

UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
OFFICE OF NUCLEAR REACTOR REGULATION  
WASHINGTON, D.C. 20555

May 19, 1993

NRC INFORMATION NOTICE 93-37: EYEBOLTS WITH INDETERMINATE PROPERTIES  
INSTALLED IN LIMITORQUE VALVE OPERATOR  
HOUSING COVERS

Addressees

All holders of operating licenses or construction permits for nuclear power reactors.

Purpose

The U.S. Nuclear Regulatory Commission (NRC) is issuing this information notice to alert addressees to problems that could result from eyebolts with indeterminate properties installed in Limitorque valve operator housing covers. It is expected that recipients will review the information for applicability to their facilities and consider actions, as appropriate, to avoid similar problems. However, suggestions contained in this information notice are not NRC requirements; therefore, no specific action or written response is required.

Description of Circumstances

During recent inspections at the Crystal River Nuclear Plant and the Virgil C. Summer Nuclear Station, the NRC found Limitorque model SMB-000 and SMB-00 valve operators in which two of the housing cover bolts were replaced with an eyebolt and nut combination. The licensees reviewed their design change programs but did not find any documentation for the installation of the eyebolts. The affected valve operators were installed in safety- and nonsafety-related applications. Some of the affected valve operators were installed on butterfly valves through a worm-drive gearbox such that the housing cover bolts do not experience stem thrust during valve operation. However, some of the affected safety-related valve operators were installed on gate valves and globe valves such that the housing cover bolts do experience stem thrust forces during valve operation. The housing cover bolts transmit valve stem thrust to the operator housing and ultimately to the valve yoke. The bolts are listed as critical to valve operator function in the Limitorque Critical Component List.

Discussion

South Carolina Electric and Gas (SCE&G), the licensee for Summer, determined that the affected valve operators arrived from the Limitorque Corporation, the

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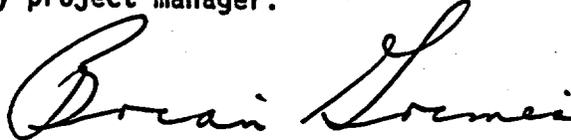
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The NRC staff believes that ungraded eyebolts are probably installed in various safety-related applications at other facilities since this condition was not previously documented by the vendor. The NRC has attached an excerpt from the Limatorque Maintenance Update 92-2 because all licensees may not automatically receive Limatorque maintenance updates.

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Brian K. Grimes, Director  
Division of Operating Reactor Support  
Office of Nuclear Reactor Regulation

Technical contacts: Stephen Elrod, RII (407) 464-7822      Richard Freudenberger, RII (904) 795-7677  
Lee Keller, RII (803) 345-5683      Thomas Scarbrough, NRR (301) 504-2794

**Attachments:**

1. Excerpt from Limatorque Maintenance Update 92-2
2. List of Recently Issued NRC Information Notices

Limitorque Corporation

### 9. SMB-000/00 Eyebolt Housing Cover Screws

Philadelphia Electric (Limerick) and South Carolina Electric and Gas (V.C. Summer) recently inquired about eyebolts that were found in place of the housing cover bolts on a number of SMB-000 and SMB-00 actuators. V.C. Summer found that 2 of the 4 housing cover bolts were replaced with the eyebolts. Limerick found that 3 of the 6 housing cover bolts were replaced with the eyebolts. The purpose of the eyebolts was to provide a lifting lug for moving the actuator. The question involved the material grade of the eyebolts. The correct housing cover hex head bolt part number is HB8-3/8-16x20 and is specified as a grade 5 material. The housing cover bolts are considered critical in Limitorque Critical Component List since the bolts receive the resulting thrust load in the closing direction of the valve.

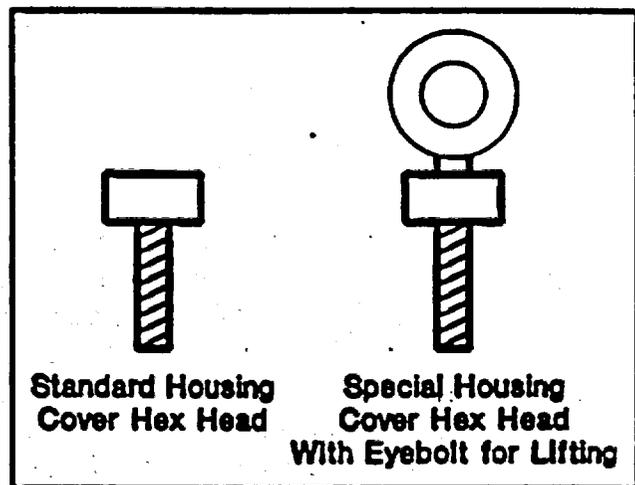


Figure 4—Eyebolt Housing Cover Screw

**Limitorque Corporation**

**Maintenance Update 92-2**

Limitorque research could not determine the material of the eyebolts. In one case, records could not confirm that the eyebolts were supplied by Limitorque.

