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L-2010-065
10 CFR 50.90

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, D. C. 20555-0001

Re: Turkey Point Units 3 and 4
Docket Nos. 50-250 and 50-251
Response to Request for Additional Information (RAI) Regarding Alternative Source Term (AST) License Amendment Request (LAR) 196 (TAC NOS. ME1624 and ME1625)

References:

(1) W. Jefferson (FPL) to U.S. Nuclear Regulatory Commission (L-2009-133), "License Amendment Request 196: Alternative Source Term and Conforming Amendment," Accession No. ML092050277, June 25, 2009.

(2) J. Paige (NRC) to M. Nazar, "Turkey Point Units 3 and 4 – Request for Additional Information Regarding Request to Adopt Alternate Source Term (TAC Nos. ME1624 and ME1625)," Accession No. ML100700446, March 24, 2010

By letter L-2009-133 dated June 25, 2009 [Reference 1], Florida Power and Light (FPL) requested to amend Facility Operating Licenses DPR-31 and DPR-41 and revise the Turkey Point Units 3 and 4 Technical Specifications (TS). The proposed amendments revise the TS to adopt the alternative source term (AST) as allowed in 10 CFR 50.67.

Additional information was requested by the NRC staff by letter dated March 24, 2010 [Reference 2]. The attachment to this letter provides the FPL response to the questions from the NRC staff.

In accordance with 10 CFR 50.91(b)(1), a copy of this letter is being forwarded to the State Designee of Florida.

This submittal does not alter the significant hazards consideration or the environmental assessment previously submitted by FPL letter L-2009-133 [Reference 1].

This letter contains no new commitments and no revisions to existing commitments.

A supplement to this response will be provided no later than May 21st containing revised offsite radiological dose consequences and proposed changes to TS 3/4.7.5 on the Control Room Emergency Ventilation System (CREVS).

Should you have any questions regarding this submittal, please contact Mr. Robert J. Tomonto, Licensing Manager, at (305) 246-7327.

A001
NRR

I declare under penalty of perjury that the foregoing is true and correct.

Executed on April 14th, 2010.

Very truly yours,

PAUL U. RUBIN

for

Michael Kiley
Site Vice President
Turkey Point Nuclear Plant

Attachment

cc: USNRC Regional Administrator, Region II
USNRC Project Manager, Turkey Point Nuclear Plant
USNRC Resident Inspector, Turkey Point Nuclear Plant
Mr. W. A. Passetti, Florida Department of Health

Attachment

Response to 03/24/2010 Request for Additional Information (RAI) Regarding Alternative Source Term (AST)

Response to Request for Additional Information

The following information is provided by Florida Power & Light (FPL) in response to the U. S. Nuclear Regulatory Commission's (NRC) Request for Additional Information (RAI). This information was requested to support License Amendment Request (LAR) 196, Alternative Source Term (AST) and Conforming Amendment, for Turkey Point Nuclear Plant (PTN) Units 3 and 4 that was submitted to the NRC by FPL via letter (L-2009-133) dated June 25, 2009 [Reference 1].

In a letter dated March 24, 2010 [Reference 2], the NRC staff requested additional information regarding FPL's request to adopt the Alternate Source Term. The questions consisted of twenty (20) RAIs from the Accident Dose, Containment, and Ventilation Branches on AST LAR 196. Each of the twenty (20) questions is documented below with the applicable FPL response.

1. ***The AST LAR Enclosure 1, Section 10.0, References, Reference 6 cites NEI 99-03, Control Room Habitability Guidance, Nuclear Energy Institute, Revision 0, June 2001 and Revision 1, March 2003. NEI 99-03, Revision 0, June 2001 is an acceptable reference, however, Revision 1 has not been reviewed and accepted by the Nuclear Regulatory Commission (NRC).***

   Provide additional information describing whether or not NEI 99-03, Revision 1 is being relied upon to support the assumptions or methods used in the AST submittal. If NEI 99-03 Revision 1 is being used to support the AST submittal, it will be necessary to submit NEI 99-03 Revision 1 on the docket with a request for staff review. In addition, the licensee will be responsible for addressing questions that may result from that review and the review will have to be completed before the staff completes its review of the AST submittal. If NEI 99-03 Revision 1 is not being relied upon to support the AST submittal and it is not the licensee's intention for the staff to review it, then it should be removed from the AST submittal as a reference.

   The references to NEI 99-03, Control Room Habitability Guidance, provided in the LAR submittal are made in the context of background information on relevant AST implementation requirements and both current regulatory and industry guidance that include: 10 CFR 50.67, Accident Source Term; NRC Regulatory Guide (RG) 1.183, Alternative Radiological Source Terms for Evaluating Design Basis Accidents at Nuclear Power Reactors; Regulatory Issue Summary (RIS) 2006-04, Experience with Implementation of Alternative Source Terms; and Generic Letter (GL) 2003-01, Control Room Habitability. NEI 99-03 is specifically discussed in conjunction with GL 2003-01 issues resolution and is not relied upon to support the assumptions or methods used in the AST submittal. Therefore, it is not FPL's intention for the staff to review NEI 99-03, Rev 1.

2. ***On page 18 of 81 of Numerical Applications, Inc. (NAI)-1396-045 Rev 1, the second paragraph under item 5 states the following:***

   "The GOTHIC analysis utilized for Turkey Point to demonstrate the level of spray induced mixing in containment included both subdivided and lumped parameter models. The detailed subdivided models were used to calculate flow patterns produced by the containment sprays and the emergency containment

coolers. Gas concentrations from the subdivided models were compared with concentrations in the lumped parameter model and used to determine equivalent mixing flow rates for the lumped model."

Provide the following additional information:

a. Describe how many subdivided models were analyzed using GOTHIC, and the differences among each of the subdivided models.

Six different cases were considered for the final analyses as shown in the table below. The geometry and noding were the same for all six cases.

Case No.	Description of Operating Equipment
1	Sprays, two ECC's (25,000 cfm) and two ECF's (37,500 cfm)
2	Sprays and two ECC's (25,000 cfm)
3	Sprays and one ECC (25,000 cfm)
4	Sprays and one ECC (24,330 cfm)
5	No Sprays and two ECC's (24,330 cfm)
6	No Sprays and one ECC (24,330 cfm)

ECC and ECF refer to Emergency Containment Coolers and Emergency Containment Filter fans, respectively.

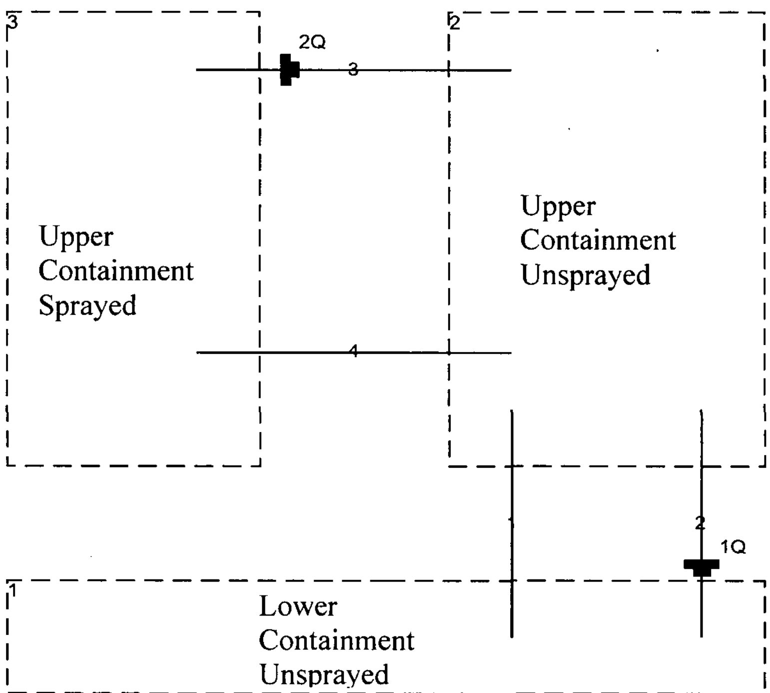
b. Provide a tabulation of the results (gas concentrations, flow rates) showing the differences within the subdivided models analyzed and show the comparison with results from the lumped parameter model.

The intercompartmental flow rates in the lumped model needed to produce mixing equivalent to that calculated in the subdivided model for the six cases are shown below. Please see the response to Part c for a discussion on the lumped model flow rates and typical concentration transients.

Case No.	Description of Operating Equipment	Unsprayed Lower to Upper Mixing Rate (cfm)	Upper Unsprayed to Sprayed Mixing Rate (cfm)
1	Sprays, two ECC's (25,000 cfm) and two ECF's (37,500 cfm)	320,000	2,200,000
2	Sprays and two ECC's (25,000 cfm)	375,000	1,300,000
3	Sprays and one ECC (25,000 cfm)	375,000	1,000,000
4	Sprays and one ECC (24,330 cfm)	375,000	990,000
5	No Sprays and two ECC's (24,330 cfm)	46,500	450,000
6	No Sprays and one ECC (24,330 cfm)	24,000	250,000

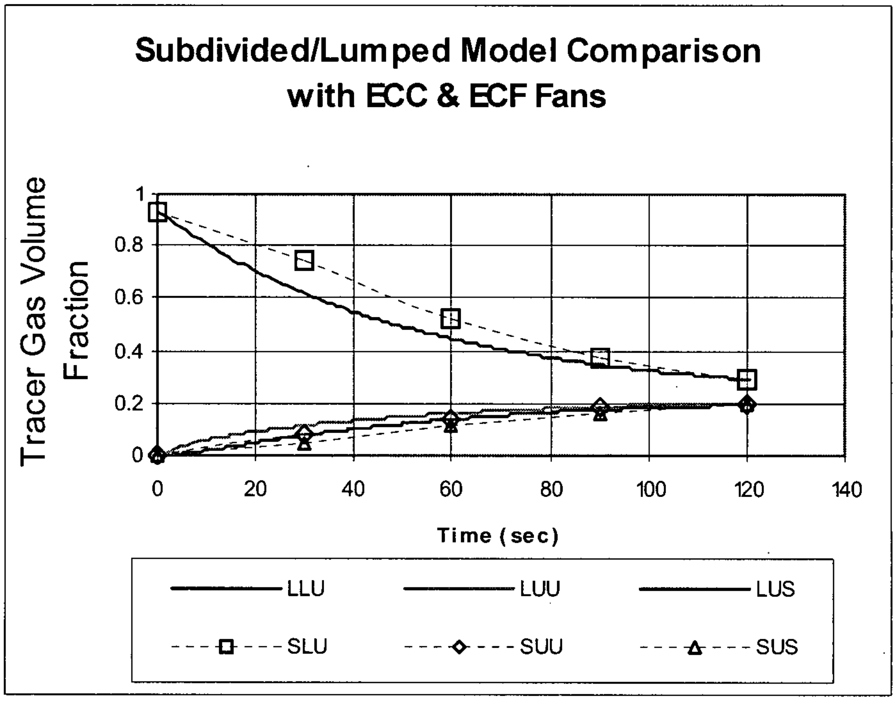
c. ***Describe how the equivalent mixing flow rates for the lumped model were determined.***

A three volume lumped model was constructed that includes the lower containment unsprayed region, the upper containment unsprayed region and the upper containment sprayed region. The volumes were interconnected by flow paths as shown in the following figure.



The lower containment region was initialized with a tracer gas at a concentration of 93.5 percent. The remaining 6.5 percent was steam. The upper containment regions initially contained no tracer gas. The tracer gas was given properties that were identical to the air in the upper containment to avoid introducing any buoyancy forces that might affect the mixing.

The fan flows in the lumped model were adjusted so that the tracer concentration in each of the 3 lumped volumes approximately matched the volume average gas concentrations in each of the three equivalent regions in a subdivided model after two minutes of operation. Typical results for the concentration transient are shown in the following figure.



LLU, LUU and LUS refer to Lumped model-Lower containment Unsprayed, Lumped model-Upper containment Unsprayed and Lumped model-Upper containment Sprayed, respectively. SLU, SUU and SUS similarly refer to corresponding regions in the subdivided model. It is evident from this graph that the mixing rate near the beginning of the run, indicated by the slopes of the concentration curves, is not as high in the subdivided model as it is in the lumped parameter model. This is because it takes a finite amount of time for the flow patterns to be established in the subdivided model. In the lumped parameter model, on the other hand, the fans are brought to full flow almost instantaneously and perfect mixing is assumed in each lumped volume. By the end of the run, mixing rates in the subdivided model have increased beyond the constant values used in the lumped parameter model, resulting in identical concentrations at that point in the transient. Matching the subdivided and lumped parameter model concentrations in this way resulted in a conservative estimate of the effective mixing rates calculated by the subdivided model.

It should also be noted that prior GOTHIC results compared favorably with the results of NUREG/CR-4102, "Air Currents Driven By Sprays in Reactor Containment Buildings." These GOTHIC results indicated that the GOTHIC spray induced velocities were conservatively slightly lower than those from NUREG/CR-4102 with a GOTHIC peak velocity of 16 ft/sec versus a reported NUREG peak velocity of 21 ft/sec (6.5 m/sec) for lower spray flux cases.

d. ***Describe the relationship between the equivalent mixing flow rates that were determined for the lumped model with the mixing flow rates in the subdivided models.***

The mixing flow rates in the lumped model were specified by the input for the volumetric fans. The equivalent mixing flow rates in the ~2,000 cell subdivided model are calculated by GOTHIC and include the combined effects of the actual system fans, spray induced circulation and turbulent diffusion. Each of the lumped model flow paths represents the flow through about 50 to 100 cell faces.

3. ***Provide additional information to insure that the cooldown times assumed in the main steam line break (MSLB), the steam generator tube rupture (SGTR), locked rotor (LRA) and rod cluster control assembly (RCCA) ejection accident analyses can be achieved by exclusive reliance on safety grade equipment.***

The current licensing and design basis for Turkey Point credits the safety-related Main Steam Safety Valves (MSSVs) in response to these design basis accidents in order to prevent overpressurization. The control room operators utilize the safety-related Atmospheric Dump Valves (ADVs) to depressurize and cool down the reactor coolant system (RCS) to the residual heat removal (RHR) cut-in temperature and pressure. These ADVs are safety-related but their upgraded digital controls, e.g., handswitches and controllers, are quality-related since the components support control functions, including safe shutdown. The valves are provided with two redundant air sources; instrument air and a backup nitrogen gas system. The nitrogen system serves as an alternate power source to the ADVs in the event of loss of all A.C. power. Furthermore, for additional defense in depth considerations, operators may operate the valves by installing a temporary gas supply. There are many instances of established licensing precedence for cooling down on non-safety related valves. For example, the NRC has approved D.C. Cook, similar to Turkey Point's design, to use non-safety related equipment without considering a single failure to analyze the margin to overfill accident for their intact steam generators (Reference 4).

Note that for analytical considerations, the time to place RHR in service was conservatively assumed to be 63 hours. Further analysis has since determined that it will actually only take 25.5 hours.

4. ***For each of the affected accident analyses, MSLB, SGTR, LRA and RCCA [ejection], provide additional information to describe the basis for the determination of the potential for 30 minutes of steam generator tube bundle uncovery and a description of the actions required to recover the bundles.***

Steam generator tube bundle uncovery was considered for the intact steam generators. The Turkey Point Units 3 and 4 operating history from rapid power transients from 100% to 0% indicates that 30 minutes may be assumed as a conservatively long tube uncovery period. It shows that following unplanned reactor trips from 100% power, steam generator level can drop (i.e. shrink) below the indicating range of the narrow range level instrument for several minutes. Since the relative height of the lower level tap for the narrow range instruments is located just above the top of the tube bundle, any indicated level on the steam generator narrow range level instrumentation indicates that the steam generator tubes are covered. Data collected for several of these events includes the steam generator narrow range level profile. In each of these cases, level is restored to the indicating range in under 10 minutes. For this reason, an assumed value of 30 minutes to tube recovery is considered to be an acceptably bounding value. Furthermore, auxiliary feedwater automatically initiates to maintain steam generator level.

5. ***For the fuel handling accident, gap fractions from NUREG/CR-5009 were used, which are approximately twice those of RG 1.183 to account for high burn-up fuel not meeting the limits described in Footnote 11. In addition, the gap fractions from Table 3 of RG 1.183 were used without the use of any stated correction factors in the evaluation of the LRA and RCCA ejection accident analyses.***

   Provide additional information, including the basis, describing whether or not correction factors were used to adjust the gap fractions from Table 3 of RG 1.183 to account for high burn-up fuel in the LRA and the RCCA ejection accident analyses.

