PROGRAM MIDAS REVISION HISTORY

	Program		Documentation		
MIDAS	Revision Date	Revision Name	User Manual (TTS-CC-117)	Verification Manual (TTS-CC-117.1)	Revision Description
Rev.			Rev.	Rev.	
0	6/1/2001	2001.152	0	0	Original issue
1	10/28/2002 8:10:08 AM Build 5.0	2002.301	1	1	Added BWROG DC Methodology Module Added EPRI Butterfly Methodology Module Added radial buttons to Output Panel to display descriptions or field data Added print preview capability for reports Removed Excel interface for printing reports Changed Print / Inputs to Print / Data Sheet which includes inputs, outputs, and references Revised printed report formats and contents

2	10/2/2003 Build 6.0	2003.275	2	2	Added the following new Valve input parameters
					    HELB Related Valve Factor
					    Butterfly DSE Excluded
					    Butterfly Seat Torque Excluded
					    Stem COF for Handwheel Analysis
					    Stem Material Yield Strength
					    Stem Unsupported Length
					    StemTorque Correction Factor
					Added the following new Operator input parameters:
					    Spring Pack Curve Source
					    HBC Efficiency Multiplier
					    HBC Torque Multiplier
					    Custom Spring Pack Filename
					    Custom Spring Pack Test Date
					    Custom Spring Pack Test Number
					    Custom Spring Pack Minimum TSS
					    Custom Spring Pack Maximum TSS
					    Custom Spring Pack Minimum Torque
					    Custom Spring Pack Maximum Torque
					    OEM Recommended TSS
					    OEM Valve Maximum TSS
					    OEM Actuator Maximum TSS
					    Installed Limiter Plate
					Added the following new Motor input parameters:
					    Cable Resistance Calculated or Input
					    Input Cable Resistance
					Added the following new System input parameters
					    Maximum HELB D-P
					    Maximum HELB Line Pressure
					    Extended Interval Factor
					Removed radio buttons to display descriptions or field data from Output Panel
					Added parameter group drop down menu to Output Panel to display specifically grouped output parameters
					
					Added Plant and Category fields to applicable reference data panels and tables
					Added the following new output parameters:
					    Minimum Design Stem Root Diameter

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Rev.			Rev.	Rev.	
					Minimum Stem Diameter for Buckling Design Stem Dia / Buckling Stem Dia SMB Handwheel Ratio SMB Handwheel Efficiency SMB Handwheel Torque Rating HBC Extended Torque Rating HBC Extended Efficiency NSR Min Required Torque HELB Related Min Required Thrust HELB Thrust due to DP Effect HELB Thrust due to Piston Effect Min Design Torque @Design SF Min Design Torque @SF=0.2 Stem Factor for Handwheel Analysis Butterfly Valve Dynamic Seating Effect Open Stem Factor Criteria Liquid Pressure Recovery Factor (squared) Pressure Drop Ratio Factor Expansion Factor Expected Torque Variability @VLV Expected Torque Variability @ACT Valve Factor Capability (close) Valve Factor Capability (open) EPRI Gate Valve Seating Margin (close) EPRI Open Unseating Margin Added Reliance Motor Data to BWROG DC Methodology Module Revised Spring Pack Lookup panel to include "Use Generic Data" and "Use Custom Data" radio button selections Added Custom Spring Pack Data input panel Added Status Table Revised Gearbox Lookup panel to include additional input parameter torque and efficiency multipliers and motor curve number, also added voltage pull-down Revised Overall Resistance Calculation panel to include Cable Resistance options, "Calculate" or "Input", radio buttons for DC motors only Revised BWROG-DC, Valve Information Panel to display additional valve input parameters Revised EPRI Butterfly, Coefficients Panel to display additional input parameter options using radio button selections Revised Export to Excel Panel to include Test Data as an available Database Field options Revised printed report formats and contents Revised Main – Help menu to include: "Contents and Index" and "About MIDAS" options Added Help Topics (F1) Function Capability Included the following four site specific pull down tables with the MidasQA pull down table data in Attachment 4

