday, March 27, 1991, 9:00-10:30 a.m. in the State Administration Building, 50 Sherburne Avenue, St. Paul, MN, Room 116A. This will be an opportunity for proposers to ask questions regarding the RFP.

A copy of the request for proposal can be obtained through the mail by calling the Department at (612) 296-6022 or by writing to Marlys Lockman, Department of Administration, Risk Management Division, 309 Administration Building, 50 Sherburne Avenue, St. Paul, MN 55155.

The deadline for receipt of proposals is set for 4:00 p.m. April 10, 1991.

Department of Commerce

Notice of Request for Proposals for Board Counsel for the Medical Malpractice Joint Underwriting Association

The Department of Commerce, on behalf of the MMJUA, is requesting proposals from qualified law firms to provide board counsel to the Medical Malpractice Joint Underwriting Association (MMJUA). Proposals should include:

1. Evidence of competency, including backgrounds, training and experience of specific lawyers within the firm.

2. A fee schedule including hourly rates for specific lawyers as well as legal assistants and clerical staff.

3. A minimum of three references.

Please submit proposals by April 15, 1991, to:

Beth Eulberg
Minnesota Joint Underwriting Association
Pioneer P.O. Box 1760
St. Paul, MN 55101

Department of Commerce

Notice of Request for Proposals for Defense Counsel for the Medical Malpractice Joint Underwriting Association

The Department of Commerce, on behalf of the MMJUA, is requesting proposals from qualified firms to provide defense counsel to the Medical Malpractice Joint Underwriting Association (MMJUA). The MMJUA intends to compile a list of qualified firms which the MMJUA Board may draw upon in the event a lawsuit it brought against one of its insureds. Firms already on the list need not reapply to be considered.

Proposals should include:

1. Evidence of competency in the area of medical malpractice including backgrounds, training and experience of specific lawyers within the firm.

2. A fee schedule including hourly rates for specific lawyers as well as legal assistants and clerical staff.

3. A minimum of three references.

Please submit proposals by April 15, 1991, to:

Beth Eulberg
Minnesota Joint Underwriting Association
Pioneer P.O. Box 1760
St. Paul, MN 55101
(612) 222-0484

Department of Commerce

Request for Proposals for Provision of Policy Administration, Accounting, Claims Management, and Other Services for the Minnesota Medical Malpractice Joint Underwriting Association

The Department of Commerce, on behalf of the Minnesota Medical Malpractice Joint Underwriting Association, is soliciting proposals from vendors of risk management and insurance services to contract with the Association for the provision of policy administration, accounting, claims management, and such other services as are necessary to administer and conduct the affairs of the Association.

Parties interested in obtaining a copy of the Request for Proposals, which fully describes the requirements of the contract, can be obtained by contacting:

Beth Eulberg
Minnesota Joint Underwriting Association
Pioneer P.O. Box 1760
St. Paul, MN 55101
(612) 222-0484

Proposals must be received by 4:30 p.m. April 15, 1991. All proposals will be forwarded to the Board of Directors of the Association for its consideration.

Pollution Control Agency

Notice of Request for Proposals for Consultant Services to Prepare an Environmental Impact Statement for a Medical Waste Incinerator

The Minnesota Pollution Control Agency (MPCA) wishes to retain a consultant for the preparation of an Environmental Impact Statement (EIS) for the proposed Mayo Foundation medical waste incinerator in the city of Rochester, Olmsted County, Minnesota. The consultant contractor will be preparing the Technical Work Papers (TWPs) for submission to the MPCA for review and approval and then using the TWPs in preparation of the draft and final EIS documents. A pre-bid meeting with the EIS staff team has been scheduled for those interested in bidding on the project. The meeting has been set for March 20, 1991, from 1:30 to 3:30 p.m. in the Central Board Room at the MPCA offices, 520 Lafayette Road, St. Paul, Minnesota 55155.

Copies of the Request for Proposals for the project are available from:

Kathryn Kramer
Environmental Analysis Office
Minnesota Pollution Control Agency
520 Lafayette Road
St. Paul, Minnesota 55155
(612) 297-8236

Proposals must be submitted on recycled and recyclable paper and the pages printed on both sides. Proposals must be received by the MPCA by March 28, 1991, by the close of business at 4:30 p.m. The MPCA reserves the right to reject any and all proposals.

Department of Trade and Economic Development

Community Development Division

Request for Proposal for Loan Portfolio Evaluation

The Minnesota Department of Trade and Economic Development is requesting proposals for an evaluation of its current loan portfolio for the Small Business Development Loan Program, Agricultural Resource Loan Guarantee Program, and Tourism Loan Program. This request for proposal does not obligate the State to complete the project, and the State reserves the right to cancel the solicitation if it is considered to be in its best interest.

A. Scope of Project

The purpose of this project is to evaluate approximately 80 loans that have been made under the above listed programs to determine the overall quality of the loans, including the credit quality of the loan portfolio and an examination of the specific risk associated with each loan. This information will provide an independent assessment of the loan portfolio which will assist the Department in evaluating its loan programs. The results of this assessment will be provided in the form of a written report.

