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BAP 1310-ST1
Revision 7

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SPECIAL PROCEDURES/TESTS/EXPERIMENTS
REQUEST FORM

TITLE: BYRON U-1 AMAG IMPLEMENTATION

TEST/PROCEDURE NUMBER: SPP - 00-003 TERMINATION DATE: 10-26-2000

REASON FOR SPECIAL TEST PROCEDURE: INCREASE POWER PRODUCTION BY USING AMAG TECHNIQUES TO MEASURE FEEDWATER FLOW

DCR INIT. Complete and attach 10CFR50.59 Review per BAP 1210-5.

RCZ INIT. Review OP-AA-101-109 to determine if an HLA briefing is required.

SIGNATURE OF ORIGINATOR AND DATE 5/5/00

COPIES TO: ☒ Systems Eng ☒ Shift Manager ☐ Radwaste ☐ NSRB

☒ Work Control ☒ Center Desk ☒ Unit 1 ☐ Unit 2 ☒ Other SEC

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INDEPENDENT TECHNICAL REVIEW DISCIPLINES REQUIRED: ABCFG

SENIOR PARTICIPANT

SPP VALIDATION REQUIRED: ☐ Yes ☒ No

SENIOR PARTICIPANT

INITIAL APPROVAL

Name	Disciplines	Date
[illegible]	A,D,G	5-5-00
[illegible]	A,F,G	5-5-00
[illegible]	A,B,G	5-7-00
[illegible]	A,C,F,G	5-9-00

PORC Approval: DB Wrenick 5/11/00
PORC Chairman Date

AUTHORIZED FOR USE: 5/11/00
STATION MANAGER DATE

SPP NOT PERFORMED, NO REVIEW OF RESULTS REQUIRED, EXPLANATION ATTACHED.

INIT. DATE

REVIEW OF RESULTS

1. Summary of Documentation initiated (NWR,DR, PIF, None, Other).
2. Evaluation attached.

Name	Disciplines	Date

PORC Approval:
PORC Chairman Date

RESULTS APPROVED:
STATION MANAGER DATE

RECORDS COMPLETE:
PROCEDURE TRACKING CLERK
ROUTE TO CENTRAL FILE FOR MAINTENANCE

RECORDS COMPLETE:
PROCEDURE TRACKING CLERK

Exp 6/7/2003

APPROVED
JUN 28 1999
B.O.S.R.

21AA/WPP/ (098)

P-5

SPP 00-003: Byron Unit 1 AMAG Implementation Review of Results

This procedure was completed successfully. The acceptance criteria of the Instrument Maintenance procedures and work packages were met and expected results were obtained from the scaling changes.

The purpose of this procedure was to implement the use of a feedwater flow correction factor determined using the AMAG method for measurement of feedwater flow and provides a correction factor as input to the plant calorimetric program. Rescaling the necessary instrument loops was performed to ensure that the ΔT, Turbine Impulse Pressure, and T_{ref} instrument loops corresponded to the revised indication of calorimetric power. Tave was <u>not</u> adjusted in this procedure as was done for Unit 2.

The acceptance criteria were all met successfully as listed belo..

1. All individual Instrument Maintenance calibration procedure acceptance criteria were met successfully.

2. Scaling changes were completed that resulted in the following:

   a. Loop A, B, C and D ΔT indications were within 2% of calorimetric power per 1BVSR XPT-19 (Step 8.1)

   b. Turbine impulse pressure "As Left" indications for 2PT-505 and 2PT-506 were within 2% of the calculated value (Steps 6.3 and 6.6)

3. Electrical power was increased by approximately 21 MWe and all primary and secondary systems are within normal specifications as indicated by no annunciators being in the alarmed condition following the power increase.

The following observation is recorded for historical retention and could be used to improve upon any similar future procedure. This observation amounts to lessons learned and does **NOT** invalidate the results of this procedure:

> Similar to the Unit 2 installation, the AMAG correction factors were reflected in the 10 minute, 60 minute and 8 hour calorimetri power indications in concert with the implementation of the correction factor. Potential enhancements to the calorimetric program should be evaluated to determine the best method to coordinate the use of AMAG feedwater flow correction factors. Action Item # 28979 was generated from the Unit 2 implementation to track this evaluation and is applicable to Unit 1.

POOR QUALITY ORIGINAL

Test Directors:

5-19-00

Ron Niederer

Wes Scheffler

David Reidich

Byron Unit 1 AMAG Implementation

A. STATEMENT OF APPLICABILITY:

This procedure controls the sequencing and implementation of the setpoint changes necessary to increase to full power as measured by AMAG. This is expected to increase output by 15-20 mW.

