ENTERGY
INDIAN POINT NUCLEAR STATION
UNIT 2

CONCEPTUAL DESIGN PACKAGE
For
SAMA IP2-009

Install a Reactor Cavity Flooding System

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

IPEC00269597

TABLE OF CONTENTS

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.

4.0 DESIGN CONSIDERATIONS

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

Item 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 Industrial 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

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

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.: SAMA IP2-009 **Rev. No.:** CONCEPTUAL DESIGN PKG.

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?	■ 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

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	☐ NO
Cable and Raceway Program • Does the proposed activity involve any changes to cable trays, raceways or the associated documentation?	■ YES	☐ 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) ***(if applicable)*** • 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 • 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?	■ 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?	☐ 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

ATTACHMENT 9.3 IMPACT SCREENING SUMMARY

SHEET 3 OF 6

PROCESS OR PROGRAM IMPACT SCREENING CHECKLIST	Potential Impact	
Computer Support and Software • Does the proposed activity impact or involve changes to plant computer software or firmware or impact Software Quality Assurance (SQA)?	☐ YES	☒ NO
Chemistry and Environmental Impact • Does the proposed activity impact or involve any changes to plant chemistry requirements, operations or procedures, or any changes to the environment?	☐ YES	☒ NO
Radiation Protection (RP) Program Impact • 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?	■ 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	☐ 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 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

ATTACHMENT 9.3 — IMPACT SCREENING SUMMARY

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	☒ 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?	☐ 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?	☐ 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

ATTACHMENT 9.3 **IMPACT SCREENING SUMMARY**

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	☐ 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	☒ 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	☐ 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?	☐ 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

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?	■ YES	☐ 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	☐ NO
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

RCM Technologies *The Source of Smart Solutions*	ENTERGY Indian Point Nuclear Station Unit 2	Conceptual Design Package SAMA IP2–009	Rev. 0

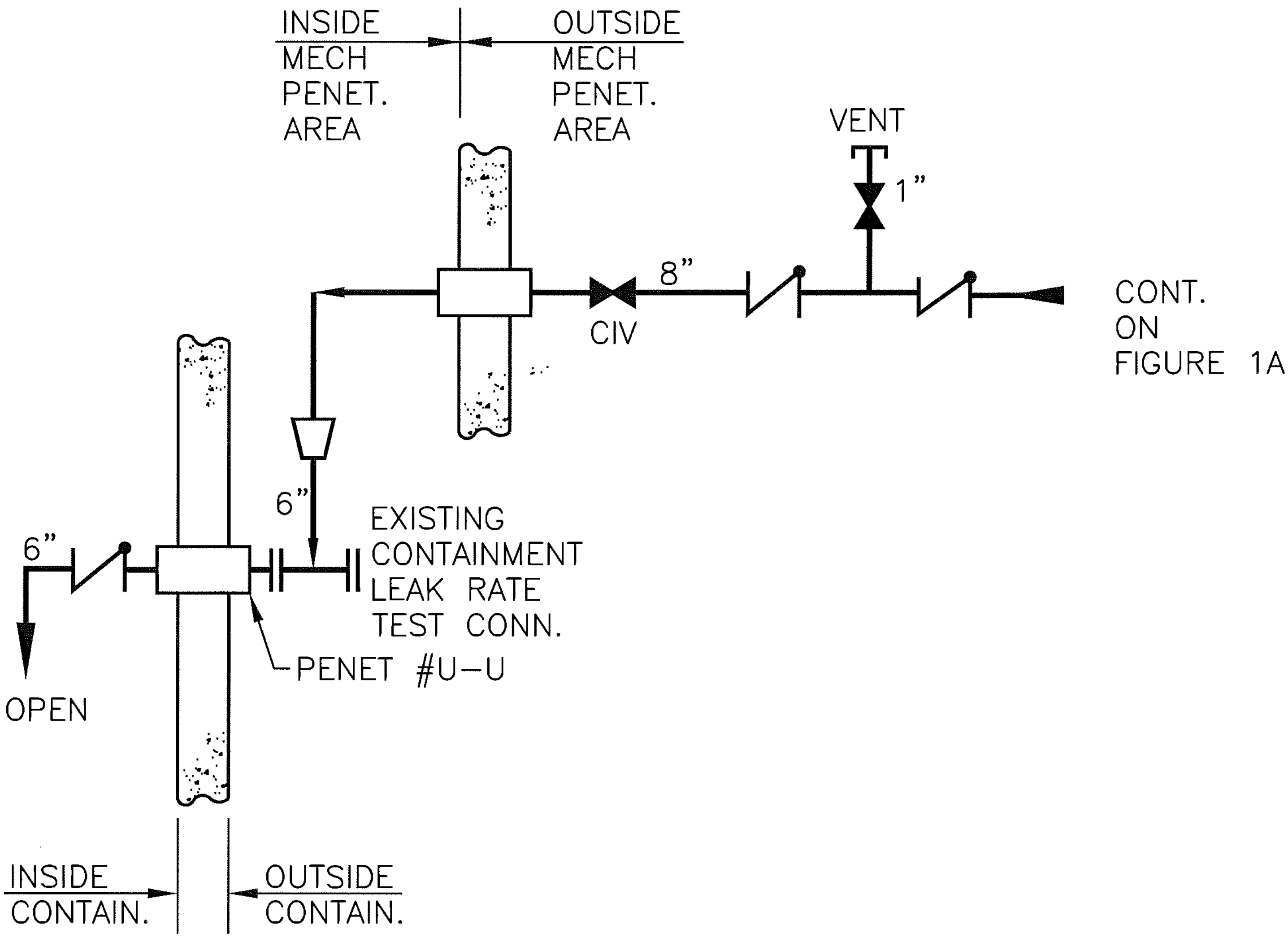


FIGURE 1
REACTOR CAVITY
FLOODING SYSTEM
FLOW DIAGRAM

RCM Technologies The Source of Smart Solutions	ENTERGY Indian Point Nuclear Station Unit 2	Conceptual Design Package SAMA IP2–009	Rev. 0