B. Goals and Objectives

The goal of this project is to obtain a written assessment by a knowledgeable, independent expert of the loans made under the above listed programs so that the information may be used by the Department to evaluate its lending procedures and criteria and make improvements where needed.

C. Project Tasks

The project shall include completion of the following specific tasks:

1) The contractor shall first meet with program staff to develop the necessary background information about the purpose, nature and structure of each program before beginning review of the loan portfolio.

2) The contractor shall assess each individual loan utilizing the information available in the program files and, if necessary, additional information obtained from participating financial institutions.

3) The contractor shall submit a written assessment of each loan including a specific assessment of the overall quality of each loan, the degree of risk associated with each loan, the quality of the collateral used to support each loan, the credit worthiness of the loan recipient, and other factors related to the viability of the loan.

4) The contractor shall present an oral summary of the assessment to officials of the Department upon completion of the written report.

5) The contractor shall supply the Department with five copies of the written report upon completion of the project.

NOTE: The responder may propose additional tasks or activities if they will substantially improve the results of the project.

D. Department Contacts

Prospective responders who have any questions regarding this Request for Proposal may call or write:

Paul Moe
Director, Agricultural and Economic Development Unit
Community Development Division
Department of Trade and Economic Development
900 American Center Building
150 East Kellogg Boulevard
St. Paul, MN 55101-1421
Phone: 612/297-1391

or

Wayne Sames
Director, Outdoor Recreation Unit
Community Development Division
Department of Trade and Economic Development
900 American Center Building
150 East Kellogg Boulevard
St. Paul, MN 55101-1421
Phone: 612/296-1567

PLEASE NOTE: Other Department personnel are not allowed to discuss the project with responders before the submittal of proposal deadline.

E. Submission of Proposals

All proposals must be sent to and received by:

Paul Moe
Director, Agricultural and Economic Development Unit
Community Development Division
Department of Trade and Economic Development
900 American Center Building
150 East Kellogg Boulevard
St. Paul, MN 55101-1421
Phone: 612/297-1391

Not later than 4:30 p.m., Wednesday, March 27, 1991.

Late proposals will not be accepted. Submit 5 copies of proposal. Proposals are to be sealed in mailing envelopes or packages with the responders name and address clearly written on the outside. Each copy of the proposal must be signed, in ink, by an authorized member of the firm. Prices and terms of the proposal as stated must be valid for the length of the project.

F. Project Completion Date

The project will be completed by May 31, 1991; or within seven weeks from the date of project authorization.

G. Proposal Contents

The following will be considered minimum contents of the proposal:

1) A restatement of the objectives, goals and tasks to demonstrate the responder's view of the nature of the project.

2) Identification and description of the work products to be provided by the responder.

3) An outline of the responder's background and experience with particular emphasis on expertise related to financial institutions and mechanisms, loan analysis, and general lending standards and criteria. Identify the personnel that will conduct the project and detail their training and work experience. No change in personnel assigned to the project will be permitted without the approval of the State Project Director/Manager.

4) The responder will prepare a detailed cost and work plan which will identify the major tasks to be accomplished and general timetable for completing the project. This will be used as a scheduling and managing tool as well as a basis for invoicing.

5) Identification of the level of the Department's required participation in the project as well as any other services to be provided by the Department.

H. Evaluation

All proposals received by the deadline will be evaluated by representatives of the Department of Trade and Economic Development. An interview may be part of the evaluation process. Factors upon which proposals will be judged include, but are not limited to, the following:

1) Expressed understanding of the project objectives.

2) The quality and clarity of the work plan.

3) The level of detail and appropriateness of the cost breakdown.

4) The qualifications of both the company and the personnel. Experience of project personnel will be given greater weight than that of the firm.

Evaluation and selection will be completed by April 10, 1991. All responders will be notified by mail as to the results of the evaluation and selection process.

Department of Trade and Economic Development

Office of Tourism

Request for Proposal for Creative, Design and Typesetting Services for Explore Minnesota Northcentral/West Travel Directory

The Minnesota Office of Tourism is seeking proposals for creative, design and typsetting services for future issues of the Explore Minnesota Northcentral/West travel directory. The services will be provided under a contract for a period of one year, with two one-year renewal options that can be exercised by mutual consent of both parties.

The directory, which is produced by the Northcentral/West Regional Office of Tourism, Brainerd, in cooperation with the Minnesota Heartland/Vikingland Association, will contain at least 88 pages with increases possible of up to 96 pages.

The design firm will be free to recommend design changes to the directory. A per page design/creative, and typesetting costs are required.

The Office of Tourism reserves the right to select a vendor in close geographic proximity to Brainerd if it appears in the state's best interest to do so.

The publication has a print run of about 150,000 copies, many of which are distributed at sports shows and by direct mail in response to advertising generated inquiries.

