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October 26, 2010

U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

ATTENTION: Document Control Desk

SUBJECT: **R.E. Ginna Nuclear Power Plant**
Docket No. 50-244

Response To Commitments Regarding Generic Letter 2004-02 Specific To Debris Transport Analysis and Strainer Head-loss Testing

REFERENCES: (1) Letter from Douglas Pickett (NRC) to John Carlin (Ginna LLC), dated December 4, 2009, Request for Additional Information Re: Generic Letter 2004-02 (TAC No. MC 4687)
(2) Letter from John Carlin (Ginna LLC) to Document Control Desk (NRC), dated April 6, 2010, Request For Additional Information Regarding Generic Letter 2004-02.

On December 4, 2009, the NRC requested additional information regarding Generic Letter 2004-02: "Potential Impact of Debris Blockage on Emergency Recirculation During Design Basis Accidents at Pressurized-Water Reactors" (Reference 1). On April 6, 2010, R.E. Ginna Nuclear Power Plant LLC (Ginna LLC), responded to that request of which included regulatory commitments (Reference 2). Enclosed please find our response to those regulatory commitments.

If there are any questions or if additional information is required, please contact Mr. Thomas Harding at (585) 771-5219 or at Thomas.HardingJr@cengllc.com

Very truly yours,

John Carlin

A116
NRR

STATE OF NEW YORK:
: TO WIT:
COUNTY OF WAYNE:

I, John Carlin, being duly sworn, state that I am Vice President, R.E. Ginna Nuclear Power Plant, LLC (Ginna LLC), and that I am duly authorized to execute and file this request on behalf of Ginna LLC. To the best of my knowledge and belief, the statements contained in this document are true and correct. To the extent that these statements are not based on my personal knowledge, they are based upon information provided by other Ginna LLC employees and/or consultants. Such information has been reviewed in accordance with company practice and I believe it to be reliable.

Subscribed and sworn before me, a Notary Public in and for the State of New York and County of Monroe, this day of October, 2010.

WITNESS my Hand and Notarial Seal:

Sharon L Miller
Notary Public

SHARON L. MILLER
Notary Public, State of New York
Registration No. 01MI6017755
Monroe County
Commission Expires December 21, 20 10

My Commission Expires:

12-21-10
Date

Attachment: Ginna LLC Response to Regulatory Commitments: Debris Transport Analysis And Strainer Head-Loss Testing.

CC: W. M. Dean, NRC
D.V. Pickett, NRC
Resident Inspector, NRC (Ginna)
P.D. Eddy, NYSDPS
A.L. Peterson, NYSERDA

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Ginna LLC Response to Regulatory Commitments: Debris Transport Analysis And Strainer Head-Loss Testing.

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Ginna LLC Response to Regulatory Commitments: Debris Transport Analysis And Strainer Head-Loss Testing.

Introduction:

The following information serves to fulfill commitments to update the NRC, as identified in Attachment 2 of Ginna LLC's response to the NRC in a letter dated April 6, 2010, on activities resulting from response to request for additional information (RAI) regarding GL 2004-02, letter dated December 4, 2009.

Debris Transport Analysis Commitment:

The debris transport analysis will be revised to:

- *Remove credit for any small fiberglass debris retention in upper containment*
- *Incorporate the potential for 0.8% fine debris to wash out of the reactor cavity and transport to the ECCS sump strainer*
- *Remove credit for any fine debris settling in the recirculation pool.*

Response to Debris Transport Analysis Commitment:

As a result of teleconference discussions with the NRC regarding Ginna's updated GL 2004-02 RAI responses, the Ginna Debris Transport Analysis, ALION-CAL-GINNA-4376-03, Revision 3, was revised on June 8, 2010, thereby fulfilling the commitment to have it revised by July 30, 2010.

The Ginna Debris Transport Analysis revision incorporates the agreed upon changes, as delineated in the following:

- Removed credit taken for holdup of small pieces on grating in upper containment. (RAI Response 3.0)
- Removed credit taken for settling of fine debris in the active recirculation pool. (RAI Response 3.7)
- Reduced credit taken for the transport of fine debris to the inactive cavity. Incorporated the potential for 0.8% of the fine debris to wash out of the reactor cavity and transport to the Emergency Core Cooling System (ECCS) sump strainer. (RAI Response 3.6)
- Added Appendix 6 to discuss transport of fines from the inactive cavity to the recirculation pool. (RAI Response 3.6)
- Incorporated results of the plant specific erosion test report.

