

U. S. NUCLEAR REGULATORY COMMISSION

REGION V

Report Nos. 50-528/85-39, 50-529/85-40

Construction Permit No. CPPR-142

Docket Nos. 50-528, 50-529

License No. NPF-41

Licensee: Arizona Nuclear Power Project  
P. O. Box 52034  
Phoenix, Arizona 85072-2034

Facility Name: Palo Verde No. 1 and No. 2

Inspection at: Wintersburg and Tempe, Arizona

Inspection conducted: October 21-25, 1985

Inspectors: G. Hamada  
G. Hamada, Radiation Laboratory Specialist

11-27-85  
Date Signed

Approved By: G. Yuhas  
G. Yuhas, Chief  
Facilities Radiological Protection Section

11/27/85  
Date Signed

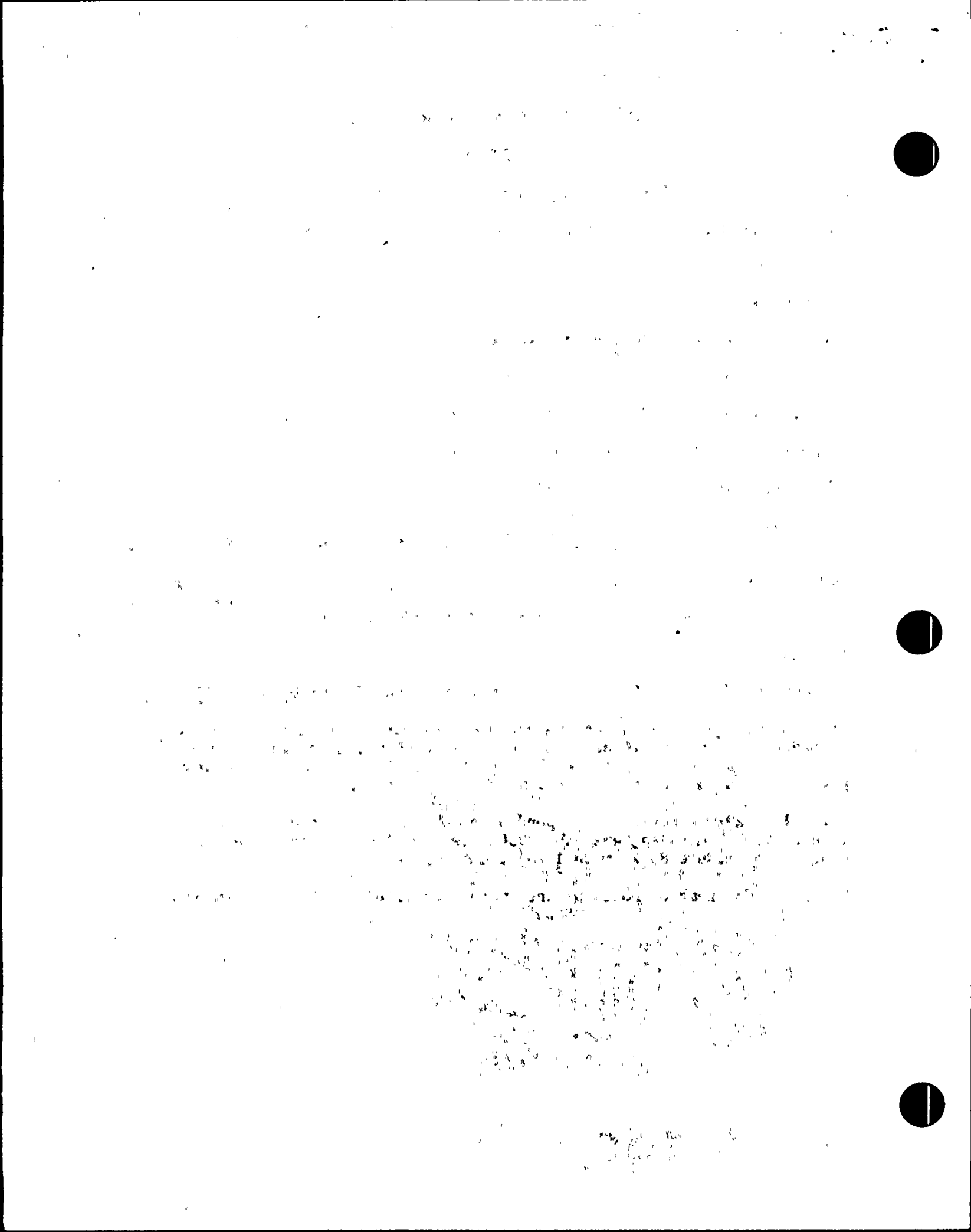
Summary:

