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WNP-2 SEMI ANNUAL EFFLUENT

REPORT

JANUARY THROUGH JUNE 1987

WASHINGTON PUBLIC POWER SUPPLY SYSTEM

LICENSE NO. NPF-21

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1.0 INTRODUCTION

This report is submitted in compliance with Technical Specification 6.9.1.11. It includes a summary of the quantities of radioactive liquid and gaseous effluents and solid waste released from WNP-2 during the previous six months of operation with data summarized on a quarterly basis.

2.0 LIQUID EFFLUENTS

The radwaste liquid effluents were released in a batch mode only during the reporting period. Six batch releases occurred during the first calendar quarter and 27 batch releases during the second calendar quarter. The total time period for the batch releases was 58.3 hours, with the maximum time period being 2.25 hours for a release, the minimum time period being 1.13 hours for a release and the average time period was 1.76 hours. The volume of dilution water considered, is the total volume of recirculating cooling tower blowdown flow for the period. The average flow rate of the Columbia River during January through June 15, 1987 was 1.1E+05 cubic feet per second.

Periodic LADTAP II computer runs were performed to verify compliance with Technical Specification limits. The calculated dose to the maximum individual due to liquid releases for the first quarter was 3.5E-04 mrem whole body and 5.7E-04 mrem for the maximum organ. The second quarter calculated dose was 1.2E-02 mrem whole body and 2.2E-02 mrem for the maximum organ.

The liquid batch releases were recirculated prior to sampling. A representative sample was obtained and analyzed for each batch release. A composite of tank samples for each quarter was analyzed for strontiums and irons. The method for measurement of total radioactivity was by gamma spectroscopy, liquid scintillation and proportional counters.

All isotopes listed in Regulatory Guide 1.21, Revision 1, 1974 and our Technical Specifications are included in effluent analyses. Additionally, any other unidentified gamma spectroscopy peak(s) is resolved and that isotope added to the analyses. Expected pure beta emitters are included in routine analyses except for those isotopes that have been shown not to be present in significant quantities.

The percent of MPC limit is based on the total MPC fractions using those nuclides in Table 2-2 and concentrations listed in 10CFR20, Appendix B, Table 2, Column 2.

The percent of estimated total errors are listed in Table 2-1. These estimated errors are based on counting statistics, tank volume, and in obtaining a representative sample prior to discharge.

The estimated total errors were calculated by obtaining the square root of the sum of the squares of the errors of the individual contributors and multiplying by 1.96 for a 95% confidence level.

Sample Racks SW-SR-42, SW-SR-43

The Residual Heat exchanger cooling water monitoring sample racks SW-SR-42 and SW-SR-43 were removed from service to be modified to operate in a postulated accident senario, in addition to functioning as a Tech Spec leakage detection monitor. The sampling systems were moved, shielded, and had their flow instrumentation changed; sample rack SW-SR-42 was moved to 501 ft. elevation of the reactor building while sample rack SW-SR-43 just had the shield and sampling chamber moved to the opposite end of its skid on 522 ft. elevation of the reactor building. After the system was installed and declared complete, the radiometric calibration was then performed. The total time the system was out of service for modification, exceeded the 30 day technical specification action statement. While the system was inoperative there was no danger to plant personnel, systems, or the public, as the plant was shutdown or in the refueling mode.

Table 2-1

WNP-2 LIQUID EFFLUENTS - SUMMATION OF ALL RELEASES

January - June 1987

	Unit	1st Quarter	2nd Quarter	Est. Total Error* %
A. Fission and activation products				
1. Total release (not including tritium, gases, alpha)	Ci	3.8E-04	8.0E-03	2.2 E+01
2. Average diluted concentration during period	uCi/ml	1.5E-09	4.0E-08	
3. Percent of MPC limit	%	2.6E-02	5.0E-02	
B. Tritium				
1. Total release	Ci	1.2E-01	6.2E-01	2.2 E+01
2. Average diluted concentration during period	uCi/ml	4.8E-07	3.1E-06	
3. Percent of MPC limit	%	1.6E-02	1.0E-01	
C. Dissolved and entrained gases				
1. Total release	Ci	<2.8E-05	<4.0E-04	2.2 E+01
2. Average diluted concentration during period	uCi/ml	<1.1E-10	<2.0E-09	
3. Percent of MPC limit	%	<5.5E-05	<1.0E-03	
D. Gross alpha radioactivity				
1. Total release	Ci	<3.1E-10	<2.4E-09	2.3 E+01
E. Volume of waste (prior to dilution)	liters	3.8E+05	1.6E+06	1.5 E+01
F. Volume of dilution water used during period	liters	2.5E+08	2.0E+08	1.5 E+01