As a result of the Ginna Debris Transport Analysis revision, the quantity of debris calculated to transport to the sump strainers increased from that previously calculated. The following tables are a comparison of the quantities determined to be transported to the sump between the latest and the earlier revision of the Ginna Debris Transport Analysis.

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Ginna LLC Response to Regulatory Commitments: Debris Transport Analysis And Strainer Head-Loss Testing.

CASE 1 – Worst Case Break in Steam Generator Compartment "A"

Debris Type	Debris Size		Debris Quantity Generated	Debris Quantity at Sump ALION-CAL-GINNA-4376-03, Revision 02	Debris Quantity at Sump ALION-CAL-GINNA-4376-03, Revision 03
Thermal Wrap	Fines		90.2 ft^3	55.9 ft^3	75.8 ft^3
	Small Pieces	Intact	316.4 ft^3	3.2 ft^3	6.3 ft^3
		Eroded to Fines		9.5 ft^3	25.3 ft^3
	Large Pieces	Intact	107.8 ft^3	0 ft^3	0 ft^3
		Eroded to Fines		4.3 ft^3	4.3 ft^3
	Intact Pieces		115.4 ft^3	0 ft^3	0 ft^3
	Total		629.8 ft^3	72.9 ft^3	111.7 ft^3
Temp Mat	Fines		9.5 ft^3	5.9 ft^3	8.0 ft^3
	Small Pieces	Intact	37.7 ft^3	12.8 ft^3	32.4 ft^3
		Eroded to Fines		0 ft^3	0 ft^3
	Large Pieces	Intact	5.6 ft^3	2.1 ft^3	2.1 ft^3
		Eroded to Fines		0 ft^3	0 ft^3
	Intact Pieces		6.0 ft^3	2.3 ft^3	2.3 ft^3
	Total		58.8 ft^3	23.1 ft^3	44.8 ft^3
Cal-Sil	Fines		8.7 ft^3	7.2 ft^3	7.3 ft^3
	Small Pieces	Intact	6.9 ft^3	0 ft^3	0 ft^3
		Eroded to Fines		3.5 ft^3	3.5 ft^3
	Total		15.6 ft^3	10.7 ft^3	10.8 ft^3
Qualified Phenolics	Fines		757 lb	628 lb	636 lb
	Chips		199 lb	0 lb	0 lb
Qualified IOZ	Fines		182 lb	151 lb	167 lb
RMI	Small Pieces		1656 ft^2	0 ft^2	0 ft^2
	Large Pieces		552 ft^2	0 ft^2	0 ft^2
	Total		2208 ft^2	0 ft^2	0 ft^2
Dust/Dirt	Fines		85 lb	85 lb	85 lb
Latent Fiber	Fines		15 lb	15 lb	15 lb

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Ginna LLC Response to Regulatory Commitments: Debris Transport Analysis And Strainer Head-Loss Testing.

CASE 2 – Worst Case Break in Steam Generator Compartment "B"

Debris Type	Debris Size		Debris Quantity Generated	Debris Quantity at Sump ALION-CAL-GINNA-4376-03, Revision 02	Debris Quantity at Sump ALION-CAL-GINNA-4376-03, Revision 03
Thermal Wrap	Fines		90.7 ft^3	21.8 ft^3	76.2 ft^3
	Small Pieces	Intact	318.6 ft^3	79.6 ft^3	207.1 ft^3
		Eroded to Fines		3.2 ft^3	6.4 ft^3
	Large Pieces	Intact	108.1 ft^3	13.0 ft^3	13.0 ft^3
		Eroded to Fines		3.2 ft^3	3.2 ft^3
	Intact Pieces		115.7 ft^3	15.0 ft^3	15.0 ft^3
	Total		633.2 ft^3	135.8 ft^3	320.9 ft^3
Temp Mat	Fines		7.7 ft^3	1.8 ft^3	6.5 ft^3
	Small Pieces	Intact	30.6 ft^3	10.4 ft^3	26.3 ft^3
		Eroded to Fines		0 ft^3	0 ft^3
	Large Pieces	Intact	13.3 ft^3	5.1 ft^3	5.1 ft^3
		Eroded to Fines		0 ft^3	0 ft^3
	Intact Pieces		14.1 ft^3	5.4 ft^3	5.4 ft^3
	Total		65.7 ft^3	22.7 ft^3	43.3 ft^3
Cal-Sil	Fines		14.7 ft^3	12.2 ft^3	12.3 ft^3
	Small Pieces	Intact	11.5 ft^3	3.8 ft^3	3.8 ft^3
		Eroded to Fines		3.9 ft^3	3.9 ft^3
	Total		26.2 ft^3	19.9 ft^3	20.0 ft^3
Qualified Phenolics	Fines		869 lb	721 lb	730 lb
	Chips		199 lb	26 lb	26 lb
Qualified IOZ	Fines		210 lb	81 lb	128 lb
RMI	Small Pieces		1656 ft^2	646 ft^2	646 ft^2
	Large Pieces		552 ft^2	215 ft^2	215 ft^2
	Total		2208 ft^2	861 ft^2	861 ft^2
Dust/Dirt	Fines		85 lb	85 lb	85 lb
Latent Fiber	Fines		15 lb	15 lb	15 lb