The instrumentation functions requiring change are the Delta T loops and P-impluse (1PT-0505 and 1PT-0506) setpoints. After the SSCRs are implemented, the Unit will be requested to ramp up to ~99.9% to 100.0%.

B. REFERENCES:

1. Safety Evaluation 6G-00-0079
2. 1BOSR 3.1.2-1, Calorimetric Calculation Daily Surveillance
3. SSCR 00-010, Tave/Delta T Locp 1A (1RC-0411) Scaling Change
4. SSCR 00-011, Tave/Delta T Loop 1B (1RC-0421) Scaling Change
5. SSCR 00-012, Tave/Delta T Loop 1C (1RC-0431) Scaling Change
6. SSCR 00-013, Tave/Delta T Loop 1D (1RC-0441) Scaling Change
7. SSCR 00-014, P-Impulse (1PT-0505 and 1PT-0506) Scaling Change
8. BVP 800-44, Feedwater Venturi Calibration

C. PREREQUISITES:

PM 1. Reactor Power is stable. RECORD calorimetric reactor power level. 99.98 %

PM 2. Tave is within plus or minus 1°F of Tref.

PM 3. IF reactor power is not within 5% of a thermal power limit, the MW feedback loop on DEHC is selected to IN. Mark N/A if reactor power is within 5% of a thermal power limit.

D. PRECAUTIONS:

1. Follow all precautions called out in referenced instrument maintenance procedures.

2. Reactor power should be maintained constant as possible as indicated by the calorimetric.

POOR QUALITY ORIGINAL

E. LIMITATIONS AND ACTIONS:

1. If unexpected test results are obtained during the AMAG factor determination, calibration of the instrument loops, or during the plant power increase evolution, then PLACE the plant in a stable condition and consult with the Shift Manager whether to:

   - EXIT this procedure, or
   - place the procedure into a SUSPEND status.

   Additional guidance is provided for unexpected results in specific test sections.

   To EXIT the procedure, the step in effect is terminated and the test is exited. There are no required specific restoration steps in this procedure. Termination during an IM procedure will use that procedure's exiting process.

   To SUSPEND the procedure, the execution is halted at the current step. Additional evaluation may be required prior to resuming the procedure. The onsite Project Manager and Shift Manager must provide approval before resuming.

2. If unexpected plant conditions, which may or may not be caused by this procedure, are observed, then PLACE the plant in a stable condition and consult with the Shift Manager whether to:

   - exit this procedure,
   - place the procedure into a suspend status, or
   - continue.

   The Operations Department will assist in determining whether the unexpected condition is due to this procedure.

3. Communication and Shift Coverage
   - Management and Engineering personnel will provide onsite support for the performance of this procedure.

4. Utilize rod motion as necessary to maintain AFD within the target band.

5. Utilize boration and/or dilution as necessary to maintain Tave at its desired temperature.

F. MAIN BODY:

1.0 Overview

The following is a brief overview of the test sections for general information:

Section	Title
2.0	AMAG Implementation per BVP 800-44 by SED
3.0	Execution of BOP FW-25 (~100% to ~98.5% by Ops)
4.0	NIS Adjustment per 1BOSR 3.1.2-1
5.0	Delta T SSCR Implementation
5.1	DT via SSCR 00-010 on 1RC-0411 loop
5.2	DT via SSCR 00-011 on 1RC-0421 loop
5.3	DT via SSCR 00-012 on 1RC-0431 loop
5.4	DT via SSCR 00-013 on 1RC-0441 loop
6.0	P impulse via SSCR 00-014 on 1FW-0505 and 1FW-0506 loops
7.0	Power ramp from ~99.9% to ~100.0%. per 1BGP 100-3T5
8.0	Verify delta T indications with calorimetric power per 1BVSR XPT-19 and direct post test ΔI evaluation per 1BVSR 2.3.2-1

NOTE

After each section is complete, the Attachment A-Nuclear Power Parameters Adjustment Log and SSCR Updates will be updated to provide Operations with a shift to shift turnover of the current plant status.

2.0 AMAG Implementation per BVP 800-44

AM 2.1 VERIFY SED has performed BVP 800-44.

3.0 BOP FW-25 Implementation

AM 3.1 RECORD initial calorimetric power (U0923 or U0925)
Calorimetric power 99.98 from U0923

AM 3.2 REQUEST Operations to PERFORM BOP FW-25 to update the plant process computer calorimetric constants with the new AMAG values obtained from step 2.1.

AM 3.3 VERIFY power indication changes as expected following the installation of the AMAG correction factors by RECORDING calorimetric power.
Ten minute calorimetric power 98.30 %

AM 3.4 VERIFY the change in calorimetric power is between 1% and 2% by SUBTRACTING step 3.1 from 3.3.
IF outside this range, engineering must evaluate continued performance of this procedure.
Power Change 1.68 %

AM 3.5 INFORM Shift Supervision that reactor power should not be increased above the value in step 3.3, except when directed by this SPP or Shift Manager. Shift Supervision shall discuss this requirement during shift turnover.

