

SAFETY INSPECTION REPORT AND COMPLIANCE INSPECTION

1. CERTIFICATE/QUALITY ASSURANCE PROGRAM (QAP) HOLDER:

NAC INTERNATIONAL
3930 East Jones Bridge Road
Norcross, Georgia 30092

2. NRC/REGIONAL OFFICE

Headquarters
U. S. Nuclear Regulatory Commission
Mail Stop EBB-3-D-02M
Washington, DC 20555-0001

REPORT NUMBER(S) 072-1031/2013-201

3. CERTIFICATE/QAP DOCKET NUMBER(S)

072-1031

4. INSPECTION LOCATION

Hitachi Zosen Corporation, Ariake
Works, Kumamoto, Japan

5. DATE(S) OF INSPECTION

05/21-24, 2013

CERTIFICATE/QUALITY ASSURANCE PROGRAM HOLDER:

The inspection was an examination of the activities conducted under your QAP as they relate to compliance with the Nuclear Regulatory Commission (NRC) rules and regulations and the conditions of your QAP Approval and/or Certificate(s) of Compliance. The inspection consisted of selective examinations of procedures and representative records, interviews with personnel, and observations by the inspector. The inspection findings are as follows:

- ☒ 1. Based on the inspection findings, no violations were identified.
- ☐ 2. Previous violation(s) closed.
- ☐ 3. The violation(s), specifically described to you by the inspector as non-cited violations, are not being cited because they were self-identified, non-repetitive, and corrective action was or is being taken, and the remaining criteria in the NRC Enforcement Policy, to exercise discretion, were satisfied.



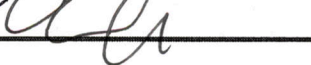
Non-cited violation(s) was/were discussed involving the following requirement(s) and Corrective Action(s):

- ☐ 4. During this inspection, certain of your activities, as described below and/or attached, were in violation of NRC requirements and are being cited in accordance with NRC Enforcement Policy. This form is a NOTICE OF VIOLATION, which may be subject to posting in accordance with 10 CFR 19.11.

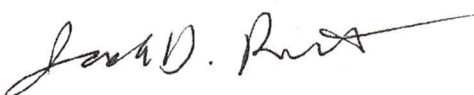
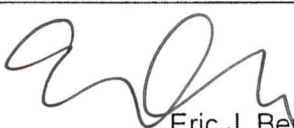
(Violations and Corrective Actions)

Statement of Corrective Actions

I hereby state that, within 30 days, the actions described by me to the Inspector will be taken to correct the violations identified. This statement of corrective actions is made in accordance with the requirements of 10 CFR 2.201 (corrective steps already taken, corrective steps which will be taken, date when full compliance will be achieved). I understand that no further written response to NRC will be required, unless specifically requested.

TITLE	PRINTED NAME	SIGNATURE	DATE
CERTIFICATE/QAP REPRESENTATIVE	R.H. Smith, VP Quality Assurance		5/24/13
NRC INSPECTOR	Jack Parrott		5/24/13
BRANCH CHIEF	Eric Benner		7/9/13

INSPECTOR NOTES COVER SHEET

Licensee/Certificate Holder (name and address)	NAC International (NAC) 3930 East Jones Bridge Road, Suite 200 Norcross, GA
Licensee/Certificate Holder contact	Howard Smith, Vice President of Quality
Docket No.	72-1031
Inspection Report No.	72-1031/2013-201
Inspection Date(s)	May 21 – 24, 2013
Inspection Location(s)	Hitachi Zosen Mechanical Corporation (HMC), Kumamoto, Japan
Inspectors	Jack Parrott Earl Love Robert Temps
Summary of Findings and Actions	The inspection team evaluated management, design, and fabrication activities at HMC against the applicable criteria of 10 CFR Parts 21 and 72, through observations of activities, review of documents, and interviews with fabricator, certificate holder and licensee personnel. The inspection team assessed that; overall, NAC's implementation of their Quality Assurance Programs for fabrication activities at HMC was satisfactory. Hitachi Zosen Mechanical Corporation's fabrication processes were assessed to be excellent with regard to the quality of workmanship and facility housekeeping practices. Overall, fabrication activities were assessed to be in compliance with NRC requirements. No findings or violations of Part 72 regulatory requirements were identified.
Lead Inspector Signature/Date	 Jack D. Parrott
Inspector Notes Approval Branch Chief Signature/Date	 Eric J. Benner

Inspection Background

HMC is under contract to NAC for the fabrication of transportable storage canisters (TSCs) for the NAC MAGNASTOR system. The team performed an inspection of HMC, located in Kumamoto Prefecture, Japan. The inspection focused on the fabrication of MAGNASTOR TSCs for Duke Energy's McGuire and Catawba Nuclear Stations, and Zion Solutions' Zion Station.