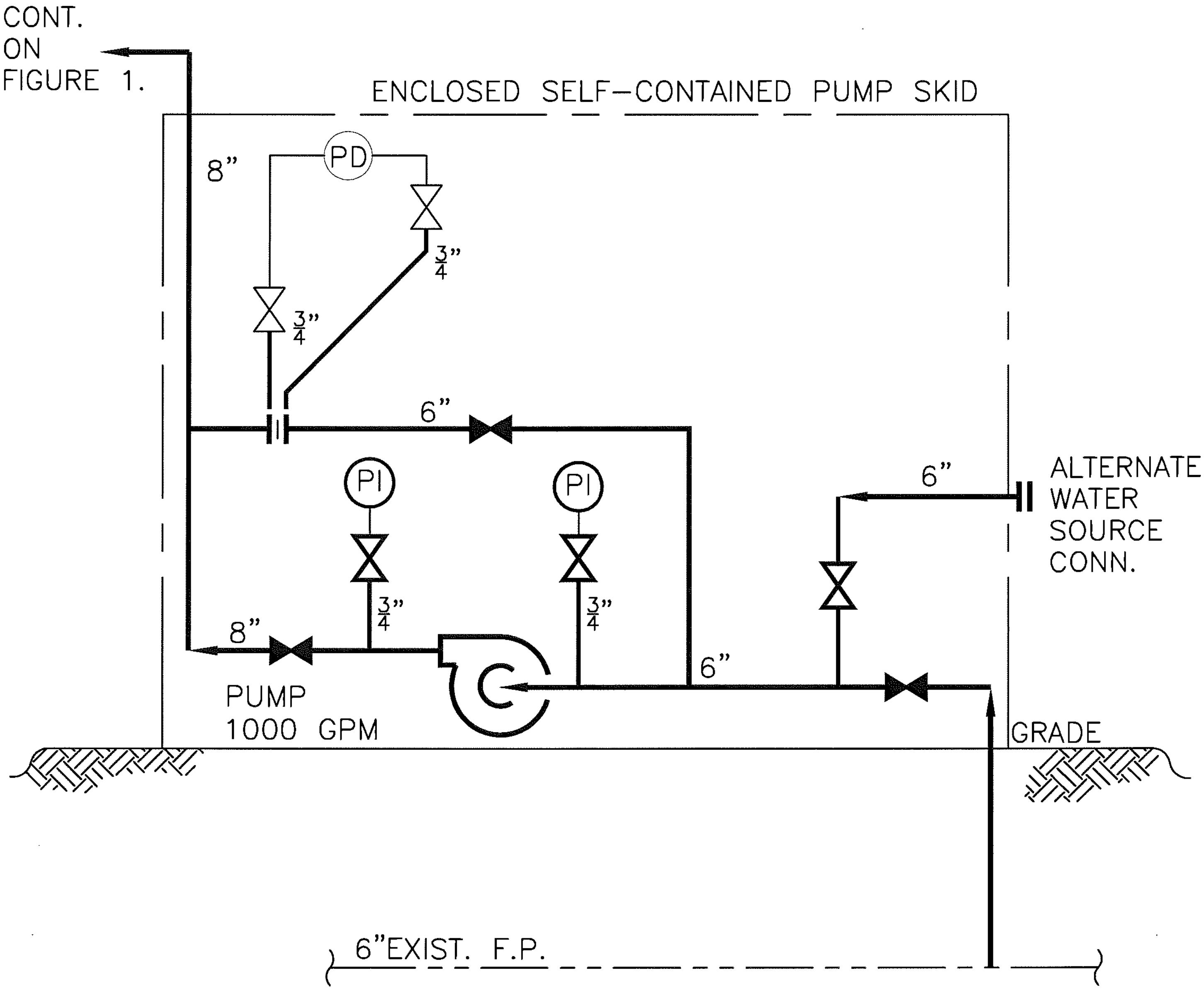


FIGURE 1A
REACTOR CAVITY
FLOODING SYSTEM
FLOW DIAGRAM

RCM Technologies *The Source of Smart Solutions*	ENTERGY Indian Point Nuclear Station Unit 2	Conceptual Design Package SAMA IP2-009	Rev. 0