   For the RCCA Ejection accident, the fraction of the core inventory assumed to be in the fuel rod gap are those event-specific source term requirements listed in Appendix H of RG 1.183. The fuel rod gap fractions from Table 3 of RG 1.183 were not used for the RCCA Ejection accident analysis. As a result, Footnote 11 from Table 3 of RG 1.183 is not applicable.

   For the Locked Rotor accident, the fuel rod gap fractions from Table 3 of RG 1.183 were assumed. Footnote 11 from Table 3 of RG 1.183 states the following:

   > "The release fractions listed here have been determined to be acceptable for use with currently approved LWR fuel with a peak burnup up to 62,000 MWD/MTU provided that the maximum linear heat generation rate does not exceed 6.3 kw/ft peak rod average power for burnups exceeding 54 GWD/MTU. As an alternative, fission gas release calculations performed using NRC approved methodologies may be considered on a case-by-case basis. To be acceptable, these calculations must use a projected power history that will bound the limiting projected plant-specific power history for the specific fuel load. For the BWR rod drop accident and the PWR rod ejection accident, the gap fractions are assumed to be 10% for iodines and noble gases."

   The Locked Rotor accident analysis assumes that 15% of the fuel rods fail due to DNB for the purposes of determining the dose consequences for this event. Only the highest powered rods are susceptible to reaching the DNB limit for the Locked Rotor accident. It is expected that rods with a burnup greater than 54 GWD/MTU would not be capable of exceeding the DNB limit during the Locked Rotor accident. The fraction of rods in the core reaching the DNB limit in the Locked Rotor accident is assessed for each reload cycle. As part of the reload analysis it is confirmed that rods exceeding the DNB limit for the Locked Rotor accident do not have a rod average linear heat generation rate greater than 6.3 kw/ft if the rod has a burnup greater than 54 GWD/MTU.

6. ***LAR Attachment 3, NAI-1396-045 Rev. 1, Table 1.6.3-1 lists the unfiltered make-up flow rate and inleakage as 1000 cfm during the normal mode of operation. For the waste gas***

decay tank rupture, Table 2.7.1 lists the unfiltered inleakage as 115 cfm and the makeup flow rate as 1000 cfm for the non-isolated control room implying that the total air exchange would be calculated using 1115 cfm.

Provide additional information to clarify the assumed total air exchange rate for the control room during normal operation.

All Turkey Point AST events were evaluated with 1000 cfm normal makeup flow rate in addition to 115 cfm assumed unfiltered inleakage. The exhaust flow/total air exchange for these conditions would be, as the NRC question states, 1115 cfm. A replacement Table 1.6.3-1 is provided below to remove the confusing reference to "and inleakage" and add a clarifying entry for Normal Operation Unfiltered Inleakage.

Replacement Table 1.6.3-1
Control Room Ventilation System Parameters

Parameter	Value
Control Room Volume	47,786 ft^3
Normal Operation	
Filtered Make-up Flow Rate	0 cfm
Filtered Recirculation Flow Rate	0 cfm
Unfiltered Make-up Flow Rate	1000 cfm
Unfiltered Inleakage	115 cfm
Emergency Operation	
Recirculation Mode:	
Filtered Make-up Flow Rate	525 cfm
Filtered Recirculation Flow Rate	375 cfm
Unfiltered Make-up Flow Rate	0 cfm
Unfiltered Inleakage	115 cfm
Filter Efficiencies	
Elemental	97.5%
Organic	97.5%
Particulate	97.5%

7. ***TS bases section 3/4.4.5, Applicable Safety Analysis, states that," No credit for iodine removal is taken for any steam released to the condenser prior to reactor trip and concurrent loss of offsite power." This statement appears to be in conflict with the revised AST analyses crediting a partition factor of 100 for releases through the condenser prior to reactor trip.***

   Provide additional information to clarify whether or not the revised AST analyses credit a partition factor of 100 for releases through the condenser prior to reactor trip.

   The revised AST analysis submitted in support of the Steam Generator Tube Rupture event does credit a partition factor of 100 for releases through the condenser prior to reactor trip. The Technical Specification (TS) Bases Section 3/4.4.5 has been corrected as shown in Figure 2 to clarify this change.

8. ***The licensee has proposed TS changes to revise limiting condition of operation (LCO) 3.4.8, "RCS [Reactor Coolant System] Specific Activity," APPLICABILITY requirements to specify that the LCO is applicable in MODES 1, 2, 3, and 4 removing MODE 5 from the APPLICABILITY. The licensee asserts and the NRC staff agrees that:***

   "In MODE 5 with the RCS loops filled, the SGs [steam generators] are specified as a backup means of decay heat removal via natural circulation. In this mode, however, due to the reduced temperature of the RCS, the probability of a design basis accident [DBA] involving the release of significant quantities of RCS inventory is greatly reduced. Therefore, monitoring of RCS specific activity is not required. In MODE 5 with the RCS loops not filled, the SGs are not used for decay heat removal; the RCS and SGs are depressurized and primary to secondary leakage is minimal. Therefore, the monitoring of RCS specific activity is not required. The change to modify the TS 3.4.8 Applicability to include only MODES 1 through 4 retains the necessary constraints to limit the potential radiological consequences of a SGTR or MSLB that may occur during these MODES and is therefore acceptable from a radiological dose perspective.""

   The cited discussion provides the basis for not requiring the monitoring of RCS specific activity in MODE 5; however the implication is that the monitoring of RCS specific activity is required in MODES 1 though 4. The NRC staff notes that the TS Table 4.4-4 specifies that the sample and analyses required to demonstrate compliance with LCO 3.4.8 are only required to be performed in MODE 1. After transient conditions (i.e. reactor trip, plant depressurization, shutdown or startup) that end in MODES 2, 3, or 4, the surveillance is not required to be performed. Isotopic spiking and fuel failures are more likely during transient conditions than during steady state plant operations.

   Provide additional information to justify why there is an apparent disparity between the modes of applicability (MODES 1, 2, 3, and 4) and the limited mode (MODE 1) under which the surveillance for TS 3.4.8 is required.

   The TS 3.4.8 surveillance requirement (SR) is consistent with that previously approved for TSTF-490 implementation by the NRC for Millstone 2 and 3 via Amendments 307 and 246 on October 27, 2008. In its SER, the NRC determined that "SR 4.4.8 is modified by inclusion of a NOTE which states, 'Only required to be performed in MODE 1.' This NOTE modifies the SR to permit entry into the applicable MODE(s) while relying on the Actions. This allowance is acceptable due to the significant conservatism incorporated into the specific activity limit, the low probability of an event which is limiting due to exceeding this limit, and the ability to restore transient specific activity excursions while the plant remains at, or proceeds to power operation. This allows entry into MODE 2 through 4 prior to performing the surveillance. This allows the surveillance to be performed in any of those MODEs, prior to entering MODE 1, which is the same as evaluated in the approved TSTF."

9. ***LAR Attachment 3, NAI-1396-045 Rev. 1, Table 1.7.2-1 does not contain values for Xe-135m or Xe-138 which are needed for staff verification of the proposed limiting value of DEX-133.***

Provide additional information documenting the values used to support the proposed limiting value of DEX-133 as well as the basis for their selection.

The Primary Coolant Source Term presented in Table 1.7.2-1 was derived from the equilibrium RCS specific activity based upon 1% fuel cladding defects. These RCS equilibrium activities are adjusted by a factor which forces the RCS activity to match the current Turkey Point TS definitions of 100/E-Bar. This factor was 0.9579, indicating that the equilibrium, 1% fuel failure based prediction would be slightly higher than the allowable maximum specified equivalent of 100/E-Bar. The current AST definition of "E-bar, Average Disintegration Energy," in Section 1.13 of the Turkey Point Technical Specifications is:

> *"$\bar{E}$ shall be the average (weighted in proportion to the concentration of each radionuclide in the reactor coolant at the time of sampling) of the sum of the average beta and gamma energies per disintegration (MeV/d) for the radionuclides in the sample isotopes, other than iodines, with half lives greater than 30 minutes, making up at least 95 percent of the total non-iodine activity in the coolant."*

Using the definition above, the 30 minute half-life exclusion of nuclides was used as the basis for eliminating the Xe-135m and Xe-138 from inclusion in the primary coolant inventory presented in Table 1.7.2. However these isotopes were used in the determination of the proposed DE Xe-133 limit as shown in the table below.

Isotope	**1% Defects Equilibrium RCS Activity (μCi/gm)**	**Scaling Factor**	**Adjusted Activity (μCi/gm)**	**Effective DCF_i EPA FGR 12 Table III.1 (Sv/Bq)**	**Activity x DCF**
Kr-85m	1.188E+00	0.9579	1.138E+00	7.480E-15	8.512E-15
Kr-85	3.486E+01	0.9579	3.340E+01	1.190E-16	3.974E-15
Kr-87	7.157E-01	0.9579	6.856E-01	4.120E-14	2.825E-14
Kr-88	2.113E+00	0.9579	2.024E+00	1.020E-13	2.065E-13
Xe-131m	2.849E+00	0.9579	2.729E+00	3.890E-16	1.062E-15
Xe-133m	3.275E+00	0.9579	3.138E+00	1.370E-15	4.298E-15
Xe-133	2.360E+02	0.9579	2.260E+02	**1.560E-15**	3.527E-13
Xe-135m	4.570E-01	0.9579	4.378E-01	2.040E-14	8.930E-15
Xe-135	5.080E+00	0.9579	4.866E+00	1.190E-14	5.791E-14
Xe-138	4.766E-01	0.9579	4.565E-01	5.770E-14	2.634E-14
Total					**6.984E-13**

DE Xe-133 = **6.984E-13 / 1.560E-15** = 447.7 μCi/gm

10. ***What are the heights above ground of all wind direction, wind speed and temperature difference measurements used in the analysis to support the June 25, 2009 AST LAR. Page 15 of Attachment 3 to the LAR states that wind speeds are measured at a height of***

11.58 meters above ground. Page 16 cites a 10 meter wind speed. Were all measurements made on a single tower and the reference to 10 meters is simply a convenient approximation to data measured at 11.58 meters (m)? NRC staff noted a relatively lower occurrence of winds from the north northeast direction than from the north and easterly directions between 2003 and 2007. To what may this be attributed? Provide a drawing or provide a reference to an existing docketed drawing which shows the location of the Turkey Point meteorological tower(s) with respect to plant structures and site features.

Based on field measurements performed on September 18, 2002, the height from the bottom of the concrete pad to the height of the wind direction and speed sensors is 38 ft, or 11.58 meters. The measured height from the bottom of the concrete pad to the height of the temperature sensors is 34 ft, or 10.36 meters. All measurements were made on a single tower, and the reference to "10 meters" is simply a convenient approximation of the more precise measurements.

The 10 meter meteorological data for the time period between 2003 and 2007 shows a relatively low occurrence of winds from the north northeast direction compared to that from the northern or easterly directions. It has been determined that this wind pattern is correct and reflects actual meteorological conditions. Comparison of 10 meter and 60 meter wind direction data from the South Dade meteorological tower correlated well as did comparison with the 10 meter data from the Land Utilization meteorological tower. Comparison with wind direction data from the Miami International Airport yielded similar results and substantiated this observed wind pattern. See Figure 1 for an aerial view of the South Dade and Land Utilization Meteorological Tower locations relative to the site.

11. ***Provide additional information describing how the Turkey Point 2003 through 2007 meteorological data were measured, processed, and selected to ensure that the data were appropriate for input into the ARCON96 and PAVAN computer codes. During the 5-year period, highlight any changes in the way in which the data were measured, processed, or selected for inclusion in the files and discuss why the changes were made. Identify each resultant temporal subset that comprises a homogeneous measurement, process, or selection grouping.***

The meteorological data is collected and transmitted to a meteorological services contractor for processing through a RG 1.23, Meteorological Monitoring Programs for Nuclear Power Plants, compliant computer program. The program runs the data through a series of quality checks that identifies and tags invalid data. It generates monthly error reports, data summary output files, and joint frequency distributions (JFDs) that are compiled into quarterly meteorological reports and also atmospheric dispersion factors (χ/Qs) that are included only in the annual meteorological reports. Data that fails the quality checks is set to missing (shown as MISG in output files), set to 0, or simply flagged on the data summary output listings. Although the South Dade 60 meter meteorological tower is the primary collection point for the meteorological data, the Land Utilization 10 meter meteorological tower acts as an available backup for the 10 meter wind speed, wind direction, and sigma theta (wind direction standard deviation) measurements. The data has, in some cases, been manually substituted using this backup data if a considerable amount of invalid data is present. Data substitutions are limited in actual practice and have historically been done when large quantities of data might otherwise have been invalidated. Data substitutions were made in the first six months of 2005 (days 1-180) in which the South Dade 60 meter channel B temperature sensor data was substituted for the channel A temperature sensor data and in the first three months of 2006 (days 1-85) in which the South Dade 10 meter channel B temperature sensor data was substituted for the channel A temperature sensor data. Data substitutions were also made for the South Dade meteorological tower lower wind speed (LWS), lower wind direction (LWD), and sigma theta data from the Land Utilization (LU) 10 meter meteorological tower on approximately 43 occasions between August 6, 2007 and October 24, 2007. See the discussion at the end of item "11.b" below for further details regarding this latter substitution.

The following specific areas should be addressed further.

a. ***FPL provided two sets of ARCON96 hourly meteorological data files for 2005 and 2006. Files were sent by letter dated July 21, 2009 (e-mail confirmation of receipt dated March 8, 2010, ADAMS Accession No. ML100680672) as part of the current LAR. In addition, files for the same 2-year period were subsequently submitted as part of another, unrelated, LAR by letter dated August 7, 2009 (ML092250585). There appears to be some differences between the two sets of files for the 2005 and 2006 data. Clarify the basis for the apparent differences, which are particularly apparent with respect to the atmospheric stability categorization. Are both sets of data measured at the same location and categorized by temperature difference with height measurements only? In addition, the data provided by letter dated August 7, 2009, were for 2002, 2005, and 2006, while the data provided previously by letter dated July 21, 2009, for the current LAR is for the period 2003 through 2007. Provide justification that the 2003 through 2007 data are appropriate for use in the current LAR.***

   Both data sets used the same hourly data measured at the South Dade 60 meter meteorological tower. The atmospheric stability categories were based on the vertical temperature difference (ΔT) between the 60 meter and 10 meter measurement levels. Further review indicates that the observed differences in the 2005 and 2006 meteorological data are primarily attributable to differences in processing and formatting of the data prior to submittal of each set of data. The AST data submitted on July 21, 2009 was only modified to remove identified invalid data while the PTN Unit 6 and 7 Combined Operating License Application (COLA) data submitted on August 7, 2009 was supplemented, when invalid data was found, with representative data from other recognized area meteorological sources, e.g., Miami International Airport, in order to optimize the data sets. The two data sets also used different wind speed categories. The AST data used seven wind speed categories (bins) provided in the PTN quarterly meteorological reports while the COLA data used thirteen wind speed categories more in line with the RIS 2006-04 recommendations. In addition, the AST submittal required five years of meteorological data for which the most recent five year period was chosen to be most representative while the COLA submittal required only three years of data and selected those years with the best data quality.

b. ***While the yearly data recovery rate by parameter is generally above 90 percent as recommended by RG 1.23, Rev. 0, "Onsite Meteorological Programs," the recovery rate in 2007 for the upper level wind direction appears to be in the upper 60 percentile. Discuss the impact of this lower recovery rate on calculation of the atmospheric dispersion factors (χ/Q values).***

The lower recovery rate observed for the upper wind speeds in 2007 was attributed to an instrumentation problem that occurred after the replacement of the South Dade 60 meter meteorological tower data recorders. The recorded wind direction was reported to have periodically fixed in one direction from early August through late October 2007. In those instances where this occurred, the wind speed, wind direction, and sigma theta (wind direction standard deviation) from the Land Utilization 10 meter met tower were manually substituted for the South Dade meteorological tower lower wind (10 meter) data. However, there was no substitute data available for the upper wind (60 meter) data.

Regarding the impact of the lower recovery rate on the accuracy of the overall site χ/Q results, Section 5 of RG 1.23 states:

> *Meteorological instruments should be inspected and serviced at a frequency that will ensure data recovery of at least 90 percent on an annual basis. The 90-percent rate applies to the composite of all variables (e.g., the joint frequency distribution of wind speed, wind direction, stability class) needed to model atmospheric dispersion for each potential release pathway. In addition, the 90-percent rate applies individually to the other meteorological parameters.*

RG 1.23 provides guidance for performance targets for the meteorological monitoring program to support a wide range of power plant applications. Many of these applications involve annual basis reporting and monitoring, which support the above cited guidance that met tower data recovery rates should be related to an annual basis. For design basis onsite and offsite accident dose consequence evaluations, however, consideration of longer time periods (for instance, 5 years as described in RG 1.194, Section 3.1) of met tower data are appropriate to ensure that representative χ/Qs are developed which include the effects of any long term trends. With a significantly larger population of met tower readings, the impact of low recovery rates on individual sensors during any given annual time interval will be minimized.

