CATEGORY 1

REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)

ACCESSION NBR:9701020083 DOC.DATE: 96/12/13 NOTARIZED: NO DOCKET #
FACIL:STN-50-530 Palo Verde Nuclear Station, Unit 3, Arizona Publi 05000530
AUTH.NAME AUTHOR AFFILIATION
IDE,W.E. Arizona Public Service Co. (formerly Arizona Nuclear Power
RECIP.NAME RECIPIENT AFFILIATION
Document Control Branch (Document Control Desk)

SUBJECT: Forwards request for additional info re lead fuel assemblies-exemption request.

DISTRIBUTION CODE: A001D COPIES RECEIVED:LTR 1 ENCL 1 SIZE: 8
TITLE: OR Submittal: General Distribution

NOTES:Standardized plant. 05000530

	RECIPIENT ID CODE/NAME	COPIES LTTR	COPIES ENCL	RECIPIENT ID CODE/NAME	COPIES LTTR	COPIES ENCL
	PD4-2 LA	1	1	PD4-2 PD	1	1
	THOMAS,C	1	1			
INTERNAL:	ACRS	1	1	FILE CENTER 01	1	1
	NRR/DE/ECGB/A	1	1	NRR/DE/EMCB	1	1
	NRR/DRCH/HICB	1	1	NRR/DSSA/SPLB	1	1
	NRR/DSSA/SRXB	1	1	NUDOCS-ABSTRACT	1	1
	OGC/HDS2	1	0			
EXTERNAL:	NOAC	1	1	NRC PDR	1	1

NOTE TO ALL "RIDS" RECIPIENTS:
PLEASE HELP US TO REDUCE WASTE! CONTACT THE DOCUMENT CONTROL DESK, ROOM OWFN 5D-5(EXT. 415-2083) TO ELIMINATE YOUR NAME FROM DISTRIBUTION LISTS FOR DOCUMENTS YOU DON'T NEED!

TOTAL NUMBER OF COPIES REQUIRED: LTTR 14 ENCL 13

CATEGORY 1 DOCUMENT

MAF

APS
Commitment. Innovation. Energy.

Palo Verde Nuclear
Generating Station

William E. Ide
Vice President
Nuclear Engineering

TEL 602/393-6116
FAX 602/393-6077

Mail Station 7616
P.O. Box 52034
Phoenix, AZ 85072-2034

102-03828-WEI/SAB/JRP
December 13, 1996

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Mail Station P1-37
Washington, D.C. 20555-0001

Reference: Letter 102-03769-WLS/SAB/JRP dated September 12, 1996, from W. L. Stewart, APS to USNRC Document Control Desk

Dear Sirs:

Subject: Palo Verde Nuclear Generating Station (PVNGS)
Unit 3
Docket No. STN 50-530
Response To Request for Additional Information
Regarding Lead Fuel Assemblies-Exemption Request

This letter transmits the Arizona Public Service Company (APS) response to a request for additional information. During a conference call with the NRC on November 19, 1996, it was requested that APS provide additional information in support of the exemption request in the referenced letter. The requested information is attached.

Should you have any questions, please contact Scott A. Bauer at (602) 393-5978.

Sincerely,

WEI/SAB/JRP/rh

Attachment

cc: L. J. Callan
K. E. Perkins
J. W. Clifford
K. E. Johnston

A001 1/1

ATTACHMENT 1

NRC Request for Additional Information
PVNGS Unit 3 Exemption Request

NRC Request for Additional Information

PVNGS Unit 3 Exemption Request

1. Are the test assemblies in rodded locations?

Yes. The two new test assemblies will be located under 2 rods from Group 1 and 2 rods from Shutdown Bank A. The Batch F carrier assembly with the 10 test rods will be under 4 part-length rods from Part Length Group 1. These rods are depicted in PVNGS UFSAR drawing 4.2-10, "Control Element Assembly Locations," (copy attached).

