**ENGINEERING CHANGE NOTICE**

2. **ECN Category** (mark one)
   - [ ] Supplemental
   - [X] Direct Revision
   - [ ] Change ECN
   - [ ] Temporary
   - [ ] Standby
   - [ ] Supersede
   - [ ] Cancel/ Void

3. **Originator's Name, Organization, MSIN, and Telephone No.**
   - Treah Nuxall, SNF CVD, R3-47, 372-3739

4. **USO Required?**
   - [ ] Yes
   - [X] No

5. **Date**
   - 3/31/99

6. **Project Title/ No./ Work Order No.**
   - Spent Nuclear Fuel Cold Vacuum Drying

7. **Bldg./ Sys./ Fac. No.**
   - CVDF

8. **ECN Category**
   - [Q.S.]

9. **Document Numbers Changed by this ECN**
   - Includes sheet no. and rev.
   - A11 Rev0

10. **Related ECN No(s).**
    - N/A

11. **Related PO No.**
    - N/A

12a. **Modification Work**
    - [ ] Yes (fill out Blk. 12b)
    - [X] No (NA Blks. 12b, 12c, 12d)

12b. **Work Package No.**
    - N/A

12c. **Modification Work Complete**
    - N/A

12d. **Restored to Original Condition (Temp. or Standby ECN only)**
    - N/A

13a. **Description of Change**
    - Revision to meet SEL, Rev. 6.

13b. **Design Baseline Document?**
    - [ ] Yes
    - [X] No

14a. **Justification (mark one)**
    - [X] Criteria Change
    - [ ] Design Improvement
    - [ ] Environmental
    - [ ] Facility Deactivation
    - [ ] As-Found
    - [ ] Facilitate Const
    - [ ] Const. Error/Omission
    - [ ] Design Error/Omission

14b. **Justification Details**
    - Revision to SEL.

15. **Distribution (include name, MSIN, and no. of copies)**
    - All attached distribution

---

**RELEASE STAMP**

- **DATE:** MAY 06 1999
- **STA:** A
- **RELEASE:** 1
16. Design Verification Required

[ ] Yes
[X] No

17. Cost Impact

<table>
<thead>
<tr>
<th>Additional Savings</th>
<th>Additional Savings</th>
</tr>
</thead>
<tbody>
<tr>
<td>[ ] $</td>
<td>[ ] $</td>
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</tbody>
</table>

18. Schedule Impact (days)

<table>
<thead>
<tr>
<th>Improvement</th>
<th>Delay</th>
</tr>
</thead>
<tbody>
<tr>
<td>[ ]</td>
<td>[ ]</td>
</tr>
</tbody>
</table>

19. Change Impact Review: Indicate the related documents (other than the engineering documents identified on Side 1) that will be affected by the change described in Block 13. Enter the affected document number in Block 20.

SDD/DD: [ ] Seismic/Stress Analysis: [ ] Tank Calibration Manual

- Operating Specification: [ ] Interface Control Drawing: [ ] Spares Multiple Unit Listing
- Criticality Specification: [ ] Calibration Procedure: [ ] Test Procedures/Specification
- Conceptual Design Report: [ ] Installation Procedure: [ ] Component Index
- Equipment Spec.: [ ] Maintenance Procedure: [ ] ASME Coded Item
- Const. Spec.: [ ] Engineering Procedure: [ ] Human Factor Consideration
- Procurement Spec.: [ ] Operating Instruction: [ ] Computer Software
- Vendor Information: [ ] Operating Procedure: [ ] Electric Circuit Schedule
- OM Manual: [ ] Operational Safety Requirement: [ ] ICRS Procedure
- FSAR/SAR: [ ] IFED Drawing: [ ] Process Control Manual/Plan
- Safety Equipment List: [ ] Cell Arrangement Drawing: [ ] Process Flow Chart
- Radiation Work Permit: [ ] Essential Material Specification: [ ] Purchase Requisition
- Environmental Report: [ ] Inspection Plan: [ ]
- Environmental Permit: [ ] Inventory Adjustment Request: [ ]

20. Other Affected Documents: (NOTE: Documents listed below will not be revised by this ECN.) Signatures below indicate that the signing organization has been notified of other affected documents listed below.

