RG&E
Always at Your Service

Robert C. Mecredy
Vice President
Nuclear Operations

March 8, 2004

Mr. Robert L. Clark
Office of Nuclear Regulatory Regulation
U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, D.C. 20555-0001

Subject: Response to Request for Additional Information (RAI) Regarding Proposed CREATS Modification and Change in Dose Calculation Methodology to Alternate Source Term
R.E. Ginna Nuclear Power Plant
Docket No. 50-244

References: 1. Letter from Robert C. Mecredy (RG&E) to Robert L. Clark (NRC) dated May 21, 2003, License Amendment Request Regarding Revision of Ginna Technical Specification Sections 1.1, 3.3.6, 3.4.16, 3.6.6, 3.7.9, 5.5.10, 5.5.16, and 5.6.7 Resulting From Modification of the Control Room Emergency Air Treatment System and Change in Dose Calculation Methodology to Alternate Source Term.

2. Letter from Robert L Clark (NRC) to Robert C. Mecredy (RG&E) dated January 20, 2004, Request for Additional Information Regarding R.E. Ginna Nuclear Power Plant License Amendment Request Relating to the Control Room Emergency Air Treatment System Modification (TAC No. MB9123).

Dear Mr. Clark:

The attachments to this letter provide a response to the Request for Additional Information (RAI) contained in Reference 2, and should be docketed as an addendum to Reference 1.

I declare under penalty of perjury under the laws of the United States of America that I am authorized by Rochester Gas and Electric Corporation to submit this documentation and that the foregoing is true and correct.

If you have questions regarding the content of this correspondence please contact Mr. Mike Ruby at (585) 771-3572.

Very truly yours,

Executed on March 8, 2004

Robert C. Mecredy

A001

Attachments:

1. Response to RAI's
2. CREATS Electrical Block Diagram
3. List of Regulatory Commitments

Cc: Mr. Robert L. Clark (Mail Stop O-8-C2)
Project Directorate I
Division of Licensing Project Management
Office of Nuclear Regulatory Regulation
U.S. Nuclear Regulatory Commission
One White Flint North
11555 Rockville Pike
Rockville, MD 20852

Regional Administrator, Region 1
U.S. Nuclear Regulatory Commission
475 Allendale Road
King of Prussia, PA 19406

U.S. NRC Ginna Senior Resident Inspector

Mr. Peter R. Smith
New York State Energy, Research, and Development Authority
Corporate Plaza West
286 Washington Avenue Extension
Albany, NY 12203-6399

Mr. Paul Eddy
NYS Department of Public Service
3 Empire State Plaza, 10th Floor
Albany, NY 12223

Attachment 1
Response to RAIs

Response to Request for Additional Information (RAI)
Ginna Control Room Emergency Air Treatment System (CREATS)

References:

1. Letter from Robert C. Mecredy (RG&E) to Robert L. Clark (NRC) dated May 21, 2003, License Amendment Request Regarding Revision of Ginna Technical Specification Sections 1.1, 3.3.6, 3.4.16, 3.6.6, 3.7.9, 5.5.10, 5.5.16, and 5.6.7 Resulting From Modification of the Control Room Emergency Air Treatment System and Change in Dose Calculation Methodology to Alternate Source Term.

2. Letter from Robert C. Mecredy (RG&E) to Robert L. Clark (NRC) dated September 30, 2003, Summary of Public Meeting Between RG&E and NRC Staff Held on August 19, 2003.

3. Letter from Robert C. Mecredy (RG&E) to Robert L. Clark (NRC) dated December 1, 2003, Reply to information Requested at Public Meeting between RG&E and NRC Staff held on August 19, 2003.

4. Letter from Robert C. Mecredy (RG&E) to Robert L. Clark (NRC) dated December 1, 2003, Addendum to License Amendment Request submitted May 21, 2003.

5. Letter from Robert C. Mecredy (RG&E) to Robert L. Clark (NRC) dated February 16, 2004, Detailed Design Information for Proposed CREATS Modification and Locked Rotor Failed Fuel Estimation.

6. Letter from Robert C. Mecredy (RG&E) to Robert L. Clark (NRC) dated March 1, 2004, Addendum to License Amendment Request submitted May 21, 2003.

7. Letter from Robert C. Mecredy (RG&E) to Allen R. Johnson (NRC) dated February 9, 1996, Application for Amendment to Facility Operating License Revised Containment Requirements During MODE 6.

Questions and Responses:

1. *In your submittal, you stated that for the first 30 seconds, before control room ventilation is switched to the recirculation mode, that 2200 cfm of outside air is assumed to leak into the control room and that this in-leakage would be reduced to 300 cfm only after switch over. Please confirm that the HABIT Code analysis for the toxic gas concentration in the control room accounts for the initial high in-leakage rate (2200 cfm) during the first 30 seconds prior to switch over to the recirculating mode.*

   Response: The 2200 cfm is the maximum fresh air makeup to the Control Room, and is the value assumed in the analysis. This path isolates upon a signal from the chlorine/ammonia monitors, or with operator action. The analysis assumes that time starts when the leading edge of the plume reaches the control room intake. After 30 seconds, the control room is assumed to be isolated and inleakage is assumed to decrease to 300 cfm, which is consistent with the radiological analysis post-isolation inleakage assumptions.

