

ENTERGY INDIAN POINT NUCLEAR STATION UNIT 2

CONCEPTUAL DESIGN PACKAGE For

SAMA IP2-009

Install a Reactor Cavity Flooding System

Preparec	the Bitlacerol.	Approved by:
Date:	9-20-2012	Date: 9 - 20 - 20 - 6

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1.0 ISSUE

Severe Accident Mitigation Alternative (SAMA) IP2-009:

Install a Reactor Cavity Flooding System

2.0 BACKGROUND

In accordance with NRC environmental regulations in 10 C.F.R. Part 51, Entergy performed SAMA analyses for both Indian Point Nuclear Generating Units 2 and 3 as part of its license renewal application. Those analyses identified a number of potentially cost-beneficial SAMAs for each unit. In its license renewal application and related correspondence with the NRC Staff, Entergy indicated that it would submit the potentially cost-beneficial SAMAs for further internal engineering project cost-benefit analysis, even though none of the potentially cost-beneficial SAMAs is related to aging management under 10 C.F.R. Part 54. Entergy contracted RCM Technologies to assist it in this effort.

This package provides a conceptual design and implementation cost estimate for SAMA IP2-009 in accordance with Entergy design engineering practices.

For SAMA IP2-009, resolution is required to reduce potential containment damage as a result of concrete-core interaction from molten debris following core damage and vessel failure.

This package will provide an installation using a standby pump and fire water to flood the reactor cavity in the event this emergent action is necessary.

The design considerations that follow will address the adequacy of the proposed resolution and the basis for the recommendation to resolve the identified potential issue.

The recommended solution will include descriptive details of the proposed design change and also conceptual design sketches as required. These descriptive details, sketches, and the preliminary material list provide the basis for initiating the all-inclusive conceptual cost estimate for engineering change (EC) development and implementation at the Station.

3.0 EXISTING CONDITIONS

IP2 does not contain a reactor cavity flooding system specifically designed to protect the containment structure from the impact of molten debris resulting from core damage and vessel failure.

A permanently installed and readily available core cavity flooding mechanism would serve to limit damage to the containment's integrity. There is a fire water supply header routed underground in an area near the Fuel Storage Building that can be utilized for this purpose. In addition, the Hudson River is a source for a backup water supply that is also available. The proposed design will provide an alternative connection so that this option can be utilized if needed.

5.0 CONFIRMATION OF DESIGN

The existing fire water supply header near the Fuel Storage Building area can be accessed and connected to a pump for flooding the containment. Calculations will be performed to verify the proposed 1000GPM pump flow rate is adequate

The new pump will be permanently installed with a suction connection from the underground fire water supply piping. Also, an additional connection will be provided on the suction line to allow for an alternate water source such as the Hudson River.

The pump will be diesel-driven to further ensure availability in the event of station blackout. The pump and a small diesel fuel oil day tank (with supply capacity to operate 72 hours) will be installed in a new outdoor weather proof enclosure in the immediate area of the Fuel Storage Building.

The discharge of the pump will be connected to piping routed to Penetration #U-U in the containment structure, an elevation suitable for flooding the reactor cavity. A permanent Containment Isolation Valve (CIV) will be installed at this penetration. In support of this new configuration, the appropriate analysis and Technical Specification/FSAR changes to make this addition will be provided.

Heat tracing, if required for any outdoor piping, will need to be provided.

6. RECOMMENDED SOLUTION

1. Diesel-Driven Pump

Outdoors in the area of the Fuel Storage Building Area provide for the installation of the diesel-driven backup pump.

- At the southeast corner, install a concrete pad for mounting the pump and its weather proof enclosure.
- Mount and permanently install the pump.
- Install the weatherproof enclosure.
- Excavate and modify the fire water line with a tie-in of required valves and new pipe routed to the pump's suction connection.
- Construct an oil spill containment berm around the weatherproof enclosure.
- Route and install conduit and cable and terminate from distribution cabinet to enclosure to provide electrical power required for heating, ventilation, lighting and heat tracing.
- 2. Piping Connection to Containment

From the pump's discharge connection, install required valves and new pipe routed to the containment piping penetration U-U at Elevation 56' -6" (Figures 1 and 1A).

- 3. Install required pipe supports
- 4. Provide heat tracing and insulation for any outdoor pump supply header piping.
- 5. Provide procedures and training to operate, test, and perform maintenance on the components of the newly installed system.



7.0 PRELIMINARY MATERIAL LIST - Mechanical

Ite	m Description	<u>Quantity</u>
1.	8" - 150# Check Valve, Butt Weld, C.S., A216-WCB, Mfr. VELAN or equal	2
2.	6" - 150# Check Valve, Butt Weld, C.S., A216-WCB, Mfr. VELAN or equal	1
3.	8" - 150# Gate Valve, Butt Weld, C.S., A216-WCB, Mfr. VELAN or equal	2
4.	6" - 150# Gate Valve, Butt Weld, C.S., A216-WCB, Mfr. VELAN or equal	3
5.	1" - 3000# Globe Valve, Socket Weld, C.S., A216-WCB, Mfr. VELAN or equal	1
6.	Pump, 1000GPM, Self-Contained Diesel-Driven Skid with Industria Weatherproof Enclosure (detailed specification to follow)	1
7.	Day Tank, diesel fuel oil storage (72 Hour capacity)	1
8.	8" Schedule 40 Seamless pipe, Carbon Steel, A-106 Grade B	200 Feet
9.	6" Schedule 40 Seamless pipe, Carbon Steel, A-106 Grade B	30 Feet
10.	1" Schedule 40 Seamless pipe, Carbon Steel, A-106 Grade B	5 Feet
11.	3/4" Schedule 40 Seamless pipe, Carbon Steel, A-106 Grade B	10 Feet
12.	6" Schedule 40 B.W. Tee, A-106 Grade B	2
13.	6" 150# R.F. WN Flange, A-106 Grade B	3
14.	6" 150# R.F. Blind Flange, A-106 Grade B	2
15.	3/4" - 3000# Globe Valve, Socket Weld, C.S., A216-WCB,	4

DCM	Tachnologias	ENTERGY	Conceptual Design	
KCIVI	rechnologies	Indian Point Nuclear Station	Package	
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8.0 PRELIMINARY MATERIAL LIST – Electrical/Instrumentation

1.	1" – Conduit and Supports	200 Feet
2.	120 VAC – 3/c Power Cable	200 Feet
3.	3/4" Stainless Steel tubing	40 Feet
4.	Pressure Gauge	2
5.	Differential Pressure Gauge	1

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Attachment 1

Entergy Impact Screening Summary



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ATTACHMENT 9.3

IMPACT SCREENING SUMMARY

SHEET 1 OF 6

INSTRUCTIONS:

Identify the potentially impacted and the unaffected areas by checking the appropriate **Yes** or **No** block on the Impact Screening Criteria.

If a direct determination cannot be made based on the impact screening questions, the detailed questions in Attachment 9.4 may be used to identify potential impacts.

The completion of detailed questions in Attachment 9.4 is recommended but not required.

Contact potentially impacted groups if assistance is required.

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Engineering Change No.: <u>TP2-009</u>	Rev. No.:	DESIGN	PKG

Prepared by:

Date: _

DESIGN ENGINEERING DISCIPLINES		al Impact
 Civil / Structural Design Engineering Does the proposed activity involve any civil / structural (including seismic) design changes, activities or affect coatings? OR Does the proposed activity involve any piping engineering design changes or activities? 	YES	□ NO
 Electrical Design Engineering Does the proposed activity involve any station or switchyard electrical design, large power transformers, or settings changes or activities? (SOER 10-1) 	YES	
Instrumentation and Controls Design Engineering Does the proposed activity involve any I&C design or settings changes or activities?	YES	
 Mechanical Design Engineering Does the proposed activity add/remove/replace insulation, aluminum or other metallic/non-metallic sources of debris in the reactor/containment building or involve any mechanical design changes or activities? 	YES	□ NO
 PSA Engineering Does the proposed activity impact or involve changes to plant evaluations or probabilistic safety assessments? Does the proposed activity impact or involve changes to the Emergency Operating Procedures, Abnormal Operating Procedures, or Severe Accident Procedures or does it add, remove or modify SSCs included in a Maintenance Rule function? 	YES 🖬	□ NO
 Nuclear Analysis Does the proposed activity impact or involve changes to plant evaluations, Technical Specifications, Technical Requirements Manual, or require a full 50.59 Evaluation? 	☐ YES	⊠ NO
 FERC / NERC Impact Does the proposed activity impact or involve change to FERC / NERC or Regional Entity compliance documents? (ex. MOU, ENN/ENS-PL-158, ENS-DC-199, etc.) 	☐ YES	X NO



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IMPACT SCREENING SUMMARY

ATTACHMENT 9.3

Sheet 2 of 6

DESIGN ENGINEERING PROGRAMS		Impact
 ASME Section III Specifications Does the proposed activity add, delete, or modify information required by ASME Section III to be contained in a design specification? 	YES	
 Cable and Raceway Program Does the proposed activity involve any changes to cable trays, raceways or the associated documentation? 	YES	
Electronic Databases (EDB) Does the proposed activity involve any changes to electronic databases?	TES	
 EQ Program (10CFR50.49, NUREG 0588, Reg Guide 1.89) Does the proposed activity involve any new or existing EQ components? 	YES	
 Hydrogen Control Program (10 CFR 50.44) (<i>if applicable</i>) Does the proposed activity impact equipment or materials related to hydrogen control? 	T YES	₩мо
 Human Factors Program Does the proposed activity involve control panel design including layout and labeling, visual displays, operator aids, auditory signals or environment in the control room, cable spreading room, and other control panel locations? 	T YES	⊠ NO
 Margin Management Does the proposed activity impact or involve any change to design, licensing or operations margins? 	YES	
 Reg. Guide 1.97 / PAM (Post Accident Monitoring) Does the proposed activity involve Reg. Guide 1.97 (Post Accident Monitoring) Indications? 	Tes 🗌	Ж NO

MAINTENANCE		Potential Impact	
Electrical Maintenance Does the proposed activity require an Electrical Maintenance review to identify affected procedures, required actions and required training?			
 I&C Maintenance Does the proposed activity require an I&C Maintenance review to identify affected procedures, required actions and required training? 			
Mechanical Maintenance Does the proposed activity require a Mechanical Maintenance review to identify affected procedures, required actions and required training?	YES		

NUCLEAR ENGINEERING		Potential Impact	
 Nuclear Fuel Design Does the proposed activity impact or involve the design, performance or storage of nuclear fuel? 	TYES	Мио	
 Reactivity Management Program Does the proposed activity impact or involve the reactor system, reactor controls, reactor chemistry, related systems, potential core and spent fuel damage, spent fuel, reactor coolant pressure boundary or reactor system procedures? 			



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ATTACHMENT 9.3

SHEET 3 OF 6

IMPACT SCREENING SUMMARY

PROCESS OR PROGRAM IMPACT SCREENING CHECKLIST		al Impact
Computer Support and Software	🗌 YES	Х NO
 Does the proposed activity impact or involve changes to plant computer software or firmware or impact Software Quality Assurance (SQA)? 		
Chemistry and Environmental Impact	TYES	⊠ NO
 Does the proposed activity impact or involve any changes to plant chemistry requirements, operations or procedures, or any changes to the environment? 		
Radiation Protection (RP) Program Impact	🗌 YES	NO
 Does the proposed activity impact or involve any changes to the RP program? Does the proposed activity involve the potential to introduce (or reintroduce) any cobalt containing materials (such as Stellite) into the primary system? 		
 Operations Does the proposed activity impact or involve changes to Operations procedures, training or operator actions? 	NES 📕	
Planning, Scheduling and Outage (PS&O) Does the proposed activity require a PS&O review to identify required design and installation information?		
 MP&C (Inventory) Does the proposed activity impact or involve any addition or removal of equipment from the inventory? Does the proposed activity impact or involve any Procurement of Quality or Augmented Quality material from non-qualified suppliers? 	YES	□ NO
Procurement Engineering Does the activity impact or involve any procurement activities?		

PROGRAMS AND COMPONENTS	Potential Impact			
 ASME Containment In-service Inspection (IWE / IWL) Program Does the proposed activity impact or involve the containment pressure boundary or associated moisture barriers or a support for the containment pressure boundary? This includes "software only" changes that do not physically change the hardware such as re-rating of pressures or temperatures to include changes to documented information on these items or additional documented information for these items. Does the proposed activity limit access to containment surfaces for inspection? Involve disassembly of a bolted connection which forms a portion of the containment boundary? 	YES	DNO		
 ASME Appendix J (Primary Containment Leak Rate Testing) Program Does the proposed activity impact or involve any changes to primary containment leak rate testing? 	YES	□ NO		



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IMPACT SCREENING SUMMARY

ATTACHMENT 9.3 SHEET 4 OF 6

PROGRAMS AND COMPONENTS (CONTINUED)	Potential Impact				
 ASME In-service Inspection (ISI) Program Does the proposed activity add, delete, or modify an ASME Section XI pressure boundary item or a support for an ASME Section XI pressure boundary item? This includes "software only" changes that do not physically change the hardware like such as re-rating of pressures or temperatures. (ASME Section XI items include ASME Class 1, 2, 3, or B31.1 treated as ISI Class 2 or 3 (T2 and T3) components, parts, or appurtenances such as pipe or pressure vessel walls, valve bodies and pump casings. 	YES	□ NO			
 ASME Section XI Repair / Replacement Program Does the proposed activity involve any mechanical component within the ASME XI program / boundaries? Does the proposed activity add, delete, or modify an ASME Section XI pressure boundary item or a support for an ASME Section XI pressure boundary item? (ASME Section XI items include ASME Class 1, 2, 3, MC, and CC, as well as B31.1 treated as ISI Class 2 or 3 (T2 and T3) components, parts, or appurtenances such as pipe or pressure vessel walls, valve bodies and pump casings). 	YES	□ NO			
 ASME In-service Testing Program Does the proposed activity impact or involve any item (safety related or non safety related) that may affect the performance or testing of a safety related pump or valve? Does the proposed activity impact the function or functional classification of any pump or valve as stated in the IST program documents? 	YES	□ NO			
 Air Operated Valve (AOV) Program Does the proposed activity impact or involve the design, operation or testing of AOVs? 	☐ YES	X NO			
 Buried Piping and Tanks (BP&T) Program Does the proposed activity impact or involve any changes to piping, coatings, or cathodic protection of Buried Piping & Components? 	YES				
 Boric Acid Corrosion (BAC) Program Does the proposed activity impact or involve any increase in the likelihood of boric acid formation or corrosion? 	TYES	⋈ NO			
 Check Valve Program Does the proposed activity impact or involve the design, operation or testing of check valves? 	YES	□ NO			
 Control Room Habitability Program Does the proposed activity impact or involve changes that affect the temperature or radiological environmental conditions in the Main Control Room? 	TYES	⋈ NO			
 Electrical Circuit Breaker, Relay and Electrical Equipment Testing Does the proposed activity impact or involve changes to the functional testing of circuit breaker, relay or electrical equipment? 	YES	□ NO			



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IMPACT SCREENING SUMMARY

ATTACHMENT 9.3 SHEET 5 OF 6

PROGRAMS AND COMPONENTS (CONTINUED)	Potential Impact			
 Flow Accelerated Corrosion (FAC) Program Does the proposed activity involve any changes (e.g.: configuration, velocity, flow rate, pressure, temperature, material, weld location, etc.) to piping systems included in the FAC Program.? 	☐ YES	MNO		
 Heat Exchanger Program Does the proposed activity impact or involve the design, operation or testing of a component in the heat exchanger program? 	☐ YES	ЖNО		
 Predictive Maintenance Program Does the proposed activity impact or involve any aspect of the storage, use and testing of lubricants? Does the proposed activity involve thermography? Does the proposed activity involve vibration monitoring? 	YES YES	□ NO		
 Microbiological Induced Corrosion (MIC) Program Impact Does the proposed activity involve piping containing untreated or stagnant water or open to the atmosphere? 	T YES	⊠ NO		
 Motor Operated Valve (MOV) Program Does the proposed activity impact or involve the design, operation or testing of MOVs? 	🗌 YES	₩ NO		
Plant Thermal Performance Program Does the proposed activity impact or involve plant thermal performance?	🗋 YES	⊠ NO		
 Preventive Maintenance Program Does the proposed activity impact or involve periodic testing or performance of SSCs? or Does the proposed activity add, modify or delete any Environmental Qualification (EQ) maintenance requirement or replacement frequency to ensure the component(s) maintains its gualification status? 	YES	□ NO		
 PT Curves Does the proposed activity add, delete, or modify the basis (as contained in each sites reactor vessel surveillance material testing program) for the Pressure / Temperature Limit Curves (fluence, pressure, temperature, reactor materials)? 	☐ YES	MNO		
 Relief Valve Program Does the proposed activity impact or involve the design, operation and testing of relief valves, safety valves, vacuum breaker valves or rupture disc? 	TYES	₩ NO		
 RPV Internals Program Does the proposed activity impact or involve any change to the reactor internals? This includes "software only" changes that do not physically change the hardware such as re-rating of pressures or temperatures. Does the proposed activity impact or involve or related documentation to include neutron fluence or neutron fluence calculations? Does the proposed activity impact or involve or changes to core flow characteristics or core flow characteristics? 	☐ YES	XNO		



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IMPACT SCREENING SUMMARY

ATTACHMENT 9.3

SHEET 6 OF 6					
PROGRAMS AND COMPONENTS (CONTINUED)	Potenti	Potential Impact			
 Welding Program Does the proposed activity impact or involve a special process, such as welding, brazing or soldering? 	YES				
Safety Program Does the proposed impact or activity involve personnel or industrial safety?	YES				
 System Engineering Does the proposed activity impact or involve any changes to system configuration, function or performance, etc., for Maintenance Rule or other system? Does the proposed activity impact or involve any changes to system procedures, maintenance or operation, etc.? 	YES 🖬	DNO			
 Training Program Does the proposed activity involve existing training requirements or create the need for new training? 	YES	□ NO			
 Simulator Impact Does the proposed activity impact or involve changes to the Simulator? 	T YES	X NO			
Fire Protection Program Does the proposed activity result in a change to the Fire Protection Program (including 10CER50 Appendix R) where the impact is more than pedigible? 	YES	□ NO			

Detailed Impact Screening (Attachment 9.4) Attached?
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IPEC00269610

Attachment 2

Conceptual Design Sketches

- 1. Figure 1: Reactor Cavity Flooding System Flow Diagram
- 2. Figure 1A: Reactor Cavity Flooding System Flow Diagram
- 3. Figure 2: Reactor Cavity Flooding System Fire Water Tie-In
- 4. Figure 3: Reactor Cavity Flooding System General Arrangement









Attachment 3

References

- 1. ENTERGY Nuclear Management Manual, Engineering Change Process, Rev 11
- Association for the Advancement of Cost Engineering (AACE),
 Cost Estimate Classification System As Applied In Engineering, Procurement, and Construction for the Process Industries
 - TCM Framework: 7.3 Cost Estimating and Budgeting
 - Figure 4 Estimate Checklist & Maturity Matrix
- 3. Typical Self Contained Diesel-Driven Pump (attached here)



Self Contained Engine Drivan Unit

Hale offers a variety of standard and custom self contained engine driven pumping modules with features designed to meet demanding applications. Our units can be mounted direct, bolted down, or set up as trailers for transportable firefighting protection at dock side. Varying in size and capability from small open chassis units to custom trailer pumping modules, they span a wide range of applications including marine firefighting pumps and industrial trailers. Hale builds water and foam pumping skids to meet the needs of government, forestry, and industrial customers. Units have been constructed for hurricane relief, fire protection at nuclear power sites, oil field fire fighting, hydrant systems, marine fire boats, dock protection, and more. These units are equipped with heavy duty fan forced radiator cooling.







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Attachment 4

Cost Estimate

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	ENIEKG'	Y NUCLEAR NURTHEAS	1											
	Indian Point Nuclear Power Station													
* ESTIMATE LEVEL *		FC #: SAMA												
	PPO IECT TITLE: Install a Practor Ca													
	PROJECT ITTLE. Install a Reactor Car			ESTIMATOR.										
		g, Yaro near FSD	PROJECT CODE: TB		07/10/00/10									
Definitive	OUTAGE IN NON-OUTAGE	ORIGINATOR:		ORIG. DATE:	07/12/2012									
	ESTIMATE TOTAL \$1,738,982		REVISION	11-0										
Summary of Change: In accordance with NRC environmental regulations in 10 C.F.R. Part 51, Entergy performed SAMA analyses for both Indian Point Nuclear Generating Units 2 and 3 as part of its license renewal application. Those analyses identified a number of potentially cost-beneficial SAMAs for each unit. In its license renewal application and related correspondence with the NRC Staff, Entergy indicated that it would submit the potentially cost-beneficial SAMAs for each unit. In its license renewal application and related correspondence with the NRC Staff, Entergy indicated that it would submit the potentially cost-beneficial SAMAs for further internal engineering project cost-benefit analysis, even though none of the potentially cost-beneficial SAMAs is related to aging management under 10 C.F.R. Part 54. Entergy contracted RCM Technologies to assist it in this effort. This package provides a conceptual design and implementation cost estimate for SAMA IP2-009 in accordance with Entergy design engineering practices. For SAMA IP2-009, resolution is required to reduce potential containment damage as a result of concrete-core interaction from molten debris following core damage and vessel failure conditions. This package will provide an installation using a standby pump and fire water to flood the reactor cavity in the event this emergency action is necessary.														
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Date: 9	- 20-20/2	Date:	9-20-2012	-										

		ENTERGY NUCLEAR NORTHEAST
		IMPLEMENTATION ESTIMATE
* 23	TRAATE LEVIEL *	Indian Point Nuclear Power Station
1/1		EC #: SAMA 1P2-009
H	Preliminary	PROJECT ITTLE. Install a Reactor Cavity Flooding System Contract Codes ESTIMATOR. ROW
H+-	Definitive	
	Demitive	CRIG. DATE. UNIZZOTZ
Item		Description
1.	This estimate assur	mes that this work will require outage conditions to complete
2.	This estimate assur	mes that this work will complete during 2014 working a 10 hours per shift, Six days per week schedule.
3.	This estimate assur	these that a Prerabricated building will be purchased for erection on site by skilled local crart.
<u>4.</u>	This estimate assur	thes first all work will be performed by trained contract cranspersons in lieu of station maintenance personnel.
<u> </u>	This estimate provid	des foi continuous ine watch during welong activities.
7	This estimate assur	Thes training for 12 Frank Ops. Ferson et
	This estimate assu	These that the safety class for piping and varies with only require a 0 or 0.
	The bulk of the wor	these that we inspections will be similar to visual and the testing.
	This estimate is bar	sed on the project's current level of scope definition and is classified Class 4 as defined per the AACE international Cost
10.	Estimate Classificat	tion System (see Attachment 3, Reference 2).
11.	for anticipated billin	g rate increases of 3% per year.
12.	cumulative and pro-	s for and includes a contingency factor related to the complexity and location of the work required. The factor is gresses as follows:
 	A. Outside fer	ice boundary - 20%
<u> </u>	B. Inside tenci	e boundary - 30%
<u> </u>	C. Implementa	ation complexity - 40%
	D. Inside Com	tainment - 50%
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INDIAN POINT IMPLEMENTATION ESTIMATE WORK SHEET 44 CA 84 A 10

Rev. 11-0	INDIAN POINT IMPLEMENTATION ESTIMATE WORK SHEET EC #: SAMA IP2-009 JECT TITLE: Install a Reactor Cavity Flooding System I I CAPITAL ORM TAKEOFF:													
PROJ	ECT TITLE: Install a Reactor Cavity Flooding System			CAPITAL	0&M	TAKEOFF:								
JOB L	OCATION: Containment Building, Yard near FSB			PROJECT CODE: 1	TBD	ESTIMATOR: RCMT								
EST.				ORIGINATOR:		ORIG. DATE: 07/12/2012								
			MA	NHOURS	MATERIAL SMATERIAL	LABOR SUB-								
ITEM	DESCRIPTION	QTY	UOM CFT NO. UNIT	FCTR TOTAL \$/MH	PER UNIT DOLLARS	DOLLARS CONTRACT TOTAL \$								
						<u></u>								
	* ESTIMATE LEVEL *				ESTIMATE SUMMARY									
	Conceptual				MANHOURS	S DOLLARS								
	Breliminary		ENGINEEDING											
	Definition				100	6 1 0 000								
	Definitive			SIGN, & CLOSEOUT	160	\$ 16,000								
			02 DESIGN EN	GR CONST SUPPORT	40	\$ 4,000								
	General Notes:		03 MODS ENG	R SUPPORT	-	\$ -								
			04 SYS ENGR/	S-U ENGR	100	\$ 12,000								
			05 PROJECT M	IANAGEMENT	200	\$ 24,000								
			06 TESTING (C	alibration & Testing)	40	\$ 4,000								
			07 TECH SPEC	/FSAR, CALCS, ANALYSIS	675	\$ 81,000								
			08 ENGR'G, DO	CP ACCEPTANCE REVIEW	40									
					1 000	6 444,000								
			08 DESIGNEN		1,200	\$ 144,000								
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			11 OSG ELELD		140	\$ 16,000 \$ 16,800								
			MATERIALS / MISC CO	ONTRACTS	140	\$ 10,000								
						\$ 124.550								
			13 OTHER CON	NTRACTS		\$ -								
			CONTRACT CRAFT LA	ABOR		Ť								
			14 SWEC CRAF		2 050	\$ 278 526								
			15 LOST TIME		205	\$ 27,853								
			16 SWEC DIST	RIBS										
			PLANT CRAFT LABOR	र										
			17 MECH MAIN	NT.	-	\$ -								
			18 ELECT MAI	NT	-	\$ -								
			19 I&C		-	\$ -								
			20 CSG		-	\$ -								
			MISC SUPPORT											
			21 QUALITY O	ONTROL	180	\$ 18,000								
			22 PLANNING 8	& SCHEDULING										
			23 IRAINING		36	\$ 4,320								
			24 CHEMISTR	Ŷ	-	\$ -								
			25 UPS		100	\$ 12,000								
				POPT	-	φ -								
					130	\$ 10.400								
			28 NDF	ONTROL	100	\$ 10,400								
		1	29 HP/RP											
		1	30 RADWAST	E	-	\$ -								
		1	31 NURSE		-	\$ -								
		1	32 ELEVATOR	R CONTRACTOR	-	\$ -								
			33 WASTE MA	ANAGEMENT	-	\$ -								
			34 HOUSEKEI	EPING	-	\$ -								
			35 EQUIPMEN	NT RENTAL	-	\$ -								
			36 VENDOR S	STOCKING	-	\$ -								
			37 DECONTAI	MINATION CONTRACTOR	-	5 - C								
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		1			-	φ - \$ 0,700								
		1			41	ψ 2,700								
		1		NCY		\$ 318.495								
					5.497	\$1.114.732								
				SITE ENC	UMBRANCE PREMIUM (20%)) \$ 222.946								
				LOADERS	(30%)	\$ 401.304								
					. ,									
				ESTIMA	TE TOTAL	\$ 1,738,982								

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INDIAN POINT IMPLEMENTATION ESTIMATE WORK SHEET EC #: SAMA IP2-009

Rev.	INDIAN POINT IMPLEMENTATION ESTIMATE WORK SHEET C #: SAMA IP2-009																
25	JECT TITLE: Install a Reactor Cavity Flooding System					20 8.07		CAPITI			08M			TAKEOFF			
EST.	STATUS: DOUTAGE DINON-OUTAGE	,						ORIGIN	IATO	R:			TODIAL	ORIG. DAT	E: 07/12/201	2	
ITEM	DESCRIPTION	QTY	иом	CFT	NO.		FCTR	TOTAL	\$1	/MH	PER UNIT	DC	DLLARS	DOLLARS	CONTRACT	T	OTAL \$
	Cather and stars tools and materials	1	L I T	10	2	Non-Outa	ge Work	4	¢	78 15		L C		\$ 313		s	313
2.	Perform walkdown of work area.	1	LT	LB	2	4,00	1.00	8	\$	78.15		\$	-	\$ 625		\$	625
3.	Perform walkdown of work area.	1	LT	OP	1	4.00	1.00	4	\$ 1	115.00		\$	-	\$ 460		Ş	460
4.	Excavate to existing Fire Water Line		LT	LB	2	16.00	1.00	32	\$ \$	78.15		\$	-	\$ 2,501		э \$	2,501
6.	Perform tie in to existing fire line	1	LT	PF	3	20.00	1.00	60	\$ 1	120.71		\$	-	\$ 7,243		\$	7,243
7.	Backfill and compact excavation	1	LT	OP	1	10.00	1.00	10	\$ 1	115.00		\$	-	\$ 1,150		\$	1,150
9.	Excavate, form and pour stab with oil berm	1		OP	1	10.00	1.00	20 10	ֆ Տ 1	115.00		\$	-	\$ 1,563		⊅ \$	1,565
10.	Excavate, form and pour slab with oil berm	1	LT	LB	3	30.00	1.00	90	\$	78,15		\$	1,500	\$ 7,034		\$	8,534
11.	Excavate, form and pour slab with oil berm	1		CP	2	10.00	1.00	20	\$	96.00	e 10 000 00	\$	10.000	\$ 1,920		\$	1,920
13.	Provide Light, Heat and Ventilation	1	LT	EL	2	30.00	1.00	60	э 5 1	123.32	\$ 4,000.00	ŝ	4,000	\$ 7,399		Ş	11,399
14.	Set Diesel Pump Skid	1	LT	MW	2	20.00	1.00	40	\$ 1	134.00	\$ 50,000.00	\$	50,000	\$ 5,360		\$	55,360
15.	Excavate and pour Pipe Support Piers	1			2	40.00	1.00	80 40	\$	78.15	\$ 4,000.00	\$	4,000	\$ 6,252		\$ 5	10,252
17.	Excavate and pour Pipe Support Piers	1	LT	OP	1	40.00	1.00	40	\$ 1	115.00		\$	-	\$ 4,600		\$	4,600
18,	Obtain Material and Erect Pipe Supports on Piers	1	LT	PF	3	40.00	1.00	120	\$ 1	120.71	\$ 2,000.00	\$	2,000	\$ 14,485		\$	16,485
19. 20	Tie in Piping at Pump and at Penet #1-U	1		PF	3	20.00	1.00	360 60	\$ 1	120.71		s s	-	\$ 43,455		э S	43,450
21.	Mount and tie in diesel day tank	1	LT	PF	3	10.00	1.00	30	\$ 1	120.71	\$ 1,000.00	\$	1,000	\$ 3,621		\$	4,621
22.	Prefabricate Containment spool piece for outage.	1	LT	PF	2	20.00	1.00	40	\$ 1	120.71		\$	-	\$ 4,828		\$	4,828
23.	Clean-up area and restore	1	LT	PF	2	10.00	1.00	20	\$ 1	120.71		\$	-	\$ 2,414		\$	2,414
25.	Clean-up area and restore	1	LT	LB	2	10.00	1.00	20	\$	78.15		\$	-	\$ 1,563		\$	1,563
L	L <u></u>			l	<u> </u>	OUTAGE	WORK	-			<u>.</u>	1.2	-	<u> </u>	L	\$	
1.	Obtain tools and material	1	LT	PF	2	5.00	1.70	17	\$ 1	120.71		\$	-	\$ 2,052		\$ ¢	2,052
2. 3.	Install prefabricated spool in containment	1	LT	PF	2	10.00	1.70	34	۵ ۱ ۱	120.71		\$	-	\$ 4,104		\$	4,104
4.	Clean up and restore area	1	LT	PF	2	5.00	1.70	17	\$ 1	120.71		\$	-	\$ 2,052		\$	2,052
								-				э \$	-	⇒ - \$ -		\$	-
								-				\$	-	\$ -		\$	-
(~				3	1	ф -		Ð	-
1.	PAINTING & TOUCH-UP - PRIME	1	LT	PT	2	40.00	1.00	80	\$	95.16		\$	1,000	\$ 7,613		\$	8,613
2.	PAINTING & TOUCH-UP	1	LT	PT	2	40.00	1.00	80	\$	95.16		\$	2,000	\$ 7,613		\$	9,613
	FIRE WATCH / BOTTLEWATCH REQUIREMENTS																10.001
1. 2.	CRAFT SUPPORT FOR FIRE WATCH CRAFT SUPPORT FOR BOTTLE WATCH	1	LI	FW	יו	120.00	1.70	204	\$	53.60		\$	-	\$ 10,934		\$ \$	10,934
1.	MISC SUB-CONTRACT MISC SUB-CONTRACT	1	LT												s -	\$	-
	SUBTOTAL CRAFT & SUB-CONTRACTOR							1,733	2.9 Martin			\$	75,500	\$ 180,148	\$ -	\$	255,648
1	CONSTRUCTION SUPPORT (8% OF LABOR \$)	1	LT					139	S 1	103 95				\$ 14,449		s	14,449
								4.070			allen – viska allen av an Allene	Ļ	76 600	8 104 507			070 007
	SUBTOTAL							1,072				\$	15,500	\$ 194,597		*	210,091
	* RELATED COSTS *																
1.	WALKDOWN ALLOWANCE	1	LT	PF		17.00	1.00	17	\$ 1	120.71				\$ 2,052		\$	2,052
2.	WORK PACKAGE REVIEW & CRAFT TRAINING	1	LT	PF		95.00	1.00	95	\$ 1 ¢ 1	120.71				\$ 11,467		\$	11,467
4	GENERAL CRAFT DISTRIBS, (10%)	•	L]			00.00	1.00		Ψ.	120.02				\$ 19,460		\$	19,460
5.	CRAFT IN PROCESSING (20%)		17									1		\$ 38,919		\$	38,919
о. 7.	(1/2 day training, or ~ 2%)	1	LI											ə 3,692		ľ	3,032
	SUBTOTAL							2,050				\$	75,500	\$278,526	\$ -	\$	354,026
	PLANT SCOPE														[
1.	MECH MAINTENANCE			PL				-				\$	-	\$ -		\$	-
	SUBTOTAL MECH MAINT.			PL				-				\$	-	\$ - \$ -	\$ -	\$	-
				DI								e		5			
Ŀ				PL				-				\$	-	\$ -	L	\$	-
	SUBTOTAL ELECT. MAINT.											\$	-	\$ -	15 -	\$	-
1.	I&C (Dev. Instrument Calibration Procedures)	0	LT	PL Pl	-	-	-	-				s s	-	\$- \$		\$	-
	SUBTOTAL I&C MAINT.							-				\$	-	\$ -	\$ -	\$	
1	CSG			PI								s	_	s -		\$	-
				PL					L			\$	-	\$		s	-
i 1	SUBTOTAL CSG MAINT.			1			t				1	15	-	- 5	15 -	15	**

7/25/2012 5:56 PM
SAMA IP2-009_Install_A_Reactor_Cavity_Flooding_System - (6-01-11)

INDIAN POINT IMPLEMENTATION ESTIMATE WORK SHEET EC #: SAMA IP2-009

Rev.	INE	DIAN	POII	NT IN	IPL	EMENTA EC #: SA		ESTIM	AT	E WOI	RK SHEET					
JOB I	LECT TITLE: Install a Reactor Cavity Flooding System LOCATION: Containment Building, Yard near FSB						CAPITAL JOBM TAKEOFF: PROJECT CODE: TBD ESTIMATOR: RCMT OPICINATOR: RCMT									
EST.	STATUS: LIOUTAGE MINON-OUTAGE		1	1				ORIGIN	AI	OR:	MATERIAL C	MATCOIAL	ORIG. DAI	TE: 07/12/201	2	
ITEM	DESCRIPTION	ατγ	UOM	CFT	NO.		FCTR	TOTAL	1	\$/MH	PER UNIT	DOLLARS	DOLLARS	SUB-	т	OTAL \$
-					<u> </u>				<u> </u>						L	
	SUBTOTAL PLANT			<u> </u>				-	-			\$ -	\$ -	\$ -	\$	
	SUBTOTAL CRAFT/PLANT	+	[+		- Ulation - Latin		2.050	+			\$ 75,500	\$ 278 526	<u> </u>	s	354 026
		+						2,000	+			• 10,000	0210.020		Ť	001,010
	IMPLEMENTATION SUPPORT															
	NORS ENGINEEDING												~			
2	DESIGN ENGINEERING SUPT DURING CONST			NM	1	40.00	1.00	40	¢	100.00			\$ 4000		¢ 2	4 000
3.	SYSTEMS ENGINEERING - MECHANICAL	1	LT	NM	1	40.00	1.00	40	\$	100.00			\$ 4,000		\$	4,000
4.	SYS ENGINEERING - ELECTRICAL	1	LT	NM	1	20.00	1,00	20	\$	100.00			\$ 2,000		\$	2,000
5.	SYS ENGINEERING - INSTR & CONTROL	1	LT	NM				-					\$-		\$	-
6,	SYS ENGINEERING - CIVIL STRUCTURAL	1	LT	NM	1	40.00	1.00	40	\$	150.00			\$ 6,000		\$	6,000
7.	PROJECT MANAGEMENT	1	LT	NM	1	200.00	1.00	200	\$	120.00			\$ 24,000		\$	24,000
8.	TRAINING (OPS Staff)	1 1		NM	12	3.00	1.00	36	\$	120.00			\$ 4,320		\$	4,320
10				NM		180,00	1,00	180	13	100.00			\$ 18,000		*	18,000
11	HP / RP/ ALARA			NM	'								s .		\$	
12	CHEMISTRY	1 1	LT	NM				-					\$ -		s	
13.	OPS (DEVELOP/REVISE PROCEDURE(S))	1	LT	NM	1	100.00	1.00	100	\$	120.00			\$ 12,000		\$	12,000
14.	TRAVEL & LIVING EXPENSES	1 1	LT										\$-		\$	
	CONTRACTOR SUPPORT]	
1.	FIS / MODS ENGINEERING - SWEC (Incl Per Diem)		LT	NM				-					\$-		\$	-
2.	MODS PLANNING & SCH SWEC (Incl Per Diem)	1	LT	NM	1	160.00	1.00	160	\$	100.00			\$ 16,000		\$	16,000
3.	OSG FIELD ENGRS/PLAN- SWEC(Incl Per Diem)	1 1		NM	1	140.00	1.00	140	\$	120.00			\$ 16,800		\$	16,800
4.	INDE			NM		130.00	1.00	130	3	80.00			\$ 10,400		3	10,400
6	HP/RP		IT	NM	1										\$	
7.	RADWASTE	1	LT	NM				-							•	
8.	NURSE	1	LT	NM				-								
9.	ELEVATOR CONTRACTOR	1	LT	NM				-							[
10.	WASTE MANAGEMENT	1	LT	NM				-								
11.	HOUSEKEEPING	1	LT	NM				-								
12.	EQUIPMENT RENTAL CONTRACTOR	1		NM				-								
13.	DECONTAMINATION CONTRACTOR	1		NIM				-								
15	RBC's			NM				-								
16	SECURITY	1	LT	SEC				-								
17.	FIRE WATCH (Rover)	1	LT	NM									\$ -		\$	-
18.	SAFETY (2%)	1	LT	NM				41	\$	68,00			\$ 2,788		\$	2,788
19.	LOST TIME (10%)	1	LT					205	\$	135.87			\$ 27,853		\$	27,853
	SUBTOTAL CRAFT/NON-MANUAL							3,382	-			\$ 75,500	\$426,687	\$ -	\$	502,187
1.	6" and 8" Sch 40 pipe Safety Class	1	LT	MT								\$ 12,000			\$	12,000
2.	8", 6", 1" and 3/4" valves, 150# class, Safety Related	1	LT	мт								\$ 30,000			\$	30,000
3.	FREIGHT, SALES TAX, & CONSUMABLES (0%)											\$ 7,050			₽	7,030
	SUBTOTAL INSTALLATION COST	+						3.382	1			\$ 124,550	\$ 426,687	\$ -	15	551,237
		1														
1.	DESIGN ENGINEERING - MECHANICAL	1	LT	NM	1	40.00	1.00	40	\$	100.00			\$ 4,000		\$	4,000
2.	DESIGN ENGINEERING - ELECTRICAL	1	LT	NM	1	40.00	1.00	40	\$	100.00			\$ 4,000		\$	4,000
3.	DESIGN ENGINEERING - INSTR, & CONTROL	0	LT	NM	-	-	-	-					\$ -		\$	-
4.	DESIGN ENGINEERING - CIVIL/STRUCTURAL	1	LT	NM	1	80.00	1.00	80	15	100.00			\$ 8,000	-	\$	8,000
5. e	CONTRACT ENCR DESIGN SUBBORT			NM	2	1 20.00	1.00	40	13	100.00			\$ 4,000	\$ - e	\$	4,000
<i>.</i> ,	TECH SPEC / FSAR REVISIONS CALCULATIONS	1 '	L. I	LAIM	· '	1,200.00	1.00	1,200	1	120.00			\$ 144,000	-	1	144,000
7.	ANALYSIS	1	LT	NM	1	675.00	1.00	675	\$	120.00			\$ 81.000		\$	81,000
8.	ENGRG DCP ACCEPTANCE REVIEW	1	LT	NM	1	40.00	1.00	40	\$	100.00			\$ 4,000		\$	4,000
	SUBTOTAL DESIGN COST	Î						2,115	Ī				\$245,000	\$-	\$	245,000
		1														
	SUBTOTAL INSTALLATION & DESIGN COST												\$671,687	\$ -	\$	796,237
1.	CONTINGENCY (40%)									·					\$	318,495
	ESTIMATE SUBTOTAL							5,497							\$ 1	1,114,732

,



ENTERGY INDIAN POINT NUCLEAR STATION UNIT 2

CONCEPTUAL DESIGN PACKAGE For

SAMA IP2-021

Install Leak Monitoring Instrumentation for ISLOCA Pathway Isolation Valves

Prepared b	py: At But accord.	Approved by:
Date:	9-20-2012	Date: 9- 20-2012

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SECTION	TITLE
1.0	ISSUE
2.0	BACKGROUND
3.0	EXISTING CONDITIONS
4.0	DESIGN CONSIDERATIONS
5.0	CONFIRMATION OF DESIGN
6.0	RECOMMENDED SOLUTION
7.0	PRELIMINARY MATERIAL LIST
Attachment 1	Entergy Impact Screening Summary
Attachment 2	Conceptual Design Sketches
Attachment 3	References
Attachment 4	Cost Estimate



ISSUE 1.0

Severe Accident Mitigation Alternative (SAMA) IP2-021:

Install Leak Monitoring Instrumentation for ISLOCA Pathway Isolation Valves

2.0 BACKGROUND

In accordance with NRC environmental regulations in 10 C.F.R. Part 51, Entergy performed SAMA analyses for both Indian Point Nuclear Generating Units 2 and 3 as part of its license renewal application. Those analyses identified a number of potentially cost-beneficial SAMAs for each unit. In its license renewal application and related correspondence with the NRC Staff, Entergy indicated that it would submit the potentially cost-beneficial SAMAs for further internal engineering project cost-benefit analysis, even though none of the potentially cost-beneficial SAMAs is related to aging management under 10 C.F.R. Part 54. Entergy contracted RCM Technologies to assist it in this effort.

This package provides a conceptual design and implementation cost estimate for SAMA IP2-021 in accordance with Entergy design engineering practices.

For SAMA IP2-021, resolution is required to provide remote monitoring of any fluid leakage past the isolation valves in ISLOCA pathways.

This package will provide the piping connections and transmitters required to interface with the monitoring instrumentation located outside containment.

The design considerations that follow will address the adequacy of the proposed resolution and the basis for the recommendation to resolve the identified potential issue.

The recommended solution will include descriptive details of the proposed design change and also conceptual design sketches as required. These descriptive details, sketches, and the preliminary material list provide the basis for initiating the all-inclusive conceptual cost estimate for engineering change (EC) development and implementation at the Station.

3.0 **EXISTING CONDITIONS**

In containment, the pathways of the Safety Injection (SI) System piping need to be monitored for potential leaks of liquid from the interfacing Reactor Cooling System (RCS) and Auxiliary Cooling System (ACS) piping. There are 22 check valves and 2 motor operated valves (MOV) installed in the SI piping that interface with these systems to provide this isolation.

In each ISLOCA pathway there are redundant "blocking valves" that provide isolation from interfacing systems. The effectiveness of the valves' blocking function to provide an isolation boundary needs to be monitored.

DESIGN CONSIDERATIONS 4.0

Check Valve Pathways

Each of the "blocked" piping sections within an isolation boundary has an existing piping connection available to be adapted as a monitoring point. (Ref. Attachment 2 - Figure 2 - all sheets)

MOV Pathway

The "blocked" piping section within this isolation boundary will require modification of the piping to include a connection that can be adapted as a monitoring point. (Ref. Attachment 2 - Figure 2 - sheet 1)

Monitoring for pressure change within each of the isolated boundaries will need to be transmitted to a remote location outside containment.

5.0 **CONFIRMATION OF DESIGN**

There are nine (9) separate ISLOCA paths with blocked isolation boundaries that potentially can allow fluid to leak by.

As stated above there are proposed connections located in each piping path for a sensing device to be applied to monitor them. Installation of a pressure transmitter at each of these piping connections will provide the means of measuring changes within an isolation boundary. In addition, the transmitter will enable this information to be electronically transmitted to a location outside containment for remote display and monitoring.

6.0 RECOMMENDED SOLUTION

- 1. Check Valves
 - A. For each isolation boundary listed in Attachment 2, Figure 3, perform the following:
 - At the existing piping connection install small bore pipe, instrument root valves, instrument tubing, pressure transmitter and required supports.

2. <u>MOVs</u>

- For the isolation boundary listed in Attachment 2, Figure 4, perform the following:
- Within the "blocked" piping section that forms the isolation boundary, install a new connection to be adapted as a monitoring point.
- At the piping connection install small bore pipe, instrument root valves, instrument tubing, pressure transmitter and required supports.

3. <u>Remote Leakage Monitoring</u>

Install new instrumentation outside containment, to display leakage data for each isolation boundary listed in Attachment 2, Table 1.

4. Conduit and Wiring

- A. Transmitters
 - Route and support conduit from each transmitter to the two new junction boxes fitted with terminal blocks located in containment.
 - Route and support a single conduit from each junction box, via containment penetration, to the new ISLOCA leak status monitoring panel outside containment.
 - Install and connect wiring from the pressure transmitters to the new junction boxes.
 - Install and connect wiring from the junction boxes to the new ISLOCA leak status monitoring panel.
- B. Remote Leakage Monitor Panel
 - Route and connect 120VAC power supply to the new monitor panel located in the Control Building at Elevation 33'- 0".
- 5. Provide procedures and training to operate, test, and perform maintenance on the components of the newly install system.

7.0 PRELIMINARY MATERIAL LIST

<u>lte</u>	em Description	Quantity
1.	Rosemount 1153 Series D Alphaline Nuclear Pressure Transmitter	9
2.	Valve - Valve Manifold	9
3.	Yokogawa – DXAdvanced R4 - DX1000 Recorder	1
4.	Loop Power - Power Supply	1
5.	Hoffman Junction Box with terminal blocks	2
6.	Hoffman Wall Mounted Panel and enclosure, with terminal blocks, 36" x 36" x 16"	1
7.	Instrument Tubing – 0.375" x 0.065 - 316 SS Tubing	950 Feet
8.	1" - Conduit	350 Feet
9.	2" - Conduit	350 Feet
10.	Two Pair - Twisted Shielded Pair Cable	200 Feet
11.	Six Pair - Twisted Shielded Pair Cable	1100 Feet
12.	2/c Cable	100 Feet
13.	¾" -1500# Socket Weld Globe Valve CONVAL Model No. 12G3J-3163D or equal	28
14.	¾" Schedule 160 Seamless Pipe, A376 Type 316	40 Feet
15.	¾"-6000# Socket Weld Tee, A182 F316	9
16.	¾"-6000# Screwed Cap, A182 F316	9
17.	¾"-6000# Sockolet, A182 F316	1

RCM	M)Technologies	ENTERGY	Conceptual Design	
J	The Source of Smart Solutions	Unit 2	SAMA IP2 -021	Rev. 0

Attachment 1

Entergy Impact Screening Summary



Engineering Change Process

ATTACHMENT 9.3

IMPACT SCREENING SUMMARY

SHEET 1 OF 6

INSTRUCTIONS:

Identify the potentially impacted and the unaffected areas by checking the appropriate Yes or No block on the Impact Screening Criteria.

If a direct determination cannot be made based on the impact screening questions, the detailed guestions in Attachment 9.4 may be used to identify potential impacts.

The completion of detailed questions in Attachment 9.4 is recommended but not required.

Contact potentially impacted groups if assistance is required.

SAMA Engineering Change No.: TP2-021 Rev. No.: DESIGN PACKAGE

Prepared by:

Date:

CONCEPTUAL

DESIGN ENGINEERING DISCIPLINES		Potential Impact	
 Civil / Structural Design Engineering Does the proposed activity involve any civil / structural (including seismic) design changes, activities or affect coatings? OR Does the proposed activity involve any piping engineering design changes or activities? 	YES	□ NO	
 Electrical Design Engineering Does the proposed activity involve any station or switchyard electrical design, large power transformers, or settings changes or activities? (SOER 10-1) 	YES		
Instrumentation and Controls Design Engineering Does the proposed activity involve any I&C design or settings changes or activities?	YES		
 Mechanical Design Engineering Does the proposed activity add/remove/replace insulation, aluminum or other metallic/non-metallic sources of debris in the reactor/containment building or involve any mechanical design changes or activities? 	TES 🖬	□ NO	
 PSA Engineering Does the proposed activity impact or involve changes to plant evaluations or probabilistic safety assessments? Does the proposed activity impact or involve changes to the Emergency Operating Procedures, Abnormal Operating Procedures, or Severe Accident Procedures or does it add, remove or modify SSCs included in a Maintenance Rule function? 	YES	□ NO	
 Nuclear Analysis Does the proposed activity impact or involve changes to plant evaluations, Technical Specifications, Technical Requirements Manual, or require a full 50.59 Evaluation? 	YES	□ NO	
 FERC / NERC Impact Does the proposed activity impact or involve change to FERC / NERC or Regional Entity compliance documents? (ex. MOU, ENN/ENS-PL-158, ENS-DC-199, etc.) 	☐ YES	MO 🕅	

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Engineering Change Process

ATTACHMENT 9.3

IMPACT SCREENING SUMMARY

Sheet 2 of 6

DESIGN ENGINEERING PROGRAMS		Potential Impact	
 ASME Section III Specifications Does the proposed activity add, delete, or modify information required by ASME Section III to be contained in a design specification? 	YES		
 Cable and Raceway Program Does the proposed activity involve any changes to cable trays, raceways or the associated documentation? 	YES		
Electronic Databases (EDB) Does the proposed activity involve any changes to electronic databases?	YES		
 EQ Program (10CFR50.49, NUREG 0588, Reg Guide 1.89) Does the proposed activity involve any new or existing EQ components? 	YES		
 Hydrogen Control Program (10 CFR 50.44) (<i>if applicable</i>) Does the proposed activity impact equipment or materials related to hydrogen control? 	T YES	🕅 NO	
 Human Factors Program Does the proposed activity involve control panel design including layout and labeling, visual displays, operator aids, auditory signals or environment in the control room, cable spreading room, and other control panel locations? 	YES		
 Margin Management Does the proposed activity impact or involve any change to design, licensing or operations margins? 	YES	□ NO	
 Reg. Guide 1.97 / PAM (Post Accident Monitoring) Does the proposed activity involve Reg. Guide 1.97 (Post Accident Monitoring) Indications? 	YES	□ NO	

MAINTENANCE		Potential Impact	
 Electrical Maintenance Does the proposed activity require an Electrical Maintenance review to identify affected procedures, required actions and required training? 			
 I&C Maintenance Does the proposed activity require an I&C Maintenance review to identify affected procedures, required actions and required training? 			
 Mechanical Maintenance Does the proposed activity require a Mechanical Maintenance review to identify affected procedures, required actions and required training? 			

NUCLEAR ENGINEERING		Potential Impact	
 Nuclear Fuel Design Does the proposed activity impact or involve the design, performance or storage of nuclear fuel? 	☐ YES	🕅 NO	
 Reactivity Management Program Does the proposed activity impact or involve the reactor system, reactor controls, reactor chemistry, related systems, potential core and spent fuel damage, spent fuel, reactor coolant pressure boundary or reactor system procedures? 		□ NO	


REFERENCE USE

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Engineering Change Process

IMPACT SCREENING SUMMARY

ATTACHMENT 9.3

SHEET 3 OF 6

PROCESS OR PROGRAM IMPACT SCREENING CHECKLIST		Potential Impact	
Computer Support and Software		🕅 NO	
 Does the proposed activity impact or involve changes to plant computer software or firmware or impact Software Quality Assurance (SQA)? 			
Chemistry and Environmental Impact	☐ YES	M NO	
 Does the proposed activity impact or involve any changes to plant chemistry requirements, operations or procedures, or any changes to the environment? 			
Radiation Protection (RP) Program Impact	□ YES	🕅 NO	
 Does the proposed activity impact or involve any changes to the RP program? Does the proposed activity involve the potential to introduce (or reintroduce) any cobalt containing materials (such as Stellite) into the primary system? 			
 Operations Does the proposed activity impact or involve changes to Operations procedures, training or operator actions? 	YES		
 Planning, Scheduling and Outage (PS&O) Does the proposed activity require a PS&O review to identify required design and installation information? 	YES	□ NO	
 MP&C (Inventory) Does the proposed activity impact or involve any addition or removal of equipment from the inventory? Does the proposed activity impact or involve any Procurement of Quality or Augmented Quality material from non-qualified suppliers? 	TYES	□ NO	
Procurement Engineering Does the activity impact or involve any procurement activities?	YES		

PROGRAMS AND COMPONENTS		Potential Impact	
 ASME Containment In-service Inspection (IWE / IWL) Program Does the proposed activity impact or involve the containment pressure boundary or associated moisture barriers or a support for the containment pressure boundary? This includes "software only" changes that do not physically change the hardware such as re-rating of pressures or temperatures to include changes to documented information on these items or additional documented information for these items. Does the proposed activity limit access to containment surfaces for inspection? Involve disassembly of a bolted connection which forms a portion of the containment 		□ NO	
 ASME Appendix J (Primary Containment Leak Rate Testing) Program Does the proposed activity impact or involve any changes to primary containment leak rate testing? 	YES		



REFERENCE USE

PAGE 99 OF 150

Engineering Change Process

ATTACHMENT 9.3 SHEET 4 OF 6

IMPACT SCREENING SUMMARY

PROGRAMS AND COMPONENTS (CONTINUED)	Potentia	al impact
 ASME In-service Inspection (ISI) Program Does the proposed activity add, delete, or modify an ASME Section XI pressure boundary item or a support for an ASME Section XI pressure boundary item? This includes "software only" changes that do not physically change the hardware like such as re-rating of pressures or temperatures. (ASME Section XI items include ASME Class 1, 2, 3, or B31.1 treated as ISI Class 2 or 3 (T2 and T3) components, parts, or appurtenances such as pipe or pressure vessel walls, valve bodies and pump casings. 	T YES	□ NO
 ASME Section XI Repair / Replacement Program Does the proposed activity involve any mechanical component within the ASME XI program / boundaries? Does the proposed activity add, delete, or modify an ASME Section XI pressure boundary item or a support for an ASME Section XI pressure boundary item? (ASME Section XI items include ASME Class 1, 2, 3, MC, and CC, as well as B31.1 treated as ISI Class 2 or 3 (T2 and T3) components, parts, or appurtenances such as pipe or pressure vessel walls, valve bodies and pump casings). 	YES	
 ASME In-service Testing Program Does the proposed activity impact or involve any item (safety related or non safety related) that may affect the performance or testing of a safety related pump or valve? Does the proposed activity impact the function or functional classification of any pump or valve as stated in the IST program documents? 	YES	□ NO
 Air Operated Valve (AOV) Program Does the proposed activity impact or involve the design, operation or testing of AOVs? 	☐ YES	X NO
 Buried Piping and Tanks (BP&T) Program Does the proposed activity impact or involve any changes to piping, coatings, or cathodic protection of Buried Piping & Components? 	TES	X NO
 Boric Acid Corrosion (BAC) Program Does the proposed activity impact or involve any increase in the likelihood of boric acid formation or corrosion? 	☐ YES	NO 🔀
 Check Valve Program Does the proposed activity impact or involve the design, operation or testing of check valves? 	Tes 🗌	NO 🖾
 Control Room Habitability Program Does the proposed activity impact or involve changes that affect the temperature or radiological environmental conditions in the Main Control Room? 	☐ YES	X NO
 Electrical Circuit Breaker, Relay and Electrical Equipment Testing Does the proposed activity impact or involve changes to the functional testing of circuit breaker, relay or electrical equipment? 	YES	□ NO



.

REFERENCE USE

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Engineering Change Process

IMPACT SCREENING SUMMARY

ATTACHMENT 9.3 SHEET 5 OF 6

PROGRAMS AND COMPONENTS (CONTINUED)		Potential Impact	
 Flow Accelerated Corrosion (FAC) Program Does the proposed activity involve any changes (e.g.: configuration, velocity, flow rate, pressure, temperature, material, weld location, etc.) to piping systems included in the FAC Program.? 	YES 🗱	□ NO	
 Heat Exchanger Program Does the proposed activity impact or involve the design, operation or testing of a component in the heat exchanger program? 	☐ YES	🕅 NO	
 Predictive Maintenance Program Does the proposed activity impact or involve any aspect of the storage, use and testing of lubricants? Does the proposed activity involve thermography? Does the proposed activity involve vibration monitoring? 	☐ YES	X NO	
 Microbiological Induced Corrosion (MIC) Program Impact Does the proposed activity involve piping containing untreated or stagnant water or open to the atmosphere? 	U YES	X NO	
 Motor Operated Valve (MOV) Program Does the proposed activity impact or involve the design, operation or testing of MOVs? 	☐ YES	NO I	
Plant Thermal Performance Program Does the proposed activity impact or involve plant thermal performance?	□ YES	🕅 NO	
 Preventive Maintenance Program Does the proposed activity impact or involve periodic testing or performance of SSCs? or Does the proposed activity add, modify or delete any Environmental Qualification (EQ) maintenance requirement or replacement frequency to ensure the component(s) maintains its gualification status? 	YES	□ NO	
 PT Curves Does the proposed activity add, delete, or modify the basis (as contained in each sites reactor vessel surveillance material testing program) for the Pressure / Temperature Limit Curves (fluence, pressure, temperature, reactor materials)? 	☐ YES	XX NO	
 Relief Valve Program Does the proposed activity impact or involve the design, operation and testing of relief valves, safety valves, vacuum breaker valves or rupture disc? 	T YES	X NO	
 RPV Internals Program Does the proposed activity impact or involve any change to the reactor internals? This includes "software only" changes that do not physically change the hardware such as re-rating of pressures or temperatures. Does the proposed activity impact or involve or related documentation to include neutron fluence or neutron fluence calculations? Does the proposed activity impact or involve or changes to core flow characteristics or core flow characteristics? 	☐ YES	X NO	



REFERENCE USE

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Engineering Change Process

IMPACT SCREENING SUMMARY

ATTACHMENT 9.3

SHEET 6 OF 6

PROGRAMS AND COMPONENTS (CONTINUED)		Potential Impact	
 Welding Program Does the proposed activity impact or involve a special process, such as welding, brazing or soldering? 	YES 📕		
 Does the proposed impact or activity involve personnel or industrial safety? 	YES		
 System Engineering Does the proposed activity impact or involve any changes to system configuration, function or performance, etc., for Maintenance Rule or other system? Does the proposed activity impact or involve any changes to system procedures, maintenance or operation, etc.? 	YES	□ NO	
 Training Program Does the proposed activity involve existing training requirements or create the need for new training? 	TES 📕		
 Simulator Impact Does the proposed activity impact or involve changes to the Simulator? 	🗌 YES	🕱 NO	
 Fire Protection Program Does the proposed activity result in a change to the Fire Protection Program (including 10CFR50 Appendix R) where the impact is more than negligible? 	☐ YES	X NO	

Detailed Impact Screening (Attachment 9.4) Attached?	□ YES	🕱 NO

Attachment 2

Conceptual Design Sketches

- 1. Figure 1: Existing Valve Tie-In Chart
- 2. Figure 2, Sheet 1 A235296: Safety Injection System Flow Diagram (partial)
- 3. Figure 2, Sheet 2 A235296: Safety Injection System Flow Diagram (partial)
- 4. Figure 2, Sheet 3 A235296: Safety Injection System Flow Diagram (partial)
- 5. Figure 3 Typical Leak Detection Piping Connection at Check Valves
- 6. Figure 4: Leak Detection Piping Connection at MOVs

Rev. 0

Existing Valve No.	Boundary Location
SX7	Test Connection between Valves 857B & 857F
S-28	Test Connection between Valves 857A & 857M
SX10	Test Connection between Valves 857D & 857H
S-24	Test Connection between Valves 857C & 857G
S-39	Test Connection between Valves 897A & 895A/838A/857J
S-42	Test Connection between Valves 897B & 895B/838B
S-45	Test Connection between Valves 897C & 895C/838C/857K
S-34	Test Connection between Valves 897D & 895D/838D
NEW	Test Connection between Valves M-730 & M-731

FIGURE 1 EXISTING VALVE TIE-IN CHART







Rev. 0





IPEC00269807



Attachment 3

References

- 1. ENTERGY Nuclear Management Manual, Engineering Change Process, Rev 11
- Association for the Advancement of Cost Engineering (AACE), Cost Estimate Classification System - As Applied In Engineering, Procurement, and Construction for the Process Industries
 - TCM Framework: 7.3 Cost Estimating and Budgeting
 - Figure 4 Estimate Checklist & Maturity Matrix
- ENTERGY Specification 9321-01-248-18
 Fabrication of Piping Systems-Indian Point Unit No. 2
- 4. Rosemount 1153 Series D Alphaline Nuclear Pressure Transmitter (attached here)
- 5. Yokogawa DXAdvanced R4 DX1000 Recorder (attached here)

Rosemount 1153 Series D Alphaline[®] Nuclear Pressure Transmitter

INDUSTRY LEADING PERFORMANCE

- Qualified per IEEE Std 323-1974 and IEEE Std 344-1975
- 5.0 x 10⁷ rads TID gamma radiation
- 7 g ZPA seismic
- 420 °F (215.6 °C) steam temperature
- 0.25% accuracy



CE

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Operation	je 2
Dimensional Drawings	je 3
Nuclear Specifications	ge 4
Performance Specifications	je 5
Functional Specifications	ge 6
Physical Specifications	je 8
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Nuclear

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EMERSON. Process Management

Product Data Sheet 00813-0100-4388, Rev BA January 2008

Rosemount 1153 Series D

Results Driven by Proven Measurement

Introduction

The Rosemount 1153 Series D Alphaline[®] Nuclear Pressure Transmitters are designed for precision pressure measurements in nuclear applications which require reliable performance and safety over a specified qualified life. These transmitters were qualified per IEEE Std 323-1974 and IEEE Std 344-1975 to radiation levels of 50 megarads TID gamma radiation, seismic levels of 7 g, and for steam pressure performance. Stringent quality control during the manufacturing process includes traceability of pressure-retaining parts, special nuclear cleaning, and hydrostatic testing.

Transmitter Description

Rosemount 1153 Series D Alphaline Nuclear Pressure Transmitters are uniquely built for Class 1E nuclear service while retaining the basic design of the Rosemount 1151 Series that has become a standard of reliable service. Units are available in absolute (A), gage (G), differential (D), and high-line differential (H) configurations, with up to eight pressure range options.

Direct electronic sensing with the completely sealed δ -CellTM capacitance sensing element (see Figure 1) eliminates mechanical force transfer and problems associated with shock and vibration. Installation and commissioning are simplified by the compact design and 2-wire system compatibility. Wiring terminals and electronics are in separate compartments, so the electronics remain sealed during installation.

Operation

The completely sealed δ -Cell capacitance sensing element is the key to the unequalled performance and reliability of the Rosemount 1153 Series D Pressure Transmitter. Process pressure is transmitted through an isolating diaphragm and silicone oil fill fluid to a sensing diaphragm in the center of the δ -Cell (see Figure 1). A reference pressure is transmitted in the same manner to the other side of the sensing diaphragm. Displacement of the sensing diaphragm, a maximum motion of 0.004 inches (0.1 mm), is proportional to the pressure differential across it. The position of the sensing diaphragm is detected by capacitor plates on both sides of the sensing diaphragm. Differential capacitance between the sensing diaphragm and the capacitor plates is converted electronically to a 2-wire, 4-20 mA dc signal.





2

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Rosemount 1153 Series D

DIMENSIONAL DRAWINGS



Rosemount 1153 Series D

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SPECIFICATIONS

Nuclear Specifications

Qualified per IEEE Std 323-1974 and IEEE Std 344-1975 as stated in Rosemount Report D8300040.

Output Code P

Radiation:

Accuracy within $\pm 6\%$ of upper range limit during and after exposure to 5.19×10^7 rads, total integrated dosage.

Range Code 0: ±8.2% of upper range limit.

Seismic:

Accuracy within $\pm 0.5\%$ of upper range limit during and after a disturbance defined by a required response spectrum with a ZPA of 7g.

Range Code 0: ±0.75% of upper range limit.

Steam Pressure/Transmitter:

Accuracy within $\pm(4.5\%$ upper range limit +3.5% span) during and after exposure to steam at the following temperatures and pressures:

420 °F (215.6 °C), 95 psig for 3 minutes 350 °F (176.6 °C), 85 psig for 7 minutes 320 °F (160 °C), 60 psig for 3 hours 240 °F (115.5 °C), 27 psig for 21 hours 176 °F (80 °C), 3 psig for 30 days simulating one year post-DBE operation.

Range Code 0: ±(6.7% of upper range limit + 3.5% of span).

Post DBE Operation

Accuracy at reference conditions shall be within $\pm 1.5\%$ of upper range limit (2.25% for Range Code 0) for one year following DBE.

Output Code R

Radiation:

Accuracy within $\pm(1.5\% \text{ of upper range limit } + 1.0\% \text{ span})$ during and after exposure to 5.5×10^7 rads, total integrated dosage.

Range Code 0: \pm (2.3% of upper range limit + 1.0% of span).

Selsmic:

Accuracy within $\pm 0.5\%$ of upper range limit during and after disturbance defined by a required response spectrum with a ZPA of 7g.

Range Code 0: ±0.75% of upper range limit.

Steam Pressure/Temperature:

Accuracy within $\pm(4.5\%)$ upper range limit + 3.5% span) during and after exposure to steam at the following temperatures and pressures:

420 °F (215.6 °C), 95 psig for 3 minutes 350 °F (176.6 °C), 120 psig for 7 minutes 320 °F (160 °C), 70 psig for 8 hours 265 °F (129.4 °C), 24 psig for 67 hours

Range Code 0: \pm (6.7% of upper range limit + 3.5% of span).

Additional Radiation:

After completion of the above tests, the transmitters were exposed to an additional 5.5×10^7 rads TID.

Performance: $\pm(1.5\% \text{ of upper range limit } \pm 1.0\% \text{ span}).$

Range Code 0: ±(2.3% of upper range limit + 1.0% of span).

Post DBE Operation:

Accuracy at reference conditions shall be within $\pm 3\%$ of upper range limit (4.5% for Range Code 0) for one year following DBE.

Both Output Codes

Chemical Spray:

Composition is 0.28 molar boric acid, 0.064 molar sodium thiosulfate, and sodium hydroxide as required to make an initial pH of 11.0 and a subsequent pH ranging from 8.5 to 11.0. Chemical spray is sprayed at a rate of 0.25 gal/min/ft².

Quality Assurance Program:

In accordance with NQA-1, 10CFR50 Appendix B, and ISO 9001:2000

Nuclear Cleaning:

To 1 ppm maximum chloride content.

Hydrostatic Testing:

To 150% of maximum working pressure or 2,000 psi, (13.8 MPa), whichever is greater.

Traceability:

In accordance with NQA-1 and 10CFR50 Appendix B; chemical and physical material certification of pressure-retaining parts.

Product Data Sheet

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Qualified Life:

Dependent on continuous ambient temperature at the installation site (see Figure 2). Replacement of the amplifier and calibration circuit boards at the end of their qualified life permits extension of the transmitter qualified life to the module qualified life. Details of the test are in the Rosemount Report D8300040.





PERFORMANCE SPECIFICATIONS

Based on zero-based ranges under reference conditions.

Accuracy

±0.25% of calibrated span; includes combined effects of linearity, hysteresis, and repeatability.

Dead Band

None

Drift

 $\pm 0.2\%$ of upper range limit for 30 months ($\pm 0.3\%$ of upper range limit for Range Code 0).

Temperature Effect

Per 100 °F (55.6 °C) ambient temperature change.

Range Code	Temperature Effect
3	±(1.5% of upper range limit + 1.0% span)
4-9	±(0.75% of upper range limit + 0.5% span)
0	±(1.13% of upper range limit + 0.5% span)

Overpressure Effect

Rosemount 1153DD:

Maximum zero shift after 2,000 psi (13.8 MPa) overpressure:

Range Code	Overpressure Effect
3, 4	±0.25% of upper range limit
5	±1.0% of upper range limit
6, 7	±3.0% of upper range limit
8	±6.0% of upper range limit

Rosemount 1153HD

Maximum zero shift after 3,000 psi (20.68 MPa) overpressure:

Range Code	Overpressure Effect
4	±1.0% of upper range limit
5	±2.0% of upper range limit
6, 7	±5.0% of upper range limit

Rosemount 1153GD and 1153AD

Maximum zero shift after 2,000 psi (13.8 MPa) overpressure:

Range Code	Overpressure Effect
3, 4	±0.25% of upper range limit
5-8	±1.0% of upper range limit

Maximum zero shift after 4,500 psi (31.0 MPa) overpressure:

Range Code	Overpressure Effect
9	±0.5% of upper range limit

Maximum zero shift after 6,000 psi (41.34 MPa) overpressure:

Range Code	Overpressure Effect
0	±0.25% of upper range limit

Static Pressure Zero Effect

Rosemount 1153DD: Per 1,000 psi (6.89 MPa):

Range Code	Zero Effect
4, 5	±0.2% of upper range limit
3, 6 - 8	±0.5% of upper range limit

Rosemount 1153HD:

Per 1,000 psi (6.89 MPa):

Range Code	Zero Effect
All	±0.66% of upper range limit

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Rosemount 1153 Series D

Static Pressure Span Effect

The effect is systematic and can be calibrated out for a particular pressure before installation. Correction uncertainty equals ±0.5% of input reading/1,000 psi (6.89 MPa).

Power Supply Effect

Less than 0.005% of output span per volt

Load Effect

No load effect other than the change in the voltage supply to the transmitter

Mounting Position Effect

No span effect; zero shift of up to 1.5 inH2O (372 Pa), which can be calibrated out

Response Time

Fixed time constant (63%) at 100 °F (37.8 °C) as follows:

Range Code	Response Time
3	2 seconds or less
4	0.5 seconds or less
5-9, 0	0.2 seconds or less

Adjustable damping is available through a special N Option.

FUNCTIONAL SPECIFICATIONS

Service

Liquid, gas, or vapor

Output

4-20 mA dc

Power Supply

Load limits are as shown in Figure 3 and Figure 4.





Span and Zero

Continually adjustable externally

Zero Elevation and Suppression

Maximum zero elevation: 600% of calibrated span (400% of calibrated span for Range Code 0)

Maximum zero suppression: 500% of calibrated span (300% of calibrated span for Range Code 0)

Zero elevation and suppression must be such that neither the calibrated span nor the upper or lower range value exceeds 100% of the upper range limit.

Temperature Limits

Normal Operating Limits: 40 to 200 °F (4.4 to 93.3 °C)

Qualified storage limits: -40 to 120 °F (-40 to 48.9 °C)

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Humidity Limits

0-100% relative humidity (NEMA 4X)

Volumetric Displacement

Less than 0.01 in³ (0.16 cm³)

Turn-On Time

2 seconds maximum. No warm-up required.

Pressure Ranges

Rosemount 1153DD and 1153HD:

Range Code	Pressure Ranges
3	0-5 to 0-30 inH2O (D units only)
	(0-1.24 to 0-7.46 kPa)
4	0-25 to 0-150 inH2O (0-6.22 to 0-37.3 kPa)
5	0-125 to 0-750 inH2O
	(0–31.08 to 0–186.4 kPa)
6.	0–17 to 0–100 psi (0–0.12 to 0–0.69 MPa)
7	0-50 to 0-300 psi (0-0.34 to 0-2.07 MPa)
8	0–170 to 0–1,000 psi (D units only) (0–1.17 to 0–6.89 MPa)

Rosemount 1153GD and 1153AD

Range Code	Pressure Ranges
3	0-5 to 0-30 inH2O (G units only)
	(0–1.24 to 0–7.46 kPa)
4	0-25 to 0-150 inH2O (G Units Only)
	(0–6.22 to 0–37.3 kPa)
5	0-125 to 0-750 inH2O
	(0–31.08 to 0–186.4 kPa)
6	0-17 to 0-100 psi (0-0.12 to 0-0.69 MPa)
7	0-50 to 0-300 psi (0-0.34 to 0-2.07 MPa)
8	0–170 to 0–1,000 psi
	(0-1.17 to 0-6.89 MPa)
9	0-500 to 0-3,000 psi (G units only)
	(0-3.45 to 0-20.68 MPa)
0	0-1,000 to 0-4,000 psi (G units only)
- 도양학교 하나는	(0-6.89 to 0-27.56 MPa)

Maximum Working Pressure

Rosemount 1153DD and 1153HD: Static pressure limit

Rosemount 1153GD and 1153AD: Upper range limit

Static Pressure and Overpressure Limits

Rosemount 1153DD:

0.5 psia to 2,000 psig (3.4 kPa abs to 13.8 MPa) maximum rated static pressure for operation within specifications; overpressure limit is 2,000 psig (13.8 MPa) on either side without damage to the transmitter

Rosemount 1153 Series D

Rosemount 1153HD:

0.5 psia to 3,000 psig (3.4 kPa abs to 20.7 MPa) maximum rated static pressure for operation within specifications; overpressure limit is 3,000 psig (20.7 MPa) on either side without damage to the transmitter

Overpressure Limits

Rosemount 1153GD and Rosemount 1153AD:

Operates within specifications from 0.5 psia (3.4 kPa abs) to upper range limit. Overpressure limits without damage to the transmitter are:

Range Code	Overpressure Limit
3-8	2,000 psig (13.8 MPa)
9	4,500 psig (31.0 MPa)
0	6,000 psig (41.34 MPa)

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Rosemount 1153 Series D

PHYSICAL SPECIFICATIONS

Materials of Construction

Isolating Diaphragms: 316L SST

Drain/Vent Valves: 316 SST

Process Flanges: CF–8M (cast version of 316 SST)

Process O-rings: 316L SST

Electronics Housing O-rings: Ethylene propylene

Fill Fluid: Silicone oil Flange Bolts and Nuts: Plated alloy steel, per ASTM A-540

Electronics Housing: 316 SST

Mounting Bracket: 316L SST

Mounting Bolts (Bracket to Transmitter): SAE J429 Carbon steel, Grade 2 or Grade 5

Process Connections

³/₈-in. Swagelok compression fitting, 316 SST (¹/₄-18 NPT optional)

Electrical Connections

¹/2-14 NPT conduit with screw terminals **Weight**

24 lb (10.9 kg) including mounting bracket.



FIGURE 5. Rosemount 1153 Series D Pressure Transmitter. Exploded view.

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FIGURE 6. Electric Block Diagram

FIGURE 7. Transmitter Wiring Diagram



Rosemount 1153 Series D

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Standard Accessories

All models are shipped with a mounting bracket. One instruction manual is included with each shipment.

Calibration

Transmitters are factory calibrated to the customer's specified range. If calibration is not specified, transmitters are calibrated at maximum range. Calibration is at reference conditions (ambient temperature and pressure).

Options

Consult the N-Options Product Data Sheet 00813-0100-2655 or call Rosemount Nuclear Instruments, Inc. for special transmitter needs.

Tagging

The transmitter will be tagged, at no charge, in accordance with customer requirements (96 characters maximum). All tags are SST. The standard tag is permanently attached to the transmitter. Standard tag character height is 0.125 in. (3.18 mm). A wire-on tag is available on request.

Documentation

Certification is provided for each Rosemount 1153 Series D Pressure Transmitter for accuracy, special cleaning, hydrostatic testing, and traceability. Chemical and physical reports and identification of pressure retaining parts are on file at Rosemount Nuclear Instruments, Inc.

Product Data Sheet

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Model	Product Description					
1153	Alphaline Pressure Transmitters for Nuclear Applications					
Code	Pressure Measurement	Pressure Measurement				
D H A G	Differential Pressure; 2,000 psig (13.8 MPa) Static Pressure Rating Differential Pressure; 3,000 psig (20.68 MPa) Static Pressure Rating Absolute Pressure Gage Pressure					
Code	Series					
D	SST Housing; qualified per II	EEE Std 323-1974 and IEEE Std	344-1975			
		Pressure Ran	nges at 68 °F			
Code	Rosemount 1153D (Differential)	Rosemount 1153H (Differential)	Rosemount 1153A (Absolute)	Rosemount 1153G (Gage)		
3	0–5 to 0–30 inH ₂ O (0–1.24 to 0–7.46 kPa)	N/A	N/A	0–5 to 0–30 inH ₂ O (0–1.24 to 0–7.46 kPa)		
4	0–25 to 0–150 inH ₂ O (0–6.22 to 0–37.3 kPa)	0–25 to 0–150 inH ₂ O (0–6.22 to 0–37.3 kPa)	N/A	0–25 to 0–150 inH ₂ O (0–6.22 to 0–37.3 kPa)		
5	0–125 to 0–750 inH ₂ O (0–31.08 to 0–186.4 kPa)	0–125 to 0–750 inH ₂ O (0–31.08 to 0–186.4 kPa)	0–125 to 0–750 inH ₂ O (0–31.08 to 0–186.4 kPa)	0–125 to 0–750 inH ₂ O (0–31.08 to 0–186.4 kPa)		
6	0–17 to 0–100 psi (0–0.12 to 0–0.69 MPa)	0–17 to 0–100 psi (0–0.12 to 0–0.69 MPa)	0–17 to 0–100 psia (0–0.12 to 0–0.69 MPa)	0–17 to 0–100 psi (0–0.12 to 0–0.69 MPa)		
7	0–50 to 0–300 psi (0–0.34 to 0–2.07 MPa)	0–50 to 0–300 psi (0–0.34 to 0–2.07 MPa)	0–50 to 0–300 psia (0–0.34 to 0–2.07 MPa)	0–50 to 0–300 psi (0–0.34 to 0–2.07 MPa)		
8	0–170 to 0–1,000 psi (0–1.17 to 0–6.89 MPa)	N/A	0–170 to 0–1,000 psia (0–1.17 to 0–6.89 MPa)	0–170 to 0–1,000 psi (0–1.17 to 0–6.89 MPa)		
9	N/A	N/A	N/A	0–500 to 0–3,000 psi (0–3.45 to 0–20.68 MPa)		
0	N/A	N/A	N/A	0–1,000 to 0–4,000 psi (0–6.89 to 0–27.56 MPa)		
Code	Output					
P R ⁽¹⁾	Standard 4–20 mA Improved Radiation Performa	ance, 420 mA				
Code	Flange Option	Flange Option				
A B ⁽²⁾ C ⁽²⁾ D E ⁽²⁾ F ⁽²⁾ G H J ⁽²⁾	A Weided */&-in. Swagelok Compression Fitting Process Connection and Weided Drain/Vent Valve B ⁽²⁾ 1/4-18 NPT Process Connection and Weided Drain/Vent Valve C ⁽²⁾ 1/4-18 NPT Process Connection and Drain Hole (Drain/Vent Valve Not Included) D One Flange Option Code A and one Remote Seal E ⁽²⁾ One Flange Option Code B and one Remote Seal F ⁽²⁾ One Flange Option Code C and one Remote Seal G Two Remote Seals H Welded ³ /8-in. Swagelok Compression Fitting on Process Connection and Drain/Vent Connection J ⁽²⁾ Welded ³ /8-in. Swagelok Compression Fitting Process Connection and ¹ /4-18 NPT Drain Hole					
M ⁽²⁾	One Flange Option Code H and one Remote Seal One Flange Option Code J and one Remote Seal					

ORDERING INFORMATION

(1) The Rosemount 1153 Series D with the Output Code R Electronics is also available with adjustable damping. Specify this option by adding "N0037" to the end of the complete model number. For example: 1153DD4RA**N0037**.

(2) Customer assumes responsibility for qualifying connection interfaces on this option. Contact Rosemount Nuclear Instruments, Inc. for details.

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Rosemount Nuclear Instuments, Inc. satisfies all obligations coming from legislation to harmonize product requirements in the European Union.







DVAdillandada - A DMDDD/TE20ED

Baystation

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Bulletin 04L41B01-01E

YOKOGAW

IPEC00269822



Evolved features for greater utility

The evolution of the global standard in paperless recorders has reached the next stage - the DAQSTATION DXAdvanced series R4 (release 4). Its basic functions have been further enhanced with an expanded security function option providing FDA 21 CFR Part 11 compliance, making it ideal for a broadening range of applications, such as in pharmaceutical manufacturing.

Basic magniture

- . Up to 48 channels of input
- · User can start/stop recording by batch, and create
 - data files! · Expandable to up to 348 channels with the MW100 automatic connection function

Obspacy & Operation

- · Arrange the display your way with a custom display function
- · Review historical data with date and time calendar
- search functions

Manual Constants

- Standard Ethernet interface Supports the PROFIBUS-DP and EtherNet/IP protocols!
- · Expanded Web and networking functions!

Reliability one Security

- and a Base - C 1 · Dust- and splash-proof front panel (IP65, NEMA4 compliant) · Highly reliable internal memory with error-correction function
- · Front panel door lock and login function

Application Software

· Software for a variety of tasks including analysis, settings, and acquisition DAOSTANDARD: Supports settings and data file analysis DAQStudio: Builder software for custom displays DAQWORX: Integrated Data Acquisition Software Suite DAQManager: Data management Software



vıgılant The clear path to operational excellence







2





High Capacity Internal Memory

Standard-equipped internal memory greatly increased (to 400 MB). Even longer recording durations, and multichannel recording.

Measurement CH = 30 channels. Computation CH = 0 channels.

	DX2000 (400 MB)
Display update (minute/div)	30 minutes
Save interval (s)	60 s
Total sample time	Approx. 5 years

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Measurement CH = 30 channels. Computation CH = 0 channels.

	DX2000 (400 MB)
Save interval (s)	1 s
Total sample time	Approx. 2 months

Compact Iach Removable Storage Usah.

All DXAdvanced models include a CompactFlash drive. Rugged and readily available CompactFlash cards (CF cards) serve as the removable media, and are available as optional accessories. Up to 2 GB CF card supported.



Media FIFO Function

This function ensures that the CF card always retains the latest data when files are saved to it automatically. When the CF card is full, the oldest files are deleted to make room for the newest files. The media FIFO function allows you to use the DX continuously for long periods of time without having to change the CF card.



Optional USB Flash Drive

A USB flash drive can be used to transfer data to your PC. The optional front panel USB port also allows an external PC keyboard to be used with the DXAdvanced to facilitate setting and text entry.



Calibration correction schedule

This function provides control of the input value correction schedule. Following a predetermined schedule, DXAdvanced displays a message prompting the user to perform input value correction. This is convenient, for example, in Nadcap* related heat treatment applications.

*Nadcap: National Aerospace and Defense Contractors Accreditation Program



Calibration schedule setting

Message to prompt calibration

6

Excel report template function

Reports can be created automatically using a spreadsheet template created in Excel. Reports are created in Excel format, greatly reducing time and effort spent on making spreadsheets.



SPECIFICATIONS See the general specifications (GS 0/41/41B01-0/1E, 0/41/42B01-0/1E) for the detailed specification

STANDARD SPE	CIFICAT	IONS		
General Specificatio	ns			
Construction Mounting:	Fiu Mo	Flush panel mounting (on a vertical plane) Mounting may be inclined downward up to 30		
Allowable Panel Thickness Front Panel:		degrees from a horizontal plane. s:2 to 26 mm Water and dust-proof		
• Input	(ba	sed on IEC529-IP65 and NEMA No.250	≀TYPE4*)	
Number of Inputs:	24	L 6 12 channels		
DX2000:	4, 8	3, 10, 20, 30, 40, 48 channels		
DX1002, DX1004,	ai. DX2004,	DX2008:		
DX1006, DX1012,	125 DX2010, 1 s	6 ms, 250 ms, 25 ms (fast sampling mod DX2020, DX2030, DX2040, DX2048; (Not available when A/D integration tim ms) 2.5 5 a 105 ms (fast sampling m	le*) e is set to	
	* A/	D integration time is fixed to 1.67 ms in case o	f fast	
Inputs:	sa DC TC	mpiing mode. V (20, 60, 200 mV, 2, 6, 20, 50 V, 1-5 V (R, S, B, K, E, J, T, N, W, L, U, WRe))	
	RTI DI (⊃ (Pt100, JPt100) 'Contact input, TTL level)		
	DC.	A (With external shunt resistor attached) Disela (
Input	Range	(when the integration time is 16.7 ms or more)	resolution	
Thermocouple*	1-5 V К	±(0.15% of rdg+3 digits) ±(0.15% of rdg+0.7°C)	0.1°C	
Resistance thermometer detector	Pt100	±(0.15% of rdg+0.3°C)	0.1°C	
* Does not include the a	accuracy o	f reference junction compensation		
 Display Display unit: 				
DX1000: DX2000:	5.5- 10.4	inch TFT color LCD (320 x 240 pixels) 4-inch TFT color LCD (640 x 480 pixels)	,	
Display group: Number of display:	DX	1000: 10 groups, DX2000: 36 groups		
Number of assignal	ole chann DX	els for one group: 1000: 6 channels, DX2000: 10 channels	;	
Trend/Bargraph: Background:	Sel Wh	ectable from 24 colors ite or black selectable		
Trend display: Trend display type:	Ver circ	tical, horizontal, landscape, horizontal s ular* selectable	plit or	
Bargraph display:	* Cir	cular display is only for DX2000.		
Direction: Digital indication: Display repowal rate	Ver	tical or horizontal selectable		
Overview display:	c. 13			
Number of Indicatio	n channe Mea	asuring values and alarm status of all ch	annels	
Information display:	Alaı info stat	Alarm summary, message summary, memory information, report information, relay status, Modbus status		
Tag display: Tag number and con	nment dis	play		
rag namber and con	No. Ta	of displayable characters g no :16 max		
Displayable charact	Ta ers: Tag Tag Chii	Tag comment :32max Tag no.: Alphanumerics Tag comments: Alphanumerics, Japanese, and		
Messages:		haractore maximum		
Number of message Data referencing fun	ed: 100 ction:Disp data	messages (including 10 free messages lay the retrieved data (display data or e) from internal or external memory	s) event	
Custom display funct User can change dis and attributes, and as	ion: play object	ct (trend, numeric, and bar graphs, etc.)	sizes	
No. of screens: Max no. of placeabl	28 (i e display	3 from internal memory, 25 from external m objects:	iedia (CF))	
	134 bitm	(normal: 80, scale: 4, trend: 4, list: 4, gr hap: 2)	арпіс: 40,	
Data Saving Function External storage med	n Jium:			
iviedium: Internal memory:	Con	npact-iash memory card (CF card)		
Medium:	Flas	sn memory		

Capacity: Maximum number of file	400MB es can be saved: 400 files (total number of display data file and event data file)
Alarm Function Number of alarm levels: Alarm types:	Up to four levels for each channel High and low limits, differential high and low limits, high and low rate-of-change limits and delay high and low
 Alarm annunciator function Alarm display based on a Supported alarm sequen Event action function 	on: alarm sequence, and relay output operation. ces: 3 (ISA-A-4, ISA-A, ISA-M)
General: Number of event action: • Security functions *	Particular action can be executed by particular event. 40 actions can be set
General:	Login function or key lock function can be set for each key operation or communication operation.
Key lock function:	On/off and password can be set for each operation key and FUNC operation.
Login function:	User name and password to login can be set. • Please refer the Advanced security function option (/AS1) for the models with the /AS1 option.
Clock Clock:	With calendar function (year of grace)
Clock accuracy:	±10 ppm, excluding a delay (of 1 second, maximum) caused each time the power is turned on.
DST function (summer/w	The time):
	adjustment is automatically calculated and configured.
Communication Function Connection:	S Ethernet (10BASE_T)
Protocols:	TCP, UDP, IP, ICMP, ARP, DHCP, HTTP, FTP, SMTP, SNTP, Modbus, DX private
E-mail inform function:	
FTP client function: Transferred data file, FT function, SNTP server fit	P server function, Web server function, SNTP client unction, DHCP client function, Modbus client function,
EtherNet/IP server	Connects to EtherNet/IP networks as an Adapter (Server).
• Batch function General:	Data display and data management with batch name, text field function and batch comment function are available
Power Supply	
Rated power supply: Allowable power supply v	100 to 240 VAC (automatic switching) voltage range:
Rated power supply frequence	90 to 132 or 180 to 264 VAC Jency:
Power consumption:	50/60 Hz (automatic switching)
	DX1000: 60 VA (max., for 240 VAC power supply) DX2000: 100 VA (max., for 240 VAC power supply)
Normal Operating Co	nditions
Power voltage:	90 to 132 or 180 to 250 VAC
Power supply frequency: Ambient temperature:	50 Hz ±2%, 60 Hz ±2% 0 to 50 °C
Ambient humidity:	20% to 80% RH (at 5 to 40 °C)
SPECIFICATIONS OF	OPTIONAL FUNCTIONS
Alarm Output Relays (/A	I, /A2, /A3, /A4*, /A5*)
An alarm signal is output Number or output:	from the rear panel as a relay contact signal. Select from 2, 4, 6, 12* and 24* points * Only for DX2000.
Serial Communication Int Connection: Protocols: Setting/measurement set	erface (/C2, /C3) EIA RS-232 (/C2) or RS-422A/485 (/C3) DX private protocol, Modbus(master/slave) protocol ver function:
	Operation, setting or output of measurement data
Modbus communication:	Operation, setting or output of measurement data are available by DX private protocol. Reading or writing of measurement data on other instruments are available by Modbus protocol.* */M1 option or /MC1 option is required to read data from other instrument.
Modbus communication: • VGA Video Output (/D5) Resolution:	Operation, setting or output of measurement data are available by DX private protocol. Reading or writing of measurement data on other instruments are available by Modbus protocol.* * /M1 option or /MC1 option is required to read data from other instrument. 640 x 480 pixels (VGA)

 Fail/Status Output (/F1) The relay contact output on the rear panel indicates the occurrence of CPU failure or selected status.

			and a second
Fail & Alarm Output Rel	ays 22 points (/F2, only for DX2000)	PROFIBUS-DP master	devices can access the following internal data.
Combination of "Fail/Si	latus output function" and "Alarm output relays 22	Load measurement cha	annel data
points".	((12)	Load MATH channel da	
 Clamped input Terminal 	(/HZ) ((detachable type) is used for input terminal	Node address setting r	appe: 0 to 125
Desk Ton Type (/H5LL/	H5*)	Interface:	PROFIBUS-DP-V0 Slave
Provides carrying band	tie and nower cord	Transmission medium:	2 dedicated cables
* /H5 is only for 24 VDC/AC	power supply model (/P1), and does not include power code.	Transmission speed/distanc/	e: 9.6 kbps/1200 m to 12 Mbps/100 m
Mathematical Functions	(/M1)	Termination resistance:	None (requires external termination resistance)
Used for calculating da	ita, displaying trends and digital values, and recording	 Advanced security funct 	ion (/AS1)
calculated data assignment	ed to channels.	Security and electronic r	ecord/signature functions have been added that are
Channel assignable to	calculated data:	compliant with the USA'	s FDA title 21 CFR Part 11.
DX1002, DX1004:	12 channels, DX1006, DX1012: 24 channels	Data anti-tamper functio	n:Settings and measured data are saved as encrypted
DX2004, DX2008:	Up to 12 channels		binary files.
DX2010, DX2020, D	X2030, DX2040, DX2048: 60 channels	Login function:	Using the login function (user name, user ID and
General anthmatic or	parations. Statistical operations. Special operations		password), you can enter security settings on the
Conditional operation	n	liser level and number c	installent
Constant	Up to 60 constants (K01 to K60)	System administrator	5 users (all can be operated)
Report functions:	op to to constante (no rice rice)	General user:	90 users
Report type:	Hourly, daily, hourly + daily, daily +weekly and daily	Electronic signature func	stion:
(op o) F	+ monthly	aneed office anglisates of ane	After checking data that has finished being recorded.
Operation:	Max. 4 types are selectable from average, maximum.		you can add three levels of electronic signature.
,	minimum, instantaneous and summation		select a pass/fail, and enter comments
• Cu10, Cu25 RTD Input /	3 leg isolated RTD input (/N1)	Audit Trail Function:	The settings change log and the operation log when
This option allows Cu1	0 and Cu25 inputs to be added to the standard input		the change was made are saved.
types.	•	Password management f	unction:
 3 legs Isolated RTD Inpu 	ıt (/N2*)		Logins are verified by a Kerberos authentication server
A, B, b legs are of isola	ited input type.		
* Only forDX1006, DX1012,	, DX2010, DX2020, DX2030, DX2040 and DX2048.	Dimensions	
 Extended Input Types (// 	V3)		
This option allows extra	a inputs types as below to be added to the standard	DV/JOOO #	5 27) Broad D. In J. & Storman L. Hould - country
input types.		DX1000	2851 Sree-Intensity (concret: inch)
IC: Kp VS AU/Fe, PLA	TINEL, PR40-20, NINIMO, WWWre26, Typen (AVVG14)		
R1D: Pt25, Pt50, Ni100) (SAMA), NI100 (DIN), NI120, J263*B, C053, C0100,	1-1-	
P146, P1200	5. (DA)	let let	
 24 VDC/AC Power Supp 	ly (/P1)		
Rated power supply:	24 VDC of 24 VAC (50/60Hz)		
Allowable power supply	voltage range:		MAX 226.5 (9.2010/12 or #7410
Man anna an an an Air	21.6 to 26.4 VDC/AC		515 (5.64) 24.0 274.1 (8.82)
wax, power consumption		40.6.11	200 2 to 20 v E
	DX1000, 26 VA (24 VDC), 45 VA (24 VAC (50/60 Hz))		
- Remete Costrol (/R1)	DX2000, 45 VA (24 VDC), 70 VA (24 VAC (50/00 H2))	- 1	
This option allows eight f	functions to be controlled remotely by a contact juput	3	
 24 VDC transmitter now 	er sunnly (/TPS2* /TPS4 /TPS8*)	8 0	
Output voltage:	22.8 to 25.2 VDC (rated load current)	103.	3 (78.0) 12
Rated output current:	4 to 20 mADG	14.03	7) (1.11 Udmerwan offer murding
fiction on a super content.	* /TPS2 is only far DX1000. /TPS8 is only for DX2000		Panel Culcul + Sconno
 Easy text entry (/KB1, /K 	B2)	DY2000	280211100 P
Remote control terminal	is available to operate the DX.	DAZOUU	
Number of units that can	be controlled:	ļ	
	Max. 32 units by ID setting		
USB interface (/USB1)		1	⋈⋓ <mark>⋈</mark> ⋓⋛⋛ ⋕∊⋕∊⋕⋠∊⋠∊⋕ ⋰
USB interface specification	r: Based on Rev1.1, host function	IJ	
Number of ports:	2 ports (Front and rear panel)		171.034
Available USB devices:		-	lim. space for mounting)
Keyboard:	104/89 keyboard (US) based on USB HID Class		MAX 225 (5.90) U-2 pr (PHD) 205 7 (11A7) 27 3
	Ver.1.1	F	
External medium:	USB flash drive (Some of the USB flash drive may	h	150 (7.0%) 2 is 28
	not be supported by DXAdvanced.)		(DECHM Restrement)
Pulse input (/PM1)			
Pulse input option inclu-	des mathematical functions option (/M1) and remote		
control option (/R1).		_ 	
Number of inputs:	3 points (8 points are available in case of using	60 Z	
	remote inputs)	8	
input format:	Photocoupler isolation (shared common)		
o	Isolated power supply for input terminal (approx. 5 V)		
Galibration correction fun	iction (/CC1)	_	<u>543</u> (2 10) <u>132</u> (1 26) 26
Corrects the measurem	ent value of each channel using segment linearizer	16 T	Si Isaachakan arrist aburnangit
approximation.			
approximation. Number of segment point	nts: 2 to 16	I wo panel brackets are us	sed in panel-mounting the DX1000 and DX2000. They
approximation. Number of segment poin External input function (A	nts: 2 to 16 VIC1, only for DX2000)	may be used either on the	sed in panel-mounting the DX1000 and DX2000. They left and right or top and bottom. See Yokogawa's
approximation. Number of segment poin External input function (A Digital input channels vi	nts: 2 to 16 MC1, only for DX2000) 'a communication are extended to input data from	may be used either on the General Specification (GS	sed in panel-mounting the DX1000 and DX2000. They left and right or top and bottom. See Yokogawa's 04L41B01-01E) for information on panel cutting
approximation. Number of segment poin External input function (<i>R</i> Digital input channels vi other instruments.	nts: 2 to 16 MC1, only for DX2000) la communication are extended to input data from	Two panel brackets are us may be used either on the General Specification (GS dimensions for DX1000 ve Indirated tolerated by 200	sed in panel-mounting the DX1000 and DX2000. They left and right or top and bottom. See Yokogawa's 04L41B01-01E) for information on panel cutting ertical or horizontal attachments. Unless otherwise
approximation. Number of segment poin External input function (// Digital input channels vi other instruments. Number of external input	nts: 2 to 16 MG1, only for DX2000) la communication are extended to input data from t channels:	Two panel brackets are us may be used either on the General Specification (GS dimensions for DX1000 ve indicated, tolerance is ±3%	sed in panel-mounting the DX1000 and DX2000. They left and right or top and bottom. See Yokogawa's 04L41B01-01E) for information on panel cutting ertical or horizontal attachments. Unless otherwise & (or ±0.3 mm for dimensions under 10 mm).
approximation. Number of segment poin External input function (// Digital input channels vi other instruments. Number of external inpu	nts: 2 to 16 MC1, only for DX2000) la communication are extended to input data from it channels: Up to 240 channels (channel number: 201 to 440)	I wo panel brackets are us may be used either on the General Specification (GS dimensions for DX1000 ve indicated, tolerance is ±3% Dagstation and DXAdvanced a	sed in panel-mounting the DX1000 and DX2000, They left and right or top and bottom. See Yokogawa's 04L41B01-01E) for information on panel cutting rrtical or honzontal attachments. Unless otherwise & (or ±0.3 mm for dimensions under 10 mm), are registered trademark of Yokogawa Electric Corporation.
approximation. Number of segment poin External input function (/ Digital input channels vi other instruments. Number of external inpu * Only for DX2010, DX2020,	nts: 2 to 16 MC1, only for DX2000) la communication are extended to input data from it channels: Up to 240 channels (channel number: 201 to 440) DX2030, DX2040 and DX2048	Two panel brackets are uz may be used either on the General Specification (GS dimensions for DX1000 ve indicated, tolerance is ±3% Dagstation and DXAdvanced a Microsoft, MS, and Windows a	sed in panel-mounting the DX1000 and DX2000, They left and right or top and bottom. See Yokogawa's 04L41B01-01E) for information on panel cutting rrtical or horizontal attachments. Unless otherwise & (or ±0.3 mm for dimensions under 10 mm), are registered trademark of Yokogawa Electric Corporation, re registered trademarks or trademarks of Microsoft
approximation. Number of segment poin External input function (# Digital input channels vi other instruments. Number of external inpu * Only for DX2010, DX2020, * Fast sampling mode is not	nts: 2 to 16 MC1, only for DX2000) la communication are extended to input data from it channels: Up to 240 channels (channel number: 201 to 440) DX2030, DX2040 and DX2048 available when external input option is equipped.	I wo panel brackets are uz may be used either on the General Specification (GS dimensions for DX1000 ve indicated, tolerance is ±39 Dagstation and DXAdvanced a Microsoft, MS, and Windows a Corporation in the United State	sed in panel-mounting the DX1000 and DX2000. They left and right or top and bottom. See Yokogawa's 04L41B01-01E) for information on panel cutting ertical or horizontal attachments. Unless otherwise & (or ±0.3 mm for dimensions under 10 mm), are registered trademarks of Yokogawa Electric Corporation, re registered trademarks or trademarks of Microsoft es and other countries.
approximation. Number of segment poi. External input function (<i>i</i> Digital input channels vi other instruments. Number of external input * Only for DX2010, DX2020, * Fast sampling mode is not Multibatch function (/BT2	nts: 2 to 16 MG1, only for DX2000) la communication are extended to input data from it channels: Up to 240 channels (channel number: 201 to 440) DX2030, DX2040 and DX2048 available when external input option is equipped.	Two panel brackets are us may be used either on the General Specification (GS dimensions for DX1000 ve indicated, tolerance is ±3% Dagstation and DXAdvanced a Microsoft, MS, and Windows a Corporation in the United State Pentium are registered tradem	sed in panel-mounting the DX1000 and DX2000. They left and right or top and bottom. See Yokogawa's 04L41B01-01E) for information on panel cutting ertical or horizontal attachments. Unless otherwise & (or ±0.3 mm for dimensions under 10 mm), are registered trademark of Yokogawa Electric Corporation. re registered trademarks of trademarks of Microsoft es and other countries. arks of Intel Corporation.
approximation. Number of segment poi. External input function (<i>I</i> Digital input channels vi other instruments. Number of external input * Only for DX2010, DX2020, * Fast sampling mode is not Multibatch function (<i>I</i> BT2 User can start/stop recor-	nts: 2 to 16 MG1, only for DX2000) la communication are extended to input data from it channels: Up to 240 channels (channel number: 201 to 440) . DX2030, DX2040 and DX2048 available when external input option is equipped.) ding independently by batch, and create data files. DX1000: 41 to 5 (DX1006 DX101 a critic)	Two panel brackets are us may be used either on the General Specification (GS dimensions for DX1000 ve indicated, tolerance is ±39 Dagstation and DXAdvanced a Microsoft, MS, and Windows a Corporation in the United State Pentium are registered tradem Ethernet is a registered tradem	sed in panel-mounting the DX1000 and DX2000. They left and right or top and bottom. See Yokogawa's 04L41B01-01E) for information on panel cutting ertical or horizontal attachments. Unless otherwise & (or ±0.3 mm for dimensions under 10 mm), are registered trademarks of Yokogawa Electric Corporation, re registered trademarks or trademarks of Microsoft as and other countries. arks of Intel Corporation, arks of Xerox Corporation, arks of Let Constraints of the Netherland
approximation. Number of segment poi External input function (// Digital input channels vi other instruments. Number of external inpu * Only for DX2010, DX2020, * Fast sampling mode is not Multibatch function (/BT2 User can start/stop recom No. of multibatches:	nts: 2 to 16 MC1, only for DX2000) la communication are extended to input data from it channels: Up to 240 channels (channel number: 201 to 440) DX2030, DX2040 and DX2048 available when external input option is equipped.) ding independently by batch, and create data files. DX1000: 2 to 5 (DX1006,DX1012 only) DX2000: 2 to 12	Two panel brackets are us may be used either on the General Specification (GS dimensions for DX1000 ve indicated, tolerance is ±39 Dagstation and DXAdvanced a Microsoft, MS, and Windows a Corporation in the United State Pentium are registered tradem Ethernet is a registered tradem Modbus is a registered tradem	sed in panel-mounting the DX1000 and DX2000. They left and right or top and bottom. See Yokogawa's 04L41B01-01E) for information on panel cutting prtical or horizontal attachments. Unless otherwise & (or ±0.3 mm for dimensions under 10 mm), are registered trademarks of Yokogawa Electric Corporation, re registered trademarks or trademarks of Microsoft es and other countries, arks of Intel Corporation, nark of Xerox Corporation, ark of AEG Schneider Automation Inc.
approximation. Number of segment poi External input function (<i>i</i> Digital input channels vi other instruments. Number of external inpu * Only for DX2010, DX2020, * Fast sampling mode is not Multibatch function (/BT2 User can start/stop recom No. of multibatches:	nts: 2 to 16 MC1, only for DX2000) la communication are extended to input data from lit channels: Up to 240 channels (channel number: 201 to 440) DX2030, DX2040 and DX2048 available when external input option is equipped.) ding independently by batch, and create data files. DX1000: 2 to 6 (DX1006,DX1012 only) DX20200: 2 to 12 (DX2040 DX2020 DX2000 DX20	Two panel brackets are tu may be used either on the General Specification (GS dimensions for DX1000 ve indicated, tolerance is ±39 Dagstation and DXAdvanced a Microsoft, MS, and Windows a Corporation in the United State Pentium are registered tradem Modtus is a registered tradem Other company names and pro-	sed in panel-mounting the DX1000 and DX2000. They left and right or top and bottom. See Yokogawa's 04L41B01-01E) for information on panel cutting ertical or horizontal attachments. Unless otherwise & (or ±0.3 mm for dimensions under 10 mm). are registered trademarks or trademarks of Microsoft er ergistered trademarks or trademarks of Microsoft es and other countries. arks of Intel Corporation. ark of AEG Schneider Automation Inc. oduct mames appearing in this document are registered bott recomptibility bolder.

Model code	Suffix	Optional code	Description
DX1002			2ch, 125ms (Fast sampling mode: 25ms)
DX1004			4ch. 125ms (Fast sampling mode: 25ms)
DX1006			6ch. 1s (Fast sampling mode: 125ms)
DX1012			12ch, 1s (Fast sampling mode: 125ms)
Internal memory	-3		400MB
External media	1 -4		CF card (with media)
Display langua	ge -2		English, degF, DST(summer/winter time)
Options		/A1	Alarm output 2 points *1
		/A2	Alarm output 4 points *1
		/A3	Alarm output 6 points *1 *2
		/C2	RS-232 interface *3
		/C3	RS-422-A/485 interface *3
		/F1	FAIL/Status output *2
		/H2	Clamped input terminal (detachable)
		/H5	Desktop type (for /P1 model, without power code
		6 ICT)	screw type power terminal) *4
		7851	Desktop type '5
		/IV(1)	Mathematical functions
		/N1	CU10 CU25 R TD Input/3 leg Isolated R TD
		/N2	3 led isolated RTU 16
		/N3	Extended input type (PR40-20, Pt50, etc.)
		/121	24VDC/AC power supply
		11.2.4	Claud Ale generation

	71VL F	iviamentatical tur	caons						
	/N1	Cu10.Cu25 RTD	Input/3 leg isolated RTD						
1	/N2	3 leg isolated RT	D *6						
	/N3	/pe (PR40-20, Pt50, etc.)							
1	I/P1	24VDC/AC powe	r supply						
	/R1	Remote control							
	/TPS2	24VDC transmitt	er power supply (2 loops) *7						
	/TPS4	er power supply (4 loops) *8							
	/KB1	Easy text entry ()	with input terminal) *9 *10						
	/KB2	Easy text entry (\	v(thout input terminal) *9						
	/USB1	USB interface							
	/PM1	Pulse input (inclu mathematical fun	iding remote control and ictions) *11						
	/CC1	Calibration correc	tion function						
	/BT2	Multi-batch functi	ons *12						
	/CP1 PROFIBUS-DP functions *3								
	/AS1	Advanced securit	v functions						
 A1, (A2, and (A3 cance together. (A3 and /F1 cance be '3 /C2, (C3 and /CF1 can together. (A case that 24 VDC/AC and desktop type are s /H5 must be specified be specified together. (F1) D: Power cord VL - R: Power cord VL - R: Power cord SC - J: Power cord G 	t be specified to specified to power sup pecified too /P1 and /H ., CSA st'd JE st'd A st'd St'd B st'd	ed *6 /N2 cc DX10 gether, *7 In cas oply (/P1) /A1, / ether, toget 5[] cannot *9 /KB1 4 5[] cannot *9 /KB1 4 10 In ca input *11 In ca /R1, / And c speci 22 /BT2 DX10	an be specified for only DX1005 and 12. e that /TPS2 is specified, /TPS4, /A2, (*F1 cannot be specified logether. e that /TPS4 is specified, /TPS2, 42, /A3 or /F1 cannot be specified is erk. Bit is specified, remote lerminal (438227) is included. se that /PM1 is specified, /A3, /M1, TPS2 or /TPS4 cannot be specified, ombination of /A2/F1 cannot be led together. can be specified for only DX1006, 12.						
APPLICATION SC	FTWAF	RE							
Model code	D	escription	0S						

MODEL AND SUFFIX CODES

Model code	Description	OS
DXA120	DAQSTANDARD	Windows 2000/XP/Vista
DXA170	DAQStudio	Windows XP/Vista
DXA250	DAQManager	Windows XP/Vista

ACCESORIES

Product	Model code (part number)	Specification				
Shunt resister	415920	250Ω±0.1%				
(for screw input terminal)	415921	100Ω±0.1%				
	415922	10Ω±0.1%				
Shunt resister	438920	250Ω±0.1%				
(for clamped input terminal)	438921	100Ω±0.1%				
	438922	10Ω±0.1%				
CF card adapter	772090	-				
CF card	772093	512MB				
	772094	1GB				
Mounting bracket	B9900BX	-				
Door lock key	88706FX					
Remote control terminal	438227	For /KB1, /KB2 option				
Validation documents	438230	For /AS1 option				

DX2000 Suffix Optiona Model code Description code X2004 4ch 125ms(Fast sampling mode: 25ms) 8ch. 125ms(Fast sampling mode: 25ms) X2005 10ch. 1s(Fast sampling mode: 125ms) 20ch. 1s(Fast sampling mode: 125ms) DX2010 X2020 30ch. 1s(Fast sampling mode: 125ms) 40ch. 1s(Fast sampling mode: 125ms) X2030 X2040 X2048 48ch, 1s(Fast sampling mode: 125ms) nternal memory -3 400MB External media -4 CF card (with media) English, degF, DST(summer/winter time) Display language Options Alarm output 2 points *1 141 Alarm output 4 points *1 /A3 Alarm output 6 points *1 /A4 Alarm output 12 points ** /A5 Alarm output 24 points *1 *2 RS-232 interface *3 /C3 RS-422-A/485 interface *3 /D5 VGA output /F1 FAIL/Status output *2 *4 FAIL + Alarm output 22 points *1 *4 Clamped input lerminal (detachable) Desktop type (for /P1 model, without power code, screw type power terminal) *5 142 1-15 /H5[] Desktop type *6 Mathematical functions /M1 Cu10.Cu25 RTD input/3 leg isolated RTD 3 leg isolated RTD *7 N1 /N2Extended input type (PR40-20, Pt50, etc.) N3 /P1 24VDC/AC power supply Remote control 24VDC transmitter power supply (4 loops) *8 24VDC transmitter power supply (8 loops) *9 Easy text entry (with input terminal) *10 *11 R1 TPS4 /TPS8 /KB1 Easy text entry (without input terminal) *10 /KB2 /USB1 USB interface PM Pulse input (including remote control and mathematical functions) *12 Calibration correction function /MC1 External input function *13 Multi-batch functions *14 PROFIBUS-DP functions *3 /BT2 /CP1 /AS1 Advanced security functions I/AS1 IAdvanced security functions *1 /A1, /A2, /A3, /A4, /A5, /F2 cannot be specified together. *7 /A2 can be specified for only DX2010, DX2020, DX2030, DX2040 and DX2048. *2 /A5 and /F1 cannot be specified together. *6 /TPS4, /TPS8, /A5 and /F2 cannot be specified together. *3 /A2, /C3 and /CP1 cannot be specified together. *6 /TPS4, /TPS8, /A5 and /F2 cannot be specified together. *4 /F1 and /F2 cannot be specified together. *9 In case that /TPS8 is specified, combination of /A4/F1 cannot be specified together. *11 m desktop type are specified together. *10 /KB1 and /KB2 cannot be specified together. *16 must be specified together. *10 /KB1 and /KB2 cannot be specified together. *16 must be specified together. *11 in case that /TPS8 is proceified, /C38227 is included. *6 /H5[] FP ever cord VL_CSA st'd *7 /B2 cannot be specified together. *13 /MC1 cannot be specified together. *13 /MC1 can be specified tor only DX2010, *13 /MC1 can be specified tor only DX2010, DX2020, DX2030, DX2040 and DX2048. *14 /B12 can be specified tor only DX2014. *14 /B12 can be specified tor only DX2014.

- /H5 must be specified together.
 /H5[]
 /D: Power cord UL_ CSA std
 /F. Power cord VDE std
 -R: Power cord SAA std
 -J: Power cord S std
 -H: Power cord GS std

RELATED PRODUCT

DXAdvanced Removable Chassis Model () 5. 1000000

Removable Chassis Model featuring

easy maintenance.

 This model enebles you to pull the inner chassis out from the case without having to remove the power supply. communication, and input wiring on the rear panel

NOTICE

- · Before operating the product, read the instruction manual thoroughly for proper and safe operation.
- If this product is for use with a system requiring safeguards that directly involve personnel safety, please contact the Yokogawa sales offices.

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*14 /BT2 can be specified for only DX2010, DX2020, DX2030, DX2040, DX2048.





Attachment 4

Cost Estimate

	ENTERO		EAST									
Indian Point Nuclear Power Station												
* ESTIMATE LEVEL *	EC #: SAMA IP2-021											
Conceptual	PROJECT TITLE: Install Leak Monito	ring	CAPITAL 08M	ESTIMATOR: RCMT								
Preliminary	Instrumentation for ISLOCA Pathway	/ Isolation Valves	PROJECT CODE: TH	3D								
Definitive	JOB LOCATION: Containment & Con	trol Bldgs.		ORIG. DATE: 06/25/2012								
		RIGINATOR:										
	ESTIMATE TOTAL \$4,607,051		REVISIO	N 11-0								
Summary of Change:												
In accordance with NRC en	vironmental regulations in 10 C.F.R. Part	t 51, Entergy perform	ed SAMA analyses for	both Indian Point Nuclear Generating								
license renewal application	and related correspondence with the NR	C Staff Entergy indic	cated that it would subr	mit the potentially cost-beneficial SAMAs								
for further internal engineeri	ng project cost-benefit analysis, even the	ough none of the pote	entially cost-beneficial	SAMAs is related to aging management								
under 10 C.F.R. Part 54. E	ntergy contracted RCM Technologies to	assist it in this effort										
This pool one managed to the	a inclusion that is the NDC's staff rout		and non-idea the task	ningt conclusion and according to a south								
required for implementation	te issue identified in the NRC's staff revi	IEW OF SAMA IPZ-UZ I	and provides the tech	nical resolution and associated costs								
required for implomentation												
For SAMA IP2-021, resolution	on is required to provide remote monitori	ing of any fluid leaka	ge past the isolation va	lves in ISLOCA pathways.								
			-									
Prepared by:	a	Approved t	oy:									
	A D _ A	and the second se	سىسىدىر ي									
1 Cel	2 Bustacaras.	Nonegourses and	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~									
Data:		Date										
Date.	1-20-2012	Date.	- 4- 20- E	COIL								

		ENTERGY NUCLEAR NORTHEAST
		Indian Point Nuclear Power Station
* ES1	IMATE LEVEL *	EC #: SAMA IP2-021
V	Conceptual	PROJECT TITLE: Install Leak Monitoring Instrumentation for ISLOCA Pathway Isolati ESTIMATOR: RCMT
	Preliminary	JOB LOCATION: Containment & Control Bldgs. PROJECT CODE: TBD
•	Definitive	ORIGINATOR: ORIG. DATE: 06/25/2012
ltem		Description
1	This estimate assur	nes that this work will require both non-outage and outage conditions to complete.
2.	This estimate assur	nes that the non-outage work work will complete during 2014 working a 10 hours per shift, four days per week schedule.
3.	This estimate assur	nes that the outage work will be completed in 2014 working (2) 10 hour shifts 6 days per week.
4.	This estimate assur	nes that the non-outage work will not suffer productivity loss due to radiation or hazardous conditions
5.	This estimate assur	nes that all work will be performed by trained contract craftspersons in lieu of station maintenance personnel.
6.	This estimate assur	nes that adequate penetrations exist for routing of wiring from the pressure transmitter junction boxes to the external panel
7.	This estimate assur	o new containment penetrations will be required. nes that the Outage work will involve radiological conditions requiring additional briefing times, dressout times and reduced
	production due to d	ressout requirements.
8.	i nis estimate assur	nes that a comercial dedication effort will be required to quality the Yokogawa Recorder for use in this application.
9.	This estimate assur Safety Class Electri	nes that the piping/tubing components and instrumentation will be Safety Class 1 and the Electrical components will be cal.
10.	This estimate is bas Estimate Classificat	ed on the project's current level of scope definition and is classified Class 5 as defined per the AACE International Cost ion System (see Attachment 3, Reference 2).
11.	Labor dollars in this for anticipated billing	estimate are projected 2014 costs based on current 2012 craft billing rates at Indian Point. The projected costs provide g rate increases of 3% per year.
12.	This estimate allows and progresses as	s for and includes a contingency factor related to the complexity and location of the work required. The factor is cumulative follows:
	A. Outside fer	ice boundary - 20%
	B. Inside fenc	e boundary - 30%
	C. Implemente	ation complexity - 40%
	D. Inside Con	ainment - 50%
\vdash		

Page 1 of 3

7/5/2012 4:55 PM SAMA IP2-021 INSTALL LEAK MONITORING INSTRUMENTATION FOR ISLOCA PATHWAY ISOLATION VALVES 06-25-12.xis

Rev.	INDIAN POINT IMPLEMENTATION ESTIMATE WORK SHEET EC #: SAMA IP2-021																			
11-0 P	POIECT TITLE: Install Leak Monitoring Instruments	EG	#: SAN	1A 1P2-0	21 ICAPITA				TAKEOFE											
LIOBIC	CATION: Containment & Control Bidos		inacy i		100	PROJEC	CT CODE: T	IBD			ESTIMATO	R' R	CMT							
EST. S			ORIGINATOR: ORIG.									ORIG. DAT	RIG. DATE: 06/25/2012							
	BEAABIBTIAN	07		OFT	100	MA	NHOURS	TOTAL		MATERIAL \$	M	ATERIAL	LABOR	-	SUB-					
ILEM	DESCRIPTION		UOM	GFT	NU.	UNIT	FGTR	TOTAL	\$/MH	PER UNIT	10	OLLARS	DOLLARS		JNTRACT	п	JIAL \$			
			-																	
	* ESTIMATE LEVEL *									ESTIMATE SUM	MARY			0						
H ^m	Preliminary			EOI	ENG!!	VEERING						Annoons			<i>July</i> NJ					
	Definitive			01		STUDY, DE	SIGN, &	CLOSEO	т			280		\$	28,000					
				02		DESIGN EN	NGR CON	IST SUPP	ORT			80		\$	8,000					
	General Notes:			03		WELDING	ENGR EC	N SUPPO	RT			80		\$	8,000					
				04		PROJECT	ANAGE	JK MENT				600		3 5	72.000					
				06		WORK MAI	NAGEME	NT				-		\$	-					
				07 08		TRAVEL &	LIVING E	ACCEPT	5 ANCE REV	iFW		80		\$ \$	8.000					
				COM	ITRAC	T ENGINEE	RING								-,					
				09		DESIGN EN	NGR CON	ITRACT S	UPPORT			1,500		5 5	180,000					
				11		MODS PLA	N & SCHI	ED -CON1	TRACT			160		\$	16.000					
				12	-	FIELD ENG	RS / PLA	NNERS				300		\$	36,000					
				13	ERIAL	MATERIAL	S	/3						\$	457,354					
				14		OTHER CO	NTRACT	S						\$	27,528					
				15	TRAC	SWEC CRA	ABUR AFT LABC	RWALKI	DOWN			4.841		\$	703,273					
				16		LOST TIME						484		5	88,054					
				17 PI AI		SWEC DIS	TRIBS							\$	197,098					
				18		MECH MA	INT.					-		\$	-					
				19 20		ELECT MA	UNT					240		\$ \$	24.000					
				21		CSG						240		\$	24,000					
				M/SC	ISC EOI SUPPORT							100			18 000					
				2Z QUALITY CONTROL 180 23 TRAINING 48										\$	\$ 18,000 \$ 5,760					
				24		CHEMISTR	RY	77				420		\$	-					
1				25 26		HP/RP	50000	T 1				120		\$	12,000					
				MISC	CON	TRACT SUP	PPORT							15.000						
				27		NDE	CONTROL	L				200		э \$	15,000					
				29		HP/RP		_				-		\$	-					
				30 31		NURSE	/ASTE F					-		3 5	-					
				32		ELEVATO	R CONTR	RACTOR				-		\$	-					
			33 WASTE MANAGEMENT -								-		5 5	-						
				35		COMMER	RCIA					-		\$	-					
				36 37		CGD COI	NTRACT		ACTOR			:		\$ \$	25,000					
				38		RBC'S						-		\$	-					
				39 40		SECURITY	- Wacke	nhut m				-		\$ \$	-					
			41 SAFETY 102								\$ 7,358									
			CONTINGENCY										¢	984 413						
				ESTIN		SUBTOTAL						9,595	•	\$	2,953,238					
									SITE ENC	UMBRANCE PRE	MUM	(20%)		\$	590,648					
			Loaders (JU%)										ð	.,,100						
					Second				ESTIMA	TE TOTAL		e e marana da		\$	4,607,051					
	Gather material and stage tools and materials	1	IT	EI	21	10.00	OUTAGE	WORK 20	\$ 123.32	1	15	2.466	\$ 2.46	<u>8 T</u>		\$	4,932			
2.	Mount new monitoring panel with recorder and		L .'			. 5.00	1.00									Ľ				
	power supply Run conduit and support as required to area of	1	LT	EL	2	40.00	1.00	80	\$ 123.32		\$	30,000	\$ 9,86	5		\$	39,866			
3	containment penetration.	1	LT	EL	2	40.00	1.00	80	\$ 123.32	1	\$	-	\$ 9,86	6		\$	9,866			
4.	Pretabricate new spool/valve/cap assemblies (9 sub assemblies).	9	LT	PF	2	25.00	1.00	450	\$ 120.71		s	150.000	\$ 54,32			\$	204,320			
5.	Perform visual and LP examination on socket			K 16.4	[45.00	1.00		2 07.00		ļ		e		10 570	•	17 676			
	werds on new spool/valve assemblies	A		NM	1	10.00	1.00	- 144	φ σ <i>τ</i> .υυ		3	-	\$	*	12,328	1	12,320			
	College and place topic and materials. Defense	1 4	117	pr	2	10 000	TAGE W		\$ 120.74	T	12		S 607	7]		19	6 977			
1	walkdown and briefing.	1		EL	2	10.000	1.70	34	\$ 123.32		5	-	\$ 7,12	в		s	7,128			
2	Stage, erect & modify scaffolding as required	1	LT	CP	2	80.00	1.70	272	\$ 96.00		\$	-	\$ 44,39	0		\$	44,390			
3.	Brage, erect & modity scattolding as required Remove existing cap and install new	8		PF	2	10.000	1.70	272	\$ 120.71		ŝ	-	\$ 55,81	6		ŝ	55,816			
5.	Mount new transmiter, valve manifold and support	9	EA	PF	2	10.000	1.70	306	\$ 120.71		\$	225,000	\$ 62,79	3		\$	287,793			
6.	Route and support new tubing between valve	8	EA	PF	2	15.000	1.70	408	\$ 120,71		\$	10,000	5 83,72 \$ 8.41	4		5	93,724 8 413			
В.	Mount Prefabricated piping/valve sub assemblies	11	EA	PF	2	10.000	1.70	34	\$ 120.71		\$	-	\$ 6,97	7		\$	6,977			
	to socklet.	1	EA	PF	2	15.000	1.70	51	\$ 120.71		5	-	\$ 10,46	6		\$	10,466			
9.	I KOULE and support new tubing between valve	1	1	I	1	1	I	1	1	1	1 9		ł	I		1				

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7/5/2012 4:55 PM SAMA IP2-021 INSTALL LEAK MONITORING INSTRUMENTATION FOR ISLOCA PATHWAY ISOLATION VALVES 08-25-12 x15

Rev		INDIAN POINT IMPLEMENTATION ESTIMATE WORK SHEET																			
11-)					EC	C #: SAM	A IP2-	021												
	PROJECT TITLE: Install Leak Monitoring Instrumenta	ation fo	r ISLO	ICA Pa	thway	Isolation Va	lves		CAPITA	AL OSM			T/	KEOFF:							
JOB	OCATION: Containment & Control Bidgs.							PROJE	CT CODE: 1	TBD			E	STIMATOR	: R(CMT					
EST.	STATUS: Let OUTAGE Let NON-OUTAGE	T	r	.		MA			IATOR:		-	ATERIAL		RIG. DATE	: 06/	25/2012					
ITE	DESCRIPTION	QTY	UOM	CFT	NO.	UNIT	FCTR	TOTAL	\$/MH	PER UNIT	H	DOLLARS	D	OLLARS	co	NTRACT	T	OTAL \$			
10.	NDE containment welds	36	EA	NM	1	1.000	1.70	61	\$ 87.00		\$	-	\$	9,022			\$	9,022			
11.	Support testing as requested Mount Hoffman boxes in containment	1 2		PF	2	10.000	1.70	34	\$ 120.71		5	-	\$ ¢	6,977			\$ ¢	6,977			
13.	Route & Support Conduit from each Transmitter in	1			-	0.000	1.75		Ψ 120.02		1	•	ľ	0,000			*	0,000			
	containment to containment Hoffman Enclosure.	350	LF	EL	2	0	2	214	123]	s	2.000	1	26390		:	\$	28.390			
14.	Pull cable from each transmitter to Hoffman boxes	2	LT	EL	2	40.00	1.70	272	\$ 123.32		\$	3,000	\$	33,543			\$	36,543			
15.	Pull cable from 2 Containment boxes to external Hoffman Rapel and enclosure and terminate	1	LT	EL	2	60.00	1 70	204	\$ 123.32			4 000	e	25 157			5	29 157			
16.	Provide testing as required.	1	LT	OP	2	80.00	1.70	272	\$ 100.00		\$	5,000	\$	27,200			\$	32,200			
17.	Assist with testing as required	1	LT	EL	2	60.00	1.70	204	\$ 123.32		\$	-	\$	25,157			\$	25,157			
18,	Dismantle scattolding to storage			EL CP	2	20,00	1.70	136	\$ 123.32		\$	-	5	22 195			⊅ \$	22 195			
22.	Cleanup and restore area	1	LT	LB	1	40.00	1.70	68	\$ 78.65		\$	-	\$	9,092			\$	9,092			
23.	Cleanup and restore area	1	LT	EL	4	10.00	1.70	68	\$ 123.32		\$	-	\$	8,386			\$	8,386			
	PAINTING & TOUCH UP REQUIREMENTS	1		PF	4	10.00	1.70	68	\$ 120.71		5	-	5	8,208			\$	8,208			
1.	PAINTING & TOUCH-UP			PT				-			\$	•	\$	+			\$	-			
2.	PAINTING & TOUCH-UP			PT				-			\$	-	\$	-			\$	-			
											\$	-									
	FIRE WATCH / BOTTLEWATCH REQUIREMENTS	5									ŝ	-									
1.	CRAFT SUPPORT FOR FIRE WATCH	2	LT	FW	1	80.00	1.00	160	\$ 53.60		\$	-	\$	8,576			\$	8,576			
2.	CRAFT SUPPORT FOR BOTTLE WATCH	1	LT	FW							\$	-	\$	-			\$	-			
	MISC SUB-CONTRACT			1							\$	-									
1.	MISC SUB-CONTRACT Commercial Grade	1	LT	NM							\$	-			\$	25,000	\$	25,000			
	SUBTOTAL CRAFT & SUB-CONTRACTOR		-			1		4,232			$\frac{1}{5}$	431,466	5	608,270	\$	37,528	51	077,264			
				1							Ι										
1.	CONSTRUCTION SUPPORT (8% OF LABOR \$)	1	LT					339	\$ 143.73	\$ -			\$	48,724			\$	48,724			
	SUBTOTAL							4,571			\$	431,466	\$	656,994	\$	37,528	\$1	125,988			
	* RELATED COSTS *																				
1,	WAI KDOWN ALLOWANCE	1	ιт	FI				20	\$ 123.32		1.5	-	1.	2 466			s	2 466			
2.	WALKDOWN ALLOWANCE	1	LT	PF				30	\$ 120.71		\$	-	s	3,621			\$	3,621			
3.	WORK PACKAGE REVIEW	1	LT	EL				30	\$ 123.32		\$	-	5	3,700			\$	3,700			
5.	TOOL ROOM ATTENDANTS (~3.5%)	1		EL				160	\$ 120.71		\$	-	5	3,621 19,731			5	19,731			
6.	GENERAL CRAFT OUTAGE DISTRIBS. (10%)												\$	65,699			\$	65,699			
7.	CRAFT IN PROCESSING (20%)		1										\$	131,399			\$	131,399			
0.	(1/2 day training, or ~ 2%)	1		1									3	13,140			₽	13,140			
	SUBTOTAL							4,841			\$	431,466	\$	900,371	\$	37,528	\$1	,369,365			
	DI ANT COORT																				
				P										_			\$	-			
·.				PL							\$	-	ŝ	-			\$	-			
	SUBTOTAL MECH MAINT.			[-			\$	-	\$		\$	-	\$				
Ι.				FI							\$						\$	-			
				PL				-			\$	-	\$	-			\$	-			
	SUBTOTAL ELECT. MAINT.						[· ·			\$	~,	\$		\$		\$				
1.	AC (Dev. Calibration and Maintenance																				
1	Procedures	1	LT	PL	2	120.00	1.00	240	\$ 100.00	l	\$	-	\$	24,000			\$	24,000			
		-	-	PL PL	ļ		ļ				\$		\$		Ļ		15	-			
	SUBTOTAL I&C MAINT.							240			+\$	-	\$	24,000	15	-	15	24,000			
1.	CSG	1		PL					1		5	-	\$	*	1		\$	-			
				PL				-			\$	-	\$	-	<u> </u>		\$				
	SUBTOTAL CSG MAINT.			ļ	ļ				ļ		\$		\$	-	\$	~	\$	~			
				hearenar	+			240		+	÷		1 c	24 000	\$	-	15	24 000			
	SUDIVIAL CLAIST			1				2.40		+	╇		+¢	27,000	۴°		t*	27,000			
																	L				
	SUBTOTAL CRAFT/PLANT	1	1	T	1		T	5 081	1	T	15	431,466	15	924.371	15	37.528	\$1	393.365			

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7/5/2012 4:55 PM SAMA IP2-021 INSTALL LEAK MONITORING INSTRUMENTATION FOR ISLOCA PATHWAY ISOLATION VALVES 06-25-12.xia

INDIAN POINT IMPLEMENTATION ESTIMATE WORK SHEET Rev EC #: SAMA IP2-021 11-0 PROJECT TITLE: Install Leak Monitoring Instrumentation for ISLOCA Pathway Isolation Valves TAKEOFF. PROJECT CODE: TBD ESTIMATOR: RCMT JOB LOCATION: Containment & Control Bidgs. OUTAGE EST. STATUS: NON-OUTAGE ORIGINATOR: ORIG. DATE: 06/25/2012 MANHOURS MATERIAL \$ MATERIAL LABOR SUB DOLLARS CONTRACT TOTAL \$ UOM CFT NO. ITEM DESCRIPTION OTY HNIT FCTR TOTAL S/MH PER UNIT DOLLARS IMPLEMENTATION SUPPORT EOI WELDING ENGINEERING \$ 100.00 8.000 LT NM 80.00 1.00 80 \$ \$ 8.000 \$ \$ 100.00 \$ 100.00 \$ 100.00 \$ 100.00 DESIGN ENGINEERING SUPT DURING CONST 1.00 8,000 \$ 8,000 LT NM 80.00 80 SYSTEMS ENGINEERING - MECHANICAL SYSTEMS ENGINEERING - ELECTRICAL LT LT 2 NM 40.00 1.00 40 \$ \$ 4 000 4 000 40.00 1.00 4,000 4,000 NN 40 1.00 1.00 \$ 100.00 \$ 100.00 6,000 4,000 5 SYSTEMS EINGINEERING - INSTR & CONTROL LT NM 60.00 60 6,000 1 ***** SYSTEMS ENGINEERING - CIVIL STRUCTURAL LT NM 40.00 40 4,000 6 1 72,000 PROJECT MANAGEMENT LT NM 600.00 1.00 600 \$ 120.00 72,000 \$ \$ \$ 120.00 \$ 100.00 NM 1.00 в TRAINING OPS STAFF 12 LT 1 4 00 48 5.760 QA / QC VERIFICATION LT NM i 180.00 1.00 180 18,000 \$ \$ \$ \$ 18,000 1 10. CHEMISTRY 1 LT NM 120 \$ 100.00 12,000 12,000 HP / RP/ ALARA NM 1 120.00 1.00 11 1 LT 12 WORK MANAGEMENT **OPS / OPS PROCEDURE SUPPORT AND** 13 14,400 DEVELOPMENT NM 120.00 1.00 120 \$ 120.00 \$ \$ 14,400 \$ \$ LT 1 TRAVEL & LIVING EXPENSES LT 14 1 CONTRACTOR SUPPORT FIS / MODS ENGINEERING - SWEC (Incl Per 1. Diem) LT NM s s 1 2. MODS PLANNING & SCH.- SWEC (Incl Per Diem) FIELD ENGRS/PLAN- SWEC(Incl Per Diem) \$ 100.00 \$ 120.00 I T 160.00 1.00 160 16 000 16 000 NM \$ \$ ¢ 1.00 з. NM 300.00 300 LT 36.000 36.000 \$ 1.00 4 QA / QC VERIFICATION LT NM 200.00 200 ŝ 75.00 \$ 15,000 \$ 15,000 \$ 30,000 5. NDE LT NM \$ \$ \$ HP / RP LT 6. NM \$ 7 RADWASTE LT NM NM NURSE 8. LT ELEVATOR CONTRACTOR WASTE MANAGEMENT 9 LT NM NM 10 LT HOUSEKEEPING LT NM 11 LT LT 12 EQUIPMENT RENTAL CONTRACTOR NM VENDOR STOCKING NM 13 14. 15. DECONTAMINATION CONTRACTOR LT NM NM RBC's LT 16 SECURITY LT SEC 17 FIREWATCH (Rover) LT NM NM \$ 72.14 \$ 181.93 18. SAFETY (2%) LT 102 7,358 7,358 LOST TIME (10%) 17 484 88 054 88.054 19 SUBTOTAL CRAFT/NON-MANUAL 7,735 431 466 \$ 1 242 943 \$ 52 528 \$1 726 937 \$ FREIGHT, SALES TAX, & CONSUMABLES (6%) SUBTOTAL INSTALLATION COST 25.888 25.888 7,735 457,354 \$ 1,242,943 \$ 52,528 \$1,752,825 S DESIGN ENGINEERING - MECHANICAL LT 60.00 1.00 60 \$ 100.00 6,000 6,000 1. \$ 100.00 \$ 100.00 \$ 100.00 DESIGN ENGINEERING - ELECTRICAL DESIGN ENGINEERING - INSTR. & CONTROL 8,000 2. LT NM 80.00 1.00 80 8,000 s \$ 1.00 3. NM 80 LT 80.00 \$ 8.000 s 4. DESIGN ENGINEERING - CIVIL/STRUCTURAL LT NM 60.00 1.00 ŝ 6,000 60 6,000 \$ 5 CONTRACT ENGR DESIGN SUPPORT LT NM 1,500.00 1.00 1,500 \$ 120.00 \$ 180,000 180 000 DESIGN ENG. DCP ACCEPTANCE REVIEW NM 80 8,000 8,000 .00 80.00 \$ 100.00 SUBTOTAL DESIGN COST 1,860 36,000 180,000 \$ 216,000 \$ \$ SUBTOTAL INSTALLATION & DESIGN COST 457,354 \$ 1,278,943 9.595 232,528 \$1,968,825 \$ ¢ CONTINGENCY (50%) \$ 984,413 1. **ESTIMATE SUBTOTAL** 9.595 \$2,953,238


ENTERGY INDIAN POINT NUCLEAR STATION UNIT 2

CONCEPTUAL DESIGN PACKAGE For

SAMA IP2-022

Add Redundant and Diverse Limit Switches to each Containment Isolation Valve

Prepared by:	Approved by:
Date: 9-20-2012	Date: 12 Zar Laste

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1.0 ISSUE

Severe Accident Mitigation Alternative (SAMA) IP2-022:

Add Redundant and Diverse Limit Switches to each Containment Isolation Valve

2.0 BACKGROUND

In accordance with NRC environmental regulations in 10 C.F.R. Part 51, Entergy performed SAMA analyses for both Indian Point Nuclear Generating Units 2 and 3 as part of its license renewal application. Those analyses identified a number of potentially cost-beneficial SAMAs for each unit. In its license renewal application and related correspondence with the NRC Staff, Entergy indicated that it would submit the potentially cost-beneficial SAMAs for further internal engineering project cost-benefit analysis, even though none of the potentially cost-beneficial SAMAs is related to aging management under 10 C.F.R. Part 54. Entergy contracted RCM Technologies to assist it in this effort.

This package provides a conceptual design and implementation cost estimate for SAMA IP2-022 in accordance with Entergy design engineering practices.

For SAMA IP2-022, resolution is required for remotely monitoring the open-close position of isolation valves in the ISLOCA pathways in containment.

This package will install additional position switches on existing valves where possible or replace any existing valves that can't be modified with new ones that have position capability. This package will also provide for the valve's position to be monitored remotely outside of containment.

The design considerations that follow will address the adequacy of the proposed resolution and the basis for the recommendation to resolve the identified potential issue.

The recommended solution will include descriptive details of the proposed design change and also conceptual design sketches as required. These descriptive details, sketches, and the preliminary material list provide the basis for initiating the all-inclusive conceptual cost estimate for engineering change (EC) development and implementation at the Station.

3.0 EXISTING CONDITIONS

In containment, the pathways of the Safety Injection (SI) System piping need protection against potential leaks of liquid from the interfacing Reactor Cooling System (RCS) and Auxiliary Cooling System (ACS) piping. There are 22 check valves and 2 motor operated valves (MOV) installed in the SI piping that interface with these systems to provide this isolation.

The effectiveness of each check valve's normally closed blocking function and the MOV's operated closed position needs to be monitored to ensure isolation is maintained from these interfacing systems. A limit switch added to each valve for monitoring status will enable its position to be transmitted to a remote location outside containment.