The MAGNASTOR System is a canister-based dry cask storage system with a capacity of up to 37 Pressurized Water Reactor (PWR) or 87 Boiling Water Reactor (BWR) spent fuel assemblies. The major components of the TSC assembly are the shell, basket assembly, base plate, closure lid, closure ring, and redundant port covers for the vent and drain ports.

This was the forth triennial inspection by NRC of NAC at the HMC facility for Part 72 fabrication activities, NRC's last inspection in 2010 (72-1031/2010-201).

Information sources consisted of observation of shop fabrication, inspection and test activities, interviews of individuals performing activities, verification of implementation of quality procedures, and review of records.

Inspection Purpose

The purpose of the inspection was to assess if NAC's and HMC's current activities associated with the fabrication of the NAC MAGNASTOR cask system at the HMC facility for Duke Energy and Zion Solutions are being performed in accordance with the requirements of 10 CFR Parts 21 and 72, the applicable Certificate of Compliance (72-1031), Final Safety Analysis Report for the MAGNASTOR System, and NAC's NRC-approved quality assurance program.

Inspection Results

The inspection at HMC was completed as planned. The inspection team assessed that overall; NAC's implementation of their Quality Assurance Programs for fabrication activities at HMC was satisfactory. HMC's fabrication processes were assessed to be excellent with regard to the quality of workmanship and facility housekeeping practices. No findings or violations of Part 72 regulatory requirements were identified.

INSPECTOR NOTES: APPLICABLE PORTIONS OF 02.01 THROUGH 02.08 OF IP 60852 WERE PERFORMED DURING THE INSPECTION WITH RESULTS DOCUMENTED BELOW:

02.01: Determine whether the fabrication specifications are consistent with the design commitments and requirements documented in the SAR, and, as applicable, the CoC or the site-specific license and technical specifications.

The team reviewed the controlled/approved documents lists that HMC maintains for each of the NAC fabrication projects at HMC. The team reviewed a sampling of procedures and drawings used in the shop for each NAC project and verified that the most current and approved versions of these documents were being used in the field. Overall, no concerns were identified with regard to the approval and distribution of drawings and procedures.

02.02: Determine whether corrective actions for identified fabrication deficiencies have been implemented in a time frame commensurate with their significance, and whether nonconformance reports documenting the deficiencies have been initiated and resolved.

The team reviewed sections of HMC Manual No. NQA-001, "Quality Assurance Manual for Nuclear Items," Seventh Revision, dated 9/14/2011, also referred to as the QAM, and the Standards that HMC uses to document, track and resolve nonconforming conditions and conditions adverse to quality. Documents reviewed included:

QAM, Section M-31-1, "Nonconformance Control"

QAM, Section M-32-1, "Corrective Action"

Standard Q-20-2, "Reporting Standard of Defects and Noncompliances"

Standard Q-32-1, "Corrective Action Standard"

The team reviewed a representative sampling of HMC Nonconformance Reports (NCRs) and Corrective Action Reports (CARs) from the ongoing fabrication projects for NAC. The reports documented various issues related to 10 CFR Part 72 activities performed by HMC for NAC. When the resolution of an NCR was "repair" or "use-as-is," NAC and customer (licensee) approval was obtained and associated NAC Vendor Nonconformance Reports (VNCRs) were included with the NCRs. Any required 10 CFR 72.48 screenings/evaluations, performed in accordance with NAC's QA procedures for this process, were also referenced in the VNCRs. The team noted one NCR where HMC requested permission to continue fabrication pending NCR resolution. While the HMC QAM Section M-31-1 does not discuss the release of work pending NCR resolution, the team was informed, and shown, where the NAC Quality Plan for each specific NAC project allows, per Section 15.5, for work at risk provided written concurrence to proceed is provided. The team concluded that HMC and NAC were using the various corrective action processes to properly document and address quality issues. Resolution of issues was appropriate to the extent and nature of the nonconformance or condition adverse to quality.