AM 3.6 Update the Attachment A-Nuclear Power Parameters Adjustment Log and SSCR Updates Log.

4.0 NIS Adjustment per 1BOSR 3.1.2-1

AM 4.1 REQUEST Operations to perform 1BOSR 3.1.2-1 to normalize the nuclear instrumentation to the AMAG adjusted calorimetric power indication.

AM 4.2 VERIFY 1BOSR 3.1.2-1 is complete.

AM 4.3 Update the Attachment A-Nuclear Power Parameters Adjustment Log and SSCR Updates Log.

5.0 ΔT Scaling SSCR Implementation

PM 5.0.1. Verify HLA completed for the evolutions performed under this SPP.

NOTE

Steps F.5.1 through F.5.4 may be performed in any order but only one at a time.

5.1 Loop 1RC-0411 -Delta T Instrumentation

PM 5.1.1 Verify no OTΔT or OPΔT channels are in the trip condition.

PM 5.1.2 Perform the necessary steps of WR990164867 and BISR 3.1.10-200, Surveillance Calibration of Delta T and TAVE Protection loop, to calibrate the Loop 1RC-0411.

PM 5.1.3 Verify Loop 1A Tave/Delta T Protection Loop restored to service per WR990164867.

¢ PM 5.1.4 Verify Loop 1A delta T indication agrees within plus or minus 2% of calorimetric power.

Delta T 98.5 % Calorimetric power 98.3 %

IF outside this range, evaluate the Delta-T scaling and the calorimetric calculation to determine the cause of the difference.

PM 5.1.5 Update the Attachment A-Nuclear Power Parameters Adjustment Log and SSCR Updates Log.

5.2 Loop 1RC-0421 -Delta T Instrumentation

PM 5.2.1 Verify no OTΔT or OPΔT channels are in the trip condition.

PM 5.2.2 Perform the necessary steps of WR990164868 and BISR 3.1.10-200, Surveillance Calibration of Delta T and TAVE Protection loop, to calibrate the Loop 1RC-0421

PM 5.2.3 Verify Loop 1B Tave/Delta T Protection Loop restored to service per WR990164868.

¢ PM 5.2.4 Verify Loop 1B delta T indication agrees within plus or minus 2% of calorimetric power.

Delta T 98.4 % Calorimetric power 98.3 %

IF outside this range, evaluate the Delta-T scaling and the calorimetric calculation to determine the cause of the difference.

AM 5.2.5 Update the Attachment A-Nuclear Power Parameters Adjustment Log and SSCR Updates Log.

5.3 Loop 1RC-0431 -Delta T Instrumentation

AM 5.3.1 Verify no OTΔT or OPΔT channels are in the trip condition.

AM 5.3.2 Perform the necessary steps of WR990164869 and BISR 3.1.10-200, Surveillance Calibration of Delta T and TAVE Protection loop, to calibrate the Loop 1RC-0431.

AM 5.3.3 Verify Loop 1C Tave/Delta T Protection Loop restored to service per WR990164869.

AM 5.3.4 Verify Loop 1C delta T indication agrees within plus or minus 2% of calorimetric power.

Delta T 98.6 % Calorimetric power 98.3 %
IF outside this range, evaluate the Delta-T scaling and the calorimetric calculation to determine the cause of the difference.

AM 5.3.5 Update the Attachment A-Nuclear Power Parameters Adjustment Log and SSCR Updates Log.

5.4 Loop 1RC-0441 -Delta T Instrumentation

AM 5.4.1 Verify no OTΔT or OPΔT channels are in the trip condition.

AM 5.4.2 Perform the necessary steps of WR990164870 and BISR 3.1.10-200, Surveillance Calibration of Delta T and TAVE Protection loop, to calibrate the Loop 1RC-0441.

AM 5.4.3 Verify Loop 1D Tave/Delta T Protection Loop restored to service per WR990164870.

AM 5.4.4 Verify Loop 1D delta T indication agrees within plus or minus 2% of calorimetric power.

Delta T 98.6 % Calorimetric power 98.3 %
IF outside this range, evaluate the Delta-T scaling and the calorimetric calculation to determine the cause of the difference.

AM 5.4.5 Update the Attachment A-Nuclear Power Parameters Adjustment Log and SSCR Updates Log.

6. Turbine Impulse Scaling Changes

5/18/00

LY 6.1 Perform the necessary steps of WR990164871 to calibrate Turbine Impulse Pressure Transmitter 1PT-0505 after SSCR 00-014.

