

**VIRGINIA ELECTRIC AND POWER COMPANY
RICHMOND, VIRGINIA 23261**

10 CFR 50.90

May 5, 2009

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

Serial No. 09-295
SPS LIC/CGL R0
Docket No. 50-280
License No. DPR-32

VIRGINIA ELECTRIC AND POWER COMPANY (DOMINION)
SURRY POWER STATION UNIT 1
PROPOSED EMERGENCY LICENSE AMENDMENT REQUEST
MODIFIED INTERIM ALTERNATE REPAIR CRITERIA
FOR UNIT 1 B STEAM GENERATOR TUBE REPAIR

Pursuant to 10 CFR 50.90 and 10 CFR 50.91(a)(5), Dominion requests an emergency amendment of the Facility Operating License, in the form of a change to the Technical Specifications (TS) to Facility Operating License Number DPR-32 for Surry Power Station Unit 1. This proposed License Amendment Request (LAR) modifies the Unit 1 interim alternate repair criteria (IARC) in TS 6.4.Q, "Steam Generator (SG) Program," and TS 6.6.3, "Steam Generator Tube Inspection Report." The proposed emergency LAR incorporates a modified IARC for the Unit 1 B SG tube repair criteria during the Unit 1 Refueling Outage 22 and the subsequent operating cycle and revises the reporting requirements for the Unit 1 B SG. Specifically, this change requests approval of a modified IARC that does not require plugging of Unit 1 B SG tubes with permeability variation indications that may mask flaws in the bottom one inch of the tubesheet. As a conservatism, the proposed change includes a commitment to use a 4.7 leakage factor (accident induced leak rate to operational leak rate) throughout the period of application of the change. In addition, the primary to secondary leakage in TS 3.1.C.1.d and TS 4.13.B is limited to 20 gallons per day (gpd) for the Unit 1 B SG for the Unit 1 Operating Cycle 23. Associated revisions to the Bases for TS 3.1.C and TS 4.13 are included for the NRC's information.

A discussion of the proposed LAR and the basis for the emergency submittal are provided in Attachment 1. The marked-up and proposed TS pages are provided in Attachments 2 and 3, respectively.

We have evaluated the proposed LAR and have determined that it does not involve a significant hazards consideration as defined in 10 CFR 50.92. The basis for that determination is provided in Attachment 1. We have also determined that operation with the proposed change will not result in any significant increase in the amount of effluents that may be released offsite and no significant increase in individual or cumulative occupational radiation exposure. Therefore, the proposed amendment is eligible for categorical exclusion as set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment is needed in connection with the approval of the proposed change. The basis for that determination is also provided in Attachment 1.

To avoid an unnecessary delay in plant restart following the ongoing Surry Unit 1 refueling outage, Dominion requests that the proposed emergency LAR be reviewed and approved


AOO1
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by 1730 hours on May 7, 2009.

As requested by the NRC during a conference call on May 4, 2009, supplemental information regarding tube slippage/pullout and estimated H* values for the Model 51 F steam generator will be transmitted by separate correspondence.

If you have any further questions or require additional information, please contact Mr. Gary D. Miller at (804) 273-2771.

Sincerely,


J. Alan Price
Vice President – Nuclear Engineering

Attachments:

1. Discussion of Change
2. Marked-up Technical Specifications Pages
3. Proposed Technical Specifications Pages
4. Westinghouse Letter LTR-SGMP-09-63 dated May 4, 2009
5. Summary of Unit 1 SG Linear Indications, Tube Maps of Permeability Variation Indications, and Summary of Permeability Variation Indications

Commitments made in this letter:

1. As a conservatism, the proposed change includes a commitment to use a 4.7 leakage factor throughout the period of application of the proposed change.

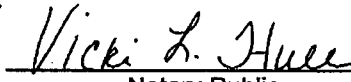
COMMONWEALTH OF VIRGINIA)

COUNTY OF HENRICO)

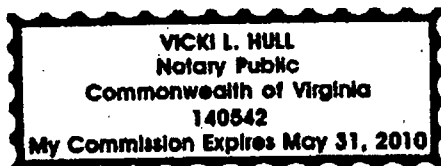
The foregoing document was acknowledged before me, in and for the County and Commonwealth aforesaid, today by J. Alan Price, who is Vice President – Nuclear Engineering, of Virginia Electric and Power Company. He has affirmed before me that he is duly authorized to execute and file the foregoing document in behalf of that Company, and that the statements in the document are true to the best of his knowledge and belief.

Acknowledged before me this 5TH day of May, 2009.

My Commission Expires: May 31, 2010.


Vicki L. Hull
Notary Public

(SEAL)



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ATTACHMENT 1

Discussion of Change

**Virginia Electric and Power Company
(Dominion)
Surry Power Station Unit 1**

DISCUSSION OF CHANGE

1.0 SUMMARY DESCRIPTION

Pursuant to 10CFR50.90 and 10CFR50.91(a)(5), Virginia Electric and Power Company (Dominion) hereby requests an emergency amendment in the form of changes to the Technical Specifications (TS) to Facility Operating License Number DPR-32 for Surry Power Station Unit 1. This proposed License Amendment Request (LAR) modifies the Unit 1 interim alternate repair criteria (IARC) in TS 6.4.Q, "Steam Generator (SG) Program," and TS 6.6.3, "Steam Generator Tube Inspection Report." The proposed emergency LAR incorporates a modified IARC for the Unit 1 B SG tube repair criteria during the Unit 1 Refueling Outage 22 and the subsequent operating cycle and revises the reporting requirements for the Unit 1 B SG. Specifically, this change requests approval of a modified IARC that does not require plugging of Unit 1 B SG tubes with permeability variation indications that may mask flaws in the bottom one inch of the tubesheet. As a conservatism, the proposed change includes a commitment to use a 4.7 leakage factor (accident induced leak rate to operational leak rate) throughout the period of application of the change. In addition, the primary to secondary leakage in TS 3.1.C.1.d and TS 4.13.B is limited to 20 gallons per day (gpd) for the Unit 1 B SG for the Unit 1 Operating Cycle 23. Associated revisions to the Bases for TS 3.1.C and TS 4.13 are included for the NRC's information.

Dominion requests that the proposed change be processed as an emergency LAR to prevent delay in either resumption of operation or of increase in power output up to the plant's licensed power level of Surry Unit 1. A discussion of the proposed TS change and the basis for the emergency LAR are provided in Attachment 1. The marked-up and proposed TS pages are provided in Attachments 2 and 3, respectively.

2.0 DETAILED DESCRIPTION OF CHANGE

The following specific changes to the Surry TS are proposed:

- TS 3.1.C – RCS Operational Leakage

TS 3.1.C.1.d is being revised to limit the RCS primary to secondary leakage for the Unit 1 B steam generator to 20 gallons per day during the Operating Cycle 23:

- d. 150 gallons per day primary to secondary LEAKAGE through any one steam generator (SG), with the following exception. The primary to secondary LEAKAGE for the Unit 1 B steam generator will be limited to 20 gallons per day during Operating Cycle 23

- TS Bases 3.1 - RCS Operational Leakage

TS Bases 3.1, Applicable Safety Analysis and Limiting Condition for Operation, section d, Primary to Secondary LEAKAGE through Any One SG, is being revised to add a

discussion on the basis for limiting the primary to secondary leak rate to 20 gallons per day for Operating Cycle 23 on Unit 1 B steam generator. The following sentence will be added:

Due to the permeability variation indications in the Unit 1 B steam generator found during Refueling Outage 22, the primary to secondary leak rate for that steam generator is limited to 20 gallons per day for Operating Cycle 23.

- TS 4.13 - RCS Operational Leakage

TS 4.13.B is being revised to limit the RCS primary to secondary leakage for the Unit 1 B steam generator to 20 gallons per day during the Operating Cycle 23:

B. Verify primary to secondary LEAKAGE is \leq 150 gallons per day through any one SG once every 72 hours¹, with the following exception. The primary to secondary LEAKAGE for the Unit 1 B steam generator will be verified to be \leq 20 gallons per day during Operating Cycle 23.

- TS Bases Surveillance Requirements 4.13.B

TS Bases 4.13.B is being revised to discuss the 20 gallons per day primary to secondary leak rate limit on Unit 1 B steam generator for Operating Cycle 23. The first sentence of the paragraph will be revised as follows:

This SR verifies that the primary to secondary LEAKAGE is less than or equal to 150 gallons per day through any one SG, with the following exception. The primary to secondary LEAKAGE for the Unit 1 B steam generator will be limited to 20 gallons per day during Operating Cycle 23.

TS Bases 4.13.B is also being revised to indicate that if the leakage rate cannot be assigned to an individual generator, then all the leakage should be conservatively assigned to one SG:

If it is not practical to assign the LEAKAGE to an individual SG, all the primary to secondary LEAKAGE should be conservatively assumed to be from one SG; for Unit 1 that leakage should be assumed to be through the B steam generator for Operating Cycle 23.

Associated revisions to the Bases for TS 3.1.C and TS 4.13 are included for the NRC's information.

- TS 6.4.Q – Steam Generator (SG) Program

TS 6.4.Q.3 is being revised to add TS 6.4.Q.3.c:

- c. For Unit 1 Refueling Outage 22 and the subsequent operating cycle, tubes in the B steam generator with permeability variation indications that may mask flaws in the bottom one inch of the tubesheet do not require plugging.

- TS 6.6.A.3 – Steam Generator Tube Inspection Report

TS 6.6.A.3 is being revised to add TS 6.6.A.3.o:

- o. Following completion of a Unit 1 inspection performed in Refueling Outage 22 (and any other inspections performed in the subsequent operating cycle), for the B steam generator, the number of permeability variation indications including location and total circumferential extent.

Consistent with the addition of TS 6.6.A.3.o, the word "and" is being deleted from the end of TS 6.6.A.3.m and being added to the end of TS 6.6.A.3.n.

3.0 MODIFIED INTERIM ALTERNATE REPAIR CRITERIA BACKGROUND AND INSPECTION RESULTS

3.1 Background

In a letter dated October 14, 2008 (Serial No. 08-0521) [Reference 1], Dominion requested a license amendment for Surry Unit 1 to incorporate an IARC into the provisions for SG tube repair for use during the Surry Unit 1 Refueling Outage 22 and the subsequent operating cycle. A February 20, 2009 letter (Serial No. 09-071) provided the response to an NRC request for additional information, including a commitment to use the 2.5 leakage factor [Reference 2]. The Unit 1 IARC was approved by the NRC on April 8, 2009 by TS Amendment 263/-- [Reference 3].

This proposed LAR modifies the Unit 1 IARC incorporated into TS 6.4.Q, "Steam Generator (SG) Program," and TS 6.6.3, "Steam Generator Tube Inspection Report," by TS Amendment 263/--. The proposed LAR incorporates a modified IARC for the Unit 1 B SG tube repair criteria during the Unit 1 Refueling Outage 22 and the subsequent operating cycle and revises the reporting requirements for the Unit 1 B SG. The proposed change requests approval of a modified IARC that does not require plugging of Unit 1 B SG tubes with permeability variation indications that may mask flaws in the bottom one inch of the tubesheet. Tubes with flaws detected in the bottom one inch that exceed 94 degrees in circumferential extent will be plugged in accordance with current TS. The proposed LAR is required to preclude unnecessary SG tube plugging due to the permeability variation indications that potentially mask flaws while still maintaining tube structural and leakage integrity. As a conservatism, a commitment is being made to use a 4.7 leakage factor (accident induced leak rate to operational leak rate) throughout the period of application of the change. In addition, the primary to secondary leakage in TS 3.1.C.1.d and TS 4.13.B is limited to 20 gallons per day (gpd) for the Unit 1 B SG for the Unit 1 Operating Cycle 23.

3.2 Unit 1 Inspection Results

SG tube inspection results from the Unit 1 Refueling Outage 21 (Fall 2007) and Unit 1 Refueling Outage 22 (Spring 2009) are discussed in the Structural Integrity Discussion in Section 4.0.

A summary of Unit 1 A, B, and C SG linear indications, tube maps of Unit 1 B SG permeability variation indications, and a summary of the Unit 1 B SG permeability variation indications from the Unit 1 Refueling Outage 22 are provided in Attachment 5.

Including tubes plugged during the Unit 1 Refueling Outage 22, the current tube plugging status is as follows:

- A SG: 38 tubes plugged
- B SG: 22 tubes plugged
- C SG: 26 tubes plugged

3.3 Unit 2 Inspection Results

The Unit 2 SGs are similar to the Unit 1 SGs in terms of materials of construction, manufacture, and operating history.

Eddy current testing (ECT) data from diagnostic exams conducted in all three SGs during the Unit 2 Spring 2008 Refueling Outage 21 did not identify any flaws in the portion of the tubes within the upper 20 inches of the tubesheet. Fifty percent of the overexpansion (OXF) locations within the tubesheet on the hot leg side along with a sample of the larger OXPs on the cold leg side in B SG and C SG were inspected. Additionally, a 20% plus point sample of the top of tubesheet from +3 inches to the tube end, 100% plus point of all expansions that extend above the top of the tubesheet, and 100% of the tube end locations in all three SGs were inspected. The B SG was inspected during the 2006 Refueling Outage 20. During this exam a 21% sample of the hot leg OXPs were inspected within the tubesheet, and 2067 tubes (62%) top of tubesheets were inspected with a plus point examination.

4.0 TECHNICAL EVALUATION

TS 6.4.Q requires that a SG program be established and implemented to ensure that SG tube integrity is maintained. SG tube integrity is maintained by meeting specified performance criteria (in TS 6.4.Q) for structural and leakage integrity consistent with the plant design and licensing bases. TS 6.4.Q requires a condition monitoring assessment be performed during each outage in which the SG tubes are inspected to confirm that the performance criteria are being met. TS 6.4.Q also includes provisions regarding the scope, frequency, and methods of SG tube inspections. Of relevance to the LAR, these provisions require that the number and portions of tubes inspected and methods of inspection be performed with the objective of detecting flaws of any type that may be

present along the length of a tube, from the tube-to-tubesheet weld at the tube inlet to the tube-to-tubesheet weld at the tube outlet, and that may satisfy the applicable tube repair criteria. The applicable tube repair criterion, specified in TS 6.4.Q.3, is that tubes found by an inservice inspection to contain flaws with a depth equal to or exceeding 40 percent of the nominal tube wall thickness shall be plugged.

Reference 5 provided the technical justification for an IARC that required full-length inspection of the tubes within the tubesheet but did not require plugging tubes if the extent of any circumferential cracking observed in the region greater than 17 inches below the top of the tubesheet (TTS) was less than a value sufficient to permit the remaining circumferential ligament to transmit the limiting axial loads [the greater of 3 times the normal operating (NOP) loads or 1.4 times the steam line break (SLB) end cap loads]. Axial cracks below 17 inches from the TTS are not relevant to the tube pullout arguments because axial cracks do not degrade the axial load carrying capability of the tube. Axial cracks do not require plugging if they are below 17 inches from the TTS. The limiting circumferential ligament was defined by calculation. The calculation assumed that friction loads between the tube and tubesheet from any source are zero. This assumption avoids potential effects of uncertainties in tube and tubesheet material properties. Also, based on the same assumption that the contact pressure between the tube and tubesheet from any source is zero, this evaluation provided a basis for demonstrating that the accident induced leakage will always meet the value assumed in the plant's safety analysis if the observed leakage during normal operating conditions is within its allowable limits. The need to calculate leakage from individual cracks is avoided by the calculation of the ratio of accident induced leakage to normal operating leakage.

In summary, the IARC technical basis relied upon a load path from the tube sheet clad through the tube-to-tubesheet weld to the tube to resist the pullout loads associated with the primary to secondary pressure differentials. Due to questions concerning the variability of the coefficients of thermal expansion (CTE) for the tube material and for the tubesheet material, the technical basis for the IARC did not credit friction between the tube and tubesheet as a factor in resisting pullout. The analysis concluded that the load could be carried through the remaining ligament for one cycle if the crack size in the bottom inch of the tubes was limited to 94 degrees. Furthermore, the NRC required a commitment to employ a leakage factor of 2.5 (accident induced leak rate to operational leak rate) when performing leak rate calculations.

During the Unit 1 Refueling Outage 22, 2299 tube ends in B SG exhibited significant permeability variation indications when examined with diagnostic eddy current techniques. These indications were confined to the bottom one-half inch of the affected tubes and were of sufficient magnitude to preclude the detection of tube degradation at those locations. Thus, this masking of any degradation that could be present precluded the ability to document the existence of the necessary remaining ligament as discussed. As shown in the tube maps in Attachment 5, 1243 cold leg tube ends and 1056 hot leg tube ends exhibited these indications; a total of 1473 tubes are affected.

Subsequent to the completion of the IARC technical basis and the resolution of associated NRC requests for additional information (RAI), a study was performed to address CTE variability. The CTE values provided in the ASME Code were determined to be acceptable and conservative as documented in Reference 4. Resolution of the CTE variability issue provides a basis for utilizing tube to tubesheet friction as the force to resist pullout rather than the remaining ligament basis discussed above. Implementation of the frictional force basis would support leaving tubes in service with 360 degree through wall cracks located in the bottom one inch. This would resolve the permeability variability masking issue. Additionally, as part of this modified IARC for the Unit 1 B SG, the leakage factor is increased from 2.5 to 4.7 to provide additional margin to ensure that the accident induced leak rate limit is not exceeded. The 4.7 leakage factor is applicable to all three Unit 1 SGs. Furthermore, the primary to secondary leakage in TS 3.1.C.1.d and TS 4.13.B is limited to 20 gallons per day (gpd) for the Unit 1 B SG for the Unit 1 Operating Cycle 23.

Discussion of Performance Criteria

The following performance criteria from NEI 97-06, Rev. 2 are included in Surry's TS and are the bases for the analyses:

The structural integrity performance criterion is:

All in-service steam generator tubes shall retain structural integrity over the full range of normal operating conditions (including startup, operation in the power range, hot standby, cool down and all anticipated transients included in the design specification) and design basis accidents. This includes retaining a safety factor of 3.0 against burst under normal steady state full power operation primary-to-secondary pressure differential and a safety factor of 1.4 against burst applied to the design basis accident primary to secondary pressure differentials. Apart from the above requirements, additional loading conditions associated with the design basis accidents, or combination of accidents in accordance with the design and licensing basis, shall also be evaluated to determine if the associated loads contribute significantly to burst or collapse. In the assessment of tube integrity, those loads that do significantly affect burst or collapse shall be determined and assessed in combination with the loads due to pressure with a safety factor of 1.2 on the combined primary loads and 1.0 on axial secondary loads.

The structural performance criterion is based on ensuring that there is reasonable assurance that a steam generator tube will not burst during normal operation or postulated accident conditions. Since tube burst cannot occur within the tubesheet, the tube burst condition is equated to tube pullout.

The accident-induced leakage performance criterion (AILPC) is:

The primary to secondary accident induced leakage rate for any design basis accident, other than a Steam Generator tube rupture, shall not exceed the leakage

rate assumed in the accident analysis in terms of total leakage rate for all Steam Generators and leakage rate for an individual steam generator. Leakage is not to exceed 1 gpm per Steam Generator, except for specific types of degradation at specific locations when implementing alternate repair criteria as documented in the Steam Generator Program technical specifications.

Primary to secondary leakage is a factor in the dose consequences outside containment resulting from a limiting design basis accident. The potential primary to secondary leak rate during postulated design basis accidents shall limit the offsite radiological dose consequences to within 10 CFR Part 100 guidelines or the radiological consequences to control room personnel required by GDC-19, or other NRC-approved licensing basis (e.g. 10 CFR 50.67).

Structural Integrity Discussion

As defined in References 5 and 6, the bounding remaining structural ligament that meets the NEI 97-06, Rev. 2, Performance Criterion described above and is required for the tube to transmit the operational loads is 235 degrees arc (360 minus 94 crack limit minus 31 for crack growth). This assumes that the residual ligament is not degraded. A small circumferential initiating crack is predicted to grow to a throughwall condition before it is predicted to reach a limiting residual ligament. A residual ligament in a part-throughwall condition is not a significant concern because it is assumed that all circumferential cracks detected are 100% throughwall. References 5 and 6 documented that the 235 degree remaining ligament in the limiting area of the tube-to-tubesheet weld meets the structural integrity performance criteria.

Attachment 4 [Reference 7] documented that the load carrying capability of the remaining 235 degree ligament at the limiting location of the tube-to tubesheet weld was 3200 lbs. This is the force that needs to be carried by the tube to tubesheet joint. The contact pressure between the tube and tube sheet combined with a conservative coefficient of friction between the contacting surfaces results in the force that resists tube pullout. Attachment 4 provides two alternative approaches, both of which demonstrate the existence of a restraining force that exceeds 3200 lbs.

- The first approach uses plant operating conditions that result in the lowest contact pressure (i.e., normal operating conditions and the lower limit of T_{avg}). The analysis uses the limiting tube in the bundle, thus bounding all tubes. The analysis concludes that the available force to resist pullout due to contact pressure in the lower four inches of the tubes is 4869 lbs, which is sufficient to exceed the maximum tube pullout forces that were considered in the basis of the IARC.
- The second approach uses the same plant operating conditions. The minimum incremental contact pressure for all tubes at all axial locations was calculated using both 2-dimensional and 3-dimensional finite element models. This minimum incremental value derived from the limiting axial location in the limiting tube was applied along the tube from one inch to seventeen inches below the top of the

tubesheet. The resistance to pullout due to contact pressure over this sixteen inch segment was calculated to be 8096 lbs, which is sufficient to exceed the maximum tube pullout forces that were considered in the basis of the IARC by a factor of greater than 2.

Both approaches assume the structural integrity of the tubes within the tubesheet above the bottom inch. ECT data from diagnostic exams conducted in all three steam generators during Unit 1 Refueling Outages 21 and 22 have identified only one flaw in the portion of the tubes within the upper 20 inches of the tubesheet. This tube, one of a small population exhibiting high residual stress due to incomplete heat treatment, had an axial indication at the expansion transition, and was removed from service. The remaining population (43) of the tier 1 high stress tubes in all three SGs were examined and found to be without flaws. A 20% sample of tier two tubes in the A and C SGs and a 100% sample of tier 2 tubes in the B SG were conducted with no additional flaws detected. Fifty percent of the overexpansion (OXP) locations within the tubesheet on the hot leg side along with a sample of the larger OXPs on the cold leg side in all three SGs have been examined over the past two inspections. Additionally, full tubesheet depth examination of a 20% sample of all of the tubes exhibiting permeability variations was conducted. In summary, one flaw was documented over the two inspections in tubes within the tubesheet. These diagnostic examinations provide a high degree of confidence that the population of tubes with permeability variation within the tubesheet are without flaws above the bottom inch.

In summary, one approach demonstrates that the available axial force developed from contact pressure over the lower four inches of the tube is sufficient to exceed the maximum tube pullout forces that were considered in the basis of the IARC. A second approach demonstrates the available axial force developed in a sixteen inch segment of a tube is sufficient to exceed the maximum tube pullout forces that were considered in the basis of the IARC by a factor of greater than 2. In both cases, the most conservative plant conditions and tube locations were used. Since this analysis was based upon and consistent with the IARC technical basis, the Structural Integrity Performance criteria continue to be met.

Consideration of Non Destructive Examination (NDE) Uncertainty

NDE uncertainty was evaluated for the Unit 1 IARC since sizing of linear indications was required. This LAR for the modified IARC assumes that the circumferential indications in the bottom one inch are 360 degrees in extent, thus no NDE sizing is required. NDE uncertainty therefore does not need to be considered.

Consideration of Accident Induced Leakage

In the case of the Unit 1 IARC, meeting the AILPC was supported by the commitment to use a conservative leakage factor of 2.5. The accident induced leak rate limit divided by 2.5 provided an operational leak rate limit that can be monitored on line. The technical basis for the modified IARC [Reference 7] concluded that the leakage factor of 2.5 is

also appropriate for this LAR. Thus, the AILPC continues to be met based upon the technical basis supporting this proposed change. In addition, this request includes a commitment to use a leakage factor of 4.7 when performing leak rate calculations, thus adding additional conservatism. Also, the primary to secondary leakage in TS 3.1.C.1.d and TS 4.13.B is limited to 20 gallons per day (gpd) for the Unit 1 B SG for the Unit 1 Operating Cycle 23.

Consideration of Crack Growth

Crack growth was a consideration in the IARC due to the need to maintain the required minimum ligament. Table 1.0 shows the application of crack growth to determine the critical ligament for the bottom one inch of the tubes.

The technical basis for this LAR assumes that any circumferential indications in the bottom one inch of the tubesheet are 100% throughwall and 360 degrees in extent. Therefore, crack growth is no longer relevant.

**Table 1.0 Calculation of Required Minimum Ligament for
18 Months Operating Period**

	<i>Bounding Structural Ligament</i>	<i>EFPY (1)</i>	<i>Growth (In./EFPY) (2)</i>	<i>Growth (Deg./EFPY) (3)</i>	<i>Growth for Operating Period (degrees)</i>	<i>Minimum Structural Ligament (degrees)</i>	<i>Critical Ligament (degrees)</i>
<i>Tube/ Weld</i>	<i>18 Calendar Month (CM) Operation</i>	1.5	0.12	20.65	31	235	94
1) It is conservatively assumed that 1 EFY= 1 Calendar Year 2) 95% upper value of typical growth rates from Reference 5 and 6 3) Based on smallest (Model F) mean tubesheet bore dimension							

Primary to Secondary Leakage Discussion

A commitment to a leakage factor of 2.5 was applied to that part of the observed normal operating leakage that cannot be associated with the degradation mechanisms outside the tubesheet expansion region to calculate the accident induced leakage from the tubesheet region [Reference 5] in conjunction with the Unit 1 IARC. For integrity assessments, the ratio of 2.5 was committed to be used in completion of both the

condition monitoring (CM) and operational assessment (OA) upon implementation of the IARC. For example, for the CM assessment, the component of leakage from the lower 4 inches for the most limiting steam generator during the prior cycle of operation would have been multiplied by a factor of 2.5 and added to the total leakage from any other source and compared to the allowable accident analysis leakage assumption. For the OA, the difference in leakage from the allowable limit during the limiting design basis accident minus the leakage from the other sources would have been divided by 2.5 and compared to the observed operational leakage.

Attachment 4 [Reference 7] concluded that this leakage factor is also appropriate in support of this LAR. However, additional margin has been provided by increasing the leakage factor from 2.5 to 4.7. The leakage factor of 4.7 will be used in integrity assessments as described above. Additional margin is provided for the Unit 1 B SG by limiting the primary to secondary leakage to 20 gpd.

Reporting Requirements

This LAR includes a proposed modification to the 180-day SG Report to include information on the location and extent of the permeability variation indications observed in the bottom one inch of the steam generator tubes in the Unit 1 B SG.

Inspection and Repair of Tubes

No tubes in the Unit 1 B SG with linear indications that exceed the repair limit specified by the Unit 1 IARC TS were identified during Refueling Outage 22. Tubes in the B SG with permeability variation indications that may mask flaws in the bottom one inch of the tubesheet do not require plugging and will remain in service.

5.0 APPLICABLE REGULATORY REQUIREMENTS/CRITERIA

Steam Generator (SG) tube inspection and repair limits are specified in Surry TS 6.4.Q, "Steam Generator (SG) Program." The current TS require that flawed tubes be repaired if the depths of the flaws are greater than or equal to 40 percent through wall. During the initial plant licensing of Surry Power Station Unit 1, it was demonstrated that the design of the reactor coolant pressure boundary met the regulatory requirements in place at that time. The General Design Criteria (GDC) included in Appendix A to 10 CFR Part 50 did not become effective until May 21, 1971. The Construction Permits for Surry Units 1 and 2 were issued prior to May 21, 1971; consequently, these units were not subject to GDC requirements. (Reference SECY-92-223 dated September 18, 1992.) However, the following information demonstrates compliance with GDC 14, 15, 30, 31, and 32 of 10 CFR 50, Appendix A. Specifically, the GDC state that the Reactor Coolant Pressure Boundary (RCPB) shall have "an extremely low probability of abnormal leakage . . . and gross rupture" (GDC 14), "shall be designed with sufficient margin" (GDCs 15 and 31), shall be of "the highest quality standards practical" (GDC 30), and shall be designed to permit "periodic inspection and testing . . . to assess . . .

structural and leak tight integrity" (GDC 32). Structural integrity refers to maintaining adequate margins against burst, and collapse of the steam generator tubing. Leakage integrity refers to limiting primary to secondary leakage during all plant conditions to within acceptable limits.

The TS repair limits ensure that tubes accepted for continued service will retain adequate structural and leakage integrity during normal operating, transient, and postulated accident conditions. The reactor coolant pressure boundary is designed, fabricated and constructed so as to have an exceedingly low probability of gross rupture or significant uncontrolled leakage throughout its design lifetime. Reactor coolant pressure boundary components have provisions for the inspection testing and surveillance of critical areas by appropriate means to assess the structural and leaktight integrity of the boundary components during their service lifetime. Structural integrity refers to maintaining adequate margins against burst and collapse of the steam generator tubing. Leakage integrity refers to limiting primary to secondary leakage during all plant conditions to within acceptable limits.

6.0 BASIS FOR EMERGENCY TS CHANGE

In a letter dated October 14, 2008 (Serial No. 08-0521) [Reference 1], Dominion requested a license amendment for Surry Unit 1 to incorporate an IARC into the provisions for SG tube repair for use during the Surry Unit 1 Refueling Outage 22 and the subsequent operating cycle. A February 20, 2009 letter (Serial No. 09-071) provided the response to an NRC request for additional information, including a commitment to use the 2.5 leakage factor [Reference 2]. The Unit 1 IARC was approved by the NRC on April 8, 2009 by TS Amendment 263/-- [Reference 3], which was implemented on April 29, 2009.

The SG tube inspection scope for Unit 1 Refueling Outage 22 included planned inspection in the A and C SGs, as well as pre-planned scope expansion for the B SG, if required. As a result of tube ends cracks found in the A and C SGs, the pre-planned expansion of the SG tube inspection in the B SG was undertaken. The B SG tube inspection commenced on April 30, 2009 at 12:06 pm and was completed on May 3, 2009 at 06:10 am. Based on the Unit 1 IARC requirements, a first time inspection of the B SG tube ends was performed using a rotating eddy current probe. The B SG inspection identified a large number of permeability variation indications of significant signal strength requiring disposition. These indications are unique to the Unit 1 B SG. The locations were reexamined using additional diagnostic techniques. Examinations included the use of magnetic bias probes, often useful in distinguishing permeability variations from flaws. These examinations were not successful due to the lack of significant reduction in the voltage signal with the magnetic bias probe and associated with the geometry of the location and the strength of the permeability signal. In summary, the use of additional diagnostic techniques did not resolve the masking issue. Preliminary disposition of the permeability variation indications concluded that these indications may mask flaws in the Unit 1 B SG tubes. A Condition Report in the

Corrective Action Program was issued on May 1, 2009 documenting the permeability variation indications and the potential masking of flaws. The number and location of these indications is identified in Section 3.2. The proposed change is required to preclude unnecessary plugging of 1473 B SG tubes due to flaw masking by the permeability variation indications. The proposed change does not require plugging of SG tubes in the Unit 1 B SG with permeability variation indications in the bottom one inch of the tubesheet for the Unit 1 Refueling Outage 22 and the subsequent operating cycle.

As indicated in the Dominion letter dated October 14, 2008 [Reference 1] requesting NRC review of the Unit 1 IARC, the Unit 1 IARC TS amendment was being implemented prior to increasing Reactor Coolant System (RCS) temperature above 200°F during startup of Surry Unit 1 from Refueling Outage 22. Similarly, implementation of the amendment approving the modified IARC for the Unit 1 B SG is needed to support the increase in RCS temperature above 200°F. The 200°F mode change for startup from the Unit 1 Refueling Outage 22 is currently scheduled to commence at 04:00 am on May 8, 2009. Dominion requests that the proposed change be processed as an emergency LAR to prevent delay in either resumption of operation or of increase in power output up to the plant's licensed power level of Surry Unit 1. Thus, NRC approval of the proposed LAR is requested by May 7, 2009.

7.0 NO SIGNIFICANT HAZARDS CONSIDERATION

Dominion has evaluated whether a significant hazards consideration is involved with the proposed amendment by focusing on the three standards set forth in 10 CFR 50.92, "Issuance of Amendment," as discussed below:

- (1) Does the proposed change involve a significant increase in the probability or consequences of an accident previously evaluated?

Response: No

Of the various accidents previously evaluated, the proposed change only affects the steam generator tube rupture (SGTR), steam line break (SLB), and locked rotor evaluations. Loss-of-coolant accident (LOCA) conditions cause a compressive axial load to act on the tube. Therefore, since the LOCA tends to force the tube into the tubesheet rather than pull it out, it is not a factor in this amendment request. Another faulted load consideration is a safe shutdown earthquake (SSE); however, the seismic analysis of Model 51F steam generators has shown that axial loading of the tubes is negligible during an SSE.

At normal operating pressures, leakage from PWSCC below 17 inches from the TTS is limited by both the tube-to-tubesheet crevice and the limited crack opening permitted by the tubesheet constraint. Consequently, negligible normal operating leakage is expected from cracks within the tubesheet region.

For the SGTR event, the required structural margins of the steam generator tubes with circumferential flaws of any extent within the bottom one inch of the tubes are maintained by ensuring that the available axial force due to tube to tubesheet contact pressure and the coefficient of friction between the tube and the tubesheet exceeds the maximum pullout force for the limiting operating conditions. These forces were calculated and the results documented in Attachment 4 [Reference 7]. In all cases, the available axial forces are sufficient to offset tube pullout forces, thus maintaining tube integrity. Attachment 4 [Reference 7] further concludes that the performance criteria of NEI 97-06, Rev. 2, "Steam Generator Program Guidelines" and Regulatory Guide (RG) 1.121, "Bases for Plugging Degraded PWR Steam Generator Tubes" continue to be met. Therefore, the margin against tube burst/pullout is maintained during normal and postulated accident conditions and the proposed change does not result in a significant increase in the probability or consequence of a SGTR.

The probability of a SLB is unaffected by the potential failure of a SG tube as the failure of a tube is not an initiator for a SLB event. SLB leakage is limited by leakage flow restrictions resulting from the leakage path above potential cracks through the tube-to-tubesheet crevice. The leak rate during postulated accident conditions (including locked rotor) has been shown to remain within the accident analysis assumptions for circumferential flaws of any extent located in the bottom one inch of the tubes. Consistent with the 4.7 leakage factor, the primary to secondary leakage will be administratively limited to 100 gpd, the attendant accident condition leak rate, assuming all leakage to be from indications below 17 inches from the top of the tubesheet would be bounded by 470 gpd. This value is within the accident analysis assumptions for the limiting design basis accident for Surry, which is the postulated SLB event.

The reduction in the primary to secondary leakage limit from 150 gallons per day to 20 gallons per day for the Unit 1 B steam generator provides additional margin.

Based on the above, the performance criteria of NEI-97-06, Rev. 2 and Regulatory Guide (RG) 1.121 continue to be met and the proposed change does not involve a significant increase in the probability or consequences of an accident previously evaluated.

- (2) Does the proposed change create the possibility of a new or different accident from any accident previously evaluated?

Response: No

The proposed change does not introduce any changes or mechanisms that create the possibility of a new or different kind of accident. Tube bundle integrity is expected to be maintained for all plant conditions upon implementation of the modified interim alternate repair criteria. The proposed change does not introduce

any new equipment or any change to existing equipment. No new effects on existing equipment are created nor are any new malfunctions introduced.

The reduction in the primary to secondary leakage limit from 150 gallons per day to 20 gallons per day for the Unit 1 B steam generator cannot initiate an accident.

Therefore, based on the above evaluation, the proposed changes do not create the possibility of a new or different kind of accident from any accident previously evaluated.

(3) Does the proposed change involve a significant reduction in a margin of safety?

Response: No

The proposed change maintains the required structural margins of the steam generator tubes for both normal and accident conditions. NEI 97-06, Rev. 2 and RG 1.121 are used as the basis in the development of the limited tubesheet inspection depth methodology for determining that steam generator tube integrity considerations are maintained within acceptable limits. RG 1.121 describes a method acceptable to the NRC staff for meeting GDC 14, 15, 31, and 32 by reducing the probability and consequences of an SGTR. RG 1.121 concludes that by determining the limiting safe conditions of tube wall degradation beyond which tubes with unacceptable cracking, as established by inservice inspection, should be removed from service or repaired, the probability and consequences of a SGTR are reduced. This RG uses safety factors on loads for tube burst that are consistent with the requirements of Section III of the ASME Code.

For circumferential flaws of any extent in the bottom one inch of the tubes, Attachment 4 [Reference 7] documents that tube to tubesheet contact pressure combined with a conservative coefficient of friction serve to provide the necessary resistance to tube pullout due to the pressure and thermally induced forces (with applicable safety factors applied). Additionally, it is shown that the existence of circumferential indications of any extent located in the bottom one inch of the tubes will not result in unacceptable primary to secondary leakage during all plant conditions.

The reduction in the primary to secondary leakage limit from 150 gallons per day to 20 gallons per day for the Unit 1 B steam generator does not result in a reduction in margin since operator intervention will be required at the lower leakage limit.

Based on the above, it is concluded that the proposed change does not result in any reduction of margin with respect to plant safety as defined in the Updated Final Safety Analysis Report or bases of the plant Technical Specifications.

Therefore, Dominion concludes that the proposed change presents no significant hazards consideration under the standards set forth in 10 CFR 50.92(c) and, accordingly, a finding of "no significant hazards consideration" is justified.

