STP CASA Grande Information (Non-Proprietary Version)

CASA01 JT4

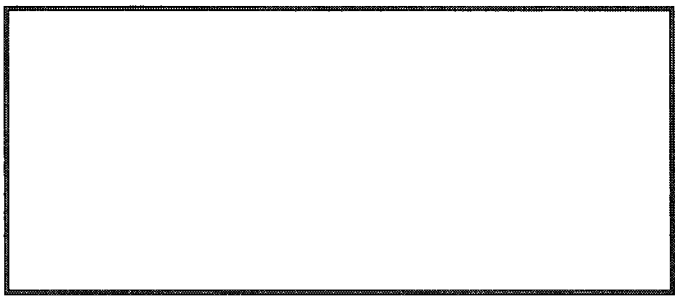
Contains No Proprietary Information
Alion Science and Technology

```
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
%LANLANLANLANLANLANLANLANLANLANLANLANLANLANLANLANLANLANLANANLANLANLANLANLA%
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%

% Define Case Folders (Main Project Folder)
"/work/02405/jjtejada/yye00/matlab_code/Demo Plant"

% Define Working Folders

% Analysis Folder (~/.../Case/Analysis)
"Analytic Results"

% Run Subfolder (~/.../Case/Analysis/run)
"Tornado"

% Run Sub_Subfolder (~/.../Case/Analysis/run/run_sub)
"SIMCON"

% Run Sub_Sub_Subfolder (~/.../Case/Analysis/run/run_sub/run_sub_sub)
"Delta Pump Case 01 Shuffle"

% CAD Folder Name (~/.../Case/CAD)
"CAD Files"

% Concrete Sub-Folder (~/.../Case/CAD/Concrete)
"Concrete Data"

% Equipment Sub-Folder (~/.../Case/CAD/Equipment)
"Equip Data"

% Grating Sub-Folder (~/.../Case/CAD/Grating)
"Grating Data"

% Pipe Sub-Folder (~/.../Case/CAD/Pipes)
"Pipe Data"

% Fequency Folder (~/.../Case/Frequency)
"Freq Data"

% Break Frequency (~/.../Case/Frequency/Break)
"LOCA Frequency and Weld Inputs - 12-7-12 R1.xlsx"

% Break Fequency Table (~/.../Case/Frequency/Break/Table)
"LOCA Data"

% Weld Case File (~/.../Case/Frequency/Weld)
"LOCA Frequency and Weld Inputs - 12-7-12 R1.xlsx"

% Weld Case Table (~/.../Case/Frequency/Weld/Table)
"Weld Table"
%------------------------------------------------------------------
% multiplicative spatial unit conversions
% rectify all CAD elements for consistency
% applied to ALL length units within each CAD file

% Concrete Multiplier
1.0

% Equipment Multiplier
1.0

% Grating Multiplier
1.0

% Pipe Multiplier

1.0
%------------------------------------------------------------------
%  LOCA bin definitions
```

```
%  (units consistent with freq dists and CAD data)

% List Number of Defined Break Size Limits
% ie. SB,MB,LB (3 designations)
% However more sizes are allowable
 3

% List Sizes
0.5   2.0   6.0

%-------------------------------------------------------------------

% CAD and Plotting Options (1/0 = Y/N)

% Show CAD Reproduction
0

% Show Concrete and Gratings
0

% Produce Intro Movie and Stop
0

% Debris Passage Correlation
0

% Sample Flow Rates
0

% Random Input Distributions
0

% ZOI Radial Inflation Factor(Plotting Only)
50

% ZOI Plotting Interval (# of breaks between plots)
25

%-------------------------------------------------------------------------
%   spatial resolution for discretizing insulation
%   (must repeat weld target sort if these are changed. delete all master
%   files and rerun with new delL and Nangbin)

% Linear Resolution (in.)
6

%Azimuthal Bins in 2 Pi Radians on Pipes
12

%-------------------------------------------------------------------------
% Head Loss Option
% porosity calc (1/2 = vol / mass weighting)
% (vol weighting was found to be more conservative)
1
%-------------------------------------------------------------------------
% Synonyms tables for nonstandard welds, hangars and valves and Equipment

% Number of Valve synonyms
5
% Valve Synonyms
Valve VALVE MOV XRH FCV

% Number of Hangar Labels
14
% Hangar Synonyms
Hangar Hanger HL AF GU SS SH RR RH
"Work Point" "work point" "Work point" "work Point" "WORK POINT"

% Number of Weld Synonyms
4
```

```
% Weld Synonyms
FW Weld WELD FS

% Number of Steam Generator Synonyms
2

% Steam Generator Synonyms
SG SteamGenerator

% Number of Reactor Coolant Pump Synonyms
2

% Reactor Coolant Pump Synonyms
RCP ReactorCoolantPump

% Number of Pressurizer Synonyms
3

% Pressurizer Synonyms
PZR PRZR Pressurizer

% Number of RHR Synonyms
2

% RHR Synonyms
RHR ResidualHeatRemoval

%-------------------------------------------------------------------------------
%Statistics Sampling Options

%Sampling Method
% (0/1/2/3 = CASA default / MatLab default / shuffle / read file)
2


%If Option 3 specified, set file name in case folder below
%If not LEAVE BLANK



% max # LHS bins in LLOCA for max DEGB (DEGB counts as 1)
% Nmaxbrk =  2 => 2044 total breaks
% Nmaxbrk =  3 => 2100 total breaks
% Nmaxbrk =  5 => 2250 total breaks
% Nmaxbrk = 10 => 3070 total breaks
5

% # LHS replicates (batches) for each frequency CCDF
20

% # epistemic freq envelope samples
% current models process ~110 cases per minute
15

% logarithmic base for sampling epistemic frequency envelope
2


% lower limit of highest epistemic frequency bin
0.99



% # interpolation pts in each break freq ccdf
1000


% logarithmic base for sampling break size
%  (double check routine before changing this from base 10)
10
```

```
%-----------------------------------------------------------------------
%Insulation Characteristics

% Number of Low Density Fiberglass Zones
3
```



Redacted

```
% Number of Debris Types
8

% Debris Types
NUKON   NUKON_2 MICROTHERM RMI LEAD    "THERMAL WRAP" IOZ     ALKYD

%Debris treated as LDFG
% 1/0 --> yes/no
1 1 0 0 0 1 0 0

%Debris treated as microtherm
% 1/0 --> yes/no
0 0 1 0 0 0 0 0

% Damage Radii with statistics definitions
% Material X Statistics
% random-variable definitions:
%  (1) first parameter (mean/geom mean/mean)
%  (2) second parameter (std dev/geom std dev) (zero sigma returns mean)
%  (3) lower limit
%  (4) upper limit
%  (5) library distribution (1/2/3 = normal/empirical/TBD ...)
%  (6) conservative direction (0/1 = low/hi)
%  (7) logarithmic sample base (0 = linear scale)
%  (8 ...) empirical pdf must provide equal # of x then y values,
%           first four entries are ignored.
%  Provide distribution type
%  if (2) or empirical provide number of xy pairs
%  ie. below where 3 pairs are 1 2 3 4 5 6
%2 3
%1 0 0 99999 2 0 0 1 2 3 4 5 6
1
17 0 0 99999 1 0 0
1
17 0 0 99999 1 0 0
1
28.6 0 0 99999 1 0 0
1
1 0 0 99999 1 0 0
1
1 0 0 99999 1 0 0
1
17 0 0 99999 1 0 0
1
1 0 0 99999 1 0 0
1
1 0 0 99999 1 0 0
%-----------------------------------------------------------------------
%  Debris Properties Table

%  (denote particulate/fiber = sphere/cylinder = 1/2)
%  (do NOT add to or reorder this list unless code is modified)
```

```
%  (inventory of fibers with cylindrical geom must be given in ft^3)
%  (can 'fake' the diameter to match a given Sv using std geom formulas)
%  (inventory of particulates with spherical geom must be given in lbm)
%  (this list MUST include every debris type of interest)
%  (if unknown, set "manufactured" density of particulate to ~20% of Rho_mat)
%       (based on comparison of FeO2 to BWR sludge compaction density)

                %'label'       DebrisPropi        'Geom'    'Diam' 'Rho_mat'  'Rho_mfc'
% native units                          'sph,cyl' 'um'    'lbm/ft^3' 'lbm/ft^3'
% calc units                            'sph,cyl' 'm'     'kg/m^3'   'kg/m^3'
              "LDFG - fines"            2         7       175        2.4
               "LDFG - small"           2         7       175        2.4
               "LDFG - large"           2         7       175        2.4
               "uTherm - filaments"     2         6       165        2.4
               "uTherm - SiO2"          1         2.5     157        27.4
               "uTherm - TiO2"          1         20      262        52.4
               "QualCoat - epoxy"       1         10      94         36.66
               "QualCoat - IOZ"         1         10      208        81.12
               "Crud"                   1         15      350        70.0
               "UQCoat - epoxyfine"     1         152     124        48.36
               "UQCoat - epoxyFchp"     1         1143    124        48.36
               "UQCoat - epoxySchp"     1         1143    124        48.36
               "UQCoat - epoxyLchp"     1         1143    124        48.36
               "UQCoat - epoxyCrls"     1         1143    124        48.36
               "UnQualCoat - alkyd"     1         10      207        80.73
               "UnQualCoat - enamel"    1         10      93         36.27
               "UnQualCoat - IOZ"       1         10      244        95.16
               "Latent - particulate"   1         17.3    169        33.80
               "Latent - fiber"         2         7       175        2.4

%-------------------------------------------------------------------------------------------
% microTherm constituents (low density concrete with fiber binder)
% mfc'd density (lbm/ft3)
15.0

% mass fraction filamentsflf_read
0.03

% mass fraction of SiO2
0.58

% mass fraction of TiO2
0.39

% debris type start and stop times (min after break)
%   (rate assumed to be uniform from Tstart to Tend)
%   (rate calc uses inventories defined above)
%   (introduce "instant" sources over 1 delT)
%   (debris from UQCoat cannot have Tstartsrc=0)
%   (timing is presently independent of break size)

%   Start Times
0       0       0       0       0       0       0       0       0       10
10      10      10      10      10      10      10      0       0

%   Stop Times
10      10      10      10      10      10      10      10      10      2160
2160    2160    2160    2160    2160    2160    2160    10      10

%-------------------------------------------------------------------------------------------
%  Noninsulation Debris Quantities

% random-variable definitions:
%  (1) first parameter (mean/geom mean/mean)
%  (2) second parameter (std dev/geom std dev) (zero sigma returns mean)
%  (3) lower limit
%  (4) upper limit
%  (5) library distribution (1/2/3 = normal/empirical/TBD ...)
%  (6) conservative direction (0/1 = low/hi)
%  (7) logarithmic sample base (0 = linear scale)
%  (8 ...) empirical pdf must provide equal # of x then y values,
```

Diameters of SiO2 and TiO2 are improperly reversed

```
%            first four entries are ignored.
%  Provide distribution type
%  if (2) or empirical provide number of xy pairs
%  ie. below where 3 pairs are 1 2 3 4 5 6
%2 3
%1 0 0 99999 2 0 0 1 2 3 4 5 6

% qual epoxy in ZOI (lbm)
1
105 0 0 99999 1 0 0

% qual IOZ in ZOI (lbm)
1
39 0 0 99999 1 0 0

% crud fines (lbm)
1
24 0 0 99999 1 0 0

% unqual epoxy fine (lbm)
%   (uniform dist
2 2
234 0 117 234 2 0 0 117 234 0.5 0.5


% unqual epoxy fine chip (lbm)
%   (uniform dist)
2 2
709 0 355 709 2 0 0 355 709 0.5 0.5

% unqual epoxy small chip (lbm)
%   (uniform dist)
2 2
180 0 90 180 2 0 0 90 180 0.5 0.5

% unqual epoxy large chip (lbm)
%   (uniform dist)
2 2
391 0 196 391 2 0 0 196 391 0.5 0.5


% unqual epoxy curls (lbm)
%   (uniform dist)
2 2
391 0 196 391 2 0 0 196 391 0.5 0.5

% unqual alkyd (lbm)
1
271 0 0 99999 1 0 0

% unqual enamel (lbm)
1
267 0 0 99999 1 0 0

% unqual IOZ (lbm)
1
369 0 0 99999 1 0 0

% latent pariculate (lbm)
1
170 0 0 99999 1 0 0

% latent fiber (ft^3)
1
12.5 0 0 99999 1 0 0

%-------------------------------------------------------------------------
%   Time points along accident progression
%   (assume all trains of injection on initially, w/spray on setpoint trip)
%   (assume HPSI and LPSI both run, but LPSI flow negligible until depress)
%   (1 of 3 spray pumps can be turned off, all HPSI can be turned off for M,L)
```

```
%   (for degraded condition with < max trains, DON'T exercise any options)


% max time of interest (hr)
36

%******Recirculation Times******
%Number of break sizes for recirc table
7

%Recirc Time Table
1.5 2 4 6 8 12 27.5    %Break Size (in.)
337 79 56 44 38 31 30  %Time to recirc (min)

%******Other LOCA Times**********
% time to ONE spray pump off (min) (S,M,L)
% (if 0.0, NO spray pumps run)
% With Statistics
% One Row for each size designation (see LOCA bin definitions)
% random-variable definitions:
%  (1) first parameter (mean/geom mean/mean)
%  (2) second parameter (std dev/geom std dev) (zero sigma returns mean)
%  (3) lower limit
%  (4) upper limit
%  (5) library distribution (1/2/3 = normal/empirical/TBD ...)
%  (6) conservative direction (0/1 = low/hi)
%  (7) logarithmic sample base (0 = linear scale)
%  (8 ...) empirical pdf must provide equal # of x then y values,
%            first four entries are ignored.
%  Provide distribution type
%  if (2) or empirical provide number of xy pairs
%  ie. below where 3 pairs are 1 2 3 4 5 6
%2 3
%1 0 0 99999 2 0 0 1 2 3 4 5 6
 1
 0      0       0       99999   1       0       0
 1
 20     5       0       99999   1       0       0
 1
 20     5       0       99999   1       0       0

% time to ALL spray pumps off (min) (S,M,L)
% One Row for each size designation (see LOCA bin definitions)
% random-variable definitions:
%  (1) first parameter (mean/geom mean/mean)
%  (2) second parameter (std dev/geom std dev) (zero sigma returns mean)
%  (3) lower limit
%  (4) upper limit
%  (5) library distribution (1/2/3 = normal/empirical/TBD ...)
%  (6) conservative direction (0/1 = low/hi)
%  (7) logarithmic sample base (0 = linear scale)
%  (8 ...) empirical pdf must provide equal # of x then y values,
%            first four entries are ignored.
%  Provide distribution type
%  if (2) or empirical provide number of xy pairs
%  ie. below where 3 pairs are 1 2 3 4 5 6
%2 3
%1 0 0 99999 2 0 0 1 2 3 4 5 6
1
390  5 390 420 1 0 0
1
390 10 390 420 1 0 0
1
390 15 390 450 1 0 0


% time to retire 1 full train (min) (S,M,L)
%  (this prob never happens, keep as option)
%  (it would be the train with spray off already)
% One Row for each size designation (see LOCA bin definitions)
% random-variable definitions:
```

```
%  (1) first parameter (mean/geom mean/mean)
%  (2) second parameter (std dev/geom std dev) (zero sigma returns mean)
%  (3) lower limit
%  (4) upper limit
%  (5) library distribution (1/2/3 = normal/empirical/TBD ...)
%  (6) conservative direction (0/1 = low/hi)
%  (7) logarithmic sample base (0 = linear scale)
%  (8 ...) empirical pdf must provide equal # of x then y values,
%            first four entries are ignored.
%  Provide distribution type
%  if (2) or empirical provide number of xy pairs
%  ie. below where 3 pairs are 1 2 3 4 5 6
%2 3
%1 0 0 99999 2 0 0 1 2 3 4 5 6
1
99999 0 0 99999 1 0 0
1
99999 0 0 99999 1 0 0
1
99999 0 0 99999 1 0 0

% earliest time for chem prod (min) (S,M,L)
% One Row for each size designation (see LOCA bin definitions)
% random-variable definitions:
%  (1) first parameter (mean/geom mean/mean)
%  (2) second parameter (std dev/geom std dev) (zero sigma returns mean)
%  (3) lower limit
%  (4) upper limit
%  (5) library distribution (1/2/3 = normal/empirical/TBD ...)
%  (6) conservative direction (0/1 = low/hi)
%  (7) logarithmic sample base (0 = linear scale)
%  (8 ...) empirical pdf must provide equal # of x then y values,
%            first four entries are ignored.
%  Provide distribution type
%  if (2) or empirical provide number of xy pairs
%  ie. below where 3 pairs are 1 2 3 4 5 6
%2 3
%1 0 0 99999 2 0 0 1 2 3 4 5 6
1
0 0 0 99999 1 0 0
1
0 0 0 99999 1 0 0
1
0 0 0 99999 1 0 0

% time to hot leg injection (min) (S,M,L)
% One Row for each size designation (see LOCA bin definitions)
% random-variable definitions:
%  (1) first parameter (mean/geom mean/mean)
%  (2) second parameter (std dev/geom std dev) (zero sigma returns mean)
%  (3) lower limit
%  (4) upper limit
%  (5) library distribution (1/2/3 = normal/empirical/TBD ...)
%  (6) conservative direction (0/1 = low/hi)
%  (7) logarithmic sample base (0 = linear scale)
%  (8 ...) empirical pdf must provide equal # of x then y values,
%            first four entries are ignored.
%  Provide distribution type
%  if (2) or empirical provide number of xy pairs
%  ie. below where 3 pairs are 1 2 3 4 5 6
%2 3
%1 0 0 99999 2 0 0 1 2 3 4 5 6
2 2
360 0 345 360 2 0 0 345 360 0.5 0.5
2 2
360 0 345 360 2 0 0 345 360 0.5 0.5
2 2
360 0 345 360 2 0 0 345 360 0.5 0.5

%-------------------------------------------------------------------------
% Chemical Product Variables
```

```
% pool temp (degF) where chem prods form
% With statistics
% random-variable definitions:
%  (1) first parameter (mean/geom mean/mean)
%  (2) second parameter (std dev/geom std dev) (zero sigma returns mean)
%  (3) lower limit
%  (4) upper limit
%  (5) library distribution (1/2/3 = normal/empirical/TBD ...)
%  (6) conservative direction (0/1 = low/hi)
%  (7) logarithmic sample base (0 = linear scale)
%  (8 ...) empirical pdf must provide equal # of x then y values,
%           first four entries are ignored.
%  Provide distribution type
%  if (2) or empirical provide number of xy pairs
%  ie. below where 3 pairs are 1 2 3 4 5 6
%2 3
%1 0 0 99999 2 0 0 1 2 3 4 5 6
1
140 5 0 99999 1 0 0

%  bump factor for chems when t>=Tchem and T<=ChemTemp (S,M,L)
%  (spec mean as if min=0, but set min and max to shifted range)
%  (preselect mean and max to set desired tail prob in last sample pt)
% random-variable definitions:
%  (1) first parameter (mean/geom mean/mean)
%  (2) second parameter (std dev/geom std dev) (zero sigma returns mean)
%  (3) lower limit
%  (4) upper limit
%  (5) library distribution (1/2/3 = normal/empirical/TBD ...)
%  (6) conservative direction (0/1 = low/hi)
%  (7) logarithmic sample base (0 = linear scale)
%  (8 ...) empirical pdf must provide equal # of x then y values,
%           first four entries are ignored.
%  Provide distribution type
%  if (2) or empirical provide number of xy pairs
%  ie. below where 3 pairs are 1 2 3 4 5 6
%2 3
%1 0 0 99999 2 0 0 1 2 3 4 5 6
1
1.25 0.64 1 15.3 3 1 10              % truncated exponential
3 2
1.50 0.44444 1 18.2 3 1 10 1 2 0.5 0.5       % truncated exponential
3 2
2.00 0.25 1 24 3 1 10 1 10 1 0.5     % truncated exponential

%-------------------------------------------------------------------------------
% thresholds of concern
%  (logical distribution functions. NOT part of sequence variability)
% random-variable definitions:
%  (1) first parameter (mean/geom mean/mean)
%  (2) second parameter (std dev/geom std dev) (zero sigma returns mean)
%  (3) lower limit
%  (4) upper limit
%  (5) library distribution (1/2/3 = normal/empirical/TBD ...)
%  (6) conservative direction (0/1 = low/hi)
%  (7) logarithmic sample base (0 = linear scale)
%  (8 ...) empirical pdf must provide equal # of x then y values,
%           first four entries are ignored.
%  Provide distribution type
%  if (2) or empirical provide number of xy pairs
%  ie. below where 3 pairs are 1 2 3 4 5 6
%2 3
%1 0 0 99999 2 0 0 1 2 3 4 5 6


% core blockage limit (g/FA) HL breaks
1
```

```
99999 0 0 0 1 0 0

% core blockage limit (g/FA) CL break
1
99999 0 0 0 1 0 0


% boron ppt limit (g/FA) for HL brk before HL inject
%   (should never fail by this mode)
1
99999 0 0 0 1 0 0

% boron ppt limit (g/FA) for CL brk before HL injection
1
7.5 0 0 0 1 0 0

% limit for strainer buckling (ft h2o)
1
9.35 0 0 0 1 0 0

% void fraction at pump inlet (@ train)
1
0.02 0 0 0 1 0 0

%-----------------------------------------------------------------------------------------
%Plant State Table Data

% Operable Trains
% Train X Pump Matrix

% three trains operable (Case 01)
%    lpsi      hpsi    spray
      1         1       1 %A
      1         1       1 %B
      1         1       1 %C

% two trains operable (Case 22)
%    lpsi      hpsi    spray
%      1       1       1 %A
%      1       1       1 %B
%      0       0       0 %C

% one train operable (Case 43)
%    lpsi      hpsi    spray
%      1       1       1 %A
%      0       0       0 %B
%      0       0       0 %C

% two LHSI pumps failed (Case 09)
%    lpsi      hpsi    spray
%      1       1       1 %A
%      0       1       1 %B
%      0       1       1 %C

% one train fail + one additional LHSI fail (Case 26)
%    lpsi      hpsi    spray
%      1       1       1 %A
%      0       1       1 %B
%      0       0       0 %C

% # reactor coolant pumps (in CAD)
4

% # pressurizers (in CAD)
1

% # RHR pumps (in CAD)
3

% # steam generators (in CAD)
4
```

```
% time increment for evaluation (min)
5


% misc debris area (ft^2) total in containment
1
100 0 0 99999 1 0 0
% fraction of misc debris overlap (arrives @ t0)
0.25

% thin-bed thickness (in)
0.0625

% clip ZOI with walls (1/0 = y/n)
1

% const fiber filtration eff in fuel
1.0

% strainer height (ft)
3.25

% containment rel humidity
1.00

% sump rel humidity
1.00

% # fuel assemblies
193

% inflation of delP before chem bump
1
5 1 1 10 1 0 0

%******Min Flow to Cool Core****************

%Number of time and flow rate points

30
% Time post SCRAM (hr)
% Must be equal to number of time and flow rate points

0.0028          0.0042          0.0056
0.0111          0.0167          0.0222
0.0278          0.0417          0.0556
0.1111          0.1667          0.2222
0.2778          0.4167          0.5556
1.1111          1.6667          2.2222
2.7778          4.1667          5.5556
11.1111         16.6667         22.2222
27.7778         41.6667         111.1111
166.6667        222.2222         277.7778


%% Flow Rate (gpm)
% Must be equal to number of time and flow rate points

1414.7000   1323.5000   1260.9000   1113.4000   1030.5000
973.3000    931.3000    859.3000    812.3000    711.0000
654.7000    614.2000    581.8000    523.1000    480.9000
388.1000    342.4000    315.1000    295.7000    265.1000
245.5000    204.2000    182.7000    168.7000    158.1000
139.8000    99.0000     84.1000     74.4000     67.7000

%**********Special Weld ****************
% single-case tracer (weld location name - from table)
% specialweld = '31-RC-1102-NSS-1.1';
% If special weld input select 1 else 0
0
```

```
% If 1 write weld name
% else leave blank



%   nominal pool volume (ft^3) and area (ft^2)
%  (uniform distribution between min and max pool volumes - S,M,L)
2 2
0 0 0 0 2 0 0 43464 61993 .5 .5 %SBLOCA
2 2
0 0 0 0 2 0 0 39533 69444 .5 .5 %MBLOCA
2 2
0 0 0 0 2 0 0 45201 69263 .5 .5 %LBLOCA


% Pool Area (ft^2)
12301

% clean strainer attributes
% clean area of ONE strainer (ft^2)
1.8185e+003
% clean area of one OLD strainer (ft^2)
%155.4

% max clean strainer head loss (ft h2o)
 0.22

% single pump runout volume rates (gpm) (S, M, L)
% high-pressure max injection rates
 1620
% low-pressure injection rate
 2800

% Containment Spray Rate (all states except Case 43)
2 2
0 0 1932 2350 2 0 0 1932 2350 0.5 0.5
2 2
0 0 1932 2350 2 0 0 1932 2350 0.5 0.5
2 2
0 0 1932 2350 2 0 0 1932 2350 0.5 0.5

% Containment Spray Rate (Case 43)
%2 2
%0 0 2080 2600 2 0 0 2080 2600 0.5 0.5
%2 2
%0 0 2080 2600 2 0 0 2080 2600 0.5 0.5
%2 2
%0 0 2080 2600 2 0 0 2080 2600 0.5 0.5


%-------------------------------------------------------------------------
% geometric loading table for a single train:
%   thickness x(in) and strainer area A(ft^2) as functions of debris volume
%   V(ft^3). see supplementary routine StrainerArea for geometry definition
%   and assumptions. must be single-valued functions. May be slight mismatch
%   in compression for thickness estimation between this table and delP routine,
%   but low flow rate indicates low fiber compression.
%     V(ft^3)        x(in)      A (ft^2)

% switch table on/off = 1/0, list length of table
% if 0 a flat approximation will be used
% for old strainers
1 28

% Table Values
% If Table off leave blank
0           0           1.8185e+003
8.1790e+001  5.0000e-001  4.1900e+002
8.1800e+001  5.0100e-001  4.1931e+002
2.8016e+002  8.1421e+000  4.4718e+002
4.7853e+002  1.5783e+001  5.9256e+002
```

```
6.7689e+002  2.3424e+001  7.4768e+002
8.7526e+002  3.1065e+001  9.1253e+002
1.0736e+003  3.8706e+001  1.0871e+003
1.2720e+003  4.6348e+001  1.2714e+003
1.4703e+003  5.3989e+001  1.4655e+003
1.6687e+003  6.1630e+001  1.6692e+003
1.8671e+003  6.9271e+001  1.8827e+003
2.0654e+003  7.6912e+001  2.1060e+003
2.2638e+003  8.4553e+001  2.3389e+003
2.4622e+003  9.2194e+001  2.5816e+003
2.6605e+003  9.9835e+001  2.8341e+003
2.8589e+003  1.0748e+002  3.0962e+003
3.0573e+003  1.1512e+002  3.3681e+003
3.2556e+003  1.2276e+002  3.6497e+003
3.4540e+003  1.3040e+002  3.9411e+003
3.6524e+003  1.3804e+002  4.2422e+003
3.8507e+003  1.4568e+002  4.5530e+003
4.0491e+003  1.5332e+002  4.8735e+003
4.2474e+003  1.6096e+002  5.2038e+003
4.4458e+003  1.6860e+002  5.5438e+003
4.6442e+003  1.7625e+002  5.8935e+003
4.8425e+003  1.8389e+002  6.2530e+003
5.0409e+003  1.9153e+002  6.6222e+003

%-------------------------------------------------------------------
% initiating event frequency and bounded Johnson fit
%    NUREG-1829 current-day exceedance frequencies (without SG breaks)
%      (# breaks/cal yr of sizes > x)
%    Interpolated values for LOCA bins MUST be consistent with LOCAbins def
%    UT Austin fit of epistemic envelope using bounded Johnson pdf.
%      Parameters MUST be listed in column order (gamma,delta,xi,lamda)
% each row varies by size, each column varies by %ile (then transposed)

% Break Frequency Table Name
"Present-Day Exceedance Frequency"

% Break Sizes in Ascending Order
% These are fixed values
% For Documentation Purpose only
0.5 1.625 2 3 6 7 14 31

% Frequency Table
% These are fixed values
% For Documentation Purpose only
% Break Size X Percentile
6.8e-5 5.0e-6 3.69e-6 2.1e-7 6.30e-8 1.4e-8 4.1e-10 3.5e-11  % 5th %ile
6.3e-4 8.9e-5 6.57e-5 3.4e-6 1.08e-6 3.1e-7 1.2e-08 1.2e-09  % 50th %ile
1.9e-3 4.2e-4 3.10e-4 1.6e-5 5.20e-6 1.6e-6 2.0e-07 2.9e-08  % mean
7.1e-3 1.6e-3 1.18e-3 6.1e-5 1.98e-5 6.1e-6 5.8e-07 8.1e-08  % 95th %ile

% Table Percentile Values
0.05 0.5 NaN 0.95 % Don't Use Mean for Fitting

% Johnson Parameters
% These are fixed values
% For Documentation Purpose only
% gamma        delta          xi             lambda
1.650950E+00   5.256964E-01   4.117000E-05   1.420000E-02
1.646304E+00   4.593913E-01   2.530000E-06   3.200000E-03
1.646308E+00   4.593851E-01   1.870000E-06   2.360550E-03
1.646605E+00   4.589467E-01   1.200000E-07   1.220000E-04
1.646403E+00   4.566256E-01   3.000000E-08   3.965000E-05
1.645739E+00   4.487957E-01   6.023625E-09   1.220000E-05
1.645211E+00   3.587840E-01   2.892430E-10   1.160000E-06
1.645072E+00   3.343493E-01   2.636770E-11   1.600000E-07

%-------------------------------------------------------------------------------
% Strainer-Test Penetration Parameters

% area of test module (ft^2)
91.44
```

```
%  fraction of sheddable debris
%  (uniform empirical) - (unitless)
2 2
0 0 0 0 2 0 0 0.00956 0.0272 0.5 0.5


% shedding rate (1/min)
%  (uniform empirical)
2 2
0 0 0 0 2 0 0 0.008236 0.0546 0.5 0.5

% filter efficiency per g (slope)
%  (uniform empirical)
2 2
0 0 0 0 2 0 0  0.000339 0.003723 0.5 0.5

% filter fit cut point (g)
%  (uniform empirical)
2 2
0 0 0 0 2 0 0 790 880 0.5 0.5


% initial filter eff (intercept)
%  (uniform empirical)
2 2
0 0 0 0 2 0 0 0.656 0.706 0.5 0.5

% filter efficiency match pt
%  (set equal to 1.0 always)
1
1 0 0 0 1 0 0

% filter exp rate const (1/g)
%  (bimodal empirical)
2 3
0 0 0 0 2 1 0 0.0011254 0.0013078 0.031787 0.10000 0.45000 0.1000

%-----------------------------------------------------------------------------------
% Debris Transport Factors
%  (enter conservative values here, random variables populated below)



%  ZOI-generated debris
%    (LDFG fines, LDFG small, LDFG large, uTherm fines, qual coat fines, crud fines)
%    (columns must ALWAYS be defined in this order left to right)
%    (rows must ALWAYS be defined in this order top to bottom)
%    (present values from Vol 3 for SG compartment break)

%    these factors were used for Full Batch 2

0.70 0.60 0.22 0.70 0.70 0.70     %F_BD_upr
0.30 0.25 0.00 0.30 0.30 0.30     %F_BD_lwr
0.53 0.27 0.00 0.53 0.53 0.53     %F_WD_UCin
0.47 0.19 0.00 0.47 0.47 0.47     %F_WD_UCan
0.00 0.27 0.00 0.00 0.00 0.00     %F_WD_BCin
0.00 0.00 0.00 0.00 0.00 0.00     %F_WD_BCan
0.02 0.00 0.00 0.02 0.02 0.02     %F_PF_sump
0.05 0.00 0.00 0.05 0.05 0.05     %F_PF_nact
1.00 0.64 0.00 1.00 1.00 1.00     %F_Rcrc_lwr
1.00 0.64 0.00 1.00 1.00 1.00     %F_Rcrc_WDin
1.00 0.58 0.00 1.00 1.00 1.00     %F_Rcrc_WDan
0.00 0.01 0.01 0.00 0.00 0.00     %F_Ersn_spry
0.00 0.07 0.07 0.00 0.00 0.00     %F_Ersn_pool


%  Unqualified coatings outside ZOI
%    (epoxy fines, epoxy fine chips, epoxy small chips, epoxy large chips,
%                                epoxy curls, alkyd, baked enamel, IOZ fines)
```

```
%    (columns must ALWAYS be defined in this order left to right)
%    (rows must ALWAYS be defined in this order top to bottom)
%    (present values from Vol 3 for MB/LBLOCA in SG compartment)

1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00   % F_fail
0.15 0.15 0.15 0.15 0.15 0.54 0.00 0.83   % F_upr
0.02 0.02 0.02 0.02 0.02 0.46 1.00 0.17   % F_lwr
0.83 0.83 0.83 0.83 0.83 0.00 0.00 0.00   % F_Rx
0.06 0.06 0.06 0.06 0.06 0.06 0.00 0.06   % F_spry
1.00 0.41 0.00 0.00 1.00 1.00 1.00 1.00   % F_rcrc
0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00   % F_Rxrcrc


% Latent Debris
%   (particulate, fiber)
%    (columns must ALWAYS be defined in this order left to right)
%    (rows must ALWAYS be defined in this order top to bottom)
%    (present values from Vol 3 for SG compartment)

0.00 0.00        %F_BD_upr       (1)
1.00 1.00        %F_BD_lwr       (2)
1.00 1.00        %F_WD           (3)
0.02 0.02        %F_PF_sump      (4)
0.05 0.05        %F_PF_nact      (5)
1.00 1.00        %F_Rcrc_lwr     (6)

%-------------------------------------------------------------------------------
%Time and Temperature Data

%Number of Time and Temperature Data Points
162


% time vector (hr) for small-break temperature profile
%  (FIRST entry is assumed 2B@ t=0. constant-value extrapolation imposed.
%  (time dependent temps ARE currently used in calc, one history for each LOCA)

% time vector (hour) for small (and medium) breaks

0.0000  0.0847  0.0864  0.0881  0.0897  0.0914  0.0931  0.0947
0.0964 0.0981  0.0997  0.1014  0.1031  0.1047  0.1064  0.1081
0.1097 0.1139  0.1306  0.1472  0.1639  0.1806  0.1972  0.2139
0.2306 0.2472  0.2639  0.2806  0.2972  0.3139  0.3306  0.3472
0.3639 0.3806  0.3972  0.4139  0.4306  0.4472  0.4639  0.4806
0.4972 0.5139  0.5306  0.5472  0.5639  0.5806  0.5972  0.6139
0.6306 0.6472  0.6639  0.6806  0.6972  0.7139  0.7306  0.7472
0.7639 0.7806  0.7972  0.8139  0.8306  0.8472  0.8639  0.8806
0.8972 0.9139  0.9306  0.9472  0.9639  0.9806  0.9972  1.0139
1.0306 1.0472  1.0639  1.0806  1.3611  1.6944  2.0278  2.3611
2.6944 3.0278  3.3611  3.6944  4.0278  4.3611  4.6944  5.0278
5.3611 5.6944  6.0278  6.3611  6.6944  7.0278  7.3611  7.6944
8.0278 8.3611  8.6944  9.0278  9.3611  9.6944  10.0278 20.0833
32.0833    44.0833 56.0833 68.0833 80.0833 92.0833 104.0833
116.0833   128.0833    140.0833    152.0833    164.0833
176.0833   188.0833    200.0833    212.0833    224.0833
236.0833   248.0833    260.0833    272.0833    283.3333
297.2222   308.3333    319.4444    333.3333    344.4444
355.5556   369.4444    380.5556    391.6667    402.7778
416.6667   427.7778    438.8889    452.7778    463.8889
475.0000   488.8889    500.0000    511.1111    525.0000
536.1111   547.2222    561.1111    572.2222    583.3333
597.2222   608.3333    619.4444    633.3333    644.4444
655.5556   669.4444    680.5556    691.6667    702.7778
716.6667

% temperature(F) profile for small (and medium) breaks
119.6000    131.2987    140.1689    150.3314    156.1240
159.2343    162.1567    164.5680    166.6937    168.5685
170.2457    171.7175    172.9577    174.0415    174.9570
175.7084    176.3081    177.5299    164.4935    132.7076
124.0848    123.6914    123.5988    123.5641    123.5529
```

```
124.4938    127.6399    129.7484    131.0391    149.8002
158.2393    162.7694    165.4960    167.3851    168.6688
169.7687    170.9814    171.9993    172.8771    173.7150
174.4595    175.0903    175.6074    176.0061    176.2923
176.4625    176.4855    176.3916    176.2055    175.9468
175.6184    175.2411    174.8243    174.3902    173.9374
173.4284    172.8459    172.2319    171.6143    171.0143
170.4548    169.9507    169.5034    169.1086    168.7661
168.4824    168.2551    168.0847    167.9707    167.9020
167.8705    167.8665    167.8947    167.9451    168.0131
168.0978    170.0607    170.9606    171.4105    170.8721
169.8110    168.7942    168.1132    165.3090    164.1228
163.0112    161.4436    159.9385    158.1298    158.4517
156.5706    151.6937    163.7090    160.9624    158.1118
156.1579    154.6151    153.2333    151.9641    150.8191
149.7667    148.7924    147.8649    136.2080    129.0230
124.9790    122.1450    120.1310    118.4710    117.3160
116.4980    115.6160    114.7100    113.8960    113.1730
112.5210    111.9240    111.3580    110.8590    110.3930
109.9930    109.5770    109.2090    108.9100    108.5930
108.2810    107.9680    107.7100    107.4730    107.1620
106.9430    106.7150    106.4770    106.2500    106.1240
105.8930    105.6660    105.5410    105.3160    105.1930
105.0690    104.8440    104.7250    104.6070    104.3770
104.3660    104.1400    104.0230    103.9050    103.7910
103.6730    103.5660    103.4520    103.3350    103.1450
103.1000    102.9130    102.8680    102.6810    102.6450
102.5250    102.5160

% time vector (hr) for medium (and small) break temperature profile
%  (FIRST entry is assumed 2B@ t=0. constant-value extrapolation imposed.
0.0000  0.0847  0.0864  0.0881  0.0897  0.0914  0.0931  0.0947
0.0964 0.0981  0.0997  0.1014  0.1031  0.1047  0.1064  0.1081
0.1097 0.1139  0.1306  0.1472  0.1639  0.1806  0.1972  0.2139
0.2306 0.2472  0.2639  0.2806  0.2972  0.3139  0.3306  0.3472
0.3639 0.3806  0.3972  0.4139  0.4306  0.4472  0.4639  0.4806
0.4972 0.5139  0.5306  0.5472  0.5639  0.5806  0.5972  0.6139
0.6306 0.6472  0.6639  0.6806  0.6972  0.7139  0.7306  0.7472
0.7639 0.7806  0.7972  0.8139  0.8306  0.8472  0.8639  0.8806
0.8972 0.9139  0.9306  0.9472  0.9639  0.9806  0.9972  1.0139
1.0306 1.0472  1.0639  1.0806  1.3611  1.6944  2.0278  2.3611
2.6944 3.0278  3.3611  3.6944  4.0278  4.3611  4.6944  5.0278
5.3611 5.6944  6.0278  6.3611  6.6944  7.0278  7.3611  7.6944
8.0278 8.3611  8.6944  9.0278  9.3611  9.6944  10.0278 20.0833
32.0833    44.0833 56.0833 68.0833 80.0833 92.0833 104.0833
116.0833   128.0833    140.0833    152.0833    164.0833
176.0833   188.0833    200.0833    212.0833    224.0833
236.0833   248.0833    260.0833    272.0833    283.3333
297.2222   308.3333    319.4444    333.3333    344.4444
355.5556   369.4444    380.5556    391.6667    402.7778
416.6667   427.7778    438.8889    452.7778    463.8889
475.0000   488.8889    500.0000    511.1111    525.0000
536.1111   547.2222    561.1111    572.2222    583.3333
597.2222   608.3333    619.4444    633.3333    644.4444
655.5556   669.4444    680.5556    691.6667    702.7778
716.6667

% Temperature(F) profile for medium breaks
119.6000    131.2987    140.1689    150.3314    156.1240
159.2343    162.1567    164.5680    166.6937    168.5685
170.2457    171.7175    172.9577    174.0415    174.9570
175.7084    176.3081    177.5299    164.4935    132.7076
124.0848    123.6914    123.5988    123.5641    123.5529
124.4938    127.6399    129.7484    131.0391    149.8002
158.2393    162.7694    165.4960    167.3851    168.6688
169.7687    170.9814    171.9993    172.8771    173.7150
174.4595    175.0903    175.6074    176.0061    176.2923
176.4625    176.4855    176.3916    176.2055    175.9468
175.6184    175.2411    174.8243    174.3902    173.9374
```

```
173.4284    172.8459    172.2319    171.6143    171.0143
170.4548    169.9507    169.5034    169.1086    168.7661
168.4824    168.2551    168.0847    167.9707    167.9020
167.8705    167.8665    167.8947    167.9451    168.0131
168.0978    170.0607    170.9606    171.4105    170.8721
169.8110    168.7942    168.1132    165.3090    164.1228
163.0112    161.4436    159.9385    158.1298    158.4517
156.5706    151.6937    163.7090    160.9624    158.1118
156.1579    154.6151    153.2333    151.9641    150.8191
149.7667    148.7924    147.8649    136.2080    129.0230
124.9790    122.1450    120.1310    118.4710    117.3160
116.4980    115.6160    114.7100    113.8960    113.1730
112.5210    111.9240    111.3580    110.8590    110.3930
109.9930    109.5770    109.2090    108.9100    108.5930
108.2810    107.9680    107.7100    107.4730    107.1620
106.9430    106.7150    106.4770    106.2500    106.1240
105.8930    105.6660    105.5410    105.3160    105.1930
105.0690    104.8440    104.7250    104.6070    104.3770
104.3660    104.1400    104.0230    103.9050    103.7910
103.6730    103.5660    103.4520    103.3350    103.1450
103.1000    102.9130    102.8680    102.6810    102.6450
102.5250    102.5160


% time vector (hr) for large breaks
0.0000   0.0847  0.0864  0.0881  0.0897  0.0914  0.0931  0.0947
0.0964  0.0981  0.0997  0.1014  0.1031  0.1047  0.1064  0.1081  0.1097
0.1139  0.1306  0.1472  0.1639  0.1806  0.1972  0.2139  0.2306  0.2472
0.2639  0.2806  0.2972  0.3139  0.3306  0.3472  0.3639  0.3806  0.3972
0.4139  0.4306  0.4472  0.4639  0.4806  0.4972  0.5139  0.5306  0.5472
0.5639  0.5806  0.5972  0.6139  0.6306  0.6472  0.6639  0.6806  0.6972
0.7139  0.7306  0.7472  0.7639  0.7806  0.7972  0.8139  0.8306  0.8472
0.8639  0.8806  0.8972  0.9139  0.9306  0.9472  0.9639  0.9806  0.9972
1.0139  1.0306  1.0472  1.0639  1.0806  1.3611  1.6944  2.0278  2.3611
2.6944  3.0278  3.3611  3.6944  4.0278  4.3611  4.6944  5.0278  5.3611
5.6944  6.0278  6.3611  6.6944  7.0278  7.3611  7.6944  8.0278  8.3611
8.6944  9.0278  9.3611  9.6944  10.0278 20.0833 32.0833 44.0833 56.0833
68.0833 80.0833 92.0833 104.0833    116.0833    128.0833    140.0833
152.0833    164.0833    176.0833    188.0833    200.0833    212.0833
224.0833    236.0833    248.0833    260.0833    272.0833    283.3333
297.2222    308.3333    319.4444    333.3333    344.4444    355.5556
369.4444    380.5556    391.6667    402.7778    416.6667    427.7778
438.8889    452.7778    463.8889    475.0000    488.8889    500.0000
511.1111    525.0000    536.1111    547.2222    561.1111    572.2222
583.3333    597.2222    608.3333    619.4444    633.3333    644.4444
655.5556    669.4444    680.5556    691.6667    702.7778    716.6667

% Temperature (F) profile for large breaks
119.8113 213.9295    242.3104    255.0268    255.7907    253.1617
252.9372    252.5390    251.9023    250.9733    249.7169    245.8894
235.9856    224.0051    212.9495    203.5499    195.7225    179.5894
199.8048    174.8143    174.8276    177.3518    180.7405    183.2333
185.1644    186.4925    187.2579    187.8270    188.1924    188.4266
188.5605    188.5934    188.5042    188.3375    189.3187    189.7570
189.0923    188.5202    188.0148    187.5621    187.4103    187.0671
186.7330    186.4249    186.1559    186.7640    186.5012    186.2557
186.0555    185.9119    185.8265    185.8062    185.8495    185.9526
186.1092    187.8900    187.9673    187.9196    187.9119    187.9385
187.9954    188.0710    188.1647    188.2538    188.3385    188.4003
189.0996    188.9199    188.7439    188.5614    188.3622    188.1314
187.8597    187.5387    187.1667    186.7559    178.4091    171.8762
166.5421    162.2238    158.1410    154.9818    151.7673    148.9234
146.0834    143.7967    141.6054    139.5251    137.9892    136.4819
134.8865    136.9000    136.6489    135.3569    134.3103    133.2941
132.4453    131.9467    132.0536    132.1915    131.3055    130.7946
130.2765    123.0489    118.1991    114.9095    112.4170    110.4096
108.7290    107.2834    106.0152    104.8855    103.8671    102.9399
102.0890    101.3027    100.5720    99.8894 99.2491 98.6461 98.0763
97.5362 97.0229 96.5339 96.0669 95.6474 95.1520 94.7720 94.4055
93.9649 93.6254 93.2967 92.9000 92.5932 92.2953 92.0057 91.6547
91.3822 91.1168 90.7942 90.5432 90.2982 89.9998 89.7671 89.5396
```

```
89.2620 89.0452 88.8328 88.5733 88.3703 88.1712 87.9276 87.7368
87.5494 87.3198 87.1398 86.9628 86.7457 86.5753 86.4076 86.2427
86.0401

%-------------------------------------------------------------------------------
% NPSH parameters:
%   (specify any # of pipe segments in common header)
%
% major HL variables

% absolute roughness of the pipe (ft)
0.00015

% Number of Pipe Segments
6

% pipe diameters (ft)
1.27 .99 1.27 .84 1.27 .99

% pipe lengths (ft)
66.96 25.41 12.00 25.46 11.50 24.91

% depth of common header (ft)
25.83 25.65 25.83 % LPSI, HPSI, SPRY

% NPSH required for each pump (ft water)
12 12 12        % LPSI, HPSI, SPRY

% minor HL variables
%  # of elbows, tees, entrances, and branches per pipe segment
%    [(# of 90 degree) (# of 45 degree) (# of gate valves)(# of entrances)(# of
%     tee runs) (# of tee branches)]

4 2 1 1 0 0    % segment AB
3 0 0 0 0 1    % segment BC
0 0 0 0 1 0    % segment BD
3 0 0 0 0 1    % segment DE
0 0 0 0 1 0    % segment DF
3 0 0 0 0 1    % segment FG

%-------------------------------------------------------------------------------
% Newly Added Options

% Use Old Degas Routine? (0 = No, 1 = Yes)
0

% Use Old NPSH Routine? (0 = No, 1 = Yes)
0

% Use Old SI Pump Flow Equation? (0 = No, 1 = Yes)
0

% Use Old Strainer Properties? (0 = No, 1 = Yes)
0

% Use Common Random Numbers Across Frequency Replications? (0 = No, 1 = Yes)
0

% Enable All Plots? (0 = No, 1 = Yes)
1

% Enable Parallel Calculations (0 = No, 1 = Yes)
% CAUTION - USE ONLY IF YOUR KNOW YOUR PC MEETS SPECIFICATIONS!!!!!
0

% Number of Parallel Threads
4

% Use Optimal Frequency Bins for 15 Freps (0 = No, 1 = Yes)
1
```

```
% Use Old Debris Source Rate (Before Error Correction)? (0 = No, 1 = Yes)
1

% Use Old Latent Debris Transport Equations (Before Error Correction)? (0 = No, 1 = Yes)
1
```

