

PDR

50-263

MAY 8 1969

Mr. John F. Badalich  
Executive Director  
Minnesota Pollution Control Agency  
459 Board of Health Building  
University Campus  
Minneapolis, Minnesota 55440

Dear Mr. Badalich:

With your letter of April 11, 1969, you enclosed a copy of a preliminary draft of a waste disposal permit, dated March 31, 1969, for the Monticello Nuclear Generating Plant. You stated that the Minnesota Pollution Control Agency is considering the issuance of this permit with possible disposition at the next meeting of the Agency scheduled for May 12, 1969. The permit contains a number of "Special Conditions Relating to Radioactive Wastes."

I understand that Mr. Tuveson and you met on April 24 with the Director of Regulation and other members of our staff, and discussed the jurisdiction question.

Since you have invited our comments, I believe it appropriate that I again call your attention to the legal situation as we see it. I understand that a copy of our General Counsel's opinion on this subject, which was published in the Federal Register of May 3, 1969 (pages 7273-7274), was given to you during your recent visit here. The conclusions of the opinion are summarized as follows:

By virtue of the Atomic Energy Act of 1954, as amended, the individual States may not, in the absence of an agreement with the AEC, regulate

Mr. John P. Badalich

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source, byproduct and special nuclear material from the standpoint of radiological health and safety. Even States which have entered into agreements with the AEC lack authority to regulate the facilities described in the Atomic Energy Act, including nuclear power plants and the discharge of effluents from such facilities, from the standpoint of radiological health and safety. To the extent that "Agreement States" have authority to regulate byproduct, source and special nuclear material, their section 274 Agreements require them to use their best efforts to assure that their regulatory programs for protection against radiation hazards will continue to be compatible with the AEC's program for the regulation of byproduct, source and special nuclear material.

Sincerely,

(Signed) Glenn T. Seaborg

Chairman

cc: Mr. Robert C. Tuveson  
Chairman, Minnesota Pollution  
Control Agency

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OFFICE ▶	OGC <i>[Signature]</i>	OGC	DR <i>[Signature]</i>		
SURNAME ▶	Shapar <i>[Signature]</i>		Harold W. Price		
DATE ▶	5/7/69	5/ /69	5/8/69		



STATE OF MINNESOTA  
POLLUTION CONTROL AGENCY  
717 DELAWARE STREET S.E.  
(OAK AND DELAWARE STREETS S.E.)  
MINNEAPOLIS, MINNESOTA  
55440

DR. 2118

April 11, 1969

Dr. Glenn T. Seaborg, Chairman  
U. S. Atomic Energy Commission  
Washington, D. C. 20545

Dear Dr. Seaborg:

I regret the lapse of time in acting and thanking you for the material you forwarded to me under cover of your letter dated March 12<sup>th</sup>, 1969 but the matter of radioactivity in the State of Minnesota has preoccupied a considerable amount of my time as you may be well aware of.

For your information, review and also if you wish to comment, is a copy of the preliminary draft of a waste disposal permit for the Monticello Nuclear Generating Plant dated March 31, 1969 that was the subject of countless hours of discussion during our April 8<sup>th</sup> and 9<sup>th</sup> Agency meetings. Also enclosed, is a copy of the statement of our consultant, Dr. Ernest C. Tsivoglou, made at this hearing.

The discharge permit for this nuclear power plant is being further considered by our Agency members with possible disposition at the next meeting of the Agency scheduled for May 12<sup>th</sup>, 1969. Further questions have been developed by one of our Agency members which we would have clarified by our consultant before further action is taken on this permit.

In any event, the main purpose of my writing is that I expect to be in Washington, D. C. on April 23-24 and possibly on the 25 in conjunction with the meeting with the International Joint Commission. I would, therefore, like to set up an informal meeting with you and/or members of your staff sometime during the latter two days of my Washington trip (24-25). This would be at your convenience to discuss matters relating to the subject of radioactivity and Minnesota's future role in this matter.

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Date 4/14/69  
Time 11:30

Dr. Glenn T. Seaborg, Chairman  
April 11, 1969  
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Accompanying me on this trip will be one or two Agency members  
and a member of my staff.

I appreciate your interest in this matter and trust that the  
proposed arrangements can be made.

Yours very truly,



John P. Badalich, P. E.  
Executive Director

JPB/ee  
Enclosures  
cc: Mr. Robert Tuveson  
Mr. Harold L. Price

MINNESOTA POLLUTION CONTROL AGENCY  
717 Delaware Street, S.E.  
University Campus  
Minneapolis  
55440

WASTE DISPOSAL PERMIT

Monticello Nuclear Generating Plant,  
Northern States Power Company,  
Monticello Township, Wright County

Pursuant to authorization by the Minnesota Pollution Control Agency, and in accordance with the provisions of Minnesota Statutes, 1967, Chapters 115 and 116, a permit is hereby granted to Northern States Power Company, Minneapolis, for disposal of waste from a steam electric generating plant being constructed by the company in the west half of Section 33, Township 122 N, Range 25 W, Wright County, including the discharge of effluents, as herein below specified therefrom to the Mississippi River, subject to the conditions given below:

General Conditions

1. This permit shall not release the permittee from any liability or obligation imposed by Minnesota statutes or local ordinances and shall remain in force subject to all conditions and limitations now or hereafter imposed by law. The permit shall be permissive only and shall not be construed as estopping or limiting any claims against the permittee for damage or injury to person or property, or omissions of the permittee, its agents, contractors or assigns, nor as estopping or limiting any legal claim of the state against the permittee, its agents, contractors or assigns, for damage to state property, or for any violation of subsequent regulations or conditions of this permit.
2. No assignment of this permit shall be effective until it is executed in writing and signed by the parties thereto and thereafter approved by the Agency.
3. No major alterations or additions to the disposal system shall be made without the written consent of the Agency.
4. The use of the disposal system shall be limited to the treatment or disposal of the waste materials or substances described in the permit application dated July 11, 1967, and associated material filed with the Agency.

5. The permit is subject to modification or revocation, and may be suspended at any time for failure to comply with the terms stated herein or the provisions of any other applicable regulations or standards of the Agency or its predecessors, and is issued with the understanding that it does not estop subsequent establishment of further requirements for treatment or control at any time by insertion of appropriate additional clauses herein at the discretion of the Agency if it is considered necessary in order to prevent or reduce possible pollution of the environment.