8.0 ENVIRONMENTAL CONSIDERATION

Dominion has evaluated the proposed change for environmental considerations. The review has determined that the proposed change would change a requirement with respect to installation or use of a facility component located within the restricted area, as defined in 10 CFR 20, and would change an inspection or surveillance requirement. However, the proposed change does not involve (i) a significant hazards consideration, (ii) a significant change in the types or significant increase in the amounts of any effluent that may be released offsite, or (iii) a significant increase in individual or cumulative occupational radiation exposure. Accordingly, the proposed change meets the eligibility criterion for categorical exclusion set for in 10 CFR 51.22(c)(9). Therefore, pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the proposed change.

9.0 CONCLUSION

Based on the considerations discussed above, (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission's regulations, (3) the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public with the implementation of the modified IARC for the Unit 1 B SG, and (4) no environmental impact statement or environmental assessment need be prepared in connection with the proposed change.

10.0 REFERENCES

1. Virginia Electric and Power (Dominion) to NRC letter Serial No. 08-0521, dated October 14, 2008, Surry Power Station Unit 1 - Proposed License Amendment Request – Interim Alternate Repair Criteria (IARC) for Steam Generator (SG) Tube Repair
2. Virginia Electric and Power (Dominion) to NRC letter Serial No. 09-071, dated February 20, 2009, Surry Power Station Unit 1 - Proposed License Amendment Request – Interim Alternate Repair Criteria for Steam Generator Tube Repair – Request for Additional Information
3. NRC to Virginia Electric and Power letter, dated April 8, 2009, Surry Power Station Unit 1 – Issuance of Amendment Regarding Proposed License Amendment Request – Interim Alternate Repair Criteria for Steam Generator Tube Repair [TS Amendment 263/--]
4. West-13-402, Revision 1, "An Evaluation of the Statistical Variability in the Coefficient of Thermal Expansion Properties of SA508 and Alloy 600," Structural Integrity Associates, Inc., Centennial, CO, December 2008
5. Westinghouse Electric Company LLC letter LTR-CDME-08-11, "Interim Alternate Repair Criterion (ARC) for Cracks in the Lower Region of the Tubesheet Expansion Zone," dated January 31, 2008 [NOTE: This reference was included in Reference 1.]
6. Westinghouse Electric Company LLC letter LTR-CDME-08-43 P-Attachment "Response to NRC Request for Additional Information Relating to LTR-CDME-08-11 P-Attachment," dated March 18, 2009 [NOTE: This reference was included in Reference 1.]
7. Westinghouse Letter LTR-SGMP-09-63, dated May 4, 2009, Assessment of Tube-end Indications at Surry Unit 1 [NOTE: This reference is included in Attachment 4.]

ATTACHMENT 2

Mark-up of Unit 1 Technical Specifications Pages

**Surry Power Station Unit 1
Virginia Electric and Power Company
(Dominion)**

C. RCS Operational LEAKAGE

Applicability

The following specifications are applicable to RCS operational LEAKAGE whenever T_{avg} (average RCS temperature) exceeds 200°F (200 degrees Fahrenheit).

Specifications

1. RCS operational LEAKAGE shall be limited to:
 - a. No pressure boundary LEAKAGE,
 - b. 1 gpm unidentified LEAKAGE,
 - c. 10 gpm identified LEAKAGE, and
 - d. 150 gallons per day primary to secondary LEAKAGE through any one steam generator (SG) ~~X~~ INSERT A
- 2.a. If RCS operational LEAKAGE is not within the limits of 3.1.C.1 for reasons other than pressure boundary LEAKAGE or primary to secondary LEAKAGE, reduce LEAKAGE to within the specified limits within 4 hours.
- b. If the LEAKAGE is not reduced to within the specified limits within 4 hours, the unit shall be brought to HOT SHUTDOWN within the next 6 hours and COLD SHUTDOWN within the following 30 hours.
3. If RCS pressure boundary LEAKAGE exists, or primary to secondary LEAKAGE is not within the limit specified in 3.1.C.1.d, the unit shall be brought to HOT SHUTDOWN within 6 hours and COLD SHUTDOWN within the following 30 hours.

Insert A on pages TS 3.1.13a and TS 4.13-2

, with the following exception. The primary to secondary LEAKAGE for the Unit 1 B steam generator will be limited to 20 gallons per day during Operating Cycle 23.

This LCO deals with protection of the reactor coolant pressure boundary (RCPB) from degradation and the core from inadequate cooling, in addition to preventing the accident analyses radiation release assumptions from being exceeded. The consequences of violating this LCO include the possibility of a loss of coolant accident (LOCA).

APPLICABLE SAFETY ANALYSES - Except for primary to secondary LEAKAGE, the safety analyses do not address operational LEAKAGE. However, other operational LEAKAGE is related to the safety analyses for LOCA; the amount of leakage can affect the probability of such an event. The safety analysis for an event resulting in steam discharge to the atmosphere assumes that primary to secondary LEAKAGE from all steam generators (SGs) is 1 gpm or increases to 1 gpm as a result of accident induced conditions. The LCO requirement to limit primary to secondary LEAKAGE through any one SG to less than or equal to 150 gallons per day is significantly less than the conditions assumed in the safety analysis. INSERT B

Primary to secondary LEAKAGE is a factor in the dose releases outside containment resulting from a main steam line break (MSLB) accident. Other accidents or transients involve secondary steam release to the atmosphere, such as a steam generator tube rupture (SGTR). The leakage contaminates the secondary fluid.

The UFSAR (Ref. 2) analysis for SGTR assumes the contaminated secondary fluid is released via power operated relief valves or safety valves. The source term in the primary system coolant is transported to the affected (ruptured) steam generator by the break flow. The affected steam generator discharges steam to the environment for 30 minutes until the generator is manually isolated. The 1 gpm primary to secondary LEAKAGE transports the source term to the unaffected steam generators. Releases continue through the unaffected steam generators until the Residual Heat Removal System is placed in service.

The MSLB is less limiting for site radiation releases than the SGTR. The safety analysis for the MSLB accident assumes 1 gpm total primary to secondary LEAKAGE, including 500 gpd leakage into the faulted generator. The dose consequences resulting from the MSLB and the SGTR accidents are within the limits defined in the plant licensing basis.

The RCS operational LEAKAGE satisfies Criterion 2 of 10 CFR 50.36(c)(2)(ii).

LIMITING CONDITIONS FOR OPERATION - RCS operational LEAKAGE shall be limited to:

a. Pressure Boundary LEAKAGE

No pressure boundary LEAKAGE is allowed, being indicative of material deterioration. LEAKAGE of this type is unacceptable as the leak itself could cause further deterioration, resulting in higher LEAKAGE. Violation of this LCO could result in continued degradation of the RCPB. LEAKAGE past seals and gaskets is not pressure boundary LEAKAGE.

Insert B on pages TS 3.1-14a and TS 3.1-14b

Due to the permeability variation indications in the Unit 1 B steam generator found during Refueling Outage 22, the primary to secondary leak rate for that steam generator is limited to 20 gallons per day for Operating Cycle 23.

\$

b. Unidentified LEAKAGE

One gallon per minute (gpm) of unidentified LEAKAGE is allowed as a reasonable minimum detectable amount that the containment air monitoring and containment sump level monitoring equipment can detect within a reasonable time period. Violation of this LCO could result in continued degradation of the RCPB, if the LEAKAGE is from the pressure boundary.

c. Identified LEAKAGE

Up to 10 gpm of identified LEAKAGE is considered allowable because LEAKAGE is from known sources that do not interfere with detection of unidentified LEAKAGE and is well within the capability of the RCS Makeup System. Identified LEAKAGE includes LEAKAGE to the containment from specifically known and located sources, but does not include pressure boundary LEAKAGE or controlled reactor coolant pump (RCP) seal leakoff (a normal function not considered LEAKAGE). Violation of this LCO could result in continued degradation of a component or system.

d. Primary to Secondary LEAKAGE through Any One SG

The limit of 150 gallons per day per SG is based on the operational LEAKAGE performance criterion in NEI 97-06, Steam Generator Program Guidelines (Ref. 3). The Steam Generator Program operational LEAKAGE performance criterion in NEI 97-06 states, "The RCS operational primary to secondary leakage through any one SG shall be limited to 150 gallons per day." The limit is based on operating experience with SG tube degradation mechanisms that result in tube leakage. The operational leakage rate criterion in conjunction with the implementation of the Steam Generator Program is an effective measure for minimizing the frequency of steam generator tube ruptures. **INSERT B**

APPLICABILITY - In REACTOR OPERATION conditions where T_{avg} exceeds 200°F, the potential for RCPB LEAKAGE is greatest when the RCS is pressurized.

In COLD SHUTDOWN and REFUELING SHUTDOWN, LEAKAGE limits are not required because the reactor coolant pressure is far lower, resulting in lower stresses and reduced potentials for LEAKAGE.

LCO 3.1.C.5 measures leakage through each individual pressure isolation valve (PIV) and can impact this LCO. Of the two PIVs in series in each isolated line, leakage measured through one PIV does not result in RCS LEAKAGE when the other is leaktight. If both valves leak and result in a loss of mass from the RCS, the loss must be included in the allowable identified LEAKAGE.

Insert B on pages TS 3.1-14a and TS 3.1-14b

Due to the permeability variation indications in the Unit 1 B steam generator found during Refueling Outage 22, the primary to secondary leak rate for that steam generator is limited to 20 gallons per day for Operating Cycle 23.

4.13 RCS OPERATIONAL LEAKAGE

Applicability

The following specifications are applicable to RCS operational LEAKAGE whenever T_{avg} (average RCS temperature) exceeds 200°F (200 degrees Fahrenheit).

Objective

To verify that RCS operational LEAKAGE is maintained within the allowable limits.

Specifications

- A. Verify RCS operational LEAKAGE is within the limits specified in TS 3.1.C by performance of RCS water inventory balance once every 24 hours.^{1,2}
- B. Verify primary to secondary LEAKAGE is ≤ 150 gallons per day through any one SG once every 72 hours.¹ INSERT C

Notes:

- 1. Not required to be completed until 12 hours after establishment of steady state operation.
- 2. Not applicable to primary to secondary LEAKAGE.

BASES

SURVEILLANCE REQUIREMENTS (SR)

SR 4.13.A

Verifying RCS LEAKAGE to be within the Limiting Condition for Operation (LCO) limits ensures the integrity of the reactor coolant pressure boundary (RCPB) is maintained. Pressure boundary LEAKAGE would at first appear as unidentified LEAKAGE and can only be positively identified by inspection. It should be noted that LEAKAGE past seals and gaskets is not pressure boundary LEAKAGE. Unidentified LEAKAGE and identified LEAKAGE are determined by performance of an RCS water inventory balance.

The RCS water inventory balance must be performed with the reactor at steady state operating conditions (stable pressure, temperature, power level, pressurizer and makeup tank levels, makeup and letdown, and RCP seal injection and return flows). The surveillance is modified by two notes. Note 1 states that this SR is not required to be completed until 12 hours after establishing steady state operation. The 12 hour allowance provides sufficient time to collect and process all necessary data after stable unit conditions are established.

Insert C on pages TS 4.13-1

, with the following exception. The primary to secondary LEAKAGE for the Unit 1 B steam generator will be verified to be ≤ 20 gallons per day during Operating Cycle 23.

Steady state operation is required to perform a proper inventory balance since calculations during maneuvering are not useful. For RCS operational LEAKAGE determination by water inventory balance, steady state is defined as stable RCS pressure, temperature, power level, pressurizer and makeup tank levels, makeup and letdown, and RCP seal injection and return flows.

An early warning of pressure boundary LEAKAGE or unidentified LEAKAGE is provided by the automatic systems that monitor the containment atmosphere radioactivity and the containment sump level. It should be noted that LEAKAGE past seals and gaskets is not pressure boundary LEAKAGE. These leakage detection systems are specified in the TS 3.1.C Bases.

Note 2 states that this SR is not applicable to primary to secondary LEAKAGE because LEAKAGE of 150 gallons per day cannot be measured accurately by an RCS water inventory balance.

The 24 hour frequency is a reasonable interval to trend LEAKAGE and recognizes the importance of early leakage detection in the prevention of accidents.

SR 4.13.B

INSERT A

This SR verifies that primary to secondary LEAKAGE is less than or equal to 150 gallons per day through any one SG. Satisfying the primary to secondary LEAKAGE limit ensures that the operational LEAKAGE performance criterion in the Steam Generator Program is met. If this SR is not met, compliance with LCO 3.1.H, "Steam Generator Tube Integrity," should be evaluated. The 150 gallons per day limit is measured at room temperature as described in Reference 4. The operational LEAKAGE rate limit applies to LEAKAGE through any one SG.

If it is not practical to assign the LEAKAGE to an individual SG, all the primary to secondary LEAKAGE should be conservatively assumed to be from one SG. The surveillance is modified by a Note, which states that the Surveillance is not required to be performed until 12 hours after establishment of steady state operation. For RCS primary to secondary LEAKAGE determination, steady state is defined as stable RCS pressure, temperature, power level, pressurizer and makeup tank levels, makeup and letdown, and RCP seal injection and return flows.

The surveillance frequency of 72 hours is a reasonable interval to trend primary to secondary LEAKAGE and recognizes the importance of early leakage detection in the prevention of accidents. The primary to secondary LEAKAGE is determined using continuous process radiation monitors or radiochemical grab sampling in accordance with the EPRI guidelines (Ref. 4).

REFERENCES

3. UFSAR, Chapter 4, Surry Units 1 and 2.
4. UFSAR, Chapter 14, Surry Units 1 and 2.
5. NEI 97-06, "Steam Generator Program Guidelines."
6. EPRI, "Pressurized Water Reactor Primary-to-Secondary Leak Guidelines."

Insert A on pages TS 3.1.13a and TS 4.13-2

, with the following exception. The primary to secondary LEAKAGE for the Unit 1 B steam generator will be limited to 20 gallons per day during Operating Cycle 23.

Insert D on page TS 4.13-2

; for Unit 1 that leakage should be assumed to be through the B steam generator for Operating Cycle 23.

NO CHANGE ON THIS PAGE -
INCLUDED FOR INFORMATION

TS 6.4-11
03-29-07

Q. Steam Generator (SG) Program

A Steam Generator Program shall be established and implemented to ensure that SG tube integrity is maintained. In addition, the Steam Generator Program shall include the following provisions:

1. Provisions for condition monitoring assessments. Condition monitoring assessment means an evaluation of the "as found" condition of the tubing with respect to the performance criteria for structural integrity and accident induced leakage. The "as found" condition refers to the condition of the tubing during an SG inspection outage, as determined from the inservice inspection results or by other means, prior to the plugging of tubes. Condition monitoring assessments shall be conducted during each outage during which the SG tubes are inspected or plugged to confirm that the performance criteria are being met.
2. Performance criteria for SG tube integrity. SG tube integrity shall be maintained by meeting the performance criteria for tube structural integrity, accident induced leakage, and operational LEAKAGE.
 - a. Structural integrity performance criterion: All in-service steam generator tubes shall retain structural integrity over the full range of normal operating conditions (including startup, operation in the power range, hot standby, and cool down and all anticipated transients included in the design specification) and design basis accidents. This includes retaining a safety factor of 3.0 against burst under normal steady state full power operation primary to secondary pressure differential and a safety factor of 1.4 against burst applied to the design basis accident primary to secondary pressure differentials. Apart from the above requirements, additional loading conditions associated with the design basis accidents, or combination of accidents in accordance with the design and licensing basis, shall also be evaluated to determine if the associated loads contribute significantly to burst or collapse. In the assessment of tube integrity, those loads that do significantly affect burst or collapse shall be determined and assessed in combination with the loads due to pressure with a safety factor of 1.2 on the combined primary loads and 1.0 on axial secondary loads.
 - b. Accident induced leakage performance criterion: The primary to secondary accident induced leakage rate for any design basis accident, other than a SG tube rupture, shall not exceed the leakage rate assumed in the accident analysis in terms of total leakage rate for all SGs and leakage rate for an individual SG. Leakage is not to exceed 1 gpm for all SG.

Amendment Nos. 251 and 250

NO CHANGE ON THIS PAGE -
INCLUDED FOR INFORMATION

TS 6.4-12
05-16-08

- c. The operational LEAKAGE performance criterion is specified in TS 3.1.C and 4.13, "RCS Operational LEAKAGE."
- 3. Provisions for SG tube repair criteria. Tubes found by inservice inspection to contain flaws with a depth equal to or exceeding 40% of the nominal tube wall thickness shall be plugged.

The following alternate tube repair criteria shall be applied as an alternative to the 40% depth-based criteria:

- a. For Unit 2 Refueling Outage 21 and the subsequent operating cycle, tubes with flaws having a circumferential component less than or equal to 203 degrees found in the portion of the tube below 17 inches from the top of the tubesheet and above 1 inch from the bottom of the tubesheet do not require plugging. Tubes with flaws having a circumferential component greater than 203 degrees found in the portion of the tube below 17 inches from the top of the tubesheet and above 1 inch from the bottom of the tubesheet shall be removed from service.

Tubes with service-induced flaws located within the region from the top of the tubesheet to 17 inches below the top of the tubesheet shall be removed from service. Tubes with service-induced axial cracks found in the portion of the tube below 17 inches from the top of the tubesheet do not require plugging.

When more than one flaw with circumferential components is found in the portion of the tube below 17 inches from the top of the tubesheet and above 1 inch from the bottom of the tubesheet with the total of the circumferential components greater than 203 degrees and an axial separation distance of less than 1 inch, then the tube shall be removed from service. When the circumferential components of each of the flaws are added, it is acceptable to count the overlapped portions only once in the total of circumferential components.

When one or more flaws with circumferential components are found in the portion of the tube within 1 inch from the bottom of the tubesheet, and the total of these circumferential components exceeds 94 degrees, then the tube shall be removed from service. When one or more flaws with circumferential components are found in the portion of the tube within 1 inch from the bottom of the tubesheet and within 1 inch axial separation distance of a flaw above 1 inch from the bottom of the tubesheet, and the total of these circumferential

components exceeds 94 degrees, then the tube shall be removed from service. When the circumferential components of each of the flaws are added, it is acceptable to count the overlapped portions only once in the total of circumferential components.

- b. For Unit 1 Refueling Outage 22 and the subsequent operating cycle, tubes with flaws having a circumferential component less than or equal to 203 degrees found in the portion of the tube below 17 inches from the top of the tubesheet and above 1 inch from the bottom of the tubesheet do not require plugging. Tubes with flaws having a circumferential component greater than 203 degrees found in the portion of the tube below 17 inches from the top of the tubesheet and above 1 inch from the bottom of the tubesheet shall be removed from service.

Tubes with service-induced flaws located within the region from the top of the tubesheet to 17 inches below the top of the tubesheet shall be removed from service. Tubes with service-induced axial cracks found in the portion of the tube below 17 inches from the top of the tubesheet do not require plugging.

When more than one flaw with circumferential components is found in the portion of the tube below 17 inches from the top of the tubesheet and above 1 inch from the bottom of the tubesheet with the total of the circumferential components greater than 203 degrees and an axial separation distance of less than 1 inch, then the tube shall be removed from service. When the circumferential components of each of the flaws are added, it is acceptable to count the overlapped portions only once in the total of circumferential components.

When one or more flaws with circumferential components are found in the portion of the tube within 1 inch from the bottom of the tubesheet, and the total of these circumferential components exceeds 94 degrees, then the tube shall be removed from service. When one or more flaws with circumferential components are found in the portion of the tube within 1 inch from the bottom of the tubesheet and within 1 inch axial separation distance of a flaw above 1 inch from the bottom of the tubesheet, and the total of these circumferential components exceeds 94 degrees, then the tube shall be removed from service. When the circumferential components of each of the flaws are added, it is acceptable to count the overlapped portions only once in the total of circumferential components.

INSERT E

Insert E on page TS 6.4-13

- c. For Unit 1 Refueling Outage 22 and the subsequent operating cycle, tubes in the B steam generator with permeability variation indications that may mask flaws in the bottom one inch of the tubesheet do not require plugging.**

NO CHANGE ON THIS PAGE -
INCLUDED FOR INFORMATION

TS 6.4-13a
04-08-09

4. Provisions for SG tube inspections. Periodic SG tube inspections shall be performed. The number and portions of the tubes inspected and methods of inspection shall be performed with the objective of detecting flaws of any type (e.g., volumetric flaws, axial and circumferential cracks) that may be present along the length of the tube, from the tube-to-tubesheet weld at the tube inlet to the tube-to-tubesheet weld at the tube outlet, and that may satisfy the applicable tube repair criteria. The tube-to-tubesheet weld is not part of the tube. In addition to meeting the requirements of 4.a, 4.b, and 4.c below, the inspection scope, inspection methods, and inspection intervals shall be such as to ensure that SG tube integrity is maintained until the next SG inspection. An assessment of degradation shall be performed to determine the type and location of flaws to which the tubes may be susceptible and, based on this assessment, to determine which inspection methods need to be employed and at what locations.
 - a. Inspect 100% of the tubes in each SG during the first refueling outage following SG replacement.
 - b. Inspect 100% of the tubes at sequential periods of 120, 90, and, thereafter, 60 effective full power months. The first sequential period shall be considered to begin after the first inservice inspection of the SGs. In addition, inspect 50% of the tubes by the refueling outage nearest the midpoint of the period and the remaining 50% by the refueling outage nearest the end of the period. No SG shall operate for more than 48 effective full power months or two refueling outages (whichever is less) without being inspected.
 - c. If crack indications are found in any SG tube, then the next inspection for each SG for the degradation mechanism that caused the crack indication shall not exceed 24 effective full power months or one refueling outage (whichever is less). If definitive information, such as from examination of a pulled tube, diagnostic non-destructive testing, or engineering evaluation indicates that a crack-like indication is not associated with a crack(s), then the indication need not be treated as a crack.
5. Provisions for monitoring operational primary to secondary LEAKAGE.

NO CHANGE ON THIS PAGE—
INCLUDED FOR INFORMATION

TS 6.6-3
05-16-08

- b. The results of specific activity analysis in which the primary coolant exceeded the limits of Specification 3.1.D.4. In addition, the information itemized in Specification 3.1.D.4 shall be included in this report.

3. Steam Generator Tube Inspection Report

A report shall be submitted within 180 days after T_{avg} exceeds 200°F following completion of an inspection performed in accordance with the Specification 6.4.Q, Steam Generator (SG) Program. The report shall include:

- a. The scope of inspections performed on each SG,
- b. Active degradation mechanisms found,
- c. Nondestructive examination techniques utilized for each degradation mechanism,
- d. Location, orientation (if linear), and measured sizes (if available) of service induced indications,
- e. Number of tubes plugged during the inspection outage for each active degradation mechanism,
- f. Total number and percentage of tubes plugged to date,
- g. The results of condition monitoring, including the results of tube pulls and in-situ testing, and
- h. The effective plugging percentage for all plugging in each SG.
- i. Following completion of a Unit 2 inspection performed in Refueling Outage 21 (and any inspections performed in the subsequent operating cycle), the number of indications and location, size, orientation, whether initiated on primary or secondary side for each service-induced flaw within the thickness of the tubesheet, and the total of the circumferential components and any circumferential overlap below 17 inches from the top of the tubesheet as determined in accordance with TS 6.4.Q.3.a,

- j. Following completion of a Unit 2 inspection performed in Refueling Outage 21 (and any inspections performed in the subsequent operating cycle), the primary to secondary LEAKAGE rate observed in each steam generator (if it is not practical to assign leakage to an individual SG, the entire primary to secondary LEAKAGE should be conservatively assumed to be from one steam generator) during the cycle preceding the inspection which is the subject of the report, and
- k. Following completion of a Unit 2 inspection performed in Refueling Outage 21 (and any inspections performed in the subsequent operating cycle), the calculated accident leakage rate from the portion of the tube below 17 inches below the top of the tubesheet for the most limiting accident in the most limiting steam generator.
- l. Following completion of a Unit 1 inspection performed in Refueling Outage 22 (and any inspections performed in the subsequent operating cycle), the number of indications and location, size, orientation, whether initiated on primary or secondary side for each service-induced flaw within the thickness of the tubesheet, and the total of the circumferential components and any circumferential overlap below 17 inches from the top of the tubesheet as determined in accordance with TS 6.4.Q.3,
- m. Following completion of a Unit 1 inspection performed in Refueling Outage 22 (and any inspections performed in the subsequent operating cycle), the primary to secondary LEAKAGE rate observed in each steam generator (if it is not practical to assign leakage to an individual SG, the entire primary to secondary LEAKAGE should be conservatively assumed to be from one steam generator) during the cycle preceding the inspection which is the subject of the report, and
- n. Following completion of a Unit 1 inspection performed in Refueling Outage 22 (and any inspections performed in the subsequent operating cycle), the calculated accident leakage rate from the portion of the tube 17 inches below the top of the tubesheet for the most limiting accident in the most limiting steam generator, and

INSERT F

Insert F on page TS 6.6-3a

- o. Following completion of a Unit 1 inspection performed in Refueling Outage 22 (and any other inspections performed in the subsequent operating cycle), for the B steam generator, the number of permeability variation indications including location and total circumferential extent.**

ATTACHMENT 3

Proposed Unit 1 Technical Specifications Pages

**Surry Power Station Unit 1
Virginia Electric and Power Company
(Dominion)**

C. RCS Operational LEAKAGE**Applicability**

The following specifications are applicable to RCS operational LEAKAGE whenever Tav_g (average RCS temperature) exceeds 200°F (200 degrees Fahrenheit).

Specifications

1. RCS operational LEAKAGE shall be limited to:
 - a. No pressure boundary LEAKAGE,
 - b. 1 gpm unidentified LEAKAGE,
 - c. 10 gpm identified LEAKAGE, and
 - d. 150 gallons per day primary to secondary LEAKAGE through any one steam generator (SG), with the following exception. The primary to secondary LEAKAGE for the Unit 1 B steam generator will be limited to 20 gallons per day during Operating Cycle 23.
- 2.a. If RCS operational LEAKAGE is not within the limits of 3.1.C.1 for reasons other than pressure boundary LEAKAGE or primary to secondary LEAKAGE, reduce LEAKAGE to within the specified limits within 4 hours.
- b. If the LEAKAGE is not reduced to within the specified limits within 4 hours, the unit shall be brought to HOT SHUTDOWN within the next 6 hours and COLD SHUTDOWN within the following 30 hours.
3. If RCS pressure boundary LEAKAGE exists, or primary to secondary LEAKAGE is not within the limit specified in 3.1.C.1.d, the unit shall be brought to HOT SHUTDOWN within 6 hours and COLD SHUTDOWN within the following 30 hours.

This LCO deals with protection of the reactor coolant pressure boundary (RCPB) from degradation and the core from inadequate cooling, in addition to preventing the accident analyses radiation release assumptions from being exceeded. The consequences of violating this LCO include the possibility of a loss of coolant accident (LOCA).

APPLICABLE SAFETY ANALYSES - Except for primary to secondary LEAKAGE, the safety analyses do not address operational LEAKAGE. However, other operational LEAKAGE is related to the safety analyses for LOCA; the amount of leakage can affect the probability of such an event. The safety analysis for an event resulting in steam discharge to the atmosphere assumes that primary to secondary LEAKAGE from all steam generators (SGs) is 1 gpm or increases to 1 gpm as a result of accident induced conditions. The LCO requirement to limit primary to secondary LEAKAGE through any one SG to less than or equal to 150 gallons per day is significantly less than the conditions assumed in the safety analysis. Due to the permeability variation indications in the Unit 1 B steam generator found during Refueling Outage 22, the primary to secondary leak rate for that steam generator is limited to 20 gallons per day for Operating Cycle 23.

Primary to secondary LEAKAGE is a factor in the dose releases outside containment resulting from a main steam line break (MSLB) accident. Other accidents or transients involve secondary steam release to the atmosphere, such as a steam generator tube rupture (SGTR). The leakage contaminates the secondary fluid.

The UFSAR (Ref. 2) analysis for SGTR assumes the contaminated secondary fluid is released via power operated relief valves or safety valves. The source term in the primary system coolant is transported to the affected (ruptured) steam generator by the break flow. The affected steam generator discharges steam to the environment for 30 minutes until the generator is manually isolated. The 1 gpm primary to secondary LEAKAGE transports the source term to the unaffected steam generators. Releases continue through the unaffected steam generators until the Residual Heat Removal System is placed in service.

The MSLB is less limiting for site radiation releases than the SGTR. The safety analysis for the MSLB accident assumes 1 gpm total primary to secondary LEAKAGE, including 500 gpd leakage into the faulted generator. The dose consequences resulting from the MSLB and the SGTR accidents are within the limits defined in the plant licensing basis.

The RCS operational LEAKAGE satisfies Criterion 2 of 10 CFR 50.36(c)(2)(ii).

LIMITING CONDITIONS FOR OPERATION - RCS operational LEAKAGE shall be limited to:

a. Pressure Boundary LEAKAGE

No pressure boundary LEAKAGE is allowed, being indicative of material deterioration. LEAKAGE of this type is unacceptable as the leak itself could cause further deterioration, resulting in higher LEAKAGE. Violation of this LCO could result in continued degradation of the RCPB. LEAKAGE past seals and gaskets is not pressure boundary LEAKAGE.

b. Unidentified LEAKAGE

One gallon per minute (gpm) of unidentified LEAKAGE is allowed as a reasonable minimum detectable amount that the containment air monitoring and containment sump level monitoring equipment can detect within a reasonable time period. Violation of this LCO could result in continued degradation of the RCPB, if the LEAKAGE is from the pressure boundary.

c. Identified LEAKAGE

Up to 10 gpm of identified LEAKAGE is considered allowable because LEAKAGE is from known sources that do not interfere with detection of unidentified LEAKAGE and is well within the capability of the RCS Makeup System. Identified LEAKAGE includes LEAKAGE to the containment from specifically known and located sources, but does not include pressure boundary LEAKAGE or controlled reactor coolant pump (RCP) seal leakoff (a normal function not considered LEAKAGE). Violation of this LCO could result in continued degradation of a component or system.

d. Primary to Secondary LEAKAGE through Any One SG

The limit of 150 gallons per day per SG is based on the operational LEAKAGE performance criterion in NEI 97-06, Steam Generator Program Guidelines (Ref. 3). The Steam Generator Program operational LEAKAGE performance criterion in NEI 97-06 states, "The RCS operational primary to secondary leakage through any one SG shall be limited to 150 gallons per day." The limit is based on operating experience with SG tube degradation mechanisms that result in tube leakage. The operational leakage rate criterion in conjunction with the implementation of the Steam Generator Program is an effective measure for minimizing the frequency of steam generator tube ruptures. Due to the permeability variation indications in the Unit 1 B steam generator found during Refueling Outage 22, the primary to secondary leak rate for that steam generator is limited to 20 gallons per day for Operating Cycle 23.

APPLICABILITY - In REACTOR OPERATION conditions where T_{avg} exceeds 200°F, the potential for RCPB LEAKAGE is greatest when the RCS is pressurized.

In COLD SHUTDOWN and REFUELING SHUTDOWN, LEAKAGE limits are not required because the reactor coolant pressure is far lower, resulting in lower stresses and reduced potentials for LEAKAGE.

LCO 3.1.C.5 measures leakage through each individual pressure isolation valve (PIV) and can impact this LCO. Of the two PIVs in series in each isolated line, leakage measured through one PIV does not result in RCS LEAKAGE when the other is leaktight. If both valves leak and result in a loss of mass from the RCS, the loss must be included in the allowable identified LEAKAGE.

4.13 RCS OPERATIONAL LEAKAGE

Applicability

The following specifications are applicable to RCS operational LEAKAGE whenever T_{avg} (average RCS temperature) exceeds 200°F (200 degrees Fahrenheit):

Objective

To verify that RCS operational LEAKAGE is maintained within the allowable limits.

Specifications

- A. Verify RCS operational LEAKAGE is within the limits specified in TS 3.1.C by performance of RCS water inventory balance once every 24 hours.^{1, 2}
- B. Verify primary to secondary LEAKAGE is ≤ 150 gallons per day through any one SG once every 72 hours, with the following exception. The primary to secondary LEAKAGE for the Unit 1 B steam generator will be verified to be ≤ 20 gallons per day during Operating Cycle 23.¹

Notes:

- 1. Not required to be completed until 12 hours after establishment of steady state operation.
- 2. Not applicable to primary to secondary LEAKAGE.

BASES

SURVEILLANCE REQUIREMENTS (SR)

SR 4.13.A

Verifying RCS LEAKAGE to be within the Limiting Condition for Operation (LCO) limits ensures the integrity of the reactor coolant pressure boundary (RCPB) is maintained. Pressure boundary LEAKAGE would at first appear as unidentified LEAKAGE and can only be positively identified by inspection. It should be noted that LEAKAGE past seals and gaskets is not pressure boundary LEAKAGE. Unidentified LEAKAGE and identified LEAKAGE are determined by performance of an RCS water inventory balance.

The RCS water inventory balance must be performed with the reactor at steady state operating conditions (stable pressure, temperature, power level, pressurizer and makeup tank levels, makeup and letdown, and RCP seal injection and return flows). The surveillance is modified by two notes. Note 1 states that this SR is not required to be completed until 12 hours after establishing steady state operation. The 12 hour allowance provides sufficient time to collect and process all necessary data after stable unit conditions are established.

Steady state operation is required to perform a proper inventory balance since calculations during maneuvering are not useful. For RCS operational LEAKAGE determination by water inventory balance, steady state is defined as stable RCS pressure, temperature, power level, pressurizer and makeup tank levels, makeup and letdown, and RCP seal injection and return flows.

An early warning of pressure boundary LEAKAGE or unidentified LEAKAGE is provided by the automatic systems that monitor the containment atmosphere radioactivity and the containment sump level. It should be noted that LEAKAGE past seals and gaskets is not pressure boundary LEAKAGE. These leakage detection systems are specified in the TS 3.1.C Bases.

Note 2 states that this SR is not applicable to primary to secondary LEAKAGE because LEAKAGE of 150 gallons per day cannot be measured accurately by an RCS water inventory balance.

The 24 hour frequency is a reasonable interval to trend LEAKAGE and recognizes the importance of early leakage detection in the prevention of accidents.

SR 4.13.B

This SR verifies that primary to secondary LEAKAGE is less than or equal to 150 gallons per day through any one SG, with the following exception. The primary to secondary LEAKAGE for the Unit 1 B steam generator will be limited to 20 gallons per day during Operating Cycle 23. Satisfying the primary to secondary LEAKAGE limit ensures that the operational LEAKAGE performance criterion in the Steam Generator Program is met. If this SR is not met, compliance with LCO 3.1.H, "Steam Generator Tube Integrity," should be evaluated. The 150 gallons per day limit is measured at room temperature as described in Reference 4. The operational LEAKAGE rate limit applies to LEAKAGE through any one SG.

If it is not practical to assign the LEAKAGE to an individual SG, all the primary to secondary LEAKAGE should be conservatively assumed to be from one SG; for Unit 1 that leakage should be assumed to be through the B steam generator for Operating Cycle 23. The surveillance is modified by a Note, which states that the Surveillance is not required to be performed until 12 hours after establishment of steady state operation. For RCS primary to secondary LEAKAGE determination, steady state is defined as stable RCS pressure, temperature, power level, pressurizer and makeup tank levels, makeup and letdown, and RCP seal injection and return flows.

The surveillance frequency of 72 hours is a reasonable interval to trend primary to secondary LEAKAGE and recognizes the importance of early leakage detection in the prevention of accidents. The primary to secondary LEAKAGE is determined using continuous process radiation monitors or radiochemical grab sampling in accordance with the EPRI guidelines (Ref. 4).

REFERENCES

1. UFSAR, Chapter 4, Surry Units 1 and 2.
2. UFSAR, Chapter 14, Surry Units 1 and 2.
3. NEI 97-06, "Steam Generator Program Guidelines."
4. EPRI, "Pressurized Water Reactor Primary-to-Secondary Leak Guidelines."

components exceeds 94 degrees, then the tube shall be removed from service. When the circumferential components of each of the flaws are added, it is acceptable to count the overlapped portions only once in the total of circumferential components.

- b. For Unit 1 Refueling Outage 22 and the subsequent operating cycle, tubes with flaws having a circumferential component less than or equal to 203 degrees found in the portion of the tube below 17 inches from the top of the tubesheet and above 1 inch from the bottom of the tubesheet do not require plugging. Tubes with flaws having a circumferential component greater than 203 degrees found in the portion of the tube below 17 inches from the top of the tubesheet and above 1 inch from the bottom of the tubesheet shall be removed from service.

Tubes with service-induced flaws located within the region from the top of the tubesheet to 17 inches below the top of the tubesheet shall be removed from service. Tubes with service-induced axial cracks found in the portion of the tube below 17 inches from the top of the tubesheet do not require plugging.

When more than one flaw with circumferential components is found in the portion of the tube below 17 inches from the top of the tubesheet and above 1 inch from the bottom of the tubesheet with the total of the circumferential components greater than 203 degrees and an axial separation distance of less than 1 inch, then the tube shall be removed from service. When the circumferential components of each of the flaws are added, it is acceptable to count the overlapped portions only once in the total of circumferential components.

When one or more flaws with circumferential components are found in the portion of the tube within 1 inch from the bottom of the tubesheet, and the total of these circumferential components exceeds 94 degrees, then the tube shall be removed from service. When one or more flaws with circumferential components are found in the portion of the tube within 1 inch from the bottom of the tubesheet and within 1 inch axial separation distance of a flaw above 1 inch from the bottom of the tubesheet, and the total of these circumferential components exceeds 94 degrees, then the tube shall be removed from service. When the circumferential components of each of the flaws are added, it is acceptable to count the overlapped portions only once in the total of circumferential components.