*At 95% confidence level

Table 2-2

WNP-2 LIQUID EFFLUENTS - SOURCE TERMS

January - June 1986 BATCH MODE

Nuclides Released	Unit	1st Quarter	2nd Quarter
Strontium-89	Ci	1.2 E-04	4.0 E-05
Strontium-90	Ci	7.5 E-06	< 9.0 E-06
Cesium-134	Ci	< 7.2 E-06	< 1.5 E-04
Cesium-137	Ci	< 5.9 E-06	< 1.2 E-04
Iodine-131	Ci	< 6.3 E-06	< 1.0 E-04
Cobalt-58	Ci	< 1.5 E-05	3.2 E-04
Cobalt-60	Ci	< 1.7 E-05	8.2 E-04
Iron-59	Ci	< 1.2 E-05	< 1.6 E-04
Zinc-65	Ci	8.1 E-05	5.3 E-03
Manganese-54	Ci	< 8.5 E-06	1.4 E-04
Chromium-51	Ci	1.5 E-04	1.4 E-03
Zirconium-Niobium-95	Ci	< 1.2 E-05	< 1.4 E-04
Molybdenum-99	Ci	< 5.6 E-05	< 9.2 E-04
Technetium-99m	Ci	< 6.0 E-06	< 6.6 E-05
Barium-lanthanum-140	Ci	< 2.0 E-05	< 3.7 E-04
Cerium-141	Ci	< 7.9 E-06	< 1.2 E-04

TABLE 2-2 (Continued)

Others			
Cerium-144	Ci	< 3.0 E-05	< 5.1 E-04
Iron-55	Ci	2.4 E-05	2.9 E-05
Total for Period (Above)	Ci	3.8 E-04	8.0 E-03
Xenon-133	Ci	< 2.0 E-05	< 3.2 E-04
Xenon-135	Ci	< 7.6 E-06	< 8.2 E-05
Tritium	Ci	1.2 E-01	6.2 E-01

NOTE: Less than (<) values are not included in the Total For Period values.

3.0 GASEOUS EFFLUENTS

The gaseous radwaste effluents from WNP-2 were released in a continuous mode. There are three (3) release points at WNP-2:

1. Main Plant Vent - mixed mode release
2. Turbine Building - ground level release
3. Radwaste Building - ground level release

The gaseous source terms from each release point are listed in Tables 3-1 to 3-3. Table 3-4 provides a summation of the total activity released, the average release rate, the percent of Technical Specification limit, gross alpha radioactivity and the estimated total error associated with the measurements of radioactivity in the gaseous effluents.

Radioactivity measurements for gaseous effluent releases are performed for fission and activation gases by collecting the samples on charcoal traps and analyzing them using gamma spectroscopy. Tritium is sampled by freeze trapping and analyzed by liquid scintillation counting. Particulates and iodines are sampled using charcoal cartridges and particulate filters and analyzed using gamma spectroscopy.

The "Percent of Technical Specification Limit" calculations were based on exposure at specified locations. Air dose due to noble gases was determined at the site boundary with the quarterly limit of 5 mrads for gamma being the more restrictive for each time period. The gamma air dose from noble gases for the first quarter was 1.2E-01 mrads and 5.8E-02 mrad for the second quarter. Iodines, particulates and tritium calculations were determined at Taylor Flats, located 4.2 miles southeast. A limit of 7.5 mrems per quarter to any organ was used in these calculations. The maximum organ dose to a "Member of the Public" was 1.2E-02 mrem for the first quarter and 7.2E-03 mrem for the second quarter.