Document Number/Revision Document Number/Revision Document Number/Revision

N/A

21. Approvals

Design Authority: C. Miska [C.M.] [4/7/99] Design Agent: ___________________________ Date: ___________________________
Other: [R.W.E.] [4/27/99] Design: ___________________________ Date: ___________________________
SAFETY (Nuclear) [ ] [4/27/99] Environ.: ___________________________ Date: ___________________________
[ ] [5/4/99] Other: ___________________________ Date: ___________________________
_________________________ ___________________________
_________________________ ___________________________
_________________________ ___________________________
_________________________ ___________________________
_________________________ ___________________________
_________________________ ___________________________
_________________________ ___________________________
_________________________ ___________________________
DEPARTMENT OF ENERGY
Signature or a Control Number that tracks the Approval Signature
_________________________ ___________________________
_________________________ ___________________________
_________________________ ___________________________
_________________________ ___________________________
_________________________ ___________________________
_________________________ ___________________________
ADDITIONAL
WORCESTER 1" SOLENOID-ACTUATED GAS-OPERATED SCHe SYSTEM VALVES

Carl Van Katwijk
Numatec Hanford, Richland, WA 99352
U.S. Department of Energy Contract DE-AC06-96RL13200

EDT/ECN: 626679
Org Code: 2G300
B&R Code: 39EW40400

UC: 620
Charge Code: 105559/A000
Total Pages: 16

Key Words: Worcester 1" Solenoid-Actuated Gas-Operated SCHe System Valves

Abstract: Worcester 1" Solenoid-Actuated Gas-Operated SCHe System Valves

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Approved for Public Release
<table>
<thead>
<tr>
<th>Revision</th>
<th>Description of Change - Replace, Add, and Delete Pages</th>
<th>Authorized for Release</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>REVISION TO MEET SEL REV. 6</td>
<td></td>
</tr>
</tbody>
</table>
Section 1 Part Information

Item No.: NA
Manufacturer: 
Supplier: 

Mfg. Part/Model No.: 
Supplier's P/N: 

Part Description: 

End Use Description: 

Section 2a Component Information

Equipment No.: He-GOV/SOV-1*02, 1*06 SCHe-GOV/SOV-5*12, 5*31, 5*51, 5*71
Specification No.: W-441-P4, Rev. 2
Manufacturer: Worcester Controls
Past P.O. No.: NA

Procurement and/or Model Number: 1" E 5966RTBW4 with 151939SWM2120PBC
Equipment Supplier (if different from manufacturer): TBD
Equip. Supplier's Part No.: NA

Component Description: 1" Gas-operated full-port ball valves incorporate a solenoid and limit switches as integral parts of the actuator. These valves are normally open and fail safe to the open position (GOV-1*02 and 1*06 fail closed) to provide a flow path of helium gas to the MCO under helium purge and off-normal conditions when the MCO is isolated.

Section 2b Commercial Availability of the Item

1. Is the Item available from a catalogue of a qualified NQA1 supplier? (coordinate with project CGI interface Engineer or BTR)
   [ ] YES (go to #2 below)
   [X] NO (go to procedure step 5.3.2, proceed to dedicate Item.)

If not available from a qualified NQA1 supplier, is it available from an ISO 9000 supplier? (coordinate with project CGI interface Engineer or BTR)
   [ ] YES (go to #2 below, then go to procedure step 5.3.2, proceed to dedicate Item)
   [X] NO (go to procedure step 5.3.2, proceed to dedicate Item.)

2. List of Candidate qualified suppliers or ISO 9000 suppliers
   company name & type  contact name  phone
   NA

3. Recommended Procurement Strategy(coordinate with project CGI interface Engineer or BTR): NA

Section 2c CGI Determination

1. Question #1: Is the Item subject to design or specification requirements that are unique to nuclear facilities or activities?
   [ ] YES (the item is not commercial grade)
   [X] NO (continue)
2. Question #2: Is the Item used in applications other than nuclear facilities or activities?
   [ ] NO (the item is not commercial grade)
   [X] YES (continue)

3. Question #3: Is the Item ordered from manufacturer/supplier on the basis of specifications set forth in the published product information (e.g., manufacturer’s catalog)?
   [ ] NO (the Item is not commercial grade)
   [X] YES (continue)

[X] All three criteria have been satisfied. The Item meets the definition of commercial grade.

