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10 CFR 50.54(q)
10 CFR 50, Appendix E

RS-02-210

December 16, 2002

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555

Braidwood Station, Units 1 and 2
Facility Operating License Nos. NPF-72 and NPF-77
NRC Docket Nos. STN 50-456 and STN 50-457

Byron Station, Units 1 and 2
Facility Operating License Nos. NPF-37 and NPF-66
NRC Docket Nos. STN 50-454 and STN 50-455

Subject: Revisions to the Exelon Nuclear Standardized Radiological Emergency Plan Annexes and Implementing Procedure

In accordance with 10 CFR 50.54, "Conditions of licenses," paragraph (q) and 10 CFR 50, Appendix E, Section V, "Implementing Procedures," Exelon Generation Company, LLC (EGC) is submitting changes to EGC procedures EP-AA-1001, "Exelon Nuclear Radiological Emergency Plan Annex For Braidwood," EP-AA-1002, "Exelon Nuclear Radiological Emergency Plan Annex For Byron," and procedure EP-AA-110-302, "Core Damage Assessment (PWR)" for the Braidwood and Byron Stations. These changes are a result of revisions in the core damage assessment methodology that were necessitated by the elimination of the Post Accident Sampling System at the Braidwood and Byron Stations.

Attachment A provides a general summary of the changes. These changes were implemented on November 14, 2002 and are being submitted within 30 days of implementation. We have reviewed these changes in accordance with 10 CFR 50.54(q) and concluded the changes do not decrease the effectiveness of the emergency plans and the plans, as changed, continue to meet the standards of 10 CFR 50.47, "Emergency plans," paragraph (b) and 10 CFR 50, Appendix E.

Attachment B provides the revised procedure EP-AA-1001, Revision 12, "Exelon Nuclear Radiological Emergency Plan Annex For Braidwood Station."

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Attachment C provides the revised procedure EP-AA-1002, Revision 14, "Exelon Nuclear Radiological Emergency Plan Annex For Byron Station."

Attachment D provides the revised procedure EP-AA-110-302, Revision 1, "Core Damage Assessment (PWR)."

Should you have any questions concerning this letter, please contact Mr. Don Cecchett at (630) 657-2826.

Respectfully,

Kenneth A. Ainger for

Keith R. Jury
Director – Licensing
Mid-west Regional Operating Group

cc: Regional Administrator – NRC Region III (two copies)
NRC Senior Resident Inspector – Braidwood Station
NRC Senior Resident Inspector – Byron Station

Attachment A – Summary of Changes to Exelon Nuclear Emergency Plan Documents
Attachment B – Exelon Nuclear Radiological Emergency Plan Annex for Braidwood Station
Attachment C – Exelon Nuclear Radiological Emergency Plan Annex for Byron Station
Attachment D – Exelon Procedure EP-AA-110-302, Core Damage Assessment (PWR)

ATTACHMENT A

SUMMARY OF CHANGES

TO

EXELON NUCLEAR EMERGENCY DOCUMENTS

ATTACHMENT A

Summary of Emergency Plan Document Changes

I Radiological Emergency Plan Annexes for Braidwood and Byron Stations

Deleted the following from Section 4.2

- To aid emergency response personnel in an assessment of core damage during an emergency condition, two figures have been prepared which represent plots of percent core damage versus containment radiation readings and percent clad damage versus containment radiation readings for Byron Station. Utilizing uncorrected containment radiation readings Figures 4-1 and 4-2, respectively, may be used to provide a preliminary estimate of percent core or clad damage during the first ten (10) hours following a reactor shutdown. Usage of the curves is limited to ten (10) hours after reactor shutdown to avoid significant uncertainties which occur due to the time dependent energy shift in the spectrum of the released activity. Figure 4-2 is based on the assumption that 100% gap activity (clad failure) equals 10% core radioactive inventory. (References for Figures 4-1 and 4-2: Sargent and Lundy letters from G. P. Lahti to John C. Golden dated: March 2, 1992; July 12, 1991; February 1, 1991; January 14, 1991; and January 31, 1989.)

- Deleted Figures 4-1 and 4-2, as they do not convey information consistent with the revised Core Damaged Assessment Methodology.

And replaced with:

- Core damage information is used to refine dose assessments and confirm or extend initial protective action recommendations. Braidwood Station utilizes WCAP-14696-A, Revision 1, (1999) as the basis for the methodology for post-accident core damage assessment. This methodology utilizes real-time plant indications in addition to samples of plant fluids and atmospheres. Core damage is qualitatively evaluated per NRC Core Condition Categories (1-10) as shown in the table below.

Degree of Degradation	**Minor (<10%**	**Intermediate (10% to 50%)**	**Major (>50)**
No Core Damage	1	1	1
Cladding Failure	2	3	4
Fuel Overheat	5	6	7
Fuel Melt	8	9	10

- Updated Figures 4-3 through 4-8 and associated text references in Sections 4 and 5 to Figure 4-1 through Figure 4-6 as a result of deleting the above referenced figures.

- Appendix 1: Deleted reference to Figures 4-1, 4-2 and updated the remainder of figure numbers for Section 4.

Also, the Braidwood Station Radiological Emergency Plan Annex revision incorporated the clarification of existing items

- Section 4.1 Updated titles of Will County Emergency Operations Center and Grundy County Emergency Management Agency.
- Section 4.4 Clarified that Exelon personnel would provide traffic control, if necessary. All control would not necessarily be by security force personnel.
- Section 5.1.3 & Figure 4-2 Updated location reference for the Operations Support Center (i.e., normal use room designation name changed w/o change to use as OSC).
- Section 5.2.1.2 Expanded the discussion, consistent with other Exelon Nuclear Station Annexes, that other sites' meteorological towers are available for back-up data.

II Exelon Procedure EP-AA-110-302, "Core Damage Assessment (PWR) Changes"

A. Background and Scope:

Braidwood and Byron Stations are implementing a revised post-accident core damage assessment methodology that is based on Westinghouse WCAP-14696-A, Revision 1, " Westinghouse Owner's Group (WOG) Core Damage Assessment Guidance." This methodology replaces the methodology previously approved by the NRC in 1984 (i.e., WOG Post Accident Core Damage Methodology, Rev. 2, Nov. 1984). Adoption of the revised methodology necessitated a significant revision to EGC procedure EP-AA-110-302, "Core Damage Assessment (PWR)," which relies on real-time plant indications rather than samples of plant fluids. As a result, changes to the Exelon Nuclear Radiological Emergency Plan Annex for the Braidwood and Byron stations were necessitated.

B. Change Comparison

The methodology provided in the current procedure (i.e., EP-AA-110-302, Rev. 0) provides methods to classify and estimate the extent of core damage through radionuclide measurements as the primary method, as well as from confirmatory auxiliary indicators.

The revised procedure (i.e., EP-AA-110-302, Rev. 1) incorporates the revised WOG methodology for estimating core damage, which relies primarily on real-time plant indications rather than samples of plant fluids from the Post Accident Sampling System. Specifically, it was revised to provide the necessary guidance and steps for estimating core damage using the PWRCDAM computer program. By using the program, damage estimates can be developed using one or more of the following methods (whose required inputs/dependencies are also listed):

ATTACHMENT A

Summary of Emergency Plan Document Changes

a. Containment Radiation Monitor (CRM)

1) CRM values in R/hr
2) Time since shutdown (when CRM reading is taken)
3) Containment Spray – On or Off
4) Reactor Coolant System (RCS) Pressure (when CRM reading is taken)
5) Average Core Exit Thermocouples (CET) reading

b. CET

1) Total and number of CETs for various temperature thresholds
2) RCS Pressure (when CET readings are taken)

c. Core and Hot Leg Temperatures

1) Estimated peak core temperature
2) Hot leg resistance temperature detector (RTD
3) Hot leg saturation temperature

4. Core Level Evaluation

A. Core uncovery time in hours
B. Reactor Vessel Level Instrumentation System level
C. Source range monitor count rate (above or below normal determination)

5. Containment Hydrogen Concentration

A. Containment hydrogen readings
B. RCS pressure (at the time the core was uncovered)
C. Make-up injection – No or Yes

6. Isotopic Ratios/Presence of Fission Products in Abnormal Concentrations

A. Sample analysis results
B. Time since shutdown (when sample is taken)

7. Sample Analysis Evaluations

   A. Sample analysis results

   B. Time since shutdown (when sample is taken)

   C. Reactor power history

      4) System pressure and temperature (gaseous samples)

      5) Sample pressure and temperature (gaseous samples)

The procedure/program also retains the ability to assess core damage based on sample methods 6 and 7 above.

ATTACHMENT B

EXELON NUCLEAR RADIOLOGICAL EMERGENCY PLAN ANNEX
FOR BRAIDWOOD STATION

ATTACHMENT D

EXELON NUCLEAR PROCEDURE EP-AA-110-302, CORE DAMAGE ASSESSMENT (PWR)

CORE DAMAGE ASSESSMENT (PWR)

TMI

TMI Core Damage Assessment is performed via a TMI Specific process.