Inspection of October 21-25, 1985 (Report Nos. 50-528/85-39 and 50-529/85-40)

Areas Inspected: This was an unannounced inspection of Unit 2 chemistry laboratory capability to perform the required chemical and radiochemical measurements. This inspection also involved Unit 1 chemistry laboratory participation in the confirmatory measurement tests with Unit 2.

A total of 29 man hours were expended on module 84525 and 4 man hours on module 79501. Modules 84525 and 79501 are now closed. Six man hours were expended on module 84725 with 10 percent completion.

Results: No items of noncompliance were identified in the areas inspected.



## DETAILS

### 1. Persons Contacted

- \*F. L. Abrahamson - Bechtel Resident Engineer
- \*R. Adney - Unit 2 Superintendent
- \*D. R. Anderson - Bechtel Resident Engineer
- \*R. Badsgard - Nuclear Engineer
- \*L. Brown - Radiation Protection and Chemistry Manager
- \*R. M. Butler - Technical Services
- \*B. Cederquist - Chemical Services Manager
- \*K. Chavet - Chemist
- \*W. F. Fernow - Plant Services Manager
- \*H. D. Foster - Bechtel Quality Control
- \*R. D. Goodwin - Unit 1 Chemistry Lead
- \*D. Hawkinson - Bechtel Project QA Manager
- \*G. A. Hierzer - Bechtel
- \*K. D. Hodges - Unit 2 Chemistry Lead
- \*F. Hopkins - Nuclear Licensing
- \*L. Johnson - Nuclear Safety Engineer
- \*R. G. Johnson - Unit 2 Chemistry Supervisor
- \*D. E. Karner - Assistant V.P. Nuclear Production
- \*J. E. Malik - Compliance Engineer
- \*J. Matteson - Transition QA/QC
- \*R. Ozment - S/U Admin. Manager
- \*L. G. Papworth - Op. Eng. Manager
- \*T. Shriver - QS&E Manager
- \*T. Warren - Unit 1 Chemistry Supervisor

\*Indicates personnel present at exit interview.

### 2. Discussion

The thrust of this inspection was to assess the capability of Unit 2 Chemistry to adequately perform the required chemical and radiochemical analyses under routine operating conditions. Because Unit 1 chemistry had earlier been determined to be "qualified" to perform the required measurements, the results of the various sample categories measured by Unit 2 were compared against results obtained by Unit 1 for these same samples. The test results are tabulated below.



Table 1  
Liquid Waste  
(One Liter Marinelli Geometry)

<u>Nuclide</u>	<u>Unit 2</u> <u>uCi/ml</u>	<u>Unit 1</u> <u>uCi/ml</u>	<u>Ratio</u> <u>Unit 2/Unit 1</u>	<u>*Agreement</u> <u>Range</u>
Na-24	4.27E-7	4.71E-7	0.91	0.50-2.00
Mn-54	3.70E-7	4.25E-7	0.87	0.50-2.00
Co-58	7.12E-6	6.90E-6	1.03	0.75-1.33
Co-60	2.01E-6	2.11E-6	0.95	0.75-1.33
Sb-122	1.35E-6	1.15E-6	1.17	0.60-1.66
Sb-124	1.36E-5	1.36E-5	1.00	0.80-1.25
Cs-136	2.06E-7	2.35E-7	0.88	0.50-2.00
Cs-137	1.61E-6	1.45E-6	1.11	0.75-1.33

\* See enclosure for explanation of agreement criteria. For all tests described in this report, use Unit 1 data in place of NRC results.