To verify compliance with Technical Specification limits, calculations were performed for each month's releases using the GASPAR computer program and parameters as outlined in the ODCM. Doses were determined at two special locations.

1. The Site Boundary at 1.2 miles from the plant and for the sector with the maximum X/Q value.

2. Taylor Flats - at 4.2 miles SE.

There were no abnormal releases of gaseous effluent during the first and second quarters of 1987. Sampling and monitoring of the gaseous effluents were performed in accordance with Technical Specifications and Plant Procedures.

Total error estimates are based on grab samples, gamma spectrometry, analyzer detectors, and beta scintillation readings. The overriding uncertainty in all cases is the measurement of the effluent and sample volumes. The estimated error was determined to be 36% at the 95% confidence level.

In addition to the reactor site, WNP-2 has a permanent laundry facility located approximately 0.75 miles from the site. Its ventilation system contains HEPA filters on the discharge and is continuously monitored for particulates and radioiodines. Also at this location is a backup chemistry lab within the EOF. The radiochemical hood containing HEPA filters is monitored for radioactive releases when in operation. Gamma spectrometry indicated no isotopes present other than those attributable to natural background.

Table 3-1

WNP-2 GASEOUS EFFLUENTS
SOURCE TERMS - MIXED MODE RELEASES
MAIN PLANT VENT

January - June 1987

CONTINUOUS MODE

Nuclides Released	Unit	1st Quarter	2nd Quarter
1. Fission gases			
Krypton-85	Ci	< 2.9 E+01	< 3.4 E+01
Krypton-85m	Ci	2.7 E-01	3.5 E-02
Krypton-87	Ci	4.0 E-01	6.0 E-01
Krypton-88	Ci	4.9 E-01	6.6 E-01
Xenon-133	Ci	6.7 E-01	7.0 E-01
Xenon-133m	Ci	1.5 E+00	1.4 E+00
Xenon-135	Ci	1.8 E-01	3.5 E-01
Xenon-135m	Ci	< 6.9 E+00	7.8 E-02
Xenon-138	Ci	1.9 E+00	1.5 E+01
Argon-41	Ci	< 3.2 E-01	4.5 E-03
Total for period	Ci	5.4 E+00	1.9 E+01
2. Iodines			
Iodine-131	Ci	2.0 E-04	1.0 E-04
Iodine-133	Ci	9.6 E-04	2.3 E-04
Iodine-135	Ci	< 4.2 E-05	< 4.7 E-05
Total for period	Ci	1.2 E-03	3.3 E-04

Table 3-1 (Continued)

3. Particulates

* Strontium-89	Ci	7.8 E-06	1.9 E-07
* Strontium-90	Ci	< 5.1 E-10	2.7 E-07
Cesium-134	Ci	< 9.3 E-05	< 1.4 E-04
Cesium-137	Ci	2.7 E-05	< 1.1 E-04
Barium-lanthanum-140	Ci	< 2.7 E-04	< 3.6 E-04
Molybdenum-99	Ci	< 1.3 E-03	2.9 E-04
Cerium-141	Ci	< 7.3 E-05	< 8.5 E-05
Cerium-144	Ci	< 3.3 E-04	< 3.6 E-04
Cobalt-58	Ci	3.0 E-04	2.8 E-04
Cobalt-60	Ci	3.3 E-04	1.2 E-03
Iron-59	Ci	< 1.5 E-04	< 2.3 E-04
Manganese-54	Ci	5.9 E-05	2.8 E-04
Zinc-65	Ci	1.2 E-03	2.7 E-03
Others			
Chromium-51	Ci	4.8 E-04	1.4 E-04
Zirconium-95	Ci	< 1.5 E-04	7.3 E-04
Cesium-138	Ci	< 9.4 E-06	3.9 E-04
Technetium - 99m	Ci	4.9 E-03	< 1.1 E-05
Sodium - 24	Ci	9.0 E-04	< 1.2 E-05
Total for period	Ci	8.2 E-03	6.0 E-03

Table 3-1 (Continued)

4. Tritium	Ci	9.9 E-02	2.1 E-01
Total building release	Ci	5.5 E+00	1.9 E+01

* The strontium analysis for LLD levels was modified between the first and second quarter reports. A newer, more conservative calculation is being used for estimating MDA in the analytical scheme.