REFER to TMI Technical Support Center (TSC) Calculational Guide - Section 6.0 "Core Damage Assessment"

1. PURPOSE

1.1 This Core Damage Assessment process is designed to assist in estimating core damage after an accident with potential clad or core damage conditions. This is done to assist in:

1.1.1 Determining if the fuel barriers are breached to evaluate the appropriate Emergency Action Level (EAL) classification.

1.1.2 Providing input on core configuration (coolable or uncoolable) for prioritization of mitigating activities.

1.1.3 Determining the potential quantity and isotopic mix of a radiological release to project offsite doses.

1.1.4 Predicting the radiation protection actions that should be considered for long term recovery activities.

1.1.5 Satisfying inquiries from local and federal government agencies and provide evidence that the utility knows the plant conditions.

2. TERMS AND DEFINITIONS

2.1 Core Damage - a term used to qualify and quantify the core state and amount of damage

2.2 Cladding Failure:

1. Also referred to as “Cladding Oxidation”, “Gap Release” or “Clad Rupture” in other documents.
2. 100% clad failure refers to the rupture of 100% of the fuel rods in the core. This would result in all fission products contained in the gap space being released to the reactor coolant system.

2.3 Fuel Melt:

1. Referred to as “Core Melt” “In-Vessel Melt” or “Over-temperature” damage in reference documents.
2. 100% fuel melt refers to high temperatures in the fuel pellets in 100% of the fuel rods in the core. This would result in all the fission products contained in the fuel pellet matrix being released to the reactor coolant system.

2.4 Vessel Melt-Through:

1. Referred to as “Ex-Vessel Melt” or “Melt Release” in reference documents.
2. Core debris is relocated to the containment building where the reactor pressure vessel has failed.

3. RESPONSIBILITIES

3.1 The *TSC Technical Manager* shall coordinate core damage assessment activities.

3.2 The *TSC Core/Thermal Hydraulic Engineer* shall serve as the Core Damage Assessment Methodology (CDAM) Evaluator.

3.3 The *TSC Radiation Controls Engineer* shall coordinate radiological and chemistry information with the Core/Thermal Hydraulic Engineer in support of core damage assessment.

4. MAIN BODY

4.1 Select the appropriate attachment for the type reactor or station experiencing the potential clad or core damage condition and implement the prescribed steps.

- **REFER** to Attachment 1 for Braidwood or Byron Station (PWR) core damage methodology

5. DOCUMENTATION

5.1 A Summary Form is generated by the PWR CDAM Software for use in documenting the results of the assessment.

5.2 Refer to Attachment 1, Section 6

6. REFERENCES

6.1 Westinghouse Owner's Group Post Accident Core Damage Methodology, Revision 2, November, 1984.

6.2 Westinghouse Owner's Group Core Damage Assessment Guidance (WCAP-14696-A, Rev. 1).

6.3 Braidwood Commitment - #20-84-074

7. ATTACHMENTS

7.1 Attachment 1, Braidwood and Byron PWR CDAM Users Guide.

ATTACHMENT 1

BRAIDWOOD AND BYRON PWR CDAM USERS GUIDE

1. OVERVIEW

1.1 As a Windows based application designed in Access, PWR CDAM, uses many standard user interfaces. Instructions are not provided in basic computer operations in the Windows® environment. The user must be familiar with these to efficiently operate the program.

1.2 It is also assumed user is familiar with basic reactor physics and core damage fundamentals. Emergency Response Organization training will provide an overview of core damage assessment methodologies.

1.3 The program should be used by qualified personnel as a tool to estimate the type and amount of core damage.

2. DETERMINE APPROPRIATE AND AVAILABLE ASSESSMENT METHODS

2.1.1 The magnitude and type of event, transport mechanism and time after shutdown will be influencing factors on the method(s) utilized to determine the extent of core damage. Damage estimates can be developed using one or more methods as they become available or applicable.

1. Indications of Core Damage
    A. The primary indicators of core damage that are available during the early phases of an event:
        1. Containment Radiation Monitor Readings
        2. Core Exit Thermocouple Readings
2. Auxiliary indicators that are used to confirm and better define the possible type of damage are:
    A. Estimation of maximum temperature reached within the core
    B. Reactor Coolant System Hot Leg Temperature
    C. Estimated core uncovery time
    D. Reactor Vessel Level Indication System readings
    E. Abnormal Source Range Monitor readings
    F. Containment Hydrogen Readings

ATTACHMENT 1

BRAIDWOOD AND BYRON PWR CDAM USERS GUIDE

3. Long Term Indicators (once liquid or gaseous samples can be safely obtained) are:

   A. Isotopic Ratios

   B. Presence of high levels of rare isotopes

   C. Quantity of isotopes present in samples

2.1.2 Choose the assessment method(s) most appropriate for the existing conditions. Methods available for assisting in the determination of the extent of core damage include the following:

Method	Use	Comment
Core Exit Thermocouples	Indication of onset of Core Damage	Limited due to range of instruments. Not reliable during later phases of core overheating due to changes in core geometry.
RVLIS	Indication of Core Uncovery	Indicates possible damage not useful in estimating the quantity of damage.
Source Range Monitor	Indication of Core Uncovery	Loss of water level leads to increase in gamma detection.
Hot Leg RTDs	Indication of Core Uncovery	Only measures bulk flow through core. Hot spots in core may not be detected by exit thermocouples.
Containment Radiation Monitor	Early Indication of Core Damage	Uncertainties due to variables in release of fission products from RCS and effects of containment sprays.
Containment Hydrogen Monitor	Early Indication of Core Damage	Significant uncertainties due to variable Hydrogen generation in core and in release of Hydrogen from RCS and effects of containment sprays.
RCS Samples and Containment Sump and Atmosphere Samples	Late Indication of Core Damage —Sump Samples provide indication of Rx Vessel Failure	Very large uncertainties until all systems have reached equilibrium. Useful in planning long term recovery.

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BRAIDWOOD AND BYRON PWR CDAM USERS GUIDE

3. START UP

3.1.1 The application is accessed by one of the following:

1. Open the PWR CDAM desktop icon on applicable dose assessment computers.

   A. Start the PWR CDAM program for the plant that has declared an emergency.

   B. Programs are labeled PWR CDAM.

2. Select RUN from the 'Start Bar' and type in the file path and name as follows:

   - C:\CDAM\PWR CDAM.MDB

3.1.2 **IF** the assigned Core Damage Assessment Computer cannot access the application or the CDAM program will not run, **THEN** Install PWR CDAM on any computer from CDs or Disks located in the TSC or the EOF Library. CDAM is installed by copying appropriate file to computer's hard drive.

4. SELECTION AND PERFORMANCE OF ASSESSMENT

4.1 Choose the assessment method(s) most appropriate for the existing conditions. Methods available for assisting in the determination of the extent of core damage include the following:

a. Containment Radiation Analysis - (Section 5.2)

b. Core Temperature Analyses - (Section 5.3)

c. Core Water Level Analyses - (Section 5.4)

d. Containment Hydrogen Analysis - (Section 5.5)

e. Nuclide Analyses (Ratios and Abnormal Isotopes) - (Section 5.6)

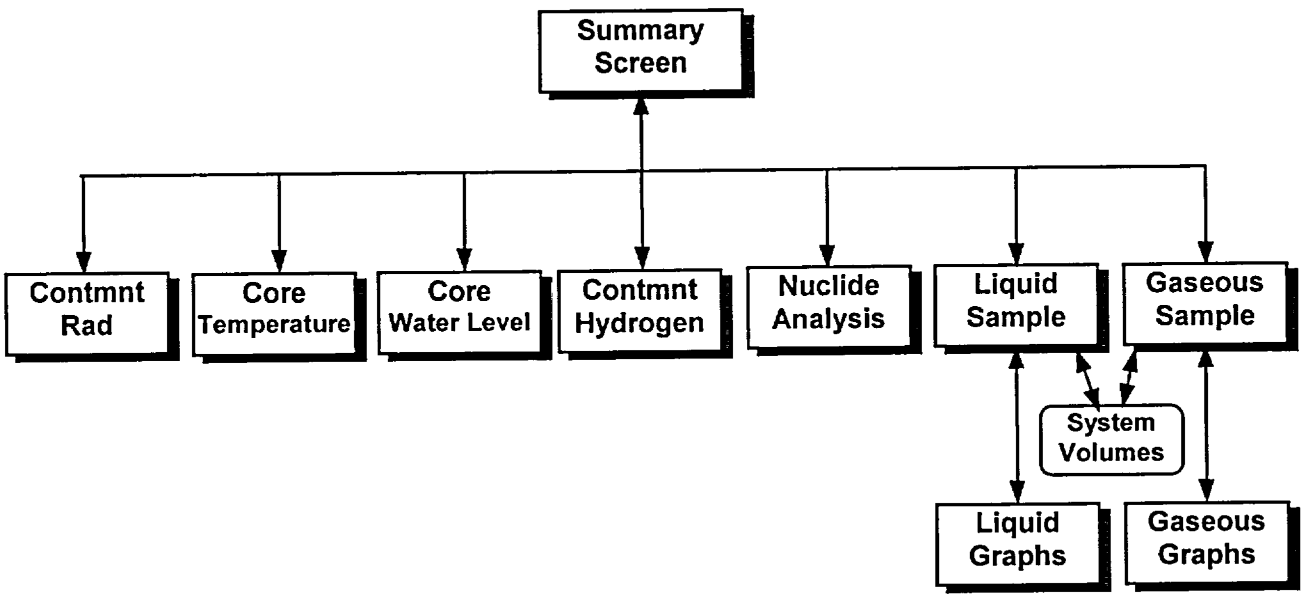
f. Liquid Samples Analysis - (Section 5.7)

g. Gaseous Samples Analysis - (Section 5.8)