Section 2d Reason for Dedication
The above described Item is being Dedicated for use in the application cited for the following reason(s):

[X] Item is being purchased from a non ESL manufacturer supplier as commercial grade to be used in a Safety Class application.

[ ] Item is being purchased from a non ESL manufacturer supplier as commercial grade to be used in a Safety Significant application.

[ ] Item was purchased from a non ESL manufacturer supplier as commercial grade to be used in a Safety Class application.

[ ] Item was purchased from a non ESL manufacturer supplier as commercial grade to be used in a Safety Significant application.

[ ] Other ('like-for-like', similar, substitution, replacement evaluation)

Section 3 Failure Effects Evaluation

A. Part/Component Safety Function:
1. Prevent H2 Explosion.
2. Remain intact and functional during any event that might threaten the valve integrity. Maintain intact pressure boundary/confinement.
3. Maintain critical function before and after Seismic event.

B. Part/Component Functional Mode:
Safety Function #1:
   [X] Active - Mechanical or Electrical change of state is required to occur for the component to perform its safety function
   [ ] Passive - Change of state is not required for the component to perform its safety function

Safety Function #2:
   [ ] Active - Mechanical or Electrical change of state is required to occur for the component to perform its safety function.
   [X] Passive - Change of state is not required for the component to perform its safety function

Safety Function #3:
   [ ] Active - Mechanical or Electrical change of state is required to occur for the component to perform its safety function.
   [X] Passive - Change of state is not required for the component to perform its safety function

04/23/99
Commercial Grade Item Upgrade Dedication Form

Title: WORCESTER 1" SOLENOID-ACTUATED GAS-OPERATED SCHE
SYSTEM VALVES

<table>
<thead>
<tr>
<th>ECN No.</th>
<th>NA</th>
<th>CGI No.</th>
<th>CGI-SNF-D-13-P4-002</th>
</tr>
</thead>
</table>

SNF-3877, Rev. 1

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C. Host Component Safety Function (If applicable): NA

D. Failure Mode(s) and the effects on component or system safety function (see Worksheet 1):

1. Electrical fault in the solenoid. Valve fails open (fail-safe), fails closed for GOV-1*02 & 1*06.

2. Loss of air pressure to the pneumatic actuator. Valve fails open (fail safe), fails closed for GOV-1*02 & 1*06.

3. Loss of control signal to solenoid. Valve fails open (fail safe), fails closed for GOV-1*02 & 1*06.

4. Failure of the valve to open on demand or failure of the valve body would prevent a helium flow path from the Safety Class Helium bottles to the MCO and loss of vent path.

Section 4 Environmental & Natural Phenomena Hazard Design

<table>
<thead>
<tr>
<th>Environmental Qualification Required:</th>
<th>Yes [ ]</th>
<th>If yes: Environmental Qualification Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No [X]</td>
<td>Limiting Environmental Conditions:</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Environmental Condition B</th>
<th>Yes [X]</th>
<th>Required Safety Functions:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No [ ]</td>
<td>Qualification Period:</td>
</tr>
</tbody>
</table>

Natural Phenomena Hazard (NPH) Design Required:

Yes [X] | Performance Category: PC-3
No [ ]  | NPH Design Req'ts.: Seismic Condition A.

HNF-PRO-97 Rev. 0
W-441-P4, Rev. 2

Required Safety Functions: Boundary/confine,
prevent H, explosion.

Section 5 Component Functional Classification

[ X ] Safety Class (SC)
[ ] General Service
[ ] Safety Significant (SS)

If part/component classification is different from host component/system, document basis.