The team reviewed the internal audit schedule for FY 2012 and 2013 and noted that audits of all of the functions at HMC had been planned on an annual basis as required by the QAM. Three

audits from FY 2012 were reviewed; the audits were of the Procurement Department, the Welding and Engineering Group, and NTI. The audits were performed to checklists. None of the audits had findings and one audit had two observations. No concerns were identified with the quality and content of the audits. The team reviewed the qualification of Lead Auditors to the requirements in Q-01-3, "Audit Personnel Qualification Standard," and the team determined that the initial qualification and annual recertification of the Lead Auditors was in compliance with the procedure. Overall, no concerns were identified in the performance of internal audits and the qualification of Lead Auditors. The team also reviewed NAC Surveillance Report 13-S-18, conducted April 1-4, 2013. The NAC surveillance was assessed to be comprehensive and identified three findings and several observations requiring action by HMC to address.

02.03: Determine whether individuals performing quality-related activities are trained and certified where required.

The team reviewed welder qualifications of T. Uda and H. Mitsusaki and reviewed a specific qualified welders list (document No. 358-L-WL, Revision 2) used to ensure welding is controlled and accomplished by qualified personnel. In addition, the team sampled other welding personnel qualification certification records for welding personnel and determined that welders, weld procedures, and procedure qualification records met applicable ASME code requirements.

The team reviewed applicable procedures and records to determine if individuals performing quality-related activities were trained and certified where required. The team sampled training and qualification records for quality assurance, quality control, nondestructive examination (NDE), and leak and pressure testing personnel. The team selected random quality control inspector and non-destructive test (NDT) personnel records with NDT Level II & III qualifications to determine if they were qualified and certified, no concerns were identified.

02.04 Determine whether the offsite fabricator personnel are familiar with the specified design, designated fabrication techniques, testing requirements, and quality controls (QCs) associated with the construction of the DCSS.

The team observed helium leak tests, basket free path tests, and the basket pull-up test after insertion of the basket in the shell and cooling from heat treatment. All tests observed were performed according to their procedures and test conditions. The tests were accomplished successfully including meeting the acceptance criteria. The qualification requirements of all test personnel observed were reviewed and checked against the qualifications of the individuals that performed the tests. For the helium leak rate test, the team reviewed procedure 358-T-HE, Rev 2, "Helium Leak Test Procedure," and verified that the acceptance criteria for a permissible helium leakage rate reflected the requirements in the MAGNASTOR FSAR. For the basket free path test, the team reviewed the requirements of QAM Standard J-01-1, Rev 1, "Basket Free Path Test Standard," against the test activities and no concerns were identified.

02.05: Determine whether materials, components, and other equipment received by the fabricator meet DCSS design procurement specifications and that the procurement specifications conform to the design commitments and requirements contained in the SAR and, as applicable, the CoC or the site-specific license and technical specifications.

The team reviewed NAC Document No. 71160-S-05, revision 2, April 2012 "Procurement /Fabrication Specification, MAGNASTOR Transportable Storage Canisters (TSCs), Basket

Assemblies, DFCs [damaged fuel cans] and Fuel Spacers” and noted that the specification provided appropriate technical and quality requirements for the procurement and fabrication of the TSC, associated PWR and BWR fuel basket assemblies, damaged fuel basket assemblies, greater than class C waste basket assemblies, damaged fuel cans, and fuel spacers. The team noted that the document provided minimum requirements and specifications for materials, fabrication, testing, inspection, cleaning, marking, packaging and documentation of these items. NAC’s purchase order identifies the quantity and length of the TSC and basket assembly, type of basket to be procured, along with any other hardware specific requirements. NAC retains overall quality compliance responsibility for activities described in the specifications, the fabrication of the components is completed under the control of QAM.

The team reviewed samples of material purchase orders (POs) and inspection reports to determine if the associated materials met the design requirements and procurement specifications. Additionally, the team sampled procurement specifications to verify the specifications conformed to the requirements contained in the Safety Analysis Report and the Certificate of Compliance. The team noted that the POs reviewed required the work to be done in accordance with the HMC QA program as audited and approved by NAC. The team verified that material was receipt inspected for conformance to procurement document requirements then placed under traceability controls throughout manufacturing. The following Inspection certificates were reviewed:

- HMC procured fuel tube steel plate
Heat No.: Y0 45695
Supplier: Metal One Corporation
Control No. A740501
HMC PO No.: 37MAG-P-C01 Revision 5
Standard: ASME Section III NG-2000 (A03), ASME SA 537 Class 1 (A03)
- NAC furnished weld filler material
Certificate of Conformance dated 10/11
Trade Name: Techalloy 309/309L .062” and .093 dia x 36”
Heat No. E61697
Supplier: GE Hitachi Nuclear Energy Cannonsburg, PA
Used to weld fuel basket connector pin washer assembly
- HMC procured weld material
Certificate of Compliance
Trade Name: TG308L
Size: 2.4mm
Lot No.: T1109351
Class: ER308L
Testing: ASME Sec. II Part C
Specification No.: SFA 5.01
Supplier: TASETO Co., Ltd., Japan
Used on shell assembly weld joint: SA-01A/-01B

In addition, the team verified: a) TSC confinement boundary materials (shell, bottom, closure lid, closure ring, and port cover plates) were procured in compliance with ASME Code Section III, Subsection NB Class 1 Components 2001 Edition, 2003 Addendum; b) quality category “A” and

“B” material for fuel basket assembly components, DFC components (e.g., collars, lid plates, lid bottom, bottom plates, side plates, and tube body), and fuel spacers were procured in accordance with ASME Code, Section III, Division 1, Subsection NG, “Core Support Structures” 2001 Edition, 2003 Addendum; c) Weld consumables for category “A” applications were procured in accordance with ASME Code Section II, SFA requirements and include requirements for identification by heat/lot/batch number, and chemical analysis; d) weld filler materials used in fabrication of the fuel TSC, shell, bottom, closure lid, and closure ring complied with ASME Code, Section III, NB Article 2400 requirements and with ASME Code Section II Part C requirements for SFA 5.9 (AWS ER308L) or SFA 5.22 (AWS E308LTX-X); and e) weld filler materials to be used for joining fuel basket assemblies, and DFC and fuel spacer components, comply with ASME Code Section III, NG, Article 2400 and ASME Code Section II Part C requirements. Overall, the team concluded that the sampled material and procurement specifications conformed to the requirements contained in the SAR and CoC.

The team observed fabrication, inspection, testing and NDE in progress, and examined selected specifications, procedures, and records to determine if components were being fabricated in accordance with procedures, specifications, drawings, and NRC requirements. The team witnessed welding of connector pin washer assemblies to fuel tubes (Zion), welding of posts (Duke), and a basket insertion (Zion). Numerous production check sheets and welding records were reviewed for compliance to controlled fabrication drawings, procedures and specifications. No concerns were noted.

The team witnessed the heating of a shell for the, Zion project (serial number 23), in accordance with procedure 358-F-NCR-SH, Revision 2, “Shell Heating Procedure.” The purpose for heating the shell was to ensure that the basket does not score the inside of the shell during insertion and extraction. The team noted that the heating process was appropriately controlled and well documented using a check sheet approved by NAC and Zion Solutions. The team reviewed NAC’s technical evaluation (71160-WP-011, “Shell Heating Method”) and determined that the practice of shell heating did not violate the shell assembly’s licensed design attributes. Overall, the shell heating process was well controlled and did not induce permanent deformation or anomalies, and the basket insertion was observed with no concerns identified.

The team identified several quality category “A” TSC components which were available for use in the fabrication shop at the time of the inspection. The procurement records of these components were reviewed against the requirements of procedure Q-20-1, Rev. 2, “Procurement Specification Standard.” The purchase order specifications were checked against the results of receipt inspections, certified material test reports or certificates of conformance, and any non-conformance reports. The purchase order specifications were traceable to a design requirement and the inventory in use on the floor was traceable by heat number to the heat numbers identified in the purchase order. Also, the suppliers of each component were verified to be on the HMC qualified suppliers list.

02.06: Determine whether DCSS components are being fabricated per approved QA and 10 CFR Part 21 implementing procedures and fabrication specifications.

The team reviewed various sections of the QAM, as well as the implementing quality procedures referred to at HMC as the Standards for Nuclear Items, and noted that the QAM implements the 18 QA criteria contained in 10 CFR Part 71 and 72, Subpart H and G respectively. The team verified that the QAM contained a statement of quality policy and

authority, signed by the General Manager (GM) of the HMC Ariake works, that describes the expectations for all HMC personnel in complying with the requirements of the QAM. The team verified that the Quality Assurance Manager, as required by the QAM, provided an annual report to the GM containing a summary of internal audit, customer audits, and corrective actions reports. The annual report was signed by the GM as required by the QAM, Section M-04-1, "Control of QA Manual." No concerns were identified in the review of the QAM and associated Standards for Nuclear Items.