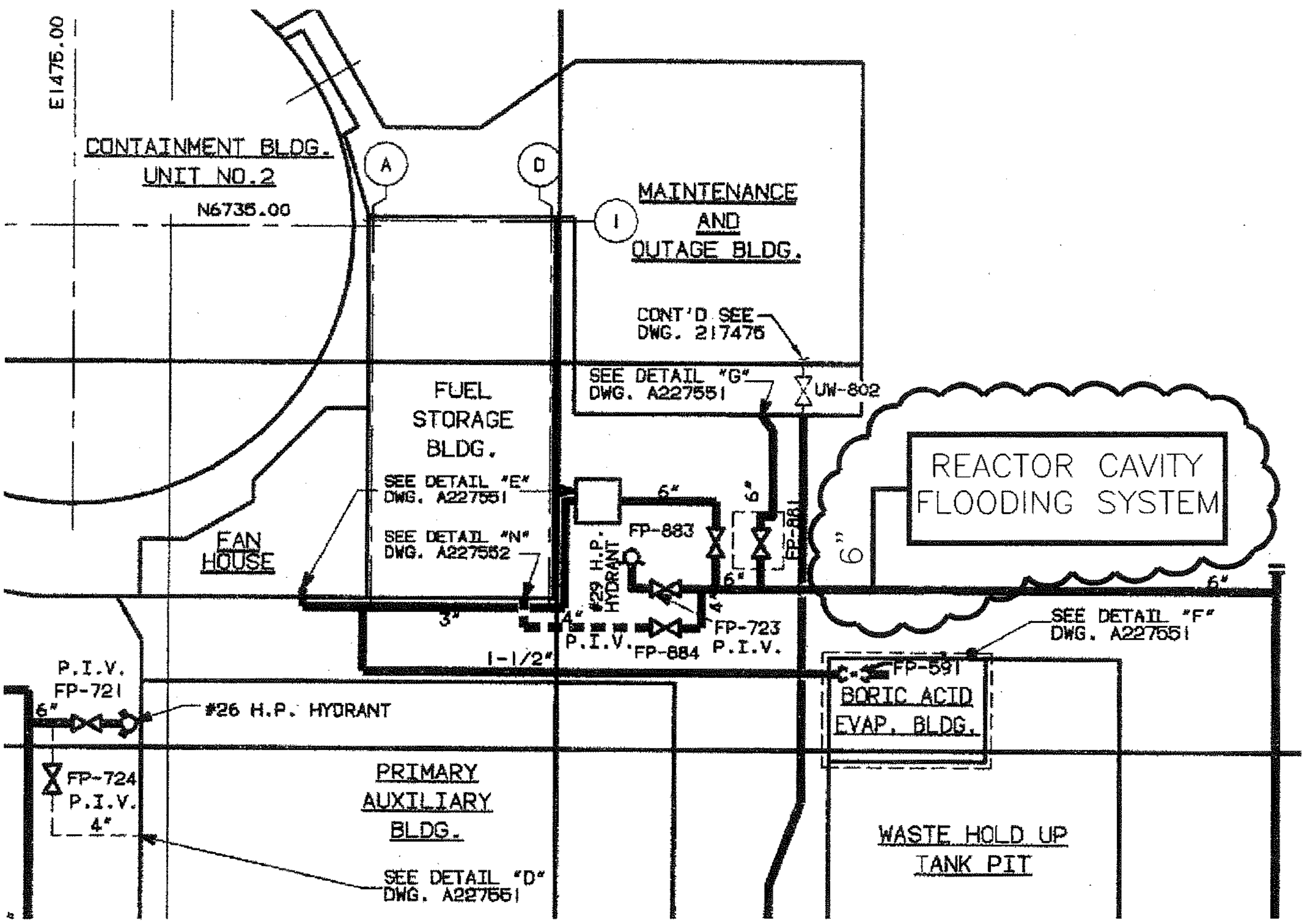


FIGURE 2
REACTOR CAVITY FLOODING SYSTEM FIRE WATER TIE-IN

TITLE: YARD FIRE PROTECTION PIPING	Entergy	STATION: INDIAN POINT
MOD. PROC. OR SPEC. / DRWN. BY: GIBBS&HILL / SCALE: NONE / REC'D	DWG. NO. 9321-F-4006-77	MY

RCM Technologies The Source of Smart Solutions	ENTERGY Indian Point Nuclear Station Unit 2	Conceptual Design Package SAMA IP2-009	Rev. 0

