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RECIP. NAME RECIPIENT AFFILIATION
Ofc of the Executive Director for Operations

SUBJECT: Requests exemption from 10CFR20, App A, "Use of GMR-I Canistersfor Protection Against Radioiodine." Proposed limitations, usage restrictions & applicable controls for use of GMR-I canister specified in encl.

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Washington Public Power Supply System
3000 George Washington Way P.O. Box 968 Richland, Washington 99352-0968 (509)372-5000

May 10, 1988
G02-88-113

Docket No. 50-397

Executive Director for Operations
U. S. Nuclear Regulatory Commission
Washington D.C. 20555

Gentlemen:

Subject: NUCLEAR PLANT NO. 2
OPERATING LICENSE NPF-21
REQUEST FOR EXEMPTION FROM 10 CFR 20, APPENDIX A,
"USE OF GMR-I CANISTERS FOR PROTECTION AGAINST RADIOIODINE"

In accordance with the provisions of 10 CFR 20.103(e) and 10 CFR 20.501, the Washington Public Power Supply System (Supply System) requests an exemption from 10 CFR 20, Appendix A, footnote d-2(c), for use at WNP-2. Footnote d-2(c) states that "No allowance is to be made for the use of sorbent canisters against radioactive gases and vapors" in establishing personnel protection factors. The Supply System requests that a protection factor of 50 be used while using Mine Safety Appliances (MSA) GMR-I canisters for radioiodine atmospheres.

Proposed limitations, usage restrictions and applicable controls for the use of the GMR-I canister are specified in Attachment I. A safety analysis has been performed documenting that the exemption will not result in undue risk to public health or property. The GMR-I canisters are to be used solely for worker protection and comfort purposes and thus would not involve any increase in the amounts or types of effluents released offsite. As such, this exemption would not impact the environmental analysis of the FSAR or Final Environmental Impact Statement. Also, use of the GMR-I canister would not affect any safety-related plant systems or increase the probability or consequences of an accident previously evaluated. Nor would use of the canisters introduce any new accident scenarios or reduce the margin of safety.

A001
1/1
ADD: EDO

The Supply System is aware that Alabama Power Company, Southern California Edison Company, Kansas Gas and Electric Company, Union Electric Company, Pacific Gas and Electric, and Grand Gulf Nuclear Station have all been issued exemptions from the aforementioned requirements to allow the use of MSA GMR-I canisters with a radioiodine protection factor of 50. The Supply System understands the exemptions were based partly on testing performed by MSA (Attachment II) for Alabama Power Company and were consistent with NUREG/CR-3403, "Criteria and Test Methods for Certifying Air-Purifying Respirator Cartridges and Canisters Against Radioiodine."

Use of the GMR-I canisters would allow utilization of air-purifying respirators in lieu of supplied air or self-contained breathing apparatuses. This would reduce the physical stress on workers resulting in an associated reduction in personnel exposure. Therefore, the exemption is consistent with the ALARA concept. A task analysis of potential person-rem savings by using an air-purifying respirator instead of supplied air or self-contained breathing apparatus is shown in Attachment III. An overall dose savings of approximately 30% was used and is consistent with dose savings calculated by Alabama Power Company and Southern California Edison Company.

According to the provisions in 10 CFR 20.103(e), the Commission can authorize the use of equipment that has not been certified by NIOSH/MSHA but has been tested reliable under proposed conditions of use. It is the Supply System's opinion that the MSA GMR-I canister has been adequately tested as evidenced by the MSA performance test and the previously granted exemptions. The Supply System, therefore, requests credit for a protection factor of 50 against radioiodine for use of the GMR-I canister, contingent upon WNP-2 adherence to the limitations, usage restrictions, and controls cited in Attachment I.

If you have any questions or need additional information, please contact Mr. P. L. Powell, Manager, WNP-2 Licensing.

Very truly yours,

G. C. Sorensen, Manager
Regulatory Programs

lw
Attachment

cc: JB Martin - NRC RV
NS Reynolds - BCP&R
RB Samworth - NRC
DL Williams - BPA/399
NRC Site Inspector

ATTACHMENT I

PROPOSED LIMITATIONS, USAGE RESTRICTIONS AND CONTROLS
TO BE USED WITH THE GMR-I CANISTER AT WNP-2

A. The following limitations on the use of the GMR-I canister will be controlled by PPM 11.2.11.2, "Selection of Respiratory Protection Equipment."