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Ginna LLC Response to Regulatory Commitments: Debris Transport Analysis And Strainer Head-Loss Testing.

Strainer Head-Loss Testing Commitment:

The strainer head loss testing will be re-performed to:

- *Include 10% erosion of the debris, determined to be transported to the sump strainer that does not become part of the strainer debris bed, to account for any potential for erosion of the debris pile in front of the face of the strainer*
- *Use appropriate quantity of Cal-Sil fines, without crediting a zinc dust surrogate.*

Response to Strainer Head-Loss Testing Commitment:

As a result of the analysis in debris transport to the sump strainers, new strainer head loss testing was conducted, thereby fulfilling the commitment to re-test by September 30, 2010. Two series of head loss tests, in July 2010 and September 2010, were conducted with the new debris quantities. The largest quantity of debris, for each debris type and size, was used without regard to Case. This results in the most conservative test results, and is bounding for all break locations. The debris used in the head loss testing was the actual debris material (cal-sil, Thermal Wrap, Temp Mat), except for the use of zinc dust for inorganic zinc coating (IOZ), stone flour for dust/dirt and phenolic coating fines, and Thermal Wrap for latent fiber. The use of these materials during testing addresses the NRC's concern for the previous use of zinc dust as a surrogate for cal-sil. Additionally, to address the potential for erosion of the debris pile in front of the strainer, 10% of the debris pile Thermal Wrap and Temp Mat small and large pieces, and 50% of the debris pile cal-sil small intact pieces were also added as fines to the testing debris quantities. The following table provides the derivation and scaled quantities of the debris used for testing.

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Ginna LLC Response to Regulatory Commitments:
Debris Transport Analysis And Strainer Head-Loss Testing.

Ginna Strainer Head Loss Testing - 2010

Debris Type and Size			Case 1			Case 2			Worst Case	Quantities to Use in Strainer Head Loss Testing		
			Debris Quantity Generated (17D ZOI)	Debris Quantity at Sump (17D ZOI) (No Settling)	Total Quantity Transported (incl. debris pile erosion)	Debris Quantity Generated (17D ZOI)	Debris Quantity at Sump (17D ZOI) (No Settling)	Total Quantity Transported (incl. debris pile erosion)	Worst Case Quantity Transported (incl. debris pile erosion)	Debris Quantity for Testing Scaling Factor of 51.04	Weight	Quantities to Use in Strainer Head Loss Testing
			ft3	ft3	ft3	ft3	ft3	ft3	ft3	ft3	lbs	kg
Thermal Wrap	Fines		90.20	75.80	105.78	90.70	76.20	99.01	105.78	2.07	4.97	2.256
	Small Pieces	Intact	316.40	6.30	5.92		207.10	194.67	194.67	3.81	9.15	4.153
		Fines		25.30		318.60	6.40					
	Large Pieces	Intact	107.80	0.00	0.00		13.00	12.22	12.22	0.24	0.57	0.261
		Fines		4.30		108.10	3.20					
	Intact Blankets		115.40	0.00	0.00	115.70	15.00	15.00	15.00	0.29	0.71	0.320
			Debris Quantity Generated (11.7D ZOI)	Debris Quantity at Sump (11.7D ZOI) (No Settling)	Total Quantity Transported (incl. debris pile erosion)	Debris Quantity Generated (11.7D ZOI)	Debris Quantity at Sump (11.7D ZOI) (No Settling)	Total Quantity Transported (incl. debris pile erosion)	Worst Case Quantity Transported (incl. debris pile erosion)	Debris Quantity for Testing Scaling Factor of 51.04	Weight	Quantities to Use in Strainer Head Loss Testing
			ft3	ft3	ft3	ft3	ft3	ft3	ft3	ft3	lbs	kg
Temp Mat	Fines		9.50	8.00	10.07	7.70	6.50	8.38	10.07	0.20	1.78	0.806
	Small Pieces	Intact	37.70	32.40	30.46	30.60	26.30	24.72	30.46	0.60	5.37	2.437
		Fines		0.00			0.00					
	Large Pieces	Intact	5.60	2.10	1.97	13.30	5.10	4.79	4.79	0.09	0.85	0.383
		Fines		0.00			0.00					
	Intact Blankets		6.00	2.30	2.30	14.10	5.40	5.40	5.40	0.11	0.95	0.432