Section 6 (Reserved)
Section 7 (Reserved)

Section 8 References (for Functional Classification)

National Codes/Standards: ASME B31.3

Safety Analysis Report (SAR): HNF-SD-SNF-SAR-002, Rev 4A

Drawings: H-1-82161, Rev. 2
HNF-SD-SNF-SEL-002, Rev. 6

Vendor Manual/Manufacturer/Supplier Information: Worcester PB451-22

Other:

04/23/99
### Critical Characteristics Verification

**Document:** Vendor Specifications, HNF-SD-SNF-SEL-002, Rev. 6

### Acceptance Criteria/Tolerances

<table>
<thead>
<tr>
<th>Acceptance Criteria/Tolerances</th>
<th>Acceptance Method</th>
<th>ID</th>
<th>Function</th>
</tr>
</thead>
</table>

### Critical Characteristics Verification

#### Nameplate - Manufacturer

- **Worcester Controls**

#### Valve-Component Number

- **Procurement and/or Model Number:**
  - 1" E 5966RTBW4 (Per Procurement Package W-441-P4, Rev. 2, Section H, Design Data Sheet)

#### Actuator-Component Number

- **Procurement and/or Model Number (Includes SOV):**
  - 15193DSWM212OPBC (Per Procurement Package W-441-P4, Rev. 2, Section H, Design Data Sheet)

#### Nameplate Data of Actuator

- **(Includes SOV):** Per Vendor Manual. Shall include "R6" in upper right corner.

### Performance Critical Characteristics

#### GOV Pressure Boundary

- **Pressure test at 165 psig (No Leakage - No Bubbles) Note 3**

#### Internal Pressure

- **150 psig and full vacuum**

#### GOV Seat leakage

- **Pressure test to 150 psig (bubble-tight standards < 10^-5 ml/sec)**

#### GOV Fail Safe Position

- **GOV-5*12, 5*31, 5*51, 5*71**
  - Valve fails OPEN on loss of air pressure, control signal, or electrical power to the solenoid. Stroke time less than 1 second, nominal.

- **GOV Fail Safe Position GOV-1*02 & 1*06**
  - Valve fails CLOSED on loss of air pressure, control signal, or electrical power to the solenoid. Stroke time less than 1 second, nominal.

#### Insulation resistance

- **Greater than 10 Megohm resistance to ground at 1000v**

#### Solenoid inrush current

- **Nominal 0.4 amp @ 120VAC**

#### Solenoid holding current

- **Nominal 0.2 amp @ 120VAC**

#### Current carrying capability

- **Nominal 5 amps @ 120 VDC, less than 0.5 V drop across contacts**

#### Environmental

- **Note 1**

#### Seismic condition A

- **Note 2**

---

*04/28/99*
4. Notes and Legend:

1. These valves have coro-lube (nickel-acetate), acetal resin and NEMA Enclosed Solenoids, these materials are not subject to degradation at 40°F and 60% RH or 115°F and 22% RH and are suitable for Condition B Application.

2. Maintain critical function before and after Seismic event. W-441-P4, Rev. 2, Appendix L, pages L-2, L-4, and L-6 provides a seismic testing plan for these components at a (TBD) seismic spectra. Equipment that has been shaker-table tested should not be installed in a plant (Ref. IEEE Standard 344-1984, Section 7). Consequently, the seismic test constitutes a destructive test. The industry sampling practice for destructive test is to test only one item.

3. Pressure test at 110% of design accident condition pressure of 150 psig.

4. Material verification acceptance method may be either inspection or test.

Acceptance Method:
1. Special Test and Inspection
   1. IN for Inspection
   1. T for Test
2. Commercial Grade Survey
3. Source Verification
4. Vendor/Item History

Section 10 Initial Review and Approval

Approvals:
Designated Engineer: [Signature] 4/20/99
Design Authority: [Signature] 4/20/99
QA Engineer: [Signature] 4/20/99

