

**Proprietary Information, withhold From Public Disclosure Under 10 CFR 2.390**

Upon the removal of Enclosure 3, the balance of this letter may be considered non-proprietary

The Detroit Edison Company  
One Energy Plaza, Detroit, MI 48226-1279



10 CFR 52.79  
10 CFR 2.390

October 19, 2010  
NRC3-10-0047

U. S. Nuclear Regulatory Commission  
Attention: Document Control Desk  
Washington, DC 20555-0001

- References:
- 1) Fermi 3  
Docket No. 52-033
  - 2) Letter from Jerry Hale (NRC) to Jack M. Davis (Detroit Edison), "Request for Additional Information Letter No. 38 Related to the SRP Section 16 for the Fermi 3 Combined License Application," dated July 13, 2010
  - 3) Letter from Peter Smith (DTE) to USNRC, "Detroit Edison Company Response to NRC Requests for Additional Information Letter No. 38," dated August 26, 2010

Subject: Detroit Edison Company Response to NRC Requests for Additional Information Letter No. 38

In Reference 2, the NRC requested additional information to support the review of certain portions of the Fermi 3 Combined License Application (COLA). Detroit Edison provided its response to the Request for Additional Information (RAI) associated with Reference 2 in Reference 3. The response in Reference 3 is being superseded due to comments received from the NRC Staff via conference call on September 14, 2010. Information contained in this response will be incorporated into a future COLA submission as described in the attachments.

Enclosure 3 contains BAE Batteries USA proprietary information as defined by 10 CFR 2.390. Detroit Edison, Black & Veatch and BAE Batteries USA customarily maintain this information in confidence and withholds it from public disclosure. Enclosure 1 is the non-proprietary version, which does not contain proprietary information and is suitable for public disclosure.

The affidavit contained in Enclosure 2 identifies that the information contained in Enclosure 3 has been handled and classified as proprietary to BAE Batteries USA. Detroit Edison, Black &

Veatch and BAE Batteries USA hereby request that the information in Enclosure 3 be withheld from public disclosure in accordance with the provisions of 10 CFR 2.390 and 9.17.

As the response in Reference 3 is being superseded and in accordance with 10 CFR 2.390(c)(3), Detroit Edison, Black & Veatch and BAE Batteries request the return of the proprietary enclosures from Reference 3: Enclosure 4, "Charging Current-BAI 2V-24OPxS-3000" and Enclosure 5, "Charging of the cell BAE OPzS 3000 N."

If you have any questions, or need additional information, please contact me at (313) 235-3341. I state under penalty of perjury that the foregoing is true and correct. Executed on the 19 day of October 2010.

Sincerely,



Peter W. Smith, Director  
Nuclear Development – Licensing & Engineering  
Detroit Edison Company

Attachments: 1) Response to RAI Letter No. 38, RAI Question No. 16-2

Enclosures:

1. Letter from Chris Searles (BAE) to James Thompson (B&V), "Charging Current-BAE 2V-24OPzS-3000N," date September 19, 2010 - [Public Version]
2. Affidavit
3. Letter from Chris Searles (BAE) to James Thompson (B&V), "Charging Current-BAE 2V-24OPzS-3000N," date September 23, 2010– [Proprietary Version]

cc: Jerry Hale, NRC Fermi 3 Project Manager  
Adrian Muniz, NRC Fermi 3 Project Manager  
Bruce Olson, NRC Fermi 3 Environmental Project Manager  
Fermi 2 Resident Inspector (w/o attachments)  
NRC Region III Regional Administrator (w/o attachments)  
NRC Region II Regional Administrator (w/o attachments)  
Supervisor, Electric Operators, Michigan Public Service Commission (w/o attachments)  
Michigan Dept. of Natural Resources & Environment  
Radiological Protection Section (w/o attachments)