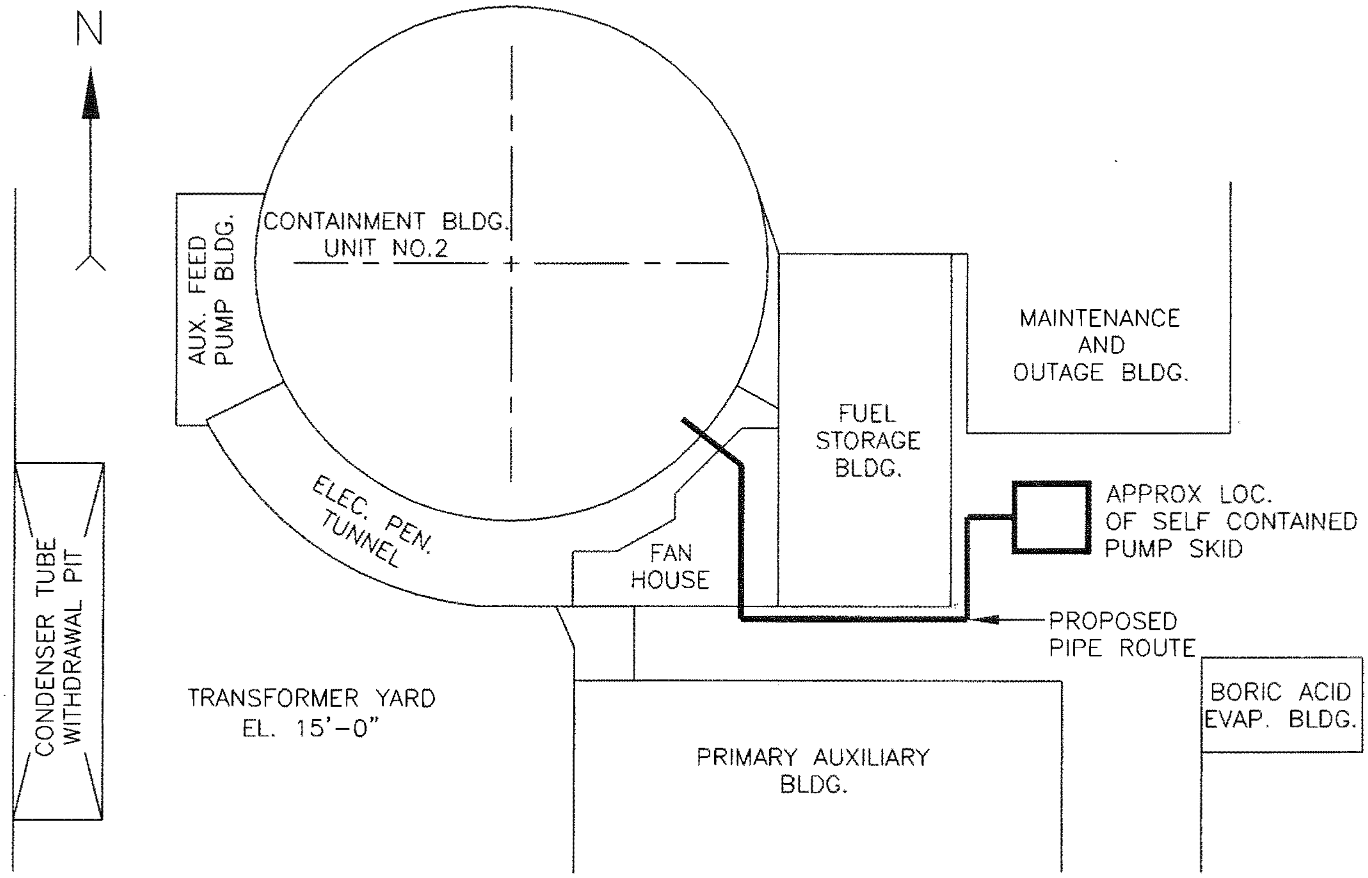


FIGURE 3
REACTOR CAVITY
FLOODING SYSTEM
GENERAL ARRANGEMENT

DWG. NO.	400400-02
Entergy Nuclear Northeast	DWG. TYPE: COMPANY DWG. SIZE: C
LOCATION:	IPEC UNIT 1 & 2
TITLE:	FIRE AREA/ZONE ARRANGEMENT SITE PLAN
— APPROVALS —	
ENGINEERING MANAGER:	F. ORLANDO
PROJECT ENGINEER:	J. COTTAM
DESIGNER:	M. SCHAIRER
DRAWN BY:	A. PRINCE
SCALE: NTS	DISCIPLINE CODE: MF

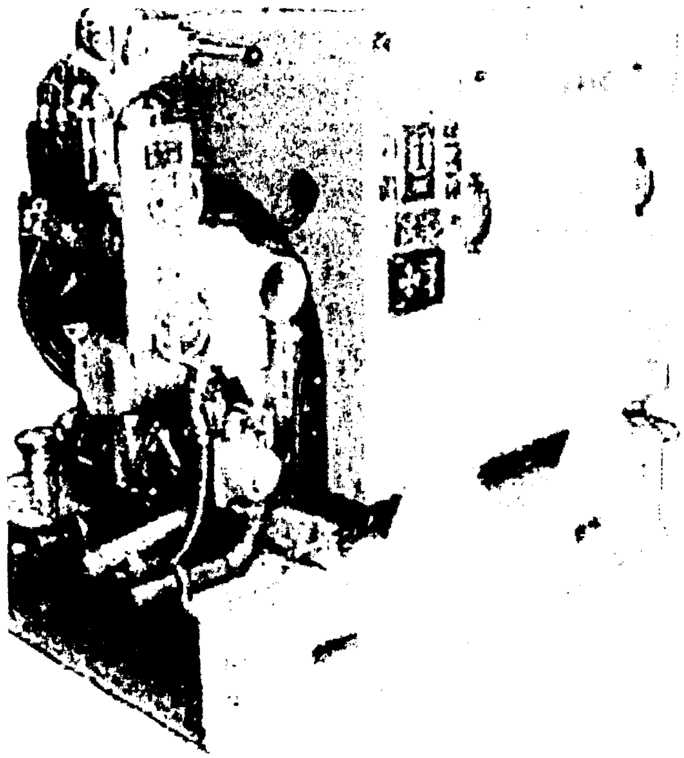
Attachment 3

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. 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.

HALE Products | Class 1

IPEC00269617

Attachment 4

Cost Estimate

ENTERGY NUCLEAR NORTHEAST IMPLEMENTATION ESTIMATE Indian Point Nuclear Power Station				
* ESTIMATE LEVEL *	EC #: SAMA IP2-009			
☑ Conceptual	PROJECT TITLE: Install a Reactor Cavity Flooding System	☑ CAPITAL ☐ O&M	ESTIMATOR: RCMT	
☐ Preliminary	JOB LOCATION: Containment Building, Yard near FSB	PROJECT CODE: TBD		
☐ Definitive	☑ OUTAGE ☑ 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 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.