1. A maximum protection factor of 50 will be used.

2. The maximum permissible continuous use of the canisters will be 8 hours, after which the canister will be discarded. The allowable canister service life will be calculated from the time of unsealing the canister, including periods of non-exposure.

3. Canisters will not be used in the presence of organic solvent vapors or chemicals which would interfere with the canister's ability to adsorb radioiodine. The use of organic solvents or chemicals will be prohibited while the GMR-I canisters are in use.

4. Canisters will be stored in sealed, humidity barrier packaging in a cool, dry environment. The GMR-I canisters will be maintained in class "A" storage (temperature and humidity controlled between 60 and 90°F and 30 and 60%, respectively) except for those maintained for ready issue in the respirator issue area.

5. Canisters will be used only with properly fitted full facepiece respirators capable of providing protection factors of 100.

6. Canisters will not be used in total challenge concentrations of organic iodines and other halogenated compounds greater than 1 ppm, including non-radioactive compounds.

7. Canisters will not be used in environments where temperatures exceed 110°F. Temperatures where GMR-I canisters may be used will be measured each shift and/or coincidentally with operations which heat the work areas to assure that this limit is not exceeded.

B. In addition to the above limitations, the following controls will be utilized by the Supply System.

1. During initial GMR-I canister implementation, the following program verification measures will be included in PPM 11.2.11.2.

   a. Weekly whole body counts of individuals using the GMR-I canister for radioiodine protection will be performed.
   b. A whole body count will be given to individuals who exceed 30 MPC hours in seven consecutive days prior to their next entry into a radioiodine atmosphere.
   c. If an individual measures 35 nCi or greater iodine uptake to the thyroid during a whole body count, the individual will be restricted from further entries into radioiodine atmospheres pending a health physics evaluation.
   d. A whole body count survey data base will be compiled to coordinate the results of the program.

2. The following procedures and training courses will be updated as necessary to include the required information regarding the proper use and limitations of the GMR-I canisters prior to use for radioiodine protection.

   a. PPM 11.2.4.1, "MPC-hour Assessment and Documentation"
   b. PPM 11.2.11.2, "Selection of Respiratory Protection Equipment"
   c. PPM 11.2.11.3, "Issuance of Respiratory Protection Equipment"
   d. 80-RDT-0606-LP, "Respiratory Protection Training"
   e. 80-RDT-0606-RT, "Respiratory Protection Refresher Training"
   f. 80-HPT-1801-LP, "Advanced Respiratory Protection"

3. To ensure that the MSA GMR-I canisters meet standards for quality control, PPM 11.2.11.2 will require personnel verify that for each canister used with the protection factor that the seal is intact, the canister shelf life has not expired, and the following MSA label is attached to the GMR-I canister:

   "This Canister Meets the NRC Quality Assurance Specification Required for Radioiodine Protection Factor Credit, In Addition To The NIOSH/MSHA Requirements. Credit May Only Be Taken By Licensees Who Have Been Granted An NRC Exemption."

4. Organic solvents and chemicals of concern relative to GMR-I canister use include materials such as paints, paint thinners, freon solvents, organochlorine solvents and isopropyl alcohol. These chemicals are not of concern in areas where GMR-I canisters will be stored since they are purchased in hermetically sealed packaging and are not opened until placed in service.

Administrative controls for chemical usage are specified in PPM 1.13.2, "Chemical Surveillance and Control." This procedure establishes controls over the ordering, storage , use, transfer and disposal of chemicals which could be harmful to personnel, the environment or plant systems. The indiscriminate use of chemicals is effectively precluded since specific approval for use in WNP-2 work areas is required. In addition to the above, PPM 11.2.11.2 will be upadated to include restrictions regarding chemical use when using GMR-I canisters. Specifically, GMR-I canisters will not be allowed in areas where chemicals are being used or have recently been used.

System controls for the emergency Standby Gas Treatment System, defined in Technical Specification 3.6.5.3 and 4.6.5.3, specify the operational conditions and surveillance requirements related to the HEPA and charcoal filters. Since GMR-I canisters will be most likely used in areas served by the Standby Gas Treatment System, proper operability of this system will provide assurance of the proper environment for canister use, i.e. no chemicals.