2. *There is an evident error in the calculated value for peak ammonia concentration. 31.9 g/m^3 is an unrealistically high number, much higher than the toxic limit of 210 mg/m^3.*

   Response: Agreed, this is a typographical error in the Summary of Control Room Toxic Hazards Summary included as Attachment 2 in Reference 1. The actual value from the analysis is 31.9 mg/m^3.

3. *Hydrazine and ethanolamine are toxic chemicals with toxicity limits of 50 ppm and 30 ppm, respectively. When their solutions are spilled, toxic vapors released from the spills may pose some risk. Justify why, in spite of the potential risk, they don't need to be evaluated.*

   Response: This is an engineering judgement based on the relatively low volatility, small volumes, and distance from the control room intake as explained below.

Hydrazine:

Hydrazine at 35% concentration is located in the northeast corner of the Turbine Building, middle level. Currently two 30 gallon drums are located inside a bermed area, and each drum is inside of it's own secondary container; thus providing redundant means of limiting the spread of a spill. Normally one drum is in service and the other in standby; the hydrazine is diluted in an open tank and then fed from that open tank into the secondary system to scavenge oxygen.

Hydrazine has harmful effects if inhaled or swallowed, including a potential carcinogenic effect. However, hydrazine is stable at normal temperature & pressure; mists or vapors are not generated under these conditions, thus it is stored in open (non-pressurized) containers.

Because hydrazine is a stable solution, stored in small quantities, and located far from the Control Room's outside air intake, it is considered a negligible threat to Control Room habitability.

Ethanolamine:

Ethanolamine (synonyms: Monoethanolamine, ETA) at 40% concentration is located in the northeast corner of the Turbine Building basement. There are currently two 350 gallon tanks stored on bermed tank holders which would contain any leakage within the stand upon which the tank rests. The tanks are equipped with a low pressure (1.6 psig) nitrogen blanket, primarily because of ETA's offensive odor.

ETA has irritating effects in high concentrations and on contact, and has an offensive odor, which is why the tanks have a low pressure nitrogen blanket. ETA is stable, having a high boiling point, low vapor pressure, and vapor density greater than air.

Because ETA is a stable solution, is stored in relatively small quantities, and is located far from the Control Room's outside air intake, it is considered a negligible threat to Control Room habitability.

4. *In Section 9.0 of Attachment 1 to your submittal dated December 1, 2003, you analyzed the radiological consequence for the locked rotor accident. For this accident, a reactor coolant pump rotor is assumed to seize instantaneously causing a rapid reduction in the flow through the affected reactor coolant system (RCS) loop. The flow imbalance creates localized temperature and pressure changes in the core. If severe enough, these differences may lead to localized boiling and fuel damage. The radiological consequences are due to leakage of the contaminated reactor coolant to the steam generators (SGs) and then releases from the SGs to the environment.*

Your radiological consequence analysis for this accident for the Exclusion Area Boundary (EAB) exceeded the dose acceptance criterion of 2.5 rem total effective dose equivalent (TEDE) specified in the Standard Review Plan (SRP) 15.0.1, "Radiological Consequence Analyses Using Alternative Source Terms." You conservatively assumed that all of the fuel rods in the core are damaged and that all of its fuel gap activity is released to the RCS as a result of this accident. The staff finds this assumption to be the most conservative based on the staff's experience in performing similar reviews for other reactor plants.

Estimate the percentage of fuel rods that will experience cladding perforation. You may use the minimum departure from nucleate boiling ratio or critical power ratio to estimate the fuel rod damage. Provide re-analyzed radiological consequence.

Response: RG&E provided a justification of locked rotor failed fuel assumptions in Attachment 2 of Reference 5, which proposes a 50% fuel failure assumption for the analysis. The analysis is scheduled for revision due to the new x/Q analysis (see # 6 below). The new fuel damage assumptions will be included in this analysis, currently scheduled for completion by April 15, 2004.

5. *Provide complete piping and instrument diagrams for the new control room emergency air filtration system to be installed at Ginna.*

Response: These drawings were provided in Attachment 1 to Reference 5.

6. *A number of atmospheric dispersion factors were recalculated using onsite meteorological data collected for the years 1992, 1993, and 1994. The radiological analysis summary states that these data are considered to be typical of any time period and were used in prior submittals. What is the basis for the statement that the data for this 3-year period are typical for any time period and are still representative of site conditions today? For what other previous submittals were these data used?*

Response: Regulatory Guide 1.194 states, "The NRC staff considers 5 years of hourly observations to be representative of long-term trends at most sites. With sufficient justification of its representativeness, however, the minimum meteorological data set is one complete year (including all four seasons) of hourly observations." RG&E retrieved 5 years of recent data for comparison to the three years mentioned above. After evaluation, it was determined that the conservative approach is to recalculate the atmospheric dispersion factors using the most recent data and reevaluate the calculated doses using the new factors. The results of those analysis will be provided to the NRC by April 15, 2004.

RG&E calculated x/Qs using the 3 years of data mentioned above for Amendment 62 to Ginna's Technical specifications (Reference 7), but elected not to use the results. Instead, RG&E conservatively used more limiting values listed in the UFSAR at the time.