04/20/99
<table>
<thead>
<tr>
<th>Typical Failure Mechanisms</th>
<th>Definition</th>
<th>Applicable to Component under Evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fracture</td>
<td>Separation of a solid accompanied by little or no macroscopic plastic deformation.</td>
<td>Yes [ ] No [X]; If Yes, indicate failure</td>
</tr>
<tr>
<td>Corrosion</td>
<td>The gradual deterioration of a material due to chemical or electrochemical reactions, such as oxidation, between the material and its environment.</td>
<td>Yes [ ] No [X]; If Yes, indicate failure</td>
</tr>
<tr>
<td>Erosion</td>
<td>Destruction of materials by the abrasive action of moving fluids, usually accelerated by the presence of solid particles carried with the fluid.</td>
<td>Yes [ ] No [X]; If Yes, indicate failure</td>
</tr>
<tr>
<td>Open Circuit</td>
<td>An electrical circuit that is unintentionally broken so that there is no complete path for current flow.</td>
<td>Yes [ ] No [X]; If Yes, indicate failure</td>
</tr>
<tr>
<td>Short Circuit</td>
<td>An abnormal connection by which an electrical current is connected to ground, or to some conducting body, resulting in excessive current flow.</td>
<td>Yes [X] No [ ]; If Yes, indicate failure</td>
</tr>
<tr>
<td>Blockage</td>
<td>Clogging of a filtering medium resulting in the inability to perform its purification function or blockage of flow.</td>
<td>Yes [ ] No [X]; If Yes, indicate failure</td>
</tr>
<tr>
<td>Seizure</td>
<td>Binding of a normally moving item through excessive pressure, temperature, friction, jamming.</td>
<td>Yes [X] No [ ]; If Yes, indicate failure</td>
</tr>
<tr>
<td>Unacceptable</td>
<td>Mechanical oscillations produced are beyond the defined permissible limits due to unbalancing, poor support, or rotation at critical speeds.</td>
<td>Yes [ ] No [X]; If Yes, indicate failure</td>
</tr>
<tr>
<td>Vibration</td>
<td>A loss of mechanical and physical properties of a material due to exposure to high temperatures, radiation exposure.</td>
<td>Yes [ ] No [X]; If Yes, indicate failure</td>
</tr>
<tr>
<td>Loss of Properties</td>
<td>Mechanical creep From prolonged exposure to high temperature and stress, the object will show a slow change in its physical (shape and dimension) and mechanical characteristics.</td>
<td>Yes [ ] No [X]; If Yes, indicate failure</td>
</tr>
<tr>
<td>Excess Strain</td>
<td>Under the action of excessive external forces the material of the part has been deformed or distorted.</td>
<td>Yes [ ] No [X]; If Yes, indicate failure</td>
</tr>
<tr>
<td>Mechanical Creep</td>
<td>Fracture characterized by tearing of metal accompanied by appreciable gross plastic deformation.</td>
<td>Yes [ ] No [X]; If Yes, indicate failure</td>
</tr>
</tbody>
</table>

Section 2 Additional Failure Modes Applicable to the Component Under Evaluation

1. Loss of Air Pressure
CHECKLIST 1

ACCEPTANCE METHOD 1

SPECIAL TEST/INSPECTION VERIFICATION

| SECTION 1 |
|-----------------|-----------------|
| **Item Description:** 1" SCHe Solenoid Valves |
| **System #:** 13 |
| **Equip #:** He-GOV/SOV-1*02, 1*06, SCHe-GOV/SOV-5*12, 5*31, 5*51, 5*71 |
| **Procurement and/or Model Number:** 1" E 5966RTBW4 with 151939SWM2120PBC |
| **Manufacturer (Address/Phone):** |
| Worcester Controls |
| P.O. BOX 538 |
| 33 Locke DR |
| Marlborough, MA 01752 |
| (508) 481-4800 |
| **Supplier (Address/Phone):** |

| SECTION 2 CRITICAL CHARACTERISTICS TO BE VERIFIED BY METHOD 1 |
|---------------------|---------------------|
| **Inspec** | **Test** | **Per-Test** |
| [X] | 1. Nameplate - Manufacturer |
| [X] | 2. Valve-Component Number-Procurement and/or Model Number |
| [X] | 3. Actuator-Component Number-Procurement and/or Model Number (Includes SOV) |
| [X] | 4. Nameplate Data of Actuator (Includes SOV) |
| [X] | 5. Valve Body Material (Verification may be by either inspection or test) |
| [X] | 6. Configuration/Mounting |
| [X] | 7. Process Connection |
| | 8. Insulation Resistance |
| | 9. GOV Pressure Boundary |
| [X] | 10. Internal Pressure |
| [X] | 11. GOV Seat leakage |
| [X] | 12. GOV Fail Safe Position |
| [X] | 13. Solenoid Inrush Current |
| [X] | 14. Solenoid Holding Current |
| [X] | 15. Current Carrying Capability Of Contacts |
| [X] | 16. Seismic Condition A |