Table 1 shows the results for a liquid waste holdup tank sample contained in a one liter Marinelli beaker geometry. The results indicate good agreement for this geometry.

Table 2  
Charcoal Cartridge  
Unit 1 Containment Air

<u>Nuclide</u>	<u>Unit 2</u> <u>uCi/cc</u>	<u>Unit 1</u> <u>uCi/cc</u>	<u>Ratio</u> <u>Unit 2/Unit 1</u>	<u>Agreement</u> <u>Range</u>
Br-82	1.09E-10	9.55E-11	1.14	0.60-1.66
I-131	6.68E-11	5.38E-11	1.24	0.50-2.00
I-133	6.04E-11	5.02E-11	1.20	0.50-2.00

Table 3  
Gas (1 Liter Marinelli)  
Unit 1 Containment Air

<u>Nuclide</u>	<u>Unit 2</u> <u>uCi/cc</u>	<u>Unit 1</u> <u>uCi/cc</u>	<u>Ratio</u> <u>Unit 2/Unit 1</u>	<u>Agreement</u> <u>Range</u>
Kr-85M	1.10E-7	1.35E-7	0.81	0.50-2.00
Xe-133	8.04E-5	8.61E-5	0.93	0.80-1.25
Xe-133M	1.04E-6	1.03E-6	1.01	0.60-1.66
Xe-135	1.50E-6	1.58E-6	0.95	0.75-1.33

Table 2 summarizes the results for a charcoal cartridge sample obtained by sampling Unit 1 containment air. Despite the relatively low activity levels of the nuclides detected, reasonably good agreement was achieved.

Table 3 gives the results for a large volume gas sample obtained from containment air. Good agreement is indicated for all nuclides listed.