7. *Identify how stability class was determined. If the stability class is based on onsite delta-temperature measurements, indicate which measurements levels on the tower were used.*

Response: The new x/Qs will utilize temperature gradients derived from Ginna's weather tower instrumentation at the 33' and 150' levels (see #6 above).

8. *A review of the ARCON96 meteorological data input files reveals that the wind speed data are reported in m/sec in increments of 0.0, 0.3, 0.5, 0.8, 1.0, 1.3, 1.5, 1.8, etc. In addition, the joint frequency distribution provided as input to PAVAN shows no occurrences of wind speeds in the 0.6-0.7 m/sec and 1.6-1.7 m/sec ranges. This*

seems to imply that the wind speed data are being recorded to the nearest 0.25 m/sec (0.56 mph). Explain the data recording and processing procedures that apparently results in reporting wind speed data to the nearest 0.25 m/sec.

Response: This question will be resolved in the development of the new x/Q data (see #6 above).

9. *A review of the ARCON96 meteorological data input files also shows an unusually low occurrence of unstable conditions (A through C stability classes) during 1994 (5.8% for 1994) as compared to an average of 21.4% for 1992 and 1993. At the same time, there was an unusually high occurrence of E stability during 1994 (47.5%) as compared to an average of 28.7% for 1992 and 1993. Explain what might have caused these differences in atmospheric stability frequency distributions between 1994 and 1992-1993.*

Response: This question will be resolved in the development of the new x/Q data (see #6 above).

10. *A comparison of the overall 1992-1994 wind direction frequency distributions between the ARCON96 meteorological data input files and the PAVAN joint frequency distribution input file shows good agreement (±0.1%) for twelve of the 16 sectors (NE clockwise to WNW). However, the following discrepancies occur in the remaining four sectors:*

Input File	*1992-1994 Wind Direction Frequency Distribution*			
	NW	*NNW*	*N*	*NNE*
ARCON96	*5.1%*	*2.4%*	*3.6%*	*3.4%*
PAVAN	*5.3%*	*2.9%*	*2.6%*	*3.6%*

Explain what might have cause these discrepancies in the wind direction frequency distributions between these input files, especially for the N and NNW sectors.

Response: This question will be resolved in the development of the new x/Q data (see #6 above).

11. *The Loss of Coolant Accident and the Waste Gas Decay Tank Rupture Accident both assume leakage from the auxiliary building. This release pathway is modeled as a vertical area source for the Control Room (CR) χ/Q values, which implies the release is homogeneously distributed throughout the auxiliary building and the release rate from the north auxiliary building wall facing the CR intake will be reasonably constant over the surface of the wall. Since leakage is most likely to occur at a penetration, verify that there are no auxiliary building penetrations from which there would be a more limiting (non-area source) release.*

Response: The Auxiliary Building is an I beam and corrugated steel building that is not designed as a leak tight structure. Penetrations including dampers and doors do exist on the North and East walls of the Auxiliary Building, but are normally closed to the outside. Further, they would be expected to remain closed during an accident. However, RG&E will run additional cases to analytically determine the most limiting release point during the development of the new x/Q data (see #6 above).

12. *The tornado missile accident assumes that a utility pole, propelled by the wind, penetrates the Auxiliary Building roof and impacts fuel stored in the spent fuel pool. Two cases are evaluated:*

- *Case 1: All activity is released over two hours. The activity released over the first hour is dispersed assuming "tornado conditions"; the activity released over the second hour is dispersed assuming "normal atmospheric conditions".*

- *Case 2: All activity is released over one hour assuming "tornado conditions".*

The CR and EAB χ/Q values for tornado conditions, 4.36E-5 sec/m^3 and 1.74E-6 sec/m^3, respectively, were generated using the CONHAB module of the HABIT computer code, assuming F stability and a wind speed of 24.5 m/sec. The wind speed used was apparently based on the maximum hourly wind speed recorded onsite during 1992.

The CR and EAB χ/Q values used to represent normal atmospheric conditions were 1.45E-3 sec/m^3 and 4.8E-4 sec/m^3, respectively.

The initiating event for this accident is the occurrence of a tornado which generates a missile and damages fuel in the spent fuel pool. The tornado itself is an isolated event, and it is unlikely that high wind speeds associated with the tornado will persist for the assumed one-hour duration of the release after the tornado strikes. Re-evaluate the CR and EAB χ/Q values used to disperse the activity during the first hour of this release utilizing more realistic (bounding) wind speed conditions. Also provide the basis for the CR χ/Q value of 1.45E-3 sec/m^3 which was used to represent normal atmospheric conditions during the second hour of this release.

Response: RG&E will reevaluate this analysis during development of the new x/Q data and dose calculations (see #6 above).

13. *In Section 5.5.10.b, "Control Room Emergency Air Treatment System" of the Ginna "Administrative Controls" you proposed to change the demonstration requirement of the pressure drop across the combined high efficiency particulate air filters, the pre-filters, the charcoal adsorbers, and the post-filters to less than 14 inches of water from less than 3 inches of water at a design flow rate. Provide the technical basis for the proposed 14 inches of water. You may find appropriate guidance in Section 8.0, "Airflow Capacity, Distribution, and Residence Time Tests" of ANSI N510-1975, "The Testing Of Nuclear Air-Cleaning Systems."*

    Response: In Reference 2, RG&E committed to revise the proposed 14"dp limit for the new CREATS filters per the above standard, if necessary. However this standard requires data from an operating system. Since the new system is yet to be built, RG&E will provide a new proposed limit after completing construction and startup testing. The commitment was restated in Reference 6, with an expected completion date of June 15, 2004.