Per review of the ARCON96 source listing (CCC-664 - ORNL RSICC Code Documentation Package, and NUREG/CR-6331, Rev 1 Atmospheric Relative Concentrations in Building Wakes) hourly data will be retained in the internal ARCON96 calculations if at least one valid pair of wind speed/direction exists, AND the stability class exists. This processing in ARCON96 is done in subroutine XOQCALC5. Thus, if the met tower data report data for a particular hourly reading contained valid data for stability class, and valid data for at least one pair (upper or lower) of wind speed/direction sensor readings, then the raw data would be processed as valid data by ARCON96 in accordance with its internal hardwired routines.

The Turkey Point AST evaluation ARCON96 output files report that 43824 hourly readings were evaluated in the composite 2003-2007 hourly data file input, with 1113 hours of "Missing Data." Again, by examination of the XOQCALC5 subroutine, the variable MISS_XOQ is incremented only for those cases where stability class is missing or for those hourly readings where no valid upper or lower wind speed/direction pair is available. In order to determine the number of hours for 2007 that ARCON96 tallied as bad or missing data, ARCON96 was rerun for a selected case (case tp01) with ONLY 2007 hourly meteorological data input.

Even though the recovery rate for the upper wind direction variable may have been only in the 60% range for 2007, the ARCON96 MISS_XOQ count of total "missing" or invalid hourly entries for the 2007 calendar year data file was only 249. Considering only these 249 missing data entries which occurred in 2007, the effective recovery rate is about 97.2%, which is above the 90% recovery rate recommended in RG 1.23 for the "composite of all variables...needed to evaluate atmospheric dispersion factors" for Turkey Point.

The missing 5 year total of 1113 hourly readings is approximately 2.5% of the total number of hourly readings considered for the 5 year time period 2002-2007. This is definitely within the <10% criteria for the composite of all variables needed to determine valid χ/Q's for the entire 2003-2007 time period. This 2.5% "missing data" rate is comparable to 2007's 2.8% "missing data" rate, so there is no overall indication that the 2007 data is not suitable for inclusion in the determination of the χ/Q values to support the Turkey Point AST submittal.

Therefore, the impact of the low recovery rate of the upper wind direction sensor readings in 2007 has little impact on the overall results of ARCON96 and other χ/Q calculations which support the PTN AST dose analyses.

c. ***The occurrence of atmospheric stability category A in 2004 appears to be approximately 22.5 percent and in the following year, 2005, approximately 4.5 percent. During the other three years, the value ranged between about 6 and 9 percent. To what is this variability attributed?***

The 2004 meteorological data experienced recurring problems with ambient temperature measurements. During the first six months of 2004, measured temperatures variations at both the 60 meter and 10 meter sensor elevations resulted in a much higher incidence of instability than is normally observed. The temperature sensors at both elevations were replaced in mid June 2004 and the observed instability in the data was significantly reduced. Note that the measured vertical temperature difference between the 10 meter and 60 meter readings is a primary determining factor for assignment of data to a given atmospheric stability category.

12. ***Provide one or more scaled figures with all postulated sources and receptors highlighted from which distance and direction inputs can be approximated. Provide the scale of the figure. Explain whether distance inputs into the ARCON96 calculations were directly estimated as horizontal straight line distances. If the distances were not estimated directly as straight line horizontal distances, explain how they were determined. Did the procedure used to estimate the distances factor in differences in heights between each source and receptor pair? Were any sources modeled as diffuse releases?***

All distances were determined as straight line, horizontal distances. Elevation differences were handled as separate inputs to the ARCON96 code for Release and Receptor (Intake) Heights. See Table 2 and the response to the Requests for Additional Information (RAI) # 13 below. All ARCON96 χ/Q's were determined assuming a point release from the identified source. Scaled figures with all postulated release and receptor points are not available; however, the site location coordinates for all release and receptor points, the N/S and E/W components, and the straight line distance between each release-receptor pair are provided in Table 1 of this response. This information confirms the distances and directions from the release points to the current air intake locations that were provided on pages 5-11 of Attachment 2 to PTN-ENG-SENS-02-052, R2 containing the meteorological data submitted to the NRC via an enclosure to L-2009-163 on July 21, 2009 and augments the information for the new emergency air intakes. The locations of the proposed northeast and southeast emergency air intakes were provided in Figure 1 (Sketch SK-051638-M-001) of Attachment 5 to PTN-ENG-SENS-02-052, R2 (L-2009-163) and in Figure 1 of FPL's response (L-2010-021) to RAIs on the AST related modifications dated February 10, 2010.

13. ***Provide additional information on the following. Table 1.8.1-1 of Attachment 3 suggests that Unit 4 and the southeast emergency intake are more limiting than releases from Unit 3 or to the northeast emergency intake. Provide the basis for this determination (i.e., were calculations made to qualitatively confirm this?). Page 2 of PTN-ENG-SENS-02-052, Rev. 2, "Release/Receptor Combination Table," appears to provide a more inclusive list of potential source and receptor pairs. However, some of the values in the PTN table do not match those in Table 1.8.1-1. Further, the PTN table refers to east and west emergency intakes whereas references in the proposed revision to the technical specification and in Attachment 3 refer to southeast and northeast intakes. Does the phrase "credit for dilution allowed" refer to the assumed cross sectional building area of 1254 m^2? Provide discussion on why the 4.8 meters from the plant stack to the east emergency intake provided in the PTN table was not the limiting pair?***

Calculations were performed with ARCON96 to confirm the selection of the limiting release/receptor pair χ/Q values used in the dose calculations. The limiting χ/Q cases were chosen from over 100 individual ARCON96 cases representing Unit 3 and Unit 4 release receptor pairs. A full listing of individual ARCON96 case results are presented in Table 3. Attachment 5 of PTN-ENG-SENS-02-052, Rev 2 (enclosure to L-2009-163) describes the replacement of East and West Emergency Intakes with new NE and SE Emergency Intakes, located significantly farther away from all release points. All final Turkey Point χ/Q results were calculated for these two new Emergency Intake locations. Tables 1 and 2 provide the inputs used in development of the release-receptor pair data for the new emergency intake locations. Distances were calculated using GPS coordinates in feet. The coordinates for the new emergency air intakes are N4618, E10457 for the NE Emergency Air Intake & N4122, E10371 for the SE Emergency Air Intake from Figure 1 in Attachment 5 of PTN-ENG-SENS-02-052, Rev 2 (enclosure to L-2009-163).

Distances and directions from each of the release points to the normal air intakes listed in Attachment 2 of PTN-ENG-SENS-02-052, Rev 2 (enclosure to L-2009-163) continue to apply. For completeness, distances for the normal intake release-receptor pairs are calculated and presented in Table 2 using intake coordinates of N4357, E10049.

The 1254 m^2 value is used by ARCON96 to calculate the building wake effect for release points immediately adjacent to the containment building. "Credit for Dilution Allowed" refers to the applicability of the reductions in the χ/Qs as permitted by RG 1.194 for the plume rise model and the dual intake configuration. The use of these dilution credits for the new NE and SE emergency intake locations are discussed in the Notes at the end of Table 3.

The 4.8 meter distance cited in Attachment 2 of PTN-ENG-SENS-02-052, Rev 2 (enclosure to L-2009-163) is the distance from the Unit 4 stack to the existing east emergency air intake location. However, this value was not used in the χ/Q calculation supporting the AST submittal since the final χ/Q results reflect the new NE/SE Emergency Air Intake locations.

Tables 1, 2, & 3 provide information that consolidates the information presented in PTN-ENG-SENS-02-052, Rev. 2, "Release/Receptor Combination Table" (enclosure to L-2009-163) for the emergency air intakes.

14. Is the 24 hour temperature swing discussed on page 16 of Attachment 3 the difference between daily maximum and minimum temperatures? How does this swing vary by time of year? Given that the accident is assumed to be of 30-day duration, why should an annual average value be used rather than a more limiting value such as that for the limiting 30 day period? How is the swing temperature used in the calculation?

The temperature swing is the average of all air temperature differences, determined for each hourly reading from the previous 24 hour time interval. The following process was used:

a. For each hourly reading, beginning with the 25th hourly reading, determine a maximum and minimum temperature (from both A and B channels) for the 10 meter (10.36 meters actual) sensor elevation from the previous 24 hourly readings.

b. Compute a ΔT for both A and B channels (maximum minus minimum), and choose the maximum ΔT.

c. Compute an average value for ΔT from all non-blank entries.

The value cited was the result of work previously performed for other Turkey Point applications. No information was generated in that prior work to evaluate the time dependent (monthly or yearly) variation of this average. The result available is the average of all hourly reading data in the population, which included the South Dade meteorological tower data from 1997 through 2001. Due to the conservatisms discussed below, similar manipulations of the current South Dade meteorological tower data set from 2002 through 2007 were not repeated.

The temperature swing is used to determine the amount of vapor released from the RWST due to thermal expansion of the tank contents. This value is combined with the displacement from the RWST backleakage to obtain the total vapor release rate from the tank in the LOCA dose calculation. A number of conservative modeling assumptions were made in determining this value:

- The process described above assures that only positive temperature deltas are averaged. Thus, the dose calculation conservatively models continuous exhaust of the tank vapor space volume.
- The outside air temperature swing is assumed to represent instantaneous ideal gas expansion of the air and vapor contents of the RWST vapor space. This neglects the significant heat transfer time lags required to transfer the heat from the outside air to the vapor space contents of the RWST through the walls of the tank.
- Heat sink and vapor temperature moderation effects due to the significant volume of liquid in the RWST are neglected in the assumption of continuous temperature equivalence between the outside air and the vapor contents of the tank.

15. Page 16 of Attachment 3 discusses the 95th percentile wind speed with respect to calculations for assumed releases from the main steam safety valves (MSSVs) and atmospheric dump valves (ADVs). Per RG 1.194, "Atmospheric Relative Concentrations for Control Room Radiological Habitability Assessments at Nuclear power Plants," provide an example of how the wind speed adjustment was calculated to demonstrate that the effluent velocity is at least five times higher than the 95th percentile wind speed. How was the effluent velocity determined for the MSSVs and ADVs and how does it vary as a function of time? Confirm that the effluent release is uncapped and in a vertical upward direction.

The meteorological data used for the ARCON96 runs to determine the 95th percentile wind speed at the limiting ADV or MSSV release height. The limiting release height is the one at which the calculated 95th percentile wind speed is the greatest. The Unit 4 MSSV release produces the greatest 95th percentile wind speed since it has the highest release point of the analyzed ADVs and MSSVs.

All of the yearly meteorological data files were combined into a single, composite data set. A "wind speed multiplier" was determined in accordance with the ARCON96 documentation based upon the stability class for each hour of data. The "wind speed multiplier" times the

10 m (11.58 meters actual) wind speed yields the expected wind speed at the height of the release.

The wind speed multiplier is selected based upon the stability class, and is taken from a special ARCON96 case run. Case 22 in Table 3, for a release from Unit 4 MSSV to the normal control room intake, was renamed tp22qa and rerun with the Expanded QA output option selected. This expanded QA output file presents the wind speed correction factors for the release height from this case. A review of the ARCON96 source code indicates that the value C2, which is listed in the expanded QA output file, is the multiplier based on stability class used on the meteorological lower wind speed data for each hour to determine the wind speed at the release height.

All of the hourly release height wind speeds were used to determine the 95^{th} percentile value. The 95^{th} percentile wind speed for the Unit 4 MSSV release height is 16.8 miles per hour. This value is multiplied by the conversion factor of 1.4667 to obtain the 95^{th} percentile wind speed for the release through an ADV or MSSV as 24.6 feet per second. That is, 95% of all of the hourly wind speeds at the Unit 4 MSSV release height are less than 24.6 feet per second. This value is then compared to the ADV and MSSV vertical exit velocities, which are determined from HZP plant conditions and are based upon the rated relief valve capacities.

Based on the above discussion, the "plume rise" adjustment described in Section 6 of RG 1.194 applies. Since the relief valve discharge velocities exceed five times the 95th percentile wind speed, the atmospheric dispersion factors for the main steam safety valve discharge and the atmospheric dump valve silencer discharge were reduced by a factor of 5. Futhermore, this plume rise factor is only used during the first two hours of the event. Once RCS cooldown begins, the intact steam generator pressure is reduced to control the RCS temperature. At lower steam pressures, the ADV discharge velocities will decrease, and the plume rise criteria will no longer be met. The effluent releases from the MSSV and ADV silencers are uncapped and oriented in a vertical upward direction.

16. Regarding the DBAs analyzed in support of this LAR, please confirm that the generated χ/Q values model the limiting doses and that all credible potential release scenarios were considered, including those due to loss of offsite power or other single failures.

The χ/Qs used in the dose analyses and presented in the LAR were selected to conservatively model the most limiting dose consequences. Table 3 lists all 105 release-receptor pairings considered and their associated χ/Qs. Conservative release-receptor pairs were selected on a case-by-case basis in order to bound other possible release paths which may be applicable to each event. Tables 1.8.1-2 and 1.8.1-3 of NAI-1396-045, Rev 1 summarize the limiting release-receptor point pairs and χ/Qs assumed for the analyzed events. Dose consequence events were modeled in compliance with RG 1.183 for PTN's DBA events regarding loss of offsite power and other single failures which may affect the dose consequence.

17. What wind speed values were used in developing the joint frequency distributions (JFDs) used as input to the PAVAN computer code calculations? For example, if two consecutive

categories are defined as 1-3 miles per hour (mph) and 4-7 mph, what is the value used to define the upper limit of the lower category (e.g., 3 mph, 3.5 mph, 4 mph)?

Inputs to PAVAN defined the seven (7) upper wind speed limit values based on interpretation of the current site meteorological quarterly and annual reports as:

Bin 1: 1.0 mph
Bin 2: 3.0 mph
Bin 3: 7.0 mph
Bin 4: 12.0 mph
Bin 5: 18.0 mph
Bin 6: 24.0 mph
Bin 7: 65.0 mph

Subsequent discussion with PTN's meteorological services contractor indicates that the meteorological data is actually "binned" into the following groups:

Bin 1: < 0.5 is calm
Bin 2: ≥ 0.5 and < 3.5 is labeled 1-3 mph
Bin 3: ≥ 3.5 and < 7.5 is labeled 4-7 mph
Bin 4: ≥ 7.5 and < 12.5 is labeled 8-12 mph
Bin 5: ≥ 12.5 and < 18.5 is labeled 13-18 mph
Bin 6: ≥ 18.5 and < 24.5 is labeled 19-24 mph
Bin 7: ≥ 24.5 is labeled > 24 mph

Regulatory Issues Summary (RIS) 2006-04 recommends a larger number of wind speed categories than was used in developing the joint frequency distributions for input to PAVAN for the AST submittal. Consistent with the RIS recommendations, the joint frequency distributions have been "rebinned" into the thirteen wind speed categories suggested in the RIS, i.e., calm, 0.5, 0.75, 1.0, 1.25, 1.5, 2.0, 3.0, 4.0, 5.0, 6.0, 8.0, and 10.0 meters/second, plus one more for wind speeds > 10 mps.

Bin 1: < 0.22 mps is calm
Bin 2: ≥ 0.22 up to 0.50 mps
Bin 3: > 0.50 up to 0.75 mps
Bin 4: > 0.75 up to 1.00 mps
Bin 5: > 1.00 up to 1.25 mps
Bin 6: > 1.25 up to 1.50 mps
Bin 7: > 1.50 up to 2.00 mps
Bin 8: > 2.00 up to 3.00 mps
Bin 9: > 3.00 up to 4.00 mps
Bin 10: > 4.00 up to 5.00 mps
Bin 11: > 5.00 up to 6.00 mps
Bin 12: > 6.00 up to 8.00 mps
Bin 13: > 8.00 up to 10.00 mps
Bin 14: > 10.00 up to 26.00 mps

This is the maximum number of groups that can be accommodated by ARCON96.

18. ***The choice of wind speed categories used in the PAVAN calculations appears to result in some clustering of the data in the lower categories. This may affect the resultant χ/Q value estimates generated by the PAVAN computer code. NRC Regulatory Issues Summary (RIS) 2006-4, "Experience with Implementation of Alternative Source Terms," states that input to PAVAN should have a large number of wind speed categories at the lower wind speeds in order to produce the best results. Provide a supplement to Section 4, "Atmospheric Dispersion," of Attachment 6 to provide justification for the selection of wind speed categories used in PAVAN calculations considering the recommendation in RIS 2006-4.***

The PAVAN inputs were extracted from PTN's annual meteorological reports generated by the existing Turkey Point Meteorological Tower data acquisition and reporting systems. The Joint Frequency Distributions were extracted from these archived reports rather than having been independently generated from the hourly readings.

