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SUBJECT: Forwards corrected pages to FSAR, correcting discrepancies re.  
 pressurized thermal shock, in response to SER (NUREG-0857).  
 Changes will be included in next FSAR update.

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NOTES: Standardized plant. 05000528  
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 Standardized plant. 05000530

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## Arizona Nuclear Power Project

P.O. BOX 52034 • PHOENIX, ARIZONA 85072-2034

Director of Nuclear Reactor Regulation  
Attention: Mr. George W. Knighton, Chief  
Licensing Branch No. 3  
Division of Licensing  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555

August 30, 1985  
ANPP-33305-EEVB/PGN

Subject: Palo Verde Nuclear Generating Station (PVNGS)  
Units 1, 2, and 3  
Pressurized Thermal Shock  
Docket No. 50-528(License No. NPF-41)/529/530  
File: 85-056-026; G.1.01.10

- References: (1) Safety Evaluation Report related to the operation of Palo Verde Nuclear Generating Station, Units 1, 2, and 3 (NUREG-0857) Supplement 8, dated May 1985.
- (2) Telecon between E. A. Licitra (NRC), B. J. Elliot (NRC), T. Collier (CE), R. Pirek (CE), K. L. McCandless (APS), P. G. Nelson (APS), dated 8/8/85; Subject: Pressurized Thermal Shock Units 2 and 3 (FSAR Sections 5.2, 5.3, 5.4).

Dear Mr. Knighton:

Reference (1) identifies pressurized thermal shock (PTS) as an issue relating to PVNGS Unit 2 which is still outstanding.

APS has previously informed the NRC that discrepancies had been identified in some of the FSAR sections concerning PTS. The corrections would be submitted to the staff in the form of an FSAR change package in order for them to complete their review of the PTS issue.

Attached are the corrected pages of the affected FSAR sections. A safety review and evaluation is in process for implementation of these changes in PVNGS Unit 1 in accordance with the requirements of 10CFR 50.59. Please review the attached changes as they apply to PVNGS Units 2 and 3. These changes will be included in the next FSAR update.

By submittal of this information, we believe the issue of pressurized thermal shock has been addressed and can be closed out.

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PDR ADDCK 05000528  
E PDR

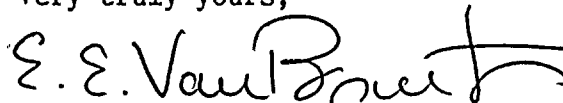
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Pressurized Thermal Shock  
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Please contact Mr. W. F. Quinn of my staff concerning any questions or additional information you may need on this matter.

Very truly yours,




E. E. Van Brunt, Jr.  
Executive Vice President  
Project Director

EEVB/WFQ/PGN/slh  
Attachment


cc: E. A. Licitra (all w/a)  
M. C. Ley  
R. P. Zimmerman  
B. J. Elliot  
A. C. Gehr

STATE OF ARIZONA    )  
                          ) ss.  
COUNTY OF MARICOPA)

I, Edwin E. Van Brunt, Jr., represent that I am Executive Vice President, Arizona Nuclear Power Project, that the foregoing document has been signed by me on behalf of Arizona Public Service Company with full authority to do so, that I have read such document and know its contents, and that to the best of my knowledge and belief, the statements made therein are true.

  
\_\_\_\_\_  
Edwin E. Van Brunt, Jr.

Sworn to before me this 30 day of August, 1985.

  
\_\_\_\_\_  
Notary Public

My Commission Expires:

My Commission Expires April 6, 1987

[illegible]

$\frac{1}{2} \cdot 2 = 1$

**A**

1. *Phragmites* (1990) 1000

Figure 1 is a line graph showing the percentage of total sample for each age group (0-14, 15-24, 25-34, 35-44, 45-54, 55-64, 65-74, 75+) across different years (1970, 1980, 1990, 2000, 2010, 2020). The y-axis ranges from 0 to 100. The x-axis shows the years. The 0-14 age group shows a steady decline from about 25% in 1970 to 10% in 2020. The 15-24 age group shows a slight increase from about 15% in 1970 to 20% in 2020. The 25-34 age group shows a slight increase from about 15% in 1970 to 20% in 2020. The 35-44 age group shows a slight increase from about 15% in 1970 to 20% in 2020. The 45-54 age group shows a slight increase from about 15% in 1970 to 20% in 2020. The 55-64 age group shows a slight increase from about 15% in 1970 to 20% in 2020. The 65-74 age group shows a slight increase from about 15% in 1970 to 20% in 2020. The 75+ age group shows a slight increase from about 15% in 1970 to 20% in 2020.