Editorial and advertising content of the publication is in an approximate 40/60 editorial/advertising ratio.

For further information, a listing of key elements of the publication, specific contractor duties and a copy of the 1991 issue, contact: Susan Lasley at 612/297-3879.

Proposal Submissions

Those interested should submit a summary of experience, work plan, a per page fee schedule for the services to be provided, a portfolio, and the name, title, address and phone number of the person empowered to negotiate a contract as a result of the proposal to:

Susan Lasley, Creative Services Manager
Minnesota Office of Tourism
375 Jackson Street
250 Skyway Level
St. Paul, MN 55101

Potential vendors are cautioned that only Susan Lasley is empowered to discuss and provide information on this project.

Deadline for submissions: 4:30 p.m.—March 26, 1991.

Dated: 4 March 1991

E. Peter Gillette, Commissioner
Minnesota Department of Trade and Economic Development

Department of Trade and Economic Development

Office of Tourism

Request for Proposal for Creative, Design and Typesetting Services for Explore Minnesota Northeastern Travel Directory

The Minnesota Office of Tourism is seeking proposals for creative, design and typesetting services for future issues of the Explore Minnesota Northeastern travel directory. The services will be provided under a contract for a period of one year, with two one-year renewal options that can be exercised by mutual consent of both parties.

The directory, which will be at least 64 pages in length, is produced by the Minnesota Northeastern Regional Office of Tourism, Duluth, in cooperation with the Minnesota Arrowhead Association. Depending upon the amount of advertising sold, editions for 1992 and subsequent years may have page lengths increased by multiples of eight pages.

The design firm will be free to recommend design changes to the directory. A per page design/creative, and typesetting costs are required.

The Office of Tourism reserves the right to select a vendor in close geographic proximity to Duluth if it appears in the state's best interest to do so.

The publication has a print run of about 175,000 copies, many of which are distributed at sports shows and by direct mail in response to advertising generated inquiries.

Editorial and advertising content of the publication is in an approximate 40/60 editorial/advertising ratio.

For further information, a listing of key elements of the publication, specific contractor duties and a copy of the 1991 issue, contact: Susan Lasley at 612/297-3879.

Proposal Submissions

Those interested should submit a summary of experience, work plan, a per page fee schedule for the services to be provided, a portfolio, and the name, title, address and phone number of the person empowered to negotiate a contract as a result of the proposal to:

Susan Lasley, Creative Services Manager
Minnesota Office of Tourism
375 Jackson Street
250 Skyway Level
St. Paul, MN 55101

Potential vendors are cautioned that only Susan Lasley is empowered to discuss and provide information on this project.

Deadline for submissions: 4:30 p.m.—March 26, 1991.

Dated: 4 March 1991

E. Peter Gillette, Commissioner
Minnesota Department of Trade and Economic Development

Department of Trade and Economic Development

Office of Tourism

Request for Proposal for Creative, Design, Typesetting and Prepress Services for Explore Minnesota Southern Travel Directory

The Minnesota Office of Tourism is seeking proposals for creative, design, typesetting and prepress services for future issues of

the Explore Minnesota Southern travel directory. The services will be provided under a contract for a period of one year, with two one-year renewal options that can be exercised by mutual consent of both parties.

The directory is produced by the Southern Minnesota Office of Tourism, Mankato, in cooperation with the southern Minnesota Tourism Association. The directory is scheduled to be 112 pages in length, but if sufficient advertising is sold, the page length may be increased in multiples of eight pages.

The design firm will be free to recommend design changes to the directory. A per page design/creative, typesetting and prepress costs are required.

The Office of Tourism reserves the right to select a vendor in close geographic proximity to Mankato if it appears in the state's best interest to do so.

The publication has a print run of about 150,000 copies, many of which are distributed at sports shows and by direct mail in response to advertising generated inquiries.

Editorial and advertising content of the publication is in an approximate 25/75 editorial/advertising ratio.

For further information, a listing of key elements of the publication, specific contractor duties and a copy of the 1991 issue, contact: Susan Lasley at 612/297-3879.

Proposal Submissions

Those interested should submit a summary of experience, work plan, a per page fee schedule for the services to be provided, a portfolio, and the name, title, address and phone number of the person empowered to negotiate a contract as a result of the proposal to:

Susan Lasley, Creative Services Manager
Minnesota Office of Tourism
375 Jackson Street
250 Skyway Level
St. Paul, MN 55101

Deadline for submissions: 4:30 p.m.—March 26, 1991.

Potential vendors are cautioned that only Susan Lasley is empowered to discuss and provide information on this project.