5. The Supply System has maintained good fuel integrity since startup and is commited to maintaining exposures to airborne radionuclides as low as reasonably achievable (ALARA) per PPM 1.11.2, "Alara Program Description." Practices and engineering controls used by WNP-2 to minimize radioiodine concentrations include:

   a. Local exhaust ventilation is utilized to reduce airborne contamination in work areas where the potential for airborne contamination is high. The drywell purge system is used during reactor shutdown for outages to reduce general airborne contamination.
   b. Radioiodine concentrations are reduced during normal operation by use of the offgas system, condensate demineralizers and Reactor Water Cleanup System. After shutdown, radioiodine concentrations are removed by the Fuel Pool Cleanup System.
   c. Currently WNP-2 has maintained relatively good fuel integrity. In the event of failed fuel, the cause of the failure would be investigated and corrected. Radioiodine levels are trended as a means of monitoring for fuel failures.
   d. At WNP-2, radiological surveys are conducted frequently during maintenance activities and decontamination conducted accordingly.
   e. Maintenance planning takes into account decay of reactor systems to reduce the overall exposure and airborne contamination potential.

ATTACHMENT II

MSA

Mine Safety Appliances Company • 600 Penn Center Boulevard • Pittsburgh, Pennsylvania 15235
412/273-5000

April 13, 1984

Writer's Direct Dial Number
412-273-5140

Mr. Wayne Carr
Health Physics
Alabama Power Company
600 North 18th St.
P. O. Box 2641
Birmingham, AL 35291

Dear Mr. Carr:

In accordance with our agreement, the following report is submitted for your approval.

1. General

It was agreed with Alabama Power Company on March 8, 1984, that MSA would test GMR-I cans to completion in order to be able to statistically project performance at 110°F and 100% RH. In addition, other tests had been run prior to the March 8th agreement and the data are shown in Table I. The tests were conducted under the following conditions:

Challenge Conc.: 5 - 10 ppm CH_3I
Humidity: 60 ± 3% and 90 ± 3% (minimum of six cans at each humidity)
Temperature: 110°F
Cyclic Flow: 192 LPM for 0.82 sec.; 0 LPM for 1.64 sec., repeating this cycle throughout the test. This gives a minute volume of 64 L.
Breakthrough Conc.: 1% of the challenge concentration

2. Test Results

During this program, 48 GMR-I cans have been tested (47 valid tests). These cans came from six production lots made over the period April 14, 1983, to February 2, 1984. Sixteen cans were tested from lot April 14, 1983, 10 at 90% RH and 6 at 60% RH. Only eight results at 90% RH were used in the statistical analysis given below, as one test was invalid (No. 47) and another was stopped before completion. Only a few cans were available from the other lots, so they could not be statistically analyzed; however, all cans run to completion had a service time of

20 hours or greater. The results are shown in Table 1. The original 14 cans not run to completion had service times well in excess of 12 hours - much in excess of the eight hours desired.

3. Statistical Analysis of Lot 4/14/83. Table 2 shows the data used and the statistical analysis to give the 99% prediction interval for individual values of Log Y (log service time), when X (relative humidity) is 100%. The lower limit of this interval is calculated to be 15.8 hours. This predicts that over 99% of the individual GMR-I can service times would be greater than 15.8 hours at 100% RH and the other test parameters used in this program. This gives a considerable safety margin over the eight hours desired.

   One other interesting point to note from the data in Table 2, as well as all of the test data on the GMR-I cans, is that humidity has little or no effect on the service time over the humidity range studied, 60 to 90%. This would indicate that results at 100% RH would be very close to those at 90% on a log service time--log RH plot, unless the slope were extremely steep--which is not the case.

4. Proposed Acceptance Plan. The extremely long service times experienced in this program for the GMR-I cans run to completion, an average of over 29 hours, makes testing to completion for routine lot acceptance impractical; therefore, the following plan is proposed.

   4.1 Interim Plan. On an interim basis, until more data can be gathered as explained in section 4.2, the proposed lot acceptance would be as follows:

      4.1.1 MIL-STD 414, Level II, AQL 1% would be used to (1) select the proper number of cans to test, depending on lot size, and (2) to interpret the results regarding lot acceptance or failure.

      4.1.2 The cans would be tested under the conditions of section 1; however, all tests would be conducted at 90% RH. Tests would be stopped at eight hours and the percent leakage recorded at this time. From evidence presented in the preceding sections, results at 90% are not significantly different from those at 100%.