**Attachment 1  
NRC3-10-0047**

**Response to RAI Letter No. 38  
(eRAI Tracking No. 4851)**

**RAI Question No. 16-2**

**NRC RAI 16-2**

*In Part 4, Rev 2, B 3.8.3, Bases, Surveillance requirements (SR 3.8.3.1), page B 3.8.3-6, it states that “The 30 amp value is based on returning the battery to 95% charge and assume a 5% design margin for the battery.”*

*Also in Part 4, Technical Specifications and Bases, Rev. 2, page 8, Item 21 (STD COL 16.0-1-A 3.8.3-1), Acceptance Criteria for Verification of Fully Charged Battery, it is indicated under “Justification” that “Values are based on BAE battery manufacturer’s recommended fully charged float current limits for the BAE 2V-240OPzS-3000 battery string.”*

*These above two statements appear to be inconsistent.*

- (1) Please clarify the 95% charged vs. the fully charged battery conditions with respect to float current of 30 amps as stated in both sections mentioned above.*
- (2) Please provide supporting document for the float current value of 30 amps for fully charged battery.*

**Response**

- (1) Please clarify the 95% charged vs. fully charged battery conditions with respect to float current of 30 amps as stated in both sections mentioned above.

The Generic Technical Specifications and Bases (GTSS) for the ESBWR, and subsequently the Fermi 3 Technical Specifications and Bases (TSs), use the term “fully charged” in a number of instances associated with TS 3.8.1, “DC Sources – Operating” and TS 3.8.3, “Battery Parameters.” The term “fully charged” is equivalent to meeting the Surveillance Requirements specified in TS 3.8.3 for battery float current (30 amps), as described in the NRC staff’s draft Safety Evaluation Report for the ESBWR GTSS (ML100550964), which, on page 16-133, states:

*“RAI 16.2-55. The staff asked the applicant to justify its proposal to use float current monitoring to determine battery state of charge (SOC), instead of a SR for measuring battery cell electrolyte specific gravity. RAI 16.2-55 was being tracked as an open item in the SER with open items. In its response dated November 13, 2006, the applicant committed to propose, upon final resolution of the staff’s concerns with TSTF-360, a surveillance that conforms to the STS to the extent practicable and consistent with the ESBWR design. TSTF-360 is to be replaced with TSTF-500, “DC Electrical Rewrite-Update to TSTF-360,” which was scheduled to be submitted by July 2007. Subsequent to its response, the applicant issued DCD Revision 3. This revision proposed that specific gravity measurements be replaced with float current monitoring to determine the battery SOC. To accept this proposal, the staff needed confirmation from the VRLA battery manufacturer that float current monitoring can accurately indicate the battery SOC during steady-state and discharge conditions. If float current monitoring does not indicate 100-*

percent SOC, the staff would have requested that the COL applicant commit to additional design margins in the battery sizing calculations to compensate for measurement uncertainty, and that the GTS bases specify these design margins. In DCD Revision 6, and in response to RAI 8.3-62 dated April, 2009, the applicant changed the type of battery to VLA and retained the proposed SR for float current measurements consistent with the STS. In addition, the applicant revised GTS 5.5.10, "Battery Monitoring and Maintenance Program," to address specific gravity. This specification states, "The following programs shall be established, implemented, and maintained....This program provides for battery restoration and maintenance, which includes the following:....A requirement to obtain specific gravity readings of all cells at each discharge test, consistent with manufacturer recommendations." This provision is consistent with staff comments that were subsequently incorporated into TSTF-500, Revision 2, which was submitted for staff review by the industry owners group TSTF by letter dated September 22, 2009. COL Information Items, such as item 3.8.1-4 in DCD Table 16.0-1-A, stipulate that use of battery float current instead of battery cell specific gravity to indicate that the battery is fully charged is acceptable "provided the battery manufacturer has confirmed the acceptability and acceptance criteria, and that battery capacity includes margin for state of charge uncertainty." The staff finds that the battery-parameter-related COL items listed in DCD Table 16.0-1-A will ensure that use of battery float current to indicate battery state of charge is adequately justified. The staff also finds that the battery monitoring and maintenance program specification will ensure that battery cell electrolyte specific gravity measurements will be obtained as recommended by the battery manufacturer to confirm battery state of charge during a battery discharge test. Therefore, RAI 16.2-55 is resolved."