The switch to be added for the MOVs position indication would be redundant to existing switches already installed and used for the open and close operation of the valve.

In the case of the check valves, further investigation has determined that these paths do not have existing limit switches on the check valves so the proposed change will be to upgrade the valves with position monitoring capability.

4.0 DESIGN CONSIDERATIONS

Check Valves

The modification being proposed can be implemented in a couple of ways; by modifying the existing valves in place or by removing the existing valves and installing new ones.

Given the age of the currently installed valves, their modification could prove to be very difficult, if not unfeasible.

Access to the installed valves for machining could be a problem. Performing any retrofit machining requirements by adding some type of positioning device would be difficult and time consuming. Testing in place versus shop bench testing would be a challenge. ALARA concerns and the need to ensure the functional operation of the valve pose further challenges.

In view of these challenges, and also the availability of check valves with the position indication feature provided, there is no substantial advantage to retrofitting the existing valves.

Accordingly, removing the existing valves and replacing them with new ones that transmit their position would be the most effective solution.



<u>MOVs</u>

Traditionally, position/limit switches have been the most effective and efficient means to monitor the physical orientation of a mechanical hardware item. For years, Motor Operated Valves (MOVs) installed in nuclear power plants have been equipped with mechanically operated limit switches that are relied upon to transmit both intermediate and open-close positions. The operating requirement being addressed in this SAMA, for both types of valves, is no exception and is a candidate for this application.

As discussed above, using position indication switches with MOVs is a standard application used in the nuclear industry. This package will install the two existing MOVs with position switches that provide open-close monitoring.

Remote Position Monitoring

Wiring from position switches provided with the check valves and MOVs will need to be connected and routed to an "off-normal' indication display panel located in a user-friendly environment in an area outside containment.

5.0 CONFIRMATION OF DESIGN

Check Valves

Based on the emphasis provided in the design considerations above, this package will remove the existing valves and provide and install new valves, each of which will have capability to transmit their open-close status for monitoring.

<u>MOVs</u>

Installation of a position indication switch on each of the existing MOVs will allow for remote monitoring of each valve's open-close status.

6. RECOMMENDED SOLUTION

1. Check Valves

For each of the existing check valves listed in Attachment 2, Figure 1, perform the following mechanical operation:

- Cut the existing piping and remove the old valve
- Weld the new "open-close indication" check valves in place of the removed valves.

2. <u>MOVs</u>

For each of the two existing MOVs listed in Attachment 2, Figure 1, perform the following:

- Install the "open-close status" position indication switch on the valve's actuator section.
- 3. <u>Remote Position Monitoring</u>

Install a new panel outside containment, in the Control Building at Elevation 33'-0", that will provide open-close indicating lamp status of each ISLOCA pathway valve listed in Attachment 2, Table 1.

- 4. Conduit and Wiring
 - A. Valves
 - Route and support conduit from each valve to the two junction boxes fitted with terminal blocks located in containment.
 - Route and support a single conduit from each junction box, via containment penetration, to the new ISLOCA status monitoring panel outside containment.
 - Install and connect wiring from the valve switches to the new junction boxes.
 - Install and connect wiring from the junction boxes to the new ISLOCA status monitoring panel.
 - B. Remote Position Monitor Panel
 - Route and connect lamp power, from a source to be determined based on indicating lamp type, to the new monitor panel.
- 5. Inside containment, install supports for conduit and junction boxes as required.
- 6. Provide procedures and training to operate, test, and perform maintenance on the components of the newly installed system.

Quantity

7.0 PRELIMINARY MATERIAL LIST - Mechanical

Item Description

- 2 inch Check Valve (swing check or similar) 1500# pressure class, 10 ASME Section III scope of supply, (Spec, Code Year and Addenda TBD). With integral (external) position indicator and remote monitoring capability (via use of IEEE qualified limit switches). Stainless steel materials and proprietary disc design with dual seating surfaces (Stellite or Norem and resilient seating material). Mfr: FLOWSERVE, or equal (estimated price \$35,000 to \$45,000 each)
- 6 inch Swing Check Valve, 1500# pressure class, 4
 ASME Section III scope of supply, (Spec, Code Year and Addenda TBD). With integral (external) position indicator and remote monitoring capability (via use of IEEE qualified limit switches). Stainless steel materials and proprietary disc design with dual seating surfaces (Stellite or Norem and resilient seating material). Mfr: FLOWSERVE, or equal (estimated price \$70,000 to \$80,000 each)
- 3. 10 inch Swing Check Valve, 1500# pressure class, 9* ASME Section III scope of supply, (Spec, Code Year and Addenda TBD). With integral (external) position indicator and remote monitoring capability (via use of IEEE qualified limit switches). Stainless steel materials and proprietary disc design with dual seating surfaces (Stellite or Norem and resilient seating material). Mfr: FLOWSERVE, or equal (estimated price \$90,000 to \$100,000 each)
 *Note: One valve required for qualification testing.
- 4. 2 inch S.S. Schedule 160 seamless pipe, A376 Grade, TP316 20 feet
- 5. 6 inch S.S. Schedule 160 seamless pipe, A376 Grade, TP316 20 feet
- 6. 10 inch S.S. Schedule 160 seamless pipe, A376 Grade, TP316 20 feet



8.0 PRELIMINARY MATERIAL LIST - Electrical

1	MOV Actuator Limit Switch Kits	2
2.	Hoffman junction box with terminal blocks	2
3.	Hoffman Wall mounted panel and enclosure, with terminal blocks and indicator lamps, 36" x 36" x 8" deep	ן 1
4.	1" Conduit 80	0 feet
5.	2" Conduit 40	0 feet
6.	2c #14 cable 700	0 feet



Entergy Impact Screening Summary



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Engineering Change Process

ATTACHMENT 9.3

IMPACT SCREENING SUMMARY

SHEET 1 OF 6

INSTRUCTIONS:

Identify the potentially impacted and the unaffected areas by checking the appropriate Yes or No block on the Impact Screening Criteria.

If a direct determination cannot be made based on the impact screening questions, the detailed questions in Attachment 9.4 may be used to identify potential impacts.

The completion of detailed questions in Attachment 9.4 is recommended but not required.

Contact potentially impacted groups if assistance is required.

SAMA Engineering Change No.: <u>IPZ-22</u> Rev. No.: <u>DES</u>IGN PACKAGE

CONCEPTUAL

Prepared by:

Date:

DESIGN ENGINEERING DISCIPLINES	Potentia	al Impact
 Civil / Structural Design Engineering Does the proposed activity involve any civil / structural (including seismic) design changes, activities or affect coatings? OR Does the proposed activity involve any piping engineering design changes or activities? 	YES	□ NO
 Electrical Design Engineering Does the proposed activity involve any station or switchyard electrical design, large power transformers, or settings changes or activities? (SOER 10-1) 	YES	
Instrumentation and Controls Design Engineering Does the proposed activity involve any I&C design or settings changes or activities?	YES	
 Mechanical Design Engineering Does the proposed activity add/remove/replace insulation, aluminum or other metallic/non-metallic sources of debris in the reactor/containment building or involve any mechanical design changes or activities? 	YES	□ NO
 PSA Engineering Does the proposed activity impact or involve changes to plant evaluations or probabilistic safety assessments? Does the proposed activity impact or involve changes to the Emergency Operating Procedures, Abnormal Operating Procedures, or Severe Accident Procedures or does it add, remove or modify SSCs included in a Maintenance Rule function? 	YES	□ NO
 Nuclear Analysis Does the proposed activity impact or involve changes to plant evaluations, Technical Specifications, Technical Requirements Manual, or require a full 50.59 Evaluation? 	YES	□ NO
 FERC / NERC Impact Does the proposed activity impact or involve change to FERC / NERC or Regional Entity compliance documents? (ex. MOU, ENN/ENS-PL-158, ENS-DC-199, etc.) 	☐ YES	🕅 NO



REV. 11

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Engineering Change Process

ATTACHMENT 9.3

Sheet 2 of 6

DESIGN ENGINEERING PROGRAMS	Potential	Impact
 ASME Section III Specifications Does the proposed activity add, delete, or modify information required by ASME Section III to be contained in a design specification? 	YES	□ NO
 Cable and Raceway Program Does the proposed activity involve any changes to cable trays, raceways or the associated documentation? 	YES	
Electronic Databases (EDB) Does the proposed activity involve any changes to electronic databases?	YES	
 EQ Program (10CFR50.49, NUREG 0588, Reg Guide 1.89) Does the proposed activity involve any new or existing EQ components? 	YES	
 Hydrogen Control Program (10 CFR 50.44) (<i>if applicable</i>) Does the proposed activity impact equipment or materials related to hydrogen control? 	□ YES	🕅 NO
 Human Factors Program Does the proposed activity involve control panel design including layout and labeling, visual displays, operator aids, auditory signals or environment in the control room, cable spreading room, and other control panel locations? 	YES	□ NO
 Margin Management Does the proposed activity impact or involve any change to design, licensing or operations margins? 	YES	
 Reg. Guide 1.97 / PAM (Post Accident Monitoring) Does the proposed activity involve Reg. Guide 1.97 (Post Accident Monitoring) Indications? 	YES	

MAINTENANCE	Potentia	l impact
 Electrical Maintenance Does the proposed activity require an Electrical Maintenance review to identify affected procedures, required actions and required training? 	YES	
 Maintenance Does the proposed activity require an I&C Maintenance review to identify affected procedures, required actions and required training? 	YES	
 Mechanical Maintenance Does the proposed activity require a Mechanical Maintenance review to identify affected procedures, required actions and required training? 	YES	

NUCLEAR ENGINEERING	Potentia	al Impact
 Nuclear Fuel Design Does the proposed activity impact or involve the design, performance or storage of nuclear fuel? 	TYES	🕅 NO
 Reactivity Management Program Does the proposed activity impact or involve the reactor system, reactor controls, reactor chemistry, related systems, potential core and spent fuel damage, spent fuel, reactor coolant pressure boundary or reactor system procedures? 	YES	

IMPACT SCREENING SUMMARY



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Engineering Change Process

IMPACT SCREENING SUMMARY

ATTACHMENT 9.3 SHEET 3 OF 6

Potential Impact	
	8

PROCESS OR PROGRAM IMPACT SCREENING CHECKLIST	Potentia	al Impact
Computer Support and Software	TYES	X NO
 Does the proposed activity impact or involve changes to plant computer software or firmware or impact Software Quality Assurance (SQA)? 		
Chemistry and Environmental Impact	T YES	🕅 NO
 Does the proposed activity impact or involve any changes to plant chemistry requirements, operations or procedures, or any changes to the environment? 		
Radiation Protection (RP) Program Impact	T YES	🕅 NO
 Does the proposed activity impact or involve any changes to the RP program? Does the proposed activity involve the potential to introduce (or reintroduce) any cobalt containing materials (such as Stellite) into the primary system? 		
 Operations Does the proposed activity impact or involve changes to Operations procedures, training or operator actions? 	YES	
 Planning, Scheduling and Outage (PS&O) Does the proposed activity require a PS&O review to identify required design and installation information? 	TES	
 MP&C (Inventory) Does the proposed activity impact or involve any addition or removal of equipment from the inventory? Does the proposed activity impact or involve any Procurement of Quality or Augmented Quality material from non-qualified suppliers? 	YES	□ NO
Procurement Engineering Does the activity impact or involve any procurement activities?	YES	

PROG	RAMS AND COMPONENTS	Potentia	al Impact
ASME •	Containment In-service Inspection (IWE / IWL) Program Does the proposed activity impact or involve the containment pressure boundary or associated moisture barriers or a support for the containment pressure boundary? This includes "software only" changes that do not physically change the hardware such as re-rating of pressures or temperatures to include changes to documented information on these items or additional documented information for these items. Does the proposed activity limit access to containment surfaces for inspection? Involve disassembly of a bolted connection which forms a portion of the containment boundary?	U YES	MO
ASME	Appendix J (Primary Containment Leak Rate Testing) Program Does the proposed activity impact or involve any changes to primary containment leak rate testing?	YES	□ NO



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Engineering Change Process

ATTACHMENT 9.3

SHEET 4 OF 6

IMPACT SCREENING SUMMARY

PROGRAMS AND COMPONENTS (CONTINUED)	Potentia	al Impact
 ASME In-service Inspection (ISI) Program Does the proposed activity add, delete, or modify an ASME Section XI pressure boundary item or a support for an ASME Section XI pressure boundary item? This includes "software only" changes that do not physically change the hardware like such as re-rating of pressures or temperatures. (ASME Section XI items include ASME Class 1, 2, 3, or B31.1 treated as ISI Class 2 or 3 (T2 and T3) components, parts, or appurtenances such as pipe or pressure vessel walls, valve bodies and pump casings. 	YES	□ NO
 ASME Section XI Repair / Replacement Program Does the proposed activity involve any mechanical component within the ASME XI program / boundaries? Does the proposed activity add, delete, or modify an ASME Section XI pressure boundary item or a support for an ASME Section XI pressure boundary item? (ASME Section XI items include ASME Class 1, 2, 3, MC, and CC, as well as B31.1 treated as ISI Class 2 or 3 (T2 and T3) components, parts, or appurtenances such as pipe or pressure vessel walls, valve bodies and pump casings). 	YES	□ NO
 ASME In-service Testing Program Does the proposed activity impact or involve any item (safety related or non safety related) that may affect the performance or testing of a safety related pump or valve? Does the proposed activity impact the function or functional classification of any pump or valve as stated in the IST program documents? 	YES	☐ NO
 Air Operated Valve (AOV) Program Does the proposed activity impact or involve the design, operation or testing of AOVs? 	T YES	🛛 NO
 Buried Piping and Tanks (BP&T) Program Does the proposed activity impact or involve any changes to piping, coatings, or cathodic protection of Buried Piping & Components? 	T YES	М 🛛
 Boric Acid Corrosion (BAC) Program Does the proposed activity impact or involve any increase in the likelihood of boric acid formation or corrosion? 	TYES	X NO
 Check Valve Program Does the proposed activity impact or involve the design, operation or testing of check valves? 	TES	🗌 NO
 Control Room Habitability Program Does the proposed activity impact or involve changes that affect the temperature or radiological environmental conditions in the Main Control Room? 	TYES	🕅 NO
Electrical Circuit Breaker, Relay and Electrical Equipment Testing Does the proposed activity impact or involve changes to the functional testing of circuit breaker, relay or electrical equipment?	YES	



EN-DC-115

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Engineering Change Process

IMPACT SCREENING SUMMARY

ATTACHMENT 9.3 SHEET 5 OF 6

PROGRAMS AND COMPONENTS (CONTINUED) Potential Impact Flow Accelerated Corrosion (FAC) Program □ YES X NO Does the proposed activity involve any changes (e.g.: configuration, velocity, flow rate, pressure, temperature, material, weld location, etc.) to piping systems included in the FAC Program.? Heat Exchanger Program □ YES X NO Does the proposed activity impact or involve the design, operation or testing of a component in the heat exchanger program? X NO **Predictive Maintenance Program** ☐ YES Does the proposed activity impact or involve any aspect of the storage, use and testing of lubricants? Does the proposed activity involve thermography? Does the proposed activity involve vibration monitoring? ☐ YES Microbiological Induced Corrosion (MIC) Program Impact M NO Does the proposed activity involve piping containing untreated or stagnant water or open to the atmosphere? Motor Operated Valve (MOV) Program YES Does the proposed activity impact or involve the design, operation or testing of MOVs? Plant Thermal Performance Program ☐ YES **X** NO Does the proposed activity impact or involve plant thermal performance? **Preventive Maintenance Program** □ NO YES Does the proposed activity impact or involve periodic testing or performance of SSCs? or Does the proposed activity add, modify or delete any Environmental Qualification (EQ) maintenance requirement or replacement frequency to ensure the component(s) maintains its gualification status? **PT Curves** □ YES 🕅 NO Does the proposed activity add, delete, or modify the basis (as contained in each sites reactor vessel surveillance material testing program) for the Pressure / Temperature Limit Curves (fluence, pressure, temperature, reactor materials)? **Relief Valve Program T**YES NO NO Does the proposed activity impact or involve the design, operation and testing of relief valves, safety valves, vacuum breaker valves or rupture disc? **RPV Internals Program** □ YES NO NO Does the proposed activity impact or involve any change to the reactor internals? This includes "software only" changes that do not physically change the hardware such as re-rating of pressures or temperatures. Does the proposed activity impact or involve or related documentation to include neutron fluence or neutron fluence calculations? Does the proposed activity impact or involve or changes to core flow characteristics or core flow characteristics?



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Engineering Change Process

ATTACHMENT 9.3

IMPACT SCREENING SUMMARY

SHEET (3 OF 6
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PROGRAMS AND COMPONENTS (CONTINUED)	Potential Impact				
 Welding Program Does the proposed activity impact or involve a special process, such as welding, brazing or soldering? 	YES	□ NO			
 Safety Program Does the proposed impact or activity involve personnel or industrial safety? 	TYES	🕅 NO			
 System Engineering Does the proposed activity impact or involve any changes to system configuration, function or performance, etc., for Maintenance Rule or other system? Does the proposed activity impact or involve any changes to system procedures, maintenance or operation, etc.? 	YES	□ NO			
 Training Program Does the proposed activity involve existing training requirements or create the need for new training? 	YES				
 Simulator Impact Does the proposed activity impact or involve changes to the Simulator? 	□ YES	🕅 NO			
 Fire Protection Program Does the proposed activity result in a change to the Fire Protection Program (including 10CFR50 Appendix R) where the impact is more than negligible? 	☐ YES	X NO			

Detailed Impact Screening (Attachment 9.4) Attached?	□ YES	🕅 NO
--	-------	------

Attachment 2

Conceptual Design Sketches

- 1. Table 1: Affected Valves
- 2. Figure 1, Sheet 1 A235296: Safety Injection System Flow Diagram (partial)
- 3. Figure 1, Sheet 2 A235296: Safety Injection System Flow Diagram (partial)
- 4. Figure 1, Sheet 3 A235296: Safety Injection System Flow Diagram (partial)
- 5. Figure 1, Sheet 4 A235296: Safety Injection System Flow Diagram (partial)

ENTERGY Indian Point Nuclear Station	Conceptual Design Package	
Unit 2	SAMA IP2 -22	Rev. 0

Size	Tag No.	Туре	Manufacturer	Model #
2"	857A	Clamp Seal Check	CONVAL INC	MDL-2C3-316
	857B			
	857C			
	857D			
	857F			
	857G			
	857H			
	857J			
	857K			
	857M			
6"	838A	Swing Check	VELAN VALVE	B14-3114B-13M
	838B		CORP	
	838C			
	838D			
10"	895A	Swing Check	ANCHOR DARLING	S3502-SC
	895B		VALVE	
	895C			
	895D			
10"	897A	Swing Check	ANCHOR DARLING	S350W-SC
	897B		VALVE	
	897C			
	897D			
14"	730	Gate-MOV	COPES VULCAN	UNK-VLV-2157-001
14"	731	Gate-MOV	COPES VULCAN	1-133641

TABLE 1 AFFECTED VALVES







IPEC00269853



IPEC00269854

References

- 1. ENTERGY Nuclear Management Manual, Engineering Change Process, Rev 11
- Association for the Advancement of Cost Engineering (AACE), Cost Estimate Classification System - As Applied In Engineering, Procurement, and Construction for the Process Industries
 - TCM Framework: 7.3 Cost Estimating and Budgeting
 - Figure 4 Estimate Checklist & Maturity Matrix
- 3. Existing CONVAL ClampSeal Check Valve (attached here)
- 4. Existing VELAN Swing Check Valve (attached here)
- 5. Existing ANCHOR/DARLING Swing Check Valve (attached here)
- 6. Existing MOV Gate Valves 730 and 731 Vendor Drawing B259680 (attached here)
- 7. Typical Swing Check Style Valve Size 3 (attached here)
- 8. Typical Swing Check Style Valve Size 8 (attached here)

Conval Clampseal[®] Check Valves are designed for demanding high-pressure applications where light weight and compact size are required.



STANDARD SIZES 1/2" through 3." Y, J. angle pattern Stop Check Optional

SW, BW, FNPT (to 1"). Grayloc or Flanged

PRESSURE RATING ASME 900 through 3500

STANDARD MATERIALS A105, F22, F316, 316L Monel[™] 400, Iconel[™] 600, optional

DESIGN FEATURES

Clampseal Check Valves feature the exclusive pressure seal bonnet which permits ready access for maintenance, while ensuring a positive pressure-actuated body to bonnet seal under all operating conditions.

The valve is comprised of five assemblies, with the piston and spring being the only moving parts. The piston utilizes two guide rings, and the spring is Inconel X for smooth operation in any position at temperatures up to 1000*F. The reliability of the Clampseal Check Valve is enhanced by use of the electron beam process for welding the cast stellite seat into the body. By using the inline maintenance tools available, long valve life can be assured.



ISO 9001 certified since September 11, 1992



World Headquarters: 265 Field Road P.O. Box 1049, Somers, CT 06071-1049 USA Phone (860) 749-0761 Fax (860) 763-3557 e-mail: sales@Conval.com www.Conval.com

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Form Check2008-KIT Printed in USA



CARBON, ALLOY OR STAINLESS STEEL

ASME CLASSES 150-900, 21/2 -24" (65-600 mm) ASME CLASS 1500, 21/2 -16" (65-400 mm)



CAUTION: For other than horizontal line orientations see pgs. 50-51, or contact Velan Engineering.





Flange dimensions are in accordance with ASME B16.5. Flanges are welded on.

DESIGN FEATURES:

- Stronger, leakproof bolted body bonnet joint. (See page 11.)
- No penetration of hinge pin to outside eliminates pin seal leakage and provides in-line service.
- Compact cage unit. All moving parts are attached to the carrier and can be removed easily for service.
- Forged seat/disc* is Stellited, ground and lapped to a mirror finish for maximum erosion resistance and long service life. It is seal-welded to the body.
- Disc can partially rotate for tight shutoff. In the fully open position, it rests against a stop.
- Stellite bearings for hinge pin.
- Easy in-line service. Seating faces can be re-lapped.
- Forged Bonnet
- * Cast option available

STANDARD MATERIALS

PART		MAT	ERIAL	
Body ⁽¹⁾	A105	A182 Gr. F11	A182 Gr. F22	A182 Gr. F316
Cover ⁽¹⁾	,,,,,,			
Seat ⁽¹⁾⁽²⁾	A105	A 182 Gr. F11	A 182 Gr. F22	A 182 Gr. F316
Disc ⁽¹⁾⁽²⁾	or A 216 Gr. WCB	or A 217 Gr. WC6	or A 217 Gr. WC9	or A 351 Gr. CF8M
Hanger		Stainlage		
Hex head bolt		Stanness		
Lock washer		Sta	inless	
Hinge pin		Gr. 410		Gr.630 or Gr.660
Bushing		Stel	lite 6	
Gasket ⁽¹⁾	Spi	ral wound stair	nless and grap	nite
Body/cover stud	Gr. 87	B16	Gr.B8M or Gr.630	
Body/cover nut	Gr. 2H	G	r. 4	Gr. 8M

(1) Other materials available. (2) Stellited.

FLOW COEFFICIENTS Cv *

Contraction of the	L		243		1966			No. of the		24,0
in form)	160,507	600	908	1508	in	(mm)	150/300	600	900	1500
2% (65)	170	170	170	170	12	(300)	3500	3500	2800	2800
3 (80)	170	170	170	170	14	(350)	5300	5300	3650	3650
4 (100)	295	295	295	295	16	(400)	7000	7000	6000	4850
6 (150)	830	830	700	700	18	(450)	8400	8400	7300	
8 (200)	1525	1525	1125	1125	20	(500)	10,500	10,500	9000	
10 (250)	2400	2400	1700	1700	24	(600)	15,000	15,000	13,500	

 $* Kv = Cv \times 0.85$

DIMENSIONS – BUTT WELD END

SIZE	ZE ASME 150 (PN 20) ASME 300 (E 300 (I	PN 50}	ASME	600 (P	N 100)	ASME	900 (P	N 150)	ASME 1500 (PN 250)				
in mm	A	B	lb kg	A	B	lb kg	A	B	łb kg	A	B	lb kg	A	B	lb kg
2½	8.50	7.00	50	11.50	7.00	50	13.00	7.00	50	10.00	7.00	50	10.00	7.00	50
65	216	178	23	292	178	23	330	178	23	254	178	23	254	178	23
3	9.50	9.00	100	12.50	9.00	100	10.00	9.00	100	12.00	9.50	100	12.00	9.50	100
80	241	229	45	318	229	45	254	229	45	305	241	45	305	241	45
4	11.50	10.56	150	14.00	10.56	150	12.00	10.56	150	14.00	10.75	150	16.00	10.75	150
100	292	268	68	356	268	68	305	268	68	356	273	68	406	273	68
6	14.00	13.13	300	17.50	13.13	300	18.00	13.13	300	20.00	16.25	450	22.00	16.50	450
150	356	333	136	445	333	136	457	333	136	508	413	204	559	419	204
8	19.50	16.19	700	21.00	16.19	700	23.00	16.19	700	26.00	19.50	850	28.00	19.50	850
200	495	411	318	533	411	318	584	411	318	660	495	386	711	495	386
10	24.50	19.50	800	24.50	19.50	800	28.00	19.50	800	31.00	21.75	1000	34.00	21.75	1000
250	622	495	363	622	495	363	711	495	363	787	552	454	864	552	454
12	27.50	22.69	1200	28.00	22.69	1200	32.00	22.69	1200	36.00	28.13	3000	39.00	28.13	3000
300	699	576	544	711	576	544	813	576	544	914	715	1361	991	715	1361
14	31.00	23.88	1400	33.00	23.88	1400	35.00	23.88	1400	39.00	26.50	3000	39.00	27.50	3000
350	787	606	635	838	606	635	889	606	635	991	673	1361	991	699	1361
16	34.00	29.00	2000	34.00	29.00	2500	39.00	30.00	2500	43.00	31.00	3350	47.00	31.00	3350
400	864	737	907	864	737	1134	991	762	1134	1092	787	1520	1194	787	1520
18 450	38.50 978	22.88 581	2300 1043	38.50 978	22.88 581	3000 1360	43.00 1092	24.38 619	3000 1360	48.00 ⁽³⁾ 1219	24.38 619	4000 1814			
20 500	38.50 978	26.00 660	3000 1360	40.00 1016	26.00 660	3600 1633	47.00 1194	27.00 686	3600 1633	47.00 ⁽³⁾ 11 9 4	27.00 686	5000 2268		_	
24 600	51.00 1295	31.00 787	5000 2268	53.00 1346	31.00 787	5500 2495	55.00 1397	31.00 787	5500 2495	55.00 ⁽³⁾ 1 397	31.00 787	7000 3175		-	

(3) The following valves do not meet the ASME B16.10 end to end dimensions.





TRINZER READT PRI 259682-0-64

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C 08-50924-01 7 Pr ROWSERVE ANTRATIG BURP, DURD AND WEEK VEAKES MOTE NOTE valve desidin pressure and temperature is 2425 pick o 6527 Cardidado pick Denvits Svett REJATD MAR-JORG PRF 2. PARS MC ROTHOD RY NOTE, 4 06 5 Den Mar-JOHT RAJATD PARS 4. RESEARCH SALT ONARTD PRF 2. DENVET OF THE OWNERD AF 2. DENVET OF THE OWNERD AFT 2. DENVET OWNERD AFT 3. Valve Drawing - Size 3 VALVE IS ASHE CUSS I PLA KANE SECTION R 1871 ED. THORU SUMMER 1973 ADDENEA WITH N-STAME WITH THE HAVE PAN HORIZONIAL AND BONNET ON TOP OF STAINLESS STEEL, SPL WELD ENDS WITH RESILIENT SEAT SIZE: 3 CLASS: 1500 SOUTHERN CALIFORMA EDROW OOMPANY SAU DONGER MICLAR GOUGNAMA STATION UNITS 2 MAD 3 ULGTOMER P.O. WAMBER, 5050206722 FLOWSSENE S.O. MAMBER, 50624, REMI (TIEM 2) AFPA-216 ETHALDAE PROPALINE RUBBER ASS 304 ASS 304 ASS 304 A WHERE G. R. ASTALED A HEADDARK RAM OF PWE A DENOTES PRESSURE RETAINING ASHE SECTION IF FAST RALEIGH, NC IN A VERICAL BUN OF PRE WITH D.OK VERMED SAIB2-FJIEL WIH NOREN MJ9-J16 WTH NOREM DRAPHITE W/JOAGS CAP NATERAL SA479-316 A564-630-1075 SAIS2-CIBM SAIS2-COTE NONHAL WAYN WENGH = 100 103 SM33-6628 NS 316 SA194-654 180-197 A479-316 4479-316 X240-316 M779-311 1240-31 AS 395 11140 800 Contraction)
 PART
 CT
 PESCREPTION

 046
 1
 BEOF
 ESCREPTION

 040
 1
 BEOF
 ESCREPTION

 041
 1
 BEOF
 ESCREPTION

 043
 1
 BEOF
 ESCREPTION

 043
 1
 BEOF
 ESCREPTION

 043
 1
 SPLACET
 ESCREPTION

 044
 1
 SPLACET
 ESCREPTION

 045
 1
 SPLACET
 ESCREPTION

 045
 1
 SPLACET
 NIS 10.1 PR L Ø 2.692 S2120440016/52120440019 S212044002/52120440019 S3120440018/53120440019 S3120444009/53120440021 24.35 MAX 22.0 200 ENLARGED DETAIL A 22 DUM NOO PLONDOR N DETML C R , 125 MIN. ** ž - 152 20.3° = DIEVERENTIAL VIJBARIX REVICE EDH 2251 XOM-6-IV ž ce 18 HILLING 5 1 24 SECTION 8-B ~|¥ A N28 90 08-50924-01 FLOWSERVE r ((((約) \$ 215 100 Ś 03.3 032 80 1000 800 013 88 Exper

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Page 3

Valve Drawing - Size 8



Page 4



Attachment 4

Cost Estimate

	IMPLEMENTATION ESTIMATE Indian Point Nuclear Power Station														
* ESTIMATE LEVEL *	E	C #: SAMA IP2-022													
Conceptual	PROJECT TITLE: ISLOCA Pathway Isolation Va	ve Position Indication	ESTIMATOR: RCMT												
Preliminary	JOB LOCATION: Containment & Control Bldgs.	PROJECT CODE: TBI	D												
Definitive	Outage Non-Outage ORIGINATOR	: 🗹 CAPITAL 🗹 O&M	ORIG. DATE: 07/23/2012												
	ESTIMATE TOTAL \$7,685,460	REVISION	I 11-0												
Summary of Change: In accordance with NRC environment as part of its license renewal applicat and related correspondence with the cost-benefit analysis, even though n RCM Technologies to assist it in this	Intal regulations in 10 C.F.R. Part 51, Entergy perform ation. Those analyses identified a number of potentia e NRC Staff, Entergy indicated that it would submit the none of the potentially cost-beneficial SAMAs is related is effort.	ed SAMA analyses for both Indian Illy cost-beneficial SAMAs for each potentially cost-beneficial SAMA d to aging management under 10	Point Nuclear Generating Units 2 and 3 h unit. In its license renewal application s for further internal engineering project C.F.R. Part 54. Entergy contracted												

This package responds to the issue identified in the NRC's staff review of SAMA IP2-022 and provides the technical resolution and associated costs required for implementation.

For SAMA IP2-022, resolution is required for remotely monitoring the open-close position of isolation valves in the ISLOCA pathways in containment.

This package will install position switches on existing valves where possible or replace any existing valves that can't be modified with new ones that have position capability. This package will also provide for the valve position to be monitored remotely outside containment.

Prepared by:	Petro puttocavos.	Approved by:
Date:	9-20-2012	Date: 9-20-2012

		ENTERGY NUC	EAR NORTHEAST											
		IMPLEMENTA	TION ESTIMATE											
		Indian Point Nuc	lear Power Station											
		EC #: SA	MA IP2-022	gan a gan gan an a										
* ST	MATE LEVEL *													
거	Conceptual 177	BOLTOLTHER ISLOCA Pathway Isolation	Valve Position Indication	ESTIMATOR: RCMT										
<u>dt</u>	Preliminary	IOB LOCATION: Containment & Control Bldg	PROJECT CODE: TB	D										
	Definitive	ORIGINA	TOR [.]	ORIG DATE: 07/23/2012										
Item		De	escription											
1	This estimate assur	es that this work will require both non-outage	and outage conditions to complete.											
2.	This setting to serve													
	This estimate assur	es that the non-outage work work will complet	e during 2011 working a 10 hours per	shift, four days per week schedule.										
3.	This estimate assumes that the outage work will be completed in 2014 working (2) 10 hour shifts 6 days per week.													
4.	This estimate assur	es that the non-outage work will not suffer pro	ductivity loss due to radiation or haza	rdous conditions										
5.	This estimate assur	es that all work will be performed by trained co	ontract craftspersons in lieu of station	maintenance personnel.										
6.	This estimate assur	es that adequate penetrations exist for routing	of wiring from the position indicating	switches to the external panel location										
	such that no new co	ntainment penetrations will be required.	is the shap and that blue sheekes wil	the performed on value coating										
1.	surfaces prior to rea	es that sale ends will be welded to the valves	armed during non-outage conditions	the performed on valve sealing										
8	This estimate assur	es that the results of the seat Blue check after	welding will not require any machinin	ng of the valve seat.										
9.	This estimate assur	es that (4) Fitter / Welders will be assigned for	non-outage work and (2) of those wi	I be assigned to 2nd shift for										
	theOutage and (4) a	ditional personnel will be assigned for the Our	tage, (2) for each shift.	Ĵ										
10.	This estimate assur	es that the Outage work will involve radiologic	al conditions requiring additional brief	fing times, dressout times and reduced										
	production due to di	essout requirements.												
11.	This estimate assur	es NDE requirements include Visual, LP, UT a	and RT,											
12	This estimate is bas	ed on the project's current level of scope defini	tion and is classified Class 4 as defin	ed per the AACE International Cost										
14.	Estimate Classificat	on System (see Attachment 3, Reference 2).												
13.	Labor dollars in this	estimate are projected 2014 costs based on cu	urrent 2012 craft billing rates at Indiar	Point. The projected costs provide										
	for anticipated billing	rate increases of 3% per year.	a the complexity and leasting of the y	work conviced. The factor is sumulative										
14.	and progresses as f	Tor and includes a contingency factor related t shows:	o the complexity and location of the v	vork required. The factor is cumulative										
	A. Outside fen	ce boundary - 20%												
	B. Inside fence	boundary - 30%												
	C. Implementa	tion complexity - 40%												
	D. Inside Cont	ainment - 50%												

Re ⁻ 11-	<i>.</i> . 0		INDIAN POINT IMPLEMENTATION ESTIMATE WORK SHEET EC #: SAMA IP2-022 TAKEOFF:														
way	Isolation Valve Position Indication	AL.	080	1				PROJE		3D			TAK EST	EOFF: IMATOR:	RCMT		
ST/	ATUS:] OUTAG	E	NON-OUTAG	E ANHOURS	ORIGIN	ATOR:	MATERIAL \$	MA	TERIAL	ORI	g. date: Abor	07/23/2012 SUB-		
ITE	M DESCRIPTION	QTY	UOM	CFT	NO.	UNIT	FCTR	TOTAL	\$/MH	PER UNIT	DO	LLARS	DO	LLARS	CONTRACT	т	OTAL \$
	* ESTIMATE LEVEL *									ESTIMATE SU	MMAR	Y				—	
U	Conceptual			501							MAN	HOURS			DOLLARS		
H	Definitive			01	ENGI	STUDY, DE	ESIGN, & C	LOSEOU	г			400			\$ 40,000		
	General Notes			02		DESIGN EN			RT			160			\$ 16,000 \$		
				04		SYS ENGR	/ S-U ENG	R				240			\$ 24,000		
				05 06		WORK MAI	MANAGEM NAGEMEN	EN I T				600			\$ 72,000 \$ -		
				07 CON	ITRAC	ENGINEER CT ENGINE	ING DCP A ERING	CCEPTA	NCE REVIE	N		100			\$ 10,000		
				08 09		DESIGN EN SUPL CON	NGR CONT TRACT MC	RACT SL DS ENG	PPORT R			1,900			\$ 228,000 \$ -		
				10 11		MODS PLA FIELD ENG	N & SCHE	D -CONTI NERS	RACT			280 240			\$ 28,000 \$ 28,800		
				MAT 12	ERIAL	S/MISC C	ONTRACT	s							\$ 1 754 331		
				13 CON	TRAC		NTRACTS								\$ 105,000		
				14		SWEC CRA	AFT LABOR	WALKD	OWN			5,417			\$ 577,322 \$ 72,818		
				16		SWEC DIS	TRIBS					542			\$ 156,991		
				17	WI CR	MECH MA	R INT.					-			\$ -		
				18 19		I&C	AIN I					54 136			\$ 5,400 \$ 13,600		
				20 Misc	EOIS	CSG SUPPORT						-			\$-		
				21 22		QUALITY (TRAINING	CONTROL					240 48			\$ 24,000 \$ 5,760		
				23 24		CHEMISTR OPS/OPS	RY S SUPPOR	Г				- 120			\$- \$14,400		
				25 Misc	con	HP/RP TRACT SU	PPORT					120			\$ 9,547		
				26 27		QUALITY (CONTROL					260			\$ 20,800 \$ -		
				28 29		HP / RP RADWAS	TE					-			\$ - \$ 50.000		
				30 31		NURSE						-			\$ - \$ -		
				32 WASTE MANAGEMENT - 33 HOUSEKEEPING -							\$- \$-						
				34		EQUIPME	NT RENTA		ACTOR			-			\$ 10,000		
				36		DECONTA	MINATION	, I CONTA	TOR			-			\$ 10,000		
				38		SECURITY	- Wackent	nut				-			• - \$ -		
				39 40		SAFETY	CH (Rover)				112			\$		
				41 501			INCY					40.060		-	\$ 1,642,192		
				E3 I IN	AIE	SUBICIAL	•					(20%)			¢ 005 315		
									LOADERS	(30%)		(2070)			\$ 1,773,568		
10505			L				NON OUT	AGEWO	ESTIMA						\$ 7,685,460		
1.	Gather and stage tools and materials Gather and stage tools and materials	1		EL PF	4	10.00 10.00	1.00	40	\$ 123.32 \$ 120.71		\$		\$ \$	4,933		\$	4,933
3.	Mount Hoffman wall mounted panel and enclosure					20.00	4.00	400	e 100 00				e	14 700			14 700
4.	Pull wire from containment external penetration box				4	30.00	1.00	120	φ 123.32			-	¢	14,/98			14,798
5.	to new panel and terminate in new panel. Cut and prep (20) 2" sch. 160 Pup pieces	1	LT	PF	4	24.00 10.00	1.00 1.00	96 40	\$ 123.32 \$ 120.71		\$	-	\$ \$	11,839 4,828		ş	4,828
6. 7.	Cut and prep (8) 6" sch. 160 Pup pieces Cut and prep (18) 10" sch. 160 Pup pieces	1 1	LT	PF PF	4	16.00 44.00	1.00 1.00	64 176	\$ 120.71 \$ 120.71		\$ \$	-	\$ \$	7,725 21,245		\$ \$	7,725 21,245
8.	Disassemble valve internals prior to welding pup pieces on (10) 2" valves.	1	LT	PF	4	5.00	1.00	20	\$ 120.71		\$	-	\$	2,414		\$	2,414
9.	Disassemble valve internals prior to welding pup pieces on (4) 6" valves.	1	LT	PF	4	7.00	1.00	28	\$ 120.71		\$	-	\$	3,380		\$	3,380
10	Disassemble valve internals prior to welding pup pieces on (9) 10" valves.	1	LT	PF	4	10.00	1.00	40	\$ 120.71		\$	-	\$	4,828		\$	4,828
11 12	Fit and weld (20) 2" Pup pieces to valves Fit and weld (8) 6" Pup pieces to valves	1 1	LT LT	PF PF	4	16.00 12.00	1.00 1.00	64 48	\$ 120.71 \$ 120.71		\$ \$	-	\$ \$	7,725 5,794		\$ \$	7,725 5,794
13 14	Fit and weld (18) 10" Pup pieces to valves Re-assemble valve internals and perform a seat	1	LT	PF	4	54.00	1.00	216	\$ 120.71		\$	-	\$	26,073		\$	26,073
15	blue check on (10) 2" valves. Re-assemble valve internals and perform a seat	1		PF	4	5.00	1.00	20	\$ 120.71		\$	-	\$	2,414		\$	2,414
16	Blue check on (4) 6" valves.	1	LT	PF	4	3.00	1.00	12	\$ 120.71		\$	-	\$	1,449		\$	1,449
	Re-assemble valve internals and perform a seat Blue check on (9) 10" valves.	1	LT	PF	4	7.00	1.00	28	\$ 120.71		\$	-	\$	3,380		\$	3,380

Rev. 11-0	-170-047-00-	🖸 CAP	INC		POI	NT IMPL	EMENT EC #: S	ATION SAMA IF	ES 2-0	STIMA	TE WORK	SHEET					
way ntain STA	isolation Valve Position Indication ment & Control Bidgs. TUS:							PROJE	CT C	ODE: TE	BD		TAKEOFF: ESTIMATO ORIG. DAT	TAKEOFF: ESTIMATOR: RCMT ORIG. DATE: 07/23/2012			
,E	DESCRIPTION	QTY	UOM	CFT	NO,	M. UNIT	ANHOURS FCTR OUTAC		Į	6/MH	MATERIAL \$ PER UNIT	MATERIAL DOLLARS	LABOR DOLLARS	SUB- CONTRACT	TOTAL \$		
1. 2. 3. 3. 4. 5. 6. 7. 8. 9, 10. 11.	Gather and stage tools and materials, waikdown Gather and stage tools and materials, waikdown Remove existing valves and prep ((10) 2" valves) Fit and weld (10) 2" valves Remove existing valves and prep ((4) 6" valves) Fit and weld (4) 6" valves Remove existing valves and prep ((8) 10" valves) Fit and weld (6) 10" valves NDE Profile (20) 2" welds NDE Profile (8) 6" welds NDE Profile (16) 10" welds Route & Support Conduil from each valve in	1 10 10 4 4 8 8 20 8 16	LT EA EA EA EA EA EA EA EA EA	PF EL PF PF PF PF PF PF	881111111111111111111111111111111111111	10,00 10,00 3,00 7,00 18,00 15,00 10,00 20,00 2,00 4,00 6,00	1.70 1.70 1.70 1.70 1.70 1.70 1.70 1.70	136 136 51 119 122 102 136 272 68 54 163	\$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$	120.71 123.32 120.71 120.71 120.71 120.71 120.71 120.71 120.71 120.71 120.71			\$ 16,41 \$ 16,77 \$ 6,15 \$ 14,36 \$ 14,76 \$ 12,31 \$ 16,41 \$ 32,83 \$ 8,20 \$ 6,51 \$ 19,67		\$ 16,417 \$ 16,772 \$ 6,156 \$ 14,364 \$ 14,727 \$ 12,312 \$ 16,417 \$ 32,833 \$ 8,208 \$ 6,518 \$ 19,676		
12. 13.	containment. Mount Hoffman wall mounted panel and enclosure and run conduit to selected in containment Route & Support Conduit from each junction box to containment Penetration.	800 2 400	LF LT LT	EL EL EL	1 1 1	0.18 30.00 0.20	1.70 1.70 1.70	245 102 136	\$ \$ \$	123.32 123.32 123.32		\$- \$- \$-	\$ 30,21 \$ 12,57 \$ 16,77		\$ 30,213 \$ 12,579 \$ 16,772		
14. 15. 16. 17. 18. 19. 20	Connect power cable to containment penetrations on both sides of containment penetration box. Provide testing as required Assist with testing as required Dismantle scaffolding to storage Dismantle scaffolding to storage Cleanup and restore area Cleanup and restore area	1 1 1 1 1	נד נד נד נד נד נד	EL PL EL CP LB EL PF	4 2 2 2 1 4 4	60.00 60.00 24.00 24.00 10.00 10.00	1.70 1.70 1.70 1.70 1.70 1.70 1.70	408 204 102 82 41 68 68	5 5 5 5 5 5 5 5	123.32 60.00 123.32 96.00 78.15 123.32 120.71		\$ - 5 - 5 - 5 - 5 - 5 - 5 - 5 -	\$ 50,31 \$ 12,24 \$ 12,57 \$ 7,87 \$ 3,20 \$ 8,38 \$ 8,20 \$		\$ 50,315 \$ 12,240 \$ 12,579 \$ 7,872 \$ 3,204 \$ 8,386 \$ 8,208		
1. 2.	PAINTING & TOUCH-UP REQUIREMENTS PAINTING & TOUCH-UP PAINTING & TOUCH-UP			PT PT				-				s - s -	\$ 5 5 5 5		\$- \$-		
1. 2.	CRAFT SUPPORT FOR FIRE WATCH	2	LT LT	FW FW	1	300.00	1.70	1,020	s	53.60		\$ - \$ -	\$ 54,672 \$ \$		\$ 54,672 \$ -		
1. 2.	MISC SUB-CONTRACT NDE Contractor MISC SUB-CONTRACT NOV Contractor	1 1	LT LT	NM NM									s \$ \$	\$ 70,000 \$ 35,000	\$ 70,000 \$ 35,000		
	SUBTOTAL CRAFT & SUB-CONTRACTOR							4,687				\$ -	\$ 484,534	\$ 105,000	\$ 589,534		
7.	CONSTRUCTION SUPPORT (8% OF LABOR \$)	1	L1					375	\$	103.38	\$ -		\$ 38,768	405 000	\$ 38,768		
	* RELATED COSTS *							5,062				\$ -	\$ 523,302	\$ 105,000	\$ 628,302		
1. 2. 3. 4. 5. 6. 7. 8. 9.	WALKDOWN ALLOWANCE WALKDOWN ALLOWANCE WORK PACKAGE REVIEW TOOL ROOM ATTENDANTS (~3.5%) GENERAL CRAFT OUTAGE DISTRIBS. (10%) CRAFT IN PROCESSING (20%) HUMAN PERFORMANCE & ALARA TRAINING (1/2 day training, or ~ 2%)	1 1 1 1 1	LT LT LT LT LT	EL PF EL EL				42 38 50 48 177	5 5 5 5 5 5	123.32 120.71 123.32 120.71 123.32			\$ 5,179 \$ 4,583 \$ 6,166 \$ 5,794 \$ 21,826 \$ 52,330 \$ 104,660 \$ 10,466		\$ 5,179 \$ 4,587 \$ 6,166 \$ 5,794 \$ 21,828 \$ 52,330 \$ 104,660 \$ 10,466		
1.	PLANT SCOPE MECH MAINTENANCE			PL				5,417 -				s . s -	\$ 734,313	\$ 105,000	\$ 839,313 \$ -		
	SUBTOTAL MECH MAINT.							-				s .	\$	5 -	\$ -		
1.	ELECT MAINTENANCE	1	LT	PL	2	16.00	1.70	54		100.00		5. 5.	\$ 5,400 \$		\$ 5,400 \$		
	SUBTOTAL ELECT. MAINT.							54				\$ -	\$ 5,400	<u>s</u> -	\$ 5,400		
1.	I&C SUBTOTAL I&C MAINT.	1	LT	PL	2	40.00	1.70	136 136	\$	100.00		\$- \$-	\$ 13,600 \$ \$ 13,600	 \$	\$ 13,600 \$ - \$ 13,600		
1.	CSG	1						-				\$ - \$	5		\$ -		
	SUBTOTAL CSG MAINT.											\$ -	\$	<u> </u>	\$ -		
	SUBTOTAL PLANT							190	L			\$.	\$ 19,000	\$ -	\$ 19,000		
	SUBTOTAL CRAFT/PLANT							5,607				\$-	\$ 753,313	\$ 105,000	\$ 858,313		
T				1		1]		l	I				T			

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Rev															
11-0		0000		121000			EC #: \$	SAMA IF	2-022				······	******	
way ntain STA	ray Isolation Valve Position Indication Iainment & Control Bidgs. STATUS:						PROJECT CODE: TBD			TAKEOFF: ESTIMATOR: ROMT ORIG: DATE: 07/23/2012					
D					ANHOURS	MATERIAL S MATERIAL			MATERIAL	LABOR SUB-					
H.	DESCRIPTION	QTY	UOM	CFT	NO.	UNIT	FCTR	TOTAL	\$/MH	PER UNIT	DOLLARS	DOLLARS	CONTRACT	1	TOTAL \$
	IMPLEMENTATION SUPPORT									1				1	
	EOI														
1.	WELDING ENGINEERING		LT	NM	1	100.00					1	\$ -		15	
1 5	DESIGN ENGINEERING SUPT DURING CONST			NM		160,00	1	160	\$ 100			5 16,000		15	36,000
4	SYSTEMS ENGINEERING - ELECTRICAL			NIM	5	80.00		80	\$ 100			s 8,000		4	8,000
5.	SYSTEMS EINGINEERING - INSTR & CONTROL		LT	NM		40.00	1	40	\$ 100			\$ 4,000		ŝ	4,000
6.	SYSTEMS ENGINEERING - CIVIL STRUCTURAL	1	LT	NM	1	40.00	1	40	\$ 100			\$ 4,000		\$	4,000
7.	PROJECT MANAGEMENT	1	LT	NM	1	600.00	1	600	\$ 120			\$ 72,000		\$	72,000
8.	TRAINING OPS STAFF	12	LT	NM	1	4.00	1	48	\$ 120			\$ 5,760		\$	5,760
9.	QA/QC VERIFICATION	1	LT	NM	1	240.00	1	240	\$ 100			\$ 24,000		\$	24,000
10.				NM		100.00		100	c 80			S -		15	0.647
112			LI IT	NIKA		120.00	·	120	3 OU			\$ 9,547 ¢		2	9,547
13.	OPS / OPS PROCEDURE SUPPORT AND DEVEL	1	LT	NM	1	120.00	1	120	S 120			\$ 14400		s	14,400
14.	TRAVEL & LIVING EXPENSES	1	LT									s -		\$	-
1	CONTRACTOR SUPPORT														
1.	FIS / MODS ENGINEERING - SWEC (Incl Per Die	1	LT	NM				0				\$-		\$	-
2.	MODS PLANNING & SCH SWEC (Incl Per Diem)	1	LT	NM	1	280.00	1	280	\$ 100	1		\$ 28,000		5	28,000
3.	FIELD ENGRS/PLAN- SWEC	1		NM	1	240.00	1	240	\$ 120			\$ 28,800		\$	28,800
5	NDE		LI IT	NM	'	200.00	'	200	\$ 50			5 20,000		ŝ	20,000
6.	HP/RP	i	LT	NM				ő				5 -		ŝ	
7.	RADWASTE	1	LT	NM				0					\$ 50,000		
8.	NURSE	1	LT	NM				0							
9.	ELEVATOR CONTRACTOR	1	LT	NM				0							
10.	WASTE MANAGEMENT		LT	NM				0							
12	FOUNDEREPTING	'		NM				0					\$ 10.000		
13.	VENDOR STOCKING	1	LT	NM				0							
14.	DECONTAMINATION CONTRACTOR	1	ĻΤ	NM				0					\$ 10,000		1
15	RBC's	1	LT	NM				D							
16.		1		SEC		1		0							
18	SAFETY (2%)	1		NM		1		112	5 68.00			5 7616		1 S	7.616
Э.	LOST TIME (10%)	1	LT					542	\$ 134.35			\$ 72,818		ŝ	72,818
	SUBTOTAL CRAFT/NON-MANUAL							8569			\$ -	\$ 1,077,054	\$ 175,000	s	1,252,054
1															
1.	FREIGHT, SALES TAX, & CONSUMABLES (6%)		1							e 20.000	\$ 17,508			5	17,508
3	2" 6" & 10" A376 TP316 set 160 Pine									000,00 5 30,000	000,00 0				
4	2" Check Valves, 1500 # Class, SR	10	EA							\$ 45,000	\$ 450,010				
5.	6" Check Valves, 1500# Class, SR	4	EA							\$ 80,000	\$ 320,004				
6	10" Check Valve, 1500# Class, SR	9	EA							\$ 100,000	\$ 900,009			[
	SUBTOTAL INSTALLATION COST	ļ		ļ				8569			\$ 1,754,331	\$ 1,077,054	\$ 175,000	\$	3,006,385
1	DESIGN ENGINEERING - MECHANICAL	1	IT	NM	1	80.00	1	RD	\$ 100			S 8.000		s	8 000
2.	DESIGN ENGINEERING - ELECTRICAL	1	LT	NM	1	60.00	1	80	\$ 100			\$ 6,000		\$	8,000
3,	DESIGN ENGINEERING - INSTR. & CONTROL	1	LT	NM	1	80.00	1	80	\$ 100			\$ 8,000		\$	8,000
4.	DESIGN ENGINEERING - CIVIL/STRUCTURAL	1	LT	NM	1	160.00	1	160	\$ 100			\$ 16,000		\$	16,000
5.	CONTRACT ENGR DESIGN SUPPORT	1	LT	NM		1900.00	1	1900	\$ 120				\$ 228,000	\$	228,000
<u> </u>		1		NM		100.00	1	2400	ə 100		1 T	a 10,000	\$ 330.000	3	278,000
	SOBTOTAL DESIGN COST							2400				\$ 50,000	\$ 226,000	- -	278,000
	SUBTOTAL INSTALLATION & DESIGN COST	******					9				**************************************	\$ 1,127,054	\$ 403,000	\$	3,284,385
1.	CONTINGENCY (50%)													\$	1,642,192
	ESTIMATE SUBTOTAL							10969						\$	4,926,577



ENTERGY INDIAN POINT NUCLEAR STATION UNIT 2

CONCEPTUAL DESIGN PACKAGE For

SAMA IP2-028

Install a Diesel-Driven Generator Set as Backup for Station Battery Charging

Prepared by:	Approved by:					
Date: 9-20-2012	Date:					

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SECTION	TITLE
1.0	ISSUE
2.0	BACKGROUND
3.0	EXISTING CONDITIONS
4.0	DESIGN CONSIDERATIONS
5.0	CONFIRMATION OF DESIGN
6.0	RECOMMENDED SOLUTION
7.0	PRELIMINARY MATERIAL LIST
Attachment 1	Entergy Impact Screening Summary
Attachment 2	Conceptual Design Sketches
Attachment 3	References
Attachment 4	Cost Estimate


1.0 ISSUE

Severe Accident Mitigation Alternative (SAMA) IP2-028:

Install a Diesel-Driven Generator Set as Backup for Station Battery Charging

2.0 BACKGROUND

In accordance with NRC environmental regulations in 10 C.F.R. Part 51, Entergy performed SAMA analyses for both Indian Point Nuclear Generating Units 2 and 3 as part of its license renewal application. Those analyses identified a number of potentially cost-beneficial SAMAs for each unit. In its license renewal application and related correspondence with the NRC Staff, Entergy indicated that it would submit the potentially cost-beneficial SAMAs for further internal engineering project cost-benefit analysis, even though none of the potentially cost-beneficial SAMAs is related to aging management under 10 C.F.R. Part 54. Entergy contracted RCM Technologies to assist it in this effort.

This package provides a conceptual design and implementation cost estimate for SAMA IP2-028 in accordance with Entergy design engineering practices.

For SAMA IP2-028, resolution is required to install and readily have available an alternate source for charging the Station's 125VDC battery system other than from the Station's 480VAC Switchgear Room.

This package provides for a conceptual design to install a diesel-driven generator set to be available when required for charging the Stations 125VDC batteries in the event of Station Blackout.

The design considerations that follow will address the adequacy of the proposed resolution and the basis for the recommendation to resolve the identified potential issue.

The recommended solution will include descriptive details of the proposed design change and also conceptual design sketches as required. These descriptive details, sketches, and the preliminary material list provide the basis for initiating the all-inclusive conceptual cost estimate for engineering change (EC) development and implementation at the Station.

3.0 EXISTING CONDITIONS

The IP2 130VDC Battery System consists of four battery banks ranging in capacity from 495 amp/hours to 1,800 amp/hours. They are located in separate and discrete Battery Cell Rooms and identified as #21, #22, #23, and #24. These rooms are in reasonably close proximity to each other. Their capacity is as follows:

Battery Bank #211,500 amp/hoursBattery Bank #221,800 amp/hoursBattery Bank #23495 amp/hoursBattery Bank #24495 amp/hours

Battery Cell Rooms #21, #22, and #24 are located in the Unit 2 Control Building at Elevation 33'-0". Battery Cell Room #23 is located in the retired Unit 1 Generator-Superheater Building also at Elevation 33'-0".

Each Battery Cell room is separate from the other, totally enclosed, and accessible through an entry door. The battery banks are connected to their respective DC Power Panels located outside of the Battery Cell Rooms. Charging of the batteries is via wiring from the power panels connected to chargers fed from the Unit 2 480VAC electrical system.

4.0 DESIGN CONSIDERATIONS

An alternative means for charging the Station's battery banks needs to be available in the event the Station's electrical supply as a charging source is unavailable. This alternative battery charger source, must be in place and readily available for use.

The existing battery bank wiring connections need to remain in place undisturbed. New, permanent, and alternative connections to locations outside the Battery Cell Rooms need to be added to provide for battery bank charging. These new locations will be available for quickly providing connection to the alternate standby battery charging system. The charger will be permanently installed and available in the immediate area of the Battery Cell Rooms.

5.0 CONFIRMATION OF DESIGN

Installation of a diesel driven generator at ground elevation outside the Control Building in the transformer yard will provide the AC required for input to the battery charger portion of the system.



There is room at Elevation 33'-0" in the vicinity of the Battery Cell Rooms for the permanent installation of the battery charger cabinet. The charger will be specified in accordance with the various size battery bank requirements and will provide the controls for regulating the charging of each battery bank as well as a power on-off disconnect switch.

There is area available on the exterior walls of the Battery Cell Rooms for individual Interlocked Receptacle enclosures to be provided for each battery bank. The enclosures include a disconnect switch and a plug-in twist-lock connector.

The battery charger cabinet will be provided with a length of permanently connected cable fitted with a plug-in twist-lock connector for connection at each battery room's connection enclosure.

6. **RECOMMENDED SOLUTION**

Diesel Driven Electric-Generator and Charger

- 1. Outdoors, in the transformer vard at Elevation 18'-0", provide for the installation of the diesel driven electric-generator.
 - At the base of the north wall of the Control building, install a concrete pad for mounting the generator and enclosure.
 - Mount and permanently install the generator and enclosure.
 - Construct an oil spill containment berm around the weatherproof enclosure.
 - Route and install conduit and cable and terminate from distribution • cabinet to enclosure to provide electrical power required for heating, ventilation and lighting.
- 2. In the control Building at elevation 33'-0", provide for the installation of the battery charger cabinet.
 - Across from Battery Cell Room #21, install and permanently mount the battery charger cabinet and its associated length of "connection" cable with plug-in twist-lock connector
 - Provide means for storing the length of plug-in jumper "connection" cable at this location.
- 3. Route and install conduit and cable and terminate as follows.
 - From the outdoor mounted generator at Elevation 18'-0", penetrate the Control Building wall and connect to the battery charger cabinet mounted indoors at Elevation 33'-0".



Battery Cell Rooms

1. Install the individual battery room plug-in Interlocked Receptacle enclosures on the exterior walls of the Control Building Battery Cell Rooms.

- 2. Route and install conduit and cable and terminate as follows.
 - Connect the existing DC power panel outside of each Battery Cell Room to its respective Interlocked Receptacle enclosure.
- 3. Provide procedures and training to operate, test, and perform maintenance on the components of the newly installed system.

7.0 PRELIMINARY MATERIAL LIST

Iter	<u>n Description</u>	Quantity
1.	Concrete pad 13' x 10' x 6"	1
2.	Enclosure for diesel generator 13' x 10' x 10'	1
3.	Cummins Diesel generator Series QSB5 with a prime rating of 69 kVA or Equivalent	1
4.	Sub-base Fuel Tank	1
5.	Solidstate Controls Battery charger 85-CC2500 or Equivalent	1
6.	Russellstoll Maxguard Interconnection Systems Interlocked Receptacle w/Circuit Breaker or Equivalent	4
7.	Russellstoll Maxguard Interconnection Systems Plug or Equivalent	1
8.	2" – Conduit and Supports	180 Feet
9.	1/0 Excelene Welding Cable or Equivalent	360 Feet
10.	480 VAC – 4/c Power Cable	120 Feet
11.	1" – Conduit and Supports	200 Feet
12.	120 VAC – 3/c Power Cable	200 Feet



Attachment 1

Entergy Impact Screening Summary



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Engineering Change Process

ATTACHMENT 9.3

IMPACT SCREENING SUMMARY

SHEET 1 OF 6

INSTRUCTIONS:

Identify the potentially impacted and the unaffected areas by checking the appropriate **Yes** or **No** block on the Impact Screening Criteria.

If a direct determination cannot be made based on the impact screening questions, the detailed questions in Attachment 9.4 may be used to identify potential impacts.

The completion of detailed questions in Attachment 9.4 is recommended but not required.

Contact potentially impacted g	proups if assistance is required.
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SANA Engineering Change No.: <u>IP2-028</u>

-	CONCEPT	UAL
Rev. No.:	DESIGN	PACKAGE

Prepared by:

Date:

DESIGN ENGINEERING DISCIPLINES	Potentia	al Impact
 Civil / Structural Design Engineering Does the proposed activity involve any civil / structural (including seismic) design changes, activities or affect coatings? OR Does the proposed activity involve any piping engineering design changes or activities? 	YES	□ NO
 Electrical Design Engineering Does the proposed activity involve any station or switchyard electrical design, large power transformers, or settings changes or activities? (SOER 10-1) 	YES	
Instrumentation and Controls Design Engineering Does the proposed activity involve any I&C design or settings changes or activities?	YES	
 Mechanical Design Engineering Does the proposed activity add/remove/replace insulation, aluminum or other metallic/non-metallic sources of debris in the reactor/containment building or involve any mechanical design changes or activities? 	T YES	X NO
 PSA Engineering Does the proposed activity impact or involve changes to plant evaluations or probabilistic safety assessments? Does the proposed activity impact or involve changes to the Emergency Operating Procedures, Abnormal Operating Procedures, or Severe Accident Procedures or does it add, remove or modify SSCs included in a Maintenance Rule function? 	YES	□ NO
 Nuclear Analysis Does the proposed activity impact or involve changes to plant evaluations, Technical Specifications, Technical Requirements Manual, or require a full 50.59 Evaluation? 	YES	
 FERC / NERC Impact Does the proposed activity impact or involve change to FERC / NERC or Regional Entity compliance documents? (ex. MOU, ENN/ENS-PL-158, ENS-DC-199, etc.) 		M NO



REV. 11

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Engineering Change Process

ATTACHMENT 9.3

IMPACT SCREENING SUMMARY

Sheet 2 of 6

DESIGN ENGINEERING PROGRAMS	Potential	<u>impact</u>
 ASME Section III Specifications Does the proposed activity add, delete, or modify information required by ASME Section III to be contained in a design specification? 	Tes 🗌	М 🕅
 Cable and Raceway Program Does the proposed activity involve any changes to cable trays, raceways or the associated documentation? 	YES	
 Does the proposed activity involve any changes to electronic databases? 	YES	
 EQ Program (10CFR50.49, NUREG 0588, Reg Guide 1.89) Does the proposed activity involve any new or existing EQ components? 	☐ YES	X NO
 Hydrogen Control Program (10 CFR 50.44) (<i>if applicable</i>) Does the proposed activity impact equipment or materials related to hydrogen control? 	🗌 YES	🕅 NO
 Human Factors Program Does the proposed activity involve control panel design including layout and labeling, visual displays, operator aids, auditory signals or environment in the control room, cable spreading room, and other control panel locations? 	YES	□ NO
 Margin Management Does the proposed activity impact or involve any change to design, licensing or operations margins? 	□ YES	🕅 NO
 Reg. Guide 1.97 / PAM (Post Accident Monitoring) Does the proposed activity involve Reg. Guide 1.97 (Post Accident Monitoring) Indications? 	□ YES	X NO

Potential Impact MAINTENANCE **Electrical Maintenance** YES Does the proposed activity require an Electrical Maintenance review to identify affected • procedures, required actions and required training? **I&C** Maintenance YES Does the proposed activity require an I&C Maintenance review to identify affected . procedures, required actions and required training? YES □ NO **Mechanical Maintenance** Does the proposed activity require a Mechanical Maintenance review to identify affected ٠ procedures, required actions and required training?

NUCLEAR ENGINEERING	Potentia	al Impact
 Nuclear Fuel Design Does the proposed activity impact or involve the design, performance or storage of nuclear fuel? 	TYES	🕅 NO
 Reactivity Management Program Does the proposed activity impact or involve the reactor system, reactor controls, reactor chemistry, related systems, potential core and spent fuel damage, spent fuel, reactor coolant pressure boundary or reactor system procedures? 		M NO



QUALITY RELATED

REFERENCE USE

REV. 11

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Engineering Change Process

IMPACT SCREENING SUMMARY

ATTACHMENT 9.3

SHEET 3 OF 6

PROCESS OR PROGRAM IMPACT SCREENING CHECKLIST		Potential Impact	
Computer Support and Software	🗌 YES	🕅 NO	
 Does the proposed activity impact or involve changes to plant computer software or firmware or impact Software Quality Assurance (SQA)? 			
Chemistry and Environmental Impact	🗌 YES	🕅 NO	
 Does the proposed activity impact or involve any changes to plant chemistry requirements, operations or procedures, or any changes to the environment? 			
Radiation Protection (RP) Program Impact	🗌 YES	🕅 NO	
 Does the proposed activity impact or involve any changes to the RP program? Does the proposed activity involve the potential to introduce (or reintroduce) any cobalt containing materials (such as Stellite) into the primary system? 			
 Operations Does the proposed activity impact or involve changes to Operations procedures, training or operator actions? 	YÈS	□ NO	
 Planning, Scheduling and Outage (PS&O) Does the proposed activity require a PS&O review to identify required design and installation information? 			
 MP&C (Inventory) Does the proposed activity impact or involve any addition or removal of equipment from the inventory? Does the proposed activity impact or involve any Procurement of Quality or Augmented Quality material from non-qualified suppliers? 	YES	□ NO	
Procurement Engineering Does the activity impact or involve any procurement activities?			

PROGRAMS AND COMPONENTS	Potentia	al Impact
 ASME Containment In-service Inspection (IWE / IWL) Program Does the proposed activity impact or involve the containment pressure boundary or associated moisture barriers or a support for the containment pressure boundary? This includes "software only" changes that do not physically change the hardware such as re-rating of pressures or temperatures to include changes to documented information on these items or additional documented information for these items. Does the proposed activity limit access to containment surfaces for inspection? Involve disassembly of a bolted connection which forms a portion of the containment boundary? 	U YES	XX NO
 ASME Appendix J (Primary Containment Leak Rate Testing) Program Does the proposed activity impact or involve any changes to primary containment leak rate testing? 	T YES	X NO



EN-DC-115

REV. 11

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Engineering Change Process

ATTACHMENT 9.3 SHEET 4 OF 6 IMPACT SCREENING SUMMARY

PROGRAMS AND COMPONENTS (CONTINUED)		Potential Impact	
 ASME In-service Inspection (ISI) Program Does the proposed activity add, delete, or modify an ASME Section XI pressure boundary item or a support for an ASME Section XI pressure boundary item? This includes "software only" changes that do not physically change the hardware like such as re-rating of pressures or temperatures. (ASME Section XI items include ASME Class 1, 2, 3, or B31.1 treated as ISI Class 2 or 3 (T2 and T3) components, parts, or appurtenances such as pipe or pressure vessel walls, valve bodies and pump casings. 	☐ YES	X NO	
 ASME Section XI Repair / Replacement Program Does the proposed activity involve any mechanical component within the ASME XI program / boundaries? Does the proposed activity add, delete, or modify an ASME Section XI pressure boundary item or a support for an ASME Section XI pressure boundary item? (ASME Section XI items include ASME Class 1, 2, 3, MC, and CC, as well as B31.1 treated as ISI Class 2 or 3 (T2 and T3) components, parts, or appurtenances such as pipe or pressure vessel walls, valve bodies and pump casings). 	1 YES	NO X	
 ASME In-service Testing Program Does the proposed activity impact or involve any item (safety related or non safety related) that may affect the performance or testing of a safety related pump or valve? Does the proposed activity impact the function or functional classification of any pump or valve as stated in the IST program documents? 	TYES	X NO	
 Air Operated Valve (AOV) Program Does the proposed activity impact or involve the design, operation or testing of AOVs? 	T YES	MO 🕅	
 Buried Piping and Tanks (BP&T) Program Does the proposed activity impact or involve any changes to piping, coatings, or cathodic protection of Buried Piping & Components? 	Tes 🗌	M NO	
 Boric Acid Corrosion (BAC) Program Does the proposed activity impact or involve any increase in the likelihood of boric acid formation or corrosion? 	☐ YES	🕅 NO	
 Check Valve Program Does the proposed activity impact or involve the design, operation or testing of check valves? 	☐ YES	MO 🕅	
 Control Room Habitability Program Does the proposed activity impact or involve changes that affect the temperature or radiological environmental conditions in the Main Control Room? 	☐ YES	🕅 NO	
 Electrical Circuit Breaker, Relay and Electrical Equipment Testing Does the proposed activity impact or involve changes to the functional testing of circuit breaker, relay or electrical equipment? 	YES		



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Engineering Change Process

IMPACT SCREENING SUMMARY

ATTACHMENT 9.3 SHEET 5 OF 6

PROGRAMS AND COMPONENTS (CONTINUED)		Potential Impact	
 Flow Accelerated Corrosion (FAC) Program Does the proposed activity involve any changes (e.g.: configuration, velocity, flow rate, pressure, temperature, material, weld location, etc.) to piping systems included in the FAC Program.? 	☐ YES	X NO	
 Heat Exchanger Program Does the proposed activity impact or involve the design, operation or testing of a component in the heat exchanger program? 	☐ YES	🕅 NO	
 Predictive Maintenance Program Does the proposed activity impact or involve any aspect of the storage, use and testing of lubricants? Does the proposed activity involve thermography? Does the proposed activity involve vibration monitoring? 	YES	□ NO	
 Microbiological Induced Corrosion (MIC) Program Impact Does the proposed activity involve piping containing untreated or stagnant water or open to the atmosphere? 	T YES	XI NO	
 Motor Operated Valve (MOV) Program Does the proposed activity impact or involve the design, operation or testing of MOVs? 	☐ YES	X NO	
Plant Thermal Performance Program Does the proposed activity impact or involve plant thermal performance?		🕅 NO	
 Preventive Maintenance Program Does the proposed activity impact or involve periodic testing or performance of SSCs? or Does the proposed activity add, modify or delete any Environmental Qualification (EQ) maintenance requirement or replacement frequency to ensure the component(s) maintains its qualification status? 	YES	□ NO	
 PT Curves Does the proposed activity add, delete, or modify the basis (as contained in each sites reactor vessel surveillance material testing program) for the Pressure / Temperature Limit Curves (fluence, pressure, temperature, reactor materials)? 	☐ YES	X NO	
 Relief Valve Program Does the proposed activity impact or involve the design, operation and testing of relief valves, safety valves, vacuum breaker valves or rupture disc? 	TYES	🕱 NO	
 RPV Internals Program Does the proposed activity impact or involve any change to the reactor internals? This includes "software only" changes that do not physically change the hardware such as re-rating of pressures or temperatures. Does the proposed activity impact or involve or related documentation to include neutron fluence or neutron fluence calculations? Does the proposed activity impact or involve or changes to core flow characteristics or core flow characteristics? 	☐ YES	X NO	



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Engineering Change Process

ATTACHMENT 9.3

IMPACT SCREENING SUMMARY

SHEET 6	6 OF 6
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PROGRAMS AND COMPONENTS (CONTINUED)	Potentia	al Impact
 Welding Program Does the proposed activity impact or involve a special process, such as welding, brazing or soldering? 	YES	
 Safety Program Does the proposed impact or activity involve personnel or industrial safety? 	YES	
 System Engineering Does the proposed activity impact or involve any changes to system configuration, function or performance, etc., for Maintenance Rule or other system? Does the proposed activity impact or involve any changes to system procedures, maintenance or operation, etc.? 	YES	□ NO
 Training Program Does the proposed activity involve existing training requirements or create the need for new training? 	YES	
 Simulator Impact Does the proposed activity impact or involve changes to the Simulator? 	YES	
 Fire Protection Program Does the proposed activity result in a change to the Fire Protection Program (including 10CFR50 Appendix R) where the impact is more than negligible? 	JES YES	

Detailed Impact Screening (Attachment 9.4) Attached?	□ YES	🕅 NO
--	-------	------

Attachment 2

Conceptual Design Sketches

- 1. Figure 1: Typical Schematic For New Diesel-Generator And New Alternate Battery Charger
- 2. Figure 2: Partial Site Plan Of Areas Affected
- 3. Figure 3: Transformer Yard Area Control Building-North Wall
- 4. Figure 4: Equipment Arrangement Control Building At El. 15'-0" Enclosure And Diesel-Driven Generator Location
- 5. Figure 5: Equipment Arrangement Control Building And Superheater Building At El. 33'-0" Battery Charger And Interlocked Receptacle Location



IPEC00269882



RCM	Technologies	ENTERGY	Conceptual Design	
	The Source of Smart Solutions	Unit 2	SAMA IP2 -028	Rev. 0



INSTALL DIESEL-DRIVEN GENERATOR IN WEATHERPROOF ENCLOSURE

FIGURE 3 TRANSFORMER YARD AREA CONTROL BUILDING-NORTH WALL





Attachment 3

References

- 1. ENTERGY Nuclear Management Manual, Engineering Change Process, Rev 11
- Association for the Advancement of Cost Engineering (AACE), Cost Estimate Classification System - As Applied In Engineering, Procurement, and Construction for the Process Industries
 - TCM Framework: 7.3 Cost Estimating and Budgeting
 - Figure 4 Estimate Checklist & Maturity Matrix
- 3. Cummins Diesel Generator set QSB5 Series Engine (attached here)
- 4. Solidstate Controls Battery Chargers for Nuclear Plants (attached here)
- 5. Russellstoll MaxGard Interconnection Systems (attached here)

Diesel generator set QSB5 series engine EPA emissions



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1.600.0000

Cummins Power Generation commercial generator sets are fully integrated power generation systems providing optimum performance, reliability and versatility for stationary and prime power applications.



This generator set is designed in facilities certified to ISO9001 and manufactured in facilities certified to ISO9001 or ISO9002.



The Prototype Test Support (PTS) program verifies the performance integrity of the generator set design. Cummins Power Generation products bearing the PTS symbol meet the prototype test requirements of NFPA 110 for Level 1 systems.

All low voltage models are CSA certified to product class 4215-01.

The generator set is available Listed to UL2200, Stationary Engine Generator Assemblies.

U.S. EPA Engine certified to U.S. EPA Nonroad Source Emissions Standards, 40 CFR 89, Tier 3.

Cummins[®] **heavy-duty engine** - Rugged 4-cycle, industrial diesel delivers reliable power, low emissions and fast response to load changes.

Alternator - Several alternator sizes offer selectable motor starting capability with low reactance 2/3 pitch windings, low waveform distortion with non-linear loads and fault clearing short-circuit capability.

Permanent magnet generator (PMG) - Offers enhanced motor starting and fault clearing short-circuit capability.

Control system - The PowerCommand[®] electronic control is standard equipment and provides total genset system integration including automatic remote starting/stopping, precise frequency and voltage regulation. Optional features include alarm and status message display, output metering, auto-shutdown at fault detection and NFPA 110 Level 1 compliance.

Cooling system - Standard integral set-mounted radiator system, designed and tested for rated ambient temperatures, simplifies facility design requirements for rejected heat.

Fuel tanks - Dual wall sub-base fuel tanks are also offered.

NFPA - The genset accepts full rated load in a single step in accordance with NFPA 110 for Level 1 systems.

Warranty and service - Backed by a comprehensive warranty and worldwide distributor network.

	Standby rating		Prime ratin	Prime rating		rating	Data sheets		
Model	60 Hz kW (kVA)	50 Hz kW (kVA)	60 Hz kW (kVA)	50 Hz kW (kVA)	60 Hz kW (kVA)	50 Hz kW (kVA)	60 Hz	50 Hz	
DSFAA	35 (44)		32 (40)				D-3366		
DSFAB	40 (50)		35 (44)				D-3367		
DSFAC	50 (63)		45 (56)				D-3368		
DSFAD	60 (75)		55 (69)				D-3369		
DSFAE	80 (100)		72 (90)				D-3370		

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Gontrolia est crasiliostinos

Governor regulation class		
Voltage regulation, no load to full load	± 1%	
Random voltage variation	± 0.5%	
Frequency regulation	Isochronous	
Random frequency variation	± 0.25%	
Radio frequency emissions compliance		

Region oppol/Basilinas

Design	4 cycle, turbocharged and charge air aftercooled
Bore	107 mm (4.21 in)
Stroke	124.0 mm (4.88 in)
Displacement	4.5 litres (272 in ³)
Cylinder block	Cast iron, in-line, 4 cylinder
Battery capacity	1000 amps minimum at ambient temperature of -18 °C to 0 °C (0 °F to 32 °F)
Battery charging alternator	100 amps
Starting voltage	12 volt, negative ground
Fuel system	Direct injection: number 2 diesel fuel
Fuel filter	Single element, 10 micron filtration, spin-on fuel filter with water separator
Air cleaner type	Dry replaceable element
Lube oil filter type(s)	One spin-on, full flow filter
Standard cooling system	High ambient radiator

Altransfor specialessies:

Design	Brushless, 4 pole, revolving field
Stator	2/3 pitch
Rotor	Single bearing, flexible disc
Insulation system	Class H
Standard temperature rise	150 °C standby @ 40 °C ambient
Exciter type	Torque match (shunt) standard, PMG optional
Phase rotation	A (U), B (V), C (W)
Alternator cooling	Direct drive centrifugal blower fan
AC waveform total harmonic distortion	< 5% no load to full linear load, < 3% for any single harmonic
Telephone influence factor (TIF)	< 50 per NEMA MG1-22.43
Telephone harmonic factor (THF)	< 3

/โรสมีสปีโร ความปูวล

60 Hz Three p	bhase line-ne	eutral/line-line		60 Hz Single phase line-neutral/line-line
• 120/208	• 139/240	• 240/416	• 277/480	• 120/240
• 120/240 Delta	• 220/380	• 255/440	• 347/600	
 127/220 				

* Note: Consult factory for other voltages.

Courries set apliant and useessafue

En	gine	Al	ternator
	120 V, 150 W lube oil heater		105 °C rise alternator
	120/240 V, 1000 W coolant		125 °C rise alternator
	heater		120 V, 100 W anti-condensation
Fu D	el System 24 hour dual wall sub-base tank		heater PMG excitation Single phase
	12 hour dual wall sub-base tank		haust system Genset-mounted muffler Heavy duty exhaust elbow
			Slip on exhaust connection

Generator set

- □ AC entrance box □ Battery
- Battery charger
- Enclosure: aluminum, steel, weather protective or sound
- attenuated Export box packaging
- □ Main line circuit breaker
 - man are circuit breaker
- PowerCommand Network
 Communications Module (NCM)
- Remote annunciator panel
- □ Spring isolators
- UL 2200 Listed
- 2 year prime power warranty
- 2 year standby power
- warranty 5 year basic power warranty
- * Note: Some options may not be available on all models consult factory for availability.

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Analog AC metering panel - Provides color-coded display of generator set output voltage, current, frequency, power factor, and kW. All phases of voltage and current are simultaneously displayed. Easy to see output status from a distance.

Graphical data display. Allows operator to view all engine and alternator data; perform operator adjustments for speed, voltage and time delays; view fault history; and set up and adjust the generator set (set up requires password access). A portion of the display is allocated to display system status, including alarm and shutdown conditions. Display is controlled by sealed membrane switches. Up to 9 lines of data can be displayed with approximately 26 characters per line.

LED status lamps - The status lamps indicate remote start command (green), not in auto (red-flashing), warning (amber) and shutdown (red).

Mode selector switch - Off/manual/auto and run/stop switches allow remote automatic starting or manual starting from the operator panel. Panel includes an LED lamp to indicate manual mode operation.

Exerciser switch - Automated exercise function in the control allows an operator to initiate an exercise period and have it automatically completed by the control.

Fault reset switch - Allows the operator to reset the control after a warning or shutdown condition. LED lamp with switch indicates that a fault is present on the system.

Panel lamps and switch - Operator panel can be illuminated by a series of high-intensity LED lamps controlled by a membrane switch on the panel. Panel lamps include a time delay to automatically switch off after a preset time period.

Emergency stop switch - Provides positive and immediate shutdown of the generator set on operation.

Construction - Operator panel is a sealed design with membrane switches for most functions. Mechanical switches are oil-tight design. Plug interfaces are provided to the generator set control system. Display panel labeling is configurable for language. NEMA3R/IP53.

- Integrated Isochronous governing and fuel control system.
- Integrated 3-phase sensing voltage regulation system with automatic single and three phase fault regulation.
- Integrated AC protective functions include over/under voltage, short-circuit, overcurrent (warning and shutdown) and overload.
- Integrated engine management system including configurable cycle-cranking functions and configurable start sequence.
- Comprehensive warning and shutdown protection including customer configurable warning and shutdown conditions.
- Comprehensive data displays including 3-phase AC voltage, current, power factor, kW and kVA; engine oil pressure, coolant temperature, DC volts and other service functions; operating history (load and fault conditions) and system setup information.

- □ LonWorks[®] or Modbus[®] network interface.
- Control anti-condensation heater.
- L Key-type mode select switch.
- Relay outputs for genset running, common warning and common shutdown.
- Exhaust temperature alarm.
- □ Alternator temperature alarm(s).



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Renderations Associated (Constanting)

Standby:

Applicable for supplying emergency power for the duration of normal power interruption. No sustained overload capability is available for this rating (equivalent to fuel stop power in accordance with ISO3046, AS2789, DIN6271 and BS5514). Nominally rated.

Prime (unlimited running time):

Applicable for supplying power in lieu of commercially purchased power. Prime power is the maximum power available at a variable load for an unlimited number of hours. A 10% overload capability is available for limited time (equivalent to prime power in accordance with ISO8528 and overload power in accordance with ISO3046, AS2789, DIN6271 and BS5514). This rating is not applicable to all generator set models.

Base load (continuous):

Applicable for supplying power continuously to a constant load up to the full output rating for unlimited hours. No sustained overload capability is available for this rating. Consult authorized distributor for rating (equivalent to continuous power in accordance with ISO8528, ISO3046, AS2789, DIN6271 and BS5514). This rating is not applicable to all generator set models.



This outline drawing is for reference only. See respective model data sheet for specific model outline drawing number.

Do not use for installation design

Model	Dim "A" mm (in.)	Dim "B" mm (in.)	Dim "C" mm (in.)	Set Weight* dry kg (lbs)	Set Weight* wet kg (lbs)
DSFAA	2104 (82.8)	1016 (40.0)	1255 (49.4)		1080 (2380)
DSFAB	2104 (82.8)	1016 (40.0)	1255 (49.4)		1080 (2380)
DSFAC	2104 (82.8)	1016 (40.0)	1255 (49.4)		1120 (2470)
DSFAD	2104 (82.8)	1016 (40.0)	1255 (49.4)		1140 (2520)
DSFAE	2104 (82.8)	1016 (40.0)	1255 (49.4)		1220 (2690)

* Note: Weights represent a set with standard features. See outline drawings for weights of other configurations.

Cummins Power Generation 1400 73^{ed} Avenue N.E. Minneapolis, MN 55432 USA Telephone: 763 574 5000 USA Toll-free: 877 769 7669 Fax: 763 574 5298

Warning: Back feed to a utility system can cause electrocution and/or property damage. Do not connect to any building's electrical system except through an approved device or after building main switch is open.

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Ponast Conterentions



BATTERY CHARGERS for NUCLEAR PLANTS

- DC Voltages-24, 48, 110, 130, 220, & 260 VDC
- Thyristor-Based Operation -Full-Wave Rectifier (6 Pulse)
- **DC** Output Isolated from AC Input
- Output Filter
- Battery Overcharge Protection
- Wide Range of Options
- Seismic and Environmental Qualifications to meet your 1E Safety Related Applications
- Replacement in existing Charger footprints are accommodated



Solidstate Controls, Inc. (SCI) has designed, manufactured and maintained hundreds of safety related, (1E) and non-safety, yet essential, Battery Chargers in Nuclear generating facilities around the globe. Each application requires a unique set of solutions in which SCI will help create the optimum Battery Charger System for your plant. SCI Battery Chargers are thyristor-based systems designed for high-efficiency conversion (>90%) of commercial AC power to DC power, for charging station type batteries. They are also compatible with our inverter systems to be used as an Uninterruptible Power System (UPS) as a float system, or as stand alone Charger for DC only applications. All models are equally compatible with all lead acid type batteries including, lead calcium & antimony, nickel cadmium, or valve regulated for station DC systems.

A dry type isolation transformer is used to isolate the DC output from the AC input and to provide the proper voltage for the rectification process. Standard output ripple filter, 2% with battery connected, is provided. Optional low ripple and battery eliminator low ripple options are available. The Charger can also be utilized, and packaged, with incorporation of a blocking diode, as a regulated rectifier package in SCI inverters.

We are available to create solutions to solve your specific problems.

Phone: 1-614-846-7500 Fax: 1-614-885-3990 or

Please visit our website(s) for more information and assistance from the Nuclear Engineering Team.

www.solidstatecontrolsinc.com www.nuclearUPS.com





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General Specifications

Controls

Cabinet

NEMA-1 (IP-20), Seismic Grade Float/Equalize Push buttons 0-100 Hr Equalize Timer, **Cable Entry/Termination** manual start, auto reset. Independent float and equalize Top (rear) Standard potentiometers on front panel Optional Bottom (front), side and custom entry/termination locations available.....consult the Factory **Standard Features** Environmental Ambient Temp.: 0°C to 40°C (50°C optional) **Circuit Breakers** Relative Humidity: 0-95% non-condensing AC Input: 3 pole molded case (Rated 14 KAIC) **Operating Altitude:** 0 to 2500 meters (0-8300 ft.) DC Output: 2 pole molded case (Rated 10 KAIC) Audible Noise: <60 dB(A) at 1 meter (High KAIC ratings optional-*Consult the Factory) AC Input Meters (2% Panel type) Voltages: 208, 220, 380, 415, DC Output Voltmeter 480 & 600 VAC/3-phase, 3 wire DC Output Ammeter *custom voltages available Custom meter locations and meter types available Range: +10, -10% for 1% output regulation including 1% switchboard and digital. *Consult the Factory Range: Optional +10, -15% additional ranges **Indicators and Alarms** Standard "LED" Indicators available Isolated Form "C" Contacts Frequency: 50 or 60 Hz ±5% **Custom Capabilities** DC Output Modular packaging for limited installation access 135, 270 ±5% adjustment Float Voltage: Equalize Voltage: 140, 280 ±5% adjustment Multiple alarm capabilities *custom output voltages available Fail safe alarms Regulation (Float): ±1.0% Custom metering Regulation (Equalize): ±1.0% Transducers Ripple: <2% RMS with battery connected Mimic panels per NEMA PE-5 *optional & Louvered recessed breakers custom ripple filters available Annunicators Current Limit: Factory set at 125%, adjustable

Additional sizes up to 1200 AMPS available-Consult Factory

from 50-135%

								Weig	ght (est)	
	Output AC/DC Cabinet Style Heat Loss (Watts				s (Watts)	130	VDC	260	VDC	
Model	Amps	%Eff	130VDC	260VDC	130VDC	260VDC	Lbs.	Kg.	Lbs.	Kg.
85-CC0500-XX	50	91		D	642	1200	615	278	740	336
85-CC0750-XX	75	91	D	<u>D</u>	964	1760	720	326	940	426
85-CC1000-XX	100	92	D	D	1100	2100	765	347	975	442
85-CC1500-XX	150	93	D	D	1400	2750	940	426	1365	619
85-CC2000-XX	200	93	Α	G	1830	3650	1255	569	1955	887
85-CC3000-XX	300	94	А	G	2350	4580	1535	696	2680	1216
85-CC4000-XX	400	94	G	Н	3100	6250	1720	780	2960	1343
85-CC5000-XX	500	94	Н	Н	3900	7800	1950	885	3535	1603
85-CC6000-XX	600	94	Н	GH	4700	9300	2565	1163	4650	2109

*Weight of 60 Hz units, 50 Hz 7% more 24 & 48 VDC also available ... consult the factory- Larger sizes also available **Cabinet styles subject to change based on selection of filters and options

* Custom enclosures and dimensions are available to meet your specific needs. Please consult the Nuclear Engineering Team at Solidstate Controls, Inc. for assistance.

	Standard Cabinet Dimensions*												
TOP I DI DI DI DI	Cabinet			Inches	(n	nm)	Cabinet			Incł	ies(mm)	
HELT TRAVEFORMER NELTONER	Style	н	x	w	x	D	Style	н	×	w	x	D	
	D	57 (1448	x x	29 737	x x	28 711)	G	85 (2159	x x	29 737	X X	36 914)	
Contract }	Α	78 (1981	x x	29 737	x x	36 914)	н	85 (2159	x x	56 1422	× ×	36 914)	
Battery Charger Block Diagram	GH	85 (2159	x x	85 2159	x x	36 914)							

Specifications subject to change without notice

11/2001

Russellstoll[®] MaxGard[®] Interconnection Systems

30-400/600 Amp, (30-200A Load Breaking) Maximum 600 VAC/250 VDC Receptacles, Inlets, Plugs, Connectors, Interlocked Receptacles, Explosion Proof Interlocked Receptacles

Opst Musimum Ginauli Breaker interbooksel Nenapteole (Lasieway Wavy



Russellstoll° MaxGard[®] Interconnection Systems

30-400/600 Amp Plugs, Connectors, Receptacles, Inlets and Interlocked Receptacles

j. Nelsterre,	the second second second						
All available voltage polarizations on pg. H20. Maximum 600 VAC 250 VDC, Load Breaking			Female Con	nector•			
Stand Poles	ard Ratings	A	Std. Bushing	0. (N	Std. Bushing	N	
Wires	Voltage	Cat. No.	I.U.**	Cat. No.	I.D.**	Cat. No.	
30 Amp /	45*	_				4	
2P3W	125	DS3107MP000	7⁄8"	DF3107FP000	7∕a*	DS3107MR000	
2P3W	250	DS3207MP000	7⁄6"	DF3207FP000	7⁄8°	DS3207MR000	
3P4W	125/250	DS3 307 MP000	1"	DF3 307 FP000	1"	DS3307MR000	
3P4W	3Ø 480	DS3 404 MP000	1"	DF3404FP000	1"	DS3404MR000	
4P5W	3ØY 277/480	DS3 504 MP000	1¾6"	DF3504FP000	1%16"	DS3 504 MR000	
60 Amp /	90*						
2P3W	250	DS6207MP000	13/16"	DF6207FP000	13⁄16"	DS6207MR000	
3P4W	125/250	DS6 307 MP000	15⁄16″	DF6307FP000	15⁄16"	DS6 307 MR000	
3P4W	3Ø 480	DS6404MP000	1 5⁄16"	DF6404FP000	1546"	DS6404MR000	
4P5W	3ØY 277/480	DS6 504 MP000	1½"	DF6 504 FP000	1½"	DS6 504 MR000	
100 Amp	/ 150*						
2P3W	250	DS1207MP000	1 11/16"	DF1207FP000	1 ¹¹ /16"	DS1 207 MR000	
3P4W	125/250	DS1 307 MP000	113/16"	DF1 307 FP000	1 ¹³ 46°	DS1307MR000	
3P4W	3Ø 480	DS1404MP000	1 ¹³ ⁄16"	DF1404FP000	1 ¹³ ⁄16"	DS1 404 MR000	
4P5W	3ØY 277/480	DS1504MP000	2"	DF1 504 FP000	2"	DS1 504 MR000	
200 Amp	/ 300*						
3P4W	277/480	DS2304MP000	21⁄4"	DF2 304 FP000	21⁄4"	DS2304MR000	
3P4W	3Ø 480	DS2404MP000	21⁄4"	DF2404FP000	21⁄4"	DS2404MR000	
4P5W	3ØY 277/480	DS2 504 MP000	21⁄2"	DF2 504 FP000	21⁄2"	DS2 504 MR000	
400 Amp	/ 600*						
3P4W	277/480	DS4 304 MP000	3"	DF4 304 FP000	3"	DS4 304 MR000	
3P4W	3Ø 480	DS4 404 MP000	3"	DF4 404 FP000	3"	DS4 404 MR000	
4P5W	3ØY 277/480	DS4 504 MP000	31⁄4"	DF4 504 FP000	31⁄4"	DS4 504 MR000	

* Special Disconnect Service Ratings Available (Consult Factory) 150% non-UL ratings (consult technical services) with separate disconnect service.
 ** Standard cable bushings shown. Additional sizes available, see page H26.

Always furnished with screw collar. We recommend cup cap with male inlet and male plug; order catalog number DS(X)CC. (X) is the amperage 3=30, 6=60, 1=100, 2=200 & 4=400. † Boldface figures are for voltage assignment; for different ratings see following pages.

Control contacts for plugs/receptacles: Use "K" where noted. ¥ Ex: DS3104MR00K

"F" Flap Cap style shown. "S" Screw Cover option also available. ex: "DF____" vs. "DS____". 400 AMP plugs and connectors are supplied with cast aluminum handles. ٠

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瞬间的 计分子工作分子 保持正式的第三

Rating	Max.Conductor Size AWG	Entrance Dia.
30	#8 AWG - 7 Strand or Flexible Conduit	.187"
60	#4 AWG - 7 Strand or Flexible Conduit	.302"
100	#0 AWG - 19 Strand or Flexible	.386"
200	#4/0 AWG - 19 Strand or Flexible	.625"
400	500MCM-37 Strand or Flexible	.937"

Male Inlets: Mounted same as receptacle, all options available. See pg. H29. 1921.×

Theoders & Berlins

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H16



Attachment 4

Cost Estimate

1	ENTER		ODTHEAST					
	IMPLEMENTATION ESTIMATE							
	Indian	Point Nuclear Po	wer Station					
* ESTIMATE LEVEL *		EC	#: SAMA IP2-()28				
Conceptual	PROJECT TITLE:Dies-Driv Gen Ba	ackup Sta Batt C	larg		ESTIMATOR: RCMT			
Preliminary	JOB LOCATION: Transformer Yar	d & Control Bidg	s. PROJEC	T CODE: TBD				
Definitive	OUTAGE 🗹 NON-OUTAGE	ORIGINATOR:			ORIG. DATE: 06/22/2012			
	ESTIMATE TOTAL \$ 2	2,137,804 ⊡⊄	PITAL 🗌 O&M	REVISION	11-0			
Summary of Change: In accordance with NRC env Units 2 and 3 as part of its lie license renewal application a for further internal engineerir under 10 C.F.R. Part 54. En This package provides a cor practices. For SAMA IP2-028, resolution	Summary of Change: in accordance with NRC environmental regulations in 10 C.F.R. Part 51, Entergy performed SAMA analyses for both Indian Point Nuclear Generating Units 2 and 3 as part of its license renewal application. Those analyses identified a number of potentially cost-beneficial SAMAs for each unit. In its license renewal application and related correspondence with the NRC Staff, Entergy indicated that it would submit the potentially cost-beneficial SAMAs for further internal engineering project cost-benefit analysis, even though none of the potentially cost-beneficial SAMAs is related to aging management under 10 C.F.R. Part 54. Entergy contracted RCM Technologies to assist it in this effort. This package provides a conceptual design and implementation cost estimate for SAMA IP2-028 in accordance with Entergy design engineering practices.							
than from the Station's 480V This package provides for a	AC Switchgear Room.	-driven generator (et to be available	when require	d for charging the Stations 125VDC			
batteries in the event of Stat	atteries in the event of Station Blackout.							
Prepared by:	Buttomos.		wed by:	ingenerationseries states algebra and states and generation and states a				
Date: 9	-20-2012	Date	9-2	0-201	L			

		ENTERGY NUCLEAR NORTHEAST IMPLEMENTATION ESTIMATE Indian Point Nuclear Power Station
* ES	IMATE LEVEL *	EC #: SAMA IP2-028
	Concentual	BRO IECT TITI E-Diag Driv Can Backun Sta Part Charg
	Proliminary	INCLOSATION TREESPIN Gen Backup Star Ballon BBO FOT CODE: TBD
	Definitive	JOB LOCATION: Transformer fand & Control Blugs. PROJECT CODE: TBD
	Demnuve	ORIGINATOR: ORIG. DATE: 06/22/2012
Item		Description
1.	This estimate assur	mes that this work will not require outage conditions to complete
2.	This estimate assur	mes that this work will complete during 2014 working a 10 hours per shift, four days per week schedule.
3	This estimate assur	mes that this work will not suffer productivity loss due to radiation, hazardous conditions or QC hold points.
4	This estimate assu	mes that all work will be performed by trained contract craftspersons in lieu of station maintenance personnel
	This estimate assur	mes that core boring is required by weap Transformer Vard and 33' - 0" cable streading area (Control Building)
<u> </u>	This estimate assu	the that core boiling is required between mansioner had and so - or case spreading area (Control Building).
6.	This estimate assur	mes triat a new diesei generator will be installed in Unit 2 Transformer Yard.
7.	This estimate assur	mes that a new battery charger will be installed at Elevation 33' - 0" cable spreading area (Control Building).
8.	This estimate assur	mes that new diesel generator and battery charger will be connected and powered by Station Maintenance personnel.
9.	This estimate does	not include funding for unreviewed safety questions or NRC submittals, but if required the additional cost will be added.
<u> </u>	This estimate is bas	sed on the project's current level of scope definition and is classified Class 4 as defined per the AACE International Cost
10.	Estimate Classificat	tion System (see Attachment 3, Reference 2)
├ ──	Labor dollare in this	setimate are projected 2014 costs based on current 2012 craft hilling rates at Indian Point. The projected costs provide
11.	for opticipated billing	a rate increases of 3% per year
<u> </u>	Tor anticipated billin	g rate increases of 9% per year.
12	I nis estimate allows	s for and includes a contingency factor related to the complexity and location of the work required. The factor is
	cumulative and prog	gresses as follows:
	 A. Outside fer 	nce boundary - 20%
	B. Inside fenc	e boundary - 30%
	C. Implement	ation complexity - 40%
	D. Inside Con	tainment - 50%
<u> </u>		
		
<u> </u>		
<u> </u>		

Rev. 11-0		I	NDI	AN P	OIN	T IMPLEN E	IENT. C #: S	ATION E	ST 028	IMATE	E W	ORK SH	EET						
PROJ JOB L EST.	ECT TITLE:Dies-Driv Gen Backup Sta Batt Charg LOCATION: Transformer Yard & Control Bidgs. STATUS:							PROJECT	CO	DE: TBD					TAKEOFF ESTIMATO ORIG. DA	: DR: F TE: 0	RCMT 6/22/2012		
ITEM	DESCRIPTION	QTY	UOM	CFT	NO	MA UNIT	NHOU	RS TOTAL		\$/MH	Υ. Μ	ATERIAL \$	MATER DOLLA	IAL RS	LABOR	C	SUB- ONTRACT	т	OTAL \$
	* ESTIMATE LEVEL * Conceptual Preliminary			EOI	ENG	INEERING					ES	TIMATE SUM	MARY MANHOL	JRS		DO	ILLARS		
	General Notes:			01 02 03 04 05 06		STUDY, DESI DESIGN ENG MODS ENGR SYS ENGR/ S PROJECT MA WORK MANA	GN, & (R CON EOI SL HU ENC NAGEI	CLOSEOUT ST SUPPO JPPORT 3R MENT NT	RT					460 160 - 140 500 160		\$ \$ \$ \$ \$ \$ \$	46,000 16,000 - 14,000 60,000 16,000		
				07 08 <i>CO</i> / 09	VTRA	TRAVEL & LIN ENGINEERIN CT ENGINEERIN DESIGN ENG	/ING E G DCP R/NG R CON	XPENSES ACCEPTAN		REVIEW			2	120		\$ \$ 5	- 12,000 324,000		
				10 11 12 <i>MA</i> 7 13	ERIA	SUPL CONTR MODS PLAN FIELD ENGRS LS / MISC CO MATERIALS	ACT M & SCHE S / PLA	ODS ENGR ED -CONTR NNERS CTS	ACT				-	60 30		\$ \$ \$ \$	6,000 3,600 280,982		
			ne sam ar fan i fan	14 CON 15 16 17 P/ A		OTHER CONT CT CRAFT LA SWEC CRAFT LOST TIME SWEC DISTR RAFT LABOR	FRACTS BOR T LABO	S IR/WALKDO	WN				1	,041 104		\$ \$ \$ \$	- 118,733 14,748 32,238		
			and a second	18 19 20 21 <i>MiS</i> (C E01	MECH MAINT ELECT MAINT I&C CSG SUPPORT	г. Т							- 80 - -		\$ \$ \$ \$	8,000 - -		
				22 23 24 25 26		QUALITY CO TRAINING CHEMISTRY OPS / OPS S HP / RP	NTROL	- २ т						48 - 120		\$ \$ \$ \$	- 5,760 - 14,400 -		
				<i>MIS</i> (27 28 29 30	c coi	NTRACT SUP QUALITY CO NDE HP / RP RADWASTE	PORT NTROL	-						60 - -		\$ \$ \$	4,800 - -		
				31 32 33 34 35		NURSE ELEVATOR WASTE MAN HOUSEKEEI EQUIPMENT	CONTR NAGEM PING RENT,	ACTOR ENT AL CONTRA	ACTO	OR				-		\$ \$ \$ \$	- - - -		
				36 37 38 39 40		VENDOR ST DECONTAM RBC'S SECURITY - V FIRE WATCH	OCKIN INATIO Wacker H (Rove	G N CONTAC nhut ar)	TOR					-		\$ \$ \$ \$	- - - -		
				41 CON 42 ESTIN	ITING	SAFETY ENCY CONTINGENO SUBTOTAL	CY		sm	É ENCUN	IRAI	NCE PREMIL	5 JM (20%)	22 ,805		\$ <u>\$</u> \$	1,587 <u>391,539</u> 1,370,387 274,077		
				A 12 10 10 10 10 10 10 10 10 10 10 10 10 10	processing of				Loa	aders (3	0%) ES) STIMATE T	OTAL			\$ \$	493,339 2,137,804		
1. 2. 3. 4. 5. 6. 7. 6. 9. 10. 11. 12. 14. 15. 10. 11. 11. 11. 11. 11. 11. 11. 11. 11	Gather and stage tools and materials install concrete pad for diesel generator install concrete pad for diesel generator nistall concrete pad for diesel generator Procure and set new diesel generator Procure and set new diesel generator Stage, erect & modify scaffolding as required Stage, erect & modify scaffolding as required Core drill as required to route new conduit Procure & install new battery charger in Control Procure & install new battery charger in Control Procure & install new battery charger in Control Procure and field erect conduit supports Procure, pull & route 480VAC 4/c power cable as Procure, pull & route 480VAC 4/c power cable as required Connect 480VAC 4/c power cable to new diesel Connect 1/0 power cables to interlocked	1 1 1 1 1 1 1 1 1 1 22 160 120 360 1 1		ਸ਼ਫ਼ੵਸ਼ ਸ਼ੵਸ਼ਸ਼ੑੑੑਲ਼ੑੑੑੑਲ਼ੑਸ਼ੑਸ਼ੑਲ਼ੑਲ਼ੑਸ਼ਸ਼ੑਲ਼ੑੑਲ਼ੑੑਲ਼	4 2 2 1 4 2 2 1 2 2 2 5 2 2 2 2 2 2 2 2 2 2 2 2 2	10.00 20.00 20.00 20.00 12.00 12.00 10.00 20.00 20.00 20.00 0.20 0.03 0.030 20.00 0.20 0.03 20.00 20.00	1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00	40 40 20 80 40 24 12 20 40 40 110 72 7 7 22 2 40 120	\$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$	123.32 137.33 96.00 78.50 123.32 96.00 96.00 78.65 123.32 123.32 123.32 123.32 123.32 123.32 123.32 123.32 123.32	**	38,000.00 14,000.00 170,000.00 42,000.00 6.00 1.75 1.50 1.25	\$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$,000 ,000 ,000 ,000 ,000 ,000 ,000 ,132 ,315 ,160 ,450 ,	\$ 4,933 \$ 5,493 \$ 3,840 \$ 1,570 \$ 9,866 \$ 2,304 \$ 2,466 \$ 4,933 \$ 4,933 \$ 13,565 \$ 8,679 \$ 863 \$ 2,713 \$ 4,933 \$ 2,713 \$ 4,933 \$ 14,798 \$ 14,798			*********	4,933 5,493 3,840 1,570 47,866 17,860 2,304 944 2,469 174,932 46,933 13,697 9,194 1,043 3,165 4,933 14,795
18. (19. 20. / 21. 22. 23. (Connect fru power cable (plug-in jumper) to Provide testing as required Assist with testing as required Dismantle scatfolding to storage Dismantle scatfolding to storage Cleanup and restore area	1 1 1 1 1		EL OP EL CP LB EL	2 2 2 1 4	20.00 10.00 20.00 12.00 12.00 8.00	1.00 1.00 1.00 1.00 1.00 1.00	40 20 40 24 12 32	555555	123.32 100.00 123.32 96.00 78.65 123.32			5 5 5 5 5 5 5 5 5	-	 4,933 2,000 4,933 4,933 2,304 944 3,948 			5 5 5 5 5 5	4,933 2,000 4,933 2,304 944 3,944

Rev 11-	INDIAN POINT IMPLEMENTATION ESTIMATE WORK SHEET EC #: SAMA IP2-028																	
PRC JOB	JECT TITLE:Dies-Driv Gen Backup Sta Batt Charg LOCATION: Transformer Yard & Control Bidgs.							PROJEC	PROJECT CODE: TBD					TAKEOFF: ESTIMATOR: RCMT ORIG. DATE: 06/22/2012				
ITER	DESCRIPTION	οτγ	цом	CFT	ÍNÓ		NHOU		1	S/MH	MATERIAL \$	M/		LABOR	SUB-	T		
1. 2.	PAINTING & TOUCH-UP REQUIREMENTS PAINTING & TOUCH-UP PAINTING & TOUCH-UP			PT PT				-				\$ \$		\$ - \$ -		\$ \$	 _	
1. 2.	FIRE WATCH / BOTTLEWATCH REQUIREMENTS CRAFT SUPPORT FOR FIRE WATCH CRAFT SUPPORT FOR BOTTLE WATCH	2	LT LT	FW FW	1	50.00	1.00	100	5	53.60		\$ \$		\$ 5,360 \$ -		5 \$	5,360 -	
1.	MISC SUB-CONTRACT MISC SUB-CONTRACT	1	LT												\$ -	\$	-	
E	SUBTOTAL CRAFT & SUB-CONTRACTOR		1					895				\$	265,077	\$ 99,457	\$ -	\$	364,534	
1.	CONSTRUCTION SUPPORT (8% OF LABOR \$)	1	LT					72	\$	111.13	\$-			\$ 8,001		\$	8,001	
	SUBTOTAL							967	F			\$	265,077	\$ 107,458	\$ -	\$	372,535	
	* RELATED COSTS *																	
1. 2. 3. 4.	WALKDOWN ALLOWANCE WORK PACKAGE REVIEW TOOL ROOM ATTENDANTS (~3.5%) GENERAL CRAFT OUTAGE DISTRIBS. (10%) CPAET IN BEOCCESSING. (20%)	1 1 1	LT LT LT	EL EL EL				10 30 34	5 5 5	123.32 123.32 123.32				\$ 1,233 \$ 3,700 \$ 4,193 \$ 10,746 \$ 21,492		\$ \$ \$ \$	1,233 3,700 4,193 10,746 21,493	
6. 7	HUMAN PERFORMANCE & ALARA TRAINING	1	LT											\$ 2,149		\$	2,1492	
É	SUBTOTAL							1,041				\$	265,077	\$ 150,971	\$-	\$	416,048	
1.	PLANT SCOPE MECH MAINTENANCE			PL PL				-				\$ \$	-	\$ - \$ -		\$	-	
	SUBTOTAL MECH MAINT.											\$	-	\$ -	\$ -	\$	-	
1.	ELECT (DEV. MAINTENANCE PROCEDURES)	1	ιт	EL PL	1	80.00	1.00	80	\$	100.00		\$ \$		\$ 8,000 \$ -		5 5	8,000	
	SUBTOTAL ELECT. MAINT.							80				\$	-	\$ 8,000	\$ -	\$	8,000	
1.	I&C			PL PL				-				5 5	-	s - s -		s s	-	
	SUBTOTAL I&C MAINT.							-				\$	-	s -	s -	\$	-	
1.	CSG			PL PL				-				\$ \$	-	\$ - \$ -		s 5	- -	
—	SUBTOTAL CSG MAINT.							•	_			\$	-	<u>s</u> -	\$ -	\$	-	
	SUBTOTAL PLANT							80				\$	-	\$ 8,000	\$ -	\$	8,000	
		L										ļ			L.,			
┝──	SUBTOTAL CRAFT/PLANT							1,121				\$	265,077	\$ 158,971	<u> </u>	\$	424,048	
	IMPLEMENTATION SUPPORT																	
1. 2. 3. 4. 5. 6. 7. 8. 9, 10.	WELDING ENGINEERING DESIGN ENGINEERING SUPT DURING CONST SYSTEMS ENGINEERING - MECHANICAL SYSTEMS ENGINEERING - ILECTRICAL SYSTEMS EINGINEERING - INSTR & CONTROL SYSTEMS ENGINEERING - CIVIL STRUCTURAL PROJECT MANAGEMENT TRAINING OPS STAFF QA / QC VERIFICATION CHEMISTRY	1 1 1 1 1 1 12 1 1		NM NM NM NM NM NM NM NM NM	1 1 1 1	160.00 20.00 40.00 500.00 4.00	1.00 1.00 1.00 1.00 1.00 1.00	160 60 20 40 500 48	\$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$	100.00 100.00 100.00 100.00 120.00 120.00				\$ - \$ 16,000 \$ - \$ 8,000 \$ 2,000 \$ 2,000 \$ 4,000 \$ 60,000 \$ 60,000 \$ 5,760 \$ - \$ - \$ -		\$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$	- 16,000 - 2,000 4,000 60,000 5,760 -	
11. 12. 13. 14.	HP / RP / ALARA WORK MANAGEMENT OPS / OPS PROCEDURE SUPPORT AND TRAVEL & LIVING EXPENSES CONTRACTOR SUPPORT	1 1 1		NM NM NM	1 1 1	160.00 120.00	1.00 1.00	160 120	\$ \$	100.00 120.00				\$ 16,000 \$ 14,400 \$ -		5 5 5	- 18,000 14,400 -	
1. 2. 3. 4. 5. 8. 7. 8. 9. 10. 11. 12. 13. 14. 15.	FIS / MODS ENGINEERING - SWEC (Ind Per MODS PLANNING & SCH SWEC (Ind Per Diem) FIELD ENGRS/PLAN - SWEC(Ind Per Diem) QA / QC VERIFICATION NDE HP / RP RADWASTE NURSE ELEVATOR CONTRACTOR WASTE MANAGEMENT HOUSEKEEPING EQUIPMENT RENTAL CONTRACTOR VENDOR STOCKING DECONTAMINATION CONTRACTOR RBC's	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		N M M M M M M M M M M	1	60,00 30,00 60,00	1.00 1.00 1.00	60 30 60 - - - - - - - - - - - - - - - - - -	5 5 5	100.00 120.00 60.00				\$ 6,000 \$ 3,600 \$ 4,800 \$ - \$ -		\$ \$ \$ \$ \$ \$	- 8,000 3,600 4,800 -	
16. 17. 18. <u>19.</u>	SECURITY FIREWATCH (Rover) SAFETY (2%) LOST TIME (10%) SUBTOTAL CRAFT/NON-MANUAL	1 1 1	LT LT LT LT	SEC NM NM				22 104 2,525	\$ \$	72.14 141.81		5	265,077	\$ 1,587 \$ 14,748 \$ 315,866	5 -	5 5 5	1,587 14,748 580,943	

INDIAN POINT IMPLEMENTATION ESTIMATE WORK SHEET

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Rev.]	I	NDI/	AN P	OIN	IT IMPLEM	IENT/ C #: S		ES ⁻		WORK SH	EET					
PRO JOB EST	JECT TITLE:Dies-Driv Gen Backup Sta Batt Charg LOCATION: Transformer Yard & Control Bidgs. STATUS:							PROJEC	T CO	DDE: TBD			TAKEOFF ESTIMATO ORIG. DAT)R: R(TE: 06/	CMT 22/2012		
					les el	MA	NHOU	RS			MATERIAL \$	MATERIAL	LABOR		SUB-		
ITEM	DESCRIPTION	UTY	MOU	CFT		UNIT	FCTR	TOTAL		\$/MH	PER UNIT	DOLLARS	DOLLARS		VTRACT	1	UTAL \$
1.	FREIGHT, SALES TAX, & CONSUMABLES (6%)											\$ 15,905				\$	15,905
	SUBTOTAL INSTALLATION COST			1				2,525				\$ 280,982	\$ 315,866	\$	-	\$	596,848
1. 2. 3.	DESIGN ENGINEERING - MECHANICAL DESIGN ENGINEERING - ELECTRICAL DESIGN ENGINEERING - INSTR & CONTROL	1		NM NM	1	40.00 340.00	1.00 1.00	40 340	\$ \$	100.00 100.00			\$ 4,000 \$ 34,000 \$ -		-	\$	4,000 34,000
4. 5. 6.	DESIGN ENGINEERING - CIVIL/STRUCTURAL CONTRACT ENGR DESIGN SUPPORT DESIGN ENG. DCP ACCEPTANCE REVIEW	1 1 1	LT LT LT	NM NM NM	1 1 1	80.00 2,700.00 120.00	1.00 1.00 1.00	80 2,700 120	5 5 5	100.00 120.00 100.00			\$ 8,000 \$ 12,000	\$	324,000	\$ \$ \$	8,000 324,000 12,000
	SUBTOTAL DESIGN COST						ľ	3,280	I			l'	\$ 58,000	\$	324,000	\$	382,000
		I											1				
	SUBTOTAL INSTALLATION & DESIGN COST											1	\$ 373,868	\$	324,000	\$	978,848
1.	CONTINGENCY (40%)															\$	391,539
	ESTIMATE SUBTOTAL							5,805								\$	1,370,387

RCM	Technologies	ENTERGY	Conceptual Design	
	The Source of Smart Solutions	Unit 2	SAMA IP2 -044	Rev. 0

ENTERGY INDIAN POINT NUCLEAR STATION UNIT 2

CONCEPTUAL DESIGN PACKAGE For

SAMA IP2-044

Provide an Alternate Water Source as Backup for Steam Generator Inventory

Prepared by:	Approved by:
Pata Bettacarol.	
Date: 9-20-2012	Date: 9 - 20 - 2016

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SECTION	TITLE
1.0	ISSUE
2.0	BACKGROUND
3.0	EXISTING CONDITIONS
4.0	DESIGN CONSIDERATIONS
5.0	CONFIRMATION OF DESIGN
6.0	RECOMMENDED SOLUTION
7.0	PRELIMINARY MATERIAL LIST
Attachment 1	Entergy Impact Screening Summary
Attachment 2	Conceptual Design Sketches
Attachment 3	References
Attachment 4	Cost Estimate

1.0 ISSUE

Severe Accident Mitigation Alternative (SAMA) IP2-044:

Provide an Alternate Water Source as Backup for Steam Generator Inventory

2.0 BACKGROUND

In accordance with NRC environmental regulations in 10 C.F.R. Part 51, Entergy performed SAMA analyses for both Indian Point Nuclear Generating Units 2 and 3 as part of its license renewal application. Those analyses identified a number of potentially cost-beneficial SAMAs for each unit. In its license renewal application and related correspondence with the NRC Staff, Entergy indicated that it would submit the potentially cost-beneficial SAMAs for further internal engineering project cost-benefit analysis, even though none of the potentially cost-beneficial SAMAs is related to aging management under 10 C.F.R. Part 54. Entergy contracted RCM Technologies to assist it in this effort.

This package provides a conceptual design and implementation cost estimate for SAMA IP2-044 in accordance with Entergy design engineering practices.

For SAMA IP2-044, resolution is required for the steam generators to be enabled with an alternate means for getting backup inventory water.

This package will provide a backup Aux Feedwater Pump and city water as an additional provision for ensuring steam generator water inventory is maintained.

The design considerations that follow will address the resolution's adequacy and the basis for the recommendation to resolve the identified potential issue.

The recommended solution will include descriptive details of the design change and also conceptual design sketches as required. These descriptive details, sketches, and the preliminary material list provide the basis for initiating the all-inclusive conceptual cost estimate for EC development and implementation at the Station.

3.0 **EXISTING CONDITIONS**

Steam generator water level is provided for and supplied by the Auxiliary Feed Water (AFW) system. The system's pumps are supplied by connections to supply headers from the Station's Condensate Storage Tank and as an alternate the Station's city water line. The existing pump portion consists of two electrically operated feedwater pumps and a backup turbine-driven pump.



If operation of the electric pumps is unavailable and the turbine-driven pump is also unavailable, supplying the steam generators with water will not be possible.

Provision for an alternate means of supplying and pumping water to the steam generators is required.

4.0 **DESIGN CONSIDERATIONS**

A backup, alternate feedwater installation independent of the Station's existing normal AFW system is required.

There is city water piping inside the Auxiliary Feed Pump Building that can be modified with a connection to a new backup pump that will provide another means of supplying water to the steam generators. The pump will be diesel-driven to further ensure availability in the event of station blackout.

The pump will be installed in a new outdoor weather proof enclosure along with a small diesel fuel oil day tank with supply capacity to operate 24 hours..

Heat tracing for any outdoor piping will need to be provided.

5.0 **CONFIRMATION OF DESIGN**

The city water piping header enters the Aux Feed Pump Building and connects to the three feedwater pumps. New piping connected to this supply header will provide backup water to the new pump. The new pump and its piping will parallel the existing three pump installation with the new pump's discharge subsequently reconnecting downstream of the existing three pumps.

There is room along the west wall (in the northwest corner) of the Aux Feed Pump Building for the installation of an outdoor weather enclosed diesel-driven pump. Exposed outdoor piping will be provided with heat tracing as required.
RECOMMENDED SOLUTION 6.

1. Diesel-Driven Pump

- A. Outdoors along the west wall (in the northwest corner) of the Aux Feed Pump Building provide for the installation of the diesel-driven backup pump.
 - At the base of the west wall of the Aux Feed Pump Building, install a concrete pad for mounting the pump and its enclosure.
 - Mount and permanently install the pump and enclosure.
 - Construct an oil spill containment berm around the weatherproof . enclosure.
 - Route and install conduit and cable and terminate from distribution 6 cabinet to enclosure to provide electrical power required for heating, ventilation, lighting and heat tracing.
- 2. Aux Feed Pump Room
 - A. At the city water piping entering the room, install piping that penetrates the west wall and connects to the inlet of the new diesel-driven backup pump.
 - B. At the discharge piping of existing Steam-Driven Pump 22, install piping that penetrates the west wall and connects to the outlet of the new dieseldriven backup pump.
- Install required pipe supports
- 4 Provide the associated valving required for the installation.
- 5. Provide heat tracing and insulation for any outdoor piping along with a heat source for the enclosure building.
- 6. Provide procedures and training for this new requirement.

7.0 PRELIMINARY MATERIAL LIST

lte	m Description	Quantity
1.	6" - 150# Gate Valve, Flanged, C.S., A216-WCB, Mfr. VELAN or equal	1
2.	6" - 900# Gate Valve, Butt Weld, C.S., A216-WCB, Mfr. VELAN or equal	2
3.	6" - 900# Swing-Check Valve, Butt Weld, C.S., A216-WCB, Mfr. VELAN or equal	1
4.	3" - 900# Gate Valve, Butt Weld, C.S., A216-WCB, Mfr. VELAN or equal	1
5.	1" - 3000# Gate Valve, Socket Weld, C.S., A216-WCB, Mfr. VELAN or equal	1
6.	.6" – Schedule 40 Seamless Pipe, C.S., A106 – Grade B	75 Feet
7.	6" – Schedule 80 Seamless Pipe, C.S., A106 – Grade B	75 Feet
8.	10 Feet x 15 Feet Weather–Proof Enclosure with HVAC and Lig Mfr. Butler Building PANL-LINE or equal	hting 1
9.	Pump, Diesel-Driven, 800 GPM, (detailed specification to follow WORTHINGTON or equal) 1
10.	. Day Tank, diesel fuel oil storage	1
11.	1" – Conduit and Supports	200 Feet
12.	120 VAC – 3/c Power Cable	200 Feet

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Attachment 1

Entergy Impact Screening Summary



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Engineering Change Process

ATTACHMENT 9.3

IMPACT SCREENING SUMMARY

SHEET 1 OF 6

INSTRUCTIONS:

Identify the potentially impacted and the unaffected areas by checking the appropriate Yes or No block on the Impact Screening Criteria.

If a direct determination cannot be made based on the impact screening questions, the detailed questions in Attachment 9.4 may be used to identify potential impacts.

The completion of detailed questions in Attachment 9.4 is recommended but not required.

Contact potentially impacted groups if assistance is required.

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SAMA		CONCE P.	TUAL
Engineering Change No.: <u>IP2-044</u>	Rev. No.:	DESIGN	PACKAGE

Prepared by:

Date:

DESIGN ENGINEERING DISCIPLINES	Potentia	Potential Impact	
 Civil / Structural Design Engineering Does the proposed activity involve any civil / structural (including seismic) design changes, activities or affect coatings? OR Does the proposed activity involve any piping engineering design changes or activities? 	YES	□ NO	
 Electrical Design Engineering Does the proposed activity involve any station or switchyard electrical design, large power transformers, or settings changes or activities? (SOER 10-1) 	☐ YES	X NO	
Instrumentation and Controls Design Engineering Does the proposed activity involve any I&C design or settings changes or activities?	YES		
 Mechanical Design Engineering Does the proposed activity add/remove/replace insulation, aluminum or other metallic/non-metallic sources of debris in the reactor/containment building or involve any mechanical design changes or activities? 	YES	□ NO	
 PSA Engineering Does the proposed activity impact or involve changes to plant evaluations or probabilistic safety assessments? Does the proposed activity impact or involve changes to the Emergency Operating Procedures, Abnormal Operating Procedures, or Severe Accident Procedures or does it add, remove or modify SSCs included in a Maintenance Rule function? 	YES	□ NO	
 Nuclear Analysis Does the proposed activity impact or involve changes to plant evaluations, Technical Specifications, Technical Requirements Manual, or require a full 50.59 Evaluation? 	YES	□ NO	
 FERC / NERC Impact Does the proposed activity impact or involve change to FERC / NERC or Regional Entity compliance documents? (ex. MOU, ENN/ENS-PL-158, ENS-DC-199, etc.) 	☐ YES	X NO	



IMPACT SCREENING SUMMARY

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Engineering Change Process

ATTACHMENT 9.3

Sheet 2 of 6

DESIGN ENGINEERING PROGRAMS	Potential	Potential Impact	
 ASME Section III Specifications Does the proposed activity add, delete, or modify information required by ASME Section III to be contained in a design specification? 	YES	□ NO	
 Cable and Raceway Program Does the proposed activity involve any changes to cable trays, raceways or the associated documentation? 	YES		
Electronic Databases (EDB) Does the proposed activity involve any changes to electronic databases?	YES		
 EQ Program (10CFR50.49, NUREG 0588, Reg Guide 1.89) Does the proposed activity involve any new or existing EQ components? 	🗌 YES	X NO	
 Hydrogen Control Program (10 CFR 50.44) (<i>if applicable</i>) Does the proposed activity impact equipment or materials related to hydrogen control? 	🗌 YES	🕅 NO	
 Human Factors Program Does the proposed activity involve control panel design including layout and labeling, visual displays, operator aids, auditory signals or environment in the control room, cable spreading room, and other control panel locations? 	T YES	X NO	
 Margin Management Does the proposed activity impact or involve any change to design, licensing or operations margins? 	YES	□ NO	
 Reg. Guide 1.97 / PAM (Post Accident Monitoring) Does the proposed activity involve Reg. Guide 1.97 (Post Accident Monitoring) Indications? 	☐ YES	🕅 NO	

MAINTENANCE	Potentia	Impact
Electrical Maintenance Does the proposed activity require an Electrical Maintenance review to identify affected procedures, required actions and required training?	T YES	🕅 NO
 I&C Maintenance Does the proposed activity require an I&C Maintenance review to identify affected procedures, required actions and required training? 	☐ YES	🕅 NO
 Mechanical Maintenance Does the proposed activity require a Mechanical Maintenance review to identify affected procedures, required actions and required training? 	YES	□ NO

NUCLEAR ENGINEERING		Potential Impact	
 Nuclear Fuel Design Does the proposed activity impact or involve the design, performance or storage of nuclear fuel? 	Tes 🗌	NO 🕅	
 Reactivity Management Program Does the proposed activity impact or involve the reactor system, reactor controls, reactor chemistry, related systems, potential core and spent fuel damage, spent fuel, reactor coolant pressure boundary or reactor system procedures? 	TYES	X NO	



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Engineering Change Process

IMPACT SCREENING SUMMARY

ATTACHMENT 9.3

SHEET 3 OF 6

PROCESS OR PROGRAM IMPACT SCREENING CHECKLIST	Potentia	Potential Impact	
Computer Support and Software	☐ YES	🕅 NO	
 Does the proposed activity impact or involve changes to plant computer software or firmware or impact Software Quality Assurance (SQA)? 			
Chemistry and Environmental Impact	S YES	🕅 NO	
 Does the proposed activity impact or involve any changes to plant chemistry requirements, operations or procedures, or any changes to the environment? 			
Radiation Protection (RP) Program Impact	🗌 YES	🕅 NO	
 Does the proposed activity impact or involve any changes to the RP program? Does the proposed activity involve the potential to introduce (or reintroduce) any cobalt containing materials (such as Stellite) into the primary system? 			
 Operations Does the proposed activity impact or involve changes to Operations procedures, training or operator actions? 	YES		
 Planning, Scheduling and Outage (PS&O) Does the proposed activity require a PS&O review to identify required design and installation information? 		□ NO	
 MP&C (Inventory) Does the proposed activity impact or involve any addition or removal of equipment from the inventory? Does the proposed activity impact or involve any Procurement of Quality or Augmented Quality material from non-qualified suppliers? 	YES	□ NO	
Does the activity impact or involve any procurement activities?	YES		

PROGRAMS AND COMPONENTS	Potentia	al Impact
 ASME Containment In-service Inspection (IWE / IWL) Program Does the proposed activity impact or involve the containment pressure boundary or associated moisture barriers or a support for the containment pressure boundary? This includes "software only" changes that do not physically change the hardware such as re-rating of pressures or temperatures to include changes to documented information on these items or additional documented information for these items. Does the proposed activity limit access to containment surfaces for inspection? Involve disassembly of a bolted connection which forms a portion of the containment boundary? 	☐ YES	X NO
 ASME Appendix J (Primary Containment Leak Rate Testing) Program Does the proposed activity impact or involve any changes to primary containment leak rate testing? 	☐ YES	🕅 NO



REV.11

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Engineering Change Process

ATTACHMENT 9.3 SHEET 4 OF 6

IMPACT SCREENING SUMMARY

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PROGRAMS AND COMPONENTS (CONTINUED)	Potentia	al Impact
 ASME In-service Inspection (ISI) Program Does the proposed activity add, delete, or modify an ASME Section XI pressure boundary item or a support for an ASME Section XI pressure boundary item? This includes "software only" changes that do not physically change the hardware like such as re-rating of pressures or temperatures. (ASME Section XI items include ASME Class 1, 2, 3, or B31.1 treated as ISI Class 2 or 3 (T2 and T3) components, parts, or appurtenances such as pipe or pressure vessel walls, valve bodies and pump casings. 	☐ YES	X NO
 ASME Section XI Repair / Replacement Program Does the proposed activity involve any mechanical component within the ASME XI program / boundaries? Does the proposed activity add, delete, or modify an ASME Section XI pressure boundary item or a support for an ASME Section XI pressure boundary item? (ASME Section XI items include ASME Class 1, 2, 3, MC, and CC, as well as B31.1 treated as ISI Class 2 or 3 (T2 and T3) components, parts, or appurtenances such as pipe or pressure vessel walls, valve bodies and pump casings). 	☐ YES	X NO
 ASME In-service Testing Program Does the proposed activity impact or involve any item (safety related or non safety related) that may affect the performance or testing of a safety related pump or valve? Does the proposed activity impact the function or functional classification of any pump or valve as stated in the IST program documents? 	☐ YES	X NO
 Air Operated Valve (AOV) Program Does the proposed activity impact or involve the design, operation or testing of AOVs? 	TYES	X NO
 Buried Piping and Tanks (BP&T) Program Does the proposed activity impact or involve any changes to piping, coatings, or cathodic protection of Buried Piping & Components? 	☐ YES	X NO
 Boric Acid Corrosion (BAC) Program Does the proposed activity impact or involve any increase in the likelihood of boric acid formation or corrosion? 	☐ YES	⊠ NO
 Check Valve Program Does the proposed activity impact or involve the design, operation or testing of check valves? 	YES	
 Control Room Habitability Program Does the proposed activity impact or involve changes that affect the temperature or radiological environmental conditions in the Main Control Room? 	☐ YES	🕅 NO
 Electrical Circuit Breaker, Relay and Electrical Equipment Testing Does the proposed activity impact or involve changes to the functional testing of circuit breaker, relay or electrical equipment? 	🗌 YES	🕅 NO



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Engineering Change Process

IMPACT SCREENING SUMMARY

ATTACHMENT 9.3 SHEET 5 OF 6

PROGRAMS AND COMPONENTS (CONTINUED)	Potentia	Potential Impact	
 Flow Accelerated Corrosion (FAC) Program Does the proposed activity involve any changes (e.g.: configuration, velocity, flow rate, pressure, temperature, material, weld location, etc.) to piping systems included in the FAC Program.? 	🗌 YES	🕅 NO	
 Heat Exchanger Program Does the proposed activity impact or involve the design, operation or testing of a component in the heat exchanger program? 	TYES	M NO	
 Predictive Maintenance Program Does the proposed activity impact or involve any aspect of the storage, use and testing of lubricants? Does the proposed activity involve thermography? Does the proposed activity involve vibration monitoring? 	YES 📕	□ NO	
 Microbiological Induced Corrosion (MIC) Program Impact Does the proposed activity involve piping containing untreated or stagnant water or open to the atmosphere? 	YES		
 Motor Operated Valve (MOV) Program Does the proposed activity impact or involve the design, operation or testing of MOVs? 	T YES	X NO	
 Plant Thermal Performance Program Does the proposed activity impact or involve plant thermal performance? 	□ YES	X NO	
 Preventive Maintenance Program Does the proposed activity impact or involve periodic testing or performance of SSCs? or Does the proposed activity add, modify or delete any Environmental Qualification (EQ) maintenance requirement or replacement frequency to ensure the component(s) maintains its gualification status? 	YES	D NO	
 PT Curves Does the proposed activity add, delete, or modify the basis (as contained in each sites reactor vessel surveillance material testing program) for the Pressure / Temperature Limit Curves (fluence, pressure, temperature, reactor materials)? 	☐ YES	🕅 NO	
 Relief Valve Program Does the proposed activity impact or involve the design, operation and testing of relief valves, safety valves, vacuum breaker valves or rupture disc? 	T YES	🕅 NO	
 RPV internals Program Does the proposed activity impact or involve any change to the reactor internals? This includes "software only" changes that do not physically change the hardware such as re-rating of pressures or temperatures. Does the proposed activity impact or involve or related documentation to include neutron fluence or neutron fluence calculations? Does the proposed activity impact or involve or changes to core flow characteristics or core flow characteristics? 	☐ YES	X NO	



PAGE 101 OF 150

Engineering Change Process

IMPACT SCREENING SUMMARY

ATTACHMENT 9.3

SHEET (3 OF 6
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PROGRAMS AND COMPONENTS (CONTINUED)	Potential Impact					
 Welding Program Does the proposed activity impact or involve a special process, such as welding, brazing or soldering? 	YES					
 Safety Program Does the proposed impact or activity involve personnel or industrial safety? 	🗆 YES	🕅 NO				
 System Engineering Does the proposed activity impact or involve any changes to system configuration, function or performance, etc., for Maintenance Rule or other system? Does the proposed activity impact or involve any changes to system procedures, maintenance or operation, etc.? 	YES	□ NO				
 Training Program Does the proposed activity involve existing training requirements or create the need for new training? 	YES					
 Simulator Impact Does the proposed activity impact or involve changes to the Simulator? 	🗋 YES	🕅 NO				
 Fire Protection Program Does the proposed activity result in a change to the Fire Protection Program (including 10CFR50 Appendix R) where the impact is more than negligible? 	YES					

Detailed Impact Screening (Attachment 9.4) Attached?	□ YES	🕱 NO
Detailed Impact Screening (Attachment 9.4) Attached?	□ YES	X NO

Attachment 2

Conceptual Design Sketches

- 1. Figure 1: Location Plan New Backup Auxiliary Feedwater Pump
- 2. Figure 2: New Backup Aux Feedwater Addition
- 3. Figure 3: Aux Feed Pump Building West Wall Area
- 4. Figure 4: City Water Supply Header
- 5. Figure 5: Aux Feedwater Pump #22



IPEC00269916



RCM	Technologies	ENTERGY	Conceptual Design	
	The Source of Smart Solutions	Unit 2	SAMA IP2 -044	Rev. 0



FIGURE 3 AUX FEED PUMP BUILDING WEST WALL AREA



Rev. 0



FIGURE 4 CITY WATER SUPPLY HEADER

RCM	Technologies	ENTERGY Indian Point Nuclear Station	Conceptual Design Package	
	The Source of Smart Solutions	Unit 2	SAMA IP2 -044	Rev. 0



FIGURE 5 AUX FEEDWATER PUMP #22

- 1. ENTERGY Nuclear Management Manual, Engineering Change Process, Rev 11
- Association for the Advancement of Cost Engineering (AACE), Cost Estimate Classification System - As Applied In Engineering, Procurement, and Construction for the Process Industries
 - TCM Framework: 7.3 Cost Estimating and Budgeting
 - Figure 4 Estimate Checklist & Maturity Matrix
- 3. BUTLER Metal Building Systems, Typical Weatherproof Enclosure (attached here)

Steel building systems, metal building systems and metal roof systems from Butler Manuf... Page 1 of 1

		Search Choose a site
	· · · · · · · · · · · · · · · · · · ·	
Building Systems Structural Systems		
Poor Systems Wall Systems	> > Panl-Line™	' Building System
Self-Storage and Small Buildings	Panl-Line™ building systems offer a size and	d type for every small-building need.
Environmental	Two distinctive appearances are available with the single-slope roof design of Panl- Line™ I buildings and the gable roof design of Panl-Line™ II buildings. Both offer maximum usable space and volume in a small building, with a high degree of functional flexibility. Relocatable endwalls make expansion simple. Panl-Line™ buildings can be used for a multitude of purposes-from simple storage space to complex computerized control stations.	