6. 7. 8. 9. 10. 11. 12. 13. 14. 15. 16. 17. 18. 19. 20. 21. 22. 23. 24. 25. 26. 27. 28. 29. 30. 31. 32. 33. 34. 35. 36. 37. 38. 39. 40. 41. 42. 43. 44. 45. 46. 47. 48. 49. 50. 51. 52. 53. 54. 55. 56. 57. 58. 59. 60. 61. 62. 63. 64. 65. 66. 67. 68. 69. 70. 71. 72. 73. 74. 75. 76. 77. 78. 79. 80. 81. 82. 83. 84. 85. 86. 87. 88. 89. 90. 91. 92. 93. 94. 95. 96. 97. 98. 99. 100. 101. 102. 103. 104. 105. 106. 107. 108. 109. 110. 111. 112. 113. 114. 115. 116. 117. 118. 119. 120. 121. 122. 123. 124. 125. 126. 127. 128. 129. 130. 131. 132. 133. 134. 135. 136. 137. 138. 139. 140. 141. 142. 143. 144. 145. 146. 147. 148. 149. 150. 151. 152. 153. 154. 155. 156. 157. 158. 159. 160. 161. 162. 163. 164. 165. 166. 167. 168. 169. 170. 171. 172. 173. 174. 175. 176. 177. 178. 179. 180. 181. 182. 183. 184. 185. 186. 187. 188. 189. 190. 191. 192. 193. 194. 195. 196. 197. 198. 199. 200. 201. 202. 203. 204. 205. 206. 207. 208. 209. 210. 211. 212. 213. 214. 215. 216. 217. 218. 219. 220. 221. 222. 223. 224. 225. 226. 227. 228. 229. 230. 231. 232. 233. 234. 235. 236. 237. 238. 239. 240. 241. 242. 243. 244. 245. 246. 247. 248. 249. 250. 251. 252. 253. 254. 255. 256. 257. 258. 259. 260. 261. 262. 263. 264. 265. 266. 267. 268. 269. 270. 271. 272. 273. 274. 275. 276. 277. 278. 279. 280. 281. 282. 283. 284. 285. 286. 287. 288. 289. 290. 291. 292. 293. 294. 295. 296. 297. 298. 299. 300. 301. 302. 303. 304. 305. 306. 307. 308. 309. 310. 311. 312. 313. 314. 315. 316. 317. 318. 319. 320. 321. 322. 323. 324. 325. 326. 327. 328. 329. 330. 331. 332. 333. 334. 335. 336. 337. 338. 339. 340. 341. 342. 343. 344. 345. 346. 347. 348. 349. 350. 351. 352. 353. 354. 355. 356. 357. 358. 359. 360. 361. 362. 363. 364. 365. 366. 367. 368. 369. 370. 371. 372. 373. 374. 375. 376. 377. 378. 379. 380. 381. 382. 383. 384. 385. 386. 387. 388. 389. 390. 391. 392. 393. 394. 395. 396. 397. 398. 399. 400. 401. 402. 403. 404. 405. 406. 407. 408. 409. 410. 411. 412. 413. 414. 415. 416. 417. 418. 419. 420. 421. 422. 423. 424. 425. 426. 427. 428. 429. 430. 431. 432. 433. 434. 435. 436. 437. 438. 439. 440. 441. 442. 443. 444. 445. 446. 447. 448. 449. 450. 451. 452. 453. 454. 455. 456. 457. 458. 459. 460. 461. 462. 463. 464. 465. 466. 467. 468. 469. 470. 471. 472. 473. 474. 475. 476. 477. 478. 479. 480. 481. 482. 483. 484. 485. 486. 487. 488. 489. 490. 491. 492. 493. 494. 495. 496. 497. 498. 499. 500. 501. 502. 503. 504. 505. 506. 507. 508. 509. 510. 511. 512. 513. 514. 515. 516. 517. 518. 519. 520. 521. 522. 523. 524. 525. 526. 527. 528. 529. 530. 531. 532. 533. 534. 535. 536. 537. 538. 539. 540. 541. 542. 543. 544. 545. 546. 547. 548. 549. 550. 551. 552. 553. 554. 555. 556. 557. 558. 559. 560. 561. 562. 563. 564. 565. 566. 567. 568. 569. 570. 571. 572. 573. 574. 575. 576. 577. 578. 579. 580. 581. 582. 583. 584. 585. 586. 587. 588. 589. 590. 591. 592. 593. 594. 595. 596. 597. 598. 599. 600. 601. 602. 603. 604. 605. 606. 607. 608. 609. 610. 611. 612. 613. 614. 615. 616. 617. 618. 619. 620. 621. 622. 623. 624. 625. 626. 627. 628. 629. 630. 631. 632. 633. 634. 635. 636. 637. 638. 639. 640. 641. 642. 643. 644. 645. 646. 647. 648. 649. 650. 651. 652. 653. 654. 655. 656. 657. 658. 659. 660. 661. 662. 663. 664. 665. 666. 667. 668. 669. 670. 671. 672. 673. 674. 675. 676. 677. 678. 679. 680. 681. 682. 683. 684. 685. 686. 687. 688. 689. 690. 691. 692. 693. 694. 695. 696. 697. 698. 699. 700. 701. 702. 703. 704. 705. 706. 707. 708. 709. 710. 711. 712. 713. 714. 715. 716. 717. 718. 719. 720. 721. 722. 723. 724. 725. 726. 727. 728. 729. 730. 731. 732. 733. 734. 735. 736. 737. 738. 739. 740. 741. 742. 743. 744. 745. 746. 747. 748. 749. 750. 751. 752. 753. 754. 755. 756. 757. 758. 759. 760. 761. 762. 763. 764. 765. 766. 767. 768. 769. 770. 771. 772. 773. 774. 775. 776. 777. 778. 779. 780. 781. 782. 783. 784. 785. 786. 787. 788. 789. 790. 791. 792. 793. 794. 795. 796. 797. 798. 799. 800. 801. 802. 803. 804. 805. 806. 807. 808. 809. 810. 811. 812. 813. 814. 815. 816. 817. 818. 819. 820. 821. 822. 823. 824. 825. 826. 827. 828. 829. 830. 831. 832. 833. 834. 835. 836. 837. 838. 839. 840. 841. 842. 843. 84

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Pressurized Thermal Shock  
ANPP- 33305  
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INTEGRITY OF REACTOR  
COOLANT PRESSURE BOUNDARY

Table 5.2-8A

PALO VERDE UNIT 2  
WELD METAL CERTIFICATION TESTS (a)  
COMPONENT: REACTOR VESSEL (Sheet 1 of 3)

| Component Weld Seam Number                          | Electrode Code        | Electrode Lot Number | T <sub>NDT</sub> (b)<br>(°F) | RT <sub>NDT</sub> (b)<br>(°F) |
|---|-----------------------|----------------------|------------------------------|-------------------------------|
| 101-101   | Coated Electrode (MA) | GABGG                | -50                          | -50                           |
| 101-102   | Coated Electrode (MA) | CAOJG                | -60                          | -30                           |
| 101-102   | Coated Electrode (MA) | GABGG                | -50                          | -50                           |
| 101-102   | Coated Electrode (MA) | LAOBF                | -70                          | -70                           |
| 101-102   | Coated Electrode (MA) | LAOGF                | -40                          | -40                           |
| 101-121   | Coated Electrode (MA) | AABHG                | -60                          | -60                           |
| 101-121   | Coated Electrode (MA) | JAAEF                | -60                          | -60                           |
| 101-122   | Coated Electrode (MA) | EAAHF                | -60                          | -40                           |
| 101-122   | Coated Electrode (MA) | FAAFF                | -70                          | -70                           |
| 101-122   | Coated Electrode (MA) | FABAF                | -60                          | -60                           |
| 101-122   | Coated Electrode (MA) | GAOAF                | -40                          | -40                           |
| <del>101-128</del>                                  | Coated Electrode (MA) | FAAFF                | -70                          | -70                           |
| <del>101-128</del>                                  | Coated Electrode (MA) | FAAHF                | -60                          | -50                           |
| <del>101-128</del>                                  | Coated Electrode (MA) | FABAF                | -60                          | -60                           |
| 101-142   | Coated Electrode (MA) | FAAFF                | -70                          | -70                           |
| 101-142   | Coated Electrode (MA) | LAOGF                | -40                          | -40                           |
| 101-150   | Coated Electrode (MA) | DABGG                | -70                          | -70                           |
| 101-150   | Coated Electrode (MA) | FAAFF                | -70                          | -70                           |
| 101-150   | Coated Electrode (MA) | LAOGF                | -40                          | -40                           |
| 101-171   | Coated Electrode (MA) | EAOAH                | -60                          | -60                           |
| 101-171   | Coated Electrode (MA) | JAOEH                | -60                          | -30                           |
| 103-121   | Coated Electrode (MA) | ABCAH                | -60                          | -60                           |
| 103-121   | Coated Electrode (MA) | BBAGG                | -60                          | -60                           |
| 103-121   | Coated Electrode (MA) | CAOJG                | -60                          | -30                           |
| 103-121   | Coated Electrode (MA) | GABGG                | -50                          | -50                           |
| 103-121   | Coated Electrode (MA) | HAAHG                | -70                          | -70                           |
| 103-121   | Coated Electrode (MA) | HABJF                | -70                          | -70                           |
| 103-121   | Coated Electrode (MA) | HACJG                | -40                          | -40                           |
| 103-121   | Coated Electrode (MA) | IABBG                | -60                          | -60                           |
| a. Per ASME BPV Codes, Section III, Article NB-2430 |                       |                      |                              |                               |
| b. Per ASME BPV Codes, Section III, Article NB-2330 |                       |                      |                              |                               |