NOTE: Less than (<) values are not included in the Total For Period values.

Table 3-2

WNP-2 GASEOUS EFFLUENTS
SOURCE TERMS GROUND LEVEL RELEASES
TURBINE BUILDING

January - June 1987

CONTINUOUS MODE

Nuclides Released	Unit	1st Quarter	2nd Quarter
1. Fission gases			
Krypton-85	Ci	< 2.9 E+02	< 2.8 E+02
Krypton-85m	Ci	< 3.4 E-01	< 3.3 E-01
Krypton-87	Ci	1.9 E+00	6.8 E-01
Krypton-88	Ci	2.2 E+00	1.2 E+00
Xenon-133	Ci	2.0 E+00	1.2 E+00
Xenon-133m	Ci	5.6 E+00	3.0 E+00
Xenon-135	Ci	1.0 E+00	7.0 E-01
Xenon-135m	Ci	4.2 E+00	< 8.9 E-01
Xenon-138	Ci	1.5 E+01	9.1 E+00
Total for period	Ci	3.2 E+01	1.6 E+01
2. Iodines			
Iodine-131	Ci	5.3 E-05	7.4 E-05
Iodine-133	Ci	3.6 E-04	< 1.9 E-04
Iodine-135	Ci	< 1.2 E-04	< 1.1 E-04
Total for period	Ci	4.1 E-04	7.4 E-05

Table 3-2 (Continued)

3. Particulates

Strontium-89	Ci	1.1 E-04	< 3.0 E-06
Strontium-90	Ci	< 1.6 E-09	< 2.1 E-06
Cesium-134	Ci	< 1.2 E-04	< 1.0 E-04
Cesium-137	Ci	< 1.1 E-04	< 9.1 E-05
Barium-lanthanum-140	Ci	< 4.4 E-04	< 2.9 E-04
Molybdenum-99	Ci	< 1.1 E-03	< 1.0 E-03
Cerium-141	Ci	< 1.2 E-04	< 1.0 E-04
Cerium-144	Ci	< 4.9 E-04	< 3.6 E-04
Cobalt-58	Ci	< 1.1 E-04	< 1.0 E-04
Cobalt-60	Ci	< 1.8 E-04	< 1.7 E-04
Iron-59	Ci	< 2.4 E-04	< 2.1 E-04
Manganese-54	Ci	< 1.0 E-04	< 9.9 E-05
Zinc-65	Ci	9.3 E-05	1.6 E-04
Others			
Chromium-51	Ci	< 1.2 E-03	3.1 E-04
Zirconium-95	Ci	< 1.8 E-04	< 1.6 E-04
Cesium - 138	Ci	< 3.1 E-04	2.2 E-03
Technetium - 99	Ci	1.8 E-05	< 1.9 E -05
Total for period	Ci	2.2 E-04	2.7 E-03

4. Tritium	Ci	1.2 E+00	3.3 E-01

Total building release	Ci	3.3 E+01	1.6 E+01

NOTE: Less than (<) values are not included in the Total For Period values.

Table 3-3

WNP-2 GASEOUS EFFLUENTS
SOURCE TERMS GROUND LEVEL RELEASES
RADWASTE BUILDING

January - June 1987

CONTINUOUS MODE

Nuclides Released	Unit	1st Quarter	2nd Quarter
1. Fission gases			
Krypton-85	Ci	< 3.6 E+01	< 3.9 E+01
Krypton-85m	Ci	< 1.1 E-01	< 1.1 E-01
Krypton-87	Ci	4.6 E-01	3.8 E-01
Krypton-88	Ci	5.9 E-01	1.3 E+00
Xenon-133	Ci	7.1 E-01	5.0 E-01
Xenon-133m	Ci	2.0 E+00	2.8 E+00
Xenon-135	Ci	3.5 E-01	3.8 E-01
Xenon-135m	Ci	3.8 E-01	8.1 E-01
Xenon-138	Ci	2.3 E+00	1.4 E+00
Total for period	Ci	6.8 E+00	7.6 E+00
2. Iodines			
Iodine-131	Ci	2.3 E-05	< 2.1 E-05
Iodine-133	Ci	9.6 E-05	2.0 E-05
Iodine-135	Ci	< 1.9 E-05	< 2.1 E-05
Total for period	Ci	1.2 E-04	2.0 E-05