14. *In Section 5.5.10, "Ventilation Filter Testing Program (VFTP)" of the Ginna Administrative Controls, you stated that the test method will be in accordance with Regulatory Guide 1.52, Revision 2. In Sections 5.5.10.a, "Containment Recirculation Fan Cooler Systems," and*

5.5.10.b, "Control Room Emergency Air Treatment System," you proposed an in-place Freon test of the charcoal adsorber bank to show a penetration and system bypass less than 1% when tested under ambient conditions. This proposal is contrary to the guidance provided (less than 0.05%) in Regulatory Guide 1.52. Discuss the difference. For instances, where1% bypass is assumed, the credited filter efficiency should be reduce by 1%.

Response: Other than step numbering, RG&E is not requesting a change to Section 5.5.10.a. This Containment Recirculation Fan Cooler System is not being physically modified and the 1% penetration and bypass flow is conservative with respect to the 95% efficiency assumed in the dose analysis. However, since the modification of the CREATS system involves new equipment and design, RG&E agrees that it is appropriate to incorporate the 0.05% requirement in section 5.5.10b. This change was included in Reference 6.

15. *Please indicate whether or not the proposed CREATS and the associated controls and actuation system will involve any digital electronics other than inputs from the new control room air intake radiation monitoring system and, possibly, outputs to a digital monitoring system (such as the plant computer). Please clarify whether or not any digital electronics other than the control room air supply radiation monitors will have any influence over the operation or the operability of the proposed CREATS.*

    Response: The present design does not incorporate any new digital electronics or interface with any digital systems other than to receive actuation signals from the new (existing) digital radiation monitoring system.

16. *If the proposed system and the associated controls and actuation circuits do involve digital electronics, please describe the digital electronics in detail, including the intended and limiting influence that they might exert over the operation and operability of the proposed system, controls, and actuation circuits. Please show that all associated hardware and software have been subjected to appropriate Verification & Validation (V&V). Please provide copies of the associated Failure Modes and Effects Analyses. Please note that the requirements concerning such digital electronics would be similar*

to those applicable to the CREATS control room air intake radiation monitors.

Response: See # 15 above.

17. *Please confirm that the proposed modifications will have no impact upon the digital system hardware and software for the recently-accepted control room air intake radiation monitors. Alternatively, if it is intended that there be some interface with the digital system other than by connection to digital system signal output contacts, describe the interface in detail and show that the alterations have received appropriate V&V. Note that any such alteration could invalidate the existing SER for that system and require re-evaluation.*

    Response: The proposed modifications will have no impact upon the digital system hardware and software for the recently-accepted control room air intake radiation monitors.

18. *Attachment 2 page 1 indicates that chlorine monitors will initiate isolation of the Control Room Exclusion Zone (CREZ) in the event of a chlorine release, and that unrestricted influx of chlorine will occur for less than 30 seconds prior to the isolation. Please explain how it is ensured that isolation would be accomplished within the indicated time limit.*

    Response: The Technical Requirements Manual (TRM) setpoints for the chlorine and ammonia monitors are conservative with respect to the toxic limits for the respective chemical. The actual monitor setpoints for CREATS isolation/initiation are set at even less than the TRM setpoints as follows:

Signal	Isolation	TRM Limit	RG 1.78 Limit
Chlorine	1 ppm	5 ppm	10 ppm
Ammonia	10 ppm	50 ppm	300 ppm

Information supplied by the vendor for the chlorine and ammonia monitors indicates that when the monitors are exposed to a given concentration of the toxic chemical, the monitor will indicate 20% of that concentration within 15 seconds. Therefore, if the TRM concentration were to enter the intake duct, the monitor would reach its alarm setpoint within 15 seconds. Given a 15 second detector response, a 5 second damper response time for the new dampers (vendor supplied information), and adding 5 seconds of margin, the control room can be assumed to isolate within the required 30 seconds with margin.

15 + 5 + 5 = 25 seconds

Additionally, neglecting the duct transport time and assuming the TRM concentration discharged for 30 seconds directly into the control room volume, only 1000 cubic feet of that concentration would be discharged into ~36,000 cubic feet of control room volume. This ensures that the concentration would be diluted and will remain well below the toxic levels.

The analysis assumes a cloud concentration well in excess of the TRM concentration. Since the monitors will isolate in less than 30 seconds for the lower TRM concentration, it is shown that the analysis assumptions are correct and conservative.

19. *The analysis summary for ammonia (Attachment 2 page 2) does not indicate the existence or application of ammonia monitors, but the draft final safety analysis report Section 6.4.6 (in Attachment 8), indicates that such monitors are present and do initiate automatic CREZ isolation and CREATS actuation. Please clarify whether or not automatic CREZ isolation and CREATS actuation is assumed in the analysis presented in Attachment 2, and indicate the response time considerations applicable to these monitors.*

<u>Response:</u> Actuation is assumed within 30 seconds via the control room ammonia monitor. The Ginna Technical Requirements Manual, Section TR-3.3.1, controls the monitor operability requirements. See # 18 above for time response considerations.