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Attachment 4

Cost Estimate

											
	Indian Point Nuclear Power Station										
* EST	IMATE LEVEL *			EC	#: SAMA IP2-044						
V	Conceptual	PROJECT TITLE: Insta Inventory.	all an Alternate \	Water Source	as Back Up for Steam	Generator	ESTIMATOR:	RCMT			
	Preliminary	JOB LOCATION: Yard	B LOCATION: Yard near Existing Aux Feed Pumps PROJECT CODE: TBD								
	Definitive	OUTAGE INON-OUT	AGE	ORIGINATO		08M	ORIG. DATE:	7/11/2012			
		ESTIMATE TOTAL	\$3,046,418			REVISION	11-0				
In acc and 3 renew intern Part 5 This p For S This p mainta	ary or Change: cordance with NRC env as part of its license re val application and relat al engineering project of 4. Entergy contracted backage provides a cor AMA IP2-044, resolution backage will provide an ained.	ironmental regulations in newal application. Tho- ed correspondence with ost-benefit analysis, eve RCM Technologies to a ceptual design and imple n is required for Steam (installation using a stand	10 C.F.R. Part 5 se analyses ident the NRC Staff, E in though none or ssist it in this effo ementation cost e Generators to be dby pump and cit	51, Entergy pe tified a numbe Entergy indicat f the potential ort. estimate for S/ enabled with a ty water as an	formed SAMA analyses r of potentially cost-bene ed that it would submit the y cost-beneficial SAMAs AMA IP2-044 in accorda an alternate means for g additional provision for e	a for both Inc eficial SAMA he potentially is related to nce with Ent etting backu	lian Point Nucle is for each unit. y cost-beneficia b aging manage lergy design eng p inventory wat am generator w	ar Generating Units 2 In its license I SAMAs for further ment under 10 C.F.R. gineering practices. er. ater inventory is			
Prepa	red by:	- fatacun	<i><</i> .		Approved by:	\bigcirc		1996 			
Date:		9-20-20	512		Date: 9-20	-20120	for the second s				

		ENTERGY NUCLEAR NORTHEAST	
		IMPLEMENTATION ESTIMATE	
* ESTIMA	TELEVEL *		
231107	1	EC #: SAMA IP 2-044	
	Concentual	Investory	
	Preliminary	Investionary.	
-#	Definitive	In different month of the charge option in the control of the control option of the control option of the control option option of the control option	
	Denniuve	Children Chi	-
ntem		Description	
1.	This estimate assur	mes that this work will not require outage conditions to complete	
2.	I his estimate assur	mes that a Pretabricated building will be purchased for erection on site by skilled local craft.	
3.	This estimate assur	nes that all work will be performed by trained contract craftspersons in lieu of station maintenance personnel.	
4.	This estimate provid	aes for continuous fire watch during weiging activities.	
D. 6	This estimate assur	Thes training to 12 Fiant Ops. Personnel.	
0.	This estimate assur	These that the discipling epiping and valves are Satety class 1.	~~~~~
7.	nining	nes that were inspections with be infinited to visual and LF testing on succion side piping and visual, LF and KT on discharge	3
	The hulk of the world	k in this estimate is non outage and is assumed to occur in 2014 on a 4 day per week. 10 hour per day schedule	
<u> </u>	This estimate assur	Kin dis Castinate is not outage and is assumed to occur in 20 and will up approved to the point of a start start of the st	
10	This estimate assur	The purp discharge pping to diamate service will not be Safety Class 1	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
	This estimate is bas	sed on the project's current level of scope definition and is classified Class 4 as defined per the AACE International Cost	
11.	Estimate Classificat	tion System (see Attachment 3, Reference 2).	
10	Labor dollars in this	sestimate are projected 2014 costs based on current 2012 craft billing rates at Indian Point. The projected costs provide fo	or
12.	anticipated billing ra	ate increases of 3% per year.	
10	This estimate allow	s for and includes a contingency factor related to the complexity and location of the work required. The factor is cumulative	а
тэ.	and progresses as f	follows:	
	A. Outside fer	nce boundary - 20%	
	B. Inside fence	e boundary - 30%	
	C. Implementa	ation complexity - 40%	
	D. Inside Cont	tainment - 50%	
	······		
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			_
12.20 Mg			-
			-
			-

INDIAN POINT IMPLEMENTATION ESTIMATE WORK SHEET

Rev.	V. INDIAN POINT IMPLEMENTATION ESTIMATE WORK SHEET .0 EC #: SAMA IP2-044																
PRO.	I JECT TITLE: Install an Alternate Water Source as Back \	Jp for \$	Steam	Gener	ator In	ventory.	SAMA		+ AL		0&M		TAKEOFF:				
JOB EST.	LOCATION: Yard near Existing Aux Feed Pumps STATUS: OUTAGE NON-OUTAGE							PROJE	CT CODE: T ATOR:	BD 			ESTIMATO ORIG. DAT	DR: RC FE: 7/1	MT 1/2012		
ITEM	DESCRIPTION	ΟΤΥ	иом	CFT	NO	M/ UNIT		ς ΤΟΤΑΙ	\$/MH	ÌΜ/ P	ATERIAL \$	MATERIAL	LABOR	CON	SUB-	тс	DTAL \$
	DECONITION	411	00111		no.	U.I.I.		TOTAL	φ/whit			TEOLEANO	TECENIC		IIIAGI		717E V
	* ESTIMATE LEVEL *									EST	IMATE SU	MMARY					
	Conceptual											MANHOU	RS	DOL	LARS		
⊢	Preliminary Definitive			01	GINE	ERING STUDY. D	ESIGN 8	CLOSE	OUT			180		\$	18.000		
-				02		DESIGN E	ENGR CO	NST SUF	PPORT			40		\$	4,000		
	General Notes:			03		MODS EN	GR SUF	PORT				-		\$ ¢	-		
				04		PROJECT	MANAGI	EMENT				200		ъ \$	24,000		
				06 07			(Calibratio	on & Test N FVALL	ting) JATION SUF	POR	т	80		\$	8,000		
				08		ENGINEE	RING DC	P ACCEF	PTANCE REV	VIEW		50		\$	5,000		
				08	VIRA	DESIGN E	ERING ENGR CO	NTRACT	SUPPORT			2,150		\$	258,000		
				09 10		SUPL CO			NGR			280		¢.	22 400		
				11		OSG FIEL	D ENGRS	S / PLAN	NERS			240		\$	28,800		
				MAT 12	ERIAI	LS / MISC C MATERIA	CONTRAC	ets						\$	458,450		
				13		OTHER C	ONTRAC	TS						\$	-		
				14	TRAC	SWEC CR	ABOR	OR/WAL	KDOWN			3,090		\$	340,933		
				15 16		LOST TIM	E					309		\$ \$	38,786 92.067		
				PLA	NTCF	RAFTLABC	R							Ψ	32,007		
				17 18		MECH M	AINT. AINT					- 40		\$ \$	- 4.000		
				19		I&C						20		\$	2,000		
				MISC	s su	PPORT						-		Φ	-		
				21 22		QUALITY PLANNING	CONTRO	DL EDLILING	i			240		\$ \$	24,000		
				23		TRAINING		DOLING				48		\$	5,760		
				24 25		CHEMIST OPS	RY					- 180		\$ \$	- 21,600		
				26								-		\$	-		
				27		QUALITY	CONTRO	DL				260		\$	20,800		
				28 29		NDE HP/RP						-		\$ \$	-		
				30		RADWAS	STE					-		\$	-		
				31 32		ELEVAT	OR CONT	RACTO	र			-		ծ \$	-		
				33 34		WASTE HOUSE	MANAGE (FEPING	MENT				-		\$ \$	-		
				35		EQUIPM	ENT REN	TAL				-		\$	-		
				36 37		DECON	AMINATI	NG ON CON	TRACTOR			-		ծ \$	-		
				38 39		RBC'S	v					-		\$ \$	-		
				40		FIRE WA	TCH (Ro	ver)				-		\$	-		
				41 CON	TING	SAFETY ENCY						63		\$	4,284		
				42			ENCY					7 610	-	\$ \$ 1	557,952		
				LOTIN		CODICIA.			SITE ENCU	MBR	ANCE PREM	VIUM (20%))	\$	390,566		
									LOADERS	(30%)			\$	703,020	•	
									ESTIMAT	TE T	OTAL			\$ 3	,046,418		
				F	our S	Non-C lab for Pun	outage W	ork sure with	Berm								
1.	Perform walkdown of work area.	1	LT	LB	2	8.00	1.00	16	\$ 78.15			\$-	\$ 1,250			\$	1,250
2. 3.	Excavate, form and pour slab with oil berm	1	LT	LB	2	40.00	1.00	80 80	\$ 78.15	\$	6,000.00	\$ 6,000	\$ 6,252			э \$	6∠5 12,252
4. 5.	Excavate, form and pour slab with oil berm Excavate, form and pour slab with oil berm	1 1	LT LT	OP CP	1 2	20.00 20.00	1.00 1.00	20 40	\$ 115.00 \$ 96.00			\$-	\$ 2,300 \$ 3.840			\$ \$	2,300 3.840
6.	Backfill and compact excavation	1		OP		20.00	1.00	20	\$ 115.00			\$-	\$ 2,300			\$	2,300
<u>(</u> .	Dacknii and compact excavation	1		S	i 2 iet Pu	mp Assem	bley and	40 Install B	ູຈ /8.15 uilding	1		⊅ -	্	1		Φ	3,126
1	Perform walkdown of work area	1	ΙТ	MW	2	10.00	1 00	20	\$ 134.00			\$ -	\$ 2.680			\$	2 680
2.	Perform walkdown of work area.	1	LT	IW	3	10.00	1.00	30	\$ 137.33	\$	1,500.00	\$ 1,500	\$ 4,120			\$	5,620
3. 4.	Реггогт walkdown of work area. Obtain Diesel Pump Skid and required tools.	1 1		OP MW	1 2	10.00 10.00	1.00 1.00	10 20	\$ 115.00 \$ 134.00	\$	125,000.00	\$ 125,000	\$ 1,150 \$ 2,680			\$	1,150 127,680
5. e	Set Diesel Pump Skid	1	LT	MW	2	20.00	1.00	40	\$ 134.00 \$ 115.00			\$ 1,500	\$ 5,360			\$	6,860
7.	Set Diesel Oil Day tank	1	LT	MW	2	10.00	1.00	20	\$ 134.00	\$	1,000.00	φ 1,000	\$ 2,680			\$	2,680
7.	Set Diesel Oil Day tank Obtain and erect insulated steel building.	1 1	LT LT	OP IW	1 3	5.00 40.00	1.00 1.00	5 120	\$ 115.00 \$ 137.33	\$	15,000.00	\$ 15.000	\$ 575 \$ 16.480			\$ \$	575 31,480
8.	Obtain and erect insulated steel building.	1		OP		40.00	1.00	40	\$ 115.00	¢	10,000,00	\$ 10,000	\$ 4,600			\$	4,600
9. 10.	Demob and Clean Up Area	1	LT	EL	2	40.00	1.00	80 20	⇒ 123.32 \$ 123.32	*	10,000.00	\$ 10,000	э 9,866 \$ 2,466			э \$	2,466

INDIAN POINT IMPLEMENTATION ESTIMATE WORK SHEET

Rev.	INDIAN POINT IMPLEMENTATION ESTIMATE WORK SHEET														
11-0			<u>.</u>			EC #	SAMA	IP2-044	4			1			
PRO.	JECT TITLE: Install an Alternate Water Source as Back	Up for	Steam	Gener	ator In	ventory.		CAPIT	AL	0&M		TAKEOFF:	-		
JOB EST	STATUS: COUTAGE NON-OUTAGE								IATOR:	BD I		ORIG. DAT	E: 7/11/2012		
						MA	ANHOUR	S		MATERIAL S	MATERIAL	LABOR	SUB-		
ITEM	DESCRIPTION	QTY	UOM	CFT	NO.	UNIT	FCTR	TOTAL	\$/MH	PER UNIT	DOLLARS	DOLLARS	CONTRACT	T	OTAL \$
		R	un anc	l Tie-Ir	ı Pipir	ng from Die	sel to Su	pply and	d Chem-Cle	an Lines					
1	Obtain Material and Frect Pipe Supports on Building	1	ιт	PF	3	40.00	1 00	120	\$ 120.71	\$ 4 000 00	\$ 4000	\$ 14.485		s	18 485
	Perform walkdown and Co-ordinate Core Bore Into	l .			ľ	10.00			•	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	¢,		Ť	,
2.	Aux. Feed Pump Building	1	LT	PF	3	10.00	1.00	30	\$ 120.71			\$ 3,621		\$	3,621
З.	Perform walkdown and Co-ordinate Core Bore Into					20.00	1.00	40	e 7045			¢ 0.400		¢	2.406
4	Perform Core Bores (2) Into Aux Feed Pump Room	1		LB	$\begin{bmatrix} 2\\ 2 \end{bmatrix}$	20.00	1.00	40	\$ 78.15 \$ 78.15			\$ 3,126		э S	3,126
1	Cut, Fit and Weld 6" diameter Sch. 80 Piping from	l .			-	20.00			• • • • • •			• •,•		Ť	0,120
5.	Diesel discharge to Pene. In Aux. Feed pump room,														
-	then to 6" Chem. Clean nozzle. (90 ft.) (12 welds)			PF	3	200.00	1.00	600	\$ 120.71	\$ 190,000.00	\$ 190,000	\$ 72,426		\$	262,426
1.	Cut. Fit and Weld 6" diameter Schedule 40 Piping from	'			l °	40.00	1.00	120	φ 120.71		- Ф	э 14,460		ð	14,460
8.	Diesel suction to Pene. In Aux. Feed pump room, then	1	LT	PF	3	100.00	1.00	300	\$ 120.71	\$ 70,000.00	\$ 70,000	\$ 36,213		\$	106,213
9.	Mount and tie in diesel day tank	1	LT	PF	3	20.00	1.00	60	\$ 120.71	\$ 1,000.00	\$ 1,000	\$ 7,243		\$	8,243
10.	Support testing as required		LT	PF	2	40.00	1.00	80	\$ 120.71		\$ -	\$ 9,657		\$	9,657
12	Clean-up area and restore	1				10.00	1.00	20	\$ 78.15		э - \$ -	\$ 2,414		э S	2,414
								-			\$-	\$ -		\$	-
_					Perfo	m Electric	al and I&	C installa	ations					¢	
1	Provide Heat Tracing as Required	1	1.	FI	2	20.00	1.00	- 40	\$ 123.32	\$ 3,000,00	\$ 3000	\$ <u>4</u> 933		\$ ¢	7 933
2.	Provide Piping Insulation as Required	1	LT	AW	2	20.00	1.00	40	\$ 97.70	\$ 3,000.00	\$ 3,000	\$ 3,908		\$	6,908
											\$-				
											\$ - ¢				
1.	PAINTING & TOUCH-UP	1	LT	PT	2	80.00	1.00	160	\$ 95.16	\$ 1.000.00	\$ 1.000	\$ 15.226		s	16.226
1		l .			-					.,		•,==•		-	,
1		1	1.7		1	200.00	1 70	340	\$ 53.60		¢	¢ 18.224		¢	18 224
2.	CRAFT SUPPORT FOR BOTTLE WATCH	'		1 **	'	200.00	1.70		φ 00.00		\$ -	\$ 10,224		\$	- 10,224
														e	
1 ^{1.}	MISC SOB-CONTRACT	'											₽ -	Э	-
	SUBTOTAL CRAFT & SUB-CONTRACTOR							2,649		\$ 430,500.00	\$ 432,500	\$ 284,150	\$ -	\$	716,650
1		1	ιт					212	\$ 107.27			\$ 22.741		¢.	22 741
1.								212	ψ 107.27			Ψ 22,741		Ψ	22,741
	SUBTOTAL							2,861			\$ 432,500	\$ 306,891	\$ -	\$	739,391
	RELATED COSTS														
1.	WALKDOWN ALLOWANCE	1	LT	PF				25	\$ 120.71			\$ 3,018		\$	3,018
2.	WORK PACKAGE REVIEW & CRAFT TRAINING		LT	PF				104	\$ 120.71			\$ 12,554		\$	12,554
3.	IGENERAL CRAFT DISTRIBS. (10%)	'						100	\$ 123.3Z			\$ 30.689		э S	30.689
5.	CRAFT IN PROCESSING (20%)											\$ 61,378		\$	61,378
6.	HUMAN PERFORMANCE & ALARA TRAINING	1	LT									\$ 6,138		\$	6,138
<u> </u>	I (1/2 day training, or ~ 2%)					 		3 000		 	\$ 432 500	\$ 433.000	1	¢	865 500
	CODIOTAL					· · · · · · · · · · · · · · · · · · ·			· · · · · · · · · · · · · · · · · · ·			φ. π 00,000:	Ψ	.ψ.:	
1	PLANT SCOPE														
1.	MECH MAINTENANCE			PL				-	\$ -		\$ -	\$ -		\$	-
				PL				-	\$ -		\$ -	\$-		\$	-
	SUBTOTAL MECH MAINT.										ъ	Φ	Φ	\$	Ŧ
1.	ELECT MAINTENANCE	1	LT	PL	2	20.00	1.00	40	\$ 100.00		\$-	\$ 4,000		\$	4,000
											\$ -			\$	-
	SUBTOTAL ELECT. MAINT.							40			\$ -	\$ 4,000	\$ -	\$	4,000
1	 I&C (Dev. Instrument Calibration Procedures)	1	1.7	Р	1	20.00	1 00	20	\$ 100.00		\$	\$ 2000		\$	2 000
		L_'		PL			1.00				\$ -	\$		\$	
	SUBTOTAL I&C MAINT.							20			\$ -	\$ 2,000	\$ -	\$	2,000
												¢.			
1 ^{1.}								[\$ - \$ -	э - \$ -		э \$	-
	SUBTOTAL CSG MAINT.							-			\$ -	\$ -	\$ -	\$	
	SUBTOTAL PLANT							60			\$ -	\$ -	\$ -	\$	
											1				
	SUBTOTAL CRAFT/PLANT					1		3,150	1		\$ 432.500	\$ 439.000	\$ -	\$	871.500

INDIAN POINT IMPLEMENTATION ESTIMATE WORK SHEET

Rev.	1	NDI/	۸N P	OINT	T IMF	PLEMEN	ΙΤΑΤΙΟ	ON ES	TIMA	TE V	NORK SHE	ET				
11-0						EC #	: SAMA	IP2-04	4							
PRO. JOB	JECT TITLE: Install an Alternate Water Source as Back	Up for	Steam	Gener	ator In	ventory.		PROJE		DE: TI	□o&m BD I		TAKEOFF: ESTIMATO			
E01.						M		S	ATOR.		MATERIAL \$	MATERIAL		SUB-		
ITEM	DESCRIPTION	QTY	UOM	CFT	NO.	UNIT	FCTR	TOTAL	\$/N	1H	PER UNIT	DOLLARS	DOLLARS	CONTRACT	то	TAL \$
	IMPLEMENTATION SUPPORT															
1. 2. 3. 4.	MODS ENGINEERING DESIGN ENGINEERING SUPT DURING CONST SYSTEMS ENGINEERING - MECHANICAL SYS ENGINEERING - ELECTRICAL	1 1 1	LT LT LT LT	NM NM NM	1 1 1	40.00 40.00 20.00	1.00 1.00 1.00	- 40 40 20	\$ 10 \$ 10 \$ 10	0.00			\$ - \$ 4,000 \$ 4,000 \$ 2,000		\$ \$ \$ \$	- 4,000 4,000 2,000
5. 6. 7. 8. 9.	SYS ENGINEERING - INSTR & CONTROL SYS ENGINEERING - CIVIL STRUCTURAL PROJECT MANAGEMENT TRAINING (OPS Staff) QA / QC VERIFICATION	1 1 1 1	LT LT LT LT	NM NM NM NM	1 1 12 1	40.00 40.00 200.00 4.00 240.00	1.00 1.00 1.00 1.00 1.00	40 40 200 48 240	\$ 10 \$ 10 \$ 12 \$ 12 \$ 10	0.00 0.00 0.00 0.00 0.00			\$ 4,000 \$ 4,000 \$ 24,000 \$ 5,760 \$ 24,000		\$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$	4,000 4,000 24,000 5,760 24,000
10. 11. 12. 13. 14.	PLANNING & SCHEDULING HP / RP/ ALARA CHEMISTRY OPS (DEVELOP/REVISE PROCEDURE(S)) TRAVEL & LIVING EXPENSES CONTRACTOR SUPPORT	1 1 1 1 1	LT LT LT LT	NM NM NM	1	180.00	1.00	- - 180	\$ 12	0.00			\$ - \$ - \$ 21,600 \$ -		\$ \$ \$ \$	- - 21,600 -
1. 2. 3. 4. 5. 6.	FIS / MODS ENGINEERING - SWEC (Incl Per Diem) MODS PLANNING & SCH SWEC (Incl Per Diem) OSG FIELD ENGRS/PLAN- SWEC(Incl Per Diem) QA / QC VERIFICATION NDE HP / RP	1 1 1 1	LT LT LT LT LT	NM NM NM NM NM	1 1 1	280.00 240.00 260.00	1.00 1.00 1.00	280 240 260	\$8 \$12 \$8	0.00 0.00 0.00			\$ 22,400 \$ 28,800 \$ 20,800 \$ - \$ -		***	22,400 28,800 20,800 -
7. 8. 9. 10. 11. 12. 13. 14. 15.	RADWASTE NURSE ELEVATOR CONTRACTOR WASTE MANAGEMENT HOUSEKEEPING EQUIPMENT RENTAL CONTRACTOR VENDOR STOCKING DECONTAMINATION CONTRACTOR RBC's	1 1 1 1 1 1 1 1	LT LT LT LT LT LT LT LT	NM NM NM NM NM NM NM												
16. 17. 18. 19.	SECURITY FIRE WATCH (Rover) SAFETY (2%) LOSTTIME (10%)	1 1 1	LT LT LT	SEC NM NM				63 309	\$ 6 \$ 12	8.00			\$- \$4,284 \$38,786		\$ \$	- 4,284 38,786
	SUBTOTAL CRAFT/NON-MANUAL							5,150				\$ 432,500	\$ 647,430	\$ -	\$1,	079,930
3.	FREIGHT, SALES TAX, & CONSUMABLES (6%)											\$ 25,950			\$	25,950
	SUBTOTAL INSTALLATION COST							5,150			1	\$ 458,450	\$ 647,430	\$ -	\$ 1,	105,880
1. 2. 3. 4. 5. 6. 7.	DESIGN ENGINEERING - MECHANICAL DESIGN ENGINEERING - ELECTRICAL DESIGN ENGINEERING - INSTR. & CONTROL DESIGN ENGINEERING - CIVIL/STRUCTURAL TESTING (Instrument Calibration and testing) CONTRACT ENGR DESIGN SUPPORT ENGINEERING DCP ACCEPTANCE REVIEW	1 1 1 1 1 1 1	LT LT LT LT LT LT	NM NM NM NM NM	1 1 1 2 1 1	40.00 40.00 20.00 80.00 40.00 2,150.00 50.00	1.00 1.00 1.00 1.00 1.00 1.00 1.00	40 40 20 80 80 2,150 50	\$ 10 \$ 10 \$ 10 \$ 10 \$ 10 \$ 10 \$ 12 \$ 10	0.00 0.00 0.00 0.00 0.00 0.00 0.00			\$ 4,000 \$ 4,000 \$ 2,000 \$ 8,000 \$ 8,000 \$ 8,000 \$ 5,000	\$ - \$ 258,000	\$ \$ \$ \$ \$ \$ \$ \$ \$ \$	4,000 4,000 2,000 8,000 8,000 258,000 5,000
	SUBTOTAL DESIGN COST							2,460					\$ 26,000	\$ 258,000	\$	289,000
	SUBTOTAL INSTALLATION & DESIGN COST							7 610					\$ 673 430	\$ 258.000	\$ 1	394:880
1.	CONTINGENCY (40%)							1,010					. <u></u> 010;400		\$	557,952
	ESTIMATE SUBTOTAL														\$1,	952,832



ENTERGY INDIAN POINT NUCLEAR STATION UNIT 2

CONCEPTUAL DESIGN PACKAGE For

SAMA IP2-053

Keep Pressurizer PORV Block Valves Open

Prepared by the Buttacurd.	Approved by:
Date: 9-20-2012	Date: Y. Com Com 20

RCM	A) Technologies	ENTERGY	Conceptual Design	
	The Source of Smart Solutions	Unit 2	SAMA IP2 -053	Rev. 0

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SECTION	TITLE
1.0	ISSUE
2.0	BACKGROUND
3.0	EXISTING CONDITIONS
4.0	DESIGN CONSIDERATIONS
5.0	CONFIRMATION OF DESIGN
6.0	RECOMMENDED SOLUTION
7.0	PRELIMINARY MATERIAL LIST
Attachment 1	Entergy Impact Screening Summary
Attachment 2	Conceptual Design Sketches
Attachment 3	References
Attachment 4	Cost Estimate

1.0 ISSUE

Severe Accident Mitigation Alternative (SAMA) IP2-053:

Keep Both Pressurizer PORV Block Valves Open

2.0 BACKGROUND

In accordance with NRC environmental regulations in 10 C.F.R. Part 51, Entergy performed SAMA analyses for both Indian Point Nuclear Generating Units 2 and 3 as part of its license renewal application. Those analyses identified a number of potentially cost-beneficial SAMAs for each unit. In its license renewal application and related correspondence with the NRC Staff, Entergy indicated that it would submit the potentially cost-beneficial SAMAs for further internal engineering project cost-benefit analysis, even though none of the potentially cost-beneficial SAMAs is related to aging management under 10 C.F.R. Part 54. Entergy contracted RCM Technologies to assist it in this effort.

This package provides a conceptual design and implementation cost estimate for SAMA IP2-053 in accordance with Entergy design engineering practices.

For SAMA IP2-053, resolution is required for Pressurizer Power Operated Relief Valve (PORV) Block Valves MOV535 and MOV536 to be open when the plant is operating under normal conditions.

This package un-installs the modification that currently keeps the block valves closed during normal operating conditions. The package will restore the original design requiring the valves to be open during normal operating conditions.

The design considerations that follow will address the adequacy of the proposed resolution and the basis for the recommendation to resolve the identified potential issue.

The recommended solution will include descriptive details of the proposed design change and also conceptual design sketches as required. These descriptive details, sketches, and the preliminary material list provide the basis for initiating the all-inclusive conceptual cost estimate for engineering change (EC) development and implementation at the Station.

3.0 EXISTING CONDITIONS

Originally, the PORV Block Valves at IP2 were intended to be open during normal plant conditions and automatically close in order to isolate a PORV should it leak or

RCM	(M) Technologies	ENTERGY	Conceptual Design	
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fail open. However, a modification has been made to each block valve control circuit that maintains the block valve closed during normal plant conditions.

Specifically, Modification FEX-96-12241-E installed an interlock in each block valve's control circuit. The interlock was added to the opening circuit of each block valve to keep it closed during normal plant conditions and automatically open the closed block valve when approaching the PORV's actuation setpoint.

4.0 DESIGN CONSIDERATIONS

The control circuit of each PORV Block Valve would be modified to function as originally designed. The presently installed Modification FEX-96-12241-E will be removed and the operation of the block valves' original design restored.

5.0 CONFIRMATION OF DESIGN

This package will provide the required evaluation, analysis, calculations, and design basis documentation required for the modification.

This package will also provide the documentation and work steps to physically remove the modification made to the PORV Block Valves. It will also include the provisions for re-installing the wiring that will restore each valve's original isolation function.

6. RECOMMENDED SOLUTION

- 1. Perform an evaluation of the Fire Protection System and its cable separation requirements. Provide the basis to confirm that the change being made will preserve the integrity of the block valve's power wiring and its ability to function as required
- 2. Prepare a new Design Package to make the required modifications. The package will, at a minimum, include documentation equivalent to that originally provided in Modification FEX-96-12241-E.
- Physically remove the existing modification installed by FEX-96-12241-E. <u>NOTE:</u> This effort will be the greater extent of the field work required.
- 4. Install the wiring associated with the PORV Block Valve control circuits and necessary to restore each valve's original isolation function

RCM	Technologies	ENTERGY Indian Point Nuclear Station	Conceptual Design Package	
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- 5. Perform a circuit continuity and functional testing of PORV Block Valve circuits and function.
- 6. Provide procedures and training for the PORV Block Valves.

7.0 PRELIMINARY MATERIAL LIST

Item Description	Quantity
1. Miscellaneous cable and wire	Minimal

RCM) Technologies The Source of Smort Solutions	ENTERGY Indian Point Nuclear Station Unit 2	Conceptual Design Package SAMA IP2 -053	Rev. 0
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Attachment 1

Entergy Impact Screening Summary



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Engineering Change Process

ATTACHMENT 9.3

IMPACT SCREENING SUMMARY

SHEET 1 OF 6

INSTRUCTIONS:

Identify the potentially impacted and the unaffected areas by checking the appropriate Yes or No block on the Impact Screening Criteria.

If a direct determination cannot be made based on the impact screening questions, the detailed questions in Attachment 9.4 may be used to identify potential impacts.

The completion of detailed questions in Attachment 9.4 is recommended but not required.

Contact potentially impacted groups if assistance is required.

Engineering Change No.: <u>IP2-053</u>

CON	C	C	P	T	UA	L

Rev. No .: DESIGN PACKAGE

Prepared by:

Date:

DESIGN ENGINEERING DISCIPLINES		l Impact
 Civil / Structural Design Engineering Does the proposed activity involve any civil / structural (including seismic) design changes, activities or affect coatings? OR Does the proposed activity involve any piping engineering design changes or activities? 	☐ YES	X NO
 Electrical Design Engineering Does the proposed activity involve any station or switchyard electrical design, large power transformers, or settings changes or activities? (SOER 10-1) 	YES	
Instrumentation and Controls Design Engineering Does the proposed activity involve any I&C design or settings changes or activities?	YES	
 Mechanical Design Engineering Does the proposed activity add/remove/replace insulation, aluminum or other metallic/non-metallic sources of debris in the reactor/containment building or involve any mechanical design changes or activities? 	□ YES	ои 🕱
 PSA Engineering Does the proposed activity impact or involve changes to plant evaluations or probabilistic safety assessments? Does the proposed activity impact or involve changes to the Emergency Operating Procedures, Abnormal Operating Procedures, or Severe Accident Procedures or does it add, remove or modify SSCs included in a Maintenance Rule function? 	YES	<u>ои П</u>
 Nuclear Analysis Does the proposed activity impact or involve changes to plant evaluations, Technical Specifications, Technical Requirements Manual, or require a full 50.59 Evaluation? 	YES	
 FERC / NERC impact Does the proposed activity impact or involve change to FERC / NERC or Regional Entity compliance documents? (ex. MOU, ENN/ENS-PL-158, ENS-DC-199, etc.) 	☐ YES	🕅 NO



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Engineering Change Process

IMPACT SCREENING SUMMARY

ATTACHMENT 9.3 Sheet 2 of 6

DESIGN ENGINEERING PROGRAMS Potential Impact **ASME** Section III Specifications □ YES X NO Does the proposed activity add, delete, or modify information required by ASME Section III to be contained in a design specification? **Cable and Raceway Program** YES Does the proposed activity involve any changes to cable trays, raceways or the associated documentation? **Electronic Databases (EDB)** YES Does the proposed activity involve any changes to electronic databases? EQ Program (10CFR50.49, NUREG 0588, Reg Guide 1.89) □ NO YES Does the proposed activity involve any new or existing EQ components? Hydrogen Control Program (10 CFR 50.44) (if applicable) □ YES 🕅 NO Does the proposed activity impact equipment or materials related to hydrogen control? Human Factors Program YES **NO** Does the proposed activity involve control panel design including layout and labeling. visual displays, operator aids, auditory signals or environment in the control room, cable spreading room, and other control panel locations? □ NO **Margin Management** YES Does the proposed activity impact or involve any change to design, licensing or operations margins? Reg. Guide 1.97 / PAM (Post Accident Monitoring) X NO **TYES** Does the proposed activity involve Reg. Guide 1.97 (Post Accident Monitoring) Indications?

MAINTENANCE **Potential Impact Electrical Maintenance** YES □ NO Does the proposed activity require an Electrical Maintenance review to identify affected procedures, required actions and required training? **NO I&C Maintenance** YES Does the proposed activity require an I&C Maintenance review to identify affected ŝ procedures, required actions and required training? 🕅 NO **Mechanical Maintenance** □ YES Does the proposed activity require a Mechanical Maintenance review to identify affected procedures, required actions and required training?

NUCLEAR ENGINEERING		Potential Impact	
 Nuclear Fuel Design Does the proposed activity impact or involve the design, performance or storage of nuclear fuel? 	T YES	M NO	
Reactivity Management Program Does the proposed activity impact or involve the reactor system, reactor controls, reactor chemistry, related systems, potential core and spent fuel damage, spent fuel, reactor coolant pressure boundary or reactor system procedures?		X NO	



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Engineering Change Process

ATTACHMENT 9.3

SHEET 3 OF 6

PROCESS OR PROGRAM IMPACT SCREENING CHECKLIST **Potential Impact M** NO **Computer Support and Software T**YES Does the proposed activity impact or involve changes to plant computer software or . firmware or impact Software Quality Assurance (SQA)? X NO Chemistry and Environmental Impact **YES** Does the proposed activity impact or involve any changes to plant chemistry requirements, operations or procedures, or any changes to the environment? X NO **Radiation Protection (RP) Program Impact** ☐ YES Does the proposed activity impact or involve any changes to the RP program? Does the proposed activity involve the potential to introduce (or reintroduce) any cobalt containing materials (such as Stellite) into the primary system? Operations YES Does the proposed activity impact or involve changes to Operations procedures, training or operator actions? Planning, Scheduling and Outage (PS&O) YES **NO** Does the proposed activity require a PS&O review to identify required design and installation information? MP&C (Inventory) □ YES M NO Does the proposed activity impact or involve any addition or removal of equipment from the inventory? Does the proposed activity impact or involve any Procurement of Quality or Augmented Quality material from non-qualified suppliers? **Procurement Engineering** □ YES X NO Does the activity impact or involve any procurement activities?

PROGRAMS AND COMPONENTS	Potential Impact	
 ASME Containment In-service Inspection (IWE / IWL) Program Does the proposed activity impact or involve the containment pressure boundary or associated moisture barriers or a support for the containment pressure boundary? This includes "software only" changes that do not physically change the hardware such as re-rating of pressures or temperatures to include changes to documented information on these items or additional documented information for these items. Does the proposed activity limit access to containment surfaces for inspection? Involve disassembly of a bolted connection which forms a portion of the containment boundary? 		K NO
 ASME Appendix J (Primary Containment Leak Rate Testing) Program Does the proposed activity impact or involve any changes to primary containment leak rate testing? 		🛛 NO

IMPACT SCREENING SUMMARY



REV. 11

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Engineering Change Process

IMPACT SCREENING SUMMARY

ATTACHMENT 9.3 SHEET 4 OF 6

PROGRAMS AND COMPONENTS (CONTINUED)	Potential Impact	
 ASME In-service Inspection (ISI) Program Does the proposed activity add, delete, or modify an ASME Section XI pressure boundary item or a support for an ASME Section XI pressure boundary item? This includes "software only" changes that do not physically change the hardware like such as re-rating of pressures or temperatures. (ASME Section XI items include ASME Class 1, 2, 3, or B31.1 treated as ISI Class 2 or 3 (T2 and T3) components, parts, or appurtenances such as pipe or pressure vessel walls, valve bodies and pump casings. 	T YES	X NO
 ASME Section XI Repair / Replacement Program Does the proposed activity involve any mechanical component within the ASME XI program / boundaries? Does the proposed activity add, delete, or modify an ASME Section XI pressure boundary item or a support for an ASME Section XI pressure boundary item? (ASME Section XI items include ASME Class 1, 2, 3, MC, and CC, as well as B31.1 treated as ISI Class 2 or 3 (T2 and T3) components, parts, or appurtenances such as pipe or pressure vessel walls, valve bodies and pump casings). 	☐ YES	X NO
 ASME In-service Testing Program Does the proposed activity impact or involve any item (safety related or non safety related) that may affect the performance or testing of a safety related pump or valve? Does the proposed activity impact the function or functional classification of any pump or valve as stated in the IST program documents? 	T YES	X NO
 Air Operated Valve (AOV) Program Does the proposed activity impact or involve the design, operation or testing of AOVs? 	YES	🕅 NO
 Buried Piping and Tanks (BP&T) Program Does the proposed activity impact or involve any changes to piping, coatings, or cathodic protection of Buried Piping & Components? 	TES	MO 🕅
 Boric Acid Corrosion (BAC) Program Does the proposed activity impact or involve any increase in the likelihood of boric acid formation or corrosion? 	TYES	🕅 NO
 Check Valve Program Does the proposed activity impact or involve the design, operation or testing of check valves? 	TES YES	⊠ NO
 Control Room Habitability Program Does the proposed activity impact or involve changes that affect the temperature or radiological environmental conditions in the Main Control Room? 	TYES	🕅 NO
 Electrical Circuit Breaker, Relay and Electrical Equipment Testing Does the proposed activity impact or involve changes to the functional testing of circuit breaker, relay or electrical equipment? 	YES	



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Engineering Change Process

IMPACT SCREENING SUMMARY

ATTACHMENT 9.3 SHEET 5 OF 6

PROGRAMS AND COMPONENTS (CONTINUED)	Potential Impact	
 Flow Accelerated Corrosion (FAC) Program Does the proposed activity involve any changes (e.g.: configuration, velocity, flow rate, pressure, temperature, material, weld location, etc.) to piping systems included in the FAC Program.? 	T YES	X NO
 Heat Exchanger Program Does the proposed activity impact or involve the design, operation or testing of a component in the heat exchanger program? 	□ YES	MO 🕅
 Predictive Maintenance Program Does the proposed activity impact or involve any aspect of the storage, use and testing of lubricants? Does the proposed activity involve thermography? Does the proposed activity involve vibration monitoring? 	T YES	X NO
Microbiological Induced Corrosion (MIC) Program Impact Does the proposed activity involve piping containing untreated or stagnant water or open to the atmosphere?	U YES	NO 🔀
 Motor Operated Valve (MOV) Program Does the proposed activity impact or involve the design, operation or testing of MOVs? 	YES	
 Plant Thermal Performance Program Does the proposed activity impact or involve plant thermal performance? 	□ YES	X) NO
 Preventive Maintenance Program Does the proposed activity impact or involve periodic testing or performance of SSCs? or Does the proposed activity add, modify or delete any Environmental Qualification (EQ) maintenance requirement or replacement frequency to ensure the component(s) maintains its gualification status? 	YES	□ NO
 PT Curves Does the proposed activity add, delete, or modify the basis (as contained in each sites reactor vessel surveillance material testing program) for the Pressure / Temperature Limit Curves (fluence, pressure, temperature, reactor materials)? 	☐ YES	X NO
 Relief Valve Program Does the proposed activity impact or involve the design, operation and testing of relief valves, safety valves, vacuum breaker valves or rupture disc? 	☐ YES	X NO
 RPV Internals Program Does the proposed activity impact or involve any change to the reactor internals? This includes "software only" changes that do not physically change the hardware such as re-rating of pressures or temperatures. Does the proposed activity impact or involve or related documentation to include neutron fluence or neutron fluence calculations? Does the proposed activity impact or involve or changes to core flow characteristics or core flow characteristics? 	☐ YES	X NO



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Engineering Change Process

ATTACHMENT 9.3

IMPACT SCREENING SUMMARY

SHEET 6 OF 6	S	H	EET	6	OF	6	
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PROGRAMS AND COMPONENTS (CONTINUED)	Potential Impact	
 Welding Program Does the proposed activity impact or involve a special process, such as welding, brazing or soldering? 	TES 🗌	NO 🕅
 Safety Program Does the proposed impact or activity involve personnel or industrial safety? 	🗋 YES	🕅 NO
 System Engineering Does the proposed activity impact or involve any changes to system configuration, function or performance, etc., for Maintenance Rule or other system? Does the proposed activity impact or involve any changes to system procedures, maintenance or operation, etc.? 	YES	□ NO
 Training Program Does the proposed activity involve existing training requirements or create the need for new training? 	YES	
 Simulator Impact Does the proposed activity impact or involve changes to the Simulator? 	YES	
 Fire Protection Program Does the proposed activity result in a change to the Fire Protection Program (including 10CFR50 Appendix R) where the impact is more than negligible? 	YES	□ NO

Detailed Impact Screening (Attachment 9.4) Attached?	🗆 YES	🕅 NO



Attachment 2

Conceptual Design Sketches

N/A
Attachment 3

References

- 1. ENTERGY Nuclear Management Manual, Engineering Change Process, Rev 11
- Association for the Advancement of Cost Engineering (AACE), Cost Estimate Classification System - As Applied In Engineering, Procurement, and Construction for the Process Industries
 - TCM Framework: 7.3 Cost Estimating and Budgeting
 - Figure 4 Estimate Checklist & Maturity Matrix
- 3. Indian Point Design Engineering Modification No. FEX-96-12241-E, Auto Open of PORV Block Valves (attached here)

Doc. ID.

FEX-96-12241-E

Rev. No. / Seq. No.



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ATTACHMENT 7.2 Page 1 of 3

Closeout Tracking Form - Post Return To Service Checklist (P-RTS)										
ER/Mod No: FEX-96-1224	-E ER/Mod Rev No.	1	"B" Work Ore	ier – IP2-0	3-31998					
	(P-p)/p)									
Engineering Change Title: Hoto Upon of TOKV BLOCK VAIVES										
Prenared by Charles Carly Date: 11/24/04 Amongood by 11/24/41 Fe Duda Date 11/24/41										
Print/Sign Date. III Print/Sign Date. III Print/Sign										
TASK	RESPONSIBLE	N/A	COMPLETED	OPEN	REFERENCE					
	DEPARTMENT			ITEM	/ OPEN					
·	·				ITEM #					
1. Appropriate Drawings Transferred	DE				13					
2. Department Procedures, including	SE				172					
Graphs, Logs, COLs, Preventative	I&C s									
				لينا	12,14,16					
· ·	OPS		Ð		B					
	MAINT				, <u> </u>					
					12-					
	CHEM		L	·Ц	12					
	Rad Pro	Ø			12					
3. Surveillance Procedures	Operations & I&C	তি			14;16.					
4. Work Packages	PS&O		9		1,7.5					
5. UFSAR	Licensing			S	10, 11, 20,22					
6. Tech Specs	Licensing				11.					
7. Licensing Commitment Database	Licensing				215					
8. Design Basis Documents	ES			<u>N/A</u>	17					
9. Major Component Database	ES	┝─┝╡─┤		<u> </u>	10					
10. Component Function Database	ES									
PEDRI	ES		Ľ	L .	6,10					
12 SPIN					1.2					
13. Calculations	DE			—— H ——	23					
14. Condition Reports	Various		H	N/A	24					
15. ALARA	Rad Pro		— <u> </u>	—	12/2					
16. EO Program	DE	17/	H		10					
17. Aluminum in Containment	DE	7	H	— Ħ	12					
18. NRC 89-10 MOVs	P&CE		- I	<u> </u>	25					
19. AOV	P&CE	9/			12					
20. Check Valve	P&CE	9,			12					
21. EPIX Program	P&CE	I.			2					
22. Maintenance Rule Program Changes	SE	1			4					
23. ISI ASME section XI	P&CE	2,			1,10,2					
24. IST	P&CE				2					
25. SQUG (Seismic)	DE				26					

DE- 12.029 REV. 4

INDIAN POINT STATION DESIGN ENGINEERING

ATTACHMENT 7.2 Page 2 of 3

Closeout Tracking Form - Post Return To Service Checklist (P-RTS)										
TASK	RESPONSIBLE DEPARTMENT	N/A	COMPLETED	OPEN ITEM	REFERENCE / OPEN ITEM #					
26. Operator Training	OPS TRAIN				2					
27. Simulator Training Guides, Lesson Plans,	NUC TRAIN		Y		20					
Student Handouts, and Training										
Schedules updates identified and planned.										
28. Technical Training	NUC TRAIN		<u> </u>		9,4					
29. Simulator	Simulator Training		M		2,30					
30. Plant Process Computer including PICS	Computer APS				10,2					
31. Software Quality Assurance	Computer APS				12					
32. CMs	Maintenance				29					
33. Spare Parts	Procurement				2.					
34. Fire Protection	P&CE				28					
35. Flow Accelerated Corrosion (FAC)	P&CE		<u> </u>		12					
36. Vendor Manuals	SE				12,2					
37. System Descriptions	Training				27					
38. Security Plan	Security									
39. Emergency Plan	EP				12					
40. Procurement Requisitions, Purchase	Procurement	Q	Ŀ,							
Orders, Warehouse Records and					12					
Procurement Specifications updates-				•						
identified.				a solid						
41. Plant Chemistry	SE, Chemistry		<u>Ľ</u>		12					
42.										
43										
44.										
45.										
46.										
47.					Í					
48.										
49.	1									

References:









SSCs that can affect the reliability or power generation of Indian Point 2 (refer to Project Guidance document for Yes No

If yes, was a PMT initiated and performed as required?

		MODIFIC	ATION P	ROCEDURE	COVER	SHEET		Sheet I of
Mod No.	□ Minor FEX-96-12241-	Set Point (<u>E</u>	Only C	Generic Maj Prepare	or (P. Kelly	□ Generic M (linor 🛛 E	nvironmenta
Project No	. <u>12241-96</u>	DI FORV DIUCK	<u>v arves</u>	ESR/FEF	L No			
Class:			FP			Non-cla	\$\$	
Mandate: Withdrawa	Yes I Date: <u>Dec 28</u>	<u>No</u> N 3, 1997	fandate Sou	<u>165</u> urce				
Purpose: block valv	This modification es when the RCS	on adds an interlo S pressure increas	ck to the co ses near the	ontrol circuits of actuation setpo	f MOV-5 pint of the	35 and MOV PORV's	-536 to open	these PORV
Construct	ion Documents:	: Attached Drav	≁ings					
Reference	Documents: E	I-6009, REV 10.	. .	~	. o		. ,	
Safety Eva Specificati	luation: <u>97-0</u>	08-MD Key 2	North	Classifica DBDs: _	RCS /	Steam Gener	ators	
Drawings:	See attac	hed list		••••				
Other:	Cleaning:	N//	4					
	Special Test F	Equipment:	<u>N/A</u>					•
	Special Preca	utions and/or Lin	utations:	<u>N/A</u>				
Scope of V	Vork: See Shee	t 2 and Sheet 3						
Procedura	d Requirements	3:		·	SAS CH	ange? 🔾	Yes	No
Simulator	Change?	Yes	□ No		CCR H	uman Engrg?	<u>Yes</u>	I No
System De	scr Change? /Requirements?	Yes Yes		***	Setpoin	t Chg/Add? ketch Change	2 12 Yes	
Contains a	n Essential Corre	ective Action?	Q Yes	No No	TNMS	Change?		No
Prerequicit	e & Corequisite	Mode and Projec	ts at Other	Stations: N/	ESAR (Change?	Yes	O No
					·			
Test Requi	rements and Acc	eptance Criteria:	Function	al tests listed o	n sheet 2	and other tes	ts as deemed a	appropriate
ASME XI Weld Requ	Quality Group: urements:	OA O N/A	BC		Exempt/C	outside Bound	laries	
APPROV	AL/DATE:	Rev. 0		Rev. 1	I	<u>Rev. 2</u>	Rev. 3	<u>Rev. 4</u>
Th	10ng 4	121/97		mis,	30/17			
Engineerin	g Section Manag	ser 1		1 1.	-/1/ -			
Taure	ne Maure	la 4/22/9	7	EM 13	kn			
Manager, S	System Engineer	ing and Analysis		7.				
20	in he	2 la la	4/249	7 ONE	1.13/17			
	Juality Assurance	e			"[]			·····
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Manager, (Manager, 1	Nuclear Safety at	706	n	UISTIU m	#2045	AD DECT	ALLATION	
Manager, (Manager, 1	vuclear Safety al	A T INOO	17 [JULL_				
Manager, (Manager, 1	ting No. (As Reg	$\frac{2\sqrt{4/22}}{\text{quired}}$			-			
Manager, (Manager, 1 DON 1 SNSC Mee	ting No. (As Red	<u>27 4/99</u> quired)						

Scope of Work

A) Addition of an Interlock

This work involves adding an interlock to the opening circuit of the PORV block valves (MOV-535 and MOV-536) to automatically signal the PORV block valves to open prior to reaching the PORV actuation setpoint. The interlock will use spare contacts of relays which are actuated by pressure controllers (PC-474B and PC-457F). These controllers will energize auxiliary relays when the pressurizer pressure reaches 2300 psig. PC-474B will provide a signal to open block valve MOV-535. PC-457F will provide a signal to open block valve MOV-536. These pressure controllers presently provide a signal to act as a permissive to open the PORV associated with the particular block valve.

The circuit change for MOV-535 will involve installing a cable (1-7/C-12 AWG) in existing raceway between panel FBF and panel SB2. Two spare conductors of existing cable JC3-JJ4/1 will be used to connect from panel SB2 to panel G3. The use of the existing spare conductors is necessary to aid in construction. This wiring will be used to connect in parallel an existing normally open contact of relay PC-474B/X with the other signals which energize the open contactor of the motor starter.

The circuit change for MOV-536 will involve installing a cable (1-7/C-12 AWG) in existing raceway between panel E1 and panel H4. Two spare conductors of existing cable JH5-JJ4 will be used to connect from panel E1 to panel G3. The use of the existing spare conductors is necessary to aid in construction. This wiring will be used to connect in parallel an existing normally open contact of relay PC-457F/X with the other signals which energize the open contactor of the motor starter.

B) Change of High RCS pressure alarm setpoint

The high RCS pressure alarm setpoint of PC-455I will be changed from 2310 PSIG to 2300 PSIG. This will be the same setpoint as PC-474B and PC-457F mentioned above. In addition, spare contacts of both relays, i.e. PC-474B/X and PC-457F/X, will be wired in parallel with the existing contacts of relays PC-455I/X and PC-456G/X to annunciate on panel SAF, window 1-2, when the RCS pressure reaches the setpoint or the PORV block valves receive an auto-open signal. The engraving on the lens of window 1-2 will be change to "Pressurizer High Press 2300 PSIG."

Test and Acceptance Requirements

- Verify the usability of existing cables by continuity testing.

- Verify the operation of PC-455I at the new setpoint of 2300 PSIG by a calibration check

- Simulate the operation of relays PC-457F and PC-474B, confirm the opening of MOV-535 and MOV-536 respectively by control room valve position indicating lights. Verify the actuation of annunciator window SAF, window 1-2 when either PC-457F or PC-474B is actuated.

- Simulate a process signal of 2300 PSIG to PC-455I and verify the actuation of annunciator SAF, window 1-2.

- With the block value in the open position, operate the control switch to the "close" position and the "pull to lock" position". Confirm closure of the associated block value.

RI

Drawing List

DMD 206782 - AC DMD 208823- AE DMD 225255- AA DMD 225305- AB DMD 225412- AK DMD 241169- AX DMD 241169- AY DMD 244415- AG DMD 244416- AK

DMD 9321-3268- AG DMD 9321-3281- AN

DMD IP2--S-000209- AF DMD IP2--S-000210- AF

DMD 1971M2304 - AF

IP2F- 000001- BH IP2F- 000002- BG IP2F- 000003- AG IP2F- 000004- CP

EM 309071-00

IPEC00269949

Changes to the FSAR due to Mod Procedure FEX-96-12241-E

1) Add the following description to the FSAR:

Permissive open interlocks for each power operated relief valve (PORV), PCV-455C and PCV-456, are generated when the reactor coolant pressure is 2300 psig or higher. At this point, the motor operated block valves associated with a PORV will also open and an control room annunciation will be generated. The actuation signals for the PORVs are generated by separate instrument channels.

2) Change Figure 7.2-21 as marked on attached copy.







IPEC00269952



FORM N132 1/95

SET POINT DEVICE DATA FORMS

Modification No. FEX-96-12241-E Rev	00 Date Feb 6, 1997									
System Reactor Coolant System Tag	s) <u>PC-4551</u>									
Function: Alarm/Control	ALARM									
Action: Incr., Decr.,/Set, Reset	Incr.									
Process Range: (Units: PSIG, F, GPM, Other) <u>1700-2500 PSIG</u>										
Signal Range: (Units: Volts, Millivolts, Amps, Milliamps, PSIG, Other) <u>10-50 mA</u>										
Dead Band Range (Units: PSIG, F, GPM, % Scale, Other)	0.3-06 mA below set point									
Set Point (Process Units) - (Summer/Winter HVAC Only)	2300 PSIG									
Set Point (Signal Units) - (Summer/Winter HVAC Only)	_ <u>40.0mA</u>									
Set Point Tolerance (Process Units)	<u>+/- 0.4 mA</u>									
Set Point Source(s)										
Process Critical Value (Signal Units)N/A										
Source of Critical Value (Tech Spec, MFR, etc) <u>N/A Function is Alarm only, no act</u>	Source of Critical Value (Tech Spec, MFR, etc) <u>N/A Function is Alarm only, no actuation is based on this alarm</u>									
First Consequence of Exceeding Critical Value (eg, Tank Rupture, Tech Spec Violation) <u>N/A</u>										
Overall Channel Accuracy (%)	<u>N/A</u>									
Remarks Process range is 1700 - 2500 PSIG. The range at the	transmitter is 1720 - 2520 PSIG.									
This modification changes the setpoint of this instrument to matc generate the PORV block valves auto-open interlock signal (PC-	h the setpoint of the controllers used to 457F and PC-474B).									
Prepared by: <u>Peter Kelly</u> Peter Kelly Print/Sign	_Feb 6, 1997 Date									
Mgr. System Engineering and Analysis (Implemented) Print/Sign	Date									
NOTES: 1. The set points listed are initial settings for the devices issued with this modification procedure. Any subsequent set point changes shall be handled as a separate plant modification.										
2. State set point and/or calibration range for each device in the l	2. State set point and/or calibration range for each device in the loop(s) from sensor(s) to bistable(s).									
3. For protective relays, fill out attachment form "Protective Equipment Data and Test Record."										

4. For instruments, Mechanical Engineering Specification MP90-172, "Guidelines for Preparation of Instrument Loop Accuracy and Setpoint Determination Calculations" shall be complied with. safety values. The Power Operated Relief Values are provided to limit the operation of the spring loaded Pressurizer safety values. The PORV's will also open at a programmed pressure setpoint (as a part of the OPS) when the Reactor Coolant temperature is between 0°F and 295°F. This provides protection for the Reactor Vessel against brittle fracture due to cold overpressurization by preventing the RCS pressure from exceeding the Appendix 'G' curves. (See Section 3.1.I).

Motor Operated Block Valves (MOV)

MOV-535 and MOV 536 (see Figure 12) are installed upstream of PCV-455C and PCV-456, respectively, in order to isolate a PORV should it leak or fail open. This is allowable since the code safety valves are sized to protect the RCS from overpressure without the aid of either PORV. The motor operated block valves operate on 480V AC power; MOV-536 is supplied from MCC-26A, MOV-535 from MCC-26B. Both valves fail *as is* on loss of electrical power. Each block valve has its own 4 position switch on panel FCF in the control room. The switch positions are TRIP PULLOUT, CLOSE, AUTO, and OPEN.

When the control switch is in Auto, the values will OPEN when the Ras pressure exceeds 2300 psig. Values manually closed when the pressure decreases below 2300 psig.

A <u>nitrogen accumulator system</u> supplies actuating fluid for opening the PORVs. This arrangement prevents a common air supply failure from causing inoperability of both PORVs. (A detailed description of the OPS Nitrogen Accumulatory system is provided in section 3.1.I.1).

System Description # 1 RCS Arrinchment to Mod Procedure FEX-96-12241-E

P3 1 85

-59-

There are two control chains and the 'Foxboro' switch is set up such that independent control signals are always used for the two chains. Channels III and IV are also used to generate interlock signals for power operated relief valves PCV-456 and PCV-455C respectively at pressure above 2185 psi, and initiate a low pressure alarm when the pressure falls below 2185 psi.

The first control chain/is used to initiate a fixed low pressure alarm (PC-456F) at 2185 psig and open power operated relief valve PCV-456 at 2335 psig (PC-456G) provided the interlock from channel III is satisfied (refer to Figure 15). This interlock will be satisfied if channel III is indicating a pressure above 2300 psig. The interlock is provided to protect against false actuation of a Power Operated Relief Valve. The switching circuitry is so set up that the signal to open the valve will never come from the channel used to derive the interlock. In addition, PC-455G) activates a fixed high pressure alarm at 2335 psig. This is a redundant alarm since the control chain annunciates the same alarm light at (2310) psig, therefore, it will not be seen unless there was a failure of the alarm in the control circuit. 2300

4.2.3 Pressure Control Circuitry (Figure 14)

In order to prevent Departure from Nucleate Boiling (DNB) in the Reactor Coolant, the Pressurizer pressure is maintained above that corresponding to the saturation pressure for the full load coolant hot leg temperature. An additional margin of safety is also included to allow for higher temperatures during load and overpower transient conditions. On this basis, the pressure control point was selected at the value 2235 psig (P_{Ref}), which remains constant under all load conditions.

The channel III interlock duill also open the block value for PORU PC456. The channel IV interlock at 2300psig will also open the block value For PORU FCU-455C. These auto-open signals are not present whentheres pressure is less than 2300 psig. The notor operated PORU block values are manually closed. -70-

System Description = 1 RCS - Att Achment to Mod Proced FEY-96-12241-E. Page 2 of S

Now consider the events associated with a pressure drift above the setpoint. The modulating heaters will decrease in the output and be full off at 2250 psig. Spray flow will be initiated at 2260 psig, via valve PCV-455A (controlled by PC-455G on the Flight Panel), and will. increase proportionally until it is full on at 2310 psig, with both PVC-455A and PCV-455B (controlled by PC-455H on the Flight panel) wide open passing 650 gpm of spray. the same pressure (2310) a high pressure alarm will be activated by the deviation signal through PC-455I., If the pressure continues to rise, Power Operated Relief Valve PCV-455C (controlled by PC-455F) will open at 2335 psig. Note that another high pressure alarm (from the fixed control chain and PC-456G is also activated at 2335 psig. This alarm is annunciated by the same alarm light on the SA panel; therefore, it will not be seen as a new alarm unless PC-455I failed to alarm at (2310) psig. At 2362 psig the Reactor will be tripped on "High Pressurizer Pressure". Finally, at 2485 psig the Pressurizer Safety Valves will 2 pressure of 2300 psy lift.

lock value will cause Note that some of the actuation pressures described in this discussion are theoretical. That is, the function controlled by the main pressure controller (PC-455K) deviation signal will actuate at the given pressures only when the normal output is 30 ma for P=2235 psig. These conditions can be changed in two ways.

2300

First, the whole range can be displaced by changing the setpoint dial on the main controller. For example, the first spray valve is set to open at 25 psi above the setpoint which will correspond to 2260 psig only when the setpoint is 2235 psig.

System Description Res Attachment to Mod Procedure FEX-96-12241-E Page 3 of 5

-73-

pressure of 2300 psid

The Power Operated

Velief Velve block

Valves MOV- 535 and

MOV-536 will OPEN

(controlled by PC-474B

signal to open either

The same alarmy on panel

2Nd PC 457F

: A to alarm.

respectively let

Sprays Wide Open and Deviation High Pressure
Alarm
Power Operated Relief Valve Interlock, Bluck Valv OPEN and alarm, and Deviation High Pressure Alarm
Spray Initiated
Modulating Heaters off
Normal Pressure MPE-96-12241-5
Modulating Heaters Full On
Backup Heaters Off (when already on from 2185 setpoint)
Low Pressure Alarm Backup Heaters On (will stay on until pressure reaches 2210)
Low Pressurizer Pressure Permissive (SI unblock)
Low Pressure Reactor Trip
Low Pressure Safety Injection Actuation

System Description #1 RCS A++achment to Mod Procedure FEX . 96-12241-E Page 4 of 5

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1.1.3.1.2 Process Measuring Loop Instrumentation

All local or CCR mounted instrumentation identified in Table 2.4-1 are within the boundaries of the RCS instrumentation and controls.

1.1.3.1.3 Supervisory Annunciator Points

The following are the RCS interfaces with the plant Supervisory Annunciator System:

				CCR PANEL
		ANNUNCIATOR POINT	LOCATION	DRAVING
		"Reactor Coolant Pump Standpipe High Level 1 Ft"	CCR Panel SA	7.1.5.1
		"Pressurizer High Pressure 2310 PSIG"	CCR Panel SA	7.1.5.1
	2300	"Pressurizer High Level 70% 5%"	CCR Panel SA	7.1.5.1
		"Pressurizer Relie <u>f</u> Line High Temp 240 ⁰ F"	CCR Panel SA	7.1.5.1
		"Pressurizer Relief Tank Liquid High Temp 130 ⁰ F"	CCR Panel SA	7.1.5.1
		"Reactor Coolant Pump Stand Pipe Lo Level 4 Ft"	CCR Panel SA	7.1.5.1
		"Pressurizer High Temp 665°F"	CCR Panel SA	7.1.5.1
	>	"Pressurizer Safety Valve Outlet High Temp 240 ⁰ F"	CCR Panel SA	7.1.5.1
		"High-T-AVG 555 ⁰ F"	CCR Panel SA	7.1.5.1
		"Reactor Coolant Pump Motor Oil High Level 1 In."	CCR Panel SA	7.1.5.1
1	DBD c	hanges		
	ATTACHMI FEX - 96-	ENT TO Mod Procedure		

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RCS/SG DBD, Rev. 0 November 25, 1991

IPEC00269960

Pg 1 of 10

Motor operated valves (MOVs) 535 and 536 are located upstream of PORVs PCV-455C and PCV-456 respectively. The MOVs are utilized to remove PORVs from service should they leak to an unacceptable degree. The MOVs 535 and 536 are open during normal plant operation. Each valve is provided with a CLOSE/PULL/TO/LOCK/ CLOSE-AUTO-OPEN control switch with red and green position indicating lights mounted above it. The valve vill open automatically in response to the OPS signal. The OPS was installed by Modification Procedure ESG-77-2-008 (Reference 7.5.3.4). Under the OPS, the MOVs will open automatically, when the reactor coolant temperature is between $0^{\circ}F$ and $290^{\circ}F$, to relieve the RCS from exceeding the pressure limits given in 10CFR50 Appendix 'G' (References 7.5.6.26, 7.5.1.1).

As part of OPS, three white supervisory lights are provided above the control switches for MOVs 535 and 536, on CCR Panel FB. The lights are labeled as:

1. TRAIN A RCS OVERPRESSURIZATION NOT AVAILABLE 2. TRAIN B RCS OVERPRESSURIZATION NOT AVAILABLE 3. ANY RCS OVERPRESSURIZATION TRAIN ARMED

Lights in item 1 and 2 above are illuminated when the control switches, for MOVs 535 and 536 respectively, are turned to CLOSE/PULL/TO/LOCK position. Light in item 3 is illuminated when at least one of the two trains is armed.

Pressurizer Heaters

(References 7.5.1.1, 7.1.4.6, 7.1.4.7 and 7.1.4.8)

*PLI-RCS-014

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changes DBD Attachment to Mod Procedure FEX -96-12241-E Page 2 of 10 2-59

RCS/SG DBD, Rev. O November 25, 1991



2300

2300

The second selector switch, P/455A, located in Foxboro Rack B-6, is used to select which channels are to be used for control and will so indicate by illuminating the pressure indicators of the selected channels. This switch is labeled "Defeat 2,3", "Defeat 3,4" and "Defeat 1,4" which refers to the two channels which are "defeated" or ignored for control functions.

There are two control chains and the switch is set up such that independent control signals are always used for the two chains. Channels III and IV are also used to generate interlock signals for Power Operated Relief Valves PCV-456 and PCV-455C respectively, at pressures above 2185 PSIG, and initiate a low pressure alarm on the CCR Panel SA when the pressure falls below

E

6 The first control chain is used to initiate a fixed low pressure alarm (PC-4569) at 2185 PSIG (and open Pover Operated Relief Valve PCV-456 at 2335 PSIG (PC-456G) provided the interlock from channel III is satisfied. This interlock will be satisfied if channel III is indicating a pressure above 2300 PSIG. The interlock . is provided to protect against false actuation of the Pover Operated Relief Valve. The switching circuitry is set up so that the signal to open the valve will never come from the channel F used to derive the interlock. In addition, PC-456G activates a fixed high pressure alarm at 2335 PSIG. This is a redundant alarm since the control chain annunciates the same alarm light at (2310) PSIG, therefore, it will not be seen unless there was a failure of the alarm in the control circuit. The annunciator vindovs are labeled as follows:

2300 PRESSURIZER HIGH PRESS. 2310 PSIG (Initiating Devices: PC-4551, & PC-4566) PC-474 Band PC-457 F

PRESSURIZER LOW PRESS. 2185 PSIG Initiating Devices: PC-455J & PC-4567)

2-66

DBD Changes, ATTACHMENT to -Mod Procedure FEX-96-12241-E Page 3of 10

2185 PSIG.

RCS/SG DBD, Rev. 0 November 25, 1991



Attachment 4

Cost Estimate

Indian Point Nuclear Power Station												
* ESTIMATE LEVEL *	-	[C #: SAMA	IP2-053								
Conceptual	PROJECT TITLE: Keep Press	ROJECT TITLE: Keep Pressurizer PORV Block Valves Open ESTIMATOR: RCMT										
Preliminary	JOB LOCATION: Panels FBF	, SB2, G3, E1, H4		PROJECT	CODE: TBE)						
Definitive		ORIGINA	TOR:			ORIG. DATE: 06/22/2012						
	ESTIMATE TOTAL \$1,4	STIMATE TOTAL \$1.467.848 CAPITAL ORM REVISION 11-0										
Summary of Change:												
In accordance with NRC environmental regulations in 10 C.F.R. Part 51, Entergy performed SAMA analyses for both Indian Point Nuclear Generating Units 2 and 3 as part of its license renewal application. Those analyses identified a number of potentially cost-beneficial SAMAs for each unit. In its license renewal application and related correspondence with the NRC Staff, Entergy indicated that it would submit the potentially cost-beneficial SAMAs for further internal engineering project cost-benefit analysis, even though none of the potentially cost-beneficial SAMAs is related to aging management under 10 C.F.R. Part 54. Entergy contracted RCM Technologies to assist it in this effort.												
This package provides a conceptual design and implementation cost estimate for SAMA IP2-053 in accordance with Entergy design engineering practices.												
For SAMA IP2-053, resolution plant is operating under norm	For SAMA IP2-053, resolution is required for Pressurizer Power Operated Relief Valve (PORV) Block Valves MOV535 and MOV536 to be open when the plant is operating under normal conditions.											
This package un-installs the modification that currently keeps the block valves closed during normal operating conditions. The package will restore original design requiring the valves to be open during normal plant operating conditions.												
Prepared by:	battanol.		Approved b	y:	and a second sec							
Date:	9-20-2012		Date:	9-2	0- 2012	and the second						

		ENTERGY NUCLEAR NORTHEAST IMPLEMENTATION ESTIMATE									
		Indian Point Nuclear Power Station									
ES	INATE LEVEL	EC #: SAMA IP2-053									
	Dreliminany	PROJECT ITLE: Keep Pressurizer PORV Block Valves Open ESTIMATOR: RCM1									
	Preliminary	JOB LOCATION: Panels FBF, SB2, G3, E1, H4 PROJECT CODE: TBD									
	Definitive	ORIGINATOR: ORIG. DATE: 06/22/2012									
Item		Description									
1.	This estimate assur	mes that this work will require outage conditions to complete									
2.	This estimate assur	mes that this work will complete during 2014 working a 10 hours per shift, Six days per week schedule.									
3.	This estimate assumes that a three buck scaffold will be required for conduit installation and wire oulling in the Switchoear Room.										
4.	This estimate assur	mes that all work will be performed by trained contract craftspersons in lieu of station maintenance personnel.									
5.	This estimate provid	des for continuous fire watch during cable tray breeching.									
6.	This estimate assumes training for 24 Plant Ops Personnel.										
7.	This estimate assumes that the Appendix R Evaluation will be performed by a Contract person for a cost of \$250000.										
8.											
	Estimate Classification System (see Attachment 3, Reference 2).										
9.	9. Labor dollars in this estimate are projected 2014 costs based on current 2012 craft billing rates at Indian Point. The projected costs provide for anticipated billing rate increases of 3% per year.										
10.	This estimate allow	s for and includes a contingency factor related to the complexity and location of the work required. The factor is									
L	A. Outside fer	ice boundary - 20%									
L	B. Inside feno	e boundary - 30%									
I	C. Implementa	ation complexity - 40%									
<u> </u>	D. Inside Con	tainment - 50%									
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Page 1 of 3

7/5/2012 3:38 PM SAMA IP2-053 ESTIMATE KEEP PRESSURIZER PORV BLOCK VALVES OPEN (4-28-11).xis

INDIAN POINT IMPLEMENTATION ESTIMATE WORK SHEET

Rev. 11-0		I	NDI/	AN P	OIN	TIMPLE	MENTA EC #: S	ATION E AMA IP2-	EST -053	IMATE	E WORK SH	EET					
PROJE JOB LO EST. S	CT TITLE: Keep Pressurizer PORV Block Valves Ope CCATION: Panels FBF, SB2, G3, E1, H4 TATUS: ☑ OUTAGE ☐ NON-OUTAGE	en CAP	ITAL	٧o	8JM			PROJEC ORIGINA	T CO	DE: TBD)			TAKEOFF: ESTIMATOR: ORIG. DATE:	RCMT 06/22/2012		
ITEM	DESCRIPTION	QTY	UOM	CFT	NO.	UNIT	ANHOUR FCTR	S TOTAL] \$	/MH	MATERIAL \$ PER UNIT	DOLLA	RS	LABOR DOLLARS	SUB- CONTRACT	T	OTAL \$
	• ESTIMATE LEVEL *		(ESTIMATE SUMI	MARY				<u></u>	
┣───	Conceptual Preliminan			E		EDING						MANHO	URS		DOLLARS		
	Definitive			01		STUDY, D	ESIGN, &	CLOSEOU	т				140		\$ 14,000		
				02		DESIGN E	NGR CON	IST SUPPO	ORT				80		\$ 8,000		
1	General Notes:			03		MODS EN	GR SUPI	PORT					- 80		\$ - \$ 8000		
				05		PROJECT	MANAGE	MENT					200		\$ 24,000		
				06 07		CONTRAC	(Calibratio	n & Testing NEVALUA	3) TION	SUPPO	RT		40		\$ 4,000 \$ 250,000		
				08		ENGINEE	RING DCP	ACCEPTA	ANCE	REVIEV	N		45		\$ 4,500		
				09	NIRA	DESIGN E	<i>ering</i> Ngr Con	ITRACT SU	UPPO	ORT		1	,700		\$ 204,000		
				10		SUPL CON		ODS ENG	R	-			-		\$ -		
				12		FIELD EN	GRS / PLA	NNERS	RAC	1			40 80		\$ 3,200 \$ 9,600		
				MA1	ERIA	LS / MISC C	ONTRAC	TS							¢		
				14		OTHER CO	.S DNTRACT	S							s - \$ -		
				15	ITRAC	SWEC CR	ABOR		10148	,			070		E 110.016		
				16		LOST TIM	E		JOVV	N Contraction			970 97		\$ 13,438		
				17 PI 4	NTC	SWEC DIS	RIBS								\$ 28,088		
				18		MECH MA	UNT.						-		\$ -		
				19 20		ELECT M	AINT						- 120		\$ - \$ 12,000		
				21		CSG							-		\$ -		
				MIS 22	c su	QUALITY	CONTRO	L					40		\$ 4.000		
				23		PLANNING	& SCHE	DULING					-		\$ -		
				24 25		CHEMIST	RY						24		\$ 2,880 \$ -		
				26 27		OPS							80		\$ 9,600 \$ 4,000		
				MIS	c cor	ITRACT SU	PPORT						40		\$ 4,000		
				28		QUALITY	CONTRO	L					60		\$ 4,800 \$		
				30		HP / RP							40		\$ 3,182		
				31 32		NURSE	TE						-		\$ - \$ -		
				33		ELEVATO	OR CONTR	RACTOR					-		\$ -		
				34		HOUSEK	EEPING	IENI					-		s - s -		
				36 27		EQUIPME	ENT RENT	AL					-		\$ -		
				38		DECONT	AMINATIO	N CONTR	ACT	OR			-		s -		
				39		RBC'S	~						-		\$ - \$.		
			-	41		FIRE WA	TCH (Rov	er)					-		\$-		
				42 CON	TING	SAFETY							22		\$ 1,587		
				43		CONTING	ENCY							· · ·	\$ 217,137	_	
				2211	ALE	SUBIUIAL						3	,896		\$ 940,928		
									Sit	e Encu	mbrance Pren	nium (209	%)		\$ 188,186		
									Lo	aders (30%)			· –	\$ 338,734	- '.	
									ES	TIMATE	ETOTAL				\$ 1,467,848		
	Cother and stage tools and materials		1.7				4.70			22.22				¢			
1. 2.	Perform walkdown of work area.	$\begin{vmatrix} 1\\ 1 \end{vmatrix}$			2	4.00	1.70	14	\$ 1 \$ 1	23.32		\$	-	ຈ 863 \$ 1,726		\$	963 1,726
3. ⊿	Gather and transport materials to work area.		LT	EL	2	6.00	1.70	20 27	\$ 1 \$	23.32		e	1	\$ 2,466		\$	2,466
5.	Stage, erect and modify scaffolding	1	LT	LB	1	8.00	1.70	14	s	78.65		\$	-	\$ 1,101		\$	1,101
6. 7.	Remove Insulation as required Remove existing modification	1	LT LT	AW E1	2	10.00	1.70 1.70	34 204	\$ \$ 1	97.70		\$ \$	-	\$ 3,322 \$ 25,157		\$	3,322 25 157
8.	Perform wiring modifications,	i	LT	EL	2	40.00	1.70	136	\$ 1	23.32		\$	-	\$ 16,772		\$	16,772
9, 9,	Perform Testing as Required Support Testing as Required		LT LT	OPS EL	2	20.00	1.70 1.70	68 68	\$ 1 \$ 1	23.32		\$ \$	-	\$ 8,386 \$ 8,386		\$	8,386
10.	Replace Insulation as required	1	LT	AW	2	10.00	1.70	34	\$	97.70				\$ 3,322		\$	3,322
11. 12.	Dismantie scartoid, return to storage and cleanup Dismantle scartfold, return to storage and cleanup			LB	2	8.00 8.00	1,70 1,70	27 27	\$ \$	96.00 78.65		\$ \$	-	\$ 2,592 \$ 2,124		\$	2,592 2,124
13.	Cleanup and restore work areas	1	LT	EL	2	10.00	1.70	34	\$ 1	23.32		\$	-	\$ 4,193		\$	4 193
		1	1	I .	ı	1		-	1			13	-	ə -		15	-

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INDIAN POINT IMPLEMENTATION ESTIMATE WORK SHEET

PROJE	CT TITLE: Keep Pressurizer PORV Block Valves Oper	 ר					EC #. 3			<u></u>		TAKEOFF:					
EST. S	TATUS: OUTAGE NON-OUTAGE			Ø۵	08M			PROJECT CODE: TBD ORIGINATOR:					ORIG. DATE: 06/22/2012				
ITEM	DESCRIPTION	ατγ	UOM	CFT	NO.	UNIT	FCTR	S TOTAL	\$/MH	MATERIAL \$ PER UNIT	DOLLARS	LABOR DOLLARS	SUB- CONTRACT	TOTAL \$			
1. 2.	PAINTING & TOUCH-UP REQUIREMENTS PAINTING & TOUCH-UP PAINTING & TOUCH-UP			PT PT				-			\$- \$-	\$- \$-		\$ \$			
1. 2.	FIRE WATCH / BOTTLEWATCH REQUIREMENTS CRAFT SUPPORT FOR FIRE WATCH CRAFT SUPPORT FOR BOTTLE WATCH	1	LT	FW	1	40.00	1.70	68 -	\$ 53.60		\$ - \$ -	\$ 3,645 \$ -		\$ 3,64 \$			
1.	MISC SUB-CONTRACT MISC SUB-CONTRACT	1	LT										\$ -	\$			
	SUBTOTAL CRAFT & SUB-CONTRACTOR							782			\$-	\$ 86,647	\$ -	\$ 86,64			
1.	CONSTRUCTION SUPPORT (8% OF LABOR \$)	1	LT					63	\$ 110.80			\$ 6,980		\$ 6,98			
	SUBTOTAL							845			\$-	\$ 93,627	\$-	\$ 93,62			
	* RELATED COSTS *																
1. 2. 3. 4. 5. 6.	WALKDOWN ALLOWANCE WORK PACKAGE REVIEW & CRAFT TRAINING TOOL ROOM ATTENDANTS (~3.5%) GENERAL CRAFT DISTRIBS. (10%) CRAFT IN PROCESSING (20%) HUMAN PERFORMANCE & ALARA TRAINING (1/2) downienter on .00000000000000000000000000000000000	1 1 1		EL EL EL				9 86 30	\$ 123.32 \$ 123.32 \$ 123.32			\$ 1,110 \$ 10,606 \$ 3,700 \$ 9,363 \$ 18,725 \$ 1,873		\$ 1,11 \$ 10,60 \$ 3,70 \$ 9,36 \$ 18,72 \$ 1,87			
	SUBTOTAL							970			\$-	\$ 139,004	\$ -	\$ 139,00			
1.	PLANT SCOPE MECH MAINTENANCE			PL PL				-			\$- \$-	\$- \$-		\$ \$			
	SUBTOTAL MECH MAINT.							-		a fa la canada da seria da se	\$-	\$ -	\$-	\$			
1.	ELECT MAINTENANCE			PL				-			\$ -	\$ -		\$			
	SUBTOTAL ELECT. MAINT.							-			\$- \$-	\$- \$-	\$-	\$			
1.	I&C (Dev. Instrument Calibration Procedures)	1	LT	PL	1	120.00	1.00	120	\$ 100.00		\$ -	\$ 12,000		\$ 12,00			
÷	SUBTOTAL I&C MAINT.			L L				- 120			\$- \$-	\$ 12,000	\$ -	\$ \$ 12,00			
1.	CSG			PL				-			s -	s -		\$			
	SUBTOTAL CSG MAINT.			PL				-			\$- \$-	s - \$ -	\$-	\$			
	SUBTOTAL PLANT							120			\$-	\$ 12,000	\$-	\$ 12,00			
	SUBTOTAL CRAFT/PLANT							1,090			\$-	\$ 151,004	\$-	\$ 151,00			
	IMPLEMENTATION SUPPORT																
1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,	MODS ENGINEERING DESIGN ENGINEERING SUPT DURING CONST SYSTEMS ENGINEERING - MECHANICAL SYS ENGINEERING - ELECTRICAL SYS ENGINEERING - CIVIL STRUCTURAL PROJECT MANAGEMENT TRAINING (OPS Staff) QA / QC VERIFICATION PLANNING & SCHEDULING HP / RP / ALARA CHEMISTRY OPS (DEVELOP/REVISE PROCEDURE(S)) TRAVEL & LIVING EXPENSES CONTRACTOR SUPPORT	1 1 1 1 1 1 1 1 1 1 1 1 1		NM NM NM NM NM NM NM NM NM NM NM	1 1 24 1 1 1	80.00 40.00 200.00 1.00 40.00 40.00 80.00	1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00	- 80 40 40 200 24 40 40 80	\$ 100.00 \$ 100.00 \$ 100.00 \$ 120.00 \$ 120.00 \$ 100.00 \$ 100.00 \$ 120.00			\$ - \$ 8,000 \$ 4,000 \$ 4,000 \$ 4,000 \$ 2,880 \$ 2,880 \$ 4,000 \$ 2,880 \$ 4,000 \$ 5 5 - \$ 5 9,600 \$ -		\$ 8,00 \$ 4,00 \$ 4,00 \$ 2,88 \$ 2,88 \$ 4,00 \$ 4,00 \$ 9,60 \$ 9,60			
1. 2. 3. 4. 5. 6. 7. 8. 9. 10. 11. 12. 13. 14. 15. 16. 7. 8. 9. 10. 11. 12. 13. 14. 15. 16. 7. 8. 9. 10. 11. 12. 13. 14. 15. 16. 7. 8. 9. 10. 11. 12. 13. 14. 15. 16. 17. 18. 19. 10. 11. 12. 13. 14. 15. 16. 17. 18. 19. 10. 11. 11. 11. 11. 11. 11. 11. 11. 11	FIS / MODS ENGINEERING - SWEC (Incl Per Diem) MODS PLANNING & SCH SWEC (Incl Per Diem) FIELD ENGRS/PLAN-SWEC(Incl Per Diem) QA / QC VERIFICATION NDE HP / RP RADWASTE NURSE ELEVATOR CONTRACTOR WASTE MANAGEMENT HOUSEKEEPING EQUIPMENT RENTAL CONTRACTOR VENDOR STOCKING DECONTAMINATION CONTRACTOR RBC's SECURITY FIRE WATCH (Rover) SAFETY (2%) LOST TIME (10%)	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		N N N N N N N N N N N N N N N N N N N	1 1 1	40.00 80.00 60.00 40.00	1.00 1.00 1.00	40 80 60 - 40 - - - - - - - - - - - - - - - - -	\$ 80.00 \$ 120.00 \$ 80.00 \$ 79.56 \$ 72.14 \$ 128.54			\$ - \$ 3,200 \$ 9,600 \$ 4,800 \$ - \$ 3,182 \$ - \$ 1,587 \$ 4,262		\$ 3,20 \$ 9,66 \$ 4,80 \$ 3,18 \$ 3,18 \$ 1,58			

Page 3 of 3

7/5/2012 3:38 PM SAMA IP2-053 ESTIMATE KEEP PRESSURIZER PORV BLOCK VALVES OPEN (4-28-11).xis

INDIAN POINT IMPLEMENTATION ESTIMATE WORK SHEET Rev, 11-0 EC #: SAMA IP2-053 TAKEOFF: ESTIMATOR: RCMT PROJECT TITLE: Keep Pressurizer PORV Block Valves Open PROJECT CODE: TBD JOB LOCATION: Paneis FBF, SB2, G3, E1, H4 EST, STATUS: OUTAGE NON-OUTAGE EST. STATUS: 🖸 08M ORIGINATOR: ORIG. DATE: 06/22/2012 MATERIAL \$ PER UNIT MANHOURS MATERIAL LABOR DOLLARS SUB-CONTRACT ITEM OTY UOM CET NO. UNIT TOTAL TOTAL \$ DESCRIPTION \$/MH SUBTOTAL CRAFT/NON-MANUAL 1,973 \$ 247,291 \$ \$ 247,291 \$ 1. FREIGHT, SALES TAX, & CONSUMABLES (6%) \$ \$ \$ 247,291 SUBTOTAL INSTALLATION COST 1,973 \$ \$ 247,291 \$ DESIGN ENGINEERING - MECHANICAL LT NM \$ 1 2. 3 DESIGN ENGINEERING - ELECTRICAL DESIGN ENGINEERING - INSTR. & CONTROL 1.00 1.00 \$ 100.00 \$ 100.00 8,000 6,000 NM 80.00 80 \$ \$ \$ 8.000 60 6,000 NM 60.00 \$ DESIGN ENGINEERING - CIVIL/STRUCTURAL TESTING (Instrument Calibration and testing) NM NM 4. 5. \$ \$ 4,000 204,000 250,000 \$ 100.00 \$ 120.00 2 20.00 1.00 40 4,000 \$ \$ \$ \$ \$ \$ 6 CONTRACT ENGR DESIGN SUPPORT NM NM 1,700.00 1.00 1,700 204,000 \$ 250,000 7. Appendix R Evaluation \$ DESIGN ENG. DCP ACCEPTANCE REVIEW SUBTOTAL DESIGN COST NR. 45.00 1.00 45 100.00 4,500 4,500 1,925 ŝ 226 500 1 \$ \$ 476,500 SUBTOTAL INSTALLATION & DESIGN COST 473,791 723,791 \$ 5 CONTINGENCY (30%) \$ 217,137 1. ESTIMATE SUBTOTAL 940,928 3 898 s



ENTERGY INDIAN POINT NUCLEAR STATION UNIT 2

CONCEPTUAL DESIGN PACKAGE For

SAMA IP2-054

Install 480 VAC Switchgear Room flooding detection to provide an alarm at the Control Room

Prepared by: John Pattacutor.	Approved by:
Date: 9-20-2012	Date: y - Light Ly /h

RCM	Technologies	ENTERGY	Conceptual Design	
	The Source of Smart Solutions	Unit 2	SAMA IP2 -054	Rev. 0

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1.0 ISSUE

Severe Accident Mitigation Alternative (SAMA) IP2-054:

Install 480 VAC Switchgear Room flooding detection to provide an alarm at the Control Room

2.0 BACKGROUND

In accordance with NRC environmental regulations in 10 C.F.R. Part 51, Entergy performed SAMA analyses for both Indian Point Nuclear Generating Units 2 and 3 as part of its license renewal application. Those analyses identified a number of potentially cost-beneficial SAMAs for each unit. In its license renewal application and related correspondence with the NRC Staff, Entergy indicated that it would submit the potentially cost-beneficial SAMAs for further internal engineering project cost-benefit analysis, even though none of the potentially cost-beneficial SAMAs is related to aging management under 10 C.F.R. Part 54. Entergy contracted RCM Technologies to assist it in this effort.

This package provides a conceptual design and implementation cost estimate for SAMA IP2-054 in accordance with Entergy design engineering practices.

For SAMA IP2-054, resolution is required to detect flooding potential in the 480 VAC Switchgear Room (Switchgear Room) and provide an alarm at the Control Room.

This package provides for a conceptual design to install water intrusion detection in the Unit 2's Control Buildings 480 VAC Switchgear Room at Elevation 15'- 0". This device, detecting water at a pre-determined set-point level in the Switchgear Room, will provide an alarm signal connected to the annunciator in the Control Building's Unit 2 Control Room at Elevation 53'- 0".

The design considerations that follow will address the resolution's adequacy and the basis for the recommendation to resolve the identified potential issue.

The recommended solution will include descriptive details of the design change and also conceptual design sketches as required. These descriptive details, sketches, and the preliminary material list provide the basis for initiating the all-inclusive conceptual cost estimate for EC development and implementation at the Station.

Technologies The Source of Smart Solutions

3.0 **EXISTING CONDITIONS**

RCM

Cooling water piping is routed to mechanical equipment located within the Switchgear Room. Also within the boundary of the Switchgear Room is a "deluge closet area" with large diameter piping providing water for the fire protection system. The Switchgear Room can potentially become flooded in the event of any breakage/leakage of these piping systems and critical 480 VAC will be unavailable. Early notification of this potential flooding condition is necessary for timely response and the actions to mitigate the situation.

DESIGN CONSIDERATIONS 4.0

All the switchgear is set upon the same level grade. Existing drains provided are for minimum discharge of water being used for floor and equipment cleaning purposes. These drains cannot be considered for mitigation of any substantial discharge of water.

Piping that can potentially discharge water in the event of a break or leak is routed throughout the entire Switchgear Room. As a result, based upon the locations of the electrical equipment in the Switchgear Room, more than one detection device will be utilized.

Spurious alarms need to be avoided, but at the same time since water intrusion will have occurred before alarming, providing the earliest detection is necessary. Based upon the above considerations water intrusion will be detected at one-half (1/2) inch above the floor grade. To alleviate further concerns with spurious alarms, the device selected will provide adjustment for sensitivity

Power requirements for the detector unit will need to be provided from a source that is not affected by the Switchgear Room water intrusion.

New wiring is required to be installed for power to the new units. Wiring is also required for the alarm signal to be routed to the Control Room's annunciator above at Elevation 53'-0". A window in the Control Room annunciator for this alarm is also required.

5.0 **CONFIRMATION OF DESIGN**

The situation here is typical for any condition that needs monitoring. In conditions where detection and alarming is required, it is provided in the most significant manner relating to the condition. In some cases the alarm is an early warning indicating a potential problem and in other cases it signifies a failure has occurred.

In this scenario the alarm condition is of a failure having already occurred. Therefore, mitigation will be the only alternative available for alleviating the condition.

The design concept being recommended will provide Operations the earliest warning obtainable.

6.0 **RECOMMENDED SOLUTION**

- 1. Install new redundant, nuclear qualified, FCI Model FLT93S FlexSwitch water level detection devices in the Switchgear Room at Elevation 15'-0"; based upon the locations of the electrical equipment.
- 2. Protective measures to be considered for protection of water level detection devices based upon installed location.
- 3. Provide power to the detection devices from a source that is not affected by the switchgear room water intrusion
 - Install power wiring in conduit raceway from Control Room at Elevation 53'-0" to the devices in the Switchgear Room at Elevation 15'-0".
- Provide alarm connection from the level detection devices to the annunciator.
 - Install 125VDC wiring in conduit raceway from the devices in the Switchgear Room at Elevation 15'-0" up to the cable spreading area at Elevation 33'-0"
 - Continue routing wiring in cable trays at Elevation 33'-0" up to the 0 annunciator in the Control Room at Elevation 53'-0"
- 5. Connect wiring to new "480 VAC SWITCHGEAR ROOM-WATER INTRUSION" alarm window in the Control Room's Supervisory Panel Electrical Section annunciator
- 6. Provide procedure for flood switch calibration and setpoint.
- 7. Provide procedures and training for mitigation relating to this condition

7.0 PRELIMINARY MATERIAL LIST

<u>Ite</u>	m Description		Quantity
1.	FCI Model FLT93S FlexSwitch	2	
2.	1" - Conduit		200 Feet
3.	Cable A. 2 – 125 VDC Cables B. 2 – 120 VAC Cables		400 Feet
4.	Support for water level switch		2
5.	Junction Box with terminal blocks		1



Attachment 1

Entergy Impact Screening Summary



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Engineering Change Process

ATTACHMENT 9.3

IMPACT SCREENING SUMMARY

SHEET 1 OF 6

INSTRUCTIONS:

Identify the potentially impacted and the unaffected areas by checking the appropriate <u>Yes</u> or <u>No</u> block on the Impact Screening Criteria.

If a direct determination cannot be made based on the impact screening questions, the detailed questions in Attachment 9.4 may be used to identify potential impacts.

The completion of detailed questions in Attachment 9.4 is recommended but not required.

Contact potentially impacted groups if assistance is required.

	SAMA	
Engineering Change	No.: IPZ-054	

CONCEPTUAL Rev. No .: DESIGN PACKAGE

Prepared by:

Date:

DESIGN ENGINEERING DISCIPLINES	Potenti	al Impact
 Civil / Structural Design Engineering Does the proposed activity involve any civil / structural (including seismic) design changes, activities or affect coatings? OR Does the proposed activity involve any piping engineering design changes or activities? 	YES	□ NO
 Electrical Design Engineering Does the proposed activity involve any station or switchyard electrical design, large power transformers, or settings changes or activities? (SOER 10-1) 	YES	
Instrumentation and Controls Design Engineering Does the proposed activity involve any I&C design or settings changes or activities?	YES	
 Mechanical Design Engineering Does the proposed activity add/remove/replace insulation, aluminum or other metallic/non-metallic sources of debris in the reactor/containment building or involve any mechanical design changes or activities? 	□ YES	M NO
 PSA Engineering Does the proposed activity impact or involve changes to plant evaluations or probabilistic safety assessments? Does the proposed activity impact or involve changes to the Emergency Operating Procedures, Abnormal Operating Procedures, or Severe Accident Procedures or does it add, remove or modify SSCs included in a Maintenance Rule function? 	YES 📔	□ NO
 Nuclear Analysis Does the proposed activity impact or involve changes to plant evaluations, Technical Specifications, Technical Requirements Manual, or require a full 50.59 Evaluation? 	YES	
 FERC / NERC Impact Does the proposed activity impact or involve change to FERC / NERC or Regional Entity compliance documents? (ex. MOU, ENN/ENS-PL-158, ENS-DC-199, etc.) 	T YES	M NO

.



REV. 11

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Engineering Change Process

IMPACT SCREENING SUMMARY

ATTACHMENT 9.3 Sheet 2 of 6

DESIGN ENGINEERING PROGRAMS		Potential Impact	
 ASME Section III Specifications Does the proposed activity add, delete, or modify information required by ASME Section III to be contained in a design specification? 	☐ YES	X NO	
 Cable and Raceway Program Does the proposed activity involve any changes to cable trays, raceways or the associated documentation? 	JES YES		
Electronic Databases (EDB) Does the proposed activity involve any changes to electronic databases?	YES		
 EQ Program (10CFR50.49, NUREG 0588, Reg Guide 1.89) Does the proposed activity involve any new or existing EQ components? 	□ YES	🔀 NO	
 Hydrogen Control Program (10 CFR 50.44) (<i>if applicable</i>) Does the proposed activity impact equipment or materials related to hydrogen control? 	☐ YES	🛛 NO	
 Human Factors Program Does the proposed activity involve control panel design including layout and labeling, visual displays, operator aids, auditory signals or environment in the control room, cable spreading room, and other control panel locations? 	YES	□ NO	
 Margin Management Does the proposed activity impact or involve any change to design, licensing or operations margins? 	Tes 🗌	🕅 NO	
Reg. Guide 1.97 / PAM (Post Accident Monitoring) • Does the proposed activity involve Reg. Guide 1.97 (Post Accident Monitoring) Indications?	☐ YES	X NO	

MAINTENANCE		Potential Impact	
 Electrical Maintenance Does the proposed activity require an Electrical Maintenance review to identify affected procedures, required actions and required training? 			
 Maintenance Does the proposed activity require an I&C Maintenance review to identify affected procedures, required actions and required training? 	YES		
 Mechanical Maintenance Does the proposed activity require a Mechanical Maintenance review to identify affected procedures, required actions and required training? 	T YES	🕅 NO	

NUCLEAR ENGINEERING		Potential Impact	
 Nuclear Fuel Design Does the proposed activity impact or involve the design, performance or storage of nuclear fuel? 		🛛 NO	
 Reactivity Management Program Does the proposed activity impact or involve the reactor system, reactor controls, reactor chemistry, related systems, potential core and spent fuel damage, spent fuel, reactor coolant pressure boundary or reactor system procedures? 		X NO	


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Engineering Change Process

ATTACHMENT 9.3

SHEET 3 OF 6

IMPACT SCREENING SUMMARY

PROCESS OR PROGRAM IMPACT SCREENING CHECKLIST	Potentia	al Impact
Computer Support and Software	☐ YES	🛛 NO
 Does the proposed activity impact or involve changes to plant computer software or firmware or impact Software Quality Assurance (SQA)? 		
Chemistry and Environmental Impact	□ YES	🔀 NO
 Does the proposed activity impact or involve any changes to plant chemistry requirements, operations or procedures, or any changes to the environment? 		
Radiation Protection (RP) Program Impact	🗌 YES	🕅 NO
 Does the proposed activity impact or involve any changes to the RP program? Does the proposed activity involve the potential to introduce (or reintroduce) any cobalt containing materials (such as Stellite) into the primary system? 		
 Operations Does the proposed activity impact or involve changes to Operations procedures, training or operator actions? 	M YES	
 Planning, Scheduling and Outage (PS&O) Does the proposed activity require a PS&O review to identify required design and installation information? 	YES	
 MP&C (Inventory) Does the proposed activity impact or involve any addition or removal of equipment from the inventory? Does the proposed activity impact or involve any Procurement of Quality or Augmented Quality material from non-qualified suppliers? 	■ YES	□ NO
Procurement Engineering Does the activity impact or involve any procurement activities?	YES	

PROGRAMS AND COMPONENTS	Potential Impact		
 ASME Containment In-service Inspection (IWE / IWL) Program Does the proposed activity impact or involve the containment pressure boundary or associated moisture barriers or a support for the containment pressure boundary? This includes "software only" changes that do not physically change the hardware such as re-rating of pressures or temperatures to include changes to documented information on these items or additional documented information for these items. Does the proposed activity limit access to containment surfaces for inspection? Involve disassembly of a bolted connection which forms a portion of the containment boundary? 	☐ YES	NO 🛛	
 ASME Appendix J (Primary Containment Leak Rate Testing) Program Does the proposed activity impact or involve any changes to primary containment leak rate testing? 	TYES	NO 🔀	



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Engineering Change Process

IMPACT SCREENING SUMMARY

ATTACHMENT 9.3

SHEET 4 OF 6											
PROGRAMS AND COMPONENTS (CONTINUED)	Potenti	al Impact									
 ASME In-service Inspection (ISI) Program Does the proposed activity add, delete, or modify an ASME Section XI pressure boundary item or a support for an ASME Section XI pressure boundary item? This includes "software only" changes that do not physically change the hardware like such as re-rating of pressures or temperatures. (ASME Section XI items include ASME Class 1, 2, 3, or B31.1 treated as ISI Class 2 or 3 (T2 and T3) components, parts, or appurtenances such as pipe or pressure vessel walls, valve bodies and pump casings. 	T YES	M NO									
 ASME Section XI Repair / Replacement Program Does the proposed activity involve any mechanical component within the ASME XI program / boundaries? Does the proposed activity add, delete, or modify an ASME Section XI pressure boundary item or a support for an ASME Section XI pressure boundary item? (ASME Section XI items include ASME Class 1, 2, 3, MC, and CC, as well as B31.1 treated as ISI Class 2 or 3 (T2 and T3) components, parts, or appurtenances such as pipe or pressure vessel walls, valve bodies and pump casings). 	☐ YES	🕅 NO									
 ASME In-service Testing Program Does the proposed activity impact or involve any item (safety related or non safety related) that may affect the performance or testing of a safety related pump or valve? Does the proposed activity impact the function or functional classification of any pump or valve as stated in the IST program documents? 	T YES	MO 🕅									
 Air Operated Valve (AOV) Program Does the proposed activity impact or involve the design, operation or testing of AOVs? 	□ YES	🕅 NO									
 Buried Piping and Tanks (BP&T) Program Does the proposed activity impact or involve any changes to piping, coatings, or cathodic protection of Buried Piping & Components? 	🗌 YES	🕅 NO									
 Boric Acid Corrosion (BAC) Program Does the proposed activity impact or involve any increase in the likelihood of boric acid formation or corrosion? 	T YES	🕅 NO									
 Check Valve Program Does the proposed activity impact or involve the design, operation or testing of check valves? 	T YES	X NO									
 Control Room Habitability Program Does the proposed activity impact or involve changes that affect the temperature or radiological environmental conditions in the Main Control Room? 	T YES	X NO									

Electrical Circuit Breaker, Relay and Electrical Equipment Testing
Does the proposed activity impact or involve changes to the functional testing of circuit breaker, relay or electrical equipment?



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Engineering Change Process

IMPACT SCREENING SUMMARY

ATTACHMENT 9.3

SHEET 5 OF 6

PROGRAMS AND COMPONENTS (CONTINUED)	Potential Impact				
 Flow Accelerated Corrosion (FAC) Program Does the proposed activity involve any changes (e.g.: configuration, velocity, flow rate, pressure, temperature, material, weld location, etc.) to piping systems included in the FAC Program.? 	☐ YES	X NO			
 Heat Exchanger Program Does the proposed activity impact or involve the design, operation or testing of a component in the heat exchanger program? 	T YES	X NO			
 Predictive Maintenance Program Does the proposed activity impact or involve any aspect of the storage, use and testing of lubricants? Does the proposed activity involve thermography? Does the proposed activity involve vibration monitoring? 	☐ YES	NO 🕅			
 Microbiological Induced Corrosion (MIC) Program Impact Does the proposed activity involve piping containing untreated or stagnant water or open to the atmosphere? 	T YES	🕅 NO			
 Motor Operated Valve (MOV) Program Does the proposed activity impact or involve the design, operation or testing of MOVs? 	□ YES	MO MO			
Plant Thermal Performance Program Does the proposed activity impact or involve plant thermal performance?	T YES	🕅 NO			
 Preventive Maintenance Program Does the proposed activity impact or involve periodic testing or performance of SSCs? or Does the proposed activity add, modify or delete any Environmental Qualification (EQ) maintenance requirement or replacement frequency to ensure the component(s) maintains its gualification status? 	YES	□ NO			
 PT Curves Does the proposed activity add, delete, or modify the basis (as contained in each sites reactor vessel surveillance material testing program) for the Pressure / Temperature Limit Curves (fluence, pressure, temperature, reactor materials)? 	T YES	X NO			
 Relief Valve Program Does the proposed activity impact or involve the design, operation and testing of relief valves, safety valves, vacuum breaker valves or rupture disc? 	□ YES	X NO			
 RPV Internals Program Does the proposed activity impact or involve any change to the reactor internals? This includes "software only" changes that do not physically change the hardware such as re-rating of pressures or temperatures. Does the proposed activity impact or involve or related documentation to include neutron fluence or neutron fluence calculations? Does the proposed activity impact or involve or changes to core flow characteristics or core flow characteristics? 	☐ YES	⊠ NO			



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Engineering Change Process

IMPACT SCREENING SUMMARY

ATTACHMENT 9.3

SHEET 6 OF 6

PROGRAMS AND COMPONENTS (CONTINUED)	Potential Impact				
 Welding Program Does the proposed activity impact or involve a special process, such as welding, brazing or soldering? 	YES				
 Safety Program Does the proposed impact or activity involve personnel or industrial safety? 	🗌 YES	🕅 NO			
 System Engineering Does the proposed activity impact or involve any changes to system configuration, function or performance, etc., for Maintenance Rule or other system? Does the proposed activity impact or involve any changes to system procedures, maintenance or operation, etc.? 	YES	□ NO			
 Training Program Does the proposed activity involve existing training requirements or create the need for new training? 	YES	D NO			
 Simulator Impact Does the proposed activity impact or involve changes to the Simulator? 	YES				
 Fire Protection Program Does the proposed activity result in a change to the Fire Protection Program (including 10CFR50 Appendix R) where the impact is more than negligible? 	TYES	🕅 NO			

Detailed Impact Screening (Attachment 9.4) Attached?	□ YES	M NO
--	-------	------



Conceptual Design Sketches

- 1. Figure 1: EQUIPMENT ARRANGEMENT CONTROL BUILDING AT EL. 15' - 0" – FLOOD SWITCH LOCATION PLAN VIEW
- 2. Figure 2: EQUIPMENT ARRANGEMENT CONTROL BUILDING AT EL. 15' - 0" – FLOOD SWITCH LOCATION
- 3. Figure 3: EQUIPMENT ARRANGEMENT CONTROL BUILDING AT EL. 33' - 0" – CONDUITS DUMPING INTO CABLE TRAYS
- Figure 4: EQUIPMENT ARRANGEMENT CONTROL BUILDING AT EL. 53' - 0" – ANNUNCIATOR WINDOW LOCATION AND POWER FOR FLOOD SWITCH
- 5. Figure 5: DETAIL FOR FLOOD SWITCH AND SUPPORT



IPEC00269983







IPEC00269986



References

- 1. ENTERGY Nuclear Management Manual, Engineering Change Process, Rev 11
- Association for the Advancement of Cost Engineering (AACE), Cost Estimate Classification System - As Applied In Engineering, Procurement, and Construction for the Process Industries
 - TCM Framework: 7.3 Cost Estimating and Budgeting
 - Figure 4 Estimate Checklist & Maturity Matrix
- 3. FCI Model FLT93S FlexSwitch (included here)

FCI FLUID COMPONENTS INTERNATIONAL LLC

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For Temperature Service: Accuracy: $\pm 2^{\circ} F [\pm 1^{\circ} C]$ **Repeatability:** $\pm 1^{\circ} F [\pm 0.6^{\circ} C]$

Response Time: As low as 3 seconds

Enclosure: Powder coated aluminum enclosure is rated for hazardous location use Groups B, C, D, E, F and G, CENELEC EEx d IIC and resists the effects of weather and corrosion per NEMA/CSA Type 4X (equivalent to IP66). Stainless steel is available as an option. Agency Approvals: FM, CSA, CENELEC, ATEX, CE Mark, T4 Rated (System

Approval) and CRN.

Flow Element

Materials of Construction: All-welded 316L stainless steel for all wetted surfaces. Hastellov C, Monel 400 and Titanium are available as an option. **Process Connection: Standard:** 0.75 inch male NPT. **Optional:** 1 inch male NPT, flanges or retractable sensing element. **Insertion Length: 1**.2 inch [30 mm] **2** inches [51 mm] 4 inches [102 mm] 6 inches [152 mm] **9** inches [229 mm] 12 inches [305 mm] **1**8 inches [457 mm] Customer specified lengths are available as an option. Operating Temperature: **D**Standard: -4° to +350° F [-20° to +177° C] **Doptional:** -100° to +500° F [-73° to +260° C] or -100° to +850° F [-73° to +454° C] **Operating Pressure:** To 3500 psig [240 bar(g)]

Control Circuit

Operating Temperature: -40° to +140° F [-40° to +60° C] **Input Power:** Field selectable 115 ± 15 Vac or 230 ± 30 Vac, 50/60 Hz; 21 to 28 Vdc or 18 to 26 Vac; 7 watts maximum.

Relay Contacts: Field configurable dual SPDT or single DPDT rated 6 amps at 115 Vac, 240 Vac or 24 Vdc. Hermetically sealed relays are available as an option.

Output Signal: Analog DC voltage related to flow or level/interface signal and proportional to temperature.

Electrical Connection: 1 inch female NPT

Remote Configuration: Available as an option with customer specified interconnecting cable length.

Optional N.I.S.T. Flow Calibration Services

Factory N.I.S.T. calibration in air or water is available as an option for customer specified setpoint(s) or a flow curve based on the media ranges specified above.

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Cost Estimate

ENTERGY NUCLEAR NORTHEAST													
IMPLEMENTATION ESTIMATE Indian Point Nuclear Power Station													
* ESTIMATE LEVEL *		EC #: SAMA IP2-054											
Conceptual	PROJECT TITLE: Flood Detection	System	CAPITAL	☑ 0&M	ESTIMATOR: RCMT								
Preliminary	JOB LOCATION: 480 Volt Switchge	ear Room		PROJECT CODE: TBI	D								
Definitive	OUTAGE NON-OUTAGE	ORIGINAT	OR:		ORIG. DATE: 06/14/2012								
	ESTIMATE TOTAL \$456,985	5		REVISION	11-0								
Summary of Change: In accordance with NRC environmental regulations in 10 C.F.R. Part 51, Entergy performed SAMA analyses for both Indian Point Nuclear Generating Units 2 and 3 as part of its license renewal application. Those analyses identified a number of potentially cost-beneficial SAMAs for each unit. In its license renewal application and related correspondence with the NRC Staff, Entergy indicated that it would submit the potentially cost-beneficial SAMAs for each unit. In its diverse renewal application and related correspondence with the NRC Staff, Entergy indicated that it would submit the potentially cost-beneficial SAMAs for further internal engineering project cost-benefit analysis, even though none of the potentially cost-beneficial SAMAs is related to aging management under 10 C.F.R. Part 54. Entergy contracted RCM Technologies to assist it in this effort. This package provides a conceptual design and implementation cost estimate for SAMA IP2-054 in accordance with Entergy design engineering practices. For SAMA IP2-054, resolution is required to detect flooding potential in the 480 VAC Switchgear Room (Switchgear Room) and provide an alarm at the Control Room.													
This package provides for a conceptual design to install water intrusion detection in the Unit 2's Control Buildings 480 VAC Switchgear Room at Elevation 15'- 0". This device, detecting water at a pre-determined set-point level in the Switchgear Room, will provide an alarm signal connected to the annunciator in the Control Building's Unit 2 Control Room at Elevation 53'- 0"													
Prepared by:	~ #		Approved by	<i>l</i> :									
Pet	bettacarole.		9	10-									
Date:	9-20-2012		Date:	9-20-201	lever .								

		ENTERGY NUCLEAR NORTHEAST
		IMPLEMENTATION ESTIMATE
		Indian Point Nuclear Power Station
* EST	IMATE LEVEL *	EC #: SAMA IP2-054
	Conceptual	PROJECT TITLE: Flood Detection System ESTIMATOR: RCMT
	Preliminary	JOB LOCATION: 480 Volt Switchgear Room PROJECT CODE: TBD
	Definitive	ORIGINATOR: ORIG. DATE: 06/14/2012
Item		Description
1.	This estimate assur	mes that this work will not require outage conditions to complete
2.	This estimate assur	mes that this work will complete during 2014 working a 10 hours per shift, four days per week schedule.
3.	This estimate assur	mes that this work will not suffer productivity loss due to radiation, hazardous conditions or QC hold points.
4.	This estimate assur	mes that all work will be performed by trained contract craftspersons in lieu of station maintenance personnel.
5.	This estimate assur	mes that a three buck scatfold will be required for conduit installation and wire pulling in the Switchgear Room.
6.	This estimate assur	mes that the detection device mounting brackets will be fabricated in the shop for installation in the Switchgear Room.
1.	This estimate provid	des for continuous fire watch during cable tray breeching.
<u> </u>	This estimate assur	These trained of the second se
9.	This estimate door	hes training to 12 Hant Obs. Personner, and the second sec
10.	This estimate is has	not include anothing of an entered sale y questions of intersection and intervention and the added
11.	Estimate Classificat	tion System (see Attachment 3, Reference 2)
	Labor dollars in this	estimate are projected 2014 costs based on current 2012 craft billing rates at Indian Point. The projected costs provide for
12.	anticipated billing ra	the increases of 3% per year.
	This estimate allows	s for and includes a contingency factor related to the complexity and location of the work required. The factor is cumulative
¹³ .	and progresses as f	follows:
	A. Outside fen	nce boundary - 20%
	B. Inside fence	e boundary - 30%
	C. Implementa	ation complexity - 40%
	D. Inside Cont	tainment - 50%
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Rev. 11-0		IN	IDIA	N PC	INT		MENTA	ATION E	STIMAT	EWOR	(SHE	et				
PROJ JOB L EST. S	CT TITLE: Flood Detection System OCATION: 480 Volt Switchgear Room STATUS: OUTAGE NON-OUTAGE							CAPITAL PROJECT ORIGINAT	CODE: TB OR:	Z]O&M D			TAKEOI ESTIMA ORIG. D	FF: TOR: DATE:	RCMT 06/14/2012	
ITEM	DESCRIPTION	QTY	UOM	CFT	NO.	M	ANHOUR FCTR	S TOTAL	\$/MH	MATER PER U	HALS INIT	MATERIAL DOLLARS	LABO DOLLA	R	SUB- CONTRACT	TOTAL \$
	• ESTIMATE LEVEL • Conceptual Preliminary Deficitive		· · · · · · ·	EN	GINEE	RING STUDY D		01.08501	TT.	ESTIMATE	SUMMA	NRY MANHOURS			DOLLARS	
	Definitive General Notes:			01 02 03 04 05 06		STUDY, D DESIGN E MODS EN SYS ENGI PROJECT TESTING	ESIGN, 8 NGR CO IGR SUF R/S-UEN MANAGI (Calibratio	CLOSEOU NST SUPPO PORT GR EMENT DR & Testing				80 40 			\$ 8,000 \$ 4,000 \$ - \$ 8,000 \$ 28,800 \$ 28,800 \$ 2,000	
				07 08 CO	ITRAC	TRAVEL & ENGINEE T ENGINE	LIVING I RING DC	EXPENSES P ACCEPT/	ANCE REV	IEW		25			\$ 2,500	
				10 11 12 MAT 13	ERIAL	SUPL COI MODS PL OSG FIEL S / MISC C MATERIAI	INGR CO NTRACT AN & SCI D ENGRI CONTRAC	MODS ENG HED -CONT S / PLANNE CTS	IPPORT R RACT RS			480 - 20 80			\$ 2,000 \$ 2,000 \$ 9,600 \$ -	
				14 CON 15 16 17 PLA	TRACI	OTHER C F CRAFT L SWEC CR LOST TIM SWEC DIS AFT LABO	ONTRAC L ABOR KAFT LAE E STRIBS DR	TS IOR/WALKE	NWOC			504 50	i		\$ 54,410 \$ 5,322 \$ -	
				18 19 20 21 <i>MISC</i> 22	: SUP	MECH M/ ELECT M I&C CSG PORT OLIALITY	AINT. AINT CONTRO					120			\$ - \$ 12,000 \$ - \$ 4,000	
				23 24 25 26 27		PLANNING TRAINING SIMULATO OPS HP/RP	G & SCHI	EDULING IGES				12 120 80			\$ 1,440 \$ 12,000 \$ 9,600 \$ -	
				M/SC 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 ESTIN	CON	RACT SL QUALITY NDE HP / RP RADWAS NURSE ELEVATC WASTE A HOUSEK EQUIPME VENDOR DECONT RBC'S SECURIT FIRE WA'S SAFETY CONTING	IPPORT CONTRO BTE DR CONT MANAGEH EEPING ENT REN STOCKII AMINATION Y TCH (Roy BENCY L	DL RACTOR MENT TAL TAL DN CONTR. rer)	ACTOR			40 			\$ 3,200 \$ - \$ - \$ - \$ - \$ - \$ - \$ - \$ -	
						SITE ENCL	JMBRAN 5 (30%)	CE PREMIL	IM (20%)						\$	
						inin inine i			ESTIMA	TE TOTAL					\$ 456,985	
1. 2. 3. 4. 5. 6. 7. 8. 9. 10. 11. 12. 3. 4. 5. 6. 7. 8. 9. 10. 11. 12. 3. 14. 15. 16. 7. 8. 19. 20.	Gather and stage tools and materials for brackets Fabricate supports for detectors Gather and transport detectors, wire and conduit Locate and install water level detector brackets Stage, erect and modify scaffolding Fabricate and install conduits for new detectors Procure and install function Boxes Core Bore between EL 15 and EL 33 Procure and install FCI Model FLT 93 FlexSWITCH Remove Control Room fire seal and route new wining Procure, pull and terminate 125 VDC detector wiring Replace and test Control Room fire seal as required Procure and install annunciator in Control Room Terminate and test annunciator in Control Room Dismantie scaffold, return to storage and cleanup Dismantie scaffold, return to storage and cleanup Cleanup and restore work areas	1 1 1 240 0 2 1 240 240 240 240 240 1 1 1 1 1 1 1 1	LT LT LT LT EA A F A LT LT LT EA A LT LT LT LT LT LT		2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	2.00 4.00 6.00 10.00 8.00 0.0525 2.00 2.00 10.00 2.00 0.030 0.030 6.00 12.00 4.00 8.00 8.00 8.00	1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00	4 8 12 20 16 8 25 40 8 20 8 20 8 20 14 14 12 24 8 16 8 8 16 8 8 30	\$ 123.32 \$ 123.32 \$ 123.32 \$ 123.32 \$ 123.32 \$ 78.65 \$ 123.32 \$ 123.3	\$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$	40.00 1.50 10.00 10.00 1.25 1.25 1.25 150.00 150.00	\$ 400 \$	\$ 4 \$ 2,4 \$ 1,4 \$ 1,5 \$ 4,5 \$ 4,5 \$ 2,4 \$ 5 2,4 \$ 5 2,4 \$ 1,7 \$ 1,4 \$ 2,5 \$ 2,4 \$ 1,7 \$ 1,5 \$ 5 4,5 \$ 5 2,4 \$ 5 5 5 5 2,4 \$ 5 5 5 5 5 2,4 \$ 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	193 187 180 186 536 529 293 333 387 466 587 726 480 387 726 480 3987 536 629 987		\$ 533 \$ 987 \$ 1,480 \$ 2,466 \$ 1,536 \$ 629 \$ 3,443 \$ 5,033 \$ 1,007 \$ 2,466 \$ 2,026 \$ 2,026 \$ 2,026 \$ 2,026 \$ 1,480 \$ 3,110 \$ 1,137 \$ 1,536 \$ 629 \$ 1,480 \$ 629 \$ 987 \$ 1,626 \$ 0,527 \$ 1,626 \$ 0,527 \$
1. 2.	PAINTING & TOUCH-UP REQUIREMENTS PAINTING & TOUCH-UP PAINTING & TOUCH-UP			PT PT												\$- \$-

Rev. 11-0		I	NDIA	N PC	DINT		MENT/ EC #: S	ATION E AMA IP2-	STIMATI 054	E WORK SHE	ET					INDIAN POINT IMPLEMENTATION ESTIMATE WORK SHEET EC #: SAMA IP2-054 ECT TILE: Elect Detertion System											
JOB LO	CT TITLE: Flood Detection System CCATION: 480 Volt Switchgear Room								CODE: TBD	јов м Э			TA ES	KEOFF:	R: RCMT												
101.0			<u> </u>			M	ANHOUF	RS S		MATERIAL\$	N	ATERIAL	L i	LABOR	SUB-												
ITEM	DESCRIPTION	QTY	UOM	CFT	NO.	UNIT	FCTR	TOTAL	\$/MH	PER UNIT	<u>c</u>	OLLARS	D	OLLARS	CONTRACT	⊥	OTAL \$										
1, 2.	FIRE WATCH / BOTTLEWATCH REQUIREMENTS CRAFT SUPPORT FOR FIRE WATCH CRAFT SUPPORT FOR BOTTLE WATCH	1	LT LT	FW FW	1	80.00	1.00	80	\$ 53.60		5 5	-	\$ \$	4,288		\$	4,288										
1.	MISC SUB-CONTRACT MISC SUB-CONTRACT	1	LT												\$ -	5	-										
	SUBTOTAL CRAFT & SUB-CONTRACTOR							373	2,376	1,464	\$	3,620	\$	38,832	\$ -	\$	43,916										
1.	CONSTRUCTION SUPPORT (8% OF LABOR \$)	1	ιT					30	\$ 104.11				\$	3,123		5	3,123										
	SUBTOTAL							403	\$ 2,480	1,464	\$	3,620	\$	41,955	\$-	\$	47,039										
	* RELATED COSTS *																										
1. 2. 3. 4. 5. 6. 7	WALKDOWN ALLOWANCE WORK PACKAGE REVIEW & CRAFT TRAINING TOOL ROOM ATTENDANTS (~3.5%) GENERAL CRAFT DISTRIBS. (10%) CRAFT IN PROCESSING (20%) HUMAN PERFORMANCE & ALARA TRAINING (1/2 day training, or 2%)	1 1 1	LT LT LT	EL EL EL				5 82 14	\$ 123.32 \$ 123.32 \$ 123.32				5 5 5	617 10,112 1,726		5 5 5 5 5 5 5 5 5 5 5 5 5	617 10,112 1,726										
	SUBTOTAL							504	2,850	**************************************	5	3,620	\$	54,410	\$ -	\$	58,030										
1.	PLANT SCOPE MECH MAINTENANCE			PL PL				-			\$ 5	-	s s	-		5	-										
	SUBTOTAL MECH MAINT.				[-			\$	-	\$	-	\$.	\$	-										
1.	ELECT MAINTENANCE			PL PL				-			5	-	s s	-		5	-										
	SUBTOTAL ELECT. MAINT.							-		······································	\$	-	\$		\$ +	\$	-										
1.	I&C (Dev. Instrument Calibration Procedures)	1	LT	PL PL	1	120.00	1.00	120	\$ 100.00		\$ \$	-	s s	12,000		5	12,000										
	SUBTOTAL I&C MAINT.						I	120			\$	-	\$	12,000	\$ -	\$	12,000										
1,	CSG			PL PL				-			\$ \$	-	\$ \$	-		\$ \$	-										
	SUBTOTAL CSG MAINT.							-			\$	-	\$		\$-	\$	+										
	SUBTOTAL PLANT							120			5	-	5	12 000	5 -	s	12,000										
																Ĺ	70.000										
<u> </u>	SUBTOTAL CRAFT/PLANT		<u> </u>				<u> </u>	624			\$	3,520	\$	66,410	\$ -	+	70,030										
	IMPLEMENTATION SUPPORT																										
1	MODS ENGINEERING	1	LT	NM				_					\$	-		s	-										
2.	DESIGN ENGINEERING SUPT DURING CONST	1	LT	NM	1	40.00	1.00	40	\$ 100.00				s	4,000		\$	4,000										
3. 4.	SYSTEMS ENGINEERING - MECHANICAL SYSTEMS ENGINEERING - ELECTRICAL	1		NM NM	1	40.00	1.00	40	s 100.00				s	4.000		\$ \$	4,000										
5,	SYSTEMS EINGINEERING - INSTR & CONTROL	1	LT	NM	1	40.00	1.00	40	\$ 100,00				\$	4,000		\$	4,000										
б. 7.	PROJECT MANAGEMENT	1		NM NM	1	240.00	1.00	240	\$ 120.00				\$ \$	28,800		5	28,800										
8.	TRAINING (OPS Staff)	1	LT	NM	12	12.00	1.00	12	\$ 120.00				\$	1,440		S	1,440										
9. 10.	DATOC VERIFICATION PLANNING & SCHEDULING	1		NM NM	1	40.00	1.00	40	\$ 100.00				\$	4,000		5	4,000										
11,	HP / RP/ ALARA	1	LT	NM		400.00	1.00	-	E 400 00				\$	-		\$	40.000										
12. 13. 14.	OPS (DEVELOP/REVISE PROCEDURE(S)) TRAVEL & LIVING EXPENSES	1	LT	NM	1	80.00	1.00	80	\$ 120.00				5 5 5	9,600		5	9,600										
1	CONTRACTOR SUPPORT FIS / MODS ENGINEERING - SWEC (Incl Per Diem)		І 1 т	NM									s	~		s	_										
2	MODS PLANNING & SCH SWEC (Ind Per Diem)	1	LT	NM	1	20.00	1.00	20	\$ 100.00				s	2,000		s	2,000										
3. 4.	USG FIELD ENGRS/PLAN- SWEC (Ind Per Diem) QA / QC VERIFICATION	1		NM NM	1	80.00 40.00	1.00	80 40	\$ 120.00 \$ 80.00		1		\$ 5	9,600 3,200		5	9,600 3,200										
5.	NDE	1	LT	NM				-					\$	-		\$,, ,										
6. 7.	RADWASTE	1		NM NM				-					\$	-		15	-										
8.		1	LT	NM												1											
9, 10,	WASTE MANAGEMENT	1		NM			ţ																				
11.		1	LT	NM																							
13.	EQUIPMENT RENTAL CONTRACTOR	1		NM NM																							
14.		1	LT	NM																							
15. 16.	SECURITY	1		SEC																							
17.	FIREWATCH (Rover)		LT.	NM									ş	-		s	-										
18.	LOST TIME (10%)	1	LT	INM				12 50	\$ 72.14 \$ 106.43				\$	5,322		\$	5,322										
	SUBTOTAL CRAFT/NON-MANUAL						1	1,438	1		\$	3,620	\$	155,238	\$ -	\$	158,858										

Rev. 11-0		1	NDIA	N PC	DINT	IMPLE	MENT/	ATION E		E WORK SHE	ET					
PROJI JOB LI EST. S	CT TITLE: Flood Detection System CCATION: 480 Volt Switchgear Room TATUS: OUTAGE ONON-OUTAGE		PROJECT CODE: TBD ORIGINATOR:				TAKEOFF: ESTIMATOR: RCMT ORIG. DATE: 06/14/2012									
ITEM	DESCRIPTION	QTY	UOM	CFT	NO.	M	ANHOUF	TOTAL	\$/MH	MATERIALS PER UNIT	M	ATERIAL OLLARS	LABOR	SUB- CONTRACT	F	OTAL S
1.	FREIGHT, SALES TAX, & CONSUMABLES (6%)										\$	217			\$	217
	SUBTOTAL INSTALLATION COST							1,438			\$	3,837	\$ 155,238	\$-	\$	159,075
1. 2. 3. 4. 5. 6. 7.	DESIGN ENGINEERING - MECHANICAL DESIGN ENGINEERING - ELECTRICAL DESIGN ENGINEERING - INSTR. & CONTROL DESIGN ENGINEERING - CIVIL/STRUCTURAL TESTING (Instrument Calibration and testing) CONTRACT ENGR DESIGN SUPPORT DESIGN ENG. ACCEPTANCE REVIEW SUBTOTAL DESIGN COST	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	LT LT LT LT LT LT	NM NM NM NM NM NM	1 1 2 1 1	40.00 40.00 10.00 480.00 25.00	1.00 1.00 1.00 1.00 1.00	40 40 20 480 25 605	\$ 100.00 \$ 100.00 \$ 100.00 \$ 120.00 \$ 120.00				\$ - \$ 4,000 \$ 4,000 \$ - \$ 2,000 \$ 57,600 \$ 57,600 \$ 2,500 \$ 70,100	\$ - \$ -	\$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$	4,000 4,000 2,000 57,600 2,500 70,100
	SUBTOTAL INSTALLATION & DESIGN COST							2,043					\$ 225,338	\$ -	\$	225,338
1.	CONTINGENCY (30%)														s	67,601
	ESTIMATE SUBTOTAL							2,043			Τ				\$	292,939

RCM Technologies The Source of Smart Solutions ENTERGY Indian Point Nuclear Station Unit 2	on Conceptual Design Package SAMA IP2-056	Rev 0	
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ENTERGY INDIAN POINT NUCLEAR STATION UNIT 2

CONCEPTUAL DESIGN PACKAGE For

SAMA IP2-056

Keep RHR Heat Exchanger Discharge Motor-Operated Valves (MOVs) Open

Prepared by:	Approved by:
Patro Buttacevol.	
Date: 9-20-2012	Date: y z z a z z z

Page 1 of 10

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SECTION	TITLE
1.0	ISSUE
2.0	BACKGROUND
3.0	EXISTING CONDITIONS
4.0	DESIGN CONSIDERATIONS
5.0	CONFIRMATION OF DESIGN
6.0	RECOMMENDED SOLUTION
7.0	PRELIMINARY MATERIAL LIST
Attachment 1	Entergy Impact Screening Summary
Attachment 2	Conceptual Design Sketches
Attachment 3	References
Attachment 4	Cost Estimate

RCM) Technologies The Source of Smort Solutions	ENTERGY Indian Point Nuclear Station Unit 2	Conceptual Design Package SAMA IP2-056	Rev 0
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1.0 ISSUE

Severe Accident Mitigation Alternative (SAMA) IP2-056:

Keep RHR Heat Exchanger Discharge Motor-Operated Valves (MOVs) Open

2.0 BACKGROUND

In accordance with NRC environmental regulations in 10 C.F.R. Part 51, Entergy performed SAMA analyses for both Indian Point Nuclear Generating Units 2 and 3 as part of its license renewal application. Those analyses identified a number of potentially cost-beneficial SAMAs for each unit. In its license renewal application and related correspondence with the NRC Staff, Entergy indicated that it would submit the potentially cost-beneficial SAMAs for further internal engineering project cost-benefit analysis, even though none of the potentially cost-beneficial SAMAs is related to aging management under 10 C.F.R. Part 54. Entergy contracted RCM Technologies to assist it in this effort.

This package provides a conceptual design and implementation cost estimate for SAMA IP2-056 in accordance with Entergy design engineering practices.

For SAMA IP2-056, resolution is needed to determine the changes and requirements necessary for the Station to be operating with the Residual Heat Removal (RHR) Heat Exchanger Discharge MOVs maintained open.

The RHR system was originally designed to operate with the MOVs normally closed. The change proposed herein is for the MOVs to be maintained open when the Station is operating, eliminating the potential risk of the MOV not opening when required.

This package will assess revising the applicable Station Operating Procedures as the solution for accommodating the proposed change. In addition, this package will also provide a physical modification to the Station that is required in conjunction with the procedural change recommended.

The design considerations that follow will address the adequacy of the proposed resolution and the basis for the recommendation to resolve the identified potential issue.

The recommended solution will include descriptive details of the proposed design change and also supportive sketches as required. These descriptive details and sketches provide the basis for initiating the all inclusive conceptual cost estimate for Engineering Change (EC) development and implementation at the Station.

3.0 EXISTING CONDITIONS

RHR MOV-747 and RHR MOV-746 are currently installed in the outlet paths of Residual Heat Exchangers No. 21 and No. 22 respectively. At present the RHR MOVs remain closed during normal operations of the Station, isolating the RHR system from the SI system, and only open when required. When the MOVs are opened, the flow from these two HX outlets inter-connect with the Safety Injection (SI) system. An operating preference would be for them to remain open when the Station is operating in order to eliminate the risk of the valves not opening when required.

Although changing the operating state of the MOVs has its benefits, there is a potential issue that the outlet flow from the RHR system could interfere with the SI system's functionality. Further analysis will be required to evaluate this issue.

4.0 DESIGN CONSIDERATIONS

This conceptual package will define the requirements necessary in order to make the operability change for the MOVs.

It will also include the details for installation of a physical modification required in conjunction with the procedural changes being made.

Pre-requisites

In order to change the operating mode of the Heat Exchanger Discharge MOVs to normally open, an approved procedure is necessary. As a pre-requisite to issuing the procedure, analytical confirmation of the proposed change is also required. With the revised operating state of the MOVs, a review of the Hx outlet flow's resulting influence on the RHR/SI systems is needed. The results of this evaluation will be the basis for the physical modifications proposed in addition to the procedure change.

Modifications

The intended option being proposed here will be to provide IP2 with the same configuration presently installed on IP3 (IP3 currently operates with the equivalent MOVs normally open). This package will provide a design similar to IP3's solution for protecting the SI system's availability. This package will provide for the installation of pressure relief valves and additional piping required for the diverted flow.

RCM	Technologies	ENTERGY Indian Point Nuclear Station	Conceptual Design Package	Rev 0
\smile	The Source of Smort Solutions	Unit 2	SAMA IP2-056	

5.0 CONFIRMATION OF DESIGN

The proposed package will provide the rationale, analysis, and calculations in order to justify making changes to the operating mode of MOV 746 and MOV 747. The package will provide the changes required to existing operating procedures and also identify if there is the need for creating additional procedures.

The package will also provide the design details necessary to modify the Station's physical condition with a modification required in conjunction with the proposed operating change.

The modification proposed will install safety related pressure-relief valves in the inlet piping of each of the MOVs (Figure 1). Each pressure-relief valve's discharge will be connected to new piping. The new piping installed will be used for routing the relief-valve's discharge flow to its final destination at Pressurizer Relief Tank (PRT) No. 21.

Note: Final design considerations will determine how the "PRT connections" will be accomplished. The intention is to modify existing PRT inflow piping to accept the new connections rather than modifying the actual vessel.

6.0 RECOMMENDED SOLUTION

Pre-requisites

- 1. Perform the necessary calculations required. Provide an evaluation and analysis of the systems involved to confirm the proposed operating change is acceptable. Verify that the integrity of the systems involved and their ability to function as required is not diminished.
- 2. Revise procedures to enable operating the Station with the MOVs kept open.
- 3. Provide the required training necessary to implement the new procedure(s).

Modifications

- 1. Provide a design package for modifications in the Containment Building that will:
 - At Elevation 68'-0", locate and install a safety related relief valve in the inlet piping of each MOV.
 - At Elevation 46'-0", provide the modifications to inflow PRT piping necessary for connecting the new piping routed from the safety valves.
 - At Elevation 68'-0", install safety related 1" piping routed from the new relief valves to the new "PRT connections" at Elevation 46'-0".
 - Install the supports required for installation of the new 1" piping.

RCM	Technologies The Source of Smart Solutions	ENTERGY Indian Point Nuclear Station Unit 2	Conceptual Design Package SAMA IP2-056	Rev 0
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7.0 PRELIMINARY MATERIAL LIST

<u>Iter</u>	n Description	Quantity
1.	Relief valve, S.S., ¾" x 1" - 2500# rating, CROSBY (or equal)	2
2.	3/4 inch Sockolet, Schedule 160, A182 Grade, F316	2
3.	1 inch Sockolet, Schedule 160, A182 Grade, F316	2
4.	3/4 inch Schedule 160 seamless pipe, A376 Grade, TP 316	6 Feet
5.	1 inch Schedule 160 seamless pipe, A376 Grade, TP 316	600 Feet
6.	1 inch elbow, 6000# rating, A182 Grade, TP F316	12

The Source of Smart Solutions Unit 2 SAMA IP2-056	RCM	Technologies The Source of Smort Solutions	ENTERGY Indian Point Nuclear Station Unit 2	Conceptual Design Package SAMA IP2-056	Rev 0
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Entergy Impact Screening Summary



Engineering Change Process

ATTACHMENT 9.3

SHEET 1 OF 6

IMPACT SCREENING SUMMARY

INSTRUCTIONS:

Identify the potentially impacted and the unaffected areas by checking the appropriate **Yes** or **No** block on the Impact Screening Criteria.

If a direct determination cannot be made based on the impact screening questions, the detailed questions in Attachment 9.4 may be used to identify potential impacts.

The completion of detailed questions in Attachment 9.4 is recommended but not required.

Contact potentially impacted groups if assistance is required.

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Engineering	Change No).: <u> </u>	22-	07	6	Rev. No.:	<u>ve</u> :	NUN	۲N	gan hos	, ~ (1

Prepared by:

Date:

DESIGN ENGINEERING DISCIPLINES	Potential Impact		
 Civil / Structural Design Engineering Does the proposed activity involve any civil / structural (including seismic) design changes, activities or affect coatings? OR Does the proposed activity involve any piping engineering design changes or activities? 	YES		
 Electrical Design Engineering Does the proposed activity involve any station or switchyard electrical design, large power transformers, or settings changes or activities? (SOER 10-1) 	□ YES	⊠ NO	
Instrumentation and Controls Design Engineering Does the proposed activity involve any I&C design or settings changes or activities?	YES		
 Mechanical Design Engineering Does the proposed activity add/remove/replace insulation, aluminum or other metallic/non-metallic sources of debris in the reactor/containment building or involve any mechanical design changes or activities? 	YES 🖉	□ NO	
 PSA Engineering Does the proposed activity impact or involve changes to plant evaluations or probabilistic safety assessments? Does the proposed activity impact or involve changes to the Emergency Operating Procedures, Abnormal Operating Procedures, or Severe Accident Procedures or does it add, remove or modify SSCs included in a Maintenance Rule function? 	YES	□ NO	
 Nuclear Analysis Does the proposed activity impact or involve changes to plant evaluations, Technical Specifications, Technical Requirements Manual, or require a full 50.59 Evaluation? 	YES		
 FERC / NERC Impact Does the proposed activity impact or involve change to FERC / NERC or Regional Entity compliance documents? (ex. MOU, ENN/ENS-PL-158, ENS-DC-199, etc.) 	☐ YES	X NO	

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Engineering Change Process

IMPACT SCREENING SUMMARY

ATTACHMENT 9.3

Sheet 2 of 6

DESIGN ENGINEERING PROGRAMS	Potential	Impact
 ASME Section III Specifications Does the proposed activity add, delete, or modify information required by ASME Section III to be contained in a design specification? 	YES	
 Cable and Raceway Program Does the proposed activity involve any changes to cable trays, raceways or the associated documentation? 		🖾 NO
Electronic Databases (EDB) Does the proposed activity involve any changes to electronic databases?	YES	
EQ Program (10CFR50.49, NUREG 0588, Reg Guide 1.89) Does the proposed activity involve any new or existing EQ components?	YES	
 Hydrogen Control Program (10 CFR 50.44) (if applicable) Does the proposed activity impact equipment or materials related to hydrogen control? 	□ YES	M NO
 Human Factors Program Does the proposed activity involve control panel design including layout and labeling, visual displays, operator aids, auditory signals or environment in the control room, cable spreading room, and other control panel locations? 	YES	
 Margin Management Does the proposed activity impact or involve any change to design, licensing or operations margins? 	YES	
Reg. Guide 1.97 / PAM (Post Accident Monitoring) • Does the proposed activity involve Reg. Guide 1.97 (Post Accident Monitoring) Indications?	☐ YES	NO 🛛

MAINTENANCE	Potentia	l Impact
 Electrical Maintenance Does the proposed activity require an Electrical Maintenance review to identify affected procedures, required actions and required training? 	T YES	🕅 NO
 I&C Maintenance Does the proposed activity require an I&C Maintenance review to identify affected procedures, required actions and required training? 	YES	
Mechanical Maintenance Does the proposed activity require a Mechanical Maintenance review to identify affected procedures, required actions and required training?	TES 💽	

	Potentia	al Impact
 Nuclear Fuel Design Does the proposed activity impact or involve the design, performance or storage of nuclear fuel? 	T YES	🖾 NO
 Reactivity Management Program Does the proposed activity impact or involve the reactor system, reactor controls, reactor chemistry, related systems, potential core and spent fuel damage, spent fuel, reactor coolant pressure boundary or reactor system procedures? 	C YES	X NO



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Engineering Change Process

IMPACT SCREENING SUMMARY

ATTACHMENT 9.3

SHEET 3 OF 6

PROCESS OR PROGRAM IMPACT SCREENING CHECKLIST		Potential Impact	
Computer Support and Software	☐ YES	NO NO	
 Does the proposed activity impact or involve changes to plant computer software or firmware or impact Software Quality Assurance (SQA)? 			
Chemistry and Environmental Impact	TYES	🖾 NO	
 Does the proposed activity impact or involve any changes to plant chemistry requirements, operations or procedures, or any changes to the environment? 			
Radiation Protection (RP) Program Impact	TYES	🖾 NO	
 Does the proposed activity impact or involve any changes to the RP program? Does the proposed activity involve the potential to introduce (or reintroduce) any cobalt containing materials (such as Stellite) into the primary system? 			
 Operations Does the proposed activity impact or involve changes to Operations procedures, training or operator actions? 	YES		
 Planning, Scheduling and Outage (PS&O) Does the proposed activity require a PS&O review to identify required design and installation information? 			
 MP&C (Inventory) Does the proposed activity impact or involve any addition or removal of equipment from the inventory? Does the proposed activity impact or involve any Procurement of Quality or Augmented Quality material from non-qualified suppliers? 	M YES	□ NO	
Procurement Engineering Does the activity impact or involve any procurement activities?	YES		

PROGRAMS AND COMPONENTS		Potential Impact	
 ASME Containment In-service Inspection (IWE / IWL) Program Does the proposed activity impact or involve the containment pressure boundary or associated moisture barriers or a support for the containment pressure boundary? This includes "software only" changes that do not physically change the hardware such as re-rating of pressures or temperatures to include changes to documented information on these items or additional documented information for these items. Does the proposed activity limit access to containment surfaces for inspection? Involve disassembly of a bolted connection which forms a portion of the containment boundary? 		MO NO	
 ASME Appendix J (Primary Containment Leak Rate Testing) Program Does the proposed activity impact or involve any changes to primary containment leak rate testing? 	T YES	M NO	



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Engineering Change Process

ATTACHMENT 9.3

SHEET 4 OF 6

IMPACT SCREENING SUMMARY

PROGRAMS AND COMPONENTS (CONTINUED)	Potentia	al Impact
 ASME In-service Inspection (ISI) Program Does the proposed activity add, delete, or modify an ASME Section XI pressure boundary item or a support for an ASME Section XI pressure boundary item? This includes "software only" changes that do not physically change the hardware like such as re-rating of pressures or temperatures. (ASME Section XI items include ASME Class 1, 2, 3, or B31.1 treated as ISI Class 2 or 3 (T2 and T3) components, parts, or appurtenances such as pipe or pressure vessel walls, valve bodies and pump casings. 	YES	□ NO
 ASME Section XI Repair / Replacement Program Does the proposed activity involve any mechanical component within the ASME XI program / boundaries? Does the proposed activity add, delete, or modify an ASME Section XI pressure boundary item or a support for an ASME Section XI pressure boundary item? (ASME Section XI items include ASME Class 1, 2, 3, MC, and CC, as well as B31.1 treated as ISI Class 2 or 3 (T2 and T3) components, parts, or appurtenances such as pipe or pressure vessel walls, valve bodies and pump casings). 	YES	□ NO
 ASME In-service Testing Program Does the proposed activity impact or involve any item (safety related or non safety related) that may affect the performance or testing of a safety related pump or valve? Does the proposed activity impact the function or functional classification of any pump or valve as stated in the IST program documents? 	YES	☐ NO
 Air Operated Valve (AOV) Program Does the proposed activity impact or involve the design, operation or testing of AOVs? 	T YES	🖾 NO
 Buried Piping and Tanks (BP&T) Program Does the proposed activity impact or involve any changes to piping, coatings, or cathodic protection of Buried Piping & Components? 	YES	🖾 NO
 Boric Acid Corrosion (BAC) Program Does the proposed activity impact or involve any increase in the likelihood of boric acid formation or corrosion? 	T YES	🕅 NO
 Check Valve Program Does the proposed activity impact or involve the design, operation or testing of check valves? 	T YES	🖾 NO
 Control Room Habitability Program Does the proposed activity impact or involve changes that affect the temperature or radiological environmental conditions in the Main Control Room? 	T YES	🕅 NO
 Electrical Circuit Breaker, Relay and Electrical Equipment Testing Does the proposed activity impact or involve changes to the functional testing of circuit breaker, relay or electrical equipment? 	☐ YES	X NO



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Engineering Change Process

ATTACHMENT 9.3 SHEET 5 OF 6 IMPACT SCREENING SUMMARY

PROGRAMS AND COMPONENTS (CONTINUED)	Potentia	al Impact
 Flow Accelerated Corrosion (FAC) Program Does the proposed activity involve any changes (e.g.: configuration, velocity, flow rate, pressure, temperature, material, weld location, etc.) to piping systems included in the FAC Program.? 	JES	□ NO
 Heat Exchanger Program Does the proposed activity impact or involve the design, operation or testing of a component in the heat exchanger program? 	VES 🖉	
 Predictive Maintenance Program Does the proposed activity impact or involve any aspect of the storage, use and testing of lubricants? Does the proposed activity involve thermography? Does the proposed activity involve vibration monitoring? 	T YES	NO 🕅
 Microbiological Induced Corrosion (MIC) Program Impact Does the proposed activity involve piping containing untreated or stagnant water or open to the atmosphere? 	☐ YES	M NO
 Motor Operated Valve (MOV) Program Does the proposed activity impact or involve the design, operation or testing of MOVs? 	YES	
 Plant Thermal Performance Program Does the proposed activity impact or involve plant thermal performance? 	□ YES	🖾 NO
 Preventive Maintenance Program Does the proposed activity impact or involve periodic testing or performance of SSCs? or Does the proposed activity add, modify or delete any Environmental Qualification (EQ) maintenance requirement or replacement frequency to ensure the component(s) maintains its gualification status? 	YES	□ NO
 PT Curves Does the proposed activity add, delete, or modify the basis (as contained in each sites reactor vessel surveillance material testing program) for the Pressure / Temperature Limit Curves (fluence, pressure, temperature, reactor materials)? 	TYES	M NO
 Relief Valve Program Does the proposed activity impact or involve the design, operation and testing of relief valves, safety valves, vacuum breaker valves or rupture disc? 	YES	
 RPV Internals Program Does the proposed activity impact or involve any change to the reactor internals? This includes "software only" changes that do not physically change the hardware such as re-rating of pressures or temperatures. Does the proposed activity impact or involve or related documentation to include neutron fluence or neutron fluence calculations? Does the proposed activity impact or involve or changes to core flow characteristics or core flow characteristics? 	☐ YES	M NO



REV. 11

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Engineering Change Process

IMPACT SCREENING SUMMARY

ATTACHMENT 9.3

SHEET 6 OF 6

PROGRAMS AND COMPONENTS (CONTINUED)	Potential Impact	
 Welding Program Does the proposed activity impact or involve a special process, such as welding, brazing or soldering? 	YES	
 Safety Program Does the proposed impact or activity involve personnel or industrial safety? 	TES 💭	
 System Engineering Does the proposed activity impact or involve any changes to system configuration, function or performance, etc., for Maintenance Rule or other system? Does the proposed activity impact or involve any changes to system procedures, maintenance or operation, etc.? 	YES	□ NO
Training Program Does the proposed activity involve existing training requirements or create the need for new training?	YES	
 Simulator Impact Does the proposed activity impact or involve changes to the Simulator? 	YES	
 Fire Protection Program Does the proposed activity result in a change to the Fire Protection Program (including 10CFR50 Appendix R) where the impact is more than negligible? 	🗌 YES	M NO

Detailed Impact Screening (Attachment 9.4) Attached?	TYES	🖾 NO
		(

RCM) Technologies The Source of Smart Solutions	ENTERGY Indian Point Nuclear Station Unit 2	Conceptual Design Package SAMA IP2-056	Rev 0
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Conceptual Design Sketches

1. Figure 1: Addition of Pressure Relief Valves at MOV 746 and MOV 747





Figure 1 Addition of Pressure Relief Valves at MOV-746 and MOV-747 Ref. Dwg. A235296 FLOW DIAGRAM SAFETY INJECTION SYSTEM

References

- 1. ENTERGY Nuclear Management Manual, Engineering Change Process......Rev 11
- Association for the Advancement of Cost Engineering (AACE),
 Cost Estimate Classification System As Applied In Engineering, Procurement, and Construction for the Process Industries
 - TCM Framework: 7.3 Cost Estimating and Budgeting
 - Figure 4 Estimate Checklist & Maturity Matrix
- 3. FLOW DIAGRAM 9321-F-2720.....IP2 Auxiliary Coolant System
- 4. FLOW DIAGRAM 235296.....IP2 Safety Injection System
- 5. DWG 9321-F-2502......IP2 Containment Arrangement Plan, Above Elevation 68'-0"
- 6. DWG 9321-F-2503.....IP2 Containment Arrangement Plan, Above Elevation 46'-0"
- 7. FLOW DIAGRAM 9321-F-27353.....IP3 Safety Injection System
- 8. FLOW DIAGRAM 9321-F 27473..... IP3 Reactor Coolant System
| RCM) Technologies
The Source of Smart Solutions | ENTERGY
Indian Point Nuclear Station
Unit 2 | Conceptual Design
Package
SAMA IP2-056 | Rev 0 |
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Attachment 4

Cost Estimate

		IMPLEI Indian Po	MENTATION ESTIMATE int Nuclear Power Station		
* ES'	TIMATE LEVEL *		EC #: SAMA IP	2-056	
\Box	Conceptual	PROJECT TITLE: KEEP RHR Hx DISCH M	IOV's OPEN		ESTIMATOR: RCMT
	Preliminary	JOB LOCATION: Containment Building.	PROJECT (CODE: TBD	
	Definitive		ATOR: CAPITAL	<u>По</u> ми	ORIG. DATE:02/16/2012
		ESTIMATE TOTAL \$1,705,367		REVISION	10-4

Summary of Change:

In accordance with NRC environmental regulations in 10 C.F.R. Part 51, Entergy performed SAMA analyses for both Indian Point Nuclear Generating Units 2 and 3 as part of its license renewal application. Those analyses identified a number of potentially cost-beneficial SAMAs for each unit. In its license renewal application and related correspondence with the NRC Staff, Entergy indicated that it would submit the potentially cost-beneficial SAMAs for further internal engineering project cost-benefit analysis, even though none of the potentially cost-beneficial SAMAs is related to aging management under 10 C.F.R. Part 54. Entergy contracted RCM Technologies to assist it in this effort.