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Rev.			**Rev.**	**Rev.**	
					allMOTOR_TOL (from site specific database) allOPER_MFG (from site specific database) allVLV_MATERIAL (from site specific database) allVLV_VENDORS (from site specific database) Removal of revision 1 Attachments 7 through 14, comparison of previous Midas calculation reports to the latest revision calculation reports. No longer required, minimal changes to report formats are discussed in Section 6.3. Relabeled revision 1 Attachments 15 through 18 as revision 2 Attachments 7 through 10
3	2/13/2005 Build 7	2005.44	3	3	Added JOG Status box to main MIDAS Calculations panel. Added the following Motor input parameters: Cable Reactance (AC Only) Added the following System input parameters: PVT Frequency Type (text) Candidate for Motor power Testing (Y/N) Removed the following BWROG DC Methodology input parameters: DC Load Profile Checksum (open) DC Load Profile Checksum (close) Added the following BWROG DC Methodology input parameters: DC Additional Stroke Time (open) DC Additional Stroke Time (close) Added the following EPRI Butterfly Methodology input parameters: Stem In-Plane with Upstream Elbow (Y/N) Added the following JOG PV Methodology input parameters: JOG Required Thrust/Torque Basis (text) JOG Subject to DP Stroking (text) JOG Max DP during DP Stroke JOG Gate Disk Style (text) JOG Gate Disk-to-Seat Material (text) JOG Gate Disk-to-Body Guide Material (text) JOG Gate Fluid Type (text) JOG Globe Type (text) JOG Globe Disk-to-Body Guide Material (text) JOG Globe Fluid Type (text) JOG Globe Flowrate JOG BF Bearing Material (text) JOG BF Shaft Material (text) JOG BF Fluid Type (text) JOG BF Hub Seal (Y/N) JOG Qualifying Basis Screen Satisfied (Y/N) JOG Qualifying Basis Condition (text) JOG Qualifying Basis Description (memo) JOG Implementation/Evaluation Details (memo) JOG Class D Plan Description (memo) JOG Class D Plan Justification (memo) Added the following output parameters: JOG Class

| MIDAS | Program | | Documentation | | Revision Description |
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Rev.			Rev.	Rev.	
					JOG CAI Rating
					JOG Gate Valve COF Threshold
					JOG Butterfly Valve COF Threshold
					JOG Gate Valve COF Allowance (close)
					JOG Gate Valve COF Allowance (open)
					COF based on Design Valve Factor (close)
					COF based on Design Valve Factor (open)
					COF based on Valve Factor Capability (close)
					COF based on Valve Factor Capability (open)
					Valve Factor based on COF Threshold (close)
					Valve Factor based on COF Threshold (open)
					Valve Factor based on COF Allowance (close)
					Valve Factor based on COF Allowance (open)
					SMB Worm Gear Set Ratio
					Min Design Thrust Criteria (close)
					Motor Torque Derate / oC
					Motor Current Loss / oC
					Cable Resistance / 1000 ft (ohms)
					Cable Reactance / 1000 ft (ohms)
					Cable Reference Temperature (oC)
					Cable Reactance (ohms)
					Motor Reactance (ohms)
					Total Reactance (ohms)
					Motor Impedance, close (ohms)
					Motor Impedance, open (ohms)
					Motor Resistance, close (ohms)
					Motor Resistance, open (ohms)
					Total Resistance, close (ohms)
					Total Resistance, open (ohms)
					Degraded Voltage At Motor (close)
					Degraded Voltage At Motor (open)
					Degraded/Nominal Voltage Ratio (close)
					Degraded/Nominal Voltage Ratio (open)
					Degraded Voltage Motor Torque (close)
					Degraded Voltage Motor Torque (open)
					Motor Limited Actuator TQ @DV (close)
					Motor Limited Actuator TQ @DV (open)
					Motor Limited Actuator Torque (close)
					Motor Limited Actuator Torque (open)
					Min Required Thrust @CST
					Max Total Thrust
					A/F Min Required Thrust @CST
					A/F Max Total Thrust
					Calculate DP Across Valve, psi
					Added Intermediate gear set data for SMB-5 lookup table
					Added additional Test of Record fields to As-Left Test Data Summary Table
					Added JOG PV Methodology Table
					Added JOG PV Methodology panel