- c. For Unit 1 Refueling Outage 22 and the subsequent operating cycle, tubes in the B steam generator with permeability variation indications that may mask flaws in the bottom one inch of the tubesheet do not require plugging.

- j. Following completion of a Unit 2 inspection performed in Refueling Outage 21 (and any inspections performed in the subsequent operating cycle), the primary to secondary LEAKAGE rate observed in each steam generator (if it is not practical to assign leakage to an individual SG, the entire primary to secondary LEAKAGE should be conservatively assumed to be from one steam generator) during the cycle preceding the inspection which is the subject of the report, and
- k. Following completion of a Unit 2 inspection performed in Refueling Outage 21 (and any inspections performed in the subsequent operating cycle), the calculated accident leakage rate from the portion of the tube below 17 inches below the top of the tubesheet for the most limiting accident in the most limiting steam generator.
- l. Following completion of a Unit 1 inspection performed in Refueling Outage 22 (and any inspections performed in the subsequent operating cycle), the number of indications and location, size, orientation, whether initiated on primary or secondary side for each service-induced flaw within the thickness of the tubesheet, and the total of the circumferential components and any circumferential overlap below 17 inches from the top of the tubesheet as determined in accordance with TS 6.4.Q.3,
- m. Following completion of a Unit 1 inspection performed in Refueling Outage 22 (and any inspections performed in the subsequent operating cycle), the primary to secondary LEAKAGE rate observed in each steam generator (if it is not practical to assign leakage to an individual SG, the entire primary to secondary LEAKAGE should be conservatively assumed to be from one steam generator) during the cycle preceding the inspection which is the subject of the report,
- n. Following completion of a Unit 1 inspection performed in Refueling Outage 22 (and any inspections performed in the subsequent operating cycle), the calculated accident leakage rate from the portion of the tube 17 inches below the top of the tubesheet for the most limiting accident in the most limiting steam generator, and

- o. Following completion of a Unit 1 inspection performed in Refueling Outage 22 (and any other inspections performed in the subsequent operating cycle), for the B steam generator, the number of permeability variation indications including location and total circumferential extent.

ATTACHMENT 4

Westinghouse Letter LTR-SGMP-09-63, dated May 4, 2009

**Virginia Electric and Power Company
(Dominion)
Surry Power Station Unit 1**

Westinghouse Non-Proprietary Class 3



Westinghouse

To: D. Rogosky
C. Nitchman

Date: May 4, 2009

cc: D.A. Testa
C.D. Cassino

G.W. Whiteman
J.T. Kandra

From: Steam Generator Management Programs
Ext: 724-722-5082
Fax: 724-722-5889

Your ref:
Our ref: LTR-SGMP-09-63

Subject: **Assessment of Tube-end Indications at Surry Unit 1**

Reference:

This letter documents an effort performed at the request of Dominion (Surry Unit 1) to provide a technical basis to support an emergency change request to the plant's technical specifications. Specifically, during the April-May 2009 inspection of Surry Unit 1, permeability variations were found at the tube-ends during the inspection to satisfy the conditions of the Interim Alternate Repair Criteria which were licensed for use at Surry. Permeability variation signals may mask real indications of degradation; therefore, if not resolved by Eddy Current techniques, the permeability signals must be considered real degradation. This evaluation addresses such a condition. Information was provided by the plant regarding the results of the inspection and this evaluation is based in part on that information.

Please transmit this evaluation to Dominion (Surry Unit 1) through normal project channels.

Hermann O. Lagally*
Fellow Engineer / SGMP

Christopher D. Cassino*
Senior Engineer / SGMP

Surry Unit 1: Justification for Leaving Tubes with Tube-end Permeability Signals In Service

References

1. LTR-CDME-08-11, "Interim Alternate Repair Criterion (IARC) for Cracks in the Lower Region of the Tubesheet Expansion Zone", Westinghouse Electric Company, LLC, January 31, 2008
2. LTR-CDME-08-43, Revision 3, "Response to NRC Request for Additional Information Relating to LTR-CDME-08-11, Revision 3 P-Attachment", Westinghouse Electric Company, LLC, June 3, 2008.
3. ASME Boiler and Pressure Vessel Code, Section III, "Rules for Construction of Nuclear Power Plant Components," The American Society of Mechanical Engineers, New York, NY, 1989
4. West-13-402, Revision 1, "An Evaluation of the Statistical Variability in the Coefficient of Thermal Expansion Properties of SA508 and Alloy 600," Structural Integrity Associates, Inc., Centennial, CO, December 2008.
5. Mark's Standard Handbook for Mechanical Engineers, 10th Ed., Editors: E.A. Avallone, T. Baumeister III, 2007.

A. Introduction

During the spring 2009 inspection at Surry Unit 1, under the inspection program required to implement the Interim Alternate Repair Criteria (Reference 1 and Reference 2) for the tubesheet expansion region, multiple permeability variation signals were reported at the tube-ends in SG-B. Permeability variations are not degradation of the tube material; however, if the permeability variations cannot be resolved by eddy current techniques, they may mask signals of real degradation. Therefore, if unresolved, these indications must be treated as if they are indications of actual degradation. The permeability variations were reported at approximately 0.2 inches above the tube ends, consistent with the location of axial and circumferential tube end indications reported at other plants that have applied the IARC. Because the permeability variations may mask signals that would require plugging many of the tubes with these signals, it is necessary to perform an engineering evaluation of this condition.

The data provided for this evaluation was principally through verbal communication which indicated that a large number of tubes in SG-B exhibited permeability indications of circumferential extent exceeding the criteria established in the IARC. Indeed, the indications were stated to be greater than 270° circumferential extent. For this evaluation, it is assumed that the permeability indications are 100% throughwall circumferential cracks.

References 1 and 2 provided the technical basis for the Interim Alternate Repair Criteria (IARC) for potential degradation in the lower end of the tubesheet expansion region. The underlying basis of the IARC was that no credit was taken for interaction forces between the tubes and the tubesheet to restrain the tube from pullout from the tubesheet. Axial restraint of the tubes was entirely dependent on showing that a sufficient circumferential ligament remained in the structural load path to restrain the tube from axial motion. Criteria for permissible circumferential flaws were established that apply to either the tube or the

tube-end weld. The most limiting criterion applies to the tube-end weld, which requires plugging a tube with a circumferential indication greater than 94 degrees.

The basis for the underlying assumption of zero restraining forces due to tube to tubesheet contact was uncertainty regarding whether tube to tubesheet contact forces could exist. From prior analyses, the principal source of tube interaction forces was believed to be differential thermal growth between the tube and the tubesheet. While this was supported by conventional data sources (Reference 3) for coefficient of thermal expansion, some alternate data suggested that it might be possible for the tubesheet material (SA508) coefficient of thermal expansion (CTE) to exceed that of the tubing material (A600). This issue was extensively studied in CTE tests of both materials and it was concluded that the use of the data from Reference 3 was applicable and conservative. Use of the alternate data could not be supported. The results of this study are documented in Reference 4.

Because a viable basis for thermal interaction forces between the tube and tubesheet exists as a result of the verification of the CTE of the tubesheet and tube materials, the underlying assumption of the IARC appears to be overly conservative. Consequently, a study was performed to relate the required circumferential ligament to retain the tube in the tubesheet to assumed values of available retarding forces due to tube to tubesheet interaction and to validate the assumed values of retarding forces by an independent analysis of thermal interaction forces. The results of this evaluation are contained in the following sections.

B. Inspection Experience for Tube-End Indications

It is extremely unlikely that the permeability variation reported at Surry Unit 1 represent actual tube end degradation. Tube end inspections have been performed by a number of operating plants that have applied the IARC since the spring outages in 2008, including Surry Unit 2. Compared to the number of tube ends inspected, the reported number of tube end indications is small. Among the tube end indications reported, the large majority are axially oriented. Axial flaws in the lower 4 inches of the tubes are acceptable for continued operation in accordance with the requirements of the IARC. Among the circumferential indications reported, only a small fraction of them have exceeded the 94° circumferential extent limit specified by the IARC for indications at, or near, the tube ends. Almost all reported indications have been within 0.3 inch of the tube-end with isolated occurrences at greater distances up to 0.7 inch. No indications have been reported by any plant above 1 inch above the tube end. Similarly, the indications at Surry Unit 1 were located predominantly below 0.3 inch from the tube-end with very few exceptions.

C. Required Structural Ligament as a Function of External Retaining Forces

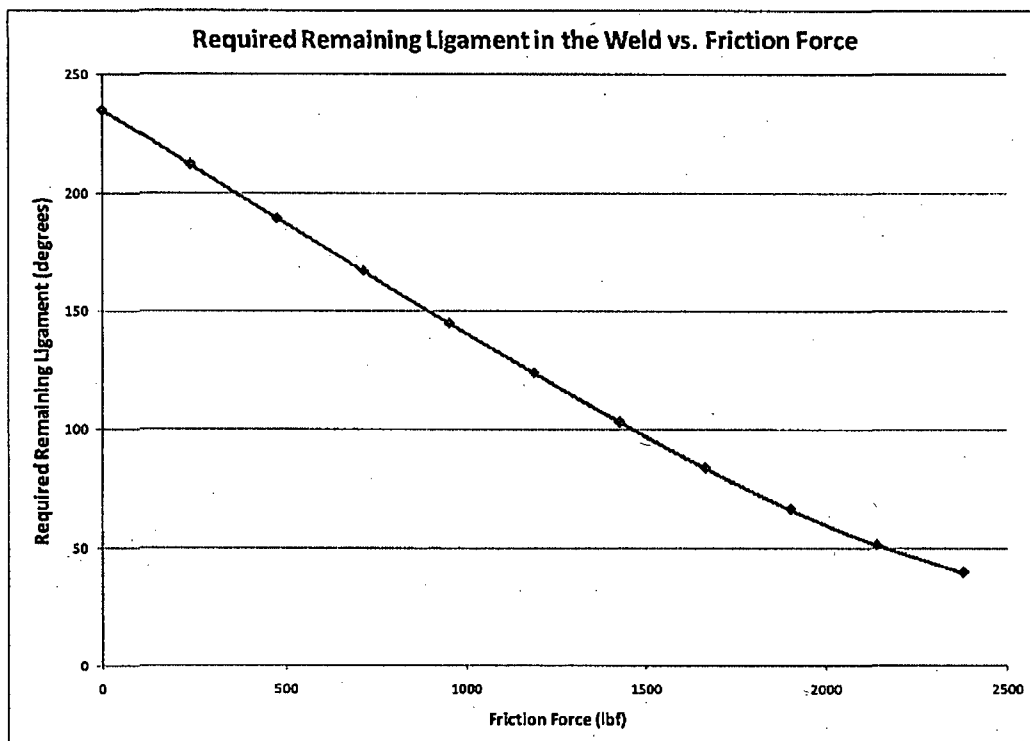
References 1 and 2 provided a calculation of the minimum circumferential ligament required in the tube-proper and in the tube-end weld to restrain the tube from pullout under loading prescribed by the structural integrity performance criteria of NEI 97-06, Revision 2 conservatively applied to the postulated condition of a throughwall circumferential crack at, or near, the tube end. The conclusions documented in Reference 2 were that tubes with circumferential cracks in the tube-end weld should be plugged if their circumferential extent is 94°, and that circumferential cracks in the tube a distance removed from the tube-end with circumferential extent of 203° would require plugging the tube. These values included a growth allowance of 31° for an operating cycle of 18 months; therefore the as-found minimum remaining

ligaments required to meet the structural performance criteria are 235° ($=360^\circ-94^\circ-31^\circ$) in the weld and 126° ($=360^\circ-203^\circ-31^\circ$) in the tube-proper. It is noted that this analysis assumed 100% throughwall conditions for all circumferential flaws.

An analysis was performed using the same methods described in References 1 and 2 to evaluate the required circumferential ligaments if external pullout resisting forces were present. In this analysis, it was assumed that the $3\Delta P_{NOP}$ (4800 psi) loading was applied to the crack face of the postulated cracks, but the axial pull-out forces (i.e., end-cap loads) were reduced by an external retarding force assumed to be the result of tube to tubesheet interaction forces. Identically the same parameters used in References 1 and 2 for 0.875 inch (nominal) tubing diameter with 0.050 inch (nominal) wall thickness were used in this evaluation.

Figure 1 shows the results of this evaluation. With zero external retarding force, the figure shows the required ligament of 235° circumferential extent. As the external retarding force is increased, the required ligament decreases as expected. The figure terminates at approximately 40° required ligament because at this point the external forces are equal to the applied end cap loading under a 4800 psi pressure differential ($3 \times \Delta P_{NOP} = 3 \times 1600 \text{ psi} = 4800 \text{ psi}$) across the tubes. However, it is still assumed that the 4800 psi loading is applied to the face of the postulated crack; therefore, a further increase of external retarding forces is required to equilibrate the crack face loading. All axial loads that would tend to cause tube ejections are equilibrated with an external retarding force of about 3200 lbf based on the same dimensional parameters used in References 1 and 2.

Figure 1



D. Tube to Tubesheet Interaction Forces and Pullout Resisting Force

Contact pressures between the tube and tubesheet are available from an independent analysis of the Model 51F tubesheet complex (channelhead, tubesheet, stub barrel) specific to the Surry plants. This analysis utilizes a comprehensive 3-dimensional (3D) finite element structural model to determine the interaction between the tubes and the tubesheet. Multiple different operating conditions were considered in this analysis, and it was determined that the condition that provides the least contact pressures in the Surry Unit 1 SG is at normal operating conditions (NOP), Low Tavg (Primary Fluid Temperature = 593.7 °F, $\Delta P = 1463$ psi). Because the IARC applies only to the lower 4 inches of the tubesheet, contact pressures for the lower 4 inches of the tube were calculated. Table 1 summarizes the unit length contact pressures for axial increments measured from the bottom of the tubesheet for approximately 4 inches.

Also included in Table 1 are the incremental axial forces resisting tube pullout and the cumulative axial forces resisting pullout based on a conservative coefficient of friction of 0.2. The equation for calculating axial force is shown in note 1 of the table. It is assumed that a 360° circumferential throughwall flaw exists at the tube end. Over the first inch of tube, the predicted contact pressure yields an axial restraining force of 1368 lbs. If it is assumed that all flaws are located at or below 0.5 inch from the tube-end, the incremental resisting force is reduced in the first increment from the tube end.

The coefficient of friction of 0.2 is a lower bounding value based on the open literature. This value is more conservative than the published value for greased Nickel on steel (Reference 5).

It is concluded from Table 1 that axial friction forces accumulate rapidly primarily due to differential thermal expansion using a conservative value of coefficient of friction, and that the assumption of zero resisting forces is excessively conservative. The results in Table 1 are bounding for all tubes in the bundle as they were developed for the limiting tube radius in the limiting sector of the tube bundle. All other tube location will have greater axial forces resisting tube pullout.

Table 1
Predicted Axial Restraining Force from Tube to Tubesheet Interaction

Location from Bottom of Tubesheet (inch)	Contact Pressure (Pc) (psi)	Coefficient of Friction (μ)	Incremental Axial Restraining Force (Fr) (lbs) ⁽¹⁾	Incremental Axial Restraining Force Adjusted for Flaw Location (lbs) ⁽³⁾	Cumulative Axial Restraining Force Adjusted for Flaw Location (lbs)
0	0	0.2	0	0	0
1	2534		1386	693	693
2	2463		1349	1349	2042
4	2359		2827 ⁽²⁾	2827 ⁽²⁾	4869

Notes:

1. $Fr = \mu * (\pi * d * \Delta l * Pc)$, where Fr is the resisting axial force, d is the effective tube diameter and Δl is the incremental length of tube.
2. This value is the Incremental restraining force from 2 inches to 4 inches above the bottom of the tubesheet
3. Flaw located ≤0.5 inch above the tube end

An alternate approach is available based on the same analysis discussed above. The minimum incremental contact pressure for all tubes in the bundle at all axial locations in the tubesheet was predicted to be 928 psi for the limiting operating conditions noted above. The contact pressure varies axially because of integral tubesheet displacement effects due to thermal and pressure loading. This value of contact pressure was validated by a separate 2-dimensional (2D) finite element analysis using the same tubesheet displacement at the location of the minimum contact pressure value from the 3D FEA analysis. The 2D model predicted a value of contact pressure of 877 psi, in close agreement with the 3D analysis results. If a value of contact pressure of 900 psi (approximately the average of the two predictions) is used, the resulting pullout resistance for the unit increment (1 inch) is 506 lbf/inch. If there are 17 inches of undegraded tube available – the basis of the IARC – the minimum pullout resisting force is calculated to be 8602 lbf. If a conservative allowance of 1 inch is made for uncertainty regarding the first point of contact between the tube and the tubesheet at the top of the tubesheet, the pullout resisting force is 8096 lbf.

It can also be shown, based on the 3D FEA discussed above, that a relatively short length of undegraded tubing, measured from the top of the tubesheet, will equilibrate the maximum loads applied to the tubes in accordance with the performance requirements of NEI 97-06, Revision 2. Contact pressures are predicted over the entire length of the tube in the tubesheet expansion region. If the resulting pullout resisting forces are integrated over the length of the tubing from the top of the tubesheet, it is predicted that the applied load, including all applicable safety factors specified in NEI 97-06, Revision 2, will be effectively resisted by a length of undegraded tube of approximately 6.5 inches when the minimum contact pressure at the limiting position in the bundle is used as the basis of the calculation. RPC inspection of a 20% sample of tubes that exhibited tube end permeability signals in SG-B at Surry Unit 1 confirmed that the tubes are free of defects in the entire length of the tubesheet expansion region. Therefore, a safety factor of greater than 2.5 against tube pullout is available, even if degradation is assumed in the tube below 17 inches from the top of the tubesheet.

E. Impact on SG Reliability

The principal intent of the performance criteria of NEI 97-06, Revision 2 is to establish margins against tube burst. A factor of safety of 3 is applied for normal operating loads and a factor of 1.4 is applied for accident condition loads to assure that tube burst does not occur. Accident induced leakage is limited to 470 gpd at Surry Unit 1, consistent with the leakage value assumed in the safety analysis.

Under the IARC, the acceptable extent of circumferential flaws is established to prevent tube pullout. Similarly, a leakage factor of 2.5 is established which is the ratio of the accident induced leakage to the observed normal operating leakage. Application of the leakage factor may lead to adjustment of the administrative leakage limit depending on the plant licensing basis or if a source of leakage other than from the tubesheet region exist in the SGs.

Tube burst is not possible within the tubesheet expansion region due to the constraint provided by the tubesheet. However, for a postulated 360° circumferential throughwall flaw, the potential for tube pullout is held equivalent to tube burst. Tube pullout for a postulated 360° circumferential throughwall flaw near the tube-end is not possible. It has been shown by the argument above that significant margins against tube pullout exist due to structural interaction between the tube and tubesheet even for a postulated 360° circumferential throughwall flaw. These margins are in addition to the inherent margins due to the load

requirements form the performance criteria. Further, the additional margins apply specifically to the limiting radius in the limiting sector of the tubesheet. All other locations have significantly greater margins. Therefore, for a postulated 360° circumferential throughwall flaws at the tube-ends, there is negligible potential for tube pullout, or tube burst, to occur.

The leakage factor and its application to Condition Monitoring and Operational Assessment as prescribed in the IARC are not affected by the postulate of a 360° circumferential throughwall flaw near the tube end. The factor applies to leakage observed from the tubesheet region of the SG without regard to the flaws that result in leakage. If no leakage is observed, no accident induced leakage will be predicted from the tubesheet region. If leakage due to flaws in the lowermost 4 inches of the tubesheet region is observed, the leakage factor is applied as specified in the IARC. Since the leakage factor does not assume any specific type of flaw, a postulated 360° circumferential throughwall flaw near the tube end will not affect the factor. Therefore, it is concluded that there is no potential for increased accident induced leakage if the factor is applied as specified in the IARC.

F. Summary and Conclusions

1. It has been shown by materials testing that thermally induced contact pressures exist between the tubes and the tubesheet bores. The hydraulic expansion process utilized in the manufacture of the Surry SGs provides line on line contact between the tube and tubesheet bore surfaces as a minimum. Therefore, the assumption underlying the IARC – that no friction forces exist to restrain the tube from pullout – is excessively conservative.
2. The limiting criterion established under the IARC - 94° throughwall circumferential flaw at the tube end- is highly sensitive to the available pullout resisting forces. The allowable circumferential extent increases rapidly if mechanical pullout resisting forces are present.
3. An external pullout resisting force of approximately 3200 lbf permits the acceptable circumferential extent of a throughwall flaw at the tube-end to be 360°.
4. Detailed 3D FEA analyses predict that an axial pullout resisting force of approximately 4869 lbf exists due to thermal interaction and pressure loading in the first 4 inches from the tube-end, assuming that all potential flaws are located at, or less than, 0.5 inch from the tube-end. Therefore, the predicted external retarding forces in less than the first 4 inches from the tube end are sufficient to prevent tube pullout.
5. Using the minimum predicted contact pressure for any radial or axial position in the tube bundle, the resulting pullout resisting force is 506 lbf/in. Therefore, approximately 6.5 inches of undegraded tubing above a potential circumferential flaw are required to permit the acceptable circumferential extent of a postulated flat to be 360°. Because the minimum predicted axially located contact pressure is used, this conclusion applies for a postulated circumferential flaw at the tube end, and provides reasonable validation of conclusion 4 above.
6. The methods utilized to assess are based on conservative assumptions and inputs and the results represent the most limiting tube location in the tube bundle. All other locations will have additional margin than shown for the most limiting bundle condition.

7. Full depth inspection of a significant sample (20%) of the tubes with permeability signals at the tube-ends has shown that the tubes are free of degradation. Therefore, the results of the evaluation of the external retarding forces are applicable for the tubes with permeability variations at the tube-ends.
8. There is no impact on structural reliability of the SG because sufficient retarding forces are shown to exist to prevent tube pullout under the assumption that a 360 degree circumferential throughwall flaw exists at, or near, the tube-ends.
9. There is no impact on leakage reliability of the steam generator. The leakage factor provided in the licensed IARC for the lowermost 4 inches of the tubesheet does not depend on the source of the leakage in the tubesheet. Therefore, the leakage factor specified in the IARC is not impacted.
10. The structural and leakage performance criteria of NEI 97-06, Revision 2 are satisfied based on this analysis. Tube pullout (assumed to be equivalent to tube burst) cannot occur as a result of the external loading that resists tube motion due to thermal and pressure lockup, including application of the factors of safety specified in NEI 97-06, Revision 2. Application of the leakage factor and appropriate adjustment of the administrative shutdown leakage limit, if necessary, will assure that accident induced leakage does not exceed the leakage assumed on the Surry Unit 1 safety analysis.

ATTACHMENT 5

**Summary of Unit 1 SG Linear Indications,
Tube Maps of Permeability Variation Indications, and
Summary of Permeability Variation Indications**

**Virginia Electric and Power Company
(Dominion)
Surry Power Station Unit 1**

Unit 1 Steam Generator Linear Indications

Refueling Outage R22

A Steam Generator Linear Indications

SG ID	Row	Column	Indication	Volts	Location	Extent
1A	1	5	SAS	2.12	TEH + 0.10	0.22
1A	1	34	SAS	2.93	TEH + 0.13	0.19
1A	1	38	SAS	4.82	TEH + 0.11	0.36
1A	1	49	SCI	1.67	TEH + 0.02	174
1A			SCI	2.62	TEH + 0.03	
1A	1	55	SAS	6.79	TEH + 0.11	0.25
1A	1	57	SAS	2.24	TEH + 0.10	0.28
1A	1	63	SAS	0.96	TEH + 0.08	0.17
1A	1	64	SAS	3.66	TEH + 0.06	0.25
1A	2	31	SCS	0.95	TEH + 0.02	38
1A	2	34	SAS	2.67	TEH + 0.08	0.25
1A	2	62	SAS	2.31	TEH + 0.08	0.24
1A	2	63	SAS	3.41	TEH + 0.08	0.36
1A	3	52	SAS	1.58	TEH + 0.11	0.3
1A	6	61	SCI	1.34	TEH + 0.05	118
1A			SCI	1.21	TEH + 0.04	
1A	7	59	SCS	0.73	TEH + 0.06	31
1A	8	56	SCS	1.67	TEH + 0.05	31
1A	8	58	SCS	1.15	TEH + 0.04	45
1A	9	33	MAS	3.13	TEH + 0.11	0.18
1A	9	59	SCS	4.04	TEH + 0.02	80
1A			SCS	0.75	TEH + 0.05	
1A	9	69	MAS	2.57	TEH + 0.12	0.15
1A	10	51	SCS	1.48	TEH + 0.00	91
1A	11	44	SCS	1.11	TEH + 0.06	28
1A	11	51	SCS	1.03	TEH + 0.01	35
1A	11	54	SCS	2.63	TEH + 0.05	38
1A	12	53	SCS	1.32	TEH + 0.04	49
1A	12	55	SCI	2.33	TEH + 0.02	178
1A	13	49	SCS	0.99	TEH + 0.02	38
1A	13	51	SCS	3.78	TEH + 0.02	42
1A	13	52	SCS	1.47	TEH + 0.05	28
1A	13	55	SCI	6.59	TEH + 0.01	171
1A			SCI	2.82	TEH + 0.01	
1A	13	57	SCS	3.96	TEH + 0.04	35
1A	14	33	SCS	0.86	TEH + 0.00	31
1A	14	55	SCI	1.91	TEH + 0.07	114
1A			SCI	1.23	TEH + 0.08	
1A			SCI	0.85	TEH + 0.06	
1A	14	58	SCS	4.51	TEH + 0.05	76
1A	15	51	SCS	0.73	TEH + 0.01	77
1A			SCS	0.47	TEH + 0.02	
1A	16	35	SCS	1.83	TEH + 0.01	45
1A	18	55	SCS	0.98	TEH + 0.05	84
1A	18	58	SCS	2.09	TEH + 0.04	45
1A	19	57	SCS	1.4	TEH + 0.05	59
1A	19	62	SCI	0.8	TEH + 0.34	164
1A	23	49	SCI	3.56	TEH + 0.02	118
1A			SCI	0.51	TEH + 0.03	
1A	24	51	SCS	1.23	TEH + 0.05	59
1A	25	48	SCS	1.19	TEH + 0.05	70
1A	26	57	SCS	0.98	TEH + 0.05	77

A Steam Generator Linear Indications
Tube Row 9 Column 69

SG ID	Row	Column	Volts	%Thru-Wall	Location
1A	9	69	0.00	0	TSH-0.29
1A	9	69	0.16	89	TSH-0.27
1A	9	69	0.24	88	TSH-0.24
1A	9	69	0.34	93	TSH-0.21
1A	9	69	0.49	98	TSH-0.19
1A	9	69	0.62	100	TSH-0.18
1A	9	69	0.91	80	TSH-0.13
1A	9	69	1.60	76	TSH-0.11
1A	9	69	2.62	88	TSH-0.08
1A	9	69	3.68	96	TSH-0.05
1A	9	69	4.25	96	TSH-0.02
1A	9	69	4.51	92	TSH-0.00
1A	9	69	4.24	92	TSH+0.03
1A	9	69	3.36	84	TSH+0.06
1A	9	69	2.46	69	TSH+0.08
1A	9	69	1.52	59	TSH+0.11
1A	9	69	1.07	62	TSH+0.14
1A	9	69	0.72	76	TSH+0.16
1A	9	69	0.47	99	TSH+0.19
1A	9	69	0.38	97	TSH+0.22
1A	9	69	0.32	92	TSH+0.24
1A	9	69	0.22	97	TSH+0.27
1A	9	69	0.00	0	TSH+0.30

B Steam Generator Linear Indications

SG ID	Row	Column	Indication	Volts	Location	Extent
1B	1	48	SCS	3.02	TEH + 0.07	52
1B	4	40	SCS	0.86	TEH + 0.12	38
1B	4	44	MCS	1.71	TEH + 0.06	63
1B	5	42	MCS	2.15	TEH + 0.00	63
1B	6	12	SCS	1.37	TEH + 0.09	56
1B	6	45	SCS	1.99	TEH + 0.11	45
1B	6	47	SCS	1.53	TEH + 0.09	45
1B	17	46	SCS	1.27	TEH + 0.11	87
1B	18	41	SCS	1.13	TEH + 0.07	31

C Steam Generator Linear Indications

SG ID	Row	Column	Indication	Volts	Location	Extent
1C	1	16	SCS	1.15	TEH + 0.02	35
1C	1	29	SCS	0.89	TEH + 0.03	38
1C	1	34	SCS	0.99	TEH + 0.10	31
1C	1	37	SCI	0.66	TEH + 0.06	188
1C	1	44	SCI	1.63	TEH + 0.01	318
1C	1	45	SCS	2.15	TEH + 0.58	77
1C	2	65	SAS	2.49	TEH + 0.10	0.25
1C	3	31	SCS	1.9	TEH + 0.08	64
1C	3	34	SCS	1.98	TEH + 0.08	35
1C	3	60	SAS	4.66	TEH + 0.11	0.37
1C	4	22	SCS	2.15	TEH + 0.07	80
1C	4	33	SCI	1.07	TEH + 0.05	149
1C			SCI	3.04	TEH + 0.07	
1C	4	44	SAS	1.55	TEH + 0.13	0.27
1C	4	51	SCS	1.91	TEH + 0.08	42
1C	4	55	SAS	2.27	TEH + 0.10	0.24
1C	5	57	SAS	1.82	TEH + 0.10	0.21
1C	6	33	SCS	1.56	TEH + 0.07	66
1C	7	84	SCS	3.41	TEH + 0.05	70
1C	8	40	SCS	1.56	TEH + 0.02	70
1C	9	57	SCS	1.53	TEH + 0.04	38
1C	10	38	MCS	1.95	TEH + 0.00	73
1C	10	44	SCS	3.15	TEH + 0.02	38
1C	11	39	SCI	1.42	TEH + 0.04	98
1C	11	54	SCS	1.31	TEH + 0.05	38
1C	11	55	SCS	1.78	TEH + 0.04	38
1C	12	39	SCS	0.87	TEH + 0.03	45
1C	12	55	SCS	2.12	TEH + 0.06	69
1C			SCS	0.78	TEH + 0.05	
1C	14	56	SCS	2.06	TEH + 0.05	84
1C			SCS	0.74	TEH + 0.07	
1C	18	42	SCI	2.72	TEH + 0.03	204
1C	22	63	SCS	0.66	TEH + 0.02	56
1C	22	65	SCS	1.07	TEH + 0.06	38
1C	36	50	MAS	1.58	TEH + 0.12	0.21

Unit 1 B Steam Generator Map
Tube End Permeability Variation Indications
Refueling Outage R22

Surry Unit 1 Tube End PV Indications

GROUP
Tube End PV

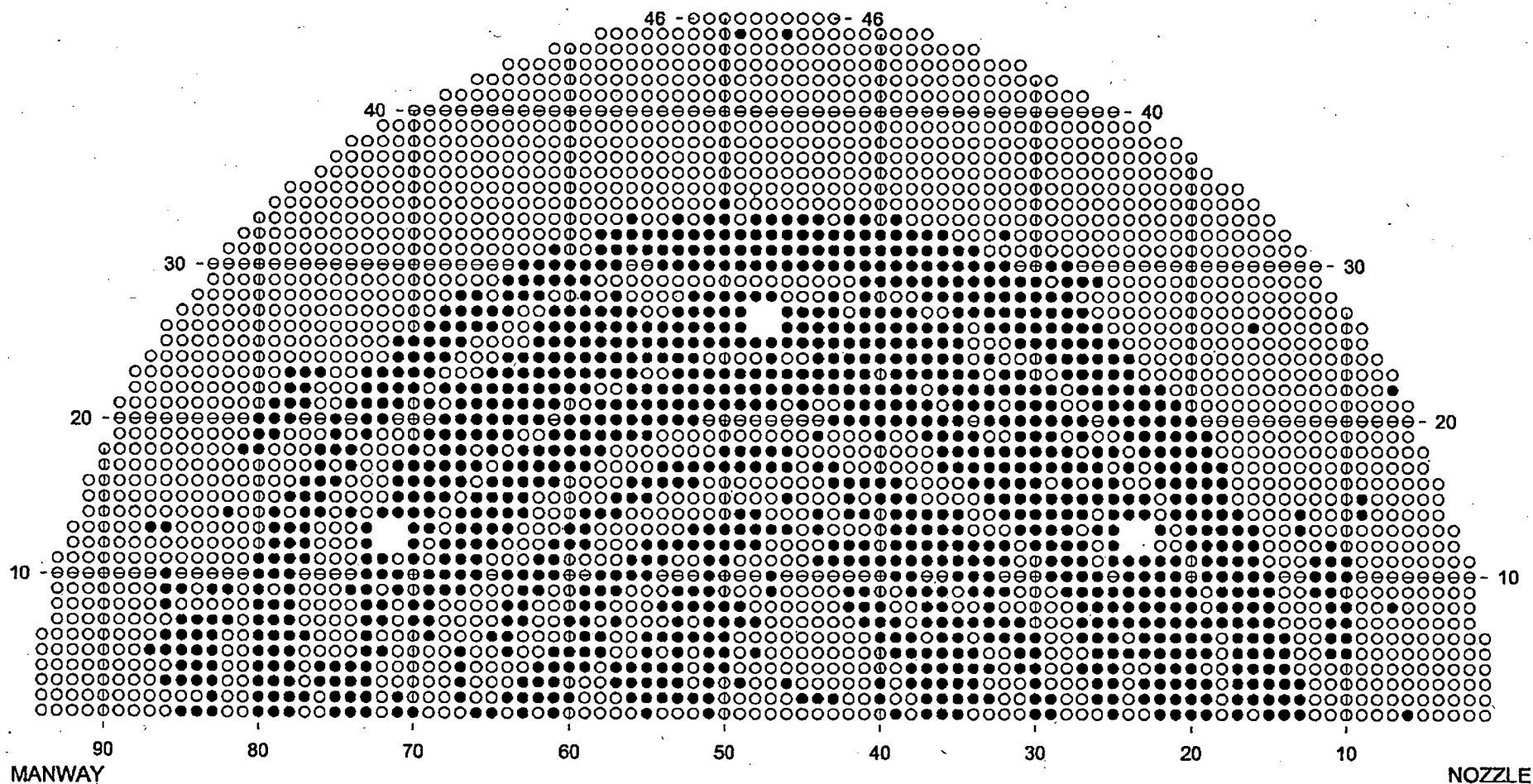
TUBES
1243

AREVA - PDMS map module Version 6.0

S/G B
COLD
PRIMARY FACE

TOTAL TUBES: 3342
SELECTED TUBES: 1243
OUT OF SERVICE (#): NA

SCALE: 0.084494 X
Sun May 03 07:02:19 2009



TUBES
1056

SCALE: 0.084494 X
Sun May 03 06:58:44 2009

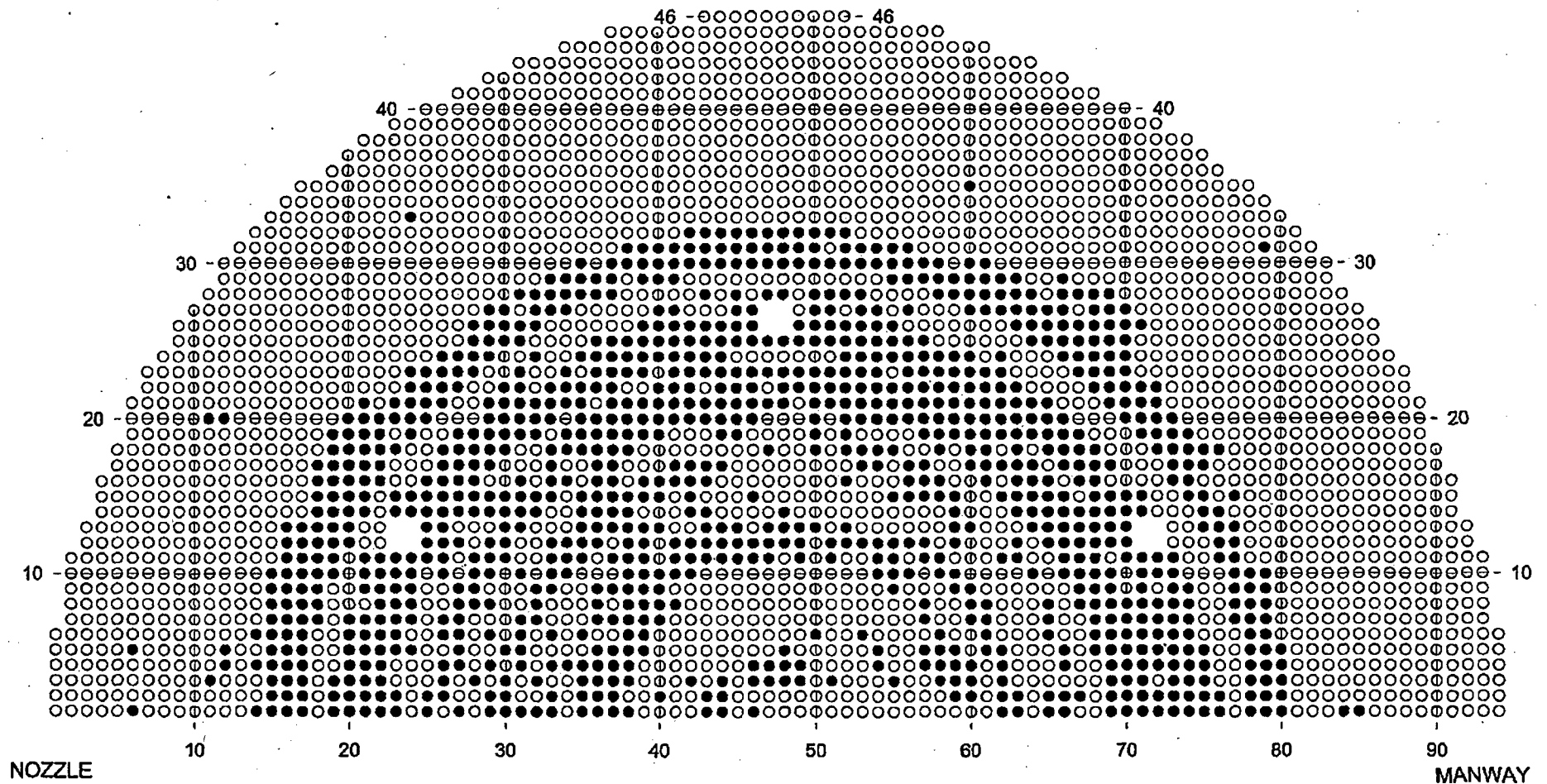


Table of Unit 1 B Steam Generator
Hot Leg Permeability Variation Indications
Refueling Outage R22