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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.

Prepared by: [signature]		Approved by: [signature]
Date: 9-20-2012		Date: 9-20-2012

ENTERGY NUCLEAR NORTHEAST
IMPLEMENTATION ESTIMATE
Indian Point Nuclear Power Station

* ESTIMATE LEVEL *	EC #: SAMA IP2-009
☑ Conceptual	PROJECT TITLE: Install a Reactor Cavity Flooding System ☑ CAPITAL ☐ O&M ESTIMATOR: RCMT
☐ Preliminary	JOB LOCATION: Containment Building, Yard near FSB PROJECT CODE: TBD
☐ Definitive	☐ OUTAGE ☑ NON- OUTAGE ORIGINATOR: ORIG. DATE: 07/12/2012

Item	Description
1.	This estimate assumes that this work will require outage conditions to complete
2.	This estimate assumes that this work will complete during 2014 working a 10 hours per shift, Six days per week schedule.
3.	This estimate assumes that a Prefabricated building will be purchased for erection on site by skilled local craft.
4.	This estimate assumes that all work will be performed by trained contract craftspersons in lieu of station maintenance personnel.
5.	This estimate provides for continuous fire watch during welding activities.
6.	This estimate assumes training for 12 Plant Ops.Personnel.
7.	This estimate assumes that the safety class for piping and valves will only require a C of C.
8.	This estimate assumes that weld inspections will be limited to visual and LP testing.
9.	The bulk of the work in this estimate is non outage and is assumed to occur in 2011 on a 4 day per week, 10 hour per day schedule.
10.	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).
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.	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 fence boundary - 30%
	C. Implementation complexity - 40%
	D. Inside Containment - 50%

Rev. 11-0

INDIAN POINT IMPLEMENTATION ESTIMATE WORK SHEET

EC #: SAMA IP2-009

PROJECT TITLE: Install a Reactor Cavity Flooding System
JOB LOCATION: Containment Building, Yard near FSB
EST. STATUS: ☐ OUTAGE ☑ NON-OUTAGE

☑ CAPITAL ☐ O&M
PROJECT CODE: TBD
ORIGINATOR:

TAKEOFF:
ESTIMATOR: RCMT
ORIG. DATE: 07/12/2012

ITEM	DESCRIPTION	QTY	UOM	MANHOURS CFT	NO.	UNIT	FCTR	TOTAL	$/MH	`MATERIAL $ PER UNIT	MATERIAL DOLLARS	LABOR DOLLARS	SUB-CONTRACT	TOTAL $

* ESTIMATE LEVEL *

☑ Conceptual
☐ Preliminary
☐ Definitive

General Notes:

ESTIMATE SUMMARY

		MANHOURS	DOLLARS
ENGINEERING			
01	STUDY, DESIGN, & CLOSEOUT	160	$ 16,000
02	DESIGN ENGR CONST SUPPORT	40	$ 4,000
03	MODS ENGR SUPPORT	-	$ -
04	SYS ENGR/ S-U ENGR	100	$ 12,000
05	PROJECT MANAGEMENT	200	$ 24,000
06	TESTING (Calibration & Testing)	40	$ 4,000
07	TECH SPEC/FSAR, CALCS, ANALYSIS	675	$ 81,000
08	ENGR'G, DCP ACCEPTANCE REVIEW	40	
CONTRACT ENGINEERING			
08	DESIGN ENGR CONTRACT SUPPORT	1,200	$ 144,000
09	SUPL CONTRACT MODS ENGR	-	$ -
10	MODS PLAN & SCHED -CONTRACT	160	$ 16,000
11	OSG FIELD ENGRS / PLANNERS	140	$ 16,800
MATERIALS / MISC CONTRACTS			
12	MATERIALS		$ 124,550
13	OTHER CONTRACTS		$ -
CONTRACT CRAFT LABOR			
14	SWEC CRAFT LABOR/WALKDOWN	2,050	$ 278,526
15	LOST TIME	205	$ 27,853
16	SWEC DISTRIBS		
PLANT CRAFT LABOR			
17	MECH MAINT.	-	$ -
18	ELECT MAINT	-	$ -
19	I&C	-	$ -
20	CSG	-	$ -
MISC SUPPORT			
21	QUALITY CONTROL	180	$ 18,000
22	PLANNING & SCHEDULING		
23	TRAINING	36	$ 4,320
24	CHEMISTRY	-	$ -
25	OPS	100	$ 12,000
26	HP / RP	-	$ -
MISC CONTRACT SUPPORT			
27	QUALITY CONTROL	130	$ 10,400
28	NDE		
29	HP / RP		
30	RADWASTE	-	$ -
31	NURSE	-	$ -
32	ELEVATOR CONTRACTOR	-	$ -
33	WASTE MANAGEMENT	-	$ -
34	HOUSEKEEPING	-	$ -
35	EQUIPMENT RENTAL	-	$ -
36	VENDOR STOCKING	-	$ -
37	DECONTAMINATION CONTRACTOR	-	$ -
38	RBC'S	-	$ -
39	SECURITY	-	$ -
40	FIRE WATCH (Rover)	-	$ -
41	SAFETY	41	$ 2,788
CONTINGENCY			
42	CONTINGENCY		$ 318,495
ESTIMATE SUBTOTAL		**5,497**	**$ 1,114,732**
	SITE ENCUMBRANCE PREMIUM (20%)		**$ 222,946**
	LOADERS (30%)		**$ 401,304**
	ESTIMATE TOTAL		**$ 1,738,982**