04/28/99
### SECTION 3 BY INSPECTION

* See Attachment G of Desk Instruction for Sampling Size

#### Characteristic: Nameplate - Manufacturer
- **Sample Size**: All Items
- **Acceptance Criteria**: Worcester Controls
- **Receipt Inspection Plan / Report #**: ______________________
- **References (see Section 7)**: ______________________

#### Characteristic: Valve-Component Number-Procurement and/or Model Number
- **Sample Size**: All Items
- **Acceptance Criteria**: 1" E 5966RTBW4 (Per Procurement Package W-441-P4, Rev. 2, Section H, Design Data Sheet)
- **Receipt Inspection Plan / Report #**: ______________________
- **References (see Section 7)**: Manual PB 302-26, PB 451-22, PB 303-1

#### Characteristic: Actuator-Component Number - Procurement and/or Model Number (Includes SOV)
- **Sample Size**: All Items
- **Acceptance Criteria**: 151939SWM2120PBC (Per Procurement Package W-441-P4, Rev. 2, Section H, Design Data Sheet)
- **Receipt Inspection Plan / Report #**: ______________________
- **References (see Section 7)**: Manual PB 302-26, PB 451-22, PB 303-1

#### Characteristic: Nameplate Date of Actuator (Includes SOV)
- **Sample Size**: All Items
- **Acceptance Criteria**: Per Vendor Manual. Shall include "R6" in upper right corner.
- **Receipt Inspection Plan / Report #**: ______________________
- **References (see Section 7)**: Manual PB 302-26, PB 451-22, PB 303-1

#### Characteristic: Configuration/Mounting
- **Sample Size**: All Items
- **Acceptance Criteria**: Integral Actuator/Valve Assembly. Black recessed override button.
- **Receipt Inspection Plan / Report #**: ______________________
- **References (see Section 7)**: ______________________

#### Characteristic: Process Connection
- **Sample Size**: All Items
- **Acceptance Criteria**: 1" butt weld
- **Receipt Inspection Plan / Report #**: ______________________
- **References (see Section 7)**: ______________________

---

04/28/99
**Commercial Grade Item Upgrade Dedication Form**

**ECN No.**: NA  **CGI No.**: CGI-SNF-D-13-P4-002  
**Title**: WORCESTER 1" SOLENOID-ACTUATED GAS-OPERATED SCHE SYSTEM VALVES

### Characteristic: Valve Body Material

**Sample Size**: Normal Sampling Size  
**Acceptance Criteria**: Stainless Steel

**Receipt Inspection Plan / Report #**:  
**References (see Section 7)**:  

### SECTION 4 BY SPECIAL TEST

* See Attachment G of Desk Instruction for Sampling Size

<table>
<thead>
<tr>
<th>Test To Be Performed by:</th>
<th>Number of Items to be Tested:</th>
</tr>
</thead>
<tbody>
<tr>
<td>[ ] Purchaser</td>
<td>Test/Inspection Location:</td>
</tr>
<tr>
<td>[ ] Supplier/Manufacturer**</td>
<td></td>
</tr>
<tr>
<td>[ ] Other</td>
<td></td>
</tr>
</tbody>
</table>

**Characteristic for Test: Insulation Resistance**

**Acceptance Criteria**: Greater than 10 Megohm resistance to ground at 1000v.

**Sample Size**: Normal Sampling Size  
**Actual Test Value**:  
**Test Plan and Report #**:  
**References (see Section 7)**:  

**Characteristic for Test: GOV Pressure Boundary**

**Acceptance Criteria**: Pressure test at 165 psig (Zero leakage)

**Sample Size**: Normal Sampling Size  
**Actual Test Value**:  
**Test Plan and Report #**:  
**References (see Section 7)**:  