20. *Attachment 3 for Limiting Condition for Operation (LCO) 3.3.6 Condition A: Please include a definition of "Emergency Mode" in sufficient detail to ensure successful implementation.*

<u>Response:</u> LCO 3.3.6 was resubmitted in Reference 4 and describes the instrumentation functions relating to CREATS actuation.

The CREATS is described in the bases of section 3.7.9 (see Reference 6), as referenced in the background of Section 3.3.6 bases.

21. *Show that the control room air intake radiation monitor sensitivity, response time, and accuracy remain adequate in spite of the change in operating point due to the application of the new source terms.*

<u>Response:</u> RG&E Calc Sheet 10.26 is under revision and will demonstrate adequacy of the monitors to isolate the control room within the assumed time. For the new system, a Safety Injection Signal is credited for actuation of the CREATS Emergency Mode for the Loss of Coolant Accident (LOCA), Steam Generator Tube Rupture (SGTR), and Steam Line Break (SLB). The radiation monitors are being credited for isolation for the Rod Ejection Accident (REA), Locked Rotor Accident (LRA), Fuel Handling Accident (FHA), Tornado Missile Accident (TMA), and Gas Decay Tank (GDT) Rupture. Since the results depend on the relative concentration in the release cloud specific to the accident, and the dose calculations are being revised to accommodate the new x/Q values (see #6 above), the response time verification will be provided by April 30, 2004.

22. *Calculation DA-EE-2001-013 Revision 0 computes the Analytical Limit (AL) for the in-duct exposure rate as a fixed fraction of the AL for the control room exposure rate. The AL for the control room exposure rate is derived from the GDC 19 limit on exposure for control room personnel. The computed values of the exposure rates are based upon some particular set of relative concentrations of various isotopes. The control room atmosphere is assumed to build to the same isotopic concentrations as the in-duct atmosphere, since isolation might not occur at exposure rates significantly below the AL. The in-duct exposure rate is lower than the control room exposure rate because the in-duct geometry differs significantly from the control room geometry. Please show that the application of AST, which will result in changes in the relative isotopic concentrations, will not alter the computed ratio of control room exposure rate to in-duct exposure rate, or revise the calculation as necessary to account for the AST.*

Response: This analysis is being evaluated in parallel with the new x/Q and dose analysis (see #6 above). The results will be provided by April 15, 2003.

23. *Please explain why the exposure ratios computed in Section 7.2.4 of the above-referenced calculation are based upon seemingly random combinations of "Dose Equivalent Rate" and "Exposure Rate" data. It would seem more reasonable to combine similar types of data. If types are to be mixed, then why is every possible combination not computed and tested? Note that using Dose Equivalent data alone, the computed ratio of 15.64 would change to 17.07. Using all possible combinations, the ratio would change to 18.62 (Exposure Rate for control room, Dose Equivalent rate for in-duct at 26 inches).*

Response: This question will be resolved in conjunction with # 22 above.

24. *Attachment 3 for Surveillance Requirements (SR) 3.6.6.8 and SR 3.6.6.9 (changed to ...7 & ...8 in this request), specify minimum content and concentration requirement for the NaOH tank. Please indicate how the volume and concentration are to be determined.*

Response: RG&E provided the requested information in Reference 3, Attachment 7.

25. *Attachment 3 for LCO 3.7.9 (revised numbering): Please confirm that "Control room boundary inoperable" (Condition B) means "both CREATS trains inoperable" (see Condition A), and clarify what is meant by "compensatory measures" in Required Action B.1. Please explain why the entire boundary should be permitted to remain inoperable for longer than a single train is permitted to be inoperable. Please explain why an inoperability of the mechanical equipment should be tolerated longer than inoperability of the associated instrumentation (see LCO 3.3.6).*

Response: Tech Spec Section 3.3.6 was resubmitted per Reference 4. Also, in Reference 2, RG&E committed to resubmit appropriate Tech Spec sections based on resolution of TSTF-448. We further committed to hold future discussions with the Staff if TSTF-448 were not approved by December 15, 2003. Since it is apparent that approval of TSTF-448 is not immediately forthcoming, RG&E has initiated these discussions and agreed with the staff that the best approach was to resubmit per Regulatory Guide 1.196. These sections were resubmitted as Reference 6 and revise the LCO requirements for the CREATS. The compensatory measures would be on a case specific basis per plant procedures and are discussed in the Section 3.7.9 Bases to the extent they are discussed in Regulatory Guide 1.196, Appendix B. These two submittals together address the issues raised in this question.

26. *Attachment 7 Section 7 lists various interfacing systems. Please describe the nature of the signal and electrical interfaces, and specify the nature of the signals. Show that adequate separation and isolation will be maintained. A block diagram sketch showing signal and power connections, separation, and isolation would be helpful.*

Response: The attached block diagram (Attachment 2) of the connection between electrical panels and devices has been created to illustrate power connections and separations. The design of the safety system precludes the use of components that are common to redundant portions of the safety system, such as common switches or sensing lines, which could compromise the independence of redundant portions of the safety system. Device and train separations is evident by inspection of this drawing in most cases. The following explanation describes how this is maintained where not evident on the drawing. The numbers correspond to the note number on the attachment.