6. The permittee or assigns shall defend, indemnify and hold harmless the State of Minnesota, its officers, agents and employees, officially or personally, against any and all actions, claims, or demands whatsoever which may arise from or on account of the issuance of this permit, or the construction or maintenance of any facilities hereunder.

7. Certification of completion of the project shall be made immediately after construction is finished. Reports on effluent quality and operational practices shall be submitted regularly every month, and the permit holder shall certify that he is in all respects in conformance with the conditions given in the Agency policy statement of August 22, 1967 entitled, "Policy Regarding Operation Permits for Sewage and Industrial Waste Treatment Works."

#### Special Conditions Relating to Conventional Wastes

1. No raw sewage or treated sewage effluent shall be discharged to surface waters of the state from the plant site.

2. Any additional construction plans and design data which may be required for all disposal systems needed for collection, treatment and disposal of sewage, industrial wastes and other wastes originating at this site, and for effective containment of stored liquids or other polluttional materials, for the prevention of water pollution to conform with the requirements of this permit, shall be submitted together with any other information requested for review by the Agency. All such plans shall meet with the approval of the Agency and the systems be completed before operation of the plant is started.

3. The following standards of quality and purity applicable to the effluent of the holding pond shall not be exceeded at the point of discharge from the pond:

pH value	6.5 - 8.5
Turbidity value	25
5-day biochemical oxygen demand	25 milligrams/liter
Total suspended solids	30 milligrams/liter

4. Cooling facilities shall be provided and operated to insure that the heat content of the cooling water after reasonable dilution and mixing in the river does not raise the temperature of the river above the limits specified below:

<u>Period</u>	<u>Maximum Temperature</u>
July and August, inclusive	86°F (or 5°F above the
June and September, inclusive	80°F ambient temperature
May and October, inclusive	67°F of the river, which
April and November, inclusive	55°F ever is greater, ex-
March and December, inclusive	43°F cept that in no case
January and February, inclusive	37°F shall the river tem-
	perature exceed 90°

The design of treatment works for compliance with the stream standards, unless otherwise specified, shall be based on the seven consecutive day low flow of the river which is equal to or exceeded by 90% of such seven-day minimum average flows of record (the lowest seven-day flow with a once in ten year recurrence interval) for the critical month. The extent of the mixing zone to be permitted will be determined by the Agency at a later date after reviewing the data made available on the characteristics of the river and the effluent and other pertinent considerations.

5. No industrial waste, or other wastes, treated or untreated, shall be discharged into the waters so as to cause any nuisance conditions, including without limitation, the presence of substantial amounts of floating solids, scum, oil, suspended solids, discoloration, obnoxious odors, sludge deposits, slimes, or fungus growths, or other offensive effects; or so as to cause any material increase in any other chemical constituents; or cause any substantial change in any characteristic which may impair the quality of the water so as to render it objectionable or unsuitable for fish and wildlife or as a source of water for municipal, industrial or agricultural purposes; or otherwise impair the quality of the waters for any other uses.

6. The company shall measure the quantity and characteristics of and sample and analyze the industrial wastes, other wastes and stored liquids at the site as may be requested by the Agency, and shall provide the Agency every month with a complete report on such measurements, samples and analyses, together with any other information relating to waste disposal or pollution control which may be requested.

7. Facilities for monitoring the quality of the receiving waters shall be provided and used as requested by the Agency. Results of the monitoring shall be reported to the Agency at monthly intervals.

8. The company shall cause to be made without cost to the state, technical studies and investigations of the biota and quality and related matters pertaining to the waters of the state which receive the plant effluents, or which are in the immediate vicinity of the plant, as may be requested by the Agency. Complete reports shall be submitted annually, or more frequently upon request.

9. Continuous operation of all of the treatment works at their maximum capability consistent with practical limitations and maintenance needs of such works shall be maintained at all times when the plant is in operation and when necessary to provide adequate treatment of the sewage, industrial wastes or other wastes by the terms of this permit.

10. The company shall expeditiously make any changes in waste disposal, monitoring, and reporting practices, and provide any additional treatment works or disposal systems or other safeguards for the prevention of pollution of the environment upon the request of the Agency.

11. Liquid substances which could constitute a source of pollution of the waters of the state shall be stored in accordance with regulation WPC 4. Other wastes as defined by Minnesota statutes, section 115.01, subdivision 4, shall not be deposited in any manner such that the same may be likely to gain entry into these waters. In any case where such substances, either liquid or solid, as a result of accident or natural catastrophe should gain entry into any waters of the state, it shall be the responsibility and duty of the company to inform the Agency in the quickest time possible and immediately remove and recover all such polluttional substances to the fullest extent reasonably possible under existing conditions.

12. The industrial or other waste effluents as discharged shall comply with any and all applicable requirements of effluent standards or river classifications and standards which may be adopted by the Agency for this type of source and/or for these waters in the future.

#### Special Conditions Relating to Radioactive Wastes

1. It is the policy of the Agency that all radioactive pollution of the environment shall be held to the lowest level that is attainable within the limitations imposed by technological feasibility and economic reasonableness. In no case shall members of the public be exposed to radiation beyond the limits recommended by the International Commission on Radiological Protection. In addition, the actual levels of radiation exposure of members of the public shall be kept as far below those limits as possible, consistent with technological feasibility and reasonableness of cost.

2. In keeping with the above policy of the Agency, all technologically feasible and reasonable measures for treatment, control and containment of radioactive wastes from the Monticello nuclear generating plant of the Northern States Power Company shall be employed for the purpose of preventing the release of radioactivity to the environment. Such measures shall include at least, but not be limited to:

(a) all measures for the treatment, control and containment of liquid and gaseous radioactive effluents that are indicated in the Final Safety Analysis Report of the Northern States Power Company, Unit 1, Monticello nuclear generating plant; and



(b) routine removal of radioiodine and halogens from the gaseous effluents to the full extent feasible, the degree of treatment and removal being at least the equivalent of that provided by effective activated charcoal filtration of the entire air ejector offgas flow; and

(c) routine ion exchange treatment (Powdex demineralization or equivalent) of the combined low purity wastes (primarily from floor drains) and the neutralized chemical wastes (primarily from laboratory drains and shop decontamination solution drains). The combined estimated flow is 8,000 gal/day; and

(d) initial inspection of fuel rods for surface contamination with uranium before use in the reactor, and decontamination or replacement of fuel rods that have detectable or significant amounts of uranium on their external surfaces, so as to prevent the use of such fuel rods in the reactor. The plant operator shall report in detail to the agency the measures taken in this regard before startup of the reactor; and

(e) initial thorough inspection of fuel rods to identify those that might develop fission product leaks, and rejection of such rods for use in the reactor; to the full extent possible, development and application of methods and techniques for locating and identifying leaking fuel rods after operation of the reactor begins, so that such rods may be removed during usual fuel replacement operations, or, if necessary, at other times, to prevent excessive release of radioactivity to the environment. The operator shall report in detail to the Agency the actual measures taken in both of these regards before startup of the reactor. If necessary, he shall initiate research and development activities designed to develop the needed effective procedures.