INTEGRITY OF REACTOR  
COOLANT PRESSURE BOUNDARY

Table 5.2-8A

PALO VERDE UNIT 2  
WELD METAL CERTIFICATION TESTS (a)  
COMPONENT: REACTOR VESSEL (Sheet 3 of 3)

| Component Weld Seam Number | Electrode Code             | Flux Type | Flux Lot | T <sub>NDT</sub> (b) (°F) | RT <sub>NDT</sub> (b) (°F) |
|----------------------------|----------------------------|-----------|----------|---------------------------|----------------------------|
| 101-101                    | Flux Electrode Comb. (SAA) | 124       | 0871     | -80                       | -60                        |
| 101-102                    | Flux Electrode Comb. (SAA) | 124       | 1061     | -70                       | -70                        |
| 101-121                    | Flux Electrode Comb. (SAA) | 124       | 1061     | -70                       | -70                        |
| 101-121                    | Flux Electrode Comb. (SAA) | 124       | 1061     | -80                       | -80                        |
| 101-122                    | Flux Electrode Comb. (SAA) | 124       | 0662     | -80                       | -30                        |
| 101-122                    | Flux Electrode Comb. (SAA) | 124       | 0662     | -70                       | -70                        |
| <sup>124</sup><br>101-123  | Flux Electrode Comb. (SAA) | 124       | 0951     | -80                       | -60                        |
| 101-142                    | Flux Electrode Comb. (SAA) | 124       | 0662     | -80                       | -80                        |
| 101-150                    | Flux Electrode Comb. (SAA) | 124       | 0751     | -60                       | -60                        |
| 101-150                    | Flux Electrode Comb. (SAA) | 124       | 0951     | -80                       | -80                        |
| 101-171                    | Flux Electrode Comb. (SAA) | 124       | 0871     | -60                       | -30                        |
| 103-121                    | Flux Electrode Comb. (SAA) | 124       | 1061     | -80                       | -80                        |
| 105-121                    | Flux Electrode Comb. (SAA) | 124       | 0171     | -90                       | -90                        |
| 105-121                    | Flux Electrode Comb. (SAA) | 124       | 0171     | -80                       | -70                        |
| 201-121                    | Flux Electrode Comb. (SAA) | 124       | 0871     | -80                       | -80                        |
| 201-121                    | Flux Electrode Comb. (SAA) | 124       | 0871     | -80                       | -60                        |
| 201-141                    | Flux Electrode Comb. (SAA) | 124       | 0161     | -50                       | -50                        |
| 401-128                    | Flux Electrode Comb. (SAA) | 124       | 1061     | -60                       | -60                        |



Table 5.2-11B  
PALO VERDE UNIT 3 FRACTURE TOUGHNESS DATA  
REACTOR COOLANT PIPING (FORGINGS) (Sheet 1 of 2)

| Piece Number   | Reference Drawing No. | Material Code No. | Material Specification | Location                       | Drop Weight NDT (°F) |      | RT <sub>NDT</sub> (°F) <sup>(c)</sup> |      |
|--|-----------------------|-------------------|------------------------|--------------------------------|----------------------|------|---------------------------------------|------|
|  |                       |                   |                        |                                | 0°                   | 180° | 0°/LST(c)                             | 180° |
| 728-101  | E-65473-761-001-02    | F-7307-01         | SA541-CL1              | Surge Nozzle                   | -10                  |      | -10(a)                                |      |
| 728-201  | E-65473-761-001-02    | F-7308-01         | SA541-CL1              | Shutdown Cooling Outlet Nozzle | -10                  |      | +10(a)                                |      |
| 728-201  | E-65473-761-001-02    | F-7308-02         | SA541-CL1              | Shutdown Cooling Outlet Nozzle | +10                  |      | +10(a)                                |      |
| 728-202  | E-65473-761-002-01    | F-7309-01         | SA541-CL1              | Spray Nozzle                   | N/A                  |      | +40(b)                                |      |
| 728-202  | E-65473-761-002-01    | F-7309-02         | SA541-CL1              | Spray Nozzle                   | N/A                  |      | +40(b)                                |      |
| 728-102  | E-65473-761-002-02    | F-7310-01         | SA541-CL1              | Letdown Drain Nozzle           | N/A                  |      | +40(b)                                |      |
| 728-102  | E-65473-761-002-02    | F-7310-02         | SA541-CL1              | Letdown Drain Nozzle           | N/A                  |      | +40(b)                                |      |
| 728-102  | E-65473-761-002-02    | F-7310-03         | SA541-CL1              | Letdown Drain Nozzle           | N/A                  |      | +40(b)                                |      |
| 728-102  | E-65473-761-002-02    | F-7310-04         | SA541-CL1              | Letdown Drain Nozzle           | N/A                  |      | +40(b)                                |      |
| a. Determined per applicable ASME-BPV Code and Addenda, Sect III, Subsection NB, Article NB-2331-(a-1,2,3)<br>b. "Lowest Service Temperature" - Determined per Applicable ASME-BPV Code and Addenda, Sect III, Subsection NB, Article NB-2332-a<br>c. Lowest Service Temperature |                       |                   |                        |                                |                      |      |                                       |      |

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INTEGRITY OF REACTOR  
COOLANT PRESSURE BOUNDARY

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Table 5.2-11B  
PALO VERDE UNIT 3 FRACTURE TOUGHNESS DATA  
REACTOR COOLANT PIPING (FORGINGS) (Sheet 2 of 2)

| Piece<br>Number | Reference<br>Drawing No. | Material<br>Code No. | Material<br>Specifi-<br>cation | Location                   | Drop<br>Weight<br>NDT (°F) |      | RT <sub>NDT</sub> (°F) <sup>(c)</sup> |      |
|-----------------|--------------------------|----------------------|--------------------------------|----------------------------|----------------------------|------|---------------------------------------|------|
|                 |                          |                      |                                |                            | 0°                         | 180° | 0°/LST(c)                             | 180° |
| 728-103         | E-65473-761-002-02       | F-7311-01            | A541-CL3                       | Safety Injection<br>Nozzle | 0                          |      | 0(a)                                  |      |
| 728-103         | E-65473-761-002-02       | F-7311-02            | A541-CL3                       | Safety Injection<br>Nozzle | 0                          |      | 0(a)                                  |      |
| 728-103         | E-65473-761-002-02       | F-7311-03            | A541-CL3                       | Safety Injection<br>Nozzle | 0                          |      | 0(a)                                  |      |
| 728-103         | E-65473-761-002-02       | F-7311-04            | A541-CL3                       | Safety Injection<br>Nozzle | 0                          |      | 0(a)                                  |      |
| 728-203         | E-65473-761-002-02       | F-7312-01            | A541-CL3                       | Charging Inlet Nozzle      | 0                          |      | 0(a)                                  |      |