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Ginna LLC Response to Regulatory Commitments:
Debris Transport Analysis And Strainer Head-Loss Testing.

Ginna Strainer Head Loss Testing - 2010

Debris Type and Size			Case 1			Case 2			Worst Case	Quantities to Use in Strainer Head Loss Testing		
			Debris Quantity Generated (6.4D ZOI)	Debris Quantity at Sump (6.4D ZOI) (No Settling)	Total Quantity Transported (incl. debris pile erosion)	Debris Quantity Generated (6.4D ZOI)	Debris Quantity at Sump (6.4D ZOI) (No Settling)	Total Quantity Transported (incl. debris pile erosion)	Worst Case Quantity Transported (incl. debris pile erosion)	Debris Quantity for Testing Scaling Factor of 51.04	Weight	Quantities to Use in Strainer Head Loss Testing
			ft3	ft3	ft3	ft3	ft3	ft3	ft3	ft3	lbs	kg
Cal-Sil	Fines		8.70	7.30	10.80	14.70	12.30	17.34	17.34	0.34	5.10	2.312
	Small Pieces	Intact	6.90	0.00	0.00	11.50	3.80	3.57	3.57	0.07	1.05	0.476
		Fines		3.50			3.90					
			Debris Quantity Generated (10D ZOI)	Debris Quantity at Sump (10D ZOI) (No Settling)	Total Quantity Transported	Debris Quantity Generated (10D ZOI)	Debris Quantity at Sump (10D ZOI) (No Settling)	Total Quantity Transported	Worst Case Quantity Transported	Debris Quantity for Testing Scaling Factor of 51.04	Weight	Quantities to Use in Strainer Head Loss Testing
			lbs	lbs	lbs	lbs	lbs	lbs	lbs	lbs	lbs	kg
Qualified Phenolic	Fines		757.00	636.00	636.00	869.00	730.00	730.00	730.00	14.30	14.30	6.488
	Chips		199	0	0	199	26	26	26	0.51	0.51	0.231
			Debris Quantity Generated (10D ZOI)	Debris Quantity at Sump (10D ZOI) (No Settling)	Total Quantity Transported	Debris Quantity Generated (10D ZOI)	Debris Quantity at Sump (10D ZOI) (No Settling)	Total Quantity Transported	Worst Case Quantity Transported	Debris Quantity for Testing Scaling Factor of 51.04	Weight	Quantities to Use in Strainer Head Loss Testing
			lbs	lbs	lbs	lbs	lbs	lbs	lbs	lbs	lbs	kg
Qualified IOZ	Fines		182.00	167.00	167.00	210.00	190.00	190.00	190.00	3.72	3.72	1.689

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Ginna LLC Response to Regulatory Commitments:
Debris Transport Analysis And Strainer Head-Loss Testing.