LY 6.2 Verify scaling changes to 1PT-0505 have been completed under WR990164871 and Update the Attachment A-Nuclear Power Parameters Adjustment Log and SSCR Updates Log.

¢ LY 6.3 Verify Turbine Impulse Power from 1PI-0505 or process computer point P0398 agrees within plus or minus 2% of calorimetric power.

Turbine Power 98.2 % from indicator P0398
Calorimetric power 98.8
IF outside this range, evaluate the Turbine Impulse scaling and the calorimetric calculation to determine the cause of the difference.

LY 6.4 Perform the necessary steps of WR990164872 to calibrate Turbine Impulse Pressure Transmitter 1PT-0506 after SSCR 00-014.

LY 6.5 Verify scaling changes to 1PT-0506 have been completed under WR990164872 and Update the Attachment A-Nuclear Power Parameters Adjustment Log and SSCR Updates Log.

¢ LY 6.6 Verify Turbine Impulse Power from 1PI-0506 or process computer point P0399 agrees within plus or minus 2% of calorimetric power.

Turbine Power 98.5 % from indicator P0399
Calorimetric power 98.3%
IF outside this range, evaluate the Turbine Impulse scaling and the calorimetric calculation to determine the cause of the difference.

6.7 VERIFY proper the Tref value by performing the following steps:

NOTE

1PT-0505 should be used for the following indication, if 1PT-0505 is defeated, 1PT-0506 should be used.

LY 6.7.1 From the controlling turbine first stage impulse pressure, RECORD the indicated Turbine power from 1PI-0505 or 1PI-0506 or process computer points P0398 or P0399.

98.2 %

4 6.7.2 CALCULATE the new Tref value from the following equation:

New Tref = (98.2 % * 25.5 °F)/100% + 557 °F
Step 6.7.1

New Tref = 582.0 °F

4 6.7.3 RECORD the indications for Tref:

Tave/Tref Recorder (2TR-0412) 581.3 °F
Iconic Display/Computer RE T0496 581.4 °F

¢ 4 6.7.4 VERIFY the indications for Tref from Step 6.7.3 are approximately equal to the calculated Tref from Step 6.7.2.

NOTE

IF the indications for Tref do not match what is expected (±1 °F), do not continue with this procedure until the problem is resolved.

7.0 Power ramp from ~98.5 to ~99.9 + 0.1 % per 1BGP 100-3T5

7.1 RAMP unit up in power, until 10 min calorimetric indicates ~99.9% to 100.0%, per 1BGP 100-3T5 or as directed by the Unit Supervisor.

8.0 Verify Power indications

8.1 PERFORM 1BVSR XPT-19.

8.2 Record the following indications for as-left values at the completion of this SPP. Evaluate any significant inconsistencies in the test evaluation.

Calorimetric Power:	U0923	99.94		
Loop A Delta-T:	U0403	100.1	MCB	100.5
Loop B Delta-T:	U0423	99.9	MCB	99.5
Loop C Delta-T:	U0443	100.4	MCB	100
Loop D Delta-T:	U0463	100.3	MCB	100
NIS Channel 41:	N0049	100.1	1PM07J	100
NIS Channel 42:	N0050	99.7	1PM07J	100
NIS Channel 43:	N0051	100.1	1PM07J	100
NIS Channel 44:	N0052	99.3	1PM07J	99.8
Turb Imp Press 505:	P0398	100.3	MCB	100
Turb Imp Press 506:	P0399	100.7	MCB	100
RCS Tref:	T0496	581.9	MCB	581.8
RCS Tavg:	U0484	581.3		
Elec Mwe	G2800	1206		

8.3 REQUEST Reactor Engineering to perform 1BVSR 2.3.2-1. After adequate stabilization time to determine new delta I targets if necessary.

8.3 EXIT this SPP by notifying Shift Manager of its completion.

Shift Manager Signature _____

G. ACCEPTANCE CRITERIA:

1. The Acceptance Criteria for the individual Instrument Maintenance calibration procedures shall be met.

2. Scaling changes result in expected changes in Tref and Pressurizer level program:
   - 2.1 Loop A,B,C,and D Delta-T indication within 2% of calorimetric power per 1BVSR XPT-19.
   - 2.2 Turbine impulse pressures (1PT-505 and 1PT-506) are within 2% of calorimetric power.

3. Electrical power output has increased, the primary and secondary systems are within normal specifications as demonstrated by having no annunciators lit on any of the Main Control Room panels after the power increase.

POOR QUALITY ORIGINAL

SIGNIFICANT EVENTS LOG (page 1 of 3

NOTE: During power ascension, monitoring of the secondary systems will be provided by the annunciator system. All alarms and actions must be recorded in this significant event log. The annunciator system will assure that the supporting secondary systems will not be exposed to operating conditions beyond their design limits for 100% Unit capacity.