Summary Unit 1 B Steam Generator Hot Leg Permeability Variations

ROW	COL	VOLTS	DEG	IND	%TW	LOCATION	EXT	EXT	Circ.Extent
====	====	=====	===	===	===	=====	===	=====	=====
1	6	2.00	46	PVN		TEH +0.06	TEH	TEH	249
1	14	1.56	93	PVN		TEH +0.02	TEH	TEH	276
1	15	9.65	72	PVN		TEH +0.07	TEH	TEH	231
1	16	9.26	62	PVN		TEH +0.02	TEH	TEH	290
1	17	18.42	69	PVN		TEH +0.16	TEH	TEH	129
1	19	3.10	78	PVN		TEH +0.07	TEH	TEH	73
1	20	9.18	54	PVN		TEH +0.02	TEH	TEH	187
1	21	14.38	68	PVN		TEH +0.09	TEH	TEH	238
1	22	4.62	88	PVN		TEH +0.05	TEH	TEH	125
1	23	13.45	70	PVN		TEH +0.20	TEH	TEH	80
1	25	16.68	59	PVN		TEH +0.17	TEH	TEH	157
1	27	1.16	60	PVN		TEH +0.13	TEH	TEH	101
1	29	10.32	78	PVN		TEH +0.12	TEH	TEH	143
1	30	7.24	70	PVN		TEH +0.01	TEH	TEH	245
		5.23	48	PVN		TEH +0.05	TEH	TEH	283
1	31	2.33	80	PVN		TEH +0.12	TEH	TEH	136
1	32	2.20	51	PVN		TEH +0.07	TEH	TEH	199
1	33	3.07	70	PVN		TEH +0.09	TEH	TEH	234
1	35	9.71	64	PVN		TEH +0.09	TEH	TEH	294
1	36	8.19	49	PVN		TEH +0.05	TEH	TEH	280
1	37	10.84	63	PVN		TEH +0.03	TEH	TEH	178
1	38	5.62	52	PVN		TEH +0.03	TEH	TEH	190
1	43	5.06	81	PVN		TEH +0.04	TEH	TEH	128
1	44	2.34	49	PVN		TEH +0.02	TEH	TEH	95
1	46	1.69	35	PVN		TEH +0.08	TEH	TEH	95
1	62	6.32	61	PVN		TEH +0.03	TEH	TEH	93
1	63	2.96	55	PVN		TEH +0.01	TEH	TEH	101
1	65	7.76	75	PVN		TEH +0.01	TEH	TEH	133
1	66	10.13	56	PVN		TEH +0.01	TEH	TEH	211
1	69	2.80	34	PVN		TEH +0.06	TEH	TEH	62
1	70	1.46	29	PVN		TEH +0.04	TEH	TEH	305
1	71	10.58	63	PVN		TEH +0.01	TEH	TEH	339
1	72	1.65	63	PVN		TEH +0.00	TEH	TEH	118
1	73	6.55	69	PVN		TEH +0.00	TEH	TEH	90
1	74	8.05	65	PVN		TEH +0.02	TEH	TEH	294
1	75	8.81	49	PVN		TEH +0.01	TEH	TEH	204
1	76	2.65	73	PVN		TEH +0.01	TEH	TEH	100
1	78	1.26	75	PVN		TEH +0.04	TEH	TEH	114
1	79	11.83	52	PVN		TEH +0.06	TEH	TEH	190
1	80	7.48	68	PVN		TEH +0.04	TEH	TEH	252
1	84	4.83	89	PVN		TEH +0.02	TEH	TEH	104
1	85	7.81	66	PVN		TEH +0.06	TEH	TEH	104
2	15	6.17	66	PVN		TEH +0.11	TEH	TEH	101
2	16	5.04	83	PVN		TEH +0.04	TEH	TEH	183
2	17	18.87	78	PVN		TEH +0.09	TEH	TEH	175
2	19	2.43	69	PVN		TEH +0.02	TEH	TEH	84
2	20	19.91	59	PVN		TEH +0.07	TEH	TEH	280
2	21	12.86	60	PVN		TEH +0.13	TEH	TEH	325
2	22	9.64	73	PVN		TEH +0.01	TEH	TEH	242
2	23	16.90	68	PVN		TEH +0.11	TEH	TEH	98
2	25	19.10	66	PVN		TEH +0.10	TEH	TEH	147
2	26	15.94	75	PVN		TEH +0.02	TEH	TEH	322
2	29	1.39	48	PVN		TEH +0.05	TEH	TEH	147
2	30	8.93	74	PVN		TEH +0.02	TEH	TEH	190
2	33	1.24	65	PVN		TEH +0.05	TEH	TEH	161
2	35	15.03	65	PVN		TEH +0.12	TEH	TEH	276
2	36	10.82	45	PVN		TEH +0.06	TEH	TEH	287

2	37	5.68	54	PVN	TEH	+0.09	TEH TEH	320
2	40	1.20	47	PVN	TEH	+0.06	TEH TEH	62
2	43	2.55	49	PVN	TEH	+0.10	TEH TEH	178
2	44	7.59	77	PVN	TEH	+0.01	TEH TEH	119
2	59	5.49	50	PVN	TEH	+0.00	TEH TEH	101
2	60	11.37	72	PVN	TEH	+0.03	TEH TEH	255
2	62	1.85	52	PVN	TEH	+0.04	TEH TEH	40
2	63	4.05	36	PVN	TEH	+0.08	TEH TEH	164
2	65	3.74	65	PVN	TEH	+0.03	TEH TEH	108
2	66	11.23	82	PVN	TEH	+0.06	TEH TEH	183
2	67	15.46	64	PVN	TEH	+0.01	TEH TEH	136
2	69	5.72	63	PVN	TEH	+0.05	TEH TEH	70
2	70	5.32	77	PVN	TEH	+0.07	TEH TEH	142
2	71	12.88	69	PVN	TEH	+0.06	TEH TEH	196
2	72	1.49	70	PVN	TEH	+0.08	TEH TEH	253
2	73	11.32	70	PVN	TEH	+0.06	TEH TEH	199
2	74	6.72	75	PVN	TEH	+0.02	TEH TEH	315
2	75	11.26	64	PVN	TEH	+0.01	TEH TEH	235
2	76	2.02	41	PVN	TEH	+0.09	TEH TEH	194
2	78	10.05	54	PVN	TEH	+0.08	TEH TEH	132
2	79	21.09	61	PVN	TEH	+0.01	TEH TEH	241
2	80	2.95	62	PVN	TEH	+0.03	TEH TEH	252
3	11	8.44	77	PVN	TEH	+0.00	TEH TEH	115
3	15	13.87	58	PVN	TEH	+0.03	TEH TEH	178
3	16	15.45	74	PVN	TEH	+0.07	TEH TEH	318
3	17	13.25	70	PVN	TEH	+0.06	TEH TEH	217
3	19	7.00	74	PVN	TEH	+0.02	TEH TEH	164
3	20	0.84	72	PVN	TEH	+0.05	TEH TEH	318
3	21	6.67	60	PVN	TEH	+0.02	TEH TEH	330
3	22	9.38	71	PVN	TEH	+0.07	TEH TEH	248
3	26	6.47	49	PVN	TEH	+0.02	TEH TEH	329
3	28	0.76	57	PVN	TEH	+0.08	TEH TEH	178
3	30	7.13	66	PVN	TEH	+0.01	TEH TEH	164
3	32	0.66	55	PVN	TEH	+0.16	TEH TEH	73
3	35	18.17	63	PVN	TEH	+0.00	TEH TEH	245
3	36	2.53	51	PVN	TEH	+0.11	TEH TEH	252
3	37	10.54	59	PVN	TEH	+0.09	TEH TEH	320
3	38	13.10	62	PVN	TEH	+0.01	TEH TEH	126
3	42	4.09	69	PVN	TEH	+0.02	TEH TEH	136
3	44	4.09	37	PVN	TEH	+0.06	TEH TEH	119
3	46	6.19	59	PVN	TEH	+0.11	TEH TEH	252
3	47	11.12	62	PVN	TEH	+0.05	TEH TEH	140
3	48	13.44	57	PVN	TEH	+0.07	TEH TEH	112
3	49	11.52	67	PVN	TEH	+0.06	TEH TEH	168
3	51	8.54	61	PVN	TEH	+0.04	TEH TEH	115
3	55	6.78	59	PVN	TEH	+0.04	TEH TEH	206
3	58	9.70	59	PVN	TEH	+0.03	TEH TEH	178
3	59	4.21	56	PVN	TEH	+0.01	TEH TEH	101
3	60	3.10	61	PVN	TEH	+0.00	TEH TEH	206
3	62	8.56	59	PVN	TEH	+0.04	TEH TEH	208
3	69	11.04	68	PVN	TEH	+0.07	TEH TEH	121
3	70	11.87	69	PVN	TEH	+0.08	TEH TEH	210
3	71	9.63	63	PVN	TEH	+0.06	TEH TEH	256
3	73	13.53	76	PVN	TEH	+0.03	TEH TEH	267
3	74	7.03	77	PVN	TEH	+0.06	TEH TEH	182
3	75	9.38	63	PVN	TEH	+0.05	TEH TEH	183
3	78	16.22	75	PVN	TEH	+0.03	TEH TEH	157
3	79	0.84	74	PVN	TEH	+0.09	TEH TEH	260
3	80	2.42	60	PVN	TEH	+0.06	TEH TEH	235
4	12	13.00	66	PVN	TEH	+0.01	TEH TEH	187
4	14	6.76	67	PVN	TEH	+0.05	TEH TEH	152

4	15	14.24	53	PVN	TEH	+0.04	TEH TEH	231
4	16	8.13	82	PVN	TEH	+0.01	TEH TEH	156
4	17	16.57	63	PVN	TEH	+0.11	TEH TEH	227
4	20	5.15	71	PVN	TEH	+0.00	TEH TEH	94
		11.24	72	PVN	TEH	+0.01	TEH TEH	66
4	21	12.49	77	PVN	TEH	+0.12	TEH TEH	329
4	22	8.35	74	PVN	TEH	+0.01	TEH TEH	218
4	26	10.29	45	PVN	TEH	+0.01	TEH TEH	343
4	27	2.51	59	PVN	TEH	+0.11	TEH TEH	66
4	29	1.07	53	PVN	TEH	+0.17	TEH TEH	175
4	31	13.71	67	PVN	TEH	+0.13	TEH TEH	105
4	33	1.40	76	PVN	TEH	+0.12	TEH TEH	147
4	34	3.05	69	PVN	TEH	+0.02	TEH TEH	87
4	35	3.45	42	PVN	TEH	+0.16	TEH TEH	147
4	36	13.25	64	PVN	TEH	+0.02	TEH TEH	150
4	37	4.46	72	PVN	TEH	+0.02	TEH TEH	273
4	38	8.92	57	PVN	TEH	+0.05	TEH TEH	159
4	46	2.34	77	PVN	TEH	+0.08	TEH TEH	87
4	47	8.59	65	PVN	TEH	+0.04	TEH TEH	227
4	48	10.19	75	PVN	TEH	+0.03	TEH TEH	182
4	49	9.01	77	PVN	TEH	+0.02	TEH TEH	164
4	54	8.85	58	PVN	TEH	+0.01	TEH TEH	101
4	57	14.46	59	PVN	TEH	+0.01	TEH TEH	143
4	58	3.82	75	PVN	TEH	+0.00	TEH TEH	136
4	59	8.41	61	PVN	TEH	+0.02	TEH TEH	248
4	60	5.26	69	PVN	TEH	+0.04	TEH TEH	103
4	62	11.57	66	PVN	TEH	+0.06	TEH TEH	234
4	66	16.70	64	PVN	TEH	+0.04	TEH TEH	215
4	69	11.39	65	PVN	TEH	+0.07	TEH TEH	300
4	70	11.93	61	PVN	TEH	+0.01	TEH TEH	235
4	71	9.49	56	PVN	TEH	+0.05	TEH TEH	108
4	72	0.39	43	PVN	TEH	+0.08	TEH TEH	180
4	73	15.94	61	PVN	TEH	+0.01	TEH TEH	360
4	74	11.25	61	PVN	TEH	+0.04	TEH TEH	318
4	75	16.89	69	PVN	TEH	+0.04	TEH TEH	206
4	78	9.48	52	PVN	TEH	+0.08	TEH TEH	215
4	79	14.23	64	PVN	TEH	+0.01	TEH TEH	224
4	80	4.89	63	PVN	TEH	+0.02	TEH TEH	49
5	6	5.90	76	PVN	TEH	+0.01	TEH TEH	204
5	12	14.25	63	PVN	TEH	+0.04	TEH TEH	231
5	15	10.24	45	PVN	TEH	+0.02	TEH TEH	196
5	16	8.65	60	PVN	TEH	+0.07	TEH TEH	267
5	17	16.95	55	PVN	TEH	+0.05	TEH TEH	196
5	20	2.31	75	PVN	TEH	+0.02	TEH TEH	231
5	21	12.07	72	PVN	TEH	+0.03	TEH TEH	300
5	22	7.36	69	PVN	TEH	+0.02	TEH TEH	145
5	23	12.31	62	PVN	TEH	+0.08	TEH TEH	129
5	24	3.12	65	PVN	TEH	+0.03	TEH TEH	52
5	27	13.41	75	PVN	TEH	+0.02	TEH TEH	203
5	30	12.52	76	PVN	TEH	+0.04	TEH TEH	199
5	31	10.55	66	PVN	TEH	+0.05	TEH TEH	154
5	36	6.09	71	PVN	TEH	+0.00	TEH TEH	217
5	37	8.61	83	PVN	TEH	+0.06	TEH TEH	101
5	38	3.01	53	PVN	TEH	+0.15	TEH TEH	320
5	39	16.78	60	PVN	TEH	+0.06	TEH TEH	91
5	48	3.14	39	PVN	TEH	+0.07	TEH TEH	105
5	54	2.87	67	PVN	TEH	+0.01	TEH TEH	161
5	57	1.00	70	PVN	TEH	+0.04	TEH TEH	66
5	58	3.18	50	PVN	TEH	+0.02	TEH TEH	261
5	59	10.94	69	PVN	TEH	+0.01	TEH TEH	227
5	61	8.75	65	PVN	TEH	+0.08	TEH TEH	83

5	62	1.97	65	PVN	TEH	+0.03	TEH	TEH	45
5	66	8.84	57	PVN	TEH	+0.02	TEH	TEH	121
5	68	1.29	29	PVN	TEH	+0.03	TEH	TEH	38
5	69	17.72	55	PVN	TEH	+0.06	TEH	TEH	263
5	70	11.04	58	PVN	TEH	+0.08	TEH	TEH	276
5	71	9.77	57	PVN	TEH	+0.04	TEH	TEH	149
5	72	15.17	68	PVN	TEH	+0.01	TEH	TEH	59
5	73	10.07	64	PVN	TEH	+0.05	TEH	TEH	284
5	74	12.06	65	PVN	TEH	+0.04	TEH	TEH	133
5	75	5.09	67	PVN	TEH	+0.03	TEH	TEH	152
5	78	17.13	70	PVN	TEH	+0.07	TEH	TEH	217
5	79	1.88	83	PVN	TEH	+0.06	TEH	TEH	208
5	80	1.66	46	PVN	TEH	+0.04	TEH	TEH	173
6	14	3.47	58	PVN	TEH	+0.01	TEH	TEH	122
		11.03	63	PVN	TEH	+0.07	TEH	TEH	149
6	15	3.01	93	PVN	TEH	+0.03	TEH	TEH	122
6	16	13.98	65	PVN	TEH	+0.03	TEH	TEH	360
6	17	11.01	37	PVN	TEH	+0.05	TEH	TEH	189
6	20	13.90	71	PVN	TEH	+0.02	TEH	TEH	256
6	21	14.22	50	PVN	TEH	+0.04	TEH	TEH	304
6	22	6.82	71	PVN	TEH	+0.01	TEH	TEH	187
6	23	12.28	73	PVN	TEH	+0.13	TEH	TEH	80
6	26	9.91	62	PVN	TEH	+0.05	TEH	TEH	217
		25.21	68	PVN	TEH	+0.01	TEH	TEH	301
6	27	16.85	71	PVN	TEH	+0.10	TEH	TEH	262
6	29	1.28	53	PVN	TEH	+0.08	TEH	TEH	115
6	31	9.73	69	PVN	TEH	+0.14	TEH	TEH	213
6	33	1.23	46	PVN	TEH	+0.06	TEH	TEH	140
6	35	14.79	77	PVN	TEH	+0.10	TEH	TEH	238
6	38	15.09	64	PVN	TEH	+0.04	TEH	TEH	360
6	39	5.63	74	PVN	TEH	+0.01	TEH	TEH	276
6	50	2.82	35	PVN	TEH	+0.04	TEH	TEH	112
6	53	3.58	63	PVN	TEH	+0.08	TEH	TEH	77
6	58	10.93	59	PVN	TEH	+0.05	TEH	TEH	203
6	61	8.95	61	PVN	TEH	+0.06	TEH	TEH	163
6	65	1.91	69	PVN	TEH	+0.07	TEH	TEH	52
6	68	10.47	91	PVN	TEH	+0.02	TEH	TEH	142
6	69	9.18	56	PVN	TEH	+0.04	TEH	TEH	360
6	70	10.06	76	PVN	TEH	+0.05	TEH	TEH	246
6	71	13.07	68	PVN	TEH	+0.01	TEH	TEH	227
6	72	12.01	67	PVN	TEH	+0.06	TEH	TEH	138
6	73	9.33	81	PVN	TEH	+0.01	TEH	TEH	360
6	74	6.79	65	PVN	TEH	+0.00	TEH	TEH	249
6	78	9.65	48	PVN	TEH	+0.04	TEH	TEH	280
6	79	13.02	65	PVN	TEH	+0.02	TEH	TEH	220
7	15	11.14	73	PVN	TEH	+0.02	TEH	TEH	182
7	16	7.85	77	PVN	TEH	+0.00	TEH	TEH	135
7	17	15.95	42	PVN	TEH	+0.05	TEH	TEH	180
7	18	16.42	74	PVN	TEH	+0.00	TEH	TEH	129
		28.47	62	PVN	TEH	+0.04	TEH	TEH	157
7	20	1.38	76	PVN	TEH	+0.03	TEH	TEH	90
7	21	11.62	62	PVN	TEH	+0.04	TEH	TEH	161
7	22	11.24	65	PVN	TEH	+0.04	TEH	TEH	241
		16.70	63	PVN	TEH	+0.05	TEH	TEH	263
7	23	13.60	65	PVN	TEH	+0.04	TEH	TEH	217
7	24	16.07	70	PVN	TEH	+0.02	TEH	TEH	147
7	26	8.50	60	PVN	TEH	+0.05	TEH	TEH	108
		25.70	62	PVN	TEH	+0.03	TEH	TEH	122
		24.05	57	PVN	TEH	+0.02	TEH	TEH	125
7	27	10.53	60	PVN	TEH	+0.10	TEH	TEH	308
7	31	7.75	68	PVN	TEH	+0.03	TEH	TEH	91

7	32	5.24	60	PVN	TEH	+0.01	TEH TEH	132
		9.57	63	PVN	TEH	+0.03	TEH TEH	136
7	36	2.25	37	PVN	TEH	+0.10	TEH TEH	266
7	37	11.63	64	PVN	TEH	+0.04	TEH TEH	185
7	38	3.09	38	PVN	TEH	+0.09	TEH TEH	196
7	39	5.48	45	PVN	TEH	+0.06	TEH TEH	360
7	40	2.30	62	PVN	TEH	+0.16	TEH TEH	266
7	57	10.98	76	PVN	TEH	+0.07	TEH TEH	227
7	60	3.57	62	PVN	TEH	+0.00	TEH TEH	161
7	61	5.05	59	PVN	TEH	+0.06	TEH TEH	163
7	65	15.50	69	PVN	TEH	+0.03	TEH TEH	322
7	68	9.51	58	PVN	TEH	+0.02	TEH TEH	239
7	69	6.94	70	PVN	TEH	+0.07	TEH TEH	270
7	70	15.88	67	PVN	TEH	+0.03	TEH TEH	241
7	71	1.24	41	PVN	TEH	+0.02	TEH TEH	104
7	72	9.41	67	PVN	TEH	+0.04	TEH TEH	192
7	73	7.01	52	PVN	TEH	+0.08	TEH TEH	322
7	74	10.01	68	PVN	TEH	+0.03	TEH TEH	126
7	77	9.57	66	PVN	TEH	+0.05	TEH TEH	59
7	78	10.18	56	PVN	TEH	+0.05	TEH TEH	360
7	79	2.68	51	PVN	TEH	+0.08	TEH TEH	253
8	15	1.98	46	PVN	TEH	+0.05	TEH TEH	118
8	16	13.62	82	PVN	TEH	+0.02	TEH TEH	330
8	17	7.09	65	PVN	TEH	+0.09	TEH TEH	118
8	18	7.35	69	PVN	TEH	+0.10	TEH TEH	171
		12.94	64	PVN	TEH	+0.06	TEH TEH	201
8	22	8.66	62	PVN	TEH	+0.04	TEH TEH	211
8	23	7.70	78	PVN	TEH	+0.10	TEH TEH	59
8	24	7.65	65	PVN	TEH	+0.04	TEH TEH	98
		16.68	69	PVN	TEH	+0.04	TEH TEH	135
8	27	14.40	84	PVN	TEH	+0.11	TEH TEH	304
8	28	9.26	64	PVN	TEH	+0.07	TEH TEH	145
8	29	1.84	42	PVN	TEH	+0.08	TEH TEH	224
8	32	4.41	78	PVN	TEH	+0.01	TEH TEH	152
8	36	11.48	84	PVN	TEH	+0.01	TEH TEH	168
8	38	6.38	69	PVN	TEH	+0.04	TEH TEH	80
8	39	9.37	45	PVN	TEH	+0.00	TEH TEH	239
8	40	4.73	73	PVN	TEH	+0.07	TEH TEH	276
8	41	14.57	55	PVN	TEH	+0.01	TEH TEH	294
8	57	6.00	47	PVN	TEH	+0.05	TEH TEH	157
8	60	8.13	64	PVN	TEH	+0.07	TEH TEH	275
8	61	2.82	66	PVN	TEH	+0.00	TEH TEH	87
8	65	11.39	74	PVN	TEH	+0.03	TEH TEH	224
8	67	11.88	79	PVN	TEH	+0.03	TEH TEH	80
8	68	4.79	63	PVN	TEH	+0.06	TEH TEH	225
8	69	5.99	60	PVN	TEH	+0.03	TEH TEH	360
8	70	5.14	60	PVN	TEH	+0.03	TEH TEH	149
8	71	7.73	67	PVN	TEH	+0.01	TEH TEH	63
8	72	6.39	54	PVN	TEH	+0.05	TEH TEH	312
8	73	10.72	64	PVN	TEH	+0.01	TEH TEH	192
8	74	5.29	70	PVN	TEH	+0.00	TEH TEH	48
8	77	20.06	68	PVN	TEH	+0.03	TEH TEH	168
8	78	1.89	51	PVN	TEH	+0.10	TEH TEH	239
8	79	12.82	75	PVN	TEH	+0.01	TEH TEH	231
9	15	3.54	56	PVN	TEH	+0.01	TEH TEH	84
9	16	8.97	81	PVN	TEH	+0.08	TEH TEH	322
9	17	13.53	40	PVN	TEH	+0.01	TEH TEH	290
9	18	8.47	84	PVN	TEH	+0.03	TEH TEH	196
9	21	7.47	65	PVN	TEH	+0.02	TEH TEH	199
9	22	16.46	62	PVN	TEH	+0.03	TEH TEH	291
9	23	11.12	67	PVN	TEH	+0.05	TEH TEH	190

9	24	26.17	59	PVN	TEH	+0.19	TEH	TEH	189
9	27	10.88	72	PVN	TEH	+0.06	TEH	TEH	118
9	28	9.24	84	PVN	TEH	+0.14	TEH	TEH	304
9	32	19.72	65	PVN	TEH	+0.15	TEH	TEH	276
9	33	12.20	63	PVN	TEH	+0.07	TEH	TEH	175
9	36	4.47	52	PVN	TEH	+0.06	TEH	TEH	182
9	37	1.96	53	PVN	TEH	+0.05	TEH	TEH	42
9	38	6.40	49	PVN	TEH	+0.08	TEH	TEH	269
9	39	17.20	66	PVN	TEH	+0.03	TEH	TEH	255
9	40	9.83	78	PVN	TEH	+0.01	TEH	TEH	280
9	55	15.99	56	PVN	TEH	+0.00	TEH	TEH	238
9	59	15.13	63	PVN	TEH	+0.06	TEH	TEH	241
9	60	15.94	66	PVN	TEH	+0.00	TEH	TEH	269
9	67	16.23	72	PVN	TEH	+0.04	TEH	TEH	199
9	68	5.95	67	PVN	TEH	+0.09	TEH	TEH	135
9	69	14.91	70	PVN	TEH	+0.05	TEH	TEH	332
9	71	8.95	78	PVN	TEH	+0.03	TEH	TEH	100
9	73	7.20	63	PVN	TEH	+0.07	TEH	TEH	322
9	74	7.42	76	PVN	TEH	+0.03	TEH	TEH	108
9	77	15.43	57	PVN	TEH	+0.03	TEH	TEH	267
9	78	8.53	75	PVN	TEH	+0.01	TEH	TEH	164
9	79	12.10	78	PVN	TEH	+0.03	TEH	TSH	199
10	15	9.16	72	PVN	TEH	+0.05	TEH	TEH	119
10	16	19.71	65	PVN	TEH	+0.07	TEH	TEH	196
10	17	10.09	69	PVN	TEH	+0.05	TEH	TEH	168
10	18	8.42	74	PVN	TEH	+0.04	TEH	TEH	173
10	19	17.54	54	PVN	TEH	+0.12	TEH	TEH	126
10	21	14.88	73	PVN	TEH	+0.13	TEH	TEH	203
10	22	6.21	91	PVN	TEH	+0.03	TEH	TEH	187
10	23	14.60	67	PVN	TEH	+0.13	TEH	TEH	276
10	24	12.58	72	PVN	TEH	+0.03	TEH	TEH	320
10	26	2.38	70	PVN	TEH	+0.01	TEH	TEH	100
10	28	10.98	71	PVN	TEH	+0.04	TEH	TEH	248
10	29	14.44	65	PVN	TEH	+0.15	TEH	TEH	164
10	31	1.18	60	PVN	TEH	+0.07	TEH	TEH	259
10	33	11.42	54	PVN	TEH	+0.14	TEH	TEH	192
10	34	8.38	54	PVN	TEH	+0.02	TEH	TEH	119
		12.14	58	PVN	TEH	+0.06	TEH	TEH	152
10	38	3.13	54	PVN	TEH	+0.02	TEH	TEH	62
10	39	10.60	57	PVN	TEH	+0.07	TEH	TEH	276
10	40	9.74	60	PVN	TEH	+0.07	TEH	TEH	260
10	41	6.63	62	PVN	TEH	+0.07	TEH	TEH	232
10	42	12.37	67	PVN	TEH	+0.05	TEH	TEH	150
10	54	4.39	62	PVN	TEH	+0.10	TEH	TEH	234
10	55	3.71	84	PVN	TEH	+0.03	TEH	TEH	140
10	56	4.02	62	PVN	TEH	+0.01	TEH	TEH	175
10	58	8.72	73	PVN	TEH	+0.07	TEH	TEH	189
10	59	14.38	64	PVN	TEH	+0.04	TEH	TEH	227
10	64	15.81	65	PVN	TEH	+0.06	TEH	TEH	256
10	66	14.08	78	PVN	TEH	+0.07	TEH	TEH	83
10	67	11.03	51	PVN	TEH	+0.02	TEH	TEH	350
10	68	6.07	67	PVN	TEH	+0.05	TEH	TEH	180
10	69	13.41	72	PVN	TEH	+0.02	TEH	TEH	231
10	71	6.01	72	PVN	TEH	+0.02	TEH	TEH	87
10	72	9.79	76	PVN	TEH	+0.04	TEH	TEH	166
10	73	15.28	60	PVN	TEH	+0.01	TEH	TEH	220
10	77	6.67	82	PVN	TEH	+0.04	TEH	TEH	300
10	78	7.51	56	PVN	TEH	+0.05	TEH	TEH	266
10	79	6.94	72	PVN	TEH	+0.04	TEH	TEH	48
11	16	7.77	64	PVN	TEH	+0.10	TEH	TEH	206
11	17	8.84	68	PVN	TEH	+0.04	TEH	TEH	238

11	18	1.55	33	PVN	TEH	+0.05	TEH	TEH	248
11	19	18.28	61	PVN	TEH	+0.07	TEH	TEH	245
11	21	3.44	70	PVN	TEH	+0.06	TEH	TEH	83
11	22	11.63	69	PVN	TEH	+0.04	TEH	TEH	133
11	23	16.20	63	PVN	TEH	+0.10	TEH	TEH	301
11	24	11.59	80	PVN	TEH	+0.01	TEH	TEH	304
11	25	17.29	65	PVN	TEH	+0.05	TEH	TEH	171
11	26	6.29	61	PVN	TEH	+0.03	TEH	TEH	45
11	28	20.92	75	PVN	TEH	+0.10	TEH	TEH	133
11	29	15.62	77	PVN	TEH	+0.00	TEH	TEH	259
11	30	9.67	64	PVN	TEH	+0.02	TEH	TEH	122
11	33	13.14	68	PVN	TEH	+0.01	TEH	TEH	143
11	34	6.33	64	PVN	TEH	+0.02	TEH	TEH	336
11	35	15.87	71	PVN	TEH	+0.04	TEH	TEH	128
11	37	1.23	86	PVN	TEH	+0.02	TEH	TEH	120
11	38	3.73	56	PVN	TEH	+0.07	TEH	TEH	175
11	39	7.71	74	PVN	TEH	+0.02	TEH	TEH	119
11	41	8.25	57	PVN	TEH	+0.08	TEH	TEH	150
11	42	14.20	69	PVN	TEH	+0.00	TEH	TEH	320
11	43	7.38	60	PVN	TEH	+0.05	TEH	TEH	280
11	44	14.76	62	PVN	TEH	+0.07	TEH	TEH	199
11	45	13.68	71	PVN	TEH	+0.02	TEH	TEH	136
11	46	12.02	58	PVN	TEH	+0.06	TEH	TEH	168
11	47	10.56	52	PVN	TEH	+0.05	TEH	TEH	98
11	49	1.88	36	PVN	TEH	+0.03	TEH	TEH	112
11	51	13.42	68	PVN	TEH	+0.03	TEH	TEH	211
11	54	2.98	52	PVN	TEH	-0.00	TEH	TEH	100
11	55	2.57	45	PVN	TEH	+0.03	TEH	TEH	178
11	57	10.42	72	PVN	TEH	+0.03	TEH	TEH	256
11	58	10.67	60	PVN	TEH	+0.04	TEH	TEH	269
11	62	6.74	75	PVN	TEH	+0.01	TEH	TEH	84
11	63	1.91	67	PVN	TEH	+0.03	TEH	TEH	189
11	66	7.93	56	PVN	TEH	+0.00	TEH	TEH	242
11	67	9.80	57	PVN	TEH	+0.07	TEH	TEH	340
11	68	9.76	76	PVN	TEH	+0.04	TEH	TEH	225
11	70	9.40	70	PVN	TEH	+0.01	TEH	TEH	66
11	71	8.40	61	PVN	TEH	+0.05	TEH	TEH	112
11	72	9.11	57	PVN	TEH	+0.06	TEH	TEH	269
11	73	3.63	56	PVN	TEH	+0.08	TEH	TEH	159
11	76	13.99	80	PVN	TEH	+0.02	TEH	TEH	164
11	77	15.25	58	PVN	TEH	+0.02	TEH	TEH	225
12	16	12.90	69	PVN	TEH	+0.04	TEH	TEH	224
12	17	10.18	73	PVN	TEH	+0.10	TEH	TEH	126
12	18	5.79	56	PVN	TEH	+0.06	TEH	TEH	108
		17.72	51	PVN	TEH	+0.03	TEH	TEH	152
12	19	11.69	61	PVN	TEH	+0.04	TEH	TEH	241
12	20	13.27	62	PVN	TEH	+0.05	TEH	TEH	70
12	25	15.96	45	PVN	TEH	+0.10	TEH	TEH	339
12	26	1.34	47	PVN	TEH	+0.07	TEH	TEH	62
12	27	8.56	66	PVN	TEH	+0.13	TEH	TEH	143
12	29	27.15	64	PVN	TEH	+0.10	TEH	TEH	241
12	30	12.35	49	PVN	TEH	+0.05	TEH	TEH	301
		21.53	57	PVN	TEH	+0.02	TEH	TEH	325
12	33	5.33	63	PVN	TEH	+0.12	TEH	TEH	259
12	34	19.11	68	PVN	TEH	+0.01	TEH	TEH	222
12	35	8.85	50	PVN	TEH	+0.12	TEH	TEH	336
12	36	19.55	59	PVN	TEH	+0.10	TEH	TEH	115
12	38	2.30	70	PVN	TEH	+0.02	TEH	TEH	25
12	39	5.25	48	PVN	TEH	+0.10	TEH	TEH	227
12	41	5.88	63	PVN	TEH	+0.04	TEH	TEH	213
12	42	8.60	56	PVN	TEH	+0.06	TEH	TEH	360

12	43	12.88	64	PVN	TEH	+0.02	TEH TEH	234
12	44	3.23	63	PVN	TEH	+0.07	TEH TEH	115
12	45	13.09	74	PVN	TEH	+0.00	TEH TEH	245
12	46	10.50	71	PVN	TEH	+0.05	TEH TEH	227
12	47	7.95	86	PVN	TEH	+0.05	TEH TEH	360
12	48	6.25	49	PVN	TEH	+0.01	TEH TEH	256
12	49	8.80	60	PVN	TEH	+0.05	TEH TEH	287
12	51	8.23	67	PVN	TEH	+0.03	TEH TEH	228
12	52	2.58	46	PVN	TEH	+0.08	TEH TEH	91
12	53	5.56	53	PVN	TEH	+0.05	TEH TEH	236
12	54	4.96	63	PVN	TEH	+0.08	TEH TEH	199
12	55	2.07	57	PVN	TEH	+0.03	TEH TEH	112
12	56	8.36	67	PVN	TEH	+0.01	TEH TEH	224
12	57	12.93	70	PVN	TEH	+0.01	TEH TEH	227
12	59	1.59	59	PVN	TEH	+0.00	TEH TEH	45
12	63	10.37	61	PVN	TEH	+0.05	TEH TEH	66
12	65	18.01	67	PVN	TEH	+0.11	TEH TEH	157
12	66	6.35	55	PVN	TEH	+0.09	TEH TEH	232
12	67	14.45	60	PVN	TEH	+0.08	TEH TEH	320
12	68	8.85	61	PVN	TEH	+0.07	TEH TEH	142
12	69	6.80	62	PVN	TEH	+0.01	TEH TEH	70
12	70	15.00	58	PVN	TEH	+0.07	TEH TEH	305
12	76	8.70	52	PVN	TEH	+0.10	TEH TEH	312
12	77	4.82	73	PVN	TEH	+0.07	TEH TEH	192
13	16	5.11	91	PVN	TEH	+0.05	TEH TEH	87
13	17	11.18	86	PVN	TEH	+0.04	TEH TEH	193
13	18	1.77	63	PVN	TEH	+0.04	TEH TEH	259
13	19	9.45	42	PVN	TEH	+0.02	TEH TEH	213
13	20	25.79	61	PVN	TEH	+0.13	TEH TEH	199
13	25	14.16	75	PVN	TEH	+0.01	TEH TEH	343
13	26	10.95	76	PVN	TEH	+0.00	TEH TEH	187
		14.81	71	PVN	TEH	+0.06	TEH TEH	227
13	30	12.87	58	PVN	TEH	+0.03	TEH TEH	248
13	31	16.06	65	PVN	TEH	+0.05	TEH TEH	234
13	35	31.39	59	PVN	TEH	+0.01	TEH TEH	273
13	36	9.86	59	PVN	TEH	+0.08	TEH TEH	185
13	37	15.32	56	PVN	TEH	+0.09	TEH TEH	122
13	38	5.11	80	PVN	TEH	+0.00	TEH TEH	280
13	39	3.94	38	PVN	TEH	+0.06	TEH TEH	91
13	40	9.11	76	PVN	TEH	+0.00	TEH TEH	206
13	43	8.31	70	PVN	TEH	+0.04	TEH TEH	129
13	44	7.90	65	PVN	TEH	+0.07	TEH TEH	301
13	45	1.70	53	PVN	TEH	+0.07	TEH TEH	115
13	47	16.02	46	PVN	TEH	+0.02	TEH TEH	360
13	48	5.07	66	PVN	TEH	+0.03	TEH TEH	239
13	49	3.27	55	PVN	TEH	+0.02	TEH TEH	197
13	50	3.34	32	PVN	TEH	+0.07	TEH TEH	129
13	52	2.19	67	PVN	TEH	+0.01	TEH TEH	270
13	59	4.71	67	PVN	TEH	+0.01	TEH TEH	280
13	60	7.76	75	PVN	TEH	+0.01	TEH TEH	105
13	64	14.51	61	PVN	TEH	+0.06	TEH TEH	135
13	65	11.19	54	PVN	TEH	+0.01	TEH TEH	220
13	66	5.73	59	PVN	TEH	+0.04	TEH TEH	201
13	67	18.47	66	PVN	TEH	+0.04	TEH TEH	204
13	68	3.47	49	PVN	TEH	+0.05	TEH TEH	93
13	69	6.90	74	PVN	TEH	+0.05	TEH TEH	170
13	70	9.81	70	PVN	TEH	+0.02	TEH TEH	263
13	75	12.43	56	PVN	TEH	+0.06	TEH TEH	145
13	76	13.02	56	PVN	TEH	+0.03	TEH TSH	320
13	77	10.47	66	PVN	TEH	+0.03	TEH TEH	256
14	18	2.92	38	PVN	TEH	+0.10	TEH TEH	252