1. Cables from MCC C and MCC D to new MCC N and MCC P are the main 480 volt power supplies for the new equipment. They are routed in tray and conduit. That routing and the evaluation demonstrating separation of these circuits was previously submitted in Reference 5. None of the wiring being added for the controls portion will introduce any wiring that would impact the separations already demonstrated for those cables.

2. All of the cables installed in the relay room annex outside of panels will be in conduit, with each conduit only carrying cables of a single train. The only non-divisional conduit will be the conduit from the A junction box to the B junction box, which will carry the control circuits that parallel relay contacts for the annunciator signals. Those cables are not redundant, as they are only for non-safety indication. Isolation from train specific wiring in the cabinets will be provided by the relays

to which they are connected. These circuits can be seen in a drawing previously submitted in Reference 5.

3. The A and B SI signal cables, and A and B train DC control power cables, will come from the Relay Room into the annex. Those cables will be routed in tray while in the relay room, then transition to train specific conduits before penetrating into the Annex. While in tray, the cables will be routed independently, maintaining adequate separation until transitioned into conduit. Sections of trays being utilized will not contain cables of the other train that are required to perform a redundant safety function.

4. Control cables that are being routed from the relay room annex to the auxiliary benchboard (ABB) will start in conduits in the annex, then transition into trays in the relay room. While being routed through the relay room tray system, separation between trains will be maintained throughout the routing to the benchboard. Sections of trays being utilized will not contain cables of the other train that are required to perform a redundant safety function.

5. Auxiliary Benchboard (ABB): The Controls and internal wiring for each train have been separated by the sections of the ABB. Previously submitted drawings show the controls on top of each section. The ABB center section will house A train components, the ABB right section will house B train and non-divisional (normal HVAC) components. The cabinet panels will provide the separation between the devices. Items 6 and 7 below address cables that route through the ABB. Per IEEE 384, inside of the cabinets, wiring of redundant trains must maintain minimum separation distances or have a suitable barrier between trains. That minimum separation will be maintained for all train specific wiring associated with this modification, or suitable barrier will be installed between circuits minimum separation distances cannot be maintained. On the ABB control panel drawing, indicating lights for both trains of isolation dampers are located next to each other for operator human factors considerations, so the operator can quickly assess the status of dampers in each flow path quickly and accurately. To maintain separation between the two electrical trains at the terminals on the rear of the light sockets, a steel plate will be connected to the underside of the ABB top panel between the two rows of lights. That plate will be long and deep enough to provide adequate separation between these two sets of circuits where they terminate on the rear of the light sockets. Radiation monitoring toxic gas cables entering the rear of the ABB will be rerouted to support this configuration. A train cables will enter from the right rear of the ABB and route through a dedicated hole to

the center section. B train cables will stay in the right section. Adequate separation distance will be maintained between the A and B train cables inside of the cabinets. Toxic gas cables terminate on a fuse block. These are the fuses shown on previously submitted drawing SK10905-0546 sheets 1 and 2 (Reference 5) that provide isolation between the safety related CREATS equipment and the safety significant toxic gas detectors and power supplies.

It should be noted that there are a set of wires in the ABB that go between an A train device (relay R81A) and a B train device (relay R81B). Independence of those circuits is discussed in the response to RAI question 29.

6. Entry into the Auxiliary Benchboard (ABB) will be through penetrations in the relay room ceiling/control room floor, directly into the ABB. To maintain separation, and to utilize existing penetrations, installation will be as follows:

A train cables will enter the ABB in the right hand section, route to the rear of that section before going between sections through a panel penetration into the center section, near the rear of the ABB. After entering the ABB center at the rear, the cables will route up to terminal blocks mounted on the rear face of the ABB center section.

B train cables will enter the ABB center section in penetrations at the front of that section. These penetrations are more than 6" from any A train cables that are entering and routed at the rear of this center section. After entering the center section, the B train cables will route to the ABB right section through a panel penetration, again maintaining adequate separation distances from B train cables.

7. Wiring internal to the ABB that ties devices that share common circuits (such as the wires that have contacts from both R81A and R81B in series, see previously submitted drawing SK10905-0546, Reference 5), will be routed through a separate hole in the ABB separator panel dedicated to these wires. The contacts of the BF relays that are in these circuits provide the separation of the trains so that a failure of a device in one train cannot propagate to the other train through the common device.

8. Circuits from the junction boxes to respective thermostats, and circuits from ABB to stairwell isolation dampers, will utilize a combination of conduit and trays. Separation will be maintained throughout the routing of these circuits. Sections of trays being

utilized will not contain cables of the other train that are required to perform a redundant safety function.

9. Two circuits for the annunciator window circuits route from the ABB to the Main Control Board. These circuits are not redundant circuits, but each go to a different annunciator window. These circuits can be seen in drawing SK-10904-0698, previously submitted in Reference 5. These circuits will route out of the ABB through a penetration, and go through the Relay Room into the MCB. These non-divisional cables will be routed so that they maintain separations between the two trains by not utilizing a routing where cables from both trains for redundant functions are installed.