TIME:	DESCRIPTION:
0006 5-18-00	Start HLA briefing for SPP 00-003
0040	HLA Briefing complete - no unresolved issues. Thunderstorm activity will be monitored by SR (J. Printz) & Sr. Mgr (Dave Wozniak)
0122	Calorimetric program results reflect new FW multipliers (See Op Aid 2000-02) Based on the "new" calorimetric result, Operations will limit Unit 1 power to 98.30%
0145	Completed 1BOSR 3.1.2-1 for the NIS channels to new calorimetric powers - Step 4 complete
0149	IMs start Loop 1A Delta-T/Tang instrument Loop
0232	IM's restored Loop 1A Delta T. Paper close out in progress

	Meter	Computer T0403
BEFORE	100.5	99.8
After	99	98.5

Loop ΔT indications as expected

0239	Loop 1A PMT completed & WR 990164867 closed out IMs start Loop 1B Delta-T Loop
0310	IMs restored Loop 1B ΔT

	meter	Computer T0423
Before	99	99.7
after	97.5	98.4

Loop 1B ΔT indications as expected

0315	Loop 1B PMT completed & WR 990164868 closed out IMs Start Loop 1C ΔT loop
0344	IM's restored Loop 1C ΔT

	meter	Computer T0~~403~~ 443
Before	100.5	101.1
After	98.5	98.6

Loop 1C ΔT indications as expected

0351	Loop 1C PMT completed & WR 990164869 closed out. IM's start Loop 1D ΔT loop
0418	IMs restored Loop 1D ΔT

	meter	Computer T0403
Before	99.5	99.5
After	98.5	98.6

POOR QUALITY ORIGINAL

SIGNIFICANT EVENTS LOG (page 2 of 3

NOTE: During power ascension, monitoring of the secondary systems will be provided by the annunciator system. All alarms and actions must be recorded in this significant event log. The annunciator system will assure that the supporting secondary systems will not be exposed to operating conditions beyond their design limits for 100% Unit capacity.

TIME:	DESCRIPTION:
0421	Loop 1D PMT complete & WR 990164870 closed out.
↓	All ΔT Scaling Complete SAT Step 5 complete
0715	RIN Turnover to W. Schaffler
0951	PRE-JOB BRIEF COMPLETE FOR SECTION 6.0
0957	ENTERED SECTION 6.0
1127	STEPS 6.1, 6.2, 6.3 SIGNED OFF. 1PT-0505 COMPLETE
1339	STEPS 6.4, 6.5, 6.6, 6.7.1, 6.7.2, 6.7.3, 6.7.4 SIGNED OFF.
1349	SECTION 6.0 COMPLETE. SECTION 7.0 ENTERED
1401	WR FOR 1PT-0506 PMT SIGNED OFF.
1404	RAMPING Up in MegaWatts - START 1185 MW on Q2800
1431	Stepped CBD to 221 steps during ramp.
1449	Stepped CBD to 222 step during ramp.
1557	Unit AT 99.43% - 1205 MW - SIGNED OFF STEP 7.
2200 ~~2260~~	Started Step 8.1, 1BUSR XPT-19
2320	1BUSR XPT-19 Complete SAT
2340	Completed review of as-left values. These

POOR QUALITY ORIGINAL

SIGNIFICANT EVENTS LOG (page 3 of 3

NOTE: During power ascension, monitoring of the secondary systems will be provided by the annunciator system. All alarms and actions must be recorded in this significant event log. The annunciator system will assure that the supporting secondary systems will not be exposed to operating conditions beyond their design limits for 100% Unit capacity.

TIME:	DESCRIPTION:
2340-cont.	are no significant inconsistencies noted from the indications. Q2800 MWe output = 1206
2340	Reactor Engineering (self) notified to evaluate if new ΔI targets will be necessary and update per 1BVSR 2.3.2-1 if necessary.
↓	With the ramp up in power, a ΔI oscillation was initiated. The need for new targets will be determined ~24 hours after oscillation is dealt with – ~3 days from now
2352 5/18/00	Shift Manager, Jim Printz, notified that this SPP was completed & he signed Step 8.3
	All Steps ARE COMPLETE – SPP 00-003 Complete