		16.72	74	PVN	TEH	+0.01	TEH	TEH	308
14	19	13.06	52	PVN	TEH	+0.04	TEH	TEH	308
14	20	14.64	54	PVN	TEH	+0.00	TEH	TEH	133
14	21	15.87	67	PVN	TEH	+0.13	TEH	TEH	63
14	23	11.54	61	PVN	TEH	+0.07	TEH	TEH	241
14	24	10.74	59	PVN	TEH	+0.06	TEH	TEH	329
14	25	15.17	51	PVN	TEH	+0.12	TEH	TEH	336
14	26	11.87	91	PVN	TEH	+0.00	TEH	TEH	270
14	27	6.95	49	PVN	TEH	+0.06	TEH	TEH	145
		18.71	65	PVN	TEH	+0.03	TEH	TEH	149
14	28	6.83	72	PVN	TEH	+0.02	TEH	TEH	209
14	29	7.42	84	PVN	TEH	+0.13	TEH	TEH	84
14	30	11.03	57	PVN	TEH	+0.02	TEH	TEH	136
		26.98	64	PVN	TEH	+0.00	TEH	TEH	190
14	31	15.87	55	PVN	TEH	+0.13	TEH	TEH	283
14	32	25.81	55	PVN	TEH	+0.03	TEH	TEH	241
14	35	11.01	75	PVN	TEH	+0.11	TEH	TEH	308
14	36	18.01	52	PVN	TEH	+0.03	TEH	TEH	360
14	37	2.94	49	PVN	TEH	+0.11	TEH	TEH	300
14	38	15.23	68	PVN	TEH	+0.04	TEH	TEH	189
14	42	2.10	72	PVN	TEH	+0.06	TEH	TEH	180
14	43	2.15	24	PVN	TEH	+0.11	TEH	TEH	266
14	48	5.72	65	PVN	TEH	+0.01	TEH	TEH	232
14	59	5.27	62	PVN	TEH	+0.08	TEH	TEH	84
14	63	15.14	67	PVN	TEH	+0.07	TEH	TEH	77
14	64	10.91	59	PVN	TEH	+0.06	TEH	TEH	235
14	65	12.37	57	PVN	TEH	+0.09	TEH	TEH	143
14	66	13.01	52	PVN	TEH	+0.03	TEH	TEH	339
14	67	9.02	78	PVN	TEH	+0.02	TEH	TEH	77
14	68	2.46	59	PVN	TEH	+0.03	TEH	TEH	52
14	69	12.27	69	PVN	TEH	+0.01	TEH	TEH	231
14	70	7.26	69	PVN	TEH	+0.07	TEH	TEH	218
14	71	7.90	71	PVN	TEH	+0.01	TEH	TEH	66
14	75	14.21	55	PVN	TEH	+0.05	TEH	TEH	308
14	76	12.49	73	PVN	TEH	+0.04	TEH	TEH	239
15	18	5.86	68	PVN	TEH	+0.04	TEH	TEH	122
		6.16	66	PVN	TEH	+0.06	TEH	TEH	168
15	19	12.82	50	PVN	TEH	+0.01	TEH	TEH	209
15	20	15.10	57	PVN	TEH	+0.08	TEH	TEH	224
15	21	28.69	65	PVN	TEH	+0.06	TEH	TEH	252
15	23	5.75	66	PVN	TEH	+0.04	TEH	TEH	42
15	24	7.08	71	PVN	TEH	+0.02	TEH	TEH	325
15	25	5.95	78	PVN	TEH	+0.05	TEH	TEH	300
15	26	9.52	55	PVN	TEH	+0.04	TEH	TEH	206
		2.81	62	PVN	TEH	+0.10	TEH	TEH	245
15	27	9.10	60	PVN	TEH	+0.06	TEH	TEH	304
15	28	14.76	64	PVN	TEH	+0.07	TEH	TEH	94
15	29	9.10	68	PVN	TEH	+0.02	TEH	TEH	252
15	30	15.40	81	PVN	TEH	+0.03	TEH	TEH	255
15	31	12.56	91	PVN	TEH	+0.02	TEH	TEH	206
15	32	10.53	49	PVN	TEH	+0.06	TEH	TEH	168
15	33	16.87	56	PVN	TEH	+0.05	TEH	TEH	224
15	35	7.15	73	PVN	TEH	+0.04	TEH	TEH	130
15	36	3.77	61	PVN	TEH	+0.00	TEH	TEH	126
15	37	7.06	64	PVN	TEH	+0.02	TEH	TEH	129
15	38	18.51	58	PVN	TEH	+0.00	TEH	TEH	310
15	39	3.66	61	PVN	TEH	+0.12	TEH	TEH	360
15	40	5.23	61	PVN	TEH	+0.10	TEH	TEH	269
15	42	2.70	41	PVN	TEH	+0.00	TEH	TEH	229
15	46	2.86	58	PVN	TEH	+0.03	TEH	TEH	129
15	55	12.65	67	PVN	TEH	+0.02	TEH	TEH	164

15	56	7.30	59	PVN	TEH	+0.01	TEH	TEH	245
15	57	8.50	62	PVN	TEH	+0.02	TEH	TEH	217
15	58	17.01	61	PVN	TEH	+0.06	TEH	TEH	210
15	59	10.54	60	PVN	TEH	+0.03	TEH	TEH	185
15	62	14.98	72	PVN	TEH	+0.05	TEH	TEH	94
15	63	9.09	53	PVN	TEH	+0.10	TEH	TEH	360
15	64	5.96	57	PVN	TEH	+0.08	TEH	TEH	277
15	65	10.70	49	PVN	TEH	+0.03	TEH	TEH	245
15	66	8.41	75	PVN	TEH	+0.00	TEH	TEH	142
15	68	8.06	62	PVN	TEH	+0.06	TEH	TEH	222
15	69	12.52	68	PVN	TEH	+0.03	TEH	TEH	320
15	70	12.74	65	PVN	TEH	+0.01	TEH	TEH	226
15	71	3.77	69	PVN	TEH	+0.01	TEH	TEH	52
15	74	15.65	74	PVN	TEH	+0.02	TEH	TEH	171
15	75	11.40	72	PVN	TEH	+0.03	TEH	TEH	168
15	77	5.58	60	PVN	TEH	+0.02	TEH	TEH	31
16	18	6.60	94	PVN	TEH	+0.02	TEH	TEH	171
		14.55	70	PVN	TEH	+0.04	TEH	TEH	204
16	19	12.13	57	PVN	TEH	+0.02	TEH	TEH	241
16	20	7.23	75	PVN	TEH	+0.17	TEH	TEH	305
16	21	7.63	45	PVN	TEH	+0.05	TEH	TEH	287
16	22	15.43	55	PVN	TEH	+0.05	TEH	TEH	115
		18.18	66	PVN	TEH	+0.03	TEH	TEH	149
16	25	8.06	90	PVN	TEH	+0.01	TEH	TEH	185
16	26	8.92	58	PVN	TEH	+0.04	TEH	TEH	301
		20.73	56	PVN	TEH	+0.02	TEH	TEH	183
16	27	13.57	61	PVN	TEH	+0.04	TEH	TEH	304
16	28	16.37	68	PVN	TEH	+0.14	TEH	TEH	284
16	31	8.69	77	PVN	TEH	+0.03	TEH	TEH	154
16	33	17.33	57	PVN	TEH	+0.06	TEH	TEH	216
16	34	13.15	50	PVN	TEH	+0.03	TEH	TEH	220
		18.16	73	PVN	TEH	+0.02	TEH	TEH	253
16	36	11.21	71	PVN	TEH	+0.06	TEH	TEH	136
16	37	3.85	73	PVN	TEH	+0.05	TEH	TEH	213
16	39	14.29	69	PVN	TEH	+0.05	TEH	TEH	140
16	40	14.63	62	PVN	TEH	+0.06	TEH	TEH	248
16	41	7.14	60	PVN	TEH	+0.03	TEH	TEH	224
16	42	17.05	59	PVN	TEH	+0.09	TEH	TEH	220
16	43	15.83	65	PVN	TEH	+0.06	TEH	TEH	103
16	52	2.22	55	PVN	TEH	+0.05	TEH	TEH	80
16	56	14.89	62	PVN	TEH	+0.06	TEH	TEH	304
16	57	10.93	63	PVN	TEH	+0.01	TEH	TEH	241
16	58	15.18	50	PVN	TEH	+0.01	TEH	TEH	262
16	61	30.44	64	PVN	TEH	+0.05	TEH	TEH	199
16	63	8.00	85	PVN	TEH	+0.05	TEH	TEH	249
16	64	10.89	59	PVN	TEH	+0.07	TEH	TEH	118
16	65	15.44	73	PVN	TEH	+0.01	TEH	TEH	188
16	67	5.23	87	PVN	TEH	+0.05	TEH	TEH	209
16	68	10.21	62	PVN	TEH	+0.02	TEH	TEH	315
16	73	3.46	54	PVN	TEH	+0.01	TEH	TEH	66
16	74	9.49	50	PVN	TEH	+0.09	TEH	TEH	150
17	18	2.26	63	PVN	TEH	+0.02	TEH	TEH	182
17	19	14.90	61	PVN	TEH	+0.14	TEH	TEH	329
17	20	13.36	52	PVN	TEH	+0.05	TEH	TEH	210
17	21	19.12	68	PVN	TEH	+0.12	TEH	TEH	170
17	22	6.30	45	PVN	TEH	+0.07	TEH	TEH	276
		5.33	53	PVN	TEH	+0.01	TEH	TEH	217
17	26	1.50	82	PVN	TEH	+0.08	TEH	TEH	227
17	27	13.95	74	PVN	TEH	+0.03	TEH	TEH	177
17	28	8.86	63	PVN	TEH	+0.07	TEH	TEH	320
17	29	16.47	70	PVN	TEH	+0.12	TEH	TEH	260

17	33	22.06	59	PVN	TEH	+0.04	TEH	TEH	238
17	36	12.31	62	PVN	TEH	+0.08	TEH	TEH	260
17	37	10.76	81	PVN	TEH	+0.05	TEH	TEH	263
17	41	6.38	68	PVN	TEH	+0.01	TEH	TEH	94
17	42	16.55	61	PVN	TEH	-0.00	TEH	TEH	203
17	43	11.69	67	PVN	TEH	+0.06	TEH	TEH	252
17	44	8.66	53	PVN	TEH	+0.06	TEH	TEH	340
17	53	9.91	78	PVN	TEH	+0.01	TEH	TEH	132
17	54	23.90	61	PVN	TEH	+0.06	TEH	TEH	262
17	56	19.22	54	PVN	TEH	+0.04	TEH	TEH	269
17	57	13.31	71	PVN	TEH	+0.02	TEH	TEH	125
17	60	27.42	64	PVN	TEH	+0.05	TEH	TEH	238
17	61	15.32	65	PVN	TEH	+0.07	TEH	TEH	277
17	62	8.65	54	PVN	TEH	+0.10	TEH	TEH	192
17	63	16.06	54	PVN	TEH	+0.02	TEH	TEH	266
17	64	8.10	59	PVN	TEH	+0.03	TEH	TEH	164
17	66	11.27	60	PVN	TEH	+0.02	TEH	TEH	206
17	67	11.87	64	PVN	TEH	+0.10	TEH	TEH	255
17	68	5.10	78	PVN	TEH	+0.07	TEH	TEH	273
17	69	15.67	67	PVN	TEH	+0.17	TEH	TEH	241
17	73	20.55	69	PVN	TEH	+0.07	TEH	TEH	235
17	74	9.29	63	PVN	TEH	+0.05	TEH	TEH	90
17	75	11.34	54	PVN	TEH	+0.06	TEH	TEH	118
18	19	13.61	55	PVN	TEH	+0.05	TEH	TEH	196
18	20	6.87	72	PVN	TEH	+0.11	TEH	TEH	267
18	21	3.03	48	PVN	TEH	+0.09	TEH	TEH	266
18	22	10.54	68	PVN	TEH	+0.06	TEH	TEH	121
18	23	16.90	57	PVN	TEH	+0.11	TEH	TEH	234
18	26	2.94	66	PVN	TEH	+0.02	TEH	TEH	149
18	27	17.40	67	PVN	TEH	+0.06	TEH	TEH	196
18	28	13.45	64	PVN	TEH	+0.07	TEH	TEH	267
18	29	13.10	64	PVN	TEH	+0.08	TEH	TEH	301
18	30	25.48	61	PVN	TEH	+0.07	TEH	TEH	266
18	33	8.02	68	PVN	TEH	+0.05	TEH	TEH	190
18	34	10.55	81	PVN	TEH	+0.03	TEH	TEH	211
18	35	12.31	80	PVN	TEH	+0.08	TEH	TEH	283
18	36	7.16	44	PVN	TEH	+0.05	TEH	TEH	245
18	37	19.35	56	PVN	TEH	+0.08	TEH	TEH	211
18	38	8.01	74	PVN	TEH	+0.04	TEH	TEH	52
18	47	5.28	75	PVN	TEH	+0.04	TEH	TEH	104
18	50	5.85	70	PVN	TEH	+0.08	TEH	TSH	196
18	52	12.78	76	PVN	TEH	+0.04	TEH	TEH	211
18	53	18.94	68	PVN	TEH	+0.03	TEH	TEH	224
18	54	19.85	64	PVN	TEH	+0.05	TEH	TEH	267
18	55	24.31	57	PVN	TEH	+0.03	TEH	TEH	112
18	58	15.05	68	PVN	TEH	+0.04	TEH	TEH	161
18	60	16.46	45	PVN	TEH	+0.02	TEH	TEH	249
18	61	9.67	49	PVN	TEH	+0.01	TEH	TEH	300
18	63	13.62	69	PVN	TEH	+0.03	TEH	TEH	114
18	65	11.84	73	PVN	TEH	+0.07	TEH	TEH	220
18	66	10.34	59	PVN	TEH	+0.02	TEH	TEH	350
18	67	8.60	64	PVN	TEH	+0.05	TEH	TEH	300
18	68	11.49	72	PVN	TEH	+0.02	TEH	TEH	190
18	72	7.96	60	PVN	TEH	+0.07	TEH	TEH	170
18	73	16.98	70	PVN	TEH	+0.06	TEH	TEH	320
18	74	14.08	66	PVN	TEH	+0.02	TEH	TEH	320
18	75	6.37	61	PVN	TEH	+0.06	TEH	TSH	87
18	76	7.72	66	PVN	TEH	+0.03	TEH	TEH	42
19	19	8.07	98	PVN	TEH	+0.09	TEH	TEH	62
19	20	12.62	69	PVN	TEH	+0.04	TEH	TEH	266
19	21	6.37	51	PVN	TEH	+0.06	TEH	TEH	218

19	22	6.41	65	PVN	TEH	+0.03	TEH	TEH	308
		13.80	64	PVN	TEH	+0.07	TEH	TEH	318
19	24	22.00	59	PVN	TEH	+0.08	TEH	TEH	210
19	27	6.60	67	PVN	TEH	+0.10	TEH	TEH	204
19	28	9.36	72	PVN	TEH	+0.07	TEH	TEH	189
19	29	9.33	61	PVN	TEH	+0.10	TEH	TEH	239
19	30	4.64	56	PVN	TEH	+0.05	TEH	TEH	245
19	31	16.71	60	PVN	TEH	+0.09	TEH	TEH	273
19	32	13.45	64	PVN	TEH	+0.05	TEH	TEH	94
19	34	8.72	61	PVN	TEH	+0.03	TEH	TEH	269
19	35	16.46	50	PVN	TEH	+0.11	TEH	TEH	246
19	36	19.53	46	PVN	TEH	+0.05	TEH	TEH	280
19	37	13.97	56	PVN	TEH	+0.08	TEH	TEH	305
19	38	3.79	57	PVN	TEH	+0.08	TEH	TEH	194
19	39	14.48	68	PVN	TEH	+0.09	TEH	TEH	183
19	40	11.17	67	PVN	TEH	+0.07	TEH	TEH	105
19	44	5.29	83	PVN	TEH	+0.05	TEH	TEH	126
19	45	12.82	73	PVN	TEH	+0.04	TEH	TEH	156
19	50	0.89	66	PVN	TEH	+0.04	TEH	TSH	73
19	52	11.63	74	PVN	TEH	+0.06	TEH	TEH	63
19	57	19.85	61	PVN	TEH	+0.01	TEH	TEH	273
19	58	10.86	44	PVN	TEH	+0.03	TEH	TEH	187
19	59	18.22	56	PVN	TEH	+0.13	TEH	TEH	242
19	60	12.43	62	PVN	TEH	+0.00	TEH	TEH	287
19	61	10.05	84	PVN	TEH	+0.13	TEH	TEH	238
19	62	2.29	59	PVN	TEH	+0.04	TEH	TEH	159
19	63	4.66	66	PVN	TEH	+0.02	TEH	TEH	50
19	64	12.42	80	PVN	TEH	+0.05	TEH	TEH	252
19	65	8.24	52	PVN	TEH	+0.03	TEH	TEH	177
19	66	10.24	72	PVN	TEH	+0.05	TEH	TEH	150
19	67	8.39	68	PVN	TEH	+0.00	TEH	TEH	177
19	71	19.01	67	PVN	TEH	+0.02	TEH	TEH	125
19	72	18.76	58	PVN	TEH	+0.01	TEH	TEH	330
19	73	3.99	40	PVN	TEH	+0.00	TEH	TEH	239
19	74	6.30	68	PVN	TEH	+0.03	TEH	TEH	73
20	11	6.81	94	PVN	TEH	+0.02	TEH	TEH	157
20	12	5.62	79	PVN	TEH	+0.03	TEH	TEH	80
20	20	10.69	64	PVN	TEH	+0.02	TEH	TEH	157
20	21	7.36	50	PVN	TEH	+0.05	TEH	TEH	283
20	22	10.76	71	PVN	TEH	+0.07	TEH	TEH	125
20	23	10.68	66	PVN	TEH	+0.11	TEH	TEH	206
20	24	10.04	83	PVN	TEH	+0.14	TEH	TEH	301
20	25	13.64	67	PVN	TEH	+0.07	TEH	TEH	161
20	29	13.92	72	PVN	TEH	+0.04	TEH	TEH	196
20	30	14.71	42	PVN	TEH	+0.02	TEH	TEH	207
20	31	16.28	64	PVN	TEH	+0.12	TEH	TEH	223
20	32	9.15	91	PVN	TEH	+0.15	TEH	TEH	301
20	33	11.79	64	PVN	TEH	+0.10	TEH	TEH	128
20	35	10.81	73	PVN	TEH	+0.07	TEH	TEH	270
20	36	15.30	69	PVN	TEH	+0.10	TEH	TEH	175
20	37	11.54	90	PVN	TEH	+0.06	TEH	TEH	211
20	38	19.39	63	PVN	TEH	+0.01	TEH	TEH	301
20	39	10.20	63	PVN	TEH	+0.05	TEH	TEH	203
20	40	15.13	59	PVN	TEH	+0.09	TEH	TEH	340
20	41	15.56	55	PVN	TEH	+0.09	TEH	TEH	280
20	42	16.43	62	PVN	TEH	+0.06	TEH	TEH	224
20	43	22.31	65	PVN	TEH	+0.07	TEH	TEH	291
20	44	13.38	62	PVN	TEH	+0.08	TEH	TEH	142
20	45	7.97	61	PVN	TEH	+0.04	TEH	TEH	149
20	46	5.56	70	PVN	TEH	+0.01	TEH	TEH	232
20	50	3.00	46	PVN	TEH	+0.02	TEH	TEH	107

20	52	3.49	59	PVN	TEH	+0.07	TEH	TEH	45
20	53	9.33	75	PVN	TEH	+0.02	TEH	TEH	126
20	54	15.35	77	PVN	TEH	+0.05	TEH	TEH	203
20	55	3.43	52	PVN	TEH	+0.08	TEH	TEH	287
20	56	13.61	69	PVN	TEH	+0.07	TEH	TEH	360
20	57	7.01	61	PVN	TEH	+0.06	TEH	TEH	255
20	58	12.13	54	PVN	TEH	+0.03	TEH	TEH	180
20	59	18.26	69	PVN	TEH	+0.04	TEH	TEH	220
20	60	8.76	65	PVN	TEH	+0.01	TEH	TEH	111
20	61	3.87	82	PVN	TEH	+0.01	TEH	TEH	101
20	62	4.76	79	PVN	TEH	+0.03	TEH	TEH	93
20	63	8.23	68	PVN	TEH	+0.04	TEH	TEH	225
20	64	8.18	65	PVN	TEH	+0.03	TEH	TEH	295
20	65	10.66	55	PVN	TEH	+0.09	TEH	TEH	157
20	66	10.33	56	PVN	TEH	+0.05	TEH	TEH	150
20	70	23.49	63	PVN	TEH	+0.00	TEH	TEH	142
20	71	10.36	44	PVN	TEH	+0.08	TEH	TEH	217
20	72	16.70	47	PVN	TEH	+0.00	TEH	TEH	222
20	73	16.09	66	PVN	TEH	+0.02	TEH	TEH	266
21	21	7.81	71	PVN	TEH	+0.08	TEH	TEH	128
21	23	11.18	59	PVN	TEH	+0.06	TEH	TEH	287
21	24	7.95	57	PVN	TEH	+0.09	TEH	TEH	273
21	25	11.27	65	PVN	TEH	+0.08	TEH	TEH	204
21	26	21.17	60	PVN	TEH	+0.13	TEH	TEH	152
21	29	11.85	72	PVN	TEH	+0.08	TEH	TEH	104
21	30	19.78	63	PVN	TEH	+0.07	TEH	TEH	225
21	31	12.42	60	PVN	TEH	+0.10	TEH	TEH	287
21	32	15.18	62	PVN	TEH	+0.05	TEH	TEH	276
21	33	14.64	71	PVN	TEH	+0.02	TEH	TEH	199
21	34	15.43	57	PVN	TEH	+0.07	TEH	TEH	217
21	35	1.95	48	PVN	TEH	+0.12	TEH	TEH	45
21	37	14.62	63	PVN	TEH	+0.09	TEH	TEH	304
21	38	8.21	64	PVN	TEH	+0.01	TEH	TEH	77
21	39	7.04	64	PVN	TEH	+0.05	TEH	TEH	189
21	40	10.12	56	PVN	TEH	+0.04	TEH	TEH	283
21	41	15.96	69	PVN	TEH	+0.05	TEH	TEH	360
21	42	10.42	52	PVN	TEH	+0.05	TEH	TEH	259
21	43	5.13	60	PVN	TEH	+0.10	TEH	TEH	320
21	44	6.88	51	PVN	TEH	+0.05	TEH	TEH	213
21	45	14.80	68	PVN	TEH	+0.04	TEH	TEH	360
21	46	9.37	55	PVN	TEH	+0.07	TEH	TEH	280
21	47	15.15	56	PVN	TEH	+0.06	TEH	TEH	259
21	48	8.69	72	PVN	TEH	+0.08	TEH	TEH	325
21	50	11.62	66	PVN	TEH	+0.03	TEH	TEH	166
21	51	21.72	66	PVN	TEH	+0.04	TEH	TEH	270
21	52	3.89	56	PVN	TEH	+0.08	TEH	TEH	330
21	53	14.75	72	PVN	TEH	+0.03	TEH	TEH	277
21	54	15.12	67	PVN	TEH	+0.04	TEH	TEH	149
21	55	13.76	47	PVN	TEH	+0.02	TEH	TEH	235
21	56	18.64	60	PVN	TEH	+0.01	TEH	TEH	300
21	57	8.36	76	PVN	TEH	+0.00	TEH	TEH	249
21	58	11.82	51	PVN	TEH	+0.02	TEH	TEH	360
21	59	1.21	34	PVN	TEH	+0.03	TEH	TEH	69
21	60	12.72	64	PVN	TEH	+0.03	TEH	TEH	287
21	61	9.49	73	PVN	TEH	+0.05	TEH	TEH	187
21	62	13.40	71	PVN	TEH	+0.04	TEH	TEH	320
21	63	9.26	68	PVN	TEH	+0.08	TEH	TEH	133
21	64	9.96	72	PVN	TEH	+0.01	TEH	TEH	192
21	65	8.67	66	PVN	TEH	+0.03	TEH	TEH	211
21	69	21.87	63	PVN	TEH	+0.11	TEH	TEH	100
21	70	7.36	55	PVN	TEH	+0.11	TEH	TEH	270

21	71	10.65	50	PVN	TEH	+0.14	TEH TEH	360
21	72	13.65	67	PVN	TEH	+0.04	TEH TEH	287
22	24	9.75	71	PVN	TEH	+0.11	TEH TEH	228
22	25	22.30	59	PVN	TEH	+0.03	TEH TEH	294
22	26	14.99	48	PVN	TEH	+0.02	TEH TEH	203
22	27	26.24	55	PVN	TEH	+0.08	TEH TEH	184
22	30	8.13	77	PVN	TEH	+0.06	TEH TEH	238
22	31	10.87	63	PVN	TEH	+0.08	TEH TEH	304
22	33	14.52	63	PVN	TEH	+0.04	TEH TEH	260
22	34	8.87	89	PVN	TEH	+0.06	TEH TEH	185
22	35	14.15	68	PVN	TEH	+0.04	TEH TEH	290
22	36	14.62	83	PVN	TEH	+0.04	TEH TEH	168
22	37	8.19	68	PVN	TEH	+0.03	TEH TEH	35
22	40	6.69	78	PVN	TEH	+0.02	TEH TEH	159
22	41	11.80	46	PVN	TEH	+0.02	TEH TEH	249
22	42	11.25	84	PVN	TEH	+0.05	TEH TEH	263
22	44	8.77	68	PVN	TEH	+0.03	TEH TEH	150
22	45	11.81	64	PVN	TEH	+0.06	TEH TEH	260
22	46	4.72	54	PVN	TEH	+0.08	TEH TEH	360
22	48	2.80	58	PVN	TEH	+0.10	TEH TEH	290
22	49	5.42	52	PVN	TEH	+0.08	TEH TEH	248
22	50	2.59	52	PVN	TEH	+0.11	TEH TEH	238
22	51	1.46	60	PVN	TEH	+0.10	TEH TEH	310
22	52	5.26	53	PVN	TEH	+0.07	TEH TEH	340
22	53	4.65	39	PVN	TEH	+0.08	TEH TEH	260
22	54	12.73	64	PVN	TEH	+0.05	TEH TEH	241
22	55	15.45	71	PVN	TEH	+0.04	TEH TEH	294
22	56	12.33	45	PVN	TEH	+0.00	TEH TEH	256
22	57	9.85	83	PVN	TEH	+0.04	TEH TEH	220
22	58	10.56	67	PVN	TEH	+0.01	TEH TEH	154
22	59	17.26	70	PVN	TEH	+0.08	TEH TEH	206
22	60	6.22	67	PVN	TEH	+0.02	TEH TEH	308
22	61	4.50	64	PVN	TEH	+0.06	TEH TEH	136
22	62	14.26	63	PVN	TEH	+0.13	TEH TEH	224
22	63	2.84	70	PVN	TEH	+0.03	TEH TEH	55
22	68	22.22	68	PVN	TEH	+0.08	TEH TEH	125
22	69	13.86	55	PVN	TEH	+0.08	TEH TEH	182
22	70	9.18	47	PVN	TEH	+0.05	TEH TEH	280
22	71	10.58	63	PVN	TEH	+0.04	TEH TEH	300
22	72	3.66	64	PVN	TEH	+0.07	TEH TEH	28
23	24	11.05	71	PVN	TEH	+0.10	TEH TEH	287
23	25	2.62	42	PVN	TEH	+0.02	TEH TEH	315
		15.19	69	PVN	TEH	+0.04	TEH TSH	139
23	26	15.96	60	PVN	TEH	+0.04	TEH TSH	225
23	27	17.80	71	PVN	TEH	+0.07	TEH TEH	336
23	28	23.96	58	PVN	TEH	+0.11	TEH TEH	140
23	31	5.27	66	PVN	TEH	+0.05	TEH TEH	62
23	34	12.86	66	PVN	TEH	+0.04	TEH TEH	210
23	36	14.37	71	PVN	TEH	+0.06	TEH TEH	206
23	37	9.56	75	PVN	TEH	+0.10	TEH TEH	318
23	38	17.04	61	PVN	TEH	+0.06	TEH TEH	213
23	39	8.33	54	PVN	TEH	+0.05	TEH TEH	87
23	41	9.29	58	PVN	TEH	+0.03	TEH TSH	170
23	42	11.66	80	PVN	TEH	+0.02	TEH TEH	214
23	43	2.52	58	PVN	TEH	+0.09	TEH TEH	300
23	44	4.08	61	PVN	TEH	+0.05	TEH TEH	63
23	45	4.52	60	PVN	TEH	+0.06	TEH TEH	242
23	46	18.43	64	PVN	TEH	+0.03	TEH TEH	173
23	47	2.96	64	PVN	TEH	+0.08	TEH TEH	249
23	48	6.91	69	PVN	TEH	+0.05	TEH TEH	166
23	49	9.25	88	PVN	TEH	+0.01	TEH TEH	152

23	50	12.23	68	PVN	TEH	+0.04	TEH	TEH	235
23	51	8.37	72	PVN	TEH	+0.02	TEH	TEH	194
23	52	9.07	62	PVN	TEH	+0.03	TEH	TSH	170
23	53	16.26	59	PVN	TEH	+0.04	TEH	TEH	308
23	54	6.30	78	PVN	TEH	+0.03	TEH	TEH	87
23	56	5.38	58	PVN	TEH	+0.06	TEH	TEH	87
23	57	17.54	73	PVN	TEH	+0.09	TEH	TEH	194
23	58	15.34	57	PVN	TEH	+0.01	TEH	TEH	249
23	59	8.83	81	PVN	TEH	+0.04	TEH	TEH	135
23	60	11.02	65	PVN	TEH	+0.03	TEH	TEH	340
23	61	12.80	72	PVN	TEH	+0.02	TEH	TEH	121
23	62	11.83	69	PVN	TEH	+0.05	TEH	TEH	98
23	67	23.47	67	PVN	TEH	+0.08	TEH	TEH	135
23	68	10.32	59	PVN	TEH	+0.05	TEH	TEH	330
23	69	16.58	60	PVN	TEH	+0.11	TEH	TEH	241
23	70	7.35	67	PVN	TEH	+0.01	TEH	TEH	294
24	26	13.20	77	PVN	TEH	+0.13	TEH	TEH	270
24	27	7.14	57	PVN	TEH	+0.11	TEH	TEH	231
24	28	10.98	44	PVN	TEH	+0.06	TEH	TEH	235
24	29	19.21	69	PVN	TEH	+0.09	TEH	TEH	224
24	32	4.09	74	PVN	TEH	+0.07	TEH	TEH	76
24	35	11.53	71	PVN	TEH	+0.04	TEH	TEH	150
24	36	5.32	68	PVN	TEH	+0.03	TEH	TEH	224
24	37	13.52	71	PVN	TEH	+0.04	TEH	TEH	150
24	38	7.14	72	PVN	TEH	+0.05	TEH	TEH	170
24	39	14.45	58	PVN	TEH	+0.06	TEH	TEH	360
24	40	12.98	63	PVN	TEH	+0.05	TEH	TEH	360
24	41	17.60	59	PVN	TEH	+0.08	TEH	TEH	210
24	42	17.83	68	PVN	TEH	+0.01	TEH	TSH	170
24	43	20.40	60	PVN	TEH	+0.08	TEH	TEH	198
24	44	3.74	55	PVN	TEH	+0.04	TEH	TEH	87
24	52	12.06	72	PVN	TEH	+0.05	TEH	TEH	85
24	53	16.60	61	PVN	TEH	+0.06	TEH	TEH	112
24	54	15.19	77	PVN	TEH	+0.01	TEH	TEH	189
24	55	12.78	60	PVN	TEH	+0.06	TEH	TEH	266
24	56	18.39	73	PVN	TEH	+0.04	TEH	TEH	322
24	57	11.21	70	PVN	TEH	+0.04	TEH	TEH	266
24	58	13.39	68	PVN	TEH	+0.06	TEH	TEH	185
24	59	4.65	70	PVN	TEH	+0.01	TEH	TEH	126
24	60	16.65	76	PVN	TEH	+0.15	TEH	TEH	232
24	62	5.75	73	PVN	TEH	+0.00	TEH	TEH	156
24	66	28.61	60	PVN	TEH	+0.05	TEH	TEH	234
24	67	9.92	47	PVN	TEH	+0.01	TEH	TEH	227
24	68	16.98	52	PVN	TEH	+0.09	TEH	TEH	196
24	69	11.97	65	PVN	TEH	+0.08	TEH	TEH	231
24	70	14.86	72	PVN	TEH	+0.01	TEH	TEH	157
25	28	9.38	52	PVN	TEH	+0.07	TEH	TEH	269
25	29	12.49	73	PVN	TEH	+0.08	TEH	TEH	267
25	30	14.96	56	PVN	TEH	+0.06	TEH	TEH	163
25	31	22.63	62	PVN	TEH	+0.13	TEH	TEH	104
25	36	9.23	67	PVN	TEH	+0.01	TEH	TEH	59
25	37	3.41	66	PVN	TEH	+0.03	TEH	TEH	101
25	38	14.79	66	PVN	TEH	+0.04	TEH	TEH	192
25	39	6.79	79	PVN	TEH	+0.08	TEH	TSH	159
25	40	12.82	66	PVN	TEH	+0.02	TEH	TEH	315
25	41	9.63	63	PVN	TEH	+0.05	TEH	TEH	297
25	42	4.22	71	PVN	TEH	+0.08	TEH	TEH	359
25	43	10.77	59	PVN	TEH	+0.01	TEH	TEH	360
25	44	8.98	68	PVN	TEH	+0.04	TEH	TEH	320
25	45	10.11	57	PVN	TEH	+0.07	TEH	TEH	245
25	46	16.50	67	PVN	TEH	+0.03	TEH	TEH	273