This package responds to the issue identified in the NRC's staff review of SAMA IP2-056 and provides the technical resolution and associated costs required for implementation.

For SAMA IP2-056, resolution is required for operating with the RHR HX Discharge MOV's open.

This package will revise procedures to change the normal mode of MOV 746 and 747. The package will also provide a design change adding pressure relief valves and associated piping for each MOV.

Prepared by	Ph Bettacerol.	Approved by:
Date:	9-20-2012	Date: 9-20-2012

		ENTERGY NUCLEAR NOR	THEAST								
		IMPLEMENTATION ESTI	MATE								
L	Indian Point Nuclear Power Station										
	EC #: SAMA IP2-056										
* EST	IMATE LEVEL *										
\Box	Conceptual	PROJECT TITLE: KEEP RHR Hx DISCH MOV'S OPEN	ESTIMATOR: RCMT								
	Preliminary	JOB LOCATION: Containment Building.	PROJECT CODE: TBD								
	Definitive	ORIGINATOR:	ORIG. DATE:02/16/2012								
Item		Description									
1.	This estimate assur	mes that this work will require both non-outage and outage	conditions to complete.								
2.	This estimate assur	mes that the non-outage work work will complete during 20	12.								
3.	This estimate assur	mes that the outage work will be completed in 2012 working	(2) 10 hour shifts 6 days per week.								
4.	This estimate assur	mes that the non-outage work will not suffer productivity los	s due to radiation or hazardous conditions								
5.	This estimate assur	mes that all work will be performed by trained contract craft	spersons in lieu of station maintenance personnel.								
6.	This estimate assur to installation.	mes that the new relief valves will be purchased with all req	uired qualifications and certifications and will be tested just prior								
7.	This estimate assur theOutage and (4) a	mes that (4) Fitter / Welders will be assigned for non-outage additional personnel will be assigned for the Outage, (2) for	e work and (2) of those will be assigned to 2nd shift for each shift.								
8.	This estimate assur production due to d	mes that the Outage work will involve radiological condition lressout requirements.	s requiring additional briefing times, dressout times and reduced								
9.	This estimate assur	mes NDE requirements include Visual, LP, UT and RT.									
10.	This estimate is bas	sed on the project's current level of scope definition and is a	classified Class 4 as defined per the AACE International Cost								
ļ	Estimate Classificat	tion System (see Attachment 3, Reference 2).	A hilling other at indian Daint. The applicated application								
11.	for anticipated billing	ig rate increases of 3% per year.	craft billing fates at indian Point. The projected costs provide								
12.	This estimate allows and progresses as f	s for and includes a contingency factor related to the compl follows:	exity and location of the work required. The factor is cumulative								
	A. Outside fer	nce boundary - 20%									
	B. Inside fenc	ce boundary - 30%									
	C. Implementa	ation complexity - 40%									
	D. Inside Con	itainment - 50%									

Rev. 10-4	11	IDIAN PO	INT IMPLEMEN EC #	ITATIC : SAMA	N ESTIMAT	TE WORK SI	HEET				
PROJ	ECT TITLE: KEEP RHR Hx DISCH MOV'S OPEN					CAPITAL	0&M	TAK	EOFF:		
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	Conceptual	01	STUDY, DESIG	N. & CLC	SEOUT	140		\$	14,000		
	Preliminary	02	DESIGN ENGR	CONST	SUPPORT	80		\$	8.000		
	Definitive	03	WELDING ENG	INFER		80		s	8,000		
		04	SYS ENGR/ S-I	LENGR		80		s	8,000		
	General Notes:	05	PROJECT MAN		ЛТ	160		ŝ	19 200		
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		13	OTHER CONTR	RACTS				Ŷ	111,100		
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		14	SWEC CRAFT	LABOR/V	VALKDOWN	1,611		\$ 2	200,759		
		15	LOST TIME			161		\$	20,948		
		16	SWEC DISTRIE	3S				\$	43,853		
		PLAN	CRAFT LABOR					-			
		17	MECH MAINT.			-		\$	-		
		18				-		\$	-		
		19	QUALITY CON	TROI		70		s	7 000		
		20	TRAINING			96		\$	11,520		
		21	CHEMISTRY			-		\$	-		
		22	OPS / OPS SU	PPORT		200		\$	22,400		
		23	HP/RP			120		\$	9,547		
		MISC 0				00		c	7 200		
		24		IROL		90		ф С	7,200		
		26	HP/RP			-		s	_		
		27	RADWASTE			-		\$	-		
		28	NURSE			-		\$	-		
		29	ELEVATOR C	ONTRAC	TOR	-		\$	-		
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		ESTIMA	TE SUBTOTAL	•		4.000		\$ 1.0	093,184		
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					LOADERS (30%	6)		\$ 3	393,546		
					ESTIMATE T	OTAL		\$1,3	705,367		
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1.	Gather and stage tools and materials	1	LT	PF	4	10.00	1.00	40	\$	120.71			\$	4,828			\$	4,828
2.	Cut and prep 3/4" sch. 160 pipe	1		PF	2	10,00	1.00	20	\$	120.71		\$ ·	\$	2,414			5	2,414
3.	Cut and prep 1" sch. 160 pipe	1	LI	PF	4	16.00	1.00	64	1\$	120.71		\$ -	1	7,725			3	1,125
4.	Pop test 1" relief valves prior to installation. (QA verify)	2	LT	PF	2	7,000	1.00	28	5	120.71		\$-	\$	3,380			\$	3.380
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2	Prep relief valves (1" valves)	2	EA	PF	2	3.00	1.70	20	\$	120.71			\$	2,414	1		\$	2,414
3.	Install scaffolding	1	LT	CP	2	24.00	1.70	82	\$	96.00			\$	7,872			\$	7,872
4.	Install scaffolding	1	LT	LB	2	24.00	1.70	82	\$	78,15			\$	6,408			\$	6,408
5.	Fit and weld 3/4" piping and fittings	2	EA	PF	2	7.00	1.70	48	\$	120.71				5,794			\$	5,794
6.	Install new relief valves	2	EA	PF	2	5.00	1.70	34	5	120.71			\$	4,104			13	4,104
1 6	Prit and weig 1" piping, fittings and install supports	4	EA	PF	2	15.00	1.70	204	\$	120.71			13	24,625	1		3	24,620
	Provide testing as required (leak test)			Pr		24.00	1.70	204		120.71		3 -		24,020]		9	24,020
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11.	Cleanup and restore area	1		PF	4	10.00	1.70	68	\$	120.71		\$ -	\$	8,208			\$	8,208
1. 2.	PAINTING & TOUCH-UP REQUIREMENTS PAINTING & TOUCH-UP PAINTING & TOUCH-UP			PT PT														
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5.	CRAFT IN PROCESSING (20%)			1									s	29,235			\$	29,235
6.	HUMAN PERFORMANCE & ALARA TRAINING	1	LT						1				\$	2,924			\$	2,924
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1	PLANT SCOPE																	
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2.	DESIGN ENGINEERING SUPT DURING CONST	1	LT	NM	1	80.00	1.00	80	\$ 100.0	0		\$	8,000			\$	8,000
3.	SYSTEMS ENGINEERING - MECHANICAL	1	LT	NM	1	40.00	1.00	40	\$ 100.0	0		\$	4,000	1		\$	4,000
4.	SYSTEMS ENGINEERING - CIVIL STRUCTURAL	1	LT	NM	1	40.00	1.00	40	\$ 100.0	0		\$	4,000	1		\$	4,000
5.	PROJECT MANAGEMENT	1		NM	1	160.00	1.00	160	\$ 120.0	0		\$	19,200			\$	19,200
6.		12		NM		8.00	1.00	96	\$ 120.0		1	\$	11,520			\$	11,520
1.	QA7 QC VERIFICATION	1		NM	1	70.00	1.00	70	\$ 100,0	0	1	\$	7,000			*	7,000
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10		i.		NM		120.00	1.00	120	\$ 795	ŝ		ŝ	9.547	1		\$	9.547
11	WORK MANAGEMENT	1	IT	NM		120.00	1.00	120	w 73.0			1*	0,047			8	5,047
12	OPS / OPS PROCEDURE SUPPORT AND DEVEL	1	LT	NM	1	120.00	1.00	120	\$ 120.0	ol		s	14,400			ŝ	14,400
13.	TRAVEL & LIVING EXPENSES CONTRACTOR SUPPORT	1	LT							-	1	-					
1.	FIS / MODS ENGINEERING - SWEC (Incl Per Dien	1	LT	NM							1	1		1			19 19 19 19 19 19 19 19 19 19 19 19 19 19 1
2.	MODS PLANNING & SCH SWEC (Incl Per Diem)	1	LT	NM	1	80.00	1.00	80	\$ 100.0	0		\$	8,000			\$	8,000
3.	FIELD ENGRS/PLAN- SWEC(Incl Per Diem)	1	LT	NM	1	60.00	1.00	60	\$ 120.0	D	1	\$	7,200			\$	7,200
4.	QA / QC VERIFICATION	1	LT	NM	1	90.00	1.00	90	\$ 80.0	D		\$	7,200			\$	7,200
5.	NDE	1	LT	NM													
6	HP/RP	1	LT	NM													
	RADWASTE			NM				-			l						
8.				NM				-									
10	ELEVATOR CONTRACTOR			NIM				-			1						
11	HOUSEKEEDING			NA													
12	FOUIPMENT RENTAL CONTRACTOR		IT	NM										\$	10.000	\$	10 000
13	VENDOR STOCKING	1	IT.	NM				-						l •	,0,000	Ť	1
14.	DECONTAMINATION CONTRACTOR	1	LT	NM				-						\$	10.000	\$	10,000
15.	RBC's	1	LT	NM								1				Ĺ,	,
16.	SECURITY	1	LT	SEC			1	-									
17.	FIREWATCH (Rover)	1	LT	NM				-								\$	-
18.	SAFETY (2%)	1	LT	NM				32	\$ 68.0	2		\$	2,176			\$	2,176
19.	LOSTTIME (10%)	1	LT					161	\$ 130.1	1		\$	20,948	-		\$	20,948
ļ	SUBTOTAL CRAFT/NON-MANUAL							2,920			\$ -	\$-	348,803	\$	55,000	\$	403,803
	FREIGHT SALES TAX & CONSUMABLES (6%)										\$ 4308					\$	4 308
2	3/4' 1" A376 TP316 sch 160 Pine	1	IT							******	\$ 36 800					\$	36 800
3	1" Relief Valves, 2500 # Class, SR	2	EA							*****	\$ 70,000					\$	70,000
	SUBTOTAL INSTALLATION COST				1			2,920			\$111,108	\$	348,803	\$	55,000	\$	514,911
1.	DESIGN ENGINEERING - MECHANICAL	1	LT	NM	1	40.00	1	40	\$ 100.0	2		\$	4,000			\$	4,000
2.	DESIGN ENGINEERING - CIVIL/STRUCTURAL	1	LT	NM	1	100.00	1	100	\$ 100.0	2		\$	10,000			\$	10,000
3.	CONTRACT ENGR DESIGN SUPPORT	1		NM	1	900.00	1	900	\$ 120.0	2			000 000	\$	108,000	\$	108,000
4.	WESTINGHOUSE ANALYSIS AND CALCS			NM		10.00		40	¢ 400.0			\$	200,000			5	200,000
<u> </u>		, 	L.1	INIVI		40.00		1 080	l l l l l l l l l l l l l l l l l l l	<u>' </u>		1 0	218 000	4	108.000	e s	326.000
	SUBTOTAL DESIGN COST							1,000				1	210,000	-	100,000	\$	520,000
	SUBTOTAL INSTALLATION & DESIGN COST				1			4,000		1	\$111,108	\$	566,803	\$	163,000	\$	840,911
1.	CONTINGENCY (30%)															\$	252,273
				.		62727277 80				1				h			
1	ESTIMATE SUBTOTAL				1			4,000		1				I		\$1	,093,184

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ENTERGY INDIAN POINT NUCLEAR STATION UNIT 2

CONCEPTUAL DESIGN PACKAGE

For

SAMA IP2-060

Prevent Water Intrusion of the 480VAC Switchgear Room from Adjacent Stairwell 4

Prepared by: Vota Butacaool.	Approved by:
Date: 9-20-2012	Date: M. alter a tra

TABLE OF CONTENTS

<u>SECTION</u> 1.0	<u>TITLE</u> ISSUE
2.0	BACKGROUND
3.0	EXISTING CONDITIONS
4.0	DESIGN CONSIDERATIONS
5.0	CONFIRMATION OF DESIGN
6.0	RECOMMENDED SOLUTION
7.0	PRELIMINARY MATERIAL LIST
Attachment 1	Entergy Impact Screening Summary
Attachment 2	Conceptual Design Sketches
Attachment 3	References
Attachment 4	Cost Estimate

1.0 ISSUE

Severe Accident Mitigation Alternative (SAMA) IP2-060:

Prevent water Intrusion of the 480VAC Switchgear Room as a result of flooding in the adjacent Stairwell 4

2.0 BACKGROUND

In accordance with NRC environmental regulations in 10 C.F.R. Part 51, Entergy performed SAMA analyses for both Indian Point Nuclear Generating Units 2 and 3 as part of its license renewal application. Those analyses identified a number of potentially cost-beneficial SAMAs for each unit. In its license renewal application and related correspondence with the NRC Staff, Entergy indicated that it would submit the potentially cost-beneficial SAMAs for further internal engineering project cost-benefit analysis, even though none of the potentially cost-beneficial SAMAs is related to aging management under 10 C.F.R. Part 54. Entergy contracted RCM Technologies to assist it in this effort.

This package provides a conceptual design and implementation cost estimate for SAMA IP2-060 in accordance with Entergy design engineering practices.

For SAMA IP2-060, resolution is required to prevent flooding at Elevation 15'-0" in Stairwell 4 from entering the adjacent 480VAC Switchgear Room (switchgear room).

The design considerations that follow will address the adequacy of the proposed resolution and the basis for the recommendation to resolve the identified potential issue.

The recommended solution will include descriptive details of the proposed design change and also conceptual design sketches as required. These descriptive details, sketches, and the preliminary material list provide the basis for initiating the all-inclusive conceptual cost estimate for engineering change (EC) development and implementation at the Station.

3.0 EXISTING CONDITIONS

There is fire protection system piping in Stairwell 4 immediately adjacent to the switchgear room which can potentially rupture. The piping varies in size up to four-inches in diameter.

There are two doors in Unit 2's Stairwell 4 at Elevation 15'. The stairwell entry from Unit 1's retired Superheater Building Raw Water Treatment Room is a solid onepiece steel door hinged to open inward into the stairwell. In the event of a pipe break in the stairwell, it is assumed that sufficient water cannot escape through that passageway to prevent damage to the 480V Switchgear.

The other door inside Stairwell 4 is the switchgear room entry door, a solid onepiece security door hinged to open inward to the switchgear room. This door, although being solid, may not prevent water resulting from of a pipe rupture from eventually entering the switchgear room.

A solution is needed to eliminate the potential for water entering the switchgear room and also to remove the water accumulated in Stairwell 4 as guickly as possible.

4.0 **DESIGN CONSIDERATIONS**

The existing switchgear room entry door is a security door. To increase the opening's structural integrity, the existing door will be removed and replaced with a door hinged that opens inward into the stairwell. This re-orientation of the door jamb will ensure the door remains closed tightly when water pressure is present due to flooding. In addition, ensuring that the door remains closed and seated firmly against the jamb reduces the potential for flooding of the switchgear room.

The accumulated water in Stairwell 4 will need an escape path to discharge to a suitable area outside the stairwell. Because the existing solid entry door from Unit 1's retired Superheater Building Raw Water Treatment Room to Stairwell 4 is not part of a fire zone boundary, the door can be modified by installing a hinged mechanical "flapper" in it to allow water from the stairwell to escape.

In the event of a pipe rupture, the water will exit through the door's flapper into Unit 1's retired Superheater Building Raw Water Treatment Room. The Raw Water Treatment Room is equipped with a sub-floor drainage trench system which will accommodate most of the initial flood waters.

In the event the ruptured piping flow is not terminated guickly and the trenches overflow, the Raw Water Treatment Room's grated floor opening and stairs will provide a path for the flood waters into the Unit 1 cellar. If the cellar fills up (an unlikely event if rapid response is taken), the water will then spill up over the south stair way and flow into the 15' yard. This flooding poses no threat to the Unit 2 safe shut down but would require a substantial effort to clean up and return the nonessential equipment to service.

In addition, since flooding may not be directly observed by personnel, an alarm is required to provide early detection of this condition. Based upon the above considerations, water intrusion will be detected at one (1) inch above the floor grade at Elevation 15'-0". To avoid spurious alarms, the detection setting of the device selected may be appropriately adjusted

New wiring is required for power to the new detector unit and will need to be provided from a source that is not affected by the Switchgear Room water intrusion.

Wiring is also required for the alarm signal to be routed to an assigned window of the Control Room's annunciation system at Elevation 53'-0".

CONFIRMATION OF DESIGN 5.0

In this scenario, mitigation is used to alleviate the condition. The design concept being recommended will provide Operations with the earliest warning of the condition.

Removing the water from Stairwell 4 in the event of a pipe rupture is the first course of action. This is accomplished with the installation of the mechanical flapper in the door leading to Unit 1's retired Superheater Building Raw Water Treatment Room.

In addition, this potential condition requires an alarm which is typical for any situation that needs monitoring. Since detection of the rupture and subsequent flooding may not be immediate, providing the earliest notification to Operations is the optimum solution.

6. RECOMMENDED SOLUTION

- 1. Install a new switchgear room entry door to open into Stairwell 4.
- 2. Modify the existing solid entry door from Unit 1's retired Superheater Building Raw Water Treatment Room to Stairwell 4. Install a mechanical hinged flapper to swing open into the Raw Water Treatment Room.
- 3. Install a FCI Model FLT93S FlexSwitch water level detection device in the Stairwell at El. 15'-0" in an area that will not inhibit passage.
- 4. Provide Instrument Bus AC power at Elevation 53'-0" to the detection device
 - Install AC power wiring in conduit raceway from Control Room at Elevation 53'-0" to the device in Stairwell 4 at Elevation 15'-0".



- 5. Provide alarm connection from the level detection device to the annunciator
 - Install 125VDC wiring in conduit raceway from the device in Stairwell 4 at Elevation 15'-0" up to the cable spreading area at Elevation 33'-0"
 - Continue routing wiring in cable trays at Elevation 33'-0" up to the annunciator in the Control Room at Elevation 53'-0"
 - Connect wiring to new "EL. 15 FT STAIRWELL 4 FLOOD" alarm window and 125VDC power source
- 6. Provide procedure for flood switch calibration and setpoint.
- 7. Provide procedures and training for mitigation relating to this condition.

7.0 PRELIMINARY MATERIAL LIST

Item Description	<u>Quantity</u>
1. Solid metal switchgear room entry door and frame	1
2. Metal Spring-Loaded Hinged Mechanical Flapper	1
3. FCI Model FLT93S FlexSwitch	1
4. 1" – Conduit and Supports	200 Feet
5. Cable A. 1 – 125 VDC Cable B. 1 – 120 VAC Cable	200 Feet
6. Support for water level switch	1
7. Junction Box with terminal blocks	1



Attachment 1

Entergy Impact Screening Summary



ATTACHMENT 9.3

IMPACT SCREENING SUMMARY

SHEET 1 OF 6

INSTRUCTIONS:

Identify the potentially impacted and the unaffected areas by checking the appropriate <u>Yes</u> or <u>No</u> block on the Impact Screening Criteria.

If a direct determination cannot be made based on the impact screening questions, the detailed questions in Attachment 9.4 may be used to identify potential impacts.

Engineering Change Process

The completion of detailed questions in Attachment 9.4 is recommended but not required.

 Contact potentially impacted groups if assistan 	ce is required.
SAMA	CONCEPTUAL
Engineering Change No.: <u>TP2-060</u>	Rev. No.: DESIGN PACKAGE

Prepared by:

Date:

DESIGN ENGINEERING DISCIPLINES	Potential Impact			
 Civil / Structural Design Engineering Does the proposed activity involve any civil / structural (including seismic) design changes, activities or affect coatings? OR Does the proposed activity involve any piping engineering design changes or activities? 	YES			
 Electrical Design Engineering Does the proposed activity involve any station or switchyard electrical design, large power transformers, or settings changes or activities? (SOER 10-1) 	YES			
 Instrumentation and Controls Design Engineering Does the proposed activity involve any I&C design or settings changes or activities? 	YES			
 Mechanical Design Engineering Does the proposed activity add/remove/replace insulation, aluminum or other metallic/non-metallic sources of debris in the reactor/containment building or involve any mechanical design changes or activities? 	YES	□ NO		
 PSA Engineering Does the proposed activity impact or involve changes to plant evaluations or probabilistic safety assessments? Does the proposed activity impact or involve changes to the Emergency Operating Procedures, Abnormal Operating Procedures, or Severe Accident Procedures or does it add, remove or modify SSCs included in a Maintenance Rule function? 	YES	□ NO		
 Nuclear Analysis Does the proposed activity impact or involve changes to plant evaluations, Technical Specifications, Technical Requirements Manual, or require a full 50.59 Evaluation? 	YES	□ NO		
 FERC / NERC Impact Does the proposed activity impact or involve change to FERC / NERC or Regional Entity compliance documents? (ex. MOU, ENN/ENS-PL-158, ENS-DC-199, etc.) 	☐ YES	🕅 NO		



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Engineering Change Process

IMPACT SCREENING SUMMARY

ATTACHMENT 9.3

Sheet 2 of 6

DESIGN ENGINEERING PROGRAMS	Potentia	Impact
 ASME Section III Specifications Does the proposed activity add, delete, or modify information required by ASME Section III to be contained in a design specification? 	🗌 YES	NO 🕅
 Cable and Raceway Program Does the proposed activity involve any changes to cable trays, raceways or the associated documentation? 	YES	
 Electronic Databases (EDB) Does the proposed activity involve any changes to electronic databases? 	YES	
 EQ Program (10CFR50.49, NUREG 0588, Reg Guide 1.89) Does the proposed activity involve any new or existing EQ components? 	TES 1	🕅 NO
 Hydrogen Control Program (10 CFR 50.44) (<i>if applicable</i>) Does the proposed activity impact equipment or materials related to hydrogen control? 	🗌 YES	🕅 NO
 Human Factors Program Does the proposed activity involve control panel design including layout and labeling, visual displays, operator aids, auditory signals or environment in the control room, cable spreading room, and other control panel locations? 	YES	
 Margin Management Does the proposed activity impact or involve any change to design, licensing or operations margins? 	TYES	🕅 NO
 Reg. Guide 1.97 / PAM (Post Accident Monitoring) Does the proposed activity involve Reg. Guide 1.97 (Post Accident Monitoring) Indications? 	☐ YES	X NO

MAINTENANCE	Potentia	l Impact
Electrical Maintenance Does the proposed activity require an Electrical Maintenance review to identify affected procedures, required actions and required training?	YES	
 I&C Maintenance Does the proposed activity require an I&C Maintenance review to identify affected procedures, required actions and required training? 	YES	
 Mechanical Maintenance Does the proposed activity require a Mechanical Maintenance review to identify affected procedures, required actions and required training? 	YES	

NUCLEAR ENGINEERING	Potentia	al Impact
 Nuclear Fuel Design Does the proposed activity impact or involve the design, performance or storage of nuclear fuel? 	🗌 YES	🕅 NO
 Reactivity Management Program Does the proposed activity impact or involve the reactor system, reactor controls, reactor chemistry, related systems, potential core and spent fuel damage, spent fuel, reactor coolant pressure boundary or reactor system procedures? 	🗌 YES	🕅 NO



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Engineering Change Process

ATTACHMENT 9.3

SHEET 3 OF 6

IMPACT SCREENING SUMMARY

PROCESS OR PROGRAM IMPACT SCREENING CHECKLIST	Potentia	al Impact
Computer Support and Software	☐ YES	🕅 NO
 Does the proposed activity impact or involve changes to plant computer software or firmware or impact Software Quality Assurance (SQA)? 		
Chemistry and Environmental Impact	TYES	M NO
 Does the proposed activity impact or involve any changes to plant chemistry requirements, operations or procedures, or any changes to the environment? 		
Radiation Protection (RP) Program Impact	□ YES	🕅 NO
 Does the proposed activity impact or involve any changes to the RP program? Does the proposed activity involve the potential to introduce (or reintroduce) any cobalt containing materials (such as Stellite) into the primary system? 		
 Operations Does the proposed activity impact or involve changes to Operations procedures, training or operator actions? 	YES	
 Planning, Scheduling and Outage (PS&O) Does the proposed activity require a PS&O review to identify required design and installation information? 	☐ YES	X NO
 MP&C (Inventory) Does the proposed activity impact or involve any addition or removal of equipment from the inventory? Does the proposed activity impact or involve any Procurement of Quality or Augmented Quality material from non-qualified suppliers? 	TYES	□ NO
Procurement Engineering Does the activity impact or involve any procurement activities?	YES	

PROGRAMS AND COMPONENTS	Potentia	al Impact
 ASME Containment In-service Inspection (IWE / IWL) Program Does the proposed activity impact or involve the containment pressure boundary or associated moisture barriers or a support for the containment pressure boundary? This includes "software only" changes that do not physically change the hardware such as re-rating of pressures or temperatures to include changes to documented information on these items or additional documented information for these items. Does the proposed activity limit access to containment surfaces for inspection? Involve disassembly of a bolted connection which forms a portion of the containment boundary? 		X NO
 ASME Appendix J (Primary Containment Leak Rate Testing) Program Does the proposed activity impact or involve any changes to primary containment leak rate testing? 	☐ YES	🛛 NO



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Engineering Change Process

ATTACHMENT 9.3 SHEET 4 OF 6

IMPACT SCREENING SUMMARY

PROGRAMS AND COMPONENTS (CONTINUED)	Potentia	al Impact
 ASME In-service Inspection (ISI) Program Does the proposed activity add, delete, or modify an ASME Section XI pressure boundary item or a support for an ASME Section XI pressure boundary item? This includes "software only" changes that do not physically change the hardware like such as re-rating of pressures or temperatures. (ASME Section XI items include ASME Class 1, 2, 3, or B31.1 treated as ISI Class 2 or 3 (T2 and T3) components, parts, or appurtenances such as pipe or pressure vessel walls, valve bodies and pump casings. 	☐ YES	X NO
 ASME Section XI Repair / Replacement Program Does the proposed activity involve any mechanical component within the ASME XI program / boundaries? Does the proposed activity add, delete, or modify an ASME Section XI pressure boundary item or a support for an ASME Section XI pressure boundary item? (ASME Section XI items include ASME Class 1, 2, 3, MC, and CC, as well as B31.1 treated as ISI Class 2 or 3 (T2 and T3) components, parts, or appurtenances such as pipe or pressure vessel walls, valve bodies and pump casings). 	☐ YES	X NO
 ASME In-service Testing Program Does the proposed activity impact or involve any item (safety related or non safety related) that may affect the performance or testing of a safety related pump or valve? Does the proposed activity impact the function or functional classification of any pump or valve as stated in the IST program documents? 	☐ YES	X NO
 Air Operated Valve (AOV) Program Does the proposed activity impact or involve the design, operation or testing of AOVs? 	1 YES	🕅 NO
 Buried Piping and Tanks (BP&T) Program Does the proposed activity impact or involve any changes to piping, coatings, or cathodic protection of Buried Piping & Components? 	☐ YES	X NO
 Boric Acid Corrosion (BAC) Program Does the proposed activity impact or involve any increase in the likelihood of boric acid formation or corrosion? 	☐ YES	🔀 NO
 Check Valve Program Does the proposed activity impact or involve the design, operation or testing of check valves? 	☐ YES	XX NO
 Control Room Habitability Program Does the proposed activity impact or involve changes that affect the temperature or radiological environmental conditions in the Main Control Room? 	☐ YES	🕅 NO
Electrical Circuit Breaker, Relay and Electrical Equipment Testing Does the proposed activity impact or involve changes to the functional testing of circuit breaker, relay or electrical equipment?	□ YES	M NO



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Engineering Change Process

IMPACT SCREENING SUMMARY

ATTACHMENT 9.3 SHEET 5 OF 6

PROGRAMS AND COMPONENTS (CONTINUED)	Potentia	al Impact
 Flow Accelerated Corrosion (FAC) Program Does the proposed activity involve any changes (e.g.: configuration, velocity, flow rate, pressure, temperature, material, weld location, etc.) to piping systems included in the FAC Program.? 	🗌 YES	NO 🕅
 Heat Exchanger Program Does the proposed activity impact or involve the design, operation or testing of a component in the heat exchanger program? 	☐ YES	🕅 NO
 Predictive Maintenance Program Does the proposed activity impact or involve any aspect of the storage, use and testing of lubricants? Does the proposed activity involve thermography? Does the proposed activity involve vibration monitoring? 	☐ YES	⊠ NO
 Microbiological Induced Corrosion (MIC) Program Impact Does the proposed activity involve piping containing untreated or stagnant water or open to the atmosphere? 	U YES	M NO
 Motor Operated Valve (MOV) Program Does the proposed activity impact or involve the design, operation or testing of MOVs? 	□ YES	M NO
 Plant Thermal Performance Program Does the proposed activity impact or involve plant thermal performance? 	□ YES	🕅 NO
 Preventive Maintenance Program Does the proposed activity impact or involve periodic testing or performance of SSCs? or Does the proposed activity add, modify or delete any Environmental Qualification (EQ) maintenance requirement or replacement frequency to ensure the component(s) maintains its gualification status? 	YES	□ NO
 PT Curves Does the proposed activity add, delete, or modify the basis (as contained in each sites reactor vessel surveillance material testing program) for the Pressure / Temperature Limit Curves (fluence, pressure, temperature, reactor materials)? 	☐ YES	X NO
 Relief Valve Program Does the proposed activity impact or involve the design, operation and testing of relief valves, safety valves, vacuum breaker valves or rupture disc? 	TYES	M NO
 RPV Internals Program Does the proposed activity impact or involve any change to the reactor internals? This includes "software only" changes that do not physically change the hardware such as re-rating of pressures or temperatures. Does the proposed activity impact or involve or related documentation to include neutron fluence or neutron fluence calculations? Does the proposed activity impact or involve or changes to core flow characteristics or core flow characteristics? 	☐ YES	NO 🕅



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Engineering Change Process

IMPACT SCREENING SUMMARY

ATTACHMENT 9.3

SHEET	6	OF	6	
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PROGRAMS AND COMPONENTS (CONTINUED)	<u>Potentia</u>	<u>ıl İmpact</u>
 Welding Program Does the proposed activity impact or involve a special process, such as welding, brazing or soldering? 	YES	□ NO
 Safety Program Does the proposed impact or activity involve personnel or industrial safety? 	YES	
 System Engineering Does the proposed activity impact or involve any changes to system configuration, function or performance, etc., for Maintenance Rule or other system? Does the proposed activity impact or involve any changes to system procedures, maintenance or operation, etc.? 	YES	□ NO
 Training Program Does the proposed activity involve existing training requirements or create the need for new training? 	YES	
 Simulator Impact Does the proposed activity impact or involve changes to the Simulator? 	YES	
 Fire Protection Program Does the proposed activity result in a change to the Fire Protection Program (including 10CFR50 Appendix R) where the impact is more than negligible? 	YES	

Detailed Impact Screening (Attachment 9.4) Attached?	□ YES	🕅 NO
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Attachment 2

Conceptual Design Sketches

- 1. Figure 1: Stairwell Flood Switch Location
- 2. Figure 2: Flood Switch Installation



IPEC00270034

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5	ENTERGY	Conceptual Design	
RCM) Technologies	Indian Point Nuclear Station	Package	
Construction Construction	Unit 2	SAMA IP2-060	Rev. 0
	, #201799-1		<u>i</u>



Figure 2 FLOOD SWITCH INSTALLATION (NOT TO SCALE)

IPEC00270035

Attachment 3

References

- 1. ENTERGY Nuclear Management Manual, Engineering Change Process, Rev 10
- Association for the Advancement of Cost Engineering (AACE), Cost Estimate Classification System - As Applied In Engineering, Procurement, and Construction for the Process Industries
 - TCM Framework: 7.3 Cost Estimating and Budgeting
 - Figure 4 Estimate Checklist & Maturity Matrix
- 3. FCI Model FLT93S FlexSwitch (included here)

FCI FLUID COMPONENTS INTERNATIONAL LLC

Bener Marshall and Andrew Andrew Andrew Andrew Andrew Andrew Andrew Andrew Andrew Andrew Andrew Andrew Andrew A

Products Level Switches FLT93B FLT93S FLT93F FLT93C F \3M L J00 8-66B

FLT93S FlexSwitch® Level Switch





Download literature for this product

Level Switch Summary

The FLT93S insertion type FlexSwitch for level and temperature monitoring represents the first true technological breakthrough in thermal technology in over a decade. This product was designed for heavy industrial environments including high temperature and high pressure. FCI is the only thermal manufacturer providing **temperature compensation** to ensure set point accuracy for process temperatures that vary up to \pm 100° F. The FLT93S is easily field-configured or factory preset, providing unparalleled flexibility, accuracy and stability for all multiple process sensing and switching requirements.

For an operational demonstration of FCI's FLT93 FlexSwitch Series, please follow this **link.**

Applications

Interface and sump level detection
 Interface/sump level detection in settling vessels
 Interface/sump level detection in settling vessels
 Agitation detection
 Liquid/resin interface detection

Specifications For Level/Interface Service: Accuracy: ± 0.25 inch [± 6.4 mm] Repeatability: ± 0.125 inch [± 3.2 mm]

Page 1 of 3

For Temperature Service: Accuracy: ± 2° F [± 1° C] Repeatability: ± 1° F [± 0.6° C]

Response Time: As low as 3 seconds

Enclosure: Powder coated aluminum enclosure is rated for hazardous location use Groups B, C, D, E, F and G, CENELEC EEx d IIC and resists the effects of weather and corrosion per NEMA/CSA Type 4X (equivalent to IP66). Stainless steel is available as an option. **Agency Approvals:** FM, CSA, CENELEC, ATEX, CE Mark, T4 Rated (System

Agency Approvals: FM, CSA, CENELEC, ATEX, CE Mark, T4 Rated (System Approval) and CRN.

Flow Element

Materials of Construction: All-welded 316L stainless steel for all wetted surfaces. Hastelloy C, Monel 400 and Titanium are available as an option.

Process Connection:

D Standard: 0.75 inch male NPT. **D** Optional: 1 inch male NPT, flanges or retractable sensing element.

Insertion Length: □ 1.2 inch [30 mm]

2 inches [51 mm]
 4 inches [102 mm]
 6 inches [152 mm]
 9 inches [229 mm]
 12 inches [305 mm]
 18 inches [457 mm]
 Customer specified lengths are available as an option.
 Operating Temperature:
 Standard: -4° to +350° F [-20° to +177° C]
 Optional: -100° to +500° F [-73° to +260° C] or -100° to +850° F [-73° to +454° C]

+454° C]

Operating Pressure: To 3500 psig [240 bar(g)]

Control Circuit

Operating Temperature: -40° to +140° F [-40° to +60° C] Input Power: Field selectable 115 ± 15 Vac or 230 ± 30 Vac, 50/60 Hz; 21 to 28 Vdc or 18 to 26 Vac; 7 watts maximum.

Relay Contacts: Field configurable dual SPDT or single DPDT rated 6 amps at 115 Vac, 240 Vac or 24 Vdc. Hermetically sealed relays are available as an option.

Output Signal: Analog DC voltage related to flow or level/interface signal and proportional to temperature.

Electrical Connection: 1 inch female NPT

Remote Configuration: Available as an option with customer specified interconnecting cable length.

Optional N.I.S.T. Flow Calibration Services

Factory N.I.S.T. calibration in air or water is available as an option for customer specified setpoint(s) or a flow curve based on the media ranges specified above.

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Attachment 4

Cost Estimate

	E	NTERGY NUCLEAR NOR IMPLEMENTATION EST dian Point Nuclear Powe	THEAST IMATE r Station	
* ESTIMATE LEVEL *		EC #:	SAMA IP2-060	
Conceptual	PROJECT TITLE: SWGR Wate	er Intrusion Protection		ESTIMATOR: RCMT
Preliminary	JOB LOCATION:U1 Superhea	ter Bldg-Stairwell 4	PROJECT CODE: TBD)
Definitive	CAPITAL INON-OUTAGE	ORIGINATOR:		ORIG. DATE: 6-19-2012
	ESTIMATE TOTAL \$	715,145	REVISION	11-0
Summary of Change:	ESTIMATE TOTAL \$	715,145 R Part 51 Enteroy perfor	REVISION	11-0

2 and 3 as part of its license renewal applications in 10 C.P.R. Part 51, Entergy performed SAMA analyses for both initial Point Nuclear Generating Online renewal application and related correspondence with the NRC Staff, Entergy indicated that it would submit the potentially cost-beneficial SAMAs for each unit. In its license internal engineering project cost-benefit analysis, even though none of the potentially cost-beneficial SAMAs is related to aging management under 10 C.F.R. Part 54. Entergy contracted RCM Technologies to assist it in this effort.

This package provides a conceptual design and implementation cost estimate for SAMA IP2-060 in accordance with Entergy design engineering practices.

For SAMA IP2-060, resolution is required to prevent flooding at Elevation 15' -0" in stairwell 4 and from entering the adjacent 480VAC Switchgear Room (switchgear room).

The stainwell also serves as a passageway to the entrance of the switchgear room. This package provides for a conceptual design to prevent water from entering the switchgear room in the event of a pipe rupture in the stainwell. The package will provide a design that will exhaust the water from the stainwell to a non-critical area in the event of a pipe rupture. The water needs to be exhausted from this area as quickly as possible before it floods the adjacent electrical switchgear room.

Sealing the switchgear room from flooding will be accomplished by replacing the room entry door with a solid door. More essential is the need for exhausting the water from the stairwell in the event of a pipe rupture. This is required to prevent severe flooding in the switchgear room. An escape path will be provided for this constrained water to discharge to a suitable area outside the stairwell.

Prepared by:	Approved by:
Date: 9-20-20/2	Date: 9-20-2012

		ENTERGY NUCLEAR NORTHEAST IMPLEMENTATION ESTIMATE Indian Roint Nuclear Review Station
* ECT		
E31		EC #: SAMA IP2-060
	Conceptual	PROJECT TITLE: SWGR Water Intrusion Protection ESTIMATOR: RCMT
	Preliminary	JOB LOCATION:U1 Superheater Bldg-Stairwell 4 PROJECT CODE: TBD
	Definitive	ORIGINATOR ORIG DATE: 6-19-2012
140.000		
item		Description
1.	This estimate ass	sumes that this work will not require outage conditions to complete
2	This estimate ass	umes that this work will complete during 2014 working a 10 hours per shift, four days per week schedule
<u> </u>	This estimate and	where a that this work will get get a start working a to redict per branch and a get per work deficiency.
3.	i nis estimate ass	sumes that this work will not suffer productivity loss due to radiation, nazardous conditions or QC hold points.
4.	This estimate ass	umes that all work will be performed by trained contract craftspersons in lieu of station maintenance personnel.
5	This estimate ass	sumes that scaffodling will be required for conduit installation and wire pulling in the stainwell
<u> </u>	This optimate and	umas the detection devices meanting bracket will be febriated in the party in the devices
0.	This estimate ass	unies the detection devices mounting blacket will be labricated in the shop.
7.	This estimate ass	sumes a blank annunciator panel is available for use in the Unit 2 Control Room.
8	This estimate ass	umes that core boring is required between EL 15' - 0" and 33' - 0" cable spreading area.
	This estimate dee	a net include funding for unreviewed oper unreviewed and the added
<u> </u>	This estimate doe	is not include funding for unreviewed safety questions of fixed submittais, but inreduited the additional cost will be added.
10	This estimate is b	ased on the project's current level of scope definition and is classified Class 4 as defined per the AACE International Cost
10.	Estimate Classific	cation System (see Attachment 3, Reference 2).
	Labor dellars in 4	in astimate are projected 2014 easts based on ourset 2012 areft billing rates at Indian Daint. The projected casts are ide
11	Labor dollars in th	is estimate are projected 2014 costs based on current 2012 crart bining rates at moran Point. The projected costs provide
	for anticipated bill	ing rate increases of 3% per year.
	This estimate allo	ws for and includes a contingency factor related to the complexity and location of the work required. The factor is
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	cumulative and pr	
	A. Outside f	ence boundary - 20%
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	D. Inside Co	ontainment - 50%
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INDIAN POINT IMPLEMENTATION ESTIMATE WORK SHEET EC #: SAMA IP2-060

11-0 PROJECT TITLE: SWGR Water Intrusion Protection TAKEOFF 08M PROJECT CODE: TBD ESTIMATOR: RCMT JOB LOCATION:U1 Superheater Bldg-Stairwell 4 EST. STATUS: OUTAGE NON-OUTAGE ORIGINATOR ORIG. DATE: 6-19-2012 MATERIAL & MATERIAL LABOR | PER UNIT DOLLARS DOLLARS MANHOURS QTY UOM CFT NO. UNIT FCTR TOTAL \$/MH SUB-CONTRACT TOTAL \$ ITEM DESCRIPTION ESTIMATE SUMMARY * ESTIMATE LEVEL MANHOURS DOLLARS V Conceptual Preliminary EOI ENGINEERING 16,000 01 STUDY, DESIGN, & CLOSEOUT 160 \$ Definitive DESIGN ENGR CONST SUPPORT 02 80 \$ 8,000 MODS ENGR EOI SUPPORT General Notes: 03 \$ SYS ENGR/ S-U ENGR PROJECT MANAGEMENT 04 106 \$ 19 600 05 300 36,000 06 WORK MANAGEMENT ŝ 07 TESTING 20 2,000 \$ \$ ENGINEERING DCP ACCEPTANCE REVIEW 08 40 4.000 CONTRACT ENGINEERING 09 DESIGN ENGR CONTRACT SUPPORT 800 96,000 \$ 09 SUPL CONTRACT MODS ENGR MODS PLAN & SCHED -CONTRACT FIELD ENGRS / PLANNERS 10 ŝ 20 \$ \$ 2,000 11 12 80 9,600 MATERIALS / MISC CONTRACTS \$ 13 14 MATERIALS 7.856 14 OTHER CONTRACTS Ś SWEC CRAFT LABOR/WALKDOWN 714 71 15 \$ 80 707 9.771 16 \$ 17 SWEC DISTRIBS PLANT CRAFT LABOR \$ 22,067 18 19 MECH MAINT. ELECT MAINT \$ \$. 20 I&C 120 \$ \$ 12.000 21 CSG MISC EOI SUPPORT 22 23 QUALITY CONTROL 40 12 4,000 1,440 \$ TRAINING \$ 12 000 24 25 SIMULATOR CHANGES 120 \$ \$ \$ 80 9,600 HP/RP 26 MISC CONTRACT SUPPORT 27 QUALITY CONTR 40 QUALITY CONTROL \$ 3,200 NDE HP/RP 28 29 30 31 32 RADWASTE s NURSE -\$ ELEVATOR CONTRACTOR WASTE MANAGEMENT HOUSEKEEPING 33 34 35 36 37 EQUIPMENT RENTAL CONTRACTOR -VENDOR STOCKING DECONTAMINATION CONTACTOR . \$ 38 RBC'S Š SECURITY - Wackenhut 39 FIRE WATCH (Rover) SAFETY 40 \$ \$ 17 41 1,226 CONTINGENCY 42 CONTINGENCY 101,360 \$ \$ 2.910 ESTIMATE SUBTOTAL SITE ENCUMBRANCE PREMIUM (20%) 91,685 Loaders (30%) \$ 166,034 ESTIMATE TOTAL 715,145 2,304 2,304 1,536 СР 96.00 LT 2 12.00 1.00 24 ******************* Gather and stage tools and materials Remove switchgear room louvered door Procure, install and align new solid steel fire door 2 FΑ CP 8.00 1.00 16 96.00 \$ \$ \$ \$ \$ \$ \$ 2,304 5,493 2,754 5,493 12.00 1.00 24 96.00 450.00 450 3 ĒA CP 22 \$ Gather hinged mechanical damper for installation in Unit 1 door Cut and modify unit 1 door to install hinged mechanical damper 1.00 40 137.33 4 EA IW 20.00 40.00 137.33 137.33 \$ 300.00 \$ 5,000.00 300 5,000 5 FA 1.00 80 \$ \$ \$ \$ 10,986 11.286 i\A. 2 2 2 2 2 40 5,493 10,493 1.00 6. 7. Install hinded mechanical damper in Unit 1 door. 1 EA IW Procure & install level detector and support ĒA 4.00 1.00 1.00 8 12 123.32 96.00 \$ 125.00 ŝ 125 5 987 1,112 1,152 F١ СP 6.00 1,152 Stage, erect and modify scaffolding as required ****** 8 LT 6 54 12 Stage, erect and modify scaffolding as required Procure & install conduit to connect level detector 1.00 78.65 9. 10 LТ 1 B 6.00 472 472 2.00 3.00 10.00 180 0.075 123.32 540 6,659 7,199 EL 2 2 2 2 2 2 2 2 2 2 6.00 123.32 \$ \$ 1,480 11 Procure and install Junction Box 1 EA EL \$ \$ 10 1,490 2.00 1.00 1.00 24 20 123.32 123.32 rocure and intall conduit supports 6 6.00 36 2,960 2,996 12 2,466 2,466 13 Core boring for routing new conduit and wiring Remove Control Room fire seal and route new wiring 1 ٤T EL 10.00 2.00 1.00 20 19 2 EA EL 123.32 2 466 2 466 LF 123.32 300 125 2,343 2,643 240 \$ \$ \$ 1.25 Procure & install wiring from stairwell to Control Room 15 EL Procure & install new alarm window in Control Panel Replace and test Control Room fire seal as required FA F١ 12.00 1.00 24 123.32 125.00 \$ 2.960 3.085 16 6.00 1.00 12 123.32 125.00 125 1,480 1,605 EL 17 LT 18 Terminate Level detector and annunciator winng Dismantle & store scaffolding 1 ΕA EL 4.00 1.00 123.32 493 493 121 4 8 4 \$ \$ \$ 4.00 96.00 78.65 1.00 766 768 LT СР \$ 19 315 \$ 20 21 Dismantie & store scattolding LT LB 1.00 \$ 315 16.00 1.00 32 123.32 \$ ŝ 3,946 \$ 3,946 2 2 2 2 Test level detector and annunciator \$ 987 \$ 987 22 Cleanup and restore area LT EL 4.00 1.00 8 123.32 23 Cleanup and restore area LT BL IW 4.00 1.00 8 8 \$ \$ 90.09 \$ \$ 721 \$ \$ 721 1 ŝ 1,099 24 Cleanup and restore area 1 LT 4.00 1.00 137.33 1,099 PAINTING & TOUCH-UP REQUIREMENTS PAINTING & TOUCH-UP PT 1.00 20 \$ 95.16 \$ 20,00 400 1,903 \$ \$ 2,303 ĹΤ 1 20.00 \$ \$ 1. 1 2 PAINTING & TOUCH-UP PT \$

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RBC's SECURITY

SAFETY (2%)

LOST TIME

FIREWATCH (Rover)

NURSE ELEVATOR CONTRACTOR WASTE MANAGEMENT HOUSEKEEPING

PRO	JECT TITLE: SWGR Water Intrusion Protection					20 1. 04		IT CADITO			1 OBM			TAKEOFE		
JOB	LOCATION:U1 Superheater Bidg-Stairwell 4					i		PROJE	ČT (CODE: TE	BD			ESTIMATOR	C RCMT	
EST.	STATUS: OUTAGE IN NON-OUTAGE	,						ORIGIN	IATC	DR:				ORIG. DATE	6-19-2012	
ITEN	DESCRIPTION	OTY	LION	CET	NO	LINIT	ANHOURS	TOTAL	r	¢/MH	MATERIAL S	MATER	AL DC	LABOR	SUB-	TOTAL
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2.	CRAFT SUPPORT FOR BOTTLE WATCH	1	LT	FW				-				s	-	s -		\$ -
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	PUPTOTAL							PEE						77 555		£ 90.068
	30BTOTAL							050				3 /	,41)	\$ 73,000		\$ 00,000
	* RELATED COSTS *	ł .														
1.	WALKDOWN ALLOWANCE	1	LT	EL	(7	\$	123.32				\$ 863		\$ 863
2.	WORK PACKAGE REVIEW	1	LT	EL		. 1		28	5	123.32				\$ 3,453		\$ 3,453
3.	CENEDAL CRAFT OUTAGE DISTRIPS (10%)	1	LI	EL				23	•	123.32				\$ 7355.50		\$ 7,830
5	CRAFT IN PROCESSING (20%)													\$ 14 711 00		\$ 14711
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7.	(1/2 day training, or ~ 2%)															
	SUBTOTAL							714				\$ 7	,411	\$ 102,774	\$-	\$ 110,185
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1.	MODS ENGINEERING	1	LT	NM										\$-		\$~
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3.	SYSTEMS ENGINEERING - MECHANICAL	1	LT	NM				-						s -		\$ -
4.	SYSTEMS ENGINEERING - ELECTRICAL		LT	NM	1	80.00	1.00	80	5	100.00				\$ 8,000		\$ 8,000
о. 6	STOLEMO EINGINEERING - INOTR & CONTROL			NM		30.00	1.00		2	100.00				\$ 3,600		5 3,000
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9.	QA / QC VERIFICATION	1	LT	NM	1	40.00	1.00	40	\$	100.00				\$ 4,000		\$ 4,000
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2.	MODS PLANNING & SCH SWEC (Incl Per Diem)	1	LT	NM	1	20.00	1.00	20	\$	100.00				\$ 2,000		\$ 2,000
3.	FIELD ENGRS/PLAN- SWEC(Incl Per Diem)	1	LT	NM	1	80.00	1.00	80	\$	120.00				\$ 9,600		\$ 9,600
4.	QA / QC VERIFICATION	1	LT	NM	1	40.00	1.00	40	\$	80.00				\$ 3,200		\$ 3,200

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INDIAN POINT IMPLEMENTATION ESTIMATE WORK SHEET EC #: SAMA IP2-060

7/5/2012 4:51 PM SAMA IP2-060 ESTIMATE PREVENT WATER INTRUSION OF THE 480 VAC SWG ROOM FROM STAIRWELL 4 (6-19-12).xis

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7.411 \$ 231.211

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(10%)

SUBTOTAL CRAFT/NON-MANUAL

EQUIPMENT RENTAL CONTRACTOR

DECONTAMINATION CONTRACTOR

Page 3 of 3

7/5/2012 4:51 PM SAMA IP2-060 ESTIMATE PREVENT WATER INTRUSION OF THE 480 VAC SWG ROOM FROM STAIRWELL 4 (6-19-12).xls

Rev	INDIAN POINT IMPLEMENTATION ESTIMATE WORK SHEET													
11-0	الم الح الح الح الح الح الح الح الح الح الح													
JOB EST	OECT TITLE: SWGR Water Intrusion Protection B LOCATION:U1 Superheater Bidg-Stairwell 4 I. STATUS: D Outrage I7 Non-Ontage						CAPITAL DOBM PROJECT CODE: TBD ORIGINATOR:					TAKEOFF: ESTIMATOR: RCMT ORIG DATE: 6-19-2012		
					M	ANHOURS MATERIAL S MA			MATERIAL	LABOR	SUB-			
TEN	DESCRIPTION	QTY	MOU	CFI	NO.	UNIT	FCIR	TOTAL	\$/MH	PER UNIT	DOLLARS	DOLLARS	CONTRACT	TOTAL \$
	SUBTOTAL INSTALLATION COST							1,056			\$ 7,856.00	\$ 231,211	\$ -	\$ 239,067
1. 2. 3. 4. 5. 6. 7.	DESIGN ENGINEERING - MECHANICAL DESIGN ENGINEERING - ELECTRICAL DESIGN ENGINEERING - INSTR. & CONTROL DESIGN ENGINECTING - CIVIL/STRUCTURAL TESTING (Instrument Calibration and testing) CONTRACT ENGR DESIGN SUPPORT DESIGN ENG. DCP ACCEPTANCE REVIEW SUBTOTAL DESIGN COST	1 1 1 1 1 1		NM NM NM NM NM	1 1 2 1 1	40 80 40 10.00 800.00 40.00	1.00 1.00 1.00 1.00 1.00 1.00	40 80 40 20 800 40 1,020	\$ 100.00 \$ 100.00 \$ 100.00 \$ 100.00 \$ 120.00 \$ 100.00			\$ - \$ 4,000 \$ 8,000 \$ 4,000 \$ 2,000 \$ 4,000 \$ 22,000	\$ - \$ 96,000	\$ - \$ 4,000 \$ 8,000 \$ 4,000 \$ 2,000 \$ 2,000 \$ 118,000
					<u> </u>								70.000	0.007.007
┣	SUBTOTAL INSTALLATION & DESIGN COST	+								4	a 7,856	\$ 253,211	3 76,800	\$ 337,867
1.	CONTINGENCY (30%)													\$ 101,360
	ESTIMATE SUBTOTAL							2,910						\$ 439,227



ENTERGY INDIAN POINT NUCLEAR STATION UNIT 2

CONCEPTUAL DESIGN PACKAGE For

SAMA IP2-061

Prevent water intrusion of the 480VAC Switchgear Room as a result of flooding in the adjacent Fire Protection Deluge Room

Prepared by:	Approved by:
Date: 9-20-2012	Date: y-200 - 2002

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SECTION	TITLE	PAGE
1.0	ISSUE	3
2.0	BACKGROUND	3
3.0	EXISTING CONDITIONS	3
4.0	DESIGN CONSIDERATIONS	4
5.0	CONFIRMATION OF DESIGN	4
6.0	RECOMMENDED SOLUTION	5
7.0	PRELIMINARY MATERIAL LIST	6
Attachment 1	Entergy Impact Screening Summary	
Attachment 2	Conceptual Design Sketches	
Attachment 3	References	
Attachment 4	Cost Estimate	



1.0 ISSUE

Severe Accident Mitigation Alternative (SAMA) IP2-061:

Prevent water intrusion of the 480VAC Switchgear Room as a result of flooding in the adjacent Fire Protection Deluge Room

2.0 BACKGROUND

In accordance with NRC environmental regulations in 10 C.F.R. Part 51, Entergy performed SAMA analyses for both Indian Point Nuclear Generating Units 2 and 3 as part of its license renewal application. Those analyses identified a number of potentially cost-beneficial SAMAs for each unit. In its license renewal application and related correspondence with the NRC Staff, Entergy indicated that it would submit the potentially cost-beneficial SAMAs for further internal engineering project cost-benefit analysis, even though none of the potentially cost-beneficial SAMAs is related to aging management under 10 C.F.R. Part 54. Entergy contracted RCM Technologies to assist it in this effort.

This package provides a conceptual design and implementation cost estimate for SAMA IP2-061 in accordance with Entergy design engineering practices.

For SAMA IP2-061, resolution is required to prevent flooding in the Fire Protection Deluge Room (deluge room) from entering the adjacent 480VAC Switchgear Room (switchgear room).

The deluge room also serves as the passageway to the entrance of the switchgear room. This package provides for a conceptual design to prevent water from entering the switchgear room in the event of pipe rupture in the deluge room. The package will provide a design that will exhaust the water from the deluge room to a non-critical area in the event of a pipe rupture. The water needs to be exhausted from this area as quickly as possible to avoid flooding of the adjacent electrical switchgear room.

The design considerations that follow will address the resolution's adequacy and the basis for the recommendation to resolve the identified potential issue.

The recommended solution will include descriptive details of the design change and also conceptual design sketches as required. These descriptive details, sketches, and the preliminary material list provide the basis for initiating the all-inclusive conceptual final cost estimate for EC development and implementation at the Station.

3.0 **EXISTING CONDITIONS**

There is fire protection system piping in the deluge room, immediately adjacent to the switchgear room, which can potentially rupture. The piping varies in size up to ten-inches in diameter.

The entry door to the deluge room is part of the fire zone boundary and is a solid one-piece steel door. In the event of a pipe break in the room, it is assumed that sufficient water cannot escape through that passageway to prevent damage to the 480V Switchgear.

Inside the deluge room, there is an entry door to the switchgear room. This door has louvered openings in the lower half and is not able to prevent water resulting from a pipe rupture from entering the room.

Resolution for the problem with the existing switchgear room door is required. In addition, once this door has been modified, a solution will be required to remove water accumulation in the deluge room as a result of a pipe rupture.

4.0 **DESIGN CONSIDERATIONS**

The existing solid entry door to the deluge room must be retained since it is part of the current fire zone boundary.

The louvered entry door (from the deluge room) to the switchgear room must be replaced with a solid door so that water will be kept from entering the switchgear room.

The dual solid-door concept provided here is intended to capture the ruptured pipe water trapped between the two solid doors of the deluge room. In turn, an escape path will need to be provided for this constrained water to discharge to a suitable area outside the deluge room.

In the event deluge piping in the Unit 2 Transformer Deluge Room ruptures causing the deluge room to begin filling with water and causing the proposed blow out panels to open, the water will exit via the stair tower #3 and flood the Unit #1 cellar. With a maximum rate of 7,000gpm the accumulated water in one hour would be approximately 400,000 gallons. This will probably fill the cellar and eventually spill up over the south stair way and flow into the 15' yard. This flooding poses no threat to the Unit 2 safe shut down but will require a substantial effort to clean up and return the non essential equipment to service.
5.0 CONFIRMATION OF DESIGN

"Sealing" the switchgear room from flooding is the first step. This will be done by replacing the room entry door with a solid door. Exhausting the water from the deluge room in the event of a large deluge room pipe rupture also is required to prevent severe flooding of the switchgear room. Considering the size of the pipe being dealt with, a large discharge relief portal is necessary.

This design will install two (2) pressure release (blow-out) panels in the deluge room's south wall (Attachment 2, Figure 2). The blow-out panels will be 3 HR fire rated equal to the removed fire wall section. PSA flooding analysis assumes a flow rate of approximately 5,000GPM as a result of a guillotine type line failure in the 10 inch line with a maximum flow rate of 7,500GPM upon pump activation. Two (2) openings of 24" wide by 24" high will be required based upon this flow rate.

The blow-out panels are located vertically in line to minimize the amount of rebar that would be required to be cut, thus minimizing the impact to the structural integrity of the wall in order to install blow out panels.

Wiring is required for a new alarm to be routed to the Control Room's annunciator at Elevation 53'-0" to indicate the occurrence of a valve station flood.

Wiring is also required for one (1) new flashing strobe light, located in the Unit 2 Turbine Building adjacent to the door to the Fire Protection Deluge Room.

Additional steel bracing will be added to areas of the walls as required.

RECOMMENDED SOLUTION 6.

- 1. Replace the switchgear room's louvered entry door with a solid door.
- 2. Modify and reinforce the deluge room's south wall for installation of the two (2) blow-out panels.
- 3. Install the two 3 HR fire rated blow-out panels as indicated.
- Install two (2) limit switches on each 3 HR fire rated blow-out panel as 4. indicated.
- 5. Provide alarm connection from the limit switches to the annunciator
 - Install wiring in conduit raceway from the limit switches in the Deluge • Valve Station at Elevation 15'-0" up to the cable spreading area at Elevation 33'-0"
 - Continue routing wiring in cable trays at Elevation 33'-0" up to the

annunciator in the Control Room at Elevation 53'-0"

- 6. Connect wiring to new "EL. 15 FT DELUGE VALVE STATION FLOOD" alarm window in the Control Room's Supervisory Panel annunciator
- 7. Install flashing strobe light outside of door entrance to deluge room warning of valve station flood.
- 8. Provide power wiring from the strobe light to the distribution panel
 - a. Install wiring in conduit raceway from the strobe light at Elevation 15'-0" up to the cable spreading area at Elevation 33'-0"
 - b. Continue routing wiring in cable trays at Elevation 33'-0" up to the distribution panel in the Control Room at Elevation 53'-0"
- 9. Provide procedures for limit switch calibration and setpoint.
- 10. Provide procedure for flashing strobe light testing.
- 11. Provide procedures and training for mitigation relating to this condition.

7.0 PRELIMINARY MATERIAL LIST

<u>Ite</u>	m Description	<u>Quantity</u>
1.	Solid metal switchgear room entry door and frame	1
2.	2' wide x 2' high $-$ 3 HR fire rated pressure release panel	2
3.	Angle iron to reinforce wall openings	As Required
4.	Anchor bolts	As Required
5.	Limit switches for pressure release panel	4
6.	1" - Conduit	250 Feet
7.	Junction Box with terminal blocks	1
8.	125 VDC 2/c Cable 120 VAC 2/c Cable	200 Feet 200 Feet
9.	Flashing strobe light	1



Attachment 1

Entergy Impact Screening Summary



Engineering Change Process

ATTACHMENT 9.3

IMPACT SCREENING SUMMARY

SHEET 1 OF 6

INSTRUCTIONS:

Identify the potentially impacted and the unaffected areas by checking the appropriate **Yes** or **No** block on the Impact Screening Criteria.

If a direct determination cannot be made based on the impact screening questions, the detailed questions in Attachment 9.4 may be used to identify potential impacts.

The completion of detailed questions in Attachment 9.4 is recommended but not required.

Contact potentially impacted groups if assistance is required.						
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	-3 × 1 × 1 × 1			{ \/ \}~
Engineering Change No.	: IP2-061	Rev. No.:	DESIGN	PACKAGE

Prepared by:

Date:

DESIGN ENGINEERING DISCIPLINES	Potentia	al Impact
 Civil / Structural Design Engineering Does the proposed activity involve any civil / structural (including seismic) design changes, activities or affect coatings? OR Does the proposed activity involve any piping engineering design changes or activities? 	YES	□ NO
 Electrical Design Engineering Does the proposed activity involve any station or switchyard electrical design, large power transformers, or settings changes or activities? (SOER 10-1) 	☐ YES	X NO
 Instrumentation and Controls Design Engineering Does the proposed activity involve any I&C design or settings changes or activities? 	☐ YES	🕅 NO
 Mechanical Design Engineering Does the proposed activity add/remove/replace insulation, aluminum or other metallic/non-metallic sources of debris in the reactor/containment building or involve any mechanical design changes or activities? 	YES	□ NO
 PSA Engineering Does the proposed activity impact or involve changes to plant evaluations or probabilistic safety assessments? Does the proposed activity impact or involve changes to the Emergency Operating Procedures, Abnormal Operating Procedures, or Severe Accident Procedures or does it add, remove or modify SSCs included in a Maintenance Rule function? 	YES	□ NO
 Nuclear Analysis Does the proposed activity impact or involve changes to plant evaluations, Technical Specifications, Technical Requirements Manual, or require a full 50.59 Evaluation? 	YES	
 FERC / NERC Impact Does the proposed activity impact or involve change to FERC / NERC or Regional Entity compliance documents? (ex. MOU, ENN/ENS-PL-158, ENS-DC-199, etc.) 	☐ YES	X NO

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IMPACT SCREENING SUMMARY

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Engineering Change Process

ATTACHMENT 9.3

Sheet 2 of 6

DESIGN ENGINEERING PROGRAMS	Potential	Impact
 ASME Section III Specifications Does the proposed activity add, delete, or modify information required by ASME Section III to be contained in a design specification? 	□ YES	M NO
 Cable and Raceway Program Does the proposed activity involve any changes to cable trays, raceways or the associated documentation? 	JES	
 Electronic Databases (EDB) Does the proposed activity involve any changes to electronic databases? 	YES	
 EQ Program (10CFR50.49, NUREG 0588, Reg Guide 1.89) Does the proposed activity involve any new or existing EQ components? 	🗌 YES	X NO
 Hydrogen Control Program (10 CFR 50.44) (<i>if applicable</i>) Does the proposed activity impact equipment or materials related to hydrogen control? 	□ YES	X NO
 Human Factors Program Does the proposed activity involve control panel design including layout and labeling, visual displays, operator aids, auditory signals or environment in the control room, cable spreading room, and other control panel locations? 	YES	□ NO
 Margin Management Does the proposed activity impact or involve any change to design, licensing or operations margins? 	☐ YES	мо 🕅
 Reg. Guide 1.97 / PAM (Post Accident Monitoring) Does the proposed activity involve Reg. Guide 1.97 (Post Accident Monitoring) Indications? 	☐ YES	MO 🕅

MAINTENANCE	Potentia	Impact
 Electrical Maintenance Does the proposed activity require an Electrical Maintenance review to identify affected procedures, required actions and required training? 	YES	
 Maintenance Does the proposed activity require an I&C Maintenance review to identify affected procedures, required actions and required training? 	YES 📕	
 Mechanical Maintenance Does the proposed activity require a Mechanical Maintenance review to identify affected procedures, required actions and required training? 	YES	□ NO

NUCLEAR ENGINEERING		Potential Impact	
 Nuclear Fuel Design Does the proposed activity impact or involve the design, performance or storage of nuclear fuel? 	☐ YES	XXÍNO	
 Reactivity Management Program Does the proposed activity impact or involve the reactor system, reactor controls, reactor chemistry, related systems, potential core and spent fuel damage, spent fuel, reactor coolant pressure boundary or reactor system procedures? 	☐ YES	MO 🕅	



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Engineering Change Process

IMPACT SCREENING SUMMARY

ATTACHMENT 9.3

SHEET 3 OF 6

PROCESS OR PROGRAM IMPACT SCREENING CHECKLIST		Potential Impact	
Computer Support and Software	T YES	🕅 NO	
 Does the proposed activity impact or involve changes to plant computer software or firmware or impact Software Quality Assurance (SQA)? 			
Chemistry and Environmental Impact	TYES	X NO	
 Does the proposed activity impact or involve any changes to plant chemistry requirements, operations or procedures, or any changes to the environment? 			
Radiation Protection (RP) Program Impact	T YES	🕅 NO	
 Does the proposed activity impact or involve any changes to the RP program? Does the proposed activity involve the potential to introduce (or reintroduce) any cobalt containing materials (such as Stellite) into the primary system? 			
 Operations Does the proposed activity impact or involve changes to Operations procedures, training or operator actions? 	YES		
 Planning, Scheduling and Outage (PS&O) Does the proposed activity require a PS&O review to identify required design and installation information? 	☐ YES	X NO	
 MP&C (Inventory) Does the proposed activity impact or involve any addition or removal of equipment from the inventory? Does the proposed activity impact or involve any Procurement of Quality or Augmented Quality material from non-qualified suppliers? 	TYES	□ NO	
Procurement Engineering Does the activity impact or involve any procurement activities?	YES		

PROGRAMS AND COMPONENTS	Potentia	al Impact
 ASME Containment In-service Inspection (IWE / IWL) Program Does the proposed activity impact or involve the containment pressure boundary or associated moisture barriers or a support for the containment pressure boundary? This includes "software only" changes that do not physically change the hardware such as re-rating of pressures or temperatures to include changes to documented information on these items or additional documented information for these items. Does the proposed activity limit access to containment surfaces for inspection? Involve disassembly of a bolted connection which forms a portion of the containment boundary? 	☐ YES	X NO
 ASME Appendix J (Primary Containment Leak Rate Testing) Program Does the proposed activity impact or involve any changes to primary containment leak rate testing? 	T YES	X NO



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Engineering Change Process

IMPACT SCREENING SUMMARY

ATTACHMENT 9.3 SHEET 4 OF 6

PROGRAMS AND COMPONENTS (CONTINUED)	Potentia	al impact
 ASME In-service Inspection (ISI) Program Does the proposed activity add, delete, or modify an ASME Section XI pressure boundary item or a support for an ASME Section XI pressure boundary item? This includes "software only" changes that do not physically change the hardware like such as re-rating of pressures or temperatures. (ASME Section XI items include ASME Class 1, 2, 3, or B31.1 treated as ISI Class 2 or 3 (T2 and T3) components, parts, or appurtenances such as pipe or pressure vessel walls, valve bodies and pump casings. 	☐ YES	⊠ NO
 ASME Section XI Repair / Replacement Program Does the proposed activity involve any mechanical component within the ASME XI program / boundaries? Does the proposed activity add, delete, or modify an ASME Section XI pressure boundary item or a support for an ASME Section XI pressure boundary item? (ASME Section XI items include ASME Class 1, 2, 3, MC, and CC, as well as B31.1 treated as ISI Class 2 or 3 (T2 and T3) components, parts, or appurtenances such as pipe or pressure vessel walls, valve bodies and pump casings). 	☐ YES	X NO
 ASME In-service Testing Program Does the proposed activity impact or involve any item (safety related or non safety related) that may affect the performance or testing of a safety related pump or valve? Does the proposed activity impact the function or functional classification of any pump or valve as stated in the IST program documents? 	T YES	MO 🕅
 Air Operated Valve (AOV) Program Does the proposed activity impact or involve the design, operation or testing of AOVs? 	T YES	XX NO
 Buried Piping and Tanks (BP&T) Program Does the proposed activity impact or involve any changes to piping, coatings, or cathodic protection of Buried Piping & Components? 	T YES	M NO
 Boric Acid Corrosion (BAC) Program Does the proposed activity impact or involve any increase in the likelihood of boric acid formation or corrosion? 	T YES	⊠ÍNO
 Check Valve Program Does the proposed activity impact or involve the design, operation or testing of check valves? 	T YES	🕅 NO
 Control Room Habitability Program Does the proposed activity impact or involve changes that affect the temperature or radiological environmental conditions in the Main Control Room? 	☐ YES	X NO
Electrical Circuit Breaker, Relay and Electrical Equipment Testing Does the proposed activity impact or involve changes to the functional testing of circuit breaker, relay or electrical equipment?	☐ YES	🕅 NO



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Engineering Change Process

ATTACHMENT 9.3 SHEET 5 OF 6 IMPACT SCREENING SUMMARY

PROGRAMS AND COMPONENTS (CONTINUED)	Potentia	al Impact
 Flow Accelerated Corrosion (FAC) Program Does the proposed activity involve any changes (e.g.: configuration, velocity, flow rate, pressure, temperature, material, weld location, etc.) to piping systems included in the FAC Program.? 	☐ YES	M NO
 Heat Exchanger Program Does the proposed activity impact or involve the design, operation or testing of a component in the heat exchanger program? 	☐ YES	M NO
 Predictive Maintenance Program Does the proposed activity impact or involve any aspect of the storage, use and testing of lubricants? Does the proposed activity involve thermography? Does the proposed activity involve vibration monitoring? 	T YES	M NO
 Microbiological Induced Corrosion (MIC) Program Impact Does the proposed activity involve piping containing untreated or stagnant water or open to the atmosphere? 	TES .	🕅 NO
 Motor Operated Valve (MOV) Program Does the proposed activity impact or involve the design, operation or testing of MOVs? 	☐ YES	M NO
 Plant Thermal Performance Program Does the proposed activity impact or involve plant thermal performance? 	□ YES	🕅 NO
 Preventive Maintenance Program Does the proposed activity impact or involve periodic testing or performance of SSCs? or Does the proposed activity add, modify or delete any Environmental Qualification (EQ) maintenance requirement or replacement frequency to ensure the component(s) maintains its gualification status? 	YES	□ NO
 PT Curves Does the proposed activity add, delete, or modify the basis (as contained in each sites reactor vessel surveillance material testing program) for the Pressure / Temperature Limit Curves (fluence, pressure, temperature, reactor materials)? 	☐ YES	X NO
 Relief Valve Program Does the proposed activity impact or involve the design, operation and testing of relief valves, safety valves, vacuum breaker valves or rupture disc? 	☐ YES	🕅 NO
 RPV Internals Program Does the proposed activity impact or involve any change to the reactor internals? This includes "software only" changes that do not physically change the hardware such as re-rating of pressures or temperatures. Does the proposed activity impact or involve or related documentation to include neutron fluence or neutron fluence calculations? Does the proposed activity impact or involve or changes to core flow characteristics or core flow characteristics? 	☐ YES	X NO



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Engineering Change Process

IMPACT SCREENING SUMMARY

ATTACHMENT 9.3

SHEET 6 OF	6
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PROGRAMS AND COMPONENTS (CONTINUED)	Potential Impact		
 Welding Program Does the proposed activity impact or involve a special process, such as welding, brazing or soldering? 	YES		
 Safety Program Does the proposed impact or activity involve personnel or industrial safety? 	YES		
 System Engineering Does the proposed activity impact or involve any changes to system configuration, function or performance, etc., for Maintenance Rule or other system? Does the proposed activity impact or involve any changes to system procedures, maintenance or operation, etc.? 	YES	□ NO	
 Training Program Does the proposed activity involve existing training requirements or create the need for new training? 	YES		
 Simulator Impact Does the proposed activity impact or involve changes to the Simulator? 	YES		
 Fire Protection Program Does the proposed activity result in a change to the Fire Protection Program (including 10CFR50 Appendix R) where the impact is more than negligible? 	YES	□ NO	

Detailed Impact Screening (Attachment 9.4) Attached?	□ YES	🕅 NO
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Engineering Change Process

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ATTACHMENT 9.3 SHEET 6 OF 6

IMPACT SCREENING SUMMARY

PROGRAMS AND COMPONENTS (CONTINUED)	Potential Impact		
 Welding Program Does the proposed activity impact or involve a special process, such as welding, brazing or soldering? 	関 YES		
 Safety Program Does the proposed impact or activity involve personnel or industrial safety? 	YES		
 System Engineering Does the proposed activity impact or involve any changes to system configuration, function or performance, etc., for Maintenance Rule or other system? Does the proposed activity impact or involve any changes to system procedures, maintenance or operation, etc.? 	YES 🕈	D NO	
 Training Program Does the proposed activity involve existing training requirements or create the need for new training? 	🖉 YES		
 Simulator Impact Does the proposed activity impact or involve changes to the Simulator? 	YES		
 Fire Protection Program Does the proposed activity result in a change to the Fire Protection Program (including 10CFR50 Appendix R) where the impact is more than negligible? 	YES	ОИ 🗌	

Detailed Impact Screening (Attachment 9.4) Attached?	🗆 YES	M NO

Attachment 2

Conceptual Design Sketches

- 1. Figure 1: EQUIPMENT ARRANGEMENT CONTROL BUILDING AT EL. 15'-0" – PRESSURE RELEASE PANEL
- 2. Figure 2: CONTROL BUILDING FLOOR PLANS & SECTIONS AT EL. 15'-0" – PRESSURE RELEASE PANEL
- 3. Figure 3: EQUIPMENT ARRANGEMENT CONTROL BUILDING AT EL. 33'-0" – CONDUITS DUMPING INTO CABLE TRAYS



IPEC00270061





Attachment 3

References

- 1. ENTERGY Nuclear Management Manual, Engineering Change Process, Rev 11
- Association for the Advancement of Cost Engineering (AACE),
 Cost Estimate Classification System As Applied In Engineering, Procurement, and Construction for the Process Industries
 - TCM Framework: 7.3 Cost Estimating and Budgeting
 - Figure 4 Estimate Checklist & Maturity Matrix
- 3. CENTRIA Architectural Metal Wall and Roof Systems
 - Pressure Relief Walls (included here)



PARTNERS IN POWER



Pressure Palaza Wels



The dangerous potential for explosions in power generating facilities requires design solutions that provide protection. With pressure release panels, only a portion of a wall will ever blow away. This relieves the pressure inside an area and diminishes the amount of overall damage to the facility.



Ren Robert Starting

- The holes in the attachment item, whether it is a panel or a panel attachment clip are larger than the fastener head.
- A special washer is placed between the oversized hole and fastener head.
- These washers are designed to fail at certain pressure, thus allowing the attachment item to pass over the head of the fastener. This will allow the section of wall to release from the supports.

This section of wall is framed together and held from falling to the ground by restraining cables.



2 | PAPTHERS CUPCHER



Attachment 4

Cost Estimate

ENTERGY NUCLEAR NORTHEAST											
IMPLEMENTATION ESTIMATE											
Indian Point Nuclear Power Station											
* ESTIMATE LEVEL *	ESTIMATE LEVEL * EC #: SAMA IP2-061										
Conceptual	PROJECT TITLE: SWGR Water In	OJECT TITLE: SWGR Water Intrusion Protection ESTIMATOR: RCMT									
Preliminary	JOB LOCATION: Fire Protection I	Deluge Room	PROJECT CODE: TB	D							
Definitive	OUTAGE NON-OUTAGE	ORIGINATOR:		ORIG. DATE: 06/11/2012							
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Prepared by: Approved by:											
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┣┿-	Definitive	JOB LOCATION: Fire Protection Deluge Room PROJECT CODE: TBD							
	Dennuve								
Item		Description							
1.	This estimate assur	nes that this work will not require outage conditions to complete							
2.	This estimate assur	nes that this work will complete during 2014 working a 10 hours per shift, four days per week schedule.							
3.	This estimate assur	nes that this work will not suffer productivity loss due to radiation, inazardous conductions of QC noid points							
4.	This estimate assur	these that all work will be performed by inamed contract clarifypersons in led of station maintenance personner.							
<u> </u>	This estimate assur	hes that deluge four source with the participation of the participation							
7	This estimate assu	nes a blak appungister appal is available for use in the Unit 2 Control Room							
	This estimate assur	hes that scaffolding will be regired for conduit installation and wire pulling in the stainvell							
9	This estimate assur	nes that core boring is required between El. 15' - 0" and 33' - 0" cable spreading area.							
10.	This estimate does	not include funding for unreviewed safety questions or NRC submittals, but if required the additional cost will be added.							
	This estimate is bas	ed on the project's current level of scope definition and is classified Class 4 as defined per the AACE International Cost							
1 11.	Estimate Classifica	ion System (see Attachment 3, Reference 2).							
12	Labor dollars in this	estimate are projected 2014 costs based on current 2012 craft billing rates at Indian Point. The projected costs provide							
L ^{12.}	for anticipated billin	g rate increases of 3% per year.							
12	This estimate allow:	s for and includes a contingency factor related to the complexity and location of the work required. The factor is cumulative							
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	A. Outside fer	ice boundary - 20%							
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4 4 CONTINGENCY 5 171,059 ESTIMATE SUBTOTAL U-OADERANCE PREMIUM 3,366 \$ 509,706 \$ 119,741 1 Gather and stage tools and materials 1 LT CP 2 12,00 1,00 24 \$ 96,00 \$ - \$ 2,304 \$ 2,304 2 Remove switchgeer room louvered door 1 EA CP 2 0,00 100 16 \$ 96,00 \$ 2.304 \$ 2,304 \$ 2,304 \$ 2,304 \$ 2,304 \$ 2,304 \$ 2,304 \$ 2,304 \$ 2,304 \$ 2,304 \$ 2,304 \$ 2,304 \$ 2,204 \$ 2,00 1,00 16 \$ 96,00 \$ 5 \$ 5,7207 \$ 7,207 \$ 7,207 \$ 7,207 \$ 7,207 \$ 3,366 \$ 1,156 \$ 1,156 \$ 1,156 \$ 1,156 \$ 1,156 \$ 1,156 \$ 1,156 \$ 1,156 \$ 1,156 \$ 1,156 \$ 1,156 \$ 1,156 \$ 1,156 \$ 1,156 \$ 1,156 \$ 1,156 \$ 1,152 \$ 1,152 \$ 1,152 \$ 1,152 \$ 1,152 \$ 1,152 \$ 1,152 \$ 1,152 </td <td></td> <td></td> <td></td> <td></td> <td></td> <td>41 CONT</td> <td>INGE</td> <td>SAFETY ENCY</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>23</td> <td></td> <td>\$</td> <td>1,659</td> <td></td> <td></td>						41 CONT	INGE	SAFETY ENCY						23		\$	1,659		
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Estimate TOTAL \$ 833,881 1. Gather and stage tools and materials 1 LT CP 2 12.00 1.00 24 \$ 96.00 \$ - \$ 2.304 \$ 2.304 2. Remove switchgear room louvered door 1 EA CP 2 8.00 1.00 16 \$ 96.00 \$ - \$ 2.304 \$ 2.304 \$ 2.304 3. Procure, install and align new solid steel fire door 1 EA CP 2 12.00 1.00 24 \$ 96.00 \$ 2.50.0 \$ 2.304 \$ 2.304 \$ 2.554 4. Cut & reinforce deluge room wall for blow out panels 1 LT IV 2 40.00 1.00 80 \$ 90.09 \$ - \$ 7.207 \$ 7.207 \$ 7.207 \$ 7.207 \$ 7.207 \$ 7.207 \$ 7.207 \$ 7.207 \$ 7.207 \$ 7.207 \$ 7.207 \$ 7.207 \$ \$ 31.973 \$ 5.00.00 \$ 10.900 \$ 2.1973 \$ 31.973 \$ 7.217 \$ \$ 31.973 \$ 5.00 \$ 3.946 \$ 4.448 \$ 5.3 \$ 472 \$ 472									NCUME	BRANCE	PREMIUM	(20	%)			\$	119,741		
1. Gather and stage tools and materials 1 LT CP 2 12.00 1.00 24 \$ 96.00 \$ - \$ 2.304 2. Remove switchgeer room louvered door 1 EA CP 2 8.00 1.00 24 \$ 96.00 \$ 250.00 \$ 250.00 \$ 2.304 \$ 2.304 \$ 2.304 2. Remove switchgeer room wall for blow out panels 1 LT BL 2.40.00 1.00 24 \$ 96.00 \$ 250.00 \$ 2.50.7 \$ 7.207 \$ 7.207 5. Cut & reinforce deluge room wall for blow out panels 1 LT IW 2 40.00 1.00 80 \$ 137.33 \$ 5.000.00 \$ 8.00 \$ 10.986 \$ 11.566 6. Procure & install 2 limit switches on 3 HR fire rated blow out panel 2 4.00 1.00 1.20 \$ 125.00 \$ 5.000.00 \$ 1.973 \$ 4.448 8. Stage, erect and modify scaffolding as required 1 LT EB 1.600 1.00 12 \$ 96.00 \$ 1.82 \$ 4.72 \$ 4.72 \$ 4.72 \$ 4.72 \$ 4.748 9. Stage, ere											ESTIM/		TOTA		1	\$	933,981		
2. Remove switchgeer room louvered door 1 EA CP 2 8.00 1.00 16 \$ 96.00 \$ 250.00 \$ 2.304 \$ 2.554 3. Procure, install and align new solid steel fire door 1 EA CP 2 12.00 1.00 24 \$ 96.00 \$ 250.00 \$ 2.304 \$ 2.554 4. Cut & reinforce deluge room wall for blow out panels 1 LT IW 2 40.00 1.00 80 \$ 90.00 \$ 5 \$ 7.207	.	1.	Gather and stage tools and materials	1	LT	СР	2	12.00	1.00	24	\$ 96.00			s -	\$ 2,304			\$	2,304
4. Cut & reinforce deluge room wall for blow out panels 1 LT BL 2 40.00 1.00 80 \$ 90.99 \$ - \$ 7,207 \$ 7,207 5. Cut & reinforce deluge room wall for blow out panels 1 LT IW 2 40.00 1.00 80 \$ 137.33 \$ 600.00 \$ 21,973 \$ 31,973 7. Procure & install 2 limit switches on 3 HR fire rated blow out panel 2 EA IW 2 4.00 1.00 32 \$ 123.32 \$ 125.00 \$ 21,973 \$ 31,973 7. panel as required 1 LT CP 2 6.00 1.00 12 \$ 96.00 \$ - \$ 1,152 \$ 1,152 9. Stage, erect and modify scaffolding as required 1 LT LP L 2 0.00 1.00 12 \$ 96.00 \$ - \$ 1,420 \$ 1,420 \$ 1,420 \$ 1,420 \$ 1,420 \$ 1,420 \$ 1,420 \$ 1,420 \$ 1,420 \$ 1,420 \$ 1,420 \$ 1,420 \$ 1,420 \$ 1,420 \$ 1,420 \$ 1,420 \$ 1,420 \$ 1,420 \$ 1,420 \$ 1,23.32 \$		2. 3.	Remove switchgear room louvered door Procure, install and align new solid steel fire door	1	EA EA	CP CP	2	8.00 12.00	1.00	16 24	\$ 96.00 \$ 96.00	\$	250.00	\$ - \$ 250	\$ 1,536 \$ 2,304		-	\$ \$	1,536 2,554
6. Procure & install 3 HR fire rated blow out panel 2 EA IW 2 40.00 1.00 160 \$137.33 \$5,000.00 \$10,000 \$21,973 \$31,973 7. panel as required 1 LT CP 2 6.00 1.00 32 \$123.32 \$125.00 \$500 \$3,946 \$4,448 8. Stage, erect and modify scaffolding as required 1 LT CP 2 6.00 1.00 12 \$96.00 \$5 \$5 \$1,152 \$1,140 \$1,140 \$1,140		4. 5.	Cut & reinforce deluge room wall for blow out panels Cut & reinforce deluge room wall for blow out panels	1	LT LT	BL	2	40.00 40.00	1.00	80 80	\$ 90.09 \$137.33	s	600.00	\$ - \$ 800	\$ 7,207 \$ 10,986			\$ \$	7,207
7. produce a instant 2 limits witches on S FIK the face blow out 4 EA EL 2 4.00 1.00 32 \$ 123.32 \$ 125.00 \$ 500 \$ 3,946 \$ 4,448 8. Stage, erect and modify scaffolding as required 1 LT CP 2 6.00 1.00 6 \$ 78,65 \$ - \$ 1,152 \$ 1,152 \$ 1,152 9. Stage, erect and modify scaffolding as required 1 LT LB 1 6.00 1.00 6 \$ 78,65 \$ - \$ 472 \$ 472 \$ 472 \$ 472 \$ 472 \$ 1,480 <td< td=""><td>e</td><td>5.</td><td>Procure & install 3 HR fire rated blow out panel</td><td>2</td><td>EA</td><td>iw</td><td>2</td><td>40.00</td><td>1.00</td><td>160</td><td>\$137.33</td><td>\$ 5</td><td>5,000.00</td><td>\$ 10,000</td><td>\$ 21,973</td><td></td><td></td><td>\$</td><td>31,973</td></td<>	e	5.	Procure & install 3 HR fire rated blow out panel	2	EA	iw	2	40.00	1.00	160	\$137.33	\$ 5	5,000.00	\$ 10,000	\$ 21,973			\$	31,973
8. Stage, erect and modify scarroding as required 1 LT LB 1 6.00 1.00 12 \$ 90.00 \$ - \$ 1,152 \$ 1,152 \$ 1,152 9. Stage, erect and modify scarroding as required 1 LT LB 1 6.00 1.00 6 \$ 76.65 \$ - \$ 1,152 \$ 472 \$ 472 10. Procure & instail conduit to connect limit switches 180 LF EL 2 0.08 2.00 54 \$ 123.32 \$ 3.00 \$ 540 \$ 6.659 \$ 7,199 11. Procure and instail junction Box 1 EA EL 2 2.00 1.00 12 \$ 123.32 \$ 1.00 \$ 540 \$ 6.859 \$ 7,199 12. Procure and instail junction Box 1 LT EL 2 1.000 1.00 24 \$ 123.32 \$ 1.050 \$ 125 \$ 2,960 \$ 2,960 \$ 2,961 13. Core & instail wiring from deluge room to Control Room 240 LF EL 2 1.000 1.00 24 \$ 123.32 \$ 1.25 \$ 3.00 \$ 2,343 \$ 2,643 \$ 2,643		7.	panel as required	4	EA	EL	2	4.00	1.00	32	\$ 123.32	\$	125.00	\$ 500	\$ 3,946			\$	4,448
10. Procure & install conduit to connect limit switches 180 LF EL 2 0.08 2.00 54 \$123.32 \$ 3.00 \$ 540 \$ 6.859 \$ 7,199 11. Procure and install junction Box 1 EA EL 2 6.00 1.00 12 \$123.32 \$ 10.00 \$ 1.480 \$ 1.480 \$ 1.490 12. Procure and intall conduit supports 6 EA EL 2 2.00 1.00 40 \$123.32 \$ 6.00 \$ 3.6 \$ 2.960 \$ 2.996 13. Core boring for routing new conduit and wiring 2 LT EL 2 10.00 1.00 40 \$123.32 \$ 125.00 \$ 125 \$ 2.960 \$ 2.996 14. Remove Fire barriers and seals 1 LT EL 2 0.04 1.00 19 \$123.32 \$ 125.00 \$ 2.343 \$ 2.643 15. Procure & install wring from deluge room to Control Room 240 LF EL 2 1.00 1.00 24 \$125.00 \$ 125 \$ 2.9460 \$ 3.085 17. Procure & in	9	э. Э.	Stage, erect and modify scatfolding as required Stage, erect and modify scaffolding as required	1		LB	1	6.00 6.00	1.00 1.00	12 6	\$ 96.00 \$ 78.65			s - s -	\$ 1,152 \$ 472			\$	472
12. Procure and intall conduit supports 6 EA EL 2 2.00 1.00 24 \$123.32 \$ 6.00 \$ 3.6 \$ 2,960 \$ 2,996 13. Core boring for routing new conduit and wiring 2 LT EL 2 10.00 1.00 40 \$123.32 \$ 6.00 \$ 3.6 \$ 2,960 \$ 4,933 \$ 4,933 14. Remove Fire barriers and seals 1 LT EL 2 10.00 1.00 40 \$123.32 \$ 125.00 \$ 125 \$ 2,466 \$ 2,591 15. Procure & install wring from deluge room to Control Room 240 LF EL 2 0.04 1.00 19 \$123.32 \$ 125.00 \$ 125 \$ 2,466 \$ 2,643 16. Procure & install wring from deluge room to Control Panel 1 EA EL 2 10.00 1.00 24 \$123.32 \$ 125.00 \$ 125 \$ 2,960 \$ 3,085 17. Procure & install wring trout eluge room 1 EA EL 2 20.00 1.00 12 \$125.00 \$ 125 \$ 2,960 \$ 2,960		0. 1.	Procure & install conduit to connect limit switches Procure and install Junction Box	180 1	LF EA	EL EL	2 2	0.08 6.00	2.00 1.00	54 12	\$123.32 \$123.32	\$ \$	3.00 10.00	\$ 540 \$ 10	\$ 6,859 \$ 1,480		1	\$ \$	7, 1 99 1,490
14. Remove Fire barriers and seals 1 LT EL 2 10.00 1.00 20 \$123.32 \$125.00 \$125 \$2,466 \$2,591 15. Procure & install wring from deluge room to Control Room 240 LF EL 2 0.04 1.00 19 \$123.32 \$125.00 \$2,343 \$2,466 \$2,643 16. Procure & install new alarm window in Control Panel 1 EA EL 2 1.00 1.00 24 \$123.32 \$125.00 \$125 \$2,960 \$3,085 17. Procure & install strobe light outside deluge room 1 EA EL 2 20.00 1.00 24 \$123.32 \$125.00 \$125 \$2,960 \$3,085 \$4,933 18. Replace and Test Seals 1 LT EL 2 6.00 1.00 12 \$123.32 \$125.00 \$125 \$1,480 \$1,605 \$1,605 \$2,960 \$2,960 \$2,960 \$2,960 \$2,960 \$2,960 \$2,960 \$2,960 \$2,960 \$2,960 \$2,960 \$2,960 \$2,960 \$2,960 \$2,960<	1	2. 3.	Procure and intall conduit supports Core boring for routing new conduit and wiring	6 2	EA LT	EL EL	2	2.00 10.00	1.00 1.00	24 40	\$123.32 \$123.32	\$	6.00	\$ 36 \$ -	\$ 2,960 \$ 4,933			\$ \$	2,996 4,933
15. Procure & instail wring from deluge room to Control Room 240 LF EL 2 0.04 1.00 19 \$123.32 \$ 1.25 \$ 300 \$ 2,343 \$ 2,643 16. Procure & install new alarm window in Control Panel 1 EA EL 2 1200 1.00 24 \$123.32 \$ 125 \$ 2,960 \$ 3,085 17. Procure & install strobe light outside deluge room 1 EA EL 2 20.00 1.00 40 \$123.32 \$ 125.00 \$ 125 \$ 2,960 \$ 3,085 18. Replace and Test Seals 1 LT EL 2 6.00 1.00 12 \$123.32 \$ 125.00 \$ 125 \$ 1,480 \$ 1,603 19. Terminate Devices 6 EA EL 1 4.00 1.00 24 \$123.32 \$ 125.00 \$ 125 \$ 2,960 \$ 2,960 \$ 2,960 \$ 2,960 \$ 2,960 \$ 2,960 \$ 2,960 \$ 2,960 \$ 2,960 \$ 2,960 \$ 2,960 \$ 2,960 \$ 2,960 \$ 2,960 \$ 2,960 \$ 3,046 \$ 3,045 \$ 2,960 \$ 3,045	1	4.	Remove Fire barriers and seals	1		EL	2	10.00	1.00	20	\$ 123.32	\$	125.00	\$ 125	\$ 2,466			\$	2,591
17. Procure & install strobe light outside deluge room 1 EA EL 2 1.00 1.00 40 \$123.02 \$125.00 \$2,903 \$4,933 18. Replace and Test Seals 1 LT EL 2 6.00 1.00 40 \$123.32 \$125.00 \$125 \$1,480 \$4,933 18. Replace and Test Seals 6 EA EL 1 4.00 1.00 24 \$123.32 \$125.00 \$125 \$1,480 \$1,605 19. Terminate Devices 6 EA EL 1 4.00 1.00 24 \$123.32 \$125.00 \$125 \$1,480 \$1,605 20. Dismantle & store scaffolding 1 LT CP 2 4.00 1.00 24 \$123.32 \$2,960 \$3,135		5. 6	Procure & install wining from deluge room to Control Room	240			2	0.04	1.00	19 24	\$123.32 \$123.32	\$	1.25	\$ 300 \$ 125	\$ 2,343 \$ 2,960			\$ \$	2,643
19. Terminate Devices 1 L1 EL 2 0.00 1.00 12 \$123.32 \$125.00 \$126.00 \$2,960 \$1,000 \$2,960 \$2,960 \$2,960 \$2,960 \$2,960 \$2,960 \$12 \$123.32 \$123.32 \$125.00		7.	Procure & install strobe light outside deluge room		EA	EL	2	20.00	1.00	40	\$123.32		125.00	\$.	\$ 4,933			\$	4,933
20. µJismanue & store scamololing 1 LT CP 2 4.00 1.00 8 \$ 96.00 \$ - \$ 768 \$ 768 \$ 768 \$ 768 \$ 768 \$ 768 \$ 768 \$ 768 \$ 768 \$ 768 \$ 768 \$ 768 \$ 768 \$ 768 \$ 768 \$ 768 \$ 768 \$ 768 \$ 315 \$ 315 \$ 315 \$ 315 \$ 3,946 \$<		9.	Terminate Devices	6	EA	EL	1	4.00	1.00	24	\$ 123.32		123.00	⊅ 125 •	\$ 2,960			\$	2,960
22. Test & secure blow out panels, switches & alarms 1 LT EL 2 16.00 1.00 32 \$123.32 \$ - \$ 3,946 \$ 3,946 \$ 3,946 23. Cleanup and restore area 1 LT EL 2 4.00 1.00 8 \$123.32 \$ - \$ 3,946 \$ 3,946 \$ 3,946 24. Cleanup and restore area 1 LT BL 2 4.00 1.00 8 \$ 10.90 \$ - \$ 987 \$ 721 \$ 721 \$ 721 \$ 721 \$ 721 \$ 721 \$ 721 \$ 721 \$ 721 \$ 721 \$ 721 \$ 721 \$ 1.099 \$ 1.09	2	0. 1.	usmantie & store scaffolding Dismantle & store scaffolding	1		CP LB	2 1	4.00 4.00	1.00	8 4	\$ 96.00 \$ 78.65			\$ - \$ -	\$ 768 \$ 315			\$ \$	768 315
24. Cleanup and restore area 1 LT BL 2 4.00 1.00 8 \$ 90.09 \$ - \$ 721 \$ 721 25. Cleanup and restore area 1 LT IW 2 4.00 1.00 8 \$ 137.33 \$ - \$ 1,099 \$ 1,099	2	2. 3.	Test & secure blow out panels, switches & alarms Cleanup and restore area	1	LT	EL EL	2 2	16.00 4.00	1.00 1.00	32 8	\$123.32 \$123.32			\$ - \$ -	\$ 3,946 \$ 987			\$ \$	3,946 987
	2	4 . 5.	Cleanup and restore area Cleanup and restore area	1		BL IW	2 2	4.00 4.00	1.00 1.00	8 8	\$90.09 \$137.33			\$ - \$ -	\$ 721 \$ 1,099			\$ \$	721 1,099

Rev.	/. Page 2 of 3 INDIAN POINT IMPLEMENTATION ESTIMATE WORK SHEET 7/5/2012 3:33 PM IP2-061 Estimate (Rev_6-12-12).xls													
PRO.	JECT TITLE: SWGR Water Intrusion Protection				EU	H: SAINA				теп		TAKEOFF:		
EST.	B LOCATION: Fire Protection Deluge Room PROJECT CODE: TBD ST. STATUS: □ OUTAGE □ NON-OUTAGE ☑ CAPITAL □ O&M ORIGINATOR:							ORIG. DAT	E: 06/11/2012					
ITEM	DESCRIPTION	ατγ	UOM	CFT	NO.	MA	NHOUF FCTR	TOTAL	\$/MH	MATERIAL PER UNIT	MATERIAL	LABOR DOLLARS	SUB- CONTRACT	TOTAL \$
1. 2.	PAINTING & TOUCH-UP REQUIREMENTS PAINTING & TOUCH-UP PAINTING & TOUCH-UP	1	LT	PT PT	1	20.00	1.00	20	\$ 95.16	\$ 20.00	\$ 400 \$ -	\$ 1,903 \$ -		\$ 2,303 \$ -
1. 2.	FIRE WATCH / BOTTLEWATCH REQUIREMENTS CRAFT SUPPORT FOR FIRE WATCH CRAFT SUPPORT FOR BOTTLE WATCH	1	LT LT	FW FW	1	80.00	1.00	80 -	\$ 53.60		\$- \$-	\$ 4,288 \$ -		\$ 4,288 \$ -
1.	MISC SUB-CONTRACT MISC SUB-CONTRACT	1	LT										\$ -	\$-
	SUBTOTAL CRAFT & SUB-CONTRACTOR							871			\$ 13,011	\$ 99,081	\$-	\$ 112,092
1.	CONSTRUCTION SUPPORT (8% OF LABOR \$)	1	LT					70	\$113.76			\$ 7,963		\$ 7,963
<u> </u>	SUBTOTAL							941			\$ 13,011	\$ 107,044	\$ -	\$ 120,055
1, 2, 3,	WALKDOWN ALLOWANCE WORK PACKAGE REVIEW TOOL ROOM ATTENDANTS (~3.5%) CENERAL CRACE OUTACE DISTRIES (40%)	1 1 1	LT LT LT	EL EL EL				10 30 33	\$ 123.32 \$ 123.32 \$ 123.32			\$ 1,233 \$ 3,700 \$ 4,070		\$ 1,233 \$ 3,700 \$ 4,070 \$ 10,704
	CRAFT IN PROCESSING (20%) HUMAN PERFORMANCE & ALARA TRAINING (1/2 day training, or ~ 2%)	1	LT									\$ 21,409 \$ 2,141		\$ 21,409 \$ 2,141
	SUBTOTAL		[1,014	[[\$ 13,011	\$ 150,301	\$	\$ 163,312
1.	PLANT SCOPE MECH MAINTENANCE			PL PL				-			\$ - \$ -	\$ - \$ -		\$- \$-
	SUBTOTAL MECH MAINT.	[ļ				-		<u> </u>	\$ -	\$-	\$-	\$ -
1.	ELECT MAINTENANCE		-	PL PL				-			\$ - \$ -	\$- 5-		\$ - \$ -
	SUBTOTAL ELECT. MAINT.							-			\$ -	\$-	\$-	\$ -
1.	I&C (Dev. Calibration & Maintenance Procedures	1	LT	PL PL	1	120.00	1.00	120	\$100.00		\$ - \$ -	\$ 12,000 \$ -		\$ 12,000 \$ -
	SUBTOTAL I&C MAINT.							120		1	\$.	\$ 12,000	\$	\$ 12,000
<u> </u>								-		L	\$ - \$ -	\$		\$
	SUBTOTAL CSG MAINT.							-			\$ -	\$ -	\$ -	<u> </u>
	SUBTOTAL PLANT							*			\$ -	\$ 12,000	\$-	\$ 12,000
			10000000000000000	-		alahin watariwa								
	SUBTOTAL CRAFT/PLANT							1,134			\$ 13,011	\$ 162,301	\$ -	\$ 1/5,312
	IMPLEMENTATION SUPPORT													
1. 2.	MODS ENGINEERING DESIGN ENGINEERING SUPT DURING CONST	1		NM NM	1	80.00	1.00	80	\$ 100.00			\$		\$- \$8,000
3.	SYSTEMS ENGINEERING - MECHANICAL	1	LT	NM	1	80.00	1.00	80	\$100.00			\$ -		\$ - \$ 8,000
 5.	SYSTEMS EINGINEERING - INSTR & CONTROL	1	LT	NM	1	36.00	1.00	36	\$100.00			\$ 3,600		\$ 3,600
6. 7.	SYSTEMS ENGINEERING - CIVIL STRUCTURAL PROJECT MANAGEMENT	1	LT	NM	1	80.00 300.00	1.00	60 300	\$100.00			\$ 8,000 \$ 36,000		\$ 8,000 \$ 36,000
8 ,	WORK MANAGEMENT (w.o Planning)	1	LT	NM	1	40.00	1.00	40	£ 100.00			\$ -		\$ -
10.	TRAINING	12	LT	NM	12	1.00	1.00	12	\$ 120.00			\$ 1,440		\$ 1,440
11. 12.	HP/RP/ALARA SIMULATOR CHANGES	1		NM NM	2	120.00	1.00	240	\$ 100.00			\$ 24,000		\$ - \$ 24,000
13. 14,	OPS (Procedure development / revision) TRAVEL & LIVING EXPENSES CONTRACTOR SUPPORT	1	LT LT	NM	1	80.00	1.00	80	\$120.00			\$ 9,600 \$ -		\$ 9,600 \$ -
1. 2. 3. 4. 5. 6. 7. 8.	FIS / MODS ENGINEERING - SWEC (Incl Per Diem) MODS PLANNING & SCH SWEC (Incl Per Diem) OSG FIELD ENGRS/PLAN- SWEC(Incl Per Diem) QA / QC VERIFICATION NDE HP / RP RADWASTE NURSE	1 1 1 1 1		NM NM NM NM NM NM	1 1 1	20.00 100.00 60.00	1.00 1.00 1.00	20 100 60	\$100.00 \$120.00 \$80.00			\$ - \$ 2,000 \$ 12,000 \$ 4,800 \$ - \$ - \$		\$ - \$ 2,000 \$ 12,000 \$ 4,800 \$ - \$ -
9, 10, 11, 12, 13, 14, 15,	IELEVATOR CONTRACTOR WASTE MANAGEMENT HOUSEKEEPING EQUIPMENT RENTAL CONTRACTOR VENDOR STOCKING DECONTAMINATION CONTRACTOR RBC's	1 1 1 1 1 1 1 1		NM NM NM NM NM										

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Rev.	Page 3 of 3 INDIAN POINT IMPLEMENTATION ESTIMATE WORK SHEET 7/5/2012 3:33 PM IP2-061 Estimate (Rev_6-12-12).xls													
11-0					EC	¥: SAMA	IP2-()61						
PRO.	ECT TITLE: SWGR Water Intrusion Protection											TAKEOFF:		
JOBI	DB LOCATION: Fire Protection Deluge Room								CT CODE:	TBD		ESTIMATO	R: RCMT	
EST.		CAP	ITAL		M			ORIGIN	ATOR:			ORIG. DAT	E: 06/11/2012	2
1						MA	NHOUR	S		MATERIAL	MATERIAL	LABOR	SUB-	
ITEM	DESCRIPTION	QTY	NOU	CFT	NÔ.	UNIT	FCTR	TOTAL	\$/MH	PER UNIT	DOLLARS	DOLLARS	CONTRACT	TOTAL \$
16.	SECURITY	1	LT	SEC									1	
17.	FIREWATCH (Rover)	1	LT	NM								\$ -		\$-
18.	SAFETY (2%)	1	LT	NM				23	\$ 72.14		1	\$ 1,659		\$ 1,659
19.	LOST TIME (10%)	1	LT					101	\$143.12			\$ 14,455		\$ 14,455
	SUBTOTAL CRAFT/NON-MANUAL							2,386			\$ 13,011	\$ 299,855	\$ -	\$ 312,866
1.	FREIGHT, SALES TAX, & CONSUMABLES (6%)										\$ 781			\$ 781
	SUBTOTAL INSTALLATION COST	T		1	Γ			2,386			\$ 13,792	\$ 299,855	\$ -	\$ 313,647
1. 2. 3. 4, 5, 6, 7.	DESIGN ENGINEERING - MECHANICAL DESIGN ENGINEERING - ELECTRICAL DESIGN ENGINEERING - INSTR. & CONTROL DESIGN ENGINEERING - CIVIL/STRUCTURAL TESTING (Instrument Calibration and testing) CONTRACT ENGR DESIGN SUPPORT DESIGN ENG. DCP ACCEPTANCE REVIEW SUBTOTAL DESIGN COST SUBTOTAL INSTALLATION & DESIGN COST CONTINGENCY (40%)	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1			1 1 1 2 1 1	40.00 40.00 10.00 800.00 40.00	1.00 1.00 1.00 1.00 1.00	40 40 20 800 40 980	\$100.00 \$100.00 \$100.00 \$100.00 \$120.00 \$100.00			\$ - \$ 4,000 \$ 4,000 \$ 2,000 \$ 96,000 \$ 4,000 \$ 4,000 \$ 114,000 \$ 114,000	\$ <u>-</u> \$	\$ - \$ 4,000 \$ 4,000 \$ 2,000 \$ 96,000 \$ 96,000 \$ 114,000 \$ 114,000 \$ 114,000 \$ 114,000 \$ 114,000
	ESTIMATE SUBTOTAL							3,366						\$ 598,706



ENTERGY INDIAN POINT NUCLEAR STATION UNIT 2

CONCEPTUAL DESIGN PACKAGE For

SAMA IP2-062

Provide Alternate Safe Shutdown System Power to Safety Injection Pump

Prepared by:	Approved by:
Jeta Putreavol-	A let and a start of the
Date: 9-20-2012	Date: 9 - 2. 2. 2. 10

RCM	Technologies	ENTERGY	Conceptual Design	
	The Source of Smart Solutions	Unit 2	SAMA IP2 -062	Rev. 0

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RCMTechnologies
The Source of Smart SolutionsENTERGY
Indian Point Nuclear Station
Unit 2Conceptual Design
Package
SAMA IP2 -062Rev. 0

1.0 ISSUE

Severe Accident Mitigation Alternative (SAMA) IP2-062:

Provide Alternate Safe Shutdown System Power to Safety Injection Pump

2.0 BACKGROUND

In accordance with NRC environmental regulations in 10 C.F.R. Part 51, Entergy performed SAMA analyses for both Indian Point Nuclear Generating Units 2 and 3 as part of its license renewal application. Those analyses identified a number of potentially cost-beneficial SAMAs for each unit. In its license renewal application and related correspondence with the NRC Staff, Entergy indicated that it would submit the potentially cost-beneficial SAMAs for further internal engineering project cost-benefit analysis, even though none of the potentially cost-beneficial SAMAs is related to aging management under 10 C.F.R. Part 54. Entergy contracted RCM Technologies to assist it in this effort.

This package provides a conceptual design and implementation cost estimate for SAMA IP2-062 in accordance with Entergy design engineering practices.

For SAMA IP2-062, resolution is required to make available an alternate source of 480VAC power to a Safety Injection System pump. This is required in the event of flooding in the 480VAC Vital Switchgear Room (switchgear room) at Elevation 15'-0" that prevents the normal 480VAC power from being available. For this SAMA, Safety Injection Pump 22 (22 SI) has been selected to be available with the alternative power option.

The design considerations that follow will address the resolution's adequacy and the basis for the recommendation to resolve the identified potential issue.

The recommended solution will include descriptive details of the design change and also conceptual design sketches as required. These descriptive details, sketches, and the preliminary material provide the basis for initiating the all-inclusive conceptual cost estimate for EC development and implementation at the Station.

3.0 EXISTING CONDITIONS

The suggested alternate source of 480VAC power to selected Pump 22 SI is Unit 1 Substation 12FD3. Substation 12FD3, a component of the Alternate Safe Shutdown System (ASSS), is fed from a 13.8kV transformer located in the same area as the substation in the "retired" Unit 1 Station. 12FD3 substation would be an appropriate alternate power source, but it cannot be used because there isn't sufficient compartment space available for the additional switchgear components required.

In addition to the requirement for an alternate power source to be provided, a device also needs to be added that will be able to switch to the backup power from the normal power supply feeding the pump.

DESIGN CONSIDERATIONS 4.0

RCM

The existing 1250 kVA at 13.8kV transformer, based upon initial review, does not have available margin sufficient enough to power the additional new MCC for the purpose required here and this transformer will have to be replaced.

Since a connection for the new MCC will be required downstream of the existing transformer's relay protection (use relay protection for existing transformer currently installed in Substation 12FD3 for new transformer), locating the new MCC in the existing substation area is preferred.

In addition to the alternate power source required, a device capable of switching the alternative power to the designated pump is also required to be installed. Considering the amount of new cable that needs to be installed, the most efficient means of implementing this part of the design change requires the "switch" to be installed in the area local to the pump.

5.0 **CONFIRMATION OF DESIGN**

Pump 22 SI normal power source is provided from the Unit 2 switchgear room. The design package will install a manually operated transfer switch to transfer the SI pump's power feed from its normal source to an alternate source.

The switch will be located in the Unit 2 Primary Auxiliary Building (PAB) in proximity of the Pump 22 SI room at Elevation 59"-0".

The "alternate" power source will be from a new MCC installed at Elevation 33'-0" in Unit 1 and fed from the new transformer in the same area. The new MCC will provide the compartment and controls necessary for operating the pump locally at the MCC instead of from the Control Room.

6.0 RECOMMENDED SOLUTION

- 1. Install a new transformer in Unit 1 at Elevation 33'-0" at Substation 12FD3 to replace the existing transformer.
- 2. Install a new MCC in Unit 1 at Elevation 33'-0" in the area of Substation 12FD3 and its associated new transformer.
 - Provide an appropriate connection for powering the new MCC's bus downstream of the existing relay protection currently installed in Substation 12FD3.
- 3. Install a manually operated transfer switch located in the Primary Auxiliary Building (PAB) at Elevation 59'-0".
- 4. At Pump 22 SI, disconnect the existing power cable. Re-route the cable to the new transfer switch and connect it to the "normal" input connection of the new switch.
- 5. At Pump 22 SI install a new power cable. Route the new cable to outside the room to the new transfer switch and connect it to the "common" output connection of the new switch.
- 6. At the new MCC installed in Unit 1 at Elevation 33'-0" install a new power cable. Route the new cable to the new transfer switch and connect it to the "alternate" input connection of the new switch at Elevation 59'-0" in the PAB.
- 7. Revise the necessary procedures and conduct training in response to these new operating conditions.

7.0 PRELIMINARY MATERIAL LIST

Item Description	Quantity
1. New transformer approximate size 3000 KVA	1
 ASCO Series 386 Non-Automatic Power Transfer Switches or Equivalent 	1
3. 1" – Conduit	80 Feet
4. 2" - Conduit	90 Feet
5. 2/c Cable	380 Feet
6. 480 VAC – 4/c Power Cable	450 Feet
7. Free standing MCC (2 buckets high x 1 bucket wide) with mounting brackets	1
8. 480 VAC switchgear to be installed into free standing MCC	1



Attachment 1

Entergy Impact Screening Summary



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Engineering Change Process

ATTACHMENT 9.3

IMPACT SCREENING SUMMARY

SHEET 1 OF 6

INSTRUCTIONS:

Identify the potentially impacted and the unaffected areas by checking the appropriate **Yes** or **No** block on the Impact Screening Criteria.

If a direct determination cannot be made based on the impact screening questions, the detailed questions in Attachment 9.4 may be used to identify potential impacts.

The completion of detailed questions in Attachment 9.4 is recommended but not required.

Contact potentially impacted groups if assistance is required.

SAMA Engineering Change No.: <u>IP2-062</u>

CONCEPTUAL Rev. No.: DESIGN PACKAGE

Prepared by:

Date:

DESIGN ENGINEERING DISCIPLINES	Potential Impact	
 Civil / Structural Design Engineering Does the proposed activity involve any civil / structural (including seismic) design changes, activities or affect coatings? OR Does the proposed activity involve any piping engineering design changes or activities? 	YES	□ NO
 Does the proposed activity involve any station or switchyard electrical design, large power transformers, or settings changes or activities? (SOER 10-1) 	YES	
Instrumentation and Controls Design Engineering Does the proposed activity involve any I&C design or settings changes or activities?	YES	
 Mechanical Design Engineering Does the proposed activity add/remove/replace insulation, aluminum or other metallic/non-metallic sources of debris in the reactor/containment building or involve any mechanical design changes or activities? 	🗌 YES	X NO
 PSA Engineering Does the proposed activity impact or involve changes to plant evaluations or probabilistic safety assessments? Does the proposed activity impact or involve changes to the Emergency Operating Procedures, Abnormal Operating Procedures, or Severe Accident Procedures or does it add, remove or modify SSCs included in a Maintenance Rule function? 	YES	□ NO
 Nuclear Analysis Does the proposed activity impact or involve changes to plant evaluations, Technical Specifications, Technical Requirements Manual, or require a full 50.59 Evaluation? 	YES	□ NO
 FERC / NERC Impact Does the proposed activity impact or involve change to FERC / NERC or Regional Entity compliance documents? (ex. MOU, ENN/ENS-PL-158, ENS-DC-199, etc.) 	T YES	🕅 NO



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Engineering Change Process

ATTACHMENT 9.3

IMPACT SCREENING SUMMARY

Sheet 2 of 6

DESIGN ENGINEERING PROGRAMS	Potentia	Impact
 ASME Section III Specifications Does the proposed activity add, delete, or modify information required by ASME Section III to be contained in a design specification? 	□ YES	M NO
 Cable and Raceway Program Does the proposed activity involve any changes to cable trays, raceways or the associated documentation? 	YES	
 Electronic Databases (EDB) Does the proposed activity involve any changes to electronic databases? 	YES	
 EQ Program (10CFR50.49, NUREG 0588, Reg Guide 1.89) Does the proposed activity involve any new or existing EQ components? 	T YES	🕅 NO
 Hydrogen Control Program (10 CFR 50.44) (<i>if applicable</i>) Does the proposed activity impact equipment or materials related to hydrogen control? 	□ YES	🕱 NO
 Human Factors Program Does the proposed activity involve control panel design including layout and labeling, visual displays, operator aids, auditory signals or environment in the control room, cable spreading room, and other control panel locations? 	YES	□ NO
 Margin Management Does the proposed activity impact or involve any change to design, licensing or operations margins? 	Tes 🗌	🕅 NO
 Reg. Guide 1.97 / PAM (Post Accident Monitoring) Does the proposed activity involve Reg. Guide 1.97 (Post Accident Monitoring) Indications? 	Tes 🗌	X NO

MAINTENANCE	<u>Potentia</u>	Impact
 Electrical Maintenance Does the proposed activity require an Electrical Maintenance review to identify affected procedures, required actions and required training? 	YES	
 I&C Maintenance Does the proposed activity require an I&C Maintenance review to identify affected procedures, required actions and required training? 	TES	
 Mechanical Maintenance Does the proposed activity require a Mechanical Maintenance review to identify affected procedures, required actions and required training? 	TYES	XX NO

NUCLEAR ENGINEERING	Potentia	al Impact
 Nuclear Fuel Design Does the proposed activity impact or involve the design, performance or storage of nuclear fuel? 	T YES	MO 🕅
 Reactivity Management Program Does the proposed activity impact or involve the reactor system, reactor controls, reactor chemistry, related systems, potential core and spent fuel damage, spent fuel, reactor coolant pressure boundary or reactor system procedures? 	T YES	MO 🕅



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Engineering Change Process

ATTACHMENT 9.3

SHEET 3 OF 6

PROCESS OR PROGRAM IMPACT SCREENING CHECKLIST Potential Impact ☐ YES X NO **Computer Support and Software** Does the proposed activity impact or involve changes to plant computer software or firmware or impact Software Quality Assurance (SQA)? **X** NO Chemistry and Environmental Impact □ YES Does the proposed activity impact or involve any changes to plant chemistry requirements, operations or procedures, or any changes to the environment? Radiation Protection (RP) Program Impact **NO** YES Does the proposed activity impact or involve any changes to the RP program? Does the proposed activity involve the potential to introduce (or reintroduce) any cobalt containing materials (such as Stellite) into the primary system? Operations YES □ NO Does the proposed activity impact or involve changes to Operations procedures, training or operator actions? Planning, Scheduling and Outage (PS&O) YES □ NO Does the proposed activity require a PS&O review to identify required design and installation information? MP&C (Inventory) YES Does the proposed activity impact or involve any addition or removal of equipment from the inventorv? Does the proposed activity impact or involve any Procurement of Quality or Augmented Quality material from non-qualified suppliers? YES □ NO **Procurement Engineering** Does the activity impact or involve any procurement activities?

PROGRAMS AND COMPONENTS	Potentia	al Impact
 ASME Containment In-service Inspection (IWE / IWL) Program Does the proposed activity impact or involve the containment pressure boundary or associated moisture barriers or a support for the containment pressure boundary? This includes "software only" changes that do not physically change the hardware such as re-rating of pressures or temperatures to include changes to documented information on these items or additional documented information for these items. Does the proposed activity limit access to containment surfaces for inspection? Involve disassembly of a bolted connection which forms a portion of the containment boundary? 	☐ YES	X NO
 ASME Appendix J (Primary Containment Leak Rate Testing) Program Does the proposed activity impact or involve any changes to primary containment leak rate testing? 	☐ YES	X NO



EN-DC-115

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Engineering Change Process

ATTACHMENT 9.3 SHEET 4 OF 6

IMPACT SCREENING SUMMARY

PROGRAMS AND COMPONENTS (CONTINUED)	Potentia	al Impact
 ASME In-service Inspection (ISI) Program Does the proposed activity add, delete, or modify an ASME Section XI pressure boundary item or a support for an ASME Section XI pressure boundary item? This includes "software only" changes that do not physically change the hardware like such as re-rating of pressures or temperatures. (ASME Section XI items include ASME Class 1, 2, 3, or B31.1 treated as ISI Class 2 or 3 (T2 and T3) components, parts, or appurtenances such as pipe or pressure vessel walls, valve bodies and pump casings. 	TES	K NO
 ASME Section XI Repair / Replacement Program Does the proposed activity involve any mechanical component within the ASME XI program / boundaries? Does the proposed activity add, delete, or modify an ASME Section XI pressure boundary item or a support for an ASME Section XI pressure boundary item? (ASME Section XI items include ASME Class 1, 2, 3, MC, and CC, as well as B31.1 treated as ISI Class 2 or 3 (T2 and T3) components, parts, or appurtenances such as pipe or pressure vessel walls, valve bodies and pump casings). 	☐ YES	X NO
 ASME In-service Testing Program Does the proposed activity impact or involve any item (safety related or non safety related) that may affect the performance or testing of a safety related pump or valve? Does the proposed activity impact the function or functional classification of any pump or valve as stated in the IST program documents? 	U YES	X NO
 Air Operated Valve (AOV) Program Does the proposed activity impact or involve the design, operation or testing of AOVs? 	Tes 🗌	M NO
 Buried Piping and Tanks (BP&T) Program Does the proposed activity impact or involve any changes to piping, coatings, or cathodic protection of Buried Piping & Components? 	T YES	🕅 NO
 Boric Acid Corrosion (BAC) Program Does the proposed activity impact or involve any increase in the likelihood of boric acid formation or corrosion? 	🗌 YES	X NO
 Check Valve Program Does the proposed activity impact or involve the design, operation or testing of check valves? 	🗌 YES	🕅 NO
 Control Room Habitability Program Does the proposed activity impact or involve changes that affect the temperature or radiological environmental conditions in the Main Control Room? 	TYES	X NO
Electrical Circuit Breaker, Relay and Electrical Equipment Testing Does the proposed activity impact or involve changes to the functional testing of circuit breaker, relay or electrical equipment?	YES	□ NO



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Engineering Change Process

IMPACT SCREENING SUMMARY

ATTACHMENT 9.3 SHEET 5 OF 6

PROGRAMS AND COMPONENTS (CONTINUED) **Potential Impact** Flow Accelerated Corrosion (FAC) Program X NO □ YES Does the proposed activity involve any changes (e.g.: configuration, velocity, flow rate, pressure, temperature, material, weld location, etc.) to piping systems included in the FAC Program.? Heat Exchanger Program **T**YES X NO Does the proposed activity impact or involve the design, operation or testing of a component in the heat exchanger program? **Predictive Maintenance Program** T YES X NO Does the proposed activity impact or involve any aspect of the storage, use and testing of lubricants? Does the proposed activity involve thermography? Does the proposed activity involve vibration monitoring? NO NO Microbiological Induced Corrosion (MIC) Program Impact ☐ YES Does the proposed activity involve piping containing untreated or stagnant water or open to the atmosphere? X NO Motor Operated Valve (MOV) Program □ YES Does the proposed activity impact or involve the design, operation or testing of MOVs? NO NO □ YES Plant Thermal Performance Program Does the proposed activity impact or involve plant thermal performance? **Preventive Maintenance Program** □ YES X NO Does the proposed activity impact or involve periodic testing or performance of SSCs? or Does the proposed activity add, modify or delete any Environmental Qualification (EQ) maintenance requirement or replacement frequency to ensure the component(s) maintains its gualification status? X NO PT Curves □ YES Does the proposed activity add, delete, or modify the basis (as contained in each sites reactor vessel surveillance material testing program) for the Pressure / Temperature Limit Curves (fluence, pressure, temperature, reactor materials)? □ YES 🛛 NO **Relief Valve Program** Does the proposed activity impact or involve the design, operation and testing of relief valves, safety valves, vacuum breaker valves or rupture disc? X NO **RPV Internals Program** □ YES Does the proposed activity impact or involve any change to the reactor internals? This includes "software only" changes that do not physically change the hardware such as re-rating of pressures or temperatures. Does the proposed activity impact or involve or related documentation to include neutron fluence or neutron fluence calculations? Does the proposed activity impact or involve or changes to core flow characteristics or core flow characteristics?



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Engineering Change Process

IMPACT SCREENING SUMMARY

ATTACHMENT 9.3

SHEET 6 OF 6

PROGRAMS AND COMPONENTS (CONTINUED)	Potential Impact	
 Welding Program Does the proposed activity impact or involve a special process, such as welding, brazing or soldering? 	YES	
 Safety Program Does the proposed impact or activity involve personnel or industrial safety? 	YES	
 System Engineering Does the proposed activity impact or involve any changes to system configuration, function or performance, etc., for Maintenance Rule or other system? Does the proposed activity impact or involve any changes to system procedures, maintenance or operation, etc.? 	YES	□ NO
 Training Program Does the proposed activity involve existing training requirements or create the need for new training? 	YES	
 Simulator Impact Does the proposed activity impact or involve changes to the Simulator? 	YES	
 Fire Protection Program Does the proposed activity result in a change to the Fire Protection Program (including 10CFR50 Appendix R) where the impact is more than negligible? 	☐ YES	M NO

Detailed Impact Screening (Attachment 9.4) Attached?	☐ YES	🕱 NO
--	-------	------
Attachment 2

Conceptual Design Sketches

- 1. Figure 1: PARTIAL SITE PLAN OF AREAS AFFECTED
- 2. Figure 2: PROVIDE ALTERNATE SAFE SHUTDOWN SYSTEM FOR 22 SI PUMP





Attachment 3

References

- 1. ENTERGY Nuclear Management Manual, Engineering Change Process, Rev 11
- Association for the Advancement of Cost Engineering (AACE), Cost Estimate Classification System - As Applied In Engineering, Procurement, and Construction for the Process Industries
 - TCM Framework: 7.3 Cost Estimating and Budgeting
 - Figure 4 Estimate Checklist & Maturity Matrix
- 3. ASCO Series 386 Non-Automatic Power Transfer Switches or Equivalent

Power Switching & Controls for Business-Critical Continuity

ASCO Series 300 Power Transfer Switches







IPEC00270090

ASCO[®] SERIES 386 Non-Automatic Power Transfer Switches

User-Initiated Control

ASCO 386 non-automatic transfer switches are generally used in applications where operating personnel are available and the load is not an emergency type requiring automatic transfer of power. The power-switching mechanism and controller is the same hardware used on the highly reliable ASCO SERIES 300 transfer switches. ASCO 386s are furnished as standard with a momentary-type selector switch to initiate transfer and re-transfer. They can also be arranged for remote control via ASCO's connectivity products.



Fig. 14: ASCO 386 400 Amp Type 1 Enclosure w/Optional Accessories 9C, 9D Source Availability Lights



Fig. 15: Control and Display Panel

Electrical Features:

- Listed under UL 1008, CSA certified:
- UL listed through 480 VAC. - CSA certified through 600 VAC.
- Door-mounted selector switch for local, manually initiated electrical control.
- Sizes from 30 through 3000 amps. Available to 600 VAC, 50 or 60 Hz.
- Rated for all classes of load transfer.
- 100% tungsten load ratings through 400 amps.
- Designed for emergency and standby applications.
- Same withstand and close-on rating as SERIES 300.

Standard Selectable Control Features:

- Inphase monitor to transfer motor loads between live sources, without any intentional off time, to prevent inrush currents from exceeding normal starting levels.
- Selective load disconnect, double-throw contact to operate at an adjustable 0 to 20 second time delay prior to transfer and reset 0 to 20 seconds after transfer.
- High/Low nominal voltage setting. Allows user to adjust for source low reduced voltage conditions in remote areas.
- 60 Hz or 50 Hz selectable switch.
- Single/Three-phase selectable switch.

Control Features:

- Switch position indicating signal lights.
- One auxiliary contact closed when transfer switch is connected to normal and one closed on emergency, standard feature 14A/14B.

Optional Accessories:

- 6Q Key-operated, momentary source selector switch furnished instead of the standard selector switch.
- 9C, 9D Source availability lights to provide operator with a local indication of power source availability.
- Accessory 14AA/14BA auxiliary contacts to indicate position of main contacts. Two (2) for normal position and two (2) for emergency position (one set is standard).
- 72A Serial module (5110) is used to allow local or remote communications with ASCO POWERQUEST[®] connectivity products.
- Special Enclosures
 (Specify by appropriate code in catalog number): Type 3R: Rain-tight
 - Type 4: Weatherproof
- Type 12: Oil Tight
- 72E Connectivity Module 5150 is used to bring several different serial devices that communicate at different baud rates and with different protocols to a common Ethernet media.