As indicated in response to RAI #17, the wind speed categories used in the PAVAN calculations have been revised to conform to the RIS 2006-04 recommendations. The resulting offsite χ/Qs based on the new binning actually decreased from those originally reported as indicated below.

	TP Report Binned JFD Data		**Rebinned Hourly TP Data RIS Compliant**	
Time Period	EAB χ/Q (sec/m^3)	LPZ χ/Q (sec/m^3)	EAB χ/Q (sec/m^3)	LPZ χ/Q (sec/m^3)
0-2 hours	1.71E-04	3.76E-05	1.36E-04	2.76E-05
2-8 hours	9.84E-05	1.64E-05	7.78E-05	1.23E-05
8-24 hours	7.47E-05	1.08E-05	5.89E-05	8.21E-06
1-4 days	4.11E-05	4.38E-06	3.22E-05	3.42E-06
4-30 days	1.74E-05	1.20E-06	1.35E-05	9.74E-07

The lower χ/Qs are anticipated to reduce the radiological dose consequences at the EAB and LPZ for the design basis accidents presented in the LAR submittal. In order to assure consistent and accurate documentation, these lower offsite radiological dose consequences will be provided in a supplemental response.

19. ***Page 16 of Attachment 3 states several conversions were performed to the JFD to result in the file provided in support of the LAR. Provide further discussion of how the JFD was developed in comparison to the hourly data files provided in the ARCON96 format. Other than the JFD, provide a consolidated list of all inputs and assumptions used in the PAVAN calculations. A copy of the summary pages of the PAVAN outputs is acceptable to show inputs.***

The JFD annual reports from FPL archives for 2005-2007 were provided as input to the PAVAN analyses rather than the raw hourly data used for ARCON96. The JFD reports were the available outputs from the PTN meteorological tower monitoring and reporting program.

The JFD reports were converted from either electronic document text or scanned images into numbers. The supplied JFD data was given in terms of "percent frequency of wind directions" and had to be converted to numbers of observations instead of percentage. Once this data conversion was complete, these report formatted values were converted to the PAVAN input format. The input summary from the 7 Bin PAVAN output file is provided in Table 4

As indicated in the responses to RAI #s 17 and 18 above, the JFDs for 2003-2007 have been rebinned into 14 wind speed categories in order to comply with NRC RIS 2006-04 recommendations. This involved generation of the JFDs directly from the hourly meteorological data instead of simply using the Land Utilization supplied meteorological reports. The input summary from the 14 Bin PAVAN output file is provided in Table 5.

20. ***For TS 3/4.7.5 "Control Room Emergency Ventilation System", the action statement for modes 1, 2, 3, and 4 states, "with the Control Room Emergency Ventilation System inoperable, suspend all movement of fuel in the spent fuel pool and restore the inoperable system to OPERABLE status within 84 hours . . ." Provide a discussion describing what action will be taken to mitigate the consequences of a DBA that may occur during the 84 hours when the system is inoperable. The discussion should include details describing how compliance with Appendix A to 10 CFR Part 50 GDC 19 "Control Room" will be maintained. The discussion should also state whether the 84 hours are factored into the calculated dose of the licensing basis analyses of DBA consequences.***

PTN's Control Room Emergency Ventilation System (CREVS) is safety-related and provides for redundancy of the active system components, e.g., air handling and condensing units, recirculation fans, and associated dampers, required to satisfy the design basis capability of the system with respect to radiological emergencies. As stated in UFSAR Section 9.9.1.1, the system is capable of automatically starting under accident conditions to initiate control room pressurization and filtration, assuming the occurrence of a single active damper or supply fan failure. The system is also supported by safety-related, redundant radiation monitors in the normal air intake. These active components are provided with emergency power via the emergency diesel generators in the event of loss of offsite power.

CREVS is currently equipped with a single recirculation filter and utilizes a single ventilation duct distribution system to provide the ventilation requirements for a common control room serving both units. However, PTN is currently considering several possible design modifications to CREVS in order to improve its reliability and availability including installation of a permanent 2nd in-line recirculation filter. The intent of such modifications would be to make the system more robust and support enhancement of the current TS to be more in-line with the approved Westinghouse Standard Technical Specifications.

With CREVS inoperable in MODES 1, 2, 3, and 4, TS 3.7.5 requires the suspension of all fuel movement in the spent fuel pool and restoration of CREVS to operable status within 84 hours. However, PTN administrative controls are more restrictive limiting planned outage times to only ½ of the TS allowable outage time (AOT), i.e., 42 hours. The AOT is based on the low probability of a design basis accident (DBA) occurring during this time period and the ability of the remaining system configuration to provide the required system design basis safety-function(s). In the unlikely event that the remaining system configuration cannot provide its safety function when required, provisions are in place via the emergency plan to protect control room personnel, as necessary against radiological exposure including self-contained breathing apparatus (SCBA), potassium iodide (KI), etc.

Consistent with the basis discussion presented above, the AST radiological dose consequence analyses do not consider the occurrence of a DBA while in the TS 3.7.5 84 hour AOT as credible, i.e., CREVS is assumed available during DBAs.

A proposed change to TS LCO 3/4.7.5 to implement Technical Specification Task Force (TSTF) 448, Control Room Habitability, addressing control room envelope (CRE) operability, maintenance, and testing was submitted on September 26, 2008 [Reference 3]. A proposed change to the TS 3.7.5 LCO is also being prepared to more specifically address CREVS operability requirements and required actions that are more in line with Westinghouse Standard Technical Specification treatment. This proposed change and additional details on potential CREVS design improvements will be provided to the NRC separately in a supplemental response.

References

1. W. Jefferson (FPL) to U.S. Nuclear Regulatory Commission (L-2009-133), "License Amendment Request 196: Alternative Source Term and Conforming Amendment," Accession No. ML092050277, June 25, 2009.
2. J. Paige (NRC) to M. Nazar, "Turkey Point Units 3 and 4 – Request for Additional Information Regarding Request to Adopt the Alternate Source Term (TAC Nos. ME1624 and ME1625)," Accession No. ML100700446, March 24, 2010
3. W. Jefferson (FPL) to U.S. Nuclear Regulatory Commission (L-2008-196), "License Amendment Request (LAR 194): Control Room Habitability TSTF-448," Accession No. ML082820551, September 26, 2008
4. J. Stang (NRC) to R. Powers, "Donald C. Cook Nuclear Plant, Units 1 and 2 – Issuance of Amendments (TAC Nos. MB0739 and MB0740)," Accession No. ML012690136, October 24, 2001.

Table 1 - Release-Receptor Combination Distance Summary

Case	Release Point	Receptor Point	Rel Pt N-S Coord	Rel Pt E-W Coord	Rec Pt N-S Coord	Rec Pt E-W Coord	N-S Dist ft	E-W Dist ft	Distance ft
tp01	Unit 3 purge duct outlet containment penetration	Normal fresh air intake	4446.52	10115.63	4357	10049	89.52	66.63	112
tp02	Unit 3 purge duct outlet containment penetration	NE emergency fresh air intake	4446.52	10115.63	4618	10457	171.48	341.37	382
tp03	Unit 3 purge duct outlet containment penetration	SE emergency fresh air intake	4446.52	10115.63	4122	10371	324.52	255.37	413
tp04	Unit 4 purge duct outlet containment penetration	Normal fresh air intake	4334.75	10146.5	4357	10049	22.25	97.5	100
tp05	Unit 4 purge duct outlet containment penetration	NE emergency fresh air intake	4334.75	10146.5	4618	10457	283.25	310.5	420
tp06	Unit 4 purge duct outlet containment penetration	SE emergency fresh air intake	4334.75	10146.5	4122	10371	212.75	224.5	309
tp07	Unit 3 SFP stack	Normal fresh air intake	4516	10217.5	4357	10049	159	168.5	232
tp08	Unit 3 SFP stack	NE emergency fresh air intake	4516	10217.5	4618	10457	102	239.5	260

Case	Release Point	Receptor Point	Rel Pt N-S Coord	Rel Pt E-W Coord	Rec Pt N-S Coord	Rec Pt E-W Coord	N-S Dist ft	E-W Dist ft	Distance ft
tp09	Unit 3 SFP stack	SE emergency fresh air intake	4516	10217.5	4122	10371	394	153.5	423
tp10	Plant stack	Normal fresh air intake	4344.75	10200.75	4357	10049	12.25	151.75	152
tp11	Plant stack	NE emergency fresh air intake	4344.75	10200.75	4618	10457	273.25	256.25	375
tp12	Plant stack	SE emergency fresh air intake	4344.75	10200.75	4122	10371	222.75	170.25	280
tp13	Unit 3 RWST	Normal fresh air intake	4448	10352	4357	10049	91	303	316
tp14	Unit 3 RWST	NE emergency fresh air intake	4448	10352	4618	10457	170	105	200
tp15	Unit 3 RWST	SE emergency fresh air intake	4448	10352	4122	10371	326	19	327
tp16	Unit 4 RWST	Normal fresh air intake	4319	10352	4357	10049	38	303	305
tp17	Unit 4 RWST	NE emergency fresh air intake	4319	10352	4618	10457	299	105	317
tp18	Unit 4 RWST	SE emergency fresh air intake	4319	10352	4122	10371	197	19	198
tp19	Unit 3 Closest MSSV (RV-3-1413)	Normal fresh air intake	4466.3	10070	4357	10049	109.3	21	111
tp20	Unit 3 Closest MSSV (RV-3-1402)	NE emergency fresh air intake	4532.5	10070	4618	10457	85.5	387	396
tp21	Unit 3 Closest MSSV (RV-3-1413)	SE emergency fresh air intake	4466.3	10070	4122	10371	344.3	301	457

Case	Release Point	Receptor Point	Rel Pt N-S Coord	Rel Pt E-W Coord	Rec Pt N-S Coord	Rec Pt E-W Coord	N-S Dist ft	E-W Dist ft	Distance ft
tp22	Unit 4 Closest MSSV (RV-4-1402)	Normal fresh air intake	4305.5	10070	4357	10049	51.5	21	56
tp23	Unit 4 Closest MSSV (RV-4-1402)	NE emergency fresh air intake	4305.5	10070	4618	10457	312.5	387	497
tp24	Unit 4 Closest MSSV (RV-4-1413)	SE emergency fresh air intake	4239.3	10070	4122	10371	117.3	301	323
tp25	Unit 3 ADV Silencer	Normal fresh air intake	4486	10068.75	4357	10049	129	19.75	131
tp26	Unit 3 ADV Silencer	NE emergency fresh air intake	4486	10068.75	4618	10457	132	388.25	410
tp27	Unit 3 ADV Silencer	SE emergency fresh air intake	4486	10068.75	4122	10371	364	302.25	473
tp28	Unit 4 ADV Silencer	Normal fresh air intake	4259	10068.75	4357	10049	98	19.75	100
tp29	Unit 4 ADV Silencer	NE emergency fresh air intake	4259	10068.75	4618	10457	359	388.25	529
tp30	Unit 4 ADV Silencer	SE emergency fresh air intake	4259	10068.75	4122	10371	137	302.25	332
tp31	Unit 3 Main Steam Line Closest Point	Normal fresh air intake	4472	10072.5	4357	10049	115	23.5	117
tp32	Unit 3 Main Steam Line Closest Point	NE emergency fresh air intake	4528	10092.5	4618	10457	90	364.5	375
tp33	Unit 3 Main Steam Line Closest Point	SE emergency fresh air intake	4472	10092.5	4122	10371	350	278.5	447

Case	Release Point	Receptor Point	Rel Pt N-S Coord	Rel Pt E-W Coord	Rec Pt N-S Coord	Rec Pt E-W Coord	N-S Dist ft	E-W Dist ft	Distance ft
tp34	Unit 4 Main Steam Line Closest Point	Normal fresh air intake	4301	10072.5	4357	10049	56	23.5	61
tp35	Unit 4 Main Steam Line Closest Point	NE emergency fresh air intake	4301	10092.5	4618	10457	317	364.5	483
tp36	Unit 4 Main Steam Line Closest Point	SE emergency fresh air intake	4245	10092.5	4122	10371	123	278.5	304
tp37	Aux Building Vent Supply (V-10)	Normal fresh air intake	4368.75	10220.5	4357	10049	11.75	171.5	172
tp38	Aux Building Vent Supply (V-10)	NE emergency fresh air intake	4368.75	10220.5	4618	10457	249.25	236.5	344
tp39	Aux Building Vent Supply (V-10)	SE emergency fresh air intake	4368.75	10220.5	4122	10371	246.75	150.5	289
tp40	Aux Building Vent Supply (V-11)	Normal fresh air intake	4368.75	10234.5	4357	10049	11.75	185.5	186
tp41	Aux Building Vent Supply (V-11)	NE emergency fresh air intake	4368.75	10234.5	4618	10457	249.25	222.5	334
tp42	Aux Building Vent Supply (V-11)	SE emergency fresh air intake	4368.75	10234.5	4122	10371	246.75	136.5	282
tp43	AFW Turbine Steam Exhaust (K3A)	Normal fresh air intake	4491.45	10071.25	4357	10049	134.45	22.25	136

Case	Release Point	Receptor Point	Rel Pt N-S Coord	Rel Pt E-W Coord	Rec Pt N-S Coord	Rec Pt E-W Coord	N-S Dist ft	E-W Dist ft	Distance ft
tp44	AFW Turbine Steam Exhaust (K3A)	NE emergency fresh air intake	4491.45	10071.25	4618	10457	126.55	385.75	406
tp45	AFW Turbine Steam Exhaust (K3A)	SE emergency fresh air intake	4491.45	10071.25	4122	10371	369.45	299.75	476
tp46	AFW Turbine Steam Exhaust (K3B)	Normal fresh air intake	4491.45	10067.5	4357	10049	134.45	18.5	136
tp47	AFW Turbine Steam Exhaust (K3B)	NE emergency fresh air intake	4491.45	10067.5	4618	10457	126.55	389.5	410
tp48	AFW Turbine Steam Exhaust (K3B)	SE emergency fresh air intake	4491.45	10067.5	4122	10371	369.45	303.5	478
tp49	AFW Turbine Steam Exhaust (K3C)	Normal fresh air intake	4491.45	10064.75	4357	10049	134.45	15.75	135
tp50	AFW Turbine Steam Exhaust (K3C)	NE emergency fresh air intake	4491.45	10064.75	4618	10457	126.55	392.25	412
tp51	AFW Turbine Steam Exhaust (K3C)	SE emergency fresh air intake	4491.45	10064.75	4122	10371	369.45	306.25	480
tp52	Unit 3 Equipment Hatch	Normal fresh air intake	4559	10165.5	4357	10049	202	116.5	233
tp53	Unit 3 Equipment Hatch	NE emergency fresh air intake	4559	10165.5	4618	10457	59	291.5	297

Case	Release Point	Receptor Point	Rel Pt N-S Coord	Rel Pt E-W Coord	Rec Pt N-S Coord	Rec Pt E-W Coord	N-S Dist ft	E-W Dist ft	Distance ft
tp54	Unit 3 Equipment Hatch	SE emergency fresh air intake	4559	10165.5	4122	10371	437	205.5	483
tp55	Unit 4 Equipment Hatch	Normal fresh air intake	4215	10167.5	4357	10049	142	118.5	185
tp56	Unit 4 Equipment Hatch	NE emergency fresh air intake	4215	10167.5	4618	10457	403	289.5	496
tp57	Unit 4 Equipment Hatch	SE emergency fresh air intake	4215	10167.5	4122	10371	93	203.5	224
tp58	Unit 3 Personnel Hatch	Normal fresh air intake	4480	10090	4357	10049	123	41	130
tp59	Unit 3 Personnel Hatch	NE emergency fresh air intake	4480	10090	4618	10457	138	367	392
tp60	Unit 3 Personnel Hatch	SE emergency fresh air intake	4480	10090	4122	10371	358	281	455
tp61	Unit 4 Personnel Hatch	Normal fresh air intake	4293	10089.5	4357	10049	64	40.5	76
tp62	Unit 4 Personnel Hatch	NE emergency fresh air intake	4293	10089.5	4618	10457	325	367.5	491
tp63	Unit 4 Personnel Hatch	SE emergency fresh air intake	4293	10089.5	4122	10371	171	281.5	329