Table 3-3 (Continued)

3. Particulates

Strontium-89	Ci	6.8 E-07	< 3.7 E-07
Strontium-90	Ci	< 5.4 E-09	< 2.6 E-07
Cesium-134	Ci	< 1.9 E-05	< 1.9 E-05
Cesium-137	Ci	< 1.5 E-05	< 1.7 E-05
Barium-Lanthanum-140	Ci	< 4.9 E-05	< 5.6 E-05
Molybdenum-99	Ci	< 1.7 E-04	< 1.8 E-04
Cerium-141	Ci	< 1.7 E-05	< 1.8 E-05
Cerium-144	Ci	< 6.6 E-05	< 7.4 E-05
Cobalt-58	Ci	< 1.6 E-05	< 1.8 E-05
Cobalt-60	Ci	< 2.4 E-05	< 2.7 E-05
Iron-59	Ci	< 3.8 E-05	< 4.4 E-05
Manganese-54	Ci	< 1.9 E-05	<1.8 E-05
Zinc-65	Ci	< 3.9 E-05	4.8 E-05
Others			
Chronium-51	Ci	< 1.1 E-04	< 1.2 E-04
Zirconium-95	Ci	< 2.7 E-05	< 2.9 E-05
Total for period	Ci	6.8 E-07	4.8 E-05

4. Tritium	Ci	1.2 E-01	1.2 E-01

Total building release	Ci	6.9 E+00	7.7 E+00

NOTE: Less than (<) values are not included in the Total For Period values.

Table 3-4

WNP-2 GASEOUS EFFLUENTS
SUMMATION OF ALL RELEASES

January - June 1987

	Unit	1st Quarter	2nd Quarter	Est. Total Error %*
A. Fission & activation gases				
1. Total release	Ci	4.4 E+01	4.3 E+01	3.6 E+01
2. Average release rate for period	uCi/sec	5.7 E+00	5.5 E+00	
3. Percent of Tech. Spec. limit	%	2.4 E+00	1.2 E+00	
B. Iodines				
1. Total iodine (131, 133)	Ci	1.7 E-03	4.2 E-04	3.6 E+01
2. Average release rate for period	uCi/sec	2.2 E-04	5.3 E-05	
3. Percent of Tech. Spec. limit	%	1.6 E-01	9.6 E-02	
C. Particulates				
1. Particulates with half-lives 8 days	Ci	8.4 E-03	8.7 E-03	3.6 E+01
2. Average release rate for period	uCi/sec	1.1 E-03	1.1 E-03	
3. Percent of Tech. Spec. limit	%	1.6 E-01	9.6 E-02	
4. Gross alpha radioactivity	Ci	1.7 E-03	1.3 E-03	
D. Tritium				
1. Total releases	Ci	1.4 E+00	6.6 E-01	3.6 E+01
2. Average release rate for period	uCi/sec	1.8 E-01	8.4 E-02	
3. Percent of Tech. Spec. limit	%	1.6 E-01	9.6 E-02	

* At 95% confidence level

Table 3-5

WNP-2 GASEOUS EFFLUENTS,
BATCH RELEASES

January - June 1987

Type	Number	Total Time (hrs)	Maximum Time (hrs)	Minimum Time (hrs)	Mean Time (hrs)
Purge	10	127.5	31.5	2.25	12.8
Vent	45	69.8	4.25	0.5	1.55

NOTE: Batch releases were performed through the Main Plant Vent - mixed mode release.