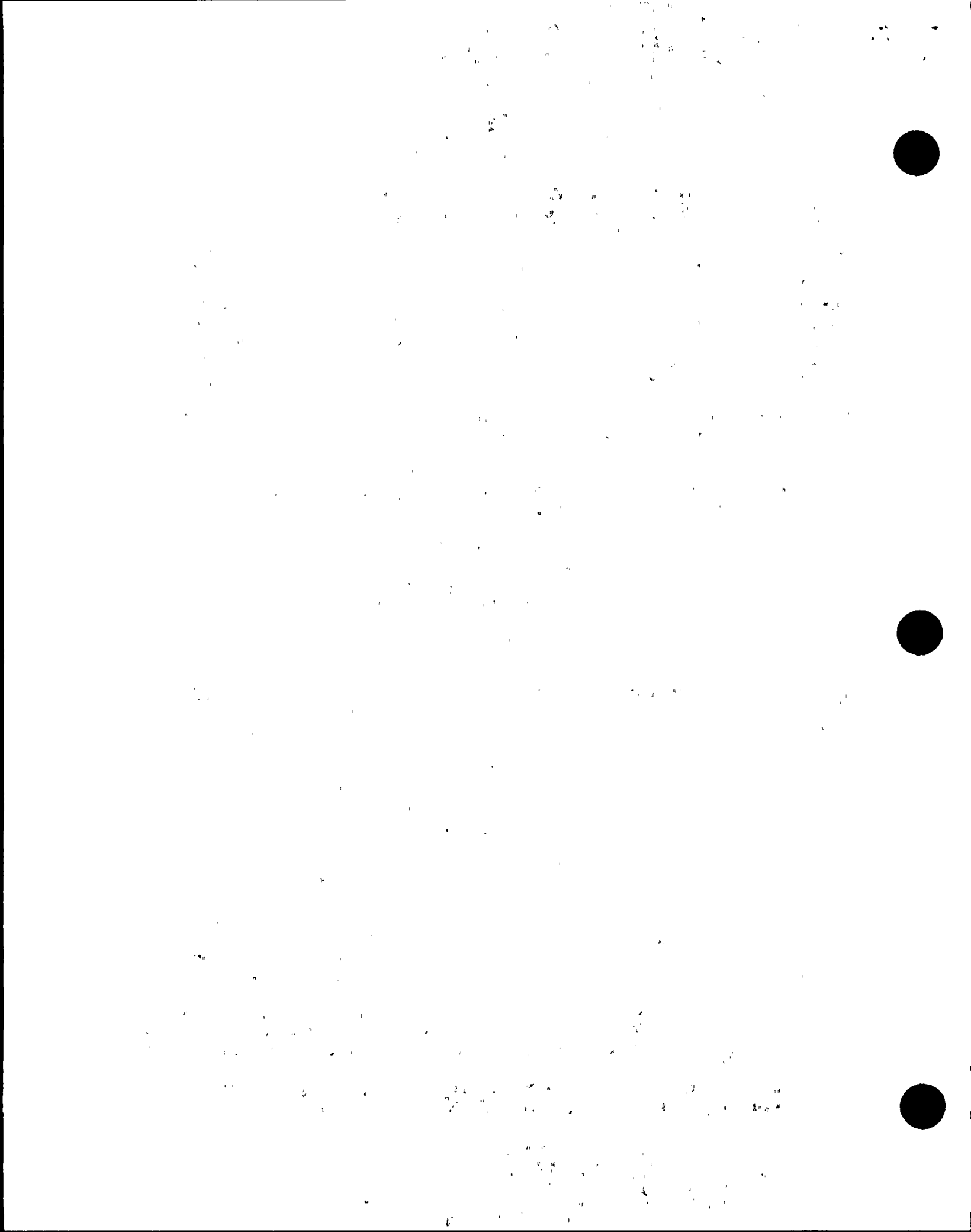


Table 4

RCS Liquid

<u>Nuclide</u>	<u>Unit 2</u> <u>uCi/ml</u>	<u>Unit 1</u> <u>uCi/ml</u>	<u>Ratio</u> <u>Unit 2/Unit 1</u>	<u>Agreement</u> <u>Range</u>
Na-24	4.14E-3	4.18E-3	0.99	0.75-1.33
Sb-122	9.94E-4	1.07E-3	0.93	0.50-2.00
I-131	6.17E-3	5.82E-3	1.06	0.75-1.33
I-132	1.25E-2	1.15E-2	1.09	0.75-1.33
I-133	2.62E-2	2.36E-2	1.11	0.80-1.25
I-134	1.98E-2	1.73E-2	1.14	0.75-1.33
I-135	2.24E-2	2.32E-2	0.97	0.75-1.33
Cs-138	3.51E-2	3.43E-2	1.02	0.75-1.33
W-187	5.44E-3	4.06E-3	1.34	0.60-1.66

Table 5

Stripped Gas

<u>Nuclide</u>	<u>Unit 2</u> <u>uCi/ml</u>	<u>Unit 1</u> <u>uCi/ml</u>	<u>Ratio</u> <u>Unit 2/Unit 1</u>	<u>Agreement</u> <u>Range</u>
Kr-85M	5.62E-2	4.92E-2	1.14	0.80-1.25
Kr-87	6.19E-2	5.26E-2	1.18	0.80-1.25
Kr-88	1.15E-1	1.00E-1	1.15	0.80-1.25
Xe-133	4.32E-1	3.70E-1	1.17	0.80-1.25
Xe-133M	1.18E-2	1.04E-2	1.13	0.60-1.66
Xe-135	1.60E-1	1.37E-1	1.17	0.80-1.25

Tables 4 and 5 list the results for reactor coolant liquid and reactor coolant stripped gas samples respectively. The results indicate that adequate agreement was obtained for both categories.