Attachment 8

STP CASA Grande Information (Non-Proprietary Version)

CASA09 JT4

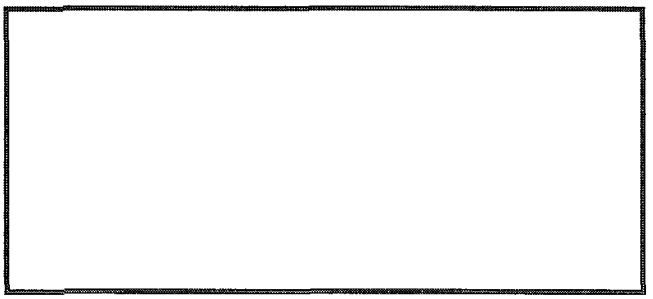
Contains No Proprietary Information
Alion Science and Technology

```
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
%LANLANLANLANLANLANLANLANLANLANLANLANLANLANLANLANLANLANLANLANANLANLANLANLANLA%
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%

% Define Case Folders (Main Project Folder)
"/work/02405/jjtejada/yye00/matlab_code/Demo Plant"

% Define Working Folders

% Analysis Folder (~/.../Case/Analysis)
"Analytic Results"

% Run Subfolder (~/.../Case/Analysis/run)
"Tornado"

% Run Sub_Subfolder (~/.../Case/Analysis/run/run_sub)
"SIMCON"

% Run Sub_Sub_Subfolder (~/.../Case/Analysis/run/run_sub/run_sub_sub)
"Delta Pump Case 09 Shuffle"

% CAD Folder Name (~/.../Case/CAD)
"CAD Files"

% Concrete Sub-Folder (~/.../Case/CAD/Concrete)
"Concrete Data"

% Equipment Sub-Folder (~/.../Case/CAD/Equipment)
"Equip Data"

% Grating Sub-Folder (~/.../Case/CAD/Grating)
"Grating Data"

% Pipe Sub-Folder (~/.../Case/CAD/Pipes)
"Pipe Data"

% Fequency Folder (~/.../Case/Frequency)
"Freq Data"

% Break Frequency (~/.../Case/Frequency/Break)
"LOCA Frequency and Weld Inputs - 12-7-12 R1.xlsx"

% Break Fequency Table (~/.../Case/Frequency/Break/Table)
"LOCA Data"

% Weld Case File (~/.../Case/Frequency/Weld)
"LOCA Frequency and Weld Inputs - 12-7-12 R1.xlsx"

% Weld Case Table (~/.../Case/Frequency/Weld/Table)
"Weld Table"
%------------------------------------------------------------------
% multiplicative spatial unit conversions
% rectify all CAD elements for consistency
% applied to ALL length units within each CAD file

% Concrete Multiplier
1.0

% Equipment Multiplier
1.0

% Grating Multiplier
1.0

% Pipe Multiplier

1.0
%-------------------------------------------------------------------
```

```
%  LOCA bin definitions
%  (units consistent with freq dists and CAD data)

% List Number of Defined Break Size Limits
% ie. SB,MB,LB (3 designations)
% However more sizes are allowable
 3

% List Sizes
0.5   2.0   6.0

%-------------------------------------------------------------------

% CAD and Plotting Options (1/0 = Y/N)

% Show CAD Reproduction
0

% Show Concrete and Gratings
0

% Produce Intro Movie and Stop
0

% Debris Passage Correlation
0

% Sample Flow Rates
0

% Random Input Distributions
0

% ZOI Radial Inflation Factor(Plotting Only)
50

% ZOI Plotting Interval (# of breaks between plots)
25

%-------------------------------------------------------------------------
%   spatial resolution for discretizing insulation
%   (must repeat weld target sort if these are changed. delete all master
%   files and rerun with new delL and Nangbin)

% Linear Resolution (in.)
6

%Azimuthal Bins in 2 Pi Radians on Pipes
12

%-------------------------------------------------------------------------
% Head Loss Option
% porosity calc (1/2 = vol / mass weighting)
% (vol weighting was found to be more conservative)
1
%-------------------------------------------------------------------------
% Synonyms tables for nonstandard welds, hangars and valves and Equipment

% Number of Valve synonyms
5
% Valve Synonyms
Valve VALVE MOV XRH FCV

% Number of Hangar Labels
14
% Hangar Synonyms
Hangar Hanger HL AF GU SS SH RR RH
"Work Point" "work point" "Work point" "work Point" "WORK POINT"

% Number of Weld Synonyms
```

```
4

% Weld Synonyms
FW Weld WELD FS

% Number of Steam Generator Synonyms
2

% Steam Generator Synonyms
SG SteamGenerator

% Number of Reactor Coolant Pump Synonyms
2

% Reactor Coolant Pump Synonyms
RCP ReactorCoolantPump

% Number of Pressurizer Synonyms
3

% Pressurizer Synonyms
PZR PRZR Pressurizer

% Number of RHR Synonyms
2

% RHR Synonyms
RHR ResidualHeatRemoval

%-------------------------------------------------------------------------------
%Statistics Sampling Options

%Sampling Method
% (0/1/2/3 = CASA default / MatLab default / shuffle / read file)
2


%If Option 3 specified, set file name in case folder below
%If not LEAVE BLANK



% max # LHS bins in LLOCA for max DEGB (DEGB counts as 1)
% Nmaxbrk =  2 => 2044 total breaks
% Nmaxbrk =  3 => 2100 total breaks
% Nmaxbrk =  5 => 2250 total breaks
% Nmaxbrk = 10 => 3070 total breaks
5

% # LHS replicates (batches) for each frequency CCDF
20

% # epistemic freq envelope samples
% current models process ~110 cases per minute
15

% logarithmic base for sampling epistemic frequency envelope
2


% lower limit of highest epistemic frequency bin
0.99



% # interpolation pts in each break freq ccdf
1000


% logarithmic base for sampling break size
```

```
%  (double check routine before changing this from base 10)
10


%-----------------------------------------------------------------------
%Insulation Characteristics

% Number of Low Density Fiberglass Zones
3
```



Redacted

```
% Number of Debris Types
8

% Debris Types
NUKON   NUKON_2 MICROTHERM PMI LEAD    "THERMAL WRAP" IOZ     ALKYD

%Debris treated as LDFG
% 1/0 --> yes/no
1 1 0 0 0 1 0 0

%Debris treated as microtherm
% 1/0 --> yes/no
0 0 1 0 0 0 0 0

% Damage Radii with statistics definitions
% Material X Statistics
% random-variable definitions:
%  (1) first parameter (mean/geom mean/mean)
%  (2) second parameter (std dev/geom std dev) (zero sigma returns mean)
%  (3) lower limit
%  (4) upper limit
%  (5) library distribution (1/2/3 = normal/empirical/TBD ...)
%  (6) conservative direction (0/1 = low/hi)
%  (7) logarithmic sample base (0 = linear scale)
%  (8 ...) empirical pdf must provide equal # of x then y values,
%            first four entries are ignored.
%  Provide distribution type
%  if (2) or empirical provide number of xy pairs
%  ie. below where 3 pairs are 1 2 3 4 5 6
%2 3
%1 0 0 99999 2 0 0 1 2 3 4 5 6
1
17 0 0 99999 1 0 0
1
17 0 0 99999 1 0 0
1
28.6 0 0 99999 1 0 0
1
1 0 0 99999 1 0 0
1
1 0 0 99999 1 0 0
1
17 0 0 99999 1 0 0
1
1 0 0 99999 1 0 0
1
1 0 0 99999 1 0 0
%-----------------------------------------------------------------------
```

```
%  Debris Properties Table

%  (denote particulate/fiber = sphere/cylinder = 1/2)
%  (do NOT add to or reorder this list unless code is modified)
%  (inventory of fibers with cylindrical geom must be given in ft^3)
%  (can 'fake' the diameter to match a given Sv using std geom formulas)
%  (inventory of particulates with spherical geom must be given in lbm)
%  (this list MUST include every debris type of interest)
%  (if unknown, set "manufactured" density of particulate to ~20% of Rho_mat)
%       (based on comparison of FeO2 to BWR sludge compaction density)

                %'label'       DebrisPropi       'Geom'    'Diam' 'Rho_mat'  'Rho_mfc'
% native units                                  'sph,cyl' 'um'   'lbm/ft^3' 'lbm/ft^3'
% calc units                                   'sph,cyl' 'm'    'kg/m^3'   'kg/m^3'
              "LDFG - fines"          2          7       175        2.4
               "LDFG - small"          2          7       175        2.4
               "LDFG - large"          2          7       175        2.4
               "uTherm - filaments"    2          6       165        2.4
               "uTherm - SiO2"         1          2.5     137        27.4
               "uTherm - TiO2"         1          20      262        52.4
               "QualCoat - epoxy"      1          10      94         36.66
               "QualCoat - IOZ"        1          10      208        81.12
               "Crud"                  1          15      350        70.0
               "UQCoat - epoxyfine"    1          152     124        48.36
               "UQCoat - epoxyFchp"    1          1143    124        48.36
               "UQCoat - epoxySchp"    1          1143    124        48.36
               "UQCoat - epoxyLchp"    1          1143    124        48.36
               "UQCoat - epoxyCrls"    1          1143    124        48.36
               "UnQualCoat - alkyd"    1          10      207        80.73
               "UnQualCoat - enamel"   1          10      93         36.27
               "UnQualCoat - IOZ"      1          10      244        95.16
               "Latent - particulate"  1          17.3    169        33.80
               "Latent - fiber"        2          7       175        2.4

%-------------------------------------------------------------------------------------------
% microTherm constituents (low density concrete with fiber binder)
% mfc'd density (lbm/ft3)
15.0

% mass fraction filamentsflf_read
0.03

% mass fraction of SiO2
0.58

% mass fraction of TiO2
0.39

% debris type start and stop times (min after break)
%   (rate assumed to be uniform from Tstart to Tend)
%   (rate calc uses inventories defined above)
%   (introduce "instant" sources over 1 delT)
%   (debris from UQCoat cannot have Tstartsrc=0)
%   (timing is presently independent of break size)

%   Start Times
0       0       0       0       0       0       0       0       0       10
10      10      10      10      10      10      10      0       0

%   Stop Times
10      10      10      10      10      10      10      10      10      2160
2160    2160    2160    2160    2160    2160    2160    10      10

%-------------------------------------------------------------------------------------------
%  Noninsulation Debris Quantities

% random-variable definitions:
%  (1) first parameter (mean/geom mean/mean)
%  (2) second parameter (std dev/geom std dev) (zero sigma returns mean)
%  (3) lower limit
```