Attachment 4

Cost Estimate

	ENTE		EACT					
	IMP	1 EMENTATION ESTIMA	ATE					
	Indian	Point Nuclear Power S	tation					
* ESTIMATE LEVEL *		EC #: SA	MA IP2-0	62				
Conceptual	PROJECT TITLE: Safety Injection	Pump ASSS Power			ESTIMATOR: RCMT			
Preliminary	JOB LOCATION: Aux, Superheate	er & Control Bidgs.	PROJECT	CODE: TBD				
Definitive	OUTAGE INON-OUTAGE	ORIGINATOR:			ORIG. DATE: 07/13/2012			
	ESTIMATE TOTAL \$1,624,8	40 CAPITAL	0&M	REVISION	10-0			
ESTIMATE TOTAL \$1,624,840 Image: In accordance with NRC environmental regulations in 10 C.F.R. Part 51, Entergy performed SAMA analyses for both Indian Point Nuclear Generating Units 2 and 3 as part of its license renewal application. Those analyses identified a number of potentially cost-beneficial SAMAs for each unit. In its license renewal application and related correspondence with the NRC Staff, Entergy indicated that it would submit the potentially cost-beneficial SAMAs for further internal engineering project cost-benefit analysis, even though none of the potentially cost-beneficial SAMAs is related to aging management under 10 C.F.R. Part 54. Entergy contracted RCM Technologies to assist it in this effort. This package provides a conceptual design and implementation cost estimate for SAMA IP2-062 in accordance with Entergy design engineering practices. For SAMA IP2-062, resolution is required to make available an alternate source of 480VAC power to a Safety Injection System pump. This is required in the event of flooding in the 480VAC Vital Switchgear Room (switchgear room) at Elevation 15'-0" that prevents the normal 480VAC power form being available. For this SAMA, Safety Injection Pump 22 (22 SI) has been selected to be available with the alternative power option. This project will also replace the existing 13.8kV transformer with with a larger capacity model.								
Prepared by:	Bu Hacaval.	Approved t	y: M	میند. ۱۰۰۰ میکوری میکوری میکورد. ۱۰۰۰ میکوری میکوری میکوری ۱۰۰۰ میکوری میکوری میکوری ۱۰۰۰ میکوری میکوری میکوری میکوری میکوری میکوری میکوری میکوری میکوری میکوری میکوری میکوری میکوری میکوری میکوری ۱۰۰۰ میکوری میکوری میکوری میکوری میکوری میکوری میکوری میکوری میکوری میکوری میکوری میکوری میکوری میکوری میکوری می				
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Γ		ENTERGY NUCLEAR NORTHEAST
		IMPLEMENTATION ESTIMATE
* ES1	IMATE LEVEL *	FC # SAMA IP2-062
U	Conceptual	PROJECT TITLE: Safety Injection Pump ASSS Power ESTIMATOR: RCMT
	Preliminary	JOB LOCATION: Aux, Superheater & Control Bidgs. PROJECT CODE: TBD
	Definitive	UUTAGE VINON-OUTAGE ORIGINATOR: VICAPITAL 08M ORIG. DATE: 07/13/2012
nem	This actimate accu	Description
$\frac{1}{2}$	This estimate assu	mes that this work will not require outage conducts to complete mes that this work will complete during 2014 working a 10 hours per shift, four days per week schedule
3.	This estimate assu	mes that this work will not suffer productivity loss due to radiation, hazardous conditions or QC hold points
4.	This estimate assu	mes that all work will be performed by trained contract craftspersons in lieu of station maintenance personnel.
5.	This estimate assu	mes that core boring is required between El. 53' - 0" and 33' - 0" cable spreading area.
6.	12FD3.	mes that a new transformer will be installed in Unit 1 at Elevation 33 - 0" to replace existing transformer at Substation
7.	This estimate assurt 12FD3.	mes that a new motor control center will be installed in Unit 1 at Elevation 33' - 0" near the new transformer at Substation
8.	This estimate assu	mes that new transformer and MCC will be connected and powered by Station Maintenance personnel.
9.	This estimate does	not include funding for unreviewed safety questions or NRC submittals, but it required the additional cost will be added. sed on the project's current level of scope definition and is classified Class 4 as defined per the AACE International Cost
10.	Estimate Classifica	tion System (see Attachment 3, Reference 2).
11	Labor dollars in this	estimate are projected 2014 costs based on current 2012 craft billing rates at Indian Point. The projected costs provide
	for anticipated billin	g rate increases of 3% per year.
12.	This estimate allow	s for and includes a contingency factor related to the complexity and location of the work required. The factor is
	A. Outside fer	nce boundary - 20%
	B. Inside fend	e boundary - 30%
	C. Implement	ation complexity - 40%
	D. Inside Con	tainment - 50%
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INDIAN POINT IMPLEMENTATION ESTIMATE WORK SHEET

10-0	0-0 EC #: SAMA IP2-062																		
PRO JOB	JECT TITLE: Safety Injection Pump ASSS Power LOCATION: Aux, Superheater & Control Bidgs.							CAPITAL PROJECT ORIGINAT(COD	E: TBD	0&M			TA ES	KEOFF: STIMATO	R: RCN	MT		
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				14	II RA	SWEC CRA	FT LAB	OR/WALKDO	WN				1,316			\$	139,400		
				15 16		LOST TIME SWEC DIST	FRIBS						132			\$ \$	17,673 37,881		
				PLA 17	NT C	RAFT LAB	OR NT						_			\$	· ·		
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				24		OPS/OPS	SUPPO	DRT					120			\$	14,400		
				25 HP7RP 80 MISC CONTRACT SUPPORT									Ф	0,300					
				26 QUALITY CONTROL 130 27 NDE -								\$ \$	10,400 -						
				28 HP/RP - 29 RADWASTE -								\$ \$	-						
				30 NURSE -									\$ \$	-					
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				-					E	STIMATE	тот	TAL				\$ 1	,624,840		
1.	Gather and stage tools and materials	1	LT	EL	4	10.00	1.00	40	\$	123.32			\$-	\$	4,933			\$	4,933
2.	12FD3 Transformer	1	EA	EL	4	20.00	1.00	80	\$	123.32			\$ -	\$	9,866			\$	9,866
3. 4.	Procure and set new 3000kVA transformer Stage, erect & modify scaffolding as required		EA LT	EL CP	4 2	20.00 12.00	1.00 1.00	80	\$	123.32 96.00	\$ 1	50,000.00	\$ 150,000 \$ -	\$ \$	9,866 2,304			\$ \$	159,866 2,304
5. 6.	Stage, erect & modify scaffolding as required Core drill as required to route new conduit	1 2	LT LT	LB EL	1 2	12.00 20.00	1.00 1.00	12	\$ \$	78.15 123.20			\$ - \$ -	\$ \$	938 9,856			\$ \$	938 9,856
7.	Procure & install new MCC, 2 buckets and 480VAC	1	EA	EL	4	30.00	1.00	120	\$	123.32	\$	8,500.00	\$ 8,500	\$	14,798			\$	23,298
8.	Install a manually operated transfer switch at EI. 59' -	1	EA	EL	2	24.00	1.00			100.02	\$	500.00	\$ 500	\$	5,919			\$	6,419
9.	Procure and field erect conduit supports	22	EA	EL	5	1.00	1.00	48 110	\$	123.32	\$	6.00	\$ 132	\$	13,565			\$	13,697
10. 11.	Procure and erect 1" conduit as required Procure and erect 2" conduit as required	80 90		EL EL	2 2	0.18 0.20	1.00 1.00	29 36	\$	123.32 123.32	\$ \$	1.75 1.75	รั 140 \$ 158	\$ \$	3,576 4,440			\$ \$	3,716 4,598
12. 13.	Procure, pull & route 2/c cable as required	456	LF	EL	2	0.018	1.00	16	\$	123.32	\$	1.25	\$ 570	\$	1,973			\$	2,543
14	Procure, pull & route 480VAC 4/c cable as required Disconnect existing power cable at 22 SI	540 1	LF	EL PI	2	0.03	1.00	32	\$ \$	123.32 60.00	\$	1.50	\$ 810 \$ -	\$ \$	3,946 3.600			\$ \$	4,756 3,600
15.	Connect new power cable to 22 SI & power cables to transfer quitte		. .		Ĺ,	00.00	1.00		ļ	60.00			- -	, e	0,000			ľ	0,000
16.						20.00	1.00	40		00.00			ə -	\$	∠,400) ^{>}	∠,400
17.	Connect power cable to new MCC's and transformer Provide testing as required	1		PL PL	2 2	60.00 4.00	1.00 1.00	120	\$ \$	60.00 60.00			5 - \$ -	\$ \$	7,200 480			\$ \$	7,200 480
18. 19	Assist with testing as required Dismantle scaffolding to storage	1	LT LT	EL CP	2 2	20.00 12.00	1.00 1.00	40	\$ \$	123.32 96.00			\$- \$-	\$ \$	4,933 2,304			\$ \$	4,933 2.304
20.	Dismantle scaffolding to storage	1	LT	LB	1	12.00	1.00	12	\$	78.15			\$ - \$	\$	938 3 946			\$ \$	938 3 946
1 ^{21.}		'	-']	5.00	1.00	32	ľ	.20.02				ľ	5,540			ľ	0,040

Rev. 10-0	Page 4 of 5		NDI	AN P	OIN	IT IMPL	EMEN	TATION	ES' 2-06	TIMATE 2	WORK SH	EET	ļ	P2-062 St Pump S	afe Sh	7/26/2012 8:5 uldown (Rev_1-22-1
JOB EST	JECT TITLE: Safety Injection Pump ASSS Power LOCATION: Aux, Superheater & Control Bidgs. STATUS: OUTAGE NON-OUTAGE							PROJECT (ORIGINATO	COD DR:	E: TBD	08.M		TAKEOFF ESTIMATO ORIG. DAT	R: RCMT E: 07/13/2012		
ITEN	DESCRIPTION	ατγ	UON	CFT	NO	UNIT	MANHC FCTR	URS TOTAL	1	\$/MH	MATERIAL S	MATERIAL DOLLARS	LABOR DOLLARS	SUB- CONTRACT	т	OTAL \$
1. 2.	PAINTING & TOUCH-UP REQUIREMENTS PAINTING & TOUCH-UP PAINTING & TOUCH-UP			PT PT				-				\$ - 5 -	s - s -		\$	-
1. 2.	FIRE WATCH / BOTTLEWATCH REQUIREMENT CRAFT SUPPORT FOR FIRE WATCH CRAFT SUPPORT FOR BOTTLE WATCH	S 2 1	L T LT	FW FW	1	48.00	1.00	96	\$	53.60		\$- \$-	\$ 5,146 \$ -		\$ \$	5,146
1.	MISC SUB-CONTRACT MISC SUB-CONTRACT													s -	s	
	SUBTOTAL CRAFT & SUB-CONTRACTOR			1				1,139				\$ 160,810	\$ 116,927	\$ -	\$	277,737
1.	CONSTRUCTION SUPPORT (8% OF LABOR \$)	1	LT					91	s	102.66	s -		\$ 9,342		\$	9,342
	SUBTOTAL	<u>†</u>	<u> </u>	ļ				1,230				\$ 160,810	\$ 126,269	<u>s</u> -	\$	287,079
	* RELATED COSTS *															
1. 2. 3. 4. 5. 6. 7	WALKDOWN ALLOWANCE WORK PACKAGE REVIEW TOOL ROOM ATTENDANTS (~3 5%) GENERAL CRAFT OUTAGE DISTRIBS. (10%) CRAFT IN PROCESSING (20%) HUMAN PERFORMANCE & ALARA TRAINING (1/2 day training or ~2%)	1		EL EL				12 31 43	5 S S	123.32 123.32 123.32			\$ 1,480 \$ 3,823 \$ 5,303 \$ 12,627 \$ 25,254 \$ 2,525		\$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$	1,460 3,823 5,303 12,627 25,254 2,525
	SUBTOTAL		İ		П			1,316	-			\$ 160,810	\$ 177,281	\$-	\$	338,091
1.	PLANT SCOPE MECH MAINTENANCE			PL PL								\$ - \$ -	s . s .		\$ \$	
	SUBTOTAL MECH MAINT.								-			\$ -	5 -	\$ -	s	
1.	ELECT MAINTENANCE	1	LT	PL PL	2	16.00	1.00	32	\$	100.00		s - s -	\$ 3,200 \$ -		s s	3,200
	SUBTOTAL ELECT. MAINT.		1		П			32	1			\$ -	\$ 3,200	\$.	\$	3,200
1.	I&C			PL Pl				-				s - s -	s - s -		s s	-
\crammers	SUBTOTAL ISC MAINT.	-	1		ГŢ				-	****		\$ -	\$ -	\$ ·	\$	- -
1.	csg			PL Pl				-	[s -	s -		s	
	SUBTOTAL CSG MAINT.				H				<u> </u>			\$ -	\$ -	\$-	\$	-
	SUBTOTAL PLANT				[]			32	1			\$ -	\$ 3,200	\$ -	\$	3,200
		<u> </u>	L												L	
<u> </u>	SUBIDIAL CRAFI/PLANT	+			$\left \right $			1,348				\$ 160,810	\$ 180,481	5 -	3	341.291
1. 2. 3. 4. 5. 6. 7, 8. 9. 10. 11. 12. 13. 14. 1. 2.	IMPLEMENTATION SUPPORT EO/ WELDING ENGINEERING DESIGN ENGINEERING SUPT DURING CONST SYSTEMS ENGINEERING - MECHANICAL SYSTEMS ENGINEERING - INSTR & CONTROL SYSTEMS ENGINEERING - CIVIL STRUCTURAL PROJECT MANAGEMENT TRAINING OPS STAFF QA / QC VERIFICATION CHEMISTRY HP / RP/ ALARA WORK MANAGEMENT OPS / OPS PROCEDURE SUPPORT AND DEVELOPMENT TRAVEL & LIVING EXPENSES CONTRACTOR SUPPORT FIS / MODS ENGINEERING - SWEC (Incl Per Diem)	1 1 1 1 1 1 1 1 1 1 1 1		NM NM NM NM NM NM NM NM NM		160 00 80.00 40.00 600.00 4.00 120.00 80.00 120.00	1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00	160 40 40 40 600 48 120 - 120	\$ \$ \$ \$ \$ \$ \$ \$	100.00 100.00 100.00 100.00 120.00 120.00 79.56 120.00			\$. \$ 16,000 \$ 8,000 \$ 4,000 \$ 4,000 \$ 60,000 \$ 12,000 \$ 14,000 \$ 14,000 \$ 4,000 \$ 12,000 \$ 12,0000 \$ 12,000 \$ 12,000 \$ 12,0000 \$ 12,0000 \$ 12,0000 \$ 12,0000		***********	16,000 8,000 4,000 60,000 5,760 12,000 6,365 - 14,400
3. 4. 5. 6. 7. 8. 9. 10. 11. 12. 13. 14. 15. 16. 17. 18. 19. 19.	FIED ENGRS/PLANSWEC FIED ENGRS/PLANSWEC QA / QC VERIFICATION NDE HP / RP RADWASTE NURSE ELEVATOR CONTRACTOR WASTE MANAGEMENT HOUSEKEEPING EQUIPMENT RENTAL CONTRACTOR VENDOR STOCKING DECONTAMINATION CONTRACTOR RBC's SECURITY FIREWATCH (Rover) SAFETY (2%) LOST TIME SUBTOTAL CERATTWOM MANUAL	111111111111111111111111111111111111111	LT LT LT LT LT LT LT LT LT LT LT LT LT L	NM NM NM NM NM NM NM NM NM NM NM NM NM N		140.00 130.00	1.00	100 140 130 	255 5 5	68.00 133.69		5 160 040	\$ 16,800 \$ 16,800 \$ 10,400 \$ - \$ - \$ - \$ - \$ - \$ -	S	9 69 69 69 69 69 69 69 69 69 69 69 69 69	16,800 10,400 - - - - - - - - - - - - - - - - - -

Rev.	Page 5 of 5	1	NDI	AN P	oli	NT IMPL	EMEN	TATION	ES	TIMATE	WORK SH	EE.	г		P2-062 St Pump S	afe S	7/26/2012 huldown (Rev. 1-
10-0							EC #:	SAMA IP2	-06	2				•	-2-002 Off thip to		nation in trees_1-
PRO	JECT TITLE: Safety Injection Pump ASSS Power							CAPITAL	~~~~		8.M			TAKEOFF:			
JOB	LOCATION: Aux, Superheater & Control Bidgs							PROJECT (COD	E: TBD				ESTIMATO	R: RCMT		
EST.	STATUS: LI OUTAGE MINON-OUTAGE							ORIGINATO	DR:					ORIG. DAT	E: 07/13/2012		
	8500B(87(0))				b.c.	1.15.075	MANHC	URS	r		MATERIAL \$	M	TERIAL	LABOR	SUB-	ł	
IEN	DESCRIPTION	<u>uir</u>	NON	CF1	NU	UNIT	FUIR	TOTAL	ļ	\$/MH	PERUNIT	0	JLLARS	DOLLARS	CONTRACT	ļ	TOTALS
1.	FREIGHT, SALES TAX, & CONSUMABLES (6%)											\$	9,649			s	9,649
	SUBTOTAL INSTALLATION COST	1						3,225			- E	\$	170,459	\$ 373,715	\$-	\$	544,174
1.	DESIGN ENGINEERING - MECHANICAL	1	LT	NM	1	60.00	1,00	80	\$	100.00				\$ 8,000		\$	8,000
2.	DESIGN ENGINEERING - ELECTRICAL	1	LT	NM	1	440.00	1.00	440	\$	100.00				\$ 44,000	1	\$	44,000
3.	DESIGN ENGINEERING - INSTR. & CONTROL	1	LT	NM				-						S -		\$	-
4.	DESIGN ENGINEERING - CIVIL/STRUCTURAL	11	LT	NM	1	80.00	1.00	80	\$	100.00				\$ 8,000		\$	8,000
5. E	CONTRACT ENGRIDESIGN SUPPORT	T		NM	11	1,040.00	1.00	1,040	S	120.00				\$ 124,800		15	124,800
0		+		NRO	+++	150.00	1.00	150	\$	100.00		~	470 100	\$ 15,000		12	15,000
	SUDIOTAL DESIGN COST	+			+			1,790				~	170,459	\$ 199,800	\$	13	370,259
	SUBTOTAL INSTALLATION & DESIGN COST	-			\square							\$	170,459	\$ 573,515	s -	\$	743,974
1.	CONTINGENCY (40%)															\$	297,590
	ESTIMATE SUBTOTAL	İ				0		5,015								\$	1,041,564



ENTERGY INDIAN POINT NUCLEAR STATION UNIT 2

CONCEPTUAL DESIGN PACKAGE For

SAMA IP2-065

Upgrade Alternate Safe Shutdown System for RCP Seal Cooling

Prepared by:	Approved by:
Date: 9-20-20/2	Date:

DCM	Technologies	ENTERGY	Conceptual Design	
KCIVI	rechnologies	Indian Point Nuclear Station	Package	
	The Source of Smart Solutions	Unit 2	SAMA IP2 -065	Rev. 0

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Technologies The Source of Smart Solutions
The Source of Smart Solutions
The Source of Smart Solutions

1.0 ISSUE

RCM

Severe Accident Mitigation Alternative (SAMA) IP2-065:

Upgrade Alternate Safe Shutdown System for RCP Seal Cooling

2.0 BACKGROUND

In accordance with NRC environmental regulations in 10 C.F.R. Part 51, Entergy performed SAMA analyses for both Indian Point Nuclear Generating Units 2 and 3 as part of its license renewal application. Those analyses identified a number of potentially cost-beneficial SAMAs for each unit. In its license renewal application and related correspondence with the NRC Staff, Entergy indicated that it would submit the potentially cost-beneficial SAMAs for further internal engineering project cost-benefit analysis, even though none of the potentially cost-beneficial SAMAs is related to aging management under 10 C.F.R. Part 54. Entergy contracted RCM Technologies to assist it in this effort.

This package provides a conceptual design and implementation cost estimate for SAMA IP2-065 in accordance with Entergy design engineering practices.

Component Cooling Water 23 Pump, Charging Pump 23, and Service Water Pumps 23 and 24 are system pumps powered from the 480VAC Vital Switchgear Room (switchgear room) at Elevation 15'-0". These pumps can provide cooling water for Reactor Cooling Pump (RCP) seal cooling when needed. When necessary, this action needs to be provided in a timely manner.

For SAMA IP2-065, resolution is required to provide the ability to switch these pumps to an existing alternative power source more quickly (within 10 to 15 minutes) than is possible using the current available method.

The modifications described above are in the event of flooding in the switchgear room that prevents the normal 480VAC power from being available.

The design considerations that follow will address the resolution's adequacy and the basis for the recommendation to resolve the identified potential issue.

The recommended solution will include descriptive details of the design change and also conceptual design sketches as required. These descriptive details, sketches, and the preliminary material list provide the basis for initiating the all-inclusive conceptual cost estimate for EC development and implementation at the Station.

3.0 EXISTING CONDITIONS

Currently, the selected pumps can be powered from alternative power available at Unit 1 Substations 12FD3 and 12RW3 through the operation of manually operated transfer switches located at the respective pump areas. In the event of loss of RCP seal cooling, it will take an operator too much time under certain circumstances to get to these local devices to switch to alternate power. A provision to enable the alternate source of 480VAC power to be provided in a more timely way than the existing method is required.

4.0 DESIGN CONSIDERATIONS

One way to more rapidly activate the alternate source of 480VAC power is to install remotely operated switching devices in place of the locally installed manual switching devices. These emergency power transfer devices will be able to be operated remotely from a new panel installed near (*but not in*) the Control Room. This philosophy ensures that the new installation maintains appropriate physical separation from the Control Rooms' existing design criteria and its current day to day operation.

These remotely located transfer switches will also be able to be operated at their installed locations.

The new remotely operated transfer devices will be installed in the locations currently occupied by the manually operated devices. The new switching devices will also have the option of manual transfer from their location in addition to being operated from the remote location.

Control power for the new switching device's operating requirements will need to be provided from a source that is not affected by the Switchgear Room water intrusion.

5.0 CONFIRMATION OF DESIGN

The normal power source for Component Cooling Water Pump 23 (23 CCW) and Charging Pump 23 (23 CHRG), and Service Water Pumps 23 (23 SW) and (24 SW) is provided from the Unit 2 switchgear room. The alternate power source for pumps 23 CCW and 23 CHRG is Unit 1 Substation 12 FD3 through the operation of manually operated transfer switches. The alternate power source for pumps 23 SW and 24 SW is Unit 1 Substation 12 RW3 through the operation of manually operated transfer switches. This design package retains the existing alternate power sources but accomplishes the transfer with the installation of new transfer switches that can be remotely operated or operated locally.



The new panel located near the Control room will provide the ability to transfer the pumps 480VAC power requirements from the normal source to their respective alternate source. This panel will also include the controls required for operating the pumps from this location instead of the Control room or at Unit 1 Substations 12FD3 and 12RW3.

6. RECOMMENDED SOLUTION

- 1. At each of the pump's existing manually operated transfer switches, disconnect the power cables.
 - Remove the existing manually operated transfer switches
- 2. In the locations previously occupied by the manual transfer switches, install the new electrically operated transfer switches.
 - Re-connect the removed power cables to the new transfer switches
 - Connect the transfer switches with a new cable routed from a source that is not affected by the Switchgear Room water intrusion.
- 3. Outside the Control Room area install a new operating panel with power transfer ability and operating controls for 23 CCW Pump, 23 CHRG Pump, and Pumps 23 SW and 24 SW.
 - Connect the transfer switches with new control cabling for its operation and route it to the new operating panel located outside the Control Room area.
 - Connect the existing two (2) pump motor control compartments at Unit 1 Substation 12FD3 with new control cabling for their operation and route it to the new operating panel located outside the Control Room area.
 - Connect the existing two (2) pump motor control compartments at Unit 1 Substation 12RW3 with new control cabling for their operation and route it to the new operating panel located outside the Control Room area.
- 4. Revise the necessary procedures to ensure the requirement for restoration of power within 10 to 15 minutes and conduct training in response to these new operating conditions.

PRELIMINARY MATERIAL LIST 7.0

Item Description	Quantity
1. ASCO Series 386 Non-Automatic Power Transfer Switches or Equivalent	4
2. Control Switches	8
3. 2" – Conduit	250 Feet
4. 2/c Cable	900 Feet
5. 4/c Cable	1500 Feet
6. Hoffman Box 12"x16"x10"	4



Attachment 1

Entergy Impact Screening Summary



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Engineering Change Process

ATTACHMENT 9.3

IMPACT SCREENING SUMMARY

SHEET 1 OF 6

INSTRUCTIONS:

Identify the potentially impacted and the unaffected areas by checking the appropriate <u>Yes</u> or <u>No</u> block on the Impact Screening Criteria.

If a direct determination cannot be made based on the impact screening questions, the detailed questions in Attachment 9.4 may be used to identify potential impacts.

The completion of detailed questions in Attachment 9.4 is recommended but not required.

Contact potentially impacted groups if assistance is required. $S \Delta M A$

			JAMA
Engineering	Change	No.:	IP2-065

CONCEPTUAL Rev. No.: DESIGN PACKAGE

Prepared by:

Date:

DESIGN ENGINEERING DISCIPLINES	Potential Impact			
 Civil / Structural Design Engineering Does the proposed activity involve any civil / structural (including seismic) design changes, activities or affect coatings? OR Does the proposed activity involve any piping engineering design changes or activities? 	M YES	□ NO		
 Electrical Design Engineering Does the proposed activity involve any station or switchyard electrical design, large power transformers, or settings changes or activities? (SOER 10-1) 	YES			
Instrumentation and Controls Design Engineering Does the proposed activity involve any I&C design or settings changes or activities?	YES			
 Mechanical Design Engineering Does the proposed activity add/remove/replace insulation, aluminum or other metallic/non-metallic sources of debris in the reactor/containment building or involve any mechanical design changes or activities? 	□ YES	M NO		
 PSA Engineering Does the proposed activity impact or involve changes to plant evaluations or probabilistic safety assessments? Does the proposed activity impact or involve changes to the Emergency Operating Procedures, Abnormal Operating Procedures, or Severe Accident Procedures or does it add, remove or modify SSCs included in a Maintenance Rule function? 	YES	□ NO		
 Nuclear Analysis Does the proposed activity impact or involve changes to plant evaluations, Technical Specifications, Technical Requirements Manual, or require a full 50.59 Evaluation? 	YES			
 FERC / NERC Impact Does the proposed activity impact or involve change to FERC / NERC or Regional Entity compliance documents? (ex. MOU, ENN/ENS-PL-158, ENS-DC-199, etc.) 	☐ YES	X NO		

IPEC00270105



REV. 11

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Engineering Change Process

IMPACT SCREENING SUMMARY

ATTACHMENT 9.3

Sheet 2 of 6

DESIGN ENGINEERING PROGRAMS	Potential Impact		
 ASME Section III Specifications Does the proposed activity add, delete, or modify information required by ASME Section III to be contained in a design specification? 	Tes (X NO	
 Cable and Raceway Program Does the proposed activity involve any changes to cable trays, raceways or the associated documentation? 	YES		
 Electronic Databases (EDB) Does the proposed activity involve any changes to electronic databases? 	□ YES	🕅 NO	
 EQ Program (10CFR50.49, NUREG 0588, Reg Guide 1.89) Does the proposed activity involve any new or existing EQ components? 	Tes 🗌	🕅 NO	
 Hydrogen Control Program (10 CFR 50.44) (<i>if applicable</i>) Does the proposed activity impact equipment or materials related to hydrogen control? 	Tes 🗌	🕅 NO	
 Human Factors Program Does the proposed activity involve control panel design including layout and labeling, visual displays, operator aids, auditory signals or environment in the control room, cable spreading room, and other control panel locations? 	YES	□ NO	
 Margin Management Does the proposed activity impact or involve any change to design, licensing or operations margins? 	TES	🕅 NO	
 Reg. Guide 1.97 / PAM (Post Accident Monitoring) Does the proposed activity involve Reg. Guide 1.97 (Post Accident Monitoring) Indications? 	☐ YES	MO 🕅	

MAINTENANCE	Potentia	l Impact
 Electrical Maintenance Does the proposed activity require an Electrical Maintenance review to identify affected procedures, required actions and required training? 	YES	
 I&C Maintenance Does the proposed activity require an I&C Maintenance review to identify affected procedures, required actions and required training? 	YES	
Mechanical Maintenance Does the proposed activity require a Mechanical Maintenance review to identify affected procedures, required actions and required training?	T YES	XX NO

NUCLEAR ENGINEERING	Potential Impact			
 Nuclear Fuel Design Does the proposed activity impact or involve the design, performance or storage of nuclear fuel? 	☐ YES	🕅 NO		
 Reactivity Management Program Does the proposed activity impact or involve the reactor system, reactor controls, reactor chemistry, related systems, potential core and spent fuel damage, spent fuel, reactor coolant pressure boundary or reactor system procedures? 	☐ YES	X NO		



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Engineering Change Process

IMPACT SCREENING SUMMARY

ATTACHMENT 9.3

SHEET 3 OF 6

PROCESS OR PROGRAM IMPACT SCREENING CHECKLIST	Potentia	al Impact
Computer Support and Software	T YES	M NO
 Does the proposed activity impact or involve changes to plant computer software or firmware or impact Software Quality Assurance (SQA)? 		
Chemistry and Environmental Impact	T YES	🕅 NO
 Does the proposed activity impact or involve any changes to plant chemistry requirements, operations or procedures, or any changes to the environment? 		
Radiation Protection (RP) Program Impact	🗌 YES	NO 🕅
 Does the proposed activity impact or involve any changes to the RP program? Does the proposed activity involve the potential to introduce (or reintroduce) any cobalt containing materials (such as Stellite) into the primary system? 		
 Operations Does the proposed activity impact or involve changes to Operations procedures, training or operator actions? 	YES	
 Planning, Scheduling and Outage (PS&O) Does the proposed activity require a PS&O review to identify required design and installation information? 	YES	
 MP&C (Inventory) Does the proposed activity impact or involve any addition or removal of equipment from the inventory? Does the proposed activity impact or involve any Procurement of Quality or Augmented Quality material from non-qualified suppliers? 	YES	□ NO
Procurement Engineering Does the activity impact or involve any procurement activities?	YES	

PROGRAMS AND COMPONENTS	Potentia	al Impact
 ASME Containment In-service Inspection (IWE / IWL) Program Does the proposed activity impact or involve the containment pressure boundary or associated moisture barriers or a support for the containment pressure boundary? This includes "software only" changes that do not physically change the hardware such as re-rating of pressures or temperatures to include changes to documented information on these items or additional documented information for these items. Does the proposed activity limit access to containment surfaces for inspection? Involve disassembly of a bolted connection which forms a portion of the containment boundary? 	☐ YES	NO 🔀
 ASME Appendix J (Primary Containment Leak Rate Testing) Program Does the proposed activity impact or involve any changes to primary containment leak rate testing? 	T YES	M NO



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Engineering Change Process

IMPACT SCREENING SUMMARY

ATTACHMENT 9.3 SHEET 4 OF 6

PROGRAMS AND COMPONENTS (CONTINUED)	Potential Impact			
 ASME In-service Inspection (ISI) Program Does the proposed activity add, delete, or modify an ASME Section XI pressure boundary item or a support for an ASME Section XI pressure boundary item? This includes "software only" changes that do not physically change the hardware like such as re-rating of pressures or temperatures. (ASME Section XI items include ASME Class 1, 2, 3, or B31.1 treated as ISI Class 2 or 3 (T2 and T3) components, parts, or appurtenances such as pipe or pressure vessel walls, valve bodies and pump casings. 	☐ YES	M NO		
 ASME Section XI Repair / Replacement Program Does the proposed activity involve any mechanical component within the ASME XI program / boundaries? Does the proposed activity add, delete, or modify an ASME Section XI pressure boundary item or a support for an ASME Section XI pressure boundary item? (ASME Section XI items include ASME Class 1, 2, 3, MC, and CC, as well as B31.1 treated as ISI Class 2 or 3 (T2 and T3) components, parts, or appurtenances such as pipe or pressure vessel walls, valve bodies and pump casings). 	☐ YES	X NO		
 ASME In-service Testing Program Does the proposed activity impact or involve any item (safety related or non safety related) that may affect the performance or testing of a safety related pump or valve? Does the proposed activity impact the function or functional classification of any pump or valve as stated in the IST program documents? 	TYES	M NO		
 Air Operated Valve (AOV) Program Does the proposed activity impact or involve the design, operation or testing of AOVs? 	TYES	🛛 NO		
 Buried Piping and Tanks (BP&T) Program Does the proposed activity impact or involve any changes to piping, coatings, or cathodic protection of Buried Piping & Components? 	☐ YES	X NO		
 Boric Acid Corrosion (BAC) Program Does the proposed activity impact or involve any increase in the likelihood of boric acid formation or corrosion? 	TYES	M NO		
 Check Valve Program Does the proposed activity impact or involve the design, operation or testing of check valves? 	TYES	X NO		
 Control Room Habitability Program Does the proposed activity impact or involve changes that affect the temperature or radiological environmental conditions in the Main Control Room? 	TYES	🕅 NO		
Electrical Circuit Breaker, Relay and Electrical Equipment Testing Does the proposed activity impact or involve changes to the functional testing of circuit breaker, relay or electrical equipment?	YES	□ NO		



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Engineering Change Process

IMPACT SCREENING SUMMARY

ATTACHMENT 9.3 SHEET 5 OF 6

PROGRAMS AND COMPONENTS (CONTINUED)	Potential Impact			
 Flow Accelerated Corrosion (FAC) Program Does the proposed activity involve any changes (e.g.: configuration, velocity, flow rate, pressure, temperature, material, weld location, etc.) to piping systems included in the FAC Program.? 	🗌 YES	X NO		
 Heat Exchanger Program Does the proposed activity impact or involve the design, operation or testing of a component in the heat exchanger program? 	☐ YES	X NO		
 Predictive Maintenance Program Does the proposed activity impact or involve any aspect of the storage, use and testing of lubricants? Does the proposed activity involve thermography? Does the proposed activity involve vibration monitoring? 	☐ YES	NO 🕅		
 Microbiological Induced Corrosion (MIC) Program Impact Does the proposed activity involve piping containing untreated or stagnant water or open to the atmosphere? 	☐ YES	🕅 NO		
 Motor Operated Valve (MOV) Program Does the proposed activity impact or involve the design, operation or testing of MOVs? 	☐ YES	X NO		
Plant Thermal Performance Program Does the proposed activity impact or involve plant thermal performance?	🗌 YES	🕅 NO		
 Preventive Maintenance Program Does the proposed activity impact or involve periodic testing or performance of SSCs? or Does the proposed activity add, modify or delete any Environmental Qualification (EQ) maintenance requirement or replacement frequency to ensure the component(s) maintains its gualification status? 	☐ YES	M NO		
 PT Curves Does the proposed activity add, delete, or modify the basis (as contained in each sites reactor vessel surveillance material testing program) for the Pressure / Temperature Limit Curves (fluence, pressure, temperature, reactor materials)? 	☐ YES	X NO		
 Relief Valve Program Does the proposed activity impact or involve the design, operation and testing of relief valves, safety valves, vacuum breaker valves or rupture disc? 	🗌 YES	M NO		
 RPV Internals Program Does the proposed activity impact or involve any change to the reactor internals? This includes "software only" changes that do not physically change the hardware such as re-rating of pressures or temperatures. Does the proposed activity impact or involve or related documentation to include neutron fluence or neutron fluence calculations? Does the proposed activity impact or involve or changes to core flow characteristics or core flow characteristics? 	TYES	NO 🕅		



REV. 11

PAGE 101 OF 150

Engineering Change Process

IMPACT SCREENING SUMMARY

ATTACHMENT 9.3

SHEET 6 OF 6

PROGRAMS AND COMPONENTS (CONTINUED)	Potentia	al Impact
 Welding Program Does the proposed activity impact or involve a special process, such as welding, brazing or soldering? 	YES	
 Does the proposed impact or activity involve personnel or industrial safety? 	YES	
 System Engineering Does the proposed activity impact or involve any changes to system configuration, function or performance, etc., for Maintenance Rule or other system? Does the proposed activity impact or involve any changes to system procedures, maintenance or operation, etc.? 	YES	□ NO
 Training Program Does the proposed activity involve existing training requirements or create the need for new training? 	YES	
 Simulator Impact Does the proposed activity impact or involve changes to the Simulator? 	YES	
 Fire Protection Program Does the proposed activity result in a change to the Fire Protection Program (including 10CFR50 Appendix R) where the impact is more than negligible? 	☐ YES	X NO

Detailed Impact Screening (Attachment 9.4) Attached?	🗆 YES	M NO

IPEC00270110



Conceptual Design Sketches

- 1. Figure 1: PARTIAL SITE PLAN OF AREAS AFFECTED
- 1. Figure 2: UPGRADE ALTERNATE SAFE SHUTDOWN SYSTEM FOR 23 CHRG AND 23 CCW PUMP
- 2. Figure 3: UPGRADE ALTERNATE SAFE SHUTDOWN SYSTEM FOR 23 SW AND 24 SW PUMP







References

- 1. ENTERGY Nuclear Management Manual, Engineering Change Process, Rev 11
- Association for the Advancement of Cost Engineering (AACE), Cost Estimate Classification System - As Applied In Engineering, Procurement, and Construction for the Process Industries
 - TCM Framework: 7.3 Cost Estimating and Budgeting
 - Figure 4 Estimate Checklist & Maturity Matrix
- 3. ASCO Series 386 Non-Automatic Power Transfer Switches or Equivalent

Power Switching & Controls for Business-Critical Continuity

ASCO Series 300 Power Transfer Switches







IPEC00270116

ASCO^{*} Series 386 Non-Automatic Power Transfer Switches

User-Initiated Control

ASCO 386 non-automatic transfer switches are generally used in applications where operating personnel are available and the load is not an emergency type requiring automatic transfer of power. The power-switching mechanism and controller is the same hardware used on the highly reliable ASCO SERIES 300 transfer switches. ASCO 386s are furnished as standard with a momentary-type selector switch to initiate transfer and re-transfer. They can also be arranged for remote control via ASCO's connectivity products.



Fig. 14: ASCO 386 400 Amp Type 1 Enclosure w/Optional Accessories 9C, 9D Source Availability Lights



Fig. 15: Control and Display Panel

Electrical Features:

- Listed under UL 1008, CSA certified: - UL listed through 480 VAC.
 - CSA certified through 600 VAC.
- Door-mounted selector switch for local, manually initiated electrical control.
- Sizes from 30 through 3000 amps. Available to 600 VAC, 50 or 60 Hz.
- Rated for all classes of load transfer.
 100% tungsten load ratings through 400 amps.
- Designed for emergency and standby applications.
- Same withstand and close-on rating as Series 300.

Standard Selectable Control Features:

- Inphase monitor to transfer motor loads between live sources, without any intentional off time, to prevent inrush currents from exceeding normal starting levels.
- Selective load disconnect, double-throw contact to operate at an adjustable 0 to 20 second time delay prior to transfer and reset 0 to 20 seconds after transfer.
- High/Low nominal voltage setting. Allows user to adjust for source low reduced voltage conditions in remote areas.
- 60 Hz or 50 Hz selectable switch.
- Single/Three-phase selectable switch.

Control Features:

- Switch position indicating signal lights.
- One auxiliary contact closed when transfer switch is connected to normal and one closed on emergency, standard feature 14A/14B.

Optional Accessories:

- 6Q Key-operated, momentary source selector switch furnished instead of the standard selector switch.
- 9C, 9D Source availability lights to provide operator with a local indication of power source availability.
- Accessory 14AA/14BA auxiliary contacts to indicate position of main contacts. Two (2) for normal position and two (2) for emergency position (one set is standard).
- 72A Serial module (5110) is used to allow local or remote communications with ASCO POWERQUEST[®] connectivity products.
- Special Enclosures
 (Specify by appropriate code in catalog number): Type 3R: Rain-tight
 Type 4: Weatherproof
 Type 12: Oil Tight
- 72E Connectivity Module 5150 is used to bring several different serial devices that communicate at different baud rates and with different protocols to a common Ethernet media.

RCM	Technologies	ENTERGY Indian Point Nuclear Station	Conceptual Design Package	Day 0
	me source of shart solutions	Unit 2	SAMA IP2 -065	Rev. 0

Attachment 4

Cost Estimate

2

	ENTER	RGY NUCLE	AR NORTH	EAST		
	IMPI	LEMENTATI	ON ESTIMA	ATE		
ESTMIATE LEVEL	Indian	FC #: SAN	ar Power S	tation		
	PROJECT TITLE: RCP Cooling Sy	/stem Safe S	Shutdown		По&м	ESTIMATOR: RCMT
Preliminary	JOB LOCATION: Auxiliary. Intake	& Turbine P	Ruildings	PROJECT	CODE- TBD	
Definitive		ORIGINATO	DR:	1100201		ORIG. DATE: 11/29/10
		9 771			REVISION	10-0
Summary of Chapter		15,111			REVISION	10-0
In accordance with NRC env	vironmental regulations in 10 C.F.R. I	Part 51, Enter	av perform	ed SAMA an:	alvses for bo	th Indian Point Nuclear Generating
Units 2 and 3 as part of its li	cense renewal application. Those ar	nalyses identi	ified a numb	per of potenti	ally cost-ben	eficial SAMAs for each unit. In its
license renewal application a	and related correspondence with the	NRC Staff, E	ntergy indic	ated that it w	ould submit	the potentially cost-beneficial SAMAs
for further internal engineering	ng project cost-benefit analysis, even	though none	of the pote	ntially cost-b	eneficial SAI	MAs is related to aging management
under 10 C.F.R. Part 54. E	ntergy contracted RCIVI Technologies	s to assist it in	i this enort.			
This package provides a cor	nceptual design and implementation of	cost estimate	for SAMA I	P2-054 in ac	cordance wit	h Entergy design engineering
practices.						
Switchgear Room (switchge	23 Pump, Charging Pump 23, and Se ar room) at Elevation 15'-0" These r	rvice vvater F	rumps 23 a ovide coolir	nd 24 are sys	stem pumps	powered from the 480VAC Vital
needed. When necessary, t	his action needs to be provided in a t	imely manner	r.	ig water for r	Cactor Goor	ing I ump (iter) sear cooling when
	•					
For SAMA IP2-065, resolution	on is required to provide the ability to	switch these	pumps to a	n existing alte	ernative pow	er source more quickly than is
possible using the current av	/allable method.					
The modifications described	above are in the event of flooding in	the switchae	ar room tha	t prevents the	e normal 480	VAC power from being available.
						· · · · · · · · · · · · · · · · · · ·
Prepared by:			Approved b	by:		معين. م
NF				113	rannanger marinennangen	waarne waarne waarne waarne waarne waarne waarne waarne waarne waarne waarne waarne waarne waarne waarne waarne
1 ch	Puklacurok:			~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	-10-100 - 10-100 - 10-10-10-10-10-10-10-10-10-10-10-10-10-1	
Date: 6	1-20-2012		Date:	9-70		
	1			1-00	- 6416	and the second second second second second second second second second second second second second second second

	ENTERGY NUCLEAR NORTHEAST
	IMPLEMENTATION ESTIMATE
	Indian Point Nuclear Power Station
⊢́E	STMIATE LEVEL* I ビビビビ : 山谷A IP2-065
	Conceptua Out PL/DNIBCODTITLE: RCP Cooling System Safe Shutdown ESTIMATOR: RCMT
	Preliminary JOB LOCATION: Auxiliary, Intake & Turbine Buildings PROJECT CODE: TBD
	Definitive ORIGINATOR: ORIG. DATE: 11/29/10
Item	Description
1	This estimate assumes that this work will be completed during 2014.
2.	This estimate assumes that this work will be completed in a single 10 hours per shift, four days per week non-outage schedule.
3.	This estimate assumes that this work will not suffer productivity loss due to radiation, hazardous conditions or QC hold points.
4.	This estimate assumes that all installation work will be performed by trained contract craftspersons in lieu of station maintenance personnel.
5.	This estimate assumes that all high voltage disconnections and reconnections will be performed by station maintenance personnel.
6.	This estimate assumes that all conduit will be erected and that all power and control cables will be pulled before disconnecting pump power.
7.	This estimate assumes that core boring will be required in the Auxiliary Building and the Control Room Area (Potential 4 Core Bores).
8.	This estimate provides for continuous fire watch during fire seal breeching.
9.	Since the added control panels are outside the control room, no changes to the simulator were included in this estimate
10.	This estimate does not include funding for unreviewed safety questions or NRC submittals, but if required the additional cost will be added.
11.	This estimate is based on the project's current level of scope definition and is classified Class 4 as defined per the AACE International Cost Estimate Classification System (see Attachment 3, Reference 2).
12.	Labor dollars in this estimate are projected 2014 costs based on current 2012 craft billing rates at Indian Point. The projected costs provide for anticipated billing rate increases of 3% per year.
13.	This estimate allows for and includes a contingency factor related to the complexity and location of the work required. The factor is cumulative and progresses as follows:
	A. Outside fence boundary - 20%
L	B. Inside fence boundary - 30%
	C. Implementation complexity - 40%
ļ	D. Inside Containment - 50%
ļ	
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L	

INDIAN POINT IMPLEMENTATION ESTIMATE WORK SHEET

10-0	CAPITAL		0&M		EC	C#: SA	MA IP2	2-065							11 2	. 000.7	(15
PROJ JOB I EST.	ECT TITLE: RCP Cooling System Safe Shutdown .OCATION: Auxiliary, Intake & Turbine Buildings STATUS:	001	TAGE	NON-OL	JTAGE			PROJE ORIGIN	CT CODE	: TBD				TAKEOFF: ESTIMATO ORIG. DAT	DR: RCMT E: 11/29/10		
ITENA	DESCRIPTION	OTV			<u></u>	MAN	HOURS	TOTAL	¢ /a TL						SUB-	T	
	DESCRIPTION	QIY	UONI		2.	UNIT	FUR	TOTAL	⊅/IVIH	PER	UNII		ARS	DULLARS	CUNTRAC		IUTAL \$
	* ESTIMATE LEVEL *									ESTI	MATE S	UMMA	RY				
	Conceptual Broliminary				OWEE							MANH	IOUH	RS	DOLLARS		
	Preniminary Definitive			01	ST		SIGN 8						480		\$ 48.000	h	
				02	DE	SIGN EN	IGR CO	NST SUF	PORT				160		\$ 16.000)	
	General Notes:			03	МС	DDS ENG	R EOI S	SUPPOR	т				-		\$	-	
				04	SY	S ENGR	/ S-U EN	IGR				:	280		\$ 28,000)	
				05 06	PR	OJECT N	VANAG VAGEMI	EMENI ENT					640 -		\$ 76,800) -	
				07	EN	GINEER	ING DC	P ACCE		REVIEW	/		120		\$ 12,000)	
				CONTR			RING			т		1.	240		\$ 1/8.800	`	
				09	SU	PL CON	TRACT	MODSE	NGR			1,.	-		\$ 140,000	-	
				10	MC	DS PLA	N & SCH		NTRACT				170		\$ 17,000)	
				MATERI	HE ALS/	MISC CO	ONTRAC	ANNERS	>				150		\$ 18,000)	
				12	MA	TERIAL	S								\$ 60,712	2	
				13 CONTR	OT OT O	HER CO	NTRAC	TS							\$	-	
				14	SV	VEC CRA	FT LAB	ORWAL	.KDOWN			2,	467		\$ 255,011		
				15 16	LO	ST TIME							247		\$ 32,626	; ,	
				PLANT	CRAFT	LABOR	, KIBS 8								ବ (,୦୦/		
				17	M	ECH MAI	NT.						-		\$	-	
				18 19	EL I&I	.ECIMA C	INT						16		\$ 1,600 \$) -	
				20	CS	SG							-		\$	-	
				MISC EC	DI SUF	PORT							120		¢ 12.000	`	
				21	TF	RAINING							96		\$ 13,000)	
				23	CH	HEMISTR	2Y	NOT.					-		\$	-	
				24 25	HF	PS/OPS P/RP	SUPPO	JRT					320 240		\$ 38,400 \$ 19,094) I	
		MISC CONTRACT SUPPORT															
				26 27		JALITY (DE	CONTRO	C					140		\$ 11,200 \$ ·) -	
				28	HF	P/RP							-		\$	-	
				29 30	R. N	ADWAST URSE	ΓE						-		\$. \$.	-	
				31	E	LEVATO	R CONT	RACTO	R				-		\$.	-	
				32	N U	ASTE M.		MENT					-		\$. ¢	-	
				33 34	E		NT REN	ITAL CO	NTRACTO	R			-		\$. \$.	_	
				35	V	ENDOR	STOCK	NG					-		\$·	-	
				36 37	R	ECONTA BC'S			TACTOR				-		\$. \$.		
				38	SE	CURITY	- Wack	enhut					-		\$ -	-	
				39 40	FI SA	IRE VVA I AFETY	CH (RO	ver)					- 50		\$ 3.400	-)	
				CONTIN	GENC	Y											
				41 ESTIMAT	CC E SUE	NTINGE STOTAL	NCY					6.5	946	-	\$ 264,759	<u>,</u>	
												-,					
									I OADER	CUMBF		PREMIL	JM (:	20%)	\$ 229,458 \$ 413.024	3 L	
									,	- ,0070	'					-	
									ESTIM	<u> </u>	OTAL				\$1,789,771	 	
	Preliminary to Tie-ins																
1.	Gather and stage tools and materials	1	LT	EL	4	10.00	1.00	40	\$111.84			\$	-	\$ 4,474		\$	4,47
2. 3	Stage, erect and modify scaffolding Core drill as required to route new conduits	1 4	LT IT	CP FI	2	60.00 20.00	1.00	120	\$ 96.00 \$ 111 84			s	_	\$ 11,520 \$ 17,894		\$	11,52 17 89
э. Л	Procure & erect conduit supports from 23 CCW, 23	250			5	20.00	1.00	00	\$111.04	¢	2 E0	¢	- 625	\$ 10.000		L C	10 60
4.	CHRG, and 23 & 24 SW pumps.	200			<u> </u>	U.18	1.00	90	φ ι ι ι.84	[⊅]	∠.50	"	020	⇒ IU,Ubb			10,69
5.	Produce & erect conduit from 23 CCVV, 23 CHRG, and 23 & 24 SW pumps.	250	LF	EL	4	0.18	1.00	180	\$111.84	\$	2.50	\$	625	\$ 20,131		\$	20,75
6.	Procure and install Hoffman boxes for switches	4	EA	EL	2	10.00	1.00	80	\$111.84	\$ 3,	000.00	\$ 12,	000	\$ 8,947		\$	20,94
7.	Procure and install new control switches for 23 CCW, 23 CHRG, and 23 & 24 SW pumps	8	FΔ	FI .	2	4 ∩∩	1 00	64	\$ 111 84	s	500.00	s ⊿1	000	\$ 7 158		\$	11 15
8	Determinate & remove existing manual switches 23				-	4.00	1.00	160	ψ 11.04	ľ	555.00	^{Ψ 4,} '	000	ψ 7,100		ľ	11,10
υ.	CCW, 23 CHRG, and 23 & 24 SW pumps.	4	EA	EL	2	20.00	1.00	100	\$111.84			\$	-	\$ 17,894		\$	17,89
9.	Procure and install non-automatic transfer switches at	4	EA	EL	2	24.00	1.00	192	\$111.84	\$ 7.	500.00	\$ 30.0	000	\$ 21,473		\$	51.473
	23 CCW, 23 CHRG, and 23 & 24 SW pumps.																
10. 11	Procure and pull 4/c control cable Procure and pull 2/c control cable	1,500 1.000		EL	2	0.04 0.020	1.00	120 40	\$111.84	\$ \$	1.25	\$ 1,8 \$ 1	875 150	\$ 13,421 \$ 4,474		\$ \$	15,296 5.624
				-				-		Ľ		,				\$	-,
Rev. 10-0	Page 4 of 5 IN		POII	NT IN	NPL	EMENTA EC #: SA		ESTIN 2-065	IATE W	ORK SHE	ET	IP2	7/26/2012 9: -065 (Rev 7-17-	02 Al 12) x	M Is		
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PRO. JOB EST.	ECT TITLE: RCP Cooling System Safe Shutdown OCATION: Auxiliary, Intake & Turbine Buildings STATUS:	🗆 ou	TAGE	⊡ NC	N-OUT	AGE		PROJE	CT CODE:	TBD		TAKEOFF ESTIMATO ORIG. DA	: DR: RCMT TE: 11/29/10				
LTEM	DESCRIPTION		шом	CET	NO		HOURS	TOTAL	¢/MLI	MATERIAL S	MATERIAL	LABOR	SUB-	-	OTAL S		
	Tie-ins for New Switches			Cri	NO.		FUIR	-	\$/1V1F1	PERUNII	DOLLARS	DULLARS	CONTRACT	\$	-		
1.	Connect power feedsand controls to new non- automatic transfer switches Terminate cables in CR Area and Substations 12FD3	1	LT	PL	2	80.00	1.00	160	\$ 60.00		s -	\$ 9,600		\$	9,600		
3	and 12RW3. Test nump switching for proper operation	2	EA	PL	2	40.00	1.00	80	\$ 60.00 \$ 60.00	\$ 3,500.00	\$ 7,000	\$ 9,600 \$ 4,800		S S	16,600		
4	Scaffolding Dismantle	1	LT	CP	2	40.00	1.00	80	\$ 96.00		s -	\$ 7,680		s	7,680		
5.	Cleanup and restore work areas		L	EL	3	40.00	1.00	120	\$123.32		5 -	\$ 14,798		3	14,798		
1. 2.	PAINTING & TOUCH-UP REQUIREMENTS PAINTING & TOUCH-UP PAINTING & TOUCH-UP			PT PT													
1. 2.	FIRE WATCH / BOTTLEWATCH REQUIREMENTS CRAFT SUPPORT FOR FIRE WATCH CRAFT SUPPORT FOR BOTTLE WATCH	30 1	LT LT	FW FW	3	24.00	1.00	720	\$ 50.53		\$-	\$ 36,382		\$	36,382		
1.	MISC SUB-CONTRACT MISC SUB-CONTRACT	1	LT														
	SUBTOTAL CRAFT & SUB-CONTRACTOR							2,156			\$ 57,275	\$220,312	\$-	\$	277,587		
1.	CONSTRUCTION SUPPORT (8% OF LABOR \$)	1	LT					172	\$102.19			\$ 17,577		\$	17,577		
	SUBTOTAL							2,328			\$ 57,275	\$237,889	\$ -	\$	295,164		
	* OUTAGE RELATED COSTS *																
1, 2, 3, 4, 5,	OUTAGE WALKDOWN ALLOWANCE WORK PACKAGE REVIEW OUTAGE TOOL ROOM ATTENDANTS (~3.5%) GENERAL CRAFT OUTAGE DISTRIBS. (10%) CRAFT IN PROCESSING (20%)	1 1 1		PF PF LB				21 37 81	\$106.40 \$106.40 \$76.46			\$ 2,234 \$ 3,937 \$ 6,193 \$ 23,789 \$ 47,578		***	2,234 3,937 6,193 23,789 47,578		
Б. 7.	(1/2 day training, or ~ 2%)	-	L.I								L	\$ 4,758		2	4,/08		
	SUBTOTAL							2,467			\$ 57,275	\$326,378	\$.	\$	383,653		
1.	PLANT SCOPE MECH MAINTENANCE			PL PL													
	SUBTOTAL MECH MAINT.							-			\$ -	\$-	\$ -	\$	4		
1.	ELECT MAINTENANCE	2	LT	PL PL	2	8.00	1.00	16	\$100.00		\$-	\$ 1,600		\$	1,600		
	SUBTOTAL ELECT. MAINT.		_					16			\$ -	\$ 1,600	\$ -	\$	1,600		
1.	i&C			PL													
	SUBTOTAL I&C MAINT.	×		PL							\$ -	\$ -	 \$-	5	-		
	000																
١.	636			PL													
\vdash	SUBTOTAL CSG MAINT.							-			\$ -	\$ -	\$ -	\$			
	SUBTOTAL PLANT							16			\$-	\$ 1,600	\$ -	\$	1,600		
	SUBTOTAL CRAFT/PLANT							2,483			\$ 57,275	\$327,978	\$-	\$	385,253		
	IMPLEMENTATION SUPPORT																
1.	EO/ FIS / MODS ENGINEERING (EOI)	1	LT	NM													
2.	DESIGN ENGINEERING SUPT DURING CONST	1	LT	NM	1	160.00	1.00	160	\$100.00			\$ 16,000		\$	16,000		
э. 4.	SYSTEMS ENGINEERING - MECHANICAL SYSTEMS ENGINEERING - ELECTRICAL	1	LT	NM	1	160.00	1.00	160	\$100.00			\$ 16,000		\$	16,000		
5. 6.	SYSTEMS EINGINEERING - INSTR & CONTROL SYSTEMS ENGINEERING - CIVIL STRUCTURAL	1		NM NM	1	120.00	1.00	120	\$100.00			\$ 12,000		\$	12,000		
7. P		1	LT	NM	1	640.00	1.00	640	\$120.00			\$ 76,800		\$	76,800		
9.	QA / QC VERIFICATION	1	LT	NM	1	130.00	1.00	130	\$100.00			\$ 13,000		\$	13,000		
10. 11.	WORK MANAGEMENT HP / RP/ ALARA	1 3	LT LT	NM NM	1	80.00	1.00	240	\$ 79.56			\$ 19,094		5	19,094		
12.		1	LT	NM	1	220.005	1.00	220	\$120.00			5 38 400		¢.	38 400		
13.	TRAVEL & LIVING EXPENSES CONTRACTOR SUPPORT EIS (MODE ENGINEERING, SIMEO (SEL DAS DISC	1		1 NOVE	I	320.00	1,00	320	φi <u>∠</u> U.UU			\$ -		\$	- 30,400		
1. 2. 3. 4.	MODS ENGINEERING - SWEC (Incl Per Diem) MODS PLANNING & SCH SWEC (Incl Per Diem) FIELD ENGRS/PLAN- SWEC (Incl Per Diem) QA / QC VERIFICATION	1	LT LT LT LT	NM NM NM NM	1 1 1	170.00 150.00 140.00	1.00 1.00 1.00	170 150 140	\$100.00 \$120.00 \$80.00			\$ 17,000 \$ 18,000 \$ 11,200		\$\$ \$\$ \$\$	17,000 18,000 11,200		

IPEC00270122

Rev. 10-0

Page 5 of 5

INDIAN POINT IMPLEMENTATION ESTIMATE WORK SHEET

7/26/2012 9:02 AM IP2-065 (Rev 7-17-12).xls

10-0	CAPITAL		M&C			EC #: SAI	MA IP2	2-065				0.2		12/12	
PRO.	JECT TITLE: RCP Cooling System Safe Shutdown											TAKEOFF	:		
JOB	OCATION: Auxiliary, Intake & Turbine Buildings							PROJE	CT CODE:	TBD		ESTIMATO	DR: RCMT		
EST.	STATUS:	🗆 ou	TAGE		N-OUTA	AGE		ORIGIN	ATOR:			ORIG. DA	TE: 11/29/10		
			T			MAN	HOURS			MATERIAL \$	MATERIAL	LABOR	SUB-		
Чтем	DESCRIPTION	OTY	UOM	CFT	NO.	UNIT	FCTR	TOTAL	\$/MH	PER UNIT	DOLLARS	DOLLARS	CONTRACT	T	OTAL \$
5	NDE	1	LT	NM			1	1		1	1		1		
6	HP / RP			NM											
7	RADWASTE			NM											
	NURSE			NM											
a.			L LT	NM				.							
10				NM											
11.				NIM				-							
12				NIM											
12.				NIM				-							
13.				NIN				-							
14.				NIN				-							
15.								-							
10.				SEC				-							
17.	(FIREVVATCH (Rover)			NM	ł I			-				¢ 0.400		3	2 400
18.	SAFETY (2%)			NM				247	\$ 68.00			\$ 3,400		\$	3,400
19.					[1	247	\$152.09] 		\$ 32,626		-	32,020
L	SUBTOTAL CRAFT/NON-MANUAL		ļ				ļ	5,106			\$ 57,275	\$613,018	\$ -	\$	670,293
1.	FREIGHT, SALES TAX, & CONSUMABLES (6%)										\$ 3,437			\$	3,437
	SUBTOTAL INSTALLATION COST						[5,106			\$ 60,712	\$613,018	\$-	\$	673,730
										1					
1.	DESIGN ENGINEERING - MECHANICAL	1	LT	NM											
2.	DESIGN ENGINEERING - ELECTRICAL	1	LT	NM	1	400.00	1.00	400	\$100.00			\$ 40,000		\$	40,000
3.	DESIGN ENGINEERING - INSTR. & CONTROL	1	LT	NM											
4.	DESIGN ENGINEERING - CIVIL/STRUCTURAL	1	LT	NM	1	80.00	1.00	80	\$100.00			\$ 8,000		\$	8,000
5.	CONTRACT ENGR DESIGN SUPPORT	1	LT	NM	1	1,240.00	1.00	1,240	\$120.00				\$ 148,800	\$	148,800
6.	ENGINEERING DCP ACCEPTANCE REVIEW	1	LT	NM	1	120.00	1.00	120	\$100.00				\$ 12,000	\$	12,000
	SUBTOTAL DESIGN COST		Τ				ľ	1,840			1	\$ 48,000	\$ 160,800	\$	208,800
—			1				1								
	SUBTOTAL INSTALLATION & DESIGN COST		[I	6,946				\$661,018	\$ 160,800	\$	882,530
														e	264 759
^{'.}														Ψ	204,705
			ļ	[[1	<u> </u>				
	ESTIMATE SUBTOTAL													\$	1,147,289



ENTERGY INDIAN POINT NUCLEAR STATION UNIT 2

CONCEPTUAL DESIGN PACKAGE For

SAMA IP2-GAG

Provide a device for manually closing a Main Steam Safety Valve (MSSV) that fails to reseat closed following a Steam Generator Tube Rupture

Prepared by:	Approved by:
Leter puttacaros.	
Date: 9-20-20/2	Date: 7 - 20 - 2012

TABLE OF CONTENTS

SECTION	TITLE	PAGE
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3.0	EXISTING CONDITIONS	4
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Attachment 1	Entergy Impact Screening Summary	
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1.0 ISSUE

Severe Accident Mitigation Alternative (SAMA) IP2-GAG:

Provide a device for manually closing a Main Steam Safety Valve (MSSV) that fails to reseat closed following a Steam Generator Tube Rupture

2.0 BACKGROUND

In accordance with NRC environmental regulations in 10 C.F.R. Part 51, Entergy performed SAMA analyses for both Indian Point Nuclear Generating Units 2 and 3 as part of its license renewal application. Those analyses identified a number of potentially cost-beneficial SAMAs for each unit. In its license renewal application and related correspondence with the NRC Staff, Entergy indicated that it would submit the potentially cost-beneficial SAMAs for further internal engineering project cost-benefit analysis, even though none of the potentially cost-beneficial SAMAs is related to aging management under 10 C.F.R. Part 54. Entergy contracted RCM Technologies to assist it in this effort.

This package provides a conceptual design and implementation cost estimate for SAMA IP2-GAG in accordance with Entergy design engineering practices.

For SAMA IP2-GAG, resolution is required for returning a "stuck-open" (failed to reseat closed) MSSV to its normally closed position after its operation resulting from a steam generator tube rupture.

This package will provide for a "valve gagging" device to be temporarily installed on the valve to provide manual assistance if needed when a MSSV fails to reseat closed upon reduction of pressure.

The design considerations that follow will address the application's adequacy and the basis for the recommendation to resolve the identified potential issue.

The recommended solution will include descriptive details of the design change and also conceptual design sketches as required. These descriptive details, sketches, and the preliminary material list will be the informal basis for initiating the all-inclusive conceptual cost estimate for EC development and implementation at the Station.

3.0 EXISTING CONDITIONS

This is a new application for use of the valve gag at IP2. Currently, the purpose of the valve gag for MSSVs at IP2 is only in conjunction with Procedure 2-PT-R006, Main Steam Safety Valve Setpoint Determination.

4.0 DESIGN CONSIDERATIONS

The MSSVs at IP2 are Crosby HC-65W ISOFLEX Safety Valves. Crosby Engineering Doc #IS-V3147A, page 9, provides instruction for installing a valve gag to be used for hydrostatic testing purposes. It cautions not to overload the valve spindle or damage to the valve may result. It provides instructions for this device to be installed only when testing at pressures no greater than 10 percent above the nameplate (lifting) pressure.

The original purpose for this device at IP2 during testing is as the name infers; to "gag the valve", meaning to keep it in a passive closed status. In the proposed resolution to the issue (MSSV fails to reseat closed after operation) the valve gag will be installed temporarily and used for the purpose of closing the valve.

Prior to installing this device, accessibility for installation requires that certain parts be removed from the valve assembly. These parts are the lever (27), the forked lever (30), the top cap (25), and the spindle nut (23) shown in Attachment 2, Figure 1.

The valve gag, and the tools needed to remove the parts indicated, along with the tool required to install the valve gag, need to be made available on the Turbine Floor elevation and located in an area close to the vicinity of the MSSVs.

5.0 CONFIRMATION OF DESIGN

The device will be used to close a valve that fails to reseat when the pressure has dropped below the lifting pressure.

The gagging application will be utilized within the same pressure limits specified in Crosby's Manual (pressure at the valve after release will be no greater than 10 percent above the nameplate (lifting) pressure).

To further ensure use of the gagging device is adequate, confirmation will be provided by the valve manufacturer or, if needed, a finite element analysis for this specific application will be performed. This will confirm that use of the gag is appropriate and adequate for this purpose and also determine its operating limitations.



6.0 RECOMMENDED SOLUTION

- 1. Provide a cabinet (in the vicinity of the MSSVs) to be used for storage of the valve gag and the associated tools needed (Attachment 2, Figure 3)
- 2. Provide training for installation of this device
- 3. Prepare the necessary installation procedure(s) for installing the gag and identify the circumstances other than testing for when this device is to be used

7.0 PRELIMINARY MATERIAL LIST

Item Description	<u>Quantity</u>
1. Wall mounted cabinet approximately 30" x 30" x 10" deep	1
2. Hilti mounting bolts	4
3. Valve gag for style HC ISOFLEX safety valve	1
4. Socket wrench and socket for installing valve gag	1
5. Lubricant for valve gag threads and end point	1
6. Tools required for removal of valve parts (includes pliers, hammer, screwdrivers, and wrenches)	1 set
7. Torque wrench set	1
8. Tote-bag for valve gag and required tools	1



Attachment 1

Entergy Impact Screening Summary



PAGE 96 OF 150

Engineering Change Process

ATTACHMENT 9.3

IMPACT SCREENING SUMMARY

SHEET 1 OF 6

INSTRUCTIONS:

Identify the potentially impacted and the unaffected areas by checking the appropriate <u>Yes</u> or <u>No</u> block on the Impact Screening Criteria.

If a direct determination cannot be made based on the impact screening questions, the detailed questions in Attachment 9.4 may be used to identify potential impacts.

The completion of detailed questions in Attachment 9.4 is recommended but not required.

Contact potentially impacted groups if assistance is required.

			5	APL	4			
Engineering	Change	No.:	I	P2-	6	Ą	6	

Prepared by:

Date:

CONCEPTUAL

Rev. No .: DESIGN PACKAGE

DESIGN ENGINEERING DISCIPLINES	Potentia	al Impact
 Civil / Structural Design Engineering Does the proposed activity involve any civil / structural (including seismic) design changes, activities or affect coatings? OR Does the proposed activity involve any piping engineering design changes or activities? 	☐ YES	X NO
 Electrical Design Engineering Does the proposed activity involve any station or switchyard electrical design, large power transformers, or settings changes or activities? (SOER 10-1) 	☐ YES	X NO
 Instrumentation and Controls Design Engineering Does the proposed activity involve any I&C design or settings changes or activities? 	☐ YES	M NO
 Mechanical Design Engineering Does the proposed activity add/remove/replace insulation, aluminum or other metallic/non-metallic sources of debris in the reactor/containment building or involve any mechanical design changes or activities? 	☐ YES	X NO
 PSA Engineering Does the proposed activity impact or involve changes to plant evaluations or probabilistic safety assessments? Does the proposed activity impact or involve changes to the Emergency Operating Procedures, Abnormal Operating Procedures, or Severe Accident Procedures or does it add, remove or modify SSCs included in a Maintenance Rule function? 	Nes	DNO
 Nuclear Analysis Does the proposed activity impact or involve changes to plant evaluations, Technical Specifications, Technical Requirements Manual, or require a full 50.59 Evaluation? 	T YES	🕅 NO
 FERC / NERC Impact Does the proposed activity impact or involve change to FERC / NERC or Regional Entity compliance documents? (ex. MOU, ENN/ENS-PL-158, ENS-DC-199, etc.) 	☐ YES	🕅 NO



REV. 11

PAGE 97 OF 150

IMPACT SCREENING SUMMARY

Engineering Change Process

ATTACHMENT 9.3

Sheet 2 of 6

DESIGN ENGINEERING PROGRAMS	Potential	Impact
 ASME Section III Specifications Does the proposed activity add, delete, or modify information required by ASME Section III to be contained in a design specification? 	Tes 🗌	X NO
 Cable and Raceway Program Does the proposed activity involve any changes to cable trays, raceways or the associated documentation? 	Tes 🗌	X NO
 Electronic Databases (EDB) Does the proposed activity involve any changes to electronic databases? 	🗆 YES	🕅 NO
 EQ Program (10CFR50.49, NUREG 0588, Reg Guide 1.89) Does the proposed activity involve any new or existing EQ components? 	□ YES	🕅 NO
 Hydrogen Control Program (10 CFR 50.44) (<i>if applicable</i>) Does the proposed activity impact equipment or materials related to hydrogen control? 	🗆 YES	🕅 NO
 Human Factors Program Does the proposed activity involve control panel design including layout and labeling, visual displays, operator aids, auditory signals or environment in the control room, cable spreading room, and other control panel locations? 	☐ YES	🛛 NO
 Margin Management Does the proposed activity impact or involve any change to design, licensing or operations margins? 	🗌 YES	🛛 NO
 Reg. Guide 1.97 / PAM (Post Accident Monitoring) Does the proposed activity involve Reg. Guide 1.97 (Post Accident Monitoring) Indications? 	TYES	X NO

MAINTENANCE	Potentia	Impact
 Electrical Maintenance Does the proposed activity require an Electrical Maintenance review to identify affected procedures, required actions and required training? 	Tes 🗌	🕅 NO
I&C Maintenance Does the proposed activity require an I&C Maintenance review to identify affected procedures, required actions and required training?		M NO
procedures, required actions and required training? Mechanical Maintenance Does the proposed activity require a Mechanical Maintenance review to identify affected procedures, required actions and required training?		

NUCLEAR ENGINEERING		al Impact
 Nuclear Fuel Design Does the proposed activity impact or involve the design, performance or storage of nuclear fuel? 	Tes 🗌	MO 🕅
 Reactivity Management Program Does the proposed activity impact or involve the reactor system, reactor controls, reactor chemistry, related systems, potential core and spent fuel damage, spent fuel, reactor coolant pressure boundary or reactor system procedures? 	C YES	🕅 NO



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Engineering Change Process

ATTACHMENT 9.3

SHEET 3 OF 6

PROCESS OR PROGRAM IMPACT SCREENING CHECKLIST	Potentia	il Impact
Computer Support and Software	☐ YES	🛛 NO
 Does the proposed activity impact or involve changes to plant computer software or firmware or impact Software Quality Assurance (SQA)? 		
Chemistry and Environmental Impact	🗌 YES	🕅 NO
 Does the proposed activity impact or involve any changes to plant chemistry requirements, operations or procedures, or any changes to the environment? 		
Radiation Protection (RP) Program Impact	🗌 YES	🕅 NO
 Does the proposed activity impact or involve any changes to the RP program? Does the proposed activity involve the potential to introduce (or reintroduce) any cobalt containing materials (such as Stellite) into the primary system? 		
 Operations Does the proposed activity impact or involve changes to Operations procedures, training or operator actions? 	T YES	X NO
 Planning, Scheduling and Outage (PS&O) Does the proposed activity require a PS&O review to identify required design and installation information? 	TES YES	X NO
 MP&C (Inventory) Does the proposed activity impact or involve any addition or removal of equipment from the inventory? Does the proposed activity impact or involve any Procurement of Quality or Augmented Quality material from non-qualified suppliers? 	☐ YES	M NO
Procurement Engineering Does the activity impact or involve any procurement activities?	T YES	🕅 NO

PROGRAMS AND COMPONENTS	Potential Impac	<u>:t</u>
 ASME Containment In-service Inspection (IWE / IWL) Program Does the proposed activity impact or involve the containment p associated moisture barriers or a support for the containment p This includes "software only" changes that do not physically ch such as re-rating of pressures or temperatures to include chan information on these items or additional documented informatio Does the proposed activity limit access to containment surface Involve disassembly of a bolted connection which forms a portiboundary? 	Pressure boundary or pressure boundary? ange the hardware ges to documented on for these items. s for inspection? on of the containment	0
 ASME Appendix J (Primary Containment Leak Rate Testing) Progra Does the proposed activity impact or involve any changes to prileak rate testing? 	imary containment	0



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Engineering Change Process

ATTACHMENT 9.3 SHEET 4 OF 6

PROGRAMS AND COMPONENTS (CONTINUED)	Potential Impact		
 ASME In-service Inspection (ISI) Program Does the proposed activity add, delete, or modify an ASME Section XI pressure boundary item or a support for an ASME Section XI pressure boundary item? This includes "software only" changes that do not physically change the hardware like such as re-rating of pressures or temperatures. (ASME Section XI items include ASME Class 1, 2, 3, or B31.1 treated as ISI Class 2 or 3 (T2 and T3) components, parts, or appurtenances such as pipe or pressure vessel walls, valve bodies and pump casings. 	TES	X NO	
 ASME Section XI Repair / Replacement Program Does the proposed activity involve any mechanical component within the ASME XI program / boundaries? Does the proposed activity add, delete, or modify an ASME Section XI pressure boundary item or a support for an ASME Section XI pressure boundary item? (ASME Section XI items include ASME Class 1, 2, 3, MC, and CC, as well as B31.1 treated as ISI Class 2 or 3 (T2 and T3) components, parts, or appurtenances such as pipe or pressure vessel walls, valve bodies and pump casings). 	☐ YES	X NO	
 ASME In-service Testing Program Does the proposed activity impact or involve any item (safety related or non safety related) that may affect the performance or testing of a safety related pump or valve? Does the proposed activity impact the function or functional classification of any pump or valve as stated in the IST program documents? 	YES	□ NO	
 Air Operated Valve (AOV) Program Does the proposed activity impact or involve the design, operation or testing of AOVs? 	☐ YES	X NO	
 Buried Piping and Tanks (BP&T) Program Does the proposed activity impact or involve any changes to piping, coatings, or cathodic protection of Buried Piping & Components? 	T YES	X NO	
 Boric Acid Corrosion (BAC) Program Does the proposed activity impact or involve any increase in the likelihood of boric acid formation or corrosion? 	T YES	🕅 NO	
 Check Valve Program Does the proposed activity impact or involve the design, operation or testing of check valves? 	🗌 YES	🕅 NO	
 Control Room Habitability Program Does the proposed activity impact or involve changes that affect the temperature or radiological environmental conditions in the Main Control Room? 	T YES	🕅 NO	
 Electrical Circuit Breaker, Relay and Electrical Equipment Testing Does the proposed activity impact or involve changes to the functional testing of circuit breaker, relay or electrical equipment? 	TYES	X NO	



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Engineering Change Process

ATTACHMENT 9.3 SHEET 5 OF 6

PROGRAMS AND COMPONENTS (CONTINUED)	Potential Impact		
 Flow Accelerated Corrosion (FAC) Program Does the proposed activity involve any changes (e.g.: configuration, velocity, flow rate, pressure, temperature, material, weld location, etc.) to piping systems included in the FAC Program.? 	☐ YES	X NO	
 Heat Exchanger Program Does the proposed activity impact or involve the design, operation or testing of a component in the heat exchanger program? 	☐ YES	X NO	
 Predictive Maintenance Program Does the proposed activity impact or involve any aspect of the storage, use and testing of lubricants? Does the proposed activity involve thermography? Does the proposed activity involve vibration monitoring? 	☐ YES	X NO	
 Microbiological Induced Corrosion (MIC) Program Impact Does the proposed activity involve piping containing untreated or stagnant water or open to the atmosphere? 	U YES	M NO	
 Motor Operated Valve (MOV) Program Does the proposed activity impact or involve the design, operation or testing of MOVs? 	☐ YES	M NO	
 Plant Thermal Performance Program Does the proposed activity impact or involve plant thermal performance? 	□ YES	🛛 NO	
 Preventive Maintenance Program Does the proposed activity impact or involve periodic testing or performance of SSCs? or Does the proposed activity add, modify or delete any Environmental Qualification (EQ) maintenance requirement or replacement frequency to ensure the component(s) maintains its qualification status? 	☐ YES	ОИ 🗹	
 PT Curves Does the proposed activity add, delete, or modify the basis (as contained in each sites reactor vessel surveillance material testing program) for the Pressure / Temperature Limit Curves (fluence, pressure, temperature, reactor materials)? 	☐ YES	X NO	
 Relief Valve Program Does the proposed activity impact or involve the design, operation and testing of relief valves, safety valves, vacuum breaker valves or rupture disc? 	YES	□ NO	
 RPV Internals Program Does the proposed activity impact or involve any change to the reactor internals? This includes "software only" changes that do not physically change the hardware such as re-rating of pressures or temperatures. Does the proposed activity impact or involve or related documentation to include neutron fluence or neutron fluence calculations? Does the proposed activity impact or involve or changes to core flow characteristics or core flow characteristics? 	☐ YES	NO 🔀	



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Engineering Change Process

IMPACT SCREENING SUMMARY

ATTACHMENT 9.3

PROGRAMS AND COMPONENTS (CONTINUED)	Potential Impact		
 Welding Program Does the proposed activity impact or involve a special process, such as welding, brazing or soldering? 	TYES	X NO	
 Safety Program Does the proposed impact or activity involve personnel or industrial safety? 	YES		
 System Engineering Does the proposed activity impact or involve any changes to system configuration, function or performance, etc., for Maintenance Rule or other system? Does the proposed activity impact or involve any changes to system procedures, maintenance or operation, etc.? 	YES	☐ NO	
 Training Program Does the proposed activity involve existing training requirements or create the need for new training? 	YES		
 Simulator Impact Does the proposed activity impact or involve changes to the Simulator? 	T YES	🕅 NO	
 Fire Protection Program Does the proposed activity result in a change to the Fire Protection Program (including 10CFR50 Appendix R) where the impact is more than negligible? 	☐ YES	X NO	

Detailed Impact Screening (Attachment 9.4) Attached?	□ YES	X NO
--	-------	------



Attachment 2

Conceptual Design Sketches

- 1. Figure 1: Style HC ISOFLEX Safety Valve
- 2. Figure 2: Gag installed on valve bonnet
- 3. Figure 3: Turbine Bldg Floor Plan at El. 53'-0" storage cabinet location

RCM)	Technologies	ENTERGY	Conceptual Design	
	The Source of Smart Solutions	Unit 2	SAMA IP2 -GAG	Rev. 0



PARTS LIST
Part Part Name Spare Parts*
1A Body
1B Nozzie
3 Nozzle Ring 3
4 Nozzie Ring Set Screw
5 Disc Insert 1
O Disc Holder Z
Disc Holder Retaining Nut Disc Holder Retaining Cotter 1
10 Guide Bing
11 Guide Ring Set Screw
124 Spindle Point
12B Spindle Bod 3
12C Spindle Rod Pin 3
13 Bonnet
14 Bonnet Stud
15 Bonnet Stud Nut
16 Spring 3
17 Bottom Spring Washer 3
18A Top Spring Washer 3
18B Bearing Pin 3
18C Locking Pin 3
19 Bearing Adapter
20 Bearing
21A Adjusting Bolt
21B Adjusting Bolt Bearing
22 Adjusting Bolt Nut
23 Spindle Nut
24 Spindle Nut Cotter 1
25 Cap
26 Cap Set Screw
27 Lever
28 Lever Pin
29 Lever Pin Cotter
30 Forked Lever
31 Forked Lever Pin
32 Forked Lever Pin Cotter 1
26 Test Dad
37 Saal and Mira
38 Protective Hood
39 Drain Plug
40 Hydro Test Plug Assembly
41 Nameplate
42 Drive Screw
43** Cooling Spool
44** Cooling Spool Stud
45** Cooling Spool Stud Nut
* Spare Parts Designation (See Notes 1, 2, 3 on
Page 4)
** For Crosby Style HCA ISOFLEX only

Figure 1

STYLE HC ISOFLEX SAFETY VALVE

RCM) Techr	Technologies	ENTERGY	Conceptual Design	
	The Source of Smart Solutions	Unit 2	SAMA IP2 -GAG	Rev. 0





GAG INSTALLED ON VALVE BONNET

Attachment 3

References

- 1. ENTERGY Nuclear Management Manual, Engineering Change Process, Rev 11
- Association for the Advancement of Cost Engineering (AACE), 2. Cost Estimate Classification System - As Applied In Engineering, Procurement, and Construction for the Process Industries
 - TCM Framework: 7.3 Cost Estimating and Budgeting
 - Figure 4 Estimate Checklist & Maturity Matrix



Attachment 4

Cost Estimate

[ENTERGY NUCLEAR NORTHEAST							
	IMPLEMENTATION ESTIMATE							
		Indian	Point Nucle	ar Power Station				
* EST	IMATE LEVEL *		E	EC #: SAMA IP2 - GAG				
Ū	Conceptual	PROJECT TITLE: Unit 2 MSSV Gag	САРП	V80 🔽	ESTIMATOR: RCMT			
	Preliminary	JOB LOCATION: IP2 Turbine Buildi	ng	PROJECT CODE: TBD)			
	Definitive	OUTA INON-OUTAGE	ORIGINAT	OR:	ORIG. DATE: 7/17/12			
		ESTIMATE TOTAL \$458,617		REVISION	10-4			
In acc and 3 applic engin Enter This p For S result This e cabin of exis	Summary of Change: In accordance with NRC environmental regulations in 10 C.F.R. Part 51, Entergy performed SAMA analyses for both Indian Point Nuclear Generating Units 2 and 3 as part of its license renewal application. Those analyses identified a number of potentially cost-beneficial SAMAs for each unit. In its license renewal application and related correspondence with the NRC Staff, Entergy indicated that it would submit the potentially cost-beneficial SAMAs for further internal engineering project cost-benefit analysis, even though none of the potentially cost-beneficial SAMAs is related to aging management under 10 C.F.R. Part 54, Entergy contracted RCM Technologies to assist it in this effort. This package provides a conceptual design and implementation cost estimate for SAMA IP2-GAG in accordance with Entergy design engineering practices. For SAMA IP2-GAG, resolution is required for returning a "stuck-open" (failed to reseat closed) MSSV to its normally closed position after its operation resulting from a steam generator tube rupture. This estimate provides for the procurement of an MSSV Gag, gagging tools, lubricant and tote bag, procurement and installation of a wall hung storage cabinet, design engineering for development of the engineering change for the cabinet installations, costs for development of new procedures and/or revision of a viction procedures and/or revision							
Prepa	ared by:	Butternol:		Approved by:				
Date:	9 -	20-12		Date: 9-20-10	2			

[ENTERGY NUCLEAR NORTHEAST							
* EST	indian Point Nuclear Power Station							
1	Concentual	EC #: SAMA IP2 - GAG						
H-	Preliminary							
	Definitive	□ UTAG UNON-0UTAGE ORIGINATOR						
Item		Description						
1	This estimate assur	nes that this work will be completed during 2014						
2	This estimate assur	they matching work will be performed on a sincle 10 hours per shift 4 days per week non-outage schedule						
3	This estimate assur	nes that mock-up training for gagging a failed MSSV will be provided to Station Maintenance personnel						
4.	This estimate assur	nes that a mockup "failed" MSSV will be provided for training purposes.						
5.	This estimate assur	nes that all work will be performed by IP in-house Maintenance personnel.						
6.	The estimates assu	mes training for 12 people						
7.	This estimate does	not include funding for unreviewed safety questions or NRC submittals, but if required the additional cost will be added.						
•	This estimate is bas	sed on the project's current level of scope definition and is classified Class 4 as defined per the AACE International Cost						
ο.	Estimate Classificat	ion System (see Attachment 3, Reference 2).						
q	Labor dollars in this	estimate are projected 2014 costs based on current 2012 craft billing rates at Indian Point. The projected costs provide for						
	anticipated billing ra	ite increases of 3% per year.						
10	This estimate allow:	s for and includes a contingency factor related to the complexity and location of the work required. The factor is cumulative						
	and progresses as f	ollows:						
	A. Outside fen	ice boundary - 20%						
	B. Inside fence	e boundary - 30%						
	C. Implementa	ation complexity - 40%						
	D. Inside Con	ainment - 50%						

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INDIAN POINT IMPLEMENTATION ESTIMATE WORK SHEET

Rev.	Rev. INDIAN POINT IMPLEMENTATION ESTIMATE WORK SHEET														
EST.	STATUS:							ORIGINA	ATOR:		_	ORIG. DATE: 3	7/17/12		
ITEN	DESCRIPTION	ΟΤΥ	цом	CFT	NO	N U/R	IANHOU		\$/MH	MAT'L \$	MATERIAL DOLLARS	LABOR	SUB-	ст	τοται \$
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	* ESTIMATE LEVEL *									ESTIMAT		,			
	Conceptual									Loningi	MANHOUR	s	DOLLARS		
	Preliminary			ENC	INEE	RING									
	Definitive			01	STU	DY, DESI	GN, & C	LOSEOUT	Г		80		\$8	000	
	General Notes:			02 03	DESI	GN ENG	R CONS	ST SUPPO	PRT		24		\$2 \$	400	
	General Hotes.			04	SYS	ENGR/S	-U ENG	R			-		\$ \$	_	
	All work associated with preparation and training for			05	PRO	JECT MA		IENT			120		\$ 14	400	
	Installation of MSSV gags will be provided by IP Station Mechanical Maintenance personnel.	1		06 07	CON	DING EN TRACT F	GR FOR APF		NANALYSIS	6	-		\$ \$ 120	- 000	
				08	ENG	R'G DCP	ACCEP	TANCE RI	EVIEW		20		\$ 2	000	
				08	DESI	ACT ENG GN ENG	R CONT	NG TRACT SU	PPORT		320		\$ 38	400	
				09	SUPL	CONTR	ACT MC	DDS ENGF	₹				\$	-	
				10 11	MOD	S PLAN &	& SCHE NGRS /	D -CONTF PI ANNEF	RACT		40 20		\$ 4 \$ 2	,000 400	
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				12 13	MATE	ERIALS							\$1 \$	590	
				PL	ANTC	RAFT L	ABOR						¥	-	
				14 15	IPEC		LABOR/	WALKDO\	WN		180		\$ 14 \$,000	
				16	DIST		BLE COS	STS			-		\$ \$	-	
				MIS	CELI		S SUPP	ORT			40			000	
				17 18	NDE	LITY CO	NIROL				40		\$4 \$	- 000	
				19	OPS	TRAININ	IG	_			24		\$ 2	880	
				20 21	HP /	RP	EDURES	5			- 60		\$ / \$	200	
				MIS		NTRACI		DRT			40		•	000	
				22 23	NDE		NIROL				40		ъз \$	200	
				24	HP /	RP					-		\$	-	
				25 26	NUR	SE					-		\$ \$	-	
			27 ELEVATOR CONTRACTOR						-		\$	-			
				28 29	HOL	IE MAN	AGEME PING	NI			-		\$ \$	-	
				30	EQU	IPMENT	RENTA	L CONTR/	ACTOR		-		\$	-	
				31 32	DEC	ONTAMI	OCKING NATION	I CONTRA	CTOR		-		\$ \$	-	
				33	RBC	'S					-		\$	-	
				34 35	SEC	URITY WATCH	(Rover)	1			-		\$ \$	-	
				36	SAF	ETY	. (,				4		\$	272	
				37 CO	LOS NTING	ST TIME					18		\$ 1	400	
				37	CON	TINGEN	CY						\$ 67	843	
				EST	IMATI	E SUBTO	TAL				990		\$ 293	,985	
										JMBRANCI	E PREMIUM	(20%)	\$58 \$105	,797 835	
									CCTIMAN				•		
		▎▕▎											\$ 458 	,617	
	Non-Outage Storage Preparation														
1.	Procure one 30" X 30" X 12" storage cabinets	1	EA FA	PL PI	2	4.00	1.00	8 80	\$ 60.00 \$ 60.00	\$250.00	250	\$ 480.00 \$ 480.00		9	\$ 730.00 \$ 4.800.00
3.	Procure MSSV gag	1	EA	PL	2	2.00	1.00	4	\$ 60.00	\$750.00	750	\$ 240.00			\$ 4,000.00 \$ 990.00
4.	Procure gagging tools, lubricant & tote bags	1	LT	PL	2	4.00	1.00	8	\$ 60.00	\$500.00	500	\$ 480.00 \$		9	980.00
	Non-Outage Training										-	\$ -			, - S -
1.	Gather and stage gag, tools and materials	1	LT	PL	2	2.00	1.00	4	\$ 100.00 \$ 100.00		-	\$ 400.00			400.00
2. 3.	Tag and store removed parts for restoration	1	LT	PL	2	4.00	1.00	48	\$ 100.00 \$ 100.00		-	\$ 4,800.00 \$ 200.00		9	\$ 4,800.00 \$ 200.00
4.	Install and adjust gag per specification	1	LT	PL	12	2.00	1.00	24	\$ 100.00		-	\$ 2,400.00		9	2,400.00
5.	Cleanup work area and return tools to storage		LI		2	1.00	1.00	2	\$ 100.00		-	⇒ 200.00 \$ -			s 200.00
											-	\$ -			5 -
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Page 4	1 of 5

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Rev. 10-4	INDIAN POINT IMPLEMENTATION ESTIMATE WORK SHEET EC #: SAMA IP2 - GAG													
PRO JOB EST	JECT TITLE: Unit 2 MSSV Gag LOCATION: IP2 Turbine Building STATUS: OUTAGE ONN-OUTAGE							PROJEC	T CODE: TE	D&M BD		TAKEOFF: ESTIMATOR: ORIG. DATE:	RCMT 7/17/12	
	DESCRIPTION				1.00	1	MANHO	URS	A (5.41.)	MAT'L \$	MATERIAL	LABOR	SUB-	TOTAL
1.	CONSTRUCTION SUPPORT (8% OF LABOR \$)		LT		NU.	UIR	FUR	TOTAL	\$/MH		DOLLARS	DOLLARS	CONTRACT	I IUIALS
							L	ļ						
	SUBTOTAL	<u> </u>	<u> </u>					180			1,500	\$ 14,000.00		\$ 15,500.00
	* OUTAGE RELATED COSTS *													
1.	OUTAGE WALKDOWN ALLOWANCE	1	LT					-	s -			\$ -		\$ -
2.	WORK PACKAGE REVIEW	1						-	\$ - •			\$ - s		\$ - e
4.	GENERAL CRAFT OUTAGE DISTRIBS. (10%)	1							φ -			\$ -		\$-
5. 6.	CRAFT IN PROCESSING (20%)	1	іт									\$ - \$ -		\$- \$-
7.	(1/2 day training, or ~ 2%)	ļ								<u> </u>				
	SUBTOTAL							180			1,500	\$ 14,000.00	\$	\$ 15,500.00
	PLANT SCOPE													
1.	MECH MAINTENANCE			PL				-			-	\$ -		\$ - \$ -
	SUBTOTAL MECH MAINT.	1	[-		1	-	\$ -	\$-	\$ -
1	ELECT MAINTENANCE			PI								\$ -		\$ -
		<u></u>	<u> </u>	PL				-		<u> </u>		\$		5 -
	SUBTOTAL ELECT, MAINT.											\$	\$ -	\$ -
1.	I&C			PL				-			-	\$ -		\$ -
-	SUBTOTAL I&C MAINT.	+	l	TPL	[+	-	1	+	-	\$ - \$ -	<u> </u> \$	\$ - \$ -
	080						1				1	e.		e
l .				PL	[\$ -	}	\$ -
	SUBTOTAL CSG MAINT.	ļ				ļ	ļ	-			-	\$ -	\$ -	\$ -
	SUBTOTAL PLANT	1					1				-	0	 \$-	0
1														
	SUBTOTAL CRAFT/PLANT							180		1	1,500	14000	\$	15,500
	IMPLEMENTATION SUPPORT													
1.	FIS / MODS ENGINEERING	1		NM			1.00	-				\$ -		\$
3.	SYSTEMS ENGINEERING - MECHANICAL	1		NM	1	24.00	1.00	- 24	\$ 100.00			\$ 2,400.00		\$ 2,400.00
4.	SYSTEMS ENGINEERING - ELECTRICAL SYSTEMS EINGINEERING - INSTR & CONTROL			NM NM				-				\$ - \$ -		\$-
6.	SYSTEMS ENGINEERING - CIVIL STRUCTURAL	1	LT	NM				-				\$ -		\$ -
8.	WELDING ENGR (Program Engr)	1		NM NM	1	120.00	1.00	120	\$ 120.00			\$ 14,400.00 \$ -		\$ 14,400.00
9.		1			1	40.00	1.00	40	\$ 100.00			\$ 4,000.00		\$ 4,000.00
11.	HP / RP/ ALARA	1	LT	NM	1			-				\$ -		\$-
12.	OPS TRAINING OPS - DEVELOP/REVISE PROCEDURES	12		NM NM	1	2.00	1.00	24 60	\$ 120.00 \$ 120.00			\$ 2,880.00 \$ 7.200.00		\$ 2,880.00 \$ 7,200.00
14	TRAVEL & LIVING EXPENSES	1	LT											
	CONTRACTOR SUPPORT											р -		\$
1.	FIS / MODS ENGINEERING - SWEC (Incl Per Diem) MODS PLANNING & SCH - SWEC (Incl Per Diem)		LT	NM NM	1	40.00	1 00	40	\$ 100.00			\$ - \$ 4 000 00		\$ 4000.00
3,	FIELD ENGRS/PLAN- SWEC	1	LT	NM	1	20.00	1.00	20	\$ 120.00			\$ 2,400.00		\$ 2,400.00
4.	NDE	1	LT	NM NM	1	40.00	1,00	40	\$ 80.00			\$ 3,200.00 \$ -		\$ 3,200.00
6,			LT	NM				-				\$-		\$ -
8,	NURSE		LT	NM				-						
9, 10.	ELEVATOR CONTRACTOR			NM NM				-						
11.	HOUSEKEEPING	1		NM				-						
12.	VENDOR STOCKING			NM				-						
14.	DECONTAMINATION CONTRACTOR	1		NM NM				-						
16.	SECURITY		LT	SEC							1	_		
17. 18,	HREWATCH (Rover) SAFETY (2%)			LB NM				- 4	\$ 68.00	1		\$ - \$ 272.00		\$ 272.00
19	LOST TIME (10%)	<u> </u>	LT		L		<u> </u>	18	\$ 77.78	L		\$ 1,400.00		\$ 1,400.00
۰	SUBIOTAL CRAFT/NON-MANUAL	<u> </u>					<u> </u>	570		<u> </u>	1,500	\$ 56,152.00	\$.	
1.	FREIGHT, SALES TAX, & CONSUMABLES (6%)										90			\$ 90.00
	SUBTOTAL INSTALLATION COST	†	1	1				570		1	1,590	\$ 56,152.00	\$-	\$ 57,742.00

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Page 5 of 5

7/25/2012 11:33 AM IP2-GAG Estimate (Rev_7-17-12)

`Rev.	Rev. INDIAN POINT IMPLEMENTATION ESTIMATE WORK SHEET														
10-4						EC #	: SAM/	A IP2 - G	AG						
PRO JOB EST	JECT TITLE: Unit 2 MSSV Gag LOCATION: IP2 Turbine Building STATUS: OUTAGE ONN-OUTAGE							CAPITAL PROJEC ORIGINA	T CODE: TE]0&м 3D		TAKEOFF: ESTIMATOR: I ORIG. DATE: 1	RCMT 7/17/12		
ITEN	DESCRIPTION	QTY	UOM	CFT	NO.	N U/R	ANHOL	JRS TOTAL	\$/MH	MAT'L \$	MATERIAL DOLLARS	LABOR DOLLARS	SUB- CONTRACT	-	TOTAL \$
1. 2. 3. 4. 5. 6. 7.	DESIGN ENGINEERING - MECHANICAL DESIGN ENGINEERING - ELECTRICAL DESIGN ENGINEERING - INSTR & CONTROL DESIGN ENGINEERING - CIVIL/STRUCTURAL CONTRACT ENGR DESIGN SUPPORT CONTRACT FOR APPLICATION ANALYSIS ENGR'G DCP ACCEPTANCE REVIEW SUBTOTAL DESIGN COST	1 1 1 1 1 1	LT LT LT LT LT LT	NM NM NM NM NM NM	1	80.00 320.00 20.00	1.00 1.00 1.00	80 - - 320 20 420	\$ 100.00 \$ 120.00 \$ 100.00			\$ 8,000.00 \$ - \$ - \$ 38,400 \$ 2,000 \$ 46,400.00	\$ 120,000 \$ 120,000	****	8,000.00
	SUBTOTAL INSTALLATION & DESIGN COST						<u> </u>					\$ 102 552 00	\$ 120,000	l s	226,142.00
1.	CONTINGENCY (30%)												· · · · · · · · · · · · · · · · · · ·	\$	67,843.00
	ESTIMATE SUBTOTAL	T						990						\$	293,985.00



ENTERGY INDIAN POINT NUCLEAR STATION UNIT 3

CONCEPTUAL DESIGN PACKAGE For

SAMA IP3-007

Install a Reactor Cavity Flooding System

Prepared by:	Approved by:
Teto fotamal.	
Date: 9-20-2017	Date: year 24.74

TABLE OF CONTENTS

SECTION	TITLE
1.0	ISSUE
2.0	BACKGROUND
3.0	EXISTING CONDITIONS
4.0	DESIGN CONSIDERATIONS
5.0	CONFIRMATION OF DESIGN
6.0	RECOMMENDED SOLUTION
7.0	PRELIMINARY MATERIAL LIST - Mechanical
8.	PRELIMINARY MATERIAL LIST – Electrical/Instrumentation
Attachment 1	Entergy Impact Screening Summary
Attachment 2	Conceptual Design Sketches
Attachment 3	References
Attachment 4	Cost Estimate

1.0 ISSUE

Severe Accident Mitigation Alternative (SAMA) IP3-007:

Install a Reactor Cavity Flooding System

2.0 BACKGROUND

In accordance with NRC environmental regulations in 10 C.F.R. Part 51, Entergy performed SAMA analyses for both Indian Point Nuclear Generating Units 2 and 3 as part of its license renewal application. Those analyses identified a number of potentially cost-beneficial SAMAs for each unit. In its license renewal application and related correspondence with the NRC Staff, Entergy indicated that it would submit the potentially cost-beneficial SAMAs for further internal engineering project cost-benefit analysis, even though none of the potentially cost-beneficial SAMAs is related to aging management under 10 C.F.R. Part 54. Entergy contracted RCM Technologies to assist it in this effort.

This package provides a conceptual design and implementation cost estimate for SAMA IP3-007 in accordance with Entergy design engineering practices.

For SAMA IP3-007, resolution is required to reduce potential containment damage as a result of concrete-core interaction from molten debris following core damage and vessel failure.

This package will provide an installation using a standby pump and fire water to flood the reactor cavity in the event this emergent action is necessary.

The design considerations that follow will address the adequacy of the proposed resolution and the basis for the recommendation to resolve the identified potential issue.

The recommended solution will include descriptive details of the proposed design change and also conceptual design sketches as required. These descriptive details, sketches, and the preliminary material list provide the basis for initiating the all-inclusive conceptual cost estimate for engineering change (EC) development and implementation at the Station.

3.0 EXISTING CONDITIONS

IP3 does not contain a reactor cavity flooding system specifically designed to protect the containment structure from the impact of molten debris resulting from core damage and vessel failure.

Indian Point Nuclear Station Unit 3

4.0 **DESIGN CONSIDERATIONS**

Technologies

The Source of Smart Solutions

RCM

A permanently installed and readily available core cavity flooding mechanism would serve to limit damage to the containment's integrity. There is a fire water supply header routed underground in an area near the Fuel Storage Building that can be utilized for this purpose. In addition, the Hudson River is a source for a backup water supply that is also available. The proposed design will provide an alternative connection so that this option can be utilized if needed.

5.0 CONFIRMATION OF DESIGN

The existing fire water supply header near the Fuel Storage Building area can be accessed and connected to a pump for flooding the containment. Calculations will be performed to verify the proposed 1000GPM pump flow rate is adequate

The new pump will be permanently installed with a suction connection from the underground fire water supply piping. Also, an additional connection will be provided on the suction line to allow for an alternate water source such as the Hudson River.

The pump will be diesel-driven to further ensure availability in the event of station blackout. The pump and a small diesel fuel oil day tank (with supply capacity to operate 72 hours) will be installed in a new outdoor weather proof enclosure in the immediate area of the Fuel Storage Building.

The discharge of the pump will be connected to piping routed to Penetration #Y-Y in the containment structure, an elevation suitable for flooding the reactor cavity. A permanent Containment Isolation Valve (CIV) will be installed at this penetration. In support of this new configuration, the appropriate analysis and Technical Specification/FSAR changes to make this addition will be provided.

Heat tracing, if required for any outdoor piping, will need to be provided.

6.0 RECOMMENDED SOLUTION

1. Diesel-Driven Pump

Outdoors in the area of the Fuel Storage Building Area provide for the installation of the diesel-driven backup pump.

- At the southeast corner, install a concrete pad for mounting the pump and its weather proof enclosure.
- Mount and permanently install the pump.
- Install the weatherproof enclosure.
- Excavate and modify the fire water line with a tie-in of required valves and new pipe routed to the pump's suction connection.
- Construct an oil spill containment berm around the weatherproof enclosure.
- Route and install conduit and cable and terminate from distribution cabinet to enclosure to provide electrical power required for heating, ventilation, lighting and heat tracing.
- 2. Piping Connection to Containment

From the pump's discharge connection, install required valves and new pipe routed to the containment piping penetration Y-Y at Elevation 59'-6" (Figures 1 and 1A).

- 3. Install required pipe supports
- 4. Provide heat tracing and insulation for any outdoor pump supply header piping.
- 5. Provide procedures and training to operate, test, and perform maintenance on the components of the newly installed system.



7.0 **PRELIMINARY MATERIAL LIST - Mechanical**

<u>lte</u>	m Description	Quantity
1.	8" - 150# Check Valve, Butt Weld, C.S., A216-WCB, Mfr. VELAN or equal	2
2.	6" - 150# Check Valve, Butt Weld, C.S., A216-WCB, Mfr. VELAN or equal	1
3.	8" - 150# Gate Valve, Butt Weld, C.S., A216-WCB, Mfr. VELAN or equal	2
4.	6" - 150# Gate Valve, Butt Weld, C.S., A216-WCB, Mfr. VELAN or equal	3
5.	1" - 3000# Globe Valve, Socket Weld, C.S., A216-WCB, Mfr. VELAN or equal	1
6.	Pump, 1000GPM, Self-Contained Diesel-Driven Skid with Industria Weatherproof Enclosure (detailed specification to follow)	1
7.	Day Tank, diesel fuel oil storage (72 hour capacity)	1
8.	8" Schedule 40 Seamless pipe, Carbon Steel, A-106 Grade B	300 Feet
9.	6" Schedule 40 Seamless pipe, Carbon Steel, A-106 Grade B	50 Feet
10.	1" Schedule 40 Seamless pipe, Carbon Steel, A-106 Grade B	5 Feet
11.	3/4" Schedule 40 Seamless pipe, Carbon Steel, A-106 Grade B	10 Feet
12.	6" Schedule 40 B.W. Tee, A-106 Grade B	2
13.	6" 150# R.F. WN Flange, A-106 Grade B	3
14.	6" 150# R.F. Blind Flange, A-106 Grade B	2
15.	3/4" - 3000# Globe Valve, Socket Weld, C.S., A216-WCB,	4

8.0 PRELIMINARY MATERIAL LIST – Electrical/Instrumentation

1.	1" – Conduit and Supports	200 Feet
2.	120 VAC – 3/c Power Cable	200 Feet
3.	3/4" Stainless Steel tubing	40 Feet
4.	Pressure Gauge	2
5.	Differential Pressure Gauge	1



Attachment 1

Entergy Impact Screening Summary



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Engineering Change Process

ATTACHMENT 9.3

IMPACT SCREENING SUMMARY

REV. 11

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SHEET 1 OF 6

INSTRUCTIONS:

Identify the potentially impacted and the unaffected areas by checking the appropriate <u>Yes</u> or <u>No</u> block on the Impact Screening Criteria.

If a direct determination cannot be made based on the impact screening questions, the detailed questions in Attachment 9.4 may be used to identify potential impacts.

The completion of detailed questions in Attachment 9.4 is recommended but not required.

Contact potentially impacted groups if assistance is required.

SAMA		CONCEPT	UAL
Engineering Change No.: <u>IP3 - 007</u>	Rev. No.:	DESIGN	PK4.

Prepared by:

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Date:

DESIGN ENGINEERING DISCIPLINES	Potenti	al Impact
 Civil / Structural Design Engineering Does the proposed activity involve any civil / structural (including seismic) design changes, activities or affect coatings? OR Does the proposed activity involve any piping engineering design changes or activities? 	YES	
 Electrical Design Engineering Does the proposed activity involve any station or switchyard electrical design, large power transformers, or settings changes or activities? (SOER 10-1) 	YES	
Instrumentation and Controls Design Engineering Does the proposed activity involve any I&C design or settings changes or activities?	YES	
 Mechanical Design Engineering Does the proposed activity add/remove/replace insulation, aluminum or other metallic/non-metallic sources of debris in the reactor/containment building or involve any mechanical design changes or activities? 	YES	
 PSA Engineering Does the proposed activity impact or involve changes to plant evaluations or probabilistic safety assessments? Does the proposed activity impact or involve changes to the Emergency Operating Procedures, Abnormal Operating Procedures, or Severe Accident Procedures or does it add, remove or modify SSCs included in a Maintenance Rule function? 	TES YES	□ NO
 Nuclear Analysis Does the proposed activity impact or involve changes to plant evaluations, Technical Specifications, Technical Requirements Manual, or require a full 50.59 Evaluation? 	T YES	X NO
 FERC / NERC Impact Does the proposed activity impact or involve change to FERC / NERC or Regional Entity compliance documents? (ex. MOU, ENN/ENS-PL-158, ENS-DC-199, etc.) 	TYES	ЖNО



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Engineering Change Process

ATTACHMENT 9.3

IMPACT SCREENING SUMMARY

Sheet 2 of 6

DESIGN ENGINEERING PROGRAMS	<u>Potential</u>	Impact
 ASME Section III Specifications Does the proposed activity add, delete, or modify information required by ASME Section III to be contained in a design specification? 	YES	
 Cable and Raceway Program Does the proposed activity involve any changes to cable trays, raceways or the associated documentation? 	YES	
Electronic Databases (EDB) Does the proposed activity involve any changes to electronic databases?	🗱 YES	
 EQ Program (10CFR50.49, NUREG 0588, Reg Guide 1.89) Does the proposed activity involve any new or existing EQ components? 	YES	
 Hydrogen Control Program (10 CFR 50.44) (if applicable) Does the proposed activity impact equipment or materials related to hydrogen control? 		МNO
 Human Factors Program Does the proposed activity involve control panel design including layout and labeling, visual displays, operator aids, auditory signals or environment in the control room, cable spreading room, and other control panel locations? 	☐ YES	⊠ NO
 Margin Management Does the proposed activity impact or involve any change to design, licensing or operations margins? 	YES	
Reg. Guide 1.97 / PAM (Post Accident Monitoring) • Does the proposed activity involve Reg. Guide 1.97 (Post Accident Monitoring) Indications?	☐ YES	Мио

MAINTENANCE **Potential Impact** YES **Electrical Maintenance** Does the proposed activity require an Electrical Maintenance review to identify affected . procedures, required actions and required training? **I&C** Maintenance YES Does the proposed activity require an I&C Maintenance review to identify affected . procedures, required actions and required training? **Mechanical Maintenance** YES Does the proposed activity require a Mechanical Maintenance review to identify affected procedures, required actions and required training?

NUCLEAR ENGINEERING	Potential Impact		
 Nuclear Fuel Design Does the proposed activity impact or involve the design, performance or storage of nuclear fuel? 	T YES	NO	
Reactivity Management Program Does the proposed activity impact or involve the reactor system, reactor controls, reactor chemistry, related systems, potential core and spent fuel damage, spent fuel, reactor coolant pressure boundary or reactor system procedures?			

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Engineering Change Process

IMPACT SCREENING SUMMARY

ATTACHMENT 9.3 SHEET 3 OF 6

PROCESS OR PROGRAM IMPACT SCREENING CHECKLIST **Potential Impact Computer Support and Software** □ YES **M**NO Does the proposed activity impact or involve changes to plant computer software or firmware or impact Software Quality Assurance (SQA)? X NO **Chemistry and Environmental Impact** □ YES Does the proposed activity impact or involve any changes to plant chemistry requirements, operations or procedures, or any changes to the environment? **Radiation Protection (RP) Program Impact** □ YES Мио Does the proposed activity impact or involve any changes to the RP program? Does the proposed activity involve the potential to introduce (or reintroduce) any cobalt containing materials (such as Stellite) into the primary system? Operations YES **NO** Does the proposed activity impact or involve changes to Operations procedures, training or operator actions? Planning, Scheduling and Outage (PS&O) YES Does the proposed activity require a PS&O review to identify required design and installation information? MP&C (Inventory) YES Does the proposed activity impact or involve any addition or removal of equipment from the inventory? Does the proposed activity impact or involve any Procurement of Quality or Augmented Quality material from non-qualified suppliers? **Procurement Engineering** YES **NO** Does the activity impact or involve any procurement activities?

PROGRAMS AND COMPONENTS	Potentia	al Impact
 ASME Containment In-service Inspection (IWE / IWL) Program Does the proposed activity impact or involve the containment pressure boundary or associated moisture barriers or a support for the containment pressure boundary? This includes "software only" changes that do not physically change the hardware such as re-rating of pressures or temperatures to include changes to documented information on these items or additional documented information for these items. Does the proposed activity limit access to containment surfaces for inspection? Involve disassembly of a bolted connection which forms a portion of the containment boundary? 	YES	
 ASME Appendix J (Primary Containment Leak Rate Testing) Program Does the proposed activity impact or involve any changes to primary containment leak rate testing? 	YES	□ NO



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REFERENCE USE

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Engineering Change Process

ATTACHMENT 9.3

SHEET 4 OF 6

PROGRAMS AND COMPONENTS (CONTINUED)	Potential Impact	
 ASME In-service Inspection (ISI) Program Does the proposed activity add, delete, or modify an ASME Section XI pressure boundary item or a support for an ASME Section XI pressure boundary item? This includes "software only" changes that do not physically change the hardware like such as re-rating of pressures or temperatures. (ASME Section XI items include ASME Class 1, 2, 3, or B31.1 treated as ISI Class 2 or 3 (T2 and T3) components, parts, or appurtenances such as pipe or pressure vessel walls, valve bodies and pump casings. 	YES	
 ASME Section XI Repair / Replacement Program Does the proposed activity involve any mechanical component within the ASME XI program / boundaries? Does the proposed activity add, delete, or modify an ASME Section XI pressure boundary item or a support for an ASME Section XI pressure boundary item? (ASME Section XI items include ASME Class 1, 2, 3, MC, and CC, as well as B31.1 treated as ISI Class 2 or 3 (T2 and T3) components, parts, or appurtenances such as pipe or pressure vessel walls, valve bodies and pump casings). 	YES	□ NO
 ASME In-service Testing Program Does the proposed activity impact or involve any item (safety related or non safety related) that may affect the performance or testing of a safety related pump or valve? Does the proposed activity impact the function or functional classification of any pump or valve as stated in the IST program documents? 	YES	□ NO
 Air Operated Valve (AOV) Program Does the proposed activity impact or involve the design, operation or testing of AOVs? 	☐ YES	X NO
 Buried Piping and Tanks (BP&T) Program Does the proposed activity impact or involve any changes to piping, coatings, or cathodic protection of Buried Piping & Components? 	YES	
 Boric Acid Corrosion (BAC) Program Does the proposed activity impact or involve any increase in the likelihood of boric acid formation or corrosion? 	☐ YES	MNO
 Check Valve Program Does the proposed activity impact or involve the design, operation or testing of check valves? 	YES	
 Control Room Habitability Program Does the proposed activity impact or involve changes that affect the temperature or radiological environmental conditions in the Main Control Room? 	TES YES	X NO
 Electrical Circuit Breaker, Relay and Electrical Equipment Testing Does the proposed activity impact or involve changes to the functional testing of circuit breaker, relay or electrical equipment? 	YES	


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REFERENCE USE

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Engineering Change Process

IMPACT SCREENING SUMMARY

ATTACHMENT 9.3 SHEET 5 OF 6

PROGRAMS AND COMPONENTS (CONTINUED)	Potential Impact			
 Flow Accelerated Corrosion (FAC) Program Does the proposed activity involve any changes (e.g.: configuration, velocity, flow rate, pressure, temperature, material, weld location, etc.) to piping systems included in the FAC Program.? 	C YES	M NO		
 Heat Exchanger Program Does the proposed activity impact or involve the design, operation or testing of a component in the heat exchanger program? 	□ YES	ХNО		
 Predictive Maintenance Program Does the proposed activity impact or involve any aspect of the storage, use and testing of lubricants? Does the proposed activity involve thermography? Does the proposed activity involve vibration monitoring? 	YES	□ NO		
Microbiological induced Corrosion (MIC) Program Impact Does the proposed activity involve piping containing untreated or stagnant water or open to the atmosphere?	U YES	M NO		
 Motor Operated Valve (MOV) Program Does the proposed activity impact or involve the design, operation or testing of MOVs? 	□ YES	NO		
Plant Thermal Performance Program Does the proposed activity impact or involve plant thermal performance?	□ YES	X NO		
 Preventive Maintenance Program Does the proposed activity impact or involve periodic testing or performance of SSCs? or Does the proposed activity add, modify or delete any Environmental Qualification (EQ) maintenance requirement or replacement frequency to ensure the component(s) maintains its gualification status? 	YES	□ NO		
 PT Curves Does the proposed activity add, delete, or modify the basis (as contained in each sites reactor vessel surveillance material testing program) for the Pressure / Temperature Limit Curves (fluence, pressure, temperature, reactor materials)? 	☐ YES	X NO		
 Relief Valve Program Does the proposed activity impact or involve the design, operation and testing of relief valves, safety valves, vacuum breaker valves or rupture disc? 	T YES	₩ NO		
 RPV Internals Program Does the proposed activity impact or involve any change to the reactor internals? This includes "software only" changes that do not physically change the hardware such as re-rating of pressures or temperatures. Does the proposed activity impact or involve or related documentation to include neutron fluence or neutron fluence calculations? Does the proposed activity impact or involve or changes to core flow characteristics or core flow characteristics? 	U YES	X NO		



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REFERENCE USE

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Engineering Change Process

ATTACHMENT 9.3

IMPACT SCREENING SUMMARY

SHEET 6 OF 6

PROGRAMS AND COMPONENTS (CONTINUED)	Potential Impact			
 Welding Program Does the proposed activity impact or involve a special process, such as welding, brazing or soldering? 	関 YES			
 Safety Program Does the proposed impact or activity involve personnel or industrial safety? 	YES			
 System Engineering Does the proposed activity impact or involve any changes to system configuration, function or performance, etc., for Maintenance Rule or other system? Does the proposed activity impact or involve any changes to system procedures, maintenance or operation, etc.? 	YES	□ NO		
Training Program Does the proposed activity involve existing training requirements or create the need for new training?	YES			
 Simulator Impact Does the proposed activity impact or involve changes to the Simulator? 	Tes 🗌	⊠ NO		
 Fire Protection Program Does the proposed activity result in a change to the Fire Protection Program (including 10CFR50 Appendix R) where the impact is more than negligible? 	YES			

Detailed Impact Screening (Attachment 9.4) Attached?	□ YES	X NO

Attachment 2

Conceptual Design Sketches

- 1. Figure 1: Reactor Cavity Flooding System Flow Diagram
- 2. Figure 1A: Reactor Cavity Flooding System Flow Diagram
- 3. Figure 2: Reactor Cavity Flooding System Fire Water Tie-In
- 4. Figure 3: Reactor Cavity Flooding System General Arrangement







IPEC00270163



Attachment 3

References

- 1. ENTERGY Nuclear Management Manual, Engineering Change Process, Rev 11
- Association for the Advancement of Cost Engineering (AACE),
 Cost Estimate Classification System As Applied In Engineering, Procurement, and Construction for the Process Industries
 - TCM Framework: 7.3 Cost Estimating and Budgeting
 - Figure 4 Estimate Checklist & Maturity Matrix
- 3. Typical Self Contained Diesel-Driven Pump (attached here)



Self Contained Engine Driven Unit

Hale offers a variety of standard and custom self contained engine driven pumping modules with features designed to meet demanding applications. Our units can be mounted direct, bolted down, or set up as trailers for transportable firefighting protection at dock side. Varying in size and capability from small open chassis units to custom trailer pumping modules, they span a wide range of applications including marine firefighting pumps and industrial trailers. Hale builds water and foam pumping skids to meet the needs of government, forestry, and industrial customers. Units have been constructed for hurricane relief, fire protection at nuclear power sites, oil field fire fighting, hydrant systems, marine fire boats, dock protection, and more. These units are equipped with heavy duty fan forced radiator cooling.









Attachment 4

Cost Estimate

Indian Point Nuclear Power Station										
* ESTIMATE LEVEL *	EC #: SAMA IP3-007									
Conceptual	PROJECT TITLE: Install a Reactor Cav	vity Flooding System	CAPITAL 0&M	ESTIMATOR: RCMT						
Preliminary	JOB LOCATION: Containment Buildin	g, Yard near FSB	PROJECT CODE: TB	D						
Definitive	OUTAGE NON-OUTAGE	ORIGINATOR:		ORIG. DATE: 07-12-2012						
	ESTIMATE TOTAL \$1,869,811		REVISION	11-0						
Summary of Change: In accordance with NRC env 2 and 3 as part of its license renewal application and relat internal engineering project of C.F.R. Part 54. Entergy cor This package provides a cor For SAMA IP3-007, resolution damage and vessel failure of This package will provide an	ummary of Change: accordance with NRC environmental regulations in 10 C.F.R. Part 51, Entergy performed SAMA analyses for both Indian Point Nuclear Generating Units and 3 as part of its license renewal application. Those analyses identified a number of potentially cost-beneficial SAMAs for each unit. In its license mewal application and related correspondence with the NRC Staff, Entergy indicated that it would submit the potentially cost-beneficial SAMAs for further iternal engineering project cost-benefit analysis, even though none of the potentially cost-beneficial SAMAs is related to aging management under 10 .F.R. Part 54. Entergy contracted RCM Technologies to assist it in this effort. his package provides a conceptual design and implementation cost estimate for SAMA IP3-007 in accordance with Entergy design engineering practices. or SAMA IP3-007, resolution is required to reduce potential containment damage as a result of concrete-core interaction from molten debris following core amage and vessel failure conditions. his package will provide an installation using a standby pump and fire water to flood the reactor cavity in the event this emergency action is necessary.									
Prepared by:		Approved	by:							
Patro	Bettacarol.		UZZ							
Date:	9-20-2012	Date:	9-20-2012	v						

		ENTERGY NUCLEAR NORTHEAST IMPLEMENTATION ESTIMATE Indian Point Nuclear Power Station
* ES	IMATE LEVEL *	EC # SAMA IP3-007
171	Concentual	
	Broliminan	
	Freininary	JOB LOCATION: Containment Building, Yard near FSB PROJECT CODE: TBD
	Definitive	ORIGINATOR: ORIG. DATE: 07-12-2012
Itom		Description
iteri		
1.	This estimate assu	mes that this work will require outage conditions to complete
2.	This estimate assu	mes that this work will complete during 2014 working a 10 hours per shift, Six days per week schedule.
3.	This estimate assu	mes that a Prefabricated building will be purchased for erection on site by skilled local craft.
4	This estimate assu	mes that all work will be performed by trained contract craftspersons in lieu of station maintenance personnel.
5	This estimate provi	des for continuous fire watch during welding activities
	This estimate provi	des for contrabels me watern during weaking detrines.
	This estimate assu	mes training for 12 man Ops. Personnel.
1.	I his estimate assu	mes that the safety class for piping and valves will only require a C of C.
8.	This estimate assu	mes that weld inspections will be limited to visual and LP testing.
9.	The bulk of the wor	k in this estimate is non outage and is assumed to occur in 2011 on a 4 day per week, 10 hour per day schedule.
	This estimate is ba	sed on the project's current level of scope definition and is classified Class 4 as defined per the AACE International Cost
10.	Estimate Classifica	tion System (see Attachment 3, Reference 2).
11.	for anticipated billin	ig rate increases of 3% per year.
12.	cumulative and pro	is for and includes a contingency factor related to the complexity and location of the work required. The factor is gresses as follows:
	A. Outside fer	nce boundary - 20%
[B. Inside fend	e boundary - 30%
	C. Implement	ation complexity - 40%
	D Inside Con	tainment - 50%
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INDIAN POINT IMPLEMENTATION ESTIMATE WORK SHEET EC #: SAMA IP3-007

Rev. 11-0			INDIAN	N POIN	IT IMPL	EMENT. EC #: S	ATION I AMA IP3	ESTIMA1 -007	TE WORK S	HEET				
PRO JOB EST.	JECT TITLE: Install a Reactor Cavity Flooding Sys LOCATION: Containment Building, Yard near FSB STATUS:	tem [⊡ OUTAGE	NON-	OUTAGE		PROJEC ORIGINA	T CODE: TE	BD 🔽 CAPITAL	0&M	TAKEOFF: ESTIMATOR ORIG. DATE	: RCMT : 07-12-20	112	
		Τ.,			N	ANHOURS	5	*/5.41 L	MATERIAL \$	MATERIAL	LABOR	SU	B-	
	DESCRIPTION			T [NO.]	UNIT	FCTR	TOTAL	\$/MH	PER UNIT	DOLLARS	DOLLARS	CONT	RACT	TOTAL \$
	* ESTIMATE LEVEL *								ESTIMATE SU	MMARY				
<u> </u>	Conceptual			ENOUNE						MANHOURS		DOLLARS	5	
⊢	Preliminary				STUDY D	ESIGN & C		г		160		¢	16.000	
	Deminuve	┩╵	0:	2	DESIGN F	EGICIN, & C	ST SUPPC	RT		40		s	4 000	
	General Notes:		0:	3	MODS EN	IGR SUPP	'ORT					¢	1,000	
			04	4	SYS ENGR	R/ S-U ENG	R			100		\$	10,000	
			05	5	PROJECT	MANAGEN	I ENT			200		\$	24,000	
			06	6	TESTING	(Calibration	& Testing)			40		\$	4,000	
				/ 0	FECH SPE	EC/ESAR, C	ACCEPTA	ALYSIS		675		\$ ¢	81,000	
			c c		CT ENGINE	EERING	ACCELLIA			40		φ	4,000	
			08	8	DESIGN E	INGR CONT	TRACT SU	PPORT		1,200		\$	144,000	
			30	9	SUPL CON	NTRACT M	ODS ENGF	2						
			1(0	MODS PL/	AN & SCHE	D-CONTR	RACT		160		\$	16,000	
					OSG FIEL	DENGRS /		≀S		140		\$	16,800	
				AIERIAL 2	MATEDIAL	LONIRACI	15					¢	121 000	
			1:	2 3	OTHER CO	ONTRACTS	3					φ	121,900	
			C C	ONTRAC	TCRAFT	LABOR								
			14	4	SWEC CR		R/WALKDO	JWN		2,446		\$	333,032	
			15	5	LOST TIM	E				245		\$	33,357	
			16	6	SWEC DIS	STRIBS								
			PI PI	LANTCR	AFT LABO	OR						_		
				7		AINT.				-		\$	-	
			10	3	RC	AINT				-		¢ ¢	-	
			20	Ś	CSG					_		\$	_	
			м	usc su	PPORT									
			21	1	QUALITY	CONTROL				180		\$	18,000	
			22	2	PLANNING	3 & SCHED	ULING					\$	-	
			23	3		i FDV				36		\$	4,320	
			24	+ 5		RI				- 100		¢	12 000	
			26	5	HP/RP					-		\$	- 12,000	
			м	ISC CON	ITRACT SU	UPPORT								
			27	7	QUALITY	CONTROL				130		\$	10,400	
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			29	•	HP / RP	OTE				-		\$	-	
			31	J 1	NURSE	SIE				-		э 5	-	
			32	2	ELEVAT	OR CONTR	ACTOR			-		\$	-	
			33	3	WASTE M	MANAGEM	ENT			-		\$	-	
			34	4	HOUSEK	EEPING				-		\$	-	
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			35	ý Đ	SECURIT	Υ				_		\$	_	
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			41	1	SAFETY					49		\$	3,332	
			C	ONTING	ENCY							_		
				2	CONTING	ENCY						\$	342,456	
			ES ES	TIMATE	SUBIUIA	.6		Site Enci	umbrancola	5,941 adore (200/)		ຈ 1 ເ	,198,597	
									(20%)	auers (20%)		ф Ф	203,/19 424 405	
								Loaders	(30%)		-	φ	431,495	
								ESTIMAT	FE TOTAL			\$ 1	,869,811	

INDIAN POINT IMPLEMENTATION ESTIMATE WORK SHEET EC #: SAMA IP3-007

Rev 11-0			IND	IAN	POII		MENT		ES 3-0	STIMAT 07	TE WORK S	HE	ET	-				
PRC JOE EST	JECT TITLE: Install a Reactor Cavity Flooding Syst LOCATION: Containment Building, Yard near FSB STATUS	tem [J ΟυΤ <i>ι</i>	AGE [-OUTAGE			OT C	CODE: TE	3D 🔽 capital		O&M	TA ES OF	AKEOFF: STIMATOF RIG. DATE	R: RCMT =: 07-12-2012		
ITEN	DESCRIPTION	QT	иом	CFT	NO.	M/ UNIT		TOTAL	I	\$/MH	MATERIAL \$	M	ATERIAL OLLARS	D	LABOR OLLARS	SUB- CONTRACT	т	OTAL \$
	-						Non-Out	age Work	,		1					•		
1. 2. 3. 4. 5. 6. 7. 8. 9. 10. 11. 12. 13.	Gather and stage tools and materials Perform walkdown of work area. Perform walkdown of work area. Excavate to existing Fire Water Line Perform tie in to existing fire line Backfill and compact excavation Backfill and compact excavation Excavate, form and pour slab with oil berm Excavate, form and pour slab with oil berm Excavate, form and pour slab with oil berm Dotain and erect insulated steel building. Provide Linbt Heat and Ventilation	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		LB OP OP LB PF OP LB OP LB CP MW	2 2 1 2 3 1 2 1 3 2 3 2 3 2	2.00 4.00 24.00 24.00 15.00 15.00 10.00 30.00 10.00 30.00 30.00	1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00	4 8 4 48 60 15 30 10 90 20 60 60	******	78.15 78.15 115.00 115.00 78.15 120.71 115.00 78.15 115.00 78.15 96.00 134.00 123.32	\$ 10,000.00 \$ 4,000.00	*********	- - - 1,500 - 10,000 4 000	******	313 625 460 2,760 3,751 7,243 1,725 2,345 1,150 7,034 1,920 8,040 7,399		******	313 625 460 2,760 3,751 7,243 1,725 2,345 1,150 8,534 1,920 18,040 11,399
13. 14. 15. 16. 17. 18. 19. 20. 21. 22. 23. 24. 25.	Set Dises Pump Skid Excavate and pour Pipe Support Piers Excavate and pour Pipe Support Piers Excavate and pour Pipe Support Piers Obtain Material and Erect Pipe Supports on Piers Cut, Fit and Weld Piping from Diesel to Pene. Y-Y Tie in Piping at Pump and at Penet. Y-Y Mount and tie in diesel day tank Prefabricate Containment spool piece for outage. Support testing as required Clean-up area and restore Clean-up area and restore	1 1 1 1 1 1 1 1 1 1 1 1		MW LB CP PF PF PF PF PF PF LB	2 2 1 1 3 3 3 2 2 2 2 2	20.00 60.00 60.00 60.00 150.00 20.00 10.00 20.00 20.00 10.00 10.00	1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00	40 120 60 60 180 450 60 30 40 40 20 20 20 5	* * * * * * * * * * * * * *	134.00 134.00 78.15 96.00 115.00 120.71 120.71 120.71 120.71 120.71 120.71 120.71 120.71 120.71 120.71	\$ 1,000.00 \$ 50,000.00 \$ 2,000.00 \$ 1,000.00	\$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$	50,000 4,000 2,000 1,000 - - - - - - - - - - - - - - - - - -	* * * * * * * * * * * * * *	5,360 9,378 5,760 6,900 21,728 54,320 7,243 3,621 4,828 4,828 2,414 1,563		•••••••	55,360 13,378 5,760 6,900 23,728 54,320 7,243 4,621 4,828 4,828 4,828 2,414 1,563
1.	Obtain tools and material	1	LT	PF	2	5.00	1.70	17	\$	120.71		\$	-	\$	2,052		\$	2,052
2. 3. 4.	Perform job brief and walk down are Install prefabricated spool in containment Clean up and restore area	1111	LT LT LT	PF PF PF	2 2 2	5.00 10.00 5.00	1.70 1.70 1.70	17 34 17 -	\$ \$	120.71 120.71 120.71		\$	-	\$ \$ \$	2,052 4,104 2,052		\$ \$ \$	2,052 4,104 2,052
1. 2. 1. 2.	PAINTING & TOUCH-UP REQUIREMENTS PAINTING & TOUCH-UP - PRIME PAINTING & TOUCH-UP FIRE WATCH / BOTTLEWATCH REQUIREMENT CRAFT SUPPORT FOR FIRE WATCH CRAFT SUPPORT FOR BOTTLE WATCH MISC SUB-CONTRACT	1 1 1 1	LT LT LT	PT PT	2 2 1	60.00 60.00 120.00	1.00 1.00 1.70	- - 120 120 204 -	\$\$	95.16 95.16 53.60		\$\$	1,500 3,000 -	\$\$	11,419 11,419 10,934		\$\$ \$\$	12,919 14,419 10,934
								2 082				9	77.000	¢	216 7/0	α	4	203 7/0
1.	CONSTRUCTION SUPPORT (8% OF LABOR \$)	1	LT					167	\$	104.10			, ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	\$	17,385		۹ \$	17,385
	SUBTOTAL							2,249				\$	77,000	\$	234,125	\$	\$	311,125
1. 2. 3. 4. 5. 6. 7	* RELATED COSTS * WALKDOWN ALLOWANCE WORK PACKAGE REVIEW & CRAFT TRAINING TOOL ROOM ATTENDANTS (~3.5%) GENERAL CRAFT DISTRIBS. (10%) CRAFT IN PROCESSING (20%) HUMAN PERFORMANCE & ALARA TRAINING (1/2 day training. or ~ 2%)	1 1 1	LT LT LT	PF PF EL				20 98 79	\$\$\$	120.71 120.71 123.32				\$ \$ \$ \$ \$ \$	2,414 11,830 9,742 23,413 46,825 4,683		\$ \$ \$ \$ \$ \$	2,414 11,830 9,742 23,413 46,825 4,683
	SUBTOTAL							2,446				\$	77,000	\$	333,032	\$	\$	410,032
1.				PL PL														
	SUBTOTAL MECH MAINT.	+						-				\$		\$		\$	\$	-
1.				PL PL														
	SUBTOTAL ELECT. MAINT.			 					1			\$		\$	÷.	-	\$	-
1.	I&C (Dev. Instrument Calibration Procedures)	0	LT	PL PL	-													
	SUBTOTAL I&C MAINT.				[-				\$		\$		\$ -	\$	

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1-0							EC #: S/	AMA IP:	3-007						
PRC IOB	JECT TITLE: Install a Reactor Cavity Flooding Syste LOCATION: Containment Building, Yard near FSB . STATUS:	em [- Ουτρ	ige [-OUTAGE		PROJEC	T CODE: TE	3D 🔽 CAPITAL	TAKEOFF: ESTIMATOR: RCMT ORIG. DATE: 07-12-2012				
						MA	NHOURS			MATERIAL \$	MATERIAL	LABOR	SUB-		
ΓEΝ	DESCRIPTION	QTI	UOM	CFT	NO.	UNIT	FCTR	TOTAL	\$/MH	PER UNIT	DOLLARS	DOLLARS	CONTRACT	T	OTAL \$
1.	csg			PL PL				-							
	SUBTOTAL CSG MAINT.										s -	\$ -	\$ -	\$	
	SUBTOTAL PLANT										\$ -	\$ -	\$ -	\$	
	SUBTOTAL CRAFT/PLANT							2,446			\$ 77,000	\$ 333,032	\$ -	\$	410,032
	IMPLEMENTATION SUPPORT														
1.	MODS ENGINEERING	1	LT	NM											
2.	DESIGN ENGINEERING SUPT DURING CONST	1	LT	NM	1	40.00	1.00	40	\$ 100.00			\$ 4,000		\$	4,000
З.	SYSTEMS ENGINEERING - MECHANICAL	1	LT	NM	1	40.00	1.00	40	\$ 100.00			\$ 4,000		\$	4,000
4.	SYS ENGINEERING - ELECTRICAL	1	LT	NM	1	20.00	1.00	20	\$ 100.00			\$ 2,000		\$	2,000
5.	SYS ENGINEERING - INSTR & CONTROL	1	LT	NM				-				\$-		\$	-
6.	SYS ENGINEERING - CIVIL STRUCTURAL	1	LT	NM	1	40.00	1.00	40	\$ 100.00			\$ 4,000		\$	4,000
7.	PROJECT MANAGEMENT	1	LT	NM	1	200.00	1.00	200	\$ 120.00			\$ 24,000		\$	24,000
8.	TRAINING (OPS Staff)	1	LT	NM	12	3.00	1.00	36	\$ 120.00			\$ 4,320		\$	4,320
9.		1		NM	1	180.00	1.00	180	\$ 100.00			\$ 18,000		\$	18,000
10.	PLANNING & SCHEDULING			NM											
11.		1		NIM											
12.	UNEIVIISTRY OPS (DEVELOP/DEVISE PROCEDURE(S))	1		NM	1	100.00	1.00	100	¢ 120.00			\$ 12,000		¢	12 000
13.	TRAVEL & LIVING EXPENSES	1		INIVI		100.00	1.00	100	\$ 120.00			\$ 12,000		¢ Q	12,000
14.	CONTRACTOR SUPPORT	'										φ -		φ	-
1	FIS / MODS ENGINEERING - SWEC (Incl Per Dierr	n)	ΙТ	NM				-				\$ -		\$	-
2	MODS PLANNING & SCH SWEC (Incl Per Diem)	ľ 1	LT	NM	1	160.00	1.00	160	\$ 100.00			\$ 16.000		ŝ	16.000
3.	OSG FIELD ENGRS/PLAN- SWEC(Incl Per Diem)	1	LT	NM	1	140.00	1.00	140	\$ 120.00			\$ 16,800		ŝ	16,800
4.	QA / QC VERIFICATION	1	LT	NM	1	130.00	1.00	130	\$ 80.00			\$ 10,400		\$	10,400
5.	NDE	1	LT	NM	1			-							,
6.	HP / RP	1	LT	NM	1			-							
7.	RADWASTE	1	LT	NM				-							
8.	NURSE	1	LT	NM				-							
9.	ELEVATOR CONTRACTOR	1	LT	NM				-							
10.	WASTE MANAGEMENT	1	LT	NM				-							
11.	HOUSEKEEPING	1	LT	NM				-							
12.	EQUIPMENT RENTAL CONTRACTOR	1	LT	NM				-							
13.		1		NM				-							
14.		1		NM				-							
10.								-							
10.		1		NM				-							
18	SAFETY (2%)	1	IT	NM				49	\$ 68.00			\$ 3,332		s	3 332
19	LOST TIME (10%)		LT	1 4141				245	\$ 136.15			\$ 33,357		ŝ	33.357
	SUBTOTAL CRAFT/NON-MANUAL							3,826			\$ 77,000	\$ 485,241	\$ -	\$	562,241
1.	6" and 8" Sch 40 pipe Safety Class	1	LT	MT							\$ 18,000			\$	18,000
2.	8", 6" and 1", 150# class, Safety Related	1	LT	MT							\$ 20,000			\$	20,000
З.	FREIGHT, SALES TAX, & CONSUMABLES (6%)										\$ 6,900			\$	6,900
	SUBTOTAL INSTALLATION COST							3,826		-	\$ 121,900	\$ 485,241	\$	\$	607,141
1		4		NM	4	10 00	1 00	10	\$ 100.00			\$ 1000		¢	1 000
т. 2				NM	1	40.00	1.00	40	\$ 100.00			\$ 1000		Ψ S	4,000
<u>د</u> . ع	DESIGN ENGINEERING - INSTR & CONTROL			NM		40.00	1.00	40	φ 100.00			Ψ 4,000		Ψ	4,000
4	DESIGN ENGINEERING - CIVIL/STRUCTURAL			NM	1	80.00	1 00	80	\$ 100.00			\$ 8,000		\$	8.000
5	TESTING (Instrument Calibration and testing)			NM	2	20.00	1.00	40	\$ 100.00			\$ 4,000	s -	ŝ	4,000
6.	CONTRACT ENGR DESIGN SUPPORT	1	LT	NM	1	1,200.00	1.00	1,200	\$ 120.00			\$ 144,000	\$ -	\$	144,000
7.	TECH SPEC/ FSAR, CALCS, ANALYSIS	1	LT	NM	1	675.00	1.00	675	\$ 120.00			\$ 81,000		\$	81,000
8.	ENGRG DCP ACCEPTANCE REVIEW	1	LT	NM	1	40.00	1.00	40	\$ 100.00			\$ 4,000		\$	4,000
	SUBTOTAL DESIGN COST							2,115				\$ 164,000	-	\$	249,000
	SUBTOTAL INSTALLATION & DESIGN COST									I	I	\$ 649.241	\$	\$	856.141
1.	CONTINGENCY (40%)													\$	342,456
	ESTIMATE SUBTOTAL							5,941						\$	1,198,597

INDIAN POINT IMPLEMENTATION ESTIMATE WORK SHEET



ENTERGY INDIAN POINT NUCLEAR STATION UNIT 3

CONCEPTUAL DESIGN PACKAGE For

SAMA IP3-018

Install a Facility to Capture MSSV Discharge Steam and **Remove Fission Products**

Prepared by:	Approved by:
Joken Ruttanarod.	and the second
Date: 9-20-20/2	Date: Y - 20 - 6072

RCM	Technologies	ENTERGY	Conceptual Design	
	The Source of Smart Solutions	Unit 3	SAMA IP3 -018	Rev. 0

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1.0	ISSUE
2.0	BACKGROUND
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4.0	DESIGN CONSIDERATIONS
5.0	CONFIRMATION OF DESIGN
6.0	RECOMMENDED SOLUTION
7.0	PRELIMINARY MATERIAL LIST - Mechanical
8.0	PRELIMINARY MATERIAL LIST - Electrical
Attachment 1	Entergy Impact Screening Summary
Attachment 2	Conceptual Design Sketches
Attachment 3	References
Attachment 4	Cost Estimate

RCM	Technologies	ENTERGY	Conceptual Design	
	The Source of Smort Solutions	Unit 3	SAMA IP3 -018	Rev. 0

1.0 ISSUE

Severe Accident Mitigation Alternative (SAMA) IP3-018:

Install a Facility to Capture MSSV Discharge Steam and Remove Fission Products

2.0 BACKGROUND

In accordance with NRC environmental regulations in 10 C.F.R. Part 51, Entergy performed SAMA analyses for both Indian Point Nuclear Generating Units 2 and 3 as part of its license renewal application. Those analyses identified a number of potentially cost-beneficial SAMAs for each unit. In its license renewal application and related correspondence with the NRC Staff, Entergy indicated that it would submit the potentially cost-beneficial SAMAs for further internal engineering project cost-benefit analysis, even though none of the potentially cost-beneficial SAMAs is related to aging management under 10 C.F.R. Part 54. Entergy contracted RCM Technologies to assist it in this effort.

This package provides a conceptual design and implementation cost estimate for SAMA IP3-018 in accordance with Entergy design engineering practices.

For SAMA IP3-018, resolution is required to reduce the resulting consequences from a Steam Generator Tube Rupture (SGTR).

This package will capture and route discharge from the Main Steam Safety Valves (MSSVs) through a structure where water will be used to condense the exhausted steam and remove potential fission products.

The design considerations that follow will address the resolution's adequacy and the basis for the recommendation to resolve the identified potential issue.

The recommended solution will include descriptive details of the design change and also conceptual design sketches as required. These descriptive details, sketches, and the preliminary material list provide the basis for initiating the all-inclusive conceptual cost estimate for EC development and implementation at the Station.

3.0 EXISTING CONDITIONS

Indian Point 3 is a pressurized water reactor, which uses steam generators to transfer the heat generated by the reactor from the primary ("Reactor Coolant") system to the secondary ("Main Steam") system, which drives the turbine. This SAMA deals with the potential effects of a rupture of one or more of the tubes in one of those generators, allowing primary system fluid to enter the secondary system and potentially be released to atmosphere.

The Main Steam System is provided with protection. In the event of a Steam Generator Tube Rupture (SGTR), the Main Steam Isolation Valves (MSIVs) close and the Main Steam Safety Valves (MSSVs) may open at a pre-determined setpoint to protect the steam line. The steam line isolation provided by the MSIVs, coupled with the relief provided by opening the MSSVs, provides for the integrity of the main steam system, but should the secondary side release not be terminated, the release to atmosphere may include fission products for postulated scenarios leading to core damage.

This potential radioactive release needs to be captured and mitigated.

4.0 DESIGN CONSIDERATIONS

An installation is required that will capture the steam released from the MSSVs and process the steam to remove fission products. There are four steam lines each of which contains five MSSVs for a total of 20 MSSVs. Any one, or multiples, of the valves has to be considered a potential release path open under the conditions described above.

A connection of piping from each 14 inch diameter MSSV stack needs to be routed and connected to a facility equipped to "scrub" the steam being discharged. This will require approximately 200 feet of pipe per stack. Each stack will require monitoring to detect if a steam discharge has occurred and to initiate the scrubbing system.

The proposed modification consists of four large vessels, one for each main steam line, each enclosed in its own structure. Each vessel will require a piped water supply and pumps to spray the steam with water in order to condense the steam. Additional controls for maintaining the water level and its recirculation will also be needed. Drainage and disposal provisions for the contaminated condensate will also be required.

Electrical power will be required for pumps, controls, heaters, & exhaust fans.

RCM)	Technologies	ENTERGY	Conceptual Design	
J	The Source of Smart Solutions	Unit 3	SAMA IP3 -018	Rev. 0

5.0 CONFIRMATION OF DESIGN

New piping connections will be added to the existing MSSV discharge stacks to capture potentially contaminated steam from being discharged to the atmosphere as a result of a SGTR. The connected piping from each main steam line, will, in turn, be routed to an enclosed vessel. The vessel, equipped with nozzles and a pumped water supply for spraying the entering steam, will condense the steam and scrub any included fission products.

Analysis and/or calculations will be performed to:

- establish physical design conditions or boundary conditions such as flow rate for the design steam generator tube rupture and rated discharge capacity of each MSSV.
- evaluate if backpressure created by the new discharge and quenching system will exceed the current design level.
- determine the resulting discharge flow rate, pressure drop and resulting conditions in the blowdown vessel. These calculations will determine final blowdown vessel and spray pump sizing and quench water flow rate required to condense the MSSV discharge and what equilibrium pressure and temperature conditions will result in the vessel.
- determine the exit flow rate of quenched water that will be discharged from the blowdown vessel drain line.
- determine the dimensions of the blowdown vessels to include the total volume, aspect ratio of length and diameter and vertical orientation along with the co-current spray pattern of admitted MSSV discharge flow and quench water.
- determine city water or fire protection system capacity to provide water supply for quenching system
- determine the physical protection for blowdown vessels to prevent damage from tornado generated missiles
- determine the amount of potential radioactive fluid leakage and develop a system to contain this fluid

In addition, with the spray pump suction coming from both an outside source and the bottom of the vessel, a calculation to establish outside source water verses flow recalculated from the blowdown vessel needs to be performed. An active flow control system may need to be added to control and maintain these proportions and prevent one from dominating the other as conditions inside the blowdown vessel

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change during the discharge transient.

The proposed discharge piping system, quench vessel and their support systems will be analyzed to determine their ability to withstand the transient shock loads that occur when one or more MSSVs opens and exposes the flow path components to dynamic stresses and thermal changes.