2. What are the exact locations of the test assemblies in the core?

The following are assembly locations for Cycle 7. The Batch F carrier assembly, P3F322, which will host 10 transplanted rods, will be located at core location J-9 (box 121, UFSAR drawing 4.3-20, copy attached.) The test assembly clad entirely with Alloy A, P3J408, will be located at S-07 (box 148, UFSAR drawing 4.3-20) and the test assembly clad entirely with Alloy F, P3J407, will be located at B-11 (box 94, UFSAR drawing 4.3-20).

3. What are the values of Fq and F delta H in the test rods?

As stated in the initial letter, the test assemblies will be in "non-limiting core locations." Non-limiting locations is defined by APS for these test assemblies as being locations where power of the peak rod in each test assembly is 95% or less than the peak rod in the core.

Fq and F delta H are terms typically applied to Westinghouse fuel. Similar defining parameters for Combustion Engineering fuel include the following:

a. Fxy - 2d planar radial peak (Fq/Fz)
b. Fr - Integrated radial peak (F delta H)

The values for these parameters given below are for the time in Cycle 7 when the percentage of the peak rod is the highest. P3J407 and P3J408 are in symmetric core locations.

	Peak rod in core	Alloy A P3J408	Alloy F P3J407	P3J407 & P3J408 % of peak rod	Batch F P3F322	P3F322 % of peak rod
Fxy	1.643	1.551	1.551	94.4%	1.08	65.7%
Fr	1.465	1.363	1.363	93.0%	.939	64.1%

4. What are the details of the long term test program?

At this point in time, the long term test program involves the continued testing of two clad materials, Alloy A and Alloy F. Testing of these two materials includes individual rod testing to higher burnups as well as full assembly tests. The scope of the test program that is planned by ABB CENO includes determination of material properties and irradiation performance characteristics of Alloy A and Alloy F.

Components of the long term test program and associated schedules were presented to the NRC during a meeting with CE and APS personnel on April 16, 1996. Further details of testing in Unit 3 Cycles 7, 8, and 9, which the pending exemption request was submitted for, were presented to the NRC in a subsequent meeting with APS and CE personnel on July 3, 1996. Copies of the slides used in these presentations were submitted to the NRC by letter along with affidavits certifying they contain proprietary information. The CE submittal letters are LD-96-008 dated April 16, 1996 and LD-96-025 dated July 3, 1996 respectively.

The broad categories of tasks in the long term plan include the following:

- Ex-reactor testing and manufacturing development for fabricating cladding materials with potential for superior in-reactor performance.
- In-reactor testing of lead test rods.
- In-reactor testing of lead test assemblies.
- Poolside examinations to monitor performance.
- Hot cell examinations subsequent to discharge of fuel rods at selected burnup intervals.
- High-temperature material property tests for safety related analyses and evaluation.
- Topical report to NRC for approval of batch-wide application.

It should be noted that the test program is based on the premise that the cladding materials selected will continue to exhibit superior performance characteristics (e.g. improved corrosion resistance and/or dimensional stability) in comparison to the current standard cladding. The continued irradiation and any successive testing may be discontinued if interim poolside examination results are obtained which indicate unsatisfactory performance. Additionally, if the cladding alloys do not show expected performance advantages over standard cladding, down stream tests planned for these

materials, such as the hot cell examinations and high-temperature material property tests, will not be performed.

5. What inspection parameters are included in hot cell testing?

The following points are typically included in performing hot cell exams.

- Visual inspection.
- Gamma scanning to determine local burnup of cladding and fuel sections used in subsequent tests.
- Rod puncture and gas collection to determine a number of parameters related to fuel behavior such as rod void volume, rod internal pressure, and fission gas release fraction.
- Metallographic examination to compare oxide thickness on the cladding determined in the poolside examination and hydride morphology.
- Quantitative analysis to determine hydrogen in the cladding for comparison to local oxide thickness to determine hydrogen absorption fraction.
- Cladding mechanical property testing to characterize ductility and strength.
- Fractography using optical/scanning microscopy.