4.0 SOLID WASTE

A total volume of 7276 ft^3 (206.0 m^3) of solid waste was transported in 19 shipments during the January 1 through June 30, 1987 reporting period. The total activity of the waste shipped was 660.641 Ci; 658.305 Ci contained in dewatered spent resins and 2.336 Ci in Dry Active Waste (DAW).

A. Dewatered Spent Resin

Dewatered resins accounted for 2956 ft^3 (83.7 m^3) of the radioactive wastes shipped during the reporting period. The burial containers were LSA-190 and ES-142 liners provided by NUPAC Services, Inc. The total activity of the resins shipped during the reporting period was 658.305 Ci. The principle nuclides and their percent contribution to the total activity are listed in Table 4-3. The solid wastes were shipped to the U.S. Ecology, Hanford burial site using flat bed trailers, NUPAC 14-210H, or NUPAC 10-142 casks as appropriate.

The counting error associated with the total activity has been found to be less than 1.0% at one standard deviation in previous effluent reports and to decrease with increasing activity. The statistical counting error is assumed to be 1% for the purpose of this error evaluation.

Other parameters considered in estimating the total error of the activity shipped included the error in measuring the absolute volume, the weight of the waste in the liners, the representativeness of the sample taken, the homogeneity of the nuclide distribution within a batch or liner and the geometry error in the gamma spectroscopy analysis. The gamma spectroscopy calibration error was approximately 5%. The best estimate of the total error in the activity of spent resin shipped was assumed to be less than or equal to 20%.

B. Dry Active Waste (DAW)

A total of 4320 ft^3 (122.3 m^3) of DAW was shipped in 48 Container Products Corporation, B-25 steel boxes. The total activity of the DAW shipped was 2.336 Ci. The values for the activities shipped were determined by using dose rate-to-curie conversion factors. The conversion factors were based on a nuclide distribution taken from reactor coolant sample analyses which are representative for the time period in which the waste was generated. Short lived nuclides were eliminated based on decay of the DAW prior to shipment. A meaningful counting error cannot be generated for the DAW, however, the total error may be assumed to be less than or equal to 20% since DAW would be subjected to similar error contributions as the spent resins.

C. Absorbed Liquids

There were no absorbed liquids shipped during the reporting period.

4.1 Scaling Factor Methodology

Scaling factors are based on outside laboratory (TMA/Norcal) analysis of hard-to-measure nuclides. For those waste streams where the scaling or the scaled nuclide concentration is not sufficient to provide a viable scaling factor, the final EPRI Report "Radionuclide Correlations in Low Level Radwaste", NP-4037, June 1985 has been used as a basis for the determination of a scaling factor.

H-3

Sampling of individual waste streams was performed with analysis performed by an outside lab. The H-3 concentration was measured per gram of waste material. This value was compared to the Reactor Coolant System H-3 concentration. The scaling factor is derived from the ratio of the H-3 concentration in the waste stream to RCS H-3 concentration.

C-14, Tc-99, I-129

Sampling of the individual waste stream was performed with analysis by off-site lab to determine isotopic concentration. Ratios were developed between the scaled nuclide to the scaling nuclide concentration determined by analysis. In those cases where the scaling nuclide is not available in large enough quantities to develop reliable (viable) scaling factors, the recommendations made in section 7 of the referenced EPRI report for the plant in the initial stages of operation are used.

TRU, Sr-90, Ni-63

TRU nuclides would be scaled to Ce-144. As recommended by the AIF report "Methodolgies for Classification of Low Level Radioactive Waste from Nuclear Power Plants". These nuclides are not considered to be present if the scaled values are less than: 1 nCi/g for TRU, 35 nCi/g for Pu-241 or 200 nCi/g for Cf-242. TRU nuclides will be reported if the scaling nuclide (Ce-144) is reliably detected and Cs-137 is also present.

Sampling of individual waste streams has been performed with analysis by an outside labortory. Cs-137 and Sr-90 were not available in sufficient concentrations to allow development of reliable scaling factors. The values obtained in the referenced EPRI report were used for scaling factors. Co-60 and Ni-63 concentrations were measured in each of the sampled waste streams. The ratio of Co-60 to Ni-63 has been determined and is used as the scaling factor for Ni-63 from Co-60.