Diameters of SiO2 and TiO2 are improperly reversed

```
%  (4) upper limit
%  (5) library distribution (1/2/3 = normal/empirical/TBD ...)
%  (6) conservative direction (0/1 = low/hi)
%  (7) logarithmic sample base (0 = linear scale)
%  (8 ...) empirical pdf must provide equal # of x then y values,
%            first four entries are ignored.
%  Provide distribution type
%  if (2) or empirical provide number of xy pairs
%  ie. below where 3 pairs are 1 2 3 4 5 6
%2 3
%1 0 0 99999 2 0 0 1 2 3 4 5 6

% qual epoxy in ZOI (lbm)
1
105 0 0 99999 1 0 0

% qual IOZ in ZOI (lbm)
1
39 0 0 99999 1 0 0

% crud fines (lbm)
1
24 0 0 99999 1 0 0

% unqual epoxy fine (lbm)
%   (uniform dist
2 2
234 0 117 234 2 0 0 117 234 0.5 0.5


% unqual epoxy fine chip (lbm)
%   (uniform dist)
2 2
709 0 355 709 2 0 0 355 709 0.5 0.5

% unqual epoxy small chip (lbm)
%   (uniform dist)
2 2
180 0 90 180 2 0 0 90 180 0.5 0.5

% unqual epoxy large chip (lbm)
%   (uniform dist)
2 2
391 0 196 391 2 0 0 196 391 0.5 0.5


% unqual epoxy curls (lbm)
%   (uniform dist)
2 2
391 0 196 391 2 0 0 196 391 0.5 0.5

% unqual alkyd (lbm)
1
271 0 0 99999 1 0 0

% unqual enamel (lbm)
1
267 0 0 99999 1 0 0

% unqual IOZ (lbm)
1
369 0 0 99999 1 0 0

% latent pariculate (lbm)
1
170 0 0 99999 1 0 0

% latent fiber (ft^3)
1
12.5 0 0 99999 1 0 0
```

```
%-------------------------------------------------------------------------
%   Time points along accident progression
%   (assume all trains of injection on initially, w/spray on setpoint trip)
%   (assume HPSI and LPSI both run, but LPSI flow negligible until depress)
%   (1 of 3 spray pumps can be turned off, all HPSI can be turned off for M,L)
%   (for degraded condition with < max trains, DON'T exercise any options)


% max time of interest (hr)
36

%******Recirculation Times******
%Number of break sizes for recirc table
7

%Recirc Time Table
1.5 2 4 6 8 12 27.5    %Break Size (in.)
337 79 56 44 38 31 30  %Time to recirc (min)

%******Other LOCA Times*********
% time to ONE spray pump off (min) (S,M,L)
% (if 0.0, NO spray pumps run)
% With Statistics
% One Row for each size designation (see LOCA bin definitions)
% random-variable definitions:
%  (1) first parameter (mean/geom mean/mean)
%  (2) second parameter (std dev/geom std dev) (zero sigma returns mean)
%  (3) lower limit
%  (4) upper limit
%  (5) library distribution (1/2/3 = normal/empirical/TBD ...)
%  (6) conservative direction (0/1 = low/hi)
%  (7) logarithmic sample base (0 = linear scale)
%  (8 ...) empirical pdf must provide equal # of x then y values,
%            first four entries are ignored.
%  Provide distribution type
%  if (2) or empirical provide number of xy pairs
%  ie. below where 3 pairs are 1 2 3 4 5 6
%2 3
%1 0 0 99999 2 0 0 1 2 3 4 5 6
 1
 0      0       0       99999   1       0       0
 1
 20     5       0       99999   1       0       0
 1
 20     5       0       99999   1       0       0

% time to ALL spray pumps off (min) (S,M,L)
% One Row for each size designation (see LOCA bin definitions)
% random-variable definitions:
%  (1) first parameter (mean/geom mean/mean)
%  (2) second parameter (std dev/geom std dev) (zero sigma returns mean)
%  (3) lower limit
%  (4) upper limit
%  (5) library distribution (1/2/3 = normal/empirical/TBD ...)
%  (6) conservative direction (0/1 = low/hi)
%  (7) logarithmic sample base (0 = linear scale)
%  (8 ...) empirical pdf must provide equal # of x then y values,
%            first four entries are ignored.
%  Provide distribution type
%  if (2) or empirical provide number of xy pairs
%  ie. below where 3 pairs are 1 2 3 4 5 6
%2 3
%1 0 0 99999 2 0 0 1 2 3 4 5 6
1
390  5 390 420 1 0 0
1
390 10 390 420 1 0 0
1
390 15 390 450 1 0 0
```

```
% time to retire 1 full train (min) (S,M,L)
%  (this prob never happens, keep as option)
%  (it would be the train with spray off already)
% One Row for each size designation (see LOCA bin definitions)
% random-variable definitions:
%  (1) first parameter (mean/geom mean/mean)
%  (2) second parameter (std dev/geom std dev) (zero sigma returns mean)
%  (3) lower limit
%  (4) upper limit
%  (5) library distribution (1/2/3 = normal/empirical/TBD ...)
%  (6) conservative direction (0/1 = low/hi)
%  (7) logarithmic sample base (0 = linear scale)
%  (8 ...) empirical pdf must provide equal # of x then y values,
%            first four entries are ignored.
%  Provide distribution type
%  if (2) or empirical provide number of xy pairs
%  ie. below where 3 pairs are 1 2 3 4 5 6
%2 3
%1 0 0 99999 2 0 0 1 2 3 4 5 6
1
99999 0 0 99999 1 0 0
1
99999 0 0 99999 1 0 0
1
99999 0 0 99999 1 0 0

% earliest time for chem prod (min) (S,M,L)
% One Row for each size designation (see LOCA bin definitions)
% random-variable definitions:
%  (1) first parameter (mean/geom mean/mean)
%  (2) second parameter (std dev/geom std dev) (zero sigma returns mean)
%  (3) lower limit
%  (4) upper limit
%  (5) library distribution (1/2/3 = normal/empirical/TBD ...)
%  (6) conservative direction (0/1 = low/hi)
%  (7) logarithmic sample base (0 = linear scale)
%  (8 ...) empirical pdf must provide equal # of x then y values,
%            first four entries are ignored.
%  Provide distribution type
%  if (2) or empirical provide number of xy pairs
%  ie. below where 3 pairs are 1 2 3 4 5 6
%2 3
%1 0 0 99999 2 0 0 1 2 3 4 5 6
1
0 0 0 99999 1 0 0
1
0 0 0 99999 1 0 0
1
0 0 0 99999 1 0 0

% time to hot leg injection (min) (S,M,L)
% One Row for each size designation (see LOCA bin definitions)
% random-variable definitions:
%  (1) first parameter (mean/geom mean/mean)
%  (2) second parameter (std dev/geom std dev) (zero sigma returns mean)
%  (3) lower limit
%  (4) upper limit
%  (5) library distribution (1/2/3 = normal/empirical/TBD ...)
%  (6) conservative direction (0/1 = low/hi)
%  (7) logarithmic sample base (0 = linear scale)
%  (8 ...) empirical pdf must provide equal # of x then y values,
%            first four entries are ignored.
%  Provide distribution type
%  if (2) or empirical provide number of xy pairs
%  ie. below where 3 pairs are 1 2 3 4 5 6
%2 3
%1 0 0 99999 2 0 0 1 2 3 4 5 6
2 2
```

```
360 0 345 360 2 0 0 345 360 0.5 0.5
2 2
360 0 345 360 2 0 0 345 360 0.5 0.5
2 2
360 0 345 360 2 0 0 345 360 0.5 0.5

%-------------------------------------------------------------------------
% Chemical Product Variables



% pool temp (degF) where chem prods form
% With statistics
% random-variable definitions:
%  (1) first parameter (mean/geom mean/mean)
%  (2) second parameter (std dev/geom std dev) (zero sigma returns mean)
%  (3) lower limit
%  (4) upper limit
%  (5) library distribution (1/2/3 = normal/empirical/TBD ...)
%  (6) conservative direction (0/1 = low/hi)
%  (7) logarithmic sample base (0 = linear scale)
%  (8 ...) empirical pdf must provide equal # of x then y values,
%           first four entries are ignored.
%  Provide distribution type
%  if (2) or empirical provide number of xy pairs
%  ie. below where 3 pairs are 1 2 3 4 5 6
%2 3
%1 0 0 99999 2 0 0 1 2 3 4 5 6
1
140 5 0 99999 1 0 0

%  bump factor for chems when t>=Tchem and T<=ChemTemp (S,M,L)
%  (spec mean as if min=0, but set min and max to shifted range)
%  (preselect mean and max to set desired tail prob in last sample pt)
% random-variable definitions:
%  (1) first parameter (mean/geom mean/mean)
%  (2) second parameter (std dev/geom std dev) (zero sigma returns mean)
%  (3) lower limit
%  (4) upper limit
%  (5) library distribution (1/2/3 = normal/empirical/TBD ...)
%  (6) conservative direction (0/1 = low/hi)
%  (7) logarithmic sample base (0 = linear scale)
%  (8 ...) empirical pdf must provide equal # of x then y values,
%           first four entries are ignored.
%  Provide distribution type
%  if (2) or empirical provide number of xy pairs
%  ie. below where 3 pairs are 1 2 3 4 5 6
%2 3
%1 0 0 99999 2 0 0 1 2 3 4 5 6
1
1.25 0.64 1 15.3 3 1 10              % truncated exponential
3 2
1.50 0.44444 1 18.2 3 1 10 1 2 0.5 0.5       % truncated exponential
3 2
2.00 0.25 1 24 3 1 10 1 10 1 0.5     % truncated exponential

%-------------------------------------------------------------------------
% thresholds of concern
%  (logical distribution functions. NOT part of sequence variability)
% random-variable definitions:
%  (1) first parameter (mean/geom mean/mean)
%  (2) second parameter (std dev/geom std dev) (zero sigma returns mean)
%  (3) lower limit
%  (4) upper limit
%  (5) library distribution (1/2/3 = normal/empirical/TBD ...)
%  (6) conservative direction (0/1 = low/hi)
%  (7) logarithmic sample base (0 = linear scale)
%  (8 ...) empirical pdf must provide equal # of x then y values,
%           first four entries are ignored.
```

```
%  Provide distribution type
%  if (2) or empirical provide number of xy pairs
%  ie. below where 3 pairs are 1 2 3 4 5 6
%2 3
%1 0 0 99999 2 0 0 1 2 3 4 5 6


% core blockage limit (g/FA) HL breaks
1
99999 0 0 0 1 0 0

% core blockage limit (g/FA) CL break
1
99999 0 0 0 1 0 0


% boron ppt limit (g/FA) for HL brk before HL inject
%   (should never fail by this mode)
1
99999 0 0 0 1 0 0

% boron ppt limit (g/FA) for CL brk before HL injection
1
7.5 0 0 0 1 0 0

% limit for strainer buckling (ft h2o)
1
9.35 0 0 0 1 0 0

% void fraction at pump inlet (@ train)
1
0.02 0 0 0 1 0 0

%-------------------------------------------------------------------------------------------
%Plant State Table Data

% Operable Trains
% Train X Pump Matrix

% three trains operable (Case 01)
%    lpsi      hpsi    spray
%      1         1       1 %A
%      1         1       1 %B
%      1         1       1 %C

% two trains operable (Case 22)
%    lpsi      hpsi    spray
%      1         1       1 %A
%      1         1       1 %B
%      0         0       0 %C

% one train operable (Case 43)
%    lpsi      hpsi    spray
%      1         1       1 %A
%      0         0       0 %B
%      0         0       0 %C

% two LHSI pumps failed (Case 09)
%    lpsi      hpsi    spray
      1         1       1 %A
      0         1       1 %B
      0         1       1 %C

% one train fail + one additional LHSI fail (Case 26)
%    lpsi      hpsi    spray
%      1         1       1 %A
%      0         1       1 %B
%      0         0       0 %C

% # reactor coolant pumps (in CAD)
```

```
4

% # pressurizers (in CAD)
1

% # RHR pumps (in CAD)
3

% # steam generators (in CAD)
4

% time increment for evaluation (min)
5


% misc debris area (ft^2) total in containment
1
100 0 0 99999 1 0 0
% fraction of misc debris overlap (arrives @ t0)
0.25

% thin-bed thickness (in)
0.0625

% clip ZOI with walls (1/0 = y/n)
1

% const fiber filtration eff in fuel
1.0

% strainer height (ft)
3.25

% containment rel humidity
1.00

% sump rel humidity
1.00

% # fuel assemblies
193

% inflation of delP before chem bump
1
5 1 1 10 1 0 0

%******Min Flow to Cool Core****************

%Number of time and flow rate points

30
% Time post SCRAM (hr)
% Must be equal to number of time and flow rate points

0.0028          0.0042          0.0056
0.0111          0.0167          0.0222
0.0278          0.0417          0.0556
0.1111          0.1667          0.2222
0.2778          0.4167          0.5556
1.1111          1.6667          2.2222
2.7778          4.1667          5.5556
11.1111         16.6667         22.2222
27.7778         41.6667         111.1111
166.6667        222.2222         277.7778


%% Flow Rate (gpm)
% Must be equal to number of time and flow rate points

1414.7000   1323.5000   1260.9000   1113.4000   1030.5000
```

```
973.3000    931.3000    859.3000    812.3000    711.0000
654.7000    614.2000    581.8000    523.1000    480.9000
388.1000    342.4000    315.1000    295.7000    265.1000
245.5000    204.2000    182.7000    168.7000    158.1000
139.8000    99.0000     84.1000     74.4000     67.7000

%**********Special Weld ***************
% single-case tracer (weld location name - from table)
% specialweld = '31-RC-1102-NSS-1.1';
% If special weld input select 1 else 0
0
% If 1 write weld name
% else leave blank


%   nominal pool volume (ft^3) and area (ft^2)
%  (uniform distribution between min and max pool volumes - S,M,L)
2 2
0 0 0 0 2 0 0 43464 61993 .5 .5 %SBLOCA
2 2
0 0 0 0 2 0 0 39533 69444 .5 .5 %MBLOCA
2 2
0 0 0 0 2 0 0 45201 69263 .5 .5 %LBLOCA


% Pool Area (ft^2)
12301

% clean strainer attributes
% clean area of ONE strainer (ft^2)
1.8185e+003
% clean area of one OLD strainer (ft^2)
%155.4

% max clean strainer head loss (ft h2o)
 0.22

% single pump runout volume rates (gpm) (S, M, L)
% high-pressure max injection rates
 1620
% low-pressure injection rate
 2800

% Containment Spray Rate (all states except Case 43)
2 2
0 0 1932 2350 2 0 0 1932 2350 0.5 0.5
2 2
0 0 1932 2350 2 0 0 1932 2350 0.5 0.5
2 2
0 0 1932 2350 2 0 0 1932 2350 0.5 0.5

% Containment Spray Rate (Case 43)
%2 2
%0 0 2080 2600 2 0 0 2080 2600 0.5 0.5
%2 2
%0 0 2080 2600 2 0 0 2080 2600 0.5 0.5
%2 2
%0 0 2080 2600 2 0 0 2080 2600 0.5 0.5


%-------------------------------------------------------------------------
% geometric loading table for a single train:
%   thickness x(in) and strainer area A(ft^2) as functions of debris volume
%   V(ft^3). see supplementary routine StrainerArea for geometry definition
%   and assumptions. must be single-valued functions. May be slight mismatch
%   in compression for thickness estimation between this table and delP routine,
%   but low flow rate indicates low fiber compression.
%     V(ft^3)        x(in)      A (ft^2)
```

```
% switch table on/off = 1/0, list length of table
% if 0 a flat approximation will be used
% for old strainers
1 28

% Table Values
% If Table off leave blank
0            0           1.8185e+003
8.1790e+001  5.0000e-001  4.1900e+002
8.1800e+001  5.0100e-001  4.1931e+002
2.8016e+002  8.1421e+000  4.4718e+002
4.7853e+002  1.5783e+001  5.9256e+002
6.7689e+002  2.3424e+001  7.4768e+002
8.7526e+002  3.1065e+001  9.1253e+002
1.0736e+003  3.8706e+001  1.0871e+003
1.2720e+003  4.6348e+001  1.2714e+003
1.4703e+003  5.3989e+001  1.4655e+003
1.6687e+003  6.1630e+001  1.6692e+003
1.8671e+003  6.9271e+001  1.8827e+003
2.0654e+003  7.6912e+001  2.1060e+003
2.2638e+003  8.4553e+001  2.3389e+003
2.4622e+003  9.2194e+001  2.5816e+003
2.6605e+003  9.9835e+001  2.8341e+003
2.8589e+003  1.0748e+002  3.0962e+003
3.0573e+003  1.1512e+002  3.3681e+003
3.2556e+003  1.2276e+002  3.6497e+003
3.4540e+003  1.3040e+002  3.9411e+003
3.6524e+003  1.3804e+002  4.2422e+003
3.8507e+003  1.4568e+002  4.5530e+003
4.0491e+003  1.5332e+002  4.8735e+003
4.2474e+003  1.6096e+002  5.2038e+003
4.4458e+003  1.6860e+002  5.5438e+003
4.6442e+003  1.7625e+002  5.8935e+003
4.8425e+003  1.8389e+002  6.2530e+003
5.0409e+003  1.9153e+002  6.6222e+003

%-------------------------------------------------------------------
% initiating event frequency and bounded Johnson fit
%    NUREG-1829 current-day exceedance frequencies (without SG breaks)
%      (# breaks/cal yr of sizes > x)
%    Interpolated values for LOCA bins MUST be consistent with LOCAbins def
%    UT Austin fit of epistemic envelope using bounded Johnson pdf.
%      Parameters MUST be listed in column order (gamma,delta,xi,lamda)
% each row varies by size, each column varies by %ile (then transposed)

% Break Frequency Table Name
"Present-Day Exceedance Frequency"

% Break Sizes in Ascending Order
% These are fixed values
% For Documentation Purpose only
0.5 1.625 2 3 6 7 14 31

% Frequency Table
% These are fixed values
% For Documentation Purpose only
% Break Size X Percentile
6.8e-5 5.0e-6 3.69e-6 2.1e-7 6.30e-8 1.4e-8 4.1e-10 3.5e-11  % 5th %ile
6.3e-4 8.9e-5 6.57e-5 3.4e-6 1.08e-6 3.1e-7 1.2e-08 1.2e-09  % 50th %ile
1.9e-3 4.2e-4 3.10e-4 1.6e-5 5.20e-6 1.6e-6 2.0e-07 2.9e-08  % mean
7.1e-3 1.6e-3 1.18e-3 6.1e-5 1.98e-5 6.1e-6 5.8e-07 8.1e-08  % 95th %ile

% Table Percentile Values
0.05 0.5 NaN 0.95 % Don't Use Mean for Fitting

% Johnson Parameters
% These are fixed values
% For Documentation Purpose only
% gamma        delta          xi             lambda
1.650950E+00   5.256964E-01   4.117000E-05   1.420000E-02
```

```
1.646304E+00   4.593913E-01   2.530000E-06   3.200000E-03
1.646308E+00   4.593851E-01   1.870000E-06   2.360550E-03
1.646605E+00   4.589467E-01   1.200000E-07   1.220000E-04
1.646403E+00   4.566256E-01   3.000000E-08   3.965000E-05
1.645739E+00   4.487957E-01   6.023625E-09   1.220000E-05
1.645211E+00   3.587840E-01   2.892430E-10   1.160000E-06
1.645072E+00   3.343493E-01   2.636770E-11   1.600000E-07

%-------------------------------------------------------------------------------
% Strainer-Test Penetration Parameters

% area of test module (ft^2)
91.44

%  fraction of sheddable debris
%  (uniform empirical) - (unitless)
2 2
0 0 0 0 2 0 0 0.00956 0.0272 0.5 0.5


% shedding rate (1/min)
%  (uniform empirical)
2 2
0 0 0 0 2 0 0 0.008236 0.0546 0.5 0.5

% filter efficiency per g (slope)
%  (uniform empirical)
2 2
0 0 0 0 2 0 0  0.000339 0.003723 0.5 0.5

% filter fit cut point (g)
%  (uniform empirical)
2 2
0 0 0 0 2 0 0 790 880 0.5 0.5


% initial filter eff (intercept)
%  (uniform empirical)
2 2
0 0 0 0 2 0 0 0.656 0.706 0.5 0.5

% filter efficiency match pt
%  (set equal to 1.0 always)
1
1 0 0 0 1 0 0

% filter exp rate const (1/g)
%  (bimodal empirical)
2 3
0 0 0 0 2 1 0 0.0011254 0.0013078 0.031787 0.10000 0.45000 0.1000

%-------------------------------------------------------------------------------
% Debris Transport Factors
%  (enter conservative values here, random variables populated below)



%  ZOI-generated debris
%    (LDFG fines, LDFG small, LDFG large, uTherm fines, qual coat fines, crud fines)
%    (columns must ALWAYS be defined in this order left to right)
%    (rows must ALWAYS be defined in this order top to bottom)
%    (present values from Vol 3 for SG compartment break)

%    these factors were used for Full Batch 2

0.70 0.60 0.22 0.70 0.70 0.70     %F_BD_upr
0.30 0.25 0.00 0.30 0.30 0.30     %F_BD_lwr
0.53 0.27 0.00 0.53 0.53 0.53     %F_WD_UCin
0.47 0.19 0.00 0.47 0.47 0.47     %F_WD_UCan
```

```
0.00 0.27 0.00 0.00 0.00 0.00     %F_WD_BCin
0.00 0.00 0.00 0.00 0.00 0.00     %F_WD_BCan
0.02 0.00 0.00 0.02 0.02 0.02     %F_PF_sump
0.05 0.00 0.00 0.05 0.05 0.05     %F_PF_nact
1.00 0.64 0.00 1.00 1.00 1.00     %F_Rcrc_lwr
1.00 0.64 0.00 1.00 1.00 1.00     %F_Rcrc_WDin
1.00 0.58 0.00 1.00 1.00 1.00     %F_Rcrc_WDan
0.00 0.01 0.01 0.00 0.00 0.00     %F_Ersn_spry
0.00 0.07 0.07 0.00 0.00 0.00     %F_Ersn_pool


%  Unqualified coatings outside ZOI
%    (epoxy fines, epoxy fine chips, epoxy small chips, epoxy large chips,
%                                epoxy curls, alkyd, baked enamel, IOZ fines)
%    (columns must ALWAYS be defined in this order left to right)
%    (rows must ALWAYS be defined in this order top to bottom)
%    (present values from Vol 3 for MB/LBLOCA in SG compartment)

1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00   % F_fail
0.15 0.15 0.15 0.15 0.15 0.54 0.00 0.83   % F_upr
0.02 0.02 0.02 0.02 0.02 0.46 1.00 0.17   % F_lwr
0.83 0.83 0.83 0.83 0.83 0.00 0.00 0.00   % F_Rx
0.06 0.06 0.06 0.06 0.06 0.06 0.00 0.06   % F_spry
1.00 0.41 0.00 0.00 1.00 1.00 1.00 1.00   % F_rcrc
0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00   % F_Rxrcrc


% Latent Debris
%   (particulate, fiber)
%    (columns must ALWAYS be defined in this order left to right)
%    (rows must ALWAYS be defined in this order top to bottom)
%    (present values from Vol 3 for SG compartment)

0.00 0.00        %F_BD_upr       (1)
1.00 1.00        %F_BD_lwr       (2)
1.00 1.00        %F_WD           (3)
0.02 0.02        %F_PF_sump      (4)
0.05 0.05        %F_PF_nact      (5)
1.00 1.00        %F_Rcrc_lwr     (6)

%-------------------------------------------------------------------------------
%Time and Temperature Data

%Number of Time and Temperature Data Points
162


% time vector (hr) for small-break temperature profile
%  (FIRST entry is assumed 2B@ t=0. constant-value extrapolation imposed.
%  (time dependent temps ARE currently used in calc, one history for each LOCA)

% time vector (hour) for small (and medium) breaks

0.0000  0.0847  0.0864  0.0881  0.0897  0.0914  0.0931  0.0947
0.0964 0.0981  0.0997  0.1014  0.1031  0.1047  0.1064  0.1081
0.1097 0.1139  0.1306  0.1472  0.1639  0.1806  0.1972  0.2139
0.2306 0.2472  0.2639  0.2806  0.2972  0.3139  0.3306  0.3472
0.3639 0.3806  0.3972  0.4139  0.4306  0.4472  0.4639  0.4806
0.4972 0.5139  0.5306  0.5472  0.5639  0.5806  0.5972  0.6139
0.6306 0.6472  0.6639  0.6806  0.6972  0.7139  0.7306  0.7472
0.7639 0.7806  0.7972  0.8139  0.8306  0.8472  0.8639  0.8806
0.8972 0.9139  0.9306  0.9472  0.9639  0.9806  0.9972  1.0139
1.0306 1.0472  1.0639  1.0806  1.3611  1.6944  2.0278  2.3611
2.6944 3.0278  3.3611  3.6944  4.0278  4.3611  4.6944  5.0278
5.3611 5.6944  6.0278  6.3611  6.6944  7.0278  7.3611  7.6944
8.0278 8.3611  8.6944  9.0278  9.3611  9.6944  10.0278 20.0833
32.0833    44.0833 56.0833 68.0833 80.0833 92.0833 104.0833
116.0833   128.0833    140.0833    152.0833    164.0833
176.0833   188.0833    200.0833    212.0833    224.0833
236.0833   248.0833    260.0833    272.0833    283.3333
```

```
297.2222   308.3333    319.4444    333.3333    344.4444
355.5556   369.4444    380.5556    391.6667    402.7778
416.6667   427.7778    438.8889    452.7778    463.8889
475.0000   488.8889    500.0000    511.1111    525.0000
536.1111   547.2222    561.1111    572.2222    583.3333
597.2222   608.3333    619.4444    633.3333    644.4444
655.5556   669.4444    680.5556    691.6667    702.7778
716.6667

% temperature(F) profile for small (and medium) breaks
119.6000    131.2987    140.1689    150.3314    156.1240
159.2343    162.1567    164.5680    166.6937    168.5685
170.2457    171.7175    172.9577    174.0415    174.9570
175.7084    176.3081    177.5299    164.4935    132.7076
124.0848    123.6914    123.5988    123.5641    123.5529
124.4938    127.6399    129.7484    131.0391    149.8002
158.2393    162.7694    165.4960    167.3851    168.6688
169.7687    170.9814    171.9993    172.8771    173.7150
174.4595    175.0903    175.6074    176.0061    176.2923
176.4625    176.4855    176.3916    176.2055    175.9468
175.6184    175.2411    174.8243    174.3902    173.9374
173.4284    172.8459    172.2319    171.6143    171.0143
170.4548    169.9507    169.5034    169.1086    168.7661
168.4824    168.2551    168.0847    167.9707    167.9020
167.8705    167.8665    167.8947    167.9451    168.0131
168.0978    170.0607    170.9606    171.4105    170.8721
169.8110    168.7942    168.1132    165.3090    164.1228
163.0112    161.4436    159.9385    158.1298    158.4517
156.5706    151.6937    163.7090    160.9624    158.1118
156.1579    154.6151    153.2333    151.9641    150.8191
149.7667    148.7924    147.8649    136.2080    129.0230
124.9790    122.1450    120.1310    118.4710    117.3160
116.4980    115.6160    114.7100    113.8960    113.1730
112.5210    111.9240    111.3580    110.8590    110.3930
109.9930    109.5770    109.2090    108.9100    108.5930
108.2810    107.9680    107.7100    107.4730    107.1620
106.9430    106.7150    106.4770    106.2500    106.1240
105.8930    105.6660    105.5410    105.3160    105.1930
105.0690    104.8440    104.7250    104.6070    104.3770
104.3660    104.1400    104.0230    103.9050    103.7910
103.6730    103.5660    103.4520    103.3350    103.1450
103.1000    102.9130    102.8680    102.6810    102.6450
102.5250    102.5160


% time vector (hr) for medium (and small) break temperature profile
%  (FIRST entry is assumed 2E@ t=0. constant-value extrapolation imposed.
0.0000  0.0847  0.0864  0.0881  0.0897  0.0914  0.0931  0.0947
0.0964 0.0981  0.0997  0.1014  0.1031  0.1047  0.1064  0.1081
0.1097 0.1139  0.1306  0.1472  0.1639  0.1806  0.1972  0.2139
0.2306 0.2472  0.2639  0.2806  0.2972  0.3139  0.3306  0.3472
0.3639 0.3806  0.3972  0.4139  0.4306  0.4472  0.4639  0.4806
0.4972 0.5139  0.5306  0.5472  0.5639  0.5806  0.5972  0.6139
0.6306 0.6472  0.6639  0.6806  0.6972  0.7139  0.7306  0.7472
0.7639 0.7806  0.7972  0.8139  0.8306  0.8472  0.8639  0.8806
0.8972 0.9139  0.9306  0.9472  0.9639  0.9806  0.9972  1.0139
1.0306 1.0472  1.0639  1.0806  1.3611  1.6944  2.0278  2.3611
2.6944 3.0278  3.3611  3.6944  4.0278  4.3611  4.6944  5.0278
5.3611 5.6944  6.0278  6.3611  6.6944  7.0278  7.3611  7.6944
8.0278 8.3611  8.6944  9.0278  9.3611  9.6944  10.0278 20.0833
32.0833    44.0833 56.0833 68.0833 80.0833 92.0833 104.0833
116.0833   128.0833    140.0833    152.0833    164.0833
176.0833   188.0833    200.0833    212.0833    224.0833
236.0833   248.0833    260.0833    272.0833    283.3333
297.2222   308.3333    319.4444    333.3333    344.4444
355.5556   369.4444    380.5556    391.6667    402.7778
416.6667   427.7778    438.8889    452.7778    463.8889
475.0000   488.8889    500.0000    511.1111    525.0000
536.1111   547.2222    561.1111    572.2222    583.3333
597.2222   608.3333    619.4444    633.3333    644.4444
```

```
655.5556   669.4444    680.5556    691.6667    702.7778
716.6667


% Temperature(F) profile for medium breaks
119.6000    131.2987    140.1689    150.3314    156.1240
159.2343    162.1567    164.5680    166.6937    168.5685
170.2457    171.7175    172.9577    174.0415    174.9570
175.7084    176.3081    177.5299    164.4935    132.7076
124.0848    123.6914    123.5988    123.5641    123.5529
124.4938    127.6399    129.7484    131.0391    149.8002
158.2393    162.7694    165.4960    167.3851    168.6688
169.7687    170.9814    171.9993    172.8771    173.7150
174.4595    175.0903    175.6074    176.0061    176.2923
176.4625    176.4855    176.3916    176.2055    175.9468
175.6184    175.2411    174.8243    174.3902    173.9374
173.4284    172.8459    172.2319    171.6143    171.0143
170.4548    169.9507    169.5034    169.1086    168.7661
168.4824    168.2551    168.0847    167.9707    167.9020
167.8705    167.8665    167.8947    167.9451    168.0131
168.0978    170.0607    170.9606    171.4105    170.8721
169.8110    168.7942    168.1132    165.3090    164.1228
163.0112    161.4436    159.9385    158.1298    158.4517
156.5706    151.6937    163.7090    160.9624    158.1118
156.1579    154.6151    153.2333    151.9641    150.8191
149.7667    148.7924    147.8649    136.2080    129.0230
124.9790    122.1450    120.1310    118.4710    117.3160
116.4980    115.6160    114.7100    113.8960    113.1730
112.5210    111.9240    111.3580    110.8590    110.3930
109.9930    109.5770    109.2090    108.9100    108.5930
108.2810    107.9680    107.7100    107.4730    107.1620
106.9430    106.7150    106.4770    106.2500    106.1240
105.8930    105.6660    105.5410    105.3160    105.1930
105.0690    104.8440    104.7250    104.6070    104.3770
104.3660    104.1400    104.0230    103.9050    103.7910
103.6730    103.5660    103.4520    103.3350    103.1450
103.1000    102.9130    102.8680    102.6810    102.6450
102.5250    102.5160


% time vector (hr) for large breaks
0.0000   0.0847  0.0864  0.0881  0.0897  0.0914  0.0931  0.0947
0.0964  0.0981  0.0997  0.1014  0.1031  0.1047  0.1064  0.1081  0.1097
0.1139  0.1306  0.1472  0.1639  0.1806  0.1972  0.2139  0.2306  0.2472
0.2639  0.2806  0.2972  0.3139  0.3306  0.3472  0.3639  0.3806  0.3972
0.4139  0.4306  0.4472  0.4639  0.4806  0.4972  0.5139  0.5306  0.5472
0.5639  0.5806  0.5972  0.6139  0.6306  0.6472  0.6639  0.6806  0.6972
0.7139  0.7306  0.7472  0.7639  0.7806  0.7972  0.8139  0.8306  0.8472
0.8639  0.8806  0.8972  0.9139  0.9306  0.9472  0.9639  0.9806  0.9972
1.0139  1.0306  1.0472  1.0639  1.0806  1.3611  1.6944  2.0278  2.3611
2.6944  3.0278  3.3611  3.6944  4.0278  4.3611  4.6944  5.0278  5.3611
5.6944  6.0278  6.3611  6.6944  7.0278  7.3611  7.6944  8.0278  8.3611
8.6944  9.0278  9.3611  9.6944  10.0278 20.0833 32.0833 44.0833 56.0833
68.0833 80.0833 92.0833 104.0833    116.0833    128.0833    140.0833
152.0833    164.0833    176.0833    188.0833    200.0833    212.0833
224.0833    236.0833    248.0833    260.0833    272.0833    283.3333
297.2222    308.3333    319.4444    333.3333    344.4444    355.5556
369.4444    380.5556    391.6667    402.7778    416.6667    427.7778
438.8889    452.7778    463.8889    475.0000    488.8889    500.0000
511.1111    525.0000    536.1111    547.2222    561.1111    572.2222
583.3333    597.2222    608.3333    619.4444    633.3333    644.4444
655.5556    669.4444    680.5556    691.6667    702.7778    716.6667

% Temperature (F) profile for large breaks
119.8113 213.9295    242.3104    255.0268    255.7907    253.1617
252.9372    252.5390    251.9023    250.9733    249.7169    245.8894
235.9856    224.0051    212.9495    203.5499    195.7225    179.5894
199.8048    174.8143    174.8276    177.3518    180.7405    183.2333
185.1644    186.4925    187.2579    187.8270    188.1924    188.4266
188.5605    188.5934    188.5042    188.3375    189.3187    189.7570
```

```
189.0923    188.5202    188.0148    187.5621    187.4103    187.0671
186.7330    186.4249    186.1559    186.7640    186.5012    186.2557
186.0555    185.9119    185.8265    185.8062    185.8495    185.9526
186.1092    187.8900    187.9673    187.9196    187.9119    187.9385
187.9954    188.0710    188.1647    188.2538    188.3385    188.4003
189.0996    188.9199    188.7439    188.5614    188.3622    188.1314
187.8597    187.5387    187.1667    186.7559    178.4091    171.8762
166.5421    162.2238    158.1410    154.9818    151.7673    148.9234
146.0834    143.7967    141.6054    139.5251    137.9892    136.4819
134.8865    136.9000    136.6489    135.3569    134.3103    133.2941
132.4453    131.9467    132.0536    132.1915    131.3055    130.7946
130.2765    123.0489    118.1991    114.9095    112.4170    110.4096
108.7290    107.2834    106.0152    104.8855    103.8671    102.9399
102.0890    101.3027    100.5720    99.8894 99.2491 98.6461 98.0763
97.5362 97.0229 96.5339 96.0669 95.6474 95.1520 94.7720 94.4055
93.9649 93.6254 93.2967 92.9000 92.5932 92.2953 92.0057 91.6547
91.3822 91.1168 90.7942 90.5432 90.2982 89.9998 89.7671 89.5396
89.2620 89.0452 88.8328 88.5733 88.3703 88.1712 87.9276 87.7368
87.5494 87.3198 87.1398 86.9628 86.7457 86.5753 86.4076 86.2427
86.0401

%-------------------------------------------------------------------------------
% NPSH parameters:
%   (specify any # of pipe segments in common header)
%
% major HL variables

% absolute roughness of the pipe (ft)
0.00015

% Number of Pipe Segments
6

% pipe diameters (ft)
1.27 .99 1.27 .84 1.27 .99

% pipe lengths (ft)
66.96 25.41 12.00 25.46 11.50 24.91

% depth of common header (ft)
25.83 25.65 25.83 % LPSI, HPSI, SPRY

% NPSH required for each pump (ft water)
12 12 12        % LPSI, HPSI, SPRY

% minor HL variables
%  # of elbows, tees, entrances, and branches per pipe segment
%    [(# of 90 degree) (# of 45 degree) (# of gate valves)(# of entrances)(# of
%     tee runs) (# of tee branches)]

4 2 1 1 0 0    % segment AB
3 0 0 0 0 1    % segment BC
0 0 0 0 1 0    % segment BD
3 0 0 0 0 1    % segment DE
0 0 0 0 1 0    % segment DF
3 0 0 0 0 1    % segment FG

%-------------------------------------------------------------------------------
% Newly Added Options

% Use Old Degas Routine? (0 = No, 1 = Yes)
0

% Use Old NPSH Routine? (0 = No, 1 = Yes)
0

% Use Old SI Pump Flow Equation? (0 = No, 1 = Yes)
0

% Use Old Strainer Properties? (0 = No, 1 = Yes)
```

```
0

% Use Common Random Numbers Across Frequency Replications? (0 = No, 1 = Yes)
0

% Enable All Plots? (0 = No, 1 = Yes)
1

% Enable Parallel Calculations (0 = No, 1 = Yes)
% CAUTION - USE ONLY IF YOUR KNOW YOUR PC MEETS SPECIFICATIONS!!!!!
0

% Number of Parallel Threads
4

% Use Optimal Frequency Bins for 15 Freps (0 = No, 1 = Yes)
1

% Use Old Debris Source Rate (Before Error Correction)? (0 = No, 1 = Yes)
1

% Use Old Latent Debris Transport Equations (Before Error Correction)? (0 = No, 1 = Yes)
1
```