Dated: 4 March 1991

E. Peter Gillette
Minnesota Department of Trade and Economic Development

Minnesota Workers' Compensation Assigned Risk Plan

Notice of Request for Proposal for a Qualified Actuary to Provide Services to the Minnesota Workers' Compensation Assigned Risk Plan (MWCARP)

The MWCARP intends to contract with an actuary to perform an audit of its reserves, and to assist in the development of future rates. The contract period will commence on May 15, 1991 and run for a two or three year period. The deadline for submission of proposals is 4:00 p.m., April 12, 1991. Interested parties may obtain the formal Request for Proposal from:

MWCARP Administrative Office
4500 Park Glen Road Suite 360
Minneapolis, Minnesota 55416
(612) 924-6972

State Grants

In addition to requests by state agencies for technical/professional services (published in the State Contracts section), the *State Register* also publishes notices about grant funds available through any agency or branch of state government. Although some grant programs specifically require printing in a statewide publication such as the *State Register*, there is no requirement for publication in the *State Register* itself.

Agencies are encouraged to publish grant notices, and to provide financial estimates as well as sufficient time for interested parties to respond.

Office of Waste Management

Notice of Grant Funds Available to Assist in the Development and Implementation of Hazardous Waste Processing Facilities

The Minnesota Office of Waste Management (OWM) is a state agency established by the Minnesota Legislature to provide financial and technical assistance to industry and local governments to encourage the proper management of hazardous and solid waste. In the area of hazardous waste, the OWM's objective is to prevent pollution at the source and if wastes cannot be prevented to provide for the orderly development of facilities to treat those wastes. The OWM's Hazardous and Problem Waste Unit provides financial and technical assistance to companies and interested developers to accomplish these objectives.

This notice is issued by the Director of the OWM (Director) under authority provided in *Minnesota Rules* Parts 9205.0100 to 9205.0110. Under this authority, the OWM has established the Hazardous Waste Processing Facility Grant Program, which provides grants to persons who wish to operate specific commercial collection or processing facilities in the state.

The purpose of this notice is to solicit applications to conduct studies for projects that meet the Facility Development program objectives. The Facility Development Program is intended to encourage and assist the development and implementation of hazardous waste processing facilities.

In general, persons who are capable of developing and operating specific hazardous waste processing facilities are eligible to apply for funding in this program. Specifically, for this solicitation the OWM is limiting, via Part 9205.0220 Subp. 2, applicants to persons who operate existing permitted hazardous waste processing and/or storage facilities in Minnesota and wish to expand their facility to include stabilization. Applicants must be willing to consider managing Minnesota's entire potential stabilization waste stream, as identified in Minnesota's *Capacity Assurance Plan*, 1989 and *Revised Draft Facility Development Report*, 1988. Applicants must also be willing to design a stabilization process which will result in a delisted and/or decharacterized residual.

Proposals are eligible for the following types of work which are preliminary to the development and operation of commercial stabilization facilities:

A. market assessment;

B. conceptual design and preliminary engineering;

C. financial and business planning;

D. environmental analysis and preparation of permit applications; and

E. analysis of methods to overcome identified technical, institutional, legal, regulatory, market, or other problems associated in developing or operating a facility.

A complete listing of eligible work is contained in *Minnesota Rules* Part 9205.0200, subpart 2.

The maximum amount available for a grant is $45,000. A match of 50 percent of the total project cost is required by the applicant. Grant money may not be spent for capital costs or equipment.

Copies of the rules applicable to the program are available by contacting:

David Cera
Minnesota Office of Waste Management
1350 Energy Lane
St. Paul, MN 55108
612-649-5742 or 1-800-652-9747 (toll-free in Minnesota)

Preliminary applications meeting the requirements of *Minnesota Rules* Parts 9205.0100 to 9205.0110 must be received by the OWM at the above address by 4:30 p.m., CST, Friday, April 5, 1991.

Announcements

Environmental Quality Board (EQB): Comments are due April 3 on the EAWs (environmental assessment worksheets) for the following projects at their listed regional governing unit: **University of St. Thomas—Minneapolis Campus,** City of Minneapolis (612) 673-2351; **Peoples Natural Gas Co. Proposed Pipeline—Ivanhoe to Canby,** EQB (612) 296-5089, with a public information meeting to receive comments on the EAW on March 19 at 7:00 p.m. at the Community Center in the Canby City Hall, 110 Oscar Avenue North, Canby. • A Scoping Decision was approved for the **Burnsville Sanitary landfill** by the Metropolitan Council on February 28. Call (612) 291-6359 for information. A Scoping Decision document is available on the **Lake Harbor Estates Project,** Cass County. Contact Carol Millard, Cass County Zoning Administrator, Cass County Courthouse, Walker, MN 56484. A Scoping Decision document for **Cove View,** Cass County has been prepared. Contact same as above scoping decision. • The Minnesota Dept. of Agriculture has received a Special Local Need registration application for the use of Furadan 4F Insecticide/Nematicide, EPA Reg. 279-2876 for a soil incorporated application for the control of nematodes and insects when establishing new stands of direct seeded alfalfa anywhere in Minnesota by the FMC Corporation. Contact Calvid Blanchard 297-2530 with comments.