3. The gross beta-gamma radioactivity of liquid effluents released to the plant discharge canal shall be limited to the extent that the annual average gross beta-gamma radioactivity concentration of the water in the discharge canal shall not exceed  $10^{-7}$   $\mu\text{c/ml}$  (100 pc/l) plus the background radioactivity.

4. As an integral part of Special Conditions 3 above, the concentrations of specific radioisotopes in the discharge canal shall not exceed, on an annual average basis, the following limits:

Radioisotope	Average Daily Concentration, $\mu\text{c/ml}$	
	Normal (a) River Flow	Low (b) River Flow
(1)	(2)	(3)
H-3	$2 \times 10^{-8}$	$4 \times 10^{-7}$
F-18	$8 \times 10^{-13}$	$1 \times 10^{-11}$
Na-24	$2 \times 10^{-12}$	$3 \times 10^{-11}$

Radioisotope <u>(1)</u>	Average Daily Concentration, $\mu\text{c}/\text{ml}$	
	Normal (a) River Flow <u>(2)</u>	Low (b) River Flow <u>(3)</u>
Cr-51	$9 \times 10^{-13}$	$1 \times 10^{-11}$
Mn-56	$5 \times 10^{-12}$	$4 \times 10^{-11}$
Co-58	$9 \times 10^{-12}$	$1 \times 10^{-10}$
Co-60	$9 \times 10^{-13}$	$1 \times 10^{-11}$
Sr-90	$4 \times 10^{-13}$	$8 \times 10^{-12}$
Sr-91	$2 \times 10^{-11}$	$4 \times 10^{-10}$
Sr-92	$4 \times 10^{-12}$	$8 \times 10^{-11}$
Tc-99, Mo-99	$1 \times 10^{-10}$	$4 \times 10^{-9}$
I-131	$4 \times 10^{-11}$	$8 \times 10^{-10}$
I-133	$2 \times 10^{-10}$	$4 \times 10^{-9}$
I-135	$6 \times 10^{-11}$	$1 \times 10^{-9}$
Te-132	$6 \times 10^{-13}$	$1 \times 10^{-11}$
Cs-136	$6 \times 10^{-14}$	$1 \times 10^{-12}$
Cs-137	$2 \times 10^{-13}$	$4 \times 10^{-13}$
Ba-139	$4 \times 10^{-13}$	$6 \times 10^{-12}$
Ba-140	$4 \times 10^{-12}$	$6 \times 10^{-11}$

(a) Open cycle - 93 percent of days; no use of cooling towers; discharge canal flow 645 cfs.

(b) Closed cycle - 7 percent of days; full use of cooling towers, discharge canal flow 36 cfs.

In addition to the specific radioisotope concentration limits given in the above table, and on an interim basis until plant operation provides more definite information, the average daily discharge canal concentration of any other radioisotope shall not exceed one three thousandth (1/3,000) of the specific ICRP limit or one three-hundredth (1/300) of the numerical limit for that radioisotope as specified in Appendix B, Table II, Title 10, Part 20 of the USAEC Standards for Protection Against Radiation. In case these two limits differ for any specific radioisotope, the lower limit shall apply.

5. In addition to all of the foregoing liquid effluent radioactivity concentration limits, for any seven consecutive day period the average gross beta-gamma radioactivity concentration of the water in the discharge canal shall not exceed  $5 \times 10^{-7}$   $\mu\text{c/ml}$  (500 pc/l) plus the background radioactivity, and the average concentration of any specific radioisotope in the discharge canal shall not exceed a limit of five times the value given in the above table.

6. The gross-beta-gamma radioactivity of the gaseous effluent released via the plant stack shall not exceed, on an annual average basis, a release rate of 0.01 curie per second. This refers to a total stack air flow of 4,000 cfm, and thereby also specifies the limiting concentration of gross beta-gamma radioactivity in the stack effluent before dilution in the atmosphere.

7. As an integral part of Special Condition 6 above, the concentrations of specific radioisotopes in the stack before release to the atmosphere shall not exceed, on an annual average basis, the following limits:

<u>Radioisotope</u>	Stack Concentration (a)
	<u><math>\mu\text{c/ml}</math></u>
H-3	$4 \times 10^{-9}$
Ar-41	$3 \times 10^{-6}$
Kr-83m	$1 \times 10^{-4}$
Kr-85m	$3 \times 10^{-4}$
Kr-85	$2 \times 10^{-7}$
Kr-87	$1 \times 10^{-3}$
Kr-88	$1 \times 10^{-3}$
Kr-89	$2 \times 10^{-5}$
Xe-131m	$1 \times 10^{-6}$
Xe-133m	$1 \times 10^{-5}$
Xe-133	$3 \times 10^{-4}$
Xe-135m	$4 \times 10^{-4}$
Xe-135	$6 \times 10^{-4}$
Xe-137	$5 \times 10^{-5}$
Xe-138	$2 \times 10^{-3}$

(a) At a total stack air flow of 4,000 cfm.

In addition to the specific radioisotopes limits given in the table immediately above, and on an interim basis until plant operation provides more definite information, the average daily stack concentration of any other radioisotope before release to the atmosphere shall not exceed 10 times the specific ICRP limit for continuous occupational exposure, or 100 times the numerical limit for that radioisotope as specified in Appendix B, Table II, Title 10, Part 20, of the USACE Standards for Protection Against Radiation.

8. In addition to all of the foregoing gaseous (stack) effluent concentration limits, the gross beta-gamma radioactivity of the gaseous effluent released via the plant stack shall not exceed a release rate of 0.05 curie per second for any seven consecutive day period. During such a period, the stack concentrations of specific radioisotopes shall not exceed five times the numerical limits given in Special Condition 7.

A stack release rate of 0.05 curie per second shall automatically sound a plant alarm to warn the plant operator that the weekly release rate limit has been reached.