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INTEGRITY OF REACTOR  
COOLANT PRESSURE BOUNDARY

PVNGS FSAR

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Table 5.2-16B  
PALO VERDE UNIT 3 FRACTURE TOUGHNESS DATA  
PRESSURIZER (FORGINGS)

| Piece Number   | Reference Drawing No. | Material Code No. | Material Specification | Location            | Drop Weight NDT (°F) |      | RT <sub>NDT</sub> (°F) |      |
|--|-----------------------|-------------------|------------------------|---------------------|----------------------|------|------------------------|------|
|  |                       |                   |                        |                     | 0°                   | 180° | 0°/LST(c)              | 180° |
| 608-3201   | E-65373-661-002-04    | F-7007-01         | SA508-CL3              | Safety Valve Nozzle | -10                  | N/A  | +10 (b)                | N/A  |
| 608-3201   | E-65373-661-002-04    | F-7007-02         | SA508-CL3              | Safety Valve Nozzle | -10                  | N/A  | +10 (b)                | N/A  |
| 608-3201   | E-65373-661-002-04    | F-7007-03         | SA508-CL3              | Safety Valve Nozzle | -10                  | N/A  | +10 (b)                | N/A  |
| 608-3201   | E-65373-661-002-04    | F-7007-04         | SA508-CL3              | Safety Valve Nozzle | -10                  | N/A  | +10 (b)                | N/A  |
| 608-3101   | E-65373-661-002-04    | F-7008-01         | A541-CL3               | Spray Nozzle        | -20                  | N/A  | 0 (b)                  | N/A  |
| 658-3301   | E-65373-661-002-04    | F-7009-01         | A541-CL3               | Surge Nozzle        | -10                  | N/A  | +30 (a)                | N/A  |
| 656-3101   | E-65373-661-002-04    | F-7013-01         | SA508-CL3              | Support Skirt       | -10                  | N/A  | -10 (a)                | N/A  |
| a. Determined per applicable ASME BPV Code and Addenda, Section III, Subsection NB, Article NB-2331-(a-1, 2, 3)<br>b. Determined per MTEB 5-2<br>c. Lowest Service Temperature |                       |                   |                        |                     |                      |      |                        |      |

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Table 5.2-20  
PALO VERDE UNIT 1 FRACTURE TOUGHNESS DATA  
STEAM GENERATOR #1 (PLATES)

| Piece Number  | Reference Drawing No. | Material Code No. | Material Specification | Location               | Drop Weight NDT (°F) | RT NDT (°F) |
|---|-----------------------|-------------------|------------------------|------------------------|----------------------|-------------|
| 248-302   | E-78373-261-003-04    | M-2105-1          | SA516-GR70             | Stay Cap               | -40                  | +30(a)      |
| 254-102   | E-78373-261-003-04    | M-7021-1          | SA533-GRB-CL1          | Primary Head           | -10                  | -10(a)      |
| 254-102   | E-78273-261-003-04    | M-7021-2          | SA533-GRB-CL1          | Primary Head           | -10                  | -10(a)      |
| 256-104   | E-78273-261-003-04    | M-7202-1          | SA533-GRB-CL1          | Support Skirt          | -35                  | -35(a)      |
| 244-102A  | E-78273-261-003-04    | M-8104-1          | SA533-GRB-CL1          | Primary Extension Ring | -20                  | -20(a)      |
| 244-102B  | E-78273-261-003-04    | M-8104-1          | SA533-GRB-CL1          | Primary Extension Ring | -20                  | -20(a)      |
| 244-102C  | E-78273-261-003-04    | M-8104-1          | SA533-GRB-CL1          | Primary Extension Ring | -20                  | -20(a)      |
| 244-102D  | E-78273-261-003-04    | M-8104-1          | SA533-GRB-CL1          | Primary Extension Ring | -20                  | -20(a)      |
| (a) Determined per applicable ASME-BPV-Code Sect III Subsection NB, Article NB-2331-(a.1.2.3) |                       |                   |                        |                        |                      |             |

|           |                    |          |               |                      |    |                   |
|-----------|--------------------|----------|---------------|----------------------|----|-------------------|
| 276-3101A | E-78273-261-003-05 | M-7243-1 | SA533-GRB-CL1 | Primary Manway Cover | 10 | 10 <sup>(a)</sup> |
| 276-310B  | E-78273-261-003-05 | M-7243-1 | SA533-GRB-CL1 | Primary Manway Cover | 10 | 10 <sup>(a)</sup> |

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Table 5.2-20A  
PALO VERDE UNIT 2 FRACTURE TOUGHNESS DATA  
STEAM GENERATOR #1 (PLATES)

| Piece Number  | Reference Drawing Number | Material Code Number | Material Specification | Location               | Drop Weight <sub>NDT</sub> | RT <sub>NDT</sub> <sup>(a)</sup> |    |
|---|--------------------------|----------------------|------------------------|------------------------|----------------------------|----------------------------------|----|
| 254-101   | E-79273-261-003-03       | F-1117-01            | SA533-GRB-CL1          | Primary Head Torus     | -10                        | -10                              | 12 |
| 254-101   | E-79273-261-003-03       | F-1117-02            | SA533-GRB-CL1          | Primary Head Torus     | -10                        | -10                              |    |
| 244-102   | E-79273-261-003-03       | M-4704-01            | SA533-GRB-CL1          | Primary Extension Ring | -20                        | 10                               | 14 |
| a. Determined per applicable ASME BPV Code Sect III, Subsection NB, Article NB-2331-a-1, 2, 3 |                          |                      |                        |                        |                            |                                  | 12 |

276-3101 | E-79273-261-003-03 | M-7243-01 | SA533-GRB-CL1 | Primary Manway Cover | 10 | 10