ATTACHMENT 1

BRAIDWOOD AND BYRON PWR CDAM USERS GUIDE

4.2 Basic Program Flow Diagram



5. PROGRAM SCREENS AND INPUTS

5.1 Main Screen – Summary Page

5.1.1 When program is started the following screen appears: (boxes are empty when program is originally launched.)

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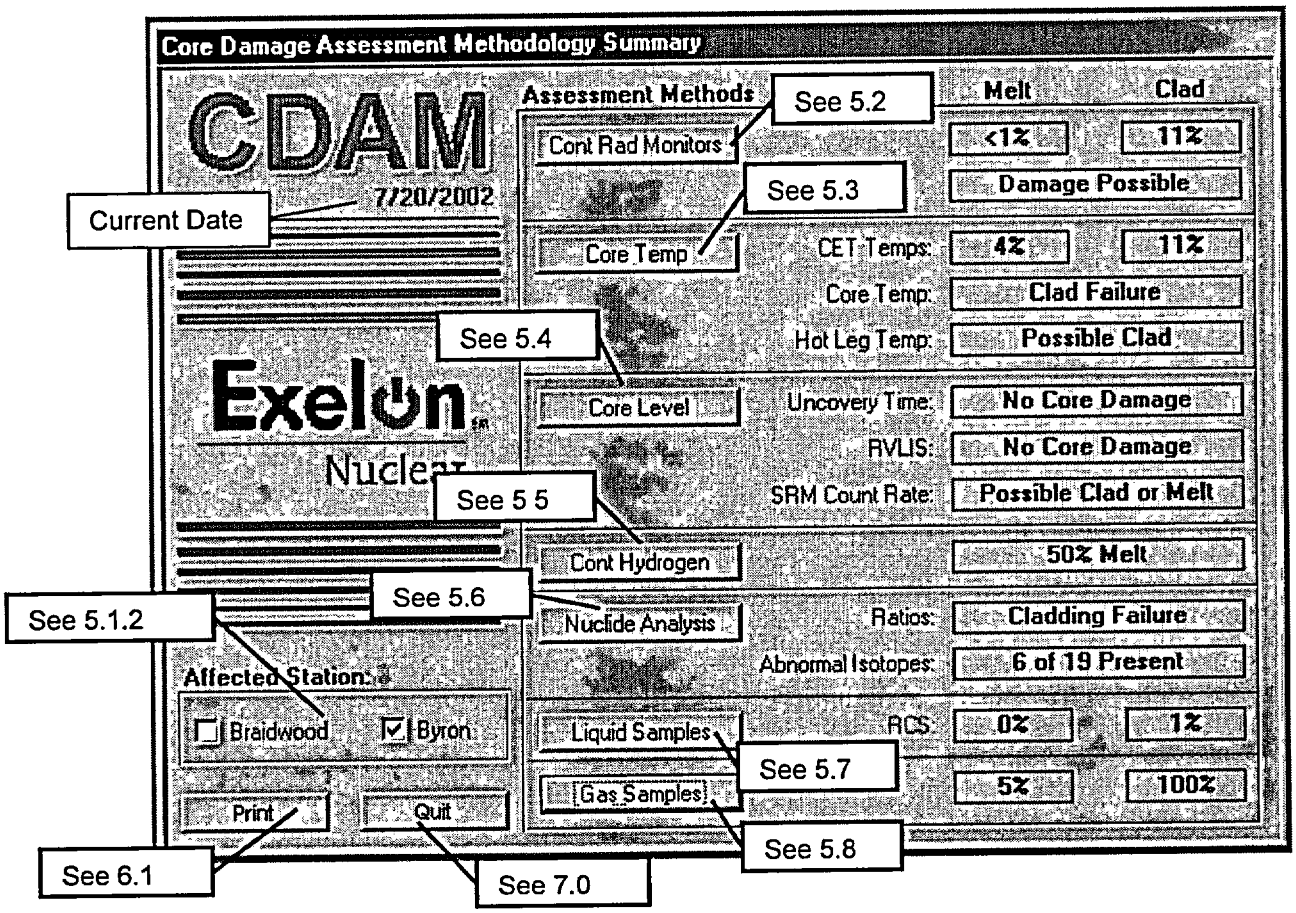
BRAIDWOOD AND BYRON PWR CDAM USERS GUIDE



CAUTION

Selecting an "Affected Station" resets all inputs to default values.

5.1.2 **SELECT** the Affected Station before other "Assessment Methods".

CAUTION

Pressing the **"Quit"** button exits the program. When the program is closed all data is reset. Program saves no information to disk; printed reports serve as record of core damage assessments.

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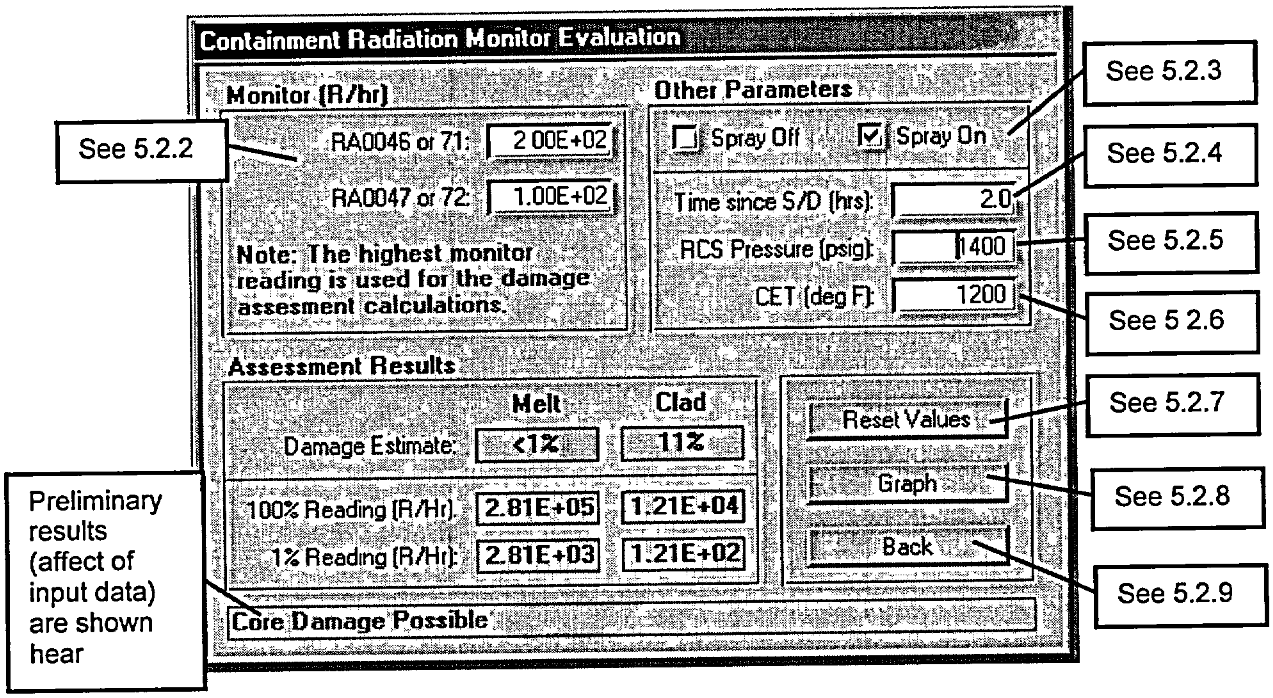
BRAIDWOOD AND BYRON PWR CDAM USERS GUIDE

5.2 Containment Radiation Monitor Method

5.2.1 Pressing **"Cont Rad Monitors"** button opens the following form:



5.2.2 Highest containment radiation monitor reading which occurred is entered in these boxes. Program only lists containment high range monitors, however a reading may be entered from any monitor which accurately showed containment radiation levels. If two entries are made only the highest is used.