Due to lack of traceability, Limitorque can only infer that the eyebolts were a heat treated forged steel designed to handle the stresses of lifting the actuator.

Discussion with long term Limitorque employees implies that the eyebolts may have been supplied on a number of SMB-000 and SMB-00 actuators--for commercial and nuclear service. However, they could not have been supplied on SMB-00 actuators with side mounted handwheels due to minimal clearance. Additionally, the eyebolt material is of no concern for applications that the actuator does not withstand the resulting thrust in the closing direction (i.e. quarter-turn applications and many reach-rod applications).

For gate and globe valve applications in which the actuator withstands thrust, the question of the eye-bolt material in regards to actuator operation cannot be addressed without uncertainty. However, it is Limitorque's opinion that the eyebolts would not require immediate replacement for continued operation based on the following:

- The material of lifting lugs are designed to withstand the weight of the actuator; consequently the assumed allowable stress of the lugs is within the stresses imparted on housing cover screws under normal operation.
- The standard grade 5 material of the housing cover bolts has a inherent safety margin in relation to the Limitorque published thrust ratings of the 000/00.
- It appears that 000/00 actuators supplied with eyebolts in place of the housing cover bolts are only a portion of the total number of housing cover bolts.
- The fact that no reports of eyebolt failures of 000/00 actuators over what may be a large population (commercial units included) implies that operational history justifies continued use of the eyebolts.

Note that the above arguments are weakened when an SMB-000 or SMB-00 actuator has experienced a stall condition above the Limitorque published thrust rating of the actuator (see Technical Update 92-02) or have operated at thrust values qualified by Kalsi extended thrust testing (see Technical Update 92-01). In summary, Limitorque recommends that the eyebolts found in place of the housing cover bolts be replaced by the grade 5 housing cover bolts at the next scheduled maintenance. Figure #1--Eyebolt Housing Cover Screw shows how the eyebolts can be identified. A visual inspection is the only known method for identifying these cases. It is assumed that a jam nut is separate from the eyebolt. This discussion does not apply to eyebolts located on actuators other than in place of the housing cover bolts (eyebolts have been supplied in other taps of the actuator housing).

LIST OF RECENTLY ISSUED  
 NRC INFORMATION NOTICES

| Information Notice No. | Subject  | Date of Issuance | Issued to  |
|------------------------|--|------------------|--|
| 93-36                  | Notifications, Reports, and Records of Misadministrations  | 05/07/93         | All U.S. Nuclear Regulatory Commission medical licensees.        |
| 93-35                  | Insights from Common-Cause Failure Events  | 05/12/93         | All holders of OLs or CPs for nuclear power plants (NPPs).       |
| 93-34, Supp. 1         | Potential for Loss of Emergency Cooling Function Due to A Combination of Operational and Post-LoCa Debris in Containment | 04/06/93         | All holders of OLs or CPs for nuclear power reactors.            |
| 93-34                  | Potential for Loss of Emergency Cooling Function Due to A Combination of Operational and Post-LoCa Debris in Containment | 04/26/93         | All holders of OLs or CPs for nuclear power reactors.            |
| 93-33                  | Potential Deficiency of Certain Class 1E Instrumentation and Control Cables  | 04/28/93         | All holders of OLs or CPs for nuclear power reactors.            |
| 93-32                  | Nonconservative Inputs for Boron Dilution Event Analysis   | 04/21/93         | All holders of OLs or CPs for pressurized water reactors (PWRs). |
| 93-31                  | Training of Nurses Responsible for the Care of Patients with Brachytherapy Implants                                      | 04/13/93         | All U.S. Nuclear Regulatory Commission medical licensees.        |

OL = Operating License  
 CP = Construction Permit

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Original signed by  
Brian K. Grimes