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Table 5.2-20B  
PALO VERDE UNIT 3. FRACTURE TOUGHNESS DATA  
STEAM GENERATOR #1 (PLATES)

| Piece Number   | Reference Drawing Number | Material Code Number | Material Specification | Location               | Drop Weight NDT (°F) | RT <sub>NDT</sub> (°F) |
|--|--------------------------|----------------------|------------------------|------------------------|----------------------|------------------------|
| 254-3101   | E-65273-261-003-04       | F-6882-01            | SA533-GRB-CL1          | Primary Head Torus     | -10                  | -10 <sup>(a)</sup>     |
| 254-3101   | E-65273-261-003-04       | F-6882-02            | SA533-GRB-CL1          | Primary Head Torus     | -10                  | -10 <sup>(a)</sup>     |
| 244-102  | E-65273-261-003-04       | M-9707-01            | SA533-GRB-CL1          | Primary Extension Ring | -10                  | -10 <sup>(a)</sup>     |
| a. Determined per Applicable ASME-BPV-Code Section III, Subsection NB, Article NB-2331-(a-1, 2, 3) |                          |                      |                        |                        |                      |                        |

276-3101 | E-65273-261-003-04 | J-512-01 | SA533-GRB-CL1 | Primary Manway Cover | 11 | 11<sup>(a)</sup>

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Table 5.2-21B  
PALO VERDE UNIT 3 FRACTURE TOUGHNESS DATA  
STEAM GENERATOR #1 (FORGINGS)

| Piece Number  | Reference Drawing No. | Material Code No. | Material Specification | Location                   | Drop Weight NDT (°F) |      | RT <sub>NDT</sub> (°F) (a) |      |
|---|-----------------------|-------------------|------------------------|----------------------------|----------------------|------|----------------------------|------|
|   |                       |                   |                        |                            | 0°                   | 180° | 0°                         | 180° |
| 258-103   | E-65273-261-003-04    | F-6883-01         | SA508-CL1              | Inlet Nozzle Safe End      | 0                    | N/A  | 0                          | 0    |
| 258-203   | E-65273-261-003-04    | F-6884-01         | SA508-CL1              | Outlet Nozzle Safe End     | -20                  | N/A  | -20                        | -20  |
| 258-203   | E-65273-261-003-04    | F-6884-02         | SA508-CL1              | Outlet Nozzle Safe End     | -20                  | N/A  | -20                        | -20  |
| 258-3101  | E-65273-261-003-04    | F-6885-01         | SA508-CL3              | Inlet Nozzle               | -30                  | N/A  | -30                        | -30  |
| 258-3201  | E-65273-261-003-04    | F-6886-01         | SA508-CL3              | Outlet Nozzle              | -40                  | N/A  | -40                        | -40  |
| 258-3201  | E-65273-261-003-04    | F-6886-02         | SA508-CL3              | Outlet Nozzle              | -40                  | N/A  | -40                        | -40  |
| 252-101   | E-65273-261-003-04    | F-6888-01         | SA508-CL3              | Stay Cylinder              | -30                  | N/A  | -30                        | -30  |
| 272-104   | E-65273-261-003-04    | M-2324-01         | A106-GRC               | Tube Sheet<br>Drain Nozzle | -30                  | N/A  | -20                        | -20  |
| 246-101   | E-65273-261-003-04    | M-9701-01         | SA508-CL2              | Tube Sheet                 | +20                  | +30  | +20                        | +30  |
| <p>a. Determined per Applicable ASME BPV Code and Addenda, Section III, Subsection NB, Article NB-2331-(a-1, 2, 3)</p> <p>b. <del>RT<sub>NDT</sub> at 180°F assumed to be the same as 0°F</del></p> |                       |                   |                        |                            |                      |      |                            |      |

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Table 5.2-25

PALO VERDE UNIT 1 FRACTURE TOUGHNESS DATA  
STEAM GENERATOR #2 (PLATES)

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| Piece Number  | Reference Drawing No. | Material Code No. | Material Specification | Location               | Drop Weight NDT (oF) | RTNDT (oF) |
|---|-----------------------|-------------------|------------------------|------------------------|----------------------|------------|
| 248-302   | E-78273-361-003-02    | M-2105-1          | SA516-GR70             | Stay Cap               | -40                  | +30(a)     |
| 256-104   | E-78273-361-003-02    | M-4919-1          | SA533-GRB-CL1          | Support Skirt          | +10                  | +10(a)     |
| 254-102   | E-78373-361-003-02    | M-7021-1          | SA533-GRB-CL1          | Primary Head           | -10                  | -10(a)     |
| 254-102   | E-78273-361-003-02    | M-7021-2          | SA533-GRB-CL1          | Primary Head           | -10                  | +0(a)      |
| 244-102A  | E-78273-361-003-02    | M-8104-1          | SA533-GRB-CL1          | Primary Extension Ring | -20                  | -20(a)     |
| 244-102B  | E-78273-361-003-02    | M-8104-1          | SA533-GRB-CL1          | Primary Extension Ring | -20                  | -20(a)     |
| 244-102C  | E-78273-361-003-02    | M-8104-1          | SA533-GRB-CL1          | Primary Extension Ring | -20                  | -20(a)     |
| 244-102D  | E-78273-361-003-02    | M-8104-1          | SA533-GRB-CL1          | Primary Extension Ring | -20                  | -20(a)     |
| (a) Determined per applicable ASME-BPV-Code Sect III Subsection NB, Article NB2331(a,1,2,3) |                       |                   |                        |                        |                      |            |

|           |                    |          |               |                      |    |        |
|-----------|--------------------|----------|---------------|----------------------|----|--------|
| 276-3101A | E-78273-361-003-02 | M-7243-1 | SA533-GRB-CL1 | Primary Manway Cover | 10 | 10 (a) |
| 276-3101B | E-78273-361-003-02 | M-7243-1 | SA533-GRB-CL1 | Primary Manway Cover | 10 | 10 (a) |

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Table 5.2-25A

PALO VERDE UNIT 2 FRACTURE TOUGHNESS DATA  
STEAM GENERATOR #2 (PLATES)

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| Piece Number   | Reference Drawing Number | Material Code Number | ASME Material Specification | Location in Component  | DW <sub>NDT</sub> (°F) | RT <sub>NDT</sub> <sup>(a)</sup> (°F) |
|--|--------------------------|----------------------|-----------------------------|------------------------|------------------------|---------------------------------------|
| 254-101  | E-79273-361-003-03       | F-1117-03            | SA533-GRB-CL1               | Primary Head Torus     | -10                    | -10                                   |
| 254-101  | E-79273-361-003-03       | F-1117-04            | SA533-GRB-CL1               | Primary Head Torus     | -10                    | 0                                     |
| 244-102  | E-79273-361-003-03       | M-4704-01            | SA533-GRB-CL1               | Primary Extension Ring | -20                    | 10                                    |
| a. Determined per applicable ASME-BPV Code Sect III Subsection NB, Article NB-2331-(a,1,2,3) |                          |                      |                             |                        |                        |                                       |

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276-3101 | E-79273-361-003-03 | M-7243-01 | SA533-GRB-CL1 | Primary Manway Cover | 10 | 10

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Table 5.2-25B  
PALO VERDE UNIT 3 FRACTURE TOUGHNESS DATA  
STEAM GENERATOR #2 (PLATES)

| Piece Number   | Reference Drawing Number | Material Code Number | Material Specification | Location               | Drop Weight NDT (°F) | RT <sub>NDT</sub> (°F) |
|--|--------------------------|----------------------|------------------------|------------------------|----------------------|------------------------|
| 254-3101   | E-65273-361-003-04       | F-6882-03            | SA533-GRB-CL1          | Primary Head Torus     | -10                  | -10 <sup>(a)</sup>     |
| 254-3101   | E-65273-361-003-04       | F-6882-04            | SA533-GRB-CL1          | Primary Head Torus     | -10                  | -10 <sup>(a)</sup>     |
| 244-102  | E-65273-361-003-04       | M-9707-01            | SA533-GRB-CL1          | Primary Extension Ring | -10                  | -10 <sup>(a)</sup>     |
| a. Determined per Applicable ASME-BPV-Code Section III, Subsection NB, Article NB-2331-(a-1, 2, 3) |                          |                      |                        |                        |                      |                        |

|          |                    |          |               |                      |    |                   |
|----------|--------------------|----------|---------------|----------------------|----|-------------------|
| 276-3101 | E-65273-361-003-04 | J-512-01 | SA533-GRB-CL1 | Primary Manway Cover | 11 | 11 <sup>(a)</sup> |
|----------|--------------------|----------|---------------|----------------------|----|-------------------|





Table 5.2-26B  
PALO VERDE UNIT 3 FRACTURE TOUGHNESS DATA  
STEAM GENERATOR #2 (FORGINGS) -

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| Piece Number   | Reference Drawing No. | Material Code Number | Material Specification | Location                | Drop Weight NDT (°F) |                    | RT <sub>NDT</sub> (°F) <sup>(a)</sup> |                    |
|--|-----------------------|----------------------|------------------------|-------------------------|----------------------|--------------------|---------------------------------------|--------------------|
|  |                       |                      |                        |                         | 0°                   | 180°               | 0°                                    | 180°               |
| 258-103  | E-65273-361-003-04    | F-6883-02            | SA508-CL1              | Inlet Nozzle Safe End   | 0                    | <del>N/A</del> 0   | 0 <del>(a)</del>                      | 0 <del>(b)</del>   |
| 258-203  | E-65273-361-003-04    | F-6884-03            | SA508-CL1              | Outlet Nozzle Safe End  | -20                  | <del>N/A</del> -20 | -20 <del>(a)</del>                    | -20 <del>(b)</del> |
| 258-203  | E-65273-361-003-04    | F-6884-04            | SA508-CL1              | Outlet Nozzle Safe End  | -20                  | <del>N/A</del> -20 | -20 <del>(a)</del>                    | -20 <del>(b)</del> |
| 258-3101   | E-65273-361-003-04    | F-6885-02            | SA508-CL3              | Inlet Nozzle            | -30                  | <del>N/A</del> -30 | -30 <del>(a)</del>                    | -30 <del>(b)</del> |
| 258-3201   | E-65273-361-003-04    | F-6886-03            | SA508-CL3              | Outlet Nozzle           | -50                  | <del>N/A</del> -50 | -50 <del>(a)</del>                    | -50 <del>(b)</del> |
| 258-3201   | E-65273-361-003-04    | F-6886-04            | SA508-CL3              | Outlet Nozzle           | -50                  | <del>N/A</del> -50 | -50 <del>(a)</del>                    | -50 <del>(b)</del> |
| 252-101  | E-65273-361-003-04    | F-6888-02            | SA508-CL3              | Stay Cylinder           | -30                  | <del>N/A</del> -30 | -30 <del>(a)</del>                    | <del>N/A</del> -30 |
| 272-104  | E-65273-361-003-04    | M-2324-01            | A106-GRC               | Tube Sheet Drain Nozzle | -30                  | <del>N/A</del> -30 | -20 <del>(a)</del>                    | <del>N/A</del> -20 |
| 246-101  | E-65273-361-003-04    | M-8101-02            | SA508-CL2              | Tube Sheet              | +40                  | <del>N/A</del> +40 | +40 <del>(a)</del>                    | +40 <del>(b)</del> |
| <p>a. Determined per Applicable ASME-BPV Code and Addenda, Sect. III, Subsection NB, Article NB-2331-(a-1,2,3)</p> <p>b. <del>RT<sub>NDT</sub> at 180°F assumed to be the same as 0°F.</del></p> |                       |                      |                        |                         |                      |                    |                                       |                    |

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Table 5.3-0A  
PALO VERDE UNIT-1 REACTOR VESSEL BELTLINE WELD METAL (AS DEPOSITED) CHEMICAL ANALYSIS  
(Sheet 1 of 2)

| Seam<br>Number<br><br>Element | Lower Shell<br>Long. Seams |          |          | Intermediate Shell<br>Long. Seams |          |          | Girth Seam |
|-------------------------------|----------------------------|----------|----------|-----------------------------------|----------|----------|------------|
|                               | 101-142C                   | 101-142B | 101-142A | 101-124C                          | 101-124B | 101-124A |            |
| C                             | 0.15                       | 0.15     | 0.15     | 0.13                              | 0.14     | 0.12     | 0.11       |
| Mn                            | 1.29                       | 1.32     | 1.36     | 1.21                              | 1.20     | 1.24     | 1.51       |
| P                             | 0.005                      | 0.005    | 0.006    | 0.009                             | 0.01     | 0.012    | 0.013      |
| S                             | 0.006                      | 0.006    | 0.006    | 0.007                             | 0.008    | 0.009    | 0.009      |
| Si                            | 0.21                       | 0.20     | 0.21     | 0.12                              | 0.14     | 0.13     | 0.54       |
| Ni                            | 0.05                       | 0.05     | 0.05     | 0.03                              | 0.03     | 0.03     | 0.11       |
| Cr                            | 0.03                       | 0.03     | 0.03     | 0.02                              | 0.02     | 0.02     | 0.16       |
| Mo                            | 0.53                       | 0.52     | 0.54     | 0.49                              | 0.49     | 0.52     | 0.52       |
| V                             | 0.005                      | 0.005    | 0.006    | 0.004                             | 0.005    | 0.005    | 0.005      |
| Cb                            | <.01                       | <.01     | <.01     | <.01                              | <.01     | <.01     | <.01       |
| Ti                            | <.01                       | <.01     | <.01     | <.01                              | <.01     | <.01     | <.01       |
| Co                            | 0.015                      | 0.015    | 0.016    | 0.005                             | 0.005    | 0.005    | 0.008      |
| Cu                            | 0.03                       | 0.03     | 0.03     | 0.02                              | 0.02     | 0.02     | 0.02       |
| Al                            | 0.005                      | 0.005    | 0.007    | 0.004                             | 0.004    | 0.004    | 0.01       |
| B                             | <.001                      | <.001    | <.001    | <.001                             | <.001    | <.001    | 0.001      |
| W                             | 0.01                       | 0.01     | 0.02     | <.01                              | <.01     | <.01     | 0.01       |
| As                            | 0.004                      | 0.004    | 0.005    | 0.007                             | 0.006    | 0.005    | 0.001      |
| Sn                            | 0.001                      | 0.001    | 0.001    | 0.003                             | 0.002    | 0.003    | 0.003      |