27. *Attachment 7 Paragraph 13.2.3 accepts the connection of non-safety cables and loads to safety power sources provided only that the connection be isolated "in accordance with the requirements of IEEE 384-1981." Please indicate the specific isolation device types and design provisions that will be applied to such electrical signal and power connections. Please indicate the specific CREATS and CREATS instrumentation connections that will involve such safety/nonsafety connections.*

Response: There are two places that non-safety related cables or devices are supplied by the safety related electrical system being utilized for the CREATS system:

Instance 1 is where the non-safety related toxic gas system interfaces with the control logic for isolation initiation. Reference drawing SK10905-0546 sheets 1 and 2 previously submitted (Reference 5). Safety related fuses are used to provide isolation to the non-safety cables to the toxic gas contacts and power supplies. Coordination of protective devices will prevent a fault on the non-1E side of the fuses from causing a loss of power to the safety related equipment.

Instance 2 is the interconnection to any remaining normal CR HVAC equipment that is not considered part of the new CREATS system, and to the non-safety related MCB annunciator windows. Those interfaces are made at relay contacts that are used to separate the normal equipment on an isolation signal. These contacts are seen on SK10905-0546 sheet 1. The relay contacts are on safety related type BF relays, providing isolation to any non-safety related circuits. More details of these interfaces can be seen on the drawings of Attachment 1 of Reference 5.

28. *Attachment 7 Section 16 indicates that various instruments and control devices are to be associated with the new system (such as new control room thermostats per 16.3.1, new charcoal filter discharge stream temperature sensors per 16.3.3, and the new and existing control switched per 16.4). Please identify all new and existing devices to be incorporated into the CREATS or connected to CREATS equipment, and confirm that each one will be or has been specified and purchased to a Quality Level and qualification requirements appropriate to the application. Please also confirm that each one, along with all associated wiring and accessories, will be or has been installed, separated, and isolated as appropriate from all devices and wiring in other separation groups. Please describe the quality, separation, and isolation provisions applicable to each device.*

<u>Response:</u> All components required to maintain the safety functions and maintain independence for the installation will be procured safety related from qualified vendors, or will be commercial grade dedicated by the controls of the Ginna Quality Assurance Program. Both processes used in procurement of these components ensure that quality assurance provisions of 10CFR50 Appendix B were met. The handling and installation of all of these components is procedurally controlled to ensure they maintain their qualification after procurement and during installation.

Previously submitted drawings (Reference 5) depict wiring and demonstrate independence between the trains. At no place in the layout are components of redundant trains located so that the failure of one component could impact the redundant function of the opposite train.

29. *Attachment 7 Section 18.2 explicitly allows violation of electrical separation criteria. Please indicate precisely where such violations will occur and why they should be considered acceptable. Show how cross-channel fault propagation and common-cause multichannel failures would be adequately suppressed in the proposed design.*

<u>Response:</u> Maintaining the minimum separation distance per IEEE 384 for specific wiring between trains is not practical in the ABB due to the design of the system (i.e. cross-train logic functions that have been included for defense-in-depth). See the previously submitted drawing SK10905-0825 sheets 1 and 2, Reference 5. The exception

to IEEE 384 applies to the wiring in the ABB cabinet for the logic to the isolation relays, where wires connect from A Train relay R81A to B train relay R81B. However, this exception has been analyzed for the effected wires. A review of that logic wiring demonstrates that any fault in the cabinet that causes failure of a wire will result in an opening of the associated circuit. Any open circuit will result in the isolation relay dropping out, automatically causing the initiation of the safety function to perform and put the CREATS in isolation. This is true for either a single train failure or a failure that propagates between both trains due to less than optimal separation. There is not a credible failure mode that would result in a condition in which faulted or failed wires in the ABB would prevent the safety system from performing its execute function if an actuation signal was present. The only way to prevent the system from performing this function would be for 120 VAC being applied to the logic circuits of both trains within this cabinet, energizing the relays even after the output contacts of the initiating devices (rate meter, SI contact or manual pushbutton) have opened. There are only a few wires that are still energized after an initiation signal in a manner that could cause this type of unlikely "hot short" in either logic train, where a wire could be disconnected and contact the relay with 120 VAC. No points have been identified where such a condition could also cause a second wire of the other train to fail in the same manner due to the failure of the first in this way.