9. In addition to all of the foregoing gaseous (stack) effluent concentration limits, the gross beta-gamma radioactivity of the gaseous effluent released via the plant stack shall not exceed a release rate of 0.30 curie per second for any 15 minute period. During such a period, the stack concentrations of specific radioisotopes shall not exceed 30 times the numerical limits given in Special Condition 7.

A stack release rate of 0.30 curie per second shall automatically sound a second and different alarm to warn the plant operator that the 'instantaneous' release rate limit has been reached. After a 15-minute delay, the air ejector offgas isolation valve shall automatically close, shutting down the reactor, if the radioactivity release rate has not been successfully reduced to the weekly release rate limit, or less.

10. During the first year of operation of the nuclear generating plant at Monticello, the routine effluent monitoring program of the Northern States Power Company shall be designed to identify and quantitatively account for all specific radioisotopes that are released in significant quantities, to the full extent feasible and reasonable. This effluent monitoring program shall provide for and include at least the kinds of samples, frequencies, radioassay procedures, etc., described in the MPCA Final Report entitled Radioactive Pollution Control in Minnesota, and dated January 31, 1969 (see especially pp. 139-143).

11. During the first year of operation of the nuclear generating plant at Monticello, the routine environmental radiological monitoring and surveillance program of the Northern States Power Company shall be designed to detect and evaluate all radioactive releases from the plant, to the full extent feasible and reasonable. This environmental monitoring program shall provide for and include at least the kinds of samples, frequencies, radioassay procedures, etc., described in the MPCA Final Report on Radioactive Pollution Control in Minnesota, dated January 31, 1969 (see especially Table IV, pp. 135 and 136, and the section included in pp. 114-139).

12. All effluent and environmental monitoring program results shall be reported monthly by the Northern States Power Company to the Agency. All monitoring program results shall also be available for inspection by the Agency at the plant site at any time.

13. The Northern States Power Company shall cooperate to the full extent necessary with the MPCA and with the Minnesota State Board of Health for purposes of development by those agencies of an adequate and effective emergency protection plan designed to immediately control and minimize the effects of any accidental release of unexpectedly large quantities of radioactivity from the Monticello nuclear generating plant. In particular, the Northern States Power Company shall immediately notify the MSBH of any uncontrolled release of unexpectedly large quantities of radioactivity to the offsite air and/or water environment due to operational failure of any of the power plant systems. Also, the Northern States Power Company shall cooperate in this regard to the full extent outlined in the MPCA Final Report on Radioactive Pollution Control in Minnesota (see pp. 90-97), and in any other manner requested by the MSBH.

14. The "Special Conditions Relating to Radioactive Wastes" part of this permit is limited to the first year of operation of the Monticello nuclear generating plant. During this period that part of the permit may be modified by the Agency in any manner and to any extent deemed necessary by the Agency. A new permit relative to radioactive wastes, modified and changed to the extent deemed necessary by the Agency, and based upon the results of the first year of power plant operation, will be issued by the Agency for the second year of operation.

15. It is emphasized that public and environmental radiation protection practice is based upon a concept of very long term protection, rather than only immediate or momentary protection. The generally accepted I.C.R.P. limits are designed to restrict radiation exposure, on a continuous basis and over a lifetime, to levels that will not produce detectable or significant somatic or genetic harm. The annual average release rate limits contained in this Permit also refer to continuous lifetime radiation exposure, rather than to momentary levels, and are considerably more stringent than could be permitted according to the I.R.C.P. recommendations. Hence, the slight transitory (E.G., daily) variations around those limits that are to be normally expected should not result in overexposure to radiation of any member of the public, and should therefore not be viewed as cause for great alarm or for hasty and unreasoned action.

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John P. Badalich, PE  
Executive Secretary and Chief Executive  
Officer

Permit No. 5633

Dated April 8, 1969

STATEMENT OF E. C. TSIVOGLIOU

April 8, 1969

The main purpose of my statement today is to review with you the Permit that has been recommended for the first year of operation of the Monticello nuclear generating plant by the Northern States Power Company. First, I will briefly outline the premises upon which the Permit is based. I will then discuss the main features of the Permit in terms of the safeguards that have been built into it.

I hope that we will be able to stick to hard facts today, to the extent that they are available, and that we can avoid the kind of exaggeration that has characterized some of the recent public statements regarding radioactivity and the Monticello plant. I hope that decisions regarding this new facility can be based upon rational consideration of real facts, and not upon unfounded speculations, emotions or politics.

THE PREMISES

The permit that has been recommended for the first year of operation of the Monticello facility is designed on the basis of two major premises. They are as follows:

- (1) The radioactivity limits that have been recommended by the International Commission on Radiological Protection (ICRP) represent the best available information in the world today regarding the hazards of radiation exposure and the degree of protection that must be provided.
- (2) All radiation exposure must be actively minimized to the full extent that is both technologically feasible and economically reasonable. This means that in no case can the limits recommended by the (ICRP) be exceeded, but in addition, the actual level of radiation exposure should be kept as far below those limits as is achievable in a practical sense.

In regard to the first premise, the radiation protection limits recommended by the ICRP are accepted by responsible public health and pollution control agencies throughout the world. They form the basis for virtually all other radiation protection standards, such as those provided by our National Committee on Radiation Protection (NCRP) and those enforced by the U. S. Atomic Energy Commission (AEC). The limits recommended by the ICRP have been designed to restrict radiation exposure on a continuous basis and over a whole lifetime to levels that will not produce detectable or significant bodily or genetic harm.

Regarding the second premise, which I refer to as the Principle of Minimum Exposure, all responsible agencies also agree that human radiation exposure should be minimized. Even exposure at the low levels recommended as limits by the ICRP is taken to be harmful in principle, although this has not been demonstrated as fact, and so it is commonly agreed that actual exposure should be kept below those limits to the full extent possible in a practical sense. As I describe the requirements of the permit for the first year of operation of the Monticello facility, and the safeguards that have been included, I think it will become quite evident that a very high degree of radiation protection will be provided. The permit that has been recommended does not provide for absolute zero radioactivity release, as that goal is not regarded as practical at this time. The Permit does provide for a higher degree of protection than has yet been required at any commercial nuclear power plant in the United States. It is worthy of mention also that no public agency, state, federal or international, has felt that absolute zero radioactive pollution is either a practical or a necessary goal.