Arts Courses for Teachers: Teachers are invited to register through June 14, 1991, for **Folk Art, Folk Culture, and Classroom Teaching,** a six-day course to help integrate multi-cultural arts experiences into the curriculum. The course is open to all K-12 Minnesota teachers, but is especially designed for social studies and art teachers. Folk Art, Folk Culture, and Classroom Teaching will be held July 22-27, 1991, at air-conditioned Woodbury High School in the South Washington County School District. The class will run from Monday through Saturday, 9 a.m. to approximately 4:30 p.m. Under the supervision of professional folklorists, teachers will work in groups to interview folk artists and take slides of their work. With the help of curriculum specialists, teachers will use the slides and interview materials to develop their own classroom materials. Special folk arts presentations will include an African-American storyteller, a Polish paper cutter, and an Ojibway basketmaker. Folk Art, Folk Culture and Classroom Teaching is offered as part of the Minnesota Arts eXperience (MAX), a series of summer arts workshops for teachers and students sponsored by the Minnesota Center for Arts Education. The cost for taking the workshop is $40. Three graduate credits are available from Winona State University for $156.27. Continuing education unit credits are available at no charge. Interested teachers should call the Minnesota State Arts Board for registration materials at (612) 297-2603, or toll free from greater Minnesota at (800) 652-9747.

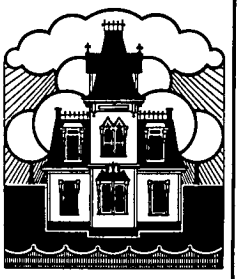
Public Comments Sought at Wildlife Meetings: Several proposed wildlife hunting regulation changes will be discussed at a series of public input meetings being conducted around the state in March by the Minnesota Department of Natural Resources (DNR). The public is invited to provide oral or written comments on these or any other wildlife-related topics. In addition to the six previously announced locations, DNR Commissioner Rodney Sando announced a seventh wildlife public meeting at the DNR headquarters in St. Paul on Tuesday, March 26, at 7 p.m. Issues to be discussed include proposals to: • Prohibit baiting as a deer hunting technique. • Establish north and south zones for waterfowl hunting. • Change the pheasant limit to allow six birds in possession, with a daily limit of either two or three. • Authorize bonus bowhunting licenses in undersubscribed firearms permit areas. • Change or simplify some antlerless permit area boundaries. • Extend northward the area open for December bowhunting. • Continue the fall turkey hunt, with a possible expansion. • Open water trapping seasons on Oct. 26 in the north and Nov. 2 in the south. • Add additional migratory waterfowl feeding and resting areas. All meetings will begin at 7 p.m.

Applications for DNR Youth Conservation Corps: Applications are being accepted for corpsmembers for the Department of Natural Resources' Minnesota Conservation Corps (MCC). Seventy corpsmember positions are open for youth between the ages of 15 and 18 to work on seven-member conservation crews. The work is labor intensive. Participants build trails, clear campsites, construct erosion control projects, and do general maintenance work in state parks, in forests and on trails. MCC corpsmembers work outdoors and learn environmental and conservation skills. In addition, MCC offers career development through classes on topics such as: careers in natural resources, life skills, career education planning, and job interviewing. On weekends, MCC members canoe, hike and enjoy other high-adventure activities, including a challenge ropes course. Corpsmembers work 35 hours a week and earn $4.25 per hour. The camp will run from June 16 to Aug. 10. Youth applications are due May 1. MCC hires an equal number of female and male corpsmembers, and encourages minority youth applicants. Twenty hearing-impaired youth, who will work with hearing-impaired staff and sign language interpreters, will be hired to work at the St. Croix State Park Camp. For more information, contact: Minnesota Conservation Corps, 500 Lafayette Road, St. Paul, MN 55155-4004; phone (612) 296-5042.

Minnesota Forest Resources Plan Ready: A draft update of the Minnesota Forest Resources Plan (MFRP), Program Direction for Fiscal Years 1991-1995, is open to public review according to the Department of Natural Resources (DNR). The Division of Forestry is acutely aware of the budgetary crisis facing state and federal governments. The division's expenditures for continuing operations (excluding pass through grants and emergency fire funds) decreased 15 percent in terms of constant 1985 dollars between 1985 and 1990. With the end of the $3 million annual forest management intensification effort designed to offset forest land withdrawal for the BWCA and the elimination of the dedicated Forest Management Fund in the state treasury, the money available for on-the-ground forest management activities may be as much as 60-70 percent lower over the next five years compared to the late 1980s. Questions regarding the plan or requests for meetings to further discuss the division's proposed program direction can be directed to Tom Polasik at (612) 297-2213, or John Olson at (612) 297-2116. Written comments can be sent to: MFRP, DNR Division of Forestry, 500 Lafayette Road, St. Paul, MN 55155-4044. The review and comments period ends March 22, 1991.