The Bases for SR 3.8.3.1 in the GTS for the ESBWR (Revision 6) states:

"Verifying battery float current while on float charge is used to determine the state of charge of the battery. Float charge is the condition in which the charger is supplying the continuous charge required to overcome the internal losses of a battery and maintain the battery in a charged state. The float current requirements are based on the float current indicative of a charged battery. The [30 amp value] is based on returning the battery to [95]% charge and assumes a [5]% design margin for the battery. Use of float current to determine the state of charge of the battery is consistent with IEEE-450 (Ref. 4). The 7-day Frequency is consistent with IEEE-450 (Ref. 4)."

where COL Item 16.0-1-A, "COL Applicant Bracketed Items" identifies that COL applicants referencing the ESBWR Design Control Document (DCD) are to replace the preliminary information provided in brackets ("[...]"), and annotated with "16.0-1-A" labels, with final plant specific information.

Revision 6 of the ESBWR Design Control Document (DCD), Table 16.0-1-A, "COL-Applicant Open Items" identifies that the reviewers note for COL Item 3.8.3-1, "Acceptance Criteria for Verification that Battery is Fully Charged" states:

“Provide acceptance criteria for verification that battery is fully charged consistent with battery manufacture recommendations. Use of float current monitoring option requires that battery manufacturer confirm acceptability and acceptance criteria and that battery capacity includes margin for state of charge uncertainty.”

The NRC staff’s draft Safety Evaluation Report for the ESBWR GTSs (ML100550964) addresses the acceptability of the text in the GTS Bases on page 16-135 and 16-136, and states:

“RAI 16.2-126. DCD Revision 4, GTS 3.8.1, Required Action A.2, states that, if one or both required battery chargers are inoperable on one required division, the associated battery must be returned to the fully charged condition. The bases specify a fully charged condition as either three consecutive hourly current readings with a change of “less than {0.5} amps” or a float current of “less than {2} amps.” The staff stated that GTS 3.8.1, not the bases, must define the fully charged condition. In addition, the staff noted that the applicant gave no technical justification for three consecutive hourly readings with a change of “less than {0.5} amps” in lieu of a float current of “less than {2} amps.” RAI 16.2-126 was being tracked as an open item in the SER with open items.

In its response dated December 4, 2007, GEH described two methods for determining battery SOC and stated that these methods are based on current monitoring because monitoring the electrolyte specific gravity of VRLA batteries is not feasible, and referenced IEEE Standard 1188-2005. GEH also stated that a third method for determining SOC is monitoring the float current, which is specifically designed for a battery being maintained in standby service at float voltage and consistent with the STS, which are based on the use of VLA batteries. GEH reasoned that this third method could be applied to VRLA batteries and noted that chemical changes occur within the VRLA battery, as they do in the VLA battery, as a result of the aging process. These chemical changes will cause the float current for a fully charged VRLA battery to increase with battery age. Therefore, unless the float current acceptance criterion is periodically increased, this method could result in a conservative but incorrect determination that a fully charged ESBWR VRLA battery is inoperable. Because of this, in DCD Revision 6, GEH revised two reviewer’s notes associated with proposed COL Items 3.8.1-2 and 3.8.3-1 (both entitled, “Acceptance criteria for verification that battery is fully charged.” in DCD Table 16.0-1-A) by adding the following statement, denoted by underlining:

Provide acceptance criteria for verification that battery is fully charged consistent with battery manufacturer recommendations. Use of float current monitoring option requires that battery manufacturer confirm acceptability and acceptance criteria and that battery capacity includes margin for state of charge uncertainty.