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Table 6  
Particulate Filter Geometry  
(Reactor Coolant Suspended Solids)

<u>Nuclide</u>	<u>Unit 2</u> <u>uCi/ml</u>	<u>Unit 1</u> <u>uCi/ml</u>	<u>Ratio</u> <u>Unit 2/Unit 1</u>	<u>Agreement</u> <u>Range</u>
Na-24	1.86E-5	1.37E-5	1.36	0.60-1.66
Cr-51	1.68E-4	1.48E-4	1.14	0.75-1.33
Mn-54	8.51E-6	8.83E-6	0.96	0.60-1.66
Mn-56	5.05E-4	4.62E-4	1.09	0.75-1.33
Co-58	1.29E-4	1.24E-4	1.04	0.75-1.33
Co-60	1.33E-5	1.41E-5	0.94	0.75-1.33
Fe-59	1.24E-5	9.82E-6	1.26	0.60-1.66
Ni-65	5.36E-5	5.96E-5	0.90	0.60-1.66
Zr-95	9.33E-6	1.10E-5	0.85	0.60-1.66
Nb-95	6.60E-6	7.14E-6	0.92	0.50-2.00
Sb-122	1.56E-4	1.32E-4	1.18	0.80-1.25
Sb-124	2.16E-5	2.03E-5	1.06	0.75-1.33
I-131	2.00E-5	2.23E-5	0.90	0.75-1.33
I-132	3.35E-5	3.61E-5	0.93	0.60-1.66
I-133	8.50E-5	7.86E-5	1.08	0.75-1.33
I-135	7.54E-5	9.23E-5	0.82	0.75-1.33
Cs-138	3.70E-4	4.89E-4	0.76	0.60-1.66
W-187	1.91E-4	2.05E-4	0.93	0.75-1.33
Np-239	3.78E-5	2.15E-5	1.76	0.50-2.00

Table 6 lists the results for a particulate filter geometry. The sample was obtained by filtering suspended solids from reactor coolant. This procedure was used because Palo Verde uses a moving filter roll to filter particulates and thus, a filter sample with the appropriate geometry for test purposes could not be obtained. Also, grab particulate filter samples often do not contain enough activity to be useful for intercomparison tests. As can be seen, the agreement is adequate.

A review of the capability of Unit 2 chemistry to perform high sensitivity trace containment analysis was also conducted. The laboratory has sufficient space and is equipped with state-of-the-art instruments such as the ion chromatograph and atomic absorption systems. The capabilities of the staff are good and at least one member from each of the six laboratory teams is qualified to operate the ion chromatograph and atomic absorption units. On the other hand, however, based on current information about laboratory personnel and the expected functions to be performed by each, the laboratory appears to be understaffed.

The quality assurance procedures and practices which apply to Unit 1 also apply to Unit 2. While Palo Verde does not participate in the EPA crosscheck program, they do participate in a commercially administered (Analytics) unknown spiked sample analysis program for both chemical and radiochemical measurements on a quarterly schedule.

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While the emphasis was on Unit 2, because of Unit 1 involvement in these tests, it was possible to compare the peak stripping algorithm of the Unit 1 system against that of Unit 2. Unit 1 uses a different gamma spectroscopy system and thus a different peak strip algorithm from Unit 2. Unit 2 has a Nuclear Data system similar to that of the NRC. Because of previous questions regarding the software associated with the Unit 1 gamma spectroscopy system, it was recommended that comparisons be made with other systems to further evaluate the Unit 1 system. Based on this review, it can be concluded that the two systems are comparable.

3. Exit Interview

Inspection findings were discussed with licensee personnel indicated in paragraph 1. Licensee management was informed about the agreement achieved for the cross-measurement checks, and the overall adequacy of the chemical and radiochemical measurement program at Unit 2. The finding of a potential understaffing problem was also discussed.

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