Interstate Trail Logo Needed; Reward Offered: **Wanted:** Creative persons, artists, to design logo for the Gandy Dancer multi-use trail that runs through Polk, Burnett and Douglas counties in Wisconsin and Pine and Carlton counties in Minnesota. **Reward offered:** A full-color, 130-page "Traveler's Guide to Wisconsin's State Parks and Forests," plus Minnesota and Wisconsin state parks stickers (for free admission to all Minnesota and Wisconsin state parks), plus an engraved plaque featuring the winning design. The Gandy Dancer, Wisconsin and Minnesota's newest recreational trail, will be built on an abandoned Soo Line railroad grade. The 90-mile trail derives its name from the men who pounded the spikes, laid the rails and maintained the line. For a copy of the design contest rules and an entry form, write: Jim Schweiger, Gandy Dancer Trail Logo Contest, PO Box 309, Spooner, Wis. 54801.

Getaway in Style



Room at the Inn Wisconsin. Includes hard-to-find lodgings in out-of-the-way places, as well as in Wisconsin's major metropolitan areas and most popular vacation destinations. 224pp. Stock #19-3. $9.95 plus tax.

Room at the Inn Minnesota. Looking for a weekday or weekend get-away? For a business meeting or simply pleasure? This is the only guide to more than 60 historic "Bed & Breakfast" homes, hotels, and country inns. 160pp. Stock #19-72, $9.95 plus tax.

Roughing It Elegantly. A guide for the canoe camper visiting the BWCA, Voyageurs Park and Quetico Provincial Park. Full of practical tips and information: planning, organizing, packing, site location, and camp set-up. Simple, creative, enjoyable meals are a major feature. 159pp. Stock #9-3, $9.95 plus tax.

Guide to Wilderness Canoeing. A unique blend of practical information and personal philosophy. Subjects covered include: spring and fall canoeing, traditional versus modern canoe design, and different paddling techniques. 143pp. Stock #19-81, $6.95 plus tax.

TO ORDER: Send to Minnesota's Bookstore, 117 University Avenue, St. Paul, MN 55155. Call (612) 297-3000, or toll-free in Minnesota: 1-800-652-9747. Minnesota residents please include 6% sales tax. On all orders, add $2.00 per order for postage and handling. Prepayment is required. Please include daytime phone. VISA/MasterCard and American Express orders accepted over phone and through mail. ***Prices are subject to change.*** FAX: (612) 296-2265.

Publication editors: As a public service, please reprint this ad in your publication, either as is, reduced, or redesigned to suit your format.

Armchair Adventures in Minnesota

Our Minnesota. More than 100 full-color photos by Les and Craig Blacklock portray Minnesota in her seasonal beauty, with text from the personal journal of Fran Blacklock's thirty years of traveling the state. Stock #9-23. $13.95 plus tax.

Minnesota Geographic Names. Place names by the thousand, with even more intriguing historical tidbits, in this over 800-page book. A must for the Minnesota-lover! Stock #17-13, $12.95 + tax.

Historic Sites and Place Names of Minnesota's North Shore. John Fritzen, long time employee of the Minnesota DNR draws upon his almost 40 years as a forester, mostly spent on Minnesota's colorful and legendary North Shore, to regale readers with tales of timbermen, pioneer settlers, miners, commercial fishermen and others. Black and white photos. Stock No. 1-89. $17.00.

TO ORDER: Send to Minnesota's Bookstore, 117 University Avenue, St. Paul, MN 55155. Call (612) 297-3000, or toll-free in Minnesota: 1-800-652-9747. Minnesota residents please include 6% sales tax. On all orders, add $2.00 per order for postage and handling. Prepayment is required. Please include daytime phone. VISA/MasterCard and American Express orders accepted over phone and through mail. ***Prices are subject to change.*** FAX: (612) 296-2265.

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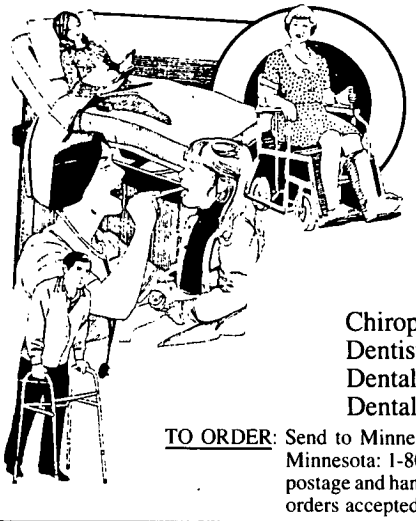

Reach Minnesota's health care field decision makers

Health Care Facilities Directory 1989

A list of hospitals and related institutions licensed and/or certified to deliver various levels of care. The list is alphabetical by county, town and facility name. Stock No. 1-89. $17.95.

Mailing Lists of Health Care Professionals Licensed by the State of Minnesota Now Available

Call 297-2552 for more information or write to the address below for your free mailing list service packet.