However, in Revision 6 of the DCD, GEH changed the battery type from VRLA to VLA and changed DCD Revision 5 by replacing GTS 3.8.1, Action A, and changing GTS 3.8.3, Required Action B.2 from “Verify battery is fully charged” to “Restore battery

[float current < 30 amps].” (See discussion of RAI 16.2-82 in this section of this report.) These changes are consistent with the equivalent requirements in STS 3.8.4, Required Action A.2, and STS 3.8.6, Required Action B.2. The applicant also made conforming changes to the bases. Based on the applicant incorporating these changes in DCD Revision 6, RAI 16.2-126 is resolved.”

Detroit Edison intends to use batteries manufactured by BAE in the 250 V Safety-Related DC System. For the selected batteries, a 30 amp battery float current is based on returning the battery to 95% charge and assumes a 5% design margin to account for uncertainties in the use of float current to measure the state of charge of the battery. These values are recommended by the battery manufacturer and are used to complete the GTS bracketed items in the Fermi 3 TS Bases for TS 3.8.3.

The method of sizing the Safety-Related 250 V batteries is described in Section 8.3.2.1.1 of Revision 6 of the ESBWR DCD, which requires that the batteries be sized for DC load in accordance with IEEE Standard 485 and include margin to compensate for uncertainty in determining the battery state of charge. The margin associated with using battery float current to indicate battery state of charge is incorporated into the design by adding the battery float current uncertainty to those margins specified in the battery sizing methods described in IEEE Standard 485.

In summary, a battery is considered to be operable when the battery float current is less than or equal to 30 amps. Battery operability is defined as being capable of performing its specified safety function (i.e., supplying the required loads for the required time period).

It is recognized that in using battery float current to determine the state of charge introduces uncertainty compared to other methods, such as specific gravity. The battery manufacturer has recommended an uncertainty value of 5%. This means that when a 30 amp battery float current is measured, the battery is at least 95% charged. The system design accounts for this uncertainty by requiring that it be included in the method for determining required battery capacity, in addition to the uncertainties considered by the methods described in IEEE 485 (i.e., a 5% larger battery capacity is specified in the design, for a given battery load, because battery float current is used in determining battery state of charge in lieu of other methods).

- (2) Please provide supporting document for the float current value of 30 amps for fully charged battery.

The manufacturer’s confirmation of the acceptability of the use of a float current of 30 amps or less to ensure a 95% or greater charged condition for the BAE 2V-24OPzS-3000 battery is provided in Enclosure 1 (Public Version) and Enclosure 3 (Proprietary Version).

**Proposed COLA Revision**

Attached is a proposed revision to the reviewer's notes for Part 4, "Technical Specifications and Bases" associated with this response.

**Markup of Detroit Edison COLA**  
(following 2 pages)

The following markup represents how Detroit Edison intends to reflect this RAI response in a future submittal of the Fermi 3 COLA. However, the same COLA content may be impacted by revisions to the ESBWR DCD, responses to other COLA RAIs, other COLA changes, plant design changes, editorial or typographical corrections, etc. As a result, the final COLA content that appears in a future submittal may be different than presented here.

unavailability of this detail reflects the preliminary design of the system, which has not progressed sufficiently to define the expected pressure. Inclusion of the expected pressure in the Bases does not serve the underlying purpose of identifying the minimum accumulator pressure, and is not necessary to achieve the underlying purpose of the Technical Specifications.

STD COL 16.0-1-A  
3.8.1-1

## 20. Acceptance Criteria for Battery Charger Testing

### GTS:

GTS and Bases for SR 3.8.1.2 includes bracketed specifics on the safety-related battery charger test duration.

### Plant-Specific TS:

Complete the bracketed values.

### Justification:

Values are bounding based on GUTOR manufacturer's recommendations for battery charger test duration.

STD COL 16.0-1-A  
3.8.3-1

## 21. Acceptance Criteria for Verification of Fully Charged Battery

### GTS:

GTS Bases for TS 3.8.3 Actions B, C and G, and GTS and Bases for SR 3.8.3.1 include bracketed method for determining the state-of-charge for the battery.