5.2.3 Containment Spray

1. **IF** the Containment Spray system was operated for the majority of the time since the estimated time of the onset of core damage **THEN** choose "Spray On".

2. **IF** the Containment Spray system was **NOT** operated or only operated for a short period of time since the estimated time of the onset of core damage **THEN** choose "Spray Off".

5.2.4 Enter the time after reactor shutdown, which corresponds the time the containment radiation reading was taken. Value must be between 1 hour and 24 hours after shutdown, which corresponds to the time period in which this method is considered effective.

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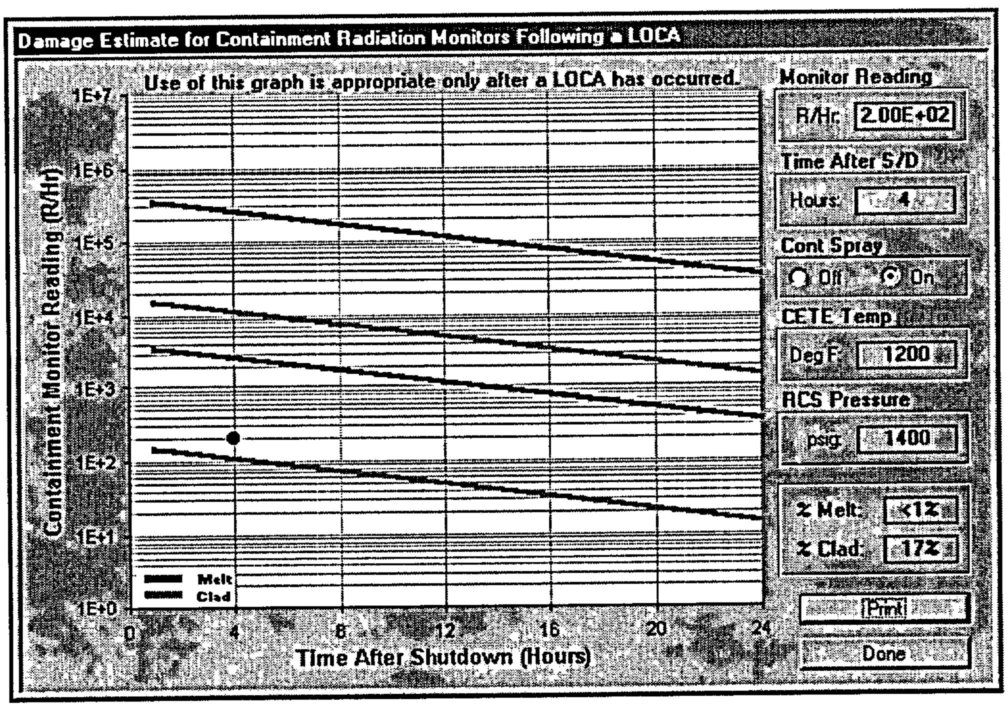
5.2.5 Enter the estimated Reactor Coolant System pressure at the time when core damage occurred (usually same time as high CET temperatures were observed).

5.2.6 Enter the highest Core Exit Thermocouple reading observed during the event.

5.2.7 Pressing **"Reset"** button resets values on this form only.

5.2.8 Pressing **"Graph"** button displays the follow screen.



1. Graph shows high and low containment radiation levels which correspond to 100% Melt or Clad or 1% Melt or Clad damage. A dot shows the last containment radiation level entered into the program for assessment.

2. Pressing "Print Button" will print report of containment radiation method inputs and best estimate of damage.

5.2.9 Pressing **"Back"** button takes the user back to the summary screen.

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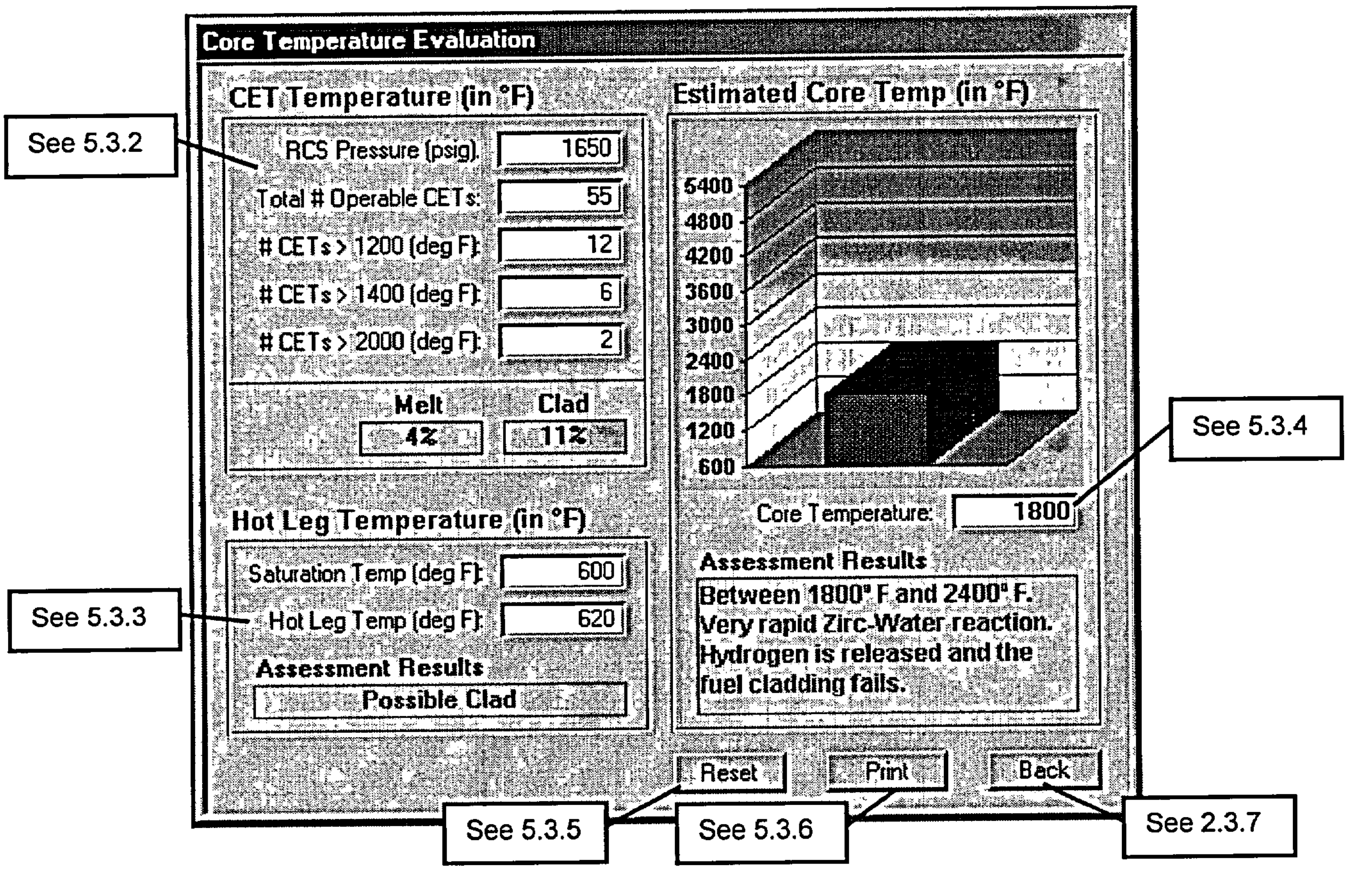
5.3 Core Temperature Methods

5.3.1 Pressing **"Core Temp"** button opens the following form:



5.3.2 Core Exit Thermocouples (CETs)

1. Enter the Reactor Coolant System pressure at the time the CETs readings were taken.
2. Normally there are 65 operating CETs, however user should enter the number that were operating when temperature readings were taken.
3. Enter number of CETs that exceeded the listed temperatures. Program will not allow user to enter a higher number of CETs than the temperature box above it. (i.e. if only 5 CETs exceeded 1200 °F there can not be 6 exceeding 1400 °F).

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5.3.3 Reactor Coolant System Hot Leg temperature.

1. Enter saturation temperature for RCS pressure at time of highest RCS Hot Leg temperature. Value must be looked up in steam tables. Value is limited to 650 °F, which corresponds to max system pressure.
2. Enter highest Hot Leg temperature observed during expected time of core damage.

5.3.4 Based on inputs from Reactor Operators, TSC Staff and other engineering personnel (including outside sources such as Westinghouse personnel) enter the estimated highest temperature reached in the reactor core.

5.3.5 Pressing **"Reset"** button resets values on this form only.

5.3.6 Pressing **"Print"** button prints report of inputs and results of core temperature methods of core damage assessment.