Case	Release Point	Receptor Point	Rel Pt N-S Coord	Rel Pt E-W Coord	Rec Pt N-S Coord	Rec Pt E-W Coord	N-S Dist ft	E-W Dist ft	Distance ft
tp64	Unit 3 Emergency Escape Lock	Normal fresh air intake	4516	10206.5	4357	10049	159	157.5	224
tp65	Unit 3 Emergency Escape Lock	NE emergency fresh air intake	4516	10206.5	4618	10457	102	250.5	270
tp66	Unit 3 Emergency Escape Lock	SE emergency fresh air intake	4516	10206.5	4122	10371	394	164.5	427
tp67	Unit 4 Emergency Escape Lock	Normal fresh air intake	4249	10204.5	4357	10049	108	155.5	189
tp68	Unit 4 Emergency Escape Lock	NE emergency fresh air intake	4249	10204.5	4618	10457	369	252.5	447
tp69	Unit 4 Emergency Escape Lock	SE emergency fresh air intake	4249	10204.5	4122	10371	127	166.5	209
tp70	Aux Building Entrance (east)	Normal fresh air intake	4372	10277.5	4357	10049	15	228.5	229
tp71	Aux Building Entrance (east)	NE emergency fresh air intake	4372	10277.5	4618	10457	246	179.5	305
tp72	Aux Building Entrance (east)	SE emergency fresh air intake	4372	10277.5	4122	10371	250	93.5	267
tp73	Aux Building Entrance (west)	Normal fresh air intake	4372	10128.5	4357	10049	15	79.5	81
tp74	Aux Building Entrance (west)	NE emergency fresh air intake	4372	10128.5	4618	10457	246	328.5	410

Case	Release Point	Receptor Point	Rel Pt N-S Coord	Rel Pt E-W Coord	Rec Pt N-S Coord	Rec Pt E-W Coord	N-S Dist ft	E-W Dist ft	Distance ft
tp75	Aux Building Entrance (west)	SE emergency fresh air intake	4372	10128.5	4122	10371	250	242.5	348
tp76	Unit 3 Spent Fuel Building (SW corner)	Normal fresh air intake	4518	10215.5	4357	10049	161	166.5	232
tp77	Unit 3 Spent Fuel Building (NE corner)	NE emergency fresh air intake	4560.83	10277.5	4618	10457	57.17	179.5	188
tp78	Unit 3 Spent Fuel Building (SE corner)	SE emergency fresh air intake	4518	10277.5	4122	10371	396	93.5	407
tp79	Unit 4 Spent Fuel Building (NW corner)	Normal fresh air intake	4269	10215.5	4357	10049	88	166.5	188
tp80	Unit 4 Spent Fuel Building (NE corner)	NE emergency fresh air intake	4269	10277.5	4618	10457	349	179.5	392
tp81	Unit 4 Spent Fuel Building (SE corner)	SE emergency fresh air intake	4227.83	10277.5	4122	10371	105.83	93.5	141
tp82	Unit 3 SJAE	Normal fresh air intake	4602.7	10034	4357	10049	245.7	15	246
tp83	Unit 3 SJAE	NE emergency fresh air intake	4602.7	10034	4618	10457	15.3	423	423
tp84	Unit 3 SJAE	SE emergency fresh air intake	4602.7	10034	4122	10371	480.7	337	587
tp85	Unit 4 SJAE	Normal fresh air intake	4384	10034	4357	10049	27	15	31

Case	Release Point	Receptor Point	Rel Pt N-S Coord	Rel Pt E-W Coord	Rec Pt N-S Coord	Rec Pt E-W Coord	N-S Dist ft	E-W Dist ft	Distance ft
tp86	Unit 4 SJAE	NE emergency fresh air intake	4384	10034	4618	10457	234	423	483
tp87	Unit 4 SJAE	SE emergency fresh air intake	4384	10034	4122	10371	262	337	427
tp88	Unit 3 Westernmost electrical penetration	Normal fresh air intake	4447.07	10114.7	4357	10049	90.07	65.7	111
tp89	Unit 3 Westernmost electrical penetration	NE emergency fresh air intake	4447.07	10114.7	4618	10457	170.93	342.3	383
tp90	Unit 3 Westernmost electrical penetration	SE emergency fresh air intake	4447.07	10114.7	4122	10371	325.07	256.3	414
tp91	Unit 3 Easternmost electrical penetration	Normal fresh air intake	4439.38	10134.72	4357	10049	82.38	85.72	119
tp92	Unit 3 Easternmost electrical penetration	NE emergency fresh air intake	4439.38	10134.72	4618	10457	178.62	322.28	368
tp93	Unit 3 Easternmost electrical penetration	SE emergency fresh air intake	4439.38	10134.72	4122	10371	317.38	236.28	396

Case	Release Point	Receptor Point	Rel Pt N-S Coord	Rel Pt E-W Coord	Rec Pt N-S Coord	Rec Pt E-W Coord	N-S Dist ft	E-W Dist ft	Distance ft
tp94	Unit 4 Westernmost electrical penetration	Normal fresh air intake	4327.52	10117.51	4357	10049	29.48	68.51	75
tp95	Unit 4 Westernmost electrical penetration	NE emergency fresh air intake	4327.52	10117.51	4618	10457	290.48	339.49	447
tp96	Unit 4 Westernmost electrical penetration	SE emergency fresh air intake	4327.52	10117.51	4122	10371	205.52	253.49	326
tp97	Unit 4 Easternmost electrical penetration	Normal fresh air intake	4333.62	10134.72	4357	10049	23.38	85.72	89
tp98	Unit 4 Easternmost electrical penetration	NE emergency fresh air intake	4333.62	10134.72	4618	10457	284.38	322.28	430
tp99	Unit 4 Easternmost electrical penetration	SE emergency fresh air intake	4333.62	10134.72	4122	10371	211.62	236.28	317
tp100	Unit 3 Closest MSL Penetration	Normal fresh air intake	4472	10092.5	4357	10049	115	43.5	123
tp101	Unit 3 Closest MSL Penetration	NE emergency fresh air intake	4528	10092.5	4618	10457	90	364.5	375

Case	Release Point	Receptor Point	Rel Pt N-S Coord	Rel Pt E-W Coord	Rec Pt N-S Coord	Rec Pt E-W Coord	N-S Dist ft	E-W Dist ft	Distance ft
tp102	Unit 3 Closest MSL Penetration	SE emergency fresh air intake	4472	10092.5	4122	10371	350	278.5	447
tp103	Unit 4 Closest MSL Penetration	Normal fresh air intake	4301	10092.5	4357	10049	56	43.5	71
tp104	Unit 4 Closest MSL Penetration	NE emergency fresh air intake	4301	10092.5	4618	10457	317	364.5	483
tp105	Unit 4 Closest MSL Penetration	SE emergency fresh air intake	4245	10092.5	4122	10371	123	278.5	304

Table 2 -- ARCON96 Release-Receptor Combination Inputs

Case	Release Location	Receptor Location	Release Height (m)	Building Area (m^2)	Distance (m)	Direction (deg)	Intake Height (m)
tp01	Unit 3 purge duct outlet containment penetration	Normal fresh air intake	15.2	1254	34.1	37	4.3
tp02	Unit 3 purge duct outlet containment penetration	NE emergency fresh air intake	15.2	1254	116.4	243	1.2
tp03	Unit 3 purge duct outlet containment penetration	SE emergency fresh air intake	15.2	1254	125.8	322	1.2
tp04	Unit 4 purge duct outlet containment penetration	Normal fresh air intake	6.1	1254	30.4	103	4.3
tp05	Unit 4 purge duct outlet containment penetration	NE emergency fresh air intake	6.1	1254	128.1	228	1.2
tp06	Unit 4 purge duct outlet containment penetration	SE emergency fresh air intake	6.1	1254	94.2	313	1.2
tp07	Unit 3 SFP stack	Normal fresh air intake	28.0	0.01	70.7	47	4.3
tp08	Unit 3 SFP stack	NE emergency fresh air intake	28.0	0.01	79.3	247	1.2
tp09	Unit 3 SFP stack	SE emergency fresh air intake	28.0	0.01	128.8	339	1.2
tp10	Plant stack	Normal fresh air intake	55.5	0.01	46.3	95	4.3

Case	Release Location	Receptor Location	Release Height (m)	Building Area (m^2)	Distance (m)	Direction (deg)	Intake Height (m)
tp11	Plant stack	NE emergency fresh air intake	55.5	0.01	114.1	223	1.2
tp12	Plant stack	SE emergency fresh air intake	55.5	0.01	85.4	323	1.2
tp13	Unit 3 RWST	Normal fresh air intake	15.2	0.01	96.3	73	4.3
tp14	Unit 3 RWST	NE emergency fresh air intake	15.2	0.01	60.9	212	1.2
tp15	Unit 3 RWST	SE emergency fresh air intake	15.2	0.01	99.5	357	1.2
tp16	Unit 4 RWST	Normal fresh air intake	15.2	0.01	92.9	97	4.3
tp17	Unit 4 RWST	NE emergency fresh air intake	15.2	0.01	96.5	199	1.2
tp18	Unit 4 RWST	SE emergency fresh air intake	15.2	0.01	60.3	354	1.2
tp19	Unit 3 Closest MSSV (RV-3-1413)	Normal fresh air intake	18.4	0.01	33.8	11	4.3
tp20	Unit 3 Closest MSSV (RV-3-1402)	NE emergency fresh air intake	18.4	0.01	120.8	258	1.2
tp21	Unit 3 Closest MSSV (RV-3-1413)	SE emergency fresh air intake	18.4	0.01	139.3	319	1.2

Case	Release Location	Receptor Location	Release Height (m)	Building Area (m^2)	Distance (m)	Direction (deg)	Intake Height (m)
tp22	Unit 4 Closest MSSV (RV-4-1402)	Normal fresh air intake	18.6	0.01	17.0	158	4.3
tp23	Unit 4 Closest MSSV (RV-4-1402)	NE emergency fresh air intake	18.6	0.01	151.6	231	1.2
tp24	Unit 4 Closest MSSV (RV-4-1413)	SE emergency fresh air intake	18.4	0.01	98.4	291	1.2
tp25	Unit 3 ADV Silencer	Normal fresh air intake	17.7	0.01	38.1	9	4.3
tp26	Unit 3 ADV Silencer	NE emergency fresh air intake	17.7	0.01	124.9	251	1.2
tp27	Unit 3 ADV Silencer	SE emergency fresh air intake	17.7	0.01	144.2	320	1.2
tp28	Unit 4 ADV Silencer	Normal fresh air intake	17.7	0.01	30.7	168	4.3
tp29	Unit 4 ADV Silencer	NE emergency fresh air intake	17.7	0.01	161.1	227	1.2
tp30	Unit 4 ADV Silencer	SE emergency fresh air intake	17.7	0.01	101.1	294	1.2
tp31	Unit 3 Main Steam Line Closest Point	Normal fresh air intake	11.2	0.01	35.6	12	4.3
tp32	Unit 3 Main Steam Line Closest Point	NE emergency fresh air intake	11.2	0.01	114.4	256	1.2

Case	Release Location	Receptor Location	Release Height (m)	Building Area (m^2)	Distance (m)	Direction (deg)	Intake Height (m)
tp33	Unit 3 Main Steam Line Closest Point	SE emergency fresh air intake	11.2	0.01	136.3	321	1.2
tp34	Unit 4 Main Steam Line Closest Point	Normal fresh air intake	11.2	0.01	18.5	157	4.3
tp35	Unit 4 Main Steam Line Closest Point	NE emergency fresh air intake	11.2	0.01	147.2	229	1.2
tp36	Unit 4 Main Steam Line Closest Point	SE emergency fresh air intake	11.2	0.01	92.7	294	1.2
tp37	Aux Building Vent Supply (V-10)	Normal fresh air intake	4.9	0.01	52.4	86	4.3
tp38	Aux Building Vent Supply (V-10)	NE emergency fresh air intake	4.9	0.01	104.7	223	1.2
tp39	Aux Building Vent Supply (V-10)	SE emergency fresh air intake	4.9	0.01	88.0	329	1.2
tp40	Aux Building Vent Supply (V-11)	Normal fresh air intake	4.9	0.01	56.6	86	4.3
tp41	Aux Building Vent Supply (V-11)	NE emergency fresh air intake	4.9	0.01	101.8	222	1.2
tp42	Aux Building Vent Supply (V-11)	SE emergency fresh air intake	4.9	0.01	85.9	331	1.2
tp43	AFW Turbine Steam Exhaust (K3A)	Normal fresh air intake	14.9	0.01	41.4	9	4.3

Case	Release Location	Receptor Location	Release Height (m)	Building Area (m^2)	Distance (m)	Direction (deg)	Intake Height (m)
tp44	AFW Turbine Steam Exhaust (K3A)	NE emergency fresh air intake	14.9	0.01	123.7	252	1.2
tp45	AFW Turbine Steam Exhaust (K3A)	SE emergency fresh air intake	14.9	0.01	145.0	321	1.2
tp46	AFW Turbine Steam Exhaust (K3B)	Normal fresh air intake	14.9	0.01	41.4	8	4.3
tp47	AFW Turbine Steam Exhaust (K3B)	NE emergency fresh air intake	14.9	0.01	124.8	252	1.2
tp48	AFW Turbine Steam Exhaust (K3B)	SE emergency fresh air intake	14.9	0.01	145.7	321	1.2
tp49	AFW Turbine Steam Exhaust (K3C)	Normal fresh air intake	14.9	0.01	41.1	7	4.3
tp50	AFW Turbine Steam Exhaust (K3C)	NE emergency fresh air intake	14.9	0.01	125.6	252	1.2
tp51	AFW Turbine Steam Exhaust (K3C)	SE emergency fresh air intake	14.9	0.01	146.2	320	1.2
tp52	Unit 3 Equipment Hatch	Normal fresh air intake	5.4	1254	71.0	30	4.3
tp53	Unit 3 Equipment Hatch	NE emergency fresh air intake	5.4	1254	90.6	259	1.2
tp54	Unit 3 Equipment Hatch	SE emergency fresh air intake	5.4	1254	147.1	335	1.2

Case	Release Location	Receptor Location	Release Height (m)	Building Area (m^2)	Distance (m)	Direction (deg)	Intake Height (m)
tp55	Unit 4 Equipment Hatch	Normal fresh air intake	5.4	1254	56.3	140	4.3
tp56	Unit 4 Equipment Hatch	NE emergency fresh air intake	5.4	1254	151.2	216	1.2
tp57	Unit 4 Equipment Hatch	SE emergency fresh air intake	5.4	1254	68.1	295	1.2
tp58	Unit 3 Personnel Hatch	Normal fresh air intake	3.3	1254	39.6	18	4.3
tp59	Unit 3 Personnel Hatch	NE emergency fresh air intake	3.3	1254	119.5	249	1.2
tp60	Unit 3 Personnel Hatch	SE emergency fresh air intake	3.3	1254	138.7	322	1.2
tp61	Unit 4 Personnel Hatch	Normal fresh air intake	3.3	1254	23.1	148	4.3
tp62	Unit 4 Personnel Hatch	NE emergency fresh air intake	3.3	1254	149.5	229	1.2
tp63	Unit 4 Personnel Hatch	SE emergency fresh air intake	3.3	1254	100.3	301	1.2
tp64	Unit 3 Emergency Escape Lock	Normal fresh air intake	11.1	1254	68.2	45	4.3
tp65	Unit 3 Emergency Escape Lock	NE emergency fresh air intake	11.1	1254	82.4	248	1.2

Case	Release Location	Receptor Location	Release Height (m)	Building Area (m^2)	Distance (m)	Direction (deg)	Intake Height (m)
tp66	Unit 3 Emergency Escape Lock	SE emergency fresh air intake	11.1	1254	130.1	337	1.2
tp67	Unit 4 Emergency Escape Lock	Normal fresh air intake	11.1	1254	57.6	125	4.3
tp68	Unit 4 Emergency Escape Lock	NE emergency fresh air intake	11.1	1254	136.2	214	1.2
tp69	Unit 4 Emergency Escape Lock	SE emergency fresh air intake	11.1	1254	63.8	307	1.2
tp70	Aux Building Entrance (east)	Normal fresh air intake	0.0	0.01	69.7	86	4.3
tp71	Aux Building Entrance (east)	NE emergency fresh air intake	0.0	0.01	92.8	216	1.2
tp72	Aux Building Entrance (east)	SE emergency fresh air intake	0.0	0.01	81.3	339	1.2
tp73	Aux Building Entrance (west)	Normal fresh air intake	0.0	0.01	24.6	79	4.3
tp74	Aux Building Entrance (west)	NE emergency fresh air intake	0.0	0.01	125.0	233	1.2
tp75	Aux Building Entrance (west)	SE emergency fresh air intake	0.0	0.01	106.1	316	1.2
tp76	Unit 3 Spent Fuel Building (SW corner)	Normal fresh air intake	4.3	0.01	70.7	46	4.3