Table 4-1 lists those scaling factors by waste stream for those nuclides that are required to be reported. Table 4-2 lists those scaling factors for the conditional nuclides that are reported only when the scaling nuclide is found to be present.

Table 4-1

Scaling Factors for Required Nuclides

	DAW	RWCU Powder Resin	CFD Powder Resin	EDR/FDR Powder Resin	EDR/FDR Bead Resin	OIL
Co-60/C-14	5.9 E-4	1.7 E-4	1.0 E-4 +	1.0 E-4 +	1.0 E-4	1.0 E-4 +
Cs-137/Tc-99	3.0 E-5	3.0 E-5 +	3.0 E-5 +	3.0 E-5 +	3.0 E-5 +	3.0 E-5 +
Cs-137/I-129	2.0 E-5 +	2.0 E-5 +	2.0 E-5 +	2.0 E-5 +	2.0 E-5 +	2.0 E-5 +
Rx Coolant/H-3	4.4 E-1	1.75 E-1 ++	1.75 E-1	1.0 E-1	2.25 E-1	4.0 E-5 +++

Table 4-2

Scaling Factors for Conditional Nuclides

	DAW	RWCU Powder Resin	CFD Powder Rs	EDR/FDR Powder Resin	EDR/FDR Bead Resin	OIL
Co-60/Ni-63	6.5 E-2	9.0 E-3	4.0 E-2	1.8 E-1	1.7 E-2	2.0 E-2 +
Ce-144/Pu-238	8.0 E-3 +	8.0 E-3 +	8.0 E-3 +	8.0 E-3 +	8.0 E-3 +	8.0 E-3 +
Ce-144/Pu-239	5.0 E-3 +	5.0 E-3 +	5.0 E-3 +	5.0 E-3 +	5.0 E-3 +	5.0 E-3 +
Ce-144/Pu-241	5.5 E-1 +	5.5 E-1 +	5.5 E-1 +	5.5 E-1 +	5.5 E-1 +	5.5 E-1 +
Ce-144/Am-241	3.0 E-3 +	3.0 E-3 +	3.0 E-3 +	3.0 E-3 +	3.0 E-3 +	3.0 E-3 +
Ce-144/Cm-242	1.5 E-2 +	1.5 E-2 +	1.5 E-2 +	1.5 E-2 +	1.5 E-2 +	1.5 E-2 +
Ce-144/Cm-244	3.5 E-3 +	3.5 E-3 +	3.5 E-3 +	3.5 E-3 +	3.5 E-3 +	3.5 E-3 +
Cs-137/Sr-90	6.0 E-3 +	6.0 E-3 +	6.0 E-3 +	6.0 E-3 +	6.0 E-3 +	6.0 E-3 +

\+ Scaling Nuclide not present in enough concentration to make determination of scaling factor. In these cases the scaling factor obtained from the final EPRI Report "Radionuclide Correlations in Low Level Radwaste" (NP-4037, June 1985), will continue to be used as the WNP-2 scaling factors.

++ The report from TMA/Norcal, showed a concentration of H-3 in RWCU resin of 2.35 times the Rx Coolant H-3 concentration. The resin mix used in RWCU and CFD is the same and the reactor coolant and condensate H-3 concentration are approximately the same. The scaling factor for CFD powdered resins is 1.75 E-1 which is more representative of H-3 retention on the dried powdered resins.

+++ Oil is processed at WNP-2 by filtration and dewatering. This process removes the water from oil. The report from TMA/Norcal was less than 4.0 E-5 for H-3. The 4.0 E-5 factor was chosen and should be conservative in determining H-3 concentrations in oil.