These, then, are the premises upon which the recommended Permit is based: that the radiation protection limits recommended by the ICRP would, by themselves, provide a high and an adequate degree of protection of the public and its environment; that

actual radioactivity releases from the Monticello nuclear power plant should be kept as far below these limits as possible; and that a goal of absolute zero radioactivity release from the plant is neither practical nor necessary at this time.

#### THE PERMIT AND THE SAFEGUARDS

The Permit that has been recommended for the Monticello nuclear generating stations sets limits on radioactive waste releases that are much more stringent than the limits that are presently enforced or planned at any other commercial nuclear power plant in the United States. In keeping with the Agency policy of eliminating radioactive pollution of the environment to the full extent possible, the Permit also requires certain waste treatment and control measures that are new to the nuclear power industry, but these are included to provide additional assurance of environmental safety. In addition to these features, the Permit requires the operation of comprehensive effluent and environmental monitoring programs that are fully capable of detecting any failure to comply with the specified radioactive release limits, both liquid and gaseous.

Quite frankly, if the Permit is adopted as recommended, I expect the environmental monitoring program to demonstrate clearly that the radioactive waste releases from the Monticello plant are so low as to be extremely difficult if not impossible to detect in the nearby environment.

To be more specific, and to stick to facts, let us consider some of the numerous safeguards that are contained in the Permit. They include:

1. The liquid and gaseous radioactive waste release limits specified by the Permit would restrict such releases to no more than two or three percent of the amounts that can be released according to the current ICRP or AEC requirements. The Permit specifies effluent limits, rather than more commonly use environmental limits, for the specific purpose of providing for closer control of the radioactivity releases. The limits that are specified are thus much more stringent than those in effect at other commercial nuclear power plants.



Enforcement of the requirements of the Permit means that the actual radioactivity releases will in most cases be well below the two or three percent mentioned above.

- (2) The Permit that has been recommended specifies limits on individual radioisotopes, as well as on gross radioactivity releases. This is an unusual precaution at commercial nuclear power plants, and provides additional protection against error or unsafe procedures.
- (3) A thorough liquid and gaseous effluent monitoring program is required by the Permit. This monitoring program is quite capable, by itself, of promptly detecting any deviation from the limits specified by the Permit. It is a considerably more thorough effluent monitoring program than is practiced at other commercial nuclear power reactors.
- (4) A quite extensive and thorough monitoring program for environmental radioactivity is also required by the Permit. It will require comprehensive monitoring and surveillance of all phases of the air and water environment that might be affected by the Monticello plant. The environmental monitoring program will be capable, by itself, of detecting any significant deviation from the radioactivity release limits specified by the Permit. It will be considerably more comprehensive and thorough than environmental monitoring programs required in the vicinity of other commercial nuclear power plants.
- (5) The recommended Permit requires that all liquid waste releases be treated and monitored on a batch basis, rather than as a continuous flow. This provides a very positive system of control, so that any batch of liquid waste that contains more than the allowed amount of radioactivity can and will be withheld from the Mississippi River for further treatment. This practice is commonly required at nuclear power plants. What is

not so common elsewhere is the Permit requirement that essentially all liquid wastes, even those from building floor drains, be routinely subjected to a high degree of treatment by relatively costly ion exchange methods. With proper handling and treatment of liquid wastes, there will be no significant radioactivity in the liquid effluents from the plant. Nevertheless, the monitoring programs specified by the Permit will require that every effort be made to evaluate the radioactivity that is released, to insure this result.

- (6) The Permit under consideration also requires the installation of a highly efficient treatment measure for the removal of radioiodine from the gaseous waste stream. Radioiodine is one of the most hazardous radioisotopes that can be given off by nuclear power reactors, as it very soon finds its way into the milk produced by dairy cattle. Even though very little radioiodine would be expected from the Monticello plant during normal operation, the new treatment measure is required by the Permit to provide positive assurance of safety from this radioisotope. Essentially none should escape via the plant stack. The required treatment measure for positive removal of radioiodine represents another 'first' for Minnesota, I believe - this measure has not been required as yet at other commercial nuclear power plants.
- (7) The main source of radioactivity from any such reactor is uranium fuel elements that develop tiny leaks, and thereby permit fission products to leak out into the primary cooling system. The Permit also requires the Northern States Power Company to make every feasible positive effort to stop any radioactive waste releases at their source - namely in the reactor itself.

Even though great efforts are made in manufacture to do so, it is extremely difficult to prevent such leaks in an absolute sense - for example, the Monticello reactor will contain 23,716 individual fuel rods, and it is unlikely that none will develop pinhole leaks. The Permit will require the plant operator to develop a positive program for finding any leaky fuel elements or fuel assemblies, so that they can be selectively removed from the reactor, either during usual refueling operations, or, should it prove necessary, as a special operation.

This is another measure that has not been required before at commercial nuclear power plants. It may not prove an easy burden to assume, but the Permit requires the company to demonstrate that it is making every effort to do so. It is emphasized that the successful development and conduct of an effective program for finding and selectively removing leaky fuel elements or fuel assemblies would introduce a new and higher level of control over radioactive wastes from reactors. It would constitute a substantial practical step forward in terms of really minimizing radioactive pollution of the environment.

- (8) One other very important safeguard, which seems to be either unrecognized or consistently ignored by some others, deserves emphasis. This safeguard automatically provides for ample time in which to take corrective actions, should they become necessary.

The limits on radiation exposure that have been recommended by the ICRP refer quite specifically to continuous exposure over a lifetime. They are decidedly not momentary or instantaneous limits. The ICRP-recommended limit for tritium, for example, refers to the amount of tritium that can be ingested every day, over a lifetime, without

producing detectable or significant harm.

The important point is that it is the cumulative radiation exposure over a lifetime that is being regulated, not just the momentary exposure. The risk of harm due to exposure at the ICRP limit for a period of one year, instead of lifetime, is proportionately smaller than the risk of exposure at the same level over a lifetime, which is already taken to be negligible. The limits that are contained in the Permit also refer to continuous lifetime exposure. As they are considerably more restrictive than the ICRP recommendations, the associated risk of harm is that much smaller again. As a result, the very important safeguard of available time in which corrective actions can be taken, if they are ever needed, is definitely present.

#### SUMMARY

To summarize the real facts, the radioactivity release limits that have been recommended for the first year of operation of the Monticello nuclear power plant will restrict such releases to quite small fraction of the releases that could be permitted according to currently accepted worldwide practice. A number of new and positive protective waste treatment and control measures are required by the Permit. A system of safeguards and checks, one superimposed upon another, is incorporated in the Permit, to the extent that the risk of harm due to radioactive releases from the plant is clearly negligible in terms of comparison to all currently accepted national and international radiation protection standards. Taken collectively, the Permit requirements are much more restrictive as regarding environmental radiation protection than any that have been placed upon any other commercial power reactor thus far.