Attachment 9

STP CASA Grande Information (Non-Proprietary Version)

CASA22 JT4

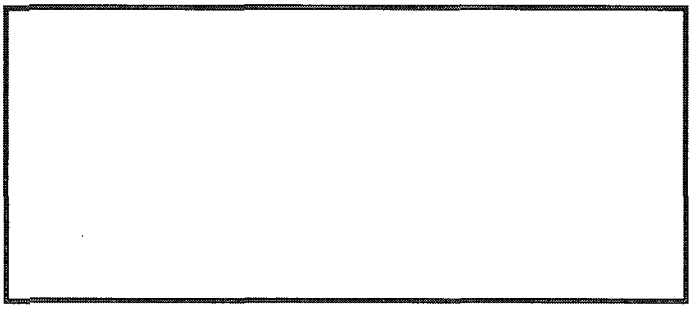
Contains No Proprietary Information
Alion Science and Technology

```
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
%LANLANLANLANLANLANLANLANLANLANLANLANLANLANLANLANLANLANLANANLANLANLANLANLA%
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%

% Define Case Folders (Main Project Folder)
"C:\Demo Plant"

% Define Working Folders

% Analysis Folder (~/.../Case/Analysis)
"Analytic Results"

% Run Subfolder (~/.../Case/Analysis/run)
"Tornado"

% Run Sub_Subfolder (~/.../Case/Analysis/run/run_sub)
"SIMCON"

% Run Sub_Sub_Subfolder (~/.../Case/Analysis/run/run_sub/run_sub_sub)
"Delta Pump Case 22 Shuffle"

% CAD Folder Name (~/.../Case/CAD)
"CAD Files"

% Concrete Sub-Folder (~/.../Case/CAD/Concrete)
"Concrete Data"

% Equipment Sub-Folder (~/.../Case/CAD/Equipment)
"Equip Data"

% Grating Sub-Folder (~/.../Case/CAD/Grating)
"Grating Data"

% Pipe Sub-Folder (~/.../Case/CAD/Pipes)
"Pipe Data"

% Fequency Folder (~/.../Case/Frequency)
"Freq Data"

% Break Frequency (~/.../Case/Frequency/Break)
"LOCA Frequency and Weld Inputs - 12-7-12 R1.xlsx"

% Break Fequency Table (~/.../Case/Frequency/Break/Table)
"LOCA Data"

% Weld Case File (~/.../Case/Frequency/Weld)
"LOCA Frequency and Weld Inputs - 12-7-12 R1.xlsx"

% Weld Case Table (~/.../Case/Frequency/Weld/Table)
"Weld Table"
%---------------------------------------------------------------
% multiplicative spatial unit conversions
% rectify all CAD elements for consistency
% applied to ALL length units within each CAD file

% Concrete Multiplier
1.0

% Equipment Multiplier
1.0

% Grating Multiplier
1.0

% Pipe Multiplier

1.0
%------------------------------------------------------------------
```

```
%  LOCA bin definitions
%  (units consistent with freq dists and CAD data)

% List Number of Defined Break Size Limits
% ie. SB,MB,LB (3 designations)
% However more sizes are allowable
 3

% List Sizes
0.5   2.0   6.0

%-------------------------------------------------------------------

% CAD and Plotting Options (1/0 = Y/N)

% Show CAD Reproduction
0

% Show Concrete and Gratings
0

% Produce Intro Movie and Stop
0

% Debris Passage Correlation
0

% Sample Flow Rates
0

% Random Input Distributions
0

% ZOI Radial Inflation Factor(Plotting Only)
50

% ZOI Plotting Interval (# of breaks between plots)
25

%-------------------------------------------------------------------------
%   spatial resolution for discretizing insulation
%   (must repeat weld target sort if these are changed. delete all master
%   files and rerun with new delL and Nangbin)

% Linear Resolution (in.)
6

%Azimuthal Bins in 2 Pi Radians on Pipes
12

%-------------------------------------------------------------------------
% Head Loss Option
% porosity calc (1/2 = vol / mass weighting)
% (vol weighting was found to be more conservative)
1
%-------------------------------------------------------------------------
% Synonyms tables for nonstandard welds, hangars and valves and Equipment

% Number of Valve synonyms
5
% Valve Synonyms
Valve VALVE MOV XRH FCV

% Number of Hangar Labels
14
% Hangar Synonyms
Hangar Hanger HL AF GU SS SH RR PH
"Work Point" "work point" "Work point" "work Point" "WORK POINT"

% Number of Weld Synonyms
```

```
4

% Weld Synonyms
FW Weld WELD FS

% Number of Steam Generator Synonyms
2

% Steam Generator Synonyms
SG SteamGenerator

% Number of Reactor Coolant Pump Synonyms
2

% Reactor Coolant Pump Synonyms
RCP ReactorCoolantPump

% Number of Pressurizer Synonyms
3

% Pressurizer Synonyms
PZR PRZR Pressurizer

% Number of RHR Synonyms
2

% RHR Synonyms
RHR ResidualHeatRemoval

%-------------------------------------------------------------------------------
%Statistics Sampling Options

%Sampling Method
% (0/1/2/3 = CASA default / MatLab default / shuffle / read file)
2


%If Option 3 specified, set file name in case folder below
%If not LEAVE BLANK



% max # LHS bins in LLOCA for max DEGB (DEGB counts as 1)
% Nmaxbrk =  2 => 2044 total breaks
% Nmaxbrk =  3 => 2100 total breaks
% Nmaxbrk =  5 => 2250 total breaks
% Nmaxbrk = 10 => 3070 total breaks
5

% # LHS replicates (batches) for each frequency CCDF
20

% # epistemic freq envelope samples
% current models process ~110 cases per minute
15

% logarithmic base for sampling epistemic frequency envelope
2


% lower limit of highest epistemic frequency bin
0.99



% # interpolation pts in each break freq ccdf
1000


% logarithmic base for sampling break size
```

```
%  (double check routine before changing this from base 10)
10


%-----------------------------------------------------------------------
%Insulation Characteristics

% Number of Low Density Fiberglass Zones
3
```



Redacted

```
% Number of Debris Types
8

% Debris Types
NUKON   NUKON_2 MICROTHERM RMI LEAD    "THERMAL WRAP" IOZ     ALKYD

%Debris treated as LDFG
% 1/0 --> yes/no
1 1 0 0 0 1 0 0

%Debris treated as microtherm
% 1/0 --> yes/no
0 0 1 0 0 0 0 0

% Damage Radii with statistics definitions
% Material X Statistics
% random-variable definitions:
%  (1) first parameter (mean/geom mean/mean)
%  (2) second parameter (std dev/geom std dev) (zero sigma returns mean)
%  (3) lower limit
%  (4) upper limit
%  (5) library distribution (1/2/3 = normal/empirical/TBD ...)
%  (6) conservative direction (0/1 = low/hi)
%  (7) logarithmic sample base (0 = linear scale)
%  (8 ...) empirical pdf must provide equal # of x then y values,
%           first four entries are ignored.
%  Provide distribution type
%  if (2) or empirical provide number of xy pairs
%  ie. below where 3 pairs are 1 2 3 4 5 6
%2 3
%1 0 0 99999 2 0 0 1 2 3 4 5 6
1
17 0 0 99999 1 0 0
1
17 0 0 99999 1 0 0
1
28.6 0 0 99999 1 0 0
1
1 0 0 99999 1 0 0
1
1 0 0 99999 1 0 0
1
17 0 0 99999 1 0 0
1
1 0 0 99999 1 0 0
1
1 0 0 99999 1 0 0
```

```
%-------------------------------------------------------------------------
%  Debris Properties Table

%  (denote particulate/fiber = sphere/cylinder = 1/2)
%  (do NOT add to or reorder this list unless code is modified)
%  (inventory of fibers with cylindrical geom must be given in ft^3)
%  (can 'fake' the diameter to match a given Sv using std geom formulas)
%  (inventory of particulates with spherical geom must be given in lbm)
%  (this list MUST include every debris type of interest)
%  (if unknown, set "manufactured" density of particulate to ~20% of Rho_mat)
%       (based on comparison of FeO2 to BWR sludge compaction density)

               %'label'      DebrisPropi       'Geom'    'Diam' 'Rho_mat'  'Rho_mfc'
% native units                          'sph,cyl' 'um'    'lbm/ft^3' 'lbm/ft^3'
% calc units                            'sph,cyl' 'm'     'kg/m^3'   'kg/m^3'
              "LDFG - fines"          2         7       175        2.4
               "LDFG - small"           2         7       175        2.4
               "LDFG - large"           2         7       175        2.4
               "uTherm - filaments"     2         6       165        2.4
               "uTherm - SiO2"          1         2.5     137        27.4
               "uTherm - TiO2"          1         20      262        52.4
               "QualCoat - epoxy"       1         10      94         36.66
               "QualCoat - IOZ"         1         10      208        81.12
               "Crud"                   1         15      350        70.0
               "UQCoat - epoxyfine"     1         152     124        48.36
               "UQCoat - epoxyFchp"     1         1143    124        48.36
               "UQCoat - epoxySchp"     1         1143    124        48.36
               "UQCoat - epoxyLchp"     1         1143    124        48.36
               "UQCoat - epoxyCrls"     1         1143    124        48.36
               "UnQualCoat - alkyd"     1         10      207        80.73
               "UnQualCoat - enamel"    1         10      93         36.27
               "UnQualCoat - IOZ"       1         10      244        95.16
               "Latent - particulate"   1         17.3    169        33.80
               "Latent - fiber"         2         7       175        2.4

%-------------------------------------------------------------------------------------------------
% microTherm constituents (low density concrete with fiber binder)
% mfc'd density (lbm/ft3)
15.0

% mass fraction filamentsflf_read
0.03

% mass fraction of SiO2
0.58

% mass fraction of TiO2
0.39

% debris type start and stop times (min after break)
%   (rate assumed to be uniform from Tstart to Tend)
%   (rate calc uses inventories defined above)
%   (introduce "instant" sources over 1 delT)
%   (debris from UQCoat cannot have Tstartsrc=0)
%   (timing is presently independent of break size)

%   Start Times
0       0       0       0       0       0       0       0       0       10
10      10      10      10      10      10      10      0       0

%   Stop Times
10      10      10      10      10      10      10      10      10      2160
2160    2160    2160    2160    2160    2160    2160    10      10

%-------------------------------------------------------------------------------------------------
%  Noninsulation Debris Quantities

% random-variable definitions:
%  (1) first parameter (mean/geom mean/mean)
%  (2) second parameter (std dev/geom std dev) (zero sigma returns mean)
```