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Table 5.3-0A  
PALO VERDE UNIT-1 REACTOR VESSEL BELTLINE WELD METAL (AS DEPOSITED) CHEMICAL ANALYSIS  
(Sheet 2 of 2)

| Seam<br>Number<br><br>Element | Lower Shell<br>Long. Seams               |          |          | Intermediate Shell<br>Long. Seams |          |          | Girth Seam |
|-------------------------------|--|----------|----------|-----------------------------------|----------|----------|------------|
|                               | 101 <sup>e</sup><br><del>141</del> -142C | 101-142B | 101-142A | 101-124C                          | 101-124B | 101-124A |            |
| Zr                            | 0.001                                    | 0.001    | 0.001    | <.001                             | <.001    | <.001    | <.001      |
| Pb                            | <.001                                    | <.001    | <.001    | -                                 | -        | -        | <.001      |
| Sb                            | <.001                                    | <.001    | <.001    | -                                 | -        | -        | 0.009      |
| N <sub>2</sub>                | 0.005                                    | 0.005    | 0.006    | 0.01                              | 0.006    | 0.008    | 0.013      |

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Table 5.3-4

## PALO VERDE UNIT 1 SURVEILLANCE PROGRAM (Sheet 1 of 4)

| Capsule<br>Assy. No.<br>& Type | Azimuthal<br>Location | Withdrawal<br>Schedule<br>EFPY(f) | Lead<br>Factor | Surveillance Material Origins  | No.                                 | Specimens       |                |
|--------------------------------|-----------------------|-----------------------------------|----------------|--|-------------------------------------|-----------------|----------------|
|                                |                       |                                   |                |  |                                     | Type            | Orientation    |
| 1<br>PC <sub>v</sub>           | 38°                   | 8-10                              | <1.5           | 1. Base Metal<br>Lower Shell Plate<br>M-4311-1(a)  | 15                                  | C <sub>v</sub>  | Trans.         |
|                                |                       |                                   |                |  | 9                                   | PC <sub>v</sub> | Trans.         |
|                                |                       |                                   |                |  | 9                                   | PC <sub>v</sub> | Long.          |
|                                |                       |                                   |                |  | 3                                   | Tension         | Trans.         |
|                                |                       |                                   |                |  | 9                                   | C <sub>v</sub>  | Long.          |
|                                |                       |                                   |                | 2. Weld Metal <sup>(b)</sup><br>M-4311-2/M-4311-3 <sup>(c)</sup><br>Weld Wire:<br>B-4 Heat/Lot 90071<br>Flux Linde 0091/1054 | 3                                   | Tension         | Trans.         |
|                                |                       |                                   |                |  | 15                                  | C <sub>v</sub>  | Trans.         |
|                                |                       |                                   |                |  | 9                                   | PC <sub>v</sub> | Trans.         |
|                                |                       |                                   |                | 3. HAZ Metal<br>Lower Shell Plate<br>M-4311-1(a)   | 12                                  | C <sub>v</sub>  | Trans.         |
|                                |                       |                                   |                |  | 4. SRM HSST Plate 01 <sup>(d)</sup> | 9               | C <sub>v</sub> |

a. See Table 5.3-0 for chemistry of Plate Code No. M-4311-1 (lower shell plates).

b. See Table 5.3-0A for chemistry of <sup>Weld</sup>~~Plate~~ Code No. 101-142 A-C (lower shell long seams).

c. Surveillance weld metal between plates M-4311-2 and M-4311-3 (long seam).

d. See ORNL-4315 dated Feb. 1968, for chemistry of SRM (HSST-01 Plate).

e. See Table 5.3-0 for chemistry of Plate Code No. M-6701-2 (intermediate shell plate).

f. Effective full power years.

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February 1984

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Amendment 12 [12

Table 5.3-4A  
PALO VERDE UNIT 2 SURVEILLANCE PROGRAM (Sheet 7 of 7)

NOTES:

- a. Effective Full Power Years.  
5.3-0B
- b. See table 5.3.1-1 for chemistry of plates.  
5.3-0C
- c. See table 5.3.1-2 for chemistry of welds.
- d. Surveillance weld metal formed between designated plates.
- e. See ORNL-4315 dated February 1968, for chemistry of SRM (IHST-01 Plate).

Code No. 101-142 A-C (lower shell long seams).

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Table 5.3-4B  
PALO VERDE UNIT 3 SURVEILLANCE PROGRAM (Sheet 1 of 4)

| Capsule Assembly No. and Type   | Azimuthal Location | Withdrawal Schedule EFPY(e) | Lead Factor | Surveillance Material Origins  | Specimens     |                         |                            |
|---|--------------------|-----------------------------|-------------|--|---------------|-------------------------|----------------------------|
|   |                    |                             |             |  | No.           | Type                    | Orientation                |
| 1<br>CT   | 38°                | Standby                     | <1.5        | 1. Base Metal<br>Lower Shell Plate<br>F-6411-2(a)  | 15<br>10<br>3 | Cv<br>1/2TCT<br>Tension | Trans.<br>Trans.<br>Trans. |
|   |                    |                             |             | 2. Weld Metal(b)<br>F-6411-1 to 3(c)<br>Weld Wires<br>B-4 Heat/Lot 4P7869<br>Flux Linde 124/0281 | 15<br>10<br>3 | Cv<br>1/2TCT<br>Tension | Trans.<br>Trans.<br>Trans. |
|   |                    |                             |             | 3. HAZ Metal<br>Lower Shell Plate F-6411-2(a)  | 12            | Cv                      | Trans.                     |
|   |                    |                             |             | 4. SRM HSST Plate 01(d)  | 9             | Cv                      | Long.                      |
| 2<br>CT   | 43°                | Standby                     | <1.5        | 1. Base Metal<br>Lower Shell Plate<br>F-6411-2(a)  | 15<br>10<br>3 | Cv<br>1/2TCT<br>Tension | Trans.<br>Trans.<br>Trans. |
| a. See Table 5.3-0D for chemistry of plates.<br>b. See Table 5.3-0E for chemistry of welds.<br>c. Surveillance weld metal formed between designated plates.<br>d. See ORNL-4315 dated February 1968, for chemistry of SRM (HSST-01 Plate).<br>e. Effective Full Power Years |                    |                             |             |  |               |                         |                            |

Code No. 101-142 A-C (lower shell long seams).