5.3.7 Pressing **"Back"** button takes the user back to the summary screen.

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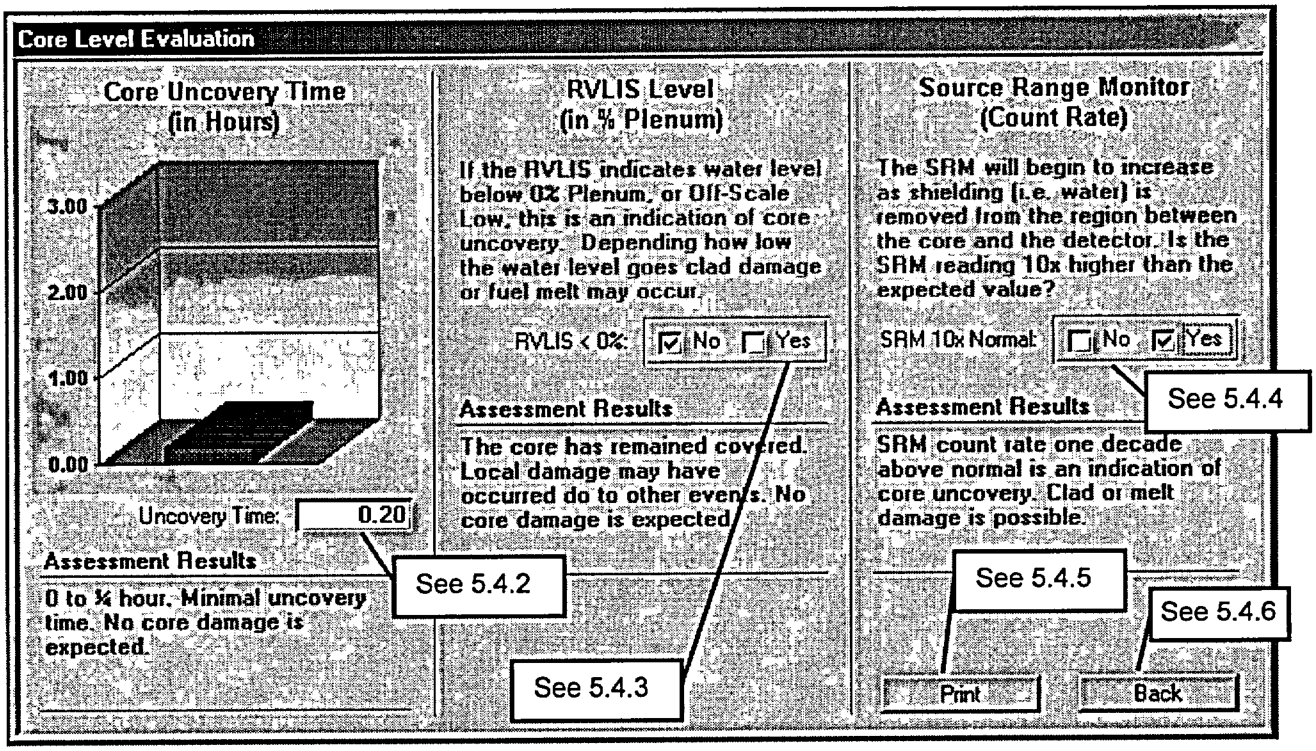
5.4 Core Level Evaluations

5.4.1 Pressing **"Core Level"** button opens the following form:



5.4.2 Enter estimated time portions of the reactor core was uncovered.

5.4.3 Enter if the Reactor Vessel Level Indication System (RVLIS) was off-scale low or indicated below 0% Plenum.

5.4.4 Check if the Source Range Monitoring system indicated abnormally high readings during the event (i.e., 1 decade above normal reading).

5.4.5 Pressing **"Print"** button prints report of inputs and results of core level methods of core damage assessment.

5.4.6 Pressing **"Back"** button takes the user back to the summary screen.

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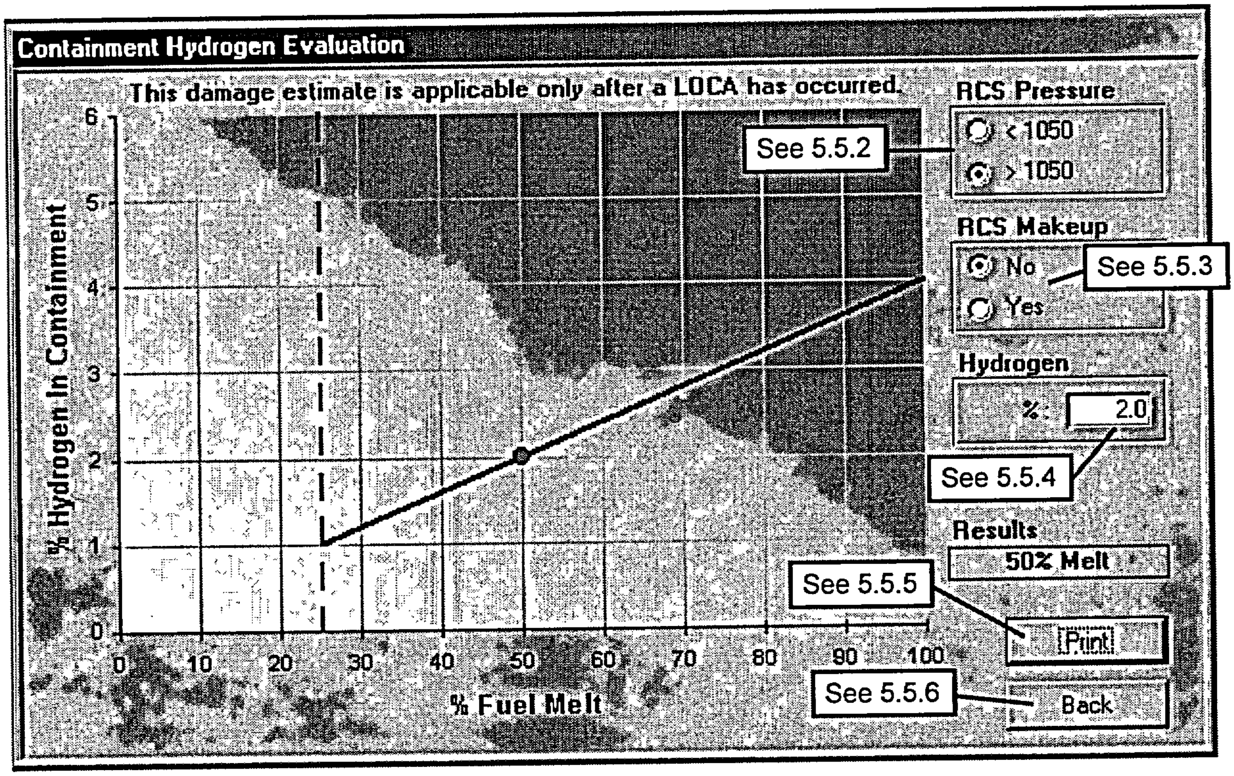
5.5 Containment Hydrogen Evaluations

5.5.1 Pressing **"Cont Hydrogen"** button opens the following form:



5.5.2 Choose the estimated Reactor Coolant System (RCS) pressure at the time core damage was occurring.

5.5.3 RCS Makeup:

1. Choose **"No"** if no or little water was added to the RCS system during the time period core damage was occurring.

2. Choose **"Yes"** if water was added to the RCS during the time core damage was occurring or prior to the time a Large Leak occurred from the RCS into the containment structure.

5.5.4 Enter highest containment hydrogen level measured. H_2 monitoring equipment is only accurate within a ± 1 % range so no damage is reported until level reaches at least 1 %. Range of instrument is 0 – 30 %.