Rev. -0

INDIAN POINT IMPLEMENTATION ESTIMATE WORK SHEET

EC #: SAMA IP2-009

PROJECT TITLE: Install a Reactor Cavity Flooding System
JOB LOCATION: Containment Building, Yard near FSB
EST. STATUS: ☐ OUTAGE ☑ NON-OUTAGE

☑ CAPITAL ☐ O&M
PROJECT CODE: TBD
ORIGINATOR:

TAKEOFF:
ESTIMATOR: RCMT
ORIG. DATE: 07/12/2012

ITEM	DESCRIPTION	QTY	UOM	CFT	NO.	MANHOURS UNIT	FCTR	TOTAL	$/MH	MATERIAL $ PER UNIT	MATERIAL DOLLARS	LABOR DOLLARS	SUB-CONTRACT	TOTAL $
	Non-Outage Work													
1.	Gather and stage tools and materials	1	LT	LB	2	2.00	1.00	4	$ 78.15		$ -	$ 313		$ 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	$ 115.00		$ -	$ 460		$ 460
4.	Excavate to existing Fire Water Line	1	LT	OP	1	16.00	1.00	16	$ 115.00		$ -	$ 1,840		$ 1,840
5.	Excavate to existing Fire Water Line	1	LT	LB	2	16.00	1.00	32	$ 78.15		$ -	$ 2,501		$ 2,501
6.	Perform tie in to existing fire line	1	LT	PF	3	20.00	1.00	60	$ 120.71		$ -	$ 7,243		$ 7,243
7.	Backfill and compact excavation	1	LT	OP	1	10.00	1.00	10	$ 115.00		$ -	$ 1,150		$ 1,150
8.	Backfill and compact excavation	1	LT	LB	2	10.00	1.00	20	$ 78.15		$ -	$ 1,563		$ 1,563
9.	Excavate, form and pour slab with oil berm	1	LT	OP	1	10.00	1.00	10	$ 115.00		$ -	$ 1,150		$ 1,150
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	LT	CP	2	10.00	1.00	20	$ 96.00		$ -	$ 1,920		$ 1,920
12.	Obtain and erect insulated steel building.	1	LT	MW	3	20.00	1.00	60	$ 134.00	$ 10,000.00	$ 10,000	$ 8,040		$ 18,040
13.	Provide Light, Heat and Ventilation	1	LT	EL	2	30.00	1.00	60	$ 123.32	$ 4,000.00	$ 4,000	$ 7,399		$ 11,399
14.	Set Diesel Pump Skid	1	LT	MW	2	20.00	1.00	40	$ 134.00	$ 50,000.00	$ 50,000	$ 5,360		$ 55,360
15.	Excavate and pour Pipe Support Piers	1	LT	LB	2	40.00	1.00	80	$ 78.15	$ 4,000.00	$ 4,000	$ 6,252		$ 10,252
16.	Excavate and pour Pipe Support Piers	1	LT	CP	1	40.00	1.00	40	$ 96.00		$ -	$ 3,840		$ 3,840
17.	Excavate and pour Pipe Support Piers	1	LT	OP	1	40.00	1.00	40	$ 115.00		$ -	$ 4,600		$ 4,600
18.	Obtain Material and Erect Pipe Supports on Piers	1	LT	PF	3	40.00	1.00	120	$ 120.71	$ 2,000.00	$ 2,000	$ 14,485		$ 16,485
19.	Cut, Fit and Weld Piping from Diesel to Pene.U-U	1	LT	PF	3	120.00	1.00	360	$ 120.71		$ -	$ 43,456		$ 43,456
20.	Tie in Piping at Pump and at Penet. #U-U	1	LT	PF	3	20.00	1.00	60	$ 120.71		$ -	$ 7,243		$ 7,243
21.	Mount and tie in diesel day tank	1	LT	PF	3	10.00	1.00	30	$ 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	$ 120.71		$ -	$ 4,828		$ 4,828
23.	Support testing as required	1	LT	PF	2	20.00	1.00	40	$ 120.71		$ -	$ 4,828		$ 4,828
24.	Clean-up area and restore	1	LT	PF	2	10.00	1.00	20	$ 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
								-			$ -	$ -		$ -
	OUTAGE WORK													
1.	Obtain tools and material	1	LT	PF	2	5.00	1.70	17	$ 120.71		$ -	$ 2,052		$ 2,052
2.	Perform job brief and walk down are	1	LT	PF	2	5.00	1.70	17	$ 120.71		$ -	$ 2,052		$ 2,052
3.	Install prefabricated spool in containment	1	LT	PF	2	10.00	1.70	34	$ 120.71		$ -	$ 4,104		$ 4,104
4.	Clean up and restore area	1	LT	PF	2	5.00	1.70	17	$ 120.71		$ -	$ 2,052		$ 2,052
								-			$ -	$ -		$ -
								-			$ -	$ -		$ -
								-			$ -	$ -		$ -
								-			$ -	$ -		$ -
	PAINTING & TOUCH-UP REQUIREMENTS													
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													
1.	CRAFT SUPPORT FOR FIRE WATCH	1	LT	FW	1	120.00	1.70	204	$ 53.60		$ -	$ 10,934		$ 10,934
2.	CRAFT SUPPORT FOR BOTTLE WATCH							-			$ -	$ -		$ -
	MISC SUB-CONTRACT													
1.	MISC SUB-CONTRACT	1	LT										$ -	$ -
	SUBTOTAL CRAFT & SUB-CONTRACTOR							1,733			$ 75,500	$ 180,148	$ -	$ 255,648
1.	CONSTRUCTION SUPPORT (8% OF LABOR $)	1	LT					139	$ 103.95			$ 14,449		$ 14,449
	SUBTOTAL							1,872			$ 75,500	$ 194,597	$ -	$ 270,097
	*** RELATED COSTS ***													
1.	WALKDOWN ALLOWANCE	1	LT	PF		17.00	1.00	17	$ 120.71			$ 2,052		$ 2,052
2.	WORK PACKAGE REVIEW & CRAFT TRAINING	1	LT	PF		95.00	1.00	95	$ 120.71			$ 11,467		$ 11,467
3.	TOOL ROOM ATTENDANTS (~3.5%)	1	LT	EL		66.00	1.00	66	$ 123.32			$ 8,139		$ 8,139
4.	GENERAL CRAFT DISTRIBS. (10%)											$ 19,460		$ 19,460
5.	CRAFT IN PROCESSING (20%)											$ 38,919		$ 38,919
6.	HUMAN PERFORMANCE & ALARA TRAINING	1	LT									$ 3,892		$ 3,892
7.	(1/2 day training, or ~ 2%)													
	SUBTOTAL							2,050			$ 75,500	$ 278,526	$ -	$ 354,026
	PLANT SCOPE													
1.	**MECH MAINTENANCE**			PL				-			$ -	$ -		$ -
				PL				-			$ -	$ -		$ -
	SUBTOTAL MECH MAINT.							-			$ -	$ -	$ -	$ -
1.	**ELECT MAINTENANCE**			PL				-			$ -	$ -		$ -
				PL				-			$ -	$ -		$ -
	SUBTOTAL ELECT. MAINT.							-			$ -	$ -	$ -	$ -
1.	**I&C (Dev. Instrument Calibration Procedures)**	0	LT	PL	-	-	-	-			$ -	$ -		$ -
				PL				-			$ -	$ -		$ -
	SUBTOTAL I&C MAINT.							-			$ -	$ -	$ -	$ -
1.	**CSG**			PL				-			$ -	$ -		$ -
				PL				-			$ -	$ -		$ -
	SUBTOTAL CSG MAINT.							-			$ -	$ -	$ -	$ -