      4.1.3 The percent leakage values would be compared to the spec. limit of 1.0%, using the single spec. limit, variables unknown, standard deviation method of MIL-STD 414. Acceptance would be based on this analysis.

   4.2 Future. Because the tests in section 4.1 are very time consuming and somewhat difficult to run for regular quality assurance lot acceptance testing, we plan to do further testing on the GMR-I can in an attempt to reduce the time required for testing and also to simplify the test. Parameters that will be investigated are:

4.2.1 Increasing the challenge concentration of CH_3I in an effort to reduce the time to test. Under current conditions, a test to completion might run 40 hours; we would like to reduce this to about two hours. If there were a simple, straight-line relationship between service time to a 1% breakthrough and challenge concentration, it would indicate that a challenge concentration of approximately 200 ppm would be required to do this. We wish to firmly establish the service time---challenge concentration relationship over a range of challenge concentrations from 1 ppm to 500 ppm.

4.2.2 Constant Flow vs. Cyclic Flow. Constant flow tests are much simpler to conduct than cyclic flow tests. From some preliminary information, it appears that constant flow gives similar service times as cyclic flow. If, by further tests, this can be verified, constant flow would be used in lot acceptance tests.

4.2.3 Temperature and Humidity Effects. Further tests will be run to study the effects of temperature and humidity on the performance of the GMR-I can. It would be preferable to test cans for lot acceptance at 25°C and 85% RH (standard NIOSH conditions), if it can be proven that these conditions are as severe as 43°C and 90% RH, or if a good correlation between these two conditions can be established.

5. Conclusion.

5.1 Forty-seven GMR-I cans have been validly tested under the conditions specified in section 1. All of these cans had service times well in excess of 12 hours. This compares to a desired service time of eight hours.

5.2 There were 14 valid tests run on lot 4/14/83. Statistical analysis of this data, projected to 100% RH, 110°F, indicate that over 99% of the GMR-I cans in this lot have service times well over eight hours (15.8 hours). Incidentally, from the data of Table 1, this lot appears to have the shortest average service time of the lots tested.

5.3 In light of sections 5.1 and 5.2, the GMR-I can should be considered qualified to give service times over eight hours under the conditions: 1% breakthrough, cyclic flow (peak 192 LPM, average 64 LPM), 110°F (43°C) and 100% RH.

5.4 Lot Acceptance will be determined by using MIL-STD-414, Level II, AQL 1%. The percent leakage at eight hours service time will be compared to the spec. limit of 1.0%, using the single spec. limit, variables unknown, standard deviation method of MIL-STD-414.

5.5 Further tests will be run studying the effects of challenge concentration, constant flow rate, temperature and humidity on the service time of GMR-1 cans. This program is intended to shorten the required test time and simplify the test procedure.

5.6 From data in this investigation, it appears that relative humidity between 60 to 90% has little effect on service time of the GMR-1 canister. Projecting the service time to 100% RH, using a log-log plot, suggests that the service times at 90% and 100% RH are not significantly different.

If you have any further questions, please do not hesitate to contact me

Very truly yours,

Wayde B. Miller, Jr.

Wayde B. Miller, Jr.
Director of Product & Sales Planning

/jw

Attachments/Tables I and 2

cc: Mr. E. J. Beck
Dr. W. P. King
Dr. E. S. McKee
Mr. J. C. Sheehan
Mr. J. H. Wylie

Table 1. Service Time of GMR-I Canisters

Test Conditions: As given in section 1

60% RH

Can #	Mfg. Date	Service Time min.	Service Time hrs.	Comment
				Leak @ 12 hrs.
5	11/30/83	>>720	>>12	0.25
6	"	"	"	0.07
7	"	"	"	0.33
29	2/2/84	2160	36.0	
30	"	2520	42.0	
31	"	2670	44.5	
32	4/14/83	1200	20.0	
33	"	1500	25.0	
34	4/14/83	1410	23.5	
35	2/2/84	1680	28.0	
36	4/14/83	1530	25.5	
37	"	1410	23.5	
38	1/9/84	1890	31.5	
39	4/14/83	1080	18.0	
40	1/9/84	2220	37.0	