Chiropractors	Medical Corporations (Clinics)	Pharmacists
Dentists	Registered Nurses	Physical Therapists
Dental Assistants	Licensed Practical Nurses	Physicians
Dental Hygienists	Pharmacies	Veterinarians

TO ORDER: Send to Minnesota's Bookstore, 117 University Avenue, St. Paul, MN 55155. Call (612) 297-3000, or toll-free in Minnesota: 1-800-652-9747. Minnesota residents please include 6% sales tax. On all orders, add $2.00 per order for postage and handling. Prepayment is required. Please include daytime phone. VISA/MasterCard and American Express orders accepted over phone and through mail. ***Prices are subject to change.*** FAX: (612) 296-2265.

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Minnesota's North Shore

Historic Sites and Place Names of Minnesota North Shore. Stories recounted by a retired DNR Forester about the North Shore's timbermen, pioneer settlers, commercial fishermen, and others who knew the area first hand. Stock #9-11. 35pp. $3.50 + tax.

Up North. A memorable collection of essays and stories that capture the mystic moods, seasonal subtleties and colorful characters that fill the landscape up north. Stock #19-16. $14.95 + tax.

A Family Guide to Minnesota's North Shore. The 150 miles from Duluth to the Canadian border offer travelers wilderness experiences, places of historic significance, and visions of astonishing beauty. Stock #19-84. $3.95 + tax.

Boundary Waters. Almost 100 pages of beautiful color photographs of Minnesota's canoe country, by Jerry Stebbins with rich text by Greg Breining. Stock #19-69. $24.99 + tax.

Minnesota II. Colorful photographs showing the lyrical balance between country and city, land and water, inhabited by 4.2 million people across 84,000 square miles. A delight for the eyes, with photos by Richard Hamilton Smith and text by Richard A. Coffey. Stock #19-30. $32.50 + tax.

TO ORDER: Send to Minnesota's Bookstore, 117 University Avenue, St. Paul, MN 55155. Call (612) 297-3000, or toll-free in Minnesota: 1-800-652-9747. Minnesota residents please include 6% sales tax. On all orders, add $2.00 per order for postage and handling. Prepayment is required. Please include daytime phone. VISA/MasterCard and American Express orders accepted over phone and through mail. ***Prices are subject to change.*** FAX: (612) 296-2265.

Publication editors: As a public service, please reprint this ad in your publication as is, reduced, enlarged, or redesigned to suit your format. Thank you.

River Stories That Warm Your Heart

A Stretch on the River. 1950 novel about the son of a wealthy family who goes to work on a Mississippi River towboat to avoid being drafted. With power, gusto and humor, author Richard Bissel creates an energetic, rowdy, and delightful account of a typical trip up the river, accurately re-creating a colorful era of towboating on America's major waterway. Stock #17-6, $8.95 plus tax.

High Water. During the worst flood on the Mississippi River anyone can remember, the mate of a towboat has his hands full on a perilous trip, working with an unhappy crew, an angry captain, and too many barges to push against too much river. A 1954 Richard Bissel novel reveals the drama, humor and charm of working on the river. Stock #17-8. $8.95 plus tax.

Old Times on the Mississippi River. George Merrick's lively, loving, and humorous reminiscences of his steamboat life from the bottom up, as a pantry boy, apprentice engineer, second clerk, and "cub" pilot. First published in 1909, he describes steamboat operations—from machinery and personnel to the economics of the business—with vivid examples and rich detail. 323 pp. includes appendices and index. Stock #17-45. $8.95 plus tax.

Canoeing with the Cree. Minnesota's distinguished newsman, Eric Sevareid, wrote his first book in 1935 about a canoe journey he and a classmate made to Hudson Bay. The classic recounts their trip on the Mississippi, Minnesota and Red River of the North Rivers into Lake Winnipeg and then God's River to Hudson Bay. 209 pp. includes index, maps and photos. Stock #17-14. $6.95 plux tax.

TO ORDER: Send to Minnesota's Bookstore, 117 University Avenue, St. Paul, MN 55155. Call (612) 297-3000, or toll-free in Minnesota: 1-800-652-9747. Minnesota residents please include 6% sales tax. On all orders, add $2.00 per order for postage and handling. Prepayment is required. Please include daytime phone. VISA/MasterCard and American Express orders accepted over phone and through mail. ***Prices are subject to change.*** FAX: (612) 296-2265.

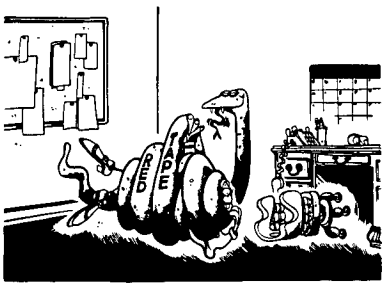
Publication editors: As a public service, please reprint this ad in your publication, either as is, reduced, or redesigned to suit your format.

Now ⅓ Off—Save $5

Relax. Unwind. Cut your frustrations with the ***Minnesota Guidebook to State Agency Services 1987-1990.***

Packed with information that cuts red tape and gets results fast, the ***Guidebook*** tells you how to put your tax dollars TO WORK FOR YOU! It tells how to obtain grants, scholarships, assistance, information services, tax help and forms, maps, reports, guides, newsletters and publications.