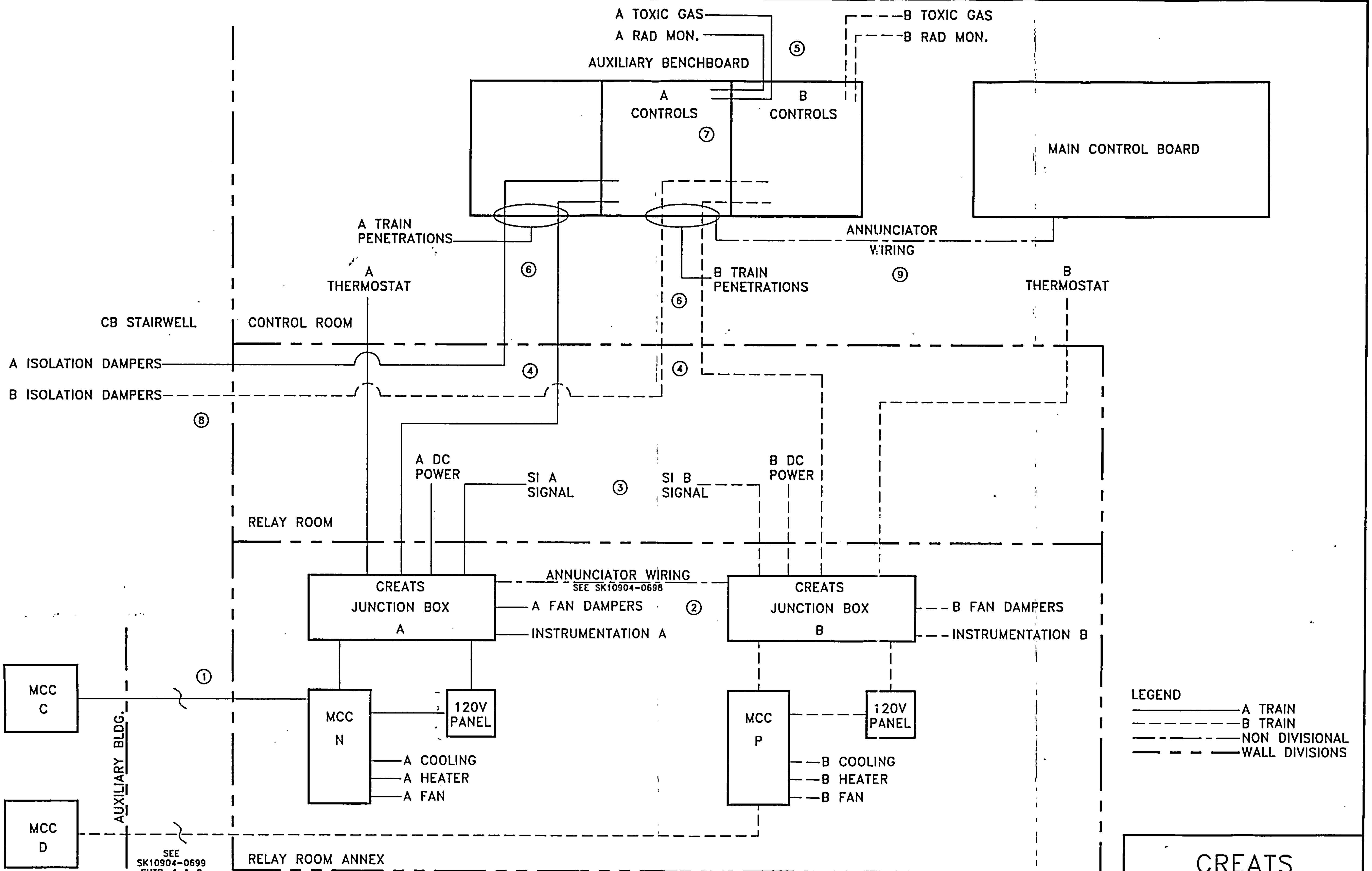
In addition, failure of any wires in the ABB due to inadequate separation between the trains can not propagate back to the radiation rate meters and cause them to fail in a manner that would prevent the system from performing its safety function. Also reviewed were the positive required actions of capability to start the CREATS fans, emergency heating, and emergency cooling. Since each of these functions has redundant control circuits separated into separate ABB sections, there is not a failure that could impact both trains. Therefore, for logic wiring in the ABB, exception to the minimum wire distance separation criteria between trains of the 120 VAC control wiring is deemed to not affect the functions of the safety system. No other exceptions of electrical separation criteria are planned.

30. *Attachment 9 page 5 indicates that there are no ducts or doors penetrating the South or West walls of the Control Building at the CREZ elevation. The new CREATS will require at least two new wall penetrations to the exterior of the building, and the CREZ is to be extended to include two existing stairwells. Please revise or confirm*

the Attachment 9 statement concerning ducts and door penetrations in the light of these changes.

Response: The above statement is correct. The new penetrations will be through the east wall and will be of leak tight construction. The drawing provided in Reference 1 is a schematic representation and does not represent physical plant layout. The CREZ is actually to be extended into a single stairwell on the west side of the control room as a temporary measure to facilitate construction. The four new dampers AKD21, AKD22, AKD23 and AKD24 will be installed in duct work located in this stairwell. The west boundary of the control room is to be returned to its original configuration after construction is completed.

Attachment 2
CREATS Electrical Block Diagram



CREATS ELECTRICAL BLOCK DIAGRAM

Attachment 3

List of Regulatory Commitments

The following table identifies those actions committed to by RG&E in this document. Any other statements in this submittal are provided for information purposes and are not considered to be regulatory commitments.

REGULATORY COMMITMENT	DUE DATE
Calculate new x/Q data for the Control Room and Off-site doses and re-calculate doses using the new x/Q data. Consider items 4,6,7,8,9,10,11 and 12 of Attachment 1 while performing the analysis.	April 15, 2004
Revise RG&E Calculation Sheet 10.26 using outputs of the new dose analysis and provide information to NRC (Attachment 1, item 21).	April 30, 2004
Evaluate and revise DA-EE-2001-013 if necessary to reflect AST sources and evaluate the current use of combinations of Dose Equivalent Rate and Exposure Rate (Attachment 1, items 22 and 23).	April 15, 2004