Ginna Strainer Head Loss Testing - 2010										
Debris Type and Size		**Case 1**			**Case 2**			**Worst Case**	**Quantities to Use in Strainer Head Loss Testing**	
		Debris Quantity Generated	Debris Quantity at Sump	Total Quantity Transported	Debris Quantity Generated	Debris Quantity at Sump	Total Quantity Transported	Worst Case Quantity Transported	Debris Quantity for Testing Scaling Factor of 51.04	Weight	Quantities to Use in Strainer Head Loss Testing
		ft2	ft2	ft2	ft2	ft2	ft2	ft2	ft2	lbs	kg
RMI	Small Pieces	1656.00	0.00	0.00	1656.00	646.00	646.00	646.00	12.66	1.04	0.472
	Large Pieces	552.00	0.00	0.00	552.00	215.00	215.00	215.00	4.21	0.35	0.157
		Debris Quantity Generated	Debris Quantity at Sump	Total Quantity Transported	Debris Quantity Generated	Debris Quantity at Sump	Total Quantity Transported	Worst Case Quantity Transported	Debris Quantity for Testing Scaling Factor of 51.04	Weight	Quantities to Use in Strainer Head Loss Testing
		lbs	lbs	lbs	lbs	lbs	lbs	lbs	lbs	lbs	
Dust/Dirt	Fines	85.00	85.00	85.00	85.00	85.00	85.00	85.00	1.67	1.67	0.755
		Debris Quantity Generated	Debris Quantity at Sump	Total Quantity Transported	Debris Quantity Generated	Debris Quantity at Sump	Total Quantity Transported	Worst Case Quantity Transported	Debris Quantity for Testing Scaling Factor of 51.04	Weight	Quantities to Use in Strainer Head Loss Testing
		lbs	lbs	lbs	lbs	lbs	lbs	lbs	lbs	lbs	
Latent Fiber	Fines	15.00	15.00	15.00	15.00	15.00	15.00	15.00	0.29	0.29	0.134

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Ginna LLC Response to Regulatory Commitments: Debris Transport Analysis And Strainer Head-Loss Testing.

The head loss testing results, for the tests conducted in July 2010 and September 2010, are summarized in the following table. Additionally, test results from March 2008 are included for comparison purposes.

Test Date	Temperature °C	Tested Head Loss (mbar)	Head Loss Normalized to 195 °F (mbar)	Total Head Loss Including Strainer Ducts (mbar)
Mar-08	20	95.2	29.7	33.6
Jul-10	48.1	40.5	22.3	26.2
Sep-10	41.8	29.7	14.6	18.5
Acceptance Criteria 2.99 ft * 29.9 mbar/ft	>>	>>	>>	89.4

The primary difference between the tests performed in July 2010 and September 2010 is the sequence in which the debris was added to the test loop. All other parameters were the same. In the July 2010 test, the precipitate was added last, after all fiber and particulate was added. In the September 2010 test, the precipitate was added following the addition of all fiber and particulate fines, and before the fiber and particulate small and large pieces. The later test was designed to determine the effect of the precipitant on the potential formation of a thin bed.

In the July 2010 test, the most rapid head loss increase occurred after the addition of the precipitant. The quantity of fiber fines, fiber small pieces, and fiber large pieces was enough to form a "bridge" across the face of the strainer at the pocket openings. This layer of fiber across the face of the strainer was able to filter out the precipitant and was strong enough to withstand the created head loss. However, due to the pocket design and strainer configuration, significant open strainer surface area remained to preclude additional head loss increase.

In the September 2010 test, the precipitate addition did not result in a rapid head loss increase. These results are due to the behavior of the layer build-up. The precipitate caused the layer of fiber and particulate fines to become compressed, diverting more and more of the flow through the relatively open areas of the strainer. The addition of precipitate before the fiber and particulate small and large pieces resulted in a less distributed layer of precipitate, thereby lessening its impact on overall strainer head loss. The most rapid rise in head loss occurred following the

addition of the fiber and particulate small and large pieces, after the precipitate had been filtered by the fines. The fiber and particulate small and large pieces tended to enter the pockets with the more open area, creating additional head loss increase. However, the impact of "bridging" across the pockets had a lesser impact on head loss as compared to the July 2010 test, due to the absence of precipitate.

The 2010 head loss tests resulted in a slightly lower head loss as compared to that from March 2008. Slight variation of results between tests is expected, given the number of variables that can differ from test to test. The most significant difference in the tests performed, aside from the differences in debris quantity, is the rate at which the chemical precipitate was added. In the March 2008 head loss test, the entire chemical precipitate quantity was conservatively added within 20 minutes. In the 2010 tests the chemical precipitate was added at a rate greater, but more consistent with, the formation rate of the chemical precipitate in containment.