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Rev.			Rev.	Rev.	
					Added Voltage Drop AC Methodology Table
					Added AC Voltage Drop Calculation panel
					Revised Valve Filter Panel to include BOP Valve Grouping
					Revised motor lookup table to include a 2.5 voltage exponent for 60 ft-lbs., AC motor, 1800 RPM with a 56 frame
					Revised Save Edits Panel to include JOG Evaluation Complete? Yes or No radio buttons to indicate JOG Status
					Revised the order of the parameter group drop down menu for Output Panel to display "All Parameters" as the default
					Revised Motor Curve Lookup Table to include standard values of horse power (HP)
					Revised BWROG DC, General Information Panel to include two sub-panels: the General Information Panel and the System Design Conditions Panel
					Revised BWROG DC, Valve Information Panel to include Cable Resistance Formula options: "Calculate" or "Input" radio buttons
					Revised EPRI Butterfly Methodology Panel to include Stem In-Plane with Upstream Elbow (Yes and No radio buttons).
					Renamed Overall Resistance Calculation panel to AC/DC Cable Resistance Calculation panel and removed Cable Resistance options, "Calculate" or "Input", radio buttons.
					Revised printed report formats and contents
					Added the following JOG tables to the MidasQA lookup table data in Attachment 1
					JOG_CAI_BF
					JOG_CAI_Gate
					JOG_CAI_Globe
					JOG_Special_Gate
					JOG_Threshold_BF
					JOG_Threshold_Gate
					Included the following site specific pull down table with the MidasQA pull down table data in Attachment 4
					allMOTOR_MFG (from site specific database)
					Added the following JOG pull down tables to the MidasQA pull down table data in Attachment 4
					allJOG_Basis_Condition
					allJOG_BF_Bearing
					allJOG_BF_Fluid
					allJOG_BF_Shaft
					allJOG_DP_Stroke
					allJOG_GATE_Body
					allJOG_GATE_Fluid
					allJOG_GATE_Seat
					allJOG_GATE_Style
					allJOG_GLOBE_Body
					allJOG_GLOBE_Fluid
					allJOG_GLOBE_Style
					allJOG_Required_Basis

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					Revised BWROG DC Methodology verification problems 17 and 18 in Attachment 7 to verify the open and close "Input Stem Torque" applications, respectively Added Attachment 11, Midas JOG PV Methodology Validation

4	12/21/2006
	
	Build 8
		2006.355	4	4	Changed Motor Input Parameter from "Degraded Voltage Flag (Y/N)" to "Use Degraded Voltage for NSR direction? (Y/N)"
					Added the following Valve input parameters:
					    Stem Elevated Temperature Flag
					    Stem Nut Wear Safety Factor
					    Stem Nut Engagement Length (in)
					    Stem Nut Total Thrust (lbs)
					    Stem Nut Material Yield Strength (psi)
					    Alternate Valve Identification
					Added the following Operator input parameters:
					    Close TQ Switch Active Flag
					    Extended Close TQ Switch Active Bypass Flag
					    HBC Efficiency Derate Factor (1)
					    HBC Efficiency Derate Factor (2)
					    Actuator Installation Date
					    Actuator Strokes per year
					    Handwheel Torque Calculation Error
					Added the following Motor input parameters:
					    AC Voltage Drop Methodology
					Added the following System input parameters:
					    Calculation Record is Active?
					Added the following Output parameters:
					    Design Stem Revolutions / Stroke
					    Design Stem Revolutions / Year
					    Maximum Stem Thread Plateau Time (sec)
					    SMB Handwheel TQ Conversion Factor
					    Maximum Handwheel Torque (backseat)
					    Effective Valve Factor for Gate Valve, open & close
					    COMED Voltage Drop Calculation Status
					    Motor Limited Actuator TQ @DV (post)
					    Motor Limited Actuator Torque (post)
					Added the following BWROG DCM input parameters:
					    Use FAC for position controlled strokes?
					    DC Partial Stroke Percentage, open & close
					    DC Valve Pressure at Full Open, open & close
					Added the following BWROG DCM output parameters:
					    Instantaneous Actuator Torque DCM, open & close
					    Functional Actuator Capability DCM, open & close
					    Added Ess-Column to main MIDAS Calculations panel to identify essential parameters
					    Added Copy To New Valve option under File
					    Added Add Valve Feature Panel
					    Added User Defined Valve Filter option
					    Added User Defined Valve Filter Panel