The MSSV blowdown vessel will be an ASME code pressure vessel and will require overpressure protection in the form of a safety/relief valve discharging to an appropriate location. There is the possibility for the quenching process to liberate a significant quantity of non-condensable gases (ex. CO2, H2, etc) resulting from condensation and cooling of steam water flow.

6.0 RECOMMENDED SOLUTION

- A. MECHANICAL
- 1. Install City Water/ Fire Protection Water Supply Piping

This will require excavating at the East wall of the house service boiler building and connection of the new piping to the existing 4 inch connection (Ref. Dwg. 9321-F-40903). This piping run is to have an underground isolation valve with a curb box located close to the house service boiler building.

- 2. Install Blowdown Vessel Support Structure
 - The blowdown vessels and spray pumps are to be located north of the Unit 3 Containment Building (see Attachment 2, figures 1, 2, and 14). A steel structure is provided for support and protection for the vessels and pumps.
 - Prior to the design of the structure, locate support foundations around existing piping and conduits in the area (new reinforced concrete foundations to be 3000 PSI compressive strength @ 28 days). Steel to be galvanized ASTM A500 GR B. All channels, angles, plates, and bars to be A36.
 - Install intermediate steel, platforms and required ladders as not to impede on existing piping and conduits, etc.

The following applicable codes, standards, and specifications shall apply:

- A. 2009 International Building Code
- B. ASCE 7, Minimum Design Loads for Building and Other Structures

- C. AISC Steel Construction Manual
- D. AWS D1.1 Structural Welding Code-Steel
- E. AISI Specification for Design of Cold-Formed Steal Structural Members
- F. ACI 301 Specification for Structural Concrete
- G. ACI 315 Detail and Detailing of Concrete Reinforcement
- H. ACI 318 Building Code for Structural Concrete
- 3. Install Blowdown Vessels
 - Lift blowdown vessels into place on the support structure using a heavy crane.
 - Secure the vessels support lugs to the steel structure by welding or mechanical means.
- 4. Install Spray/Recirculation Pumps and Related Piping
 - Install the spray/recirculation pump on the intermediate platform located just above the existing piping and conduits and below the blowdown vessel drain.
 - Install the pump suction piping, discharge piping, and valves.
 - Install sample and level connections, root valves, level transmitter, tubing, tray, hardware and supports.
- 5. Install 14 inch DIA. Main Steam Relief Valve (MSSV) Stack Extension Piping
 - Prepare ends of existing stack pipes for welding.
 - Install new piping from each main steam line relief valve (five MSSV's per main steam line) and run to its related Nozzle connection on the appropriate blowdown vessel.
 - Utilize "five diameter Bends" where possible.
 - Install supports as required.
 - Install flow switch on each MSSV Stack Extension Piping downstream of MSSV (five MSSV per main steam line - thus five flow switches per main steam line).

- Install pressure switch connection, root valve, pressure switch, tubing, tray, and supports.
- 6. Install Building Siding and Roof
 - Install siding and roof by attaching to the blowdown vessel support structure.
 - Install space heaters and exhaust wall units.

B. ELECTRICAL

- 1. Install a new MCC extension in Unit 3 in Turbine Bldg. at Elevation 15'-0" at MCC 312A.
 - Power the new MCC extension from the existing MCC 312A.
- 2. In MSSV Blowdown building on the intermediate platform install a 480/120 Volt transformer.
- 3. Conduit and Wiring
 - Route and support conduit from new MCC extension in Unit 3 Turbine Bldg. at Elevation 15'-0" to 480/120 Volt transformer in MSSV Blowdown building.
 - Install and connect wiring from the new MCC extension to 480/120 Volt transformer in MSSV Blowdown building.
- 4. Install Hoffman junction box with terminal blocks.
- 5. Install Hoffman Panel and Related Components
 - Install the Hoffman panel on the intermediate platform.
 - Install the loop power supply and local controller into Hoffman panel.
- 6. Conduit and Wiring A. Instruments
 - Route and support conduit from each flow switch to the new junction box fitted with terminal blocks.
 - Route and support single conduit from flow switch junction box to the new Hoffman panel.

- Install and connect wiring from the flow switches to the new junction box.
- Install and connect wiring from the junction box to the new Hoffman panel.
- Route and support conduit from each level transmitter and pressure switch to the new Hoffman panel.
- Install and connect wiring from each level transmitter and pressure switch to the new Hoffman panel.
- B. Pump and Valves
 - Route and support conduit from pump and valves to the new Hoffman panel.
 - Install and connect wiring from pump and valves to the new Hoffman panel.
- C. GENERAL
- 1. Testing

Perform a functional test by running pump in a spray mode until level in the vessel signals valving to switch to recirculation mode.

2. Additional Requirements

The condensed steam collided in the blowdown vessel must be sampled for fission products and disposed of at plant operation's discretion.

- 3. Provide procedures and training for operating, testing, and performing maintenance on the components of the newly installed system.
- 4. Provide preventive maintenance procedures and parts for all blowdown vessels and recirc/spray system components.

7.0 PRELIMINARY MATERIAL LIST - Mechanical

Iten	n Description	<u>Quantity</u>
1.	14 inch Dia Schedule 40 Seamless pipe A106 Grade B	4000 feet
2.	Pump–300GPM, Griswold Pump Co (or equal)	4
3.	Blowdown Vessel, ASME Section VIII, per sketch	4
4.	Structural Steel – 12 x 12 x 190 lb/ft Wide Flange, A500 GR B	1,500 feet
	10 x 10 x 112 lb/ft Wide Flange, A500 GR B	1,000 feet
	8 x 8 x 67 lb/ft Wide Flange, A500 GR B	1,000 feet
	4 x 4 x ¾" Angle, A500 GR B	2,500 feet
5.	Spray Nozzles	80
6.	4 inch Gate Valve, 150# Carbon Steel	12
7.	4 inch Check Valve, 150# Carbon Steel	4
8.	8 inch Dia Schedule 40 Seamless pipe A106 Grade B	600 feet
9.	3 inch Dia Schedule 40 Seamless pipe A106 Grade B	600 feet
10.	1 inch Dia Schedule 40 Seamless pipe A106 Grade B	40 feet
11.	4 inch Dia Schedule 40 Seamless pipe A106 Grade B	500 feet
12.	4 inch Gate Valve, 150# Carbon Steel, with curb box	1
13.	4 inch Air operated gate valve, 150# Carbon Steel	8
14.	8 inch Air operated gate valve, 150# Carbon Steel	4
15.	Unit Heaters – Large Capacity Industrial-280V-15000 W	
	50000-BTU/HR – 1342 CFM	2
16.	Shutter Mounted Exhaust Fan, 36" Blade, 1 Speed, 12,000 CFM	2
17.	Metal Siding-Ryerson Great Rib Style or Equal	20,000 Sq. Ft.
18.	Metal Roofing-Ryerson RY-Lock Style or Equal	2,400 Sq. Ft.
19.	Double Door w/Frame-Metal w/Hardware	1
20.	1"-Globe Valve Carbon Steel	12
21.	2" x 3" Relief Valve (setpoint data pending calculation)	4

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8.0 PRELIMINARY MATERIAL LIST - Electrical

Item Description	Quantity
1. FCI Flow Switch Model FLT93f FlexSwitch or Equivalent	20
2. Rosemount 3051 Pressure Transmitter for level measurement or Equivalent	4
3. Allen-Bradley 836 836-C12 Pressure Switch or Equivalent	4
4. Loop Power - Power Supply	1
5. Local Controller	1
6. Hoffman Junction Box with terminal blocks	4
 Hoffman Wall Mounted Panel and enclosure, with terminal blocks, 36" x 36" x 16" 	1
8. Instrument Tubing – 0.375" x 0.065 - 316 SS Tubing	300 Feet
9. 3" – Conduit and supports	1200 Feet
10.1" – Conduit and supports	3000 Feet
11.10/c – Cable	1200 Feet
12. 2/c - Cable	2600 Feet
13. One Pair - Twisted Shielded Pair Cable	400 Feet
 MCC extension (2 buckets high x 1 bucket wide) with mounting brackets to connect to existing MCC 312A 	1
15. 480 VAC switchgear to be installed into MCC extension	2
16. 480/120 volt Transformer	1
17. 2" – Conduit and supports	500 Feet
18. 480 VAC – 4/c Power Cable	500 Feet

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Attachment 1

Entergy Impact Screening Summary



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Engineering Change Process

ATTACHMENT 9.3

IMPACT SCREENING SUMMARY

SHEET 1 OF 6

INSTRUCTIONS:

Identify the potentially impacted and the unaffected areas by checking the appropriate <u>Yes</u> or <u>No</u> block on the Impact Screening Criteria.

If a direct determination cannot be made based on the impact screening questions, the detailed questions in Attachment 9.4 may be used to identify potential impacts.

The completion of detailed questions in Attachment 9.4 is recommended but not required.

Contact potentially impacted groups if assistance is required.

SAMA		CONCEP	TUAL
Engineering Change No.: <u>TP3-018</u>	Rev. No.:	DESIGN	PACKAGE

Prepared by:

Date:

DESIGN ENGINEERING DISCIPLINES		al Impact
 Civil / Structural Design Engineering Does the proposed activity involve any civil / structural (including seismic) design changes, activities or affect coatings? OR Does the proposed activity involve any piping engineering design changes or activities? 	YES	□ NO
 Electrical Design Engineering Does the proposed activity involve any station or switchyard electrical design, large power transformers, or settings changes or activities? (SOER 10-1) 		
 Instrumentation and Controls Design Engineering Does the proposed activity involve any I&C design or settings changes or activities? 	YES	
 Mechanical Design Engineering Does the proposed activity add/remove/replace insulation, aluminum or other metallic/non-metallic sources of debris in the reactor/containment building or involve any mechanical design changes or activities? 	YES	
 PSA Engineering Does the proposed activity impact or involve changes to plant evaluations or probabilistic safety assessments? Does the proposed activity impact or involve changes to the Emergency Operating Procedures, Abnormal Operating Procedures, or Severe Accident Procedures or does it add, remove or modify SSCs included in a Maintenance Rule function? 	YES	□ NO
 Nuclear Analysis Does the proposed activity impact or involve changes to plant evaluations, Technical Specifications, Technical Requirements Manual, or require a full 50.59 Evaluation? 	YES	□ NO
 FERC / NERC Impact Does the proposed activity impact or involve change to FERC / NERC or Regional Entity compliance documents? (ex. MOU, ENN/ENS-PL-158, ENS-DC-199, etc.) 		□ NO



IMPACT SCREENING SUMMARY

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Engineering Change Process

ATTACHMENT 9.3

Sheet 2 of 6

DESIGN ENGINEERING PROGRAMS	Potential Impact	
 ASME Section III Specifications Does the proposed activity add, delete, or modify information required by ASME Section III to be contained in a design specification? 	YES	
 Cable and Raceway Program Does the proposed activity involve any changes to cable trays, raceways or the associated documentation? 	YES	
Electronic Databases (EDB) Does the proposed activity involve any changes to electronic databases?	YES	
 EQ Program (10CFR50.49, NUREG 0588, Reg Guide 1.89) Does the proposed activity involve any new or existing EQ components? 	YES	
 Hydrogen Control Program (10 CFR 50.44) (<i>if applicable</i>) Does the proposed activity impact equipment or materials related to hydrogen control? 	TES 🗌	🕅 NO
 Human Factors Program Does the proposed activity involve control panel design including layout and labeling, visual displays, operator aids, auditory signals or environment in the control room, cable spreading room, and other control panel locations? 	YES	□ NO
 Margin Management Does the proposed activity impact or involve any change to design, licensing or operations margins? 	YES	
Reg. Guide 1.97 / PAM (Post Accident Monitoring) • • Does the proposed activity involve Reg. Guide 1.97 (Post Accident Monitoring) Indications?	YES	

MAINTENANCE		Potential Impact	
 Electrical Maintenance Does the proposed activity require an Electrical Maintenance review to identify affected procedures, required actions and required training? 			
 I&C Maintenance Does the proposed activity require an I&C Maintenance review to identify affected procedures, required actions and required training? 			
 Mechanical Maintenance Does the proposed activity require a Mechanical Maintenance review to identify affected procedures, required actions and required training? 			

NUCLEAR ENGINEERING		Potential Impact	
 Nuclear Fuel Design Does the proposed activity impact or involve the design, performance or storage of nuclear fuel? 		🕅 NO	
 Reactivity Management Program Does the proposed activity impact or involve the reactor system, reactor controls, reactor chemistry, related systems, potential core and spent fuel damage, spent fuel, reactor coolant pressure boundary or reactor system procedures? 		X NO	



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Engineering Change Process

ATTACHMENT 9.3

SHEET 3 OF 6

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IMPACT SCREENING SUMMARY

PROCESS OR PROGRAM IMPACT SCREENING CHECKLIST	Potentia	al Impact
Computer Support and Software	YES	
 Does the proposed activity impact or involve changes to plant computer software or firmware or impact Software Quality Assurance (SQA)? 		
Chemistry and Environmental Impact	YES	
 Does the proposed activity impact or involve any changes to plant chemistry requirements, operations or procedures, or any changes to the environment? 		
Radiation Protection (RP) Program Impact	YES	
 Does the proposed activity impact or involve any changes to the RP program? Does the proposed activity involve the potential to introduce (or reintroduce) any cobalt containing materials (such as Stellite) into the primary system? 		
 Operations Does the proposed activity impact or involve changes to Operations procedures, training or operator actions? 	TES 🗮 YES	
 Planning, Scheduling and Outage (PS&O) Does the proposed activity require a PS&O review to identify required design and installation information? 	JES &	□ NO
 MP&C (Inventory) Does the proposed activity impact or involve any addition or removal of equipment from the inventory? Does the proposed activity impact or involve any Procurement of Quality or Augmented Quality material from non-qualified suppliers? 	YES	□ NO
Procurement Engineering Does the activity impact or involve any procurement activities?	YES	

PROGRAMS AND COMPONENTS	Potentia	al impact
 ASME Containment In-service Inspection (IWE / IWL) Program Does the proposed activity impact or involve the containment pressure boundary or associated moisture barriers or a support for the containment pressure boundary? This includes "software only" changes that do not physically change the hardware such as re-rating of pressures or temperatures to include changes to documented information on these items or additional documented information for these items. Does the proposed activity limit access to containment surfaces for inspection? Involve disassembly of a bolted connection which forms a portion of the containment boundary? 	YES	□ NO
 ASME Appendix J (Primary Containment Leak Rate Testing) Program Does the proposed activity impact or involve any changes to primary containment leak rate testing? 	YES	



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Engineering Change Process

IMPACT SCREENING SUMMARY

ATTACHMENT 9.3

SHEET 4 OF 6

PROGRAMS AND COMPONENTS (CONTINUED) Potential Impact ASME In-service Inspection (ISI) Program YES Does the proposed activity add, delete, or modify an ASME Section XI pressure boundary item or a support for an ASME Section XI pressure boundary item? This includes "software only" changes that do not physically change the hardware like such as re-rating of pressures or temperatures. (ASME Section XI items include ASME Class 1, 2, 3, or B31.1 treated as ISI Class 2 or 3 (T2 and T3) components, parts, or appurtenances such as pipe or pressure vessel walls, valve bodies and pump casings. ASME Section XI Repair / Replacement Program YES **NO** Does the proposed activity involve any mechanical component within the ASME XI program / boundaries? Does the proposed activity add, delete, or modify an ASME Section XI pressure boundary item or a support for an ASME Section XI pressure boundary item? (ASME Section XI items include ASME Class 1, 2, 3, MC, and CC, as well as B31.1 treated as ISI Class 2 or 3 (T2 and T3) components, parts, or appurtenances such as pipe or pressure vessel walls, valve bodies and pump casings). ASME In-service Testing Program YES Does the proposed activity impact or involve any item (safety related or non safety related) that may affect the performance or testing of a safety related pump or valve? Does the proposed activity impact the function or functional classification of any pump or valve as stated in the IST program documents? Air Operated Valve (AOV) Program YES Does the proposed activity impact or involve the design, operation or testing of AOVs? **Buried Piping and Tanks (BP&T) Program** YES Does the proposed activity impact or involve any changes to piping, coatings, or cathodic protection of Buried Piping & Components? Boric Acid Corrosion (BAC) Program T YES X NO Does the proposed activity impact or involve any increase in the likelihood of boric acid formation or corrosion? **Check Valve Program** □ YES 🛛 NO Does the proposed activity impact or involve the design, operation or testing of check valves? **X** NO **Control Room Habitability Program** □ YES Does the proposed activity impact or involve changes that affect the temperature or radiological environmental conditions in the Main Control Room? **Electrical Circuit Breaker, Relay and Electrical Equipment Testing** YES □ NO Does the proposed activity impact or involve changes to the functional testing of circuit breaker, relay or electrical equipment?



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Engineering Change Process

IMPACT SCREENING SUMMARY

ATTACHMENT 9.3 SHEET 5 OF 6

PROGRAMS AND COMPONENTS (CONTINUED) **Potential Impact NO** Flow Accelerated Corrosion (FAC) Program YES Does the proposed activity involve any changes (e.g.: configuration, velocity, flow rate, pressure, temperature, material, weld location, etc.) to piping systems included in the FAC Program.? X NO Heat Exchanger Program **T**YES Does the proposed activity impact or involve the design, operation or testing of a component in the heat exchanger program? □ YES X NO **Predictive Maintenance Program** Does the proposed activity impact or involve any aspect of the storage, use and testing of lubricants? Does the proposed activity involve thermography? Does the proposed activity involve vibration monitoring? **Microbiological Induced Corrosion (MIC) Program Impact** YES Does the proposed activity involve piping containing untreated or stagnant water or open to the atmosphere? □ YES Motor Operated Valve (MOV) Program X NO Does the proposed activity impact or involve the design, operation or testing of MOVs? Plant Thermal Performance Program YES Does the proposed activity impact or involve plant thermal performance? **Preventive Maintenance Program** YES Does the proposed activity impact or involve periodic testing or performance of SSCs? or Does the proposed activity add, modify or delete any Environmental Qualification (EQ) maintenance requirement or replacement frequency to ensure the component(s) maintains its qualification status? PT Curves X NO □ YES Does the proposed activity add, delete, or modify the basis (as contained in each sites reactor vessel surveillance material testing program) for the Pressure / Temperature Limit Curves (fluence, pressure, temperature, reactor materials)? **Relief Valve Program** YES □ NO Does the proposed activity impact or involve the design, operation and testing of relief valves, safety valves, vacuum breaker valves or rupture disc? M NO **RPV internals Program** □ YES Does the proposed activity impact or involve any change to the reactor internals? This includes "software only" changes that do not physically change the hardware such as re-rating of pressures or temperatures. Does the proposed activity impact or involve or related documentation to include neutron fluence or neutron fluence calculations? Does the proposed activity impact or involve or changes to core flow characteristics or core flow characteristics?



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Engineering Change Process

IMPACT SCREENING SUMMARY

ATTACHMENT 9.3

SHEET 6 OF 6

PROGRAMS AND COMPONENTS (CONTINUED)	Potentia	al Impact
 Welding Program Does the proposed activity impact or involve a special process, such as welding, brazing or soldering? 	YES	□ NO
 Safety Program Does the proposed impact or activity involve personnel or industrial safety? 	YES	
 System Engineering Does the proposed activity impact or involve any changes to system configuration, function or performance, etc., for Maintenance Rule or other system? Does the proposed activity impact or involve any changes to system procedures, maintenance or operation, etc.? 	YES	□ NO
 Training Program Does the proposed activity involve existing training requirements or create the need for new training? 	YES	
 Simulator impact Does the proposed activity impact or involve changes to the Simulator? 	YES	
 Fire Protection Program Does the proposed activity result in a change to the Fire Protection Program (including 10CFR50 Appendix R) where the impact is more than negligible? 	YES	

Detailed Impact Screening (Attachment 9.4) Attached?	□ YES	🕅 NO
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Attachment 2

Conceptual Design Sketches

- 1. Figure 1: Partial Site Plan of Areas Affected
- 2. Figure 2: General Arrangement Blowdown Vessels Location
- 3. Figure 3: General Arrangement Proposed Piping Routing
- 4. Figure 4, Sheet 1: Partial Flow Diagram S.G. No. 31, Ref Dwg 9321-F-20173
- 5. Figure 4, Sheet 2: Partial Flow Diagram S.G. No. 31, Ref Dwg 9321-F-20173
- 6. Figure 5, Sheet 1: Partial Flow Diagram S.G. No. 32, Ref Dwg 9321-F-20173
- 7. Figure 5, Sheet 2: Partial Flow Diagram S.G. No. 32, Ref Dwg 9321-F-20173
- 8. Figure 6, Sheet 1: Partial Flow Diagram S.G. No. 33, Ref Dwg 9321-F-20173
- 9. Figure 6, Sheet 2: Partial Flow Diagram S.G. No. 33, Ref Dwg 9321-F-20173
- 10. Figure 7, Sheet 1: Partial Flow Diagram S.G. No. 34, Ref Dwg 9321-F-20173
- 11. Figure 7, Sheet 2: Partial Flow Diagram S.G. No. 34, Ref Dwg 9321-F-20173
- 12. Figure 8: Partial Flow Diagram Fire Protection System, Ref Dwg 9321-F-40903
- 13. Figure 9: MSSV Blowdown Vessel
- 14. Figure 10: MSSV Blowdown Vessel and Support Elevation

r			
RCM) Technologies	ENTERGY Indian Point Nuclear Station Unit 3	Conceptual Design Package ~ SAMA IP3 -018	Rev. 0
	FIGURE 1		
PAR	TIAL SITE PLAN OF AREAS AF	FECTED	
NORTH AND	le la la la la la la la la la la la la la	JNIT 3 CONTAI	NMENT
MSSV BLOWDO	OWN VESSEL	BUILDING	
SUPPORT STRUC	TURE LOCATION		
MSSV DI STACK LO	SCHARGE		






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Attachment 3

References

- 1. ENTERGY Nuclear Management Manual, Engineering Change Process, Rev 11
- 2. Association for the Advancement of Cost Engineering (AACE), Cost Estimate Classification System - As Applied In Engineering, Procurement, and Construction for the Process Industries
 - TCM Framework: 7.3 - Cost Estimating and Budgeting
 - Figure 4 Estimate Checklist & Maturity Matrix
- 3. ENTERGY - Main Steam Safety Valve Setpoint Data from Procedure 3-PT-R006A (attached here)
- Typical Water Spray Pump (attached here) 4.
- Flow Switch Model FLT93F Flexswitch (attached here) 5.
- 6. Rosemount 3051 Pressure Transmitter (attached here)
- 7. Allen-Bradley Bulletin 836 Pressure Switch (attached here)

MAIN STEAM SAFETY VALVES SETTING TEST USING SET PRESSURE VERIFICATION DEVICE

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ATTACHMENT 1, SAFETY VALVE DATA SHEETS

(Page 9 of 12)

SG 33

	VALVE NO.	REQUIRED SETTING PSIG	AS FOUND REQUIRED ± 3%	AS FOUND ACTUAL *	AS LEFT REQUIRED ± 1%	AS LEFT ACTUAL **	INITIALS
1	MS-45-3	1065	1034 TO 1096		1055 TO 1075		
2	MS-46-3	1080	1048 TO 1112		1070 TO 1090		
3	MS-47-3	1095	1063 TO 1127		1085 TO 1105		
4	MS-48-3	1110	1077 TO 1143		1099 TO 1121		
5	MS-49-3	1120	1087 TO 1153		1109 TO 1131		

* As Found: First Initial Actuation

** As Left: Last Actuation Performed





18 inches [457 mm]

Customer specified lengths are available as an option.

- Operating Temperature:
- Standard: -4° to +350° F [-20° to +177° C]
 Optional: -100° to +500° F [-73° to +260° C]
- Operating Pressure: To 3500 psig [240 bar(g)]

Control Circuit

Operating Temperature: -40° to +140° F [-40° to +60° C] Input Power: Field selectable 115 \pm 15 Vac or 230 \pm 30 Vac (50/60 Hz); 21 to 28 Vdc or 18 to 26 Vac; 7 watts maximum, Relay Contacts: Field configurable dual SPDT or single DPDT rated 6 amps at 115 Vac, 240 Vac or

24 Vdc. Hermetically sealed relays are available as an option. Output Signal: Analog DC voltage related to flow or level/interface signal and proportional to temperature.

Electrical Connection: 1 inch female NPT

Remote Configuration: Available as an option with customer specified interconnecting cable length.

Optional N.I.S.T. Flow Calibration Services

Factory N.I.S.T. calibration in air or water is available as an option for customer specified setpoint(s) or a flow curve based on the media ranges specified above.

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Rosemount 3051 Pressure Transmitter

THE PROVEN INDUSTRY LEADER IN PRESSURE MEASUREMENT

- Best-in-Class performance with up to 0.04% reference accuracy
- Industry first installed five-year stability
- Unmatched Dynamic Performance
- Coplanar[™] platform enables integrated pressure, flow, and level solutions
- Advanced PlantWeb[®] Functionality to increase plant productivity



Contents

Setting the Standard for Pressure Measurement
Ordering Information
Rosemount 3051C Coplanar Pressure Transmitter
Rosemount 3051T In-Line Pressure Transmitter
Rosemount 3051CF Flowmeter Series
Rosemount 3051L Liquid Level Transmitter
Specifications
Product Certifications
Dimensional Drawings



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Setting the Standard for Pressure Measurement



Unlock the Value of Devices with the Smart Wireless THUM[™] Adapter

- Gain access to field intelligence and improve quality, safety, availability, operations and maintenance costs
- · Remotely manage devices and monitor health
- · Enable new wireless measurement points
- · Utilize existing loop power

Innovative, Integrated DP Flowmeters

- · Fully assembled and leak tested for out-of-the-box installation
- Reduce straight pipe requirements, lower permanent pressure loss and achieve accurate measurement in small line sizes
- Up to 1.65% volumetric flow accuracy at 8:1 turndown

Proven, Reliable and Innovative DP Level Technologies

- Connect to virtually any process with a comprehensive offering of process connections, fill fluids, direct mount or capillary connections and materials
- · Quantify and optimize total system performance with QZ option
- Operate at higher temperature and in vacuum applications
- Optimize level measurement with cost efficient Tuned-System[™] Assemblies

Instrument Manifolds - Quality, Convenient, and Easy

- · Design and engineered for optimal performance with Rosemount transmitters
- Save installation time and money with factory assembly
- Offers a variety of styles, materials and configurations



4 s.e. 4 - 4

C





Rosemount 3051C Coplanar Pressure Transmitter



3051C Coplanar Pressure Transmitter

Industry's best total performance, a flexible Coplanar platform, and installed five-year stability has made Rosemount 3051 the standard for Differential, Gage, and Absolute pressure measurement. Select from the following capabilities for seamless integration:

- Performance up to 0.04% accuracy
- · Manifolds, Primary Elements and Seal Solutions
- 4-20 mA HART, 1-5 Vdc HART low power, FOUNDATION fieldbus, and Profibus PA protocols
- Calibrated spans/ranges from 0.1 inH2O to 4000 psi (0,25 mbar to 276 bar)
- 316 SST, Alloy C-276, Alloy 400, Tantalum, Gold-Plated Alloy 400 or 316L SST wetted materials

Additional Information

Specifications: page 35 Certifications: page 44 Dimensional Drawings: page 49

Table 1. 3051C Coplanar Pressure Transmitters Ordering Information

Model	Transmitter Type			
3051C	Coplanar Pressure Transmitter			
Measuren	nent Type			
Standard			name. In the first of the first state of the state of t	Standard
D	Differential			*
G	Gage		a de la conservation en la conservation de la conservation de la conservation de la conservation de la conserva	*
Expanded				
A	Absolute			
Pressure	Range			
	3051CD	3051CG	3051CA	and a set of a second set of the
Standard		ан ал — таланан на « ³ ана налана жилаттан жилан таланан кананатанан канан канан канан канан канан канан канан ка	anna a a a a na seu a a an an an an an anna annana an an an	Standard
1	–25 to 25 inH ₂ O (–62.2 to 62.2 mbar)	25 to 25 inH ₂ O (62,1 to 62.2 mbar)	0 to 30 psia (0 to 2.1 bar)	*
2	-250 to 250 inH2O (-623 to 623 mbar)	−250 to 250 inH ₂ O (−621 to 623 mbar)	0 to 150 psia (0 to 10.3 bar)	*
3	–1000 to 1000 inH ₂ O (–2.5 to 2.5 bar)	−393 to 1000 inH ₂ O (−0.98 to 2.5 bar)	0 to 800 psia (0 to 55.2 bar)	*
4	-300 to 300 psi (-20.7 to 20.7 bar)	-14.2 to 300 psi (-0.98 to 20.7 bar)	0 to 4000 psia (0 to 275.8 bar)	*
5	–2000 to 2000 psi (–137.9 to 137.9 bar)	–14.2 to 2000 psi (–0.98 to 137.9 bar)	Not Applicable	*
Expanded	al in our construction constituted ablas ablas ablas ablas and an annual construction of the second	a analanan ee oo soo ah ah oo karaan ah ah ah ah ah ah ah ah ah ah ah ah ah	uunna aa aadalaa ka kuuna ay kuuna ay kaanaa ay ka kuuna ahaa kuuna kuuna kuuna kuuna kuuna kuuna kuuna ahaa ku	CONTRACTORY CONTRACTORY AND A
0 ⁽¹⁾	-3 to 3 inH ₂ O (-7.5 to 7.5 mbar)	Not Applicable	Not Applicable	
Transmitte	er Output	eer (h. an). 1996ad die 1997aa maar in een naam een met daar het der, wie die die daar het daar die bedre	na de la companya en contra en presentante (n. 1971). Esta de la companya contra contra de la contra de la comp	
Standard				Standard
A	4-20 mA with Digital Signal Ba	*		
F	FOUNDATION fieldbus Protocol			
W ⁽²⁾	Profibus PA Protocol			*
a contractor a second de la Mal V d'Add	, hans het er en en en en en en en en en en en en en	aan barde di 1944 - Herrin Konstanting ander die die die Staar ander die Staar van	אר איז איז איז איז איז איז איז איז איז איז	3

[★] The Standard offering represents the most common options. The starred options (★) should be selected for best delivery. The Expanded offering is subject to additional delivery lead time.

Expanded		d LAN CANTON NATIONAL AND AND AND AND AND AND AND AND AND AND		
M	Low-Power, 1–5 V dc with	Digital Signal Based on H	ART Protocol (See Option C2 for 0.8–3.2 V dc)	
Materials of Construction				
	Process Flange Type	Flange Material	Drain/Vent	
Standard				Standard
2	Coplanar	SST	SST	*
3 ⁽³⁾	Coplanar	Cast C-276	Alloy C-276	*
4	Coplanar	Cast Alloy 400	Alloy 400/K-500	*
5	Coplanar	Plated CS	SST	*
7 ⁽³⁾	Coplanar	SST	Alloy C-276	*
8 ⁽³⁾	Coplanar	Plated CS	Alloy C-276	*
0	Alternate Process Connec	tion		*
Isolating [Diaphragm	na ana ao amin'ny faritr'o amin'ny faritr'o 1900. I Geol dia faritr'o dia faritr'o amin'ny faritr'o amin'ny far		
Standard				Standard
2 ⁽³⁾	316L SST			*
3 ⁽³⁾	Alloy C-276	ala — — na 1979 na haita da balanda balanda bilanda da da da da da da da da da da da da d		*
Expanded				
4	Alloy 400			
5	Tantalum (Available on 3051CD and CG, Ranges 2-5 only. Not available on 3051CA)			
6	Gold-plated Alloy 400 (Use in combination with O-ring Option Code B.)			
7	Gold-plated SST			
O-ring				
Standard				Standard
A	Glass-filled PTFE			*
В	Graphite-filled PTFE			*
Sensor Fil	ll Fluid			
Standard		антикиналар калар тур наланинар саланын калалар калар	Standard	
1	Silicone			*
2	Inert (Differential and Gage	e only)		*
Housing N	Housing Material Conduit Entry Size			
Standard				Standard
A	Aluminum		1/2-14 NPT	*
В	Aluminum	nn a far a thread a church church church church church church ann an san an san ann an san an san an san an sa	M20 × 1.5	*
J	SST		1⁄2–14 NPT	*
K .	SST M20 × 1.5			*
Expanded				
D	Aluminum		G1⁄2	
М	SST		G½	

Options (Include with selected model number)

Plantweb Control Functionality		
Standard		
A01 FOUNDATION fieldbus Advanced Control Function Block Suite		
Plantweb Diagnostic Functionality		
Standard		
D01 FOUNDATION fieldbus Diagnostics Suite	*	

4

Alternate Flange ⁽⁴⁾		
Standard		Standard
H2	Traditional Flange, 316 SST, SST Drain/Vent	*
H3 ⁽³⁾	Traditional Flange, Alloy C, Alloy C-276 Drain/Vent	*
H4	Traditional Flange, Cast Alloy 400, Alloy 400/K-500 Drain/Vent	*
H7 ⁽³⁾	Traditional Flange, 316 SST, Alloy C-276 Drain/Vent	*
HJ	DIN Compliant Traditional Flange, SST, ¹ /16 in. Adapter/Manifold Bolting	*
FA	Level Flange, SST, 2 in., ANSI Class 150, Vertical Mount	*
FB	Level Flange, SST, 2 in., ANSI Class 300, Vertical Mount	*
FC	Level Flange, SST, 3 in., ANSI Class 150, Vertical Mount	*
FD	Level Flange, SST, 3 in., ANSI Class 300, Vertical Mount	*
FP	DIN Level Flange, SST, DN 50, PN 40, Vertical Mount	*
FQ	DIN Level Flange, SST, DN 80, PN 40, Vertical Mount	*
Expanded		
HK ⁽⁵⁾	DIN Compliant Traditional Flange, SST, 10 mm Adapter/Manifold Bolting	
HL	DIN Compliant Traditional Flange, SST, 12mm Adapter/Manifold Bolting (Not available on 3051CD0)	
Manifold A	Assembly ⁽⁵⁾⁽⁹⁾	
Standard		Standard
S5	Assemble to Rosemount 305 Integral Manifold	*
S6	Assemble to Rosemount 304 Manifold or Connection System	*
Integral M	ount Primary Element ⁽⁵⁾⁽⁹⁾	
Standard		Standard
S4 ⁽⁶⁾	Assemble to Rosemount Annubar or Rosemount 1195 Integral Orifice	*
S3	Assemble to Rosemount 405 Compact Orifice Plate	*
Seal Asse	mblies ⁽⁹⁾	
Standard		Standard
S1 ⁽⁷⁾	Assemble to one Rosemount 1199 seal	*
S2 ⁽⁸⁾	Assemble to two Rosemount 1199 seals	*
All-Welder	1 Seal Assemblies (for high vacuum applications) ⁽⁹⁾	
Standard		Standard
Standard	One Seal All Moldad System (Direct Maunt Connection Type)	
07	One Seal, All Welded System (Direct Mount Connection Type)	×
0		×
50	Two Seals, All-Welded System (Capillary Connection Type)	*
Maunting	Two Seals, All-Weided System (One Direct would and One Capiliary Connection Type)	<u> </u>
Mounting	Bracket	
Standard		Standard
B1	Traditional Flange Bracket for 2-in. Pipe Mounting, CS Bolts	*
B2	Traditional Flange Bracket for Panel Mounting, CS Bolts	*
B3	Traditional Flange Flat Bracket for 2-in. Pipe Mounting, CS Bolts	*
B4	Coplanar Hange Bracket for 2-in. Pipe or Panel Mounting, all SST	*
B7	B1 Bracket with Series 300 SST Bolts	*
B8	B2 Bracket with Series 300 SST Bolts	*
B9	B3 Bracket with Series 300 SST Bolts	*
BA	SST B1 Bracket with Series 300 SST Bolts	*
BC	SST B3 Bracket with Series 300 SST Bolts	*

Product C	ertifications	
Standard		Standard
C6	CSA Explosion-proof, Dust Ignition-proof, Intrinsically Safe, and Division 2	*
E2 ⁽¹¹⁾	INMETRO Flameproof	*
E3 ⁽¹¹⁾	China Flameproof	*
E4 ⁽¹⁰⁾	TIIS Flame-proof	*
E5	FM Explosion-proof, Dust Ignition-Proof	*
E7 ⁽¹¹⁾	IECEx Flameproof, Dust Ignition-proof	*
E8	ATEX Flameproof and Dust Certification	*
11 ⁽¹¹⁾	ATEX Intrinsic Safety and Dust	*
l2 ⁽¹¹⁾	INMETRO Intrinsic Safety	*
13	China Intrinsic Safety	*
4 ⁽¹²⁾	TIIS Intrinsic Safety	*
15	FM Intrinsically Safe, Division 2	*
17 ⁽¹¹⁾	IECEx Intrinsic Safety	*
IA	ATEX FISCO Intrinsic Safety; for FOUNDATION fieldbus protocol only	*
IE	FM FISCO Intrinsically Safe; for FOUNDATION fieldbus protocol only	*
K2 ⁽¹¹⁾	INMETRO Flameproof, Instrinsic Safety	*
K5	FM Explosion-proof, Dust Ignition-Proof, Intrinsically Safe, and Division 2	*
K6 ⁽¹¹⁾	CSA and ATEX Explosion-proof, Intrinsically Safe, and Division 2 (combination of C6 and K8)	*
K7 ⁽¹¹⁾	IECEx Flame-proof, Dust Ignition-proof, Intrinsic Safety, and Type n (combination of I7, N7, and E7)	*
K8 ⁽¹¹⁾	ATEX Flameproof, Intrinsic Safety, Type n, Dust (combination of E8, I1 and N1)	*
KB	FM and CSA Explosion-proof, Dust Ignition Proof, Intrinsically Safe, and Division 2 (combination of K5 and C6)	*
KD ⁽¹¹⁾	FM, CSA, and ATEX Explosion-proof, Intrinsically Safe (combination of K5, C6, I1, and E8)	*
N1 ⁽¹¹⁾	ATEX Type n Certification and Dust	*
N3	China Type n	*
N7 ⁽¹¹⁾	IECEx Type n Certification	*
Drinking V	Vater Approval	
Standard		Standard
DW ⁽¹³⁾	NSF drinking water approval	*
Shipboard	Approvals	
Standard		Standard
SBS	American Bureau of Shipping	*
Custody T	ransfer	
Standard		Standard
C5 ⁽¹⁶⁾	Measurement Canada Accuracy Approval (Limited availability depending on transmitter type and range. Contact an	*
	Emerson Process Management representative)	and the second sec
		01
Standard		Standard
L4		*
L5	ASTMA 193, Grade B/M Bolts	*
L0		*
Display an	d Interface Options	
Standard		Standard
M4 ⁽¹⁴⁾	LCD Display with Local Operator Interface	*
M5	LCD Display for Aluminum Housing (Housing Codes A, B, C, and D only)	*
M6	LCD Display for SST Housing (Housing Codes J, K, L, and M only)	*

Calibration Certificate		
Standard		Standard
Q4	Calibration Certificate	*
QG	Calibration Certificate and GOST Verification Certificate	*
QP	Calibration certification and tamper evident seal	*
Material T	aceability Certification	
Standard		Standard
Q8	Material Traceability Certification per EN 10204 3.1.B	*
Quality Ce	rtification for Safety	
Standard		Standard
QS ⁽¹⁵⁾	Prior-use certificate of FMEDA data	*
Hardware	Adjustments	
Standard		Standard
J1 ⁽¹⁶⁾⁽¹⁷⁾	Local Zero Adjustment Only	*
J3 ⁽¹⁶⁾⁽¹⁷⁾	No Local Zero or Span Adjustment	*
Transient	Protection Terminal Block	
Standard		Standard
T1 ⁽¹⁸⁾	Transient Protection Terminal Block	*
Software (Configuration	
Standard		Standard
C1 ⁽¹⁶⁾	Custom Software Configuration (Completed CDS 00806-0100-4001 required with order)	*
Low Powe	r Output	
Expanded		
C2	0.8–3.2 V dc Output with Digital Signal Based on HART Protocol (Output Code M only)	
Gage Pres	sure Calibration	
Standard		Standard
C3	Gage Calibration (Model 3051CA4 only)	*
Alarm Lim	it	
Standard		Standard
C4 ⁽¹⁶⁾⁽¹⁹⁾	Analog Output Levels Compliant with NAMUR Recommendation NE 43, Alarm High	*
CN ⁽¹⁶⁾⁽¹⁹⁾	Analog Output Levels Compliant with NAMUR Recommendation NE 43, Alarm Low	*
Pressure 1	festing	
Expanded		
P1	Hydrostatic Testing with Certificate	
Cleaning F	Process Area	
Expanded		
P2	Cleaning for Special Service	
P3	Cleaning for <1 PPM Chlorine/Fluorine	
Pressure Calibration		
Expanded		
P4	Calibrate at Line Pressure (Specify Q48 on order for corresponding certificate)	
Performan	Ce	and a second second second second second second second second second second second second second second second
Standard		Standard
P8 ⁽²⁰⁾	High Performance Option	*

★ The Standard offering represents the most common options. The starred options (★) should be selected for best delivery. The Expanded offering is subject to additional delivery lead time.

Flange Adapters		
Standard		Standard
DF ⁽²¹⁾	¹ /2 -14 NPT flange adapter(s)	*
Vent/Drain	I Valves	
Expanded		
D7	Coplanar Flange Without Drain/Vent Ports	
Conduit P	lug	
Standard		Standard
DO ⁽²²⁾	316 SST Conduit Plug	*
RC ¹ /4 RC ¹ /	2 Process Connection	
Expanded		
D9 ⁽²³⁾	RC ¼ Flange with RC ½ Flange Adapter - SST	
Max Static	Line Pressure	
Standard		Standard
P9	4500 psig (310 bar) Static Pressure Limit (3051CD Ranges 2–5 only)	*
Ground Screw		
Standard		Standard
V5 ⁽²⁴⁾	External Ground Screw Assembly	*
Surface Fi	nish	
Standard		Standard
Q16	Surface finish certification for sanitary remote seals	*
Toolkit Total System Performance Reports		
Standard		Standard
QZ Remote Seal System Performance Calculation Report		*
Conduit E	lectrical Connector	
Standard		Standard
GE	M12, 4-pin, Male Connector (eurofast [®])	*
GM	A size Mini, 4-pin, Male Connector (minifast [®])	*
Typical Mo	odel Number: 3051CD 2 A 2 2 A 1 A B4	

(1) 3051CD0 is available only with Output Code A, Process Flange Code 0 (Alternate Flange H2, H7, HJ, or HK), Isolating Diaphragm Code 2, O-ring Code A, and Bolting Option L4.

(2) Option code M4 - LCD Display with Local Operator Interface required for local addressing and configuration.

(3) Materials of Construction comply with recommendations per NACE MR0175/ISO 15156 for sour oil field production environments. Environmental limits apply to certain materials. Consult latest standard for details. Selected materials also conform to NACE MR0103 for sour refining environments.

(4) Requires 0 code in Materials of Construction for Alternate Process Connection.

(5) Not valid with optional code P9 for 4500 psi Static Pressure.

(6) Process Flange limited to Coplanar (codes 2, 3, 5, 7, 8) or Traditional (H2, H3, H7).

(7) Not valid with optional code D9 for RC1/2 Adaptors.

(8) Not valid for optional codes DF and D9 for Adaptors.

(9) "Assemble-to" items are specified separately and require a completed model number.

(10) Available only with output codes A - 4-20 HART and F - FOUNDATION fieldbus.

(11) Not available with Low Power code M.

(12) Available only with 3051CD and 3051CG and output code A - 4-20 mA HART

Product Data Sheet 00813-0100-4001, Rev LA November 2010

- (13) Not available with Alloy C-276 isolator (3 code), tantalum isolator (5 code), all cast C-276 flanges, all plated CS flanges, all DIN flanges, all Level flanges, assemble-to manifolds (S5 and S6 codes), assemble-to seals (S1 and S2 codes), assemble-to primary elements (S3 and S4 codes), surface finish certification (Q16 code), and remote seal system report (QZ code).
- (14) Available only with output code W Profibus PA.
- (15) Only available with HART 4-20 mA output (output code A).
- (16) Not available with Fieldbus (output code F) or Profibus (output code W).
- (17) Local zero and span adjustments are standard unless Option Code J1 or J3 is specified
- (18) The T1 option is not needed with FISCO Product Certifications; transient protection is included in the FISCO product certification codes IA and IE.
- (19) NAMUR-Compliant operation is pre-set at the factory and cannot be changed to standard operation in the field.
- (20) High Performance Option includes 0.04% Reference Accuracy. See Performance Specifications for details.
- (21) Not valid with Alternate Process Connection options S3, S4, S5, and S6.
- (22) Transmitter is shipped with 316 SST conduit plug (uninstalled) in place of standard carbon steel conduit plug.
- (23) Not available with Alternate Process Connection; DIN Flanges and Level Flanges.
- (24) The V5 option is not needed with the T1 option; external ground screw assembly is included with the T1 option.

Allen-Bradley / Rockwell Automation 1201 South Second Street Milwaukee, WI 53204-2496 USA Phone: (800) 230-4787 Contact Allen-Bradley / Rockwell Automation

- Request a Quote
 - Send an Email

•

• Supplier's Website



View Smaller

Bulletin 836 Pressure Controls

- Operating ranges from 30 in. Hg vacuum...900 psi
- Independently adjustable range and differential
- Copper alloy and stainless steel bellows
- 7/16-20 S.A.E. and 1/4 in. N.P.T. connections
- · Variety of contact blocks available
- Open Type, Type 1, Type 4&13, Type 4X and Type 7&9 and 4&13 combination enclosures

Supplier's Website

Specifications

Sensor Technology	Mechanical Deflection
Pressure Measurement	Gauge
Switch Point Range	98.24 to 900 psi
Switch Characteristics	

Tech Electro-mechanical

RCM) Technologies		ENTERGY	Conceptual Design	
	The Source of Smart Solutions	Unit 3	SAMA IP3 -018	Rev. 0

Attachment 4

Cost Estimate

F					
		IMPLEMENTATION ESTIMAT	E		
		Indian Point Nuclear Power Stat	tion		
* ESTIMATE LEVEL *		EC #: SAN	IA IP3-018		
Conceptual	PROJECT TITLE: Install a F Fission Products.	acility to Capture MSSV Discharge	Steam and Remove	ESTIMATOR: RCMT	
Preliminary	JOB LOCATION: Yard North	and East of MSSV Vent Stacks	PROJECT CODE: TH	3D	
Definitive	🖸 OUTAGE 🗹 NON-OUTAGE	ORIGINATOR:	CAPITAL 08M	ORIG. DATE: 07/24/12	
	ESTIMATE TOTAL \$	35,676,701	REVISIO	N 11-0	
Summary of Change: In accordance with NRC environmental regulations in 10 C.F.R. Part 51, Entergy performed SAMA analyses for both Indian Point Nuclear Generating Units 2 and 3 as part of its license renewal application. Those analyses identified a number of potentially cost-beneficial SAMAs for each unit. In its license renewal application and related correspondence with the NRC Staff, Entergy indicated that it would submit the potentially cost-beneficial SAMAs for further internal engineering project cost-benefit analysis, even though none of the potentially cost-beneficial SAMAs is related to aging management under 10 C.F.R. Part 54. Entergy contracted RCM Technologies to assist it in this effort. This package provides a conceptual design and implementation cost estimate for SAMA IP3-018 in accordance with Entergy design engineering practices. For SAMA IP3-018, resolution is required to reduce the resulting consequences from a Steam Generator Tube Rupture (SGTR). This package will capture and route discharge from the Main Steam Safety Valves (MSSVs) through a structure where water will be used to condense the exhausted steam and remove potentialfission products.					
Prepared by:	to Butacard.	Approve	d by:	~/	
Date:	9-20-2012	Date:	9-20-2012	. /	

		ENTERGY NUCLEAR NORTHEAST										
		IMPLEMENTATION ESTIMATE										
		Indian Point Nuclear Power Station										
L ESTIMA		EC #: SAMA IP3-018 CAPITAL LORM										
	Conceptual	PROJECT TITLE: Install a Facility to Capture MSSV Discharge Steam and Remove FESTIMATOR: RCMT										
	Freinninary	JOB LOCATION: Yard North and East of MSSV Vent Stacks PROJECT CODE: TBD										
	Definitive	L'OUTAGE L'INON-OUTAGE ORIGINATOR: ORIG. DATE: 07/24/12										
ltem		Description										
1.	This estimate assu	mes that this work will not require outage conditions to complete										
3.	This estimate assu	mes that Sheet Prodtuct for siding will be Installed by Sheet Metal Craft Using Manlifts with assistance from a crane.										
4.	This estimate assu	mes that all work will be performed by trained contract craftspersons in lieu of station maintenance personnel.										
5.	This estimate provi	ides for continuous fire watch during welding cutting and grinding activities.										
<u>ь</u>	This estimate assu	mes training for 12 Plant Ops. Personnel.										
1.	This estimate assu	mes that the safety class for piping and valves and tanks will be Safety Class 1.										
0.	The work in this es	these that were inspections will be for Safety Class i Prphil.										
9.	10 hour per day sc	hedule.										
10,	On this estimate is based on the project's current level of scope deminion and is classified class 4 as defined per the AACE International Cost Estimate Classification System (see Attachment 3, Reference 2). Use a constraint of the antimeter of a constraint of the cost of											
11.	11. Labor dollars in this estimate are projected 2014 costs based on current 2012 craft billing rates at Indian Point. The projected costs provide for anticipated billing rate increases of 3% per year.											
12.	12. This estimate allows for and includes a contingency factor related to the complexity and location of the work required. The factor is cumulative and progresses as follows:											
	A. Outside fence boundary - 20%											
	B. Inside fend	ze boundary - 30%										
	C. Implement	tation complexity - 40%										
	D. Inside Con	ntainment - 50%										
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ļ												

Rev.		IND	DIAN POIN	NT IMPLEMENTA EC #: SA	TION ESTIMAT	E WORK SH	EET			
PROJ JOB I EST.	ECT TITLE: Install a Facility to Capture MSSV Dischal _OCATION: Yard North and East of MSSV Vent Stack: STATUS: ☑ouTage ☑ NoN-OUTage	rge Ste s	eam and Rem	nove Fission Products.	CAPITAL PROJECT CODE: ⁻ ORIGINATOR:	□ o&m TBD		TAKEOFF: ESTIMATOR: ORIG. DATE:	RCMT 07/24/12	
ITEM	DESCRIPTION	QTY	UOM CFT		RS TOTAL \$/MH	MATERIAL \$ PER UNIT	MATERIAL DOLLARS	LABOR DOLLARS	SUB- CONTRACT	TOTAL \$
	* ESTIMATE LEVEL *					ESTIMATE SU	MMARY			
4	Conceptual						MANHOURS		DOLLARS	
	Preliminary Definitive		EN	IGINEERING			1 600		¢ 160.000	
	Definitive	4	02	DESIGN ENGR	ONST SUPPORT		200		\$ 100,000 \$ 20,000	
	General Notes:		03	MODS ENGR S	JPPORT		-		\$	
			04	SYS ENGR/ S-U	ENGR		220		\$ 22,000	
			05	PROJECT MANA			900		\$ 108,000	
			06	ESTING (Calibra	CP ACCEPTANCE R	FVIEW	200		\$ 16,000 \$ 20,000	
			CON	NTRACT ENGINEERING			200		0,000	
			08	DESIGN ENGR C	ONTRACT SUPPOR	Т	7,800		\$ 936,000	
			10	MODS PLAN & S	CHED -CONTRACT		- 960		\$ 96.000	
			11	OSG FIELD ENG	RS / PLANNERS		800		\$ 96,000	
			MAT	ERIALS / MISC CONTR	ACTS				0 7 400 400	
			12 13	OTHER CONTRA	CTS				\$ 7,432,190 \$ 180,000	
			CON	ITRACT CRAFT LABOR					• •••,•••	
			14	SWEC CRAFT LA	BOR/WALKDOWN		37,920		\$ 4,152,773	
			15 16	SW/EC DISTRIBS			3,792		\$ 531,600 \$ 1.167.945	
			PLA	NT CRAFT LABOR					• 1,101,040	
			17	MECH MAINT.			-		\$ -	
			18 19				- 120		\$ - \$ 12,000	
			20	CSG			-		\$ 12,000	
			MISC	C SUPPORT						
			21 22	QUALITY CONT	ROL HEDULUNG		600		\$ 60,000 \$ -	
			23	TRAINING			72		\$ 8,640	
			24	CHEMISTRY			40		\$ 4,000	
			25 26	OPS HP/RP			200		\$ 24,000 \$ 3,182	
			 Misc	C CONTRACT SUPPOR	r		40		¢ 0,102	
			27	QUALITY CONT	ROL		720		\$ 57,600	
			28 29	NDE HP/RP			120		\$ 10,184 \$ 1,591	
			30	RADWASTE			-		\$ -	
			31	NURSE			-		\$ -	
			32	WASTE MANAG	FMENT		-		\$ - \$ -	
			34	HOUSEKEEPIN	G		-		\$-	
			35	EQUIPMENT RE			-		\$ 50,000	
			36 37	DECONTAMINA	KING TION CONTRACTOR	2	-		\$ 25,000 \$ -	
			38	RBC'S			-		\$-	
			39	SECURITY	20 vort		-		\$ -	
			40 41	FIRE WATCH (F	(over)		- 761		⇒ - \$ 51.748	
			CON	TINGENCY			.01		- 51,740	
			42				67.045		\$ 7,623,227	
			ESTIN	SITE		⇒ ∠∠,009,080 \$ 4,573.936				
				LOAE	DERS (30%)			_	\$ 8,233,085	
					ESTIM	ΑΤΕ ΤΟΤΔΙ			\$ 35.676 701	
		1	11	Non Outor	a Mark					

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	Protect existing infrastructure															
1	Gather and stage tools and materials	1	LT	LB	2	20.00	1.00	40	\$ 78.15		\$0	\$	3,126		\$	3,126
2	2. Gather and stage tools and materials	1	LT	IW	4	20.00	1.00	80	\$137.33	\$ 10,000.00	\$10,000	\$	10,986		\$	20,986
3	 Perform walkdown of work area. 	1	LT	LB	2	10.00	1.00	20	\$ 78.15		\$0	\$	1,563		\$	1,563
4	 Perform walkdown of work area. 	1	LT	OP	1	10.00	1.00	10	\$115.00		\$0	\$	1,150		\$	1,150
5	5. Perform walkdown of work area.	1	LT	IW	5	10.00	1.00	50	\$137.33			\$	6,867		\$	6,867
6	Erect barriers, platforms, walkways, stairs, supports	1	LT	IW	5	80.00	1.00	400	\$137.33			\$	54,932		\$	54,932
	Erect barriers, platforms, walkways, stairs, supports	1	LT	OP	1	80.00	1.00	80	\$115.00			\$	9,200	\$ 5,000)\$	14,200
7	7. Erect barriers, platforms, walkways, stairs, supports	1	LT	LB	2	80.00	1.00	160	\$ 78.15			\$	12,504		\$	12,504
						Tie li	nto City	/ Water								
1	. Exca∨ate to existing City Water Line	1	LT	OP	1	32.00	1.00	32	\$115.00		\$ -	\$	3,680		\$	3,680
2	2. Exca∨ate to existing City Water Line	1	LT	LB	2	32.00	1.00	64	\$ 78.15		\$ -	\$	5,002		\$	5,002
3	Perform tie in to existing City Water line	1	LT	PF	3	40.00	1.00	120	\$120.71	\$ 5,000.00	\$ 5,000	\$	14,485		\$	19,485
4	 Backfill and compact excavation 	1	LT	OP	1	20.00	1.00	20	\$115.00		\$ -	\$	2,300		\$	2,300
5	5. Backfill and compact excavation	1	LT	LB	2	20.00	1.00	40	\$ 78.15		\$ -	\$	3,126		\$	3,126

Rev.	V. INDIAN POINT IMPLEMENTATION ESTIMATE WORK SHEET EC #: SAMA IP3-018															
PRO	JECT TITLE: Install a Facility to Capture MSSV Dischar	rge St	eam ar	nd Rerr	nove F	ission Produ	icts.		-	0&M		TAKEOFF:				
JOB	LOCATION: Yard North and East of MSSV Vent Stacks	6								TBD			R: RCM	IT 4/12		
						MAN	HOUR	S	troit.	MATERIAL \$	MATERIAL	LABOR	S	5UB-		
ITEN	DESCRIPTION	QTY	UOM	CFT	NO.	UNIT	FCTR	TOTAL Suppor	\$/MH	PER UNIT	DOLLARS	DOLLARS	CON	TRACT	TOT/	AL\$
1.	Excavate, form and pour Blowdown Vessel Support			0.5		biowdow	1 000							40.000	<u> </u>	
2	piers Excavate, form and pour Blowdown Vessel Support				1	120.00	1.00	120	\$115.00		\$0	\$ 13,800	\$	10,000	\$2	23,800
Z.	piers Excevate form and nour Blowdown Vessel Support	1	LT	LB	3	120.00	1.00	360	\$ 78.15	\$ 6,000.00	\$6,000	\$ 28,134			\$3	34,134
3.	piers	1	LT	СР	2	80.00	1.00	160	\$ 96.00		\$0	\$ 15,360			\$1	5,360
З.	Obtain and erect steel support structure for vessel support and enclosure siding.	1	LT	Iw	5	200.00	1.00	1,000	\$137.33	\$ 353,000.00	\$353,000	\$ 137,330			\$ 49	90,330
4.	Obtain and erect steel support structure for vessel							,								,
	support and enclosure siding.	1	LT	OP	2	200.00 Set Blo	1.00	400 Vessels	\$115.00		\$0	\$ 46,000	\$	30,000	\$ 7	76,000
1.	Perform walkdown of work area.	1	LT	BM	5	10.00	1.00	50	\$130.83		\$0	\$ 6,542			\$	6,542
2. 3.	Perform walkdown of work area. Obtain and Set (4) ASME Pressure Vessels.		LT	OP BM	25	10.00 100.00	1.00 1.00	20 2.000	\$115.00 \$130.83	\$ 500.000.00	\$0	\$ 2,300 \$ 261.660			\$ \$2.26	2,300 51.660
4.	Obtain and Set (4) ASME Pressure Vessels.	4	LT	OP	2	50.00	1.00	400	\$115.00	,	\$0	\$ 46,000	\$	25,000	\$ 7	1,000
5. 6.	Clean Up and Restore Area/Demob Clean Up and Restore Area/Demob		LT	BM OP	5	20.00 20.00	1.00 1.00	100 40	\$130.83 \$115.00		\$0 \$0					
_					Exca	avate and P	our Pip	ing Supp	ort Piers	1						
1.	Perform walkdown of work area. Perform walkdown of work area.		LI		63	10.00	1.00	60 30	\$ 78.15 \$ 96.00		\$0	\$ 4,689 \$ 2,880			\$ \$	4,689 2.880
3.	Perform walkdown of work area.	1	LT	OP	1	10.00	1.00	10	\$115.00			\$ 1,150			\$	1,150
4.	Gather and stage tools and materials		LT	LB	6 3	20.00	1.00	120 60	\$ 78.15 \$ 96.00	\$ 20,000.00	\$10,000	\$ 9,378 \$ 5,760			\$1 \$	9,378
6.	Gather and stage tools and materials	1	LT	OP	1	10.00	1.00	10	\$115.00	4,000.00	\$4,000	\$ 1,150	\$	5,000	\$	6,150
7.	Excavate, form and pour Piping Support piers	1	LT	LB	6	200.00	1.00	1,200	\$ 78.15			\$ 93,780			\$ 9	93,780
8. 9	Excavate, form and pour Piping Support piers			OP	3	200.00	1.00	600 200	\$ 96.00 \$115.00			\$ 57,600 \$ 23.000			\$5 \$2	23.000
10.	Clean Up and Restore Area/Demob	1	LT	LB	6	20.00	1.00	120	\$ 78.15			\$ 9,378			\$	9,378
11.	Clean Up and Restore Area/Demob		LT	CP	3	20.00	1.00	60 20	\$ 96.00 \$ 115.00			\$ 5,760 \$ 2,300			\$ ¢	5,760
12.		'				20.00	1.00	20	\$115.00			\$ 2,300			9	2,300
1	Perform walkdown of work area	Erec	t Yard		Pipe S	Supports Fr	om MS	SV Blowd	own Pipes	s to New Vessels	1	\$ 6.867	1		\$	6.867
2.	Perform walkdown of work area.	1	LT	LB	2	10.00	1.00	20	\$ 78.15			\$ 1,563			\$	1,563
3.	Perform walkdown of work area.	1	LT	OP	1	10.00	1.00	10	\$115.00			\$ 1,150			\$	1,150
4. 5	Gather and stage tools and materials				5 2	20.00	1.00	100 40	\$137.33			\$ 13,733 \$ 3,126			\$ 1 \$	3,733
6.	Gather and stage tools and materials	1	LT	OP	1	10.00	1.00	10	\$115.00			\$ 1,150	\$	10,000	\$ 1	1,150
7. 8	Erect Piping Supports				5	200.00	1.00	1,000 400	\$137.33		\$90,000	\$ 137,330 \$ 31,260			\$22 \$3	27,330
9.	Erect Piping Supports		LT	OP	1	200.00	1.00	200	\$115.00			\$ 23,000			\$2	23,000
10.	Prime and paint Pipe supports	1	LT	PT	4	80.00	1.00	320	\$ 95.16		\$4,000	\$ 30,451			\$3	84,451
	I (OUT	AGE)	Prep	, Instal	l and	Weld 14" Bl	ow Do\	wn Pipe fr	om Existir	ng Pipe to New V	essels					
1.	Perform walkdown of work area.	1	LT	PF	6	10.00	1.70	102	\$120.71			\$ 12,312			\$ 1	2,312
2.	Perform walkdown of work area. Perform walkdown of work area.			CP	4	10.00	1.70	17 68	\$ 115.00			\$ 1,955 \$ 6,528			ծ Տ	1,955 6,528
4.	Gather and stage tools and materials	1	LT	PF	6	20.00	1.70	204	\$120.71	\$ 2,000,000.00	\$2,000,000	\$ 24,625			\$ 2,02	24,625
5.	Gather and stage tools and materials				1	10.00	1.70	17 136	\$115.00			\$ 1,955 \$ 13,056			\$ \$ 1	1,955
7.	Erect Scaffolding as Required	4	LT	CP	4	80.00	1.70	2,176	\$ 96.00			\$ 208,896			\$ 20	08,896
8.	Erect Scaffolding as Required	4	LT	LB	2	80.00	1.70	1,088	\$ 78.15			\$ 85,027			\$8	85,027
9.	Pipes to New Blowdown Vessel Nozzles (5 Pipes).	4	LT	PF	6	140.00	1.70	5,712	\$120.71	\$ 110,000.00	\$440,000	\$ 689,496	\$	50,000	\$ 1,17	⁷ 9,496
10.	Prime and Paint and touch up 14' Pipe	4	LT	PT	4	40.00	1.70	1,088	\$ 95.16	\$ 6,000.00	\$24,000	\$ 103,534			\$ 12	27,534
11.	Remove Scaffolding and Store	4	LT	CP	4	40.00	1.70	1,088	\$ 96.00			\$ 104,448			\$ 10	04,448
12.	Remove Scanolding and Store	4			2	40.00	1.70	544	\$ 78.15			\$ 42,514 \$ -			\$4 \$	- 2,514
_		_		Install	Spray	/Recirc Pur	np, Pip	ing and R	elated Har	rdware						
1.	Perform walkdown of work area.	1	LT	MW	2	10.00	1.00	20	\$134.00			\$ 2,680			\$	2,680
2.	Perform walkdown of work area.			PF	6	10.00	1.00	60 10	\$120.71			\$ 7,243			\$	7,243
4.	Gather and stage tools and materials		LT	MW	2	20.00	1.00	40	\$134.00			\$ 5,360			у \$	5.360
5.	Gather and stage tools and materials	1	LT	PF	6	20.00	1.00	120	\$120.71			\$ 14,485			\$ 1	4,485
6.	Gather and stage tools and materials	1	LT	OP	1	10.00	1.00	10	\$115.00			\$ 1,150	\$	5,000	\$	6,150
7. e	Install the Spray/Recirc Pump on the platform.	4			2	10.00	1.00	80	\$134.00	\$ 25,000.00	\$100,000	\$ 10,720			\$ 11 ¢	0,720
9.	Install, Fit and Weld 8" Drain Line and Valve			PF	2	40.00	1.00	20 320	\$120.71	\$ 78,000.00	\$0	\$ 38.627			\$35	2,300 50,627
10	Install, Fit and Weld 4" Recirc line from Pump to	'														
	Vessel Spray Nozzle connection, including Valves.	4	LT	PF	2	20.00	1.00	160	\$120.71	\$ 68,750.00	\$275,000	\$ 19,314			\$ 29	94,314
11.	Vessel recirc. connection, including Valves.	4	LT	PF	2	16.00	1.00	128	\$120.71	\$ 68.750.00	\$275.000	\$ 15.451			\$ 29	90,451
12	Install, Fit and Weld 4" Pipe from City Water previously	ł						.20							. 20	-, ,
^{'2.}	Installed to new tee in Pump Suction Line.	4	LT	PF	2	8.00	1.00	64	\$120.71	\$ 20,000.00	\$80,000	\$ 7,725			\$8	37,725
13.	install Fit and view 1° lines and install instrument isolation vavles for sample, relief valve . Level and															
	Pressure Switch.	4	LT	PF	2	12.00	1.00	96	\$120.71	\$ 20,000.00	\$80,000	\$ 11,588			\$9	91,588
14.	Install and tie in Level Transmitter, Relief Valve, Pressure and Flow Switches	,	I			20.00	1.00	100	\$ 120 74	\$ 100.000.00	\$400.000	\$ 10.214			с л4	9 214
15.	Clean up Area	1	LT	PF	6	10.00	1.00	60	\$120.71		400,000	\$ 7.243			\$ 41	7,243
												,				

Rev.	INDIAN POINT IMPLEMENTATION ESTIMATE WORK SHEET														
11-0 PRO	JECT TITLE: Install a Facility to Capture MSSV Dischar	rge Ste	eam ar	ıd Rem	nove F	ission Produ	#: SAN		18 L	0&M		TAKEOFF:			
JOB EST.	LOCATION: Yard North and East of MSSV Vent Stacks STATUS: OUTAGE ONN-OUTAGE	ò						PROJEC ORIGINA	T CODE: 1 TOR:	[BD		ESTIMATOR ORIG. DATE	R: RCMT E: 07/24/12		
ITEM	DESCRIPTION	QTY	υом	CFT	NO.	MAN UNIT	HOUR	S TOTAL	\$/MH	MATERIAL \$ PER UNIT	MATERIAL DOLLARS	LABOR DOLLARS	SUB- CONTRACT	T	OTAL \$
		t, Cab	le, Pov	ver Su	pply a	nd Local C	ontrolle	ers and Ma	ake Conne	ctions to Switch	es/Transmitters	¢ 4022		¢	4.022
2.	Gather and stage tools and materials		LT	EL	4	20.00	1.00	40 80	\$123.32 \$123.32		\$0 \$0	\$ 4,933 \$ 9,866		ъ \$	4,933 9,866
3.	Install Hoffman Junction Box with Terminal Blocks Install Hoffman Panel, then Install loop power supply	4	LT	EL	2	20.00	1.00	160	\$123.32	\$ 3,000.00	\$12,000	\$ 19,731		\$	31,731
4.	and local controler in the panel.	1	LT	EL	2	20.00	1.00	40	\$123.32	\$ 12,000.00	\$12,000	\$ 4,933		\$	16,933
5.	new Hoffman Box	4	LT	EL	2	80.00	1.00	640	\$123.32	\$ 50,000.00	\$200,000	\$ 78,925		\$	278,925
6.	terminate.	4	LT	EL	2	80.00	1.00	640	\$123.32	\$ 4,000.00	\$16,000	\$ 78,925		\$	94,925
7.	Run and Support Conduit from Junction Boxes to new Hoffman panel.	4	LT	EL	2	80.00	1.00	640	\$123.32	\$ 12,000.00	\$48,000			\$	48,000
8.	Install and connect wiring from Junction boxes to Hoffman Panel.	1	LT	EL	2	40.00	1.00	80	\$123.32	\$ 6,000.00	\$6,000	\$ 9,866		\$	15,866
9.	Run and support conduit from level and pressure switches to new Hoffman Panel	4	LT	EL	2	80.00	1.00	640	\$123.32	\$ 12.000.00	\$48,000	\$ 78.925		\$	126.925
10.	Pull Cable from Level and Pressure switches to new				-	60.00	1.00	490	¢ 100.00	¢ 6,000,00	\$24,000	¢ E0.104		e.	02 104
11	Route and support Conduit from the Pump and valves	4	LI	EL	2	60.00	1.00	480	\$123.32	\$ 6,000.00	\$24,000	\$ 59,194		\$	83,194
	to the new Hoffman Panel. Install and connect wiring from Pump and valves to	4	LT	EL	2	80.00	1.00	640	\$123.32			\$ 78,925		\$	78,925
12.	new Hoffman Panel.	4	LT	EL	2	60.00	1.00	480	\$123.32			\$ 59,194		\$	59,194
13.	conduit and box installations.	1	LT	СР	4	80.00	1.00	320	\$ 96.00			\$ 30,720		\$	30,720
14.	Erect Scaffolding to support Electrical work of cable, conduit and box installations.	1	LT	LB	2	80.00	1.00	160	\$ 78.15			\$ 12,504		\$	12,504
15. 16	Remove/dismantle and store Scaffolding Remove/dismantle and store Scaffolding		LT	CP	4	40.00	1.00	160	\$ 96.00			\$ 15,360 \$ 6,252			
17.	Support testing and calibration as required			EL	2	40.00	1.00	80	\$ 123.32		\$0	\$ 9,866		\$	9,866
18. 19.	Clean-up area and restore Clean-up area and restore		LT	LB	4	20.00	1.00	80 40	\$123.32 \$78.15		\$0 \$0	\$ 9,866 \$ 3,126		э \$	9,866 3,126
					Insta	all New MC	C Exten	sion and	480/120					\$	-
1.	Perform walkdown of work area and job brief	1	LT	EL	3	10.00	1.00	30	\$123.32		\$0	\$ 3,700		\$	3,700
2. 3.	Perform walkdown of work area and job brief Gather Materials and tools and transport to areas	1	LT LT	OP EL	1 3	10.00 20.00	1.00 1.00	10 60	\$115.00 \$123.32	\$ 14,000.00	\$0 \$14,000	\$ 1,150 \$ 7,399		\$ \$	1,150 21,399
4.	Gather Materials and tools and transport to areas	1	LT	OP	1	20.00	1.00	20	\$115.00		\$0	\$ 2,300	\$ 5,000	\$	7,300
5.	Elev. 15' at existing MCC312A. Power new MCC Extension from Existing MCC 312A	1	LT	EL	3	20.00	1.00	60	\$123.32		\$0	\$ 7,399		\$	7,399
6.		1	LT	EL	3	10.00	1.00	30	\$123.32		\$0	\$ 3,700		\$	3,700
7.	on intermediate platform .	1	LT	EI	3	10.00	1.00	30	\$123.32		\$0	\$ 3,700		\$	3,700
8.	Install New 480/120V Transformer in MSSV building on intermediate platform .	1	LT	OP	1	5.00	1.00	5	\$115.00		\$0	\$ 575		\$	575
9.	Erect scaffolding as required to support conduit/cable installation.	1	LT	СР	4	40.00	1.00	160	\$ 96.00		\$0	\$ 15.360		\$	15.360
10.	Erect scaffolding as required to support conduit/cable		 1 т		2	40.00	1.00	80	¢ 78 15		۰۰ ۵۵	¢ 6252		¢	6 252
11.	Install and Support Conduit from new MCC extension				2	40.00	1.00		\$ 76.15		30 	\$ 0,202			0,252
12	to new Transformer Pull Cable from new MCC extension to new		LT	EL	3	50.00	1.00	150	\$123.32		\$0	\$ 18,498		\$	18,498
12.	Transformer and connect. Run local conduit from new transformer to equipment	1	LT	EL	3	15.00	1.00	45	\$123.32		\$0	\$ 5,549		\$	5,549
13.	as required. Pull cable from new transformer to equipment as	1	LT	EL	3	20.00	1.00	60	\$123.32		\$0	\$ 7,399		\$	7,399
14.	required and terminate.	1	LT	EL	3	20.00	1.00	60	\$123.32		\$0	\$ 7,399		\$	7,399
15. 16.	Dismantle and Store Scarolung. Dismantle and Store Scaffolding.		LT	CP	4	20.00	1.00	80 40	\$ 96.00 \$ 78.15		\$0 \$0	\$ 7,680 \$ 3,126		\$	7,680
					2	20.00	1.00	40	φ 70.15		ψŪ	ψ 0,120		Ĺ	3,120
_			SI	DING,	ROOF	ING AND B		G UTILITI	ES INSTAI		1				
1.	Perform walkdown of work area and job brief	1	LT	SM	4	10.00	1.00	40	\$ 106.94		\$0	\$4,278			\$4,278
2. 3.	Perform walkdown of work area and job brief Gather Materials and tools and transport to areas	1	LT LT	SM	1 4	10.00 30.00	1.00 1.00	10 120	\$115.00 \$106.94	\$120,000.00	\$0 \$120,000	\$1,150 \$12,833			\$1,150 \$132,833
4. 5.	Gather Materials and tools and transport to areas		LT LT	OP SM	1 4	30.00 250	1.00	30 1000	\$115.00 \$106.94		\$0 \$0	\$3,450 \$106.940	\$25,000		\$28,450 \$106.940
6. 7	Install Siding on Tank Support Structure			OP	1	250	1.00	250	\$ 115.00	\$20,000,00	\$0	\$28,750			\$28,750
7. 8.	Support Roofing Installation and Bldg. Elec. Work.		LT	OP	4	80	1.00	240 80	\$ 07.92 \$115.00	⇒∠υ,υυυ.υυ	\$20,000	\$≥1,101 \$9,200	\$10,000		\$41,101 \$19,200
9. 10.	Install Unit Heaters Install Exhaust fans with dampers	1 1	LT LT	EL EL	3 3	20 20	1.00 1.00	60 60	\$123.32 \$123.32	\$11,500.00 \$4,000.00	\$11,500 \$4,000	\$7,399 \$7,399			\$18,899 \$11,399
11. 12	Install Lighting Demob and clean area	1	LT I T	EL EI	3	20 20	1.00	60 60	\$123.32 \$123.32	\$4,000.00	\$4,000	\$7,399 \$7,399			\$11,399 \$7,399
13.	Demob and clean area			SM	4	20	1.00	80	\$106.94			\$8,555			\$8,555
14.						20	1.00	20	ຈ 115.00			\$2,300			 ,300

INDIAN POINT IMPLEMENTATION ESTIMATE WORK SHEET

FO #		100.040
EC #	SAMA	IP3-018

	IFOT TITLE, Installing Fracility to Operations MOOV (Disables			-l D		LU 1	7. 3AN		10	_				
JOB EST	JECT TITLE: Install a Facility to Capture MSSV Dischar LOCATION: Yard North and East of MSSV Vent Stacks STATUS: 디이UTAGE 디NON-OUTAGE	ge Sti	eam an	id Rem	iove F	Ission Produ	icts.	PROJEC ORIGINA	- T CODE: T TOR:	⊡0&m BD		TAKEOFF: ESTIMATOF ORIG. DATE	RCMT	
						MAN	HOUR	s		MATERIAL \$	MATERIAL	LABOR	SUB-	
ITEM	DESCRIPTION	QTY	UOM	CFT	NO.	UNIT	FCTR	TOTAL	\$/MH	PER UNIT	DOLLARS	DOLLARS	CONTRACT	TOTAL \$
1. 2.	PAINTING & TOUCH-UP REQUIREMENTS PAINTING & TOUCH-UP PAINTING & TOUCH-UP	1	LT	PT PT	4	160.00	1.00	640 -	\$ 95.16		\$4,000	\$ 60,902 \$ -		\$ - \$ 64,902 \$ -
1. 2.	FIRE WATCH / BOTTLEWATCH REQUIREMENTS CRAFT SUPPORT FOR FIRE WATCH CRAFT SUPPORT FOR BOTTLE WATCH	1	LT	FW	1	600.00	1.00	600 -	\$ 53.60			\$ 32,160		\$ 32,160 \$ -
1.	MISC SUB-CONTRACT MISC SUB-CONTRACT	1	LT										\$-	\$-
	SUBTOTAL CRAFT & SUB-CONTRACTOR							33,744		\$ 3,673,000.00	\$7,011,500	\$3,604,710	\$ 180,000	\$10,796,210
1.	CONSTRUCTION SUPPORT (8% OF LABOR \$)	1	LT					2,700	\$106.83			\$ 288,441		\$ 288,441
	SUBTOTAL							36,444			\$ 7,011,500	\$3,893,151	\$ 180,000	\$11,084,651
1. 2. 2a.	* RELATED COSTS * WALKDOWN ALLOWANCE WALKDOWN ALLOWANCE WORK PACKAGE REVIEW & CRAFT TRAINING WORK PACKAGE REVIEW & CRAFT TRAINING	1	LT LT	PF				100 100	\$120.71 \$123.32			\$ - \$ - \$ 12,071 \$ 12,332		\$- \$- \$12,071 \$12,332
3. 4. 5. 6. 7.	TOOL ROOM ATTENDANTS (~3.5%) GENERAL CRAFT DISTRIBS. (10%) CRAFT IN PROCESSING (20%) HUMAN PERFORMANCE & ALARA TRAINING (1/2 day training, or ~ 2%)	1	LT	EL				1,276	\$123.32		· 7.044.500	\$ 157,356 \$ 389,315 \$ 778,630 \$ 77,863	¢ 100.000	\$ 157,356 \$ 389,315 \$ 778,630 \$ 77,863
	SUBTOTAL							37,920			\$ 7,011,500	\$5,320,718	\$ 180,000	\$12,512,218
1.	PLANT SCOPE MECH MAINTENANCE			PL PL				-			\$- \$-	\$- \$-		\$- \$-
	SUBTOTAL MECH MAINT.							-			\$ -	\$ -	\$-	\$-
1.	ELECT MAINTENANCE			PL PL				-			\$ - \$ -	\$- \$-		\$- \$-
	SUBTOTAL ELECT. MAINT.							-			\$ -	\$ -	\$ -	\$ -
1.	I&C (Dev. Instrument Calibration Procedures)	1	LT	PL PL	1	120.00	1.00	120 -	\$100.00		\$- \$-	\$ 12,000 \$ -		\$ 12,000 \$ -
	SUBTOTAL I&C MAINT.							120			\$ -	\$ 12,000	\$	\$ 12,000
1.	csg			PL PL				-			\$ - \$ -	\$ - \$ -		\$- \$-
	SUBTOTAL CSG MAINT.										\$ -	\$ -	\$ -	\$ -
	SUBTOTAL PLANT							120			\$	\$ 12,000	s	\$ 12,000
								120						
	SUBTOTAL CRAFT/PLANT							38.040			\$ 7 011 500	\$5,332,718	\$ 180,000	\$12 524 218
								00,040				,2,,0		
1.		1	LT	NM	4	200.00	1.00	-	\$ 100.00			\$ -		\$- \$-
2. 3. 4. 5. 6. 7. 8. 9. 10. 11. 12. 13. 14.	SYSTEMS ENGINEERING SOFT DURING CONST SYSTEMS ENGINEERING - MECHANICAL SYS ENGINEERING - LECTRICAL SYS ENGINEERING - INSTR & CONTROL SYS ENGINEERING - CIVIL STRUCTURAL PROJECT MANAGEMENT TRAINING (OPS staff) QA / QC VERIFICATION PLANNING & SCHEDULING HP / RP/ ALARA CHEMISTRY OPS (DEVELOP/REVISE PROCEDURE(S)) TRAVEL & LIVING EXPENSES	1 1 1 1 1 1 1 1 1 1 1 1 1 1	LT LT LT LT LT LT LT LT LT LT		1 1 1 12 1 1 1 1	40.00 40.00 60.00 80.00 900.00 6.00 600.00 40.00 40.00 200.00	1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00	200 40 60 80 900 72 600 40 40 200	\$ 100.00 \$ 100.00 \$ 100.00 \$ 120.00 \$ 120.00 \$ 120.00 \$ 100.00 \$ 79.56 \$ 100.00 \$ 120.00			5 20,000 \$ 4,000 \$ 4,000 \$ 6,000 \$ 8,000 \$ 108,000 \$ 108,000 \$ 8,640 \$ 60,000 \$ 3,182 \$ 4,000 \$ 4,000 \$ 24,000 \$ -		3 20,000 \$ 4,000 \$ 4,000 \$ 6,000 \$ 8,000 \$ 108,000 \$ 8,640 \$ 60,000 \$ - \$ 3,182 \$ 4,000 \$ 24,000 \$ -

Rev.

INDIAN POINT IMPLEMENTATION ESTIMATE WORK SHEET

EC	#:	SA	МΑ	IP
		00		

Rev]	IND	IAN	POIN	IT IN	IPLEME	ΝΤΑΤ	ION ES	ытимати	E WORK SH	IEET				
11-0						EC a	#: SAN	/IA IP3-0	18						
PRC	JECT TITLE: Install a Facility to Capture MSSV Dischar	ge Ste	eam ar	nd Rem	iove F	ission Produ	cts.	CAPITA	L	0&M		TAKEOFF:			
JOB	LOCATION: Yard North and East of MSSV Vent Stacks							PROJEC	T CODE: T	ГВD		ESTIMATOR	R: RCMT		
EST	.STATUS: L'OUTAGE L'INON-OUTAGE 1	87.0													
ITEN	DESCRIPTION	QTY	υом	CFT	NO.	UNIT	FCTR	TOTAL	\$/MH	PER UNIT	DOLLARS	DOLLARS	CONTRACT	TOTAL \$	
	CONTRACTOR SUPPORT														
1.	FIS / MODS ENGINEERING - SWEC (Incl Per Diem)		LT	NM								\$-		\$-	
2.	MODS PLANNING & SCH SWEC (Incl Per Diem)	1	LT	NM	1	960.00	1.00	960	\$100.00			\$ 96,000		\$ 96,000	
3.	OSG FIELD ENGRS/PLAN- SWEC(Incl Per Diem)				1	800.00	1.00	800	\$120.00			\$ 96,000		\$ 96,000	
4.	NDE				1	120.00	1.00	120	\$ 80.00			\$ 57,600		\$ 57,600 \$ 10,184	
6	HP/RP			NM	1	20.00	1.00	20	\$ 79.56			\$ 1.591		\$ 1,591	
7.	RADWASTE	1	LT	NM								.,		• .,	
8.	NURSE	1	LT	NM											
9.	ELEVATOR CONTRACTOR	1	LT	NM											
10.	WASTE MANAGEMENT	1	LT	NM											
11.	HOUSEKEEPING				4							e 50.000			
12.	EQUIPMENT RENTAL CONTRACTOR-Grane				1							\$ 50,000			
14	DECONTAMINATION CONTRACTOR			NM								\$ 25,000			
15.	RBC's	1	LT	NM											
16.	SECURITY	1	LT	SEC											
17.	FIRE WATCH (Rover)	1	LT	NM								\$-		\$-	
18.	SAFETY (2%)			NM				761	\$ 68.00			\$ 51,748		\$ 51,748	
19.		1	LI					3,792	\$140.19		0.7.044.500	\$ 531,600	LC 100.000	\$ 531,600	
3	EPEIGHT SALES TAX & CONSUMABLES (6%)							47,480			\$ 7,011,500	\$6,002,263	\$ 180,000	\$ 13,693,763	
J.	TREIGHT, GALES TAX, & CONSOMABLES (078)										\$ 420,030			\$ 420,030	
	SUBTOTAL INSTALLATION COST							47,485			\$ 7,432,190	\$6,502,263	\$ 180,000	\$14,114,453	
		1	ιт		2	200.00	1 00	400	\$ 100.00			\$ 40.000		\$ 40.000	
2	DESIGN ENGINEERING - ELECTRICAL			NM	2	200.00	1.00	400	\$100.00			\$ 40,000		\$ 40,000 \$ 40,000	
3.	DESIGN ENGINEERING - INSTR. & CONTROL	1	LT	NM	2	200.00	1.00	400	\$100.00			\$ 40,000		\$ 40,000	
4.	DESIGN ENGINEERING - CIVIL/STRUCTURAL	1	LT	NM	2	200.00	1.00	400	\$100.00			\$ 40,000		\$ 40,000	
5.	TESTING (Instrument Calibration and testing)	1	LT	NM	2	80.00	1.00	160	\$100.00			\$ 16,000	s -	\$ 16,000	
6.	CONTRACT ENGR DESIGN SUPPORT														
	(CALCULATIONS AND ELECTRICAL LOAD STUDY)	1	LT	NM	3	2,600.00	1.00	7,800	\$120.00				\$ 936,000	\$ 936,000	
7.	ENGINEERING DCP ACCEPTANCE REVIEW	1	LT	NM	4	50.00	1.00	200	\$100.00			\$ 20,000		\$ 20,000	
	SUBTOTAL DESIGN COST							9,760				\$ 176,000	\$ 936,000	\$ 1,132,000	
											 	C 6 6 70 262	C 1 116 000	¢ 15 046 450	
-	SUBTOTAL INSTALLATION & DESIGN COST											v0,070,203	ູ ອີ່ 1,110,000	j.φ.i0,240,403 	
1.	CONTINGENCY (50%)													\$ 7,623,227	
	ESTIMATE SUBTOTAL							57,245	-			-		\$ 22,869,680	



ENTERGY INDIAN POINT NUCLEAR STATION UNIT 3

CONCEPTUAL DESIGN PACKAGE For

SAMA IP3-019

Install Leak Monitoring Instrumentation for ISLOCA Pathway Isolation Valves

Prepared by:	Approved by:
Date: 9-20-2012	Date: 9 - 20 - 2012
TABLE OF CONTENTS

SECTION	TITLE
1.0	ISSUE
2.0	BACKGROUND
3.0	EXISTING CONDITIONS
4.0	DESIGN CONSIDERATIONS
5.0	CONFIRMATION OF DESIGN
6.0	RECOMMENDED SOLUTION
7.0	PRELIMINARY MATERIAL LIST
Attachment 1	Entergy Impact Screening Summary
Attachment 2	Conceptual Design Sketches
Attachment 3	References
Attachment 4	Cost Estimate

1.0 ISSUE

Severe Accident Mitigation Alternative (SAMA) IP3-019:

Install Leak Monitoring Instrumentation for ISLOCA Pathway Isolation Valves

2.0 BACKGROUND

In accordance with NRC environmental regulations in 10 C.F.R. Part 51, Entergy performed SAMA analyses for both Indian Point Nuclear Generating Units 2 and 3 as part of its license renewal application. Those analyses identified a number of potentially cost-beneficial SAMAs for each unit. In its license renewal application and related correspondence with the NRC Staff, Entergy indicated that it would submit the potentially cost-beneficial SAMAs for further internal engineering project cost-benefit analysis, even though none of the potentially cost-beneficial SAMAs is related to aging management under 10 C.F.R. Part 54. Entergy contracted RCM Technologies to assist it in this effort.

This package provides a conceptual design and implementation cost estimate for SAMA IP3-019 in accordance with Entergy design engineering practices.

For SAMA IP3-019, resolution is required to provide remote monitoring of any potential fluid leakage past the isolation valves in ISLOCA pathways.

This package will provide the piping connections and transmitters required to interface with the monitoring instrumentation located outside containment.

The design considerations that follow will address the adequacy of the proposed resolution and the basis for the recommendation to resolve the identified potential issue.

The recommended solution will include descriptive details of the proposed design change and also conceptual design sketches as required. These descriptive details, sketches, and the preliminary material list provide the basis for initiating the all-inclusive conceptual cost estimate for engineering change (EC) development and implementation at the Station.

3.0 EXISTING CONDITIONS

In containment, the pathways of the Safety Injection (SI) System piping need to be monitored for potential leaks of liquid from the interfacing Reactor Cooling System (RCS) and Auxiliary Cooling System (ACS) piping. There are 32 check valves and 2 motor operated valves (MOV) installed in the SI piping that interface with these systems to provide this isolation.

In each ISLOCA pathway there are redundant "blocking valves" that provide isolation from interfacing systems. The effectiveness of the valves blocking function to provide an isolation boundary needs to be monitored.

4.0 DESIGN CONSIDERATIONS

Check Valve Pathways

Each of the "blocked" piping sections within an isolation boundary has an existing piping connection that may be adapted as a monitoring point. (Ref. Attachment 2 – Figure 2 – all sheets)

MOV Pathway

The "blocked" piping section within this isolation boundary will require modification of piping to include a connection that can be adapted as a monitoring point. (Ref. Attachment 2 – Figure 2 - sheet 1)

Monitoring for pressure change within each of the isolated boundaries will need to be transmitted to a remote location outside containment.

5.0 CONFIRMATION OF DESIGN

There are fifteen (15) separate ISLOCA paths with blocked isolation boundaries that potentially can allow fluid to leak by.

As stated above, there are proposed connections located in each piping path for a sensing device to be applied to monitor them. Installation of a pressure transmitter at each of these piping connections will provide the means of measuring changes within an isolation boundary. In addition, the transmitter will enable this information to be electronically transmitted to a location outside containment for remote display and monitoring.

6. RECOMMENDED SOLUTION

- 1. Check Valves
 - A. For each isolation boundary listed in Attachment 2, Figure 1, perform the following:
 - At the existing piping connection install small bore pipe, instrument root valves, instrument tubing, pressure transmitter and required supports.

2. <u>MOVs</u>

- For the isolation boundary listed in Attachment 2, Figure 1, perform the following:
- Within the "blocked" piping section that forms the isolation boundary, install a new connection to be adapted as a monitoring point.
- At the piping connection install small bore pipe, instrument root valves, instrument tubing, pressure transmitter and required supports.

3. Remote Leakage Monitoring

Install new instrumentation outside containment, to display leakage data for each isolation boundary listed in Attachment 2, Table 1.

4. Conduit and Wiring

A. Transmitters

- Route and support conduit from each transmitter to the two new junction boxes fitted with terminal blocks located in containment.
- Route and support a single conduit from each junction box, via containment penetration, to the new ISLOCA leak status monitoring panel outside containment.
- Install and connect wiring from the pressure transmitters to the new junction boxes.
- Install and connect wiring from the junction boxes to the new ISLOCA leak status monitoring panel.
- B. Remote Leakage Monitor Panel
 - Route and connect 120VAC power supply to the new monitor panel located in the Control Building at Elevation 33'- 0".
- 5. Provide procedures and training to operate, test, and perform maintenance on the components of the newly installed system.

7.0 PRELIMINARY MATERIAL LIST

<u>lte</u>	em Description	Quantity
1.	Rosemount 1153 Series D Alphaline Nuclear Pressure Transmitter	15
2.	Valve - Valve Manifold	15
3.	Yokogawa – DXAdvanced R4 – DX2000 Recorder	1
4.	Loop Power - Power Supply	1
5.	Hoffman Junction Box with terminal blocks	2
6.	Hoffman Wall Mounted Panel and enclosure, with terminal blocks, 36" x 36" x 16"	1
7.	Instrument Tubing – 0.375" x 0.065 - 316 SS Tubing	1500 Feet
8.	1" - Conduit	450 Feet
9.	2" - Conduit	350 Feet
10.	Two Pair - Twisted Shielded Pair Cable	350 Feet
11.	Eight Pair - Twisted Shielded Pair Cable	1100 Feet
12.	2/c Cable	100 Feet
13.	¾" -1500# Socket Weld Globe Valve CONVAL Model No. 12G3J-3163D or equal	46
14.	³ ⁄4" Schedule 160 Seamless Pipe, A376 Type 316	80 Feet
15.	³ ⁄4"-6000# Socket Weld Tee, A182 F316	15
16.	¾"-6000# Screwed Cap, A182 F316	15
17.	¾"-6000# Sockolet, A182 F316	1



Attachment 1

Entergy Impact Screening Summary

Engineering Change Process

ATTACHMENT 9.3

IMPACT SCREENING SUMMARY

SHEET 1 OF 6

INSTRUCTIONS:

Identify the potentially impacted and the unaffected areas by checking the appropriate Yes or No block on the Impact Screening Criteria.

If a direct determination cannot be made based on the impact screening questions, the detailed questions in Attachment 9.4 may be used to identify potential impacts.

The completion of detailed guestions in Attachment 9.4 is recommended but not required.

Contact potentially impacted groups if assistance is required.

SAMA		CON	CEPTUAL
Engineering Change No.: <u>IP3-0</u>	<u> 9</u> Rev. I	NO.: <u>DES</u> I	GN PACKAGE

Prepared by:

Date:

DESIGN ENGINEERING DISCIPLINES		Potential Impact	
 Civil / Structural Design Engineering Does the proposed activity involve any civil / structural (including seismic) design changes, activities or affect coatings? OR Does the proposed activity involve any piping engineering design changes or activities? 	YES		
 Electrical Design Engineering Does the proposed activity involve any station or switchyard electrical design, large power transformers, or settings changes or activities? (SOER 10-1) 	YES		
Instrumentation and Controls Design Engineering Does the proposed activity involve any I&C design or settings changes or activities?	YES		
 Mechanical Design Engineering Does the proposed activity add/remove/replace insulation, aluminum or other metallic/non-metallic sources of debris in the reactor/containment building or involve any mechanical design changes or activities? 	YES	□ NO	
 PSA Engineering Does the proposed activity impact or involve changes to plant evaluations or probabilistic safety assessments? Does the proposed activity impact or involve changes to the Emergency Operating Procedures, Abnormal Operating Procedures, or Severe Accident Procedures or does it add, remove or modify SSCs included in a Maintenance Rule function? 	YES 📕	□ NO	
 Nuclear Analysis Does the proposed activity impact or involve changes to plant evaluations, Technical Specifications, Technical Requirements Manual, or require a full 50.59 Evaluation? 	YES		
 FERC / NERC Impact Does the proposed activity impact or involve change to FERC / NERC or Regional Entity compliance documents? (ex. MOU, ENN/ENS-PL-158, ENS-DC-199, etc.) 	☐ YES	🕅 NO	

IPEC00270236

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IMPACT SCREENING SUMMARY

Engineering Change Process

ATTACHMENT 9.3

Sheet 2 of 6

DESIGN ENGINEERING PROGRAMS		Impact
 ASME Section III Specifications Does the proposed activity add, delete, or modify information required by ASME Section III to be contained in a design specification? 	YES	□ NO
 Cable and Raceway Program Does the proposed activity involve any changes to cable trays, raceways or the associated documentation? 	YES	
 Electronic Databases (EDB) Does the proposed activity involve any changes to electronic databases? 	YES	
 EQ Program (10CFR50.49, NUREG 0588, Reg Guide 1.89) Does the proposed activity involve any new or existing EQ components? 	YES	
 Hydrogen Control Program (10 CFR 50.44) (<i>if applicable</i>) Does the proposed activity impact equipment or materials related to hydrogen control? 	□ YES	🕅 NO
 Human Factors Program Does the proposed activity involve control panel design including layout and labeling, visual displays, operator aids, auditory signals or environment in the control room, cable spreading room, and other control panel locations? 	YES	□ NO
 Margin Management Does the proposed activity impact or involve any change to design, licensing or operations margins? 	YES	
 Reg. Guide 1.97 / PAM (Post Accident Monitoring) Does the proposed activity involve Reg. Guide 1.97 (Post Accident Monitoring) Indications? 	YES	

MAINTENANCE	Potentia	l Impact
Electrical Maintenance Does the proposed activity require an Electrical Maintenance review to identify affected procedures, required actions and required training?	YES	
 Maintenance Does the proposed activity require an I&C Maintenance review to identify affected procedures, required actions and required training? 	YES	
 Mechanical Maintenance Does the proposed activity require a Mechanical Maintenance review to identify affected procedures, required actions and required training? 	YES	

NUCLEAR ENGINEERING		Potential Impact	
 Nuclear Fuel Design Does the proposed activity impact or involve the design, performance or storage of nuclear fuel? 	TYES	🕅 NO	
 Reactivity Management Program Does the proposed activity impact or involve the reactor system, reactor controls, reactor chemistry, related systems, potential core and spent fuel damage, spent fuel, reactor coolant pressure boundary or reactor system procedures? 			



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Engineering Change Process

IMPACT SCREENING SUMMARY

ATTACHMENT 9.3

SHEET 3 OF 6

PROCESS OR PROGRAM IMPACT SCREENING CHECKLIST		Potential Impact	
Computer Support and Software	T YES	🕅 NO	
 Does the proposed activity impact or involve changes to plant computer software or firmware or impact Software Quality Assurance (SQA)? 	ŕ		
Chemistry and Environmental Impact	T YES	⊠ NO	
 Does the proposed activity impact or involve any changes to plant chemistry requirements, operations or procedures, or any changes to the environment? 			
Radiation Protection (RP) Program Impact	🗌 YES	🕅 NO	
 Does the proposed activity impact or involve any changes to the RP program? Does the proposed activity involve the potential to introduce (or reintroduce) any cobalt containing materials (such as Stellite) into the primary system? 			
 Operations Does the proposed activity impact or involve changes to Operations procedures, training or operator actions? 	YĘS	□ NO	
 Planning, Scheduling and Outage (PS&O) Does the proposed activity require a PS&O review to identify required design and installation information? 	YES		
 MP&C (Inventory) Does the proposed activity impact or involve any addition or removal of equipment from the inventory? Does the proposed activity impact or involve any Procurement of Quality or Augmented Quality material from non-qualified suppliers? 	YES	□ NO	
Procurement Engineering Does the activity impact or involve any procurement activities?	YES		

PROGRAMS AND COMPONENTS		Potential Impact	
 ASME Containment In-service Inspection (IWE / IWL) Program Does the proposed activity impact or involve the containment pressure boundary or associated moisture barriers or a support for the containment pressure boundary? This includes "software only" changes that do not physically change the hardware such as re-rating of pressures or temperatures to include changes to documented information on these items or additional documented information for these items. Does the proposed activity limit access to containment surfaces for inspection? Involve disassembly of a bolted connection which forms a portion of the containment boundary? 	YES	DNO	
 ASME Appendix J (Primary Containment Leak Rate Testing) Program Does the proposed activity impact or involve any changes to primary containment leak rate testing? 	YES 📲	□ NO	



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Engineering Change Process

ATTACHMENT 9.3 SHEET 4 OF 6 IMPACT SCREENING SUMMARY

PROGRAMS AND COMPONENTS (CONTINUED)		Potential Impact	
 ASME In-service Inspection (ISI) Program Does the proposed activity add, delete, or modify an ASME Section XI pressure boundary item or a support for an ASME Section XI pressure boundary item? This includes "software only" changes that do not physically change the hardware like such as re-rating of pressures or temperatures. (ASME Section XI items include ASME Class 1, 2, 3, or B31.1 treated as ISI Class 2 or 3 (T2 and T3) components, parts, or appurtenances such as pipe or pressure vessel walls, valve bodies and pump casings. 	YES	□ NO	
 ASME Section XI Repair / Replacement Program Does the proposed activity involve any mechanical component within the ASME XI program / boundaries? Does the proposed activity add, delete, or modify an ASME Section XI pressure boundary item or a support for an ASME Section XI pressure boundary item? (ASME Section XI items include ASME Class 1, 2, 3, MC, and CC, as well as B31.1 treated as ISI Class 2 or 3 (T2 and T3) components, parts, or appurtenances such as pipe or pressure vessel walls, valve bodies and pump casings). 	YES	☐ NO	
 ASME In-service Testing Program Does the proposed activity impact or involve any item (safety related or non safety related) that may affect the performance or testing of a safety related pump or valve? Does the proposed activity impact the function or functional classification of any pump or valve as stated in the IST program documents? 	YES	☐ NO	
 Air Operated Valve (AOV) Program Does the proposed activity impact or involve the design, operation or testing of AOVs? 	☐ YES	🕅 NO	
 Buried Piping and Tanks (BP&T) Program Does the proposed activity impact or involve any changes to piping, coatings, or cathodic protection of Buried Piping & Components? 	Tes 🗌	X NO	
 Boric Acid Corrosion (BAC) Program Does the proposed activity impact or involve any increase in the likelihood of boric acid formation or corrosion? 	☐ YES	🕅 NO	
 Check Valve Program Does the proposed activity impact or involve the design, operation or testing of check valves? 	☐ YES	X NO	
 Control Room Habitability Program Does the proposed activity impact or involve changes that affect the temperature or radiological environmental conditions in the Main Control Room? 	☐ YES	🕅 NO	
 Electrical Circuit Breaker, Relay and Electrical Equipment Testing Does the proposed activity impact or involve changes to the functional testing of circuit breaker, relay or electrical equipment? 	YES	□ NO	



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Engineering Change Process

IMPACT SCREENING SUMMARY

ATTACHMENT 9.3

SHEET 5 OF 6

PROGRAMS AND COMPONENTS (CONTINUED)		Potential Impact	
 Flow Accelerated Corrosion (FAC) Program Does the proposed activity involve any changes (e.g.: configuration, velocity, flow rate, pressure, temperature, material, weld location, etc.) to piping systems included in the FAC Program.? 	YES	□ NO	
 Heat Exchanger Program Does the proposed activity impact or involve the design, operation or testing of a component in the heat exchanger program? 	☐ YES	M NO	
 Predictive Maintenance Program Does the proposed activity impact or involve any aspect of the storage, use and testing of lubricants? Does the proposed activity involve thermography? Does the proposed activity involve vibration monitoring? 	□ YES	X NO	
 Microbiological Induced Corrosion (MIC) Program Impact Does the proposed activity involve piping containing untreated or stagnant water or open to the atmosphere? 		X NO	
 Motor Operated Valve (MOV) Program Does the proposed activity impact or involve the design, operation or testing of MOVs? 	□ YES	M NO	
Plant Thermal Performance Program Does the proposed activity impact or involve plant thermal performance?	□ YES	🕅 NO	
 Preventive Maintenance Program Does the proposed activity impact or involve periodic testing or performance of SSCs? or Does the proposed activity add, modify or delete any Environmental Qualification (EQ) maintenance requirement or replacement frequency to ensure the component(s) maintains its gualification status? 	TYES	□ NO	
 PT Curves Does the proposed activity add, delete, or modify the basis (as contained in each sites reactor vessel surveillance material testing program) for the Pressure / Temperature Limit Curves (fluence, pressure, temperature, reactor materials)? 	☐ YES	X NO	
 Relief Valve Program Does the proposed activity impact or involve the design, operation and testing of relief valves, safety valves, vacuum breaker valves or rupture disc? 	□ YES	🕅 NO	
 RPV Internals Program Does the proposed activity impact or involve any change to the reactor internals? This includes "software only" changes that do not physically change the hardware such as re-rating of pressures or temperatures. Does the proposed activity impact or involve or related documentation to include neutron fluence or neutron fluence calculations? Does the proposed activity impact or involve or changes to core flow characteristics or core flow characteristics? 	☐ YES	X NO	



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Engineering Change Process

IMPACT SCREENING SUMMARY

ATTACHMENT 9.3

SHEET 6 OF 6

PROGRAMS AND COMPONENTS (CONTINUED)		Potential Impact	
 Welding Program Does the proposed activity impact or involve a special process, such as welding, brazing or soldering? 	YES		
 Safety Program Does the proposed impact or activity involve personnel or industrial safety? 	YES		
 System Engineering Does the proposed activity impact or involve any changes to system configuration, function or performance, etc., for Maintenance Rule or other system? Does the proposed activity impact or involve any changes to system procedures, maintenance or operation, etc.? 	YES	□ NO	
 Training Program Does the proposed activity involve existing training requirements or create the need for new training? 	YES		
 Simulator Impact Does the proposed activity impact or involve changes to the Simulator? 	□ YES	🕅 NO	
 Fire Protection Program Does the proposed activity result in a change to the Fire Protection Program (including 10CFR50 Appendix R) where the impact is more than negligible? 	☐ YES	X NO	

Detailed Impact Screening (Attachment 9.4) Attached?	□ YES	🕅 NO
Detailed Impact Screening (Attachment 9.4) Attached?	□ YES	🕅 NO

Attachment 2

Conceptual Design Sketches

- 1. Figure 1: Existing Valve Tie-In Chart
- 2. Figure 2, Sheet 1 9321-F-27353: Safety Injection System Flow Diagram (partial)
- 3. Figure 2, Sheet 2 9321-F-27353: Safety Injection System Flow Diagram (partial)
- 4. Figure 2, Sheet 3 9321-F-27353: Safety Injection System Flow Diagram (partial)
- 5. Figure 2, Sheet 4 9321-F-27353: Safety Injection System Flow Diagram (partial)
- 6. Figure 3 Typical Leak Detection Piping Connection at Check Valves
- 7. Figure 4: Leak Detection Piping Connection at MOVs

Existing Valve No.	Boundary Location
SI-162	Test Connection between Valves SI-857U & SI-857W
SI-158	Test Connection between Valves SI-857S & SI-857T
SI-161	Test Connection between Valves SI-857Q & SI-857R
SI-159	Test Connection between Valves SI-857B & SI-857H
SI-154	Test Connection between Valves SI-857A & SI-857G
SI-163	Test Connection between Valves SI-857C & SI-857J
SI- 157	Test Connection between Valves SI-857D & SI-857K
SI-153	Test Connection between Valves SI-857E & SI-857L
SI-160	Test Connection between Valves SI-857F & SI-857M
SI-156	Test Connection between Valves SI-857N & SI-857P
SI-113	Test Connection between Valves SI-897A & SI-838A/ SI-895A/ SI-857A
SI-120	Test Connection between Valves SI-897B & SI-838B/ SI-895B/ SI-857S
SI-123	Test Connection between Valves SI-897C & SI-838C/ SI-895C/ SI-857Q
SI-130	Test Connection between Valves SI-897D & SI-838D/ SI-895D/ SI-857U
NEW	Test Connection between Valves AC-731 & AC-730

FIGURE 1 EXISTING VALVE TIE-IN CHART













Attachment 3

References

- ENTERGY Nuclear Management Manual, Engineering Change Process, Rev 11 1.
- 2. Association for the Advancement of Cost Engineering (AACE), Cost Estimate Classification System - As Applied In Engineering, Procurement, and Construction for the Process Industries
 - TCM Framework: 7.3 Cost Estimating and Budgeting
 - Figure 4 Estimate Checklist & Maturity Matrix
- 3. ENTERGY Material Specification Indian Point Unit No. 3, NYPA Spec. TS-MS-024
- 4. Rosemount 1153 Series D Alphaline Nuclear Pressure Transmitter (attached here)
- 5. Yokogawa - DXAdvanced R4 - DX1000 Recorder (attached here)

Rosemount 1153 Series D

Rosemount 1153 Series D Alphaline[®] Nuclear Pressure Transmitter

INDUSTRY LEADING PERFORMANCE

- Qualified per IEEE Std 323-1974 and IEEE Std 344-1975
- 5.0 x 10⁷ rads TID gamma radiation
- 7 g ZPA seismic
- 420 °F (215.6 °C) steam temperature
- 0.25% accuracy



CE

Contents

Introduction
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Operation
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Nuclear Specifications
Performance Specificationspage 5
Functional Specificationspage 6
Physical Specifications
Ordering Information



Nuclear

www.rosemountnuclear.com



Product Data Sheet 00813-0100-4388, Rev BA January 2008

Rosemount 1153 Series D

Results Driven by Proven Measurement

Introduction

The Rosemount 1153 Series D Alphaline[®] Nuclear Pressure Transmitters are designed for precision pressure measurements in nuclear applications which require reliable performance and safety over a specified qualified life. These transmitters were qualified per IEEE Std 323-1974 and IEEE Std 344-1975 to radiation levels of 50 megarads TID gamma radiation, seismic levels of 7 g, and for steam pressure performance. Stringent quality control during the manufacturing process includes traceability of pressure-retaining parts, special nuclear cleaning, and hydrostatic testing.

Transmitter Description

Rosemount 1153 Series D Alphaline Nuclear Pressure Transmitters are uniquely built for Class 1E nuclear service while retaining the basic design of the Rosemount 1151 Series that has become a standard of reliable service. Units are available in absolute (A), gage (G), differential (D), and high-line differential (H) configurations, with up to eight pressure range options.

Direct electronic sensing with the completely sealed δ -CellTM capacitance sensing element (see Figure 1) eliminates mechanical force transfer and problems associated with shock and vibration. Installation and commissioning are simplified by the compact design and 2-wire system compatibility. Wiring terminals and electronics are in separate compartments, so the electronics remain sealed during installation.

Operation

The completely sealed δ -Cell capacitance sensing element is the key to the unequalled performance and reliability of the Rosemount 1153 Series D Pressure Transmitter. Process pressure is transmitted through an isolating diaphragm and silicone oil fill fluid to a sensing diaphragm in the center of the δ -Cell (see Figure 1). A reference pressure is transmitted in the same manner to the other side of the sensing diaphragm. Displacement of the sensing diaphragm, a maximum motion of 0.004 inches (0.1 mm), is proportional to the pressure differential across it. The position of the sensing diaphragm is detected by capacitor plates on both sides of the sensing diaphragm. Differential capacitance between the sensing diaphragm and the capacitor plates is converted electronically to a 2-wire, 4-20 mA dc signal.





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Rosemount 1153 Series D

DIMENSIONAL DRAWINGS



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SPECIFICATIONS

Nuclear Specifications

Qualified per IEEE Std 323-1974 and IEEE Std 344-1975 as stated in Rosemount Report D8300040.

Output Code P

Radiation:

Accuracy within ±6% of upper range limit during and after exposure to 5.19 \times 10⁷ rads, total integrated dosage.

Range Code 0: ±8.2% of upper range limit.

Seismic:

Accuracy within $\pm 0.5\%$ of upper range limit during and after a disturbance defined by a required response spectrum with a ZPA of 7g.

Range Code 0: ±0.75% of upper range limit.

Steam Pressure/Transmitter:

Accuracy within $\pm(4.5\%)$ upper range limit $\pm(3.5\%)$ span) during and after exposure to steam at the following temperatures and pressures:

420 °F (215.6 °C), 95 psig for 3 minutes 350 °F (176.6 °C), 85 psig for 7 minutes 320 °F (160 °C), 60 psig for 3 hours 240 °F (115.5 °C), 27 psig for 21 hours 176 °F (80 °C), 3 psig for 30 days simulating one year post-DBE operation.

Range Code 0: \pm (6.7% of upper range limit + 3.5% of span).

Post DBE Operation

Accuracy at reference conditions shall be within $\pm 1.5\%$ of upper range limit (2.25% for Range Code 0) for one year following DBE.

Output Code R

Radiation:

Accuracy within $\pm(1.5\%)$ of upper range limit + 1.0% span) during and after exposure to 5.5×10^7 rads, total integrated dosage.

Range Code 0: $\pm(2.3\%)$ of upper range limit + 1.0% of span).

Seismic:

Accuracy within $\pm 0.5\%$ of upper range limit during and after disturbance defined by a required response spectrum with a ZPA of 7g.

Range Code 0: ±0.75% of upper range limit.

Steam Pressure/Temperature:

Accuracy within $\pm(4.5\%)$ upper range limit + 3.5% span) during and after exposure to steam at the following temperatures and pressures:

420 °F (215.6 °C), 95 psig for 3 minutes 350 °F (176.6 °C), 120 psig for 7 minutes 320 °F (160 °C), 70 psig for 8 hours 265 °F (129.4 °C), 24 psig for 67 hours

Range Code 0: \pm (6.7% of upper range limit + 3.5% of span).

Additional Radiation:

After completion of the above tests, the transmitters were exposed to an additional 5.5×10^7 rads TID.

Performance: $\pm(1.5\%)$ of upper range limit + 1.0% span).

Range Code 0: $\pm(2.3\%)$ of upper range limit + 1.0% of span).

Post DBE Operation:

Accuracy at reference conditions shall be within $\pm 3\%$ of upper range limit (4.5% for Range Code 0) for one year following DBE.

Both Output Codes

Chemical Spray:

Composition is 0.28 molar boric acid, 0.064 molar sodium thiosulfate, and sodium hydroxide as required to make an initial pH of 11.0 and a subsequent pH ranging from 8.5 to 11.0. Chemical spray is sprayed at a rate of 0.25 gal/min/ft².

Quality Assurance Program:

In accordance with NQA-1, 10CFR50 Appendix B, and ISO 9001:2000

Nuclear Cleaning:

To 1 ppm maximum chloride content.

Hydrostatic Testing:

To 150% of maximum working pressure or 2,000 psi, (13.8 MPa), whichever is greater.

Traceability:

In accordance with NQA-1 and 10CFR50 Appendix B; chemical and physical material certification of pressure-retaining parts.

Product Data Sheet

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Qualified Life:

Dependent on continuous ambient temperature at the installation site (see Figure 2). Replacement of the amplifier and calibration circuit boards at the end of their qualified life permits extension of the transmitter qualified life to the module qualified life. Details of the test are in the Rosemount Report D8300040.



PERFORMANCE SPECIFICATIONS

Based on zero-based ranges under reference conditions.

Accuracy

±0.25% of calibrated span; includes combined effects of linearity, hysteresis, and repeatability.

Dead Band

None

Drift

 $\pm 0.2\%$ of upper range limit for 30 months ($\pm 0.3\%$ of upper range limit for Range Code 0).

Temperature Effect

Per 100 °F (55.6 °C) ambient temperature change.

Range Code	Temperature Effect
3	±(1.5% of upper range limit + 1.0% span)
4-9	±(0.75% of upper range limit + 0.5% span)
0	±(1.13% of upper range limit + 0.5% span)

Overpressure Effect

Rosemount 1153DD:

Maximum zero shift after 2,000 psi (13.8 MPa) overpressure:

Range Code	Overpressure Effect
3, 4	±0.25% of upper range limit
5	±1.0% of upper range limit
6, 7	±3.0% of upper range limit
8	±6.0% of upper range limit

Rosemount 1153HD

Maximum zero shift after 3,000 psi (20.68 MPa) overpressure:

Range Code Overpressure Effect		
4	±1.0% of upper range limit	
5	±2.0% of upper range limit	
6, 7	±5.0% of upper range limit	

Rosemount 1153GD and 1153AD

Maximum zero shift after 2,000 psi (13.8 MPa) overpressure:

Range Code	Overpressure Effect
3, 4	±0.25% of upper range limit
5-8	±1.0% of upper range limit

Maximum zero shift after 4,500 psi (31.0 MPa) overpressure:

Range Code	Overpressure Effect	
9	±0.5% of upper range limit	

Maximum zero shift after 6,000 psi (41.34 MPa) overpressure:

Range Code Overpressure Effect	
0 ±0.25% of upper range limit	

Static Pressure Zero Effect

Rosemount 1153DD: Per 1,000 psi (6.89 MPa):

Range Code	Zero Effect
4, 5	±0.2% of upper range limit
3, 6 - 8	±0.5% of upper range limit

Rosemount 1153HD:

Per 1,000 psi (6.89 MPa):

Range Code	Zero Effect	
All	±0.66% of upper range limit	

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Rosemount 1153 Series D

Static Pressure Span Effect

The effect is systematic and can be calibrated out for a particular pressure before installation. Correction uncertainty equals $\pm 0.5\%$ of input reading/1,000 psi (6.89 MPa).

Power Supply Effect

Less than 0.005% of output span per volt

Load Effect

No load effect other than the change in the voltage supply to the transmitter

Mounting Position Effect

No span effect; zero shift of up to 1.5 inH2O (372 Pa), which can be calibrated out

Response Time

Fixed time constant (63%) at 100 °F (37.8 °C) as follows:

Range Code	Response Time
3	2 seconds or less
4	0.5 seconds or less
5-9, 0 0.2 seconds or less	

Adjustable damping is available through a special N Option.

FUNCTIONAL SPECIFICATIONS

Service

Liquid, gas, or vapor

Output

4-20 mA dc

Power Supply

Load limits are as shown in Figure 3 and Figure 4.





Span and Zero

Continually adjustable externally

Zero Elevation and Suppression

Maximum zero elevation: 600% of calibrated span (400% of calibrated span for Range Code 0)

Maximum zero suppression: 500% of calibrated span (300% of calibrated span for Range Code 0)

Zero elevation and suppression must be such that neither the calibrated span nor the upper or lower range value exceeds 100% of the upper range limit.

Temperature Limits

Normal Operating Limits: 40 to 200 °F (4.4 to 93.3 °C)

Qualified storage limits: –40 to 120 °F (–40 to 48.9 °C)

Product Data Sheet

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Humidity Limits

0-100% relative humidity (NEMA 4X)

Volumetric Displacement

Less than 0.01 in³ (0.16 cm^3)

Turn-On Time

2 seconds maximum. No warm-up required.

Pressure Ranges

Rosemount 1153DD and 1153HD:

Range Code	Pressure Ranges	
3	0-5 to 0-30 inH2O (D units only)	
	(0–1.24 to 0–7.46 kPa)	
4	0-25 to 0-150 inH2O (0-6.22 to 0-37.3 kPa)	
5	0–125 to 0–750 inH2O	
	(0–31.08 to 0–186.4 kPa)	
6	0-17 to 0-100 psi (0-0.12 to 0-0.69 MPa)	
7	0-50 to 0-300 psi (0-0.34 to 0-2.07 MPa)	
8	0–170 to 0–1,000 psi (D units only) (0–1.17 to 0–6.89 MPa)	

Rosemount 1153GD and 1153AD

Range Code	Pressure Ranges	
3	0-5 to 0-30 inH2O (G units only)	
	(U-1.24 to U-7.40 kPa)	
4	0–25 to 0–150 inH2O (G Units Only)	
	(0–6.22 to 0–37.3 kPa)	
5	0–125 to 0–750 inH2O	
	(0–31.08 to 0–186.4 kPa)	
6	0-17 to 0-100 psi (0-0.12 to 0-0.69 MPa)	
7	0–50 to 0–300 psi (0–0.34 to 0–2.07 MPa)	
8	0–170 to 0–1,000 psi	
a bebara katenda ku sabig	(0–1.17 to 0–6.89 MPa)	
9	0-500 to 0-3,000 psi (G units only)	
	(0–3.45 to 0–20.68 MPa)	
0	0-1,000 to 0-4,000 psi (G units only)	
	(0-6.89 to 0-27.56 MPa)	

Maximum Working Pressure

Rosemount 1153DD and 1153HD: Static pressure limit

Rosemount 1153GD and 1153AD: Upper range limit

Static Pressure and Overpressure Limits

Rosemount 1153DD:

0.5 psia to 2,000 psig (3.4 kPa abs to 13.8 MPa) maximum rated static pressure for operation within specifications; overpressure limit is 2,000 psig (13.8 MPa) on either side without damage to the transmitter

Rosemount 1153 Series D

Rosemount 1153HD:

0.5 psia to 3,000 psig (3.4 kPa abs to 20.7 MPa) maximum rated static pressure for operation within specifications; overpressure limit is 3,000 psig (20.7 MPa) on either side without damage to the transmitter

Overpressure Limits

Rosemount 1153GD and Rosemount 1153AD:

Operates within specifications from 0.5 psia (3.4 kPa abs) to upper range limit. Overpressure limits without damage to the transmitter are:

Range Code Overpressure Limit		
3-8	2,000 psig (13.8 MPa)	
9	4,500 psig (31.0 MPa)	
0	6,000 psig (41.34 MPa)	

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Rosemount 1153 Series D

PHYSICAL SPECIFICATIONS

Materials of Construction

Isolating Diaphragms: 316L SST

Drain/Vent Valves: 316 SST

Process Flanges: CF–8M (cast version of 316 SST)

Process O-rings: 316L SST

Electronics Housing O-rings: Ethylene propylene

Fill Fluid: Silicone oil Flange Bolts and Nuts: Plated alloy steel, per ASTM A-540

Electronics Housing: 316 SST

Mounting Bracket: 316L SST

Mounting Bolts (Bracket to Transmitter): SAE J429 Carbon steel, Grade 2 or Grade 5

Process Connections

³/₈-in. Swagelok compression fitting, 316 SST (¹/₄--18 NPT optional)

Electrical Connections

¹/2–14 NPT conduit with screw terminals **Weight**

24 lb (10.9 kg) including mounting bracket.



FIGURE 5. Rosemount 1153 Series D Pressure Transmitter. Exploded view.



FIGURE 6. Electric Block Diagram

FIGURE 7. Transmitter Wiring Diagram



Rosemount 1153 Series D

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Standard Accessories

All models are shipped with a mounting bracket. One instruction manual is included with each shipment.

Calibration

Transmitters are factory calibrated to the customer's specified range. If calibration is not specified, transmitters are calibrated at maximum range. Calibration is at reference conditions (ambient temperature and pressure).

Options

Consult the N-Options Product Data Sheet 00813-0100-2655 or call Rosemount Nuclear Instruments, Inc. for special transmitter needs.

Tagging

The transmitter will be tagged, at no charge, in accordance with customer requirements (96 characters maximum). All tags are SST. The standard tag is permanently attached to the transmitter. Standard tag character height is 0.125 in. (3.18 mm). A wire-on tag is available on request.

Documentation

Certification is provided for each Rosemount 1153 Series D Pressure Transmitter for accuracy, special cleaning, hydrostatic testing, and traceability. Chemical and physical reports and identification of pressure retaining parts are on file at Rosemount Nuclear Instruments, Inc.

Product Data Sheet

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Rosemount 1153 Series D

Model	Product Description				
1153	Alphaline Pressure Transmitters for Nuclear Applications				
Code	Pressure Measurement				
D H A G	Differential Pressure; 2,000 psig (13.8 MPa) Static Pressure Rating Differential Pressure; 3,000 psig (20.68 MPa) Static Pressure Rating Absolute Pressure Gage Pressure				
Code	Series				
D	SST Housing; qualified per I	EEE Std 323-1974 and IEEE Std	344-1975		
	Pressure Ranges at 68 °F				
Code	Rosemount 1153D (Differential)	Rosemount 1153H (Differential)	Rosemount 1153A (Absolute)	Rosemount 1153G (Gage)	
3	0–5 to 0–30 inH ₂ O (0–1.24 to 0–7.46 kPa)	N/A	N/A	0–5 to 0–30 inH ₂ O (0–1.24 to 0–7.46 kPa)	
4	0–25 to 0–150 inH ₂ O (0–6.22 to 0–37.3 kPa)	0–25 to 0–150 inH ₂ O (0–6.22 to 0–37.3 kPa)	N/A	0-25 to 0-150 inH ₂ O (0-6.22 to 0-37.3 kPa)	
5	0–125 to 0–750 inH ₂ O (0–31.08 to 0–186.4 kPa)	0–125 to 0–750 inH ₂ O (0–31.08 to 0–186.4 kPa)	0–125 to 0–750 inH ₂ O (0–31.08 to 0–186.4 kPa)	0–125 to 0–750 inH ₂ O (0–31.08 to 0–186.4 kPa)	
6	0–17 to 0–100 psi (0–0.12 to 0–0.69 MPa)	017 to 0100 psi (00.12 to 00.69 MPa)	0–17 to 0–100 psia (0–0.12 to 0–0.69 MPa)	0–17 to 0–100 psi (0–0.12 to 0–0.69 MPa)	
7	0–50 to 0–300 psi (0–0.34 to 0–2.07 MPa)	0–50 to 0–300 psi (0–0.34 to 0–2.07 MPa)	0–50 to 0–300 psia (0–0.34 to 0–2.07 MPa)	0–50 to 0–300 psi (0–0.34 to 0–2.07 MPa)	
8	0–170 to 0–1,000 psi (0–1.17 to 0–6.89 MPa)	N/A	0170 to 0-1,000 psia (01.17 to 06.89 MPa)	0–170 to 0–1,000 psi (0–1.17 to 0–6.89 MPa)	
9	N/A	N/A	N/A	0–500 to 0–3,000 psi (0–3.45 to 0–20.68 MPa)	
0	N/A	N/A	N/A	0–1,000 to 0–4,000 psi (0–6.89 to 0–27.56 MPa)	
Code	Output				
P R ⁽¹⁾	Standard 4–20 mA Improved Radiation Performance, 4–20 mA				
Code	Flange Option		la na sana da farana na Afrika da Sana	er er som er som er som er som er som er som er som er som er som er som er som er som er som er som er som er Som er som er som er som er som er som er som er som er som er som er som er som er som er som er som er som er	
A B ⁽²⁾ C ⁽²⁾ D E ⁽²⁾ F ⁽²⁾ G H J ⁽²⁾ L M ⁽²⁾	A Welded ³ / ₈ -in. Swagelok Compression Fitting Process Connection and Welded Drain/Vent Valve B ⁽²⁾ ¹ / ₄ -18 NPT Process Connection and Welded Drain/Vent Valve C ⁽²⁾ ¹ / ₄ -18 NPT Process Connection and Drain Hole (Drain/Vent Valve Not Included) D One Flange Option Code A and one Remote Seal E ⁽²⁾ One Flange Option Code B and one Remote Seal F ⁽²⁾ One Flange Option Code C and one Remote Seal G Two Remote Seals H Welded ³ / ₈ -in. Swagelok Compression Fitting on Process Connection and Drain/Vent Connection J ⁽²⁾ Welded ³ / ₈ -in. Swagelok Compression Fitting Process Connection and ¹ / ₄ -18 NPT Drain Hole L One Flange Option Code H and one Remote Seal				
Typical Mod	el Number:1153 D D 4 R	A			

ORDERING INFORMATION

(1) The Rosemount 1153 Series D with the Output Code R Electronics is also available with adjustable damping. Specify this option by adding "N0037" to the end of the complete model number. For example: 1153DD4RAN0037.

(2) Customer assumes responsibility for qualifying connection interfaces on this option. Contact Rosemount Nuclear Instruments, Inc. for details.

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Rosemount Nuclear Instuments, Inc. satisfies all obligations coming from legislation to harmonize product requirements in the European Union.





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Bulletin 04L41B01-01E

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Evolved features for greater utility

The evolution of the global standard in paperless recorders has reached the next stage - the DAQSTATION DXAdvanced series R4 (release 4). Its basic functions have been further enhanced with an expanded security function option providing FDA 21 CFR Part 11 compliance, making it ideal for a broadening range of applications, such as in pharmaceutical manufacturing.

Basic Marchene

 Up to 4 	8 channels of input
- User ca	an start/stop recording by batch, and create
data fil	85) fable to up to 248 observate with the MIX/100

automatic connection function

- 186 - A. 199 - A. 199 - A.

Display & Operation

- · Arrange the display your way with a custom display function
- Review historical data with date and time calendar
- search functions

S. RAWOR ROME

· Standard Ethernet interface Supports the PROFIBUS-DP and EtherNet/IP protocols · Expanded Web and networking functions!

Reliability and theoretic

- · Dust- and splash-proof front panel (IP65, NEMA4 compliant) · Highly reliable internal memory with error-correction
 - function · Front panel door lock and login function
- Application Software
 - · Software for a variety of tasks including analysis, settings, and acquisition DAQSTANDARD: Supports settings and data file analysis DAQStudio: Builder software for custom displays DAQWORX: Integrated Data Acquisition Software Suite DAQManager: Data management Software





vıgılant The clear path to operational excellence

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High Capacity Internal Memory

Standard-equipped internal memory greatly increased (to 400 MB). Even longer recording durations, and multichannel recording.

Measurement CH = 30 channels. Computation CH = 0 channels.

	DX2000 (400 MB)
Display update (minute/div)	30 minutes
Save interval (s)	60 s
Total sample time	Approx, 5 years

Const data the statety data

Measurement CH = 30 channels. Computation CH = 0 channels.

	DX2000 (400 MB)
Save interval (s)	1 s
Total sample time	Approx. 2 months

Companifican Removable Structle Monthe

All DXAdvanced models include a CompactFlash drive. Rugged and readily available CompactFlash cards (CF cards) serve as the removable media, and are available as optional accessories. Up to 2 GB CF card supported.



Media FIFO Function

This function ensures that the CF card always retains the latest data when files are saved to it automatically. When the CF card is full, the oldest files are deleted to make room for the newest files. The media FIFO function allows you to use the DX continuously for long periods of time without having to change the CF card.



Optional USB Flash Drive

A USB flash drive can be used to transfer data to your PC. The optional front panel USB port also allows an external PC keyboard to be used with the DXAdvanced to facilitate setting and text entry.



Calibration correction schedule

This function provides control of the input value correction schedule. Following a predetermined schedule, DXAdvanced displays a message prompting the user to perform input value correction. This is convenient, for example, in Nadcap* related heat treatment applications.

*Nadcap: National Aerospace and Defense Contractors Accreditation Program



Excel report (emplets function

Reports can be created automatically using a spreadsheet template created in Excel. Reports are created in Excel format, greatly reducing time and effort spent on making spreadsheets.



6
SPECIFICATIONS See the general specifications (GS 04L41B01-01E_04L42B01-01E) for the defailed specification .

STANDARD SPE		IONS								
Sanaral Specificatio		10143								
Construction	¢1.9									
Mounting: Flush panel mounting (on a vertical plane) Mounting may be inclined downward up to 30 degrees from a borizontal plane										
Allowable Panel Thick Front Panel:	deg ness:2 to Wa	degrees from a horizontal plane. 2 to 26 mm Water and dust-proof								
(based on IEC529-IP65 and NEMA No.250 TYP										
Number of Inputs: DX1000: DX2000:	2,4 4,8	l, 6, 12 channels I, 10, 20, 30, 40, 48 channels								
Measurement Interv DX1002, DX1004,	al: DX2004, 125	DX2008:	o*)							
DX1006, DX1012, I	DX2010, 1 s 100 * A/l	DX2020, DX2030, DX2040, DX2048: (Not available when A/D integration time) ms), 2 s, 5 s, 125 ms (fast sampling mo D integration time is fixed to 1.67 ms in case of	e is set to ode*)							
Inputs:	sa DC' TC RTI DI (mpling mode. V (20, 60, 200 mV, 2, 6, 20, 50 V, 1-5 V, (R, S, B, K, E, J, T, N, W, L, U, WRe) D (Pt100, JPt100) Contact input, TTL level))							
	DC,	A (With external shunt resistor attached))							
Input	Range	Measurement accuracy (when the integration time is 16.7 ms or more)	Display resolution							
DCV	1-5 V	±(0.05% of rdg+3 digits)	1 mV							
Thermocouple*	к	±(0.15% of rdg+0.7°C)	0.1°C							
Resistance thermometer detector	Pt100	±(0.15% of rdg+0.3°C)	0.1°C							
* Does not include the a	eccuracy of	reference junction compensation								
Display unit:										
DX1000:	5.5-	inch TFT color LCD (320 x 240 pixels)								
DX2000: Display group:	10.4	⊷ncn TET color LCD (640 x 480 pixels)								
Number of display; Number of assignal	DX1 ble chann DX1	1000: 10 groups, DX2000: 36 groups els for one group: 1000: 6 channels, DX2000: 10 channels								
Display color: Trend/Bargraph: Background:	Selé Whi	ectable from 24 colors te or black selectable								
Trend display: Trend display type:	Veri cîrci * Cir	iical, horizontal, landscape, horizontal sj Jlar* selectable cular display is only for DX2000.	olit or							
Bargraph display: Direction: Digital indication:	Ver	Vertical or horizontal selectable								
Display renewal rate Overview display:	e: 1s	1 s								
Numper of indication	n cnanne Mea	is: isuring values and alarm status of all ch	annels							
Information display:	Alar info state	Alarm summary, message summary, memory information, report information, relay status, Modbus status								
Tag display:										
Tag number and con	nment dis No. Taj	play of displayable_characters g no :16 max								
Displayable charact	Tag ers: Tag Tag Chir	Tag comment :32max Tag no.: Alphanumerics Tag comments: Alphanumerics, Japanese, and Chinase								
Messages: Number of characte	rs: 32 c	haracters maximum								
Number of messaged: 100 messages (including 10 free messages) Data referencing function:Display the retrieved data (display data or event data) from internal or evental memory										
Custom display funct User can change disp and attributes, and ad No. of screens: Max no. of placeable	ion: blay object dd objects 28 (3 e display 134	ot (trend, numeric, and bar graphs, etc.) 5 freely to create screens. 9 from internal memory, 25 from external me objects: (normal: 80, scale: 4, trend: 4, list: 4, ara	sizes :dia (CF)) aphic: 40.							
Data Saving Functior	bitm	ap: 2)								
External storage med Medium:	liu m : Corr	pactFlash memory card (CF card)								
Internal memory: Medium:	Flas	h memory								

400MB Capacity: Maximum number of files can be saved: 400 files (total number of display data file and event data file) Alarm Function Number of alarm levels: Up to four levels for each channel Alarm types: High and low limits, differential high and low limits, high and low rate-of-change limits and delay high and low Alarm annunciator function: Alarm display based on alarm sequence, and relay output operation. Supported alarm sequences: 3 (ISA-A-4, ISA-A, ISA-M) · Event action function General: Particular action can be executed by particular event. Number of event action: 40 actions can be set Security functions * General: Login function or key lock function can be set for each key operation or communication operation. Key lock function: On/off and password can be set for each operation key and FUNC operation. User name and password to login can be set. * Please refer the Advanced security function option (/AS1) Login function: for the models with the /AS1 option. Clock With calendar function (year of grace) Clock: ±10 ppm, excluding a delay (of 1 second, maximum) Clock accuracy: caused each time the power is turned on. DST function (summer/winter time): The time at which the daylight savings time adjustment is automatically calculated and configured · Communication Functions Connection: Ethernet (10BASE-T) Protocols: TCP, UDP, IP, ICMP, ARP, DHCP, HTTP, FTP. SMTP, SNTP, Modbus, DX private E-mail inform function: FTP client function: Transferred data file, FTP server function, Web server function, SNTP client function, SNTP server function, DHCP client function, Modbus client function, Modbus server function EtherNet/IP server Connects to EtherNet/IP networks as an Adapter (Server). Batch function General: Data display and data management with batch name, text field function and batch comment function are available. Power Supply 100 to 240 VAC (automatic switching) Rated power supply: Allowable power supply voltage range: 90 to 132 or 180 to 264 VAC Rated power supply frequency: 50/60 Hz (automatic switching) Power consumption: DX1000: 60 VA (max., for 240 VAC power supply) DX2000: 100 VA (max., for 240 VAC power supply) Normal Operating Conditions Power voltage: 90 to 132 or 180 to 250 VAC Power supply frequency: 50 Hz ±2%, 60 Hz ±2% Ambient temperature: 0 to 50 °C Ambient humidity: 20% to 80% RH (at 5 to 40 °C) SPECIFICATIONS OF OPTIONAL FUNCTIONS · Alarm Output Relays (/A1, /A2, /A3, /A4*, /A5*) An alarm signal is output from the rear panel as a relay contact signal. Number or output: Select from 2, 4, 6, 12* and 24* points Only for DX2000. Serial Communication Interface (/C2, /C3) EIA RS-232 (/C2) or RS-422A/485 (/C3) Connection: Protocols: DX private protocol, Modbus(master/slave) protocol Setting/measurement server function: Operation, setting or output of measurement data are available by DX private protocol. Reading or writing of measurement data on other Modbus communication: instruments are available by Modbus protocol.* * /M1 option or /MC1 option is required to read data from other instrument.

 VGA Video Output (/D5) Resolution: 640 x 480 pixels (VGA)

Fail/Status Output (/F1)

The relay contact output on the rear panel indicates the occurrence of CPU failure or selected status.