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\* SEE PREVIOUS CONCURRENCES  
DOC NAME: 93-37.IN

|                |                |                                      |  |                                    |
|----------------|----------------|--------------------------------------|--|------------------------------------|
|                |                | D/DORS:NRR<br>BKG:Grimes<br>05/13/93 | *C/OGCB:DORS:NRR<br>GHMarcus<br>05/10/93 | *D/DRIL:NRR<br>CERossi<br>04/29/93 |
| *C/EMEB:DE:NRR | *D/DE:NRR      | *RVIB:DRIL:NRR                       | *RVIB:DRIL:NRR                           | *C/RVIB:DRIL:NRR                   |
| JANorberg      | JERichardson   | LLCampbell                           | UPotapovs                                | LJNorrholm                         |
| 04/05/93       | 04/14/93       | 03/29/93                             | 03/29/93                                 | 03/29/93                           |
| *DRP:RII       | *DRP:RII       | *D/DRP:RII                           | *EMEB:DE:NRR                             | *EMEB:DE:NRR                       |
| RPSchin        | MVSinkule      | EMMerschoff                          | TGScarbrough                             | EJSullivan                         |
| 03/19/93       | 03/22/93       | 03/23/93                             | 04/02/93                                 | 04/02/93                           |
| *RPB:ADM       | *OGCB:DORS:NRR | *RII                                 | *RII                                     | *RII                               |
| TechEd         | AJKugler       | SAElrod                              | RFreudenberger                           | LAKeller                           |
| 02/25/93       | 03/02/93       | 03/03/93                             | 03/18/93                                 | 03/02/93                           |

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Enclosure: *filed in jacket*  
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|                |                     |                     |                  |
|----------------|---------------------|---------------------|------------------|
|                | D/DORS:NRR          | C/OGCB:DORS:NRR     | *D/DRIL:NRR      |
|                | BKGrimes            | GHMarcus <i>GHM</i> | CERossi          |
|                | 04/1993 <i>mlem</i> | 05/10/93            | 04/29/93         |
| *C/EMEB:DE:NRR | *RVIB:DRIL:NRR      | *RVIB:DRIL:NRR      | *C/RVIB:DRIL:NRR |
| JANorberg      | LLCampbell          | UPotapovs           | LJNorrholm       |
| 04/05/93       | 03/29/93            | 03/29/93            | 03/29/93         |
| *DRP:RII       | *D/DRP:RII          | *EMEB:DE:NRR        | *EMEB:DE:NRR     |
| RPSchin        | EW Merschhoff       | TGScarbrough        | EJSullivan       |
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| TechEd         | SAE1rod             | RFreudenberger      | LAKeller         |
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|                                     |  |  |  |   |
|-------------------------------------|--|--|--|---|
| C/EMEB:DE:NRR<br>JANorberg<br>/ /93 | D/DE:NRR<br>JERichardson<br>/ /93          | D/DORS:NRR<br>BKGrimes<br>04/ /93      | C/OGCB:DORS:NRR<br>GHMarcus<br>04/ /93 | D/DRL:NRR<br>CERoss<br>4/9/93           |
| *DRP:RII<br>RPSchin<br>03/19/93     | *DRP:RII<br>MVSinkule<br>03/22/93          | RVIB:DRIL:NRR<br>LLCampbell<br>3/29/93 | RVIB:DRIL:NRR<br>UPotbovs<br>3/29/93   | C/RVIB:DRIL:NRR<br>LDorrholm<br>3/29/93 |
| *RPB:ADM<br>TechEd<br>02/25/93      | *OGCB:DORS:NRR*RII<br>AJKugler<br>03/02/93 | *D/DRP:RII<br>EWMerschhoff<br>03/23/93 | EMEB:DE:NRR<br>TGScarbrough<br>/ /93   | EMEB:DE:NRR<br>EJSullivan<br>/ /93      |
|                                     |  |  | *RII<br>RFreudenberger<br>03/18/93     | *RII<br>LAKeller<br>03/02/93            |