COORDINATION

POOR QUALITY ORIGINAL

Attachment A-Nuclear Power Parameters Adjustment Log and SSCR Updates

Parameters		SPP Step Number	Value End	Verified Complete (Initials/Date/Time)
K Values	K130	BOP FW-25	0.9813	PM 5-18-00 0104
	K131	BOP FW-25	0.9798	PM 5-18-00 0105
	K132	BOP FW-25	0.9883	PM 5-18-00 0105
	K133	BOP FW-25	0.9833	PM 5-18-00 0106
Calorimetric Software		BOP FW-25	98.30	PM 5-18-00 0122
Nuclear Instrumentation				
	NIS 41	1BOSR 3.1.2-1	98.3	PM 5-18-00 0140
	NIS 42	1BOSR 3.1.2-1	98.4	PM 5-18-00 0140
	NIS 43	1BOSR 3.1.2-1	98.3	PM 5-18-00 0142
	NIS 44	1BOSR 3.1.2-1	98.2	PM 5-18-00 0143
DT	Loop A		98.5	PM 5-18-00 0232
	Loop B		98.4	PM 5-18-00 0310
	Loop C		98.6	PM 5-18-00 0344
	Loop D		98.6	PM 5-18-00 0420
P impulse	1FW-505		98.2	LR 5-18-00 1117
	1FW-506		98.2	LR 5-18-00

Plant = Byron 1 , Mode = Real

TIME \ POINT	U0923	T0403	T0423	T0443	T0463	N0049	N0050	N0051	N0052	P0398	P0399	T0496	U0484	Q2800
05/18/2000 21:58	99.96	100.45	100.26	100.44	100.43	100.19	99.73	100.06	99.45	100.29	100.66	581.90	581.34	1206.65
05/18/2000 21:59	99.94	99.79	99.79	100.45	100.08	100.11	99.78	100.00	99.42	100.30	100.69	581.90	581.32	1204.77
05/18/2000 22:00	99.94	100.42	100.06	100.45	100.14	100.06	99.83	100.09	99.26	100.31	100.71	581.90	581.30	1207.62
05/18/2000 22:01	99.90	100.03	99.65	100.45	100.42	100.09	99.55	100.00	99.25	100.31	100.67	581.90	581.33	1208.20
05/18/2000 22:02	99.90	100.48	100.16	100.45	100.17	100.13	99.67	100.11	99.38	100.33	100.69	581.90	581.34	1206.65
05/18/2000 22:03	99.94	100.10	100.12	100.46	100.25	100.11	99.69	100.05	99.37	100.28	100.66	581.90	581.29	1204.77
05/18/2000 22:04	99.96	99.85	99.73	100.45	100.40	100.13	99.48	100.10	99.18	100.31	100.69	581.89	581.29	1206.18
05/18/2000 22:05	99.93	100.02	99.73	100.45	100.27	100.06	99.42	100.16	99.35	100.30	100.68	581.90	581.33	1206.14
05/18/2000 22:06	99.93	100.25	99.60	100.46	100.41	100.19	99.74	100.17	99.33	100.29	100.68	581.90	581.32	1205.39
05/18/2000 22:07	99.96	99.90	99.94	100.44	100.09	100.10	99.75	100.17	99.36	100.32	100.68	581.90	581.30	1206.76
Averages =	99.94	100.13	99.91	100.45	100.27	100.12	99.66	100.09	99.34	100.30	100.68	581.90	581.31	1206.31

OP-AA-101-403.01
OPERATOR AID REVIEW AND APPROVAL

Rev # 3 Op Aid # 2000-0002

Operator Aid Title: **Unit 1 FW Flow Constants**

Permanent Sign/Label Required: ☐ Yes ☑ No If Yes, Label Request Submittal Date:

Description / Use (include primary posting locations):

Unit 1 Feedwater Flow Calibration Multiplier Constants

"A" S/G	K8130	0.9813	Emergency Value	1.0
"B" S/G	K8131	0.9798	Emergency Value	1.0
"C" S/G	K8132	0.9883	Emergency Value	1.0
"D" S/G	K8133	0.9833	Emergency Value	1.0

Control of the Unit 1 Feedwater Flow Calibration Multiplier Constants

The Feedwater Flow Calibration Multiplier constants are calculated by Procedure BVP 800-44, "Feedwater Venturi Calibration Unit 1 and 2". This procedure collects Feedwater flow data from the installed Venturi elements and the Feedwater ultrasonic flow instrument. Using this data, BVP 800-44 calculates new FW Flow Calibration Multiplier Factors, updates this operator aid and requests the performance of BOP FW-25 to change the constants in the Plant Process Computer.

Venturi De-Fouling

The FW Flow Calibration Multiplier Constants have been created due to calculated FW venturi flows that are higher than actual. The cause of this is assumed to be Feedwater Venturi throat fouling. Any event which may cause this material to shed (de-fouling) may result in an over power condition when using Calibration Multiplier Factors other than 1.0. Therefore, if the Shift Supervisor believes De-Fouling has occurred, as indicated by an unexplained decrease in calorimetric power or unexplained increase in main generator output, they are authorized to line through the Calibration Multipliers listed below and use a value of 1.0 (the Emergency value). In so doing, they must also set K8130, K8131, K8132 and K8133 on the Plant Process Computer to 1.0, make an entry in the Operators Log and contact System Engineering as soon as practical for further evaluations. Entering a value of 1.0 returns all Calorimetric Feedwater flow calculations to the as built Venturi conditions.