Fail & Alarm Output Rel Combination of "Eail/S	ays 22 points (/F2, only for DX2000)	PROFIBUS-DP maste	r devices can access the following internal data.
noints".	latus output fanction and marin output relays 22	Load MATH channel	data
Clamped Input Terminal	(/H2)	Write communication	input channel data
Clamped input termina	I (detachable type) is used for input terminal.	Node address setting	range: 0 to 125
• Desk Top Type (/H5[], /	H5*)	Interface:	PROFIBUS-DP-V0 Slave
Provides carrying hand	lle and power cord.	Transmission medium:	2 dedicated cables
* /H5 is only for 24 VDC/AC	power supply model (/P1), and does not include power code.	Transmission speed/distan	ice: 9.6 kbps/1200 m to 12 Mbps/100 m
 Mathematical Functions 	(/M1)	Termination resistance	 None (requires external termination resistance)
Used for calculating da	ta, displaying trends and digital values, and recording	 Advanced security fundamental 	ction (/AS1)
calculated data assigned	ed to channels.	Security and electronic	crecord/signature functions have been added that are
Channel assignable to	calculated data:	compliant with the USA	A's FDA title 21 CFR Part 11.
DX1002, DX1004: DX2004, DX2008:	Up to 12 channels, DX1006, DX1012: 24 channels	Data anti-tamper funct	binary files.
Operation:		Login function,	password), you can enter security settings on the
General antimetic of	perations, Statistical operations, Special operations,	Lloss loval and symbol	instrument
Constant:	Up to 60 constants (K01 to K60)	System administrator	 6 users (all can be operated)
Report functions:	op to constants (NOT to NOU)	General user	90 users
Report fyner	Hourly, daily, hourly + daily, daily +weekly and daily	Electronic signature for	nction
	+ monthly	Linear and alginatiants in	After checking data that has finished being recorded
Operation:	Max. 4 types are selectable from average, maximum		you can add three levels of electronic signature.
- F	minimum, instantaneous and summation		select a pass/fail, and enter comments
Cu10, Cu25 RTD Input /	3 leg isolated RTD Input (/N1)	Audit Trail Function:	The settings change log and the operation log when
This option allows Cu1	0 and Cu25 inputs to be added to the standard input		the change was made are saved.
types.		Password management	t function:
· 3 legs Isolated RTD Inpu	it (/N2*)	0	Logins are verified by a Kerberos authentication server
A, B, b legs are of isola	ted input type.		-
* Only forDX1006, DX1012,	DX2010, DX2020, DX2030, DX2040 and DX2048.	Dimensions	
Extended Input Types (//	N3)	2,11,01,01,01,0	
This option allows extra	a inputs types as below to be added to the standard	D)(4000	(Cable Damas Damas) from the Statement
input types.		DX1000 m	DIGAS F Sign Cit Income
IC: Kp vs Au7Fe, PLA	HNEL, PR40-20, NINIMO, W/Wre26, TypeN (AWG14)	E Contraction of the second second second second second second second second second second second second second	(approx inch)
RTD: Pt25, Pt50, Ni100) (SAMA), NITUU (DIN), NIT20, J263*B, Cu53, Cu100,	L_	
PI46, PI200	br (/D4)	16	
 Z4 VDU/AU Hower Supp Rated newsr supplus 	94 MPC of 24 MAC (50/60Hz)		UT 1630
Allowable power suppry:	zer vidio di zervalo (pu/dumz) Valtada rando:	lõ	
Hunmante hower anhbià.		E	
Max nower concumption			15.15.15.588 24.0 224.1 (8.37) (44.15.67) 10.941 170.5 (8.70
wax, power consumption	L 	×0.8	ITUBDI Z is 28
	DX1000, 20 VX (24 VDC), 45 VX (24 VAC (50/60 Hz))		
Remote Control (/R1)	DISCOUNTO VITLET (DO), ID VITLEM VAG (00/00 MZ))	_ T	
This option allows eight f	unctions to be controlled remotely by a contact input	<u>ă</u>	
• 24 VDC transmitter powe	er supply (/TPS2*, /TPS4, /TPS8*)	SiQC	
Output voltage:	22.8 to 25.2 VDC (rated load current)		
Rated output current:	4 to 20 mADC	u	
	* /TPS2 is only for DX1000, /TPS8 is only for DX2000		280.2 mp32 36244N
 Easy text entry (/KB1, /K 	B2)	DX2000	
Remote control terminal	is available to operate the DX.	F	╤═┫
Number of units that can	be controlled:	-	
	Max. 32 units by ID setting		
 USB interface (/USB1) 		Ĩ	
USB interface specification	: Based on Rev1.1, host function	L.	2011
Number of ports:	2 ports (Front and rear panel)		initial (mail above for mounting)
Available USB devices:			HAX 278 18.901
Keyboard:	104/89 Keyboard (US) based on USB HID Class	ı	2952 (1142) 27.3 UHZ or (PH0 2214 (8.72)
Evicenci madi	Ver. I. I LICD Tash days (Come of the LICD fact days are		288 (T.33) (1077) E88 (5.6%) E
External medium:	DSB liash drive (Some or the USB flash drive may		2 10 25
Duleo input //DM41	nor be supported by DAAuvanced.)		
Pulse input (r=W11)	des mathematical functions ontion //M1) and remote		
control option (/R1)	and remained remaining obtain (Min) and remain		
Number of inputs:	3 points (8 points are available in case of using	Ę	
ristricat of triputa.	remote inputs)	7/10	
Input format:	Photocoupler isolation (shared common)	8 1 m	
2. p. m. r. m. 117.002	Isolated power supply for input terminal (approx. 5 V)		
 Calibration correction fun 	clion (/CC1)		54.8 17.15) 772.1 11.26) et B
Corrects the measurem	ent value of each channel using segment linearizer	L	108 (devension aller sounting)
approximation.	~ ~	14	بر .
Number of segment point	nts: 2 to 16	Two panel brackets are t	used in panel-mounting the DX1000 and DX2000. They
 External input function (/I 	MC1, only for DX2000)	may be used either on th	e left and right or top and bottom. See Yokogawa's
Digital input channels vi	a communication are extended to input data from	General Specification (G	S 04L41B01-01E) for information on panel cutting
other instruments.		dimensions for DX1000 v	vertical or horizontal attachments. Unless otherwise
Number of external inpu	t channels:	indicated, tolerance is ±3	3% (or ±0.3 mm for dimensions under 10 mm).
	Up to 240 channels (channel number: 201 to 440)	Dagstation and DXAdvanced	are registered trademark of Yokogawa Electric Corporation.
* Only for DX2010, DX2020,	DX2030, DX2040 and DX2048	Microsoft, MS, and Windows	are registered trademarks or trademarks of Microsoft
* Fast sampling mode is not	available when external input option is equipped.	Corporation in the United Sta	ites and other countries.
Multibatch function (/BT2)	Pentium are registered trade	marks of intel Corporation.
User can start/stop record	ding independently by batch, and create data files.	Ethernet is a registered trade	mark of Xerox Corporation,
No. of multibatches:	DX1000: 2 to 6 (DX1006,DX1012 only)	Modbus is a registered trade	mark of AEG Schneider Automation Inc.
	DX2000 2 to 12	Other company names and p	product names appearing in this document are registered
	(DX2010,DX2020,Dx2030,DX2040,DX2048 only)	trademarks or trademarks of	their respective holders.

(17

Model code		and a summary of the	
	Suffix code	Optional code	Description
DX1002			2ch. 125ms (Fast sampling mode: 25ms)
DX1004			4ch, 125ms (Fast sampling mode: 25ms)
DX1006			6ch, 1s (Fast sampling mode; 125ms)
DX1012			12ch, 1s (Fast sampling mode: 125ms)
Internal memory	-3	-	400MB
External media	-4		CF card (with media)
Display languad	je -2		English, degF, DST(summer/winter time)
Options		/A1	Alarm output 2 points *1
		/A2	Alarm output 4 points *1
		/A3	Alarm output 6 points *1 *2
		/C2	RS-232 interface *3
		/C3	RS-422-A/485 interface *3
		/F1	FAIL/Status output *2
		/H2	Clamped input terminal (detachable)
		/H5	Desktop type (for /P1 model, without power code,
			screw type power terminal) *4
		/H5[]	Desktop type *5
		/M1	Mathematical functions
		/N1	Cu10.Cu25 RTD input/3 leg isolated RTD
		/N2	3 leg isolated RTD *6
		/N3	Extended input type (PR40-20, Pt50, etc.)
		/P1	24VDC/AC power supply
		/R1	Remote control
		/TPS2	24VDC transmitter power supply (2 loops) *7
		/TPS4	24VDC transmitter power supply (4 loops) *8
		/KB1	Easy text entry (with input terminal) *9 *10
		/K82	Easy text entry (without input terminal) *9
		/USB1	USB interface
		/PM1	Pulse input (including remote control and
			mathematical functions) *11
		/001	Calibration correction function
		/BT2	Multi-batch functions *12
	1	/CP1	PROFIBUS-DP functions *3
		/AS1	Advanced security functions
1 /A1, /A2 and /A together. 2 /A3 and /F1 ca 3 /C2, /C3 and /C together.	3 cannot nnot be s 2P1 cann	be specified to ot be specified to	 *6 /N2 can be specified for only DX1005 and DX1012. *7 In case that /TPS2 is specified, /TPS4, /A fifed *6 In case that /TPS4 is specified together. *8 In case that /TPS4 is specified together. *8 In case that /TPS4 is specified together.

MODEL AND SHEELY CODES

and desktop type are specified together, /H5 must be specified //P1 and /H5[] cannot '9 /KB1 and /K82 cannot be specified logether. *5 /H5[] D: Power cord UL, CSA st'd -F. Power cord VDE st'd -J. Power cord GB st'd -H. Power cord GB st'd -

APPLICATION SOFTWARE

Model code	Description	OS
DXA120	DAQSTANDARD	Windows 2000/XP/Vista
DXA170	DAOStudio	Windows XP/Vista
DXA250	DAQManager	Windows XP/Vista

ACCESORIES

Product	Model code (part number)	Specification				
Shunt resister	415920	250Ω±0.1%				
(for screw input terminal)	415921	100Ω±0.1%				
	415922	10Ω±0,1%				
Shunt resister	436920	250Ω±0.1%				
(for clamped input terminal)	438921	100Ω±0.1%				
	438922	10Ω±0.1%				
CF card adapter	772090	-				
CF card	772093	512MB				
	772094	1GB				
Mounting bracket	B9900BX	-				
Door lock key	B8706FX	-				
Remote control terminal	438227	For /KB1, /KB2 option				
Validation documents	438230	For IAS1 option				

Suffix Optiona Model code Description DX2004 4ch, 125ms(Fast sampling mode: 25ms) DX2008 8ch, 125ms/Fast sampling mode; 25ms) DX2010 10ch, 1s(Fast sampling mode: 125ms) DX2020 DX2030 20ch. 1s(Fast sampling mode; 125ms) 30ch. 1s(Fast sampling mode: 125ms) DX2040 40ch 1s/Fast sampling mode: 125ms) 1s(Fast sampling mode: 125ms) DX2048 48ch. Internal memory -3 400MB F card (with media) xternal media -4 English, degF, DST(summer/winter time) Alarm output 2 points *1 Display language Options 'A1 Alarm output 4 points *1 /A2 /A3 Alarm output 6 points * /A4 Alarm output 12 points Alarm output 24 points *1 *2 /C2 /C3 RS-232 interface *3 RS-422-A/485 interface *3 VGA output FAIL/Status output *2 *4 EAIL + Alarm output 22 points *1 *4 /F2 Clamped input terminal (detachable) Desktop type (for /P1 model, without power code, screw type power terminal) *5 /H2 /H5 /H5[] Desktop type *6 Mathematical functions Cu10.Cu25 RTD input/3 leg isolated RTD 3 leg isolated RTD '7 /M1 /N1 /N2 Extended input type (PR40-20, Pt50, etc.) /N3 /P1 /R1 24VDC/AC power supply Remote control 24VDC transmitter power supply (4 loops) *8 24VDC transmitter power supply (8 loops) *9 /TPS4 /TPS8 /KB1 Easy text entry (with input terminal) *10 *11 /KB2 Easy text entry (without input terminal) *10 /USB1 /PM1 USB Interface Pulse input (including remote control and mathematical functions) *12 /CC1 Calibration correction function /MC1 External input function *13 Multi-batch functions *14 /BT2 /CP1 PROFIBUS-DP functions *3 /A\$1 Advanced security functions

DX2000

- I/AS1
 I Advanced security functions

 *1/A1, /A2, /A3, /A4, /A5, /F2 cannot be specified together.
 ?7 (N2 can be specified for only DX2010, DX2020, DX2030, DX2040 and DX2048.

 *2 /A5 and /F1 cannot be specified together.
 ?7 (N2 can be specified together.

 *3 (C2, /C3 and /F1 cannot be specified together.
 ?8 /TPS4, /TPS8, /A5 and /F2 cannot be specified together.

 *4 /F1 and /F2 cannot be specified together.
 ?9 in case that /TPS8 is specified together.

 *16 mase that 24 VDC/AC power supply (/P1)
 *10 /KB1 and /KB2 cannot be specified together.

 *16 mase basecified together.
 *11 in case that /AB3 specified together.

 *16 mase basecified together.
 *11 in case that /AB3 specified, remote the specified together.

 *16 mase basecified together.
 *12 in case that /AF1 and orbitation of /A4/F1 cannot be specified, remote that and /R1 cannot be specified, remote the specified together.

 *16 mase basecified together.
 *11 in case that /AF1 and combination of /A4/F1 cannot be specified, remote that and /R1 cannot be specified together.

 *16 mase basecified together.
 *13 /MC1 can be specified together.

 *13 /MC1 can be specified for only DX2010, DX2020, DX2030, DX2040 and DX2018, DX2020, DX2030, DX2040 and DX2018, DX2020, DX2030, DX2040, DX2048.

RELATED PRODUCT

Removable Chassis Model featuring easy maintenance.

•This model enebles you to pull the inner chassis out from the case without having to remove the power supply, communication, and input wiring on the rear panel

NOTICE-

- Before operating the product, read the instruction manual thoroughly for proper and safe operation.
- If this product is for use with a system requiring safeguards that directly

involve personnel safety, please contact the Yokogawa sales offices.

VigilantPlant is Yokogawa's automation concept for safe, reliable, and profitable $\frac{1}{2} = \frac{1}{2} \sum_{i=1}^{n} \frac{1}{2} \sum_{i=$ plant operations. VigilantPlant aims to enable an ongoing state of Operational Excellence where plant personnel are watchful and attentive, well-informed, and ready to take actions that optimize plant and business performance.

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The clear path to operational excellence

YOKOGAWA ELECTRIC CORPORATION

Network Solutions Business Div./Phone: (81)-422-52-7179, Fax: (81)-422-52-6619

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IPEC00270268

RCM	Technologies	ENTERGY	Conceptual Design	
	The Source of Smart Solutions	Unit 3	SAMA IP3 -019	Rev. 0

Cost Estimate

	ENTER	CALIFORNO	IFAST		
	IMP	LEMENTATION ESTIM	ATE		
	Indian	Point Nuclear Power	Station		
* ESTIMATE LEVEL *	EE	C #: SAMA IP3-019			
Conceptual	PROJECT TITLE: Install Leak Mor	nitoring		ESTIMATOR: 1	RCMT
Preliminary	Instrumentation for ISLOCA Pathy	vay Isolation Valves	PROJECT COD	E: TBD	
Definitive	JOB LOCATION: Containment & C	Control Bldgs.		ORIG. DATE: (06-25-2012
		ORIGINATOR:	🗹 CAPITAL 🔲 O	0&M	
	ESTIMATE TOTAL \$6,462,47	70	REV	/ISION 11-0	
Summary of Change:					
In accordance with NRC envi	/ironmental regulations in 10 C.F.R. I	Part 51, Entergy perform	ned SAMA analyse	es for both Indian Point I	Nuclear Generating
Units 2 and 3 as part of its in	cense renewal application. I nose an	alyses identified a num	cer of potentially co	ost-beneficial SAMAs to	r each unit. In its
for further internal engineering	and related correspondence with the	though none of the not	entially cost-benef	ficial SAMAs is related to	ost-beneficial SAMAS
under 10 C.F.R. Part 54. E	ntergy contracted RCM Technologies	to assist it in this effor			o uging munugunun
This package responds to the	e issue identified in the NRC's staff r	eview of SAMA IP3-01	and provides the	technical resolution and	associated costs
required for implementation.					
For SAMA IP3-019, resolution	on is required to provide remote moni	toring of any fluid leaka	ne nast the isolatir	on valves in ISLOCA nat	thwave
		toring of any hard round	go poor the lookant	on fondo in foco on pa	
5					
Prepared by:		Approved	by:		
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1 leht	-uklacyrot.	. Martin and Street	and the second s	and the second sec	
Date: 9 - 2	0-2012	Date: <	7-20-2	0/2	

		ENTERGY NUCLEAR NORTHEAST IMPLEMENTATION ESTIMATE							
* 1757	MATELEVEL *								
ΗĞ	Concentual	PPO IECT TITLE: Install Leak Monitoring Instrumentation for ISLOCA Pathway Isolati ESTIMATOR: PCMT							
НЪЧ	Preliminary	INDELOCATION: Containing and and and and and and and and and and							
	Definitive								
Item	Demmare	Description							
1	This actimate accur	Description							
2	This estimate assur								
	This estimate assur	nes that the non-outage work work will complete during 2014 working a 10 hours per shift, four days per week schedule.							
3.	This estimate assur	thes that the outage work will be completed in 2014 working (2) 10 hour shirts 6 days per week.							
4.	This estimate assur	nes that all work will be performed by trained contract craftspersons in liquid station or hazardous conditions.							
6	This estimate assur	hes that all work will be performed by italined contact cranspletions in the oristance metanece personner.							
Ŭ.	location such that n	o new containment penetrations will be required.							
7.	This estimate assur production due to d	nes that the Outage work will involve radiological conditions requiring additional briefing times, dressout times and reduced ressout requirements.							
8.	This estimate assur	nes that a comercial dedication effort will be required to qualify the Yokogawa Recorder for use in this application.							
9.	9. This estimate assumes that the piping/tubing components and instrumentation will be Safety Class 1 and the Electrical components will be Safety Class Electrical.								
10.	This estimate is bas Estimate Classificat	eed on the project's current level of scope definition and is classified Class 5 as defined per the AACE International Cost ion System (see Attachment 3, Reference 2).							
11.	Labor dollars in this for anticipated billing	estimate are projected 2014 costs based on current 2012 craft billing rates at Indian Point. The projected costs provide g rate increases of 3% per year.							
12.	This estimate allows and progresses as f	s for and includes a contingency factor related to the complexity and location of the work required. The factor is cumulative follows:							
	A. Outside fer	nce boundary - 20%							
	B. Inside fence	e boundary - 30%							
	C. Implementa	ation complexity - 40%							
	D. Inside Con	lainment - 50%							

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Rev.		IN		I POI	NTI ⊒oi	MPLE	MENT	ATION	ΙE	STIMA	TE	WORK S	HE	ET						
JOB	L JECT (사안한, 사상원약산원本 Monitoring Instrumentation LOCATION: Containment & Control Bldgs. STATUS	for ISI	LOCA	Pathwa	ay Isola	ation Valv	es	PROJEC	CT (CODE: TE	3D				TAK EST ORI	EOFF: MATOR: G. DATE:	RCI 06-2	MT 25-2012		
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				13	CRIAL	MATERIA	LONIF	CACIS									\$	763.200		
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				21		CSG											\$	1,000		
				MISC	EOI -	SUPPOR	r													
				22			CONT	ROL						300			\$	30,000		
				24		CHEMIS	TRY										\$	5,700		
				25		OPS / OF	PS SUP	PORT						120			\$	14,400		
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				36		CGD C	ONTRA	ст						-			\$	25,000		
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				41		SAFETY								136			\$	9,811		
				CON	TING	ENCY	CHOY											4 280 870		
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									SI	TE ENCU)MBF	RANCE PREM	AIUN	4 (20%)			\$	828,522		
									LC	DADERS	(30%	%)					\$	1,491,339		
									E	STIMAT	TE T	TOTAL					\$	6.462.470		
			<u> </u>			NC	ON OUT	AGE WO	RK											
1.	Gather material and stage tools and materials	1	LT	EL	2	10.00	1.00	20	\$	123.32	\$	18,000.00	\$	18,000	\$	2,466			\$	20,466
2.	mount new monitoring panel with recorder and	1	1 1 T	FI	,	40.00	1 1 00	80	4	123 39			*	35 000	5	9 866			\$	44 866
3.	Run conduit and support as required to area of	`							ľ	~ L U. U L		:	1		ľ	0,000			-	
	containment penetration.	1	LT	EL	2	40.00	1.00	80	\$	123.32					\$	9,866			\$	9,866
	sub assemblies).	15	LT	PF	2	25.00	1.00	750	\$	120,71			\$	250,000	\$	90,533			\$	340,533
5.	Perform visual and LP examination on socket	15	1.+	NK4		16.00	1 00	240		87.00								20.000	¢	20 990
	HOLDS OF LIGHT SPOOLAGIAG SPOOLDIGS	15				10.00	1.00	∠4U ~	\$	07.UU						-		20,880	Ŷ	20,000

8/1/2012 9:12 AM SAMA IP3-019 INSTALL LEAK MONITORING INSTRUMENTATION FOR ISLOCA PATHWAY ISOLATION VALVES 05-25-12

INDIAN POINT IMPLEMENTATION ESTIMATE WORK SHEET Rev CAPIT DO 11-0 EC #: SAMA IP3-019 PROJECT HEE Heavier Monitoring Instrumentation for ISLOCA Pathway Isolation Valves TAKEOFF JOB LOCATION: Containment & Control Bldgs PROJECT CODE: TBD ESTIMATOR: RCMT ORIG. DATE: 06-25-2012 EST. STATUS ORIGINATOR: MATERIAL \$ MANHOURS LABOR MATERIAL SUB EM QTY UOM CFT NO. UNIT FCTR TOTAL DESCRIPTION DOLLARS CONTRACT TOTAL S \$/MH PER LINIT DOLLARS OUTAGE WORK Gather and stage tools and materials, Perform 1 walkdown and briefing. 6 977 1 1 T PF 2 10.00 170 34 \$ 120.71 \$ 6 977 \$ 2 Gather and stage tools and materials, Perform LT EL 1.70 \$ 123.32 \$ 7,128 2 10.00 34 7.128 s walkdown and briefing. 1 3 Stage, erect & modify scaffolding as required LT CP 2 80.00 1.70 272 \$ 96.00 \$ \$ 44,390 \$ 44,390 Á Stage, erect & modify scaffolding as required LB \$ \$ LT 80.00 1,70 136 \$ 78.65 18,184 £ 18,184 5. Remove existing cap and install new ips/valve/cap sub assembley(14 valve locations). PF 476 120.71 97.679 97,679 14 EA 2 10.00 170 \$ \$ Mount new transmiter, valve manifold and support. 15 PF 2 10.00 510 \$ 375,000 \$ \$ 6 ΕA 1.70 120.71 \$ 104,656 479,656 7 Route and support new tubing between valve manifold and new piping. Weld new sockolet to 14" existing pipe. 14 FA PF 15.00 1,70 \$ 120.71 18,000 146 518 \$ 164,518 2 714 \$ \$ \$ \$ EA PF 2 12.00 1.70 41 120.71 \$ 8,413 8,413 8 1 Mount Prefabricated piping/valve sub assemblie to 9. socklet. 1 FA PF 2 10.00 1.70 34 \$ 120.71 \$ 6,977 s 6.977 Route and support new tubing between valve 10 10,466 manifold and new piping. 15.00 \$ 10,466 ΕA PF 2 1.70 51 120,71 \$ \$ 11 NDE containment welds welds 60 EA NLA 1.00 1.70 102 \$ 87.00 \$ 15,086 \$ 15,086 12 LΤ PF 20.00 1.70 68 \$ 120.71 13,954 13,954 Support testing as requested 2 \$ \$ 13. Mount Hoffman boxes in containment 6.00 2 ΕA ΕL 2 1.70 41 \$ 123.32 \$ 8,595 \$ 8,595 14 Route & Support Conduit from each Transmitter in containment to containment Hoffman Enclosure. EL 450 LF 37,913 2 1.70 275 \$ 123.32 \$ \$ 0.18 \$ 4,000 33,913 15 Route and support conduit from (2) Hoffman boxes 2 LT EL 2 40.00 1.70 272 \$ 3.000 \$ 33.543 5 36.543 o penetration and tie in with external conduit. \$ 123.32 16 Pull cable from each transmitter to Hoffman boxes and terminate at transmitter and Holfman box LT ΕL 2 100.00 1.70 340 \$ 8,000 \$ 41,929 \$ 49,929 terminal strips. \$ 123.32 Pull cable from 2 Containment boxes to external 17 LT 1 EL 2 80.00 1.70 272 \$ 9,000 \$ 33,543 \$ 42,543 Hoffman Panel and enclosure and terminate \$ 123.32 18 Provide testing as required. 1 IT OF 2 100.00 1 00 200 \$ 100.00 \$ \$ 20.000 \$ 20.000 19 Assist with testing as required 1 I T FI 2 40.00 1 70 136 \$ 123.32 \$ \$ 16.772 \$ 16,772 20 Dismantle scaffolding to storage CP 1.70 136 \$ 22,195 1 LT 2 40.00 \$ 96.00 s \$ 22,195 21 Dismantle scaffolding to storage IΤ 18 40.00 1.70 68 78 65 \$ 9.092 \$ 9.092 \$ \$ 22 Cleanup and restore area 10.00 68 8,386 LT EL 1.70 \$ \$ 123.32 \$ \$ \$ 8,386 \$ 23 Cleanup and restore area PE . 10.00 1.70 68 120.71 8,208 \$ 8,208 LT PAINTING & TOUCH-UP REQUIREMENTS PAINTING & TOUCH-UP PT \$ \$ \$ \$ 2 PAINTING & TOUCH-UP FIRE WATCH / BOTTLEWATCH REQUIREMENTS CRAFT SUPPORT FOR FIRE WATCH 2 FW 120.00 1.00 240 12.864 LT 53,60 12.864 1 \$ \$ \$ \$ \$ 2 CRAFT SUPPORT FOR BOTTLE WATCH LT FW s \$ MISC SUB-CONTRACT MISC SUB-CONTRACT Commercial Grade 1. Dedication NM 25.000 1 LT 25.000 \$ \$ SUBTOTAL CRAFT & SUB-CONTRACTOR 5 758 \$ 720,000 \$ 842,199 \$ 45 880 \$ 1,608,079 1. CONSTRUCTION SUPPORT (8% OF LABOR \$) 1 LT 461 \$ 146.27 \$ \$ 67,430 \$ 67,430 1,675,509 SUBTOTAL 6.219 720.000 \$ 909.629 \$ 45,880 \$ 1.5 * RELATED COSTS * 123.32 120.71 2,466 2,466 WALKDOWN ALLOWANCE Eι 20 \$ \$ \$ \$ WALKDOWN ALLOWANCE 3.621 2 1 LT PF 30 \$ 3.621 5 З. WORK PACKAGE REVIEW 30 \$ 123.32 \$ 3,700 3,700 LT EL \$ WORK PACKAGE REVIEW \$ 3,621 LT PF 30 120.71 \$ 3.621 \$ 4 1 FOOL ROOM ATTENDANTS (~3.5%) \$ \$ \$ 26,884 5 LT ΕL 218 123.32 26,884 6. GENERAL CRAFT OUTAGE DISTRIBS. (10%) \$ \$ 90,963 \$ \$ 90 963 CRAFT IN PROCESSING (20%) 181,926 7 181,926 HUMAN PERFORMANCE & ALARA TRAINING (1/2 day training, or ~ 2%) 8 LT \$ 18,193 \$ 18,193 1 SUBTOTAL 2,006,883 6,547 720,000 \$ 1,241,003 \$ 45,880 \$ \$ PLANT SCOPE MECH MAINTENANCE 1. PL \$ PI SUBTOTAL MECH MAINT. \$ \$ \$ - 5 ELECT MAINTENANCE EL 1. \$ \$ \$ P SUBTOTAL ELECT. MAINT. 15 \$ \$ -8 I&C Dev. Calibration and Maintenance 1. Procedures LΤ PL 2 120.00 1.00 240 \$ 100.00 24,000 24,000 1 \$ \$ SUBTOTAL I&C MAINT. 240 \$ 15 24 000 \$ 5 24,000

Rev		IN		I PO	INT	IMPLE	VENT	ATION	ESTIMA	TE WORK	SHEET					
11-0	EC #: SAMA IP3-019															
PRO JOB EST	JECT (HPET ICLER/CEAk Monitoring Instrumentation LOCATION: Containment & Control Bidgs.	thway Isolation Valves PROJECT CODE: TBD ORIGINATOR:				TAKEOFF: ESTIMATOR: RCMT ORIG DATE: 08-25-2012										
10	T	1	1	T		M	NHOU	RS		MATERIAL \$	MATERIAL	t	LABOR	SUB-	T	
EN 1	DESCRIPTION	QTY	UOM	CFT	NO.	UNIT	FCTR	TOTAL	\$/MH	PER UNIT	DOLLARS		DOLLARS	CONTRAC	T	TOTAL \$
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<u> </u>	SUBTOTAL CRAFT/PLANT	Ļ		ļ	ļ			6,787			\$ 720,000	\$	1,265,003	\$ 45,88	0 \$	2,030,883
	IMPLEMENTATION SUPPORT															
1.	WELDING ENGINEERING	1	LT	NM	1	120.00	1.00	120	\$ 100.00			\$	12,000		\$	12,000
2.	DESIGN ENGINEERING SUPT DURING CONST SYSTEMS ENGINEERING - MECHANICAL			NM NM		120.00	1.00	120	\$ 100.00			\$	12,000		\$	4 000
4	SYSTEMS ENGINEERING - ELECTRICAL	1		NM		40.00	1.00	40	\$ 100.00			s	4,000		s	4,000
5.	SYSTEMS EINGINEERING - INSTR & CONTROL	1	LT	NM	1	60.00	1.00	60	\$ 100.00			\$	6,000		\$	6,000
6.	SYSTEMS ENGINEERING - CIVIL STRUCTURAL	1	LT	NM	1	40.00	1.00	40	\$ 100.00		1	\$	4,000		\$	4,000
1.	TRAINING ORS STAFE	1 12	냁	NM		700,00	1.00	700	\$ 120.00			\$	84,000		5	5 760
9.	QA / QC VERIFICATION	1	LT	NM	1	300.00	1.00	300	\$ 100.00			\$	30,000		ŝ	30,000
10.	CHEMISTRY	1	LT	NM				-				\$	-		\$	-
11.	HP / RP/ ALARA	1	LT	NM	1	200.00	1.00	200	\$ 100.00		1	\$	20,000		\$	20,000
13	IOPS / OPS PROCEDURE SUPPORT AND	1	LI	NIN	1	200.00	1.00	200	\$ 100.00			2	20,000		•	20,000
13.	DEVELOPMENT	1	LT	NM	1	120.00	1.00	120	\$ 120.00			\$	14,400		\$	14,400
14.	TRAVEL & LIVING EXPENSES	1	LT									\$	-		\$	
1.																
1.	Diem)	1	I IT	NM								\$	-		s	-
												ľ				
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3.	FIELD ENGRS/PLAN- SWEC(Incl Per Diem)		LT	NM		320.00	1.00	320	\$ 120.00			\$	38,400		\$	38,400
5	INDE		IT	NM	1	240.00	1.00	240	ຈ 80.00			5	19,200		5	19,200
6.	HP / RP	1	LT	NM				-				\$	-		\$	-
7.	RADWASTE	1	LT	NM				-								
8.				NM				-								
10.	WASTE MANAGEMENT	1	LT	NM				-								
11.	HOUSEKEEPING	1	LT	NM				-								
12.	EQUIPMENT RENTAL CONTRACTOR	1	LT	NM				-								
13.	DECONTAMINATION CONTRACTOR			NM				-								
15.	RBC's	1		NM				-				1				
16.	SECURITY	1	LT	SEC				-			1					
17.	FIREWATCH (Rover)	1		NM				-	. 70.44				0.044		\$	-
19.	LOST TIME (10%)	1	LT	INDVI				655	\$ 186.39			\$	122,085		ŝ	122.085
	SUBTOTAL CRAFT/NON-MANUAL							10,426			\$ 720,000	\$	1,700,659	\$ 45,88	0 \$	2,466,539
	CREWLE BALES TAY & CONDUMADIES (201)															40.000
<u> </u>	SUBTOTAL INSTALLATION COST	<u> </u>	<u> </u>					10 426		1	3 43,200	15	1 700 659	1 \$ 45.88	15	43,200
 		<u> </u>						10,420			1 00,200	1°	1,100,009		<u>~ *</u>	2,000,100
1.	DESIGN ENGINEERING - MECHANICAL	1	LT	NM	1	80.00	1.00	80	\$ 100.00			\$	8,000		\$	8,000
2.	DESIGN ENGINEERING - ELECTRICAL	1		NM	1	100.00	1.00	100	\$ 100.00			5	10,000		\$	10,000
3. 4	DESIGN ENGINEERING - INSTR. & CONTROL DESIGN ENGINEERING - CIVIL/STRUCTURAL		L T	NM NM	1	100.00	1.00	100	\$ 100.00 \$ 100.00			\$	10,000		\$	10,000 8.000
5.	CONTRACT ENGR DESIGN SUPPORT		LT	NM	1	1,700.00	1.00	1,700	\$ 120.00			1	0,000	\$ 204,00	0 \$	204,000
6,	DESIGN EGN. DCP ACCEPTANCE REVIEW	1	LT	NM	1	120.00	1.00	120	\$ 100.00		L	\$	12,000		\$	12,000
<u> </u>	SUBTOTAL DESIGN COST		\vdash					2,180				\$	48,000	\$ 204,00	0 \$	252,000
<u> </u>	SUBTOTAL INSTALLATION & DESIGN COST	<u> </u>	L			*****					\$ 763,200	1s	1 748 659	\$ 249.88	0 \$	2,761,739
 											1	f		2-70,00	-+*	
1.	CONTINGENCY (50%)					-	-				-	_			\$	1,380,870
	ESTIMATE SUBTOTAL							12,606							5	4,142,609



ENTERGY INDIAN POINT NUCLEAR STATION UNIT 3

CONCEPTUAL DESIGN PACKAGE For

SAMA IP3-052

Open City Water Supply Valve for Alternate AFW Pump Suction

Prepared by:	Approved by:
Patra Battacyvol.	SUF
Date: 9-20-2012	Date: 9-60-6076

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SECTION	TITLE
1.0	ISSUE
2.0	BACKGROUND
3.0	EXISTING CONDITIONS
4.0	DESIGN CONSIDERATIONS
5.0	CONFIRMATION OF DESIGN
6.0	RECOMMENDED SOLUTION
Attachment 1	Entergy Impact Screening Summary
Attachment 2	Conceptual Design Sketches
Attachment 3	References

Attachment 4 Cost Estimate

1.0 ISSUE

Severe Accident Mitigation Alternative (SAMA) IP3-052:

Open City Water Supply Valve for Alternate AFW Pump Suction

2.0 BACKGROUND

In accordance with NRC environmental regulations in 10 C.F.R. Part 51, Entergy performed SAMA analyses for both Indian Point Nuclear Generating Units 2 and 3 as part of its license renewal application. Those analyses identified a number of potentially cost-beneficial SAMAs for each unit. In its license renewal application and related correspondence with the NRC Staff, Entergy indicated that it would submit the potentially cost-beneficial SAMAs for further internal engineering project cost-benefit analysis, even though none of the potentially cost-beneficial SAMAs is related to aging management under 10 C.F.R. Part 54. Entergy contracted RCM Technologies to assist it in this effort.

This package provides a conceptual design and implementation cost estimate for SAMA IP3-052 in accordance with Entergy design engineering practices.

For SAMA IP3-052, resolution is required to determine the changes necessary to provide city water as an alternative backup supply to the Auxiliary Feed Water (AFW) Pumps. This is required should any unanticipated blockage occur in the normal supply line connecting the Condensate Storage Tank (CST) outlet to the AFW Pumps.

This package will assess revising as a minimum the applicable Station's operating procedures as the potential solution for the proposed change.

The design considerations that follow will address the adequacy of the proposed resolution and the basis for the recommendation to resolve the identified potential issue.

The recommended solution will include descriptive details of the proposed design change and also supportive sketches as required. These descriptive details and sketches provide the basis for initiating the all inclusive conceptual cost estimate for Engineering Change (EC) development and implementation at the Station.

3.0 EXISTING CONDITIONS

Feedwater Supply

Normally, feedwater is provided to the AFW pumps from the CST supply header via Isolation Valve CT-64 in the CST's outlet piping. This supply header valve is required to be open during the Station's operation. Any failure of this valve to remain open during the Station's operation, or any blockage condition in the supply line from the CST, will require resolution to restore feedwater to the AFW pumps.

Although it is not a desired supply option to be employed, backup water can be made available from the city water header to the AFW pumps. The city water header is connected to each of the three feedwater pumps suction piping by system block valves that can be opened to allow city water flow to its respective pump: It is available to be used in the event a condition arises when the normal condensate source is unavailable.

Control Room

In the Control Room there is an existing common alarm, "AUX B.F.P. LOW FLOW", for monitoring pump flow. There is also existing instrumentation displaying "AUX FWP SUCTION PRESSURE" for each pump.

4.0 DESIGN CONSIDERATIONS

In an emergent situation, connecting the backup city water supply to AFW pump(s) will require the appropriate "valve lineup" from the city water header to the respective pump. Should this action be necessary, an approved procedure must be available to use for this requirement.

5.0 CONFIRMATION OF DESIGN

No physical modification to the Station will be needed for implementing the requirements of this proposed SAMA.

This package will revise, or if necessary provide, the appropriate Station actions and operating procedure(s) required for responding to this condition. The package will identify the applicable valves, procedures, and steps required for re-configuring the valve-lineup. The equivalent requirements necessary for restoration of the system to its normal configuration will also be addressed.

RCM) Technologies The Source of Smart Solutions	ENTERGY Indian Point Nuclear Station Unit 3	Conceptual Design Package SAMA IP3 -052	Rev. 0
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6. **RECOMMENDED SOLUTION**

1. Alarm Response Procedure 3-ARP-006 needs to be revised to provide the solution to the issue discussed here. The revision should indicate the considerations and work steps to be employed when it is indicated that city water may be needed as an alternate water source.

Revise the response to alarm "AUX B.F.P. LOW FLOW" to include provisions necessary to resolve the potential issue discussed in this SAMA. The response, as a minimum, should reflect the usage of this alarm in conjunction with the information available on the "AUX FWP SUCTION PRESSURE" indicators.

- 2. Also, necessary changes should be made to any other Station procedures that require actions when implementing this backup option.
- 3. Provide the required training to support implementation of all revised and any new procedures.

RCM	Technologies	ENTERGY Indian Point Nuclear Station	Conceptual Design Package	Rev. 0
	The Source of Smart Solutions	Unit 3	SAMA IP3 -052	

Entergy Impact Screening Summary



Engineering Change Process

ATTACHMENT 9.3

IMPACT SCREENING SUMMARY

SHEET 1 OF 6

INSTRUCTIONS:

Identify the potentially impacted and the unaffected areas by checking the appropriate <u>Yes</u> or <u>No</u> block on the Impact Screening Criteria.

If a direct determination cannot be made based on the impact screening questions, the detailed questions in Attachment 9.4 may be used to identify potential impacts.

The completion of detailed questions in Attachment 9.4 is recommended but not required.

Contact potentially impacted groups if assistance is required.

SAMA	CONCEPTUAL
Engineering Change No.: <u>IP3-052</u>	Rev. No .: DE SIGN PACKAGE

Prepared by:

Date: ____

DESIGN ENGINEERING DISCIPLINES	Potentia	al Impact
 Civil / Structural Design Engineering Does the proposed activity involve any civil / structural (including seismic) design changes, activities or affect coatings? OR Does the proposed activity involve any piping engineering design changes or activities? 	☐ YES	M NO
 Electrical Design Engineering Does the proposed activity involve any station or switchyard electrical design, large power transformers, or settings changes or activities? (SOER 10-1) 	☐ YES	X NO
Instrumentation and Controls Design Engineering Does the proposed activity involve any I&C design or settings changes or activities?	☐ YES	🔀 NO
 Mechanical Design Engineering Does the proposed activity add/remove/replace insulation, aluminum or other metallic/non-metallic sources of debris in the reactor/containment building or involve any mechanical design changes or activities? 	☐ YES	X NO
 PSA Engineering Does the proposed activity impact or involve changes to plant evaluations or probabilistic safety assessments? Does the proposed activity impact or involve changes to the Emergency Operating Procedures, Abnormal Operating Procedures, or Severe Accident Procedures or does it add, remove or modify SSCs included in a Maintenance Rule function? 	YES	□ NO
 Nuclear Analysis Does the proposed activity impact or involve changes to plant evaluations, Technical Specifications, Technical Requirements Manual, or require a full 50.59 Evaluation? 	☐ YES	🔀 NO
 FERC / NERC Impact Does the proposed activity impact or involve change to FERC / NERC or Regional Entity compliance documents? (ex. MOU, ENN/ENS-PL-158, ENS-DC-199, etc.) 	☐ YES	🕅 NO



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Engineering Change Process

IMPACT SCREENING SUMMARY

ATTACHMENT 9.3 Sheet 2 of 6

DESIGN ENGINEERING PROGRAMS	Potential	Impact
 ASME Section III Specifications Does the proposed activity add, delete, or modify information required by ASME Section III to be contained in a design specification? 	TYES	🕅 NO
 Cable and Raceway Program Does the proposed activity involve any changes to cable trays, raceways or the associated documentation? 	□ YES	¶⊈ NO
 Does the proposed activity involve any changes to electronic databases? 	🗌 YES	🕅 NO
 EQ Program (10CFR50.49, NUREG 0588, Reg Guide 1.89) Does the proposed activity involve any new or existing EQ components? 	☐ YES	1 ⊊1 NO
 Hydrogen Control Program (10 CFR 50.44) (<i>if applicable</i>) Does the proposed activity impact equipment or materials related to hydrogen control? 	🗌 YES	Ø NO
 Human Factors Program Does the proposed activity involve control panel design including layout and labeling, visual displays, operator aids, auditory signals or environment in the control room, cable spreading room, and other control panel locations? 	Tes (⊠ NO
 Margin Management Does the proposed activity impact or involve any change to design, licensing or operations margins? 	TYES	X NO
 Reg. Guide 1.97 / PAM (Post Accident Monitoring) Does the proposed activity involve Reg. Guide 1.97 (Post Accident Monitoring) Indications? 	T YES	X NO

MAINTENANCE	Potentia	l Impact
 Electrical Maintenance Does the proposed activity require an Electrical Maintenance review to identify affected procedures, required actions and required training? 	☐ YES	🕅 NO
 I&C Maintenance Does the proposed activity require an I&C Maintenance review to identify affected procedures, required actions and required training? 	C YES	🕅 NO
 Mechanical Maintenance Does the proposed activity require a Mechanical Maintenance review to identify affected procedures, required actions and required training? 	Tes 🗌	🖾 NO

NUCLEAR ENGINEERING		Potential Impact	
 Nuclear Fuel Design Does the proposed activity impact or involve the design, performance or storage of nuclear fuel? 	T YES	X NO	
 Reactivity Management Program Does the proposed activity impact or involve the reactor system, reactor controls, reactor chemistry, related systems, potential core and spent fuel damage, spent fuel, reactor coolant pressure boundary or reactor system procedures? 	T YES	X NO	



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Engineering Change Process

ATTACHMENT 9.3

SHEET 3 OF 6

IMPACT SCREENING SUMMARY

PROCESS OR PROGRAM IMPACT SCREENING CHECKLIST	Potentia	il impact
Computer Support and Software	☐ YES	M NO
 Does the proposed activity impact or involve changes to plant computer software or firmware or impact Software Quality Assurance (SQA)? 		
Chemistry and Environmental Impact	□ YES	🕅 NO
 Does the proposed activity impact or involve any changes to plant chemistry requirements, operations or procedures, or any changes to the environment? 		
Radiation Protection (RP) Program Impact	□ YES	🕅 NO
 Does the proposed activity impact or involve any changes to the RP program? Does the proposed activity involve the potential to introduce (or reintroduce) any cobalt containing materials (such as Stellite) into the primary system? 		
 Operations Does the proposed activity impact or involve changes to Operations procedures, training or operator actions? 	M YES	
 Planning, Scheduling and Outage (PS&O) Does the proposed activity require a PS&O review to identify required design and installation information? 	☐ YES	🕅 NO
 MP&C (Inventory) Does the proposed activity impact or involve any addition or removal of equipment from the inventory? Does the proposed activity impact or involve any Procurement of Quality or Augmented Quality material from non-qualified suppliers? 	T YES	₿ĝi NO
Procurement Engineering Does the activity impact or involve any procurement activities?	☐ YES	🗹 NO

PROGRAMS AND COMPONENTS		Potential Impact	
 ASME Containment In-service Inspection (IWE / IWL) Program Does the proposed activity impact or involve the containment pressure boundary or associated moisture barriers or a support for the containment pressure boundary? This includes "software only" changes that do not physically change the hardware such as re-rating of pressures or temperatures to include changes to documented information on these items or additional documented information for these items. Does the proposed activity limit access to containment surfaces for inspection? Involve disassembly of a bolted connection which forms a portion of the containment boundary? 	☐ YES	NO NO	
 ASME Appendix J (Primary Containment Leak Rate Testing) Program Does the proposed activity impact or involve any changes to primary containment leak rate testing? 	TYES	X NO	



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Engineering Change Process

IMPACT SCREENING SUMMARY

ATTACHMENT 9.3 SHEET 4 OF 6

PROGRAMS AND COMPONENTS (CONTINUED)		Potential Impact	
 ASME In-service Inspection (ISI) Program Does the proposed activity add, delete, or modify an ASME Section XI pressure boundary item or a support for an ASME Section XI pressure boundary item? This includes "software only" changes that do not physically change the hardware like such as re-rating of pressures or temperatures. (ASME Section XI items include ASME Class 1, 2, 3, or B31.1 treated as ISI Class 2 or 3 (T2 and T3) components, parts, or appurtenances such as pipe or pressure vessel walls, valve bodies and pump casings. 	Tes Yes	NO 🕅	
 ASME Section XI Repair / Replacement Program Does the proposed activity involve any mechanical component within the ASME XI program / boundaries? Does the proposed activity add, delete, or modify an ASME Section XI pressure boundary item or a support for an ASME Section XI pressure boundary item? (ASME Section XI items include ASME Class 1, 2, 3, MC, and CC, as well as B31.1 treated as ISI Class 2 or 3 (T2 and T3) components, parts, or appurtenances such as pipe or pressure vessel walls, valve bodies and pump casings). 	☐ YES	X NO	
 ASME In-service Testing Program Does the proposed activity impact or involve any item (safety related or non safety related) that may affect the performance or testing of a safety related pump or valve? Does the proposed activity impact the function or functional classification of any pump or valve as stated in the IST program documents? 	☐ YES	X NO	
 Air Operated Valve (AOV) Program Does the proposed activity impact or involve the design, operation or testing of AOVs? 	☐ YES	M NO	
 Buried Piping and Tanks (BP&T) Program Does the proposed activity impact or involve any changes to piping, coatings, or cathodic protection of Buried Piping & Components? 	Tes 🗌	🕅 NO	
 Boric Acid Corrosion (BAC) Program Does the proposed activity impact or involve any increase in the likelihood of boric acid formation or corrosion? 	☐ YES	🖾 NO	
 Check Valve Program Does the proposed activity impact or involve the design, operation or testing of check valves? 	☐ YES	🖾 NO	
 Control Room Habitability Program Does the proposed activity impact or involve changes that affect the temperature or radiological environmental conditions in the Main Control Room? 	TYES	⊠ NO	
Electrical Circuit Breaker, Relay and Electrical Equipment Testing Does the proposed activity impact or involve changes to the functional testing of circuit breaker, relay or electrical equipment?	C YES	M NO	



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Engineering Change Process

IMPACT SCREENING SUMMARY

ATTACHMENT 9.3

SHEET 5 OF 6

PROGRAMS AND COMPONENTS (CONTINUED)		Potential Impact	
 Flow Accelerated Corrosion (FAC) Program Does the proposed activity involve any changes (e.g.: configuration, velocity, flow rate, pressure, temperature, material, weld location, etc.) to piping systems included in the FAC Program.? 	☐ YES	⊠ NO	
 Heat Exchanger Program Does the proposed activity impact or involve the design, operation or testing of a component in the heat exchanger program? 	T YES	X NO	
 Predictive Maintenance Program Does the proposed activity impact or involve any aspect of the storage, use and testing of lubricants? Does the proposed activity involve thermography? Does the proposed activity involve vibration monitoring? 	☐ YES	NO NO	
 Microbiological Induced Corrosion (MIC) Program Impact Does the proposed activity involve piping containing untreated or stagnant water or open to the atmosphere? 	TYES	NO 🗹	
 Motor Operated Valve (MOV) Program Does the proposed activity impact or involve the design, operation or testing of MOVs? 	☐ YES	NO 🔀	
Plant Thermal Performance Program Does the proposed activity impact or involve plant thermal performance?	☐ YES	K NO	
 Preventive Maintenance Program Does the proposed activity impact or involve periodic testing or performance of SSCs? or Does the proposed activity add, modify or delete any Environmental Qualification (EQ) maintenance requirement or replacement frequency to ensure the component(s) maintains its qualification status? 	☐ YES	K NO	
 PT Curves Does the proposed activity add, delete, or modify the basis (as contained in each sites reactor vessel surveillance material testing program) for the Pressure / Temperature Limit Curves (fluence, pressure, temperature, reactor materials)? 	☐ YES	🔀 NO	
 Relief Valve Program Does the proposed activity impact or involve the design, operation and testing of relief valves, safety valves, vacuum breaker valves or rupture disc? 	TYES	K NO	
 Poes the proposed activity impact or involve any change to the reactor internals? This includes "software only" changes that do not physically change the hardware such as re-rating of pressures or temperatures. Does the proposed activity impact or involve or related documentation to include neutron fluence or neutron fluence calculations? Does the proposed activity impact or involve or changes to core flow characteristics or core flow characteristics? 	☐ YES	K NO	



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Engineering Change Process

IMPACT SCREENING SUMMARY

ATTACHMENT 9.3

SHEET 6 OF 6

True of

PROGRAMS AND COMPONENTS (CONTINUED)		Potential Impact	
 Welding Program Does the proposed activity impact or involve a special process, such as welding, brazing or soldering? 	TYES	NO 🕅	
 Does the proposed impact or activity involve personnel or industrial safety? 	C YES	🕅 NO	
 System Engineering Does the proposed activity impact or involve any changes to system configuration, function or performance, etc., for Maintenance Rule or other system? Does the proposed activity impact or involve any changes to system procedures, maintenance or operation, etc.? 	TYES	NO 🕅	
 Training Program Does the proposed activity involve existing training requirements or create the need for new training? 	📕 YES		
 Simulator Impact Does the proposed activity impact or involve changes to the Simulator? 	☐ YES	X NO	
 Fire Protection Program Does the proposed activity result in a change to the Fire Protection Program (including 10CFR50 Appendix R) where the impact is more than negligible? 	☐ YES	🕱 NO	

Detailed Impact Screening (Attachment 9.4) Attached?	C YES	⊠ NO
Detailed Impact Screening (Attachment 9.4) Attached?	C YES	🕅 NO

Conceptual Design Sketches

1. Figure 1: AFW Pump Suction Flow Arrangement (simplified for clarity)





BOILER FEED PUMP SUCTION

References

- 1. ENTERGY Nuclear Management Manual, Engineering Change Process, Rev 11
- Association for the Advancement of Cost Engineering (AACE), Cost Estimate Classification System - As Applied In Engineering, Procurement, and Construction for the Process Industries
 - TCM Framework: 7.3 Cost Estimating and Budgeting
 - Figure 4 Estimate Checklist & Maturity Matrix
- 3. FLOW DIAGRAM 9321-F-20183..... Condensate & Boiler Feed Pump Suction
- 4. Alarm Response Procedure 3-ARP-006.....Panel SCF Condensate and Feedwater
- 5. Drawing. 9321-F-33613.....Front View of Control Board Section B, Panel SCF

RCM) Technologies The Source of Smart Solutions	ENTERGY Indian Point Nuclear Station Unit 3	Conceptual Design Package SAMA IP3 -052	Rev. 0
--	---	---	--------

Cost Estimate

	ENTERGY NUCLEAR NUR IMEAST								
	Indian Po	oint Nuclear Power Stat	ion						
* ESTIMATE LEVEL *		EC #: SAM	A IP3-052						
Conceptual	PROJECT TITLE: IP3 AFW Pump Bac	kup Water Supply	CAPITAL 08M	ESTIMATOR: RCMT					
Preliminary	JOB LOCATION: IP3 AFW Pump Buil	ding	PROJECT CODE: TBI	D					
Definitive	OUTAGE INON-OUTAGE	ORIGINATOR:		ORIG. DATE: 06-22-2012					
	ESTIMATE TOTAL \$ 138,378		REVISION	11-0					
Summary of Change: In accordance with NRC environmental regulations in 10 C.F.R. Part 51, Entergy performed SAMA analyses for both Indian Point Nuclear Generating Units 2 and 3 as part of its license renewal application. Those analyses identified a number of potentially cost-beneficial SAMAs for each unit. In its license renewal application and related correspondence with the NRC Staff, Entergy indicated that it would submit the potentially cost-beneficial SAMAs for each unit. In its license renewal application and related correspondence with the NRC Staff, Entergy indicated that it would submit the potentially cost-beneficial SAMAs for further internal engineering project cost-benefit analysis, even though none of the potentially cost-beneficial SAMAs is related to aging management under 10 C.F.R. Part 54. Entergy contracted RCM Technologies to assist it in this effort. This package provides a conceptual design and implementation cost estimate for SAMA IP3-052 in accordance with Entergy design engineering practices. For SAMA IP3-052, resolution is required to determine the changes necessary to provide city water as an alternative backup supply to the Auxilliary Feedwater (AFW) pumps. This package provides for the costs for development of new procedures and/or revision of existing procedures and the cost of training Station Operating Personnel for the use of these procedures.									
Prepared by:	B. Haaroe.	Approved b	y: V E						
Date:	9-20-2012	Date:	9-20-2017						

Γ		ENTERGY NUCLEAR NORTHEAST
		Indian Point Nuclear Power Station
* EST	IMATE LEVEL *	FC #: SAMA IP3-052
17	Conceptual	PROJECT TITLE: IP3 AFW Pump Backup Water Supply ESTIMATOR: RCMT
	Preliminary	JOB LOCATION: IP3 AFW Pump Building PROJECT CODE: TBD
	Definitive	ORIGINATOR: ORIG. DATE: 06-22-2012
Item		Description
1	This estimate assur	nes that this work will be completed during 2014
2	This estimate assur	hes that all work will be performed by IP in-house personnel
2.	The estimates assu	mes training for 12 people
<u> </u>	This estimate does	not include funding for unreviewed safety questions or NRC submittals, but if required the additional cost will be added
	This estimate is has	sed on the project's current level of scope definition and is classified class 4 as defined the dubbonal cost wind added.
5.	Estimate Classificat	tion System (see Attachment 3, Reference 2).
6.	Labor dollars in this for anticipated billin	estimate are projected 2014 costs based on current 2012 craft billing rates at Indian Point. The projected costs provide g rate increases of 3% per year.
	This estimate allows	s for and includes a contingency factor related to the complexity and location of the work required. The factor is cumulative
7.	and progresses as	follows:
	A. Outside fer	Ice boundary - 20%
	B. Inside tenc	e boundary - 30%
	C. Implement	ation complexity - 40%
	D. Inside Con	tainment - 50%
	·	
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	80000100000000000000000000000000000000	

Rev.

Page 3 of 4

INDIAN POINT IMPLEMENTATION ESTIMATE WORK SHEET 7/5/2012 2:55 PM EC #: SAMA IP3-052 CAPITAL 208M TAKEOFF:

11-0 PROJECT TITLE: IP3 AFW Pump Backup Water Supply

PRO	JECT TITLE: IP3 AFW Pump Backup Water Supply									✓ 08M		TAKEOFF:	DONT		
EST.	DE LOCATION: IP3 APV PUINE BUILDING ST. STATUS: OUTAGE IN NON-OUTAGE							ORIGINATOR:				ORIG. DATE: 06-22-2012			
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	* ESTIMATE LEVEL *									ESTIMATES		96	0011405		
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Rev. 11-0	Page 4 of 4 IN	DIA	N POI	NT I	WPLE	MENT	ATIO SAMA	N EST IP3-052		WORK ŞJ	1552 Istima	te AF\	N Pp Bac	7/5/2012 2:55 F kup Sply (06-22-12).:	'M ds	
PRO JOB EST.	ECT TITLÉ: IP3 AFW Pump Backup Water Supply LOCATION: IP3 AFW Pump Building STATUS: OUTAGE IN NON-OUTAGE							CAPIT/ PROJE ORIGIN	L CT CODE: ATOR:	TBD		TAP EST OR	(EOFF: TIMATOF IG, DATE	RCMT		
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11.	HP/RP/ALARA		LT	NM				-				\$	-		\$	-
12.	CHEMISTRY OPS (DEVELOP/REVISE PROCEDURE(S))	1		NM NM	1	320.00	1.00	320	\$120.00			\$ \$	- 38,400		\$	38,400
14.	TRAVEL & LIVING EXPENSES		LT									\$	-		\$	-
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3.	OSG FIELD ENGRS/PLAN- SWEC(Incl Per Diem)		LT	NM				-				\$	-		\$	-
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16.			LT	SEC				-								
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	SUBTOTAL INSTALLATION COST							536			\$ -	\$	64,320	\$-	\$	64,320
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2.	DESIGN ENGINEERING - ELECTRICAL	1	LT	NM				-				\$	-		\$	-
3. 4.	DESIGN ENGINEERING - INSTR. & CONTROL DESIGN ENGINEERING - CIVIL/STRUCTURAL	1	LT	NM NM				-	:			\$ \$	-		\$ \$	-
5. 6	TESTING (Instrument Calibration and testing)	1	LT	NM				-				\$	-	s -	\$	-
7.	CONTRACT ENGR - TRAINING SUPPORT	1	LT	NM	1	80,00	1.00	80	\$120.00			\$	9,600	\$ -	\$	9,600
	SUBTOTAL DESIGN COST							80				\$	9,600	\$ -	\$	9,600
	SUBTOTAL INSTALLATION & DESIGN COST	[616			[\$	73,920	\$ -	\$	73,920
1,	CONTINGENCY (20%)														\$	14,784
	ESTIMATE SUBTOTAL							616							\$	88,704

	ENTERGY	Conceptual Design	
KCM J lechnologies	Indian Point Nuclear Station	Package	
The Source of Smart Solutions	Unit 3	SAMA IP3 -053	Rev. 0

ENTERGY INDIAN POINT NUCLEAR STATION UNIT 3

CONCEPTUAL DESIGN PACKAGE

For

SAMA IP3-053

Install a Hydrogen Excess-Flow Supply Valve to Reduce Station Explosion Risk

Prepared by:	Approved by:
Voto Dettaceros.	Sulles
Date: 9-20-2012	Date: 9-2-0-2016

TABLE OF CONTENTS

SECTION	TITLE
1.0	ISSUE
2.0	BACKGROUND
3.0	EXISTING CONDITIONS
4.0	DESIGN CONSIDERATIONS
5.0	CONFIRMATION OF DESIGN
6.0	RECOMMENDED SOLUTION
7.0	PRELIMINARY MATERIAL LIST
Attachment 1	Entergy Impact Screening Summary
Attachment 2	Conceptual Design Sketches
Attachment 3	References
Attachment 4	Cost Estimate

1.0 **ISSUE**

Severe Accident Mitigation Alternative (SAMA) IP3-053:

Install a Hydrogen Excess-Flow Supply Valve to Reduce Station Explosion Risk

2.0 BACKGROUND

In accordance with NRC environmental regulations in 10 C.F.R. Part 51, Entergy performed SAMA analyses for both Indian Point Nuclear Generating Units 2 and 3 as part of its license renewal application. Those analyses identified a number of potentially cost-beneficial SAMAs for each unit. In its license renewal application and related correspondence with the NRC Staff, Entergy indicated that it would submit the potentially cost-beneficial SAMAs for further internal engineering project cost-benefit analysis, even though none of the potentially cost-beneficial SAMAs is related to aging management under 10 C.F.R. Part 54. Entergy contracted RCM Technologies to assist it in this effort.

This package provides a conceptual design and implementation cost estimate for SAMA IP3-053 in accordance with Entergy design engineering practices.

For SAMA IP3-053, resolution is required to shut down hydrogen supply to piping that is leaking.

This package provides for a conceptual design to install a non-electric excess flow valve in the Station's hydrogen supply system.

The design considerations that follow will address the adequacy of the proposed resolution and the basis for the recommendation to resolve the identified potential issue.

The recommended solution will include descriptive details of the proposed design change and also conceptual design sketches as required. These descriptive details, sketches, and the preliminary material list provide the basis for initiating the all-inclusive conceptual cost estimate for engineering change (EC) development and implementation at the Station.

3.0 **EXISTING CONDITIONS**

There are two hydrogen supply piping sources to the Unit 3 Station. A 1-1/2" pipe supplies the Turbine Building and a 1" pipe supplies the Primary Auxiliary Building (PAB).



Once supply valves are opened, any undetected and unconfined piping damage in the hydrogen supply system will result in leaks. In the absence of a hydrogen leak detection system, leaks in the Station's hydrogen supply piping may occur undetected before the unanticipated hydrogen discharge is determined. Any release and accumulation of hydrogen in confined areas creates the possibility of ignition and explosion. For maximum effectiveness, leak detection and resolution is needed immediately at the hydrogen sources supplying the piping systems.

4.0 **DESIGN CONSIDERATIONS**

The two hydrogen supply sources to the Unit 3 Station require a means to detect and prevent hydrogen piping from continuing to leak and accumulate. Installation of a device in the supply piping that will detect this situation and stop the leakage is proposed.

5.0 CONFIRMATION OF DESIGN

MALEMA FLOW SENSORS manufactures a hydrogen rated Safety Excess Flow Valve (flow valve) that is installed in a piping system to monitor flow rate. At a preset flow rate the valve will measure flow in the piping and detect for an unprescribed change of flow. Any pressure differential resulting from a change of flow offsets the spring-loading of the valve's piston and shuts the valve closed. It can be installed so that set-point can be reset by manual intervention only. Once the reason for the occurrence has been determined and addressed, the valve can be manually reset

RECOMMENDED SOLUTION 6.

- Install a 1-1/2" M-XF Series Safety Excess Flow Valve manufactured by 1. MALEMA FLOW SENSORS in the 1-1/2" pipe that supplies the Turbine Building. Specify the valve to be provided with the Reset built-in. This will eliminate installation of additional piping and hardware that would be needed for the reset feature to be added (see Attachment 3, Reference 3). The built-in reset will ensure that reset can only be done manually at the flow valve's location.
- 2. Install a 1" M-XF Series Safety Excess Flow Valve manufactured by MALEMA FLOW SENSORS in the 1" pipe that supplies the PAB. Specify the valve to be provided with the Reset built-in. This will eliminate installation of additional piping and hardware that would be needed for the reset feature to be added (see Attachment 3, Reference 3). The built-in reset will ensure that reset can only be done manually at the flow valve's location.

- 3. Provide flow valve calibration and set-point procedure requirements.
- 4. Provide OPS training and procedures required for this addition to the hydrogen supply system.

7.0 PRELIMINARY MATERIAL LIST

Item Description	<u>Quantity</u>
 MALEMA M-XF Series Excess Flow Valve with built-in Reset 1-1/2" – 300# Flanged, S.S., or equal 	t, 1
2. Slip-on Flange, R.F., 1-1/2" – 300#, C.S.	2
3. Flange Insulation Kit, R.F., 1-1/2" – 300#	2
 MALEMA M-XF Series Excess Flow Valve with built-in Reset 1" – 300#, Socket Weld, S.S., or equal 	i, 1

RCM	Technologies	ENTERGY	Conceptual Design	
	The Source of Smart Solutions	Unit 3	SAMA IP3 -053	Rev. 0

Entergy Impact Screening Summary



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Engineering Change Process

ATTACHMENT 9.3

IMPACT SCREENING SUMMARY

SHEET 1 OF 6

INSTRUCTIONS:

Identify the potentially impacted and the unaffected areas by checking the appropriate <u>Yes</u> or <u>No</u> block on the Impact Screening Criteria.

If a direct determination cannot be made based on the impact screening questions, the detailed questions in Attachment 9.4 may be used to identify potential impacts.

The completion of detailed questions in Attachment 9.4 is recommended but not required.

Contact potentially impacted groups if assistance is required.

		(S AM	A	
Engineering	Change	No.:	[P3	-0:	53

-	CONCEPTUAL			
Rev. No.:	DESI	GN	PACKA	GE

Prepared by:

Date:

DESIGN ENGINEERING DISCIPLINES		Potential Impact	
 Civil / Structural Design Engineering Does the proposed activity involve any civil / structural (including seismic) design changes, activities or affect coatings? OR Does the proposed activity involve any piping engineering design changes or activities? 	YES	□ NO	
 Electrical Design Engineering Does the proposed activity involve any station or switchyard electrical design, large power transformers, or settings changes or activities? (SOER 10-1) 	☐ YES	⊠NO	
 Instrumentation and Controls Design Engineering Does the proposed activity involve any I&C design or settings changes or activities? 	☐ YES	🕅 NO	
 Mechanical Design Engineering Does the proposed activity add/remove/replace insulation, aluminum or other metallic/non-metallic sources of debris in the reactor/containment building or involve any mechanical design changes or activities? 	YES 🎬	□ NO	
 PSA Engineering Does the proposed activity impact or involve changes to plant evaluations or probabilistic safety assessments? Does the proposed activity impact or involve changes to the Emergency Operating Procedures, Abnormal Operating Procedures, or Severe Accident Procedures or does it add, remove or modify SSCs included in a Maintenance Rule function? 	MYES	D NO	
 Nuclear Analysis Does the proposed activity impact or involve changes to plant evaluations, Technical Specifications, Technical Requirements Manual, or require a full 50.59 Evaluation? 	Tes 🗌	MO 🕅	
 FERC / NERC Impact Does the proposed activity impact or involve change to FERC / NERC or Regional Entity compliance documents? (ex. MOU, ENN/ENS-PL-158, ENS-DC-199, etc.) 	☐ YES	X NO	


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Engineering Change Process

IMPACT SCREENING SUMMARY

ATTACHMENT 9.3

Sheet 2 of 6

DESIGN ENGINEERING PROGRAMS	Potentia	Impact
 ASME Section III Specifications Does the proposed activity add, delete, or modify information required by ASME Section III to be contained in a design specification? 	□ YES	M NO
 Cable and Raceway Program Does the proposed activity involve any changes to cable trays, raceways or the associated documentation? 	☐ YES	X NO
 Electronic Databases (EDB) Does the proposed activity involve any changes to electronic databases? 	□ YES	🕅 NO
 EQ Program (10CFR50.49, NUREG 0588, Reg Guide 1.89) Does the proposed activity involve any new or existing EQ components? 	T YES	🕅 NO
 Hydrogen Control Program (10 CFR 50.44) (<i>if applicable</i>) Does the proposed activity impact equipment or materials related to hydrogen control? 	YES	
 Human Factors Program Does the proposed activity involve control panel design including layout and labeling, visual displays, operator aids, auditory signals or environment in the control room, cable spreading room, and other control panel locations? 	☐ YES	🕅 NO
 Margin Management Does the proposed activity impact or involve any change to design, licensing or operations margins? 	□ YES	🕅 NO
Reg. Guide 1.97 / PAM (Post Accident Monitoring) • Does the proposed activity involve Reg. Guide 1.97 (Post Accident Monitoring) Indications?	☐ YES	X NO

MAINTENANCE Potential Impact X NO **Electrical Maintenance** ☐ YES Does the proposed activity require an Electrical Maintenance review to identify affected 6 procedures, required actions and required training? X NO **I&C Maintenance** ☐ YES Does the proposed activity require an I&C Maintenance review to identify affected . procedures, required actions and required training? 🗌 NO **Mechanical Maintenance** YES Does the proposed activity require a Mechanical Maintenance review to identify affected ۲ procedures, required actions and required training?

NUCLEAR ENGINEERING	Potentia	al Impact
 Nuclear Fuel Design Does the proposed activity impact or involve the design, performance or storage of nuclear fuel? 	☐ YES	X NO
 Reactivity Management Program Does the proposed activity impact or involve the reactor system, reactor controls, reactor chemistry, related systems, potential core and spent fuel damage, spent fuel, reactor coolant pressure boundary or reactor system procedures? 		X NO



REV. 11

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Engineering Change Process

IMPACT SCREENING SUMMARY

ATTACHMENT 9.3

SHEET 3 OF 6

PROCESS OR PROGRAM IMPACT SCREENING CHECKLIST	Potentia	al Impact
Computer Support and Software	🗌 YES	🕅 NO
 Does the proposed activity impact or involve changes to plant computer software or firmware or impact Software Quality Assurance (SQA)? 		
Chemistry and Environmental Impact	□ YES	🕅 NO
 Does the proposed activity impact or involve any changes to plant chemistry requirements, operations or procedures, or any changes to the environment? 		
Radiation Protection (RP) Program Impact	🗌 YES	X NO
 Does the proposed activity impact or involve any changes to the RP program? Does the proposed activity involve the potential to introduce (or reintroduce) any cobalt containing materials (such as Stellite) into the primary system? 		
Operations Does the proposed activity impact or involve changes to Operations procedures, training or operator actions?		
Planning, Scheduling and Outage (PS&O) Does the proposed activity require a PS&O review to identify required design and installation information?	YES	□ NO
 MP&C (Inventory) Does the proposed activity impact or involve any addition or removal of equipment from the inventory? Does the proposed activity impact or involve any Procurement of Quality or Augmented Quality material from non-qualified suppliers? 	☐ YES	X NO
Procurement Engineering Does the activity impact or involve any procurement activities?	YES	

PROGRAMS AND COMPONENTS		al Impact
 ASME Containment In-service Inspection (IWE / IWL) Program Does the proposed activity impact or involve the containment pressure boundary or associated moisture barriers or a support for the containment pressure boundary? This includes "software only" changes that do not physically change the hardware such as re-rating of pressures or temperatures to include changes to documented information on these items or additional documented information for these items. Does the proposed activity limit access to containment surfaces for inspection? Involve disassembly of a bolted connection which forms a portion of the containment boundary? 		X NO
 ASME Appendix J (Primary Containment Leak Rate Testing) Program Does the proposed activity impact or involve any changes to primary containment leak rate testing? 	☐ YES	🕅 NO



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Engineering Change Process

IMPACT SCREENING SUMMARY

ATTACHMENT 9.3 SHEET 4 OF 6

PROGRAMS AND COMPONENTS (CONTINUED)	Potentia	al Impact
 ASME In-service Inspection (ISI) Program Does the proposed activity add, delete, or modify an ASME Section XI pressure boundary item or a support for an ASME Section XI pressure boundary item? This includes "software only" changes that do not physically change the hardware like such as re-rating of pressures or temperatures. (ASME Section XI items include ASME Class 1, 2, 3, or B31.1 treated as ISI Class 2 or 3 (T2 and T3) components, parts, or appurtenances such as pipe or pressure vessel walls, valve bodies and pump casings. 	☐ YES	MO 🕅
 ASME Section XI Repair / Replacement Program Does the proposed activity involve any mechanical component within the ASME XI program / boundaries? Does the proposed activity add, delete, or modify an ASME Section XI pressure boundary item or a support for an ASME Section XI pressure boundary item? (ASME Section XI items include ASME Class 1, 2, 3, MC, and CC, as well as B31.1 treated as ISI Class 2 or 3 (T2 and T3) components, parts, or appurtenances such as pipe or pressure vessel walls, valve bodies and pump casings). 	☐ YES	XI NO
 ASME In-service Testing Program Does the proposed activity impact or involve any item (safety related or non safety related) that may affect the performance or testing of a safety related pump or valve? Does the proposed activity impact the function or functional classification of any pump or valve as stated in the IST program documents? 	TYES	X NO
 Air Operated Valve (AOV) Program Does the proposed activity impact or involve the design, operation or testing of AOVs? 	TYES	MO 🕅
 Buried Piping and Tanks (BP&T) Program Does the proposed activity impact or involve any changes to piping, coatings, or cathodic protection of Buried Piping & Components? 	🗌 YES	XI NO
 Boric Acid Corrosion (BAC) Program Does the proposed activity impact or involve any increase in the likelihood of boric acid formation or corrosion? 	TES YES	🕅 NO
 Check Valve Program Does the proposed activity impact or involve the design, operation or testing of check valves? 	☐ YES	MO 🕅
 Control Room Habitability Program Does the proposed activity impact or involve changes that affect the temperature or radiological environmental conditions in the Main Control Room? 	☐ YES	NO 🕅
 Electrical Circuit Breaker, Relay and Electrical Equipment Testing Does the proposed activity impact or involve changes to the functional testing of circuit breaker, relay or electrical equipment? 	☐ YES	🕅 NO



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Engineering Change Process

IMPACT SCREENING SUMMARY

ATTACHMENT 9.3

SHEET 5 OF 6

PROGRAMS AND COMPONENTS (CONTINUED)	Potentia	al Impact
 Flow Accelerated Corrosion (FAC) Program Does the proposed activity involve any changes (e.g.: configuration, velocity, flow rate, pressure, temperature, material, weld location, etc.) to piping systems included in the FAC Program.? 	☐ YES	🕅 ио
 Heat Exchanger Program Does the proposed activity impact or involve the design, operation or testing of a component in the heat exchanger program? 	☐ YES	🕅 NO
 Predictive Maintenance Program Does the proposed activity impact or involve any aspect of the storage, use and testing of lubricants? Does the proposed activity involve thermography? Does the proposed activity involve vibration monitoring? 	☐ YES	X NO
 Microbiological Induced Corrosion (MIC) Program Impact Does the proposed activity involve piping containing untreated or stagnant water or open to the atmosphere? 	U YES	X NO
 Motor Operated Valve (MOV) Program Does the proposed activity impact or involve the design, operation or testing of MOVs? 	□ YES	
Plant Thermal Performance Program Does the proposed activity impact or involve plant thermal performance?		🕅 NO
 Preventive Maintenance Program Does the proposed activity impact or involve periodic testing or performance of SSCs? or Does the proposed activity add, modify or delete any Environmental Qualification (EQ) maintenance requirement or replacement frequency to ensure the component(s) maintains its gualification status? 	☐ YES	X NO
 PT Curves Does the proposed activity add, delete, or modify the basis (as contained in each sites reactor vessel surveillance material testing program) for the Pressure / Temperature Limit Curves (fluence, pressure, temperature, reactor materials)? 	☐ YES	X NO
 Relief Valve Program Does the proposed activity impact or involve the design, operation and testing of relief valves, safety valves, vacuum breaker valves or rupture disc? 	YES	
 RPV Internals Program Does the proposed activity impact or involve any change to the reactor internals? This includes "software only" changes that do not physically change the hardware such as re-rating of pressures or temperatures. Does the proposed activity impact or involve or related documentation to include neutron fluence or neutron fluence calculations? Does the proposed activity impact or involve or changes to core flow characteristics or core flow characteristics? 	☐ YES	X NO



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Engineering Change Process

IMPACT SCREENING SUMMARY

ATTACHMENT 9.3

SHEET 6 OF 6

PROGRAMS AND COMPONENTS (CONTINUED)	Potentia	al Impact
 Welding Program Does the proposed activity impact or involve a special process, such as welding, brazing or soldering? 	YES	□ NO
 Safety Program Does the proposed impact or activity involve personnel or industrial safety? 	YES	
 System Engineering Does the proposed activity impact or involve any changes to system configuration, function or performance, etc., for Maintenance Rule or other system? Does the proposed activity impact or involve any changes to system procedures, maintenance or operation, etc.? 	YES	□ NO
 Training Program Does the proposed activity involve existing training requirements or create the need for new training? 	YES	
 Simulator Impact Does the proposed activity impact or involve changes to the Simulator? 	□ YES	🕅 NO
 Fire Protection Program Does the proposed activity result in a change to the Fire Protection Program (including 10CFR50 Appendix R) where the impact is more than negligible? 	☐ YES	X NO

Detailed Impact Screening (Attachment 9.4) Attached?	□ YES	🕅 NO
	1	i ,

Attachment 2

Conceptual Design Sketches

- 1. Figure 1: PAB Hydrogen Supply - Flow Diagram
- Figure 2: PAB Hydrogen Supply Shed Location 2.
- 3. Figure 3: PAB Hydrogen Supply - Shed Excess Flow Valve Location
- 4. Figure 4: Turbine Building Hydrogen Supply – Flow Diagram
- Figure 5: Turbine Building Hydrogen Supply Crib Location 5.
- Figure 6: Turbine Building Hydrogen Supply Crib Excess Flow Valve Location 6.





Dastr 1.	ENTERGY	Conceptual Design	
KLM Technologies	Indian Point Nuclear Station	Package	
The Source of Smart Solutions	Unit 3	SAMA IP3 -053	Rev. 0





FIGURE 3 PAB HYDROGEN SUPPLY SHED





RCM) Technologies	ENTERGY Indian Point Nuclear Station Unit 3	Conceptual Design Package SAMA IP3 -053	Rev. 0
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INSTALL NEW HYDROGEN SUPPLY EXCESS FLOW VALVE

FIGURE 6 TURBINE BUILDING HYDROGEN SUPPLY CRIB

Attachment 3

References

- 1. ENTERGY Nuclear Management Manual, Engineering Change Process, Rev 11
- Association for the Advancement of Cost Engineering (AACE), Cost Estimate Classification System - As Applied In Engineering, Procurement, and Construction for the Process Industries
 - TCM Framework: 7.3 Cost Estimating and Budgeting
 - Figure 4 Estimate Checklist & Maturity Matrix
- Resolution of Generic Safety Issues: Issue 106: Piping and the Use of Highly Combustible Gases in Vital Areas (NRC NUREG-0933 with Supplements 1-33) (attached here)
- 4. MALEMA FLOW SENSORS Model M-XF Series Safety Excess Flow Valves (attached here)
- 5. MALEMA Excess Flow Valve with built-in Reset (attached here)

Resolution of Generic Safety Issues: Issue 106: Piping and the Use of Highly Combustible Gases in Vital Areas (Rev. 2) (NUREG-0933, Main Report with Supplements 1–33)

DESCRIPTION

Historical Background

Combustible gases such as H₂, propane, and acetylene are used during normal operations of nuclear power plants in limited quantities and for relatively short periods of time. H₂, the most prevalent of these gases in nuclear plants, is used as a coolant for electric generators in both BWRs and PWRs, for the control of reactor water chemistry and waste gas disposal in PWRs, and in the volume control tank (VCT) which is usually located in the auxiliary building of PWRs. It is stored as high pressure gas in vessels and is supplied to the various systems in the auxiliary building through standard piping, usually 3/4-inch in diameter. As a result, H₂ piping is field-run and its location is plant-specific.

The concern in this issue is that leaks or breaks in the H₂ piping and supply system could result in the accumulation of a combustible or explosive mixture of air and H₂ within the auxiliary building. Inasmuch as the auxiliary building is a safety-related structure which houses most of the components of the safety-related systems of a plant, the accumulation of combustible or explosive mixtures of gas represents a threat to plant safety by virtue of the potential disablement of safety-related equipment, in the event that the combustible gases are inadvertently ignited. H₂ detectors can signal the presence and accumulation of gas, but these are not qualified as safety-grade equipment and do not have an emergency power source. Thus, they are not regarded as sufficient protection against the development of H₂ leakage and subsequent uncontrolled combustion or explosion. This issue primarily affected operating reactors licensed prior to the issuance of SRP¹¹ Section 9.5-1, "Fire Protection," which addresses the safe use of combustible gases on site.

This issue was identified in NUREG-0705⁴⁴ and is related to Issue 136, "Storage and Use of Large Quantities of Cryogenic Combustibles on Site." Whereas Issue 106 addressed the normal process system use of relatively small amounts of combustible gases on site, Issue 136 addressed the considerably greater hazards of much greater amounts of combustible materials introduced by new needs at sites, i.e., solid waste processing and BWR H₂ water chemistry control and the unique hazards associated with the transport and storage of large quantities of combustibles on site in a cryogenic liquid state.

Safety Significance

The auxiliary building is a safety-related structure housing safety-related system components. Inasmuch as the most frequently used combustible gas (H_2) is piped into this building for use in the VCT, there is the potential for leakage and the inadvertent ignition of the gas. The ensuing combustion or explosion can cause damage or failure of safety-related equipment, thereby contributing to a possibly significant increase in the core-melt probability of the plant.

Possible Solution

In the event of a piping system break or large leak, large releases of combustible gas and the accumulation of combustible or explosive mixtures in air can be prevented by the installation of excess-flow check valves located close to the source of the combustible gas. SRP¹¹ Section 9.5-1 recommends the use of excess-flow check valves. Other measures are needed to reduce the frequency of, or cause of, combustible gas accumulation accidents from such events as valve malfunctions or leaks, connection or fitting leaks, operations errors, material failures, etc. Plants licensed in accordance with the guidelines of SRP¹¹ Section 9.5-1 were assumed to be not affected by this issue; however, the backfitting of excess-flow check valves at all plants not licensed in accordance with SRP¹¹ 9.5-1 plants was assumed.

Excess-flow check valves were an effective "fix" for piping system breaks, but other fixes, such as installation or upgrading of H_2 detection systems, design changes, procedural changes, etc., will be required for other types of accidental releases. The risk and cost analyses performed for the installation of excess-flow check valves as a fix were extrapolated to develop a proper perspective.

PRIORITY DETERMINATION

Assumptions

It was assumed that, of all the combustible gases routinely used in a nuclear power plant, the most significant safety concern was associated with the use of H₂. Unlike most other gases used in small quantities at nuclear power plants, H₂ is used almost continuously while most other gases are used intermittently and, most likely, in the presence of trained personnel such as during welding operations. H₂ leaks could continue unnoticed as a result of leaks or pipe breaks that go undetected for a sufficient time to accumulate a combustible mixture. It was assumed that H₂ detectors were either not provided (as was the case in an event at Vogtle)¹⁰³¹ or were inoperative. In addition, it was assumed that operating plants licensed prior to the issuance of SRP¹¹ Section 9.5-1 did not have excess-flow check valves in place. This latter assumption was a conservative element in this analysis because it was likely that some of the plants licensed prior to SRP¹¹ Section 9.5-1 may have already had excess-flow check valves in place.

The auxiliary building is a safety-related structure that contains most of the components of the safety systems of a plant. However, the design of this structure and the location of safety-related components within the structure are plant-specific. In addition, location of the H_2 source and, in particular, the H_2 field-run piping layout are also plant-specific. In view of this, it was not possible to identify a particular damage scenario that represented a bounding

sequence for the purposes of a generic analysis. Therefore, a reasonable but not necessarily bounding damage scenario was assumed in order to evaluate this issue. This scenario entailed the assumption of an H_2 piping system leak or break, the accumulation of a combustible mixture within a room or space containing safety-related equipment, an ignition source, and damage contained within that room or space.

A PNL analysis⁶⁴ of this issue based on a pipe break was extrapolated to estimate the frequency of all events that might result in the release and accumulation of combustible gases in the auxiliary building. It was assumed that the pipe break frequency (for $\frac{3}{4}$ " pipe) may be obtained from WASH-1400,¹⁶ but that the probability of the accumulation of a combustible mixture, the probability of the availability of an ignition source, and the probability of total demolition of the safety-related redundant equipment are 1 in each instance. This latter assumption was conservative.

The scenario that was selected as a reasonable one for this analysis was the loss of both RHR heat exchangers (complete loss of heat sink). Resolution of this issue would affect operating plants using H_2 and not already in compliance with SRP¹¹ Section 9.5-1 with respect to H_2 gas piping. Specifically, resolution was anticipated to include all operating PWRs. Therefore, the number of affected plants was 47 PWRs with an average remaining lifetime of about 27.7 years.

Frequency Estimate

 H_2 piping is standard piping generally thought to be ³/₄" in diameter. Based on the results of WASH-1400¹⁶ (Tables III 2-1, 2-2), the pipe break frequency for piping less than 3" in diameter was 10⁻⁹/hour per section. In general, it was assumed that the H₂ piping in nuclear plants is comprised of about 25 sections. With 8,760 hours/year and an assumed plant utilization factor of 70%, the frequency of H₂ release due to pipe break (f_p) was estimated to be:

 $(10^{-9})(25 \text{ sections})(8760 \text{ hours/year})(0.7) = (1.5)(10^{-4}) \text{ pipe breaks/RY}$

A review of 96 H₂ accidents by NASA¹⁰³⁰ indicated that about 52% could have been attributed to causes that relate to use of H₂ in a gaseous state and about 48% to causes that relate to the use of H₂ in its liquid (cryogenic) state; only about 2% was attributed to piping breaks. Therefore, it was assumed that an H₂ accident from a gaseous state cause was $(52\% \div 2\%)$ or 26 times more likely to occur than an H₂ accident due to a pipe break. The probability (P) of an H₂ release (leak) was given by:

P = (26)(Probability of Pipe Break) = (26)(1.5 x 10^{-4}) = 3.9 x 10^{-3}

The probability of failing both RHR heat exchangers, f(RHR), is the product of the probability

of an H₂ leak, the probability of obtaining a combustible mixture, the probability of ignition, and the probability of being in the blast zone. Thus, $f(RHR) = (3.9 \times 10^{-3})(1)(1)(1) = 3.9 \times 10^{-3}$.

When both trains of the RHR system are inoperable, the TS require plants to proceed to the hot shutdown condition within 12 hours; this requirement was modeled in this analysis as a T3 (PWR) transient. Therefore, an H₂ explosion was modeled as an additional initiating transient (with a frequency of 3.9×10^{-3} /year as calculated above). All other initiating transients and LOCA parameters were scaled by (12/8,760 hours/RY) in order to model the occurrence of other random initiators during the 12 hours that the reactor is proceeding to hot shutdown. Finally, using the Oconee 3 PRA as representative of all PWRs, the RHR heat exchangers were modeled as inoperative by setting their representative system unavailabilities to 1. The Oconee PRA was then altered to incorporate the modified initiating event frequencies and the RHR systems unavailability in the affected minimal cut sets for each affected accident sequence. All affected Boolean equations were solved to calculate new core-melt frequencies for all containment failure modes and the affected core-melt frequencies were summed for each of the 7 distinct PWR core-melt categories. Public risk was then determined by summing the products of core-melt frequency and their respective release category dose factor for each release category.

The analysis was repeated for a period of 96 hours (4 days) as an approximation of the time necessary to achieve cold shutdown by alternate means such as feed-and-bleed. Based on these details, the following core-melt frequency results were calculated:

PWR Base Case	= 5.46 x 10 ⁻ ⁶ /RY
Adjusted Case	= 2.26 x 10 ⁻ ⁷ /RY
Reduction in Core-melt Frequency	= 5.20 x 10 ⁻ ⁶ /RY

Consequence Estimate

For the time required to come to hot shutdown (12 hours), the results of a PNL analysis⁶⁴ indicated that resolution of this issue would result in a risk reduction of 8.8 man-rem/RY for PWRs. The total public risk reduction was estimated to be approximately 11,500 man-rem. The estimated occupational risk reduction due to accident avoidance was approximately 135 man-rem.

Cost Estimate

Industry Cost: The cost of installing excess-flow check valves in the H₂ lines outside of the safety-related areas was estimated.⁶⁴ It was assumed that these valves would be installed during scheduled reactor shutdown periods so that there would be no additional power replacement cost incurred. Based on two vendor quotations, the average cost of one excess-flow valve was approximately \$870. The costs for the implementation, maintenance, and

operation of the excess-flow check valve "fix" was detailed as follows:

(a)	Implementation	
	Hardware Design and Review	= 2 days
	Procurement	= 1 day
	Pre-Installation Check	= 0.5 hour/valve
	Installation	= 2 days/valve [1 man-day/valve (welder),1 man-day/valve (fitter)]
	Post-Installation Check	= 1.5 hours/valve
	Documentation	= 0.5 day
	Total Labor Time (PWR)	= 3.5 days + 2.25 days/valve
		= 8 days
	Labor Cost (PWR)	= (8 days)(\$2,270/man-week)/(5 days/man-week)
		= \$3,632/plant
(b)	Equipment	
	Valve Cost (PWR)	=(2)(\$870)
		= \$1,740/plant

The total implementation cost/plant was (3,632 + 1,740) or 5,372; for all 47 affected plants, this cost was approximately 255,000.

Operation and maintenance would include a semi-annual check of the installation to ensure that the valve shaft was not "frozen" and replacement of the valve diaphragm as needed; the frequency of this replacement would depend upon the valve environment. For this analysis, the diaphragm was assumed to require replacement every 7 years with an associated labor requirement of 0.5 man-day.

(a) Labor for Maintenance and Operation

Semi-annual Check = 2 hours/valves

Diaphragm replacement required (average plant life/7-year replacements) over the remaining lifetime at 4 hours per replacement.

Labor (PWR)	= (2 hours/valve)(2 valves)(2 checks/year)
	+ (27.7 years/7 years)(4 hours/valve)(2 valves)/(27.7 years)
	= 8 hours/year(checks) + 1.14 hours/year (average diaphragm replacement)
	= 9.14 hours/RY
Labor Cost	= (9.14 hours/RY)(\$2,270/man-week)/(40 hours/man-week)
	= \$519/RY.

Thus, the operation and maintenance cost was (\$519/RY)(47 plants)(27.7 years) or \$675,686 and the total industry cost for the resolution of this issue was approximately \$(255,000 + 675,000) or \$930,000.

NRC Cost: Development of the implementation of the solution, including the formulation of guidelines and documentation requirements, and review and inspection of the final installation were estimated to cost (4 man-weeks) (\$2,270/man-week) or \$9,080. Implementation costs were estimated to be (0.6 man-week/plant)(\$2,270/man-week) or \$1,362/plant; for the 47 affected plants, this cost was \$64,000. Review and inspection of plant operation and maintenance activities were estimated to be (0.5 day/plant-test)(2 tests/year) or 1 day/RY; at a daily rate of [(\$2,270/man-week)/(5 days/man-week)], this cost was \$454/RY. For 47 plants with an average remaining life of 27.7 years, the operation and maintenance cost was estimated to be (47 reactors)(27.7 years)(\$454/RY) or \$591,000. Thus, the total NRC cost was estimated to be \$(9,080 + 64,000 + 591,000) or \$664,000.

Total Cost: The total industry and NRC cost associated with the possible solution was estimated to be \$(930,000 + 656,000) or approximately \$1.5M. Installation of excess-flow check valves was considered a satisfactory "fix" for the possibility of sudden accumulation of combustible or explosive mixtures of H₂ resulting from a piping system break, but it was not a solution for H₂ accidents arising from slow leaks in valves or fittings, purging errors, material degradation problems, contamination, etc. Other "fixes" are required to reduce or preclude H₂ accidents from scenarios other than pipe breaks. These other "fixes" would include the installation or upgrading of existing H₂ detection and alarm systems, completion of combustible gas system design reviews and modifications to plant design and hardware. operating procedure reviews and modifications, improved preventive maintenance programs, and major modifications to the auxiliary building ventilation system. For an assumed population of 47 plants, the total industry cost of these other "fixes" would be very much more than the costs estimated for the very restrictive "fix" (excess-flow check valves) estimated by PNL. Therefore, the cost of the other "fixes" was assumed to be an order of magnitude greater than that calculated for the installation of excess-flow check valves. Thus, the total estimate for complete resolution of the issue was at least \$15M.

Value/Impact Assessment

Based on a potential public risk reduction of 11,500 man-rem a cost of \$15M for a possible solution, the priority score was given by:

Other Considerations

Based on the potential reduction in core-melt frequency of $5.2 \times 10^{-6}/RY$ for PWRs, the cost

savings from accident avoidance was (1.65 billion)($5.2 \times 10^{-6}/\text{RY}$) (47 reactors)(27.7 years) or approximately 11.4M.

CONCLUSION

For the potential reduction in both public risk and core-melt frequency, a medium priority was appropriate, regardless of potential cost, unless the value/impact score was greater than 3,000 man-rem/\$M, in which case, a high priority would be appropriate. For the value/impact score to be \$3,000 man-rem/\$M, the total industry resolution cost could not exceed about \$3.8M. Based on the relatively detailed estimate of the cost of excess-flow check valve installation (~\$1.6M), which was only a small portion of the total "fix," and extrapolation, it appeared very unlikely that this issue could be completely resolved for less than \$4M. Therefore, the issue was given a medium priority (See Appendix C).

The staff's technical findings and regulatory analysis were reported in NUREG/CR-5759¹⁵⁴⁴ and NUREG-1364,¹⁵⁴⁵ respectively. The issue was RESOLVED with no new requirements¹⁵⁴⁶ and Generic Letter 93-06¹⁵⁴⁷ was issued to inform OLs and CPs. However, RES recommended that the SRP¹¹ be revised to: (1) include the information contained in Generic Letter 93-06¹⁵⁴⁷; and (2) reference EPRI NP-5283-SR-A,¹⁵⁴⁸ "Guidelines for Permanent BWR Hydrogen Water Chemistry Installations - 1987 Revision"; the latter recommendation was consistent with the RES recommendation made with the resolution of Issue 136. Consideration of a 20-year license renewal period would not affect the resolution of Issue 106.

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Safety Excess Flow Valves



Malema's valves provide instant shut off in the event of a hose break or fine failure, preventing the release of hazardous or inflammable products to the area, which can result in a disatrous fire or explosion and untold damage to personel and equipment.

Note: All LPG tank cars and transport trucks are required by law to have excess flow valves installed. In addition, state LPG regulatory bodies require excess flow valves on all LPG storage vessels, storing products for domestic delivery and consumption.

Operation

As the fluid enters the valve, it flows through the onlice to the outlet. The orifice and tapered piston create a venturi effect, accelerating the flow through the valve. At a preset flow rate, the pressure differential offsets the spring-loading of the piston and shuts off the valve. Fluid can flow through the valve in either direction; however, the flow will be shut off in the direction indicated on the valve.



Adjustment is achieved by means of an externally adjustable screw that positions the pistons closer or farther away from the orifice. Turning the adjusting screw clockwise to reduce the flow area causes actuation at lower preset flows.

malema flow sensors

M-XF Series

Field adjustable excess flow valve

Features

- Can be disassembled for repair or inspection without removal from pipe line
- Field adjustable
- Broad adjustable range
- Meets OSHA requirements for safety shutoff valves
- Operates effectively with liquids or gases
- In-line flow

Applications

- Fuel lines
- Pollution control
- Chemical processing
- · Gas and hydraulic lines
- · Petroleum and gas installations

Calibration Range

Air: 0.5 to 40,000 sc/m Water: 0.1 to 2,500 gpm

* These ranges are over different valve sizes.

Specifications

Set Point Accuracy: Repeatability:

±10% maximum ± 5%

Forged Steel

316 Stainless Steel

aion zacas Flow Van

Naterial Version

- Bronze
- Carbon Steel
- Cast Iron

* Other materials available on request

Pert Sizes

• 3/4"	• <u>2</u> ~	۰.Q.,
a 1*	• 3"	• 3**
+ 1 1/2"	• 4 **	• 10'

(ANSI Flanged, FNPT, and Socket Welded port types are available)

* Other sizes available on request.

Catalog # 246:

Installation and Maintenance

The mounting position for this excess flow valve is horizontal. These valves can also be mounted vertically; this will change trip settings by approxiamately 15% (this is easily corrected since one can adjust the valve to counter for this change). This valve can be easily maintained in the field without removing it from the pipeline as all the components slide out of the top on disassembly; a special tool is provided for disassembly.

Flow Characteristics

[For Class 300 Valves]

Valve Size	ĊV	Shut C (Air,)ff Range /scfm)	Shut Off Range (Water/gpm)						
3/4*	3	0.5	180	Ő, I	15					
\$ ¹⁴	5.5	2	400	0.5	25					
1-1/2*	17	4	800	1	50					
Z *	38	8	1,500	2	90					
3*	84	20	4.200	5	190					
4 *	160	90	5.800	10	350					
6"	380	60	13,000	15	850					
8*	560	72	18,000	18	1,450					
10*	1,200	80	40,000	20	2,500					

* Air @ STP (i.e. Pressure at 14.7 psig & Temperature at 70* F)

Note: These CVs are shown for fully open standard globe valves. We use standard globe valve bodies to construct our EFVs.

Pressure Drop

Typical pressure drops for class 300 valves for normal flow are well below 5 psi max. Please contact factory to review pressure drop information for other sizes as required.



For pressure drops on other sizes, call factory.

How It Works



Valve Open - Normal Flow



Valve Tripped Flow Shut Off

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Safety Excess Flow Valves

Dimensional Drawing

n i

UT

Adjustment Screw Turns

vs. Flow Trip Point Settings

[The following graphs are included as examples only they should not be used to calibrate individual values]



Size	Connection	Class	Material	A' (Height)	:B" (End to End)	(Flange Port OD
0.75*	FI,	150	CS or SS	5.60	4.63	3.901
1.00	FL.	150	CS or SS	5.40	5.00	4.30
1.00	FL	300	CS or SS	5.50	7.75	4: 30 1
1.50	FL	150	CS or SS	÷.e.	6.50	5.00*
1.50	Fl,	3(30)	CS or SS	. A	9.001	6.13
2.00	÷	150	CS or 35	8.10	8.00	8.00 ⁻
2.00*		300	CS or SS	8,50	10.50*	6.90
3.001	Ê.	150	CS or SS	11.60*	9.50'	1.50
3.001	₹Ę.	300	CS or SS	9,25	12.50	8.25
4.001	FL	300	CS 8635	15.30	14.00*	19.00
6.00	FI.	300	CS 67 55 :	¥.e	12.50*	12.50
8.00	FL	300	CS or SS	¥ H	22.00	15.00
10.00	FL	300	CS or 55	4.92	24.50°	17.50

Note 1: Dimension "A" may be different if the globe bodies that Malema uses are sourced from difference does.

Note 2: Piease contact factory for dimensions of bodies that are not listed here.

ANSI Flange Data II ANSI 8 16.5, Class 300 [Steel]

Size -	op	Piange Thickness	Roised Face Diameter	Number of Holes	Hole Diameter	Hole Circle Diameter
(1-1/2)	$\lesssim 1/B^*$	13/16	2-7/8*	4	7/ 8 °	:4-12 2 *
Z	<	7/8	3-5/8*		3/4*	5
37	8-1/4";	1-1/8	5*	8	7/8*	6.5/8
47	10	1-1/41	6-3/16*	ß	7/19	7-7/8
¢*	12-021	13216	8-1/2	12	7/ 8 *	19(5/81
8	45	1-5/6	10/5/8	12	f	12
(61	17-172	1-1/18	12:3/45	16	11/0	15 I/4

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III #########	rerer	0000000	 ***********						 						
			iddh d	L (Ph	#	P									

Heile

Circle

Diameter

2.3/4

3.7/6

4.3/4

6

7.172

 $9 - 1/2^{\circ}$

11-3/4

Catalog # 246:

AA 101	75 i	A. D. Charles I. D. D. Marsonell	
2212124	01	O.D. CHIM FOUNDER	

Flancie

Thickness

7/16

9/16

5/8

324

15/16

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M-XF Series

Oring

Viton

EPDM

Kairez



Ordering Information

M - XF - 1.00 - SS - 300 - FL - V Valve Size Body Material Valve Class Connection Type Code Ŵ. Code Size Code Body Trim Pressure Rating Type Code 3/4" 0.75 ₹i. BZ/6N Bronze Brass filanigied 1 125 200 A352-LCB (Cast Garbon Steel) EN. FNPT K 1.00 N 12 C\$/3\$ 31655 150 285 SW 1.50 Socket Weld 1-1/Z 300 740 F5/55 [Forged Carbon Steel] 31655 Ż 8W Bull Weld Z.001,480 600 \leq S (Cast 316 Stainless Steel) 31655 32 3,00 800 1,975 4 4.00 1,500 3,705 δ^* 6.00

IPEC00270325	

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Malema Excess Flow Valve with built-in Reset nalema sensors

- Reset mechanism is integrated to the excess flow valve
- Eliminates additional
 piping and hardware
 required upstream of the
- Reduces the cost installation

Confidential





Attachment 4

Cost Estimate

	ENTE	RGY NUCLEAR NORTHEAS	ŕ		
	IMF	LEMENTATION ESTIMATE	_		
	indiar I	EC # SAMA II	n วว.กรว		
Concentual		EC #: SAIVIA II	-3-053		ESTIMATOR POMT
Breliminan	IOR LOCATION: Eap Room Vard		LECT CODE: TP		LOTIMATOR. ROM
			IECT CODE. TB		
		URIGINATOR:		ORIG. DATE	: 06/22/2012
	ESTIMATE TOTAL \$340,790	an an an an an an an an an an an an an a	REVISION	N 11-0	
In accordance with NRC Generating Units 2 and 3 each unit. In its license cost-beneficial SAMAs fo related to aging manager	environmental regulations in 10 C.F.f as part of its license renewal applica renewal application and related corre r further internal engineering project ment under 10 C.F.R. Part 54. Enter	R. Part 51, Entergy performed tion. Those analyses identifie spondence with the NRC Staff cost-benefit analysis, even tho gy contracted RCM Technolog	SAMA analyses ed a number of pe , Entergy indicate ugh none of the pies to assist it in	for both Indian otentially cost-b ed that it would potentially cost this effort.	Point Nuclear beneficial SAMAs for submit the potentially -beneficial SAMAs is
This package provides a practices.	conceptual design and implementation	on cost estimate for SAMA IP3	-053 in accordan	ice with Entergy	y design engineering
For SAMA IP3-053, resol	ution is required to shut down hydrog	en supply piping that is leaking] .		
This package provides fo	r a conceptual design to install a non	-electric excess flow valve in th	ne Station's hydr	ogen supply sy	stem.
Prepared by:	Settacarol.	Approved by:	and a second and a second and a second and a second and a second and a second and a second and a second and a s	_	
Date: 9 -	20-2012	Date: 9 ~ 2.	3-2012		

		ENTERGY NUCLEAR NORTHEAST
		IMPLEMENTATION ESTIMATE
1		Indian Point Nuclear Power Station
* EST	IMATE LEVEL *	EC #: SAMA IP3-053
	Conceptual	PROJECT TITLE: Hydrogen Excess-Flow Valve Installation ESTIMATOR: RCMT
	Preliminary	JOB LOCATION: Fan Room, Yard Area PROJECT CODE: TBD
	Definitive	ORIGINATOR: ORIG. DATE: 06/22/2012
Item		Description
		Description
2	This estimate assun	nes that this work will require outage conditions to complete
3	This estimate assun	these that this work will not suffer productivity loss due to radiation bezardous conditions or OC hold points
4.	This estimate assun	hes that all work will be performed by trained contract craftspersons in lieu of station maintenance personnel.
5.	This estimate provid	les for continuous fire watch during cable tray breeching.
6.	This estimate assun	nes training for 24 Plant Ops. Personnel
7.	This estimate assun	nes that the Appendix R Evaluation will be performed by a Contract person for a cost of \$250,000.
8.	This estimate is bas	ed on the project's current level of scope definition and is classified Class 4 as defined per the AACE International Cost
	Labor dollars in this	ion system (see Altacilinent 5, Reference 2), estimate are projected 2014 costs based on current 2012 craft billing rates at Indian Point. The projected costs provide for
9.	anticipated billing ra	te increases of 3% per year.
10	This estimate allows	s for and includes a contingency factor related to the complexity and location of the work required. The factor is cumulative
10.	and progresses as f	ollows:
	A. Outside fen	ce boundary - 20%
	B. Inside tence	e boundary - 30%
	D Inside Cont	aiment - 50%
	2. 110/00 00/10	
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Rev. 11-0	Page 3 of 5	IN	DIAN	POI	NT I	MPLEN	MENT	'ATION SAMA II	N E P3-0	STIMA	re v	VORK S	HEE	т		S	AMA	IP3-053 Hydi	rogen E	Excess-Flow	7/5/2012 2: Va (6-22-
PRO. JOB	ECT TITLE: Hydrogen Excess-Flow Valve Installat OCATION: Fan Room, Yard Area	ion							FAL CT C		ORM D				TA	KEOFF:	R: R	СМТ			
EST.	STATUS: OUTAGE NON-OUTAGE							ORIGIN	ATC	DR:	'MA		MAT	COIAI	OF	ABOR	E: 06	8/22/2012 SUR			
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r		1		02		DESIGN	ENGR	CONST	SUF	PPORT				40			\$	4,000			
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				cor	VTRA	CT ENGINE	NEERIN	NG G	UCF P	PIANCER	EVIE	vv		. 20			*	2,000			
				08		DESIGN SUPL C	I ENGR	CONTR	ACT	SUPPOR	т			200			\$ \$	24,000			
				10		MODS	LAN	SCHED	-00	NTRACT				40			\$	4,000			
				11 MAT	ERIA	FIELD E LS / MISC	INGRS	/ PLANN	ERS	5				40			\$	4,800			
				12		MATER	IALS										\$	9,498			
				-13 - CON	ITRAC	OTHER	CONTI T LABO	RACTS									\$	-			
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		1		15 16		SWEC I	IME DISTRI	BS						35			5 5	4,232 8,922			
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		+	<u> </u>			[]	r	<u></u>	T		23	IMALE			T		*	340,790			
1.	Gather and stage tools and materials	2	LT	PF	2	10.00	1.00	40	\$	120.71			s		\$	4,828			s	4,828	1
2. 3.	Tag-out (close) required valves Purge or Vent 1" line of all Gas	2		OP OP	1	2.00	1,00	4	\$	100.00 100.00			\$	-	5	400 800			5	400 800	
4.	Purge or Vent 1 1/2" line of all Gas	1	LT	OP	1	8.00	1.00	8	5	100.00			\$ c	•	s	800			5	800	
э. 6.	Cut and Remove required Section of 1 1/2 " pipe	1	LT	PF	2	8.00	1.00	18	5	120.71			\$	-	ŝ	1,931			\$	1,931	
7. 8.	Procure and install new 1" Excess Flow Valve Procure and install new 1 1/2" Excess Flow Valve	1	LT	PF	2	20.00	1.00	40	\$	120.71	\$	4,200.00	\$	4,200	\$	4,828			5	9,028	
	Two Flanges and Isolation Kit			PF	2	30.00	1.00	60	\$	120,71	5	4,800.00	\$	4,600	\$	1,243			\$	11,843	
ы. 10,	Assist with testing as required	2		EL		8.00	1.00	16 16	5	123.32			\$ \$	-	s	1,800			\$	1,800	
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	PAINTING & TOUCH-UP REQUIREMENTS																				
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2.	PAINTING & TOUCH-UP		1	PT				-					5	-	\$	-			\$	^	
																					1
1,	CRAFT SUPPORT FOR FIRE WATCH	1	LT	FW	1	70.00		70	\$	53.60			5	-	\$	3,752			\$	3,752	
2.	CRAFT SUPPORT FOR BOTTLE WATCH	1	LT	FW									\$	-	s	-			5	-	
	MISC SUB-CONTRACT					l	1														
1.	MISC SUB-CONTRACT	1	LT														\$	-	\$	-	
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	SUBTUTAL CRAFT & SUB-CONTRACTOR	+					+	282	+				\$	6,960	13	21,077	<u>*</u>	-	<u> </u> *	30,637	1
1.	CONSTRUCTION SUPPORT (8% OF LABOR \$)	1	LT					21	\$	98.15	\$	•			s	2,061			s	2,061	
	SUBTOTAL	ad an an an an an an an an an an an an an	† –	1	173326	1	1	303	+				\$	8,960	\$	29,738	\$	*	5	38,698	í

Rev. 11-0	Page 4 of 5	IN	DIAN	POI	NT I	MPLE	MENT	ATION SAMA II	ESTIMA 93-053	TE WORK S	HEET	s	AMA IP3-053 Hyd	rogen Excess-Flow	7/5/2012 2:57 PM Va (6-22-12).xl
PRO JOB EST.	JECT TITLE: Hydrogen Excess-Flow Valve Installatio LOCATION: Fan Room, Yard Area STATUS: ☑ Outage □ NON-Outage	on						PROJE ORIGIN		O&M D		TAKEOFF: ESTIMATO ORIG. DAT	R: RCMT E: 06/22/2012		
ITEN	DESCRIPTION	οτγ	UOM	CFT	NO.		ANHO	URS TOTAL	S/MH	'MATERIAL \$	MATERIAL DOLLARS	LABOR	SUB- CONTRACT	TOTAL S	
	A DEL ATEL COSTS +														
1. 2. 3. 4. 5. 8. 7.	WALKDOWN ALLOWANCE WORK PACKAGE REVIEW TOOL ROOM ATTENDANTS (~3.5%) GENERAL CRAFT OUTAGE DISTRIBS. (10%) CRAFT IN PROCESSING (20%) HUMAN PERFORMANCE & ALARA TRAINING (1/2 day training, or ~2%)	1 1 1	LT LT LT	EL EL EL				4 27 11	\$ 123.32 \$ 123.32 \$ 123.32			\$ 493 \$ 3,330 \$ 1,357 \$ 2,974 \$ 5,948 \$ 595		\$ 493 \$ 3,330 \$ 1,357 \$ 2,974 \$ 5,948 \$ 595	
<u> </u>	SUBTOTAL							345			\$ 8,960	\$ 44,435	5 -	\$ 53,395	
1.	PLANT SCOPE MECH MAINTENANCE	1	LT	PL	1	10,00	1,00	10	\$ 100.00		\$ - \$ -	\$ 1,000 \$		\$ 1,000 \$	
	SUBTOTAL MECH MAINT.							10			\$ <u>.</u>	\$ 1,000	\$ -	\$ 1,000	
1.	ELECT MAINTENANCE	1	ιт	EL				-			s -	s -		s -	
	SUBTOTAL ELECT. MAINT.							-			<u> </u>	<u> </u>	 \$-	s - s -	
1. 2.	I&C (Develop Calibration and Maintenance Proce- dures)	1	LT	PL	1	120.00	1.00	120	\$ 100 .00		\$ - \$ -	\$ 12,000 \$ -		\$ 12,000 \$ -	
	SUBTOTAL I&C MAINT.		—					120			\$ -	\$ 12,000	\$ -	\$ 12,000	
1.	CSG			PL				-			s -	\$. \$.		\$- \$-	
	SUBTOTAL CSG MAINT.	ļ	ļ								\$.	\$ -	\$ -	\$ -	
	SUBTOTAL PLANT	1						130			\$.	\$ 13,000	\$.	\$ 13,000	
	SUBTOTAL CRAFT/PLANT							475			\$ 6,960	\$ 57,435	\$ -	\$ 68,395	
1. 2. 3. 4. 5. 8. 9. 10. 11. 12. 13. 14. 1. 2. 3. 4. 5.	IMPLEMENTATION SUPPORT EO/ EO/ FIS / MODS ENGINEERING SUFT DURING CONST SYSTEMS ENGINEERING - MECHANICAL SYSTEMS ENGINEERING - ELECTRICAL SYSTEMS ENGINEERING - CIVIL STRUCTURAL PROJECT MANAGEMENT TRAINING OPS STAFF QA / QC VERIFICATION NDE HP / RP/ALARA WORK MANAGEMENT OPS / OPS PROCEDURE SUPPORT AND DEVELOPMENT TRAVEL & LIVING EXPENSES CONTRACTOR SUPPORT FIS / MODS ENGINEERING - SWEC (Incl Per Diem) MODS PLANNING & SCH - SWEC (Incl Per Diem) FIELD ENGRS/PLAN- SWEC(Incl Per Diem) QA / QC VERIFICATION NDE	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	נונונונונונונונונונונונונונונונונונונו	NM NM NM NM NM NM NM NM NM NM NM NM	111111111111111111111111111111111111111	40.00 20.00 20.00 40.00 80.00 40.00 80.00 80.00 80.00 80.00 80.00	1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00	40 20 80 20 40 80 80 80 80 80 - 40 40 30	\$ 100.00 \$ 100.00 \$ 100.00 \$ 100.00 \$ 120.00 \$ 120.00 \$ 100.00 \$ 100.00 \$ 100.00 \$ 120.00 \$ 120.00 \$ 120.00 \$ 120.00 \$ 120.00 \$ 120.00			\$ - \$ 4,000 \$ 2,000 \$ 4,000 \$ 4,000 \$ 4,000 \$ 1,000 \$ 1,000 \$ 1,000 \$ 1,000 \$ 1,000 \$ 2,780 \$ 1,000 \$ 2,780 \$ 1,000 \$ 2,780 \$ 2,800 \$ 2,900 \$ 2,900 \$ 2,900 \$ 2,900 \$ 2,900 \$ 2,900 \$ 1,000 \$ 1,000 \$ 2,000 \$ 3,000 \$ 1,000 \$ 2,000 \$ 1,000 \$ 1,000 \$ 2,000 \$ 1,000 \$ 1,000 \$ 2,000 \$ 1,000 \$ 2,000 \$ 1,000 \$ 2,000 \$ 2,000 \$ 1,000 \$ 2,000 \$		\$ 4,000 \$ 2,000 \$ 2,000 \$ 4,000 \$ 4,000 \$ 1,000 \$ 3,000 \$ 2,4000 \$ 2,4000 \$ 2,4000 \$ 2,4000 \$ 2,4000 \$ 2,4000 \$ 2,4000 \$ 2,4000 \$ 2,4000 \$ 2,000 \$ 2,000 \$ 2,000 \$ 2,000 \$ 2,000 \$ 2,000 \$ 2,000 \$ 3,000 \$ 3,0000\$ \$ 3,000\$ \$ 3	
8. 7, 8. 9. 10. 11. 12. 13. 14. 15. 16. 17. 18. 19.	HP / RP RADWASTE NURSE ELEVATOR CONTRACTOR WASTE MANAGEMENT HOUSEKEEPING EQUIPMENT RENTAL CONTRACTOR VENDOR STOCKING DECONTAMINATION CONTRACTOR RBC'S SECURITY FIREWATCH (Rover) SAFETY (2%) LOST TIME (10%) SUBTOTAL CRAFT/RION-MANUAL FREIGHT, SALES TAX, & CONSUMABLES (8%) SUBTOTAL INSTALLATION COST			NM NM NM NM NM NM NM NM NM SEM NM				- - - - - - - - - - - - - - - - - - -	\$ 72.14 \$ 120.92		\$ 8,960 \$ 538 \$ 9,496	\$ 721 \$ 4,232 \$ 128,548 \$ 128,548	\$ - \$ -	\$	

Rev. 11-0	rage 5015	INU	JIAN	POI	NTI	MPLEI	VIEN I EC #: 1	ATION SAMA IF	ESTIMA 93-053	TE WORK S	HEET		SAMA	IP3-053 Hyd	rogen	Excess-Flow
PRO IOB EST.	ECT TITLE: Hydrogen Excess-Flow Valve Installatik LOCATION: Fan Room, Yard Area STATUS: 🖸 OUTAGE 🗌 NON-OUTAGE	on						PROJEC	AL E CT CODE: TB	Говм D		TAKEOFF ESTIMAT ORIG, DA	CR: R	CMT 3/22/2012		
TEL	SECODIFICAL	0.00		-	1.110	N	ANHOL	JRS	A-0-0-1	'MATERIAL \$	MATERIAL	LABOR		SUB-		
IEN	DESCRIPTION	QTY	MOU	CFT	NO.	UNIT	FCIR	TOTAL	\$/MH	PERUNIT	DOLLARS	DOLLAR		INTRACT		OTAL \$
1.	DESIGN ENGINEERING - MECHANICAL	1	LT	NM	1	60.00	1.00	60	\$ 100.00			\$ 6.000			5	6,000
2.	DESIGN ENGINEERING - ELECTRICAL	1	LT	NM	1	40.00	1.00	40	\$ 100.00			\$ 4,000			5	4,000
З.	DESIGN ENGINEERING - INSTR. & CONTROL	1	LT	NM	1	40.00	1.00	40	\$ 100.00			\$ 4,000			s	4,000
4.	DESIGN ENGINEERING - CIVIL/STRUCTURAL	1	LT	NM	1	40.00	1.00	40	\$ 100.00			\$ 4,000			\$	4,000
5.	CONTRACT ENGR DESIGN SUPPORT	1	LT	NM	1	200.00	1.00	200	\$ 120.00				\$	24,000	\$	24,000
6.	DESIGN ENG. DCP ACCEPTANCE REVIEW	1	LT	NM	1	20.00	1.00	20	\$ 100.00				\$	2,000	s	2,000
	SUBTOTAL DESIGN COST							400				\$ 18,000	\$	26,000	\$	44,000
	SUBTOTAL INSTALLATION & DESIGN COST			L								\$ 146 548	15	26,000	15	182 046
											****	1	+*		Ť	102,040
1.	CONTINGENCY (20%)														\$	36,409
	ESTIMATE SUBTOTAL				-			1 538					†			219 455

ENTERGY INDIAN POINT NUCLEAR STATION UNIT 3

CONCEPTUAL DESIGN PACKAGE

For

SAMA IP3-055

Provide Alternate Safe Shutdown System Power to Safety Injection Pump & Residual Heat Removal Pump

Prepared by:	Approved by:
John Battacarol.	CM ZZ
Date: 9-20-2012	Date: 9 - 2 - 2 - 7 - 2

RCM	Technologies The Source of Smart Solutions	ENTERGY	Conceptual Design	
		Unit 3	SAMA IP3 -055	Rev. 0

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SECTION	TITLE	<u>PA</u>	<u>GE</u>
1.0	ISSUE	3	
2.0	BACKGROUND	3	
3.0	EXISTING CONDITIONS	3	
4.0	DESIGN CONSIDERATIONS	4	
5.0	CONFIRMATION OF DESIGN	4	
6.0	RECOMMENDED SOLUTION	5	
7.0	PRELIMINARY MATERIAL LIST	6	
Attachment 1	Entergy Impact Screening Summary		
Attachment 2	Conceptual Design Sketches		
Attachment 3	References		
Attachment 4	Cost Estimate		

1.0 ISSUE

Severe Accident Mitigation Alternative (SAMA) IP3-055:

Provide Alternate Safe Shutdown System Power to Safety Injection Pump and Residual Heat Removal Pump

2.0 BACKGROUND

In accordance with NRC environmental regulations in 10 C.F.R. Part 51, Entergy performed SAMA analyses for both Indian Point Nuclear Generating Units 2 and 3 as part of its license renewal application. Those analyses identified a number of potentially cost-beneficial SAMAs for each unit. In its license renewal application and related correspondence with the NRC Staff, Entergy indicated that it would submit the potentially cost-beneficial SAMAs for further internal engineering project cost-benefit analysis, even though none of the potentially cost-beneficial SAMAs is related to aging management under 10 C.F.R. Part 54. Entergy contracted RCM Technologies to assist it in this effort.

This package provides a conceptual design and implementation cost estimate for SAMA IP3-055 in accordance with Entergy design engineering practices.

For SAMA IP3-055, resolution is required to make available an alternate source of 480VAC power to the Safety Injection System (SIS) pump and Residual Heat Removal (RHR) Pump. This action is required in the event of flooding in the 480VAC Vital Switchgear Room (switchgear room) at Elevation 15'-0" that prevents the normal 480VAC power from being available. Pump 31 SI and Pump 31 RHR have been selected to be available with the alternative power option.

The design considerations that follow will address the resolution's adequacy and the basis for the recommendation to resolve the identified potential issue.

The recommended solution will include descriptive details of the design change and also conceptual design sketches as required. These descriptive details, sketches, and the preliminary material list will be the informal basis for initiating the all-inclusive conceptual cost estimate for EC development and implementation at the Station.

3.0 EXISTING CONDITIONS

Pumps 31 SI and 31 RHR do not have any current capability to manually switch to alternate power. Under certain emergency conditions, these pumps require their power feed to be transferred to an alternate source of 480VAC power.



The suggested alternate source of 480VAC power is Unit 3 Substation 312A. Substation 312A, a component of the Alternate Safe Shutdown System (ASSS), is fed from a 2000 kVA at the 6.9 kV transformer located in the same area as the substation.

In addition to the need for an alternate power source, a device also needs to be added that will be able to switch to the backup power from the normal power supply feeding the designated pump.

4.0 DESIGN CONSIDERATIONS

The existing 2000 kVA at the 6.9 kV transformer power source has available margin sufficient enough to power an addition to MCC312A for the purpose required here. Since a connection for the new MCC will be required downstream of the transformer's existing relay protection, locating the new MCC in the existing substation area is preferred.

The new manually operated transfer devices will be installed in locations near the pumps. As stated, these two pumps are presently only powered from the Unit 3 switchgear room. With the new requirement for the two pumps to be powered from an alternate source, a load analysis of the components providing the alternate source needs to be performed.

Considering the amount of new cable that needs to be installed, the most efficient means of implementing this design change requires each "switch" to be installed in the area local to its associated pump.

5.0 CONFIRMATION OF DESIGN

The normal power source for Pump 31 SI and Pump 31 RHR is provided from the Unit 3 switchgear room.

Currently, no alternate power transfer option is available for these pumps. This design will incorporate the addition of new transfer switches operated locally and connected to power feeds that provide an alternate power source option to these pumps from MCC312A.

The transfer switches will be located in the Unit 3 Primary Auxiliary Building (PAB) in proximity of Pump 31 SI room at Elevation 34'-0" and Pump 31 RHR room at Elevation 15'-0".

A preliminary investigation of the documents reviewed, in conjunction with engineering judgment, indicates the transformer connected to this substation has adequate margin and capability to provide the additional power required to operate the additional Pumps 31 SI and 31 RHR. If further analysis refutes this conclusion, based on an unanticipated rationale, a different power source will be required.

6. RECOMMENDED SOLUTION

Technologies

The Source of Smart Solutions

RCM

- 1. In the vicinity of each Pump 31 SI and Pump 31 RHR location:
 - Install the new manually operated transfer switch.
 - Disconnect the existing pump power feed. Re-route the cable through conduit to the new transfer switch and connect it to the "normal" input connection of the new transfer switch.
 - Install new power cable and conduit from the pump to outside the room to "common" output connection at the new transfer switch
 - At the new MCC312A Extension installed in Turbine Bldg. at Elevation 15'-0" install a new power cable to the new compartment. Route the new power cable to the new transfer switch and connect the cable to the "alternate" input connection on the new transfer switch.
- 2. At the pump motor control compartments, maintain the capability to continue to control the pumps from MCC312A Extension.
- 3. Revise the necessary procedures and conduct training required in response to these new operating conditions.
7.0 PRELIMINARY MATERIAL LIST

Item Description	Quantity
1. ASCO Series 386 Non-Automatic Power Transfer Switches or Equivalent	2
2. 1" – Conduit	200 Feet
3. 2" - Conduit	280 Feet
4. 2/c Cable	600 Feet
5. 480 VAC – 4/c Power Cable	1120 Feet
 MCC extension (2 buckets high x 1 bucket wide) with mounting brackets to connect to existing MCC 312A 	1
7. 480 VAC switchgear to be installed into MCC extension	2

RCM	Technologies	ENTERGY	Conceptual Design	
	The Source of Smart Solutions	Unit 3	SAMA IP3 -055	Rev. 0

Attachment 1

Entergy Impact Screening Summary



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Engineering Change Process

ATTACHMENT 9.3

IMPACT SCREENING SUMMARY

SHEET 1 OF 6

INSTRUCTIONS:

Identify the potentially impacted and the unaffected areas by checking the appropriate **Yes** or **No** block on the Impact Screening Criteria.

If a direct determination cannot be made based on the impact screening questions, the detailed questions in Attachment 9.4 may be used to identify potential impacts.

The completion of detailed questions in Attachment 9.4 is recommended but not required.

Contact potentially impacted groups if assistance is required. $\leq \Delta M \Delta$

			2	8	5 6		10			
Engineering	Change	No.:	Ţ	P	3	-	0	5	5	

CONCEPTUAL Rev. No.: DESIGN PACKAGE

Prepared by:

Date:

DESIGN ENGINEERING DISCIPLINES	Potentia	al Impact
 Civil / Structural Design Engineering Does the proposed activity involve any civil / structural (including seismic) design changes, activities or affect coatings? OR Does the proposed activity involve any piping engineering design changes or activities? 	YES	□ NO
 Electrical Design Engineering Does the proposed activity involve any station or switchyard electrical design, large power transformers, or settings changes or activities? (SOER 10-1) 	YES	□ NO
 Instrumentation and Controls Design Engineering Does the proposed activity involve any I&C design or settings changes or activities? 	YES	
 Mechanical Design Engineering Does the proposed activity add/remove/replace insulation, aluminum or other metallic/non-metallic sources of debris in the reactor/containment building or involve any mechanical design changes or activities? 	🗆 YES	X NO
 PSA Engineering Does the proposed activity impact or involve changes to plant evaluations or probabilistic safety assessments? Does the proposed activity impact or involve changes to the Emergency Operating Procedures, Abnormal Operating Procedures, or Severe Accident Procedures or does it add, remove or modify SSCs included in a Maintenance Rule function? 	YES	□ NO
 Nuclear Analysis Does the proposed activity impact or involve changes to plant evaluations, Technical Specifications, Technical Requirements Manual, or require a full 50.59 Evaluation? 	YES	□ NO
 FERC / NERC Impact Does the proposed activity impact or involve change to FERC / NERC or Regional Entity compliance documents? (ex. MOU, ENN/ENS-PL-158, ENS-DC-199, etc.) 	☐ YES	X NO



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Engineering Change Process

IMPACT SCREENING SUMMARY

□ YES

YES

YES

□ YES

☐ YES

Potential Impact

X NO

M NO

NO 🕅

ATTACHMENT 9.3

Sheet 2 of 6 **DESIGN ENGINEERING PROGRAMS ASME Section III Specifications** Does the proposed activity add, delete, or modify information required by ASME Section III to be contained in a design specification? Cable and Raceway Program Does the proposed activity involve any changes to cable trays, raceways or the ۵ associated documentation? Electronic Databases (EDB) Does the proposed activity involve any changes to electronic databases? EQ Program (10CFR50.49, NUREG 0588, Reg Guide 1.89) Does the proposed activity involve any new or existing EQ components? Hydrogen Control Program (10 CFR 50.44) (if applicable) Does the proposed activity impact equipment or materials related to hydrogen control? Uuman Eastars Dragram

 Human Factors Program Does the proposed activity involve control panel design including layout and labeling, visual displays, operator aids, auditory signals or environment in the control room, cable spreading room, and other control panel locations? 	YES	□ NO
 Margin Management Does the proposed activity impact or involve any change to design, licensing or operations margins? 	T YES	🛛 NO
Reg. Guide 1.97 / PAM (Post Accident Monitoring)	☐ YES	M NO

Reg. Guide 1.97 / PAM (Post Accident Monitoring) Does the proposed activity involve Reg. Guide 1.97 (Post Accident Monitoring) Indications?

MAINTENANCE	Potentia	Impact
 Electrical Maintenance Does the proposed activity require an Electrical Maintenance review to identify affected procedures, required actions and required training? 	YES	
 Maintenance Does the proposed activity require an I&C Maintenance review to identify affected procedures, required actions and required training? 	YES	
Mechanical Maintenance Does the proposed activity require a Mechanical Maintenance review to identify affected procedures, required actions and required training?	☐ YES	🕅 NO

NUCLEAR ENGINEERING Potential Impact Nuclear Fuel Design □ YES • Does the proposed activity impact or involve the design, performance or storage of nuclear fuel? □ YES Reactivity Management Program □ YES • Does the proposed activity impact or involve the reactor system, reactor controls, reactor chemistry, related systems, potential core and spent fuel damage, spent fuel, reactor coolant pressure boundary or reactor system procedures? □ YES



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Engineering Change Process

IMPACT SCREENING SUMMARY

ATTACHMENT 9.3

SHEET 3 OF 6

PROCESS OR PROGRAM IMPACT SCREENING CHECKLIST	Potentia	al impact
Computer Support and Software	☐ YES	🕅 NO
 Does the proposed activity impact or involve changes to plant computer software or firmware or impact Software Quality Assurance (SQA)? 		
Chemistry and Environmental Impact	☐ YES	🕅 NO
 Does the proposed activity impact or involve any changes to plant chemistry requirements, operations or procedures, or any changes to the environment? 		
Radiation Protection (RP) Program Impact	YES	
 Does the proposed activity impact or involve any changes to the RP program? Does the proposed activity involve the potential to introduce (or reintroduce) any cobalt containing materials (such as Stellite) into the primary system? 		
 Operations Does the proposed activity impact or involve changes to Operations procedures, training or operator actions? 	YES	
 Planning, Scheduling and Outage (PS&O) Does the proposed activity require a PS&O review to identify required design and installation information? 	TES 📕	
 MP&C (Inventory) Does the proposed activity impact or involve any addition or removal of equipment from the inventory? Does the proposed activity impact or involve any Procurement of Quality or Augmented Quality material from non-qualified suppliers? 	YES	□ NO
Procurement Engineering Does the activity impact or involve any procurement activities?	YES	

PROGRAMS AND COMPONENTS	Potentia	al Impact
 ASME Containment In-service Inspection (IWE / IWL) Program Does the proposed activity impact or involve the containment pressure boundary or associated moisture barriers or a support for the containment pressure boundary? This includes "software only" changes that do not physically change the hardware such as re-rating of pressures or temperatures to include changes to documented information on these items or additional documented information for these items. Does the proposed activity limit access to containment surfaces for inspection? Involve disassembly of a bolted connection which forms a portion of the containment boundary? 	☐ YES	Х) NO
 ASME Appendix J (Primary Containment Leak Rate Testing) Program Does the proposed activity impact or involve any changes to primary containment leak rate testing? 	□ YES	🕅 NO



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Engineering Change Process

ATTACHMENT 9.3 SHEET 4 OF 6

IMPACT SCREENING SUMMARY

PROGRAMS AND COMPONENTS (CONTINUED)	Potentia	al Impact
 ASME In-service Inspection (ISI) Program Does the proposed activity add, delete, or modify an ASME Section XI pressure boundary item or a support for an ASME Section XI pressure boundary item? This includes "software only" changes that do not physically change the hardware like such as re-rating of pressures or temperatures. (ASME Section XI items include ASME Class 1, 2, 3, or B31.1 treated as ISI Class 2 or 3 (T2 and T3) components, parts, or appurtenances such as pipe or pressure vessel walls, valve bodies and pump casings. 	☐ YES	X NO
 ASME Section XI Repair / Replacement Program Does the proposed activity involve any mechanical component within the ASME XI program / boundaries? Does the proposed activity add, delete, or modify an ASME Section XI pressure boundary item or a support for an ASME Section XI pressure boundary item? (ASME Section XI items include ASME Class 1, 2, 3, MC, and CC, as well as B31.1 treated as ISI Class 2 or 3 (T2 and T3) components, parts, or appurtenances such as pipe or pressure vessel walls, valve bodies and pump casings). 	T YES	X NO
 ASME In-service Testing Program Does the proposed activity impact or involve any item (safety related or non safety related) that may affect the performance or testing of a safety related pump or valve? Does the proposed activity impact the function or functional classification of any pump or valve as stated in the IST program documents? 	☐ YES	X NO
 Air Operated Valve (AOV) Program Does the proposed activity impact or involve the design, operation or testing of AOVs? 	□ YES	X NO
 Buried Piping and Tanks (BP&T) Program Does the proposed activity impact or involve any changes to piping, coatings, or cathodic protection of Buried Piping & Components? 	☐ YES	M NO
 Boric Acid Corrosion (BAC) Program Does the proposed activity impact or involve any increase in the likelihood of boric acid formation or corrosion? 	🗌 YES	🕅 NO
 Check Valve Program Does the proposed activity impact or involve the design, operation or testing of check valves? 	☐ YES	X NO
 Control Room Habitability Program Does the proposed activity impact or involve changes that affect the temperature or radiological environmental conditions in the Main Control Room? 	TYES	X NO
 Electrical Circuit Breaker, Relay and Electrical Equipment Testing Does the proposed activity impact or involve changes to the functional testing of circuit breaker, relay or electrical equipment? 	YES	



EN-DC-115

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Engineering Change Process

IMPACT SCREENING SUMMARY

ATTACHMENT 9.3 SHEET 5 OF 6

PROGRAMS AND COMPONENTS (CONTINUED)	Potentia	al Impact
 Flow Accelerated Corrosion (FAC) Program Does the proposed activity involve any changes (e.g.: configuration, velocity, flow rate, pressure, temperature, material, weld location, etc.) to piping systems included in the FAC Program.? 	🗌 YES	X NO
 Heat Exchanger Program Does the proposed activity impact or involve the design, operation or testing of a component in the heat exchanger program? 	☐ YES	🕅 NO
 Predictive Maintenance Program Does the proposed activity impact or involve any aspect of the storage, use and testing of lubricants? Does the proposed activity involve thermography? Does the proposed activity involve vibration monitoring? 	☐ YES	X NO
 Microbiological Induced Corrosion (MIC) Program Impact Does the proposed activity involve piping containing untreated or stagnant water or open to the atmosphere? 	U YES	XI NO
 Motor Operated Valve (MOV) Program Does the proposed activity impact or involve the design, operation or testing of MOVs? 	☐ YES	NO I
 Plant Thermal Performance Program Does the proposed activity impact or involve plant thermal performance? 	□ YES	🕱 NO
 Preventive Maintenance Program Does the proposed activity impact or involve periodic testing or performance of SSCs? or Does the proposed activity add, modify or delete any Environmental Qualification (EQ) maintenance requirement or replacement frequency to ensure the component(s) maintains its gualification status? 	☐ YES	X NO
 PT Curves Does the proposed activity add, delete, or modify the basis (as contained in each sites reactor vessel surveillance material testing program) for the Pressure / Temperature Limit Curves (fluence, pressure, temperature, reactor materials)? 	☐ YES	X NO
 Relief Valve Program Does the proposed activity impact or involve the design, operation and testing of relief valves, safety valves, vacuum breaker valves or rupture disc? 	☐ YES	X NO
 RPV Internals Program Does the proposed activity impact or involve any change to the reactor internals? This includes "software only" changes that do not physically change the hardware such as re-rating of pressures or temperatures. Does the proposed activity impact or involve or related documentation to include neutron fluence or neutron fluence calculations? Does the proposed activity impact or involve or changes to core flow characteristics or core flow characteristics? 	☐ YES	X NO



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Engineering Change Process

IMPACT SCREENING SUMMARY

ATTACHMENT 9.3

SHEET 6 OF 6

PROGRAMS AND COMPONENTS (CONTINUED)	Potentia	al Impact
 Welding Program Does the proposed activity impact or involve a special process, such as welding, brazing or soldering? 	YES	
 Safety Program Does the proposed impact or activity involve personnel or industrial safety? 	YES	
 System Engineering Does the proposed activity impact or involve any changes to system configuration, function or performance, etc., for Maintenance Rule or other system? Does the proposed activity impact or involve any changes to system procedures, maintenance or operation, etc.? 	YES	□ NO
 Training Program Does the proposed activity involve existing training requirements or create the need for new training? 	YES	□ NO
 Simulator Impact Does the proposed activity impact or involve changes to the Simulator? 	YES	
 Fire Protection Program Does the proposed activity result in a change to the Fire Protection Program (including 10CFR50 Appendix R) where the impact is more than negligible? 	☐ YES	🕅 NO

Detailed Impact Screening (Attachment 9.4) Attached?
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Attachment 2

Conceptual Design Sketches

- 1. Figure 1: PARTIAL SITE PLAN OF AREAS AFFECTED
- 2. Figure 2: PROVIDE ALTERNATE SAFE SHUTDOWN SYSTEM FOR 31 RHR AND 31 SI PUMP





Attachment 3

References

- 1. ENTERGY Nuclear Management Manual, Engineering Change Process, Rev 11
- Association for the Advancement of Cost Engineering (AACE), Cost Estimate Classification System - As Applied In Engineering, Procurement, and Construction for the Process Industries
 - TCM Framework: 7.3 Cost Estimating and Budgeting
 - Figure 4 Estimate Checklist & Maturity Matrix
- 3. ASCO Series 386 Non-Automatic Power Transfer Switches or Equivalent

Power Switching & Controls for Business-Critical Continuity

ASCO Series 300 Power Transfer Switches







IPEC00270350

ASCO[®] SERIES 386 Non-Automatic Power Transfer Switches

User-Initiated Control

ASCO 386 non-automatic transfer switches are generally used in applications where operating personnel are available and the load is not an emergency type requiring automatic transfer of power. The power-switching mechanism and controller is the same hardware used on the highly reliable ASCO SERIES 300 transfer switches. ASCO 386s are furnished as standard with a momentary-type selector switch to initiate transfer and re-transfer. They can also be arranged for remote control via ASCO's connectivity products.



Fig. 14: ASCO 386 400 Amp Type 1 Enclosure w/Optional Accessories 9C, 9D Source Availability Lights



Fig. 15: Control and Display Panel

Electrical Features:

- Listed under UL 1008, CSA certified:
 - UL listed through 480 VAC.
 - CSA certified through 600 VAC.
- Door-mounted selector switch for local, manually initiated electrical control.
- Sizes from 30 through 3000 amps. Available to 600 VAC, 50 or 60 Hz.
- Rated for all classes of load transfer.
- 100% tungsten load ratings through 400 amps.
- Designed for emergency and standby applications.
- Same withstand and close-on rating as SERIES 300.

Standard Selectable Control Features:

- Inphase monitor to transfer motor loads between live sources, without any intentional off time, to prevent inrush currents from exceeding normal starting levels.
- Selective load disconnect, double-throw contact to operate at an adjustable 0 to 20 second time delay prior to transfer and reset 0 to 20 seconds after transfer.
- High/Low nominal voltage setting. Allows user to adjust for source low reduced voltage conditions in remote areas.
- 60 Hz or 50 Hz selectable switch.
- Single/Three-phase selectable switch.

Control Features:

- Switch position indicating signal lights.
- One auxiliary contact closed when transfer switch is connected to normal and one closed on emergency, standard feature 14A/14B.

Optional Accessories:

- 6Q Key-operated, momentary source selector switch furnished instead of the standard selector switch.
- 9C, 9D Source availability lights to provide operator with a local indication of power source availability.
- Accessory 14AA/14BA auxiliary contacts to indicate position of main contacts. Two (2) for normal position and two (2) for emergency position (one set is standard).
- 72A Serial module (5110) is used to allow local or remote communications with ASCO POWERQUEST[®] connectivity products.
- Special Enclosures
 (Specify by appropriate code in catalog number):
 Type 3R: Rain-tight
 Type 4: Weatherproof
- Type 12: Oil Tight • 72E Connectivity Module 5150 is used to bring several different serial devices that communicate at different baud rates and with different protocols to a common Ethernet media.

RCM	Technologies	ENTERGY	Conceptual Design	
	The Source of Smart Solutions	Unit 3	SAMA IP3 -055	Rev. 0

Attachment 4

Cost Estimate

* ESTIMATE LEVEL *		EC #: SAMA IP3-055									
Conceptual	PROJECT TITLE: 31 SI & 32 RHR P	umps Safe Shutdown	CAPITAL 08M	ESTIMATOR: Doug Staton							
Preliminary	JOB LOCATION: Primary Auxiliary &	& Turbine Buildings	PROJECT CODE: TBD)							
Definitive		RIGINATOR:		ORIG. DATE: 12/01/10							
	ESTIMATE TOTAL \$1,589,189)	REVISION	10-0							
Summary of Change: In accordance with NRC environmental regulations in 10 C.F.R. Part 51, Entergy performed Safe Accident Mitigation Alternative (SAMA) analyses for both Indian Point Nuclear Generating Units 2 and 3 as part of its license renewal application. Those analyses identified a number of potentially cost-beneficial SAMA's for each unit. In its license renewal application and related correspondence with the NRC Staff, Entergy indicated that it would submit the potentially cost-beneficial SAMA's for further internal engineering project cost-benefit analysis, even though none of the potentially cost-beneficial SAMA's is related to aging management order 10 C.F.R. Part 54 This package provides a conceptual design and implementation cost estimate for SAMA IP3-055 in accordance with Entergy design engineering practices. For SAMA IP3-055, resolution is required to make available an alternate source of 480VAC power to a Safety Injection System (SIS) pump and Residual Heat Removal (RHR) pump. This action is required in the event of flooding in the 480VAC Vital Switchgear Room (switchgear room) at Elevation 15' - 0" that prevents the normal 480VAC power from being available. Pump 31 SI and Pump 31 RHR have been selected to be available for the alternative power option. The 2000 kVA at 6.9 kV transformer power source has available margin sufficient enough to power an addition to MCC312A for the purpose required here. Since a connection for the new MCC will be required downstream of the transformer's existing relay protection.											
preferred.	C will be required downstream of the lit	ansiormer's existing rela	y protection, locating th	e new MCC in the existing substation area is							
The new manually operated room, the new requirement for	transfer devices will be installed in local or the two pumps to be powered from a	tions near the pumps. Si n alternate source requir	nce the pumps are pres es a load analysis for th	sently powered only from the Unit 3 switchgear new power source.							
In addition to the alternate power source required, a service capable of switching the alternative power to the designated Pump 31SI and Pump 31 RHR is also required. Considering the amount of new cable needed for installation, the most efficient means of implementing this part of the design change requires each "switch" to be installed in the area local to its associated pump.											
Prepared by:	ettacyool .	Approved by									
Date: 9 -	20-2012	Date: 9	- 20 - 201	Ž.							