Rev. -0

INDIAN POINT IMPLEMENTATION ESTIMATE WORK SHEET

EC #: SAMA IP2-009

(OJECT TITLE: Install a Reactor Cavity Flooding System
JOB LOCATION: *Containment Building, Yard near FSB*
EST. STATUS: ☐OUTAGE ☑NON-OUTAGE

☑ CAPITAL ☐O&M
PROJECT CODE: TBD
ORIGINATOR:

TAKEOFF:
ESTIMATOR: RCMT
ORIG. DATE: 07/12/2012

ITEM	DESCRIPTION	QTY	UOM	CFT	NO.	MANHOURS UNIT	MANHOURS FCTR	MANHOURS TOTAL	$/MH	MATERIAL $ PER UNIT	MATERIAL DOLLARS	LABOR DOLLARS	SUB-CONTRACT	TOTAL $
	SUBTOTAL PLANT							-			$ -	$ -	$ -	$ -
	SUBTOTAL CRAFT/PLANT							2,050			$ 75,500	$ 278,526	$ -	$ 354,026
	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
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	LT	NM	12	3.00	1.00	36	$ 120.00			$ 4,320		$ 4,320
9.	QA / QC VERIFICATION	1	LT	NM	1	180.00	1.00	180	$ 100.00			$ 18,000		$ 18,000
10.	PLANNING & SCHEDULING	1	LT	NM	1									
11.	HP / RP/ ALARA	1	LT	NM				-				$ -		$ -
12.	CHEMISTRY	1	LT	NM				-				$ -		$ -
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	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	LT	NM	1	140.00	1.00	140	$ 120.00			$ 16,800		$ 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.	VENDOR STOCKING	1	LT	NM				-						
14.	DECONTAMINATION CONTRACTOR	1	LT	NM				-						
15.	RBC's	1	LT	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	MT							$ 30,000			$ 30,000
3.	FREIGHT, SALES TAX, & CONSUMABLES (6%)										$ 7,050			$ 7,050
	SUBTOTAL INSTALLATION COST							3,382			$ 124,550	$ 426,687	$ -	$ 551,237
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	$ 100.00			$ 8,000		$ 8,000
5.	TESTING (Instrument Calibration and testing)	1	LT	NM	2	20.00	1.00	40	$ 100.00			$ 4,000	$ -	$ 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 REVISIONS, CALCULATIONS, 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				$ 245,000	$ -	$ 245,000
	SUBTOTAL INSTALLATION & DESIGN COST											$ 671,687	$ -	$ 796,237
1.	CONTINGENCY (40%)													$ 318,495
	ESTIMATE SUBTOTAL							5,497						$ 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 by:	Approved by:
Date: 9-20-2012	Date: 9-20-2012

TABLE OF CONTENTS

SECTION **TITLE**

1.0 ISSUE

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.