	(Print)	(Signature/Date)
Preparer's Name:	Eder David C	
Department Head Approval:	Grundmann William E	5/17/00
Shift Manager Approval:	James W. Printz	5-17-00

Review Items (Unit Supervisor, or designee):

- Was it prepared on a computer?
- Does this Operator Aid replicate information from a procedure?
- Should this be incorporated into a procedure?
- Could it be eliminated with better labeling or a placard?

POOR QUALITY ORIGINAL

Attach this form to the original Operator Aid placed in the WEC Book. Copies shall be made and distributed as appropriate. The database shall be updated with the location of all posted copies to allow audits to be completed in a timely manner.

OP-AA-101-404.02
UNIT 1 STANDING ORDER

TOPIC/SYSTEM: AMAG FW Flow Measurement

1. Log Number: 00-48

2. Effective Date: 05/17/00 Termination Date: 06/17/00

Termination dates are when the Standing Order will no longer be valid (if known) or a date specified by the SOS/.

3. Instructions or Information of the Standing Order or Special Operating Order:
See attached information regarding AMAG on U1.

(If more space is needed a sheet may be attached to this Attachment for additional space.)

4. Approval: [signature] 5/17/00
Operations Manager/designee Date

5. Distribution:

	Book #
Shift Manager	1
Records Management (original)	2
Operations Training	3

POOR QUALITY ORIGINAL

6. Actual Termination Date _____
on orders of/Reason
_____

Operations Manager/designee Approval_____

Appropriate Copies Removed_____

RETURN COMPLETED ATTACHMENT TO RECORDS MANAGEMENT FOR RETENTION

Unit 1 Setpoint/Scaling Changes (SSCRs) Required To Use AMAG Feedwater Flow Element Correction Factors in Calorimetric Program

The decision has been made to implement use of the "AMAG" (Advanced Measurements and Analysis Group) Ultrasonic Feedwater Flow Element correction factors as input to the calorimetric power program. This evolution was recently completed for Unit 2, which also included a reduction of Tave/Tref from 583.0 F to 582.5 F. Unit 1 operating RCS temperature program will not be changed with AMAG implementation like on Unit 2 due to differences between Unit 1 and Unit 2 Steam Generators.

SPP 00-003 (Unit 1 AMAG Implementation) has been written to sequence the implementation of these SSCRs and to assure plant conditions and controls are appropriate to allow calibration of the applicable instrumentation while on-line. The following is an overview of this SPP.

The following is a brief overview of SPP 00-003 test sections:

1. Determine feedwater flow multiplier constants for AMAG Implementation per BVP 800-44 performed by SED. Op Aid issued with new constants.

2. Execute BOP FW-25 to enter the new flow multiplier constants into the PPC (Calorimetric Power indication will decrease from ~100 % to ~98.5 % by Ops). Power will only be increased above this new calorimetric value under the guidance of this SPP.

3. NIS Adjustment per 2BOSR 3.1.2-1 (NIS power to read ~98.5%)

4. T_{AVE}/ΔT Protection Loops (SSCR 00-010 through SSCR 00-013):

   RCS Loop ΔT indications will be scaled down from ~100% to ~98.5% due to the decrease in indicated calorimetric power from ~100% to ~98.5% after the AMAG correction factors are installed. These changes will be made to the 1A, 1B, 1C, and 1D T_{AVE} ΔT protection loops.

5. Turbine Impulse Pressure Transmitter Rescaling (SSCR 00-014):

   The Turbine Impulse Pressure Power Transmitters (1PT-0505/1PT-0506) will be rescaled in order to better match the new indicated calorimetric power after AMAG correction factors are installed.

6. Power ramp up to ~100% per BGP 100-3T5

7. Verify Delta T indications agree with calorimetric power per 1BVSR XPT-19

8. Direct post test evaluation per 1BVSR 2.3.2-1 (outside of SPP). Expect ΔI to change slightly. Evaluate need for new targets after 1-3 days of operation.