[ENTERGY NUCLEAR NORTHEAST
1	IMPLEMENTATION ESTIMATE
-	Indian Point Nuclear Power Station
ESI	
	Brolingary Inc. Inc. 1 SI & 32 RHR Pumps Safe Shutdown ESTIMATOR: Doug Staton
	Definition JOB LOCATION: Primary Auxiliary & Turbine Buildings PROJECT CODE: TBD
	ORIGNATOR: ORIG. DATE: 12/01/10
Item	Description
1.	This estimate assumes that this work will not require outage conditions to complete
2.	This estimate assumes that this work will complete during 2014 working a 10 hours per shift, four days per week schedule.
3.	I his estimate assumes that this work will not suffer productivity loss due to radiation, hazardous conditions or QC hold points.
4.	This estimate assumes that all work will be performed by trained contract cratispersons in lieu of station maintenance personnel.
5.	This estimate assumes that core boring is required between E. 15 - 0 and 33 - 0 cable spreading area.
0.	This estimate assumes that any MCC still be considered and power by States Martineanes are power by the state of the states and the states are states and the states are states and the states are states and the states are states and the states are states and the states are states and the states are states and the states are states and the states are states are states are states and the states are states a
	This estimate does not include funding for uncertained and powered by Station wanternative personner.
- <u>0.</u>	This estimate does not include ranking of uneviewed safety questions on NCC submittais, but integrate does not include ranking of uneviewed safety questions and is classified Class 4 as defined on the actionations in the ranking comparison of the constraints of the ranking comparison of the constraints of the ranking comparison of the constraints of the ranking comparison of the constraints of the ranking comparison of the constraints of the cons
9.	Estimate Classification System (see Attachment 3, Reference 2)
	Labor dollars in this estimate are projected 2014 costs based on current 2012 craft billing rates at Indian Point. The projected costs provide
10.	for anticipated billing rate increases of 3% per year.
	This estimate allows for and includes a contingency factor related to the complexity and location of the work required. The factor is
11.	cumulative and progresses as follows:
	A. Outside fence boundary - 20%
	B. Inside fence boundary - 30%
	C. Implementation complexity - 40%
	D. Inside Containment - 50%
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INDIAN POINT IMPLEMENTATION ESTIMATE WORK SHEET 7/31/2012 7:10 AM EC #: SAMA IP3-055

TAKEOFF

10-0 PROJECT TITLE: 31 SI & 32 RHR Pumps Safe Shutdown DB LOCATION: Primary Auxiliary & Turbine Buildings _ST. STATUS:

LOCATION: Primary Auxiliary & Turbine Buildings , STATUS:	11						PROJECT	CODE: T	BD			1	ESTIMATOR	: Dou	ug Staton 01/10		
DESCRIPTION	ΟΤΥ	UOM	CET		M	ANHOUF	RS	S/MH	N	ATERIAL S	MATERIA			CC	SUB-	T T	
BEGORI HON		0011	011	110.	Unit		TOTAL			FLRONI	DOLLAN	31	DOLLANS				
* ESTIMATE LEVEL * Conceptual Preliminary			EOI	ENGI	NEERING				E	STIMATE S	UMMARY MANHOL	URS	\$	00	LLARS		
Définitive			01 02		STUDY, D DESIGN E	ESIGN, 8 NGR CO	L CLOSEOU	T DRT			800 160	כ ר		\$ \$	80,000 16,000		
General Notes:			03 04 05		MODS EN SYS ENGI PROJECT	GR EOI S R/ S-U EN MANAGI	SUPPORT NGR EMENT				280	- 0 0		\$ \$ \$	28,000 72,000		
			06		ENGINEE	RING DC		NCE RE	ЛЕW		200	5		љ \$	20,000		
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			MAT 12 13	ERIAL	S / MISC C MATERIAL OTHER C	CONTRAC	75 TS							\$ \$	14,804		
			14	IRAC	SWEC CR	ABOR	OR/WALKD	OWN			1,995	5		\$	205,269		
			15 16 PLA	NT CR	LOST TIM SWEC DIS AFT LABO	e Stribs I R					200	נ		\$ \$	26,108 56,130		
			17 18 19		MECH MA ELECT M I&C	AINT. AINT					32	-		\$ \$ \$	3,200		
			MISC	C EOI :	SUPPORT							-		\$	-		
			21 22		QUALITY	CONTRO	DL				120 48	3		\$ \$	12,000 5,760		
			23 24 25		CHEMIST OPS / OP HP / RP	'RY 'S SUPPC	DRT				160 80	-))		\$ \$ \$	19,200 6,365		
			MIS(26 27	C CON	QUALITY NDE	CONTRO	DL.				130)		\$ \$	10,400		
			28 29		HP / RP RADWAS	STE		-			-	\$- \$-					
			30		NURSE						- \$ -						
			32		WASTEN	MANAGE	SEMENT -				-						
			33 34 35		EQUIPMI	ENT REN STOCKI	RENTAL CONTRACTOR				· \$ - · \$ - ~ \$ -						
			36 37 38		DECONT RBC'S SECURIT	'AMINATI Y - Wack	IINATION CONTACTOR				- \$- - \$-						
			39 40		FIRE WA	TCH (Ro	(Rover)					- \$ -					
			CON	ITING	ENCY	CHOY	4					\$ 2,788					
			ESTIN	ATE	SUBTOTAL	-					6,586	5		\$	1,018,711		
								LOADE	RS (30%)	KEMIUM (209	/6)	\$ \$	203,742 366,736		
	\vdash	<u> </u>						ESTIN		TOTAL		T		\$	1,589,189		
Preliminary to Tie-ins Gather and stage tools and materials Stage, erect & modify scaffolding as required Stage, erect & modify scaffolding as required Core drill as required to route new conduit Procure & install new MCC312A EXT, 2 buckets and 480/AC switchear as required	1 1 3 1	LT LT LT LT EA	EL CP LB EL EL	4 2 1 2 4	10.00 16.00 16.00 20.00 30.00	1.00 1.00 1.00 1.00 1.00	40 32 16 120	\$ 123.3 \$ 96.0 \$ 78.1 \$ 123.3	2 10 5 22 \$	8,500.00	\$ - \$ - \$ - \$ - \$ - \$ -		 4,933 3,072 1,250 14,798 14,798 			5 5 5 5 5	4,933 3,072 1,250 14,798 23,298
Install a manually operated transfer switches at El. 15' - 0" & El. 34' - 0" in the Primary Aux.Building	2	EA	EL	2	24.00	1.00		E 400 S	\$	500.00	\$ 1,000		\$ 11,839			\$	12,839
Procure and erect 1 ^e conduit as required Procure and erect 2 ^e conduit as required	200 280	LF LF	EL EL	2	0.18 0.20	1.00 1.00	72 112	\$ 123.3 \$ 123.3 \$ 123.3	2 \$	1.75 2.50	\$ 350 \$ 700		\$			\$ \$	9,229 14,512
Procure and field erect junction box as required Procure and field erect conduit support Procure, pull & route 2/c cable as required	14 60 720	EA EA LF	EL EL EL	2 5 2	1.00 1.00 0.018	1.00 1.00 1.00	28 300 26	\$ 123.3 \$ 123.3 \$ 123.3	2 \$ 2 2 \$	10.00 6.00 1.25	\$ 140 \$ 360 \$ 900		\$ 3,453 \$ 36,996 \$ 3,206			\$ \$ \$	3,593 37,356 4,106
Procure, pull & route 480VAC 4/c cable as required	1,344	LF	EL	2	0.03	1.00	81	\$ 123.3	2 \$	1.50	\$ 2,016	6	\$ 9,989			\$	12,005
Tie-ins for New Switches Disconnect existing power cable at 31 SI & 31 RHR	2	LT	PL	2	30.00	1.00	120	\$ 60.0	0		\$.	- 9	\$ 7,200			\$	7,200
Connect new power cable to 31 SI, 31 RHR & transfer switches	2	LT	PL	2	20.00	1.00	80	\$ 60.0	00		\$-	- s	\$ 4,800			\$	4,800
Connect power cable in MCC312A and MCC312A EXT	1	LT	PL	2	60.00	1.00	120	\$ 60.0	00		\$.	- 4	\$ 7,200			\$	7,200
Provide testing as required	1	LT	PL	2	8.00	1.00	16	\$ 60.0	00		\$-	- \$	\$ 960			\$	960

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INDIAN POINT IMPLEMENTATION ESTIMATE WORK SHEET 7/31/2012 7:10 AM IP3-055 Si & RHR Pump Safe Shutdown (Rev_1-22-11) EC #: SAMA IP3-055

10-0 PROJECT TITLE: 31 SI & 32 RHR Pumps Safe Shutdown 38 LOCATION: Primary Auxiliary & Turbine Buildings

)B	LOCATION: Primary Auxiliary & Turbine Buildings	1						PROJECT	CODE: TBD)		ESTIMATO	R: Doug Staton		
<u> </u>		[M	ANHOUF	RS	UK.	MATERIAL \$	MATERIAL	LABOR	SUB-		
ITEN	DESCRIPTION	QTY	UOM	CFT	NO.	UNIT	FCTR	TOTAL	\$/MH	PER UNIT	DOLLARS	DOLLARS	CONTRACT	TC	TAL \$
5. 6. 7.	Assist with testing as required Dismantle scaffolding to storage Dismantle scaffolding to storage	1 1 1	LT LT LT	EL CP LB	2 2 1	40.00 16.00 16.00	1.00 1.00 1.00	80 32 16	\$ 123.32 \$ 96.00 \$ 78.15		\$- \$- \$-	\$ 9,866 \$ 3,072 \$ 1,250		\$ \$ \$	9,866 3,072 1,250
8.	Cleanup and restore area PAINTING & TOUCH-UP REQUIREMENTS	1	LT	EL	4	8.00	1.00	32	\$ 123.32		\$-	\$ 3,946		\$	3,946
1.	PAINTING & TOUCH-UP			PT				-			\$-	\$ -		\$	-
2.	PAINTING & TOUCH-UP			1 11				-			\$-	5 -		\$	-
	FIRE WATCH / BOTTLEWATCH REQUIREMENTS														
1.	CRAFT SUPPORT FOR FIRE WATCH	10	LT	FW FW	2	24.00	1.00	240	\$ 53.60		\$- \$-	\$ 12,864 \$ -		\$ \$	12,864
1.	MISC SUB-CONTRACT	1	LT										\$ -	\$	-
	SUBTOTAL CRAFT & SUB-CONTRACTOR							1,739			\$ 13,966	\$ 173,250	\$ -	\$	187,216
1.	CONSTRUCTION SUPPORT (8% OF LABOR \$)	1	LT					139	\$ 99.63	\$-		\$ 13,849		\$	13,849
	SUBTOTAL							1 878			\$ 13 966	\$ 187.099		\$	201.065
								1,070			• 10,000	101,000	1	Ť	201,000
1	* RELATED COSTS *														
1.	WALKDOWN ALLOWANCE	1	LT	EL				17	\$ 123.32			\$ 2,096		\$	2,096
3.	TOOL ROOM ATTENDANTS (~3.5%)	1	LT	EL				34 66	\$ 123.32 \$ 123.32			\$ 4,193 \$ 8,139		\$	4,193 8,139
4.	GENERAL CRAFT OUTAGE DISTRIBS. (10%)											\$ 18,710		\$	18,710
6.	HUMAN PERFORMANCE & ALARA TRAINING	1	LT									\$ 3,742		\$	3,742
7.	(1/2 day training, or ~ 2%)							1 995			\$ 13,966	\$ 261 399	<u> </u>	s	275 365
 											• • • • • • • •				
•				Р							s -	s .		\$	_
1. Jeremen				PL				_			\$ -	\$		\$	-
 	SUBTOTAL MECH MAINT.	<u> </u>		 				-			\$ -	\$-	\$ -	\$	-
1.	ELECT MAINTENANCE	1	LT	PL	2	16.00	1.00	32	\$ 100.00		\$ -	\$ 3,200		\$	3,200
-	SUBTOTAL ELECT, MAINT.	 					L	32			\$- \$-	\$ 3,200	\$ -	\$	3,200
	IRC			Ы							\$.	s .		\$	
				PL	<u> </u>						<u>s</u> -	\$ -		\$	-
	SUBTOTAL I&C MAINT.							-			\$ -	\$		\$	-
1.	CSG			PL				-			\$ -	\$ -		\$	•
	SUBTOTAL CSG MAINT.							-			\$ - \$ -	\$ -	\$ -	\$	-
			 				<u> </u>	22			c	E 2 200	 t	e	3 200
	SUBICIAL FLANT	<u> </u>						32				\$ 3,200	+*	-	0,200
	SUBTOTAL CRAFT/PLANT	ļ		 			 	2 027			\$ 13.966	\$ 264 599	1.5	s	278 565
								L,OLI			\$ 10,000	0 204,000	1	Ť	2/0,000
	EOI														
1.	FIS / MODS ENGINEERING	1	LT	NM		160.00	1.00	160	\$ 100.00			\$ -		\$	-
3.	SYSTEMS ENGINEERING - MECHANICAL	1	LT	NM	'	100.00	1,00	- 100	\$ 100.00			\$ 10,000		\$	- 10,000
4,	SYSTEMS ENGINEERING - ELECTRICAL	1	LT	NM NM	1	160.00	1.00	160	\$ 100.00			\$ 16,000 \$ 4,000		\$	16,000 4,000
6.	SYSTEMS ENGINEERING - CIVIL STRUCTURAL	i	LT	NM	1	80.00	1.00	80	\$ 100.00			\$ 8,000		\$	8,000
7. B.	PROJECT MANAGEMENT WORK MANAGEMENT(W.O. Development)			NM NM	1	600.00	1.00	600	\$ 120.00			\$ 72,000		\$	72,000
9.		1	LT	NM	1	120.00	1.00	120	\$ 100.00			\$ 12,000		\$	12,000
11.	HP / RP/ ALARA	1	LT	NM	1	80.00	1.00	80	\$ 79.56			\$ 6,365		\$	6,365
12.	CHEMISTRY OPS(New proc. dev / rev.existing.proc)			NM NM	1	160.00	1 00	160	\$ 120.00			\$ - \$ 19.200		\$ \$	- 19,200
14.	TRAVEL & LIVING EXPENSES	1	LT									\$ -		\$	
1.	FIS / MODS ENGINEERING - SWEC (Incl Per Dien	1	LT	NM	1			-				\$ -		\$	-
2.	MODS PLANNING & SCH SWEC (Incl Per Diem)	1		NM NM		160.00	1.00	160	\$ 100.00			\$ 16,000 \$ 16,000		\$ \$	16,000 16,800
1 4.	QA / QC VERIFICATION	1	LT	NM	1	130,00	1.00	130	\$ 80.00			\$ 10,400		\$	10,400
5. 6.	NDE HP/RP	1		NM NM	1	11.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1		-				\$ - \$ -		\$ 5	-
7.	RADWASTE	1	LT	NM				-							
о. 9.	ELEVATOR CONTRACTOR	1		NM				-							
10.	WASTE MANAGEMENT	1		NM NM				-							
12.	EQUIPMENT RENTAL CONTRACTOR	1 1	LT	NM											

	Rev.	Page 5 of 5
1	10-0	

INDIAN POINT IMPLEMENTATION ESTIMATE WORK SHEET 7/31/2012 7:10 AM EC #: SAMA IP3-055 SI & RHR Pump Safe Shutdown (Rev_1-22-11)

]	<u></u>																
IPRO	JECT TITLE: 31 SI & 32 RHR Pumps Safe Shutdowr	a -				1						TA	KEOFF:				
IOB	3B LOCATION: Primary Auxiliary & Turbine Buildings						PROJECT CODE: TBD ESTIMATOR: Doug Staton										
EST.	EST. STATUS:							ORIGINAT	OR:			OR	IG. DATE	: 12/01/	10		
	1					M	ANHOUF	RS		MATERIAL \$	MATERIAL	1 L	ABOR	S	UB-		
ITEM	DESCRIPTION	QTY	UOM	CFT	NO.	UNIT	FCTR	TOTAL	\$/MH	PER UNIT	DOLLARS	D	OLLARS	CON	TRACT	٢	FOTAL \$
13.	VENDOR STOCKING	1	LT	NM				-			1	1		1			
14.	DECONTAMINATION CONTRACTOR	1	LT	NM												1	
15.	RBC's	1	LT	NM	1			-							1	1	
16.	SECURITY	1		SEC		1		-							ł		1
17.	FIREWATCH (Rover)	1	LT	NM				-				\$	_			5	-
18.	SAFETY (2%)	1	LT	NM		[41	\$ 66.00		l	5	2,788			\$	2,788
19.	LOST TIME (10%)	1	LT					200	\$ 130.54			\$	26,108			\$	26,108
	SUBTOTAL CRAFT/NON-MANUAL	T	T			[4,146			\$ 13,966	\$	496,020	\$	-	\$	509,986
													Conversion of the Original State				Part of the second second second second second second second second second second second second second second s
1.	FREIGHT, SALES TAX, & CONSUMABLES (6%)										\$ 838				1	\$	838
				I													
	SUBTOTAL INSTALLATION COST		1					4,146			\$ 14,804	\$	496,020	\$	•	\$	510,824
		-															
1.	DESIGN ENGINEERING - MECHANICAL	1	LT	NM		1		-				s	-		1	\$	-
2.	DESIGN ENGINEERING - ELECTRICAL	1 1	LT	NM	1	800.00	1.00	800	\$ 100.00			s	80,000		}	\$	80,000
3.	DESIGN ENGINEERING - INSTR. & CONTROL	1	LT	NM				-				\$				\$	-
4.	DESIGN ENGINEERING - CIVIL/STRUCTURAL	1	LT	NM		1		-				\$	-		ļ	\$	-
5,	CONTRACT ENGR DESIGN SUPPORT	1	LT	NM	1	1,440.00	1.00	1,440	\$ 120.00			1		\$	172,800	\$	172,800
6.	ENGINEERING DCP ACCEPTANCE REVIEW	1	LT	NM	1	200.00	1.00	200	\$ 100.00				1	\$	20,000	\$	20,000
	SUBTOTAL DESIGN COST	[[]		2,440			[\$	80,000	\$	192,800	\$	272,800
														ſ			
	SUBTOTAL INSTALLATION & DESIGN COST	1	1			7		6,586				\$	576,020	\$	192,800	\$	783,624
												1					
1.	CONTINGENCY (30%)				1										1	\$	235,087
		1										L					
												I			-		
1	ESTIMATE SUBTOTAL		1 1	1 1	1	1								I		15	1,018,711



ENTERGY INDIAN POINT NUCLEAR STATION UNIT 3

CONCEPTUAL DESIGN PACKAGE For

SAMA IP3-061

Upgrade/Provide Alternate Safe Shutdown System for RCP Seal Cooling

Prepared by:	Approved by:
Joh Bettowers:	
Date: 9-20-2012	Date: 5-21 - 22

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1.0 ISSUE

RCM

Severe Accident Mitigation Alternative (SAMA) IP3-061:

Upgrade/Provide Alternate Safe Shutdown System for RCP Seal Cooling

2.0 BACKGROUND

In accordance with NRC environmental regulations in 10 C.F.R. Part 51, Entergy performed SAMA analyses for both Indian Point Nuclear Generating Units 2 and 3 as part of its license renewal application. Those analyses identified a number of potentially cost-beneficial SAMAs for each unit. In its license renewal application and related correspondence with the NRC Staff, Entergy indicated that it would submit the potentially cost-beneficial SAMAs for further internal engineering project cost-benefit analysis, even though none of the potentially cost-beneficial SAMAs is related to aging management under 10 C.F.R. Part 54. Entergy contracted RCM Technologies to assist it in this effort.

This package provides a conceptual design and implementation cost estimate for SAMA IP3-061 in accordance with Entergy design engineering practices.

Component Cooling Water Pump 32 (32 CCW), Charging Pumps 31 (31 CHRG) and 32 (32 CHRG), and Service Water Pumps 33 (33 SW) and 34 (34 SW) are system pumps that are powered from the 480VAC Vital Switchgear Room (switchgear room) at Elevation 15'-0". These pumps can provide cooling water for Reactor Cooling Pump (RCP) seal cooling when needed. When necessary, this action needs to be provided in a timely manner.

For SAMA IP3-061, resolution is required to provide the ability to switch Pump 32 CCW, and Pumps 31 CHRG and 32 CHRG to their existing alternative power source more quickly than is currently possible using the existing manual-transfer method.

For Pumps 33 SW and 34 SW a more extensive resolution is required. These two pumps are currently installed without any provision for an alternative power source. An alternate power supply to each of these pumps would provide the required power in the same way as the three currently installed pumps that are being upgraded

The modifications described above are in the event of flooding in the switchgear room that prevents the normal 480VAC power from being available.

The design considerations that follow will address the resolution's adequacy and the basis for the recommendation to resolve the identified potential issue.



The recommended solution will include descriptive details of the design change and also conceptual design sketches as required. These descriptive details, sketches, and the preliminary material list provide the basis for initiating the all-inclusive conceptual cost estimate for EC development and implementation at the Station.

3.0 EXISTING CONDITIONS

In the event of loss of RCP seal cooling, the time it takes to get to these local devices to manually switch to alternate power can be too long.

Currently, three of the selected pumps (Pump 32 CCW, and Pumps 31 CHRG and 32 CHRG), during emergency conditions, are powered from their alternate power connection at Substation MCC312A. This is accomplished with the operation of manually operated transfer switches located at the respective pump areas. In the event of loss of RCP seal cooling, it will take an operator too much time under certain circumstances to get to these local devices to switch to alternate power. A provision to enable the alternate source of 480VAC power to be provided in a more timely way than the existing method is required.

Pumps 33 SW and 34 SW do not have any current capability to manually switch to alternate power. Under certain circumstances, these pumps require their power feed to be transferred to an alternate source of 480VAC power rapidly. The two pumps are required to be powered since they are on separate headers, either of which at the time of the event may be aligned to the non-essential cooling loads which include support of the RCP seal cooling function.

A provision to enable the alternate source of 480VAC power to be provided to both of these pumps in a timely way is required.

4.0 DESIGN CONSIDERATIONS

One way to activate the alternate source of 480VAC power rapidly is to install remotely operated switching devices in place of the locally installed manual switching devices or in the case of Pumps 33 SW and 34 SW add the remote operated transfer switches. These emergency power transfer devices will be able to be operated remotely from a new panel installed near (*but not in*) the Control Room. This philosophy ensures that the new installation maintains appropriate physical separation from the Control Rooms' existing design criteria and its current day to day operation.

These remotely located transfer switches will also be able to be operated at their installed locations.

The new remotely operated transfer devices (for Pumps 32 CCW, Pumps 31 CHRG and 32 CHRG) will be installed in the locations currently occupied by the manually operated devices.

The new remotely operated transfer devices (for Pumps 33 SW and 34 SW) will be installed in locations near the pumps. As stated, these two pumps are presently only powered from the Unit 3 switchgear room. With the new requirement for the two pumps to be powered from an alternate source, a load analysis of the components providing the new source needs to be performed.

The new transfer devices will also have the option of being operated manually at their location in addition to being operated from the remote Control Building location.

Control power for the new switching device's operating requirements will need to be provided from a source that is not affected by the potential Switchgear Room water intrusion.

5.0 CONFIRMATION OF DESIGN

RCM

The normal power source for Pumps 32 CCW, Pumps 31 CHRG and 32 CHRG and Pumps 33 SW and 34 SW is provided from the Unit 3 switchgear room.

MCC312A is currently the alternate power source for Pumps 32 CCW, Pumps 31 CHRG and 32 CHRG through the operation of manually operated transfer switches. This design package removes the pump's existing manually operated transfer switches and upgrades the pump's alternate power transfer method with new transfer switches that can be either remotely operated or operated locally.

Currently, for Pumps 33 SW and 34 SW, no alternate power transfer option is available. Therefore, there no transfer switches to be removed. This design will incorporate the addition of new transfer switches that can be operated remotely or operated locally and connected to power feeds that provide an alternate power source option to these pumps from MCC312A.

A preliminary investigation of the documents reviewed, in conjunction with engineering judgment, indicates the transformer connected to this substation has adequate margin and capability to provide the additional power required to operate the additional Pumps 33 SW and 34 SW. If further analysis somehow refutes this conclusion, based on an unforeseen and unanticipated rationale, a different power source will be utilized instead.

The new panel located near the Control room will provide the ability to transfer the pumps power requirements from the normal 480VAC to the alternate source. The

panel will also include the controls required for operating the pumps from this location instead of the Control room or at MCC312A.

6. **RECOMMENDED SOLUTION**

- 1. At each Pump 32 CCW, Pumps 31 CHRG and 32 CHRG existing manually operated transfer switches, disconnect the power cables.
 - Remove the existing manually operated transfer switches
- 2. In the locations previously occupied by the manual transfer switches, install the new electrically operated transfer switches.
 - Re-connect the removed power cables to the new transfer switches
 - Provide control power to operate each transfer switch with new cable and conduit routed from sources that are not affected by Switchgear Room flooding.
- 3. At each Pumps 33 SW and 34 SW:
 - Install the new electrically operated transfer switch.
 - Disconnect the existing pump power feed and re-connect it in new conduit at the "normal" input connection of the transfer switch
 - Install new cable and conduit from the pump to the "common" output connection at the transfer switch
 - Install a new cable and conduit connected at the "alternate' input connection of the transfer switch and route it to the new compartment at MCC312A.
 - Provide control power to operate each transfer switch with new cable and conduit routed from sources that are not affected by Switchgear Room flooding.
- 4. Outside the Control Room area install a new operating panel with power transfer ability and operating controls for Pump 32 CCW, Pumps 33 CHRG and 34 CHRG, and Pumps 33 SW and 34 SW.
 - Connect the transfer switches with new control cabling and conduit for its operation and route it to the new operating panel located outside the Control Room area.
 - Connect the five (5) pump motor control compartments at MCC312A with new control cabling and conduit for their operation and route it to the new operating panel located outside the Control Room area.
- 5. Revise the necessary procedures to ensure the requirement for restoration of power within 10 to 15 minutes and conduct training in response to these new operating conditions.

7.0 PRELIMINARY MATERIAL LIST

Item Description	Quantity
1. ASCO Series 386 Non-Automatic Power Transfer Switches or Equivalent	5
2. Control Switches	9
3. 2" – Conduit	350 Feet
4. 2/c Cable	2000 Feet
5. 4/c Cable	1000 Feet
6. 480 VAC – 4/c Power Cable	600 Feet
 MCC extension (2 buckets high x 1 bucket wide) with mounting brackets to connect to existing MCC 312A 	1
8. 480 VAC switchgear to be installed into MCC extension	2
9. Hoffman Box 12"x16"x10"	4



Attachment 1

Entergy Impact Screening Summary



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Engineering Change Process

ATTACHMENT 9.3

IMPACT SCREENING SUMMARY

SHEET 1 OF 6

INSTRUCTIONS:

Identify the potentially impacted and the unaffected areas by checking the appropriate **Yes** or **No** block on the Impact Screening Criteria.

If a direct determination cannot be made based on the impact screening questions, the detailed questions in Attachment 9.4 may be used to identify potential impacts.

The completion of detailed questions in Attachment 9.4 is recommended but not required.

Contact potentially impacted groups if assistance is required.

			SAMA
Enaineerina	Change	No.:	IP3-061

	C	ON	CE	PT	UA	١L			
Rev. No.:	D	esi	6	Ν	P4	١C	KA	6	E

Prepared by:

Date:

DESIGN ENGINEERING DISCIPLINES	Potentia	al Impact
 Civil / Structural Design Engineering Does the proposed activity involve any civil / structural (including seismic) design changes, activities or affect coatings? OR Does the proposed activity involve any piping engineering design changes or activities? 	YES	□ NO
 Electrical Design Engineering Does the proposed activity involve any station or switchyard electrical design, large power transformers, or settings changes or activities? (SOER 10-1) 	YES	
 Instrumentation and Controls Design Engineering Does the proposed activity involve any I&C design or settings changes or activities? 	YES	
 Mechanical Design Engineering Does the proposed activity add/remove/replace insulation, aluminum or other metallic/non-metallic sources of debris in the reactor/containment building or involve any mechanical design changes or activities? 	☐ YES	X NO
 PSA Engineering Does the proposed activity impact or involve changes to plant evaluations or probabilistic safety assessments? Does the proposed activity impact or involve changes to the Emergency Operating Procedures, Abnormal Operating Procedures, or Severe Accident Procedures or does it add, remove or modify SSCs included in a Maintenance Rule function? 	YES	□ NO
 Nuclear Analysis Does the proposed activity impact or involve changes to plant evaluations, Technical Specifications, Technical Requirements Manual, or require a full 50.59 Evaluation? 	YES	
 FERC / NERC Impact Does the proposed activity impact or involve change to FERC / NERC or Regional Entity compliance documents? (ex. MOU, ENN/ENS-PL-158, ENS-DC-199, etc.) 	☐ YES	X NO



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Engineering Change Process

IMPACT SCREENING SUMMARY

ATTACHMENT 9.3

Sheet 2 of 6

DESIGN ENGINEERING PROGRAMS	Potential	Impact
 ASME Section III Specifications Does the proposed activity add, delete, or modify information required by ASME Section III to be contained in a design specification? 	T YES	🕅 NO
 Cable and Raceway Program Does the proposed activity involve any changes to cable trays, raceways or the associated documentation? 	YES	
Electronic Databases (EDB) Does the proposed activity involve any changes to electronic databases?	□ YES	🕅 NO
 EQ Program (10CFR50.49, NUREG 0588, Reg Guide 1.89) Does the proposed activity involve any new or existing EQ components? 	□ YES	X NO
 Hydrogen Control Program (10 CFR 50.44) (<i>if applicable</i>) Does the proposed activity impact equipment or materials related to hydrogen control? 	□ YES	M NO
 Human Factors Program Does the proposed activity involve control panel design including layout and labeling, visual displays, operator aids, auditory signals or environment in the control room, cable spreading room, and other control panel locations? 	YES	□ NO
 Margin Management Does the proposed activity impact or involve any change to design, licensing or operations margins? 	TYES	🕅 NO
 Reg. Guide 1.97 / PAM (Post Accident Monitoring) Does the proposed activity involve Reg. Guide 1.97 (Post Accident Monitoring) Indications? 	☐ YES	🕅 NO

MAINTENANCE	Potentia	Impact
 Electrical Maintenance Does the proposed activity require an Electrical Maintenance review to identify affected procedures, required actions and required training? 	YES	
 Maintenance Does the proposed activity require an I&C Maintenance review to identify affected procedures, required actions and required training? 	YES	□ NO
 Mechanical Maintenance Does the proposed activity require a Mechanical Maintenance review to identify affected procedures, required actions and required training? 	☐ YES	⊠ NO

NUCLEAR ENGINEERING		Potential Impact	
 Nuclear Fuel Design Does the proposed activity impact or involve the design, performance or storage of nuclear fuel? 	TES	X NO	
 Reactivity Management Program Does the proposed activity impact or involve the reactor system, reactor controls, reactor chemistry, related systems, potential core and spent fuel damage, spent fuel, reactor coolant pressure boundary or reactor system procedures? 	TYES	X NO	



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Engineering Change Process

IMPACT SCREENING SUMMARY

ATTACHMENT 9.3

SHEET 3 OF 6

PROCESS OR PROGRAM IMPACT SCREENING CHECKLIST		Potential Impact	
Computer Support and Software	☐ YES	🕅 NO	
 Does the proposed activity impact or involve changes to plant computer software or firmware or impact Software Quality Assurance (SQA)? 			
Chemistry and Environmental Impact	□ YES	🕅 NO	
 Does the proposed activity impact or involve any changes to plant chemistry requirements, operations or procedures, or any changes to the environment? 			
Radiation Protection (RP) Program Impact	🗆 YES	🕅 NO	
 Does the proposed activity impact or involve any changes to the RP program? Does the proposed activity involve the potential to introduce (or reintroduce) any cobalt containing materials (such as Stellite) into the primary system? 			
 Operations Does the proposed activity impact or involve changes to Operations procedures, training or operator actions? 	YES	□ NO	
 Planning, Scheduling and Outage (PS&O) Does the proposed activity require a PS&O review to identify required design and installation information? 	YES	□ NO	
 MP&C (Inventory) Does the proposed activity impact or involve any addition or removal of equipment from the inventory? Does the proposed activity impact or involve any Procurement of Quality or Augmented Quality material from non-qualified suppliers? 	■ YES	□ NO	
Procurement Engineering Does the activity impact or involve any procurement activities?	YES		

PROGRAMS AND COMPONENTS		Potential Impact	
 ASME Containment In-service Inspection (IWE / IWL) Program Does the proposed activity impact or involve the containment pressure boundary or associated moisture barriers or a support for the containment pressure boundary? This includes "software only" changes that do not physically change the hardware such as re-rating of pressures or temperatures to include changes to documented information on these items or additional documented information for these items. Does the proposed activity limit access to containment surfaces for inspection? Involve disassembly of a bolted connection which forms a portion of the containment boundary? 	YES	X NO	
 ASME Appendix J (Primary Containment Leak Rate Testing) Program Does the proposed activity impact or involve any changes to primary containment leak rate testing? 	T YES	K NO	



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Engineering Change Process

IMPACT SCREENING SUMMARY

ATTACHMENT 9.3 SHEET 4 OF 6

PROGRAMS AND COMPONENTS (CONTINUED)		Potential Impact	
 ASME In-service Inspection (ISI) Program Does the proposed activity add, delete, or modify an ASME Section XI pressure boundary item or a support for an ASME Section XI pressure boundary item? This includes "software only" changes that do not physically change the hardware like such as re-rating of pressures or temperatures. (ASME Section XI items include ASME Class 1, 2, 3, or B31.1 treated as ISI Class 2 or 3 (T2 and T3) components, parts, or appurtenances such as pipe or pressure vessel walls, valve bodies and pump casings. 	☐ YES	M NO	
 ASME Section XI Repair / Replacement Program Does the proposed activity involve any mechanical component within the ASME XI program / boundaries? Does the proposed activity add, delete, or modify an ASME Section XI pressure boundary item or a support for an ASME Section XI pressure boundary item? (ASME Section XI items include ASME Class 1, 2, 3, MC, and CC, as well as B31.1 treated as ISI Class 2 or 3 (T2 and T3) components, parts, or appurtenances such as pipe or pressure vessel walls, valve bodies and pump casings). 	☐ YES	X NO	
 ASME In-service Testing Program Does the proposed activity impact or involve any item (safety related or non safety related) that may affect the performance or testing of a safety related pump or valve? Does the proposed activity impact the function or functional classification of any pump or valve as stated in the IST program documents? 	☐ YES	X NO	
 Air Operated Valve (AOV) Program Does the proposed activity impact or involve the design, operation or testing of AOVs? 	☐ YES	X NO	
 Buried Piping and Tanks (BP&T) Program Does the proposed activity impact or involve any changes to piping, coatings, or cathodic protection of Buried Piping & Components? 	TES	🕅 NO	
 Boric Acid Corrosion (BAC) Program Does the proposed activity impact or involve any increase in the likelihood of boric acid formation or corrosion? 	T YES	🕅 NO	
 Check Valve Program Does the proposed activity impact or involve the design, operation or testing of check valves? 	TYES	X NO	
 Control Room Habitability Program Does the proposed activity impact or involve changes that affect the temperature or radiological environmental conditions in the Main Control Room? 	🗌 YES	MO 🕅	
 Electrical Circuit Breaker, Relay and Electrical Equipment Testing Does the proposed activity impact or involve changes to the functional testing of circuit breaker, relay or electrical equipment? 	HYES	□ NO	



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Engineering Change Process

IMPACT SCREENING SUMMARY

ATTACHMENT 9.3

SHEET 5 OF 6

PROGRAMS AND COMPONENTS (CONTINUED)	Potenti	al Impact
 Flow Accelerated Corrosion (FAC) Program Does the proposed activity involve any changes (e.g.: configuration, velocity, flow rate, pressure, temperature, material, weld location, etc.) to piping systems included in the FAC Program.? 	🗌 YES	X NO
 Heat Exchanger Program Does the proposed activity impact or involve the design, operation or testing of a component in the heat exchanger program? 	TYES	🔀 NO
 Predictive Maintenance Program Does the proposed activity impact or involve any aspect of the storage, use and testing of lubricants? Does the proposed activity involve thermography? Does the proposed activity involve vibration monitoring? 	T YES	🕅 ио
 Microbiological Induced Corrosion (MIC) Program Impact Does the proposed activity involve piping containing untreated or stagnant water or open to the atmosphere? 	U YES	🕅 NO
 Motor Operated Valve (MOV) Program Does the proposed activity impact or involve the design, operation or testing of MOVs? 	T YES	XI NO
 Plant Thermal Performance Program Does the proposed activity impact or involve plant thermal performance? 	□ YES	🕅 NO
 Preventive Maintenance Program Does the proposed activity impact or involve periodic testing or performance of SSCs? or Does the proposed activity add, modify or delete any Environmental Qualification (EQ) maintenance requirement or replacement frequency to ensure the component(s) maintains its qualification status? 	□ YES	X NO
 PT Curves Does the proposed activity add, delete, or modify the basis (as contained in each sites reactor vessel surveillance material testing program) for the Pressure / Temperature Limit Curves (fluence, pressure, temperature, reactor materials)? 	☐ YES	X NO
 Relief Valve Program Does the proposed activity impact or involve the design, operation and testing of relief valves, safety valves, vacuum breaker valves or rupture disc? 	☐ YES	X NO
 RPV Internals Program Does the proposed activity impact or involve any change to the reactor internals? This includes "software only" changes that do not physically change the hardware such as re-rating of pressures or temperatures. Does the proposed activity impact or involve or related documentation to include neutron fluence or neutron fluence calculations? Does the proposed activity impact or involve or changes to core flow characteristics or core flow characteristics? 	☐ YES	X NO



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Engineering Change Process

IMPACT SCREENING SUMMARY

ATTACHMENT 9.3

SHEET 6 OF 6

PROGRAMS AND COMPONENTS (CONTINUED)		Potential Impact	
 Welding Program Does the proposed activity impact or involve a special process, such as welding, brazing or soldering? 	YES		
 Safety Program Does the proposed impact or activity involve personnel or industrial safety? 	YES		
 System Engineering Does the proposed activity impact or involve any changes to system configuration, function or performance, etc., for Maintenance Rule or other system? Does the proposed activity impact or involve any changes to system procedures, maintenance or operation, etc.? 	YES	□ NO	
 Training Program Does the proposed activity involve existing training requirements or create the need for new training? 	YES	□ NO	
 Simulator Impact Does the proposed activity impact or involve changes to the Simulator? 	YES		
 Fire Protection Program Does the proposed activity result in a change to the Fire Protection Program (including 10CFR50 Appendix R) where the impact is more than negligible? 	☐ YES	🕅 NO	

Detailed Impact Screening (Attachment 9.4) Attached?	□ YES	🕅 NO



Attachment 2

Conceptual Design Sketches

- 1. Figure 1: PARTIAL SITE PLAN OF AREAS AFFECTED
- 2. Figure 2: UPGRADE ALTERNATE SAFE SHUTDOWN SYSTEM FOR 31 CHRG AND 32 CHRG PUMP
- 3. Figure 3: UPGRADE ALTERNATE SAFE SHUTDOWN SYSTEM FOR 32 CCW PUMP
- 4. Figure 4: UPGRADE ALTERNATE SAFE SHUTDOWN SYSTEM FOR 33 SW AND 34 SW PUMP










Attachment 3

References

- 1. ENTERGY Nuclear Management Manual, Engineering Change Process, Rev 11
- Association for the Advancement of Cost Engineering (AACE), Cost Estimate Classification System - As Applied In Engineering, Procurement, and Construction for the Process Industries
 - TCM Framework: 7.3 Cost Estimating and Budgeting
 - Figure 4 Estimate Checklist & Maturity Matrix
- 3. ASCO Series 386 Non-Automatic Power Transfer Switches or Equivalent (attached here)

ASCO SERIES 300 Power Transfer Switches







IPEC00270378

ASCO[®] Series 386 Non-Automatic Power Transfer Switches

User-Initiated Control

ASCO 386 non-automatic transfer switches are generally used in applications where operating personnel are available and the load is not an emergency type requiring automatic transfer of power. The power-switching mechanism and controller is the same hardware used on the highly reliable ASCO SERIES 300 transfer switches. ASCO 386s are furnished as standard with a momentary-type selector switch to initiate transfer and re-transfer. They can also be arranged for remote control via ASCO's connectivity products.



Fig. 14: ASCO 386 400 Amp Type 1 Enclosure w/Optional Accessories 9C, 9D Source Availability Lights



Fig. 15: Control and Display Panel

Electrical Features:

- Listed under UL 1008, CSA certified:
 - UL listed through 480 VAC.
 - CSA certified through 600 VAC.
- Door-mounted selector switch for local, manually initiated electrical control.
- Sizes from 30 through 3000 amps. Available to 600 VAC, 50 or 60 Hz.
- Rated for all classes of load transfer.
- 100% tungsten load ratings through 400 amps.
- Designed for emergency and standby applications.
- Same withstand and close-on rating as SERIES 300.

Standard Selectable Control Features:

- Inphase monitor to transfer motor loads between live sources, without any intentional off time, to prevent inrush currents from exceeding normal starting levels.
- Selective load disconnect, double-throw contact to operate at an adjustable 0 to 20 second time delay prior to transfer and reset 0 to 20 seconds after transfer.
- High/Low nominal voltage setting. Allows user to adjust for source low reduced voltage conditions in remote areas.
- 60 Hz or 50 Hz selectable switch.
- Single/Three-phase selectable switch.

Control Features:

- Switch position indicating signal lights.
- One auxiliary contact closed when transfer switch is connected to normal and one closed on emergency, standard feature 14A/14B.

Optional Accessories:

- 6Q Key-operated, momentary source selector switch furnished instead of the standard selector switch.
- 9C, 9D Source availability lights to provide operator with a local indication of power source availability.
- Accessory 14AA/14BA auxiliary contacts to indicate position of main contacts. Two (2) for normal position and two (2) for emergency position (one set is standard).
- 72A Serial module (5110) is used to allow local or remote communications with ASCO POWERQUEST[®] connectivity products.
- Special Enclosures
 (Specify by appropriate code in catalog number):
 Type 3R: Rain-tight
 Type 4: Weatherproof
 Type 12: Oil Tight
- 72E Connectivity Module 5150 is used to bring several different serial devices that communicate at different baud rates and with different protocols to a common Ethernet media.

RCM	Technologies	ENTERGY	Conceptual Design	
	The Source of Smart Solutions	Unit 3	SAMA IP3 -061	Rev. 0

Attachment 4

Cost Estimate

ENTERGY NUCLEAR NORTHEAST IMPLEMENTATION ESTIMATE									
			Indian Point Nucle	ar Power S	station				
* ESTIMATE LEVEL *				EC #: SA	MA IP3-06	51			
Conceptual	PROJECT 1	TITLE: RCP Co	oling System Safe	Shutdown			ESTIMATOR: RCMT		
Preliminary	JOB LOCA	TION: Auxiliary	, Intake & Turbine I	Buildings			PROJECT CODE: TBD		
Definitive		NON-OUTAGE	ORIGINAT	OR:		0&м	ORIG. DATE: 07/19/2012		
	ESTIMATE	TOTAL	\$2,258,137				REVISION 10-0		
Summary of Change: In accordance with NRC environmental regulations in 10 C.F.R. Part 51, Entergy performed SAMA analyses for both Indian Point Nuclear Generating Units 2 and 3 as part of its license renewal application. Those analyses identified a number of potentially cost-beneficial SAMAs for each unit. In its license renewal application and related correspondence with the NRC Staff, Entergy indicated that it would submit the potentially cost-beneficial SAMAs for further internal engineering project cost-benefit analysis, even though none of the potentially cost-beneficial SAMAs is related to aging management under 10 C.F.R. Part 54. Entergy contracted RCM Technologies to assist it in this effort. This package responds to the issue identified in the NRC's staff review of SAMA IP3-061 and provides the technical resolution and associated costs required for implementation. Component Cooling Water Pump 32 (32 CCW), Charging Pumps 31 (31 CHRG) and 32 (32 CHRG), and Service Water Pumps 33 (33 SW) and 34 (34 SW) are system pumps that are powered from the 480VAC Vital Switchgear Room (switchgear room) at Elevation 15'-0". These pumps can provide cooling water for Reactor Cooling Pump (RCP) seal cooling when needed. When necessary, this action needs to be provided in a timely manner.									
For SAMA IP3-061, resolutio power source more quickly th For Pumps 33 SW and 34 SV power source. An alternate p	n is required han is current N a more ext power supply	to provide the a tly possible usin tensive resolution to each of these	ability to switch Pump g the existing manua on is required. These e pumps would provi	al-transfer m two pumps de the requi	and Pumps 33 lethod. s are currently ired power in	B CHRG and rinstalled w the same w	3 34 CHRG to their existing alternative ithout any provision for an alternative av as the three currently installed		
The modifications described above are in the event of flooding in the switchgear room that prevents the normal 480VAC power from being available									
Prepared by:	Autac	e whe		Approved I	oy: M	and the second	1		
Date: 9-	20-2	012		Date: 9	- 20- Z	312	·		

		ENTERGY NUCLEAR NORTHEAST
		IMPLEMENTATION ESTIMATE
* EST	IMATE LEVEL *	EC # SAMA IP3-061
1	Conceptual	
	Preliminary	JOB LOCATION: Auxiliary, Intake & Turbine Buildings PROJECT CODE: TBD
I	Definitive	□ OUTAGE □ NON-OUTAGE ORIGINATOR: ORIG. DATE: 07/19/2012
Item		Description
1	This estimate assu	mes that this work will be completed during 2014
2.	This estimate assu	mes that this work will be completed in a single 10 hours per shift, four days per week non-outage schedule.
3.	This estimate assu	mes that this work will not suffer productivity loss due to radiation, hazardous conditions or QC hold points
4.	This estimate assu	mes that all installation work will be performed by trained contract craftspersons in lieu of station maintenance personnel.
5.	This estimate assu	mes that all high voltage disconnections and reconnections will be performed by station maintenance personnel.
6.	This estimate assu	mes that all conduit will be erected and that all power and control cables will be pulled before disconnecting pump power.
7	This estimate assu	mes that core boring will be required in the Auxiliary Building and the Control Room Area (Potential 4 Core Bores).
8.	This estimate provi	des for continuous fire watch during fire seal breeching.
9.	Since the added co	ntrol panels are outside the control room, no changes to the simulator were included in this estimate
10	This estimate is bas	sed on the project's current level of scope definition and is classified Class 4 as defined per the AACE International Cost
10.	Estimate Classifica	tion System (see Attachment 3, Reference 2).
11	Labor dollars in this	s estimate are projected 2014 costs based on current 2012 craft billing rates at Indian Point. The projected costs provide
L	for anticipated billin	ig rate increases of 3% per year.
12.	I his estimate allow	is for and includes a contingency factor related to the complexity and location of the work required. The factor is
<u> </u>	cumulative and pro	gresses as follows:
	A. Outside fei	nce boundary - 20%
	B. Inside tend	2e boundary - 30%
	D Inside Con	autor complexity - 40%
<u> </u>	D. Inside Con	
<u> </u>		
		
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	- Martine and a second	
L		

INDIAN POINT IMPLEMENTATION ESTIMATE WORK SHEET

Rev. 10-0	Page 1 of 3 INDI.	AN P	ΟΙΝΤ	IMP	LEN	IENTATIO	ON ES	STIMA)61	TE WOF	RK SHEE	т				
PROJ JOB L EST.	ECT TITLE: RCP Cooling System Safe Shutdown OCATION: Auxiliary, Intake & Turbine Buildings STATUS:		AGE		DN-OUT	AGE		PROJE	CT CODE: 1	□ о&м TBD		TAKEOFF: ESTIMATO ORIG. DAT	: DR: RCMT TE: 07/19/2012		
ITEM	DESCRIPTION	QTY	UOM	CFT	NO.	MAN UNIT	HOURS	TOTAL	\$/M H	MATERIA	L \$ MATERIAL T DOLLARS	LABOR DOLLARS	SUB- CONTRACT	ΤΟΤΑ	.L \$
	* ESTIMATE LEVEL * Conceptual									ESTIMATE	SUMMARY MANHOU	RS	DOLLARS		
	Preliminary			EOI	ENG				0.117		400				
	Definitive			01		DESIGN EN	GR CO	NST SUF	PORT		480 160		\$ 48,000 \$ 16,000		
	General Notes:			03 04		MODS ENG	R EOI 8	SUPPOR IGR	Т		- 280		\$- \$28,000		
				05							640		\$ 76,800		
				07		ENGINEER		P ACCE	PTANCE R	EVIEW	120		\$ 12,000		
				08	NA.	DESIGN EN			SUPPORT		1,680		\$ 201,600		
				10		MODS PLAI	N & SCI	HED -CO	NTRACT		260		\$ 26,000		
				MAT	ERIA	LS / MISC CC	NTRA	CTS			220		\$ 26,400		
				12		OTHER CO	NTRAC	тs					\$ /3,44/ \$ -		
				14	IRAC	SWEC CRA	FT LAB	ORWAL	KDOWN		3,180		\$ 349,291		
				15 16		SWEC DIST	RIBS				318		\$ 44,600 \$ 97,976		
				PLA . 17	NT CI	MECH MAI	NT.				-		\$-		
				18 19		ELECT MA I&C	INT				32		\$ 3,200 \$ -		
				20 MISC	C EOI	CSG SUPPORT					-		\$-		
				21 22		QUALITY C	ONTRO	DL			200 96		\$ 20,000 \$ 11.520		
				23 24		CHEMISTR OPS / OPS	Y SUPPO	ORT			- 320		\$ - \$ 38,400		
				25 MISC	c cor	HP / RP	PORT				240		\$ 19,094		
				26 27		QUALITY C	ONTRO	DL			210		\$ 16,800 \$ -		
				28 29		HP / RP RADWAST	E				-		\$- \$-		
				30 31		NURSE		RACTO	2		-		\$- \$-		
				32 33		WASTE M		MENT			-		\$ - \$ -		
				34 35			NT REN		NTRACTOR		-		\$ - \$ -		
				36 37		DECONTA RBC'S	MINAT		TACTOR		-		\$ - \$ -		
				38 39		SECURITY	-Wack	enhut			-		\$ - \$ -		
				40 CON	TING	SAFETY		very			64		\$ 4,352		
				41	1111G	CONTINGE	NCY				9 500		\$ 334,044		
				2311		SUBIUIAL						2094)	\$ 1,447,524		
									LOADERS	(30%)		20 78)	\$ 521,109		
					-				ESTIMA	TE TOTA			\$ 2,258,1 37		
	Preliminary to Tie-Ins					10.00									
1. 2.	Gather and stage tools and materials Stage, erect and modify scaffolding	1	LT	EL CP	2	10.00 60.00	1.00	40 120	\$ 123.32 \$ 96.00		\$ -	\$ 4,933 \$ 11,520		\$ 1 [°]	4,933 1,520
3. 4.	Core arill as required to route new conduits Procure & erect conduit supports from 32 CCW, 31 & 32	4 350	LT	EL	2	20.00	1.00 1.00	160 126	\$ 123.32	\$ 24	50 \$ 875	\$ 19,731 \$ 15.538		\$ 19 \$ 10	9,731 6.413
5	CHRG and 33 & 34 SW pumps Procure & erect conduit from 32 CCW, 31 & 32 CHRG and 33					00		252	\$ 123.32						
б.	& 34 SW pumps Procure and install Hoffman boxes for switches	350 4	LF EA	EL EL	4 2	0.18 10.00	1.00 1.00	80	\$ 123.32 \$ 123.32	\$ 2.5 \$ 3,000.0	i0 \$ 875 i0 \$ 12,000	\$ 31,077 \$ 9,866		\$ 3 ⁻ \$ 2 ⁻	1,952 1,866
7.	Procure and install new control switches for 32 CCW, 31 & 32 CHRG and 33 & 34 SW pumps	9	EA	EL	2	4.00	1.00	72	\$ 123.32	\$ 500.0	0 \$ 4,500	\$ 8,879		\$ 1:	3,379
8.	Determinate & removie existing manual switches 32CCW, 33CHRG, 34CHRG.	3	EA	EL	2	20.00	1.00	120	\$ 123.32		\$ -	\$ 14,798		\$ 14	4,798
9.	Procure and install non-automatic transfer switches at 32 CCW, 33 CHRG and 34 CHRG	3	EA	EL	2	24.00	1.00	144	\$ 123.32	\$ 7,500.0	00 \$ 22,500	\$ 17,758		\$ 40	0,258
10.	Procure, fabricate, support and install non-automatic transfer switches at 33 SW and 24 SW	2	EA	EL	2	40.00	1.00	160	\$ 123.32	\$ 7,500.0	0 \$ 15,000	\$ 19,731		\$ 34	4,731
11. 12.	Procure and install MCC extension ofr MCC 312A Procure and pull 480VAC 4/c power cable	1 720	EA LF	EL EL	2	60.00 0.06	1.00 1.00	120 86	\$ 123.32 \$ 123.32	\$ 1,200.0 \$ 1.5	00 \$ 1,200 00 \$ 1.080	\$ 14,798 \$ 10.606		\$ 15 \$ 1	5,998 1.686
13. 14	Procure and pull 4/c control cable Procure and pull 2/c control cable	1,200	LF	EL	2	0.04	1.00	96 96	\$ 123.32 \$ 123.32	\$ 1.2 \$ 1.1	5 \$ 1,500 5 \$ 2,760	\$ 11,839 \$ 11,839		\$ 1: \$ 1.	3,339
'		2,400			1	0.020	1.00	-	+ 120.02			÷ 1,000		s '	

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INDIAN POINT IMPLEMENTATION ESTIMATE WORK SHEET EC #: SAMA IP3-061

7/26/2012 7:33 AM IP3-061 (Rev_7-19-12) (2)

PRO JOB	JECT TITLE: RCP Cooling System Safe Shutdown LOCATION: Auxiliary, Intake & Turbine Buildings	_		_				PROJE	CAPITAL CT CODE:	DO&M TBD		TAKEOFF	: DR: RCMT		
IST.	STATUS:		AGE	N I		MAN	HOURS		NATOR:	MATERIAL S	MATERIAL	LABOR	TE: 07/19/2012 SUB-		
ITEN	DESCRIPTION	ΩΤΥ	UOM	CFT	NO.	UNIT	FCTR	TOTAL	\$/MH	PER UNIT	DOLLARS	DOLLARS	CONTRACT	T	OTAL \$
1. 2. 3. 4. 5. 6. 7. 8.	Ite-ins for New Switches Disconnect power feeds at 33 SW and 34 SW Connect power feeds at 33 CW and 34 SW Connect power feeds at 32 CCW, 33 CHRG and 34 CHRG Connect power feedsand controls to new switches Terminate cables in CR Area, MCC312A, MCC312A EXT Test pump switching for proper operation Scaffolding Dismantle Cleanup and restore work areas	1 1 1 2 1 1	LT LT LT EA LT LT LT	PL PL PL PL PL CP EL	2 2 2 2 2 2 2 3	60.00 40.00 60.00 40.00 40.00 40.00 40.00 40.00	1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00	120 80 120 80 160 80 80 120	\$ 60.00 \$ 60.00 \$ 60.00 \$ 60.00 \$ 60.00 \$ 60.00 \$ 96.00 \$ 123.32	\$ 3,500.00	\$ - \$ - \$ - \$ 7,000 \$ - \$ - \$ - \$ - \$ - \$ -	\$ 7,200 \$ 4,800 \$ 7,200 \$ 4,800 \$ 9,600 \$ 4,800 \$ 7,680 \$ 7,680 \$ 14,798		<i>እ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~</i>	7,200 4,800 7,200 4,800 16,600 4,800 7,680 14,798
1. 2.	PAINTING & TOUCH-UP REQUIREMENTS PAINTING & TOUCH-UP PAINTING & TOUCH-UP			PT PT				-			s - s -	s - s -		s s	-
1. 2.	FIRE WATCH / BOTTLEWATCH REQUIREMENTS CRAFT SUPPORT FOR FIRE WATCH CRAFT SUPPORT FOR BOTTLE WATCH	30 1	LT	FW FW	3	24.00	1.00	720 -	\$ 53.60		s - s -	\$38,592 \$-		55	38,592
1.	MISC SUB-CONTRACT MISC SUB-CONTRACT	1	LT										\$-	\$	
	SUBTOTAL CRAFT & SUB-CONTRACTOR							2,786			\$ 69,290	\$302,383	\$-	\$	371,673
1.	CONSTRUCTION SUPPORT (8% OF LABOR \$)	1	LT					223	\$ 108.54			\$ 24,204		\$	24,204
	SUBTOTAL							3,009			\$ 69,290	\$326,587	\$-	\$	395,877
	• OUTAGE RELATED COSTS •														
1. 2. 3. 4. 5. 6.	OUTAGE WALKDOWN ALLOWANCE WORK PACKAGE REVIEW OUTAGE TOOL ROOM ATTENDANTS (~3.5%) GENERAL CRAFT OUTAGE DISTRIBS. (10%) CRAFT IN PROCESSING. (20%) HUMAN PERFORMANCE & ALARA TRAINING	1 1 1		PF PF LB				26 40 105	\$ 120.71 \$ 120.71 \$ 78.15			\$ 3,138 \$ 4,828 \$ 8,206 \$ 32,659 \$ 65,317 \$ 6,532		\$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$	3,138 4,828 8,206 32,659 65,317 6,532
<u></u>	(1/2 day training, or ~ 2%) SUBTOTAL							3,180			\$ 69,290	\$447,267	\$-	\$	516,557
	PLANT SCOPE														
i 1.	MECH MAINTENANCE			PL				-			\$ -	5 -		\$	-
	SUBTOTAL MECH MAINT.			FL.				-			s -	s -	\$-	\$	-
1.		1	LT	PL	2	16.00	1.00	32	\$ 100.00		\$ -	\$ 3,200		5	3,200
<u> </u>	SUBTOTAL ELECT. MAINT.			PL				- 32			<u>s</u> -	\$ - \$ 3,200	\$-	\$ \$	3,200
1.	I&C			PL				-			s -	\$ -		\$	-
	SUBTOTAL I&C MAINT.			PL							<u> </u>	<u> </u>	\$-	5 \$	
1.	CSG			PL							\$ - e	\$ -		5	-
	SUBTOTAL CSG MAINT.							-			\$ - \$	\$ -	\$ -	\$	-
	SUBTOTAL PLANT							32			\$ -	\$ 3,200	\$-	\$	3,200
	SUBTOTAL CRAFT/PLANT							3,212			\$ 69,290	\$450,467	\$-	\$	519,757
	IMPLEMENTATION SUPPORT														
1. 2. 3. 4. 5. 6. 7. 8. 9. 10. 11. 12. 13. 14. 1. 2.	EUT FIS / MODS ENGINEERING (E0I) DESIGN ENGINEERING SUPT DURING CONST SYSTEMS ENGINEERING - MECHANICAL SYSTEMS EINGINEERING - LECTRICAL SYSTEMS ENGINEERING - LILCTRICAL SYSTEMS ENGINEERING - CIVIL STRUCTURAL PROJECT MANAGEMENT TRAINING (OPS STAFF) QA / QC VERFICATION WORK MANAGEMENT HP / RP/ ALARA CHEMISTRY OPS / OPS PROCEDURE SUPPORT & DEVELOPMENT TRAVEL & UVING EXPENSES CONTRACTOR SUPPORT FIS / MODS ENGINEERING - SWEC (Incl Per Diem) MODS PLANNING & SCH. SWEC (Incl Per Diem)	1 1 1 1 1 1 1 1 3 1 1 1 1 1 1 1 1 1 1 1		2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	1 1 1 1	160.00 160.00 120.00 640.00 8.00 200.00 80.00 320.00	1.00 1.00 1.00 1.00 1.00 1.00 1.00	160 160 120 96 200 240 320 240	\$ 100.00 \$ 100.00 \$ 100.00 \$ 120.00 \$ 120.00 \$ 79.56 \$ 120.00 \$ 120.00			\$ -5 \$ 16,000 \$ - \$ 16,000 \$ 12,000 \$ 12,000 \$ 11,520 \$ 20,000 \$ 19,094 \$ 38,400 \$ 38,400 \$ 5 26,000		****	16,000 16,000 12,000 11,520 20,000 19,094 38,400
3. 4. 5. 6. 7. 8. 9. 10. 11. 12. 13. 14. 15. 16. 17. 18. 19.	FIELD ENGRS/PLAN-SWEC (Incl Per Diem) QA / QC VERIFICATION NDE HP / RP RADWASTE NURSE ELEVATOR CONTRACTOR WASTE MANAGEMENT HOUSEKEEPING EQUIPMENT RENTAL CONTRACTOR VENDOR STOCKING DECONTAMINATION CONTRACTOR RBC'S SECURITY FIREWATCH (Rover) SAFETY (2%) LOST TIME (10%)	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		$\begin{array}{c} \Sigma \\ \Sigma \\ \Sigma \\ \Sigma \\ \Sigma \\ \Sigma \\ \Sigma \\ \Sigma \\ \Sigma \\ \Sigma $	1	220.00 210.00	1.00	220 210 - - - - - - - - - - - - - - - - - - -	\$ 120.00 \$ 80.00 \$ 68.00 \$ 140.25		E 60 000	\$ 26,400 \$ 16,800 \$ - \$ - \$ - \$ 4,352 \$ 4,600	\$	\$ \$ \$ \$ \$	26,400 16,800 - - 4,352 44,600 847-222

Rev. 10-0	Page 5 of 5	NDIAN P	οιντ	IMP	LEN	NENTATI	ON E	STIMA	TE WOF	RK SHEET					_	IP3-01	7/26/20 61 (Rev
PRO.	ECT TITLE: RCP Cooling System Safe Shutdown								C CAPITAL	C O&M		TAKEOFF	-				
ו B	DCATION: Auxiliary, Intake & Turbine Buildings			1		A.C.E.		PROJE	CT CODE: 1	TBD		ESTIMATO		ROMI			1
1.	STATUS:		AGE	Tari be	JN-OUT	MUC BAAK	HOURS	ORIGIN	ATOR:	MATERIAL .	MATERIAL	LABOD	15:0	0//19/2012	T		1
ITEM	DESCRIPTION		UOM	CET	NO.	UNIT	FCTR	TOTAL	\$/MH	PER UNIT	DOLLARS	DOLLARS	CC	NTRACT		TOTALS	Í -
							-			1			+		+		i
1.	FREIGHT, SALES TAX, & CONSUMABLES (6%)			ĺ							\$ 4,157				\$	4,157	ĺ
	SUBTOTAL INSTALLATION COST						L	6,220			\$ 73,447	\$778,433	\$	-	5	851,880	1
													1				i i
1.	DESIGN ENGINEERING - MECHANICAL			NM		400.00	1	400	e 100.00			\$ 40.000			5	40.000	1
2.	DESIGN ENGINEERING - ELECTRICAL			ENM NBL4	1	400.00	1.00	400	a 100.00			a 40,000 a	1		6	40,000	l l
а. А	DESIGN ENGINEERING - INSTR. & CONTROL DESIGN ENGINEERING - CIVILISTRUCTURAL			NIM	4	80.00	1 00	80	\$ 100.00	l		s anno			6	B 000	1
5	CONTRACT ENGR DESIGN SUPPORT		l ît	NM		1 680 00	1.00	1.680	\$ 120.00			. 5,500	5	201.600	s	201 600	1
6	ENGINEERING DCP ACCEPTANCE REVIEW		LT	NM	1	120.00	1.00	120	\$ 100.00			\$ 12,000	1*	21.1000	s	12,000	
-	SUBTOTAL DESIGN COST		1	-				2,280		·····	1	\$ 60,000	\$	201,600	5	261,600	1
															1		1
	SUBTOTAL INSTALLATION & DESIGN COST		-					I		1	1	\$838,433	\$	201,600	\$	1,113,480	i i
1.	CONTINGENCY (30%)														5	334,044	
	ESTIMATE SUBTOTAL							8,500					+		s	1,447,524	



ENTERGY INDIAN POINT NUCLEAR STATION UNIT 3

CONCEPTUAL DESIGN PACKAGE For

SAMA IP3-062

Install 480 VAC Switchgear Room flooding detection to provide an alarm at the Control Room

Prepared by: Letre B. Hora rol.	Approved by:
Date: 9-20-2012	Date: South and an and

RCM) Technologies The Source of Smart Solutions The Source of Smart Solutions	Conceptual Design Package SAMA IP3 -062	Rev. 0	
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SECTION	TITLE	PAGE
1.0	ISSUE	3
2.0	BACKGROUND	3
3.0	EXISTING CONDITIONS	4
4.0	DESIGN CONSIDERATIONS	4
5.0	CONFIRMATION OF DESIGN	5
6.0	RECOMMENDED SOLUTION	5
7.0	PRELIMINARY MATERIAL LIST	6
Attachment 1	Entergy Impact Screening Summary	
Attachment 2	Conceptual Design Sketches	
Attachment 3	References	
Attachment 4	Cost Estimate	

1.0 ISSUE

Severe Accident Mitigation Alternative (SAMA) IP3-062:

Install 480 VAC Switchgear Room flooding detection to provide an alarm at the Control Room

2.0 BACKGROUND

In accordance with NRC environmental regulations in 10 C.F.R. Part 51, Entergy performed SAMA analyses for both Indian Point Nuclear Generating Units 2 and 3 as part of its license renewal application. Those analyses identified a number of potentially cost-beneficial SAMAs for each unit. In its license renewal application and related correspondence with the NRC Staff, Entergy indicated that it would submit the potentially cost-beneficial SAMAs for further internal engineering project cost-benefit analysis, even though none of the potentially cost-beneficial SAMAs is related to aging management under 10 C.F.R. Part 54. Entergy contracted RCM Technologies to assist it in this effort.

This package provides a conceptual design and implementation cost estimate for SAMA IP3-062 in accordance with Entergy design engineering practices.

For SAMA IP3-062, resolution is required to detect flooding potential in the 480 VAC Switchgear Room (Switchgear Room) and provide an alarm at the Control Room.

This package provides for a conceptual design to install water intrusion detection in the Unit 3's Control Buildings 480 VAC Switchgear Room at Elevation 15'- 0". This device, detecting water detected at a pre-determined set-point level in the Switchgear Room, will provide an alarm signal connected to the annunciator in the Control Building's Unit 3 Control Room at Elevation 53'- 0".

The design considerations that follow will address the resolution's adequacy and the basis for the recommendation to resolve the identified potential issue.

The recommended solution will include descriptive details of the design change and also conceptual design sketches as required. These descriptive details, sketches, and the preliminary material list provide the basis for initiating the all-inclusive conceptual cost estimate for EC development and implementation at the Station.

3.0 EXISTING CONDITIONS

Cooling water piping is routed to mechanical equipment located within the Switchgear Room. The Switchgear Room can potentially become flooded in the event of any breakage/leakage of this piping system and critical 480 VAC will be unavailable. Early notification of this potential flooding condition is necessary for timely response and the actions to mitigate the situation.

4.0 DESIGN CONSIDERATIONS

All the switchgear is set upon the same level grade. Existing drains provided are for minimum discharge of water being used for floor and equipment cleaning purposes. These drains cannot be considered for mitigation of any substantial discharge of water.

Piping that can potentially discharge water in the event of a break or leak is routed throughout the entire Switchgear Room. As a result, based upon the locations of the electrical equipment in the Switchgear Room, more than one detection device will be utilized.

Spurious alarms need to be avoided, but at the same time since water intrusion will have occurred before alarming, providing the earliest detection is necessary. Based upon the above considerations water intrusion will be detected at one-half (1/2) inch above the floor grade. To alleviate further concerns with spurious alarms, the device selected will provide adjustment for sensitivity

Power requirements for the detector unit will need to be provided from a source that is not affected by the Switchgear Room water intrusion.

New wiring is required to be installed for power to the new units. Wiring is also required for the alarm signal to be routed to the Control Room's annunciator above at Elevation 53'-0". A window in the Control Room annunciator for this alarm is also required.

5.0 CONFIRMATION OF DESIGN

The situation here is typical for any condition that needs monitoring. In conditions where detection and alarming is required, it is provided in the most significant manner relating to the condition. In some cases it is an early warning indicating a potential problem and in other cases it signifies a failure has occurred.

In this scenario the alarm condition is of a failure having already occurred. Therefore, mitigation will be the only alternative available for alleviating the condition.

The design concept being recommended will provide Operations the earliest warning obtainable.

6.0 RECOMMENDED SOLUTION

- 1. Install new redundant, nuclear qualified, FCI Model FLT93S FlexSwitch water level detection devices in the Switchgear Room at Elevation 15'-0"; based upon the locations of the electrical equipment.
- 2. Protective measures to be considered for protection of water level detection devices based upon installed location.
- 3. Provide power to the detection devices from a source that is not affected by the switchgear room water intrusion
 - Install power wiring in conduit raceway from Control Room at Elevation 53'-0" to the devices in the Switchgear Room at Elevation 15'-0"
- 4. Provide alarm connection from the level detection devices to the annunciator
 - Install 125VDC wiring in conduit raceway from the devices in the Switchgear Room at Elevation 15'-0" up to the cable spreading area at Elevation 33'-0"
 - Continue routing wiring in cable trays at Elevation 33'-0" up to the annunciator in the Control Room at Elevation 53'-0"
- Connect wiring to new "480 VAC SWITCHGEAR ROOM-WATER INTRUSION" alarm window in the Control Room's Supervisory Panel Electrical Section annunciator
- 6. Provide procedure for flood switch calibration and setpoint.
- 7. Provide procedures and training for mitigation relating to this condition

7.0 PRELIMINARY MATERIAL LIST

<u>Ite</u>	m Description	Quantity
1.	FCI Model FLT93S FlexSwitch	2
2.	1" – Conduit with supports	200 Feet
3.	Cable A. (2) – 125 VDC Cables B. (2) – 120 VAC Cables	400 Feet
4.	Support for water level switch	2
5.	Junction Box with terminal blocks	1

RCM) Techr The Source o	ENTER Indian Point Nuc of Smart Solutions	RGY Conceptu clear Station Pack 3 SAMA I	al Design kage P3 -062 Rev. 0
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Attachment 1

Entergy Impact Screening Summary

Engineering Change Process

ATTACHMENT 9.3

IMPACT SCREENING SUMMARY

SHEET 1 OF 6

INSTRUCTIONS:

Identify the potentially impacted and the unaffected areas by checking the appropriate <u>Yes</u> or <u>No</u> block on the Impact Screening Criteria.

If a direct determination cannot be made based on the impact screening questions, the detailed questions in Attachment 9.4 may be used to identify potential impacts.

The completion of detailed questions in Attachment 9.4 is recommended but not required.

Contact potentially impacted groups if assistance is required.

			SAMA	
Engineering	Change	No.:	IP3-062	

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Rev. No .: DESIGN PACKAGE

Prepared by:

Date:

DESIGN ENGINEERING DISCIPLINES	Potential Impact	
 Civil / Structural Design Engineering Does the proposed activity involve any civil / structural (including seismic) design changes, activities or affect coatings? OR Does the proposed activity involve any piping engineering design changes or activities? 	YES	□ NO
 Electrical Design Engineering Does the proposed activity involve any station or switchyard electrical design, large power transformers, or settings changes or activities? (SOER 10-1) 	YES	□ NO
 Instrumentation and Controls Design Engineering Does the proposed activity involve any I&C design or settings changes or activities? 	YES	
 Mechanical Design Engineering Does the proposed activity add/remove/replace insulation, aluminum or other metallic/non-metallic sources of debris in the reactor/containment building or involve any mechanical design changes or activities? 	☐ YES	X NO
 PSA Engineering Does the proposed activity impact or involve changes to plant evaluations or probabilistic safety assessments? Does the proposed activity impact or involve changes to the Emergency Operating Procedures, Abnormal Operating Procedures, or Severe Accident Procedures or does it add, remove or modify SSCs included in a Maintenance Rule function? 	MYES	□ NO
 Nuclear Analysis Does the proposed activity impact or involve changes to plant evaluations, Technical Specifications, Technical Requirements Manual, or require a full 50.59 Evaluation? 	YES	□ NO
 FERC / NERC Impact Does the proposed activity impact or involve change to FERC / NERC or Regional Entity compliance documents? (ex. MOU, ENN/ENS-PL-158, ENS-DC-199, etc.) 	☐ YES	X NO



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IMPACT SCREENING SUMMARY

Engineering Change Process

ATTACHMENT 9.3

Sheet 2 of 6

DESIGN ENGINEERING PROGRAMS	Potential Impact	
 ASME Section III Specifications Does the proposed activity add, delete, or modify information required by ASME Section III to be contained in a design specification? 	T YES	🕅 NO
 Cable and Raceway Program Does the proposed activity involve any changes to cable trays, raceways or the associated documentation? 	YES	
 Electronic Databases (EDB) Does the proposed activity involve any changes to electronic databases? 	YES	
 EQ Program (10CFR50.49, NUREG 0588, Reg Guide 1.89) Does the proposed activity involve any new or existing EQ components? 	□ YES	🕅 NO
 Hydrogen Control Program (10 CFR 50.44) (<i>if applicable</i>) Does the proposed activity impact equipment or materials related to hydrogen control? 	🗌 YES	🕅 NO
 Human Factors Program Does the proposed activity involve control panel design including layout and labeling, visual displays, operator aids, auditory signals or environment in the control room, cable spreading room, and other control panel locations? 	YES	□ NO
 Margin Management Does the proposed activity impact or involve any change to design, licensing or operations margins? 	🗌 YES	🛛 NO
Reg. Guide 1.97 / PAM (Post Accident Monitoring) Does the proposed activity involve Reg. Guide 1.97 (Post Accident Monitoring) Indications? 	□ YES	🕅 NO

MAINTENANCE Potential Impact **Electrical Maintenance** YES 🗌 NO Does the proposed activity require an Electrical Maintenance review to identify affected 6 procedures, required actions and required training? **NO I&C** Maintenance YES Does the proposed activity require an I&C Maintenance review to identify affected procedures, required actions and required training? **Mechanical Maintenance** ☐ YES **NO** Does the proposed activity require a Mechanical Maintenance review to identify affected procedures, required actions and required training?

NUCLEAR ENGINEERING		Potential Impact	
 Nuclear Fuel Design Does the proposed activity impact or involve the design, performance or storage of nuclear fuel? 	☐ YES	🕅 NO	
 Reactivity Management Program Does the proposed activity impact or involve the reactor system, reactor controls, reactor chemistry, related systems, potential core and spent fuel damage, spent fuel, reactor coolant pressure boundary or reactor system procedures? 	🗌 YES	🕅 NO	



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Engineering Change Process

ATTACHMENT 9.3

SHEET 3 OF 6

PROCESS OR PROGRAM IMPACT SCREENING CHECKLIST Potential Impact **Computer Support and Software TYES X** NO Does the proposed activity impact or involve changes to plant computer software or firmware or impact Software Quality Assurance (SQA)? **Chemistry and Environmental Impact** ☐ YES **X** NO Does the proposed activity impact or involve any changes to plant chemistry requirements, operations or procedures, or any changes to the environment? **Radiation Protection (RP) Program Impact YES** 🖾 NO Does the proposed activity impact or involve any changes to the RP program? Does the proposed activity involve the potential to introduce (or reintroduce) any cobalt containing materials (such as Stellite) into the primary system? YES **NO** Operations Does the proposed activity impact or involve changes to Operations procedures, training or operator actions? Planning, Scheduling and Outage (PS&O) YES □ NO Does the proposed activity require a PS&O review to identify required design and installation information? YES □ NO MP&C (Inventory) Does the proposed activity impact or involve any addition or removal of equipment from the inventory? Does the proposed activity impact or involve any Procurement of Quality or Augmented Quality material from non-qualified suppliers? **Procurement Engineering** YES Does the activity impact or involve any procurement activities?

PROGRAMS AND COMPONENTS		Potential Impact	
 ASME Containment In-service Inspection (IWE / IWL) Program Does the proposed activity impact or involve the containment pressure boundary or associated moisture barriers or a support for the containment pressure boundary? This includes "software only" changes that do not physically change the hardware such as re-rating of pressures or temperatures to include changes to documented information on these items or additional documented information for these items. Does the proposed activity limit access to containment surfaces for inspection? Involve disassembly of a bolted connection which forms a portion of the containment boundary? 		M NO	
 ASME Appendix J (Primary Containment Leak Rate Testing) Program Does the proposed activity impact or involve any changes to primary containment leak rate testing? 		X NO	



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Engineering Change Process

ATTACHMENT 9.3 SHEET 4 OF 6

PROGRAMS AND COMPONENTS (CONTINUED)	Potenti	al Impact
 ASME In-service Inspection (ISI) Program Does the proposed activity add, delete, or modify an ASME Section XI pressure boundary item or a support for an ASME Section XI pressure boundary item? This includes "software only" changes that do not physically change the hardware like such as re-rating of pressures or temperatures. (ASME Section XI items include ASME Class 1, 2, 3, or B31.1 treated as ISI Class 2 or 3 (T2 and T3) components, parts, or appurtenances such as pipe or pressure vessel walls, valve bodies and pump casings. 	T YES	NO 🔀
 ASME Section XI Repair / Replacement Program Does the proposed activity involve any mechanical component within the ASME XI program / boundaries? Does the proposed activity add, delete, or modify an ASME Section XI pressure boundary item or a support for an ASME Section XI pressure boundary item? (ASME Section XI items include ASME Class 1, 2, 3, MC, and CC, as well as B31.1 treated as ISI Class 2 or 3 (T2 and T3) components, parts, or appurtenances such as pipe or pressure vessel walls, valve bodies and pump casings). 	T YES	NO 🕅
 ASME In-service Testing Program Does the proposed activity impact or involve any item (safety related or non safety related) that may affect the performance or testing of a safety related pump or valve? Does the proposed activity impact the function or functional classification of any pump or valve as stated in the IST program documents? 	☐ YES	X NO
 Air Operated Valve (AOV) Program Does the proposed activity impact or involve the design, operation or testing of AOVs? 	🗌 YES	🕅 NO
 Buried Piping and Tanks (BP&T) Program Does the proposed activity impact or involve any changes to piping, coatings, or cathodic protection of Buried Piping & Components? 	☐ YES	🕅 NO
 Boric Acid Corrosion (BAC) Program Does the proposed activity impact or involve any increase in the likelihood of boric acid formation or corrosion? 	TES 🗌	X NO
 Check Valve Program Does the proposed activity impact or involve the design, operation or testing of check valves? 	TYES	MO 🕅
 Control Room Habitability Program Does the proposed activity impact or involve changes that affect the temperature or radiological environmental conditions in the Main Control Room? 	TYES	🕅 NO
 Electrical Circuit Breaker, Relay and Electrical Equipment Testing Does the proposed activity impact or involve changes to the functional testing of circuit breaker, relay or electrical equipment? 	YES	□ NO



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Engineering Change Process

ATTACHMENT 9.3 SHEET 5 OF 6

PROGRAMS AND COMPONENTS (CONTINUED)	Potenti	al Impact
 Flow Accelerated Corrosion (FAC) Program Does the proposed activity involve any changes (e.g.: configuration, velocity, flow rate, pressure, temperature, material, weld location, etc.) to piping systems included in the EAC Program.? 		K NO
 Heat Exchanger Program Does the proposed activity impact or involve the design, operation or testing of a component in the heat exchanger program? 	☐ YES	🕅 NO
 Predictive Maintenance Program Does the proposed activity impact or involve any aspect of the storage, use and testing of lubricants? Does the proposed activity involve thermography? Does the proposed activity involve vibration monitoring? 	□ YES	X NO
 Microbiological Induced Corrosion (MIC) Program Impact Does the proposed activity involve piping containing untreated or stagnant water or open to the atmosphere? 	U YES	🕅 NO
 Motor Operated Valve (MOV) Program Does the proposed activity impact or involve the design, operation or testing of MOVs? 	□ YES	NO 🕅
 Plant Thermal Performance Program Does the proposed activity impact or involve plant thermal performance? 	□ YES	🕱 NO
 Preventive Maintenance Program Does the proposed activity impact or involve periodic testing or performance of SSCs? or Does the proposed activity add, modify or delete any Environmental Qualification (EQ) maintenance requirement or replacement frequency to ensure the component(s) maintains its gualification status? 	YES	□ NO
 PT Curves Does the proposed activity add, delete, or modify the basis (as contained in each sites reactor vessel surveillance material testing program) for the Pressure / Temperature Limit Curves (fluence, pressure, temperature, reactor materials)? 	☐ YES	M NO
 Relief Valve Program Does the proposed activity impact or involve the design, operation and testing of relief valves, safety valves, vacuum breaker valves or rupture disc? 	🗌 YES	🕅 NO
 RPV Internals Program Does the proposed activity impact or involve any change to the reactor internals? This includes "software only" changes that do not physically change the hardware such as re-rating of pressures or temperatures. Does the proposed activity impact or involve or related documentation to include neutron fluence or neutron fluence calculations? Does the proposed activity impact or involve or changes to core flow characteristics or core flow characteristics? 	☐ YES	X NO



Reference Use

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Engineering Change Process

ATTACHMENT 9.3

PROGRAMS AND COMPONENTS (CONTINUED)	Potential Impact	
 Welding Program Does the proposed activity impact or involve a special process, such as welding, brazing or soldering? 	YES	Пио
 Safety Program Does the proposed impact or activity involve personnel or industrial safety? 	□ YES	M NO
 System Engineering Does the proposed activity impact or involve any changes to system configuration, function or performance, etc., for Maintenance Rule or other system? Does the proposed activity impact or involve any changes to system procedures, maintenance or operation, etc.? 	YES 📕	□ NO
 Training Program Does the proposed activity involve existing training requirements or create the need for new training? 	YES 🎆	
Simulator Impact Does the proposed activity impact or involve changes to the Simulator? 	YES	
 Fire Protection Program Does the proposed activity result in a change to the Fire Protection Program (including 10CFR50 Appendix R) where the impact is more than negligible? 	☐ YES	M NO

Detailed Impact Screening (Attachment 9.4) Attached?	🗆 YES	X NO
		1



Attachment 2

Conceptual Design Sketches

- 1. Figure 1: EQUIPMENT ARRANGEMENT CONTROL BUILDING AT EL. 15' - 0" – FLOOD SWITCH LOCATION PLAN VIEW
- 2. Figure 2: EQUIPMENT ARRANGEMENT CONTROL BUILDING AT EL. 15' - 0" - FLOOD SWITCH LOCATION
- 3. Figure 3: EQUIPMENT ARRANGEMENT CONTROL BUILDING AT EL. 33' - 0" – CONDUITS DUMPING INTO CABLE TRAYS
- Figure 4: EQUIPMENT ARRANGEMENT CONTROL BUILDING AT EL. 53' - 0" – ANNUNCIATOR WINDOW LOCATION AND POWER FOR FLOOD SWITCH
- 5. Figure 5: DETAIL FOR FLOOD SWITCH AND SUPPORT



IPEC00270400









IPEC00270404

References

- 1. ENTERGY Nuclear Management Manual, Engineering Change Process, Rev 11
- Association for the Advancement of Cost Engineering (AACE), Cost Estimate Classification System - As Applied In Engineering, Procurement, and Construction for the Process Industries
 - TCM Framework: 7.3 Cost Estimating and Budgeting
 - Figure 4 Estimate Checklist & Maturity Matrix
- 3. FCI Model FLT93S FlexSwitch (included here)

FCI FLUID COMPONENTS INTERNATIONAL LLC

FLT93S FlexSwitch® Level Switch

Products

- Level Switches
- F: 7635
- 51.725S
- 111625
- FLAST
- a na kuriziya
- F BM
- 1 300

8-653







Download literature for this product

Level Switch Summary

The FLT93S insertion type FlexSwitch for level and temperature monitoring represents the first true technological breakthrough in thermal technology in over a decade. This product was designed for heavy industrial environments including high temperature and high pressure. FCI is the only thermal manufacturer providing temperature compensation to ensure set point accuracy for process temperatures that vary up to $\pm 100^{\circ}$ F. The FLT93S is easily field-configured or factory preset, providing unparalleled flexibility, accuracy and stability for all multiple process sensing and switching requirements.

For an operational demonstration of FCI's FLT93 FlexSwitch Series, please follow this link.

Applications

Interface and sump level detection in settling vessels
 Interface/sump level detection in separation vessels
 Agitation detection
 Specifications

For Level/Interface Service: Accuracy: ± 0.25 inch [± 6.4 mm] Repeatability: ± 0.125 inch [± 3.2 mm]

Page 1 of 3

IPEC00270406

For Temperature Service: Accuracy: ± 2° F [± 1° C] Repeatability: ± 1° F [± 0.6° C]

Response Time: As low as 3 seconds

Enclosure: Powder coated aluminum enclosure is rated for hazardous location use Groups B, C, D, E, F and G, CENELEC EEx d IIC and resists the effects of weather and corrosion per NEMA/CSA Type 4X (equivalent to IP66). Stainless steel is available as an option. Agency Approvals: FM, CSA, CENELEC, ATEX, CE Mark, T4 Rated (System

Approval) and CRN.

Flow Element

Materials of Construction: All-welded 316L stainless steel for all wetted surfaces. Hastellov C. Monel 400 and Titanium are available as an option. Process Connection: U Standard: 0.75 inch male NPT. Optional: 1 inch male NPT, flanges or retractable sensing element. Insertion Length: □ 1.2 inch [30 mm] Ci 2 inches [51 mm] [] 4 inches [102 mm] 11 6 inches [152 mm] U9 inches [229 mm] [] 12 inches [305 mm] 18 inches [457 mm] Customer specified lengths are available as an option. **Operating Temperature:** U Standard: -4° to +350° F [-20° to +177° C] Doptional: -100° to +500° F [-73° to +260° C] or -100° to +850° F [-73° to +454° C] Operating Pressure: To 3500 psig [240 bar(q)]

Control Circuit

Operating Temperature: -40° to +140° F [-40° to +60° C] Input Power: Field selectable 115 ± 15 Vac or 230 ± 30 Vac, 50/60 Hz; 21 to 28 Vdc or 18 to 26 Vac; 7 watts maximum. Relay Contacts: Field configurable dual SPDT or single DPDT rated 6 amps at 115 Vac, 240 Vac or 24 Vdc. Hermetically sealed relays are available as an option. Output Signal: Analog DC voltage related to flow or level/interface signal and proportional to temperature. Electrical Connection: 1 inch female NPT Remote Configuration: Available as an option with customer specified interconnecting cable length.

Optional N.I.S.T. Flow Calibration Services

Factory N.I.S.T. calibration in air or water is available as an option for customer specified setpoint(s) or a flow curve based on the media ranges specified above.

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IPEC00270407

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Attachment 4

Cost Estimate
					<u>Ат</u>					
	ENIERGI NUCLEAR NORTHEASI									
* EST	IMATE I EVEL *		E	C #: SAM	A IP3-062					
		PPO IECT TITLE: Flood Detection				ESTIMATOR: PCMT				
	Broliminan	IOR LOCATION: 480 Volt Switches	or Boom		BRO JECT CODE, TRI					
					PROJECT CODE. TBI					
	Definitive	LIOUTAGE LINON-OUTAGE	ORIGINAT	OR:		ORIG. DATE: 06/19/2012				
		ESTIMATE TOTAL \$494,17	5		REVISION	11-0				
In acc Units licens for fur under This p practi For S Contro This p 15'- 0 annur	Summary of Change: In accordance with NRC environmental regulations in 10 C.F.R. Part 51, Entergy performed SAMA analyses for both Indian Point Nuclear Generating Units 2 and 3 as part of its license renewal application. Those analyses identified a number of potentially cost-beneficial SAMAs for each unit. In its license renewal application and related correspondence with the NRC Staff, Entergy indicated that it would submit the potentially cost-beneficial SAMAs for each unit. In its license renewal application and related correspondence with the NRC Staff, Entergy indicated that it would submit the potentially cost-beneficial SAMAs for further internal engineering project cost-benefit analysis, even though none of the potentially cost-beneficial SAMAs is related to aging management under 10 C.F.R. Part 54. Entergy contracted RCM Technologies to assist it in this effort. This package provides a conceptual design and implementation cost estimate for SAMA IP3-062 in accordance with Entergy design engineering practices. For SAMA IP3-062, resolution is required to detect flooding potential in the 480 VAC Switchgear Room (Switchgear Room) and provide an alarm at the Control Room. This package provides for a conceptual design to install water intrusion detection in the Unit 3's Control Buildings 480 VAC Switchgear Room at Elevation 15'- 0". This device, detecting water detected at a pre-determined set-point level in the Switchgear Room, will provide an alarm signal connected to the annunciator in the Control Building's Unit 3 Control Room at Elevation 53'- 0"									
Prepa	ared by:	Buttaceroly.		Approved b	y: M					
Date:	9	- 20-2012		Date:	9-20-2012	/				

	ENTERGY NUCLEAR NORTHEAST IMPLEMENTATION ESTIMATE								
		Indian Point Nuclear Power Station							
* EST	IMATE LEVEL *	EC #: SAMA IP3-062							
I	Conceptual	PROJECT TITLE: Flood Detection System ESTIMATOR: RCMT							
	Preliminary	JOB LOCATION: 480 Volt Switchgear Room PROJECT CODE: TBD							
	Definitive	ORIGINATOR: ORIG. DATE: 06/19/2012							
ltem		Description							
1.	This estimate assur	nes that this work will not require outage conditions to complete							
2.	This estimate assur	mes that this work will complete during 2014 working a 10 hours per shift, four days per week schedule.							
3.	This estimate assur	mes that this work will not suffer productivity loss due to radiation, hazardous conditions or QC hold points							
5.	This estimate assur	nes that a three buck scaffold will be required for conduit installation and wire pulling in the Switchgear Room.							
6.	This estimate assur	nes that the detection device mounting brackets will be fabricated in the shop for installation in the Switchgear Room.							
7.	This estimate provid	des for continuous fire watch during cable tray breeching.							
9.	This estimate assur	nes training for 12 Plant Ops. Personnel.							
10.	This estimate does	not include funding for unreviewed safety questions or NRC submittals, but if required the additional cost will be added.							
11.	This estimate is bas	sed on the project's current level of scope definition and is classified Class 4 as defined per the AACE International Cost							
	Labor dollars in this	estimate are projected 2014 costs based on current 2012 craft billing rates at Indian Point. The projected costs provide							
12.	for anticipated billin	g rate increases of 3% per year.							
13.	This estimate allows	s for and includes a contingency factor related to the complexity and location of the work required. The factor is cumulative							
	B. Inside fenc	e boundary - 20%							
	C. Implementa	ation complexity - 40%							
	D. Inside Con	tainment - 50%							
<u> </u>									
L									

INDIAN POINT IMPLEMENTATION ESTIMATE WORK SHEET

Rev 11-0	- -	IND	IAN I	POIN		ENTAT			E WORK S	HEET				
PRO	JECT TITLE: Flood Detection System								SM TBD		TAKEOFF: ESTIMATOR	RCMT		
EST	STATUS: CUTAGE INON-OUTAGE						ORIGI	NATOR:			ORIG. DATE:	06/19/2012		
ITE	DESCRIPTION	QTY	UOM	CFT	NO. UNIT	FCTR	TOTAL	\$/MH	PER UNIT	DOLLARS	DOLLARS	CONTRACT	TI	OTAL \$
	* ESTIMATE LEVEL *					ilulur			ESTIMATE	SUMMARY				
	Conceptual	1								MANHOU	RS	DOLLARS		
<u> </u>	Preliminary			EN	IGINEERING									
<u> </u>	Definitive	1		01	STUDY, I	JESIGN, 4	& CLOSE			80		\$ 8,000		
	General Notes:			03	MODS EI	NGR EOI	SUPPO	RT				\$ -		
				04	SYS ENG	R/ S-U E	NGR			80		\$ 8,000		
				05 06	PROJEC	T MANAG	EMENT	stinn)		240 20		\$ 28,800		
				07	TRAVEL	& LIVING	EXPENS	SES		20		\$ -		
				08 COI	ENGINEE	RING DO	P ACCE	PTANCE R	EVIEW	25		\$ 2,500		
				09	DESIGN	ENGR CC	NTRAC	T SUPPORT	Г	480		\$ 57,600		
				10 11	SUPL CC	NTRACT	MODS E			- 20		\$ -		
				12	OSG FIE	D ENGR	S / PLAN	INERS		80		\$ 9,600		
				MAT 13	ERIALS / MISC MATERIA	CONTRA	CTS					\$ 3837		
				14	OTHER	ONTRAC	TS					\$ 0,037		
				CON 15	TRACT CRAFT	LABOR				504		\$ 67.836		
				16	LOST TIN	NE				50		\$ 6,397		
				17 DI A	SWEC D	STRIBS								
				18	MECH M	AINT.				-		\$-		
				19	ELECT N	IAINT				-		\$ -		
				20	CSG					- 120		\$ 12,000 \$ -		
				MISC	SUPPORT		~			40		¢ 4.000		
				23	PLANNIN	G & SCH	5L EDULIN(3		40		\$ 4,000		
	1			24		G CUAR	ICES			12		\$ 1,440		
	,			26	OPS		NGE5			80		\$ 9,600		
				27 MISI	HP / RP					-		\$-		
				28	QUALITY	CONTRO	CL			40		\$ 3,200		
				29 30	NDE					-		\$ - \$		
			· .	31	RADWA	STE				-		ч - \$-		
				32 33	NURSE ELEVAT	OR CON	TRACTO	R		-		\$- \$-		
				34	WASTE	MANAGE	MENT			-		\$ -		
				35 36	HOUSE	EEPING						\$- \$-		
				37	VENDO	R STOCK	ING			+		\$ -		
				38 39	DECON BBC'S	TAMINAT	ION CON	ITRACTOR		-		\$ - \$ -		
				40	SECURI	ΓY				-		\$ -		
				41 42	FIRE WA	ATCH (Ro	ver)			12		\$- \$866		
				CON										
				43 ESTIN		L				2,043		\$ 73,103 \$ 316,779	-	
					SITE ENC	UMBRAN	CE PREI	MIUM (20%)			\$ 63,356		
					LOADER	5 (30%)		ECTIMA				\$ 114,040		
			I			1		ESTINA		1		\$ 494,175	T	
1.	Gather and stage tools and materials for brackets	1	LT	EL	2 2.00	1.00	4	\$ 123.32	\$ 40.00	\$ 40	\$ 493		\$	533
2.	Fabricate supports for detectors Gather and transport detectors, wire and conduit			EL	2 4.00	1.00	8 12	\$ 123.32 \$ 123.32		\$ - \$ -	\$ 987 \$ 1.480		\$ \$	987 1.480
4.	Locate and install water level detector brackets	1	LT	EL	2 10,00	1.00	20	\$ 123.32		\$ -	\$ 2,466		\$	2,466
5. 6.	Stage, erect and modify scattolding Stage, erect and modify scatfolding	1		LB	2 8.00	1.00	16 8	\$ 96.00 \$ 78.65		\$ - \$ -	୬ 1,536 \$ 629		\$	1,536 629
7.	Fabricate and install conduits for new detectors	240	LF	EL	2 0.0525	1.00	25	\$ 123.32	\$ 1.50	\$ 360	\$ 3,083		\$	3,443
8. 9.	Procure and install conduit supports	10	EA EA	EL	2 2.00	1.00 1.00	40 8	\$ 123.32 \$ 123.32	\$ 10.00 \$ 10.00	\$ 100 \$ 20	\$ 4,933 \$ 987		\$	5,033 1,007
10	re Bore between EL 15 and EL 33	1	LF	EL	2 10.00	1.00	20	\$ 123.32		\$ -	\$ 2,466		\$	2,466
11. 12.	cure and install FCI Model FLT 93 FlexSWITCh remove Control Room fire seal and route new wiri	2	LT	EL	2 2.00	1.00	8 20	\$ 123.32 \$ 123.32	\$ 1,100.00	\$ 2,200	३ 987 \$ 2,466		\$	3,187 2,466
13.	Procure, pull and terminate 125 VDC detector wirir	240	LF	EL	2 0.030	1.00	14	\$ 123.32	\$ 1.25	\$ 300	\$ 1,726		\$	2,026
14. 15.	Replace and test Control Room fire seal as require	240		EL	2 0.030	1.00	14 12	⇒ 123.32 \$ 123.32) > 1.25	\$ 300 \$ ~	⇒ 1,726 \$ 1,480		ъ \$	2,026 1,480

INDIAN POINT IMPLEMENTATION ESTIMATE WORK SHEET EC # SAMA IP3-062

Rev		IND	AN I	POIN	T IN		NTAT	ION E		WO	RK SI	HEET				
PRO JOB	JECT TITLE: Flood Detection System LOCATION: 480 Volt Switchgear Room STATUS: OUTAGE 7 NON-OUTAGE									1 BD			TAKEOFF: ESTIMATOR	: RCMT		
ITE	DESCRIPTION		UOM	CET		MA	NHOUR		¢ (MALI	MATE	ERIAL \$		LABOR	SUB-	$\frac{1}{7}$	OTAL \$
16. 17. 18. 19. 20.	Description Procure and install annunciator in Control Room Dismantle scaffold, return to storage and cleanup Dismantle scaffold, return to storage and cleanup Cleanup and restore work areas	1 1 1 1 1 1	EA EA LT LT	EL EL CP LB EL	2 2 2 1 2	12.00 4.00 8.00 8.00 4.00	1.00 1.00 1.00 1.00	24 8 166 8 - - - - - - - - - - - - - - - - - -	\$784 \$ 123.32 \$ 123.32 \$ 96.00 \$ 78.65 \$ 123.32	\$	150.00	S 150 \$ 150 \$ -	S 2,960 \$ 987 \$ 1,536 \$ 629 \$ 987 \$ - \$ - \$ - \$ - \$ - \$ - \$ - \$ - \$ - \$ - \$ - \$ - \$ - \$ -		\$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$	3,110 1,137 1,536 629 987 - - - - - - - - - - - - - - - - - - -
1. 2.	PAINTING & TOUCH-UP REQUIREMENTS PAINTING & TOUCH-UP PAINTING & TOUCH-UP			PT PT				-				\$- \$-	\$- \$-		\$	-
1. 2.	FIRE WATCH / BOTTLEWATCH REQUIREMENT CRAFT SUPPORT FOR FIRE WATCH CRAFT SUPPORT FOR BOTTLE WATCH	S 1 1	LT LT	FW FW	1	80.00	1.00	80	\$ 53.60			\$ - \$ -	\$ 4,288 \$ -		\$	4,288 -
1.	MISC SUB-CONTRACT MISC SUB-CONTRACT	1	LT											\$ -	\$	-
	SUBTOTAL CRAFT & SUB-CONTRACTOR							373				\$ 3,620	\$ 38,832	\$ -	\$	42,452
1.	CONSTRUCTION SUPPORT (8% OF LABOR \$)	1	LT					30	\$ 104.11				\$ 3,123		\$	3,123
	SUBTOTAL	_		[403				\$ 3,620	\$ 41,955	\$-	\$	45,575
	* RELATED COSTS *															
1. 2. 3. 4. 5. 6. 7.	WALKDOWN ALLOWANCE WORK PACKAGE REVIEW & CRAFT TRAINING TOOL ROOM ATTENDANTS (~3.5%) GENERAL CRAFT DISTRIBS. (10%) CRAFT IN PROCESSING (20%) HUMAN PERFORMANCE & ALARA TRAINING (1/2 day training, or ~ 2%)	1 1 1	LT LT LT	EL EL EL				5 82 14	\$ 123.32 \$ 123.32 \$ 123.32				\$ 617 \$ 10,112 \$ 1,726 \$ 4,196 \$ 8,391 \$ 839		\$ \$ \$ \$ \$ \$ \$	617 10,112 1,726 4,196 8,391 839
	SUBTOTAL							504				\$ 3,620	\$ 67,836	\$-	\$	71,456
1.	PLANT SCOPE MECH MAINTENANCE			PL PL				-				\$- \$-	\$ - \$ -		\$ \$	-
	SUBTOTAL MECH MAINT.							-				\$ -	\$ -	\$ -	\$	
1.			<u> </u>	PL PL				-				\$ - \$ -	\$ - \$ -		\$	
<u> </u>	SUBTOTAL ELECT. MAINT.							-				<u>ə</u> -	ک د		>	
1.	I&C (Dev. Instrument Calibration Procedures)	1	LT	PL PL	1	120.00	1.00	120	\$ 100.00			\$ - \$ -	\$ 12,000 \$ -		\$	12,000
	SUBTOTAL INC MAINT.							120				φ -	a <u>12,000</u>	φ	Ψ	12,000
1.				PL PL				-				\$- \$-	\$ - <u>\$ -</u>		\$	
	SUBTOTAL CSG MAINT:							-				- ¢	φ -	Ş -	\$	-
	SUBTOTAL PLANT							120				\$ -	\$ 12,000	\$ -	\$	12,000
	SUBTOTAL CRAFT/PLANT							624				\$ 3,620	\$ 79,836	\$ -	\$	83,456
	IMPLEMENTATION SUPPORT															
1 2. 3. 4. 5. 6. 7. 8, 9.	DS ENGINEERING SIGN ENGINEERING SUPT DURING CONST SYSTEMS ENGINEERING - MECHANICAL SYS ENGINEERING - ELECTRICAL SYS ENGINEERING - INSTR & CONTROL SYS ENGINEERING - CIVIL STRUCTURAL PROJECT MANAGEMENT TRAINING (OPS Staff) QA / QC VERIFICATION	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	LT LT LT LT LT LT LT	NM NM NM NM NM NM NM	1 1 1 1 12 1	40.00 40.00 40.00 240.00 1.00 40.00	1.00 1.00 1.00 1.00 1.00 1.00	40 40 40 240 12 40	\$ 100.00 \$ 100.00 \$ 100.00 \$ 120.00 \$ 120.00 \$ 120.00 \$ 100.00				\$ - \$ 4,000 \$ - \$ 4,000 \$ 4,000 \$ - \$ 28,800 \$ 1,440 \$ 4,000		\$ \$ \$ \$ \$ \$ \$ \$ \$	4,000 - 4,000 4,000 - 28,800 1,440 4,000

INDIAN POINT IMPLEMENTATION ESTIMATE WORK SHEET EC #: SAMA IP3-062

Rev.		IND	AN F	POIN	T IN	IPLEME	NTAT	ION E	STIMAT	TE ۱	WORK SI	HEET					
11-0						EC #	#: SAM	A IP3-0	62								
PRO	JECT TITLE: Flood Detection System								AL 🗌 (08M	_		TAK	EOFF:			
JOB	LOCATION: 480 Volt Switchgear Room							PROJE	CT CODE	: 18	D		ESTI	MATOR:	RCMT		
ESI.	STATUS: LI OUTAGE MINON-OUTAGE	<u> </u>	1			EA A			ATOR:		MATEOIAL	MATEDIAL	URIC	DATE:	06/19/2012		
ITE	DESCRIPTION	OTY	UOM	CFT	NO	LINIT	FCTR	TOTAL	S/MH		PER LINIT	DOLLARS		LARS	CONTRACT	T	
10	IN ANNING & SCHEDULING	1	IT	NM				1	V			DOPERTICO			Contractor	د	017/12/0
11	HP / RP/ ALARA		IT	NM				-					\$			ŝ	-
12.	SIMULATOR CHANGES	1	LT	NM	1	120.00	1.00	120	\$ 100.0	00			\$	12.000		s	12,000
13.	OPS (DEVELOP/REVISE PROCEDURE(S))	1	LT	NM	1	80.00	1.00	80	\$ 120.0	20			\$	9,600		\$	9,600
14.	TRAVEL & LIVING EXPENSES	1	LT										\$	-		\$	-
	CONTRACTOR SUPPORT																
1.	FIS / MODS ENGINEERING - SWEC (Incl Per Die	m)	LT	NM				-					\$	-		\$	-
2.	MODS PLANNING & SCH SWEC (Incl Per Diem	1	LT	NM		20.00	1.00	20	\$ 100.0	00			\$	2,000		\$	2,000
3.	OSG FIELD ENGRS/PLAN- SWEC(Incl Per Diem)			NM		80.00	1.00	80	\$ 120.0	00			\$	9,600		\$	9,600
4, 5				NM	' '	40.00	1.00	40	j⊅ 60.t	10			5	3,200		e e	3,200
6	HP / RP		IT	NM									ŝ			\$	-
7	RADWASTE	1	ιT	NM				_					۴.	-		ľ	_
8,	NURSE	1	LT	NM				-									
9.	ELEVATOR CONTRACTOR	1	LT	NM				-									
10.	WASTE MANAGEMENT	1	LT	NM				-									
11.	HOUSEKEEPING	1	LT	NM				-									
12.	EQUIPMENT RENTAL CONTRACTOR	1	LT	NM				-									
13.			LT	NM				-									
14.				NIVI				-									
16	SECURITY	1		SEC													
17	FIRE WATCH (Rover)	1	LT	NM				l.					\$	-		\$	_
18.	SAFETY (2%)	1	LT	NM				12	\$ 72.1	14			\$	866		\$	866
19.	LOST TIME (10%)	1	LT					50	\$ 127.9	94			\$	6,397		\$	6,397
	SUBTOTAL CRAFT/NON-MANUAL							1,438				\$ 3,620	\$ 1	69,739	\$-	\$	173,359
1.	FREIGHT, SALES TAX, & CONSUMABLES (6%)											\$ 217				\$	217
	SUBTOTAL INSTALLATION COST							1,438		1		\$ 3,837	\$ 1	69,739	\$ -	\$	173,576
													(
1.	DESIGN ENGINEERING - MECHANICAL	1	LT	NM				-					\$	-		\$	-
2.	DESIGN ENGINEERING - ELECTRICAL	1	LT	NM	1	40.00	1.00	40	\$ 100.0	00			\$	4,000		\$	4,000
3.	DESIGN ENGINEERING - INSTR. & CUNTROL			NM	1	40.00	1.00	40	\$ 100.0				\$	4,000		\$	4,000
4.	3TING (Instrument Calibration and testing)	1	1 T	NM	2	10.00	1 00	20	s 100 r				9	2 000	¢	e e	2 000
6	NTRACT ENGR DESIGN SUPPORT	1	IT	NM	1	480.00	1.00	480	\$ 120.0	00			ŝ	57 600	Ψ - \$ -	ŝ	57 600
7.	DESING ENG. DCP ACCEPTANCE REVIEW	1	LT	NM	1	25.00	1.00	25	\$ 100.0	00			s	2,500	\$ -	\$	2,500
	SUBTOTAL DESIGN COST							605		1		• • • • • • • • • • • • • • • • • • • •	\$	70,100	\$ -	\$	70,100
ļ	SUBTOTAL INSTALLATION & DESIGN COST												\$ 2	39,839	\$ -	\$	243,676
1.	CONTINGENCY (30%)															\$	73,103
	ESTIMATE SUBTOTAL							2,043								\$	316,779



ENTERGY INDIAN POINT NUCLEAR STATION UNIT 3

CONCEPTUAL DESIGN PACKAGE For

SAMA IP3-GAG

Provide a device for manually closing a Main Steam Safety Valve (MSSV) that fails to reseat closed following a Steam Generator Tube Rupture

Prepared b	by:	Approved by:
	In Bettacarol	
Date:	9-20-2012	Date: 7 20 - 2014-

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Attachment 2	Conceptual Design Sketches	
Attachment 3	References	
Attachment 4	Cost Estimate	

1.0 ISSUE

Severe Accident Mitigation Alternative (SAMA) IP3-GAG:

Provide a device for manually closing a Main Steam Safety Valve (MSSV) that fails to reseat closed following a Steam Generator Tube Rupture

2.0 BACKGROUND

In accordance with NRC environmental regulations in 10 C.F.R. Part 51, Entergy performed SAMA analyses for both Indian Point Nuclear Generating Units 2 and 3 as part of its license renewal application. Those analyses identified a number of potentially cost-beneficial SAMAs for each unit. In its license renewal application and related correspondence with the NRC Staff, Entergy indicated that it would submit the potentially cost-beneficial SAMAs for further internal engineering project cost-benefit analysis, even though none of the potentially cost-beneficial SAMAs is related to aging management under 10 C.F.R. Part 54. Entergy contracted RCM Technologies to assist it in this effort.

This package provides a conceptual design and implementation cost estimate for SAMA IP3-GAG in accordance with Entergy design engineering practices.

For SAMA IP3-GAG, resolution is required for returning a "stuck-open" (failed to reseat closed) MSSV to its normally closed position after its operation resulting from a steam generator tube rupture.

This package will provide for a "valve gagging" device to be temporarily installed on the valve to provide manual assistance if needed when a MSSV fails to reseat closed upon reduction of pressure.

The design considerations that follow will address the application's adequacy and the basis for the recommendation to resolve the identified potential issue.

The recommended solution will include descriptive details of the design change and also conceptual design sketches as required. These descriptive details, sketches, and the preliminary material list will be the informal basis for initiating the all-inclusive conceptual cost estimate for EC development and implementation at the Station.

3.0 **EXISTING CONDITIONS**

This is a new application for use of the valve gag at IP3. Currently, the purpose of the valve gag for MSSVs at IP3 is only in conjunction with Procedure 3-PT-R006A, Main Steam Safety Valves Setting Test Using Set Pressure Verification Device.

4.0 **DESIGN CONSIDERATIONS**

The MSSVs at IP3 are Crosby HC-65W ISOFLEX Safety Valves. Crosby Engineering Doc #IS-V3147A, page 9, provides instruction for installing a valve gag to be used for hydrostatic testing purposes. It cautions not to overload the valve spindle or damage to the valve may result. It provides instructions for this device to be installed only when testing at pressures no greater than 10 percent above the nameplate (lifting) pressure.

The original purpose for this device at IP3 during testing is as the name infers; to "gag the valve", meaning to keep it in a passive closed status. In the proposed resolution to the issue (MSSV fails to reseat closed after operation) the valve gag will be installed temporarily and used for the purpose of closing the valve.

Prior to installing this device, accessibility for installation requires that certain parts be removed from the valve assembly. These parts are the lever (27), the forked lever (30), the top cap (25), and the spindle nut (23) shown in Attachment 2, Figure 1.

The valve gag, and the tools needed to remove the parts indicated, along with the tool required to install the valve gag, need to be made available on the Turbine Floor elevation and located in an area close to the vicinity of the MSSVs.

5.0 **CONFIRMATION OF DESIGN**

The device will be used to close a valve that fails to reseat when the pressure has dropped below the lifting pressure.

The gagging application will be utilized within the same pressure limits specified in Crosby's Manual (pressure at the valve after release will be no greater than 10 percent above the nameplate (lifting) pressure).

To further ensure use of the gagging device is adequate, confirmation will be provided by the valve manufacturer, or, if needed, a finite element analysis for this specific application will be performed. This will confirm that use of the gag is appropriate and adequate for this purpose and also determine its operating limitations.



By adhering to the valve gag's specific use limitations, reseating the valve closed by this method will be similar to the current use of the gag for the valve-test installation. (Attachment 2, Figure 2).

6.0 **RECOMMENDED SOLUTION**

- 1. Provide a cabinet (in the vicinity of the MSSVs) to be used for storage of the valve gag and the associated tools needed (Attachment 2, Figure 3)
- 2. Provide training for installation of this device
- 3. Prepare the necessary installation procedure(s) for installing the gag and identify the circumstances other than testing for when this device is to be used

7.0 PRELIMINARY MATERIAL LIST

Item Description	Quantity
1. Wall mounted cabinet approximately 30" x 30" x 10" deep	1
2. Hilti mounting bolts	4
3. Valve gag for style HC ISOFLEX safety valve	1
4. Socket wrench and socket for installing valve gag	1
5. Lubricant for valve gag threads and end point	1
6. Tools required for removal of valve parts (includes pliers, hammer, screwdrivers, and wrenches)	1 set
7. Torque wrench set	1
8. Tote-bag for valve gag and required tools	1



Attachment 1

Entergy Impact Screening Summary



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Engineering Change Process

ATTACHMENT 9.3

IMPACT SCREENING SUMMARY

SHEET 1 OF 6

INSTRUCTIONS:

Identify the potentially impacted and the unaffected areas by checking the appropriate <u>Yes</u> or <u>No</u> block on the Impact Screening Criteria.

If a direct determination cannot be made based on the impact screening questions, the detailed questions in Attachment 9.4 may be used to identify potential impacts.

The completion of detailed questions in Attachment 9.4 is recommended but not required.

Contact potentially impacted groups if assistance is required.

SAMA Engineering Change No.: IP3-GAG

	CONCEPT	UAL	
Rev. No.:	Design	PACKA	GE

Prepared by:

Date:

DESIGN ENGINEERING DISCIPLINES	Potential Impact		
 Civil / Structural Design Engineering Does the proposed activity involve any civil / structural (including seismic) design changes, activities or affect coatings? OR Does the proposed activity involve any piping engineering design changes or activities? 	☐ YES	MO 🕅	
 Does the proposed activity involve any station or switchyard electrical design, large power transformers, or settings changes or activities? (SOER 10-1) 	☐ YES	X NO	
Instrumentation and Controls Design Engineering Does the proposed activity involve any I&C design or settings changes or activities?	☐ YES	🔀 NO	
 Mechanical Design Engineering Does the proposed activity add/remove/replace insulation, aluminum or other metallic/non-metallic sources of debris in the reactor/containment building or involve any mechanical design changes or activities? 	🗌 YES	🖾 NO	
 PSA Engineering Does the proposed activity impact or involve changes to plant evaluations or probabilistic safety assessments? Does the proposed activity impact or involve changes to the Emergency Operating Procedures, Abnormal Operating Procedures, or Severe Accident Procedures or does it add, remove or modify SSCs included in a Maintenance Rule function? 	YES 🖬	, NO ⊡, NO	
 Nuclear Analysis Does the proposed activity impact or involve changes to plant evaluations, Technical Specifications, Technical Requirements Manual, or require a full 50.59 Evaluation? 	TYES	🔀 NO	
 FERC / NERC Impact Does the proposed activity impact or involve change to FERC / NERC or Regional Entity compliance documents? (ex. MOU, ENN/ENS-PL-158, ENS-DC-199, etc.) 	☐ YES	🕅 NO	

IPEC00270421



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Engineering Change Process

ATTACHMENT 9.3

Sheet 2 of 6

DESIGN ENGINEERING PROGRAMS	Potential	Impact
 ASME Section III Specifications Does the proposed activity add, delete, or modify information required by ASME Section III to be contained in a design specification? 	TYES	🛛 NO
 Cable and Raceway Program Does the proposed activity involve any changes to cable trays, raceways or the associated documentation? 	T YES	🔀 NO
Electronic Databases (EDB) Does the proposed activity involve any changes to electronic databases?		🔀 NO
 EQ Program (10CFR50.49, NUREG 0588, Reg Guide 1.89) Does the proposed activity involve any new or existing EQ components? 	□ YES	🕅 NO
 Hydrogen Control Program (10 CFR 50.44) (<i>if applicable</i>) Does the proposed activity impact equipment or materials related to hydrogen control? 	□ YES	🕅 NO
 Human Factors Program Does the proposed activity involve control panel design including layout and labeling, visual displays, operator aids, auditory signals or environment in the control room, cable spreading room, and other control panel locations? 	☐ YES	🔀 NO
 Margin Management Does the proposed activity impact or involve any change to design, licensing or operations margins? 	☐ YES	K NO
 Reg. Guide 1.97 / PAM (Post Accident Monitoring) Does the proposed activity involve Reg. Guide 1.97 (Post Accident Monitoring) Indications? 	☐ YES	🕅 NO

MAINTENANCE	Potentia	Potential Impact		
 Electrical Maintenance Does the proposed activity require an Electrical Maintenance review to identify affected procedures, required actions and required training? 	☐ YES	K NO		
 Maintenance Does the proposed activity require an I&C Maintenance review to identify affected procedures, required actions and required training? 	☐ YES	🕅 NO		
 Mechanical Maintenance Does the proposed activity require a Mechanical Maintenance review to identify affected procedures, required actions and required training? 	YES			

NUCLEAR ENGINEERING	Potential Impact	
 Nuclear Fuel Design Does the proposed activity impact or involve the design, performance or storage of nuclear fuel? 	□ YES	🕅 NO
 Reactivity Management Program Does the proposed activity impact or involve the reactor system, reactor controls, reactor chemistry, related systems, potential core and spent fuel damage, spent fuel, reactor coolant pressure boundary or reactor system procedures? 	□ YES	M NO



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Engineering Change Process

ATTACHMENT 9.3

SHEET 3 OF 6

IMPACT SCREENING SUMMARY

PROCESS OR PROGRAM IMPACT SCREENING CHECKLIST	Potential Impact	
Computer Support and Software	☐ YES	🕅 NO
 Does the proposed activity impact or involve changes to plant computer software or firmware or impact Software Quality Assurance (SQA)? 		
Chemistry and Environmental Impact	🗌 YES	🔀 NO
 Does the proposed activity impact or involve any changes to plant chemistry requirements, operations or procedures, or any changes to the environment? 		
Radiation Protection (RP) Program Impact	☐ YES	🕅 NO
 Does the proposed activity impact or involve any changes to the RP program? Does the proposed activity involve the potential to introduce (or reintroduce) any cobalt containing materials (such as Stellite) into the primary system? 		
 Operations Does the proposed activity impact or involve changes to Operations procedures, training or operator actions? 	🗌 YES	X NO
 Planning, Scheduling and Outage (PS&O) Does the proposed activity require a PS&O review to identify required design and installation information? 	☐ YES	X NO
 MP&C (Inventory) Does the proposed activity impact or involve any addition or removal of equipment from the inventory? Does the proposed activity impact or involve any Procurement of Quality or Augmented Quality material from non-qualified suppliers? 	☐ YES	X NO
Procurement Engineering Does the activity impact or involve any procurement activities?	🗌 YES	🛛 NO

PROGRAMS AND COMPONENTS			Potential Impact	
 ASME Containment In-service Inspection (IWE / IWL) Program Does the proposed activity impact or involve the containment pressure boundary or associated moisture barriers or a support for the containment pressure boundary? This includes "software only" changes that do not physically change the hardware such as re-rating of pressures or temperatures to include changes to documented information on these items or additional documented information for these items. Does the proposed activity limit access to containment surfaces for inspection? Involve disassembly of a bolted connection which forms a portion of the containment boundary? 		☐ YES	NO 🛛	
ASME . •	☐ YES	🔀 NO		



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Engineering Change Process

ATTACHMENT 9.3 SHEET 4 OF 6

IMPACT SCREENING SUMMARY

PROGRAMS AND COMPONENTS (CONTINUED)	Potentia	al impact
 ASME In-service Inspection (ISI) Program Does the proposed activity add, delete, or modify an ASME Section XI pressure boundary item or a support for an ASME Section XI pressure boundary item? This includes "software only" changes that do not physically change the hardware like such as re-rating of pressures or temperatures. (ASME Section XI items include ASME Class 1, 2, 3, or B31.1 treated as ISI Class 2 or 3 (T2 and T3) components, parts, or appurtenances such as pipe or pressure vessel walls, valve bodies and pump casings. 	T YES	X NO
 ASME Section XI Repair / Replacement Program Does the proposed activity involve any mechanical component within the ASME XI program / boundaries? Does the proposed activity add, delete, or modify an ASME Section XI pressure boundary item or a support for an ASME Section XI pressure boundary item? (ASME Section XI items include ASME Class 1, 2, 3, MC, and CC, as well as B31.1 treated as ISI Class 2 or 3 (T2 and T3) components, parts, or appurtenances such as pipe or pressure vessel walls, valve bodies and pump casings). 	U YES	NO 🕅
 ASME In-service Testing Program Does the proposed activity impact or involve any item (safety related or non safety related) that may affect the performance or testing of a safety related pump or valve? Does the proposed activity impact the function or functional classification of any pump or valve as stated in the IST program documents? 	YES	□ NO
 Air Operated Valve (AOV) Program Does the proposed activity impact or involve the design, operation or testing of AOVs? 	TYES	🔀 NO
 Buried Piping and Tanks (BP&T) Program Does the proposed activity impact or involve any changes to piping, coatings, or cathodic protection of Buried Piping & Components? 	TYES	🛛 NO
 Boric Acid Corrosion (BAC) Program Does the proposed activity impact or involve any increase in the likelihood of boric acid formation or corrosion? 	TYES	🕅 NO
 Check Valve Program Does the proposed activity impact or involve the design, operation or testing of check valves? 	TYES	🔀 NO
 Control Room Habitability Program Does the proposed activity impact or involve changes that affect the temperature or radiological environmental conditions in the Main Control Room? 	TYES	🔀 NO
 Electrical Circuit Breaker, Relay and Electrical Equipment Testing Does the proposed activity impact or involve changes to the functional testing of circuit breaker, relay or electrical equipment? 	🗌 YES	MO 🕅



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Engineering Change Process

IMPACT SCREENING SUMMARY

ATTACHMENT 9.3

SHEET 5 OF 6

PROGRAMS AND COMPONENTS (CONTINUED)	Potential Impact	
 Flow Accelerated Corrosion (FAC) Program Does the proposed activity involve any changes (e.g.: configuration, velocity, flow rate, pressure, temperature, material, weld location, etc.) to piping systems included in the FAC Program.? 	☐ YES	X NO
 Heat Exchanger Program Does the proposed activity impact or involve the design, operation or testing of a component in the heat exchanger program? 	□ YES	🔀 NO
 Predictive Maintenance Program Does the proposed activity impact or involve any aspect of the storage, use and testing of lubricants? Does the proposed activity involve thermography? Does the proposed activity involve vibration monitoring? 	☐ YES	🕅 NO
 Microbiological Induced Corrosion (MIC) Program Impact Does the proposed activity involve piping containing untreated or stagnant water or open to the atmosphere? 	TYES	🔀 NO
 Motor Operated Valve (MOV) Program Does the proposed activity impact or involve the design, operation or testing of MOVs? 	☐ YES	NO NO
 Plant Thermal Performance Program Does the proposed activity impact or involve plant thermal performance? 	□ YES	🔀 NO
 Preventive Maintenance Program Does the proposed activity impact or involve periodic testing or performance of SSCs? or Does the proposed activity add, modify or delete any Environmental Qualification (EQ) maintenance requirement or replacement frequency to ensure the component(s) maintains its qualification status? 	☐ YES	X NO
 PT Curves Does the proposed activity add, delete, or modify the basis (as contained in each sites reactor vessel surveillance material testing program) for the Pressure / Temperature Limit Curves (fluence, pressure, temperature, reactor materials)? 	☐ YES	🔀 NO
 Relief Valve Program Does the proposed activity impact or involve the design, operation and testing of relief valves, safety valves, vacuum breaker valves or rupture disc? 	TES	□ NO
 RPV Internals Program Does the proposed activity impact or involve any change to the reactor internals? This includes "software only" changes that do not physically change the hardware such as re-rating of pressures or temperatures. Does the proposed activity impact or involve or related documentation to include neutron fluence or neutron fluence calculations? Does the proposed activity impact or involve or changes to core flow characteristics or core flow characteristics? 	☐ YES	K NO



REV. 11

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Engineering Change Process

IMPACT SCREENING SUMMARY

ATTACHMENT 9.3

SHEET 6 OF 6

PROGRAMS AND COMPONENTS (CONTINUED)	Potential Impact	
 Welding Program Does the proposed activity impact or involve a special process, such as welding, brazing or soldering? 	☐ YES	🛛 NO
 Safety Program Does the proposed impact or activity involve personnel or industrial safety? 	YES	
 System Engineering Does the proposed activity impact or involve any changes to system configuration, function or performance, etc., for Maintenance Rule or other system? Does the proposed activity impact or involve any changes to system procedures, maintenance or operation, etc.? 	YES	□ NO
 Training Program Does the proposed activity involve existing training requirements or create the need for new training? 		
 Simulator Impact Does the proposed activity impact or involve changes to the Simulator? 	□ YES	🔀 NO
 Fire Protection Program Does the proposed activity result in a change to the Fire Protection Program (including 10CFR50 Appendix R) where the impact is more than negligible? 	☐ YES	🕅 NO

Detailed Impact Screening (Attachment 9.4) Attached?	□ YES	📕 NO



Attachment 2

Conceptual Design Sketches

- 1. Figure 1: Style HC ISOFLEX Safety Valve
- 2. Figure 2: Gag installed on valve bonnet
- 3. Figure 3: Turbine Bldg Floor Plan at El. 53'-0" storage cabinet location

RCM	Technologies	ENTERGY	Conceptual Design	
	The Source of Smart Solutions	Unit 3	SAMA IP3 -GAG	Rev. 0



	PARTS LIST
Par	t Part Name Spare Parts*
1A	Body
18	Nozzie
3	Nozzle Ring 3
4	Nozzle Ring Set Screw
5	Disc Insert 1
6	Disc Holder 2
7	Disc Holder Relaining Nut
-8	Disc Holder Retaining Cotter 1
9	Guide 3
10. 0	Guide Hing 3
11	Guide Hing Set Screw
12A	Spindle Point 3
128	Spindle Hod 3
120	Spindle Hod Pin
13	
14	Bonnet Stud
15	Bonnet Stud Nut
- 16	Spring 3
17	Bottom Spring Washer 3
18A -	top spring washer
188	Bearing Pin 3
180	Locking Pin 3
19	Bearing Adapter
20	Bearing
21A	
218	Adjusting Bolt Bearing
22	Adjusting Bolt Nut
23	
24	
25	Cap Cat Carrier
20	Lap Set Screw
21	
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Page 4	i ano Deaghailthi (000 Mulas 1, 2, 3 01

** For Crosby Style HCA (SOFLEX only

Figure 1

STYLE HC ISOFLEX SAFETY VALVE

RCM	Technologies	ENTERGY	Conceptual Design	
	The Source of Smart Solutions	Unit 3	SAMA IP3 -GAG	Rev. 0



Figure 2

GAG INSTALLED ON VALVE BONNET



Attachment 3

References

- 1. ENTERGY Nuclear Management Manual, Engineering Change Process, Rev 11
- Association for the Advancement of Cost Engineering (AACE), Cost Estimate Classification System - As Applied In Engineering, Procurement, and Construction for the Process Industries
 - TCM Framework: 7.3 Cost Estimating and Budgeting
 - Figure 4 Estimate Checklist & Maturity Matrix



Attachment 4

Cost Estimate

ENTERGY NUCLEAR NORTHEAST IMPLEMENTATION ESTIMATE						
* STIMATE I EVEL *	Indian Point Nuclear Power Station					
Conceptual	PROJECT TITLE: Unit 3 MSSV Gag			ESTIMATOR: RCMT		
Prefiminary	JOB LOCATION: IP3 Turbine Build	ing PROJEC	T CODE: TBE)		
Definitive		ORIGINATOR:		ORIG. DATE: 7/17/2012		
	ESTIMATE TOTAL \$458,617		REVISION	10-4		
Summary of Change: In accordance with NRC environmental regulations in 10 C.F.R. Part 51, Entergy performed SAMA analyses for both Indian Point Nuclear Generating Units 2 and 3 as part of its license renewal application. Those analyses identified a number of potentially cost-beneficial SAMAs for each unit. In its license renewal application and related correspondence with the NRC Staff, Entergy indicated that it would submit the potentially cost-beneficial SAMAs for further internal engineering project cost-benefit analysis, even though none of the potentially cost-beneficial SAMAs is related to aging management under 10 C.F.R. Part 54. Entergy contracted RCM Technologies to assist it in this effort. This package provides a conceptual design and implementation cost estimate for SAMA IP3-GAG in accordance with Entergy design engineering practices. For SAMA IP3-GAG, resolution is required for returning a "stuck-open" (failed to reseat closed) MSSV to its normally closed position after its operation resulting from a steam generator tube rupture. This estimate provides for the procurement of an MSSV Gag, gagging tools, lubricant and tote bag, procurement and installation of a wall hung storage cabinet, design engineering for development of the engineering change for the cabinet installations, costs for development of new procedures and/or revision of existing procedures and the cost of training station maintenance personnel to the new or existing procedures.						
Prepared by: Petro Petro						
Date: 9	20-2012	Date: 9-	20-201	о. С		

Γ	ENTERGY NUCLEAR NORTHEAST IMPLEMENTATION ESTIMATE						
			India	an Point Nucle	ar Power Stat	ion	
* EST	IMATE LEVEL *			E	C #: SAMA	IP3 - GAG	
Ľ	Conceptual	PROJECT TITL	E: Unit 3 MSSV G	aq	CAPI	V O&M	ESTIMATOR: RCMT
	Preliminary	JOB LOCATIO	N: IP3 Turbine Buil	dina	Р	ROJECT CODE: TBI)
	Definitive	OUTAG	NON-OUTAGE	ORIGINATO	R:		ORIG. DATE: 7/17/2012
Item		£		Des	cription		
1	This estimate assur	mes that this wor	k will be completed	during 2014			
2	This estimate assur	mes that this wor	k will be performed	on a single 10	hours per shif	t 4 days per week no	n-outage schedule
3	This estimate assur	mes that mock-u	p training for gaggi	ng a failed MSS	V will be provi	ded to Station Mainte	nance personnel
4	This estimate assur	nes that a mock	up "failed" MSSV w	ill be provided	for training pur	DOSES.	
5.	This estimate assur	nes that all work	will be performed	by IP in-house I	Maintenance p	ersonnel.	
6.	The estimates assu	mes the training	for 12 people was	conducted und	er IP2 - GAG II	mplementation Packa	ide.
7.	The estimate assun	nes that IP3 - GA	G is developed in	conjunction with	n or after IP2 -	GAG Implementation	Package.
8.	This estimate does	not include fund	ing for unreviewed	safety question	s or NRC subr	nittals, but if required	the additional cost will be added.
	This estimate is bas	sed on the project	t's current level of	scope definition	and is classifi	ed Class 4 as defined	per the AACE International Cost
9.	Estimate Classificat	tion System (see	Attachment 3, Ref	erence 2).			
10	Labor dollars in this	estimate are pro	pjected 2014 costs	based on curre	nt 2012 craft b	illing rates at Indian F	Point. The projected costs provide for
<u> </u>	anticipated billing ra	ite increases of 3	3% per year.			110000000000000000000000000000000000000	
11	This estimate allows	s for and include	s a contingency fac	tor related to th	e complexity a	and location of the wo	rk required. The factor is cumulative
	and progresses as f	ollows:			0		
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	B. Inside fence	e boundary -	30%				
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INDIAN POINT IMPLEMENTATION ESTIMATE WORK SHEET Rev EC #: SAMA IP3 - GAG 10-4 **I** 08 PROJECT TITLE: Unit 3 MSSV Gag TAKEOFF JOB LOCATION: IP3 Turbine Building PROJECT CODE: TBD ESTIMATOR: RCMT 🗹 0&M ORIGINATOR: ORIG. DATE: 7/17/2012 EST. STATUS: NON-OUTAGE MANHOURS MATL \$ MATERIAL LABOR SUB-ITEM DESCRIPTION QTY UOM CFT NO. U/R FCTR TOTAL \$/MH /UNIT DOLLARS DOLLARS CONTRACT TOTAL \$ * ESTIMATE LEVEL * ESTIMATE SUMMARY Conceptual MANHOURS DOLLARS ENGINEERING Preliminary 01 STUDY, DESIGN, & CLOSEOUT 80 8,000 Definitive \$ 02 DESIGN ENGR CONST SUPPORT 24 \$ 2.400 03 MODS ENGR SUPPORT General Notes: \$ -04 SYS ENGR/ S-U ENGR \$ PROJECT MANAGEMENT \$ All work associated with preparation and training for 05 120 14,400 installation of MSSV gags will be provided by IP Station 06 WELDING ENGR \$ -Mechanical Maintenance personnel. 07 CONTRACT FOR APPLICATION ANALYSIS \$ 120,000 ENGR'G DCP ACCEPTANCE REVIEW 08 20 \$ 2.000 CONTRACT ENGINEERING 08 DESIGN ENGR CONTRACT SUPPORT 320 \$ 38,400 SUPL CONTRACT MODS ENGR \$ 09 4,000 MODS PLAN & SCHED -CONTRACT 40 10 \$ OSG FIELD ENGRS / PLANNERS 2,400 11 20 \$ MATERIALS / MISC CONTRACTS 12 MATERIALS \$ 1,590 13 OTHER CONTRACTS \$ PLANT CRAFT LABOR 14 IPEC CRAFT LABOR/WALKDOWN 180 \$ 14,000 15 LOST TIME \$ 16 DISTRIBUTABLE COSTS \$ MISCELLANEOUS SUPPORT \$ 17 QUALITY CONTROL 40 4.000 18 NDE \$ 19 **OPS - TRAINING** 24 \$ 2.880 20 **OPS - PROCEDURES** 60 \$ 7,200 21 HP/RP \$ MISC CONTRACT SUPPORT 22 QUALITY CONTROL 40 \$ 3,200 23 NDE \$ 24 HP / RP \$ RADWASTE 25 \$ _ 26 NURSE \$ 27 ELEVATOR CONTRACTOR \$ 28 WASTE MANAGEMENT \$ \$ 29 HOUSEKEEPING EQUIPMENT RENTAL CONTRACTOR 30 \$ VENDOR STOCKING 31 \$ 32 DECONTAMINATION CONTRACTOR \$ 33 RBC'S \$ SECURITY 34 \$ 35 FIRE WATCH (Rover) \$ 36 SAFETY 272 4 \$ 37 LOST TIME 1.400 18 \$ CONTINGENCY 37 CONTINGENCY \$ 67,843 990 \$ 293,985 ESTIMATE SUBTOTAL SITE ENCUMBRANCE PREMIUM (20%) \$ 58.797 LOADERS (30%) \$ 105,835 ESTIMATE TOTAL \$ 458,617 Non-Outage Storage Preparation Procure one 30" X 30" X 12" storage cabinets 60.00 \$ 250.00 480.00 730.00 FA Ы 4 00 1.00 250 2 8 \$ S S Hang one 30" X 30" X 12" storage cabinets Ы 2 40.00 80 4 800 00 2 FΑ 1.00 \$ 60.00 \$ \$ 4 800 00 S \$ 750.00 750 3 Procure MSSV gag ΕA ΡL 2 2 2.00 1.00 4 \$ 60.00 \$ 240.00 \$ 990 00 4 Procure gagging tools, lubricant & tote bags 1 T Ы 4 00 1.00 8 \$ 60.00 \$ 500.00 500 \$ 480.00 \$ 980.00 \$ \$ Non-Outage Training \$ Gather and stage gag, tools and materials LT ΡL 2.00 1.00 \$ 100.00 \$ 400.00 \$ 400.00 2 4 2 Disassemble mock-up valve per procedure 1 LT ΡL 12 4.00 1.00 48 \$ 100.00 \$ 4,800.00 \$ 4,800.00 3 LT ΡL 2 1.00 1.00 2 \$ 100.00 \$ 200.00 \$ 200.00 Tag and store removed parts for restoration PL 12 2.00 24 \$ 100.00 \$ 2,400.00 \$ 2,400.00 4 Install and adjust gag per specification LT 1.00 5. ΡL 1.00 1.00 \$ 100.00 \$ 200.00 \$ 200.00 Cleanup work area and return tools to storage LT 2 2 \$ \$ \$ \$ \$ \$ --\$ -\$ _ \$ \$

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Rev.

INDIAN POINT IMPLEMENTATION ESTIMATE WORK SHEET

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OUTAGE TOOL ROOM ATTENDANTS (~3.5%)
GENERAL CRAFT OUTAGE DISTRIBS (10%)
(TAFE TIN PROCESSING (20%)
HUMAN PERFORMANCE & ALARA TRAINING
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SUBTOTAL CRAFT/PLANT
IMPLEMENTATION SUPPORT
FIS / MODS ENGINEERING - MECHANICAL
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PROJECT MANAGEMENT
WELDING ENGR (Program Engr)
QA / QC VERIFICATION
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H7 / RP/ ALARA
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INDIAN POINT IMPLEMENTATION ESTIMATE WORK SHEET

Rev.		DIAN	POII	NT I	MPL	.EMEN	ΤΑΤΙΟ	ON ES		NORK	SHEET				
10-4		САРП	~A [Z 081	4	EC #: 5	SAMA	IP3 - GA	١G						
PRO	JECT TITLE: Unit 3 MSSV Gag											TAKEOFF:			
JOB	B LOCATION: IP3 Turbine Building							PROJEC	T CODE: TI		ESTIMATOR: RCMT				
EST.	STATUS: O&M INON-OUTAGE					ORIGINATOR:						ORIG. DATE: 7/17/2012			
Liter	DECORIDION	ATV	1000	CET	NO	M	ANHOL	JRS	* (84)	MAT'L \$	MATERIAL	LABOR	SUB-	TOTAL	
TIEN	DESCRIPTION		UOM	UFI	NO.	U/K	FUIK	TUTAL	\$////71	IUNII	DOLLARS	DOLLARS	CONTRACT	IUTAL \$	
ļ	SUBTOTAL CRAFT/NON-MANUAL	ļ						570			1,500	\$ 56,152.00	\$ -	\$ 57,652.00	
1.	FREIGHT, SALES TAX, & CONSUMABLES (6%)										90			\$ 90.00	
	SUBTOTAL INSTALLATION COST	1						570			1,590	\$ 56,152.00	\$-	\$ 57,742.00	
1. 2. 3. 4. 5. 6.	DESIGN ENGINEERING - MECHANICAL DESIGN ENGINEERING - ELECTRICAL DESIGN ENGINEERING - INSTR. & CONTROL DESIGN ENGINEERING - CIVIL/STRUCTURAL CONTRACT ENGR DESIGN SUPPORT CONTRACT FOR APPLICATION ANALYSIS	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	LT LT LT LT LT LT	NM NM NM NM NM NM	1	80.00 320.00	1.00	80 - - 320	\$ 100.00 \$ 120,00			\$ 8,000.00 \$ - \$ - \$ 38,400.00 \$ -	\$ 120,000	\$ 8,000.00 \$ - \$ - \$ 38,400.00 \$ 120,000.00	
7.	ENGR'G DCP ACCEPTANCE REVIEW	1	LT	NM	1	20.00	1.00	20	\$ 100.00			\$ 2,000.00		\$ 2,000.00	
	SUBTOTAL DESIGN COST			T		1		990				\$ 48,400.00	\$ 120,000	\$ 168,400.00	
	1	1													
	SUBTOTAL INSTALLATION & DESIGN COST	1				[\$ 104,552.00	\$ 120,000	\$226,142.00	
1.	CONTINGENCY (30%)													\$ 67,843.00	
	ESTIMATE SUBTOTAL							990						\$ 293,985.00	