There are some who insist that no radioactivity at all should be released

from nuclear plants - that absolute zero release is the only acceptable answer. I can agree zero pollution of our environment is an ideal that we should always seek as a matter of principle, and no matter what kind of pollution is involved. I cannot agree that absolute zero radioactivity release is a reasonable or necessary Permit requirement at this time. I would point out, however, that this Permit comes a good deal closer to requiring zero release of radioactivity than many people seem to realize - in point of fact, if we measure this in terms of the limits that are currently regarded as safe throughout the world, we have come more than 98 percent of the way toward zero.

MINNESOTA POLLUTION CONTROL AGENCY  
717 Delaware Street, S.E.  
University Campus  
Minneapolis  
55440

WASTE DISPOSAL PERMIT

Monticello Nuclear Generating Plant,  
Northern States Power Company,  
Monticello Township, Wright County

Pursuant to authorization by the Minnesota Pollution Control Agency, and in accordance with the provisions of Minnesota Statutes, 1967, Chapters 115 and 116, a permit is hereby granted to Northern States Power Company, Minneapolis, for disposal of waste from a steam electric generating plant being constructed by the company in the west half of Section 33, Township 122 N, Range 25 W, Wright County, including the discharge of effluents, as herein below specified therefrom to the Mississippi River, subject to the conditions given below:

General Conditions

1. This permit shall not release the permittee from any liability or obligation imposed by Minnesota statutes or local ordinances and shall remain in force subject to all conditions and limitations now or hereafter imposed by law. The permit shall be permissive only and shall not be construed as estopping or limiting any claims against the permittee for damage or injury to person or property, or omissions of the permittee, its agents, contractors or assigns, nor as estopping or limiting any legal claim of the state against the permittee, its agents, contractors or assigns, for damage to state property, or for any violation of subsequent regulations or conditions of this permit.
2. No assignment of this permit shall be effective until it is executed in writing and signed by the parties thereto and thereafter approved by the Agency.
3. No major alterations or additions to the disposal system shall be made without the written consent of the Agency.
4. The use of the disposal system shall be limited to the treatment or disposal of the waste materials or substances described in the permit application dated July 11, 1967, and associated material filed with the Agency.

5. The permit is subject to modification or revocation, and may be suspended at any time for failure to comply with the terms stated herein or the provisions of any other applicable regulations or standards of the Agency or its predecessors, and is issued with the understanding that it does not estop subsequent establishment of further requirements for treatment or control at any time by insertion of appropriate additional clauses herein at the discretion of the Agency in order to prevent or reduce possible pollution of the environment.

6. The permittee or assigns shall defend, indemnify and hold harmless the State of Minnesota, its officers, agents and employees, officially or personally, against any and all actions, claims, or demands whatsoever which may arise from or on account of the issuance of this permit, or the construction or maintenance of any facilities hereunder.

7. Certification of completion of the project shall be made immediately after construction is finished. Reports on effluent quality and operational practices shall be submitted regularly every month, and the permit holder shall certify that he is in all respects in conformance with the conditions given in the Agency policy statement of August 22, 1967 entitled, "Policy Regarding Operation Permits for Sewage and Industrial Waste Treatment Works."

#### Special Conditions Relating to Conventional Wastes

1. No raw sewage or treated sewage effluent shall be discharged to surface waters of the state from the plant site.

2. Any additional construction plans and design data which may be required for all disposal systems needed for collection, treatment and disposal of sewage, industrial wastes and other wastes originating at this site, and for effective containment of stored liquids or other pollutional materials, for the prevention of water pollution to conform with the requirements of this permit, shall be submitted together with any other information requested for review by the Agency. All such plans shall meet with the approval of the Agency and the systems be completed before operation of the plant is started.

3. The following standards of quality and purity applicable to the effluent of the holding pond shall not be exceeded at the point of discharge from the pond:

pH value	6.5 - 8.5
Turbidity value	25
5-day biochemical oxygen demand	25 milligrams/liter
Total suspended solids	30 milligrams/liter

4. Cooling facilities shall be provided and operated to insure that the temperature of the cooling water at the point of discharge to the river does not exceed the limits specified below:

<u>Period</u>	<u>Maximum Temperature</u>
July and August, inclusive	86°F (or 5°F above the ambient
June and September, inclusive	80°F temperature of the river,
May and October, inclusive.	67°F whichever is greater, ex-
April and November, inclusive	55°F cept that in no case shall
March and December, inclusive	43°F the cooling water temperature
January and February, inclusive	37°F as discharged exceed 86°F)

The design of treatment works for compliance with the stream standards, unless otherwise specified, shall be based on the seven consecutive day low flow of the river which is equal to or exceeded by 90% of such seven-day minimum average flows of record (the lowest seven-day flow with a once in ten year recurrence interval) for the critical month.

5. No industrial waste, or other wastes, treated or untreated, shall be discharged into the waters so as to cause any nuisance conditions, including, without limitation, the presence of substantial amounts of floating solids, scum, oil, suspended solids, discoloration, obnoxious odors, sludge deposits, slimes, or fungus growths, or other offensive effects; or so as to cause any material increase in any other chemical constituents; or cause any substantial change in any characteristics which may impair the quality of the water so as to render it objectionable or unsuitable for fish and wildlife or as a source of water for municipal, industrial or agricultural purposes; or otherwise impair the quality of the waters for any other uses.

6. The company shall measure the quantity and characteristics of and sample and analyze the industrial wastes, other wastes and stored liquids at the site as may be requested by the Agency, and shall provide the Agency every month with a complete report on such measurements, samples and analyses, together with any other information relating to waste disposal or pollution control which may be requested.

7. Facilities for monitoring the quality of the receiving waters shall be provided and used as requested by the Agency. Results of the monitoring shall be reported to the Agency at monthly intervals.

8. The company shall cause to be made without cost to the state, technical studies and investigations of the biota and quality and related matters pertaining to the waters of the state which receive the plant effluents, or which are in the immediate vicinity of the plant, as may be requested by the Agency. Complete reports shall be submitted annually, or more frequently upon request.