Case	Release Location	Receptor Location	Release Height (m)	Building Area (m^2)	Distance (m)	Direction (deg)	Intake Height (m)
tp77	Unit 3 Spent Fuel Building (NE corner)	NE emergency fresh air intake	1.2	0.01	57.4	252	1.2
tp78	Unit 3 Spent Fuel Building (SE corner)	SE emergency fresh air intake	1.2	0.01	124.0	347	1.2
tp79	Unit 4 Spent Fuel Building (NW corner)	Normal fresh air intake	4.3	0.01	57.3	118	4.3
tp80	Unit 4 Spent Fuel Building (NE corner)	NE emergency fresh air intake	1.2	0.01	119.6	207	1.2
tp81	Unit 4 Spent Fuel Building (SE corner)	SE emergency fresh air intake	1.2	0.01	43.0	319	1.2
tp82	Unit 3 SJAE	Normal fresh air intake	7.5	0.01	75.0	357	4.3
tp83	Unit 3 SJAE	NE emergency fresh air intake	7.5	0.01	129.0	268	1.2
tp84	Unit 3 SJAE	SE emergency fresh air intake	7.5	0.01	178.9	325	1.2
tp85	Unit 4 SJAE	Normal fresh air intake	7.5	0.01	9.4	331	4.3
tp86	Unit 4 SJAE	NE emergency fresh air intake	7.5	0.01	147.3	241	1.2
tp87	Unit 4 SJAE	SE emergency fresh air intake	7.5	0.01	130.1	308	1.2

Case	Release Location	Receptor Location	Release Height (m)	Building Area (m^2)	Distance (m)	Direction (deg)	Intake Height (m)
tp88	Unit 3 Westernmost electrical penetration	Normal fresh air intake	4.0	1254	33.9	36	4.3
tp89	Unit 3 Westernmost electrical penetration	NE emergency fresh air intake	1.2	1254	116.6	243	1.2
tp90	Unit 3 Westernmost electrical penetration	SE emergency fresh air intake	1.2	1254	126.1	322	1.2
tp91	Unit 3 Easternmost electrical penetration	Normal fresh air intake	4.0	1254	36.2	46	4.3
tp92	Unit 3 Easternmost electrical penetration	NE emergency fresh air intake	1.2	1254	112.3	241	1.2
tp93	Unit 3 Easternmost electrical penetration	SE emergency fresh air intake	1.2	1254	120.6	323	1.2
tp94	Unit 4 Westernmost electrical penetration	Normal fresh air intake	4.0	1254	22.7	113	4.3
tp95	Unit 4 Westernmost electrical penetration	NE emergency fresh air intake	1.2	1254	136.1	229	1.2
tp96	Unit 4 Westernmost electrical penetration	SE emergency fresh air intake	1.2	1254	99.4	309	1.2
tp97	Unit 4 Easternmost electrical penetration	Normal fresh air intake	4.0	1254	27.0	105	4.3
tp98	Unit 4 Easternmost electrical penetration	NE emergency fresh air intake	1.2	1254	131.0	229	1.2

Case	Release Location	Receptor Location	Release Height (m)	Building Area (m^2)	Distance (m)	Direction (deg)	Intake Height (m)
tp99	Unit 4 Easternmost electrical penetration	SE emergency fresh air intake	1.2	1254	96.6	312	1.2
tp100	Unit 3 Closest MSL Penetration	Normal fresh air intake	11.2	1254	37.4	21	4.3
tp101	Unit 3 Closest MSL Penetration	NE emergency fresh air intake	11.2	1254	114.4	256	1.2
tp102	Unit 3 Closest MSL Penetration	SE emergency fresh air intake	11.2	1254	136.3	321	1.2
tp103	Unit 4 Closest MSL Penetration	Normal fresh air intake	11.2	1254	21.3	143	4.3
tp104	Unit 4 Closest MSL Penetration	NE emergency fresh air intake	11.2	1254	147.2	229	1.2
tp105	Unit 4 Closest MSL Penetration	SE emergency fresh air intake	11.2	1254	92.7	294	1.2

This table provides a full list of 105 individual case χ/Q results supporting PTN AST submittal.

Table 3 - Onsite χ/Q Factors from ARCON96 Runs

Case	Release Location	Receptor Location	Notes	0-2 hr χ/Q (sec/m³)	2-8 hr χ/Q (sec/m³)	8-24 hr χ/Q (sec/m³)	1-4 days χ/Q (sec/m³)	4-30 days χ/Q (sec/m³)
1	Unit 3 purge duct outlet containment penetration	Normal fresh air intake	1	4.56E-03	3.45E-03	1.51E-03	1.35E-03	9.69E-04
2	Unit 3 purge duct outlet containment penetration	NE emergency fresh air intake	2	4.04E-04	2.24E-04	1.04E-04	7.02E-05	3.82E-05
3	Unit 3 purge duct outlet containment penetration	SE emergency fresh air intake	2	4.39E-04	3.42E-04	1.17E-04	1.07E-04	7.81E-05
4	Unit 4 purge duct outlet containment penetration	Normal fresh air intake	1	6.54E-03	5.89E-03	2.78E-03	2.63E-03	1.88E-03
5	Unit 4 purge duct outlet containment penetration	NE emergency fresh air intake	2	3.32E-04	1.88E-04	8.35E-05	6.01E-05	3.21E-05
6	Unit 4 purge duct outlet containment penetration	SE emergency fresh air intake	2	6.95E-04	5.39E-04	1.95E-04	1.69E-04	1.22E-04
7	Unit 3 SFP stack	Normal fresh air intake	1	1.49E-03	1.27E-03	5.58E-04	5.00E-04	3.38E-04
8	Unit 3 SFP stack	NE emergency fresh air intake	2	9.15E-04	5.11E-04	2.37E-04	1.66E-04	8.84E-05
9	Unit 3 SFP stack	SE emergency fresh air intake	2	5.34E-04	4.03E-04	1.45E-04	1.31E-04	9.44E-05
10	Plant stack	Normal fresh air intake	1	1.85E-03	1.70E-03	7.60E-04	7.52E-04	5.21E-04
11	Plant stack	NE emergency fresh air intake	2	4.31E-04	2.93E-04	1.28E-04	8.99E-05	4.92E-05
12	Plant stack	SE emergency fresh air intake	2	9.02E-04	7.50E-04	2.76E-04	2.22E-04	1.53E-04
13	Unit 3 RWST	Normal fresh air intake	1	9.14E-04	8.16E-04	3.96E-04	3.63E-04	2.54E-04
14	Unit 3 RWST	NE emergency fresh air intake	2	1.55E-03	8.96E-04	4.04E-04	2.84E-04	1.71E-04
15	Unit 3 RWST	SE emergency fresh air intake	2	7.59E-04	6.09E-04	2.54E-04	1.89E-04	1.42E-04
16	Unit 4 RWST	Normal fresh air intake	1	9.72E-04	8.76E-04	4.24E-04	4.05E-04	2.76E-04
17	Unit 4 RWST	NE emergency fresh air intake	2	6.96E-04	4.19E-04	1.94E-04	1.35E-04	8.50E-05
18	Unit 4 RWST	SE emergency fresh air intake	2	1.89E-03	1.49E-03	6.00E-04	4.67E-04	3.49E-04
19	Unit 3 Closest MSSV (RV-3-1413)	Normal fresh air intake	1,3	5.53E-03	4.33E-03	1.97E-03	1.51E-03	1.09E-03
20	Unit 3 Closest MSSV (RV-3-1402)	NE emergency fresh air intake	2,3	4.27E-04	2.50E-04	1.05E-04	7.60E-05	4.25E-05
21	Unit 3 Closest MSSV (RV-3-1413)	SE emergency fresh air intake	2,3	4.25E-04	3.29E-04	1.20E-04	1.04E-04	7.57E-05
22	Unit 4 Closest MSSV (RV-4-1402)	Normal fresh air intake	1,3	1.33E-02	1.01E-02	4.41E-03	3.16E-03	2.38E-03
23	Unit 4 Closest MSSV (RV-4-1402)	NE emergency fresh air intake	2,3	2.88E-04	1.61E-04	7.23E-05	5.27E-05	2.80E-05

Case	Release Location	Receptor Location	Notes	0-2 hr χ/Q (sec/m³)	2-8 hr χ/Q (sec/m³)	8-24 hr χ/Q (sec/m³)	1-4 days χ/Q (sec/m³)	4-30 days χ/Q (sec/m³)
24	Unit 4 Closest MSSV (RV-4-1413)	SE emergency fresh air intake	2,3	6.79E-04	4.44E-04	1.84E-04	1.36E-04	8.47E-05
25	Unit 3 ADV Silencer	Normal fresh air intake	1,3	4.53E-03	3.57E-03	1.62E-03	1.22E-03	9.01E-04
26	Unit 3 ADV Silencer	NE emergency fresh air intake	2,3	4.04E-04	2.30E-04	9.91E-05	7.11E-05	3.95E-05
27	Unit 3 ADV Silencer	SE emergency fresh air intake	2,3	3.94E-04	3.09E-04	1.12E-04	9.68E-05	7.02E-05
28	Unit 4 ADV Silencer	Normal fresh air intake	1,3	5.66E-03	4.32E-03	1.88E-03	1.31E-03	9.39E-04
29	Unit 4 ADV Silencer	NE emergency fresh air intake	2,3	2.57E-04	1.49E-04	6.54E-05	4.86E-05	2.57E-05
30	Unit 4 ADV Silencer	SE emergency fresh air intake	2,3	6.69E-04	4.33E-04	1.78E-04	1.35E-04	8.68E-05
31	Unit 3 Main Steam Line Closest Point	Normal fresh air intake	1	4.96E-03	4.18E-03	1.89E-03	1.45E-03	1.05E-03
32	Unit 3 Main Steam Line Closest Point	NE emergency fresh air intake	2	4.36E-04	2.58E-04	1.07E-04	7.68E-05	4.33E-05
33	Unit 3 Main Steam Line Closest Point	SE emergency fresh air intake	2	3.90E-04	3.16E-04	1.16E-04	9.76E-05	7.14E-05
34	Unit 4 Main Steam Line Closest Point	Normal fresh air intake	1	1.53E-02	1.28E-02	5.41E-03	3.90E-03	2.92E-03
35	Unit 4 Main Steam Line Closest Point	NE emergency fresh air intake	2	2.89E-04	1.65E-04	7.26E-05	5.30E-05	2.87E-05
36	Unit 4 Main Steam Line Closest Point	SE emergency fresh air intake	2	7.32E-04	4.61E-04	1.94E-04	1.45E-04	9.21E-05
37	Aux Building Vent Supply (V-10)	Normal fresh air intake	1	2.80E-03	2.53E-03	1.23E-03	1.15E-03	8.09E-04
38	Aux Building Vent Supply (V-10)	NE emergency fresh air intake	2	5.41E-04	3.18E-04	1.39E-04	1.01E-04	5.58E-05
39	Aux Building Vent Supply (V-10)	SE emergency fresh air intake	2	8.68E-04	6.88E-04	2.61E-04	2.16E-04	1.60E-04
40	Aux Building Vent Supply (V-11)	Normal fresh air intake	1	2.41E-03	2.19E-03	1.06E-03	1.01E-03	6.93E-04
41	Aux Building Vent Supply (V-11)	NE emergency fresh air intake	2	5.71E-04	3.36E-04	1.44E-04	1.06E-04	5.80E-05
42	Aux Building Vent Supply (V-11)	SE emergency fresh air intake	2	8.94E-04	7.27E-04	2.72E-04	2.22E-04	1.67E-04
43	AFW Turbine Steam Exhaust (K3A)	Normal fresh air intake	1	3.91E-03	3.13E-03	1.42E-03	1.07E-03	7.91E-04
44	AFW Turbine Steam Exhaust (K3A)	NE emergency fresh air intake	2	4.00E-04	2.28E-04	9.79E-05	6.96E-05	3.91E-05
45	AFW Turbine Steam Exhaust (K3A)	SE emergency fresh air intake	2	3.73E-04	2.98E-04	1.07E-04	9.39E-05	6.76E-05
46	AFW Turbine Steam Exhaust (K3B)	Normal fresh air intake	1	3.90E-03	3.12E-03	1.41E-03	1.06E-03	7.83E-04
47	AFW Turbine Steam Exhaust (K3B)	NE emergency fresh air intake	2	3.95E-04	2.24E-04	9.61E-05	6.89E-05	3.81E-05
48	AFW Turbine Steam Exhaust (K3B)	SE emergency fresh air intake	2	3.71E-04	2.95E-04	1.06E-04	9.32E-05	6.71E-05
49	AFW Turbine Steam Exhaust (K3C)	Normal fresh air intake	1	3.95E-03	3.17E-03	1.41E-03	1.05E-03	7.93E-04
50	AFW Turbine Steam Exhaust (K3C)	NE emergency fresh air intake	2	3.88E-04	2.22E-04	9.55E-05	6.83E-05	3.77E-05
51	AFW Turbine Steam Exhaust (K3C)	SE emergency fresh air intake	2	3.68E-04	2.92E-04	1.06E-04	9.15E-05	6.68E-05
52	Unit 3 Equipment Hatch	Normal fresh air intake	1	1.22E-03	9.53E-04	4.32E-04	3.71E-04	2.60E-04

Case	Release Location	Receptor Location	Notes	0-2 hr χ/Q (sec/m³)	2-8 hr χ/Q (sec/m³)	8-24 hr χ/Q (sec/m³)	1-4 days χ/Q (sec/m³)	4-30 days χ/Q (sec/m³)
53	Unit 3 Equipment Hatch	NE emergency fresh air intake	2	6.17E-04	3.60E-04	1.50E-04	1.08E-04	5.92E-05
54	Unit 3 Equipment Hatch	SE emergency fresh air intake	2	3.10E-04	2.46E-04	8.66E-05	7.56E-05	5.63E-05
55	Unit 4 Equipment Hatch	Normal fresh air intake	1	1.93E-03	1.59E-03	6.91E-04	5.60E-04	4.55E-04
56	Unit 4 Equipment Hatch	NE emergency fresh air intake	2	2.53E-04	1.46E-04	6.55E-05	4.70E-05	2.70E-05
57	Unit 4 Equipment Hatch	SE emergency fresh air intake	2	1.18E-03	7.63E-04	3.19E-04	2.41E-04	1.53E-04
58	Unit 3 Personnel Hatch	Normal fresh air intake	1	3.68E-03	2.96E-03	1.35E-03	1.09E-03	7.60E-04
59	Unit 3 Personnel Hatch	NE emergency fresh air intake	2	3.71E-04	2.12E-04	9.05E-05	6.39E-05	3.63E-05
60	Unit 3 Personnel Hatch	SE emergency fresh air intake	2	3.44E-04	2.76E-04	9.72E-05	8.55E-05	6.27E-05
61	Unit 4 Personnel Hatch	Normal fresh air intake	1	1.03E-02	8.31E-03	3.58E-03	2.74E-03	2.16E-03
62	Unit 4 Personnel Hatch	NE emergency fresh air intake	2	2.52E-04	1.41E-04	6.34E-05	4.54E-05	2.45E-05
63	Unit 4 Personnel Hatch	SE emergency fresh air intake	2	6.02E-04	4.11E-04	1.60E-04	1.30E-04	8.66E-05
64	Unit 3 Emergency Escape Lock	Normal fresh air intake	1	1.35E-03	1.12E-03	4.90E-04	4.34E-04	2.97E-04
65	Unit 3 Emergency Escape Lock	NE emergency fresh air intake	2	7.35E-04	4.14E-04	1.83E-04	1.27E-04	6.95E-05
66	Unit 3 Emergency Escape Lock	SE emergency fresh air intake	2	3.95E-04	3.08E-04	1.09E-04	9.60E-05	7.10E-05
67	Unit 4 Emergency Escape Lock	Normal fresh air intake	1	1.87E-03	1.65E-03	7.39E-04	6.54E-04	5.04E-04
68	Unit 4 Emergency Escape Lock	NE emergency fresh air intake	2	3.06E-04	1.79E-04	7.89E-05	5.76E-05	3.34E-05
69	Unit 4 Emergency Escape Lock	SE emergency fresh air intake	2	1.44E-03	1.03E-03	3.89E-04	3.29E-04	2.27E-04
70	Aux Building Entrance (east)	Normal fresh air intake	1	1.62E-03	1.48E-03	7.18E-04	6.75E-04	4.70E-04
71	Aux Building Entrance (east)	NE emergency fresh air intake	2	6.94E-04	4.06E-04	1.81E-04	1.30E-04	7.42E-05
72	Aux Building Entrance (east)	SE emergency fresh air intake	2	9.92E-04	8.00E-04	3.01E-04	2.42E-04	1.84E-04
73	Aux Building Entrance (west)	Normal fresh air intake	1	1.14E-02	1.03E-02	4.97E-03	4.59E-03	3.28E-03
74	Aux Building Entrance (west)	NE emergency fresh air intake	2	3.77E-04	2.19E-04	9.30E-05	7.01E-05	3.79E-05
75	Aux Building Entrance (west)	SE emergency fresh air intake	2	6.07E-04	4.80E-04	1.80E-04	1.52E-04	1.10E-04
76	Unit 3 Spent Fuel Building (SW corner)	Normal fresh air intake	1	1.51E-03	1.33E-03	6.16E-04	5.36E-04	3.57E-04
77	Unit 3 Spent Fuel Building (NE corner)	NE emergency fresh air intake	2	1.53E-03	9.09E-04	3.82E-04	2.74E-04	1.51E-04
78	Unit 3 Spent Fuel Building (SE corner)	SE emergency fresh air intake	2	4.61E-04	3.68E-04	1.42E-04	1.13E-04	8.43E-05
79	Unit 4 Spent Fuel Building (NW corner)	Normal fresh air intake	1	2.31E-03	2.06E-03	9.96E-04	8.94E-04	6.35E-04
80	Unit 4 Spent Fuel Building (NE corner)	NE emergency fresh air intake	2	4.45E-04	2.65E-04	1.20E-04	8.35E-05	5.18E-05