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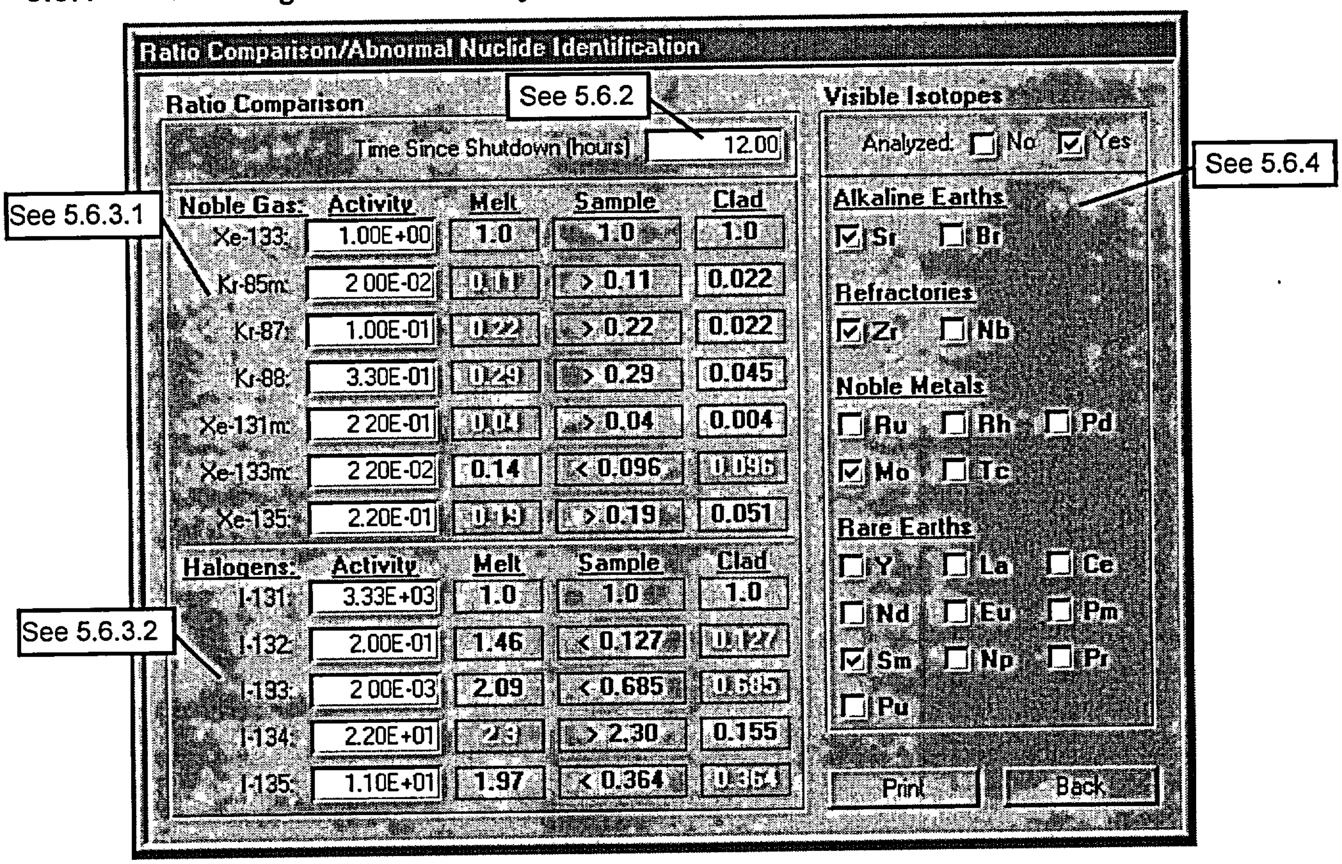
5.5.5 Pressing **"Print"** button prints report of inputs and results of core level methods of core damage assessment.

5.5.6 Pressing **"Back"** button takes the user back to the summary screen.

5.6 <u>Nuclide Analysis</u>

5.6.1 Pressing **"Nuclide Analysis"** button opens the following form:



5.6.2 Enter the time since reactor shutdown when the sample was taken.

5.6.3 If the ratio is greater than predicted melt ratio, melt damage is predicted if less than clad ratio, clad damage is predicted.

1. Noble Gases are ratioed to Xe-133
2. Halogens are ratioed to I-131

5.6.4 **IF** abnormal levels of rare isotopes are present **THEN** check yes AND check which isotopes are present.

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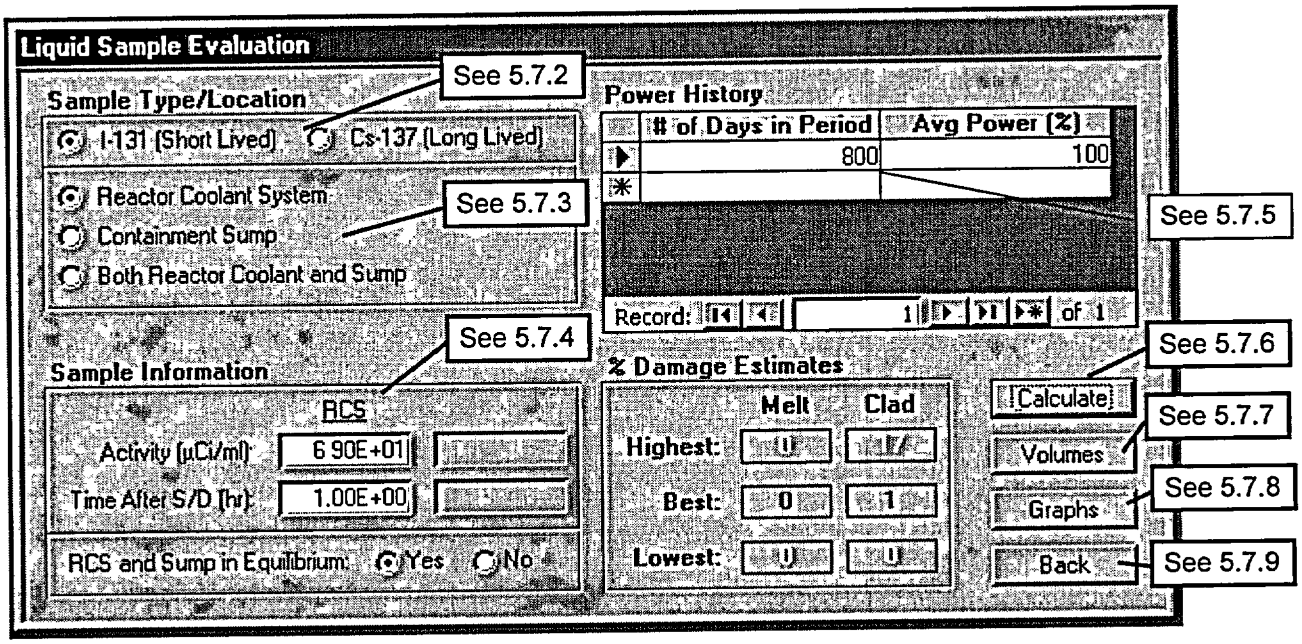
5.7 Liquid Samples

5.7.1 Pressing **"Liquid Samples"** button opens the following form:



5.7.2 Select appropriate isotope.

NOTE: A volume entry must be made for sump volume, Before you can choose "Containment Sump" or "Both Reactor Coolant and Sump." Refer to see 5.7.7.

5.7.3 Select sample location. If samples are available from both locations select both.

5.7.4 Enter sample activity(s) and Time After S/D that samples were taken.

5.7.5 Enter power history of core since last refueling. Shutdown times are entered as the number of days with Ave Power (%) set at 0.

1. For short-lived isotopes power history should extend at least 30 days.
2. For long-lived isotopes power history should extend at least 100 days, however the power history for the extent of the cycle is preferred.
3. Variations in steady state power should be limited to ± 20% within each operational period entered.

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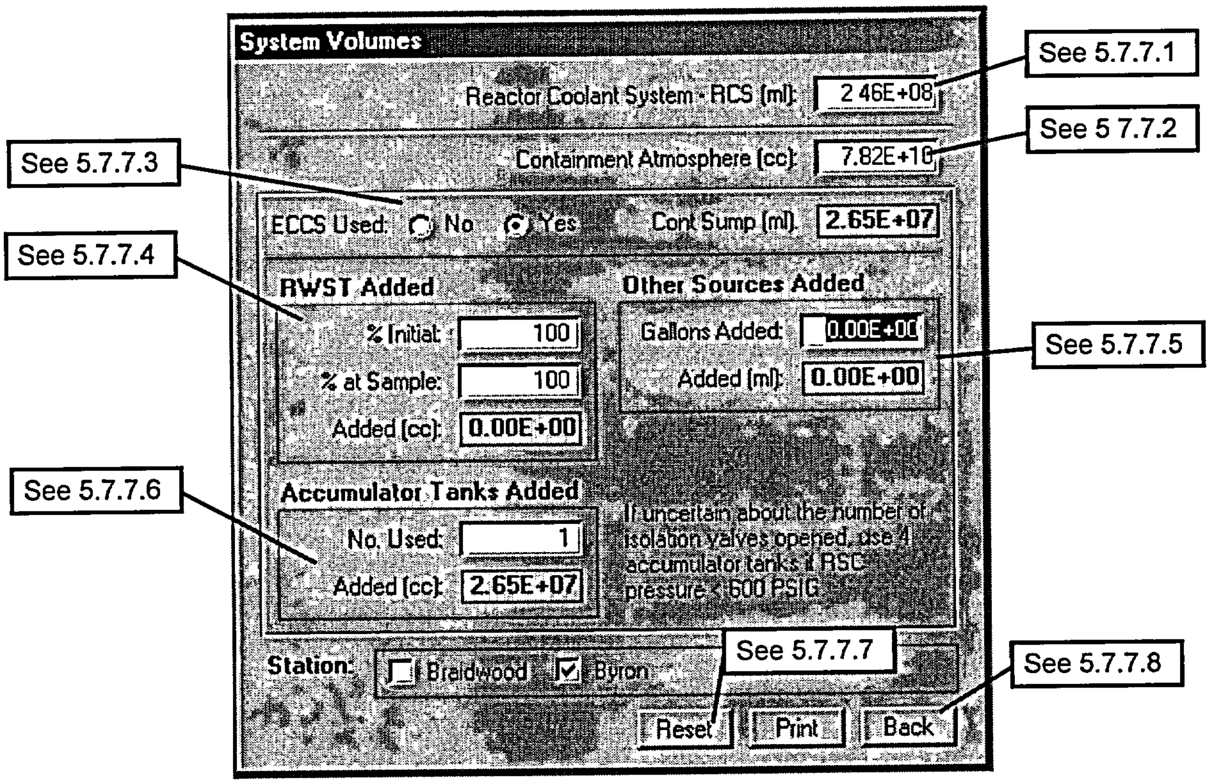
5.7.6 Once all data has been entered pressing the "Calculate" button will display the % Damage Estimates.