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|                                      |  |  |  |  |
|--------------------------------------|--|--|--|--|
|                                      | ✓<br>#1-46<br>CAP<br>JER                   | D/DORS:NRR<br>BKGrimes<br>04/ /93      | C/OGCB:DORS:NRR<br>GHMarcus<br>04/ /93 | D/DRIL:NRR<br>CERossi<br>/ /93         |
| C/EMEB:DE:NRR<br>JANorberg<br>4/5/93 | D/DE:NRR<br>JERichardson<br>4/14/93        | RVIB:DRIL:NRR<br>LLCampbell<br>/ /93   | RVIB:DRIL:NRR<br>UPotapovs<br>/ /93    | C/RVIB:DRIL:NRR<br>LJNorrholm<br>/ /93 |
| *DRP:RII<br>RPSchin<br>03/19/93      | *DRP:RII<br>MVSinkule<br>03/22/93          | *D/DRP:RII<br>EWMerschhoff<br>03/23/93 | EMEB-DR:NRR<br>TGScarbrough<br>4/2/93  | EMEB-DE:NRR<br>EJSHwan<br>4/2/93       |
| *RPB:ADM<br>TechEd<br>02/25/93       | *OGCB:DORS:NRR*RII<br>AJKugler<br>03/02/93 | SAElrod<br>03/03/93                    | *RII<br>RFreudenberger<br>03/18/93     | *RII<br>LAKeller<br>03/02/93           |

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| C/EMEB:DE:NRR | D/DE:NRR       | D/DORS:NRR    | C/OGCB:DORS:NRR | D/ORIL:NRR      |
| JANorberg     | JERichardson   | BKGrimes      | GHMarcus        | CERossi         |
| 03/ /93       | 03/ /93        | 03/ /93       | 03/ /93         | 03/ /93         |
| DRP:RII       | DRP:RII        | RVIB:DRIL:NRR | RVIB:DRIL:NRR   | C/RVIB:DRIL:NRR |
| RPSchin       | MVSinkule      | LLCampbell    | UPotapovs       | LJNorrholm      |
| 03/19/93      | 03/12/93       | 03/ /93       | 03/ /93         | 03/ /93         |
| *RPB:ADM      | *OGCB:DORS:NRR | D/DRP:RII     | EMEB:DE:NRR     | EMEB:DE:NRR     |
| TechEd        | AKugler        | EWerschoff    | TGScarbrough    | EJSullivan      |
| 02/25/93      | 03/02/93       | 03/ /93       | 03/ /93         | 03/ /93         |
|               |                | *RII          | *RII            | *RII            |
|               |                | SAElrod       | REFreudenberger | LEKeller        |
|               |                | 03/03/93      | 03/16/93        | 03/02/93        |

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|---------------|---------------|-----------------|-----------------|
|               | D/DORS:NRR    | C/OGCB:DORS:NRR | D/DRIL:NRR      |
|               | BKGrimes      | GHMarcus        | CERossi         |
|               | 03/ /93       | 03/ /93         | 03/ /93         |
| C/EMEB:DE:NRR | D/DE:NRR      | RVIB:DRIL:NRR   | C/RVIB:DRIL:NRR |
| JANorberg     | JERichardson  | LLCampbell      | UPotapovs       |
| 03/ /93       | 03/ /93       | 03/ /93         | 03/ /93         |
| DRP:RII       | DRP:RII       | D/DRP:RII       | EMEB:DE:NRR     |
| RPSchin       | MVSinkule     | EWerschoff      | TGScarbrough    |
| 03/ /93       | 03/ /93       | 03/ /93         | 03/ /93         |
| *RPB:ADM      | OGCB:DORS:NRR | RII             | RII             |
| TechEd        | AJKugler      | SAElrod         | RFreudenberger  |
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|               |               |                 | PER PHONCON     |

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Richard Freudenberger, RII (904) 795-7677  
Lee Keller, RII (803) 345-5683  
Thomas Scarbrough, NRR (301) 504-2794

Attachments:

- 1. Excerpt from Limatorque Maintenance Update 92-2
- 2. List of Recently Issued NRC Information Notices