25	47	8.81	58	PVN	TEH	+0.12	TEH	TEH	241
25	48	21.39	66	PVN	TEH	+0.08	TEH	TEH	248
25	49	14.03	68	PVN	TEH	+0.06	TEH	TEH	284
25	50	14.62	69	PVN	TEH	+0.04	TEH	TEH	315
25	51	18.74	74	PVN	TEH	+0.03	TEH	TEH	256
25	52	10.43	69	PVN	TEH	+0.04	TEH	TEH	178
25	53	7.34	59	PVN	TEH	+0.08	TEH	TSH	201
25	54	8.28	59	PVN	TEH	+0.01	TEH	TEH	97
25	55	15.05	70	PVN	TEH	+0.06	TEH	TSH	276
25	56	10.02	69	PVN	TEH	+0.06	TEH	TEH	248
25	57	4.08	71	PVN	TEH	+0.06	TEH	TEH	90
25	64	15.96	77	PVN	TEH	+0.03	TEH	TEH	150
25	65	13.43	79	PVN	TEH	+0.03	TEH	TEH	298
25	66	5.87	71	PVN	TEH	+0.03	TEH	TEH	249
25	67	8.00	67	PVN	TEH	+0.02	TEH	TEH	246
25	68	6.09	67	PVN	TEH	+0.04	TEH	TEH	330
25	69	15.63	61	PVN	TEH	+0.09	TEH	TEH	87
25	70	8.02	86	PVN	TEH	+0.05	TEH	TEH	90
26	28	21.49	63	PVN	TEH	+0.11	TEH	TEH	190
26	29	10.38	59	PVN	TEH	+0.12	TEH	TEH	234
26	30	5.79	56	PVN	TEH	+0.12	TEH	TEH	241
26	31	1.47	69	PVN	TEH	+0.16	TEH	TEH	175
26	32	18.61	64	PVN	TEH	+0.14	TEH	TEH	239
26	39	4.56	76	PVN	TEH	+0.00	TEH	TEH	111
26	40	3.19	60	PVN	TEH	+0.05	TEH	TEH	66
26	41	15.02	65	PVN	TEH	+0.01	TEH	TEH	335
26	42	9.16	51	PVN	TEH	+0.05	TEH	TEH	287
26	43	19.11	61	PVN	TEH	+0.07	TEH	TEH	340
26	44	11.78	55	PVN	TEH	+0.05	TEH	TEH	287
26	45	6.46	64	PVN	TEH	+0.07	TEH	TSH	320
26	46	12.00	71	PVN	TEH	+0.05	TEH	TEH	196
26	49	6.56	61	PVN	TEH	+0.13	TEH	TEH	248
26	50	8.23	56	PVN	TEH	+0.08	TEH	TEH	297
26	51	6.20	59	PVN	TEH	+0.06	TEH	TEH	262
26	52	11.85	62	PVN	TEH	+0.04	TEH	TEH	180
26	53	8.66	74	PVN	TEH	+0.04	TEH	TEH	298
26	54	11.76	72	PVN	TEH	+0.03	TEH	TEH	161
26	55	8.11	66	PVN	TEH	+0.11	TEH	TSH	253
26	63	15.35	73	PVN	TEH	+0.02	TEH	TEH	234
26	64	4.01	72	PVN	TEH	+0.07	TEH	TEH	152
26	65	14.71	61	PVN	TEH	+0.03	TEH	TEH	310
26	66	12.86	69	PVN	TEH	+0.03	TEH	TEH	310
26	67	12.28	74	PVN	TEH	+0.05	TEH	TEH	171
26	68	1.56	50	PVN	TEH	+0.02	TEH	TEH	48
26	69	20.04	70	PVN	TEH	+0.02	TEH	TEH	291
26	70	8.79	54	PVN	TEH	+0.03	TEH	TEH	189
26	71	3.01	69	PVN	TEH	+0.04	TEH	TEH	129
27	29	11.97	73	PVN	TEH	+0.10	TEH	TEH	107
27	30	18.82	73	PVN	TEH	+0.13	TEH	TEH	263
27	32	3.78	51	PVN	TEH	+0.12	TEH	TEH	171
27	33	16.50	61	PVN	TEH	+0.02	TEH	TEH	231
27	34	19.23	59	PVN	TEH	+0.09	TEH	TEH	203
27	40	1.72	64	PVN	TEH	+0.05	TEH	TEH	112
27	41	8.31	64	PVN	TEH	+0.03	TEH	TEH	336
27	45	5.06	54	PVN	TEH	+0.06	TEH	TEH	215
27	46	12.16	72	PVN	TEH	+0.01	TEH	TEH	121
27	50	8.57	64	PVN	TEH	+0.05	TEH	TEH	108
27	51	9.36	69	PVN	TEH	+0.02	TEH	TEH	76
27	53	4.32	64	PVN	TEH	+0.07	TEH	TEH	84
27	54	5.36	97	PVN	TEH	+0.01	TEH	TEH	170
27	56	6.21	69	PVN	TEH	+0.01	TEH	TEH	91

27	60	9.72	75	PVN	TEH	+0.03	TEH	TEH	63
27	61	8.47	86	PVN	TEH	+0.02	TEH	TEH	135
27	62	7.65	59	PVN	TEH	+0.08	TEH	TEH	290
27	63	4.75	64	PVN	TEH	+0.04	TEH	TEH	360
27	64	15.33	38	PVN	TEH	+0.02	TEH	TEH	320
27	65	7.40	65	PVN	TEH	+0.02	TEH	TEH	270
27	66	12.57	78	PVN	TEH	+0.01	TEH	TEH	156
27	68	17.35	58	PVN	TEH	+0.07	TEH	TEH	192
27	69	16.37	52	PVN	TEH	+0.00	TEH	TEH	183
27	70	18.03	75	PVN	TEH	+0.05	TEH	TEH	163
28	31	12.92	61	PVN	TEH	+0.07	TEH	TEH	189
28	32	13.89	40	PVN	TEH	+0.10	TEH	TEH	252
28	33	21.20	58	PVN	TEH	+0.01	TEH	TEH	199
28	34	8.25	48	PVN	TEH	+0.07	TEH	TEH	310
28	35	8.04	65	PVN	TEH	+0.05	TEH	TEH	178
28	36	11.58	68	PVN	TEH	+0.05	TEH	TEH	220
28	37	21.40	62	PVN	TEH	+0.10	TEH	TEH	166
28	43	19.06	61	PVN	TEH	+0.08	TEH	TEH	239
28	45	10.72	65	PVN	TEH	+0.04	TEH	TEH	128
28	47	1.79	43	PVN	TEH	+0.12	TEH	TEH	126
28	48	11.19	68	PVN	TEH	+0.04	TEH	TEH	249
28	50	5.57	64	PVN	TEH	+0.02	TEH	TEH	98
28	51	9.68	69	PVN	TEH	+0.03	TEH	TEH	224
28	52	17.89	60	PVN	TEH	+0.02	TEH	TEH	253
28	53	10.56	85	PVN	TEH	+0.03	TEH	TEH	166
28	58	7.76	73	PVN	TEH	+0.05	TEH	TEH	83
28	59	23.96	64	PVN	TEH	+0.08	TEH	TEH	213
28	60	15.26	48	PVN	TEH	+0.11	TEH	TEH	294
28	61	15.28	60	PVN	TEH	+0.01	TEH	TEH	255
28	62	3.80	70	PVN	TEH	+0.05	TEH	TEH	263
28	63	11.41	79	PVN	TEH	+0.02	TEH	TEH	182
28	64	14.55	78	PVN	TEH	+0.01	TEH	TEH	197
28	66	6.61	80	PVN	TEH	+0.02	TEH	TEH	87
28	67	7.82	66	PVN	TEH	+0.02	TEH	TEH	252
28	68	8.85	47	PVN	TEH	+0.02	TEH	TEH	183
28	69	13.76	74	PVN	TEH	+0.02	TEH	TEH	126
29	33	17.32	72	PVN	TEH	+0.06	TEH	TEH	196
29	34	14.28	66	PVN	TEH	+0.10	TEH	TEH	241
29	35	16.87	65	PVN	TEH	+0.05	TEH	TEH	308
29	36	12.33	83	PVN	TEH	+0.05	TEH	TEH	297
29	37	8.20	53	PVN	TEH	+0.09	TEH	TEH	287
29	39	11.53	52	PVN	TEH	+0.07	TEH	TEH	203
29	40	13.15	54	PVN	TEH	+0.07	TEH	TEH	147
29	41	18.38	69	PVN	TEH	+0.05	TEH	TEH	66
29	55	14.92	67	PVN	TEH	+0.04	TEH	TEH	142
29	56	21.36	68	PVN	TEH	+0.03	TEH	TEH	224
29	57	6.33	72	PVN	TEH	+0.02	TEH	TEH	308
29	58	14.60	48	PVN	TEH	+0.01	TEH	TEH	300
29	59	5.01	43	PVN	TEH	+0.01	TEH	TEH	291
29	60	6.50	64	PVN	TEH	+0.01	TEH	TEH	300
29	61	3.83	49	PVN	TEH	+0.05	TEH	TEH	225
29	62	14.04	69	PVN	TEH	+0.03	TEH	TEH	210
29	63	8.32	82	PVN	TEH	+0.11	TEH	TEH	66
29	66	8.95	63	PVN	TEH	+0.03	TEH	TEH	173
30	35	14.39	66	PVN	TEH	+0.04	TEH	TEH	119
30	37	15.39	53	PVN	TEH	+0.07	TEH	TEH	215
30	38	8.51	62	PVN	TEH	+0.10	TEH	TEH	320
30	39	13.51	74	PVN	TEH	+0.10	TEH	TEH	284
30	40	10.06	42	PVN	TEH	+0.01	TEH	TEH	263
30	41	8.00	78	PVN	TEH	+0.04	TEH	TEH	240
30	42	12.62	50	PVN	TEH	+0.05	TEH	TEH	318

30	43	19.54	65	PVN	TEH	+0.03	TEH TEH	277
30	44	24.63	55	PVN	TEH	+0.03	TEH TSH	249
30	45	19.25	57	PVN	TEH	+0.09	TEH TEH	218
30	46	21.82	63	PVN	TEH	+0.05	TEH TEH	182
30	47	18.82	65	PVN	TEH	+0.04	TEH TEH	168
30	48	21.01	64	PVN	TEH	+0.04	TEH TEH	171
30	49	22.43	60	PVN	TEH	+0.05	TEH TEH	154
30	50	18.59	76	PVN	TEH	+0.01	TEH TEH	154
30	51	16.97	58	PVN	TEH	+0.05	TEH TEH	213
30	52	25.91	62	PVN	TEH	+0.04	TEH TEH	260
30	53	9.72	52	PVN	TEH	+0.07	TEH TEH	224
30	54	17.33	66	PVN	TEH	+0.04	TEH TEH	248
30	55	2.24	42	PVN	TEH	+0.10	TEH TEH	208
30	56	13.70	67	PVN	TEH	+0.07	TEH TEH	320
30	57	10.92	79	PVN	TEH	+0.05	TEH TEH	340
30	58	12.76	88	PVN	TEH	+0.01	TEH TEH	310
30	60	13.09	70	PVN	TEH	+0.01	TEH TEH	206
30	61	9.51	76	PVN	TEH	+0.02	TEH TEH	98
31	38	6.51	75	PVN	TEH	+0.01	TEH TEH	135
31	39	10.68	73	PVN	TEH	+0.02	TEH TEH	249
31	40	8.50	72	PVN	TEH	+0.06	TEH TEH	189
31	41	9.86	63	PVN	TEH	+0.04	TEH TEH	215
31	42	12.56	67	PVN	TEH	+0.01	TEH TEH	329
31	43	9.05	51	PVN	TEH	+0.02	TEH TEH	332
31	44	18.20	56	PVN	TEH	+0.01	TEH TEH	315
31	45	10.92	67	PVN	TEH	+0.03	TEH TEH	291
31	46	10.49	61	PVN	TEH	+0.03	TEH TEH	267
31	47	8.50	56	PVN	TEH	+0.04	TEH TEH	213
31	48	10.13	73	PVN	TEH	+0.02	TEH TEH	209
31	49	10.19	72	PVN	TEH	+0.01	TEH TEH	294
31	50	13.16	68	PVN	TEH	+0.02	TEH TEH	228
31	52	13.31	51	PVN	TEH	+0.07	TEH TEH	360
31	53	4.35	40	PVN	TEH	+0.05	TEH TSH	253
31	54	11.37	69	PVN	TEH	+0.01	TEH TEH	196
31	55	4.05	55	PVN	TEH	+0.08	TEH TEH	70
31	56	9.63	62	PVN	TEH	+0.06	TEH TEH	273
31	79	1.50	33	PVN	TEH	+0.12	TEH TEH	14
32	42	6.74	63	PVN	TEH	+0.08	TEH TEH	112
32	43	3.05	64	PVN	TEH	+0.07	TEH TEH	118
32	44	11.61	80	PVN	TEH	+0.12	TEH TEH	210
32	45	11.30	83	PVN	TEH	+0.10	TEH TEH	276
32	46	18.67	64	PVN	TEH	+0.05	TEH TEH	308
32	47	15.09	68	PVN	TEH	+0.10	TEH TEH	325
32	48	11.17	60	PVN	TEH	+0.10	TEH TEH	300
32	49	13.16	67	PVN	TEH	+0.05	TEH TEH	245
32	50	12.27	68	PVN	TEH	+0.09	TEH TEH	227
32	51	3.88	61	PVN	TEH	+0.07	TEH TEH	180
32	52	15.06	76	PVN	TEH	+0.12	TEH TEH	197
33	24	7.97	48	PVN	TEH	+0.03	TEH TEH	87
35	60	4.30	41	PVN	TEH	+0.08	TEH TEH	119

Table of Unit 1 B Steam Generator
Hot Leg Permeability Variation Indications
Refueling Outage R22

Summary Unit 1 B Steam Generator Cold Leg Permeability Variations

ROW	COL	VOLTS	DEG	IND	%TW	LOCATION	EXT	EXT	Circ.Extent
1	6	6.02	79	PVN	TEC	+0.02	TEC	TEC	108
1	13	8.58	67	PVN	TEC	+0.02	TEC	TEC	129
1	14	10.95	59	PVN	TEC	+0.04	TEC	TEC	329
1	15	10.83	51	PVN	TEC	+0.05	TEC	TEC	140
1	17	15.21	72	PVN	TEC	-0.00	TEC	TEC	150
1	19	2.45	43	PVN	TEC	+0.08	TEC	TEC	192
1	20	14.94	59	PVN	TEC	+0.01	TEC	TEC	290
1	21	10.61	54	PVN	TEC	+0.03	TEC	TEC	182
1	22	13.48	62	PVN	TEC	+0.02	TEC	TEC	227
1	25	13.01	69	PVN	TEC	+0.00	TEC	TEC	150
1	29	10.12	77	PVN	TEC	+0.02	TEC	TEC	147
1	30	13.81	54	PVN	TEC	+0.04	TEC	TEC	304
1	35	14.83	58	PVN	TEC	+0.00	TEC	TEC	354
1	36	10.25	69	PVN	TEC	+0.00	TEC	TEC	360
1	37	4.33	79	PVN	TEC	+0.01	TEC	TEC	129
1	39	10.28	70	PVN	TEC	+0.05	TEC	TEC	143
1	51	8.04	70	PVN	TEC	+0.00	TEC	TEC	115
1	55	3.05	51	PVN	TEC	+0.04	TEC	TEC	66
1	61	7.37	60	PVN	TEC	+0.00	TEC	TEC	360
1	63	11.10	71	PVN	TEC	+0.01	TEC	TEC	126
1	65	6.37	63	PVN	TEC	+0.01	TEC	TEC	31
1	66	8.95	56	PVN	TEC	+0.04	TEC	TEC	74
1	70	9.41	63	PVN	TEC	+0.04	TEC	TEC	88
1	71	10.93	75	PVN	TEC	+0.00	TEC	TEC	161
1	73	10.23	63	PVN	TEC	+0.01	TEC	TEC	108
1	74	8.01	57	PVN	TEC	+0.04	TEC	TEC	261
1	75	14.03	65	PVN	TEC	+0.02	TEC	TEC	266
1	78	14.46	61	PVN	TEC	+0.06	TEC	TEC	115
1	79	8.74	50	PVN	TEC	+0.04	TEC	TEC	245
1	80	10.46	62	PVN	TEC	+0.02	TEC	TEC	259
1	83	13.32	67	PVN	TEC	+0.01	TEC	TEC	143
1	84	14.84	58	PVN	TEC	+0.05	TEC	TEC	136
1	85	5.09	70	PVN	TEC	+0.00	TEC	TEC	255
2	13	2.06	72	PVN	TEC	+0.06	TEC	TEC	73
2	14	12.23	62	PVN	TEC	+0.02	TEC	TEC	332
2	15	11.11	54	PVN	TEC	+0.07	TEC	TEC	329
2	16	9.94	65	PVN	TEC	+0.07	TEC	TEC	322
2	17	19.01	72	PVN	TEC	+0.13	TEC	TEC	213
2	19	4.79	69	PVN	TEC	+0.09	TEC	TEC	80
2	20	11.73	77	PVN	TEC	+0.04	TEC	TEC	325
2	21	15.20	69	PVN	TEC	+0.11	TEC	TEC	231
2	22	6.34	74	PVN	TEC	+0.02	TEC	TEC	255
2	23	9.70	84	PVN	TEC	+0.00	TEC	TEC	213
2	25	14.77	67	PVN	TEC	+0.00	TEC	TEC	150
2	26	9.85	64	PVN	TEC	+0.03	TEC	TEC	301
2	29	7.96	62	PVN	TEC	+0.02	TEC	TEC	77
2	30	6.54	55	PVN	TEC	+0.11	TEC	TEC	290
2	33	2.48	49	PVN	TEC	+0.03	TEC	TEC	146
2	34	10.17	55	PVN	TEC	+0.02	TEC	TEC	300
2	35	10.82	64	PVN	TEC	+0.00	TEC	TEC	360
2	36	15.72	62	PVN	TEC	+0.02	TEC	TEC	360
2	37	16.74	67	PVN	TEC	+0.05	TEC	TEC	283

2	40	10.51	69	PVN	TEC	+0.02	TEC	TEC	175
2	43	5.39	57	PVN	TEC	+0.01	TEC	TEC	180
2	44	9.49	60	PVN	TEC	+0.09	TEC	TEC	213
2	45	1.31	54	PVN	TEC	+0.02	TEC	TEC	30
2	51	5.71	74	PVN	TEC	+0.00	TEC	TEC	133
2	52	2.32	49	PVN	TEC	+0.03	TEC	TEC	59
2	53	7.14	74	PVN	TEC	+0.00	TEC	TEC	178
2	54	12.90	68	PVN	TEC	+0.06	TEC	TEC	162
2	55	14.57	66	PVN	TEC	+0.00	TEC	TEC	199
2	56	12.84	61	PVN	TEC	+0.07	TEC	TEC	325
2	60	4.22	51	PVN	TEC	+0.06	TEC	TEC	60
2	61	14.71	65	PVN	TEC	+0.00	TEC	TEC	238
2	62	13.50	76	PVN	TEC	+0.07	TEC	TEC	314
2	63	11.93	72	PVN	TEC	+0.03	TEC	TEC	248
2	64	10.69	67	PVN	TEC	+0.07	TEC	TEC	180
2	67	13.55	65	PVN	TEC	+0.05	TEC	TEC	294
2	71	6.30	68	PVN	TEC	+0.02	TEC	TEC	129
2	73	8.13	75	PVN	TEC	+0.03	TEC	TEC	129
2	74	7.74	54	PVN	TEC	+0.01	TEC	TEC	142
2	75	6.63	76	PVN	TEC	+0.01	TEC	TEC	190
2	77	5.23	70	PVN	TEC	+0.00	TEC	TEC	45
2	78	15.84	84	PVN	TEC	+0.05	TEC	TEC	165
2	79	11.16	61	PVN	TEC	+0.06	TEC	TEC	213
2	80	9.06	83	PVN	TEC	+0.01	TEC	TEC	227
2	83	12.83	88	PVN	TEC	+0.01	TEC	TEC	199
3	13	11.96	57	PVN	TEC	+0.11	TEC	TEC	119
3	14	11.09	53	PVN	TEC	+0.03	TEC	TEC	329
3	15	11.23	51	PVN	TEC	+0.05	TEC	TEC	220
3	16	6.53	55	PVN	TEC	+0.08	TEC	TEC	339
3	17	19.64	64	PVN	TEC	+0.03	TEC	TEC	192
3	19	12.73	57	PVN	TEC	+0.07	TEC	TEC	168
3	20	13.25	69	PVN	TEC	+0.03	TEC	TEC	276
3	21	11.75	55	PVN	TEC	+0.08	TEC	TEC	248
3	22	10.76	64	PVN	TEC	+0.05	TEC	TEC	157
3	23	8.47	61	PVN	TEC	+0.02	TEC	TEC	105
3	25	9.48	66	PVN	TEC	+0.00	TEC	TEC	119
3	26	5.78	55	PVN	TEC	+0.02	TEC	TEC	287
3	30	9.15	61	PVN	TEC	+0.09	TEC	TEC	322
3	34	7.39	68	PVN	TEC	+0.05	TEC	TEC	333
3	35	12.82	82	PVN	TEC	+0.00	TEC	TEC	355
3	36	11.34	78	PVN	TEC	+0.03	TEC	TEC	360
3	37	16.03	48	PVN	TEC	+0.07	TEC	TEC	360
3	38	13.64	61	PVN	TEC	+0.04	TEC	TEC	120
3	40	7.12	74	PVN	TEC	+0.02	TEC	TEC	109
3	46	11.08	60	PVN	TEC	+0.04	TEC	TEC	140
3	49	5.19	80	PVN	TEC	+0.02	TEC	TEC	120
3	51	17.70	66	PVN	TEC	+0.07	TEC	TEC	226
3	53	20.70	62	PVN	TEC	+0.03	TEC	TEC	205
3	54	16.75	49	PVN	TEC	+0.02	TEC	TEC	328
3	55	10.96	57	PVN	TEC	+0.05	TEC	TEC	265
3	56	15.23	66	PVN	TEC	+0.03	TEC	TEC	229
3	57	12.33	69	PVN	TEC	+0.02	TEC	TEC	222
3	61	10.69	62	PVN	TEC	+0.03	TEC	TEC	360
3	62	11.59	64	PVN	TEC	+0.02	TEC	TEC	307
3	63	13.33	64	PVN	TEC	+0.08	TEC	TEC	220
3	67	17.61	51	PVN	TEC	+0.05	TEC	TEC	269
3	73	15.05	60	PVN	TEC	+0.10	TEC	TEC	283

3	74	11.86	63	PVN	TEC	+0.07	TEC	TEC	272
3	75	11.17	64	PVN	TEC	+0.08	TEC	TEC	227
3	76	3.56	89	PVN	TEC	+0.02	TEC	TEC	94
3	78	17.40	72	PVN	TEC	+0.03	TEC	TEC	178
3	79	11.52	80	PVN	TEC	+0.03	TEC	TEC	273
3	80	12.20	84	PVN	TEC	+0.05	TEC	TEC	203
3	83	12.76	58	PVN	TEC	+0.10	TEC	TEC	203
3	84	5.08	52	PVN	TEC	+0.01	TEC	TEC	105
3	85	15.44	71	PVN	TEC	+0.04	TEC	TEC	206
3	86	11.81	63	PVN	TEC	+0.02	TEC	TEC	77
4	14	9.36	70	PVN	TEC	+0.04	TEC	TEC	311
4	15	10.16	49	PVN	TEC	+0.00	TEC	TEC	273
4	16	10.57	58	PVN	TEC	+0.02	TEC	TEC	329
4	17	19.14	71	PVN	TEC	+0.10	TEC	TEC	301
4	20	8.96	70	PVN	TEC	+0.01	TEC	TEC	279
4	21	13.17	72	PVN	TEC	+0.02	TEC	TEC	283
4	22	9.22	75	PVN	TEC	+0.03	TEC	TEC	171
4	25	6.81	59	PVN	TEC	+0.01	TEC	TEC	73
4	26	9.04	51	PVN	TEC	+0.06	TEC	TEC	297
4	27	5.10	61	PVN	TEC	+0.00	TEC	TEC	56
4	30	9.41	67	PVN	TEC	+0.02	TEC	TEC	227
4	31	17.73	65	PVN	TEC	+0.02	TEC	TEC	129
4	33	3.55	60	PVN	TEC	+0.00	TEC	TEC	308
4	34	8.21	66	PVN	TEC	+0.07	TEC	TEC	301
4	35	12.20	65	PVN	TEC	+0.03	TEC	TEC	234
4	36	17.64	61	PVN	TEC	+0.10	TEC	TEC	318
4	37	11.06	62	PVN	TEC	+0.12	TEC	TEC	235
4	38	8.48	66	PVN	TEC	+0.00	TEC	TEC	176
4	50	19.48	56	PVN	TEC	+0.04	TEC	TEC	282
4	51	13.69	53	PVN	TEC	+0.00	TEC	TEC	360
4	53	7.24	68	PVN	TEC	+0.00	TEC	TEC	336
4	54	11.80	57	PVN	TEC	+0.06	TEC	TEC	272
4	55	6.63	44	PVN	TEC	+0.00	TEC	TEC	360
4	56	4.95	66	PVN	TEC	+0.02	TEC	TEC	85
4	57	7.87	72	PVN	TEC	+0.00	TEC	TEC	133
4	59	10.88	72	PVN	TEC	+0.06	TEC	TEC	290
4	60	11.74	63	PVN	TEC	+0.08	TEC	TEC	289
4	61	12.44	66	PVN	TEC	+0.00	TEC	TEC	224
4	62	7.55	74	PVN	TEC	+0.05	TEC	TEC	201
4	67	13.08	46	PVN	TEC	+0.03	TEC	TEC	255
4	73	11.03	74	PVN	TEC	+0.03	TEC	TEC	287
4	74	14.15	72	PVN	TEC	+0.04	TEC	TEC	148
4	75	12.32	66	PVN	TEC	+0.03	TEC	TEC	182
4	76	8.33	70	PVN	TEC	+0.01	TEC	TEC	135
4	78	22.04	59	PVN	TEC	+0.06	TEC	TEC	238
4	79	14.07	75	PVN	TEC	+0.01	TEC	TEC	255
4	80	6.36	70	PVN	TEC	+0.00	TEC	TEC	147
4	83	8.16	73	PVN	TEC	+0.01	TEC	TEC	115
4	84	16.14	77	PVN	TEC	+0.04	TEC	TEC	143
4	85	12.01	74	PVN	TEC	+0.00	TEC	TEC	217
5	10	10.11	65	PVN	TEC	+0.05	TEC	TEC	119
5	11	13.52	70	PVN	TEC	+0.10	TEC	TEC	147
5	14	9.78	77	PVN	TEC	+0.04	TEC	TEC	209
5	15	8.13	51	PVN	TEC	+0.05	TEC	TEC	300
5	16	5.80	65	PVN	TEC	+0.04	TEC	TEC	336
5	17	10.37	44	PVN	TEC	+0.03	TEC	TEC	157
5	19	11.99	59	PVN	TEC	+0.01	TEC	TEC	119

5	20	6.86	58	PVN	TEC	+0.03	TEC	TEC	283
5	21	10.83	69	PVN	TEC	+0.03	TEC	TEC	269
5	22	7.07	68	PVN	TEC	+0.02	TEC	TEC	139
5	23	16.24	60	PVN	TEC	+0.00	TEC	TEC	91
5	24	3.09	54	PVN	TEC	+0.02	TEC	TEC	172
5	25	7.95	62	PVN	TEC	+0.04	TEC	TEC	347
5	26	14.00	65	PVN	TEC	+0.04	TEC	TEC	276
5	30	6.92	63	PVN	TEC	+0.08	TEC	TEC	231
5	31	9.75	59	PVN	TEC	+0.06	TEC	TEC	217
5	34	5.60	43	PVN	TEC	+0.09	TEC	TEC	273
5	35	8.23	53	PVN	TEC	+0.08	TEC	TEC	325
5	36	11.76	62	PVN	TEC	+0.01	TEC	TEC	290
5	37	14.77	59	PVN	TEC	+0.02	TEC	TEC	233
5	38	13.58	53	PVN	TEC	+0.05	TEC	TEC	360
5	39	12.17	64	PVN	TEC	+0.05	TEC	TEC	56
5	48	4.88	75	PVN	TEC	+0.02	TEC	TEC	131
5	50	13.42	71	PVN	TEC	+0.02	TEC	TEC	184
5	51	14.04	55	PVN	TEC	+0.01	TEC	TEC	320
5	53	19.00	52	PVN	TEC	+0.01	TEC	TEC	360
5	55	12.32	48	PVN	TEC	+0.01	TEC	TEC	226
5	58	7.53	56	PVN	TEC	+0.06	TEC	TEC	152
5	59	14.14	54	PVN	TEC	+0.00	TEC	TEC	360
5	60	4.89	58	PVN	TEC	+0.04	TEC	TEC	244
5	61	11.34	88	PVN	TEC	+0.05	TEC	TEC	134
5	64	5.20	64	PVN	TEC	+0.05	TEC	TEC	81
5	67	18.97	69	PVN	TEC	+0.07	TEC	TEC	245
5	72	6.03	80	PVN	TEC	+0.03	TEC	TEC	106
5	73	11.90	63	PVN	TEC	+0.07	TEC	TEC	205
5	78	13.70	68	PVN	TEC	+0.02	TEC	TEC	276
5	79	16.02	61	PVN	TEC	+0.09	TEC	TEC	203
5	80	13.00	73	PVN	TEC	+0.04	TEC	TEC	210
5	83	2.33	36	PVN	TEC	+0.03	TEC	TEC	161
5	84	13.09	60	PVN	TEC	+0.03	TEC	TEC	140
5	85	5.59	81	PVN	TEC	+0.01	TEC	TEC	168
5	86	12.39	69	PVN	TEC	+0.07	TEC	TEC	161
5	87	2.56	67	PVN	TEC	+0.00	TEC	TEC	77
6	10	8.06	72	PVN	TEC	+0.02	TEC	TEC	111
6	11	12.64	53	PVN	TEC	+0.09	TEC	TEC	147
6	14	12.46	72	PVN	TEC	+0.04	TEC	TEC	206
6	15	14.20	58	PVN	TEC	+0.03	TEC	TEC	157
6	16	9.30	59	PVN	TEC	+0.05	TEC	TEC	343
6	17	17.91	47	PVN	TEC	+0.14	TEC	TEC	252
6	19	12.06	79	PVN	TEC	+0.14	TEC	TEC	122
6	20	10.61	62	PVN	TEC	+0.04	TEC	TEC	301
6	21	18.66	57	PVN	TEC	+0.16	TEC	TEC	273
6	22	10.67	71	PVN	TEC	+0.04	TEC	TEC	269
6	23	7.91	61	PVN	TEC	+0.00	TEC	TEC	164
6	25	7.40	72	PVN	TEC	+0.03	TEC	TEC	294
6	26	13.55	51	PVN	TEC	+0.05	TEC	TEC	280
6	27	18.56	64	PVN	TEC	+0.02	TEC	TEC	259
6	30	8.89	56	PVN	TEC	+0.03	TEC	TEC	150
6	31	12.24	66	PVN	TEC	+0.02	TEC	TEC	320
6	32	8.76	54	PVN	TEC	+0.06	TEC	TEC	133
6	33	7.49	61	PVN	TEC	+0.08	TEC	TEC	276
6	35	7.70	63	PVN	TEC	+0.01	TEC	TEC	340
6	36	16.19	66	PVN	TEC	+0.02	TEC	TEC	234
6	38	13.77	68	PVN	TEC	+0.03	TEC	TEC	161

6	39	7.49	68	PVN	TEC	+0.02	TEC	TEC	165
6	40	4.60	37	PVN	TEC	+0.11	TEC	TEC	77
6	50	7.08	84	PVN	TEC	+0.02	TEC	TEC	180
6	51	10.71	67	PVN	TEC	+0.00	TEC	TEC	276
6	52	10.41	72	PVN	TEC	+0.07	TEC	TEC	275
6	53	5.61	62	PVN	TEC	+0.00	TEC	TEC	87
6	54	13.21	67	PVN	TEC	+0.02	TEC	TEC	251
6	55	2.59	66	PVN	TEC	+0.00	TEC	TEC	94
6	58	9.00	63	PVN	TEC	+0.06	TEC	TEC	141
6	59	13.91	60	PVN	TEC	+0.10	TEC	TEC	222
6	64	18.08	62	PVN	TEC	+0.04	TEC	TEC	275
6	65	13.87	59	PVN	TEC	+0.02	TEC	TEC	178
6	69	13.47	68	PVN	TEC	+0.02	TEC	TEC	91
6	73	8.78	68	PVN	TEC	+0.04	TEC	TEC	94
6	77	3.00	55	PVN	TEC	+0.02	TEC	TEC	66
6	78	22.24	63	PVN	TEC	+0.04	TEC	TEC	287
6	79	15.14	53	PVN	TEC	+0.03	TEC	TEC	189
6	80	22.02	67	PVN	TEC	+0.06	TEC	TEC	150
6	83	6.89	86	PVN	TEC	+0.02	TEC	TEC	115
6	84	12.88	65	PVN	TEC	+0.05	TEC	TEC	206
6	85	12.17	57	PVN	TEC	+0.01	TEC	TEC	360
6	86	11.74	80	PVN	TEC	+0.05	TEC	TEC	276
7	10	13.08	92	PVN	TEC	+0.05	TEC	TEC	164
7	11	11.32	59	PVN	TEC	+0.07	TEC	TEC	198
7	15	13.07	71	PVN	TEC	+0.07	TEC	TEC	266
7	16	12.12	65	PVN	TEC	+0.04	TEC	TEC	318
7	17	7.32	50	PVN	TEC	+0.05	TEC	TEC	199
7	18	26.96	64	PVN	TEC	+0.05	TEC	TEC	150
7	19	5.04	64	PVN	TEC	+0.06	TEC	TEC	77
7	20	9.37	82	PVN	TEC	+0.02	TEC	TEC	220
7	21	6.86	58	PVN	TEC	+0.09	TEC	TEC	259
7	22	13.46	70	PVN	TEC	+0.06	TEC	TEC	329
7	23	15.37	62	PVN	TEC	+0.08	TEC	TEC	220
7	24	10.62	76	PVN	TEC	+0.02	TEC	TEC	185
7	25	8.51	58	PVN	TEC	+0.05	TEC	TEC	308
7	26	12.21	54	PVN	TEC	+0.01	TEC	TEC	171
7	27	5.09	49	PVN	TEC	+0.02	TEC	TEC	108
7	31	10.76	56	PVN	TEC	+0.03	TEC	TEC	206
7	32	4.49	56	PVN	TEC	+0.08	TEC	TEC	287
7	33	10.17	66	PVN	TEC	+0.01	TEC	TEC	260
7	34	6.93	74	PVN	TEC	+0.02	TEC	TEC	217
7	35	6.64	61	PVN	TEC	+0.01	TEC	TEC	297
7	36	13.57	49	PVN	TEC	+0.01	TEC	TEC	350
7	37	13.49	78	PVN	TEC	+0.01	TEC	TEC	102
7	39	11.46	72	PVN	TEC	+0.04	TEC	TEC	176
7	40	3.79	44	PVN	TEC	+0.00	TEC	TEC	146
7	41	1.40	63	PVN	TEC	+0.02	TEC	TEC	189
7	48	6.37	67	PVN	TEC	+0.04	TEC	TEC	113
7	49	13.75	75	PVN	TEC	+0.03	TEC	TEC	290
7	50	8.41	61	PVN	TEC	+0.04	TEC	TEC	247
7	51	9.54	50	PVN	TEC	+0.06	TEC	TEC	340
7	53	12.56	56	PVN	TEC	+0.05	TEC	TEC	140
7	57	8.49	60	PVN	TEC	+0.01	TEC	TEC	102
7	59	13.09	42	PVN	TEC	+0.01	TEC	TEC	320
7	60	9.65	59	PVN	TEC	+0.06	TEC	TEC	152
7	63	7.44	72	PVN	TEC	+0.06	TEC	TEC	108
7	64	11.62	48	PVN	TEC	+0.01	TEC	TEC	252

7	69	21.95	62	PVN	TEC	+0.10	TEC	TEC	230
7	70	14.27	51	PVN	TEC	+0.06	TEC	TEC	233
7	72	10.14	58	PVN	TEC	+0.06	TEC	TEC	205
7	73	7.67	63	PVN	TEC	+0.09	TEC	TEC	273
7	78	11.92	85	PVN	TEC	+0.03	TEC	TEC	238
7	79	15.36	48	PVN	TEC	+0.11	TEC	TEC	290
7	80	34.18	53	PVN	TEC	+0.06	TEC	TEC	164
7	82	3.51	62	PVN	TEC	+0.02	TEC	TEC	59
7	83	5.14	43	PVN	TEC	+0.07	TEC	TEC	144
7	84	4.22	66	PVN	TEC	+0.04	TEC	TEC	140
7	85	10.45	84	PVN	TEC	+0.02	TEC	TEC	150
8	7	3.57	69	PVN	TEC	+0.02	TEC	TEC	59
8	10	5.07	67	PVN	TEC	+0.03	TEC	TEC	38
8	11	10.68	72	PVN	TEC	+0.03	TEC	TEC	133
8	15	5.28	59	PVN	TEC	+0.04	TEC	TEC	311
8	16	6.29	54	PVN	TEC	+0.04	TEC	TEC	350
8	17	15.72	35	PVN	TEC	+0.01	TEC	TEC	301
8	18	14.29	78	PVN	TEC	+0.04	TEC	TEC	224
8	20	2.89	53	PVN	TEC	+0.03	TEC	TEC	294
8	21	5.14	68	PVN	TEC	+0.03	TEC	TEC	108
8	22	9.42	82	PVN	TEC	+0.04	TEC	TEC	171
8	23	16.40	66	PVN	TEC	+0.01	TEC	TEC	176
8	24	17.24	78	PVN	TEC	+0.04	TEC	TEC	98
8	25	5.01	65	PVN	TEC	+0.02	TEC	TEC	101
8	26	8.11	67	PVN	TEC	+0.04	TEC	TEC	283
8	27	9.77	67	PVN	TEC	+0.07	TEC	TEC	325
8	33	8.90	62	PVN	TEC	+0.08	TEC	TEC	133
8	36	17.11	57	PVN	TEC	+0.10	TEC	TEC	157
8	37	12.51	74	PVN	TEC	+0.00	TEC	TEC	262
8	40	5.27	48	PVN	TEC	+0.06	TEC	TEC	140
8	41	7.96	64	PVN	TEC	+0.04	TEC	TEC	180
8	42	10.81	63	PVN	TEC	+0.04	TEC	TEC	56
8	49	14.71	59	PVN	TEC	+0.00	TEC	TEC	290
8	50	13.92	70	PVN	TEC	+0.04	TEC	TEC	289
8	51	11.74	59	PVN	TEC	+0.00	TEC	TEC	259
8	52	9.92	80	PVN	TEC	+0.04	TEC	TEC	219
8	53	10.53	68	PVN	TEC	+0.00	TEC	TEC	248
8	54	6.07	94	PVN	TEC	+0.02	TEC	TEC	236
8	58	13.06	71	PVN	TEC	+0.04	TEC	TEC	240
8	59	12.81	87	PVN	TEC	+0.00	TEC	TEC	213
8	63	21.17	57	PVN	TEC	+0.05	TEC	TEC	283
8	64	15.43	73	PVN	TEC	+0.01	TEC	TEC	234
8	69	7.41	68	PVN	TEC	+0.02	TEC	TEC	290
8	70	13.32	60	PVN	TEC	+0.03	TEC	TEC	131
8	72	16.20	60	PVN	TEC	+0.02	TEC	TEC	215
8	73	13.65	61	PVN	TEC	+0.05	TEC	TEC	243
8	78	15.04	60	PVN	TEC	+0.08	TEC	TEC	266
8	79	17.22	57	PVN	TEC	+0.04	TEC	TEC	283
8	80	31.07	62	PVN	TEC	+0.02	TEC	TEC	178
8	86	8.15	65	PVN	TEC	+0.10	TEC	TEC	66
9	11	10.97	77	PVN	TEC	+0.10	TEC	TEC	154
9	12	6.86	63	PVN	TEC	+0.08	TEC	TEC	150
9	15	9.55	69	PVN	TEC	+0.03	TEC	TEC	332
9	16	8.36	30	PVN	TEC	+0.04	TEC	TEC	223
9	17	12.55	58	PVN	TEC	+0.07	TEC	TEC	230
9	18	15.54	71	PVN	TEC	+0.02	TEC	TEC	332
9	20	2.56	63	PVN	TEC	+0.01	TEC	TEC	126

9	21	4.39	61	PVN	TEC	+0.11	TEC	TEC	238
9	22	11.62	50	PVN	TEC	+0.05	TEC	TEC	308
9	23	16.09	58	PVN	TEC	+0.09	TEC	TEC	210
9	24	15.09	74	PVN	TEC	+0.02	TEC	TEC	203
9	25	6.71	87	PVN	TEC	+0.00	TEC	TEC	77
9	26	7.81	62	PVN	TEC	+0.04	TEC	TEC	320
9	27	11.22	70	PVN	TEC	+0.00	TEC	TEC	287
9	28	9.04	65	PVN	TEC	+0.00	TEC	TEC	262
9	32	5.12	60	PVN	TEC	+0.11	TEC	TEC	290
9	33	9.00	72	PVN	TEC	+0.01	TEC	TEC	163
9	34	6.52	66	PVN	TEC	+0.04	TEC	TEC	304
9	36	9.72	66	PVN	TEC	+0.01	TEC	TEC	360
9	37	14.11	54	PVN	TEC	+0.07	TEC	TEC	187
9	38	9.94	70	PVN	TEC	+0.02	TEC	TEC	240
9	41	7.05	49	PVN	TEC	+0.00	TEC	TEC	122
9	42	9.41	51	PVN	TEC	+0.06	TEC	TEC	106
9	47	6.52	40	PVN	TEC	+0.05	TEC	TEC	113
9	51	13.24	81	PVN	TEC	+0.01	TEC	TEC	194
9	52	9.47	79	PVN	TEC	+0.01	TEC	TEC	109
9	53	4.65	41	PVN	TEC	+0.03	TEC	TEC	95
9	57	19.19	64	PVN	TEC	+0.01	TEC	TEC	236
9	58	9.45	69	PVN	TEC	+0.02	TEC	TEC	310
9	59	5.12	59	PVN	TEC	+0.04	TEC	TEC	64
9	62	10.41	67	PVN	TEC	+0.03	TEC	TEC	162
9	63	8.99	64	PVN	TEC	+0.08	TEC	TEC	280
9	67	3.16	41	PVN	TEC	+0.02	TEC	TEC	160
9	68	17.54	58	PVN	TEC	+0.02	TEC	TEC	205
9	69	9.79	81	PVN	TEC	+0.05	TEC	TEC	285
9	71	14.08	63	PVN	TEC	+0.04	TEC	TEC	115
9	73	12.60	70	PVN	TEC	+0.03	TEC	TEC	280
9	74	13.53	74	PVN	TEC	+0.05	TEC	TEC	236
9	78	12.03	65	PVN	TEC	+0.04	TEC	TEC	276
9	80	30.99	61	PVN	TEC	+0.01	TEC	TEC	164
9	82	5.86	58	PVN	TEC	+0.01	TEC	TEC	59
9	83	3.10	70	PVN	TEC	+0.00	TEC	TEC	140
9	85	10.75	74	PVN	TEC	+0.04	TEC	TEC	210
9	86	16.48	62	PVN	TEC	+0.04	TEC	TEC	171
10	10	11.58	77	PVN	TEC	+0.02	TEC	TEC	269
10	11	1.90	59	PVN	TEC	+0.03	TEC	TEC	160
10	12	1.57	56	PVN	TEC	+0.04	TEC	TEC	158
10	15	14.59	65	PVN	TEC	+0.04	TEC	TEC	227
10	16	20.43	43	PVN	TEC	+0.01	TEC	TEC	248
10	17	10.84	56	PVN	TEC	+0.01	TEC	TEC	196
10	18	8.60	51	PVN	TEC	+0.06	TEC	TEC	294
10	19	24.95	66	PVN	TEC	+0.15	TEC	TEC	161
10	21	10.84	57	PVN	TEC	+0.14	TEC	TEC	209
10	22	13.83	69	PVN	TEC	+0.03	TEC	TEC	352
10	23	13.12	58	PVN	TEC	+0.05	TEC	TEC	227
10	24	2.10	46	PVN	TEC	+0.09	TEC	TEC	227
10	26	11.06	66	PVN	TEC	+0.03	TEC	TEC	185
10	27	12.99	55	PVN	TEC	+0.00	TEC	TEC	259
10	28	10.70	55	PVN	TEC	+0.01	TEC	TEC	360
10	29	11.29	70	PVN	TEC	+0.02	TEC	TEC	196
10	33	5.22	79	PVN	TEC	+0.01	TEC	TEC	210
10	34	4.23	55	PVN	TEC	+0.07	TEC	TEC	308
10	35	2.06	51	PVN	TEC	+0.02	TEC	TEC	84
10	38	9.51	67	PVN	TEC	+0.04	TEC	TEC	161

10	39	12.20	68	PVN	TEC	+0.07	TEC TEC	266
10	47	4.24	52	PVN	TEC	+0.08	TEC TEC	110
10	51	5.70	64	PVN	TEC	+0.00	TEC TEC	150
10	55	10.98	64	PVN	TEC	+0.00	TEC TEC	66
10	56	17.20	72	PVN	TEC	+0.00	TEC TEC	280
10	57	14.23	51	PVN	TEC	+0.00	TEC TEC	308
10	58	2.43	54	PVN	TEC	+0.04	TEC TEC	84
10	61	9.60	63	PVN	TEC	+0.00	TEC TEC	94
10	62	5.99	85	PVN	TEC	+0.01	TEC TEC	113
10	63	3.14	72	PVN	TEC	+0.01	TEC TEC	56
10	64	5.71	52	PVN	TEC	+0.05	TEC TEC	87
10	66	9.04	65	PVN	TEC	+0.04	TEC TEC	176
10	67	10.98	67	PVN	TEC	+0.02	TEC TEC	227
10	68	13.06	63	PVN	TEC	+0.06	TEC TEC	305
10	69	15.85	68	PVN	TEC	+0.01	TEC TEC	203
10	71	9.04	72	PVN	TEC	+0.01	TEC TEC	133
10	72	7.69	65	PVN	TEC	+0.07	TEC TEC	241
10	73	10.76	53	PVN	TEC	+0.04	TEC TEC	280
10	78	15.97	76	PVN	TEC	+0.02	TEC TEC	290
10	79	8.62	72	PVN	TEC	+0.02	TEC TEC	185
10	80	29.81	57	PVN	TEC	+0.05	TEC TEC	213
10	86	14.41	69	PVN	TEC	+0.00	TEC TEC	175
11	10	5.36	78	PVN	TEC	+0.03	TEC TEC	133
		5.55	52	PVN	TEC	+0.16	TEC TSC	133
11	11	10.83	69	PVN	TEC	+0.03	TEC TEC	136
		11.63	72	PVN	TEC	+0.04	TEC TSC	80
11	12	2.01	43	PVN	TEC	+0.03	TEC TEC	129
11	16	4.22	61	PVN	TEC	+0.02	TEC TEC	122
11	17	8.67	48	PVN	TEC	+0.01	TEC TEC	308
11	18	12.54	68	PVN	TEC	+0.01	TEC TEC	269
11	19	2.04	55	PVN	TEC	+0.17	TEC TEC	210
11	21	8.00	84	PVN	TEC	+0.02	TEC TEC	199
11	22	7.19	77	PVN	TEC	+0.01	TEC TEC	259
11	23	12.21	58	PVN	TEC	+0.16	TEC TEC	255
11	24	17.57	58	PVN	TEC	+0.01	TEC TEC	360
11	25	6.48	58	PVN	TEC	+0.05	TEC TEC	143
11	27	11.12	71	PVN	TEC	+0.01	TEC TEC	115
11	28	17.56	66	PVN	TEC	+0.00	TEC TEC	301
11	29	12.21	65	PVN	TEC	+0.04	TEC TEC	283
11	32	2.47	46	PVN	TEC	+0.06	TEC TEC	255
11	33	3.58	49	PVN	TEC	+0.02	TEC TEC	122
11	34	5.87	64	PVN	TEC	+0.04	TEC TEC	213
11	35	8.07	66	PVN	TEC	+0.04	TEC TEC	325
11	36	6.01	78	PVN	TEC	+0.00	TEC TEC	81
11	37	9.71	58	PVN	TEC	+0.02	TEC TEC	134
11	38	9.97	63	PVN	TEC	+0.00	TEC TEC	265
11	39	15.13	62	PVN	TEC	+0.02	TEC TEC	134
11	40	6.74	69	PVN	TEC	+0.02	TEC TEC	146
11	41	5.90	66	PVN	TEC	+0.00	TEC TEC	131
11	42	2.58	52	PVN	TEC	+0.05	TEC TEC	147
11	43	20.13	67	PVN	TEC	+0.02	TEC TEC	244
11	44	10.39	73	PVN	TEC	+0.03	TEC TEC	74
11	50	8.04	72	PVN	TEC	+0.02	TEC TEC	95
11	51	9.75	71	PVN	TEC	+0.01	TEC TEC	251
11	54	14.21	66	PVN	TEC	+0.05	TEC TSC	127
11	55	16.13	53	PVN	TEC	+0.01	TEC TEC	320
11	56	6.79	85	PVN	TEC	+0.01	TEC TEC	127

11	61	16.79	48	PVN	TEC	+0.02	TEC	TEC	300
11	62	12.13	68	PVN	TEC	+0.04	TEC	TEC	145
11	66	3.18	55	PVN	TEC	+0.01	TEC	TEC	131
11	67	15.78	60	PVN	TEC	+0.09	TEC	TEC	236
11	68	4.46	62	PVN	TEC	+0.02	TEC	TEC	136
11	70	7.04	90	PVN	TEC	+0.04	TEC	TEC	109
11	72	10.48	68	PVN	TEC	+0.04	TEC	TEC	161
11	73	9.09	79	PVN	TEC	+0.02	TEC	TEC	290
11	77	4.55	60	PVN	TEC	+0.04	TEC	TEC	56
11	78	18.83	59	PVN	TEC	+0.04	TEC	TEC	287
11	79	9.88	47	PVN	TEC	+0.10	TEC	TEC	287
11	80	17.50	63	PVN	TEC	+0.01	TEC	TEC	122
12	11	8.11	76	PVN	TEC	+0.05	TEC	TEC	220
12	16	6.75	77	PVN	TEC	+0.07	TEC	TEC	175
12	17	5.27	75	PVN	TEC	+0.06	TEC	TEC	108
12	18	9.48	57	PVN	TEC	+0.08	TEC	TEC	318
12	19	17.01	59	PVN	TEC	+0.15	TEC	TEC	203
12	20	3.21	67	PVN	TEC	+0.08	TEC	TEC	87
12	25	14.64	66	PVN	TEC	+0.00	TEC	TEC	280
12	27	17.95	64	PVN	TEC	+0.01	TEC	TEC	217
12	28	18.12	39	PVN	TEC	+0.00	TEC	TEC	360
12	29	17.11	66	PVN	TEC	+0.02	TEC	TEC	171
12	30	12.99	52	PVN	TEC	+0.12	TEC	TEC	252
12	32	3.69	76	PVN	TEC	+0.01	TEC	TEC	84
12	33	3.07	69	PVN	TEC	+0.00	TEC	TEC	273
12	34	8.41	75	PVN	TEC	+0.04	TEC	TEC	185
12	35	6.48	52	PVN	TEC	+0.01	TEC	TEC	294
12	36	11.01	76	PVN	TEC	+0.05	TEC	TEC	122
12	37	5.01	79	PVN	TEC	+0.07	TEC	TEC	238
12	38	8.46	61	PVN	TEC	+0.09	TEC	TEC	248
12	39	7.63	64	PVN	TEC	+0.05	TEC	TEC	280
12	41	10.31	77	PVN	TEC	+0.07	TEC	TEC	224
12	42	6.24	73	PVN	TEC	+0.02	TEC	TEC	91
12	43	12.34	69	PVN	TEC	+0.09	TEC	TEC	304
12	48	5.45	57	PVN	TEC	+0.01	TEC	TEC	113
12	49	8.73	70	PVN	TEC	+0.00	TEC	TEC	234
12	50	3.22	91	PVN	TEC	+0.04	TEC	TEC	106
12	51	11.25	59	PVN	TEC	+0.00	TEC	TEC	343
12	52	9.91	64	PVN	TEC	+0.00	TEC	TEC	224
12	53	10.66	52	PVN	TEC	+0.00	TEC	TEC	360
12	54	8.78	57	PVN	TEC	+0.08	TEC	TEC	233
12	55	9.13	82	PVN	TEC	+0.00	TEC	TEC	129
12	59	8.79	69	PVN	TEC	+0.00	TEC	TEC	52
12	60	12.87	64	PVN	TEC	+0.00	TEC	TEC	122
12	61	9.03	69	PVN	TEC	+0.00	TEC	TEC	208
12	65	3.01	54	PVN	TEC	+0.01	TEC	TEC	163
12	66	13.41	69	PVN	TEC	+0.02	TEC	TEC	233
12	67	10.21	66	PVN	TEC	+0.02	TEC	TEC	320
12	68	8.05	65	PVN	TEC	+0.06	TEC	TEC	192
12	70	17.85	57	PVN	TEC	+0.03	TEC	TEC	243
12	73	6.76	48	PVN	TEC	+0.01	TEC	TEC	192
12	77	19.16	67	PVN	TEC	+0.01	TEC	TEC	192
12	78	10.77	72	PVN	TEC	+0.03	TEC	TEC	266
12	79	9.61	73	PVN	TEC	+0.01	TEC	TEC	192
13	13	2.74	71	PVN	TEC	+0.03	TEC	TEC	168
13	16	5.06	70	PVN	TEC	+0.05	TEC	TEC	129
13	17	6.34	60	PVN	TEC	+0.08	TEC	TEC	157

13	18	4.42	55	PVN	TEC	+0.03	TEC	TEC	315
13	19	4.28	46	PVN	TEC	+0.11	TEC	TEC	217
13	20	15.91	68	PVN	TEC	+0.01	TEC	TEC	133
13	22	1.48	69	PVN	TEC	+0.02	TEC	TEC	329
13	25	11.37	76	PVN	TEC	+0.01	TEC	TEC	147
13	26	19.22	66	PVN	TEC	+0.06	TEC	TEC	259
13	28	19.35	62	PVN	TEC	+0.07	TEC	TEC	294
13	29	18.20	58	PVN	TEC	+0.06	TEC	TEC	360
13	30	18.74	66	PVN	TEC	+0.07	TEC	TEC	220
13	31	9.77	65	PVN	TEC	+0.04	TEC	TEC	140
13	35	9.77	89	PVN	TEC	+0.00	TEC	TEC	224
13	36	6.77	78	PVN	TEC	+0.01	TEC	TEC	360
13	37	9.73	68	PVN	TEC	+0.00	TEC	TEC	148
13	38	10.65	66	PVN	TEC	+0.04	TEC	TEC	206
13	39	12.70	72	PVN	TEC	+0.01	TEC	TEC	250
13	44	6.08	67	PVN	TEC	+0.02	TEC	TEC	133
13	46	7.70	54	PVN	TEC	+0.02	TEC	TEC	261
13	47	14.82	66	PVN	TEC	+0.05	TEC	TEC	295
13	48	11.37	67	PVN	TEC	+0.00	TEC	TEC	287
13	49	7.38	69	PVN	TEC	+0.02	TEC	TEC	229
13	50	5.67	77	PVN	TEC	+0.02	TEC	TEC	173
13	51	3.52	76	PVN	TEC	+0.02	TEC	TEC	169
13	52	8.54	79	PVN	TEC	+0.01	TEC	TEC	99
13	59	10.21	60	PVN	TEC	+0.08	TEC	TEC	360
13	60	18.72	62	PVN	TEC	+0.01	TEC	TEC	180
13	64	6.79	87	PVN	TEC	+0.03	TEC	TEC	199
13	65	16.04	75	PVN	TEC	+0.02	TEC	TEC	300
13	66	13.05	72	PVN	TEC	+0.01	TEC	TEC	311
13	67	7.56	60	PVN	TEC	+0.07	TEC	TEC	255
13	69	13.28	61	PVN	TEC	+0.07	TEC	TEC	171
13	70	11.88	71	PVN	TEC	+0.04	TEC	TEC	127
13	73	10.11	53	PVN	TEC	+0.05	TEC	TEC	224
13	77	10.05	52	PVN	TEC	+0.06	TEC	TEC	209
13	78	12.93	63	PVN	TEC	+0.04	TEC	TEC	234
13	79	7.53	63	PVN	TEC	+0.05	TEC	TEC	206
13	86	11.38	80	PVN	TEC	+0.03	TEC	TEC	129
13	87	10.59	62	PVN	TEC	+0.00	TEC	TEC	178
14	9	2.56	68	PVN	TEC	+0.03	TEC	TEC	126
14	13	5.21	71	PVN	TEC	+0.06	TEC	TEC	168
14	17	5.23	64	PVN	TEC	+0.07	TEC	TEC	154
14	18	9.81	70	PVN	TEC	+0.02	TEC	TEC	308
14	19	10.75	68	PVN	TEC	+0.11	TEC	TEC	161
14	20	12.38	59	PVN	TEC	+0.16	TEC	TEC	332
14	21	20.29	63	PVN	TEC	+0.12	TEC	TEC	84
14	23	14.82	56	PVN	TEC	+0.16	TEC	TEC	248
14	24	10.95	56	PVN	TEC	+0.06	TEC	TEC	360
14	25	12.01	81	PVN	TEC	+0.04	TEC	TEC	234
14	27	20.98	57	PVN	TEC	+0.03	TEC	TSC	140
14	28	8.65	65	PVN	TEC	+0.01	TEC	TEC	217
14	29	15.83	47	PVN	TEC	+0.01	TEC	TEC	287
14	30	16.94	50	PVN	TEC	+0.08	TEC	TEC	276
14	31	15.07	68	PVN	TEC	+0.02	TEC	TEC	287
14	32	14.75	67	PVN	TEC	+0.01	TEC	TEC	178
14	35	4.93	62	PVN	TEC	+0.01	TEC	TEC	150
14	36	15.10	62	PVN	TEC	+0.07	TEC	TEC	171
14	37	11.39	63	PVN	TEC	+0.02	TEC	TEC	283
14	38	14.84	72	PVN	TEC	+0.08	TEC	TEC	199

14	39	10.45	77	PVN	TEC	+0.10	TEC	TEC	238
14	41	3.64	58	PVN	TEC	+0.02	TEC	TEC	101
14	42	3.00	38	PVN	TEC	+0.03	TEC	TEC	102
14	44	5.74	50	PVN	TEC	+0.05	TEC	TEC	297
14	48	12.70	62	PVN	TEC	+0.05	TEC	TEC	95
14	49	7.70	86	PVN	TEC	+0.00	TEC	TEC	70
14	57	2.95	63	PVN	TEC	+0.00	TEC	TEC	168
14	58	3.27	73	PVN	TEC	+0.02	TEC	TEC	236
14	59	8.17	74	PVN	TEC	+0.00	TEC	TEC	101
14	63	5.54	79	PVN	TEC	+0.01	TEC	TEC	140
14	64	11.09	70	PVN	TEC	+0.04	TEC	TEC	203
14	65	17.82	71	PVN	TEC	+0.03	TEC	TEC	255
14	66	11.49	49	PVN	TEC	+0.10	TEC	TEC	247
14	67	1.34	43	PVN	TEC	+0.03	TEC	TEC	52
14	69	9.72	63	PVN	TEC	+0.02	TEC	TEC	199
14	70	7.35	83	PVN	TEC	+0.02	TEC	TEC	275
14	71	4.77	67	PVN	TEC	+0.03	TEC	TEC	181
14	72	8.05	71	PVN	TEC	+0.03	TEC	TEC	150
14	74	14.18	73	PVN	TEC	+0.05	TEC	TEC	233
14	76	16.80	72	PVN	TEC	+0.06	TEC	TEC	182
14	77	7.26	70	PVN	TEC	+0.03	TEC	TEC	189
14	79	6.70	64	PVN	TEC	+0.02	TEC	TEC	70
14	82	6.40	59	PVN	TEC	+0.04	TEC	TEC	133
15	9	10.80	80	PVN	TEC	+0.05	TEC	TEC	255
15	18	7.71	50	PVN	TEC	+0.02	TEC	TEC	295
15	19	3.20	60	PVN	TEC	+0.13	TEC	TEC	164
15	20	8.80	49	PVN	TEC	+0.12	TEC	TEC	231
15	21	19.84	74	PVN	TEC	+0.02	TEC	TEC	213
15	23	9.71	60	PVN	TEC	+0.05	TEC	TEC	189
15	24	14.24	70	PVN	TEC	+0.03	TEC	TEC	290
15	25	11.67	70	PVN	TEC	+0.01	TEC	TEC	224
15	26	2.88	67	PVN	TEC	+0.13	TEC	TEC	283
15	27	11.70	77	PVN	TEC	+0.07	TEC	TEC	101
15	28	6.72	59	PVN	TEC	+0.08	TEC	TEC	73
15	29	20.63	52	PVN	TEC	+0.04	TEC	TEC	203
15	30	6.05	43	PVN	TEC	+0.10	TEC	TEC	245
15	31	27.09	54	PVN	TEC	+0.01	TEC	TEC	318
15	32	5.68	85	PVN	TEC	+0.00	TEC	TEC	266
15	33	11.05	62	PVN	TEC	+0.03	TEC	TEC	150
15	38	16.35	65	PVN	TEC	+0.02	TEC	TEC	233
15	39	8.63	79	PVN	TEC	+0.03	TEC	TEC	208
15	40	17.86	62	PVN	TEC	+0.02	TEC	TEC	166
15	42	8.38	62	PVN	TEC	+0.00	TEC	TEC	138
15	46	3.45	48	PVN	TEC	+0.04	TEC	TEC	102
15	55	20.57	66	PVN	TEC	+0.01	TEC	TEC	176
15	56	13.71	67	PVN	TEC	+0.05	TEC	TEC	360
15	57	15.67	64	PVN	TEC	+0.04	TEC	TEC	212
15	63	4.46	44	PVN	TEC	+0.12	TEC	TEC	175
15	64	15.78	55	PVN	TEC	+0.11	TEC	TEC	245
15	65	10.38	50	PVN	TEC	+0.08	TEC	TEC	268
15	66	6.75	55	PVN	TEC	+0.05	TEC	TEC	106
15	68	6.65	51	PVN	TEC	+0.11	TEC	TEC	270
15	69	14.54	65	PVN	TEC	+0.06	TEC	TEC	249
15	70	7.76	66	PVN	TEC	+0.03	TEC	TEC	198
15	71	3.36	53	PVN	TEC	+0.06	TEC	TEC	125
15	76	6.31	62	PVN	TEC	+0.05	TEC	TEC	220
15	77	6.78	59	PVN	TEC	+0.07	TEC	TEC	213

15	78	13.91	61	PVN	TEC	+0.05	TEC	TEC	192
16	18	14.55	68	PVN	TEC	+0.01	TEC	TEC	213
16	19	11.17	68	PVN	TEC	+0.07	TEC	TEC	283
16	20	16.10	55	PVN	TEC	+0.07	TEC	TEC	154
16	21	12.79	52	PVN	TEC	+0.08	TEC	TEC	157
16	22	26.10	56	PVN	TEC	+0.06	TEC	TEC	196
16	25	9.91	54	PVN	TEC	+0.06	TEC	TEC	192
16	26	3.75	63	PVN	TEC	+0.09	TEC	TEC	290
16	28	17.10	61	PVN	TEC	+0.01	TEC	TEC	269
16	30	20.48	67	PVN	TEC	+0.05	TEC	TEC	161
16	31	16.47	44	PVN	TEC	+0.00	TEC	TEC	360
16	32	25.65	61	PVN	TEC	+0.02	TEC	TEC	320
16	33	7.91	73	PVN	TEC	+0.00	TEC	TEC	248
16	34	4.71	48	PVN	TEC	+0.07	TEC	TEC	136
16	39	9.28	73	PVN	TEC	+0.05	TEC	TEC	101
16	40	4.59	71	PVN	TEC	+0.00	TEC	TEC	136
16	41	9.68	67	PVN	TEC	+0.07	TEC	TEC	300
16	42	7.59	75	PVN	TEC	+0.04	TEC	TEC	150
		6.90	63	PVN	TEC	+0.02	TEC	TEC	150
16	43	11.26	66	PVN	TEC	+0.04	TEC	TEC	122
16	52	14.58	61	PVN	TEC	+0.00	TEC	TEC	140
16	53	10.08	51	PVN	TEC	+0.07	TEC	TEC	199
16	54	9.89	48	PVN	TEC	+0.07	TEC	TEC	245
		10.18	57	PVN	TEC	+0.06	TEC	TEC	283
16	55	6.52	78	PVN	TEC	+0.04	TEC	TEC	168
16	56	2.51	59	PVN	TEC	+0.00	TEC	TEC	105
16	61	6.58	90	PVN	TEC	+0.02	TEC	TEC	248
16	62	13.81	51	PVN	TEC	+0.09	TEC	TEC	254
16	63	9.93	69	PVN	TEC	+0.00	TEC	TEC	283
16	64	12.46	58	PVN	TEC	+0.00	TEC	TEC	359
16	65	2.85	50	PVN	TEC	+0.03	TEC	TEC	66
16	67	7.53	77	PVN	TEC	+0.02	TEC	TEC	206
16	68	7.52	68	PVN	TEC	+0.00	TEC	TEC	360
16	69	4.12	80	PVN	TEC	+0.03	TEC	TEC	52
16	70	7.89	70	PVN	TEC	+0.04	TEC	TEC	106
16	71	12.02	65	PVN	TEC	+0.04	TEC	TEC	241
16	75	19.48	60	PVN	TEC	+0.05	TEC	TEC	199
16	76	10.69	58	PVN	TEC	+0.01	TEC	TEC	360
16	77	11.14	66	PVN	TEC	+0.00	TEC	TEC	252
17	18	6.10	64	PVN	TEC	+0.03	TEC	TEC	101
17	19	4.32	58	PVN	TEC	+0.00	TEC	TEC	273
17	20	4.24	51	PVN	TEC	+0.14	TEC	TEC	224
17	21	6.74	50	PVN	TEC	+0.13	TEC	TEC	168
17	22	13.33	66	PVN	TEC	+0.06	TEC	TEC	241
17	24	6.15	91	PVN	TEC	+0.02	TEC	TEC	52
17	26	6.22	74	PVN	TEC	+0.04	TEC	TEC	224
17	27	5.80	60	PVN	TEC	+0.00	TEC	TEC	136
17	28	8.03	53	PVN	TEC	+0.09	TEC	TEC	164
17	29	7.56	47	PVN	TEC	+0.09	TEC	TEC	273
17	30	2.42	84	PVN	TEC	+0.00	TEC	TEC	273
17	31	10.51	66	PVN	TEC	+0.08	TEC	TEC	147
17	32	14.79	65	PVN	TEC	+0.01	TEC	TEC	304
17	33	11.80	77	PVN	TEC	+0.04	TEC	TEC	360
17	34	9.44	67	PVN	TEC	+0.03	TEC	TEC	220
17	35	11.01	69	PVN	TEC	+0.04	TEC	TEC	276
17	36	2.31	79	PVN	TEC	+0.01	TEC	TEC	30
17	43	7.63	72	PVN	TEC	+0.04	TEC	TEC	255

17	44	10.64	74	PVN	TEC	+0.02	TEC	TEC	266
17	46	13.60	76	PVN	TEC	+0.13	TEC	TEC	255
		10.99	56	PVN	TEC	+0.06	TEC	TEC	255
17	47	15.42	68	PVN	TEC	+0.06	TEC	TEC	217
17	48	14.86	66	PVN	TEC	+0.00	TEC	TEC	266
17	49	16.17	69	PVN	TEC	+0.00	TEC	TEC	260
17	50	12.68	63	PVN	TEC	+0.02	TEC	TEC	180
		10.00	63	PVN	TEC	+0.04	TEC	TEC	178
17	51	14.49	57	PVN	TEC	+0.06	TEC	TEC	345
17	52	16.68	69	PVN	TEC	+0.05	TEC	TEC	213
17	53	11.16	80	PVN	TEC	+0.00	TEC	TEC	206
17	54	3.53	110	PVN	TEC	+0.02	TEC	TEC	266
17	59	8.96	73	PVN	TEC	+0.00	TEC	TEC	140
17	60	19.92	61	PVN	TEC	+0.10	TEC	TEC	301
17	61	6.78	72	PVN	TEC	+0.03	TEC	TEC	340
17	62	16.82	48	PVN	TEC	+0.03	TEC	TEC	314
17	63	15.23	42	PVN	TEC	+0.02	TEC	TEC	210
17	64	13.68	88	PVN	TEC	+0.02	TEC	TEC	154
17	66	15.32	60	PVN	TEC	+0.04	TEC	TEC	169
17	67	11.38	57	PVN	TEC	+0.00	TEC	TEC	300
17	68	14.32	59	PVN	TEC	+0.05	TEC	TEC	330
17	69	12.04	50	PVN	TEC	+0.00	TEC	TEC	320
17	70	11.46	70	PVN	TEC	+0.01	TEC	TEC	289
17	71	7.38	80	PVN	TEC	+0.00	TEC	TEC	147
17	74	4.77	55	PVN	TEC	+0.00	TEC	TEC	52
17	76	10.85	72	PVN	TEC	+0.01	TEC	TEC	77
18	19	13.51	70	PVN	TEC	+0.09	TEC	TEC	182
18	20	12.51	69	PVN	TEC	+0.13	TEC	TEC	213
18	21	16.09	76	PVN	TEC	+0.10	TEC	TEC	269
18	22	20.57	66	PVN	TEC	+0.04	TEC	TEC	357
18	23	28.78	59	PVN	TEC	+0.07	TEC	TEC	231
18	25	9.18	76	PVN	TEC	+0.02	TEC	TEC	147
18	26	13.46	62	PVN	TEC	+0.06	TEC	TEC	283
18	28	9.59	71	PVN	TEC	+0.02	TEC	TEC	175
18	29	13.67	67	PVN	TEC	+0.01	TEC	TEC	252
18	30	14.24	77	PVN	TEC	+0.01	TEC	TEC	276
18	31	4.80	55	PVN	TEC	+0.03	TEC	TSC	73
18	32	5.75	63	PVN	TEC	+0.00	TEC	TEC	91
18	33	11.56	85	PVN	TEC	+0.03	TEC	TEC	294
18	34	5.30	56	PVN	TEC	+0.07	TEC	TEC	164
18	35	7.45	80	PVN	TEC	+0.01	TEC	TEC	163
18	36	3.64	72	PVN	TEC	+0.00	TEC	TEC	146
18	46	11.88	80	PVN	TEC	+0.05	TEC	TEC	126
		7.47	88	PVN	TEC	+0.05	TEC	TEC	154
18	47	10.35	83	PVN	TEC	+0.00	TEC	TEC	196
18	48	3.06	87	PVN	TEC	+0.03	TEC	TEC	91
18	49	11.66	69	PVN	TEC	+0.05	TEC	TEC	101
18	50	6.52	92	PVN	TEC	+0.05	TEC	TSC	227
18	58	13.18	71	PVN	TEC	+0.02	TEC	TEC	213
		11.80	67	PVN	TEC	+0.04	TEC	TEC	220
18	59	5.83	62	PVN	TEC	+0.02	TEC	TEC	224
18	60	10.86	51	PVN	TEC	+0.05	TEC	TEC	150
18	61	9.52	54	PVN	TEC	+0.06	TEC	TEC	310
18	62	12.18	49	PVN	TEC	+0.03	TEC	TEC	293
18	63	15.21	62	PVN	TEC	+0.00	TEC	TEC	150
18	65	10.84	77	PVN	TEC	+0.03	TEC	TEC	196
18	67	13.77	63	PVN	TEC	+0.04	TEC	TEC	245

18	68	12.59	61	PVN	TEC	+0.00	TEC	TEC	287
18	70	8.16	65	PVN	TEC	+0.05	TEC	TEC	198
18	74	16.35	39	PVN	TEC	+0.01	TEC	TEC	273
18	75	11.97	72	PVN	TEC	+0.05	TEC	TEC	227
18	76	13.92	74	PVN	TEC	+0.00	TEC	TEC	203
18	80	14.28	59	PVN	TEC	+0.00	TEC	TEC	311
18	81	11.46	78	PVN	TEC	+0.00	TEC	TEC	143
19	19	3.96	80	PVN	TEC	-0.00	TEC	TEC	216
19	20	5.69	68	PVN	TEC	+0.03	TEC	TEC	122
19	21	12.15	65	PVN	TEC	+0.00	TEC	TEC	229
19	22	7.42	51	PVN	TEC	+0.04	TEC	TEC	269
19	23	5.67	37	PVN	TEC	+0.02	TEC	TEC	147
19	24	19.30	57	PVN	TEC	+0.04	TEC	TEC	140
19	27	6.19	71	PVN	TEC	+0.01	TEC	TEC	73
19	29	9.89	59	PVN	TEC	+0.04	TEC	TEC	203
19	30	4.90	56	PVN	TEC	+0.10	TEC	TEC	252
19	31	11.89	64	PVN	TEC	+0.01	TEC	TEC	168
19	34	6.47	56	PVN	TEC	+0.10	TEC	TEC	231
19	35	4.14	55	PVN	TEC	+0.09	TEC	TEC	329
19	36	16.15	75	PVN	TEC	+0.04	TEC	TEC	210
19	37	11.73	76	PVN	TEC	+0.00	TEC	TEC	231
19	40	2.86	64	PVN	TEC	+0.03	TEC	TEC	94
19	44	3.02	81	PVN	TEC	+0.01	TEC	TEC	98
19	55	18.59	65	PVN	TEC	+0.00	TEC	TEC	133
19	56	15.14	66	PVN	TEC	+0.05	TEC	TEC	203
19	57	10.44	64	PVN	TEC	+0.06	TEC	TEC	203
19	58	16.12	62	PVN	TEC	+0.03	TEC	TEC	309
		15.69	61	PVN	TEC	+0.05	TEC	TEC	339
19	59	16.94	62	PVN	TEC	+0.13	TEC	TEC	260
19	60	6.38	45	PVN	TEC	+0.04	TEC	TEC	260
19	61	12.97	78	PVN	TEC	+0.01	TEC	TEC	175
19	64	16.62	62	PVN	TEC	+0.04	TEC	TEC	262
19	65	6.93	68	PVN	TEC	+0.00	TEC	TEC	360
19	66	13.53	63	PVN	TEC	+0.04	TEC	TEC	293
19	67	4.77	79	PVN	TEC	+0.00	TEC	TEC	307
19	68	7.85	78	PVN	TEC	+0.03	TEC	TEC	185
19	69	11.82	63	PVN	TEC	+0.00	TEC	TEC	269
19	73	14.32	65	PVN	TEC	+0.00	TEC	TEC	224
19	75	2.22	59	PVN	TEC	+0.00	TEC	TEC	31
19	79	16.43	77	PVN	TEC	+0.00	TEC	TEC	231
19	80	15.60	66	PVN	TEC	+0.01	TEC	TEC	280
20	20	4.40	76	PVN	TEC	+0.09	TEC	TEC	91
20	21	14.13	61	PVN	TEC	+0.04	TEC	TEC	171
20	22	11.27	45	PVN	TEC	+0.05	TEC	TEC	343
20	23	10.42	39	PVN	TEC	+0.02	TEC	TEC	248
20	24	14.00	60	PVN	TEC	+0.01	TEC	TEC	203
20	25	19.25	68	PVN	TEC	+0.02	TEC	TEC	136
20	27	5.65	58	PVN	TEC	+0.01	TEC	TEC	30
20	28	8.66	63	PVN	TEC	+0.05	TEC	TEC	73
20	29	15.74	67	PVN	TEC	+0.02	TEC	TEC	220
20	30	8.77	64	PVN	TEC	+0.04	TEC	TEC	318
20	31	9.25	74	PVN	TEC	+0.01	TEC	TEC	190
20	32	8.09	75	PVN	TEC	+0.02	TEC	TEC	171
20	33	3.56	66	PVN	TEC	+0.11	TEC	TEC	105
20	35	11.04	72	PVN	TEC	+0.02	TEC	TEC	112
20	36	9.25	62	PVN	TEC	+0.02	TEC	TEC	196
20	37	9.18	75	PVN	TEC	+0.04	TEC	TEC	160