Case	Release Location	Receptor Location	Notes	0-2 hr χ/Q (sec/m³)	2-8 hr χ/Q (sec/m³)	8-24 hr χ/Q (sec/m³)	1-4 days χ/Q (sec/m³)	4-30 days χ/Q (sec/m³)
81	Unit 4 Spent Fuel Building (SE corner)	SE emergency fresh air intake	2	3.27E-03	2.66E-03	1.00E-03	8.15E-04	5.99E-04
82	Unit 3 SJAE	Normal fresh air intake	1	1.18E-03	9.72E-04	4.10E-04	2.98E-04	2.26E-04
83	Unit 3 SJAE	NE emergency fresh air intake	2	3.45E-04	2.10E-04	8.72E-05	6.38E-05	3.60E-05
84	Unit 3 SJAE	SE emergency fresh air intake	2	2.30E-04	1.93E-04	6.91E-05	5.92E-05	4.39E-05
85	Unit 4 SJAE	Normal fresh air intake	1,4	5.57E-02	4.48E-02	1.64E-02	1.38E-02	1.02E-02
86	Unit 4 SJAE	NE emergency fresh air intake	2	2.77E-04	1.60E-04	7.06E-05	5.03E-05	2.76E-05
87	Unit 4 SJAE	SE emergency fresh air intake	2	4.14E-04	3.10E-04	1.16E-04	9.92E-05	6.76E-05
88	Unit 3 Westernmost electrical penetration	Normal fresh air intake	1	5.02E-03	3.93E-03	1.74E-03	1.56E-03	1.08E-03
89	Unit 3 Westernmost electrical penetration	NE emergency fresh air intake	2	3.90E-04	2.21E-04	9.93E-05	6.85E-05	3.68E-05
90	Unit 3 Westernmost electrical penetration	SE emergency fresh air intake	2	4.10E-04	3.27E-04	1.16E-04	1.02E-04	7.49E-05
91	Unit 3 Easternmost electrical penetration	Normal fresh air intake	1	4.49E-03	3.82E-03	1.66E-03	1.48E-03	9.99E-04
92	Unit 3 Easternmost electrical penetration	NE emergency fresh air intake	2	4.17E-04	2.35E-04	1.07E-04	7.40E-05	3.97E-05
93	Unit 3 Easternmost electrical penetration	SE emergency fresh air intake	2	4.45E-04	3.54E-04	1.25E-04	1.10E-04	8.14E-05
94	Unit 4 Westernmost electrical penetration	Normal fresh air intake	1	1.14E-02	1.02E-02	4.74E-03	4.46E-03	3.24E-03
95	Unit 4 Westernmost electrical penetration	NE emergency fresh air intake	2	2.98E-04	1.67E-04	7.53E-05	5.37E-05	2.89E-05
96	Unit 4 Westernmost electrical penetration	SE emergency fresh air intake	2	6.30E-04	4.72E-04	1.74E-04	1.49E-04	1.05E-04
97	Unit 4 Easternmost electrical penetration	Normal fresh air intake	1	8.00E-03	7.49E-03	3.46E-03	3.29E-03	2.36E-03
98	Unit 4 Easternmost electrical penetration	NE emergency fresh air intake	2	3.18E-04	1.79E-04	8.07E-05	5.79E-05	3.11E-05
99	Unit 4 Easternmost electrical penetration	SE emergency fresh air intake	2	6.66E-04	5.12E-04	1.85E-04	1.62E-04	1.16E-04
100	Unit 3 Closest MSL Penetration	Normal fresh air intake	1	4.05E-03	3.14E-03	1.44E-03	1.18E-03	8.27E-04
101	Unit 3 Closest MSL Penetration	NE emergency fresh air intake	2	4.08E-04	2.34E-04	1.00E-04	7.02E-05	3.97E-05
102	Unit 3 Closest MSL Penetration	SE emergency fresh air intake	2	3.64E-04	2.85E-04	1.01E-04	8.87E-05	6.50E-05
103	Unit 4 Closest MSL Penetration	Normal fresh air intake	1	1.12E-02	9.10E-03	3.91E-03	3.11E-03	2.51E-03
104	Unit 4 Closest MSL Penetration	NE emergency fresh air intake	2	2.60E-04	1.45E-04	6.60E-05	4.65E-05	2.50E-05
105	Unit 4 Closest MSL Penetration	SE emergency fresh air intake	2	6.70E-04	4.29E-04	1.77E-04	1.34E-04	8.54E-05

χ/Q Table Notes

1. No dual ventilation intake dilution credit allowed.
2. Emergency intakes are not in the same wind direction window. Dilution credit may be taken for these cases according to Section 3.3.2.2 of RG 1.194. Note that the values in the table do not have this factor applied.
3. Plume rise credit may possibly be taken for these release-receptor combinations per Section 6 of RG 1.194. Note: Values in the table do not have this factor applied.
4. These χ/Q values for the Unit 4 SJAE release to the normal control room intake should not be used, since Item 3.4 of RG 1.194 warns that ARCON96 should not be used for distances of less than 10 meters. Such cases should be addressed on a case-by-case basis. This release receptor pair is closer than 10 meters, so the following method was used to generate conservative χ/Qs for this pair. ARCON96 was used to evaluate predicted χ/Q values for hypothetical receptors at 10 and 20 meters along that direction, and adjustments were made using ratios of the farther distance squared to the nearer distance squared. The resulting predicted χ/Qs at 10 meters were higher than the ARCON96 calculated 10 meter χ/Qs. Using these conservatively adjusted 10 meter χ/Qs as a starting point, conservative 9.4 meter χ/Qs were generated with the same method (applied ratio of 10 meters squared to 9.4 meters squared). The conservatively adjusted 9.4 meter χ/Qs are larger than the ARCON96 predictions for the actual input distance of 9.4 meters, so the following table results for Case 85 showing these adjustments should be used for this release point:

Case	Distance (m)	0-2 hr χ/Q (sec/m^3)	2-8 hr χ/Q (sec/m^3)	8-24 hr χ/Q (sec/m^3)	1-4 days χ/Q (sec/m^3)	4-30 days χ/Q (sec/m^3)
85	9.4	5.57E-02	4.48E-02	1.64E-02	1.38E-02	1.02E-02
85a	10	5.02E-02	4.02E-02	1.47E-02	1.24E-02	9.15E-03
85b	20	1.42E-02	1.13E-02	4.22E-03	3.47E-03	2.60E-03

Table 4 - Input Summary from the 7 Bin PAVAN Output File

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PRINTOUT OF INPUT CARDS

  1     00000 01101 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000
  2     Turkey Point        2005-2007          Ground Level Release
  3     11.58 Meters        Delta-T from 10-60m
  4     Met Data from NAI-1396-006, Rev. 0
  5     NONE
  6          7 26217      0
  7          0.500  1254.000     46.400     10.000     11.580
  8       0.000   0.000   0.000   2.000   8.000  28.000  43.000
  9       0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   1.000   3.000   2.000
  9      17.000   4.000   1.000   0.000   1.000   1.000   2.000  31.000  13.000  10.000   8.000   7.000   2.000  11.000  11.000  33.000
  9      55.000  31.000  78.000  31.000  13.000  11.000  33.000145.000  97.000  39.000  37.000  25.000  26.000  14.000  41.000149.000
  9      22.000  10.000130.000  74.000  38.000  43.000  52.000  66.000  45.000  32.000  31.000  15.000  16.000   6.000   8.000  56.000
  9       0.000   0.000   2.000   4.000   0.000   0.000   4.000   0.000   5.000   9.000   0.000   0.000   0.000   3.000   2.000   1.000
  9       0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000
  9       2.000   0.000   0.000   0.000   1.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   1.000   1.000
  9      16.000   7.000   7.000   4.000   2.000   6.000   9.000  25.000  16.000  12.000   6.000   1.000   3.000   5.000  16.000  21.000
  9      39.000  29.000  83.000  55.000  49.000  65.000  80.000  76.000  65.000  39.000   8.000   8.000  13.000   7.000  19.000  35.000
  9       9.000   3.000  48.000  92.000  69.000  52.000  57.000  30.000  24.000  33.000  22.000   6.000   4.000   2.000   3.000  19.000
  9       0.000   0.000   3.000  10.000   3.000   0.000   3.000   0.000   0.000   0.000   1.000   0.000   0.000   0.000   1.000   0.000
  9       0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000
  9       1.000   1.000   1.000   1.000   0.000   2.000   1.000   1.000   1.000   0.000   1.000   1.000   3.000   3.000   0.000   1.000
  9      23.000   6.000  16.000  11.000  12.000  22.000  22.000  33.000  10.000   9.000   9.000  13.000   5.000  10.000  23.000  23.000
  9      35.000  29.000  96.000101.000124.000177.000  81.000  62.000  48.000  39.000  11.000  21.000  15.000  12.000   8.000  29.000
  9      10.000   4.000  49.000123.000116.000  82.000  61.000  22.000  16.000  26.000  16.000   5.000   4.000   2.000   5.000  15.000
  9       0.000   1.000   3.000  11.000   1.000   0.000   0.000   0.000   1.000   0.000   2.000   0.000   0.000   0.000   0.000   0.000
  9       0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000
  9      16.000   5.000  12.000   4.000  13.000   5.000  15.000  10.000   8.000  10.000   8.000  11.000   4.000   9.000  15.000  19.000
  9     101.000  49.000135.000213.000209.000206.000124.000113.000  73.000  52.000  38.000  40.000  73.000  60.000  79.000101.000
  9     147.000  71.000282.000613.000919.000696.000315.000198.000191.000106.000  83.000  67.000  72.000  55.000  37.000200.000
  9      21.000  38.000252.000484.000494.000172.000117.000  64.000  47.000  38.000  44.000  25.000   8.000   3.000   7.000  53.000
  9       1.000  15.000  49.000  15.000  26.000   4.000  13.000   3.000   6.000   8.000   5.000   4.000   2.000   0.000   0.000   1.000
  9       0.000   0.000   0.000   0.000   0.000   0.000   3.000   5.000   2.000   1.000   0.000   3.000   1.000   0.000   0.000   0.000
  9      47.000  38.000  26.000  58.000  78.000  99.000  65.000  40.000  27.000  42.000  54.000  59.000  56.000  67.000  54.000  61.000
  9     242.000  85.000150.000522.000793.000509.000314.000174.000188.000119.000  89.000103.000148.000136.000166.000276.000
```

9	122.000	68.000	293.000	676.000	951.000	492.000	338.000	171.000	90.000	65.000	34.000	43.000	27.000	24.000	67.000	206.000
9	6.000	26.000	83.000	120.000	172.000	80.000	76.000	44.000	15.000	6.000	4.000	5.000	2.000	3.000	9.000	36.000
9	0.000	2.000	17.000	2.000	11.000	35.000	10.000	5.000	4.000	0.000	2.000	0.000	0.000	0.000	0.000	2.000
9	0.000	0.000	0.000	2.000	6.000	9.000	14.000	4.000	5.000	2.000	1.000	1.000	0.000	0.000	0.000	0.000
9	65.000	30.000	34.000	22.000	43.000	35.000	28.000	33.000	21.000	28.000	45.000	40.000	65.000	77.000	100.000	125.000
9	193.000	32.000	25.000	37.000	158.000	126.000	100.000	54.000	43.000	47.000	54.000	98.000	106.000	108.000	195.000	302.000
9	21.000	4.000	10.000	5.000	7.000	10.000	6.000	2.000	4.000	3.000	2.000	9.000	3.000	5.000	22.000	56.000
9	0.000	1.000	1.000	0.000	0.000	0.000	0.000	1.000	0.000	0.000	1.000	2.000	1.000	0.000	0.000	2.000
9	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.000	0.000	0.000	0.000	0.000
9	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.000	1.000	1.000	0.000	0.000	0.000	0.000
9	44.000	9.000	6.000	1.000	5.000	3.000	4.000	9.000	7.000	14.000	24.000	21.000	38.000	66.000	51.000	55.000
9	191.000	10.000	2.000	0.000	6.000	4.000	6.000	0.000	6.000	10.000	37.000	43.000	63.000	86.000	181.000	466.000
9	4.000	1.000	1.000	0.000	0.000	1.000	0.000	0.000	0.000	1.000	1.000	0.000	0.000	0.000	2.000	7.000
9	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
9	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
9	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
10	101.	1.000	3.000	7.000	12.000	18.000	24.000	65.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
11	1701.	1701.	2113.	2113.	2113.	2113.	1269.	1269.	1269.	1269.	1269.	1269.	1269.	1269.	1269.	1701.
11	8045.	8045.	8045.	8045.	8045.	8045.	8045.	8045.	8045.	8045.	8045.	8045.	8045.	8045.	8045.	8045.

Table 5 - Input Summary from the 14 Bin PAVAN Output File

PRINTOUT OF INPUT CARDS