**Characteristic for Test: Internal Pressure**

**Acceptance Criteria**: 150 psig and full vacuum

**Sample Size**: Normal Sampling Size  
**Actual Test Value**:  
**Test Plan and Report #**:  
**References (see Section 7)**:  

**Characteristic for Test: GOV Seat Leakage**

**Acceptance Criteria**: Pressure test to 150 psig (bubble-tight standards < $10^{-3}$ ml/sec)

**Sample Size**: Normal Sampling Size  
**Actual Test Value**:  
**Test Plan and Report #**:  
**References (see Section 7)**:  

---

*04/20/99*
### Characteristic for Test: GOV Fail Safe Position GOV-5*12, 5*31, 5*51, 5*71

**Acceptance Criteria:** Valve fails OPEN on loss of air pressure, control signal, or electrical power to the solenoid. Stroke time less than 1 second, nominal.

**Sample Size**: Normal Sampling Size

**Actual Test Value:**

**Test Plan and Report #:**

**References (see Section 7):**

### Characteristic for Test: GOV Fail Safe Position GOV-1*02 & 1*06

**Acceptance Criteria:** Valve fails CLOSED on loss of air pressure, control signal, or electrical power to the solenoid. Stroke time less than 1 second, nominal.

**Sample Size**: Normal Sampling Size

**Actual Test Value:**

**Test Plan and Report #:**

**References (see Section 7):**

### Characteristic for Test: Solenoid Inrush Current

**Acceptance Criteria:** Nominal 0.4 amp @ 120VAC

**Sample Size**: Normal Sampling Size

**Actual Test Value:**

**Test Plan and Report #:**

**References (see Section 7):**

### Characteristic for Test: Solenoid Holding Current

**Acceptance Criteria:** Nominal 0.2 amp @ 120VAC

**Sample Size**: Normal Sampling Size

**Actual Test Value:**

**Test Plan and Report #:**

**References (see Section 7):**

### Characteristic for Test: Current Carrying Capability Of Contacts

**Acceptance Criteria:** Nominal 5 amps @ 120 VDC, less than 0.5 V drop across contacts

**Sample Size**: Normal Sampling Size

**Actual Test Value:**

**Test Plan and Report #:**

**References (see Section 7):**

### Characteristic for Test: Seismic Condition A

**Acceptance Criteria:** Maintain critical function before and after Seismic event.

**Sample Size**: Destructively Test Only One Item

**Actual Test Value:**

**Test Plan and Report #:**

**References (see Section 7):**

---

**If Supplier/Manufacturer or Other, Refer to CGI Checklist-2 for Support Information**

---

04/20/99
# 1. SUMMARY OF VERIFIED CRITICAL CHARACTERISTICS, THEIR VERIFICATION METHODS, AND RESULTS

<table>
<thead>
<tr>
<th>Critical Characteristics</th>
<th>Acceptance Criteria/Tolerances</th>
<th>Function</th>
<th>Method VID</th>
<th>Procedure or R#</th>
<th>Check-list ID</th>
<th>Number Tested</th>
<th>Number Failed</th>
<th>Verifying Organization</th>
<th>Printed Name Signature</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nameplate - Manufacturer</td>
<td>Worcester Controls</td>
<td>X</td>
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<tr>
<td>Valve-Component Number-Procurement and/or Model Number</td>
<td>1&quot; E 5966RTBW4 (Per Procurement Package W-441-P4, Rev. 2, Section H, Design Data Sheet)</td>
<td>X</td>
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</tr>
<tr>
<td>Actuator-Component Number-Procurement and/or Model Number (Includes SOV)</td>
<td>15I939SWM2120PBC (Per Procurement Package W-441-P4, Rev. 2, Section H, Design Data Sheets)</td>
<td>X</td>
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</tr>
<tr>
<td>Nameplate Data of Actuator (Includes SOV)</td>
<td>Per Vendor Manual. Shall include &quot;R6&quot; in upper right corner.</td>
<td>X</td>
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<tr>
<td>Valve Body Material</td>
<td>Stainless Steel</td>
<td>X</td>
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<tr>
<td>Process Connection</td>
<td>1&quot; butt weld</td>
<td>X</td>
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<tr>
<td>Configuration/Mounting</td>
<td>Integral Actuator/Valve Assembly. Black recessed override button.</td>
<td>X</td>
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<tr>