The team observed shop material in use at different production stages and noted that adequate measures were established and implemented for release and distribution to shop work stations. The team noted that the items were properly identified as to the inspection and/or production status and that components were adequately staged and/or stored, as applicable. The team noted material controls were adequate and that no deficiencies were noted for a sampling of items that were being used in production at the time of the inspection. The following components/assemblies were observed (with the customer identified in parenthesis):

- Shield Plate (Zion)
- Closure Lid Assembly (Zion)
- Basket Assembly (Zion)
- Shell Weldments (Duke and Zion)
- Neutron Absorber Material (Duke and Zion)
- Weld Posts (Duke)
- Fuel Tubes Type 1 and 3 (Duke)

The team reviewed a completed documentation package of a Duke Energy (McGuire Nuclear Station), MAGNASTOR TSC, Serial No. MAG-TSC-418-064, Certificate of Compliance No. 1031, Amendment 2, release date March 12, 2012. The team noted the package included design records, materials, inspections, tests, personnel qualifications, non-conformances, as-built configuration, and measuring and test equipment as a minimum. Overall, the team noted that NAC maintains sufficient records to furnish evidence of activities affecting quality. No concerns were noted.

02.07: With regard to fabrication activities, determine whether the provisions of 10 CFR Part 21, have been implemented; personnel are familiar with the reporting requirements of 10 CFR Part 21; and compliance with 10 CFR 21.6, ΔPosting requirements.@

The team reviewed HMC's compliance to the posting and reporting requirements of 10 CFR Part 21 and no concerns were identified.

02.08:

- a) With regard to quality assurance activities, determine whether the fabricator has been audited by either the licensee or CoC holder.**
- b) For selected audits and inspection findings from (as applicable) QA audit or surveillance and/or inspection reports issued in the previous 2 years, the findings were appropriately handled with corrective actions implemented in a time frame commensurate with their safety significance.**
- c) Supervision and QC/QA personnel perform appropriate oversight during fabrication activities.**

The team reviewed HMC's internal surveillance process as described in HMC procedure Q-40-1, Rev 2, "Internal Surveillance Standard." The team reviewed the HMC QA's monthly surveillance checklists for fabrication control of nuclear items for the period of April 2012 to March 2013. The team found that during that time period, six "unsatisfactory" conditions were discovered during the surveillances. Three of the conditions were a repeat of the same condition. HMC's response to the identification of these issues was to rectify the immediate condition, but interview of HMC personnel indicate that unsatisfactory conditions discovered during surveillances were not routinely put into the HMC corrective action system. Therefore, when a repeat condition would arise, its recurrent nature may not be recognized. In addition, the surveillance procedure did not specify when a nonconformance report or corrective action report should be issued when unsatisfactory conditions are found during surveillances. However, the team determined that these observations did not constitute violations. When discussed with NAC the team learned that very similar observations were made by a NAC QA surveillance of HMC in the month before the NRC inspection, and that HMC was working on a corrective action response.

The team identified several pieces of test equipment, calibration standards, and fabrication tools being used on the shop floor. The team verified the calibration status of each piece or standard, as reflected on the calibration stickers, and checked the calibration records in the HMC calibration lab. The calibration of each piece was current and traceable to a national (NIST) or international (METI) recognized standards, or calibrated by qualified outside vendors. For most pieces or standards calibrated by outside vendors, the team verified them to be on the HMC qualified vendors list (QVL). However, two of the calibration vendors identified through the check of calibration records were not on the QVL. This is contrary to the requirements in HMC's QAM. The team determined that this issue had also been discovered by NAC during NAC's surveillance of HMC in April 2013. NAC had issued a "finding report" on the issue and HMC issued a corrective action report. HMC corrective actions had been reviewed and accepted by NAC but were still in progress at the time of the NRC inspection. The team determined that certain calibration vendors were not the QVL due to their having ISO 17025 accreditation. However, HMC indicated in their corrective actions that these vendors had been audited and approved by HMC QA and should have been on the QVL, and that in any case HMC was not using the ISO 17025 accreditation to qualify those calibration vendors. The team determined that since this issue had no impact on safety, and had been identified by NAC oversight before the NRC inspection, it is identified as an observation only.