Test Stopped

90% RH

Can #	Mfg. Date	Service Time min.	Service Time hrs.	Comment
				Leakage
3	11/30/83	>>1215	>>20.3	0.30
4	"	>>1215	>>20.3	0.15
8	10/21/83	>> 990	>>16.5	0.45
9	"	"	"	0.25
10	"	"	"	0.43
				Leak @ 12 hrs.
11	11/30/83	>>720	>>12	0.67
12	10/21/83	"	"	0.04
13	11/30/83	"	"	0.47
14	1/9/84	>>795	>>13.3	0.64
15	"	"	"	0.34
16	"	"	"	0.35
17	1/9/84	1890	31.5	Const. Flow
18	"	3180	53.0	"
19	"	2530	42.2	"
20	9/13/83	2390	39.8	"
21	"	1530*	25.5*	*Test Stopped
22	"	2280*	38.0*	No Breakthrough
23	10/21/83	2490	41.5	
24	"	2910	48.5	
25	"	2490	41.5	
26	2/2/84	1560	26.0	
27	"	2070	34.5	
28	"	2220	37.0	
41	4/14/83	1230	20.5	
42	"	1320	22.0	
43	"	1650	27.5	
44	"	1320	22.0	
45	"	1500	25.0	
46	"	1260	21.0	
47	"	--	--	Test Invalid
48	"	1350	22.5	
49	"	1290	21.5	
50	"	840*	14.0*	Test Stopped No Breakthrough

Test Stopped

4/26/84

Table 2.

Statistical Analysis of Lot 4/14/83

X (% RH)	Y (Svc. Time)	Log X	Log Y	
60	1200 min.	1.77815	3.07918	Ave. Y_{60} = 1355 min. (22.6 hrs.)
60	1500	"	3.17609	
60	1410	"	3.14922	Ave. Y_{90} = 1365 min. (22.7 hrs.)
60	1530	"	3.18469	
60	1410	"	3.14922	
60	1080	"	3.03342	
90	1650	1.95424	3.21748	
90	1230	"	3.08991	
90	1320	"	3.12057	
90	1500	"	3.17609	
90	1260	"	3.18037	
90	1350	"	3.13033	
90	1290	"	3.11059	
90	1320	"	3.12057	

99% Prediction Interval for Log Y, given Log X = 2 (100% RH)

99% Interval = $\hat{Y} \pm t_{[1.99/2]_{n-2}} S_{\hat{Y}}$

Where $\hat{Y} = bo + b_1 X$ and $bo = 3.08231$, $b_1 = 0.02606$

$= 3.13443$ (1362 min., 22.7 hrs.)

$$S_{\hat{Y}} = \sqrt{S_E^2 \left[1 + 1/n + \frac{(X-\bar{X})^2}{\Sigma x^2}\right]} = .05543 \qquad S_E^2 = \frac{\Sigma(Y-\hat{Y})^2}{n-2}$$

$x = X - \bar{X}$

99% Interval = $3.13443 \pm (3.055)\ (.05543) = 3.13443 \pm .16934$

$= 3.30377$ to 2.96509

$Y = 33.5$ hrs. to 15.4 hrs.

Revision 4/26/84

ATTACHMENT III

ESTIMATED DOSE SAVINGS AT WNP-2
FROM USE OF GMR-I CANISTERS*

Task Description	Estimated Person-Hours	Estimated Person-Rem	Estimated Person-Rem Savings**
Refueling Tasks	1671	8.82	2.65
- Remove Vessel Head, etc. - Replace Both Cables on Refuel Mast - Remove Shield Plugs, Drywell Heat and Space Frame - Fuel Shuffle, Op of Refuel Bridge - Inspection of Rx Vessel Internals by TV Camera - Repair Unit Switch on Fuel Mast - Install Moisture Sep, Stm Dryer, RPV Head - Decon Rx Cavity, and Dryer/Sep. Pool - Remove Damaged Bracket from Steam Dryer			
Install/Remove Temp. Shielding (Drywell)	72	2.94	0.88
Relamp Drywell	17	0.165	0.05
ISI, UT/PT Various Welds (Drywell)	1365	24.609	7.38
ISI Exam or RPV/large weld	7	0.025	0.01
Perform ISI, UT/PT Various welds (Rx Bldg)	315	2.262	0.69
Visual Exam & Testing Snubbers, etc.	1247	11.91	3.57
TOTAL:	4694	50.73	15.23

*This list was derived from the major RF02 RWPs active in the area of concern and adjusted for the 21 days during which a radioiodine atmosphere could be expected to exist.

**Based upon a 30% savings task analyses performed by Alabama Power Co. and Southern California Edison Co. and reviewed by NRC.