Table 4-3
WNP-2 SOLID WASTE SHIPMENTS

January - June 1987

A. SOLID WASTE SHIPPED OFFSITE FOR BURIAL OR DISPOSAL

1. Type of Waste

Waste Stream	Unit	6-month Period	Est. Total Error, %
a. Spent resins, filter sludges, evaporator bottoms, etc.	m^3 Ci	83.7 658.305	20
b. Dry active waste, contaminated equip., etc.	m^3 Ci	122.3 2.336	20
c. Irradiated components, control rods, etc.	m^3 Ci	No Shipment	
d. Other, (absorbed aqueous liquid)	m^3 Ci	No Shipment	

2. Estimate of major nuclide composition (by type of waste):

a. Dewatered Spent Resins

	Nuclide	%	Ci
1	Zn-65	62.29	410.00
2	Co-60	14.91	98.16
3	Cr-51	5.41	35.61
4	Co-58	4.84	31.84
5	Nb-95	4.53	29.83
6	Zr-95	2.61	17.18
7	Mn-54	2.21	14.55
8	Cd-109	1.27	8.36
9	Sb-124	0.607	4.00
10	Ag-110m	0.58	3.83
11	Ni-63*	0.411	2.71
12	Sn-113	0.161	1.06
13	Fe-59	0.101	0.662
14	Co-57	0.0359	0.236

*Indicates scaled nuclide

Table 4-3 (Continued)

b. Dry Active Wastes (DAW)

Nuclide		%	Ci
1	Zn-65	48.29	1.128
2	Cr-51	20.6	0.4825
3	Co-60	14.52	0.3556
4	Co-58	7.47	0.1744
5	Mn-54	4.71	0.1099
6	Nb-95	2.07	4.822E-2
7	Ni-63*	1.07	2.489E-2
8	H-3*	0.501	1.171E-2

c. Irradiated Components - None

d. Other - Absorbed Liquids (None)

3. Solid Waste Disposition

Number of Shipments	Mode of Transportation	Destination
19	Flat bed trailer (5) 14-210H Cask (13) 10-142 Cask (1)	US Ecology Richland, WA

B. IRRADIATED FUEL SHIPMENTS (Disposition)

None

*Indicates scaled nuclide

4.2 Process Control Program

The Process Control Program (PCP) used to control solidification at WNP-2 will be provided by the vendor waste processor, Pacific Nuclear Inc. in accordance with Contract C-20452, and will be subjected to POC review prior to any solidification of radwaste. Two Pacific Nuclear generic solidification PCP's, TP-04, "Portable Solidification System and TP-05, "Radwaste Solidification System" are currently under NRC review. As an alternative, approved High Integrity Containers (HIC's) could be used for the transport of wastes requiring stabilization. Other portions of the radwaste program are controlled by the WNP-2 procedures PPM 1.12.1, "Radwaste Management Program", PPM 1.12.2, "Radwaste Process Control Program", and 1.12.3, "Contract (Vendor) Waste Processing". No significant changes have occurred in these procedures during this reporting period.

5.0 METEOROLOGY

The meteorological data for the first half of calendar year 1987 will be included in the Semi-Annual Effluent Report due 60 days after January 1, 1988 and will include data covering the full calendar year 1987.

6.0 DOSE ASSESSMENT - IMPACT ON MAN

The dose impact on man for the calendar year 1987 will be included in the Semi-Annual Effluent Report due 60 days after January 1, 1988.

7.0 REVISIONS TO THE ODCM

During this semi-annual reporting period, no revisions were made to the offsite Dose Calculation Manual (ODCM).

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

August 18, 1987
G02-87-229

Docket No. 50-397

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, D.C. 20555

Gentlemen:

Subject: NUCLEAR PLANT NO. 2
SEMI-ANNUAL EFFLUENT REPORT
JANUARY 1, 1987 TO JUNE 30, 1987 (ATTACHED)

In accordance with title 10 of the Code of Federal Regulations, Part 50.36a (a) (2), the subject report is herewith being submitted.

Should you have any questions, please contact Mr. R. G. Graybeal, Manager, WNP-2 Health Physics/Chemistry.

Very truly yours,

C M Powers

C. M. Powers
WNP-2 Plant Manager

bk
Attachment

cc: RB Samworth - NRC
C Eschels - EFSEC
D Jaquish- DOE
JB Martin - NRC RV (2)
D Sherman - Amer. Nuclear Insurers
TR Strong - DSHS
NRC Site Inspector

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