9. Continuous operation of all of the treatment works at their maximum capability consistent with practical limitations and maintenance needs of such works shall be maintained at all times when the plant is in operation and when necessary to provide adequate treatment of the sewage, industrial wastes or other wastes by the terms of this permit.

10. The company shall expeditiously make any changes in waste disposal, monitoring, and reporting practices, and provide any additional treatment works or disposal systems or other safeguards for the prevention of pollution of the environment upon the request of the Agency.

11. Liquid substances which could constitute a source of pollution of the waters of the state shall be stored in accordance with regulation WPC 4. Other wastes as defined by Minnesota statutes, section 115.01, subdivision 4, shall not be deposited in any manner such that the same may be likely to gain entry into these waters. In any case where such substances, either liquid or solid, as a result of accident or natural catastrophe should gain entry into any waters of the state, it shall be the responsibility and duty of the company to inform the Agency in the quickest time possible and immediately remove and recover all such polluttional substances to the fullest extent reasonably possible under existing conditions.

12. The industrial or other waste effluents as discharged shall comply with any and all applicable requirements of effluent standards or river classifications and standards which may be adopted by the Agency for this type of source and/or for these waters in the future.

#### Special Conditions Relating to Radioactive Wastes

1. It is the policy of the Agency that all radioactive pollution of the environment shall be held to the lowest level that is attainable within the limitations imposed by technological feasibility and economic reasonableness. In no case shall members of the public be exposed to radiation beyond the limits recommended by the International Commission on Radiological Protection. In addition, the actual levels of radiation exposure of members of the public shall be kept as far below those limits as possible, consistent with technological feasibility and reasonableness of cost.

2. In keeping with the above policy of the Agency, all practical measures for treatment, control and containment of radioactive wastes from the Monticello nuclear generating plant of the Northern States Power Company shall be employed for the purpose of preventing the release of radioactivity to the environment. Such measures shall include at least, but not be limited to:

(a) all measures for the treatment, control and containment of liquid and gaseous radioactive effluents that are indicated in the Final Safety Analysis Report of the Northern States Power Company, Unit 1, Monticello nuclear generating plant; and

(b) routine removal of radiiodine and halogens from the gaseous effluents to the full extent feasible, the degree of treatment and removal being at least the equivalent of that provided by effective activated charcoal filtration of the entire air ejector offgas flow; and

(c) routine ion exchange treatment (Powdex demineralization or equivalent) of the combined low purity wastes (primarily from floor drains) and the neutralized chemical wastes (primarily from laboratory drains and shop decontamination solution drains). The combined estimated flow is 8,000 gal/day; and

(d) initial inspection of fuel rods for surface contamination with uranium before use in the reactor, and decontamination or replacement of fuel rods that have detectable or significant amounts of uranium on their external surfaces, so as to prevent the use of such fuel rods in the reactor. The plant operator shall report in detail to the agency the measures taken in this regard before startup of the reactor; and

(e) initial thorough inspection of fuel rods to identify those that might develop fission product leaks, and rejection of such rods for use in the reactor; to the full extent possible, development and application of methods and techniques for locating and identifying leaking fuel rods after operation of the reactor begins, so that such rods may be removed during usual fuel replacement operations or, at other times, to prevent excessive release of radioactivity to the environment. The operator shall report in detail to the Agency the actual measures taken in both of these regards before startup of the reactor. If necessary, he shall initiate research and development activities designed to develop the needed effective procedures.

3. The gross beta-gamma radioactivity of liquid effluents released to the plant discharge canal shall be limited to the extent that the annual average gross beta-gamma radioactivity concentration of the water in the discharge canal shall not exceed  $10^{-7}$   $\mu\text{c}/\text{ml}$  (100 pc/l) plus the background radioactivity.

4. As an integral part of Special Conditions 3 above, the concentrations of specific radioisotopes in the discharge canal shall not exceed, on an annual average basis, the following limits:

Radioisotope	Average Daily Concentrations, $\mu\text{c}/\text{ml}$	
	Normal (a)	Low (b)
	River Flow	River Flow
(1)	(2)	(3)
H-3	$2 \times 10^{-6}$	$4 \times 10^{-7}$
F-18	$6 \times 10^{-13}$	$1 \times 10^{-11}$
Na-24	$2 \times 10^{-12}$	$3 \times 10^{-11}$

Radioisotope	Average Daily Concentration, $\mu\text{c}/\text{ml}$	
	Normal (a)	Low (b)
	River Flow (2)	River Flow (3)
Cr-51	$9 \times 10^{-13}$	$1 \times 10^{-11}$
Mn-56	$5 \times 10^{-12}$	$4 \times 10^{-11}$
Co-58	$9 \times 10^{-12}$	$1 \times 10^{-10}$
Co-60	$9 \times 10^{-13}$	$1 \times 10^{-11}$
Sr-90	$4 \times 10^{-13}$	$8 \times 10^{-12}$
Sr-91	$2 \times 10^{-11}$	$4 \times 10^{-10}$
Sr-92	$4 \times 10^{-12}$	$8 \times 10^{-11}$
Tc-99, Mo-99	$1 \times 10^{-10}$	$4 \times 10^{-9}$
I-131	$4 \times 10^{-11}$	$8 \times 10^{-10}$
I-133	$2 \times 10^{-10}$	$4 \times 10^{-9}$
I-135	$6 \times 10^{-11}$	$1 \times 10^{-9}$
Te-132	$6 \times 10^{-13}$	$1 \times 10^{-11}$
Cs-136	$6 \times 10^{-14}$	$1 \times 10^{-12}$
Cs-137	$2 \times 10^{-13}$	$4 \times 10^{-13}$
Ba-139	$4 \times 10^{-13}$	$6 \times 10^{-12}$
Ba-140	$4 \times 10^{-12}$	$6 \times 10^{-11}$

(a) Open cycle - 93 percent of days; no use of cooling towers; discharge canal flow 645 cfs.

(b) Closed cycle - 7 percent of days; full use of cooling towers; discharge canal flow 36 cfs.

In addition to the specific radioisotope concentration limits given in the above table, and on an interim basis until plant operation provides more definite information, the average daily discharge canal concentration of any other radioisotope shall not exceed one three thousandth ( $1/3,000$ ) of the specific I.C.P. limit for continuous occupational exposure or one three-hundredth ( $1/300$ ) of the numerical limit for that radioisotope as specified in Appendix J, Table II, Title 10, Part 20 of the USAEC Standards for Protection Against Radiation. In case these two limits differ for any specific radioisotope, the lower limit shall apply.