20	38	15.17	66	PVN	TEC	+0.03	TEC	TEC	305
		2.23	60	PVN	TEC	+0.10	TEC	TEC	199
20	39	18.68	68	PVN	TEC	+0.03	TEC	TEC	245
20	40	15.33	70	PVN	TEC	+0.00	TEC	TEC	320
20	41	9.57	69	PVN	TEC	+0.07	TEC	TEC	180
20	42	12.30	69	PVN	TEC	+0.03	TEC	TEC	199
20	43	17.06	73	PVN	TEC	+0.05	TEC	TEC	133
20	52	9.52	65	PVN	TEC	+0.00	TEC	TEC	129
20	53	15.06	59	PVN	TEC	+0.03	TEC	TEC	185
20	54	15.39	61	PVN	TEC	+0.00	TEC	TEC	280
		11.10	53	PVN	TEC	+0.07	TEC	TEC	283
20	55	9.14	40	PVN	TEC	+0.08	TEC	TEC	122
20	56	11.45	68	PVN	TEC	+0.06	TEC	TEC	255
20	57	10.19	53	PVN	TEC	+0.02	TEC	TEC	360
20	58	14.91	78	PVN	TEC	+0.08	TEC	TEC	320
		7.82	68	PVN	TEC	+0.05	TEC	TEC	304
20	59	11.02	77	PVN	TEC	+0.03	TEC	TEC	143
20	60	9.25	70	PVN	TEC	+0.02	TEC	TEC	63
20	62	4.76	69	PVN	TEC	+0.01	TEC	TEC	53
20	63	8.33	77	PVN	TEC	+0.00	TEC	TEC	331
20	64	9.39	62	PVN	TEC	+0.00	TEC	TEC	340
20	65	16.78	47	PVN	TEC	+0.03	TEC	TEC	129
20	66	7.78	93	PVN	TEC	+0.04	TEC	TEC	187
20	67	14.52	60	PVN	TEC	+0.05	TEC	TEC	164
20	68	8.66	68	PVN	TEC	+0.00	TEC	TEC	262
20	72	13.95	76	PVN	TEC	+0.00	TEC	TEC	175
20	73	10.23	61	PVN	TEC	+0.06	TEC	TEC	227
20	75	12.41	80	PVN	TEC	+0.01	TEC	TEC	129
20	78	19.23	65	PVN	TEC	+0.04	TEC	TEC	182
20	79	8.92	67	PVN	TEC	+0.05	TEC	TEC	360
20	80	14.73	73	PVN	TEC	+0.01	TEC	TEC	136
21	21	9.76	83	PVN	TEC	+0.03	TEC	TEC	129
21	22	12.32	57	PVN	TEC	+0.05	TEC	TEC	311
21	23	14.21	50	PVN	TEC	+0.06	TEC	TEC	175
21	24	10.39	42	PVN	TEC	+0.02	TEC	TEC	259
21	25	11.03	53	PVN	TEC	+0.01	TEC	TEC	360
21	26	11.03	64	PVN	TEC	+0.00	TEC	TEC	150
21	29	12.75	68	PVN	TEC	+0.01	TEC	TEC	213
21	30	9.79	63	PVN	TEC	+0.04	TEC	TEC	147
21	31	2.36	72	PVN	TEC	+0.00	TEC	TEC	125
21	33	9.49	78	PVN	TEC	+0.05	TEC	TEC	185
21	34	3.33	48	PVN	TEC	+0.00	TEC	TEC	140
21	35	2.66	46	PVN	TEC	+0.06	TEC	TEC	66
21	37	9.53	53	PVN	TEC	+0.07	TEC	TEC	320
21	38	11.53	75	PVN	TEC	+0.05	TEC	TEC	119
21	39	7.18	51	PVN	TEC	+0.07	TEC	TEC	287
21	40	19.16	54	PVN	TEC	+0.03	TEC	TEC	294
21	41	10.61	79	PVN	TEC	+0.00	TEC	TEC	119
21	42	15.70	71	PVN	TEC	+0.07	TEC	TEC	260
21	45	6.95	70	PVN	TEC	+0.02	TEC	TEC	154
21	47	15.56	69	PVN	TEC	+0.04	TEC	TEC	269
21	48	5.39	54	PVN	TEC	+0.00	TEC	TEC	150
21	49	12.99	64	PVN	TEC	+0.00	TEC	TEC	300
21	50	8.18	67	PVN	TEC	+0.00	TEC	TEC	293
21	51	11.19	60	PVN	TEC	+0.07	TEC	TEC	270
21	52	2.79	74	PVN	TEC	+0.03	TEC	TEC	176
21	53	7.36	55	PVN	TEC	+0.00	TEC	TEC	320

21	54	19.52	58	PVN	TEC	+0.05	TEC	TEC	210
21	55	10.87	48	PVN	TEC	+0.09	TEC	TEC	360
21	56	11.47	56	PVN	TEC	+0.02	TEC	TEC	231
21	57	9.07	62	PVN	TEC	+0.00	TEC	TEC	315
21	58	17.46	61	PVN	TEC	+0.07	TEC	TEC	161
21	61	10.00	61	PVN	TEC	+0.03	TEC	TEC	147
21	62	13.54	66	PVN	TEC	+0.04	TEC	TEC	330
21	63	7.72	86	PVN	TEC	+0.03	TEC	TEC	280
21	64	8.37	72	PVN	TEC	+0.02	TEC	TEC	196
21	65	8.47	73	PVN	TEC	+0.00	TEC	TEC	270
21	66	9.30	61	PVN	TEC	+0.00	TEC	TEC	215
21	67	14.89	63	PVN	TEC	+0.00	TEC	TEC	273
21	69	6.74	63	PVN	TEC	+0.00	TEC	TEC	77
21	71	16.60	69	PVN	TEC	+0.00	TEC	TEC	143
21	72	12.81	60	PVN	TEC	+0.05	TEC	TEC	252
21	73	3.65	55	PVN	TEC	+0.00	TEC	TEC	143
21	74	14.27	67	PVN	TEC	+0.00	TEC	TEC	213
21	77	11.27	76	PVN	TEC	+0.03	TEC	TEC	66
21	78	10.98	37	PVN	TEC	+0.00	TEC	TEC	224
21	79	17.22	64	PVN	TEC	+0.00	TEC	TEC	199
22	7	1.39	44	PVN	TEC	+0.07	TEC	TEC	136
22	22	14.03	74	PVN	TEC	+0.11	TEC	TEC	171
22	23	11.78	76	PVN	TEC	+0.11	TEC	TEC	238
22	24	6.97	83	PVN	TEC	+0.01	TEC	TEC	231
22	25	9.33	49	PVN	TEC	+0.02	TEC	TEC	360
22	26	9.92	71	PVN	TEC	+0.03	TEC	TEC	196
22	27	28.06	55	PVN	TEC	+0.04	TEC	TEC	122
22	29	10.54	72	PVN	TEC	+0.02	TEC	TEC	157
22	30	8.97	83	PVN	TEC	+0.04	TEC	TEC	301
22	31	19.41	64	PVN	TEC	+0.02	TEC	TEC	310
22	32	10.48	67	PVN	TEC	+0.02	TEC	TEC	203
22	33	3.75	85	PVN	TEC	+0.05	TEC	TEC	143
22	34	2.13	61	PVN	TEC	+0.01	TEC	TEC	154
22	35	12.77	70	PVN	TEC	+0.01	TEC	TEC	297
22	36	21.98	67	PVN	TEC	+0.00	TEC	TEC	241
22	38	5.66	68	PVN	TEC	+0.01	TEC	TEC	80
22	39	4.95	65	PVN	TEC	+0.01	TEC	TEC	63
22	40	9.03	72	PVN	TEC	+0.00	TEC	TEC	175
22	41	13.66	76	PVN	TEC	+0.02	TEC	TEC	245
		7.38	55	PVN	TEC	+0.07	TEC	TEC	273
22	42	8.20	54	PVN	TEC	+0.06	TEC	TEC	297
22	43	19.73	47	PVN	TEC	+0.00	TEC	TEC	301
22	44	15.60	57	PVN	TEC	+0.10	TEC	TEC	315
22	45	16.97	60	PVN	TEC	+0.00	TEC	TEC	300
22	46	18.41	61	PVN	TEC	+0.01	TEC	TEC	231
22	47	14.41	71	PVN	TEC	+0.02	TEC	TEC	300
22	48	11.83	58	PVN	TEC	+0.04	TEC	TEC	268
22	49	16.76	61	PVN	TEC	+0.02	TEC	TEC	360
22	50	17.09	61	PVN	TEC	+0.03	TEC	TEC	248
22	51	14.65	65	PVN	TEC	+0.03	TEC	TEC	360
22	52	15.40	62	PVN	TEC	+0.11	TEC	TEC	240
22	53	16.31	56	PVN	TEC	+0.03	TEC	TEC	241
22	54	8.33	35	PVN	TEC	+0.01	TEC	TEC	260
22	55	15.26	66	PVN	TEC	+0.02	TEC	TEC	262
22	56	13.51	68	PVN	TEC	+0.00	TEC	TEC	157
22	59	10.82	85	PVN	TEC	+0.03	TEC	TEC	140
22	60	10.39	75	PVN	TEC	+0.05	TEC	TEC	281

22	61	9.07	54	PVN	TEC	+0.05	TEC	TEC	260
22	62	8.67	54	PVN	TEC	+0.01	TEC	TEC	355
22	63	13.18	63	PVN	TEC	+0.00	TEC	TEC	252
22	64	6.48	66	PVN	TEC	+0.00	TEC	TEC	77
22	65	12.71	56	PVN	TEC	+0.06	TEC	TEC	238
22	66	0.94	57	PVN	TEC	+0.07	TEC	TEC	63
22	67	4.04	59	PVN	TEC	+0.02	TEC	TEC	91
22	68	3.80	58	PVN	TEC	+0.02	TEC	TEC	80
22	70	15.07	73	PVN	TEC	+0.02	TEC	TEC	115
22	71	15.53	57	PVN	TEC	+0.01	TEC	TEC	360
22	72	11.29	71	PVN	TEC	+0.00	TEC	TEC	234
22	73	11.53	62	PVN	TEC	+0.03	TEC	TEC	227
22	77	29.60	57	PVN	TEC	+0.01	TEC	TSC	275
22	78	22.34	70	PVN	TEC	+0.03	TEC	TEC	269
23	24	11.24	62	PVN	TEC	+0.12	TEC	TEC	360
23	25	5.15	53	PVN	TEC	+0.06	TEC	TSC	252
		7.81	77	PVN	TEC	+0.04	TEC	TEC	325
23	26	6.68	45	PVN	TEC	+0.08	TEC	TSC	234
23	27	2.99	61	PVN	TEC	+0.04	TEC	TEC	234
23	28	10.14	52	PVN	TEC	+0.09	TEC	TEC	199
23	31	5.67	68	PVN	TEC	+0.01	TEC	TEC	217
23	32	3.67	63	PVN	TEC	+0.08	TEC	TEC	91
23	34	4.07	82	PVN	TEC	+0.00	TEC	TEC	213
23	35	3.74	57	PVN	TEC	+0.07	TEC	TEC	248
23	36	14.43	80	PVN	TEC	+0.05	TEC	TEC	269
23	37	10.19	58	PVN	TEC	+0.07	TEC	TEC	310
23	38	23.14	57	PVN	TEC	+0.08	TEC	TEC	238
23	39	13.84	69	PVN	TEC	+0.00	TEC	TEC	140
23	41	7.62	83	PVN	TEC	+0.01	TEC	TSC	224
23	42	3.49	61	PVN	TEC	+0.02	TEC	TEC	60
23	43	8.28	56	PVN	TEC	+0.08	TEC	TEC	273
23	44	7.62	87	PVN	TEC	+0.01	TEC	TEC	178
23	45	10.18	60	PVN	TEC	+0.05	TEC	TEC	168
23	46	8.54	78	PVN	TEC	+0.00	TEC	TEC	115
23	47	14.03	59	PVN	TEC	+0.05	TEC	TEC	259
23	48	13.79	64	PVN	TEC	+0.00	TEC	TEC	164
23	49	9.40	80	PVN	TEC	+0.00	TEC	TEC	199
23	50	14.51	59	PVN	TEC	+0.09	TEC	TEC	245
23	51	6.78	74	PVN	TEC	+0.00	TEC	TEC	203
23	52	9.84	73	PVN	TEC	+0.06	TEC	TSC	231
23	53	13.82	63	PVN	TEC	+0.00	TEC	TEC	300
23	56	8.65	76	PVN	TEC	+0.03	TEC	TEC	56
23	57	20.43	67	PVN	TEC	+0.00	TEC	TEC	224
23	58	14.40	61	PVN	TEC	+0.05	TEC	TEC	280
23	59	9.52	77	PVN	TEC	+0.06	TEC	TEC	220
23	60	8.15	67	PVN	TEC	+0.04	TEC	TEC	299
23	61	7.58	71	PVN	TEC	+0.02	TEC	TEC	320
23	62	7.24	69	PVN	TEC	+0.00	TEC	TEC	245
23	63	6.44	52	PVN	TEC	+0.03	TEC	TEC	143
23	64	10.37	80	PVN	TEC	+0.02	TEC	TEC	147
23	65	5.37	78	PVN	TEC	+0.00	TEC	TEC	105
23	69	21.59	66	PVN	TEC	+0.00	TEC	TEC	164
23	70	13.65	53	PVN	TEC	+0.00	TEC	TEC	360
23	71	8.60	63	PVN	TEC	+0.00	TEC	TEC	320
23	72	9.33	68	PVN	TEC	+0.03	TEC	TEC	178
23	73	5.75	53	PVN	TEC	+0.00	TEC	TEC	56
23	76	13.03	71	PVN	TEC	+0.03	TEC	TEC	91

23	77	11.00	67	PVN	TEC	+0.01	TEC	TEC	252
23	78	6.58	61	PVN	TEC	+0.00	TEC	TEC	63
24	24	11.28	66	PVN	TEC	+0.01	TEC	TEC	196
24	25	9.64	64	PVN	TEC	+0.05	TEC	TEC	269
24	26	16.07	56	PVN	TEC	+0.01	TEC	TEC	318
24	27	10.97	64	PVN	TEC	+0.01	TEC	TEC	238
24	28	13.46	43	PVN	TEC	+0.01	TEC	TEC	360
24	29	18.85	69	PVN	TEC	+0.03	TEC	TEC	210
24	33	9.38	78	PVN	TEC	+0.05	TEC	TEC	168
24	35	15.26	66	PVN	TEC	+0.02	TEC	TEC	276
24	36	8.32	67	PVN	TEC	+0.01	TEC	TEC	227
24	37	5.62	65	PVN	TEC	+0.02	TEC	TEC	168
24	38	8.09	79	PVN	TEC	+0.00	TEC	TEC	320
24	39	16.29	59	PVN	TEC	+0.01	TEC	TEC	320
24	40	11.53	64	PVN	TEC	+0.04	TEC	TEC	248
24	41	22.77	67	PVN	TEC	+0.07	TEC	TEC	186
24	42	13.44	72	PVN	TEC	+0.07	TEC	TSC	129
24	43	16.16	78	PVN	TEC	+0.05	TEC	TEC	140
24	44	7.69	66	PVN	TEC	+0.00	TEC	TEC	161
24	47	1.18	61	PVN	TEC	+0.00	TEC	TEC	60
24	52	10.37	70	PVN	TEC	+0.03	TEC	TEC	129
24	53	18.40	55	PVN	TEC	+0.05	TEC	TEC	119
24	54	14.79	67	PVN	TEC	+0.00	TEC	TEC	220
24	55	9.64	77	PVN	TEC	+0.03	TEC	TEC	254
24	56	12.77	57	PVN	TEC	+0.06	TEC	TEC	310
24	57	12.37	69	PVN	TEC	+0.01	TEC	TEC	182
24	58	8.22	66	PVN	TEC	+0.03	TEC	TEC	185
24	59	9.89	65	PVN	TEC	+0.01	TEC	TEC	320
24	60	10.93	62	PVN	TEC	+0.04	TEC	TEC	294
24	61	14.05	62	PVN	TEC	+0.07	TEC	TEC	206
24	62	10.18	76	PVN	TEC	+0.01	TEC	TEC	224
24	63	12.62	59	PVN	TEC	+0.02	TEC	TSC	229
24	64	6.03	58	PVN	TEC	+0.00	TEC	TEC	155
24	68	21.50	65	PVN	TEC	+0.00	TEC	TEC	196
24	69	18.34	61	PVN	TEC	+0.03	TEC	TEC	337
24	70	15.37	46	PVN	TEC	+0.02	TEC	TEC	346
24	71	12.92	67	PVN	TEC	+0.03	TEC	TEC	290
25	25	5.65	81	PVN	TEC	+0.03	TEC	TEC	122
25	26	9.57	66	PVN	TEC	+0.02	TEC	TEC	319
25	27	14.15	67	PVN	TEC	+0.01	TEC	TEC	332
25	28	2.03	44	PVN	TEC	+0.11	TEC	TEC	269
25	29	15.50	41	PVN	TEC	+0.02	TEC	TEC	273
25	30	10.27	57	PVN	TEC	+0.07	TEC	TEC	339
25	31	23.80	54	PVN	TEC	+0.00	TEC	TEC	133
25	35	7.25	58	PVN	TEC	+0.08	TEC	TEC	234
25	36	7.20	62	PVN	TEC	+0.00	TEC	TEC	122
25	37	3.56	87	PVN	TEC	+0.00	TEC	TEC	154
25	38	11.90	79	PVN	TEC	+0.05	TEC	TEC	171
25	39	4.90	51	PVN	TEC	+0.11	TEC	TSC	336
25	40	10.26	63	PVN	TEC	+0.06	TEC	TEC	234
25	41	11.65	67	PVN	TEC	+0.02	TEC	TEC	300
25	42	10.80	63	PVN	TEC	+0.09	TEC	TEC	276
25	43	7.01	44	PVN	TEC	+0.01	TEC	TEC	290
25	44	11.10	86	PVN	TEC	+0.03	TEC	TEC	262
25	45	9.62	63	PVN	TEC	+0.06	TEC	TEC	294
25	45	7.35	64	PVN	TEC	+0.03	TEC	TEC	171
25	46	13.53	74	PVN	TEC	+0.08	TEC	TEC	300

25	47	20.47	52	PVN	TEC	+0.07	TEC	TEC	248
25	48	21.11	58	PVN	TEC	+0.04	TEC	TEC	276
25	49	18.12	58	PVN	TEC	+0.05	TEC	TEC	293
25	50	17.16	58	PVN	TEC	+0.00	TEC	TEC	260
25	51	16.43	62	PVN	TEC	+0.06	TEC	TEC	320
25	52	10.71	64	PVN	TEC	+0.04	TEC	TEC	245
25	53	13.43	52	PVN	TEC	+0.10	TEC	TSC	224
25	54	8.08	70	PVN	TEC	+0.04	TEC	TEC	107
25	55	11.46	56	PVN	TEC	+0.07	TEC	TSC	245
25	56	13.48	61	PVN	TEC	+0.02	TEC	TEC	276
25	57	12.51	82	PVN	TEC	+0.00	TEC	TEC	300
25	58	11.84	68	PVN	TEC	+0.01	TEC	TSC	259
25	59	7.01	62	PVN	TEC	+0.00	TEC	TEC	195
25	60	7.52	54	PVN	TEC	+0.07	TEC	TEC	143
25	61	1.87	43	PVN	TEC	+0.01	TEC	TEC	80
25	62	8.67	71	PVN	TEC	+0.00	TEC	TEC	129
25	67	16.14	81	PVN	TEC	+0.00	TEC	TEC	224
25	68	14.18	49	PVN	TEC	+0.02	TEC	TEC	345
25	69	8.67	73	PVN	TEC	+0.00	TEC	TEC	185
25	70	9.25	73	PVN	TEC	+0.00	TEC	TEC	276
25	71	4.89	68	PVN	TEC	+0.00	TEC	TEC	50
26	16	2.83	55	PVN	TEC	+0.16	TEC	TEC	140
26	26	8.78	69	PVN	TEC	+0.01	TEC	TEC	147
26	27	8.02	63	PVN	TEC	+0.01	TEC	TEC	290
26	28	12.33	76	PVN	TEC	+0.02	TEC	TEC	220
26	29	7.99	51	PVN	TEC	+0.01	TEC	TEC	360
26	30	10.28	37	PVN	TEC	+0.03	TEC	TEC	304
26	31	8.54	52	PVN	TEC	+0.04	TEC	TEC	320
26	32	23.22	58	PVN	TEC	+0.03	TEC	TEC	213
26	33	5.47	62	PVN	TEC	+0.07	TEC	TEC	101
26	35	6.82	68	PVN	TEC	+0.01	TEC	TEC	56
26	36	6.67	82	PVN	TEC	+0.00	TEC	TEC	175
26	37	10.42	68	PVN	TEC	+0.01	TEC	TEC	127
26	38	6.35	67	PVN	TEC	+0.03	TEC	TEC	142
26	39	9.16	83	PVN	TEC	+0.00	TEC	TEC	122
		8.52	78	PVN	TEC	+0.03	TEC	TEC	129
26	40	4.08	32	PVN	TEC	+0.02	TEC	TEC	192
26	41	12.01	72	PVN	TEC	+0.04	TEC	TEC	206
26	42	4.85	50	PVN	TEC	+0.05	TEC	TEC	30
26	43	10.98	63	PVN	TEC	+0.04	TEC	TEC	315
26	44	14.84	50	PVN	TEC	+0.08	TEC	TEC	320
26	45	5.55	53	PVN	TEC	+0.11	TEC	TSC	283
26	46	13.32	70	PVN	TEC	+0.02	TEC	TEC	199
26	49	13.09	71	PVN	TEC	+0.03	TEC	TEC	290
26	50	12.16	61	PVN	TEC	+0.03	TEC	TEC	290
26	51	17.66	58	PVN	TEC	+0.04	TEC	TEC	259
26	52	8.62	65	PVN	TEC	+0.10	TEC	TEC	290
26	53	12.36	45	PVN	TEC	+0.00	TEC	TEC	203
		3.12	56	PVN	TEC	+0.12	TEC	TEC	227
26	54	13.25	62	PVN	TEC	+0.00	TEC	TEC	300
26	55	11.77	61	PVN	TEC	+0.03	TEC	TSC	318
26	56	8.66	64	PVN	TEC	+0.00	TEC	TEC	168
26	57	9.28	63	PVN	TEC	+0.02	TEC	TEC	252
26	58	12.60	73	PVN	TEC	+0.04	TEC	TEC	310
26	59	12.38	70	PVN	TEC	+0.07	TEC	TEC	196
26	60	5.56	74	PVN	TEC	+0.02	TEC	TEC	108
26	61	4.43	61	PVN	TEC	+0.02	TEC	TEC	161

26	62	8.57	81	PVN	TEC	+0.02	TEC	TEC	126
26	65	1.82	55	PVN	TEC	+0.03	TEC	TEC	34
26	66	21.78	61	PVN	TEC	+0.05	TEC	TEC	273
26	67	4.43	66	PVN	TEC	+0.04	TEC	TEC	336
26	68	9.60	41	PVN	TEC	+0.02	TEC	TEC	325
26	69	13.34	75	PVN	TEC	+0.04	TEC	TEC	164
27	27	2.79	73	PVN	TEC	+0.00	TEC	TEC	80
27	28	2.29	58	PVN	TEC	+0.00	TEC	TEC	178
27	29	3.93	59	PVN	TEC	+0.10	TEC	TEC	301
27	30	6.68	55	PVN	TEC	+0.01	TEC	TEC	360
27	31	8.50	46	PVN	TEC	+0.01	TEC	TEC	360
27	32	3.47	53	PVN	TEC	+0.11	TEC	TEC	355
27	33	22.54	51	PVN	TEC	+0.07	TEC	TEC	320
27	34	20.14	70	PVN	TEC	+0.00	TEC	TEC	203
27	35	3.37	66	PVN	TEC	+0.09	TEC	TEC	91
27	38	2.86	85	PVN	TEC	+0.06	TEC	TSC	192
27	39	4.47	73	PVN	TEC	+0.00	TEC	TEC	84
27	40	3.81	49	PVN	TEC	+0.05	TEC	TEC	91
27	41	7.60	75	PVN	TEC	+0.02	TEC	TEC	300
27	43	3.31	76	PVN	TEC	+0.01	TEC	TEC	136
27	44	7.56	65	PVN	TEC	+0.04	TEC	TEC	66
27	45	9.86	70	PVN	TEC	+0.00	TEC	TEC	203
27	46	6.79	72	PVN	TEC	+0.00	TEC	TEC	129
27	49	4.00	98	PVN	TEC	+0.00	TEC	TEC	94
27	50	8.66	71	PVN	TEC	+0.00	TEC	TEC	122
27	51	8.81	69	PVN	TEC	+0.00	TEC	TEC	206
27	52	12.67	75	PVN	TEC	+0.04	TEC	TEC	122
27	53	6.25	68	PVN	TEC	+0.03	TEC	TEC	185
27	56	11.66	79	PVN	TEC	+0.02	TEC	TEC	150
27	57	9.60	69	PVN	TEC	+0.00	TEC	TEC	231
27	58	6.78	49	PVN	TEC	+0.09	TEC	TEC	320
27	59	14.31	68	PVN	TEC	+0.00	TEC	TEC	310
27	60	13.66	65	PVN	TEC	+0.07	TEC	TEC	321
27	61	12.80	75	PVN	TEC	+0.02	TEC	TEC	140
27	64	21.80	62	PVN	TEC	+0.08	TEC	TEC	175
27	65	16.66	39	PVN	TEC	+0.00	TEC	TEC	266
27	66	11.28	52	PVN	TEC	+0.00	TEC	TEC	360
27	67	11.26	63	PVN	TEC	+0.02	TEC	TEC	360
27	68	8.54	63	PVN	TEC	+0.05	TEC	TEC	140
28	28	2.61	63	PVN	TEC	+0.02	TEC	TEC	63
28	29	3.08	65	PVN	TEC	+0.02	TEC	TEC	59
28	30	6.72	38	PVN	TEC	+0.00	TEC	TEC	360
28	31	13.77	58	PVN	TEC	+0.03	TEC	TEC	315
28	32	12.55	48	PVN	TEC	+0.01	TEC	TEC	360
28	33	2.46	54	PVN	TEC	+0.10	TEC	TEC	350
28	34	12.94	50	PVN	TEC	+0.09	TEC	TEC	360
28	35	11.19	70	PVN	TEC	+0.00	TEC	TEC	320
28	36	19.61	62	PVN	TEC	+0.00	TEC	TEC	273
28	37	22.16	67	PVN	TEC	+0.05	TEC	TEC	164
28	41	10.41	62	PVN	TEC	+0.06	TEC	TEC	63
28	43	11.29	69	PVN	TEC	+0.00	TEC	TEC	105
28	47	4.59	52	PVN	TEC	+0.02	TEC	TEC	84
28	48	13.51	66	PVN	TEC	+0.00	TEC	TEC	290
28	49	3.74	74	PVN	TEC	+0.04	TEC	TEC	66
28	50	5.77	41	PVN	TEC	+0.04	TEC	TEC	87
28	51	4.29	51	PVN	TEC	+0.03	TEC	TEC	164
28	52	6.74	84	PVN	TEC	+0.00	TEC	TEC	147

28	57	7.88	57	PVN	TEC	+0.04	TEC	TEC	98
28	59	9.56	74	PVN	TEC	+0.02	TEC	TEC	87
28	62	25.62	61	PVN	TEC	+0.03	TEC	TEC	164
28	63	12.29	62	PVN	TEC	+0.02	TEC	TEC	304
28	64	6.37	54	PVN	TEC	+0.00	TEC	TEC	185
28	66	14.03	69	PVN	TEC	+0.04	TEC	TEC	283
28	67	11.52	72	PVN	TEC	+0.02	TEC	TEC	84
29	26	4.87	73	PVN	TEC	+0.01	TEC	TEC	105
29	27	12.04	63	PVN	TEC	+0.01	TEC	TEC	269
29	28	11.25	63	PVN	TEC	+0.04	TEC	TEC	84
29	30	5.01	74	PVN	TEC	+0.01	TEC	TEC	115
29	31	2.17	30	PVN	TEC	+0.09	TEC	TEC	350
29	32	7.63	49	PVN	TEC	+0.07	TEC	TEC	360
29	33	13.34	44	PVN	TEC	+0.01	TEC	TEC	320
29	34	3.16	41	PVN	TEC	+0.02	TEC	TEC	360
29	35	2.66	59	PVN	TEC	+0.12	TEC	TEC	360
29	36	13.94	63	PVN	TEC	+0.07	TEC	TEC	260
29	37	17.26	58	PVN	TEC	+0.06	TEC	TEC	262
29	38	13.88	49	PVN	TEC	+0.00	TEC	TEC	248
29	39	26.02	65	PVN	TEC	+0.00	TEC	TEC	259
29	40	15.46	72	PVN	TEC	+0.02	TEC	TEC	175
29	41	16.48	65	PVN	TEC	+0.06	TEC	TEC	133
29	59	2.54	62	PVN	TEC	+0.00	TEC	TEC	52
29	60	21.86	62	PVN	TEC	+0.09	TEC	TEC	206
29	61	13.25	65	PVN	TEC	+0.05	TEC	TEC	224
29	62	12.99	60	PVN	TEC	+0.02	TEC	TEC	320
29	63	16.89	61	PVN	TEC	+0.00	TEC	TEC	283
29	64	12.29	74	PVN	TEC	+0.05	TEC	TEC	294
30	28	10.01	64	PVN	TEC	+0.05	TEC	TEC	287
30	29	13.81	61	PVN	TEC	+0.01	TEC	TEC	143
30	32	7.68	71	PVN	TEC	+0.04	TEC	TEC	126
30	33	12.06	53	PVN	TEC	+0.04	TEC	TSC	294
30	34	12.15	55	PVN	TEC	+0.09	TEC	TEC	259
30	35	8.07	47	PVN	TEC	+0.03	TEC	TEC	280
30	36	11.00	62	PVN	TEC	+0.10	TEC	TEC	300
30	37	17.39	49	PVN	TEC	+0.03	TEC	TEC	320
30	38	12.85	67	PVN	TEC	+0.07	TEC	TEC	330
30	39	11.94	46	PVN	TEC	+0.05	TEC	TEC	330
30	40	11.26	66	PVN	TEC	+0.04	TEC	TEC	264
30	41	8.86	68	PVN	TEC	+0.05	TEC	TEC	320
30	42	10.98	55	PVN	TEC	+0.03	TEC	TEC	320
30	43	22.75	59	PVN	TEC	+0.08	TEC	TEC	290
30	44	20.02	64	PVN	TEC	+0.04	TEC	TSC	234
30	45	21.74	72	PVN	TEC	+0.04	TEC	TEC	210
30	46	18.64	65	PVN	TEC	+0.03	TEC	TEC	178
30	47	23.14	61	PVN	TEC	+0.05	TEC	TEC	182
30	48	28.22	58	PVN	TEC	+0.06	TEC	TEC	192
30	49	25.61	58	PVN	TEC	+0.02	TEC	TEC	196
30	50	14.06	64	PVN	TEC	+0.02	TEC	TEC	185
30	51	16.06	58	PVN	TEC	+0.10	TEC	TEC	203
30	52	26.11	55	PVN	TEC	+0.04	TEC	TEC	276
30	53	14.52	67	PVN	TEC	+0.04	TEC	TEC	311
30	54	24.45	66	PVN	TEC	+0.04	TEC	TEC	241
30	57	11.75	68	PVN	TEC	+0.00	TEC	TEC	150
30	58	16.44	61	PVN	TEC	+0.04	TEC	TEC	150
30	59	11.88	71	PVN	TEC	+0.04	TEC	TEC	300
30	60	5.71	66	PVN	TEC	+0.06	TEC	TEC	219

30	61	9.37	52	PVN	TEC	+0.09	TEC	TEC	300
30	62	12.50	69	PVN	TEC	+0.04	TEC	TEC	252
30	63	3.57	57	PVN	TEC	+0.01	TEC	TEC	42
31	34	8.81	85	PVN	TEC	+0.01	TEC	TEC	108
31	35	9.85	81	PVN	TEC	+0.05	TEC	TEC	231
31	36	6.77	67	PVN	TEC	+0.02	TEC	TEC	301
31	37	9.59	55	PVN	TEC	+0.03	TEC	TEC	360
31	38	8.45	65	PVN	TEC	+0.01	TEC	TEC	315
31	39	8.16	71	PVN	TEC	+0.03	TEC	TEC	360
31	40	9.20	89	PVN	TEC	+0.05	TEC	TEC	300
31	41	11.23	61	PVN	TEC	+0.01	TEC	TEC	273
31	42	8.10	70	PVN	TEC	+0.05	TEC	TEC	300
31	43	8.01	60	PVN	TEC	+0.04	TEC	TEC	360
31	44	15.53	54	PVN	TEC	+0.08	TEC	TEC	308
31	45	13.24	61	PVN	TEC	+0.05	TEC	TEC	320
31	46	8.49	62	PVN	TEC	+0.04	TEC	TEC	250
31	47	8.49	55	PVN	TEC	+0.07	TEC	TEC	320
31	48	10.68	57	PVN	TEC	+0.04	TEC	TEC	320
31	49	14.33	51	PVN	TEC	+0.06	TEC	TEC	320
31	50	14.30	54	PVN	TEC	+0.02	TEC	TEC	340
31	51	10.68	49	PVN	TEC	+0.02	TEC	TEC	260
31	52	10.63	64	PVN	TEC	+0.04	TEC	TEC	240
31	53	11.45	51	PVN	TEC	+0.11	TEC	TSC	276
31	54	11.64	60	PVN	TEC	+0.02	TEC	TEC	280
31	55	12.11	70	PVN	TEC	+0.02	TEC	TEC	206
31	56	18.80	58	PVN	TEC	+0.03	TEC	TEC	290
31	57	7.57	64	PVN	TEC	+0.02	TEC	TEC	132
31	58	11.63	77	PVN	TEC	+0.05	TEC	TEC	147
31	61	2.42	56	PVN	TEC	+0.02	TEC	TEC	38
32	32	4.91	62	PVN	TEC	+0.07	TEC	TEC	198
32	36	2.28	63	PVN	TEC	+0.01	TEC	TEC	45
32	37	10.52	75	PVN	TEC	+0.01	TEC	TEC	129
32	38	4.80	51	PVN	TEC	+0.07	TEC	TEC	330
32	39	12.06	72	PVN	TEC	+0.02	TEC	TEC	294
32	40	6.21	68	PVN	TEC	+0.01	TEC	TEC	340
32	41	9.45	66	PVN	TEC	+0.05	TEC	TEC	280
32	42	12.61	73	PVN	TEC	+0.01	TEC	TEC	178
32	43	2.40	50	PVN	TEC	+0.09	TEC	TEC	290
32	44	13.74	65	PVN	TEC	+0.00	TEC	TEC	320
32	45	12.35	59	PVN	TEC	+0.03	TEC	TEC	300
32	46	4.71	55	PVN	TEC	+0.07	TEC	TEC	320
32	47	12.46	62	PVN	TEC	+0.00	TEC	TEC	330
32	48	7.72	43	PVN	TEC	+0.06	TEC	TEC	360
32	49	10.46	50	PVN	TEC	+0.03	TEC	TEC	300
32	50	13.77	62	PVN	TEC	+0.05	TEC	TEC	259
32	51	10.81	66	PVN	TEC	+0.04	TEC	TEC	185
32	52	6.68	52	PVN	TEC	+0.00	TEC	TEC	210
32	53	11.52	74	PVN	TEC	+0.06	TEC	TEC	245
32	54	7.79	67	PVN	TEC	+0.00	TEC	TEC	227
32	55	10.43	69	PVN	TEC	+0.02	TEC	TEC	297
32	56	7.55	70	PVN	TEC	+0.00	TEC	TEC	241
32	57	9.45	85	PVN	TEC	+0.03	TEC	TEC	246
32	58	4.90	74	PVN	TEC	+0.00	TEC	TEC	101
33	39	5.57	57	PVN	TEC	+0.05	TEC	TEC	66
33	41	9.22	56	PVN	TEC	+0.05	TEC	TEC	227
33	42	10.15	72	PVN	TEC	+0.04	TEC	TEC	161
33	44	15.24	68	PVN	TEC	+0.05	TEC	TEC	255

33	45	7.63	72	PVN	TEC	+0.03	TEC	TEC	101
33	46	11.92	63	PVN	TEC	+0.06	TEC	TEC	234
33	47	9.74	65	PVN	TEC	+0.06	TEC	TEC	241
33	48	2.03	56	PVN	TEC	+0.02	TEC	TEC	77
33	50	10.41	71	PVN	TEC	+0.01	TEC	TEC	175
33	51	12.90	72	PVN	TEC	+0.09	TEC	TEC	245
33	53	5.91	68	PVN	TEC	+0.05	TEC	TEC	87
33	56	3.18	71	PVN	TEC	+0.01	TEC	TEC	38
34	50	3.12	61	PVN	TEC	+0.02	TEC	TEC	45
45	46	3.08	66	PVN	TEC	+0.04	TEC	TEC	38
45	49	2.39	69	PVN	TEC	+0.01	TEC	TEC	59