### Plant-Specific TS:

Complete the brackets with float current.

### Justification:

~~Values are based on BAE battery manufacturer's recommended fully charged float current limits for the BAE 2V-240P-0-0000 battery string.~~

Values for battery float current acceptance criteria and battery capacity margin for state of charge are based on the battery manufacturer's recommendations.

STD COL 16.0-1-A  
3.8.1-4  
3.8.3-3  
5.5.10-1

## 22. Battery Cell Parameters

### GTS:

GTS Bases for SR 3.8.1.1 and TS 3.8.3 Background; the GTS and Bases for TS 3.8.3 Actions, SR 3.8.3.2, and SR 3.8.3.5; and GTS 5.5.10.a, include bracketed battery cell voltage values and bracketed basis for the values. GTS Bases for SR 3.8.1.1 includes a bracketed location for monitoring the applicable battery temperature for battery voltage compensation. GTS Bases for TS 3.8.3

Background includes bracketed values for nominal specific gravity and number of battery cells. GTS Bases for SR 3.8.3.4 includes bracketed value for battery pilot cell electrolyte minimum temperature.

Plant-Specific TS:

Complete the brackets.

Justification:

Various values for battery parameters are based on the ~~BAE 2V-24OPzS-3000~~ battery manufacturer's recommendations. Total number of battery cells is supported in ESBWR DCD Tier 2 Table 8.3-4.

STD COL 16.0-1-A  
3.8.1-5  
3.8.3-4

**23. Battery Margin for Aging Factor and State of Charge Uncertainty**

GTS:

GTS Bases for TS 3.8.1 Background and GTS and Bases for SR 3.8.3.6, include bracketed battery end-of-life capacity limit.

Plant-Specific TS:

Complete the brackets.

Justification:

Values are based on the ~~BAE 2V-24OPzS-3000~~ battery manufacturer's recommendations.

STD COL 16.0-1-A  
5.5.11-1

**24. Setpoint Control Program Methodology and Implementation**

GTS:

GTS 5.5.11.b includes bracketed references to the approved GEH setpoint methodology revision and the corresponding NRC Safety Evaluation date, as well as applicable ADAMS accession numbers.

Plant-Specific TS:

The approved GEH setpoint methodology revision and the corresponding NRC Safety Evaluation date, as well as applicable ADAMS accession numbers will be provided in a subsequent submittal to complete these brackets.

Justification:

NRC approval of the GEH setpoint methodology is pending.

**Enclosure 1**  
**NRC3-10-0047**

**RAI Question 16-2**

**“Charging Current-BAE 2V-24OPzS-3000N”– [Public Version]**  
(following 1 page(s))



**BAE Batteries USA**  
 County Highway V V  
 Somerset WI 54025  
 Phone: 715-247-2262  
 Fax: 715-247-5741

**Major Account Office:**  
 2902 Glen Hollow Court  
 McKinney TX 75070  
 Phone: 972-540-2972  
 Fax: 972-542-8905

Date:	Tuesday, October 05, 2010
To:	James (Bo) Thompson Black & Veatch
cc:	Wieland Rusch, BAE Batterien Dan Hatch, BAE Batteries USA
Subject:	Charging Current- BAE 2V-24OPzS-3000N

**Non-Proprietary – Public Version**

This document will confirm that BAE approves the use of the following statements to support the use of float current as a measure for state of charge for its BAE 2V-24OPzS-3000N VLA batteries as follows:

A charged condition of 95% or greater exists when charging current has stabilized as indicated by three consecutive hourly current readings changing by [ ] for one 2V-24OPzS-3000N string composed of 120 cells at 25°C (77°F) while the battery voltage is maintained within the authorized limits as provided in specification documentation. When more than one string (120 cells) is placed in parallel with another string (120 cells), and the paralleled strings are being recharged from one charger, the values are [ ] e.g. two 2V-24OPzS-3000N strings of 120 cells placed in parallel would increase the value to [ ] for two such strings placed in parallel.

Alternatively, a charged condition of 95% or greater exists when the float current is  $\leq 15.0$  amps while the battery voltage is being maintained within the specified voltage limits for one 2V-24OPzS-3000N string composed of 120 cells at 25°C (77°F). When one or more additional strings of 120 cells are placed in parallel, the float current is  $\leq 15.0$  amps multiplied by the number of strings placed in parallel. Thus, when two strings of 2V-24OPzS-3000N of 120 cells per string are placed in parallel, the float current would be  $\leq 30.0$  amps. Either method verifies that a battery is charged at 95% or greater. Use of float current to determine the state of charge of the battery is consistent with IEEE-450, 2002 and manufacturer's recommendations.

BAE concurs with these statements for the 2V-24OPzS-3000N or when multiple strings of 2V-24OPzS-3000N are placed in parallel.

Sincerely,  
*Chris*  
 Chris Searles  
 National Director of Business Development  
 BAE Batteries USA  
 972-540-2972

**Enclosure 2**  
**NRC3-10-0047**

**RAI Question 16-2**

**BAE Affidavit**  
(following 3 page(s))

**BAE Batteries USA** County Highway V V Somerset WI 54025 Phone: 715-247-2262

## AFFIDAVIT

I, Daniel Hatch, state as follows:

- 1) I am the Chief Executive Officer of BAE Batteries USA. I have reviewed the information being submitted and sought to be withheld. I am authorized to apply for withholding this information.
- 2) The information we are seeking to remain withheld are our responses to FERMI 3 RAI Letter #38 ML 1019402500 and indicated as proprietary. The document in question is entitled "Charging Current- BAE 2V-24OPzS-3000N."
- 3) In making this application for withholding information, BAE Batteries USA relies on exemption from disclosure as set forth in the Freedom of Information Act 5 USC, Section 552 (b) (4) and 10CFR 2.390 (a) (4) for "trade secrets."
- 4) An example of categories of information which fit the definition of proprietary information is:

- a. The information requested to be withheld consists of supporting data, including actual test and results data, and the application of this data secures a competitive advantage as described in this affidavit.
- b. This information, if used by a competitor, would greatly reduce his expenditure of resources or improve his competitive position in the design, manufacture and assurance of quality or licensing of a similar product.
- c. The information being submitted reveals past GEH submission of development plans and should already be considered proprietary under the conditions of 10 CFR 2.390 (b) (4).

The information in a. - c. above is all relevant, but the information BAE requests to be withheld meets category 4)b. above.

- 5) To address 10CFR 2.390 (b) (4), the information we are seeking to be withheld is being submitted to the NRC in confidence. This information, to the best of my knowledge and belief, has been consistently held in confidence by GEH, DTE and Black & Veatch; no public disclosure has been made of this exact information; and is not available from public sources.
- 6) All disclosures to 3<sup>rd</sup> parties, including transmittal to GEH, DTE, Black & Veatch and the NRC, have been or must be made subject to regulatory provisions or proprietary agreements made in writing or verbally which call for the maintaining of this information in confidence.

- 7) External release of this information which we are requesting to be withheld requires review and authorization from the chief scientist, Director of Design Engineering, or other equivalent authority, and is subject to appropriate regulatory provisions and/or proprietary agreements.
  
- 8) Public disclosure of the information contained in this submission is likely to cause substantial harm to BAE Batteries USA's competitive position and reduce or foreclose on the availability of BAE Batteries USA's profit-making opportunities.
  
- 9) The research, engineering, product development, and review costs associated with this project comprise a substantial investment of time and money by BAE Batterien GmbH and BAE Batteries USA.

I declare under penalty of perjury that the foregoing affidavit and the matters stated therein are true and correct to the best of my knowledge, information and belief.

Executed this 6<sup>th</sup> day of October, 2010.

A handwritten signature in black ink, appearing to read 'D Hatch', followed by a long horizontal line extending to the right.

Daniel Hatch  
Chief Executive Officer  
BAE Batteries USA