Diameters of SiO2 and TiO2 are improperly reversed

```
%  (3) lower limit
%  (4) upper limit
%  (5) library distribution (1/2/3 = normal/empirical/TBD ...)
%  (6) conservative direction (0/1 = low/hi)
%  (7) logarithmic sample base (0 = linear scale)
%  (8 ...) empirical pdf must provide equal # of x then y values,
%           first four entries are ignored.
%  Provide distribution type
%  if (2) or empirical provide number of xy pairs
%  ie. below where 3 pairs are 1 2 3 4 5 6
%2 3
%1 0 0 99999 2 0 0 1 2 3 4 5 6

% qual epoxy in ZOI (lbm)
1
105 0 0 99999 1 0 0

% qual IOZ in ZOI (lbm)
1
39 0 0 99999 1 0 0

% crud fines (lbm)
1
24 0 0 99999 1 0 0

% unqual epoxy fine (lbm)
%   (uniform dist
2 2
234 0 117 234 2 0 0 117 234 0.5 0.5


% unqual epoxy fine chip (lbm)
%   (uniform dist)
2 2
709 0 355 709 2 0 0 355 709 0.5 0.5

% unqual epoxy small chip (lbm)
%   (uniform dist)
2 2
180 0 90 180 2 0 0 90 180 0.5 0.5

% unqual epoxy large chip (lbm)
%   (uniform dist)
2 2
391 0 196 391 2 0 0 196 391 0.5 0.5


% unqual epoxy curls (lbm)
%   (uniform dist)
2 2
391 0 196 391 2 0 0 196 391 0.5 0.5

% unqual alkyd (lbm)
1
271 0 0 99999 1 0 0

% unqual enamel (lbm)
1
267 0 0 99999 1 0 0

% unqual IOZ (lbm)
1
369 0 0 99999 1 0 0

% latent pariculate (lbm)
1
170 0 0 99999 1 0 0

% latent fiber (ft^3)
1
```

```
12.5 0 0 99999 1 0 0

%-------------------------------------------------------------------------
%   Time points along accident progression
%   (assume all trains of injection on initially, w/spray on setpoint trip)
%   (assume HPSI and LPSI both run, but LPSI flow negligible until depress)
%   (1 of 3 spray pumps can be turned off, all HPSI can be turned off for M,L)
%   (for degraded condition with < max trains, DON'T exercise any options)


% max time of interest (hr)
36

%******Recirculation Times******
%Number of break sizes for recirc table
7

%Recirc Time Table
1.5 2 4 6 8 12 27.5    %Break Size (in.)
337 79 56 44 38 31 30  %Time to recirc (min)

%******Other LOCA Times**********
% time to ONE spray pump off (min) (S,M,L)
% (if 0.0, NO spray pumps run)
% With Statistics
% One Row for each size designation (see LOCA bin definitions)
% random-variable definitions:
%  (1) first parameter (mean/geom mean/mean)
%  (2) second parameter (std dev/geom std dev) (zero sigma returns mean)
%  (3) lower limit
%  (4) upper limit
%  (5) library distribution (1/2/3 = normal/empirical/TBD ...)
%  (6) conservative direction (0/1 = low/hi)
%  (7) logarithmic sample base (0 = linear scale)
%  (8 ...) empirical pdf must provide equal # of x then y values,
%            first four entries are ignored.
%  Provide distribution type
%  if (2) or empirical provide number of xy pairs
%  ie. below where 3 pairs are 1 2 3 4 5 6
%2 3
%1 0 0 99999 2 0 0 1 2 3 4 5 6
 1
 0      0       0       99999   1       0       0
 1
 20     5       0       99999   1       0       0
 1
 20     5       0       99999   1       0       0

% time to ALL spray pumps off (min) (S,M,L)
% One Row for each size designation (see LOCA bin definitions)
% random-variable definitions:
%  (1) first parameter (mean/geom mean/mean)
%  (2) second parameter (std dev/geom std dev) (zero sigma returns mean)
%  (3) lower limit
%  (4) upper limit
%  (5) library distribution (1/2/3 = normal/empirical/TBD ...)
%  (6) conservative direction (0/1 = low/hi)
%  (7) logarithmic sample base (0 = linear scale)
%  (8 ...) empirical pdf must provide equal # of x then y values,
%            first four entries are ignored.
%  Provide distribution type
%  if (2) or empirical provide number of xy pairs
%  ie. below where 3 pairs are 1 2 3 4 5 6
%2 3
%1 0 0 99999 2 0 0 1 2 3 4 5 6
1
390  5 390 420 1 0 0
1
390 10 390 420 1 0 0
1
```

```
390 15 390 450 1 0 0


% time to retire 1 full train (min) (S,M,L)
%  (this prob never happens, keep as option)
%  (it would be the train with spray off already)
% One Row for each size designation (see LOCA bin definitions)
% random-variable definitions:
%  (1) first parameter (mean/geom mean/mean)
%  (2) second parameter (std dev/geom std dev) (zero sigma returns mean)
%  (3) lower limit
%  (4) upper limit
%  (5) library distribution (1/2/3 = normal/empirical/TBD ...)
%  (6) conservative direction (0/1 = low/hi)
%  (7) logarithmic sample base (0 = linear scale)
%  (8 ...) empirical pdf must provide equal # of x then y values,
%            first four entries are ignored.
%  Provide distribution type
%  if (2) or empirical provide number of xy pairs
%  ie. below where 3 pairs are 1 2 3 4 5 6
%2 3
%1 0 0 99999 2 0 0 1 2 3 4 5 6
1
99999 0 0 99999 1 0 0
1
99999 0 0 99999 1 0 0
1
99999 0 0 99999 1 0 0

% earliest time for chem prod (min) (S,M,L)
% One Row for each size designation (see LOCA bin definitions)
% random-variable definitions:
%  (1) first parameter (mean/geom mean/mean)
%  (2) second parameter (std dev/geom std dev) (zero sigma returns mean)
%  (3) lower limit
%  (4) upper limit
%  (5) library distribution (1/2/3 = normal/empirical/TBD ...)
%  (6) conservative direction (0/1 = low/hi)
%  (7) logarithmic sample base (0 = linear scale)
%  (8 ...) empirical pdf must provide equal # of x then y values,
%            first four entries are ignored.
%  Provide distribution type
%  if (2) or empirical provide number of xy pairs
%  ie. below where 3 pairs are 1 2 3 4 5 6
%2 3
%1 0 0 99999 2 0 0 1 2 3 4 5 6
1
0 0 0 99999 1 0 0
1
0 0 0 99999 1 0 0
1
0 0 0 99999 1 0 0

% time to hot leg injection (min) (S,M,L)
% One Row for each size designation (see LOCA bin definitions)
% random-variable definitions:
%  (1) first parameter (mean/geom mean/mean)
%  (2) second parameter (std dev/geom std dev) (zero sigma returns mean)
%  (3) lower limit
%  (4) upper limit
%  (5) library distribution (1/2/3 = normal/empirical/TBD ...)
%  (6) conservative direction (0/1 = low/hi)
%  (7) logarithmic sample base (0 = linear scale)
%  (8 ...) empirical pdf must provide equal # of x then y values,
%            first four entries are ignored.
%  Provide distribution type
%  if (2) or empirical provide number of xy pairs
%  ie. below where 3 pairs are 1 2 3 4 5 6
%2 3
%1 0 0 99999 2 0 0 1 2 3 4 5 6
```

```
2 2
360 0 345 360 2 0 0 345 360 0.5 0.5
2 2
360 0 345 360 2 0 0 345 360 0.5 0.5
2 2
360 0 345 360 2 0 0 345 360 0.5 0.5

%-------------------------------------------------------------------------
% Chemical Product Variables



% pool temp (degF) where chem prods form
% With statistics
% random-variable definitions:
%  (1) first parameter (mean/geom mean/mean)
%  (2) second parameter (std dev/geom std dev) (zero sigma returns mean)
%  (3) lower limit
%  (4) upper limit
%  (5) library distribution (1/2/3 = normal/empirical/TBD ...)
%  (6) conservative direction (0/1 = low/hi)
%  (7) logarithmic sample base (0 = linear scale)
%  (8 ...) empirical pdf must provide equal # of x then y values,
%           first four entries are ignored.
%  Provide distribution type
%  if (2) or empirical provide number of xy pairs
%  ie. below where 3 pairs are 1 2 3 4 5 6
%2 3
%1 0 0 99999 2 0 0 1 2 3 4 5 6
1
140 5 0 99999 1 0 0

%  bump factor for chems when t>=Tchem and T<=ChemTemp (S,M,L)
%  (spec mean as if min=0, but set min and max to shifted range)
%  (preselect mean and max to set desired tail prob in last sample pt)
% random-variable definitions:
%  (1) first parameter (mean/geom mean/mean)
%  (2) second parameter (std dev/geom std dev) (zero sigma returns mean)
%  (3) lower limit
%  (4) upper limit
%  (5) library distribution (1/2/3 = normal/empirical/TBD ...)
%  (6) conservative direction (0/1 = low/hi)
%  (7) logarithmic sample base (0 = linear scale)
%  (8 ...) empirical pdf must provide equal # of x then y values,
%           first four entries are ignored.
%  Provide distribution type
%  if (2) or empirical provide number of xy pairs
%  ie. below where 3 pairs are 1 2 3 4 5 6
%2 3
%1 0 0 99999 2 0 0 1 2 3 4 5 6
1
1.25 0.64 1 15.3 3 1 10              % truncated exponential
3 2
1.50 0.44444 1 18.2 3 1 10 1 2 0.5 0.5       % truncated exponential
3 2
2.00 0.25 1 24 3 1 10 1 10 1 0.5     % truncated exponential

%-------------------------------------------------------------------------
% thresholds of concern
%  (logical distribution functions. NOT part of sequence variability)
% random-variable definitions:
%  (1) first parameter (mean/geom mean/mean)
%  (2) second parameter (std dev/geom std dev) (zero sigma returns mean)
%  (3) lower limit
%  (4) upper limit
%  (5) library distribution (1/2/3 = normal/empirical/TBD ...)
%  (6) conservative direction (0/1 = low/hi)
%  (7) logarithmic sample base (0 = linear scale)
%  (8 ...) empirical pdf must provide equal # of x then y values,
```

```
%            first four entries are ignored.
%  Provide distribution type
%  if (2) or empirical provide number of xy pairs
%  ie. below where 3 pairs are 1 2 3 4 5 6
%2 3
%1 0 0 99999 2 0 0 1 2 3 4 5 6

% core blockage limit (g/FA) HL breaks
1
99999 0 0 0 1 0 0

% core blockage limit (g/FA) CL break
1
99999 0 0 0 1 0 0


% boron ppt limit (g/FA) for HL brk before HL inject
%   (should never fail by this mode)
1
99999 0 0 0 1 0 0

% boron ppt limit (g/FA) for CL brk before HL injection
1
7.5 0 0 0 1 0 0

% limit for strainer buckling (ft h2o)
1
9.35 0 0 0 1 0 0

% void fraction at pump inlet (@ train)
1
0.02 0 0 0 1 0 0

%-------------------------------------------------------------------------------------
%Plant State Table Data

% Operable Trains
% Train X Pump Matrix

% three trains operable (Case 01)
%    lpsi      hpsi    spray
%     1         1       1 %A
%     1         1       1 %B
%     1         1       1 %C

% two trains operable (Case 22)
%    lpsi      hpsi    spray
      1         1       1 %A
      1         1       1 %B
      0         0       0 %C

% one train operable (Case 43)
%    lpsi      hpsi    spray
%      1       1       1 %A
%      0       0       0 %B
%      0       0       0 %C

% two LHSI pumps failed (Case 09)
%    lpsi      hpsi    spray
%      1       1       1 %A
%      0       1       1 %B
%      0       1       1 %C

% one train fail + one additional LHSI fail (Case 26)
%    lpsi      hpsi    spray
%      1       1       1 %A
%      0       1       1 %B
%      0       0       0 %C
```

```
% # reactor coolant pumps (in CAD)
4

% # pressurizers (in CAD)
1

% # RHR pumps (in CAD)
3

% # steam generators (in CAD)
4

% time increment for evaluation (min)
5


% misc debris area (ft^2) total in containment
1
100 0 0 99999 1 0 0
% fraction of misc debris overlap (arrives @ t0)
0.25

% thin-bed thickness (in)
0.0625

% clip ZOI with walls (1/0 = y/n)
1

% const fiber filtration eff in fuel
1.0

% strainer height (ft)
3.25

% containment rel humidity
1.00

% sump rel humidity
1.00

% # fuel assemblies
193

% inflation of delP before chem bump
1
5 1 1 10 1 0 0

%******Min Flow to Cool Core****************

%Number of time and flow rate points

30
% Time post SCRAM (hr)
% Must be equal to number of time and flow rate points

0.0028          0.0042          0.0056
0.0111          0.0167          0.0222
0.0278          0.0417          0.0556
0.1111          0.1667          0.2222
0.2778          0.4167          0.5556
1.1111          1.6667          2.2222
2.7778          4.1667          5.5556
11.1111         16.6667         22.2222
27.7778         41.6667         111.1111
166.6667        222.2222         277.7778


%% Flow Rate (gpm)
% Must be equal to number of time and flow rate points
```

```
1414.7000   1323.5000   1260.9000   1113.4000   1030.5000
973.3000    931.3000    859.3000    812.3000    711.0000
654.7000    614.2000    581.8000    523.1000    480.9000
388.1000    342.4000    315.1000    295.7000    265.1000
245.5000    204.2000    182.7000    168.7000    158.1000
139.8000    99.0000     84.1000     74.4000     67.7000

%**********Special Weld ****************
% single-case tracer (weld location name - from table)
% specialweld = '31-RC-1102-NSS-1.1';
% If special weld input select 1 else 0
0
% If 1 write weld name
% else leave blank



%   nominal pool volume (ft^3) and area (ft^2)
%  (uniform distribution between min and max pool volumes - S,M,L)
2 2
0 0 0 0 2 0 0 43464 61993 .5 .5 %SBLOCA
2 2
0 0 0 0 2 0 0 39533 69444 .5 .5 %MBLOCA
2 2
0 0 0 0 2 0 0 45201 69263 .5 .5 %LBLOCA


% Pool Area (ft^2)
12301

% clean strainer attributes
% clean area of ONE strainer (ft^2)
1.8185e+003
% clean area of one OLD strainer (ft^2)
%155.4

% max clean strainer head loss (ft h2o)
 0.22

% single pump runout volume rates (gpm) (S, M, L)
% high-pressure max injection rates
 1620
% low-pressure injection rate
 2800

% Containment Spray Rate (all states except Case 43)
2 2
0 0 1932 2350 2 0 0 1932 2350 0.5 0.5
2 2
0 0 1932 2350 2 0 0 1932 2350 0.5 0.5
2 2
0 0 1932 2350 2 0 0 1932 2350 0.5 0.5

% Containment Spray Rate (Case 43)
%2 2
%0 0 2080 2600 2 0 0 2080 2600 0.5 0.5
%2 2
%0 0 2080 2600 2 0 0 2080 2600 0.5 0.5
%2 2
%0 0 2080 2600 2 0 0 2080 2600 0.5 0.5


%-------------------------------------------------------------------------
% geometric loading table for a single train:
%   thickness x(in) and strainer area A(ft^2) as functions of debris volume
%   V(ft^3). see supplementary routine StrainerArea for geometry definition
%   and assumptions. must be single-valued functions. May be slight mismatch
%   in compression for thickness estimation between this table and delP routine,
%   but low flow rate indicates low fiber compression.
%     V(ft^3)        x(in)      A (ft^2)
```

```
% switch table on/off = 1/0, list length of table
% if 0 a flat approximation will be used
% for old strainers
1 28

% Table Values
% If Table off leave blank
0            0           1.8185e+003
8.1790e+001  5.0000e-001  4.1900e+002
8.1800e+001  5.0100e-001  4.1931e+002
2.8016e+002  8.1421e+000  4.4718e+002
4.7853e+002  1.5783e+001  5.9256e+002
6.7689e+002  2.3424e+001  7.4768e+002
8.7526e+002  3.1065e+001  9.1253e+002
1.0736e+003  3.8706e+001  1.0871e+003
1.2720e+003  4.6348e+001  1.2714e+003
1.4703e+003  5.3989e+001  1.4655e+003
1.6687e+003  6.1630e+001  1.6692e+003
1.8671e+003  6.9271e+001  1.8827e+003
2.0654e+003  7.6912e+001  2.1060e+003
2.2638e+003  8.4553e+001  2.3389e+003
2.4622e+003  9.2194e+001  2.5816e+003
2.6605e+003  9.9835e+001  2.8341e+003
2.8589e+003  1.0748e+002  3.0962e+003
3.0573e+003  1.1512e+002  3.3681e+003
3.2556e+003  1.2276e+002  3.6497e+003
3.4540e+003  1.3040e+002  3.9411e+003
3.6524e+003  1.3804e+002  4.2422e+003
3.8507e+003  1.4568e+002  4.5530e+003
4.0491e+003  1.5332e+002  4.8735e+003
4.2474e+003  1.6096e+002  5.2038e+003
4.4458e+003  1.6860e+002  5.5438e+003
4.6442e+003  1.7625e+002  5.8935e+003
4.8425e+003  1.8389e+002  6.2530e+003
5.0409e+003  1.9153e+002  6.6222e+003

%-----------------------------------------------------------------
% initiating event frequency and bounded Johnson fit
%    NUREG-1829 current-day exceedance frequencies (without SG breaks)
%      (# breaks/cal yr of sizes > x)
%    Interpolated values for LOCA bins MUST be consistent with LOCAbins def
%    UT Austin fit of epistemic envelope using bounded Johnson pdf.
%      Parameters MUST be listed in column order (gamma,delta,xi,lamda)
% each row varies by size, each column varies by %ile (then transposed)

% Break Frequency Table Name
"Present-Day Exceedance Frequency"

% Break Sizes in Ascending Order
% These are fixed values
% For Documentation Purpose only
0.5 1.625 2 3 6 7 14 31

% Frequency Table
% These are fixed values
% For Documentation Purpose only
% Break Size X Percentile
6.8e-5 5.0e-6 3.69e-6 2.1e-7 6.30e-8 1.4e-8 4.1e-10 3.5e-11  % 5th %ile
6.3e-4 8.9e-5 6.57e-5 3.4e-6 1.08e-6 3.1e-7 1.2e-08 1.2e-09  % 50th %ile
1.9e-3 4.2e-4 3.10e-4 1.6e-5 5.20e-6 1.6e-6 2.0e-07 2.9e-08  % mean
7.1e-3 1.6e-3 1.18e-3 6.1e-5 1.98e-5 6.1e-6 5.8e-07 8.1e-08  % 95th %ile

% Table Percentile Values
0.05 0.5 NaN 0.95 % Don't Use Mean for Fitting

% Johnson Parameters
% These are fixed values
% For Documentation Purpose only
% gamma        delta          xi             lambda
```

```
1.650950E+00   5.256964E-01   4.117000E-05   1.420000E-02
1.646304E+00   4.593913E-01   2.530000E-06   3.200000E-03
1.646308E+00   4.593851E-01   1.870000E-06   2.360550E-03
1.646605E+00   4.589467E-01   1.200000E-07   1.220000E-04
1.646403E+00   4.566256E-01   3.000000E-08   3.965000E-05
1.645739E+00   4.487957E-01   6.023625E-09   1.220000E-05
1.645211E+00   3.587840E-01   2.892430E-10   1.160000E-06
1.645072E+00   3.343493E-01   2.636770E-11   1.600000E-07

%-------------------------------------------------------------------------------
% Strainer-Test Penetration Parameters

% area of test module (ft^2)
91.44

%  fraction of sheddable debris
%  (uniform empirical) - (unitless)
2 2
0 0 0 0 2 0 0 0.00956 0.0272 0.5 0.5


% shedding rate (1/min)
%  (uniform empirical)
2 2
0 0 0 0 2 0 0 0.008236 0.0546 0.5 0.5

% filter efficiency per g (slope)
%  (uniform empirical)
2 2
0 0 0 0 2 0 0  0.000339 0.003723 0.5 0.5

% filter fit cut point (g)
%  (uniform empirical)
2 2
0 0 0 0 2 0 0 790 880 0.5 0.5


% initial filter eff (intercept)
%  (uniform empirical)
2 2
0 0 0 0 2 0 0 0.656 0.706 0.5 0.5

% filter efficiency match pt
%  (set equal to 1.0 always)
1
1 0 0 0 1 0 0

% filter exp rate const (1/g)
%  (bimodal empirical)
2 3
0 0 0 0 2 1 0 0.0011254 0.0013078 0.031787 0.10000 0.45000 0.1000

%-------------------------------------------------------------------------------
% Debris Transport Factors
%  (enter conservative values here, random variables populated below)



%  ZOI-generated debris
%    (LDFG fines, LDFG small, LDFG large, uTherm fines, qual coat fines, crud fines)
%    (columns must ALWAYS be defined in this order left to right)
%    (rows must ALWAYS be defined in this order top to bottom)
%    (present values from Vol 3 for SG compartment break)

%    these factors were used for Full Batch 2

0.70 0.60 0.22 0.70 0.70 0.70     %F_BD_upr
0.30 0.25 0.00 0.30 0.30 0.30     %F_BD_lwr
0.53 0.27 0.00 0.53 0.53 0.53     %F_WD_UCin
```

```
0.47 0.19 0.00 0.47 0.47 0.47     %F_WD_UCan
0.00 0.27 0.00 0.00 0.00 0.00     %F_WD_BCin
0.00 0.00 0.00 0.00 0.00 0.00     %F_WD_BCan
0.02 0.00 0.00 0.02 0.02 0.02     %F_PF_sump
0.05 0.00 0.00 0.05 0.05 0.05     %F_PF_nact
1.00 0.64 0.00 1.00 1.00 1.00     %F_Rcrc_lwr
1.00 0.64 0.00 1.00 1.00 1.00     %F_Rcrc_WDin
1.00 0.58 0.00 1.00 1.00 1.00     %F_Rcrc_WDan
0.00 0.01 0.01 0.00 0.00 0.00     %F_Ersn_spry
0.00 0.07 0.07 0.00 0.00 0.00     %F_Ersn_pool


%  Unqualified coatings outside ZOI
%    (epoxy fines, epoxy fine chips, epoxy small chips, epoxy large chips,
%                               epoxy curls, alkyd, baked enamel, IOZ fines)
%    (columns must ALWAYS be defined in this order left to right)
%    (rows must ALWAYS be defined in this order top to bottom)
%    (present values from Vol 3 for MB/LBLOCA in SG compartment)

1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00   % F_fail
0.15 0.15 0.15 0.15 0.15 0.54 0.00 0.83   % F_upr
0.02 0.02 0.02 0.02 0.02 0.46 1.00 0.17   % F_lwr
0.83 0.83 0.83 0.83 0.83 0.00 0.00 0.00   % F_Rx
0.06 0.06 0.06 0.06 0.06 0.06 0.00 0.06   % F_spry
1.00 0.41 0.00 0.00 1.00 1.00 1.00 1.00   % F_rcrc
0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00   % F_Rxrcrc


% Latent Debris
%   (particulate, fiber)
%    (columns must ALWAYS be defined in this order left to right)
%    (rows must ALWAYS be defined in this order top to bottom)
%    (present values from Vol 3 for SG compartment)

0.00 0.00        %F_BD_upr       (1)
1.00 1.00        %F_BD_lwr       (2)
1.00 1.00        %F_WD           (3)
0.02 0.02        %F_PF_sump      (4)
0.05 0.05        %F_PF_nact      (5)
1.00 1.00        %F_Rcrc_lwr     (6)

%-------------------------------------------------------------------------------
%Time and Temperature Data

%Number of Time and Temperature Data Points
162


% time vector (hr) for small-break temperature profile
%  (FIRST entry is assumed @B@ t=0. constant-value extrapolation imposed.
%  (time dependent temps ARE currently used in calc, one history for each LOCA)

% time vector (hour) for small (and medium) breaks

0.0000  0.0847  0.0864  0.0881  0.0897  0.0914  0.0931  0.0947
0.0964 0.0981  0.0997  0.1014  0.1031  0.1047  0.1064  0.1081
0.1097 0.1139  0.1306  0.1472  0.1639  0.1806  0.1972  0.2139
0.2306 0.2472  0.2639  0.2806  0.2972  0.3139  0.3306  0.3472
0.3639 0.3806  0.3972  0.4139  0.4306  0.4472  0.4639  0.4806
0.4972 0.5139  0.5306  0.5472  0.5639  0.5806  0.5972  0.6139
0.6306 0.6472  0.6639  0.6806  0.6972  0.7139  0.7306  0.7472
0.7639 0.7806  0.7972  0.8139  0.8306  0.8472  0.8639  0.8806
0.8972 0.9139  0.9306  0.9472  0.9639  0.9806  0.9972  1.0139
1.0306 1.0472  1.0639  1.0806  1.3611  1.6944  2.0278  2.3611
2.6944 3.0278  3.3611  3.6944  4.0278  4.3611  4.6944  5.0278
5.3611 5.6944  6.0278  6.3611  6.6944  7.0278  7.3611  7.6944
8.0278 8.3611  8.6944  9.0278  9.3611  9.6944  10.0278 20.0833
32.0833    44.0833 56.0833 68.0833 80.0833 92.0833 104.0833
116.0833   128.0833    140.0833    152.0833    164.0833
176.0833   188.0833    200.0833    212.0833    224.0833
```

```
236.0833   248.0833    260.0833    272.0833    283.3333
297.2222   308.3333    319.4444    333.3333    344.4444
355.5556   369.4444    380.5556    391.6667    402.7778
416.6667   427.7778    438.8889    452.7778    463.8889
475.0000   488.8889    500.0000    511.1111    525.0000
536.1111   547.2222    561.1111    572.2222    583.3333
597.2222   608.3333    619.4444    633.3333    644.4444
655.5556   669.4444    680.5556    691.6667    702.7778
716.6667

% temperature(F) profile for small (and medium) breaks
119.6000    131.2987    140.1689    150.3314    156.1240
159.2343    162.1567    164.5680    166.6937    168.5685
170.2457    171.7175    172.9577    174.0415    174.9570
175.7084    176.3081    177.5299    164.4935    132.7076
124.0848    123.6914    123.5988    123.5641    123.5529
124.4938    127.6399    129.7484    131.0391    149.8002
158.2393    162.7694    165.4960    167.3851    168.6688
169.7687    170.9814    171.9993    172.8771    173.7150
174.4595    175.0903    175.6074    176.0061    176.2923
176.4625    176.4855    176.3916    176.2055    175.9468
175.6184    175.2411    174.8243    174.3902    173.9374
173.4284    172.8459    172.2319    171.6143    171.0143
170.4548    169.9507    169.5034    169.1086    168.7661
168.4824    168.2551    168.0847    167.9707    167.9020
167.8705    167.8665    167.8947    167.9451    168.0131
168.0978    170.0607    170.9606    171.4105    170.8721
169.8110    168.7942    168.1132    165.3090    164.1228
163.0112    161.4436    159.9385    158.1298    158.4517
156.5706    151.6937    163.7090    160.9624    158.1118
156.1579    154.6151    153.2333    151.9641    150.8191
149.7667    148.7924    147.8649    136.2080    129.0230
124.9790    122.1450    120.1310    118.4710    117.3160
116.4980    115.6160    114.7100    113.8960    113.1730
112.5210    111.9240    111.3580    110.8590    110.3930
109.9930    109.5770    109.2090    108.9100    108.5930
108.2810    107.9680    107.7100    107.4730    107.1620
106.9430    106.7150    106.4770    106.2500    106.1240
105.8930    105.6660    105.5410    105.3160    105.1930
105.0690    104.8440    104.7250    104.6070    104.3770
104.3660    104.1400    104.0230    103.9050    103.7910
103.6730    103.5660    103.4520    103.3350    103.1450
103.1000    102.9130    102.8680    102.6810    102.6450
102.5250    102.5160


% time vector (hr) for medium (and small) break temperature profile
%  (FIRST entry is assumed 2B@ t=0. constant-value extrapolation imposed.
0.0000  0.0847  0.0864  0.0881  0.0897  0.0914  0.0931  0.0947
0.0964 0.0981  0.0997  0.1014  0.1031  0.1047  0.1064  0.1081
0.1097 0.1139  0.1306  0.1472  0.1639  0.1806  0.1972  0.2139
0.2306 0.2472  0.2639  0.2806  0.2972  0.3139  0.3306  0.3472
0.3639 0.3806  0.3972  0.4139  0.4306  0.4472  0.4639  0.4806
0.4972 0.5139  0.5306  0.5472  0.5639  0.5806  0.5972  0.6139
0.6306 0.6472  0.6639  0.6806  0.6972  0.7139  0.7306  0.7472
0.7639 0.7806  0.7972  0.8139  0.8306  0.8472  0.8639  0.8806
0.8972 0.9139  0.9306  0.9472  0.9639  0.9806  0.9972  1.0139
1.0306 1.0472  1.0639  1.0806  1.3611  1.6944  2.0278  2.3611
2.6944 3.0278  3.3611  3.6944  4.0278  4.3611  4.6944  5.0278
5.3611 5.6944  6.0278  6.3611  6.6944  7.0278  7.3611  7.6944
8.0278 8.3611  8.6944  9.0278  9.3611  9.6944  10.0278 20.0833
32.0833    44.0833 56.0833 68.0833 80.0833 92.0833 104.0833
116.0833   128.0833    140.0833    152.0833    164.0833
176.0833   188.0833    200.0833    212.0833    224.0833
236.0833   248.0833    260.0833    272.0833    283.3333
297.2222   308.3333    319.4444    333.3333    344.4444
355.5556   369.4444    380.5556    391.6667    402.7778
416.6667   427.7778    438.8889    452.7778    463.8889
475.0000   488.8889    500.0000    511.1111    525.0000
536.1111   547.2222    561.1111    572.2222    583.3333
```

```
597.2222   608.3333    619.4444    633.3333    644.4444
655.5556   669.4444    680.5556    691.6667    702.7778
716.6667


% Temperature(F) profile for medium breaks
119.6000    131.2987    140.1689    150.3314    156.1240
159.2343    162.1567    164.5680    166.6937    168.5685
170.2457    171.7175    172.9577    174.0415    174.9570
175.7084    176.3081    177.5299    164.4935    132.7076
124.0848    123.6914    123.5988    123.5641    123.5529
124.4938    127.6399    129.7484    131.0391    149.8002
158.2393    162.7694    165.4960    167.3851    168.6688
169.7687    170.9814    171.9993    172.8771    173.7150
174.4595    175.0903    175.6074    176.0061    176.2923
176.4625    176.4855    176.3916    176.2055    175.9468
175.6184    175.2411    174.8243    174.3902    173.9374
173.4284    172.8459    172.2319    171.6143    171.0143
170.4548    169.9507    169.5034    169.1086    168.7661
168.4824    168.2551    168.0847    167.9707    167.9020
167.8705    167.8665    167.8947    167.9451    168.0131
168.0978    170.0607    170.9606    171.4105    170.8721
169.8110    168.7942    168.1132    165.3090    164.1228
163.0112    161.4436    159.9385    158.1298    158.4517
156.5706    151.6937    163.7090    160.9624    158.1118
156.1579    154.6151    153.2333    151.9641    150.8191
149.7667    148.7924    147.8649    136.2080    129.0230
124.9790    122.1450    120.1310    118.4710    117.3160
116.4980    115.6160    114.7100    113.8960    113.1730
112.5210    111.9240    111.3580    110.8590    110.3930
109.9930    109.5770    109.2090    108.9100    108.5930
108.2810    107.9680    107.7100    107.4730    107.1620
106.9430    106.7150    106.4770    106.2500    106.1240
105.8930    105.6660    105.5410    105.3160    105.1930
105.0690    104.8440    104.7250    104.6070    104.3770
104.3660    104.1400    104.0230    103.9050    103.7910
103.6730    103.5660    103.4520    103.3350    103.1450
103.1000    102.9130    102.8680    102.6810    102.6450
102.5250    102.5160


% time vector (hr) for large breaks
0.0000   0.0847  0.0864  0.0881  0.0897  0.0914  0.0931  0.0947
0.0964  0.0981  0.0997  0.1014  0.1031  0.1047  0.1064  0.1081  0.1097
0.1139  0.1306  0.1472  0.1639  0.1806  0.1972  0.2139  0.2306  0.2472
0.2639  0.2806  0.2972  0.3139  0.3306  0.3472  0.3639  0.3806  0.3972
0.4139  0.4306  0.4472  0.4639  0.4806  0.4972  0.5139  0.5306  0.5472
0.5639  0.5806  0.5972  0.6139  0.6306  0.6472  0.6639  0.6806  0.6972
0.7139  0.7306  0.7472  0.7639  0.7806  0.7972  0.8139  0.8306  0.8472
0.8639  0.8806  0.8972  0.9139  0.9306  0.9472  0.9639  0.9806  0.9972
1.0139  1.0306  1.0472  1.0639  1.0806  1.3611  1.6944  2.0278  2.3611
2.6944  3.0278  3.3611  3.6944  4.0278  4.3611  4.6944  5.0278  5.3611
5.6944  6.0278  6.3611  6.6944  7.0278  7.3611  7.6944  8.0278  8.3611
8.6944  9.0278  9.3611  9.6944  10.0278 20.0833 32.0833 44.0833 56.0833
68.0833 80.0833 92.0833 104.0833    116.0833    128.0833    140.0833
152.0833    164.0833    176.0833    188.0833    200.0833    212.0833
224.0833    236.0833    248.0833    260.0833    272.0833    283.3333
297.2222    308.3333    319.4444    333.3333    344.4444    355.5556
369.4444    380.5556    391.6667    402.7778    416.6667    427.7778
438.8889    452.7778    463.8889    475.0000    488.8889    500.0000
511.1111    525.0000    536.1111    547.2222    561.1111    572.2222
583.3333    597.2222    608.3333    619.4444    633.3333    644.4444
655.5556    669.4444    680.5556    691.6667    702.7778    716.6667

% Temperature (F) profile for large breaks
119.8113 213.9295    242.3104    255.0268    255.7907    253.1617
252.9372    252.5390    251.9023    250.9733    249.7169    245.8894
235.9856    224.0051    212.9495    203.5499    195.7225    179.5894
199.8048    174.8143    174.8276    177.3518    180.7405    183.2333
185.1644    186.4925    187.2579    187.8270    188.1924    188.4266
```

```
188.5605    188.5934    188.5042    188.3375    189.3187    189.7570
189.0923    188.5202    188.0148    187.5621    187.4103    187.0671
186.7330    186.4249    186.1559    186.7640    186.5012    186.2557
186.0555    185.9119    185.8265    185.8062    185.8495    185.9526
186.1092    187.8900    187.9673    187.9196    187.9119    187.9385
187.9954    188.0710    188.1647    188.2538    188.3385    188.4003
189.0996    188.9199    188.7439    188.5614    188.3622    188.1314
187.8597    187.5387    187.1667    186.7559    178.4091    171.8762
166.5421    162.2238    158.1410    154.9818    151.7673    148.9234
146.0834    143.7967    141.6054    139.5251    137.9892    136.4819
134.8865    136.9000    136.6489    135.3569    134.3103    133.2941
132.4453    131.9467    132.0536    132.1915    131.3055    130.7946
130.2765    123.0489    118.1991    114.9095    112.4170    110.4096
108.7290    107.2834    106.0152    104.8855    103.8671    102.9399
102.0890    101.3027    100.5720    99.8894 99.2491 98.6461 98.0763
97.5362 97.0229 96.5339 96.0669 95.6474 95.1520 94.7720 94.4055
93.9649 93.6254 93.2967 92.9000 92.5932 92.2953 92.0057 91.6547
91.3822 91.1168 90.7942 90.5432 90.2982 89.9998 89.7671 89.5396
89.2620 89.0452 88.8328 88.5733 88.3703 88.1712 87.9276 87.7368
87.5494 87.3198 87.1398 86.9628 86.7457 86.5753 86.4076 86.2427
86.0401

%-------------------------------------------------------------------------------
% NPSH parameters:
%   (specify any # of pipe segments in common header)
%
% major HL variables

% absolute roughness of the pipe (ft)
0.00015

% Number of Pipe Segments
6

% pipe diameters (ft)
1.27 .99 1.27 .84 1.27 .99

% pipe lengths (ft)
66.96 25.41 12.00 25.46 11.50 24.91

% depth of common header (ft)
25.83 25.65 25.83 % LPSI, HPSI, SPRY

% NPSH required for each pump (ft water)
12 12 12        % LPSI, HPSI, SPRY

% minor HL variables
%  # of elbows, tees, entrances, and branches per pipe segment
%    [(# of 90 degree) (# of 45 degree) (# of gate valves)(# of entrances)(# of
%     tee runs) (# of tee branches)]

4 2 1 1 0 0    % segment AB
3 0 0 0 0 1    % segment BC
0 0 0 0 1 0    % segment BD
3 0 0 0 0 1    % segment DE
0 0 0 0 1 0    % segment DF
3 0 0 0 0 1    % segment FG

%-------------------------------------------------------------------------------
% Newly Added Options

% Use Old Degas Routine? (0 = No, 1 = Yes)
0

% Use Old NPSH Routine? (0 = No, 1 = Yes)
0

% Use Old SI Pump Flow Equation? (0 = No, 1 = Yes)
0
```

```
% Use Old Strainer Properties? (0 = No, 1 = Yes)
0

% Use Common Random Numbers Across Frequency Replications? (0 = No, 1 = Yes)
0

% Enable All Plots? (0 = No, 1 = Yes)
1

% Enable Parallel Calculations (0 = No, 1 = Yes)
% CAUTION - USE ONLY IF YOUR KNOW YOUR PC MEETS SPECIFICATIONS!!!!!
0

% Number of Parallel Threads
4

% Use Optimal Frequency Bins for 15 Freps (0 = No, 1 = Yes)
1

% Use Old Debris Source Rate (Before Error Correction)? (0 = No, 1 = Yes)
1

% Use Old Latent Debris Transport Equations (Before Error Correction)? (0 = No, 1 = Yes)
1
```

Attachment 10

STP CASA Grande Information (Non-Proprietary Version)

CASA26 JT4

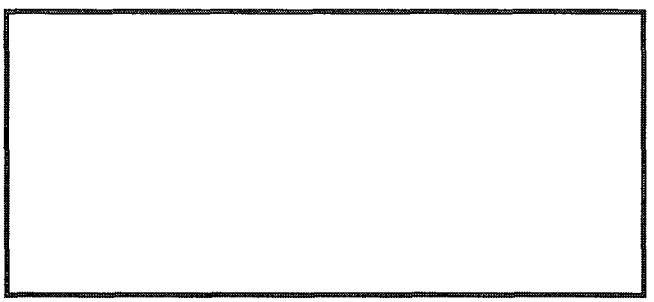
Contains No Proprietary Information
Alion Science and Technology

```
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
%LANLANLANLANLANLANLANLANLANLANLANLANLANLANLANLANLANLANLANLANANLANLANLANLANLA%
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%

% Define Case Folders (Main Project Folder)
"/work/02405/jjtejada/yye00/matlab_code/Demo Plant"

% Define Working Folders

% Analysis Folder (~/.../Case/Analysis)
"Analytic Results"

% Run Subfolder (~/.../Case/Analysis/run)
"Tornado"

% Run Sub_Subfolder (~/.../Case/Analysis/run/run_sub)
"SIMCON"

% Run Sub_Sub_Subfolder (~/.../Case/Analysis/run/run_sub/run_sub_sub)
"Delta Pump Case 26 Shuffle"

% CAD Folder Name (~/.../Case/CAD)
"CAD Files"

% Concrete Sub-Folder (~/.../Case/CAD/Concrete)
"Concrete Data"

% Equipment Sub-Folder (~/.../Case/CAD/Equipment)
"Equip Data"

% Grating Sub-Folder (~/.../Case/CAD/Grating)
"Grating Data"

% Pipe Sub-Folder (~/.../Case/CAD/Pipes)
"Pipe Data"

% Fequency Folder (~/.../Case/Frequency)
"Freq Data"

% Break Frequency (~/.../Case/Frequency/Break)
"LOCA Frequency and Weld Inputs - 12-7-12 R1.xlsx"

% Break Fequency Table (~/.../Case/Frequency/Break/Table)
"LOCA Data"

% Weld Case File (~/.../Case/Frequency/Weld)
"LOCA Frequency and Weld Inputs - 12-7-12 R1.xlsx"

% Weld Case Table (~/.../Case/Frequency/Weld/Table)
"Weld Table"
%-------------------------------------------------------------
% multiplicative spatial unit conversions
% rectify all CAD elements for consistency
% applied to ALL length units within each CAD file

% Concrete Multiplier
1.0

% Equipment Multiplier
1.0

% Grating Multiplier
1.0

% Pipe Multiplier

1.0
%-----------------------------------------------------------------
```

```
%  LOCA bin definitions
%  (units consistent with freq dists and CAD data)

% List Number of Defined Break Size Limits
% ie. SB,MB,LB (3 designations)
% However more sizes are allowable
 3

% List Sizes
0.5   2.0   6.0

%-----------------------------------------------------------------

% CAD and Plotting Options (1/0 = Y/N)

% Show CAD Reproduction
0

% Show Concrete and Gratings
0

% Produce Intro Movie and Stop
0

% Debris Passage Correlation
0

% Sample Flow Rates
0

% Random Input Distributions
0

% ZOI Radial Inflation Factor(Plotting Only)
50

% ZOI Plotting Interval (# of breaks between plots)
25

%-----------------------------------------------------------------------
%   spatial resolution for discretizing insulation
%   (must repeat weld target sort if these are changed. delete all master
%   files and rerun with new delL and Nangbin)

% Linear Resolution (in.)
6

%Azimuthal Bins in 2 Pi Radians on Pipes
12

%-----------------------------------------------------------------------
% Head Loss Option
% porosity calc (1/2 = vol / mass weighting)
% (vol weighting was found to be more conservative)
1
%-----------------------------------------------------------------------
% Synonyms tables for nonstandard welds, hangars and valves and Equipment

% Number of Valve synonyms
5
% Valve Synonyms
Valve VALVE MOV XRH FCV

% Number of Hangar Labels
14
% Hangar Synonyms
Hangar Hanger HL AF GU SS SH RR RH
"Work Point" "work point" "Work point" "work Point" "WORK POINT"

% Number of Weld Synonyms
```

```
4

% Weld Synonyms
FW Weld WELD FS

% Number of Steam Generator Synonyms
2

% Steam Generator Synonyms
SG SteamGenerator

% Number of Reactor Coolant Pump Synonyms
2

% Reactor Coolant Pump Synonyms
RCP ReactorCoolantPump

% Number of Pressurizer Synonyms
3

% Pressurizer Synonyms
PZR PRZR Pressurizer

% Number of RHR Synonyms
2

% RHR Synonyms
RHR ResidualHeatRemoval

%-------------------------------------------------------------------------------
%Statistics Sampling Options

%Sampling Method
% (0/1/2/3 = CASA default / MatLab default / shuffle / read file)
2


%If Option 3 specified, set file name in case folder below
%If not LEAVE BLANK



% max # LHS bins in LLOCA for max DEGB (DEGB counts as 1)
% Nmaxbrk =  2 => 2044 total breaks
% Nmaxbrk =  3 => 2100 total breaks
% Nmaxbrk =  5 => 2250 total breaks
% Nmaxbrk = 10 => 3070 total breaks
5

% # LHS replicates (batches) for each frequency CCDF
20

% # epistemic freq envelope samples
% current models process ~110 cases per minute
15

% logarithmic base for sampling epistemic frequency envelope
2


% lower limit of highest epistemic frequency bin
0.99



% # interpolation pts in each break freq ccdf
1000


% logarithmic base for sampling break size
```

```
%  (double check routine before changing this from base 10)
10


%-----------------------------------------------------------------------
%Insulation Characteristics

% Number of Low Density Fiberglass Zones
3
```