You'll gain access to state agencies like never before and have AT YOUR FINGERTIPS emergency phone numbers, crisis and hot lines. This ***Guidebook*** will save you valuable time and money by



speedily getting you through the fears of license requirements, forms, fees, application and complaint filing, and even tells the length of waiting time for obtaining services.

Need to know about license requirements for your profession and for recreation? IT'S A BREEZE with the ***Guidebook*** on your desk. It's a treasure of information on state parks, campgrounds, state forests and wildlife management areas, historic sites, museums, art galleries, festivals, libraries, education resources, agency descriptions with names and phone numbers of real people, statistical data and historical profiles.

It's "MINNESOTA'S OWNER'S MANUAL"—the handiest, fact-filled resource that answers thousands of your questions about Minnesota and how it works. Order today before they're gone. Stop struggling with bureaucratic red tape! Stock #1-4, 640 pages. Now $9.95 + 60¢ tax. FAX: (612) 296-2265.

Publication editors: As a public service, please reprint this ad in your publication as is, reduced, enlarged, or redesigned to suit your format. Thank you.

Social workers', counselors' and therapists' guides and directories

It's Never OK. A handbook for professionals on sexual exploitation by counselors and therapists. It covers the therapeutic and prevention issues and employer responsibilities, plus recommended curriculum for training institutions for counselors and therapists. Stock No. 14-16. $19.95 + tax.

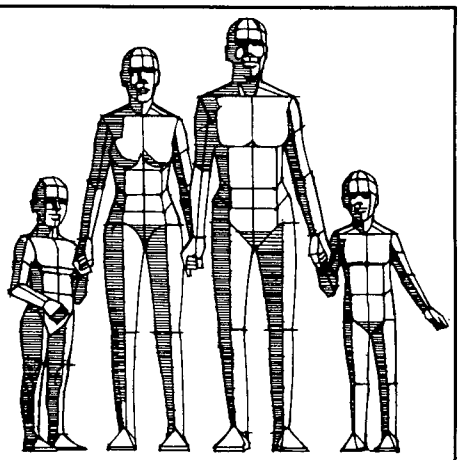
Chemical Dependency Programs Directory 1989. Features comprehensive listings for programs ranging from prevention/intervention services to a wide range of treatment services. Each type of program includes a listing of facilities and description of programs. Stock No. 1-12, $15.00 + tax.

Process parenting—Breaking the Addictive Cycle. This training manual provides parent education and treatment techniques for professionals working with recovering chemically dependent parents or dysfunctional families. Stock No. 5-4, $15.00 + tax.

TO ORDER: Send to Minnesota Documents Division, 117 University Avenue, St. Paul, MN 55155. Call (612) 297-3000, or toll-free in Minnesota: 1-800-652-9747 and ask for "DOCUMENTS." Please include 6% sales tax and $2.00 postage and handling. Prepayment required. Please include daytime phone. VISA/MasterCard and American Express orders accepted over phone. FAX: (612) 296-2265.

Publication editors: As a public service please reprint this ad in your publications. Thank you.

Adoption and Process Parenting



Adoption Resource Directory. This comprehensive resource directory to adoption services and laws will be your best friend if you are looking into adoption. Over 300-pages of research by the Minnesota Dept. of Human Services Adoption Unit make this a valuable tool that includes federal and state adoption laws and policies, information on Minnesota's adoption program and child placement resources. It goes into detail listing support groups, advocacy groups; health, education, social service and vocational resources; and a whole range of assorted community and state resources, and legal services including IRS information. Stock #1-16, $12.45 + 75¢ tax.

Process Parenting: Breaking the Addictive Cycle. This is a curriculum and training manual designed to help chemical dependency treatment counselors to incorporate parent education into their on-going programs. It focuses on positive parent-child interactions and parenting strengths to assist chemically dependent persons develop a more positive view of self, feelings of greater control or influence over situations, understanding of self-defeating behaviors, and increased responsibility within one's social/community situation. 163 pages plus appendices. Stock #5-4, $15.00 + 90¢ tax.

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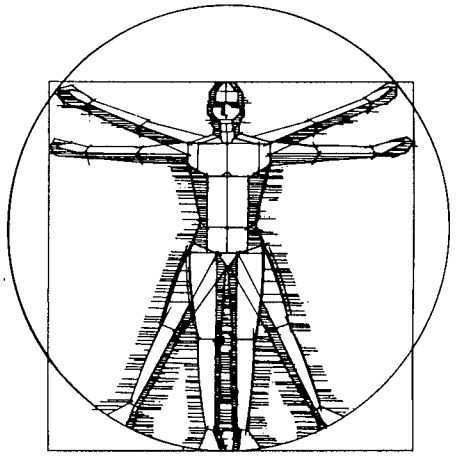
Directory of Chemical Dependency Programs in Minnesota.



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