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					Revised Valve Filter Panel to include all Valves or Active or Retired Record Grouping Revised Gearbox Lookup panel to include DF1 and DF2 (Efficiency Derated Factors) Revised History Panel to add double-click feature to activate editable history and open issues panel Revised BWROG DC Methodology panel Print option to include Worksheet from Work in Progress or As-Built Revised BWROG DC, General Information Panel sub-panel names to: General and System Revised BWROG DC, General Information Panel, General sub-panel to include Use FAC for position controlled strokes? Yes or No, radio buttons Revised BWROG DC, General Information Panel, System sub-panel to include Partial Stroke Percentage, open & close Revised BWROG DC, Valve Information Panel to include Valve Pressure at Full Open for open & close Revised BWROG DC, Detailed Results Panel to include Functional Actuator Capability (FAC) at bottom of open & close sub-panels Changed the JOG PV Methodology Table hotkey from "Ctrl+0" to "Ctrl+J" Revised JOG PV Methodology main panel to include Valve Family number Revised As-Left Test Data Summary panel to include TSS (O) terms Revised As-Left Test Margin Analysis - COF panel to include What-IF Calculator button Added What-IF Margin Analysis panel Revised Voltage Drop Calculation panel to combine all inputs and outputs on one panel Revised Voltage Drop Calculation panel to include Voltage Drop Methodology selection parameter and group Voltage Divider Terminology terms Revised Help panel to include Add Valves privilege
5	3/14/2008 7:05:55 AM Build 2.3.26	2008.74	5	5	General editorial changes to add clarity throughout text Updated references Added the following Valve input parameters: Stem Nut Methodology Stem Nut Thread Backlash (in) Perform Pressure Locking Analysis? PL Valve Factor PL Mean Seat Radius (in) PL Bonnet Pressure (psi) PL Upstream Pressure (psi) PL Downstream Pressure (psi) PL Disc Thickness (in) PL Hub Radius (in) PL Hub Length (in) PL Disc Material Type PL Disc Material Modulus (psi X 10E6) PL Disc Material Poisson's Ratio

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					PL Static Unwedging Thrust (lbs)

PL Static Unwedging Thrust (lbs)
PL Min Required Margin (decimal)
Added the following Motor input parameters:
  Motor Torque Derate
    Motor Current Loss
  Motor Rotor Material
  Motor Installation Date
Removed the following Output parameters:
  Motor Torque Derate
  Motor Current Loss
Added the following Output parameters:
  Limitorque Allowable Backlash Time (sec)
  Pressure Locking Required Thrust (lbs)
  Pressure Locking Required Margin (decimal)
  Pressure Locking Available Margin (decimal)
  Pressure Locking Margin Acceptable
Revised the following BWROG DC Methodology input parameter titles:
  Data at xxx% (100% to −100%) Close to DC Profile Close at xxx% (100% to −100%)
  Data at xxx% (100% to −100%) Open to DC Profile Open at xxx% (100% to −100%)
Added the following EPRI BF Methodology input parameters:
  Ignore Choked Flow
  Ignore Hydrodynamic TQ for flow assist
  Hydrodynamic TQ Factor (Com Flow)
Revised the following EPRI BF Methodology input parameter titles:
  BF DP at xx Deg Open (psi) (5 to 90 Deg) to BF DP at xx Deg Open (psi) (5 to 90 Deg
  Revised EPRI Butterfly Methodology – General Information – System sub-panel to include new input parameters
  Revised EPRI Butterfly Methodology Results Report to include new input parameters and a page for References
Added the following JOG PV Methodology input parameters:
  JOG Gate Hard Seat Required
  JOG Gate Hard Seat Thrust Acceptable
  JOG Valve Reference Notes
  Revised As-left Test Data Margins Panel to consolidate the three sub-panels into one panel and to include the "Show - As-Built" menu option and the "What-If Calculator" button
  Revised As-left Test Setup Review Panel to include the "Show - As-Built" menu option
  Revised JOG PV Methodology – Valve Info sub-panel to include Valve Reference Notes
  Revised JOG PV Methodology – Valve Info sub-panel to include Hard Seat Required? (Yes/No) radio buttons
  Revised JOG PV Methodology – Results/Evaluation sub-panel to include Acceptable Required Thrust to Hard Seat? (Yes/No) radio buttons and Close Required Thrust value

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					Revised JOG PV Methodology Panel to include Feedback sub-panel
					Revised JOG MOV Evaluation Report to include Hard Seat Required? (Yes/No), Acceptable Required Thrust to Hard Seat? (Yes/No), Valve Reference Notes and JOG Reference page
					Revised JOG MOV Evaluation Report, page 1, sixth line to hide "Stroke Differential Pressure (psid)" when not applicable
					Changed JOG MOV Evaluation Report, page 2, first line from "Qualifying Basis Screen Satisfied (Yes, No, N/A)" to "Qualifying Basis Screen Satisfied (Yes, No)"
					Revised Global Parameter Evaluator, SQL Statement to include Controls sub-panel
					Revised Export to Excel, SQL Statement to include Controls sub-panel
					Revised User Defined Filter, SQL Statement to include Controls sub-panel
					Revised List Edits - References sub-panel to include "Numbers" or "Titles" radio buttons
					Added Compare to Historical option
					Added Copy from Historical option
					Revised Compare to As-Built - References sub-panel to include "Numbers" or "Titles" radio buttons
					Revised Attachment 5, Section 6, to include validation of the Exelon & BWROG Stem Nut Wear Analyses
					Revised Attachment 5, to add Section 7 validation of the Pressure Locking Analyses