Redacted

```
% Number of Debris Types
8

% Debris Types
NUKON   NUKON_2 MICROTHERM RMI LEAD    "THERMAL WRAP" IOZ      ALKYD

%Debris treated as LDFG
% 1/0 --> yes/no
1 1 0 0 0 1 0 0

%Debris treated as microtherm
% 1/0 --> yes/no
0 0 1 0 0 0 0 0

% Damage Radii with statistics definitions
% Material X Statistics
% random-variable definitions:
%  (1) first parameter (mean/geom mean/mean)
%  (2) second parameter (std dev/geom std dev) (zero sigma returns mean)
%  (3) lower limit
%  (4) upper limit
%  (5) library distribution (1/2/3 = normal/empirical/TBD ...)
%  (6) conservative direction (0/1 = low/hi)
%  (7) logarithmic sample base (0 = linear scale)
%  (8 ...) empirical pdf must provide equal # of x then y values,
%            first four entries are ignored.
%  Provide distribution type
%  if (2) or empirical provide number of xy pairs
%  ie. below where 3 pairs are 1 2 3 4 5 6
%2 3
%1 0 0 99999 2 0 0 1 2 3 4 5 6
1
17 0 0 99999 1 0 0
1
17 0 0 99999 1 0 0
1
28.6 0 0 99999 1 0 0
1
1 0 0 99999 1 0 0
1
1 0 0 99999 1 0 0
1
17 0 0 99999 1 0 0
1
1 0 0 99999 1 0 0
1
1 0 0 99999 1 0 0
%-----------------------------------------------------------------------
```

```
%  Debris Properties Table

%  (denote particulate/fiber = sphere/cylinder = 1/2)
%  (do NOT add to or reorder this list unless code is modified)
%  (inventory of fibers with cylindrical geom must be given in ft^3)
%  (can 'fake' the diameter to match a given Sv using std geom formulas)
%  (inventory of particulates with spherical geom must be given in lbm)
%  (this list MUST include every debris type of interest)
%  (if unknown, set "manufactured" density of particulate to ~20% of Rho_mat)
%       (based on comparison of FeO2 to BWR sludge compaction density)

                %'label'       DebrisPropi       'Geom'    'Diam' 'Rho_mat'  'Rho_mfc'
% native units                          'sph,cyl' 'um'    'lbm/ft^3' 'lbm/ft^3'
% calc units                            'sph,cyl' 'm'     'kg/m^3'   'kg/m^3'
               "LDFG - fines"           2         7       175        2.4
                "LDFG - small"          2         7       175        2.4
                "LDFG - large"          2         7       175        2.4
                "uTherm - filaments"    2         6       165        2.4
                "uTherm - SiO2"         1         2.5     137        27.4
                "uTherm - TiO2"         1         20      262        52.4
                "QualCoat - epoxy"      1         10      94         36.66
                "QualCoat - IOZ"        1         10      208        81.12
                "Crud"                  1         15      350        70.0
                "UQCoat - epoxyfine"    1         152     124        48.36
                "UQCoat - epoxyFchp"    1         1143    124        48.36
                "UQCoat - epoxySchp"    1         1143    124        48.36
                "UQCoat - epoxyLchp"    1         1143    124        48.36
                "UQCoat - epoxyCrls"    1         1143    124        48.36
                "UnQualCoat - alkyd"    1         10      207        80.73
                "UnQualCoat - enamel"   1         10      93         36.27
                "UnQualCoat - IOZ"      1         10      244        95.16
                "Latent - particulate"  1         17.3    169        33.80
                "Latent - fiber"        2         7       175        2.4

%-------------------------------------------------------------------------------------------
% microTherm constituents (low density concrete with fiber binder)
% mfc'd density (lbm/ft3)
15.0

% mass fraction filamentsflf_read
0.03

% mass fraction of SiO2
0.58

% mass fraction of TiO2
0.39

% debris type start and stop times (min after break)
%   (rate assumed to be uniform from Tstart to Tend)
%   (rate calc uses inventories defined above)
%   (introduce "instant" sources over 1 delT)
%   (debris from UQCoat cannot have Tstartsrc=0)
%   (timing is presently independent of break size)

%   Start Times
0       0       0       0       0       0       0       0       0       10
10      10      10      10      10      10      10      0       0

%   Stop Times
10      10      10      10      10      10      10      10      10      2160
2160    2160    2160    2160    2160    2160    2160    10      10

%-------------------------------------------------------------------------------------------
%  Noninsulation Debris Quantities

% random-variable definitions:
%  (1) first parameter (mean/geom mean/mean)
%  (2) second parameter (std dev/geom std dev) (zero sigma returns mean)
%  (3) lower limit
```

Diameters of SiO2 and TiO2 are improperly reversed

```
%  (4) upper limit
%  (5) library distribution (1/2/3 = normal/empirical/TBD ...)
%  (6) conservative direction (0/1 = low/hi)
%  (7) logarithmic sample base (0 = linear scale)
%  (8 ...) empirical pdf must provide equal # of x then y values,
%           first four entries are ignored.
%  Provide distribution type
%  if (2) or empirical provide number of xy pairs
%  ie. below where 3 pairs are 1 2 3 4 5 6
%2 3
%1 0 0 99999 2 0 0 1 2 3 4 5 6

% qual epoxy in ZOI (lbm)
1
105 0 0 99999 1 0 0

% qual IOZ in ZOI (lbm)
1
39 0 0 99999 1 0 0

% crud fines (lbm)
1
24 0 0 99999 1 0 0

% unqual epoxy fine (lbm)
%   (uniform dist
2 2
234 0 117 234 2 0 0 117 234 0.5 0.5


% unqual epoxy fine chip (lbm)
%   (uniform dist)
2 2
709 0 355 709 2 0 0 355 709 0.5 0.5

% unqual epoxy small chip (lbm)
%   (uniform dist)
2 2
180 0 90 180 2 0 0 90 180 0.5 0.5

% unqual epoxy large chip (lbm)
%   (uniform dist)
2 2
391 0 196 391 2 0 0 196 391 0.5 0.5


% unqual epoxy curls (lbm)
%   (uniform dist)
2 2
391 0 196 391 2 0 0 196 391 0.5 0.5

% unqual alkyd (lbm)
1
271 0 0 99999 1 0 0

% unqual enamel (lbm)
1
267 0 0 99999 1 0 0

% unqual IOZ (lbm)
1
369 0 0 99999 1 0 0

% latent pariculate (lbm)
1
170 0 0 99999 1 0 0

% latent fiber (ft^3)
1
12.5 0 0 99999 1 0 0
```

```
%-------------------------------------------------------------------------
%   Time points along accident progression
%   (assume all trains of injection on initially, w/spray on setpoint trip)
%   (assume HPSI and LPSI both run, but LPSI flow negligible until depress)
%   (1 of 3 spray pumps can be turned off, all HPSI can be turned off for M,L)
%   (for degraded condition with < max trains, DON'T exercise any options)


% max time of interest (hr)
36

%******Recirculation Times******
%Number of break sizes for recirc table
7

%Recirc Time Table
1.5 2 4 6 8 12 27.5    %Break Size (in.)
337 79 56 44 38 31 30  %Time to recirc (min)

%******Other LOCA Times**********
% time to ONE spray pump off (min) (S,M,L)
% (if 0.0, NO spray pumps run)
% With Statistics
% One Row for each size designation (see LOCA bin definitions)
% random-variable definitions:
%  (1) first parameter (mean/geom mean/mean)
%  (2) second parameter (std dev/geom std dev) (zero sigma returns mean)
%  (3) lower limit
%  (4) upper limit
%  (5) library distribution (1/2/3 = normal/empirical/TBD ...)
%  (6) conservative direction (0/1 = low/hi)
%  (7) logarithmic sample base (0 = linear scale)
%  (8 ...) empirical pdf must provide equal # of x then y values,
%            first four entries are ignored.
%  Provide distribution type
%  if (2) or empirical provide number of xy pairs
%  ie. below where 3 pairs are 1 2 3 4 5 6
%2 3
%1 0 0 99999 2 0 0 1 2 3 4 5 6
 1
 0      0       0       99999   1       0       0
 1
 20     5       0       99999   1       0       0
 1
 20     5       0       99999   1       0       0

% time to ALL spray pumps off (min) (S,M,L)
% One Row for each size designation (see LOCA bin definitions)
% random-variable definitions:
%  (1) first parameter (mean/geom mean/mean)
%  (2) second parameter (std dev/geom std dev) (zero sigma returns mean)
%  (3) lower limit
%  (4) upper limit
%  (5) library distribution (1/2/3 = normal/empirical/TBD ...)
%  (6) conservative direction (0/1 = low/hi)
%  (7) logarithmic sample base (0 = linear scale)
%  (8 ...) empirical pdf must provide equal # of x then y values,
%            first four entries are ignored.
%  Provide distribution type
%  if (2) or empirical provide number of xy pairs
%  ie. below where 3 pairs are 1 2 3 4 5 6
%2 3
%1 0 0 99999 2 0 0 1 2 3 4 5 6
1
390  5 390 420 1 0 0
1
390 10 390 420 1 0 0
1
390 15 390 450 1 0 0
```

```
% time to retire 1 full train (min) (S,M,L)
%  (this prob never happens, keep as option)
%  (it would be the train with spray off already)
% One Row for each size designation (see LOCA bin definitions)
% random-variable definitions:
%  (1) first parameter (mean/geom mean/mean)
%  (2) second parameter (std dev/geom std dev) (zero sigma returns mean)
%  (3) lower limit
%  (4) upper limit
%  (5) library distribution (1/2/3 = normal/empirical/TBD ...)
%  (6) conservative direction (0/1 = low/hi)
%  (7) logarithmic sample base (0 = linear scale)
%  (8 ...) empirical pdf must provide equal # of x then y values,
%            first four entries are ignored.
%  Provide distribution type
%  if (2) or empirical provide number of xy pairs
%  ie. below where 3 pairs are 1 2 3 4 5 6
%2 3
%1 0 0 99999 2 0 0 1 2 3 4 5 6
1
99999 0 0 99999 1 0 0
1
99999 0 0 99999 1 0 0
1
99999 0 0 99999 1 0 0

% earliest time for chem prod (min) (S,M,L)
% One Row for each size designation (see LOCA bin definitions)
% random-variable definitions:
%  (1) first parameter (mean/geom mean/mean)
%  (2) second parameter (std dev/geom std dev) (zero sigma returns mean)
%  (3) lower limit
%  (4) upper limit
%  (5) library distribution (1/2/3 = normal/empirical/TBD ...)
%  (6) conservative direction (0/1 = low/hi)
%  (7) logarithmic sample base (0 = linear scale)
%  (8 ...) empirical pdf must provide equal # of x then y values,
%            first four entries are ignored.
%  Provide distribution type
%  if (2) or empirical provide number of xy pairs
%  ie. below where 3 pairs are 1 2 3 4 5 6
%2 3
%1 0 0 99999 2 0 0 1 2 3 4 5 6
1
0 0 0 99999 1 0 0
1
0 0 0 99999 1 0 0
1
0 0 0 99999 1 0 0

% time to hot leg injection (min) (S,M,L)
% One Row for each size designation (see LOCA bin definitions)
% random-variable definitions:
%  (1) first parameter (mean/geom mean/mean)
%  (2) second parameter (std dev/geom std dev) (zero sigma returns mean)
%  (3) lower limit
%  (4) upper limit
%  (5) library distribution (1/2/3 = normal/empirical/TBD ...)
%  (6) conservative direction (0/1 = low/hi)
%  (7) logarithmic sample base (0 = linear scale)
%  (8 ...) empirical pdf must provide equal # of x then y values,
%            first four entries are ignored.
%  Provide distribution type
%  if (2) or empirical provide number of xy pairs
%  ie. below where 3 pairs are 1 2 3 4 5 6
%2 3
%1 0 0 99999 2 0 0 1 2 3 4 5 6
2 2
```

```
360 0 345 360 2 0 0 345 360 0.5 0.5
2 2
360 0 345 360 2 0 0 345 360 0.5 0.5
2 2
360 0 345 360 2 0 0 345 360 0.5 0.5

%-------------------------------------------------------------------------
% Chemical Product Variables



% pool temp (degF) where chem prods form
% With statistics
% random-variable definitions:
%  (1) first parameter (mean/geom mean/mean)
%  (2) second parameter (std dev/geom std dev) (zero sigma returns mean)
%  (3) lower limit
%  (4) upper limit
%  (5) library distribution (1/2/3 = normal/empirical/TBD ...)
%  (6) conservative direction (0/1 = low/hi)
%  (7) logarithmic sample base (0 = linear scale)
%  (8 ...) empirical pdf must provide equal # of x then y values,
%           first four entries are ignored.
%  Provide distribution type
%  if (2) or empirical provide number of xy pairs
%  ie. below where 3 pairs are 1 2 3 4 5 6
%2 3
%1 0 0 99999 2 0 0 1 2 3 4 5 6
1
140 5 0 99999 1 0 0

%  bump factor for chems when t>=Tchem and T<=ChemTemp (S,M,L)
%  (spec mean as if min=0, but set min and max to shifted range)
%  (preselect mean and max to set desired tail prob in last sample pt)
% random-variable definitions:
%  (1) first parameter (mean/geom mean/mean)
%  (2) second parameter (std dev/geom std dev) (zero sigma returns mean)
%  (3) lower limit
%  (4) upper limit
%  (5) library distribution (1/2/3 = normal/empirical/TBD ...)
%  (6) conservative direction (0/1 = low/hi)
%  (7) logarithmic sample base (0 = linear scale)
%  (8 ...) empirical pdf must provide equal # of x then y values,
%           first four entries are ignored.
%  Provide distribution type
%  if (2) or empirical provide number of xy pairs
%  ie. below where 3 pairs are 1 2 3 4 5 6
%2 3
%1 0 0 99999 2 0 0 1 2 3 4 5 6
1
1.25 0.64 1 15.3 3 1 10              % truncated exponential
3 2
1.50 0.44444 1 18.2 3 1 10 1 2 0.5 0.5       % truncated exponential
3 2
2.00 0.25 1 24 3 1 10 1 10 1 0.5     % truncated exponential

%-------------------------------------------------------------------------
% thresholds of concern
%  (logical distribution functions. NOT part of sequence variability)
% random-variable definitions:
%  (1) first parameter (mean/geom mean/mean)
%  (2) second parameter (std dev/geom std dev) (zero sigma returns mean)
%  (3) lower limit
%  (4) upper limit
%  (5) library distribution (1/2/3 = normal/empirical/TBD ...)
%  (6) conservative direction (0/1 = low/hi)
%  (7) logarithmic sample base (0 = linear scale)
%  (8 ...) empirical pdf must provide equal # of x then y values,
%           first four entries are ignored.
```

```
%  Provide distribution type
%  if (2) or empirical provide number of xy pairs
%  ie. below where 3 pairs are 1 2 3 4 5 6
%2 3
%1 0 0 99999 2 0 0 1 2 3 4 5 6


% core blockage limit (g/FA) HL breaks
1
99999 0 0 0 1 0 0

% core blockage limit (g/FA) CL break
1
99999 0 0 0 1 0 0


% boron ppt limit (g/FA) for HL brk before HL inject
%   (should never fail by this mode)
1
99999 0 0 0 1 0 0

% boron ppt limit (g/FA) for CL brk before HL injection
1
7.5 0 0 0 1 0 0

% limit for strainer buckling (ft h2o)
1
9.35 0 0 0 1 0 0

% void fraction at pump inlet (@ train)
1
0.02 0 0 0 1 0 0

%-------------------------------------------------------------------------------------
%Plant State Table Data

% Operable Trains
% Train X Pump Matrix

% three trains operable (Case 01)
%    lpsi      hpsi    spray
%     1         1       1 %A
%     1         1       1 %B
%     1         1       1 %C

% two trains operable (Case 22)
%    lpsi      hpsi    spray
%      1       1       1 %A
%      1       1       1 %B
%      0       0       0 %C

% one train operable (Case 43)
%    lpsi      hpsi    spray
%      1       1       1 %A
%      0       0       0 %B
%      0       0       0 %C

% two LHSI pumps failed (Case 09)
%    lpsi      hpsi    spray
%      1       1       1 %A
%      0       1       1 %B
%      0       1       1 %C

% one train fail + one additional LHSI fail (Case 26)
%    lpsi      hpsi    spray
      1        1       1 %A
      0        1       1 %B
      0        0       0 %C

% # reactor coolant pumps (in CAD)
```

```
4

% # pressurizers (in CAD)
1

% # RHR pumps (in CAD)
3

% # steam generators (in CAD)
4

% time increment for evaluation (min)
5


% misc debris area (ft^2) total in containment
1
100 0 0 99999 1 0 0
% fraction of misc debris overlap (arrives @ t0)
0.25

% thin-bed thickness (in)
0.0625

% clip ZOI with walls (1/0 = y/n)
1

% const fiber filtration eff in fuel
1.0

% strainer height (ft)
3.25

% containment rel humidity
1.00

% sump rel humidity
1.00

% # fuel assemblies
193

% inflation of delP before chem bump
1
5 1 1 10 1 0 0

%******Min Flow to Cool Core***************

%Number of time and flow rate points

30
% Time post SCRAM (hr)
% Must be equal to number of time and flow rate points

0.0028          0.0042          0.0056
0.0111          0.0167          0.0222
0.0278          0.0417          0.0556
0.1111          0.1667          0.2222
0.2778          0.4167          0.5556
1.1111          1.6667          2.2222
2.7778          4.1667          5.5556
11.1111         16.6667         22.2222
27.7778         41.6667         111.1111
166.6667        222.2222         277.7778


%% Flow Rate (gpm)
% Must be equal to number of time and flow rate points

1414.7000   1323.5000   1260.9000   1113.4000   1030.5000
```

```
973.3000    931.3000    859.3000    812.3000    711.0000
654.7000    614.2000    581.8000    523.1000    480.9000
388.1000    342.4000    315.1000    295.7000    265.1000
245.5000    204.2000    182.7000    168.7000    158.1000
139.8000    99.0000     84.1000     74.4000     67.7000

%**********Special Weld ****************
% single-case tracer (weld location name - from table)
% specialweld = '31-RC-1102-NSS-1.1';
% If special weld input select 1 else 0
0
% If 1 write weld name
% else leave blank


%  nominal pool volume (ft^3) and area (ft^2)
%  (uniform distribution between min and max pool volumes - S,M,L)
2 2
0 0 0 0 2 0 0 43464 61993 .5 .5 %SBLOCA
2 2
0 0 0 0 2 0 0 39533 69444 .5 .5 %MBLOCA
2 2
0 0 0 0 2 0 0 45201 69263 .5 .5 %LBLOCA


% Pool Area (ft^2)
12301

% clean strainer attributes
% clean area of ONE strainer (ft^2)
1.8185e+003
% clean area of one OLD strainer (ft^2)
%155.4

% max clean strainer head loss (ft h2o)
 0.22

% single pump runout volume rates (gpm) (S, M, L)
% high-pressure max injection rates
 1620
% low-pressure injection rate
 2800

% Containment Spray Rate (all states except Case 43)
2 2
0 0 1932 2350 2 0 0 1932 2350 0.5 0.5
2 2
0 0 1932 2350 2 0 0 1932 2350 0.5 0.5
2 2
0 0 1932 2350 2 0 0 1932 2350 0.5 0.5

% Containment Spray Rate (Case 43)
%2 2
%0 0 2080 2600 2 0 0 2080 2600 0.5 0.5
%2 2
%0 0 2080 2600 2 0 0 2080 2600 0.5 0.5
%2 2
%0 0 2080 2600 2 0 0 2080 2600 0.5 0.5


%-------------------------------------------------------------------------
% geometric loading table for a single train:
%   thickness x(in) and strainer area A(ft^2) as functions of debris volume
%   V(ft^3). see supplementary routine StrainerArea for geometry definition
%   and assumptions. must be single-valued functions. May be slight mismatch
%   in compression for thickness estimation between this table and delP routine,
%   but low flow rate indicates low fiber compression.
%     V(ft^3)        x(in)      A (ft^2)
```

```
% switch table on/off = 1/0, list length of table
% if 0 a flat approximation will be used
% for old strainers
1 28

% Table Values
% If Table off leave blank
0            0           1.8185e+003
8.1790e+001  5.0000e-001  4.1900e+002
8.1800e+001  5.0100e-001  4.1931e+002
2.8016e+002  8.1421e+000  4.4718e+002
4.7853e+002  1.5783e+001  5.9256e+002
6.7689e+002  2.3424e+001  7.4768e+002
8.7526e+002  3.1065e+001  9.1253e+002
1.0736e+003  3.8706e+001  1.0871e+003
1.2720e+003  4.6348e+001  1.2714e+003
1.4703e+003  5.3989e+001  1.4655e+003
1.6687e+003  6.1630e+001  1.6692e+003
1.8671e+003  6.9271e+001  1.8827e+003
2.0654e+003  7.6912e+001  2.1060e+003
2.2638e+003  8.4553e+001  2.3389e+003
2.4622e+003  9.2194e+001  2.5816e+003
2.6605e+003  9.9835e+001  2.8341e+003
2.8589e+003  1.0748e+002  3.0962e+003
3.0573e+003  1.1512e+002  3.3681e+003
3.2556e+003  1.2276e+002  3.6497e+003
3.4540e+003  1.3040e+002  3.9411e+003
3.6524e+003  1.3804e+002  4.2422e+003
3.8507e+003  1.4568e+002  4.5530e+003
4.0491e+003  1.5332e+002  4.8735e+003
4.2474e+003  1.6096e+002  5.2038e+003
4.4458e+003  1.6860e+002  5.5438e+003
4.6442e+003  1.7625e+002  5.8935e+003
4.8425e+003  1.8389e+002  6.2530e+003
5.0409e+003  1.9153e+002  6.6222e+003

%-----------------------------------------------------------------
% initiating event frequency and bounded Johnson fit
%    NUREG-1829 current-day exceedance frequencies (without SG breaks)
%      (# breaks/cal yr of sizes > x)
%    Interpolated values for LOCA bins MUST be consistent with LOCAbins def
%    UT Austin fit of epistemic envelope using bounded Johnson pdf.
%      Parameters MUST be listed in column order (gamma,delta,xi,lamda)
% each row varies by size, each column varies by %ile (then transposed)

% Break Frequency Table Name
"Present-Day Exceedance Frequency"

% Break Sizes in Ascending Order
% These are fixed values
% For Documentation Purpose only
0.5 1.625 2 3 6 7 14 31

% Frequency Table
% These are fixed values
% For Documentation Purpose only
% Break Size X Percentile
6.8e-5 5.0e-6 3.69e-6 2.1e-7 6.30e-8 1.4e-8 4.1e-10 3.5e-11  % 5th %ile
6.3e-4 8.9e-5 6.57e-5 3.4e-6 1.08e-6 3.1e-7 1.2e-08 1.2e-09  % 50th %ile
1.9e-3 4.2e-4 3.10e-4 1.6e-5 5.20e-6 1.6e-6 2.0e-07 2.9e-08  % mean
7.1e-3 1.6e-3 1.18e-3 6.1e-5 1.98e-5 6.1e-6 5.8e-07 8.1e-08  % 95th %ile

% Table Percentile Values
0.05 0.5 NaN 0.95 % Don't Use Mean for Fitting

% Johnson Parameters
% These are fixed values
% For Documentation Purpose only
% gamma        delta          xi             lambda
1.650950E+00   5.256964E-01   4.117000E-05   1.420000E-02
```

```
1.646304E+00   4.593913E-01   2.530000E-06   3.200000E-03
1.646308E+00   4.593851E-01   1.870000E-06   2.360550E-03
1.646605E+00   4.589467E-01   1.200000E-07   1.220000E-04
1.646403E+00   4.566256E-01   3.000000E-08   3.965000E-05
1.645739E+00   4.487957E-01   6.023625E-09   1.220000E-05
1.645211E+00   3.587840E-01   2.892430E-10   1.160000E-06
1.645072E+00   3.343493E-01   2.636770E-11   1.600000E-07

%-------------------------------------------------------------------------------
% Strainer-Test Penetration Parameters

% area of test module (ft^2)
91.44

%  fraction of sheddable debris
%  (uniform empirical) - (unitless)
2 2
0 0 0 0 2 0 0 0.00956 0.0272 0.5 0.5


% shedding rate (1/min)
%  (uniform empirical)
2 2
0 0 0 0 2 0 0 0.008236 0.0546 0.5 0.5

% filter efficiency per g (slope)
%  (uniform empirical)
2 2
0 0 0 0 2 0 0  0.000339 0.003723 0.5 0.5

% filter fit cut point (g)
%  (uniform empirical)
2 2
0 0 0 0 2 0 0 790 880 0.5 0.5


% initial filter eff (intercept)
%  (uniform empirical)
2 2
0 0 0 0 2 0 0 0.656 0.706 0.5 0.5

% filter efficiency match pt
%  (set equal to 1.0 always)
1
1 0 0 0 1 0 0

% filter exp rate const (1/g)
%  (bimodal empirical)
2 3
0 0 0 0 2 1 0 0.0011254 0.0013078 0.031787 0.10000 0.45000 0.1000

%-------------------------------------------------------------------------------
% Debris Transport Factors
%  (enter conservative values here, random variables populated below)



%  ZOI-generated debris
%    (LDFG fines, LDFG small, LDFG large, uTherm fines, qual coat fines, crud fines)
%    (columns must ALWAYS be defined in this order left to right)
%    (rows must ALWAYS be defined in this order top to bottom)
%    (present values from Vol 3 for SG compartment break)

%    these factors were used for Full Batch 2

0.70 0.60 0.22 0.70 0.70 0.70     %F_BD_upr
0.30 0.25 0.00 0.30 0.30 0.30     %F_BD_lwr
0.53 0.27 0.00 0.53 0.53 0.53     %F_WD_UCin
0.47 0.19 0.00 0.47 0.47 0.47     %F_WD_UCan
```

```
0.00 0.27 0.00 0.00 0.00 0.00     %F_WD_BCin
0.00 0.00 0.00 0.00 0.00 0.00     %F_WD_BCan
0.02 0.00 0.00 0.02 0.02 0.02     %F_PF_sump
0.05 0.00 0.00 0.05 0.05 0.05     %F_PF_nact
1.00 0.64 0.00 1.00 1.00 1.00     %F_Rcrc_lwr
1.00 0.64 0.00 1.00 1.00 1.00     %F_Rcrc_WDin
1.00 0.58 0.00 1.00 1.00 1.00     %F_Rcrc_WDan
0.00 0.01 0.01 0.00 0.00 0.00     %F_Ersn_spry
0.00 0.07 0.07 0.00 0.00 0.00     %F_Ersn_pool


%  Unqualified coatings outside ZOI
%    (epoxy fines, epoxy fine chips, epoxy small chips, epoxy large chips,
%                                epoxy curls, alkyd, baked enamel, IOZ fines)
%    (columns must ALWAYS be defined in this order left to right)
%    (rows must ALWAYS be defined in this order top to bottom)
%    (present values from Vol 3 for MB/LBLOCA in SG compartment)

1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00   % F_fail
0.15 0.15 0.15 0.15 0.15 0.54 0.00 0.83   % F_upr
0.02 0.02 0.02 0.02 0.02 0.46 1.00 0.17   % F_lwr
0.83 0.83 0.83 0.83 0.83 0.00 0.00 0.00   % F_Rx
0.06 0.06 0.06 0.06 0.06 0.06 0.00 0.06   % F_spry
1.00 0.41 0.00 0.00 1.00 1.00 1.00 1.00   % F_rcrc
0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00   % F_Rxrcrc


% Latent Debris
%   (particulate, fiber)
%    (columns must ALWAYS be defined in this order left to right)
%    (rows must ALWAYS be defined in this order top to bottom)
%    (present values from Vol 3 for SG compartment)

0.00 0.00        %F_BD_upr       (1)
1.00 1.00        %F_BD_lwr       (2)
1.00 1.00        %F_WD           (3)
0.02 0.02        %F_PF_sump      (4)
0.05 0.05        %F_PF_nact      (5)
1.00 1.00        %F_Rcrc_lwr     (6)

%-------------------------------------------------------------------------------
%Time and Temperature Data

%Number of Time and Temperature Data Points
162


% time vector (hr) for small-break temperature profile
%  (FIRST entry is assumed 2B@ t=0. constant-value extrapolation imposed.
%  (time dependent temps ARE currently used in calc, one history for each LOCA)

% time vector (hour) for small (and medium) breaks

0.0000  0.0847  0.0864  0.0881  0.0897  0.0914  0.0931  0.0947
0.0964 0.0981  0.0997  0.1014  0.1031  0.1047  0.1064  0.1081
0.1097 0.1139  0.1306  0.1472  0.1639  0.1806  0.1972  0.2139
0.2306 0.2472  0.2639  0.2806  0.2972  0.3139  0.3306  0.3472
0.3639 0.3806  0.3972  0.4139  0.4306  0.4472  0.4639  0.4806
0.4972 0.5139  0.5306  0.5472  0.5639  0.5806  0.5972  0.6139
0.6306 0.6472  0.6639  0.6806  0.6972  0.7139  0.7306  0.7472
0.7639 0.7806  0.7972  0.8139  0.8306  0.8472  0.8639  0.8806
0.8972 0.9139  0.9306  0.9472  0.9639  0.9806  0.9972  1.0139
1.0306 1.0472  1.0639  1.0806  1.3611  1.6944  2.0278  2.3611
2.6944 3.0278  3.3611  3.6944  4.0278  4.3611  4.6944  5.0278
5.3611 5.6944  6.0278  6.3611  6.6944  7.0278  7.3611  7.6944
8.0278 8.3611  8.6944  9.0278  9.3611  9.6944  10.0278 20.0833
32.0833    44.0833 56.0833 68.0833 80.0833 92.0833 104.0833
116.0833   128.0833    140.0833    152.0833    164.0833
176.0833   188.0833    200.0833    212.0833    224.0833
236.0833   248.0833    260.0833    272.0833    283.3333
```

```
297.2222   308.3333   319.4444   333.3333   344.4444
355.5556   369.4444   380.5556   391.6667   402.7778
416.6667   427.7778   438.8889   452.7778   463.8889
475.0000   488.8889   500.0000   511.1111   525.0000
536.1111   547.2222   561.1111   572.2222   583.3333
597.2222   608.3333   619.4444   633.3333   644.4444
655.5556   669.4444   680.5556   691.6667   702.7778
716.6667

% temperature(F) profile for small (and medium) breaks
119.6000   131.2987   140.1689   150.3314   156.1240
159.2343   162.1567   164.5680   166.6937   168.5685
170.2457   171.7175   172.9577   174.0415   174.9570
175.7084   176.3081   177.5299   164.4935   132.7076
124.0848   123.6914   123.5988   123.5641   123.5529
124.4938   127.6399   129.7484   131.0391   149.8002
158.2393   162.7694   165.4960   167.3851   168.6688
169.7687   170.9814   171.9993   172.8771   173.7150
174.4595   175.0903   175.6074   176.0061   176.2923
176.4625   176.4855   176.3916   176.2055   175.9468
175.6184   175.2411   174.8243   174.3902   173.9374
173.4284   172.8459   172.2319   171.6143   171.0143
170.4548   169.9507   169.5034   169.1086   168.7661
168.4824   168.2551   168.0847   167.9707   167.9020
167.8705   167.8665   167.8947   167.9451   168.0131
168.0978   170.0607   170.9606   171.4105   170.8721
169.8110   168.7942   168.1132   165.3090   164.1228
163.0112   161.4436   159.9385   158.1298   158.4517
156.5706   151.6937   163.7090   160.9624   158.1118
156.1579   154.6151   153.2333   151.9641   150.8191
149.7667   148.7924   147.8649   136.2080   129.0230
124.9790   122.1450   120.1310   118.4710   117.3160
116.4980   115.6160   114.7100   113.8960   113.1730
112.5210   111.9240   111.3580   110.8590   110.3930
109.9930   109.5770   109.2090   108.9100   108.5930
108.2810   107.9680   107.7100   107.4730   107.1620
106.9430   106.7150   106.4770   106.2500   106.1240
105.8930   105.6660   105.5410   105.3160   105.1930
105.0690   104.8440   104.7250   104.6070   104.3770
104.3660   104.1400   104.0230   103.9050   103.7910
103.6730   103.5660   103.4520   103.3350   103.1450
103.1000   102.9130   102.8680   102.6810   102.6450
102.5250   102.5160

% time vector (hr) for medium (and small) break temperature profile
%  (FIRST entry is assumed 2B@ t=0. constant-value extrapolation imposed.
0.0000  0.0847  0.0864  0.0881  0.0897  0.0914  0.0931  0.0947
0.0964 0.0981  0.0997  0.1014  0.1031  0.1047  0.1064  0.1081
0.1097 0.1139  0.1306  0.1472  0.1639  0.1806  0.1972  0.2139
0.2306 0.2472  0.2639  0.2806  0.2972  0.3139  0.3306  0.3472
0.3639 0.3806  0.3972  0.4139  0.4306  0.4472  0.4639  0.4806
0.4972 0.5139  0.5306  0.5472  0.5639  0.5806  0.5972  0.6139
0.6306 0.6472  0.6639  0.6806  0.6972  0.7139  0.7306  0.7472
0.7639 0.7806  0.7972  0.8139  0.8306  0.8472  0.8639  0.8806
0.8972 0.9139  0.9306  0.9472  0.9639  0.9806  0.9972  1.0139
1.0306 1.0472  1.0639  1.0806  1.3611  1.6944  2.0278  2.3611
2.6944 3.0278  3.3611  3.6944  4.0278  4.3611  4.6944  5.0278
5.3611 5.6944  6.0278  6.3611  6.6944  7.0278  7.3611  7.6944
8.0278 8.3611  8.6944  9.0278  9.3611  9.6944  10.0278 20.0833
32.0833    44.0833 56.0833 68.0833 80.0833 92.0833 104.0833
116.0833   128.0833   140.0833   152.0833   164.0833
176.0833   188.0833   200.0833   212.0833   224.0833
236.0833   248.0833   260.0833   272.0833   283.3333
297.2222   308.3333   319.4444   333.3333   344.4444
355.5556   369.4444   380.5556   391.6667   402.7778
416.6667   427.7778   438.8889   452.7778   463.8889
475.0000   488.8889   500.0000   511.1111   525.0000
536.1111   547.2222   561.1111   572.2222   583.3333
597.2222   608.3333   619.4444   633.3333   644.4444
```

```
655.5556   669.4444    680.5556    691.6667    702.7778
716.6667


% Temperature(F) profile for medium breaks
119.6000    131.2987    140.1689    150.3314    156.1240
159.2343    162.1567    164.5680    166.6937    168.5685
170.2457    171.7175    172.9577    174.0415    174.9570
175.7084    176.3081    177.5299    164.4935    132.7076
124.0848    123.6914    123.5988    123.5641    123.5529
124.4938    127.6399    129.7484    131.0391    149.8002
158.2393    162.7694    165.4960    167.3851    168.6688
169.7687    170.9814    171.9993    172.8771    173.7150
174.4595    175.0903    175.6074    176.0061    176.2923
176.4625    176.4855    176.3916    176.2055    175.9468
175.6184    175.2411    174.8243    174.3902    173.9374
173.4284    172.8459    172.2319    171.6143    171.0143
170.4548    169.9507    169.5034    169.1086    168.7661
168.4824    168.2551    168.0847    167.9707    167.9020
167.8705    167.8665    167.8947    167.9451    168.0131
168.0978    170.0607    170.9606    171.4105    170.8721
169.8110    168.7942    168.1132    165.3090    164.1228
163.0112    161.4436    159.9385    158.1298    158.4517
156.5706    151.6937    163.7090    160.9624    158.1118
156.1579    154.6151    153.2333    151.9641    150.8191
149.7667    148.7924    147.8649    136.2080    129.0230
124.9790    122.1450    120.1310    118.4710    117.3160
116.4980    115.6160    114.7100    113.8960    113.1730
112.5210    111.9240    111.3580    110.8590    110.3930
109.9930    109.5770    109.2090    108.9100    108.5930
108.2810    107.9680    107.7100    107.4730    107.1620
106.9430    106.7150    106.4770    106.2500    106.1240
105.8930    105.6660    105.5410    105.3160    105.1930
105.0690    104.8440    104.7250    104.6070    104.3770
104.3660    104.1400    104.0230    103.9050    103.7910
103.6730    103.5660    103.4520    103.3350    103.1450
103.1000    102.9130    102.8680    102.6810    102.6450
102.5250    102.5160


% time vector (hr) for large breaks
0.0000   0.0847  0.0864  0.0881  0.0897  0.0914  0.0931  0.0947
0.0964  0.0981  0.0997  0.1014  0.1031  0.1047  0.1064  0.1081  0.1097
0.1139  0.1306  0.1472  0.1639  0.1806  0.1972  0.2139  0.2306  0.2472
0.2639  0.2806  0.2972  0.3139  0.3306  0.3472  0.3639  0.3806  0.3972
0.4139  0.4306  0.4472  0.4639  0.4806  0.4972  0.5139  0.5306  0.5472
0.5639  0.5806  0.5972  0.6139  0.6306  0.6472  0.6639  0.6806  0.6972
0.7139  0.7306  0.7472  0.7639  0.7806  0.7972  0.8139  0.8306  0.8472
0.8639  0.8806  0.8972  0.9139  0.9306  0.9472  0.9639  0.9806  0.9972
1.0139  1.0306  1.0472  1.0639  1.0806  1.3611  1.6944  2.0278  2.3611
2.6944  3.0278  3.3611  3.6944  4.0278  4.3611  4.6944  5.0278  5.3611
5.6944  6.0278  6.3611  6.6944  7.0278  7.3611  7.6944  8.0278  8.3611
8.6944  9.0278  9.3611  9.6944  10.0278 20.0833 32.0833 44.0833 56.0833
68.0833 80.0833 92.0833 104.0833    116.0833    128.0833    140.0833
152.0833    164.0833    176.0833    188.0833    200.0833    212.0833
224.0833    236.0833    248.0833    260.0833    272.0833    283.3333
297.2222    308.3333    319.4444    333.3333    344.4444    355.5556
369.4444    380.5556    391.6667    402.7778    416.6667    427.7778
438.8889    452.7778    463.8889    475.0000    488.8889    500.0000
511.1111    525.0000    536.1111    547.2222    561.1111    572.2222
583.3333    597.2222    608.3333    619.4444    633.3333    644.4444
655.5556    669.4444    680.5556    691.6667    702.7778    716.6667

% Temperature (F) profile for large breaks
119.8113 213.9295    242.3104    255.0268    255.7907    253.1617
252.9372    252.5390    251.9023    250.9733    249.7169    245.8894
235.9856    224.0051    212.9495    203.5499    195.7225    179.5894
199.8048    174.8143    174.8276    177.3518    180.7405    183.2333
185.1644    186.4925    187.2579    187.8270    188.1924    188.4266
188.5605    188.5934    188.5042    188.3375    189.3187    189.7570
```

```
189.0923    188.5202    188.0148    187.5621    187.4103    187.0671
186.7330    186.4249    186.1559    186.7640    186.5012    186.2557
186.0555    185.9119    185.8265    185.8062    185.8495    185.9526
186.1092    187.8900    187.9673    187.9196    187.9119    187.9385
187.9954    188.0710    188.1647    188.2538    188.3385    188.4003
189.0996    188.9199    188.7439    188.5614    188.3622    188.1314
187.8597    187.5387    187.1667    186.7559    178.4091    171.8762
166.5421    162.2238    158.1410    154.9818    151.7673    148.9234
146.0834    143.7967    141.6054    139.5251    137.9892    136.4819
134.8865    136.9000    136.6489    135.3569    134.3103    133.2941
132.4453    131.9467    132.0536    132.1915    131.3055    130.7946
130.2765    123.0489    118.1991    114.9095    112.4170    110.4096
108.7290    107.2834    106.0152    104.8855    103.8671    102.9399
102.0890    101.3027    100.5720    99.8894 99.2491 98.6461 98.0763
97.5362 97.0229 96.5339 96.0669 95.6474 95.1520 94.7720 94.4055
93.9649 93.6254 93.2967 92.9000 92.5932 92.2953 92.0057 91.6547
91.3822 91.1168 90.7942 90.5432 90.2982 89.9998 89.7671 89.5396
89.2620 89.0452 88.8328 88.5733 88.3703 88.1712 87.9276 87.7368
87.5494 87.3198 87.1398 86.9628 86.7457 86.5753 86.4076 86.2427
86.0401

%-------------------------------------------------------------------------------
% NPSH parameters:
%   (specify any # of pipe segments in common header)
%
% major HL variables

% absolute roughness of the pipe (ft)
0.00015

% Number of Pipe Segments
6

% pipe diameters (ft)
1.27 .99 1.27 .84 1.27 .99

% pipe lengths (ft)
66.96 25.41 12.00 25.46 11.50 24.91

% depth of common header (ft)
25.83 25.65 25.83 % LPSI, HPSI, SPRY

% NPSH required for each pump (ft water)
12 12 12        % LPSI, HPSI, SPRY

% minor HL variables
%  # of elbows, tees, entrances, and branches per pipe segment
%    [(# of 90 degree) (# of 45 degree) (# of gate valves)(# of entrances)(# of
%     tee runs) (# of tee branches)]

4 2 1 1 0 0    % segment AB
3 0 0 0 0 1    % segment BC
0 0 0 0 1 0    % segment BD
3 0 0 0 0 1    % segment DE
0 0 0 0 1 0    % segment DF
3 0 0 0 0 1    % segment FG

%-------------------------------------------------------------------------------
% Newly Added Options

% Use Old Degas Routine? (0 = No, 1 = Yes)
0

% Use Old NPSH Routine? (0 = No, 1 = Yes)
0

% Use Old SI Pump Flow Equation? (0 = No, 1 = Yes)
0

% Use Old Strainer Properties? (0 = No, 1 = Yes)
```

```
0

% Use Common Random Numbers Across Frequency Replications? (0 = No, 1 = Yes)
0

% Enable All Plots? (0 = No, 1 = Yes)
1

% Enable Parallel Calculations (0 = No, 1 = Yes)
% CAUTION - USE ONLY IF YOUR KNOW YOUR PC MEETS SPECIFICATIONS!!!!!
0

% Number of Parallel Threads
4

% Use Optimal Frequency Bins for 15 Freps (0 = No, 1 = Yes)
1

% Use Old Debris Source Rate (Before Error Correction)? (0 = No, 1 = Yes)
1

% Use Old Latent Debris Transport Equations (Before Error Correction)? (0 = No, 1 = Yes)
1
```