5. In addition to all of the foregoing liquid effluent radioactivity concentration limits, for any seven consecutive day period the average gross beta-gamma radioactivity concentration of the water in the discharge canal shall not exceed  $5 \times 10^{-7}$   $\mu\text{c}/\text{ml}$  (500 pc/l) plus the background radioactivity, and the average concentration of any specific radioisotope in the discharge canal shall not exceed a limit of five times the value given in the above table.

6. The gross-beta-gamma radioactivity of the gaseous effluent released via the plant stack shall not exceed, on an annual average basis, a release rate of 0.01 curie per second. This refers to a total stack air flow of 4,000 cfm, and thereby also specifies the limiting concentration of gross beta-gamma radioactivity in the stack effluent before dilution in the atmosphere.

7. As an integral part of Special Condition 6 above, the concentrations of specific radioisotopes in the stack before release to the atmosphere shall not exceed, on an annual average basis, the following limits:

Radioisotope	Stack Concentration (a)
	$\mu\text{c}/\text{ml}$
H-3	$4 \times 10^{-9}$
Ar-41	$3 \times 10^{-6}$
Kr-83m	$1 \times 10^{-4}$
Kr-85m	$3 \times 10^{-4}$
Kr-85	$2 \times 10^{-7}$
Kr-87	$1 \times 10^{-3}$
Kr-88	$1 \times 10^{-3}$
Kr-89	$2 \times 10^{-5}$
Xe-131m	$1 \times 10^{-6}$
Xe-133m	$1 \times 10^{-5}$
Xe-133	$3 \times 10^{-4}$
Xe-135m	$4 \times 10^{-4}$
Xe-135	$6 \times 10^{-4}$
Xe-137	$5 \times 10^{-5}$
Xe-138	$2 \times 10^{-3}$

(a) At a total stack air flow of 4,000 cfm.

In addition to the specific radioisotope limits given in the table immediately above, and on an interim basis until plant operation provides more definite information, the average daily stack concentration of any other radioisotopes before release to the atmosphere shall not exceed 10 times the specific ICRP limit for continuous occupational exposure, or 100 times the numerical limit for that radioisotope as specified in Appendix B, Table II, Title 10, Part 20, of the USAEC Standards for Protection Against Radiation.

8. In addition to all of the foregoing gaseous (stack) effluent concentration limits, the gross beta-gamma radioactivity of the gaseous effluent released via the plant stack shall not exceed a release rate of 0.05 curie per second for any seven consecutive day period. During such a period, the stack concentrations of specific radioisotopes shall not exceed five times the numerical limits given in Special Condition 7.

A stack release rate of 0.05 curie per second shall automatically sound a plant alarm to warn the plant operator that the weekly release rate limit has been reached.

9. In addition to all of the foregoing gaseous (stack) effluent concentration limits, the gross beta-gamma radioactivity of the gaseous effluent released via the plant stack shall not exceed a release rate of 0.30 curie per second for any 15 minute period. During such a period, the stack concentrations of specific radioisotopes shall not exceed 30 times the numerical limits given in Special Condition 7.

A stack release rate of 0.30 curie per second shall automatically sound a second and different alarm to warn the plant operator that the 'instantaneous' release rate limit has been reached. After a 15-minute delay, the air ejector offgas isolation valve shall automatically close, shutting down the reactor, if the radioactivity release rate has not been successfully reduced to the weekly release rate limit, or less.

10. During the first year of operation of the nuclear generating plant at Monticello, the routine effluent monitoring program of the Northern States Power Company shall be designed to identify and quantitatively account for all specific radioisotopes that are released in significant quantities. This effluent monitoring program shall provide for and include at least the kinds of samples, frequencies, radioassay procedures, etc., described in the MPCA Final Report entitled Radioactive Pollution Control in Minnesota, and dated January 31, 1969 (see especially pp. 138-143).

11. During the first year of operation of the nuclear generating plant at Monticello, the routine environmental radiological monitoring and surveillance program of the Northern States Power Company shall be designed to detect and evaluate all significant radioactive releases from the plant. This environmental monitoring program shall provide for and include at least the kinds of samples, frequencies, radioassay procedures, etc., described in the MPCA Final Report on Radioactive Pollution Control in Minnesota, dated January 31, 1969 (see especially Table IV, pp. 135 and 136, and the section included in pp. 114-139).

12. All effluent and environmental monitoring program results shall be reported monthly by the Northern States Power Company to the Agency. All monitoring program results shall also be available for inspection by the Agency at the plant site at any time.

13. The Northern States Power Company shall cooperate to the full extent necessary with the MPCA and with the Minnesota State Board of Health (MSBH) for purposes of development by those agencies of an adequate and effective emergency protection plan designed to immediately control and minimize the effects of any accidental release of unexpectedly large quantities of radioactivity from the Monticello nuclear generating plant. In particular, the Northern States Power Company shall immediately notify both the MPCA and the MSBH of any uncontrolled release of unexpectedly large quantities of radioactivity to the offsite air and/or water environment due to operational failure of any of the power plant systems. Also, the Northern States Power Company shall cooperate in this regard to the full extent outlined in the MPCA Final Report on Radioactive Pollution Control in Minnesota (see pp. 90-97), and in any other manner requested by the MSBH.

14. The "Special Conditions Relating to Radioactive Wastes" part of this permit is limited to the first year of operation of the Monticello nuclear generating plant. During this period that part of the permit may be modified by the Agency in any manner and to any extent deemed necessary by the Agency. A new permit relative to radioactive wastes, modified and changed to the extent deemed necessary by the Agency, and based upon the results of the first year of power plant operation, will be issued by the Agency for the second year of operation.

15. It is emphasized that public and environmental radiation protection practice is based upon a concept of very long term protection, rather than only immediate or momentary protection. The generally accepted I.C.R.P. limits are designed to restrict radiation exposure, on a continuous basis and over a lifetime, to levels that will not produce detectable or significant somatic or genetic harm. The annual average release rate limits contained in this Permit also refer to continuous lifetime radiation exposure, rather than to momentary levels, and are considerably more stringent than could be permitted according to the I.R.C.P. recommendations. Hence, the slight transitory (E.G., daily) variations around these limits that are to be normally expected should not result in overexposure to radiation of any member of the public, and should therefore not be viewed as cause for great alarm or for hasty and unreasoned action.

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John P. Badalich, PE  
Executive Secretary and Chief Executive  
Officer

Permit No. 5633

Dated May 12, 1969