6. What plans are there to perform drag testing, i.e. drop time testing?

As a result of NRC Bulletin 96-01, Control Rod Insertion Problems, CE evaluated its fuel assemblies to look for potential mechanisms which could prevent control rods from fully inserting during a reactor trip. The results from this evaluation were submitted by CE to the NRC on October 17, 1996 in report CE NPSD-1049-P, Rev. 2 June 1996. Overall, the report found no mechanisms that would prevent control rods from fully inserting.

APS performs drop time surveillance testing for each of the 89 CEAs in the core following each refueling outage. The evaluation performed in response to Bulletin 96-01 included a sample of these drop times. No significant increase in drop times was noted in any of the data evaluated.

In-reactor testing of the two test clads to date has not shown any behavior that would lead to an abnormal condition which would affect assembly guide tubes, control rod insertion capability, or have any effects on the other structural components of the assembly. The structural components of the lead test assemblies, namely the guide tubes, spacer grids and the end fittings, are identical in design and material to the standard fuel being fabricated for Unit 3 Cycle 7.

For Cycle 7, all three test assemblies will be in rodded locations and hence, will be subjected to drop time testing. Consideration was given to perform additional testing as a result of the NRC's request for more information. However, based on the above

points, APS does not believe that more frequent or detailed drop time testing for the lead test assemblies is necessary at this time.

7. What dimensional changes are involved with the test assemblies?

No dimensional changes will exist for structural components and test rods in assemblies P3J407 and P3J408 as compared to the remainder of the fuel manufactured for Unit 3 Cycle 7. The only difference will be the cladding materials with the exception that the rod endcaps in the Alloy F assembly will also be fabricated of Alloy F material. Rod endcaps in the Alloy A assembly will be fabricated from standard OPTIN material. Assembly grids, guide tubes, and top and bottom end fittings will be the same for the test assemblies as for the rest of the Unit 3 Cycle 7 fuel.

The 10 carry-over test rods being placed in the Batch F carrier assembly were manufactured to the same design as the other Batch F fuel, hence there were no dimensional changes for these test rods as well.

8. What are the poolside inspection parameters?

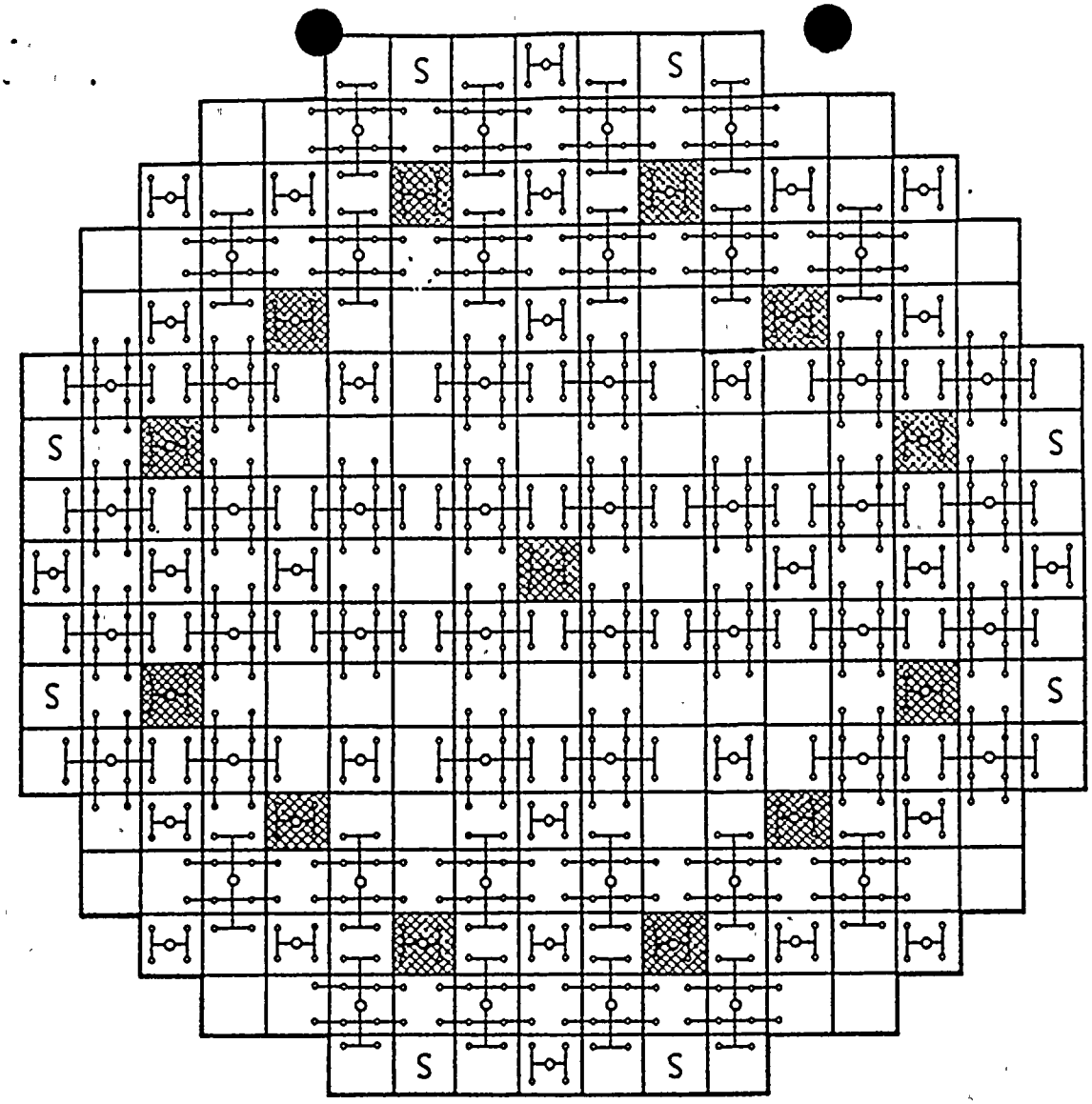
Inspections of test rods are performed in the spent fuel pool following each cycle of irradiation. The rods are typically examined for oxide thickness, axial fuel rod growth and/or shoulder gap, and at particular times in assembly life (early and late), ovality and cladding diameters over the length of the rods. Visual inspections are also performed to evaluate surface conditions and look for defects.

9. How long will the test assemblies be in-core for testing?

The new assembly clad with Alloy A and the new assembly clad with Alloy F are planned to be in Unit 3 for cycles 7, 8, and 9. The exposure of these two assemblies during these three cycles will not exceed 60,000 MWD/MTU. Exposure for these two assemblies in Cycle 7 is not expected to exceed 29,000 MWD/MTU.

The batch F carrier assembly has received two cycles of burnup to date. The 6 Alloy A test rods and the 4 OPTIN test rods, which have been in Unit 3 cores for Cycles 4, 5, & 6, will be transplanted to the carrier assembly during the next refueling outage. The carrier assembly and the test rods will be irradiated during Cycle 7 only.

At the end of Cycle 7, the 6 Alloy A test rods will have achieved a maximum of 73,000 MWD/MTU burnup and the 4 OPTIN test rods will have achieved a maximum of 67,000 MWD/MTU. The remainder of the standard clad rods in the Batch F carrier assembly will achieve a maximum of 59,000 MWD/MTU at the end of Cycle 7.