\* SEE PREVIOUS CONCURRENCES

|               |               |               |                 |                 |
|---------------|---------------|---------------|-----------------|-----------------|
| C/EMEB:DE:NRR | D/DE:NRR      | D/DORS:NRR    | C/OGCB:DORS:NRR | D/DRIL:NRR      |
| JANorberg     | JERichardson  | BKGrimes      | GHMarcus        | CERoss1         |
| 03/ /93       | 03/ /93       | 03/ /93       | 03/ /93         | 03/ /93         |
| DRP:RII       | DRP:RII       | RVIB:DRIL:NRR | RVIB:DRIL:NRR   | C/RVIB:DRIL:NRR |
| RPSchin       | MVSinkule     | LLCampbell    | UPotapovs       | LJNorrholm      |
| 03/ /93       | 03/ /93       | 03/ /93       | 03/ /93         | 03/ /93         |
| *RPB:ADM      | OGCB:DORS:NRR | D/DRP:RII     | EMEB:DE:NRR     | EMEB:DE:NRR     |
| TechEd        | AJKugler      | EWerschoff    | TGScarbrough    | EJSullivan      |
| 02/25/93      | 03/2/93       | 03/ /93       | 03/ /93         | 03/ /93         |
|               |               | RII           | RII             | RII             |
|               |               | SAElrod       | RFreudenberger  | LAKeller        |
|               |               | 01/17/93      | 03/ /93         | 03/ /93         |

Discussion

South Carolina Electric and Gas (SCE&G), the licensee for Summer, determined that the affected valve operators arrived from the Limatorque Corporation, the valve operator vendor, with the eyebolts installed. In a letter to SCE&G of December 11, 1992, Limatorque confirmed that it had shipped valve operators with eyebolts installed since the early 1970s, that the eyebolt material was not controlled by Limatorque, and that therefore the question of the qualification of the eyebolt material for actuator operation could not currently be addressed. Limatorque stated that it had not received any reports of failures associated with the eyebolts. Subsequently, Limatorque issued Maintenance Update 92-2, which discussed this problem in paragraph 9, and recommended that the eyebolts be replaced by grade 5 housing cover bolts at the next scheduled maintenance.

The NRC staff considers it likely that ungraded eyebolts exist in various licensee safety-related applications since this condition was not previously documented by the vendor. The attached excerpt from the Limatorque Maintenance Update 92-2 is provided because the NRC staff is concerned that: (1) all licensees may not automatically receive Maintenance Update 92-2 and (2) licensees may believe that the eyebolts are qualified for safety-related service because the vendor supplied the eyebolts.

This information notice requires no specific action or written response. If you have any questions about the information in this notice, please contact one of the technical contacts listed below or the appropriate Office of Nuclear Reactor Regulation (NRR) project manager.

Brian K. Grimes, Director  
Division of Operating Reactor Support  
Office of Nuclear Reactor Regulation

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|               |               | RII           | RII             | RII                 |
|               |               | SAElrod       | RFreudenberger  | LAKeller <i>LAK</i> |
|               |               | 03/ /93       | 03/ /93         | 03/2/93             |

Discussion

South Carolina Electric and Gas (SCE&G), the licensee for Summer, determined that the affected valve operators arrived from the Limatorque Corporation, the valve operator vendor, with the eye bolts installed. In a letter to SCE&G of December 11, 1992, Limatorque confirmed that it had shipped valve operators with eye bolts installed since the early 1970s, that the eye bolt material was not controlled by Limatorque, and that therefore the question of the qualification of the eye bolt material for actuator operation could not currently be addressed. Limatorque stated that it had not received any reports of failures associated with the eye bolts. Subsequently, Limatorque issued Maintenance Update 92-2, which discussed this problem in paragraph 9, and recommended that the eye bolts be replaced by grade 5 housing cover bolts at the next scheduled maintenance.

The NRC staff considers it likely that ungraded eye bolts exist in various licensee safety-related applications since this condition was not previously documented by the vendor. The attached excerpt from the Limatorque Maintenance Update 92-2 is provided because the NRC staff is concerned that: (1) all licensees may not automatically receive Maintenance Update 92-2 and (2) licensees may believe that the eye bolts are qualified for safety-related service because the vendor supplied the eye bolts.

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| JERichardson    |               |               | GHMarcus        | BKGrimes      |
| 03/ /93         | 03/ /93       | 03/ /93       | 03/ /93         | 03/ /93       |
| RPB:ADM         | OGCB:DORS:NRR | EMEB:DE:NRR   | C/RVIB:DRIL:NRR | D/DRIL:NRR    |
| TechEdJMain(jm) | AJKugler      | TGScarborough | LJNorrholm      | CERossi       |
| 02/25/93        | 02/ /93       | 03/ /93       | 03/ /93         | 03/ /93       |
|                 |               |               | EMEB:DE:NRR     | C/EMEB:DE:NRR |
|                 |               |               | EJSullivan      | JANorberg     |
|                 |               |               | 03/ /93         | 03/ /93       |