<td>Insulation Resistance</td>
<td>Greater than 10 Megohm resistance to ground at 1000v.</td>
<td>X</td>
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</tr>
<tr>
<td>GOV Pressure Boundary</td>
<td>Pressure test at 165 psig (No Leakage-No Bubbles)</td>
<td>X</td>
<td></td>
<td></td>
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<tr>
<td>Internal Pressure</td>
<td>150 psig and full vacuum</td>
<td>X</td>
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<tr>
<td>GOV Seat Leakage</td>
<td>Pressure test to 150 psig (bubble-tight standards &lt; 10⁻² ml He/sec)</td>
<td>X</td>
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</tr>
<tr>
<td>GOV Fail Safe Position (GOV-5<em>12, 5</em>31, 5<em>51, 5</em>71)</td>
<td>Valve fails OPEN on loss of air pressure, control signal, or electrical power to the solenoid. Stroke time less than 1 second, nominal.</td>
<td>X</td>
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<tr>
<td>GOV Fail Safe Position (GOV-1<em>02 &amp; 1</em>06)</td>
<td>Valve fails CLOSED on loss of air pressure, control signal, or electrical power to the solenoid. Stroke time less than 1 second, nominal.</td>
<td>X</td>
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<tr>
<td>Solenoid Inrush Current</td>
<td>Nominal 0.4 amp @ 120VAC</td>
<td>X</td>
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<tr>
<td>Solenoid Holding Current</td>
<td>Nominal 0.2 amp @ 120VAC</td>
<td>X</td>
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<tr>
<td>Current Carrying Capability Of Contacts</td>
<td>Nominal 5 amps @ 120 VDC, less than 0.5 V drop across contacts</td>
<td>X</td>
<td></td>
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<tr>
<td>Seismic Condition A</td>
<td>Maintain critical function before and after Seismic event.</td>
<td>X</td>
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</table>
2. DISPOSITION OF UNVERIFIED OR FAILED CRITICAL CHARACTERISTICS

<table>
<thead>
<tr>
<th>Critical Characteristic</th>
<th>Disposition</th>
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<tr>
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</table>

3. SIGNATURE INDICATES ALL CRITICAL CHARACTERISTICS VERIFIED SATISFACTORY OR ACCEPTABLY DISPOSITIONED AND COMMERCIAL GRADE DEDICATION IS SATISFACTORY AND COMPLETE.

<table>
<thead>
<tr>
<th>Testing Agency Approval:</th>
<th>Date</th>
<th>Design Authority:</th>
<th>Date</th>
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<tbody>
<tr>
<td>Testing Agency QA Engineer:</td>
<td>Date</td>
<td>QA Engineer:</td>
<td>Date</td>
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</table>

BUYER VERIFICATION

04/20/99
### Section 6 Contacts/Phone Numbers

<table>
<thead>
<tr>
<th>Name</th>
<th>Phone</th>
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<tbody>
<tr>
<td>Design Authority</td>
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<tr>
<td>QA</td>
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<tr>
<td>QC</td>
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<tr>
<td>Cog - Engineer</td>
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<tr>
<td>CGI Engineer</td>
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<tr>
<td>Procurement Engineer</td>
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<tr>
<td>Other</td>
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</tbody>
</table>

### Section 7 Supporting Documentation for this Checklist

#### Initial Procurement Documents

- [ ] Drawings:
- [ ] Manuals (specify type & number):
- [ ] Design Calculations
- [ ] Installation Instructions
- [ ] Operation Instructions
- [ ] Calibration Instructions
- [ ] Manufacturer’s Recommended Spare Parts List
- [ ] Other:

#### Procurement Documents

- [ ] Certificate of Conformance/Compliance
- [ ] Seismic Qualification Certificate
- [ ] Environmental Qualification Certificate
- [ ] Test Report (s):
- [ ] Inspection Report (s):
- [ ] CMTRs for ASME Pressure Retaining Materials
- [ ] Valve Seat Leakage Report
- [ ] Weld Records
- [ ] Material Traceability Record
- [ ] Other: