HF Controls Corp. • 1624 West Crosby Road Suite 124 • Carrollton, TX 75006 USA •
Phone 469.568.6500 • Fax 469.568.6599 • www:hfcontrols.com

PR0073 1

June 15, 2015

United States Nuclear Regulatory Commission
11555 Rockville Pike,
Rockville, Maryland 20852

Subject: Response to questions for second amendment and third amendment submittal requests for HFC-6000 Safety Platform Safety Evaluation Report (ADAMS No. ML110831014)

Reference: HFC-6000 Safety Control System

Ladies and Gentlemen:

HFC received a set of questions regarding to two HFC amendment requests, dated in September 2011 (RR901-102-01, Rev. A) and August 2012 (RR901-003-01, Rev. B). The questions were related to the scope of review in related to the equipment listed in HFC-6000 Safety Platform Safety Evaluation Report (ADAMS No. ML110831014). HFC provided answers to these questions in the attachment with this letter.

In addition, HFC is requesting NRC to review section 5.2, Plant-Specific Action Items (PSAI) listed in HFC-6000 Safety Platform Safety Evaluation Report (ADAMS No. ML110831014) after the six generic open items (GOI) listed in section 5.1 had been closed or removed based on the approval of HFC amendment dated April 2015. HFC believes many of the PSAI can be removed based on the fact that the GOI have been closed.

We thank the agency for the work.

Yours Truly,

Ivan Chow
V&V Engineering Manager
Doosan HF Controls

4G51
NRR

Enclosures:

1. Answers to questions on the second amendment and the third amendment submittal for HFC-6000 Safety Platform Safety Evaluation Report – Proprietary and Non-Proprietary version

2. Supporting documents in Proprietary and Non-Proprietary versions:

Non-Proprietary Version	Proprietary Version	Description	Revision
TR901-201-01	No Proprietary Version	ERD921 Burn-in Detail Test Report	A
TR901-201-02-NP	TR901-201-02-PI	ERD921 Pre-Qualification Detail Test Report	A
TR901-201-03-NP	TR901-201-03-PI	ERD921 Environmental Stress Detail Test Report	A
TR901-201-04-NP	TR901-201-04-PI	ERD921 EMI/RFI Detail Test Report	A

3. Proprietary Equipment Qualification (EQ) Laboratory Test Reports for Test Specimen ERD1192:
   i. Environment Stress Test Results at ETL (Dallas, Texas)
   ii. EMI/RFI Test Report at Nemko (Lewisville, Texas)
   iii. Seismic Test Report at NTS (Acton, Massachusetts)

4. Justification of Proprietary Information
5. Proprietary Information Notice

CC: Joseph J. Holonich, Sr. Project Manager
Licensing Process Branch
Division of Policy and Rulemaking
Office of Nuclear Reactor Regulation
MS O-12D1

Dr. Steve Yang
Senior VP of Operations
Doosan HF Controls

Justification for Proprietary Information Affidavit

(1) My name is Ivan Chow. I am the V&V Team Manager of Doosan HF Controls (HFC) Corporation and as such, I have been specifically delegated the function of reviewing the proprietary information sought to be withheld from public disclosure in connection with nuclear power plant licensing and rulemaking proceedings, and am authorized to apply for its withholding on behalf of Doosan-HFC Corporation.

(2) I am making this Affidavit in conformance with the provisions of 10 CFR Section 2.390 of the Commission's regulations and in conjunction with the Doosan HFC application for withholding accompanying this affidavit.

(3) I have personal knowledge of the criteria and procedures utilized by Doosan HFC in designating information as trade secret, privileged or as confidential commercial or financial information.

(4) Pursuant to the provisions of paragraph (b)(4) of Section 2.390 of the Commission's regulations, the following is furnished for consideration by the Commission in determining whether the information sought to be withheld from public disclosure should be withheld.

(a) The information sought to be withheld from public disclosure is owned and has been held in confidence by Doosan HFC Corporation.

(b) The information is of a type customarily held in confidence by Doosan HFC and not customarily disclosed to the public. Doosan HFC has a rational basis for determining the types of information customarily held in confidence by it and, in that connection, uses a uniform method to determine when and whether to hold certain types of information in confidence. The application of our method and the substance of constitute Doosan HFC's policy and provide the rational basis required.

Under the Doosan HFC method, information is held in confidence if it falls in one or more of several types of information, the release of which might result in the loss of an existing or potential competitive advantage as follows:

- ❖ Its use by a competitor would reduce his expenditure of resources and improve his competitive position in the design, manufacture, installation, assurance of quality, or licensing a digital based I&C system.

- ❖ It reveals cost or price information, production capacities, budget levels, or commercial strategies of Doosan HFC, its customers or suppliers.

- ❖ It reveals aspects of past, present or future Doosan HFC or customer funded development plans and programs of potential commercial value to Doosan HFC.

- ❖ It contains patentable ideas, for which patent protection may be desirable.

For this affidavit, all of the information marked proprietary is because its use by a competitor would reduce his expenditure of resources and improve his competitive position in the design, manufacture, installation, assurance of quality, or licensing a digital based I&C system (type one above). This leads to a Doosan HFC need to restrict certain commercial information from the public to prevent its use by competitors and creating a commercial advantage for them to the detriment of Doosan HFC.

The development of the HFC-6000 system design is the result of many years of development by uniquely experienced personnel in an intensive effort along with the expenditure of a considerable sum of money. In order for competitors to duplicate the Doosan HFC design and applicable information, similar technical programs would have to be performed and a significant manpower effort, having the requisite talent and experience would have to be expended for the development of a digital design to equal the HFC-6000 system design.

There are sound Doosan HFC policy reasons behind the Doosan HFC proprietary designation system which include the following:

a) The Use of such information by Doosan HFC gives Doosan HFC a competitive advantage over its competitors. It is therefore, withheld from disclosure to protect the Doosan HFC competitive position.

b) It is information which is marketable in many ways. The extent to which such information is available to competitors diminishes the Doosan HFC ability to sell products involving the use of the information.

c) Use by our competitors would put Doosan HFC at a competitive disadvantage by reducing their expenditure or resources at Doosan HFC expense.

d) Each component of proprietary information pertinent to a particular competitive advantage is potentially as valuable as the total competitive advantage. If competitors acquire components of proprietary information, any one component may be the key to the entire puzzle, thereby depriving Doosan HFC of a competitive advantage.

e) Unrestricted disclosure would jeopardize the position of Doosan HFC in the world market such as South Korea, and thereby give a market advantage to the competition in those countries.

(5) The information is being transmitted to the Commission in confidence and, under the provisions of 10 CFR 2.390, it is to be received in confidence by the Commission.

(6) Available information has not been previously employed in the same original. The information sought to be protected is not available in public sources or manner or method to the best of our knowledge and belief.

(7) The proprietary information sought to be withheld in the submittal is that which is appropriately marked by deletion, with brackets in some documents, in the following HFC non-proprietary documents:

Document Number	Description	Revision
N/A	Answers to questions from NRC for second and third amendment submittal for HFC-6000 Safety Platform	N/A
TR901-201-02-NP	ERD921 Pre-Qualification Detail Test Report	A
TR901-201-03-NP	ERD921 Environmental Stress Detail Test Report	A
TR901-201-04-NP	ERD921 EMI/RFI Detail Test Report	A

AFFIDAVIT, STATE OF TEXAS, COUNTY OF DALLAS

Before me, the undersigned authority, personally appeared Ivan Chow, who, being by me duly sworn according to law, deposes and says that he is authorized to execute this Affidavit on behalf of Doosan HF Controls Corporation (HFC) and the averments of fact set forth in this Affidavit are true and correct to the best of his knowledge, information and belief:

Ivan Chow

NOTARY PUBLIC STATE OF TEXAS
RICHARD KIMBALL
My Commission Expires
November 19, 2018

Sworn to and subscribed

Before me this 15TH day

of JUNE, 2015

Notary Public

Proprietary Information Notice

On June 15, 2015, Doosan HF Controls transmitted the following documents in non-proprietary format:

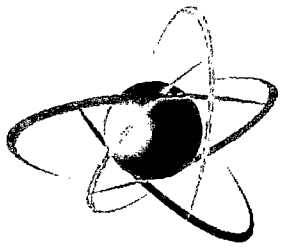
Document Number	Description	Revision
N/A	Answers to questions from NRC for second and third amendment submittal for HFC-6000 Safety Platform	N/A
TR901-201-02-NP	ERD921 Pre-Qualification Detail Test Report	A
TR901-201-03-NP	ERD921 Environmental Stress Detail Test Report	A
TR901-201-04-NP	ERD921 EMI/RFI Detail Test Report	A

In order to conform to the requirements of 10 CFR 2.390 concerning the protection of proprietary information submitted to the NRC, the proprietary version of the document listed above is marked "HFC Proprietary" on the title page and on each subsequent page containing proprietary information. For the corresponding non-proprietary versions, all proprietary information has been deleted, with brackets in some documents, such that only non-proprietary information remains. In addition, the deletion was done in the manner such that the formatting of the documents was preserved so that page numbers, headings and section numbers remain unchanged. Since the basis for deleting the information in all instances is to protect Doosan HFC corporation confidential commercial information; there is no adjacent marking for each deletion as specified in 2.390(b)(1)(a)(i)(B). Instead, in order to facilitate the review process, the locations of the proprietary information in each file are listed in the table below:

Document Number	Locations of the proprietary information as deleted in the non-proprietary version
Answers to questions from NRC for second and third amendment submittal for HFC-6000 Safety Platform	Pages 3 and 4
TR901-201-02-PI	Page 1, Pages 11-24, 28-29
TR901-201-03-PI	Page 1, Pages 10-24
TR901-201-04-PI	Page 1, Pages 10,12,14,16, 18, 20,21

HFC classifies the following test reports for test specimen ERD1192 as proprietary documents:

1. Environmental Stress Tests at ETL
2. EMI/RFI Test Reports at Nemko (Lewisville, Texas)
3. Seismic Test Reports at NTS Acton



U.S.NRC

UNITED STATES NUCLEAR REGULATORY COMMISSION

Protecting People and the Environment

Submittal Documents
Non-Proprietary Version

1. **Answers to questions on the second and third amendment submittals for HFC-6000 Safety Platform Safety Evaluation Non-Proprietary Version**
2. **TR901-201-01 ERD921 Burn-in Detail Test Report**
3. **TR901-201-02-NP ERD921 Pre-Qualification Detail Test Report, Rev. A**
4. **TR901-201-03-NP ERD921 Environment Stress Detail Test Report, Rev. A**
5. **TR901-201-04-NP ERD921 EMI/RFI Detail Test Report, Rev. A**

HF Controls

Items Needed to Complete the Acceptance Review of Doosan HF Controls Topical Reports

NRC staff is reviewing the HFC submittals dated September 2011 (RR901-002-01, Rev. A) and August 2012 (RR901-003-01, Rev. B) that propose to expand the scope of the approved HFC-6000 TR. The staff is currently performing an Acceptance Review to determine if the necessary information has been provided.

The staff has identified the following topics for discussion during a conference call with HFC:

1. Using Table 1 and Table 5 of RR901-002-01, Rev. A, and Table 1 of RR901-003-01, Rev. B, the NRC staff created a table which identifies 47 additional pieces of equipment (modules, terminal blocks, etc.). It is not clear if HFC is requesting approval for all 47 parts. The staff would like to clarify the following:

    a. What equipment listed in the table is NOT part of the TR Amendment scope? Is HFC requesting approval of all the equipment listed?

    HFC requests all equipment listed in the table to be included in HFC-6000 Safety Platform Equipment List. All equipment listed has been approved by Korean Hydro and Nuclear Power (KHNP), a NUPIC member, to be used in Korean Nuclear Power Plants and they have been used since 2009.

    b. For the equipment that HFC is requesting approval, is the table complete and accurate?

    Yes, the table was complete and accurate at the time the amendment was submitted in 2011 for RR901-002-01, Rev. A and 2012 RR901-003-01, Rev. A except a couple of mistakes as described in d. and e. under this discussion topic.

    c. RR901-003-01, Rev. B, lists the following types of HFC-FPC08 Fast Performance Controller: C-Link (40103827Q), MTP (40103823Q), SDL (40103824Q). The staff needs to confirm if HFC is requesting approval of all three modules. If so, can either module be used for an application specific design, or should all three modules be used together?

    Yes, HFC is requesting approval of all three modules but these three modules are independent of one another. That is, they do not need to work together at the same time. These three modules use the same hardware design but only the software is different.

d. What is the correct Module Number for part 40054282? In Table 1 of RR901-002-01, Rev. A, it is HFC-AI16RD, and in Table 5 of RR901-002-01, Rev. A, it is HFC-AC16RD.
The correct module name for 40054282 is HFC-AI16RD. It was a mistake in Table 5 of RR901-002-01, Rev. A for that name.

e. What is the correct Part Number for TBDC34S? In Table 1 of RR901-002-01, Rev. A, it is 40065381 and in Table 5 of RR901-002-01, Rev. A, it is 40065391.

The correct part number for TBDC34S is 40065391. It was a mistake in Table 1 of RR901-002-01, Rev. A for that part number.

f. Table 1 of RR901-002-01, Rev. A, identifies that HFC-AI8LD (40083881) replaces HFC-AI8L (40043701). However HFC-AI8L was not approved in the original SE (ML110831017). Is HFC requesting approval of both HFC-AI8LD and HFC-AI8L, or just HFC-AI8LD?

HFC is requesting approval for just HFC-AI8LD.

2. The staff has noticed that some HFC documents follow a distinct numbering format. For example: RR901-**002**-02, DS901-**000**-23, TP901-**200**-07, RR901-**003**-06, TP901-**301**-03. It would be helpful for the staff, as it navigates through all the documents, to understand the logic behind numbering such as -000-, -001-, -002-, -003-, -200- and -301-. A summary of the document relationship will also be helpful to the staff.

RR means Review Report. RS means Requirement Specification. DS means Design Specification. TP means Test Procedure/Plan.

The three digits in the middle follow a convention which is determined by HFC to effectively manage the documents for internal projects. That is, the middle three digits are project based. For RR901-002-xx and RR901-003-xx, HFC decides to use 002 and 003 to relate the documents as the number of amendment submittals for the HFC-6000 platform. And the number '901' in the document name is used for designating the HFC-6000 platform.

For documents in the TP category, since HFC has many different test processes, HFC needs a higher number such as -200- and -300- to avoid collision of document numbers for internal project usage. TP901-200-xx, the -200- is used for designating generic equipment qualification process. In TP901-301-xx, the -301- is used for specific equipment qualification test procedure for specific test specimen.

3. Several modules are being added and others replaced with this TR amendment. Does HFC intend to:

   a. Discontinue the use of the modules being replaced?
   Only for the following I/O modules, HFC intends to discontinue them: AI16F, AI8L, AI8M
   and replace them as AI16FD, AI8LD, AI8MD respectively.

   b. Be able to combine previously approved modules with the new modules? If this is the case, HFC needs to demonstrate that old modules are compatible and tested with the new modules.

   The only module which fits the description of this question is: HFC-SBC-06 module which is described in the next question. Yes, HFC is requesting the approval for this module of its FPGA-based HFC-SBC06 (400411786) to work with or replace the CPLD-based HFC-SBC06 (40041701) as a form-fit-function satisfied module. The equipment qualification (EQ) test data provided the evidence.

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4. Table 1 of the HFC-6000 SE (ML110831017) lists the firmware of the HFC-SBC06 (part number 40041701) controller's SYS, ICL, and C-Link microprocessors (SC Firmware: 9120905-13, SAP Firmware: 9120906-12, SEP Firmware: 9120907-12). Is the firmware for these microprocessors being changed in HFC-SBC06 (part number 40041786)?

   No.

5. HFC-DPM06 (part number 40042281) is being replaced with HFC-DPM06BP (part number 40089401).

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6. When was the last time HFC was audited by a NUPIC member utility?

   The last time HFC was audited by Korean Hydro and Nuclear Power (KHNP), a NUPIC member, was in 2007.

7. Are the new boards developed under an Appendix B program or did they undergo commercial grade dedication (CGD)? If they underwent CGD, please identify the Appendix B supplier who dedicated the equipment.

   All new boards developed by HFC under an Appendix B program. The commercial grade items listed in HFC submittals only include the following:

HFC Part Number	Module Name
9044514	8-slot Power Supply Rack
6990176	Fan Tray
70050001	Control Module Type 1
70050101	Control Module Type 2
70050401	Control Module Type 3
70051101	Control Module Type 4
70052305	Control Module Type 6

   HFC is the Appendix B supplier who dedicated the equipment listed above.

8. Regarding Equipment Qualification (EQ):

   a. EQ Test Procedures are included in the September 2011 and August 2012 submittals, but not the Summary Test Reports. Are all modules for which approval is being sought, included in previously submitted Summary Test Reports? If so, please identify which reports.

      The EQ test procedures are the same for modules in the test specimen ERD111 listed in the SE for last amendment submittal and the modules listed in September 2011 and August 2012 submittals. The environmental stress test laboratory report and EMI/RFI test laboratory report for modules listed in the September 2011 submittal has been submitted in the previous submittal for the test specimen ERD111. The test specimen ERD921 was

installed in the same cabinet as the test specimen ERD111. The equipment in test specimen ERD921 went through the environmental stress tests and EMI/RFI tests exactly the same as the equipment in test specimen ERD111. HFC document TR901-200-03, Rev. A with NRC ADAMS Accession No. ML11199A102 contains the environmental stress test laboratory report. HFC document TR901-200-04, Rev. A with ADAMS Accession No. ML11199A103 contains the EMI/RFI test laboratory report. The detail reports of these tests for the modules listed September 2011 submittal are provided with the submittal of this response.

For the modules listed in August 2012 submittal, the laboratory test reports for the environment stress tests, EMI/RFI tests, and seismic tests are included in the supporting documents of the submittal documents of this response.

b. Test specimen ERD1192 is mentioned in RR901-003-01, Rev. B. What modules for which HFC is requesting approval are part of the ERD1192 test specimen?

Test specimen ERD1192 includes sets of equipment which were in test specimens ERD111 and ERD921 listed in previous submittal documents. At the time of submittal in August 2012, the expectation was that equipment in test specimen ERD921 would be already included in the revised SE for HFC-6000 safety platform. That is the reason why Table 4 in document RR901-003-01, Rev. B did not include the equipment listed in previous submittals. After the submittal of August 2012, HFC performed seismic 14g tests in accordance with EPRI TR 107330 figure 4-5 in NTS Acton in the week of October 21 2013. HFC is requesting approval for all modules installed in test specimen ERD1192 with seismic operating envelope elevated to 14g instead of 10g in the current SE. Detailed seismic report is included in the submittal of this response. See the table in the answer to the following question for the list of equipment.

c. Which test specimens contain the modules for which approval is being sought?

ERD1192 test specimen contains the modules which approval is being sought. Although the foci for performing equipment qualification tests for test specimen ERD1192 were mainly for: HFC-FPC08, HFC-HSIM and 14g seismic qualification in accordance with EPRI TR 107330 Figure 4-5, since all modules installed in this test specimen passed seismic qualification tests, HFC is requesting approval for all modules in this test specimen. See the following table for modules which had passed the 14g seismic tests performed at NTS Acton.