Attachment 11

STP CASA Grande Information (Non-Proprietary Version)

CASA43 JT4

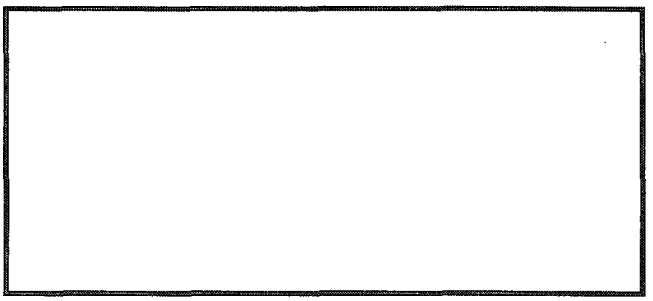
Contains No Proprietary Information
Alion Science and Technology

```
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
%LANLANLANLANLANLANLANLANLANLANLANLANLANLANLANLANLANLANANLANLANLANLANLA%
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%

% Define Case Folders (Main Project Folder)
"/work/02405/jjtejada/yye00/matlab_code/Demo Plant"

% Define Working Folders

% Analysis Folder (~/.../Case/Analysis)
"Analytic Results"

% Run Subfolder (~/.../Case/Analysis/run)
"Tornado"

% Run Sub_Subfolder (~/.../Case/Analysis/run/run_sub)
"SIMCON"

% Run Sub_Sub_Subfolder (~/.../Case/Analysis/run/run_sub/run_sub_sub)
"Delta Pump Case 43 Shuffle"

% CAD Folder Name (~/.../Case/CAD)
"CAD Files"

% Concrete Sub-Folder (~/.../Case/CAD/Concrete)
"Concrete Data"

% Equipment Sub-Folder (~/.../Case/CAD/Equipment)
"Equip Data"

% Grating Sub-Folder (~/.../Case/CAD/Grating)
"Grating Data"

% Pipe Sub-Folder (~/.../Case/CAD/Pipes)
"Pipe Data"

% Fequency Folder (~/.../Case/Frequency)
"Freq Data"

% Break Frequency (~/.../Case/Frequency/Break)
"LOCA Frequency and Weld Inputs - 12-7-12 R1.xlsx"

% Break Fequency Table (~/.../Case/Frequency/Break/Table)
"LOCA Data"

% Weld Case File (~/.../Case/Frequency/Weld)
"LOCA Frequency and Weld Inputs - 12-7-12 R1.xlsx"

% Weld Case Table (~/.../Case/Frequency/Weld/Table)
"Weld Table"
%------------------------------------------------------------------
% multiplicative spatial unit conversions
% rectify all CAD elements for consistency
% applied to ALL length units within each CAD file

% Concrete Multiplier
1.0

% Equipment Multiplier
1.0

% Grating Multiplier
1.0

% Pipe Multiplier

1.0
%---------------------------------------------------------------------
```

```
%  LOCA bin definitions
%  (units consistent with freq dists and CAD data)

% List Number of Defined Break Size Limits
% ie. SB,MB,LB (3 designations)
% However more sizes are allowable
 3

% List Sizes
0.5   2.0   6.0

%-------------------------------------------------------------------

% CAD and Plotting Options (1/0 = Y/N)

% Show CAD Reproduction
0

% Show Concrete and Gratings
0

% Produce Intro Movie and Stop
0

% Debris Passage Correlation
0

% Sample Flow Rates
0

% Random Input Distributions
0

% ZOI Radial Inflation Factor(Plotting Only)
50

% ZOI Plotting Interval (# of breaks between plots)
25

%-------------------------------------------------------------------
%   spatial resolution for discretizing insulation
%   (must repeat weld target sort if these are changed. delete all master
%   files and rerun with new delL and Nangbin)

% Linear Resolution (in.)
6

%Azimuthal Bins in 2 Pi Radians on Pipes
12

%-------------------------------------------------------------------
% Head Loss Option
% porosity calc (1/2 = vol / mass weighting)
% (vol weighting was found to be more conservative)
1
%-------------------------------------------------------------------
% Synonyms tables for nonstandard welds, hangars and valves and Equipment

% Number of Valve synonyms
5
% Valve Synonyms
Valve VALVE MOV XRH FCV

% Number of Hangar Labels
14
% Hangar Synonyms
Hangar Hanger HL AF GU SS SH RR RH
"Work Point" "work point" "Work point" "work Point" "WORK POINT"

% Number of Weld Synonyms
```

```
4

% Weld Synonyms
FW Weld WELD FS

% Number of Steam Generator Synonyms
2

% Steam Generator Synonyms
SG SteamGenerator

% Number of Reactor Coolant Pump Synonyms
2

% Reactor Coolant Pump Synonyms
RCP ReactorCoolantPump

% Number of Pressurizer Synonyms
3

% Pressurizer Synonyms
PZR PRZR Pressurizer

% Number of RHR Synonyms
2

% RHR Synonyms
RHR ResidualHeatRemoval

%-------------------------------------------------------------------------------
%Statistics Sampling Options

%Sampling Method
% (0/1/2/3 = CASA default / MatLab default / shuffle / read file)
2


%If Option 3 specified, set file name in case folder below
%If not LEAVE BLANK



% max # LHS bins in LLOCA for max DEGB (DEGB counts as 1)
% Nmaxbrk =  2 => 2044 total breaks
% Nmaxbrk =  3 => 2100 total breaks
% Nmaxbrk =  5 => 2250 total breaks
% Nmaxbrk = 10 => 3070 total breaks
5

% # LHS replicates (batches) for each frequency CCDF
20

% # epistemic freq envelope samples
% current models process ~110 cases per minute
15

% logarithmic base for sampling epistemic frequency envelope
2


% lower limit of highest epistemic frequency bin
0.99



% # interpolation pts in each break freq ccdf
1000


% logarithmic base for sampling break size
```

```
%  (double check routine before changing this from base 10)
10


%-----------------------------------------------------------------------
%Insulation Characteristics

% Number of Low Density Fiberglass Zones
3
```



Redacted

```
% Number of Debris Types
8

% Debris Types
NUKON   NUKON_2 MICROTHERM RMI LEAD    "THERMAL WRAP" IOZ      ALKYD

%Debris treated as LDFG
% 1/0 --> yes/no
1 1 0 0 0 1 0 0

%Debris treated as microtherm
% 1/0 --> yes/no
0 0 1 0 0 0 0 0

% Damage Radii with statistics definitions
% Material X Statistics
% random-variable definitions:
%  (1) first parameter (mean/geom mean/mean)
%  (2) second parameter (std dev/geom std dev) (zero sigma returns mean)
%  (3) lower limit
%  (4) upper limit
%  (5) library distribution (1/2/3 = normal/empirical/TBD ...)
%  (6) conservative direction (0/1 = low/hi)
%  (7) logarithmic sample base (0 = linear scale)
%  (8 ...) empirical pdf must provide equal # of x then y values,
%            first four entries are ignored.
%  Provide distribution type
%  if (2) or empirical provide number of xy pairs
%  ie. below where 3 pairs are 1 2 3 4 5 6
%2 3
%1 0 0 99999 2 0 0 1 2 3 4 5 6
1
17 0 0 99999 1 0 0
1
17 0 0 99999 1 0 0
1
28.6 0 0 99999 1 0 0
1
1 0 0 99999 1 0 0
1
1 0 0 99999 1 0 0
1
17 0 0 99999 1 0 0
1
1 0 0 99999 1 0 0
1
1 0 0 99999 1 0 0
%-----------------------------------------------------------------------
```

```
%  Debris Properties Table

%  (denote particulate/fiber = sphere/cylinder = 1/2)
%  (do NOT add to or reorder this list unless code is modified)
%  (inventory of fibers with cylindrical geom must be given in ft^3)
%  (can 'fake' the diameter to match a given Sv using std geom formulas)
%  (inventory of particulates with spherical geom must be given in lbm)
%  (this list MUST include every debris type of interest)
%  (if unknown, set "manufactured" density of particulate to ~20% of Rho_mat)
%       (based on comparison of FeO2 to BWR sludge compaction density)

                %'label'       DebrisPropi       'Geom'    'Diam' 'Rho_mat'  'Rho_mfc'
% native units                                  'sph,cyl' 'um'   'lbm/ft^3' 'lbm/ft^3'
% calc units                                   'sph,cyl' 'm'    'kg/m^3'   'kg/m^3'
              "LDFG - fines"          2         7       175        2.4
               "LDFG - small"          2         7       175        2.4
               "LDFG - large"          2         7       175        2.4
               "uTherm - filaments"    2         6       165        2.4
               "uTherm - SiO2"         1         2.5     137        27.4
               "uTherm - TiO2"         1         20      262        52.4
               "QualCoat - epoxy"      1         10      94         36.66
               "QualCoat - IOZ"        1         10      208        81.12
               "Crud"                  1         15      350        70.0
               "UQCoat - epoxyfine"    1         152     124        48.36
               "UQCoat - epoxyFchp"    1         1143    124        48.36
               "UQCoat - epoxySchp"    1         1143    124        48.36
               "UQCoat - epoxyLchp"    1         1143    124        48.36
               "UQCoat - epoxyCrls"    1         1143    124        48.36
               "UnQualCoat - alkyd"    1         10      207        80.73
               "UnQualCoat - enamel"   1         10      93         36.27
               "UnQualCoat - IOZ"      1         10      244        95.16
               "Latent - particulate"  1         17.3    169        33.80
               "Latent - fiber"        2         7       175        2.4

%-------------------------------------------------------------------------------------------
% microTherm constituents (low density concrete with fiber binder)
% mfc'd density (lbm/ft3)
15.0

% mass fraction filamentsflf_read
0.03

% mass fraction of SiO2
0.58

% mass fraction of TiO2
0.39

% debris type start and stop times (min after break)
%   (rate assumed to be uniform from Tstart to Tend)
%   (rate calc uses inventories defined above)
%   (introduce "instant" sources over 1 delT)
%   (debris from UQCoat cannot have Tstartsrc=0)
%   (timing is presently independent of break size)

%   Start Times
0       0       0       0       0       0       0       0       0       10
10      10      10      10      10      10      10      0       0

%   Stop Times
10      10      10      10      10      10      10      10      10      2160
2160    2160    2160    2160    2160    2160    2160    10      10

%-------------------------------------------------------------------------------------------
%  Noninsulation Debris Quantities

% random-variable definitions:
%  (1) first parameter (mean/geom mean/mean)
%  (2) second parameter (std dev/geom std dev) (zero sigma returns mean)
%  (3) lower limit
```