5.7.7 Pressing "Volumes" button displays the follow screen:



1. Program enters default RCS volume, which the user may change based on RVLIS Readings and Pressurizer level at time of sample.

2. Program enters default Containment free air volume which user may change based on containment sump level at time of sample.

3. Program assumes Containment Sump volume is 0 unless there has been an activation of the Emergency Core Cooling System (ECCS). Checking yes allows user to estimate Containment Sump volume.

4. The change in level of the Refueling Water Storage Tank (RWST) determines amount of water in Containment Sump from this source.

5. The number of Accumulators that have injected into the RCS determines amount of water in Containment Sump from this source.

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BRAIDWOOD AND BYRON PWR CDAM USERS GUIDE

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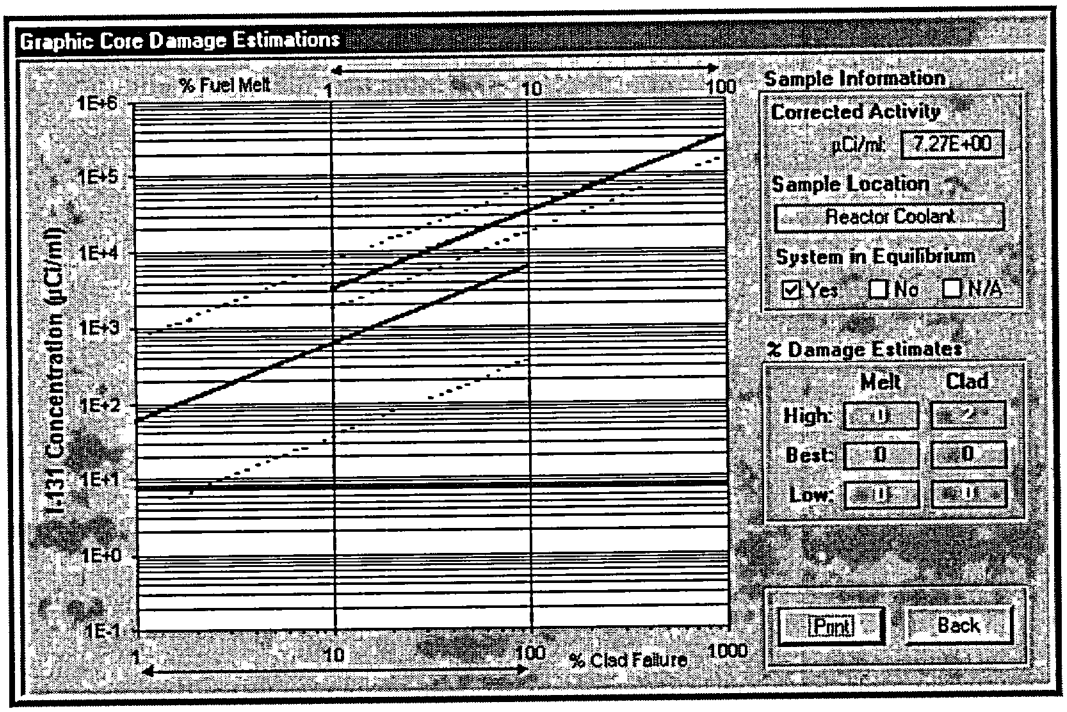
6. User may enter other sources of water added during an event. (such as fire main, secondary water, potable water, etc.).

7. Pressing "Reset" button resets all volumes to default values.

8. Pressing **"Back"** button takes the user back to the Liquid or Gaseous screen, which user used to call volume form.

5.7.8 Pressing **"Graph"** button displays the following screen:



1. Graph shows High, Low, and Best melt curves; High, Low, and Best clad damage curves, and a red line across graph indicating entered corrected sample activity.

2. User can select "Print" button to print graph and summary of inputs or press "Back" button to go back to liquid or gaseous form which called this form.

5.7.9 Pressing **"Back"** button takes the user back to the summary screen.

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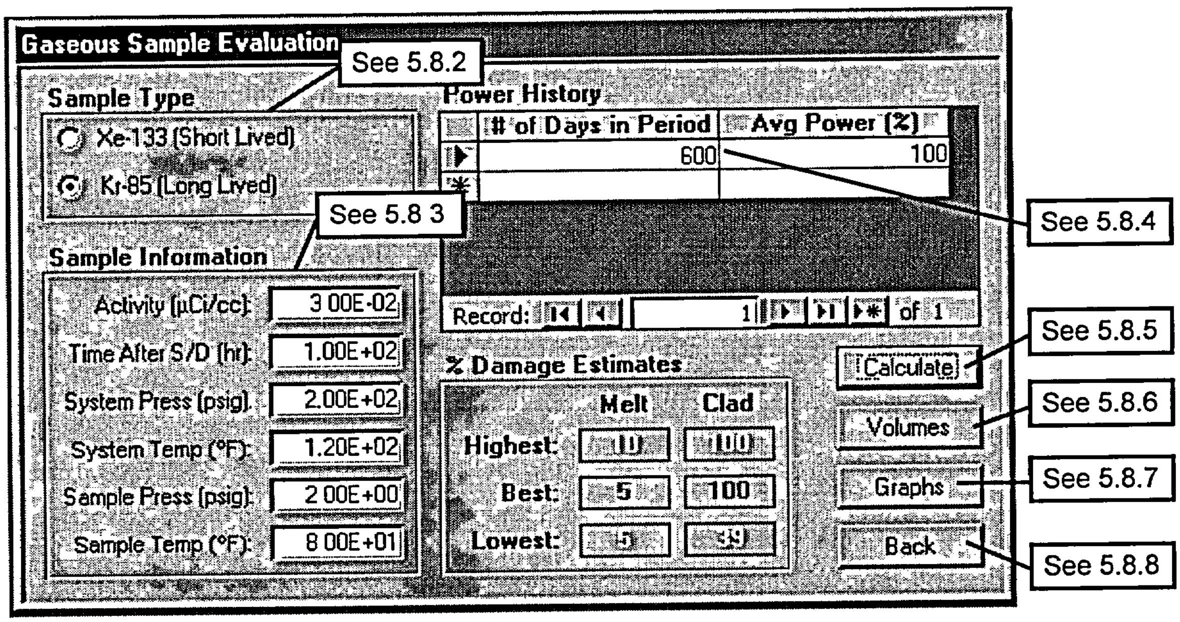
BRAIDWOOD AND BYRON PWR CDAM USERS GUIDE

5.8 Gaseous Samples

5.8.1 Pressing **"Gas Samples"** button opens the following form:



5.8.2 **Select** appropriate isotope.

5.8.3 **Enter** Sample Information:

1. Enter sample activity for selected isotope.
2. Enter Time After S/D that sample was taken.
3. Enter the pressure and temperature of the system sampled
4. Enter the end pressure and temperature of sample.

5.8.4 **Enter** power history of core since last refueling. Shutdown times are entered as the number of days with Ave Power (%) set at 0.

1. For short-lived isotopes power history should extend at least 30 days.
2. For long-lived isotopes power history should extend at least 100 days, however the power history for the extent of the cycle is preferred.