POOR QUALITY ORIGINAL

Byron Unit 1 AMAG Status Log

Date	Time	Prepared by	Status
5/18/00	0006	Ron Niederer	Start HLA briefing for SPP 00-003 on Unit 1 AMAG implementation
	0040	RJN	HLA Briefing complete- no unresolved issues Some discussion on the possible impact of thunderstorm activity in the area. Conditions are relatively quiet but will be monitored by the Shift Manager (Jim Printz) and Senior Manager (Dave Wozniak).
	0045	RJN	Signed into SPP-00-003
	0122	RJN	Calorimetric program results reflect new feedwater multipliers. Based on the "new" calorimetric result, Operations will limit Unit 1 power output to 98.30% until increased by SPP 00-003.
	0145	RJN	Completed 1BOSR 3.1.2-1 for the NIS channel adjustments to the new calorimetric power levels.
	0149	RJN	IMs start Loop 1A Delta-T/Tavg instrument loop
	0232	RJN	IMs restored Loop 1A ΔT/Tavg instrument loop. Paper closeout in progress. Loop ΔT indications as expected.
	0239	RJN	Loop 1A PMT completed and WR 990164867 closed out. IMs start Loop 1B Delta-T/Tavg instrument loop.
	0310	RJN	IMs restored Loop 1B ΔT/Tavg instrument loop. Paper closeout in progress. Loop ΔT indications as expected.
	0315	RJN	Loop 1B PMT completed and WR 990164868 closed out. IMs start Loop 1C Delta-T/Tavg instrument loop.
	0344	RJN	IMs restored Loop 1C ΔT/Tavg instrument loop. Paper closeout in progress. Loop ΔT indications as expected.
	0351	RJN	Loop 1C PMT completed and WR 990164869 closed out. IMs start Loop 1D Delta-T/Tavg instrument loop.
	0418	RJN	IMs restored Loop 1D ΔT/Tavg instrument loop. Paper closeout in progress. Loop ΔT indications as expected.
	0421	RJN	Loop 1D PMT completed and WR 990164870 closed out. All Delta-T re-scalings are complete for Unit 1
			Equipment preparation in progress for Turbine impulse pressure re-scalings
	0700	RJN	Turnover to Wes Scheffler
	0951	WES	Pre-job completed for section 6.0
	0957	WES	Entered section 6.0
	1127	WES	1PT-0505 completed. Steps 6.1 to 6.3 signed off.
	1339	WES	Section 6.0 complete. 1PT-0506 completed.
	1404	WES	Started ramp per section 7.0
	1431	WES	Stepped CBD to 221 steps during ramp.
	1449	WES	Stepped CBD to 222 steps during ramp.
	1551	WES	Unit at 99.93% at 1205 MW-gained apx. 20 MW.
	1630	WES	Turned over to Mike Schlagel
	2150	RJN	Turnover to Ron Niederer
	2200	RJN	Started 1BVSR XPT-19
	2320	RJN	1BVSR XPT-19 completed SAT
	2340	RJN	Completed review of as-left values. There are no significant

			inconsistencies noted. All are within 1% of nominal 100% power expected values. Computer point Q2800 indicates 1206 MWe. Reactor Engineering notified to evaluate and determine new ΔI targets if necessary after adequate stabilization time. Based on the oscillation initiated with the power ramp, at least 2-3 days will be required to obtain acceptable data.
5/18/00	2352	RJN	Shift Manager, Jim Printz, was notified that all steps in SPP 00-003 were complete, the acceptance criteria were met, and that this procedure was being exited. The Unit Supervisor and NSO were similarly notified.

AMAG SHIFT TURNOVER
Unit 1

From 1530 (Time) 5/17/00 (Date) To 2300 (Time) 5/17/00 (Date)

Major Items Completed this Shift:

Issued Standing Order 00-048 for SPP 00-048

Significant Problems:

No specific training will be given per P. Knarr.

To Do:

✓ See coverage sheet ① S. Gackstetter is "Mgmt" oversite on 5/18, 5/19 (days). ② No Test Director on 5-18 afternoon shift.

✓ HLA/Brief for SPP 00-003 → Install AMAG factors

✓ Rescale ΔT/Tave loops

Critique Items:

Off Going Shift Lead [signature] On Going Shift Lead [signature]

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AMAG SHIFT TURNOVER
Unit 1

From 2300 (Time) 5/17/00 (Date) To 0700 (Time) 5/18/00 (Date)

Major Items Completed this Shift:

HLA
BOP-GW-25 to install new constants - Limit = 98.30 %
1BVSR 3.1.2-1 to Align NIS channels
All 4 ΔT channels rescaled

Significant Problems:

none

To Do:

Next Steps - Brief w/ Ops & IM's &
rescale P505 & 506

Critique Items:

Off Going Shift Lead [signature] On Going Shift Lead [signature]

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AMAG SHIFT TURNOVER

Unit 1

From 0700 (Time) 7/18/00 (Date) To 1530 (Time) 7/18/00 (Date)

Major Items Completed this Shift:

SECTIONS 6.0 & 7.0

POWER - 1205 MW @ 99.93 % POWER

Significant Problems: NONE - NO ALARMS

To Do:

SECTION 8.0 (1BVSR XPT-19)

Critique Items: NONE

Off Going Shift Lead [signature]

On Going Shift Lead [signature]

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