Diameters of SiO2 and TiO2 are improperly reversed

```
%  (4) upper limit
%  (5) library distribution (1/2/3 = normal/empirical/TBD ...)
%  (6) conservative direction (0/1 = low/hi)
%  (7) logarithmic sample base (0 = linear scale)
%  (8 ...) empirical pdf must provide equal # of x then y values,
%            first four entries are ignored.
%  Provide distribution type
%  if (2) or empirical provide number of xy pairs
%  ie. below where 3 pairs are 1 2 3 4 5 6
%2 3
%1 0 0 99999 2 0 0 1 2 3 4 5 6

% qual epoxy in ZOI (lbm)
1
105 0 0 99999 1 0 0

% qual IOZ in ZOI (lbm)
1
39 0 0 99999 1 0 0

% crud fines (lbm)
1
24 0 0 99999 1 0 0

% unqual epoxy fine (lbm)
%   (uniform dist
2 2
234 0 117 234 2 0 0 117 234 0.5 0.5


% unqual epoxy fine chip (lbm)
%   (uniform dist)
2 2
709 0 355 709 2 0 0 355 709 0.5 0.5

% unqual epoxy small chip (lbm)
%   (uniform dist)
2 2
180 0 90 180 2 0 0 90 180 0.5 0.5

% unqual epoxy large chip (lbm)
%   (uniform dist)
2 2
391 0 196 391 2 0 0 196 391 0.5 0.5


% unqual epoxy curls (lbm)
%   (uniform dist)
2 2
391 0 196 391 2 0 0 196 391 0.5 0.5

% unqual alkyd (lbm)
1
271 0 0 99999 1 0 0

% unqual enamel (lbm)
1
267 0 0 99999 1 0 0

% unqual IOZ (lbm)
1
369 0 0 99999 1 0 0

% latent pariculate (lbm)
1
170 0 0 99999 1 0 0

% latent fiber (ft^3)
1
12.5 0 0 99999 1 0 0
```

```
%-------------------------------------------------------------------------
%   Time points along accident progression
%   (assume all trains of injection on initially, w/spray on setpoint trip)
%   (assume HPSI and LPSI both run, but LPSI flow negligible until depress)
%   (1 of 3 spray pumps can be turned off, all HPSI can be turned off for M,L)
%   (for degraded condition with < max trains, DON'T exercise any options)


% max time of interest (hr)
36

%******Recirculation Times******
%Number of break sizes for recirc table
7

%Recirc Time Table
1.5 2 4 6 8 12 27.5    %Break Size (in.)
337 79 56 44 38 31 30  %Time to recirc (min)

%******Other LOCA Times**********
% time to ONE spray pump off (min) (S,M,L)
% (if 0.0, NO spray pumps run)
% With Statistics
% One Row for each size designation (see LOCA bin definitions)
% random-variable definitions:
%  (1) first parameter (mean/geom mean/mean)
%  (2) second parameter (std dev/geom std dev) (zero sigma returns mean)
%  (3) lower limit
%  (4) upper limit
%  (5) library distribution (1/2/3 = normal/empirical/TBD ...)
%  (6) conservative direction (0/1 = low/hi)
%  (7) logarithmic sample base (0 = linear scale)
%  (8 ...) empirical pdf must provide equal # of x then y values,
%            first four entries are ignored.
%  Provide distribution type
%  if (2) or empirical provide number of xy pairs
%  ie. below where 3 pairs are 1 2 3 4 5 6
%2 3
%1 0 0 99999 2 0 0 1 2 3 4 5 6
 1
 0      0       0       99999   1       0       0
 1
 20     5       0       99999   1       0       0
 1
 20     5       0       99999   1       0       0

% time to ALL spray pumps off (min) (S,M,L)
% One Row for each size designation (see LOCA bin definitions)
% random-variable definitions:
%  (1) first parameter (mean/geom mean/mean)
%  (2) second parameter (std dev/geom std dev) (zero sigma returns mean)
%  (3) lower limit
%  (4) upper limit
%  (5) library distribution (1/2/3 = normal/empirical/TBD ...)
%  (6) conservative direction (0/1 = low/hi)
%  (7) logarithmic sample base (0 = linear scale)
%  (8 ...) empirical pdf must provide equal # of x then y values,
%            first four entries are ignored.
%  Provide distribution type
%  if (2) or empirical provide number of xy pairs
%  ie. below where 3 pairs are 1 2 3 4 5 6
%2 3
%1 0 0 99999 2 0 0 1 2 3 4 5 6
1
390  5 390 420 1 0 0
1
390 10 390 420 1 0 0
1
390 15 390 450 1 0 0
```

```
% time to retire 1 full train (min) (S,M,L)
%  (this prob never happens, keep as option)
%  (it would be the train with spray off already)
% One Row for each size designation (see LOCA bin definitions)
% random-variable definitions:
%  (1) first parameter (mean/geom mean/mean)
%  (2) second parameter (std dev/geom std dev) (zero sigma returns mean)
%  (3) lower limit
%  (4) upper limit
%  (5) library distribution (1/2/3 = normal/empirical/TBD ...)
%  (6) conservative direction (0/1 = low/hi)
%  (7) logarithmic sample base (0 = linear scale)
%  (8 ...) empirical pdf must provide equal # of x then y values,
%            first four entries are ignored.
%  Provide distribution type
%  if (2) or empirical provide number of xy pairs
%  ie. below where 3 pairs are 1 2 3 4 5 6
%2 3
%1 0 0 99999 2 0 0 1 2 3 4 5 6
1
99999 0 0 99999 1 0 0
1
99999 0 0 99999 1 0 0
1
99999 0 0 99999 1 0 0

% earliest time for chem prod (min) (S,M,L)
% One Row for each size designation (see LOCA bin definitions)
% random-variable definitions:
%  (1) first parameter (mean/geom mean/mean)
%  (2) second parameter (std dev/geom std dev) (zero sigma returns mean)
%  (3) lower limit
%  (4) upper limit
%  (5) library distribution (1/2/3 = normal/empirical/TBD ...)
%  (6) conservative direction (0/1 = low/hi)
%  (7) logarithmic sample base (0 = linear scale)
%  (8 ...) empirical pdf must provide equal # of x then y values,
%            first four entries are ignored.
%  Provide distribution type
%  if (2) or empirical provide number of xy pairs
%  ie. below where 3 pairs are 1 2 3 4 5 6
%2 3
%1 0 0 99999 2 0 0 1 2 3 4 5 6
1
0 0 0 99999 1 0 0
1
0 0 0 99999 1 0 0
1
0 0 0 99999 1 0 0

% time to hot leg injection (min) (S,M,L)
% One Row for each size designation (see LOCA bin definitions)
% random-variable definitions:
%  (1) first parameter (mean/geom mean/mean)
%  (2) second parameter (std dev/geom std dev) (zero sigma returns mean)
%  (3) lower limit
%  (4) upper limit
%  (5) library distribution (1/2/3 = normal/empirical/TBD ...)
%  (6) conservative direction (0/1 = low/hi)
%  (7) logarithmic sample base (0 = linear scale)
%  (8 ...) empirical pdf must provide equal # of x then y values,
%            first four entries are ignored.
%  Provide distribution type
%  if (2) or empirical provide number of xy pairs
%  ie. below where 3 pairs are 1 2 3 4 5 6
%2 3
%1 0 0 99999 2 0 0 1 2 3 4 5 6
2 2
```

```
360 0 345 360 2 0 0 345 360 0.5 0.5
2 2
360 0 345 360 2 0 0 345 360 0.5 0.5
2 2
360 0 345 360 2 0 0 345 360 0.5 0.5

%-------------------------------------------------------------------------
% Chemical Product Variables



% pool temp (degF) where chem prods form
% With statistics
% random-variable definitions:
%  (1) first parameter (mean/geom mean/mean)
%  (2) second parameter (std dev/geom std dev) (zero sigma returns mean)
%  (3) lower limit
%  (4) upper limit
%  (5) library distribution (1/2/3 = normal/empirical/TBD ...)
%  (6) conservative direction (0/1 = low/hi)
%  (7) logarithmic sample base (0 = linear scale)
%  (8 ...) empirical pdf must provide equal # of x then y values,
%            first four entries are ignored.
%  Provide distribution type
%  if (2) or empirical provide number of xy pairs
%  ie. below where 3 pairs are 1 2 3 4 5 6
%2 3
%1 0 0 99999 2 0 0 1 2 3 4 5 6
1
140 5 0 99999 1 0 0

%  bump factor for chems when t>=Tchem and T<=ChemTemp (S,M,L)
%  (spec mean as if min=0, but set min and max to shifted range)
%  (preselect mean and max to set desired tail prob in last sample pt)
% random-variable definitions:
%  (1) first parameter (mean/geom mean/mean)
%  (2) second parameter (std dev/geom std dev) (zero sigma returns mean)
%  (3) lower limit
%  (4) upper limit
%  (5) library distribution (1/2/3 = normal/empirical/TBD ...)
%  (6) conservative direction (0/1 = low/hi)
%  (7) logarithmic sample base (0 = linear scale)
%  (8 ...) empirical pdf must provide equal # of x then y values,
%            first four entries are ignored.
%  Provide distribution type
%  if (2) or empirical provide number of xy pairs
%  ie. below where 3 pairs are 1 2 3 4 5 6
%2 3
%1 0 0 99999 2 0 0 1 2 3 4 5 6
1
1.25 0.64 1 15.3 3 1 10              % truncated exponential
3 2
1.50 0.44444 1 18.2 3 1 10 1 2 0.5 0.5       % truncated exponential
3 2
2.00 0.25 1 24 3 1 10 1 10 1 0.5     % truncated exponential

%-------------------------------------------------------------------------
% thresholds of concern
%  (logical distribution functions. NOT part of sequence variability)
% random-variable definitions:
%  (1) first parameter (mean/geom mean/mean)
%  (2) second parameter (std dev/geom std dev) (zero sigma returns mean)
%  (3) lower limit
%  (4) upper limit
%  (5) library distribution (1/2/3 = normal/empirical/TBD ...)
%  (6) conservative direction (0/1 = low/hi)
%  (7) logarithmic sample base (0 = linear scale)
%  (8 ...) empirical pdf must provide equal # of x then y values,
%            first four entries are ignored.
```

```
%  Provide distribution type
%  if (2) or empirical provide number of xy pairs
%  ie. below where 3 pairs are 1 2 3 4 5 6
%2 3
%1 0 0 99999 2 0 0 1 2 3 4 5 6


% core blockage limit (g/FA) HL breaks
1
99999 0 0 0 1 0 0

% core blockage limit (g/FA) CL break
1
99999 0 0 0 1 0 0


% boron ppt limit (g/FA) for HL brk before HL inject
%   (should never fail by this mode)
1
99999 0 0 0 1 0 0

% boron ppt limit (g/FA) for CL brk before HL injection
1
7.5 0 0 0 1 0 0

% limit for strainer buckling (ft h2o)
1
9.35 0 0 0 1 0 0

% void fraction at pump inlet (@ train)
1
0.02 0 0 0 1 0 0

%-------------------------------------------------------------------------------------------
%Plant State Table Data

% Operable Trains
% Train X Pump Matrix

% three trains operable (Case 01)
%    lpsi      hpsi    spray
%      1         1       1 %A
%      1         1       1 %B
%      1         1       1 %C

% two trains operable (Case 22)
%    lpsi      hpsi    spray
%      1         1       1 %A
%      1         1       1 %B
%      0         0       0 %C

% one train operable (Case 43)
%    lpsi      hpsi    spray
       1         1       1 %A
       0         0       0 %B
       0         0       0 %C

% two LHSI pumps failed (Case 09)
%    lpsi      hpsi    spray
%      1         1       1 %A
%      0         1       1 %B
%      0         1       1 %C

% one train fail + one additional LHSI fail (Case 26)
%    lpsi      hpsi    spray
%      1         1       1 %A
%      0         1       1 %B
%      0         0       0 %C

% # reactor coolant pumps (in CAD)
```

```
4

% # pressurizers (in CAD)
1

% # RHR pumps (in CAD)
3

% # steam generators (in CAD)
4

% time increment for evaluation (min)
5


% misc debris area (ft^2) total in containment
1
100 0 0 99999 1 0 0
% fraction of misc debris overlap (arrives @ t0)
0.25

% thin-bed thickness (in)
0.0625

% clip ZOI with walls (1/0 = y/n)
1

% const fiber filtration eff in fuel
1.0

% strainer height (ft)
3.25

% containment rel humidity
1.00

% sump rel humidity
1.00

% # fuel assemblies
193

% inflation of delP before chem bump
1
5 1 1 10 1 0 0

%******Min Flow to Cool Core*****************

%Number of time and flow rate points

30
% Time post SCRAM (hr)
% Must be equal to number of time and flow rate points

0.0028          0.0042          0.0056
0.0111          0.0167          0.0222
0.0278          0.0417          0.0556
0.1111          0.1667          0.2222
0.2778          0.4167          0.5556
1.1111          1.6667          2.2222
2.7778          4.1667          5.5556
11.1111         16.6667         22.2222
27.7778         41.6667         111.1111
166.6667        222.2222         277.7778


%% Flow Rate (gpm)
% Must be equal to number of time and flow rate points

1414.7000   1323.5000   1260.9000   1113.4000   1030.5000
```

```
973.3000    931.3000    859.3000    812.3000    711.0000
654.7000    614.2000    581.8000    523.1000    480.9000
388.1000    342.4000    315.1000    295.7000    265.1000
245.5000    204.2000    182.7000    168.7000    158.1000
139.8000    99.0000     84.1000     74.4000     67.7000

%**********Special Weld ****************
% single-case tracer (weld location name - from table)
% specialweld = '31-RC-1102-NSS-1.1';
% If special weld input select 1 else 0
0
% If 1 write weld name
% else leave blank



%   nominal pool volume (ft^3) and area (ft^2)
%  (uniform distribution between min and max pool volumes - S,M,L)
2 2
0 0 0 0 2 0 0 43464 61993 .5 .5 %SBLOCA
2 2
0 0 0 0 2 0 0 39533 69444 .5 .5 %MBLOCA
2 2
0 0 0 0 2 0 0 45201 69263 .5 .5 %LBLOCA


% Pool Area (ft^2)
12301

% clean strainer attributes
% clean area of ONE strainer (ft^2)
1.8185e+003
% clean area of one OLD strainer (ft^2)
%155.4

% max clean strainer head loss (ft h2o)
 0.22

% single pump runout volume rates (gpm) (S, M, L)
% high-pressure max injection rates
 1620
% low-pressure injection rate
 2800

% Containment Spray Rate (all states except Case 43)
%2 2
%0 0 1932 2350 2 0 0 1932 2350 0.5 0.5
%2 2
%0 0 1932 2350 2 0 0 1932 2350 0.5 0.5
%2 2
%0 0 1932 2350 2 0 0 1932 2350 0.5 0.5

% Containment Spray Rate (Case 43)
2 2
0 0 2080 2600 2 0 0 2080 2600 0.5 0.5
2 2
0 0 2080 2600 2 0 0 2080 2600 0.5 0.5
2 2
0 0 2080 2600 2 0 0 2080 2600 0.5 0.5


%-------------------------------------------------------------------------
% geometric loading table for a single train:
%   thickness x(in) and strainer area A(ft^2) as functions of debris volume
%   V(ft^3). see supplementary routine StrainerArea for geometry definition
%   and assumptions. must be single-valued functions. May be slight mismatch
%   in compression for thickness estimation between this table and delP routine,
%   but low flow rate indicates low fiber compression.
%     V(ft^3)        x(in)      A (ft^2)
```

```
% switch table on/off = 1/0, list length of table
% if 0 a flat approximation will be used
% for old strainers
1 28

% Table Values
% If Table off leave blank
0            0           1.8185e+003
8.1790e+001  5.0000e-001  4.1900e+002
8.1800e+001  5.0100e-001  4.1931e+002
2.8016e+002  8.1421e+000  4.4718e+002
4.7853e+002  1.5783e+001  5.9256e+002
6.7689e+002  2.3424e+001  7.4768e+002
8.7526e+002  3.1065e+001  9.1253e+002
1.0736e+003  3.8706e+001  1.0871e+003
1.2720e+003  4.6348e+001  1.2714e+003
1.4703e+003  5.3989e+001  1.4655e+003
1.6687e+003  6.1630e+001  1.6692e+003
1.8671e+003  6.9271e+001  1.8827e+003
2.0654e+003  7.6912e+001  2.1060e+003
2.2638e+003  8.4553e+001  2.3389e+003
2.4622e+003  9.2194e+001  2.5816e+003
2.6605e+003  9.9835e+001  2.8341e+003
2.8589e+003  1.0748e+002  3.0962e+003
3.0573e+003  1.1512e+002  3.3681e+003
3.2556e+003  1.2276e+002  3.6497e+003
3.4540e+003  1.3040e+002  3.9411e+003
3.6524e+003  1.3804e+002  4.2422e+003
3.8507e+003  1.4568e+002  4.5530e+003
4.0491e+003  1.5332e+002  4.8735e+003
4.2474e+003  1.6096e+002  5.2038e+003
4.4458e+003  1.6860e+002  5.5438e+003
4.6442e+003  1.7625e+002  5.8935e+003
4.8425e+003  1.8389e+002  6.2530e+003
5.0409e+003  1.9153e+002  6.6222e+003

%-----------------------------------------------------------------
% initiating event frequency and bounded Johnson fit
%    NUREG-1829 current-day exceedance frequencies (without SG breaks)
%      (# breaks/cal yr of sizes > x)
%    Interpolated values for LOCA bins MUST be consistent with LOCAbins def
%    UT Austin fit of epistemic envelope using bounded Johnson pdf.
%      Parameters MUST be listed in column order (gamma,delta,xi,lamda)
% each row varies by size, each column varies by %ile (then transposed)

% Break Frequency Table Name
"Present-Day Exceedance Frequency"

% Break Sizes in Ascending Order
% These are fixed values
% For Documentation Purpose only
0.5 1.625 2 3 6 7 14 31

% Frequency Table
% These are fixed values
% For Documentation Purpose only
% Break Size X Percentile
6.8e-5 5.0e-6 3.69e-6 2.1e-7 6.30e-8 1.4e-8 4.1e-10 3.5e-11  % 5th %ile
6.3e-4 8.9e-5 6.57e-5 3.4e-6 1.08e-6 3.1e-7 1.2e-08 1.2e-09  % 50th %ile
1.9e-3 4.2e-4 3.10e-4 1.6e-5 5.20e-6 1.6e-6 2.0e-07 2.9e-08  % mean
7.1e-3 1.6e-3 1.18e-3 6.1e-5 1.98e-5 6.1e-6 5.8e-07 8.1e-08  % 95th %ile

% Table Percentile Values
0.05 0.5 NaN 0.95 % Don't Use Mean for Fitting

% Johnson Parameters
% These are fixed values
% For Documentation Purpose only
% gamma        delta          xi             lambda
1.650950E+00   5.256964E-01   4.117000E-05   1.420000E-02
```

```
1.646304E+00   4.593913E-01   2.530000E-06   3.200000E-03
1.646308E+00   4.593851E-01   1.870000E-06   2.360550E-03
1.646605E+00   4.589467E-01   1.200000E-07   1.220000E-04
1.646403E+00   4.566256E-01   3.000000E-08   3.965000E-05
1.645739E+00   4.487957E-01   6.023625E-09   1.220000E-05
1.645211E+00   3.587840E-01   2.892430E-10   1.160000E-06
1.645072E+00   3.343493E-01   2.636770E-11   1.600000E-07

%-------------------------------------------------------------------------------
% Strainer-Test Penetration Parameters

% area of test module (ft^2)
91.44

%  fraction of sheddable debris
%  (uniform empirical) - (unitless)
2 2
0 0 0 0 2 0 0 0.00956 0.0272 0.5 0.5


% shedding rate (1/min)
%  (uniform empirical)
2 2
0 0 0 0 2 0 0 0.008236 0.0546 0.5 0.5

% filter efficiency per g (slope)
%  (uniform empirical)
2 2
0 0 0 0 2 0 0  0.000339 0.003723 0.5 0.5

% filter fit cut point (g)
%  (uniform empirical)
2 2
0 0 0 0 2 0 0 790 880 0.5 0.5


% initial filter eff (intercept)
%  (uniform empirical)
2 2
0 0 0 0 2 0 0 0.656 0.706 0.5 0.5

% filter efficiency match pt
%  (set equal to 1.0 always)
1
1 0 0 0 1 0 0

% filter exp rate const (1/g)
%  (bimodal empirical)
2 3
0 0 0 0 2 1 0 0.0011254 0.0013078 0.031787 0.10000 0.45000 0.1000

%-------------------------------------------------------------------------------
% Debris Transport Factors
%  (enter conservative values here, random variables populated below)



%  ZOI-generated debris
%    (LDFG fines, LDFG small, LDFG large, uTherm fines, qual coat fines, crud fines)
%    (columns must ALWAYS be defined in this order left to right)
%    (rows must ALWAYS be defined in this order top to bottom)
%    (present values from Vol 3 for SG compartment break)

%    these factors were used for Full Batch 2

0.70 0.60 0.22 0.70 0.70 0.70     %F_BD_upr
0.30 0.25 0.00 0.30 0.30 0.30     %F_BD_lwr
0.53 0.27 0.00 0.53 0.53 0.53     %F_WD_UCin
0.47 0.19 0.00 0.47 0.47 0.47     %F_WD_UCan
```

```
0.00 0.27 0.00 0.00 0.00 0.00     %F_WD_BCin
0.00 0.00 0.00 0.00 0.00 0.00     %F_WD_BCan
0.02 0.00 0.00 0.02 0.02 0.02     %F_PF_sump
0.05 0.00 0.00 0.05 0.05 0.05     %F_PF_nact
1.00 0.64 0.00 1.00 1.00 1.00     %F_Rcrc_lwr
1.00 0.64 0.00 1.00 1.00 1.00     %F_Rcrc_WDin
1.00 0.58 0.00 1.00 1.00 1.00     %F_Rcrc_WDan
0.00 0.01 0.01 0.00 0.00 0.00     %F_Ersn_spry
0.00 0.07 0.07 0.00 0.00 0.00     %F_Ersn_pool


%  Unqualified coatings outside ZOI
%    (epoxy fines, epoxy fine chips, epoxy small chips, epoxy large chips,
%                                epoxy curls, alkyd, baked enamel, IOZ fines)
%    (columns must ALWAYS be defined in this order left to right)
%    (rows must ALWAYS be defined in this order top to bottom)
%    (present values from Vol 3 for MB/LBLOCA in SG compartment)

1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00   % F_fail
0.15 0.15 0.15 0.15 0.15 0.54 0.00 0.83   % F_upr
0.02 0.02 0.02 0.02 0.02 0.46 1.00 0.17   % F_lwr
0.83 0.83 0.83 0.83 0.83 0.00 0.00 0.00   % F_Rx
0.06 0.06 0.06 0.06 0.06 0.06 0.00 0.06   % F_spry
1.00 0.41 0.00 0.00 1.00 1.00 1.00 1.00   % F_rcrc
0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00   % F_Rxrcrc


% Latent Debris
%   (particulate, fiber)
%    (columns must ALWAYS be defined in this order left to right)
%    (rows must ALWAYS be defined in this order top to bottom)
%    (present values from Vol 3 for SG compartment)

0.00 0.00        %F_BD_upr       (1)
1.00 1.00        %F_BD_lwr       (2)
1.00 1.00        %F_WD           (3)
0.02 0.02        %F_PF_sump      (4)
0.05 0.05        %F_PF_nact      (5)
1.00 1.00        %F_Rcrc_lwr     (6)

%-------------------------------------------------------------------------------
%Time and Temperature Data

%Number of Time and Temperature Data Points
162


% time vector (hr) for small-break temperature profile
%  (FIRST entry is assumed 2B@ t=0. constant-value extrapolation imposed.
%  (time dependent temps ARE currently used in calc, one history for each LOCA)

% time vector (hour) for small (and medium) breaks

0.0000  0.0847  0.0864  0.0881  0.0897  0.0914  0.0931  0.0947
0.0964 0.0981  0.0997  0.1014  0.1031  0.1047  0.1064  0.1081
0.1097 0.1139  0.1306  0.1472  0.1639  0.1806  0.1972  0.2139
0.2306 0.2472  0.2639  0.2806  0.2972  0.3139  0.3306  0.3472
0.3639 0.3806  0.3972  0.4139  0.4306  0.4472  0.4639  0.4806
0.4972 0.5139  0.5306  0.5472  0.5639  0.5806  0.5972  0.6139
0.6306 0.6472  0.6639  0.6806  0.6972  0.7139  0.7306  0.7472
0.7639 0.7806  0.7972  0.8139  0.8306  0.8472  0.8639  0.8806
0.8972 0.9139  0.9306  0.9472  0.9639  0.9806  0.9972  1.0139
1.0306 1.0472  1.0639  1.0806  1.3611  1.6944  2.0278  2.3611
2.6944 3.0278  3.3611  3.6944  4.0278  4.3611  4.6944  5.0278
5.3611 5.6944  6.0278  6.3611  6.6944  7.0278  7.3611  7.6944
8.0278 8.3611  8.6944  9.0278  9.3611  9.6944  10.0278 20.0833
32.0833    44.0833 56.0833 68.0833 80.0833 92.0833 104.0833
116.0833   128.0833    140.0833    152.0833    164.0833
176.0833   188.0833    200.0833    212.0833    224.0833
236.0833   248.0833    260.0833    272.0833    283.3333
```

```
297.2222   308.3333   319.4444   333.3333   344.4444
355.5556   369.4444   380.5556   391.6667   402.7778
416.6667   427.7778   438.8889   452.7778   463.8889
475.0000   488.8889   500.0000   511.1111   525.0000
536.1111   547.2222   561.1111   572.2222   583.3333
597.2222   608.3333   619.4444   633.3333   644.4444
655.5556   669.4444   680.5556   691.6667   702.7778
716.6667

% temperature(F) profile for small (and medium) breaks
119.6000   131.2987   140.1689   150.3314   156.1240
159.2343   162.1567   164.5680   166.6937   168.5685
170.2457   171.7175   172.9577   174.0415   174.9570
175.7084   176.3081   177.5299   164.4935   132.7076
124.0848   123.6914   123.5988   123.5641   123.5529
124.4938   127.6399   129.7484   131.0391   149.8002
158.2393   162.7694   165.4960   167.3851   168.6688
169.7687   170.9814   171.9993   172.8771   173.7150
174.4595   175.0903   175.6074   176.0061   176.2923
176.4625   176.4855   176.3916   176.2055   175.9468
175.6184   175.2411   174.8243   174.3902   173.9374
173.4284   172.8459   172.2319   171.6143   171.0143
170.4548   169.9507   169.5034   169.1086   168.7661
168.4824   168.2551   168.0847   167.9707   167.9020
167.8705   167.8665   167.8947   167.9451   168.0131
168.0978   170.0607   170.9606   171.4105   170.8721
169.8110   168.7942   168.1132   165.3090   164.1228
163.0112   161.4436   159.9385   158.1298   158.4517
156.5706   151.6937   163.7090   160.9624   158.1118
156.1579   154.6151   153.2333   151.9641   150.8191
149.7667   148.7924   147.8649   136.2080   129.0230
124.9790   122.1450   120.1310   118.4710   117.3160
116.4980   115.6160   114.7100   113.8960   113.1730
112.5210   111.9240   111.3580   110.8590   110.3930
109.9930   109.5770   109.2090   108.9100   108.5930
108.2810   107.9680   107.7100   107.4730   107.1620
106.9430   106.7150   106.4770   106.2500   106.1240
105.8930   105.6660   105.5410   105.3160   105.1930
105.0690   104.8440   104.7250   104.6070   104.3770
104.3660   104.1400   104.0230   103.9050   103.7910
103.6730   103.5660   103.4520   103.3350   103.1450
103.1000   102.9130   102.8680   102.6810   102.6450
102.5250   102.5160


% time vector (hr) for medium (and small) break temperature profile
%  (FIRST entry is assumed 2B@ t=0. constant-value extrapolation imposed.
0.0000  0.0847  0.0864  0.0881  0.0897  0.0914  0.0931  0.0947
0.0964 0.0981  0.0997  0.1014  0.1031  0.1047  0.1064  0.1081
0.1097 0.1139  0.1306  0.1472  0.1639  0.1806  0.1972  0.2139
0.2306 0.2472  0.2639  0.2806  0.2972  0.3139  0.3306  0.3472
0.3639 0.3806  0.3972  0.4139  0.4306  0.4472  0.4639  0.4806
0.4972 0.5139  0.5306  0.5472  0.5639  0.5806  0.5972  0.6139
0.6306 0.6472  0.6639  0.6806  0.6972  0.7139  0.7306  0.7472
0.7639 0.7806  0.7972  0.8139  0.8306  0.8472  0.8639  0.8806
0.8972 0.9139  0.9306  0.9472  0.9639  0.9806  0.9972  1.0139
1.0306 1.0472  1.0639  1.0806  1.3611  1.6944  2.0278  2.3611
2.6944 3.0278  3.3611  3.6944  4.0278  4.3611  4.6944  5.0278
5.3611 5.6944  6.0278  6.3611  6.6944  7.0278  7.3611  7.6944
8.0278 8.3611  8.6944  9.0278  9.3611  9.6944  10.0278 20.0833
32.0833    44.0833 56.0833 68.0833 80.0833 92.0833 104.0833
116.0833   128.0833   140.0833   152.0833   164.0833
176.0833   188.0833   200.0833   212.0833   224.0833
236.0833   248.0833   260.0833   272.0833   283.3333
297.2222   308.3333   319.4444   333.3333   344.4444
355.5556   369.4444   380.5556   391.6667   402.7778
416.6667   427.7778   438.8889   452.7778   463.8889
475.0000   488.8889   500.0000   511.1111   525.0000
536.1111   547.2222   561.1111   572.2222   583.3333
597.2222   608.3333   619.4444   633.3333   644.4444
```

```
655.5556   669.4444    680.5556    691.6667    702.7778
716.6667


% Temperature(F) profile for medium breaks
119.6000    131.2987    140.1689    150.3314    156.1240
159.2343    162.1567    164.5680    166.6937    168.5685
170.2457    171.7175    172.9577    174.0415    174.9570
175.7084    176.3081    177.5299    164.4935    132.7076
124.0848    123.6914    123.5988    123.5641    123.5529
124.4938    127.6399    129.7484    131.0391    149.8002
158.2393    162.7694    165.4960    167.3851    168.6688
169.7687    170.9814    171.9993    172.8771    173.7150
174.4595    175.0903    175.6074    176.0061    176.2923
176.4625    176.4855    176.3916    176.2055    175.9468
175.6184    175.2411    174.8243    174.3902    173.9374
173.4284    172.8459    172.2319    171.6143    171.0143
170.4548    169.9507    169.5034    169.1086    168.7661
168.4824    168.2551    168.0847    167.9707    167.9020
167.8705    167.8665    167.8947    167.9451    168.0131
168.0978    170.0607    170.9606    171.4105    170.8721
169.8110    168.7942    168.1132    165.3090    164.1228
163.0112    161.4436    159.9385    158.1298    158.4517
156.5706    151.6937    163.7090    160.9624    158.1118
156.1579    154.6151    153.2333    151.9641    150.8191
149.7667    148.7924    147.8649    136.2080    129.0230
124.9790    122.1450    120.1310    118.4710    117.3160
116.4980    115.6160    114.7100    113.8960    113.1730
112.5210    111.9240    111.3580    110.8590    110.3930
109.9930    109.5770    109.2090    108.9100    108.5930
108.2810    107.9680    107.7100    107.4730    107.1620
106.9430    106.7150    106.4770    106.2500    106.1240
105.8930    105.6660    105.5410    105.3160    105.1930
105.0690    104.8440    104.7250    104.6070    104.3770
104.3660    104.1400    104.0230    103.9050    103.7910
103.6730    103.5660    103.4520    103.3350    103.1450
103.1000    102.9130    102.8680    102.6810    102.6450
102.5250    102.5160


% time vector (hr) for large breaks
0.0000   0.0847  0.0864  0.0881  0.0897  0.0914  0.0931  0.0947
0.0964  0.0981  0.0997  0.1014  0.1031  0.1047  0.1064  0.1081  0.1097
0.1139  0.1306  0.1472  0.1639  0.1806  0.1972  0.2139  0.2306  0.2472
0.2639  0.2806  0.2972  0.3139  0.3306  0.3472  0.3639  0.3806  0.3972
0.4139  0.4306  0.4472  0.4639  0.4806  0.4972  0.5139  0.5306  0.5472
0.5639  0.5806  0.5972  0.6139  0.6306  0.6472  0.6639  0.6806  0.6972
0.7139  0.7306  0.7472  0.7639  0.7806  0.7972  0.8139  0.8306  0.8472
0.8639  0.8806  0.8972  0.9139  0.9306  0.9472  0.9639  0.9806  0.9972
1.0139  1.0306  1.0472  1.0639  1.0806  1.3611  1.6944  2.0278  2.3611
2.6944  3.0278  3.3611  3.6944  4.0278  4.3611  4.6944  5.0278  5.3611
5.6944  6.0278  6.3611  6.6944  7.0278  7.3611  7.6944  8.0278  8.3611
8.6944  9.0278  9.3611  9.6944  10.0278 20.0833 32.0833 44.0833 56.0833
68.0833 80.0833 92.0833 104.0833    116.0833    128.0833    140.0833
152.0833    164.0833    176.0833    188.0833    200.0833    212.0833
224.0833    236.0833    248.0833    260.0833    272.0833    283.3333
297.2222    308.3333    319.4444    333.3333    344.4444    355.5556
369.4444    380.5556    391.6667    402.7778    416.6667    427.7778
438.8889    452.7778    463.8889    475.0000    488.8889    500.0000
511.1111    525.0000    536.1111    547.2222    561.1111    572.2222
583.3333    597.2222    608.3333    619.4444    633.3333    644.4444
655.5556    669.4444    680.5556    691.6667    702.7778    716.6667

% Temperature (F) profile for large breaks
119.8113 213.9295    242.3104    255.0268    255.7907    253.1617
252.9372    252.5390    251.9023    250.9733    249.7169    245.8894
235.9856    224.0051    212.9495    203.5499    195.7225    179.5894
199.8048    174.8143    174.8276    177.3518    180.7405    183.2333
185.1644    186.4925    187.2579    187.8270    188.1924    188.4266
188.5605    188.5934    188.5042    188.3375    189.3187    189.7570
```

```
189.0923    188.5202    188.0148    187.5621    187.4103    187.0671
186.7330    186.4249    186.1559    186.7640    186.5012    186.2557
186.0555    185.9119    185.8265    185.8062    185.8495    185.9526
186.1092    187.8900    187.9673    187.9196    187.9119    187.9385
187.9954    188.0710    188.1647    188.2538    188.3385    188.4003
189.0996    188.9199    188.7439    188.5614    188.3622    188.1314
187.8597    187.5387    187.1667    186.7559    178.4091    171.8762
166.5421    162.2238    158.1410    154.9818    151.7673    148.9234
146.0834    143.7967    141.6054    139.5251    137.9892    136.4819
134.8865    136.9000    136.6489    135.3569    134.3103    133.2941
132.4453    131.9467    132.0536    132.1915    131.3055    130.7946
130.2765    123.0489    118.1991    114.9095    112.4170    110.4096
108.7290    107.2834    106.0152    104.8855    103.8671    102.9399
102.0890    101.3027    100.5720    99.8894 99.2491 98.6461 98.0763
97.5362 97.0229 96.5339 96.0669 95.6474 95.1520 94.7720 94.4055
93.9649 93.6254 93.2967 92.9000 92.5932 92.2953 92.0057 91.6547
91.3822 91.1168 90.7942 90.5432 90.2982 89.9998 89.7671 89.5396
89.2620 89.0452 88.8328 88.5733 88.3703 88.1712 87.9276 87.7368
87.5494 87.3198 87.1398 86.9628 86.7457 86.5753 86.4076 86.2427
86.0401

%-------------------------------------------------------------------------------
% NPSH parameters:
%   (specify any # of pipe segments in common header)
%
% major HL variables

% absolute roughness of the pipe (ft)
0.00015

% Number of Pipe Segments
6

% pipe diameters (ft)
1.27 .99 1.27 .84 1.27 .99

% pipe lengths (ft)
66.96 25.41 12.00 25.46 11.50 24.91

% depth of common header (ft)
25.83 25.65 25.83 % LPSI, HPSI, SPRY

% NPSH required for each pump (ft water)
12 12 12        % LPSI, HPSI, SPRY

% minor HL variables
%  # of elbows, tees, entrances, and branches per pipe segment
%    [(# of 90 degree) (# of 45 degree) (# of gate valves)(# of entrances)(# of
%     tee runs) (# of tee branches)]

4 2 1 1 0 0    % segment AB
3 0 0 0 0 1    % segment BC
0 0 0 0 1 0    % segment BD
3 0 0 0 0 1    % segment DE
0 0 0 0 1 0    % segment DF
3 0 0 0 0 1    % segment FG

%-------------------------------------------------------------------------------
% Newly Added Options

% Use Old Degas Routine? (0 = No, 1 = Yes)
0

% Use Old NPSH Routine? (0 = No, 1 = Yes)
0

% Use Old SI Pump Flow Equation? (0 = No, 1 = Yes)
0

% Use Old Strainer Properties? (0 = No, 1 = Yes)
```

```
0

% Use Common Random Numbers Across Frequency Replications? (0 = No, 1 = Yes)
0

% Enable All Plots? (0 = No, 1 = Yes)
1

% Enable Parallel Calculations (0 = No, 1 = Yes)
% CAUTION - USE ONLY IF YOUR KNOW YOUR PC MEETS SPECIFICATIONS!!!!!
0

% Number of Parallel Threads
4

% Use Optimal Frequency Bins for 15 Freps (0 = No, 1 = Yes)
1

% Use Old Debris Source Rate (Before Error Correction)? (0 = No, 1 = Yes)
1

% Use Old Latent Debris Transport Equations (Before Error Correction)? (0 = No, 1 = Yes)
1
```