```
1     00000 01101 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000
2     Turkey Point         2003-2007          Ground Level Release
3     11.58 Meters         Delta-T from 10-60m
4     Hourly Met Data from NAI-1396-006, Rev. 1, Case 3 JFD, Calms Counted
5     NONE
6         14 42350     0
7          0.500  1254.000     46.400    10.000     11.580
8       0.000  0.000  0.000  3.000  5.000  9.000  8.000
9       0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  1.000  0.000  0.000
9       0.000  0.000  0.000  0.000  0.000  0.000  1.000  0.000  1.000  0.000  1.000  0.000  1.000  0.000  0.000  0.000
9       0.000  1.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  1.000  1.000  0.000
9       3.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  1.000  1.000  0.000  3.000  3.000
9       1.000  0.000  0.000  0.000  1.000  1.000  0.000  0.000  0.000  0.000  0.000  1.000  0.000  0.000  3.000  2.000
9       2.000  0.000  1.000  0.000  0.000  0.000  1.000  2.000  4.000  5.000  0.000  0.000  2.000  3.000  5.000  6.000
9      19.000 11.000  7.000 11.000  5.000  1.000  9.000 37.000 11.000  9.000  7.000  7.000  3.000  7.000 11.000 22.000
9      41.000 28.000 44.000 23.000 12.000 29.000 50.000 97.000 44.000 11.000  6.000 10.000  9.000 11.000 31.000 73.000
9      51.000 28.000114.000 75.000 57.000125.000101.000162.000 87.000 31.000 23.000 10.000 12.000 16.000 42.000112.000
9      44.000 28.000146.000 82.000146.000178.000112.000125.000 74.000 44.000 47.000 23.000 21.000 12.000 33.000104.000
9      38.000 15.000167.000155.000233.000165.000 70.000 69.000 84.000 42.000 35.000  7.000 16.000  9.000 10.000 61.000
9       0.000  0.000  4.000 13.000 15.000  5.000  7.000  3.000 24.000 14.000  6.000  1.000  1.000  4.000  2.000 11.000
9       0.000  0.000  0.000  0.000  0.000  0.000  0.000  1.000  2.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000
9       0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  1.000
9       0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000
9       1.000  0.000  1.000  0.000  0.000  0.000  1.000  0.000  0.000  0.000  0.000  0.000  1.000  0.000  0.000  0.000
9       0.000  0.000  0.000  0.000  0.000  0.000  1.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000
9       1.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  1.000  0.000  0.000  0.000  0.000  1.000
9       4.000  2.000  1.000  1.000  0.000  0.000  1.000  1.000  1.000  1.000  4.000  0.000  1.000  1.000  3.000  3.000
9      20.000  8.000 14.000 13.000  5.000 11.000 21.000 26.000 15.000  8.000  1.000  3.000  4.000  6.000 10.000 23.000
9      32.000 17.000 45.000 26.000 48.000 45.000 44.000 54.000 29.000 24.000  8.000  4.000  8.000 16.000 22.000 26.000
9      23.000 22.000 56.000 72.000 92.000115.000 68.000 56.000 50.000 35.000 13.000  7.000 12.000  2.000 11.000 23.000
9      19.000 11.000 77.000 76.000103.000 95.000 55.000 46.000 45.000 45.000 15.000  5.000 10.000  3.000  7.000 22.000
9       7.000  5.000 59.000 91.000 94.000 59.000 51.000 21.000 21.000 39.000 21.000  4.000  6.000  6.000  4.000 22.000
9       1.000  1.000  5.000 13.000  3.000  3.000  4.000  0.000  1.000  2.000  4.000  0.000  0.000  1.000  1.000  2.000
9       0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  1.000  4.000  1.000  0.000  0.000  0.000  0.000  0.000
9       0.000  0.000  1.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000
9       0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000
9       1.000  0.000  1.000  0.000  2.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000
9       0.000  0.000  1.000  0.000  1.000  0.000  0.000  0.000  2.000  0.000  0.000  2.000  0.000  0.000  0.000  0.000
9       1.000  1.000  0.000  1.000  1.000  3.000  1.000  1.000  1.000  0.000  1.000  1.000  2.000  3.000  1.000  3.000
9       5.000  5.000  3.000  5.000  5.000  2.000  2.000  7.000  1.000  3.000  4.000  2.000  1.000  5.000  2.000  2.000
9      25.000 10.000 26.000 16.000 21.000 30.000 34.000 39.000 16.000  9.000 10.000 14.000  7.000 13.000 26.000 23.000
9      40.000 24.000 46.000 57.000 74.000 85.000 52.000 45.000 39.000 17.000 12.000 15.000  6.000 15.000 16.000 13.000
9      28.000 21.000 61.000 82.000130.000150.000 66.000 56.000 39.000 22.000 10.000 13.000 14.000 10.000  6.000 21.000
9      15.000  9.000 69.000 75.000130.000109.000 49.000 31.000 35.000 43.000 19.000 13.000 10.000  5.000  1.000 17.000
9      12.000  2.000 53.000123.000131.000 69.000 50.000 14.000 16.000 26.000 13.000  5.000  5.000  2.000  3.000 20.000
9       0.000  0.000  4.000 13.000  4.000  4.000  3.000  0.000  2.000  1.000  5.000  0.000  0.000  0.000  1.000  2.000
```

9	0.000	1.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
9	0.000	0.000	0.000	2.000	3.000	2.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
9	1.000	1.000	2.000	1.000	3.000	2.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
9	2.000	1.000	2.000	1.000	0.000	0.000	2.000	1.000	3.000	3.000	3.000	3.000	1.000	4.000	2.000	5.000
9	6.000	3.000	1.000	4.000	8.000	3.000	5.000	5.000	9.000	5.000	2.000	6.000	4.000	8.000	7.000	6.000
9	10.000	2.000	5.000	5.000	7.000	5.000	10.000	9.000	5.000	3.000	7.000	10.000	4.000	4.000	5.000	10.000
9	28.000	15.000	19.000	27.000	41.000	45.000	23.000	22.000	22.000	19.000	18.000	14.000	25.000	20.000	29.000	33.000
9	108.000	48.000	125.000	177.000	200.000	191.000	160.000	134.000	93.000	53.000	45.000	53.000	79.000	64.000	70.000	118.000
9	123.000	46.000	171.000	352.000	480.000	461.000	258.000	171.000	146.000	87.000	63.000	52.000	64.000	60.000	41.000	147.000
9	88.000	55.000	207.000	417.000	590.000	467.000	256.000	156.000	145.000	86.000	57.000	42.000	55.000	47.000	37.000	139.000
9	57.000	36.000	247.000	425.000	584.000	299.000	172.000	95.000	95.000	65.000	49.000	27.000	33.000	10.000	15.000	89.000
9	16.000	40.000	229.000	380.000	492.000	191.000	99.000	54.000	57.000	48.000	53.000	23.000	12.000	14.000	13.000	50.000
9	1.000	20.000	57.000	22.000	37.000	12.000	9.000	3.000	7.000	10.000	12.000	7.000	6.000	2.000	1.000	5.000
9	0.000	1.000	0.000	0.000	0.000	0.000	5.000	1.000	0.000	14.000	6.000	2.000	0.000	0.000	0.000	0.000
9	0.000	3.000	2.000	0.000	3.000	1.000	4.000	2.000	0.000	0.000	3.000	1.000	2.000	1.000	0.000	1.000
9	4.000	7.000	2.000	12.000	7.000	7.000	5.000	8.000	2.000	7.000	4.000	8.000	3.000	6.000	7.000	6.000
9	18.000	10.000	9.000	15.000	9.000	22.000	14.000	9.000	7.000	9.000	17.000	16.000	14.000	14.000	14.000	18.000
9	23.000	20.000	18.000	33.000	39.000	47.000	28.000	19.000	10.000	20.000	31.000	26.000	20.000	34.000	21.000	19.000
9	34.000	9.000	9.000	28.000	57.000	67.000	42.000	19.000	18.000	24.000	25.000	24.000	37.000	36.000	26.000	31.000
9	91.000	34.000	50.000	105.000	236.000	181.000	101.000	57.000	55.000	52.000	57.000	65.000	76.000	71.000	64.000	71.000
9	235.000	78.000	159.000	527.000	832.000	515.000	336.000	197.000	198.000	125.000	96.000	92.000	149.000	112.000	134.000	282.000
9	167.000	48.000	182.000	505.000	796.000	442.000	276.000	168.000	132.000	70.000	37.000	50.000	44.000	44.000	88.000	259.000
9	57.000	62.000	240.000	425.000	610.000	297.000	218.000	104.000	71.000	35.000	21.000	25.000	10.000	12.000	36.000	140.000
9	16.000	29.000	126.000	228.000	310.000	158.000	111.000	75.000	38.000	17.000	7.000	4.000	1.000	5.000	5.000	40.000
9	5.000	14.000	88.000	72.000	121.000	50.000	39.000	24.000	18.000	12.000	7.000	2.000	1.000	3.000	13.000	41.000
9	0.000	3.000	17.000	3.000	9.000	23.000	13.000	7.000	4.000	1.000	1.000	1.000	2.000	0.000	0.000	4.000
9	0.000	0.000	1.000	3.000	9.000	15.000	17.000	4.000	2.000	0.000	3.000	2.000	2.000	0.000	0.000	0.000
9	2.000	0.000	4.000	2.000	5.000	3.000	3.000	1.000	0.000	3.000	4.000	2.000	4.000	6.000	2.000	3.000
9	10.000	3.000	4.000	3.000	5.000	3.000	6.000	4.000	4.000	5.000	9.000	6.000	6.000	12.000	11.000	10.000
9	10.000	14.000	8.000	7.000	14.000	10.000	11.000	11.000	5.000	11.000	5.000	20.000	24.000	13.000	28.000	26.000
9	28.000	20.000	19.000	6.000	16.000	17.000	10.000	17.000	9.000	16.000	25.000	21.000	29.000	35.000	52.000	55.000
9	52.000	16.000	16.000	15.000	13.000	14.000	17.000	16.000	7.000	14.000	20.000	21.000	38.000	43.000	49.000	77.000
9	136.000	30.000	21.000	31.000	50.000	55.000	45.000	25.000	20.000	26.000	50.000	56.000	78.000	89.000	123.000	229.000
9	198.000	25.000	18.000	27.000	144.000	116.000	75.000	38.000	37.000	33.000	39.000	88.000	73.000	82.000	145.000	272.000
9	47.000	3.000	10.000	8.000	21.000	16.000	10.000	11.000	9.000	8.000	5.000	16.000	0.000	5.000	39.000	114.000
9	7.000	1.000	4.000	3.000	13.000	3.000	4.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	5.000	13.000
9	1.000	3.000	1.000	1.000	1.000	1.000	7.000	0.000	0.000	0.000	0.000	3.000	0.000	0.000	0.000	3.000
9	0.000	0.000	0.000	0.000	0.000	0.000	1.000	2.000	0.000	0.000	1.000	0.000	0.000	0.000	0.000	0.000
9	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
9	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.000	1.000	1.000	2.000	0.000	0.000	0.000	0.000
9	1.000	0.000	3.000	0.000	2.000	1.000	0.000	0.000	2.000	1.000	0.000	1.000	1.000	4.000	1.000	6.000
9	3.000	4.000	0.000	0.000	1.000	0.000	0.000	0.000	1.000	0.000	1.000	2.000	5.000	5.000	5.000	3.000
9	11.000	0.000	1.000	0.000	4.000	1.000	0.000	0.000	2.000	2.000	2.000	3.000	11.000	19.000	11.000	8.000
9	16.000	6.000	0.000	0.000	1.000	4.000	2.000	1.000	4.000	0.000	7.000	7.000	20.000	21.000	18.000	19.000
9	23.000	2.000	2.000	0.000	1.000	0.000	1.000	3.000	1.000	6.000	6.000	7.000	17.000	22.000	32.000	26.000
9	114.000	8.000	2.000	0.000	7.000	3.000	2.000	1.000	4.000	9.000	26.000	28.000	52.000	57.000	89.000	179.000
9	244.000	6.000	2.000	1.000	3.000	3.000	9.000	0.000	4.000	8.000	20.000	35.000	48.000	52.000	161.000	505.000
9	13.000	1.000	0.000	0.000	0.000	2.000	0.000	1.000	0.000	1.000	2.000	2.000	0.000	0.000	7.000	49.000
9	0.000	1.000	3.000	0.000	0.000	1.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
9	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

9	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
9	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
9	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
10	101.	0.500	1.120	1.680	2.240	2.800	3.360	4.470	6.710	8.950	11.180	13.420	17.900	22.370	58.160	
11	1701.	1701.	2113.	2113.	2113.	2113.	1269.	1269.	1269.	1269.	1269.	1269.	1269.	1269.	1269.	1701.
11	8045.	8045.	8045.	8045.	8045.	8045.	8045.	8045.	8045.	8045.	8045.	8045.	8045.	8045.	8045.	8045.

Figure 1 – Meteorological Tower Location

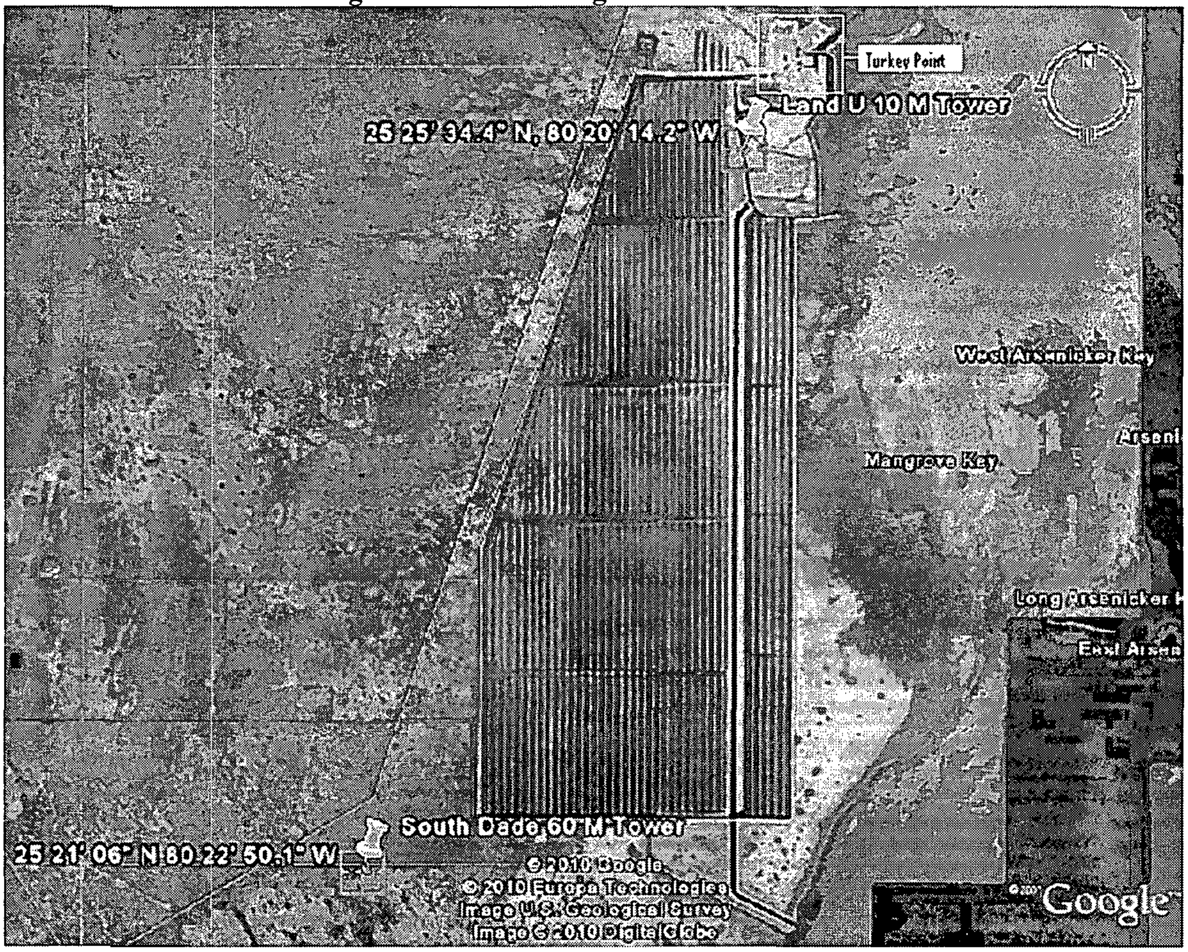

Figure 2 – Technical Specification Bases (Information Only)

Procedure No.: 0-ADM-536	Procedure Title: Technical Specification Bases Control Program	Page: 55 Approval Date: 2/18/09

ATTACHMENT 1
(Page 44 of 111)

TECHNICAL SPECIFICATION BASES

3/4.4.5 (Cont'd)

SG tubing is subject to a variety of degradation mechanisms. SG tubes may experience tube degradation related to corrosion phenomena, such as wastage, pitting, intergranular attack, and stress corrosion cracking, along with other mechanically induced phenomena such as denting and wear. These degradation mechanisms can impair tube integrity if they are not managed effectively. The SG performance criteria are used to manage SG tube degradation.

Specification 6.8.4.j, Steam Generator (SG) Program, requires that a program be established and implemented to ensure that SG tube integrity is maintained. Pursuant to Specification 6.8.4.j, tube integrity is maintained when the SG performance criteria are met. There are three SG performance criteria: structural integrity, accident induced leakage, and operational leakage. The SG performance criteria are described in Specification 6.8.4.j. Meeting the SG performance criteria provides reasonable assurance of maintaining tube integrity at normal and accident conditions.

The processes used to meet the SG performance criteria are defined by the Steam Generator Program Guidelines (Ref. 1).

Applicable Safety Analysis

The steam generator tube rupture (SGTR) accident is the limiting design basis event for SG tubes and avoiding a SGTR is the basis for this Specification. The analysis of a SGTR event assumes a bounding primary-to-secondary leakage rate equal to ~~500 gpd~~ [0.20 gpm at room temperature conditions] for each of the two intact SGs plus the leakage rate associated with a double-ended rupture of a single tube in the third (ruptured) SG. The accident analysis for a SGTR assumes the contaminated secondary fluid is released to the atmosphere ~~via~~ [initially via the condenser steam jet air ejectors (SJAE) then via the main steam] safety valves ~~or~~ [and/or the condenser] atmospheric dump valves. ~~No credit for iodine removal is taken for any steam released to the condenser prior to reactor trip and concurrent loss of offsite power.~~

The analysis for design basis accidents and transients other than a SGTR assume the SG tubes retain their structural integrity (i.e., they are assumed not to rupture). In the dose consequence analysis for these events the activity level in the steam discharged to the atmosphere is based on a primary-to-secondary leakage rate of ~~1~~ [0.60] gpm total through all SGs and ~~500 gallons per day~~ [0.20 gpm] through any one SG at ~~accident~~ [room temperature] conditions, or is assumed to increase to these levels as a result of accident induced conditions. For accidents that do not involve fuel damage, the primary coolant activity level of DOSE EQUIVALENT I-131 is assumed to be equal to the LCO 3.4.8, Reactor Coolant System Specific Activity, limits. For accidents that assume fuel damage, the primary coolant activity is a function of the amount of activity released from the damaged fuel. The dose consequences of these events are within the limits of GDC 19 (Ref. 2), ~~10 CFR 100 (Ref. 3),~~ 10 CFR 50.67 (Ref. 7) or the NRC approved licensing basis.

Steam generator tube integrity satisfies Criterion 2 of 10 CFR 50.36(c)(2)(ii).