February 1985

5.4-3

Amendment 14

Table 5.4-1  
FRACTURE TOUGHNESS DATA  
PALO VERDE UNIT 1  
STEAM GENERATOR 1 SECONDARY SIDE (PLATES)<sup>(a)</sup>

| Piece Number | Reference Drawing Number | Material Code Number | ASME Material Specification | Location In Component    | DWNTD<br>(°F) | RTNTD<br>(°F) |    |
|--------------|--------------------------|----------------------|-----------------------------|--------------------------|---------------|---------------|----|
| 242-102      | E-78273-261-003-05       | M-4705-01            | SA533-GRA-CL1               | Lower Shell Plate        | - 20          | - 10          | 8  |
| 242-102      | E-78273-261-003-05       | M-4705-02            | SA533-GRA-CL1               | Lower Shell Plate        | - 20          | - 10          | 12 |
| 242-102      | E-78273-261-003-05       | M-4705-03            | SA533-GRA-CL1               | Lower Shell Plate        | - 30          | 0             |    |
| 204-102      | E-78273-261-003-05       | M-7029-01            | SA516-GR70                  | Closure Head Torus       | - 10          | 10            |    |
| 204-102      | E-78273-261-003-05       | M-7029-02            | SA516-GR70                  | Closure Head Torus       | - 10          | - 10          |    |
| 202-101      | E-78273-261-003-05       | M-7030-01            | SA533-GRB-CL1               | Top Head Dome            | - 10          | - 10          | 8  |
| 276-3201     | E-78273-261-003-05       | M-7232-01            | SA533-GRB-CL1               | Manway Cover             | 10            | 10            |    |
| 276-3101A    | E-78273-261-003-05       | M-7243-1             | SA533-GRB-CL1               | Primary Manway Cover     | 10            | 10            | 14 |
| 276-3101B    | E-78273-261-003-05       | M-7243-1             | SA533-GRB-CL1               | Primary Manway Cover     | 10            | 10            |    |
| 222-102      | E-78273-261-003-05       | M-8102-02            | SA533-GRB-CL1               | Upper Shell Plate        | - 50          | - 20          |    |
| 222-102      | E-78273-261-003-05       | M-8102-03            | SA533-GRB-CL1               | Upper Shell Plate        | - 70          | - 30          |    |
| 222-102      | E-78273-261-003-05       | M-8102-05            | SA533-GRB-CL1               | Upper Shell Plate        | - 40          | - 20          | 8  |
| 244-202      | E-78273-261-003-05       | M-8103-01            | SA533-GRA-CL1               | Secondary Extension Ring | 30            | 30            |    |
| 224-102      | E-78273-261-003-05       | M-8106-01            | SA533-GRA-CL1               | Intermediate Shell       | - 30          | 10            |    |
| 224-102      | E-78273-261-003-05       | M-8106-02            | SA533-GRA-CL1               | Intermediate Shell       | - 50          | 10            | 12 |
| 224-102      | E-78273-261-003-05       | M-8106-03            | SA533-GRA-CL1               | Intermediate Shell       | - 60          | -10           |    |
| 225-102      | E-78273-261-003-05       | M-8107-01            | SA533-GRB-CL1               | Shell Cone Segment       | - 10          | - 10          |    |
| 225-102      | E-78273-261-003-05       | M-8107-02            | SA533-GRB-CL1               | Shell Cone Segment       | 20            | 20            | 6  |

a. ASME Section 3 Article NB 2331-A-1,2,3

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COMPONENT AND SUBSYSTEM DESIGN

PVNGS FSAR

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Table 5.4-5  
PALO VERDE UNIT 1 FRACTURE TOUGHNESS DATA  
STEAM GENERATOR-2 SECONDARY SIDE (PLATES)<sup>(a)</sup>

| Piece Number                              | Reference Drawing Number | Material Code Number | ASME Material Specification | Location in Component | DWNTD<br>(°F) | RTNDT<br>(°F) |    |
|---|--------------------------|----------------------|-----------------------------|-----------------------|---------------|---------------|----|
| 242-102                                   | E-78273-361-003-03       | M-4705-04            | SA533-GRA-CL1               | Lower Shell Plate     | -40           | 0             | 6  |
| 242-102                                   | E-78273-361-003-03       | M-4705-05            | SA533-GRA-CL1               | Lower Shell Plate     | -50           | 10            | 12 |
| 242-102                                   | E-78273-361-003-03       | M-4705-06            | SA533-GRA-CL1               | Lower Shell Plate     | -40           | 10            |    |
| 255-102                                   | E-78273-361-003-03       | M-7007-01            | SA533-GRB-CL1               | Shell Cone Segment    | -20           | 40            | 9  |
| 255-102                                   | E-78273-361-003-03       | M-7007-02            | SA533-GRB-CL1               | Shell Cone Segment    | -30           | 10            |    |
| 204-102                                   | E-78273-361-003-03       | M-7029-03            | SA516-GR70                  | Closure Head Torus    | -10           | 10            |    |
| 204-102                                   | E-78273-361-003-03       | M-7029-04            | SA516-GR70                  | Closure Head Torus    | -10           | 30            | 8  |
| 202-101                                   | E-78273-361-003-03       | M-7030-01            | SA533-GRB-CL1               | Top Head Dome         | -10           | -10           |    |
| 276-3201                                  | E-78273-361-003-03       | M-7232-01            | SA533-GRB-CL1               | Manway Cover          | 10            | 10            |    |
| 276-3101A                                 | E-78273-361-003-02       | M-7243-1             | SA533-GRB-CL1               | Primary Manway Cover  | 10            | 10            | 14 |
| 276-3101B                                 | E-78273-361-003-02       | M-7243-1             | SA533-GRB-CL1               | Primary Manway Cover  | 10            | 10            |    |
| 222-102                                   | E-78273-361-003-03       | M-8102-01            | SA533-GRB-CL1               | Upper Shell Plate     | -60           | -20           | 6  |
| 222-102                                   | E-78273-361-003-03       | M-8102-04            | SA533-GRB-CL1               | Upper Shell Plate     | -50           | -10           |    |
| 222-102                                   | E-78273-361-003-03       | M-8102-06            | SA533-GRB-CL1               | Upper Shell Plate     | -40           | -10           | 12 |
| 244-202                                   | E-78273-361-003-03       | M-8103-01            | SA533-GRB-CL1               | Secondary Extnsn Rng  | -40           | 30            |    |
| 224-102                                   | E-78273-361-003-03       | M-8106-04            | SA533-GRA-CL1               | Intermediate Shell    | -50           | -20           | 6  |
| 224-102                                   | E-78273-361-003-03       | M-8106-05            | SA533-GRA-CL1               | Intermediate Shell    | -30           | -30           | 12 |
| 224-102                                   | E-78273-361-003-03       | M-8106-06            | SA533-GRA-CL1               | Intermediate Shell    | -30           | 20            |    |
| a. ASME Section 3 Article NB 2331-A 1,2,3 |                          |                      |                             |                       |               |               | 6  |