Module Type	HFC Part Number
Jasper 24V Power Supply	9044524Q
Rack, Jasper Power Supply	9044514Q
Fan Tray	6990176Q
HFC-FOT06	40062581Q
HFC-ILR06	40040281Q
HFC-BPC01-19	40040701Q
HFC-BPE01-19	40041201Q
HFC-BPC01-08	40051701Q
HFC-HUB06-16-01	40080681Q
HFC-HUB06-16-02	40080682Q
HFC-HUB06-EXT	40081481Q
HFC-SBC06	40041781Q, 40041786Q
HFC-DPM06	40042281Q
HFC-DPM06BP	40089401Q
HFC-SCG06	40068983Q
Control Switch Module Type 1	70050001Q
Control Switch Module Type 2	70050101Q
Control Switch Module Type 3	70050401Q
Control Switch Module Type 4	70051101Q
Control Switch Module Type 6	70052305Q
MANUAL/AUTO STATION	70210209Q
HFC-PCC06	40042781Q
HFC-DI16I	40045281Q
HFC-DO8J	40045701Q
HFC-DO16J	40053881Q
HFC-DO16C	40053882Q
HFC-DC33	40046281Q
HFC-DC34	40046781Q
HFC-DC35	40062181Q
HFC-AI4K	40044701Q
HFC-AI4K2	40070901Q
HFC-AI16FD	40054281Q
HFC-AI16RD	40054282Q
HFC-AO8FD	40081881Q
HFC-AI8MD	40079081Q
HFC-AI8LD	40083881Q
HFC-AC36FD	40078681Q
HFC-SBC04A	40090281Q, 40090282Q
HFC-FPC08	40103881Q (Base PCB Part Number)
HFC-HSIM	40108621Q
HFC-ILR06T	40108621Q
HFC-ILR06R	40040222Q
HFC-TBAC36	40068181Q
HFC-TBAI16	40067381Q

Module Type	HFC Part Number
HFC-TBAI8L	40067781Q
HFC-TBAI8M	40066981Q
HFC-TBAO8F	40067782Q
HFC-TBDC33	40065782Q
HFC-TBDC34S	40065391Q
HFC-TBDI16	40066181Q
HFC-TBDO16C	40066581Q
HFC-TBDO16J	40064981Q
HFC-TBPCC	40064581Q
HFC-HSIMCON RX	40109483Q (2 ch), 40109485Q (1 ch)
HFC-HSIMCON TX	40109484Q
HFC-DI32IG	40118681Q
HFC-FX12TX4	40115881Q (2km), 40115884Q (4km)
HFC-FPC08CON4	40123081Q
AFS-CSM-01	40031281Q

Basically, ERD1192 test specimen includes modules in the ERD921 and new components such as FPC08 and the CSMs. Modules in the ERD921 test specimen provided the additional evidences in regard to the qualification process because these modules underwent the same equipment qualification test processes approved by NRC for closing the generic open items previously listed in the SE.

9. Figure 1 of the HFC-6000 SE (ML110831017) includes a Channel Gateway Controller which was out of the scope of the original TR. HFC-SCG06 (part number 40068983) is described as a Gateway Controller Card in Table 1 of RR901-002-01. Is HFC-SCG06 the Channel Gateway Controller in Figure 1 of the SE? If this is the case, is HFC requesting approval of the gateway controller?

Yes, HFC-SCG06 is the Channel Gateway Controller in Figure 1 of the SE.
Yes, HFC is requesting approval of the gateway controller, HFC-SCG-06.

10. Section 4.1 of RR901-002-01, Rev. A, 'Codes, Standards, Regulations and Guidance' states: "The accepted topical report, PP901-000-01, provides the conformance details of the HFC-6000 Safety Platform to these codes and standards. Since the enhancement process did not deviate from the conformance, the details of the conformance are not provided in this document."

    Because different technology from what was approved in the HFC-6000 SE (ML110831017) is being used in the new components, the staff needs to verify the FPGA-based products and new components meet the applicable codes and standards.

    That statement in RR901-002-01 section 4.1 only points out that the enhancement process did not deviate from the conformance. Yes, HFC will provide all the information for the conformance for the FPGA-based products and new components in separate documents with the submittal of this response.