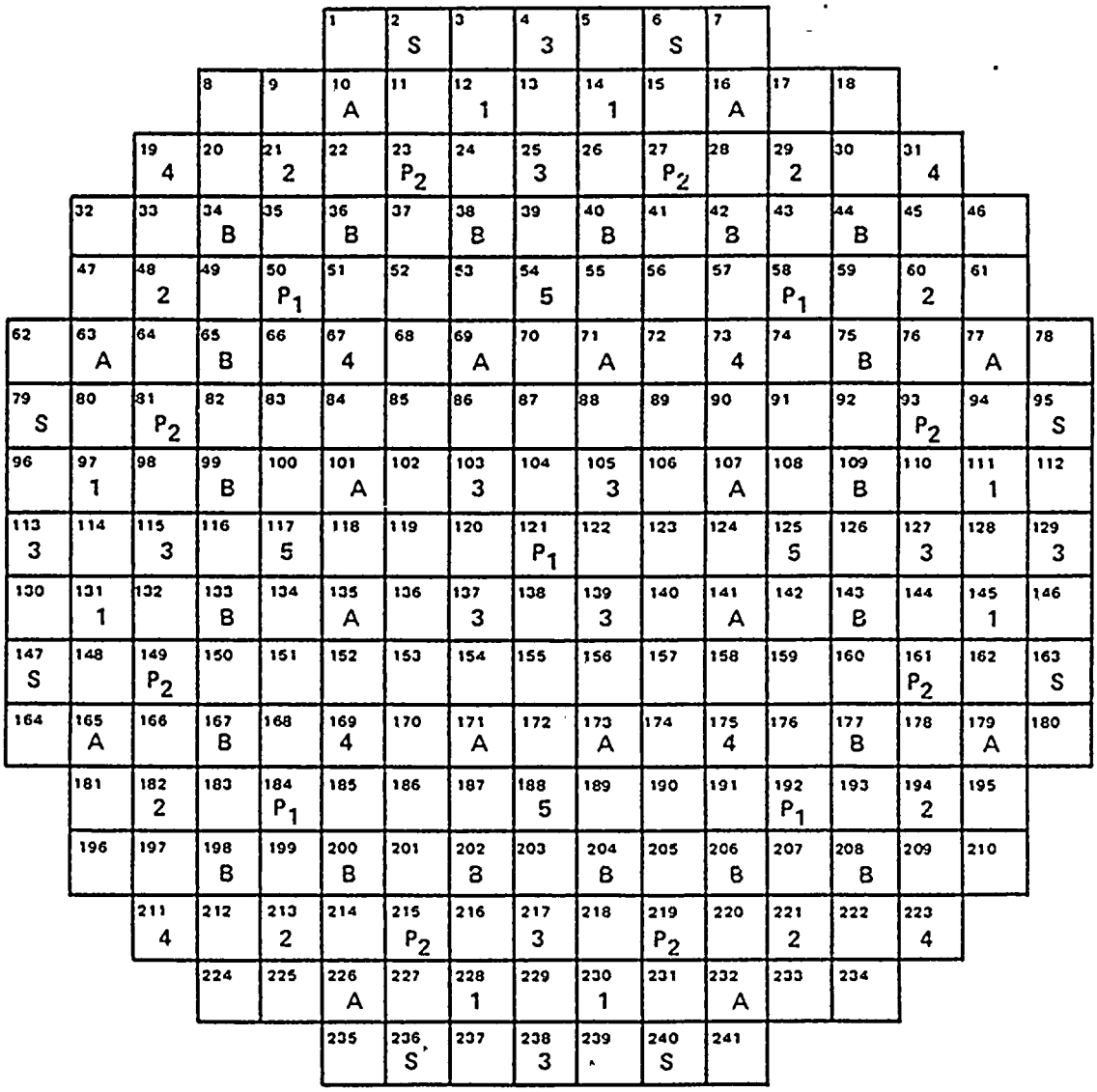
12 ELEMENT FULL LENGTH CEA's	48
4 ELEMENT FULL LENGTH CEA's	28
4 ELEMENT PART LENGTH CEA's	13
TOTAL	89 CEA's
S DENOTES SPARE CEA LOCATIONS	8

Palo Verde Nuclear Generating Station
Updated FSAR

CONTROL ELEMENT ASSEMBLY LOCATIONS

Figure 4.2-10

5 – LEAD REGULATING BANK
4 – SECOND REGULATING BANK
3 – THIRD REGULATING BANK
2 – FOURTH REGULATING BANK
1 – LAST REGULATING BANK
B – SHUTDOWN BANK B
A --SHUTDOWN BANK A
P_2 – PLR GROUP 2
P_1 – PLR GROUP 1
S – SPACE CEA LOCATIONS



Palo Verde Nuclear Generating Station
Updated FSAR

CEA BANK IDENTIFICATION

Figure 4.3-20