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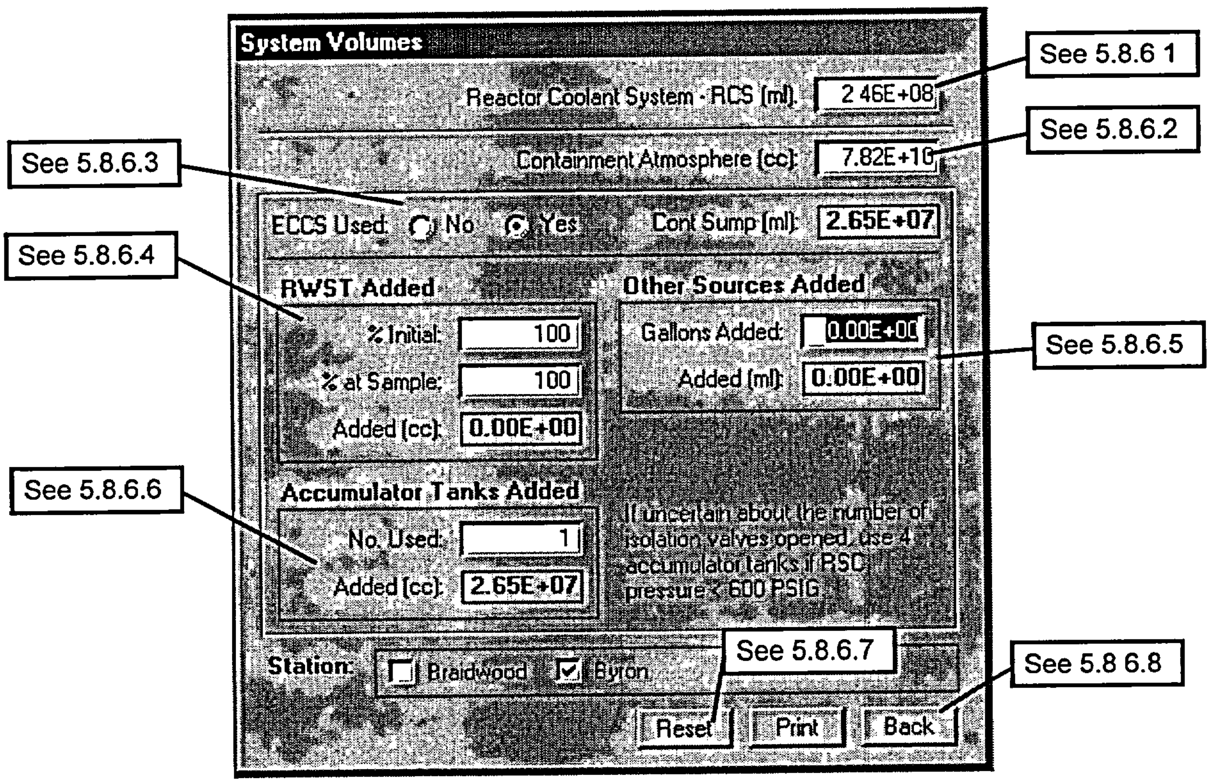
3. Variations in steady state power should be limited to ± 20% within each operational period entered.

5.8.5 Once all data has been entered pressing the "Calculate" button will display the % Damage Estimates.

5.8.6 Pressing "Volumes" button displays the follow screen (Same as 5.7.7):



1. Program enters default RCS volume, which the user may change based on RVLIS Readings and Pressurizer level at time of sample.

2. Program enters default Containment free air volume which user may change based on containment sump level at time of sample.

3. Program assumes Containment Sump volume is 0 unless there has been an activation of the Emergency Core Cooling System (ECCS). Checking yes allows user to estimate Containment Sump volume.

4. The change in level of the Refueling Water Storage Tank (RWST) determines amount of water in Containment Sump from this source.

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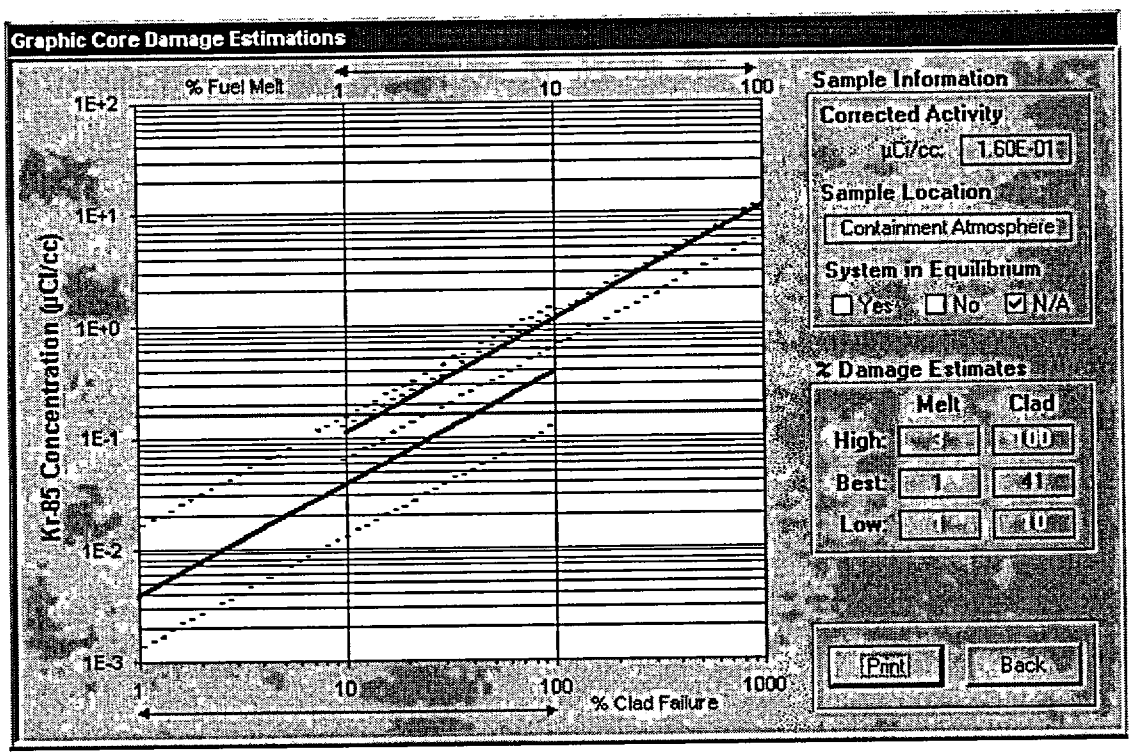
5. The number of Accumulators that have injected into the RCS determines amount of water in Containment Sump from this source.
6. User may enter other sources of water added during an event. (such as fire main, secondary water, potable water, etc.).
7. Pressing "Reset" button resets all volumes to default values.
8. Pressing **"Back"** button takes the user back to the Liquid or Gaseous screen, which user used to call volume form.

5.8.7 Pressing **"Graph"** button displays the following screen:



1. Graph shows High, Low, and Best melt curves; High, Low, and Best clad damage curves, and a red line across graph indicating entered.
2. User can select "Print" button to print graph and summary of inputs or press "Back" button to go back to liquid or gaseous form which called this form.

5.8.8 Pressing **"Back"** button takes the user back to the summary screen.

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6. CORE DAMAGE SUMMARY REPORT

6.1 Once the program user enters data for all available assessment methods and the program calculates damage based on inputs, **SELECT** the **"Print"** button to print a summary of all methods used

6.1.1 A sample report is shown on the next page.

6.1.2 Individual tasked with assessing core damage shall then analyze report to determine best estimate of type and amount of damage.

6.1.3 Based on estimated type and amount of damage and following table (table also printed on summary report) assign NRC Core Condition Category (1-10).

Degree of Degradation	Minor (<10%)	Intermediate (10% to 50%)	Major (>50)
No Core Damage	1	1	1
Cladding Failure	2	3	4
Fuel Overheat	5	6	7
Fuel Melt	8	9	10

7. QUITING, OR EXITING, THE PROGRAM

7.1 Pressing the "Quit" button on the Summary Screen exits the program.

7.1.1 When the program is closed all data is reset.

7.1.2 Program saves no information to disk; printed reports serve as record of core damage assessments.

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SAMPLE SUMMARY REPORT

CDAM Method:

Core Damage Summary

Station: ☐ Braidwood ☒ Byron

Assessment Methods:		Melt	Clad
Containment Radiation Monitors*		<1%	23%
		Damage Possible	
Core Temperatures	CET Temps:	0.86667	100%
	Core Temp:	Clad Failure	
	Hot Leg Temp:	Possible Melt	
Core Levels	Core Uncovery Time:	Fuel Melt	
	RVLIS:	Possible Clad or Melt	
	SRM Count Rate:	Possible Clad or Melt	
Containment Hydrogen*		38% Melt	
Sample Analysis	Ratios:	Fuel Melt	
	Abnormal Isotopes:	2 of 19 Present	
	RCS: Liquid Samples:	0%	27%
	Gas Samples:	1%	41%

* These methods should NOT be used for qualitative or quantitative assessment except in the case of a LOCA.

Analyst's Estimate:

☐ No Core Damage ☐ Cladding Failure ☐ Fuel Melt Amount:

NRC Core Condition Category:

Degree of Degradation	Minor (<10%)	Intermediate (10%-50%)	Major (>50%)
No Core Damage	1	1	1
Cladding Failure	2	3	4
Fuel Overheat	5	6	7
Fuel Melt	8	9	10

Generated By:

Name: ____________________ Date: 10/08/02 Time: 7:19 PM

Core Damage Summary Exelon PWRCDAM v1.0