4.0 DESIGN CONSIDERATIONS

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. MOVs
   - 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. 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 install system.

7.0 PRELIMINARY MATERIAL LIST

Item 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

Attachment 1

Entergy 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.

Engineering Change No.: SAMA IP2-021 **Rev. No.:** CONCEPTUAL 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	☐ 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	☐ 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

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	☐ NO
Cable and Raceway Program • Does the proposed activity involve any changes to cable trays, raceways or the associated documentation?	■ YES	☐ 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) ***(if applicable)*** • 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 • 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?	■ 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?	☐ 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

ATTACHMENT 9.3 IMPACT SCREENING SUMMARY

SHEET 3 OF 6

PROCESS OR PROGRAM IMPACT SCREENING CHECKLIST	Potential Impact	
Computer Support and Software • Does the proposed activity impact or involve changes to plant computer software or firmware or impact Software Quality Assurance (SQA)?	☐ YES	☒ NO
Chemistry and Environmental Impact • Does the proposed activity impact or involve any changes to plant chemistry requirements, operations or procedures, or any changes to the environment?	☐ YES	☒ NO
Radiation Protection (RP) Program Impact • 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?	■ 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	☐ 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 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

ATTACHMENT 9.3 IMPACT SCREENING SUMMARY

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	☒ 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?	☐ 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?	☐ 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

ATTACHMENT 9.3 **IMPACT SCREENING SUMMARY**

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	☒ 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	☒ 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	☐ 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?	☐ 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

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?	■ YES	☐ 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	☐ NO
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

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

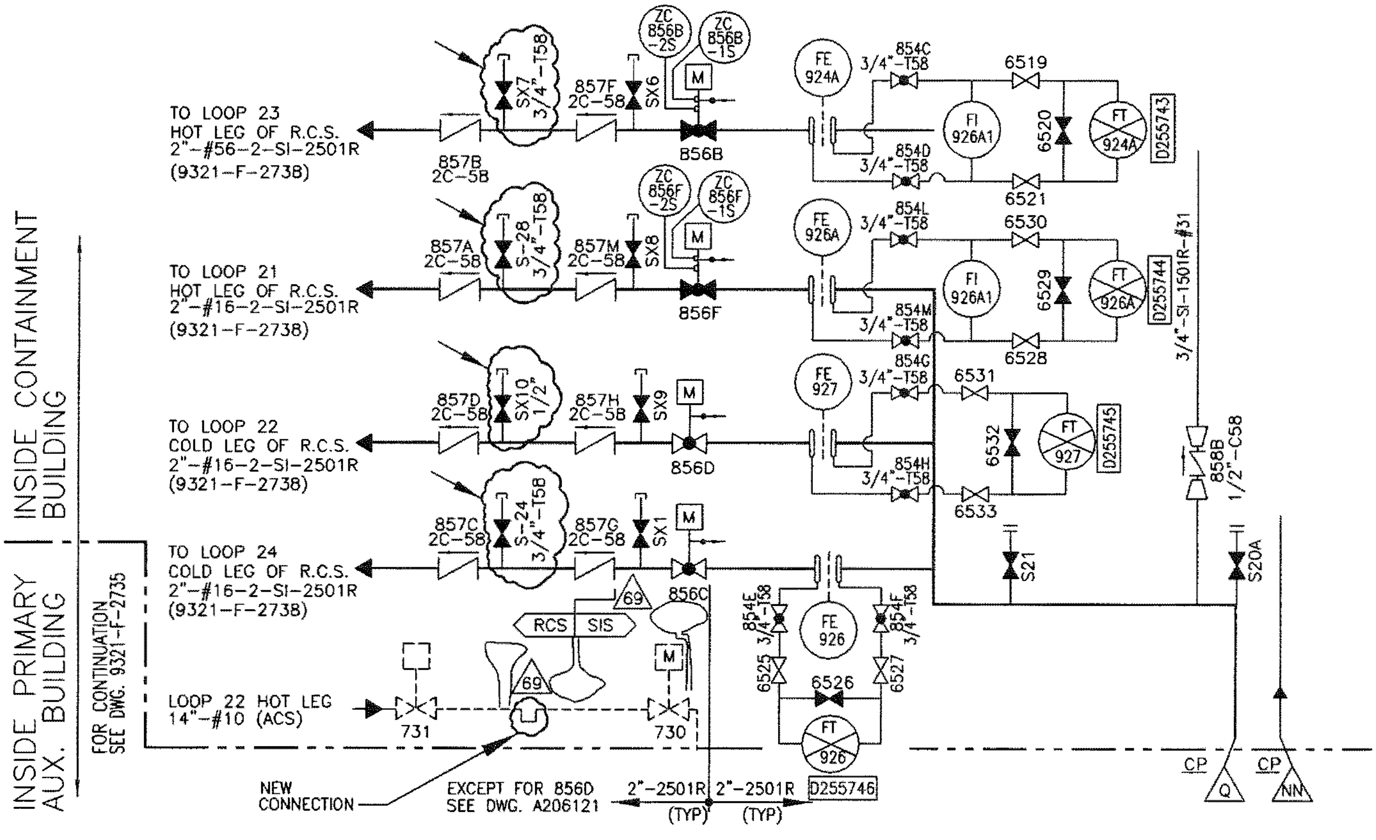
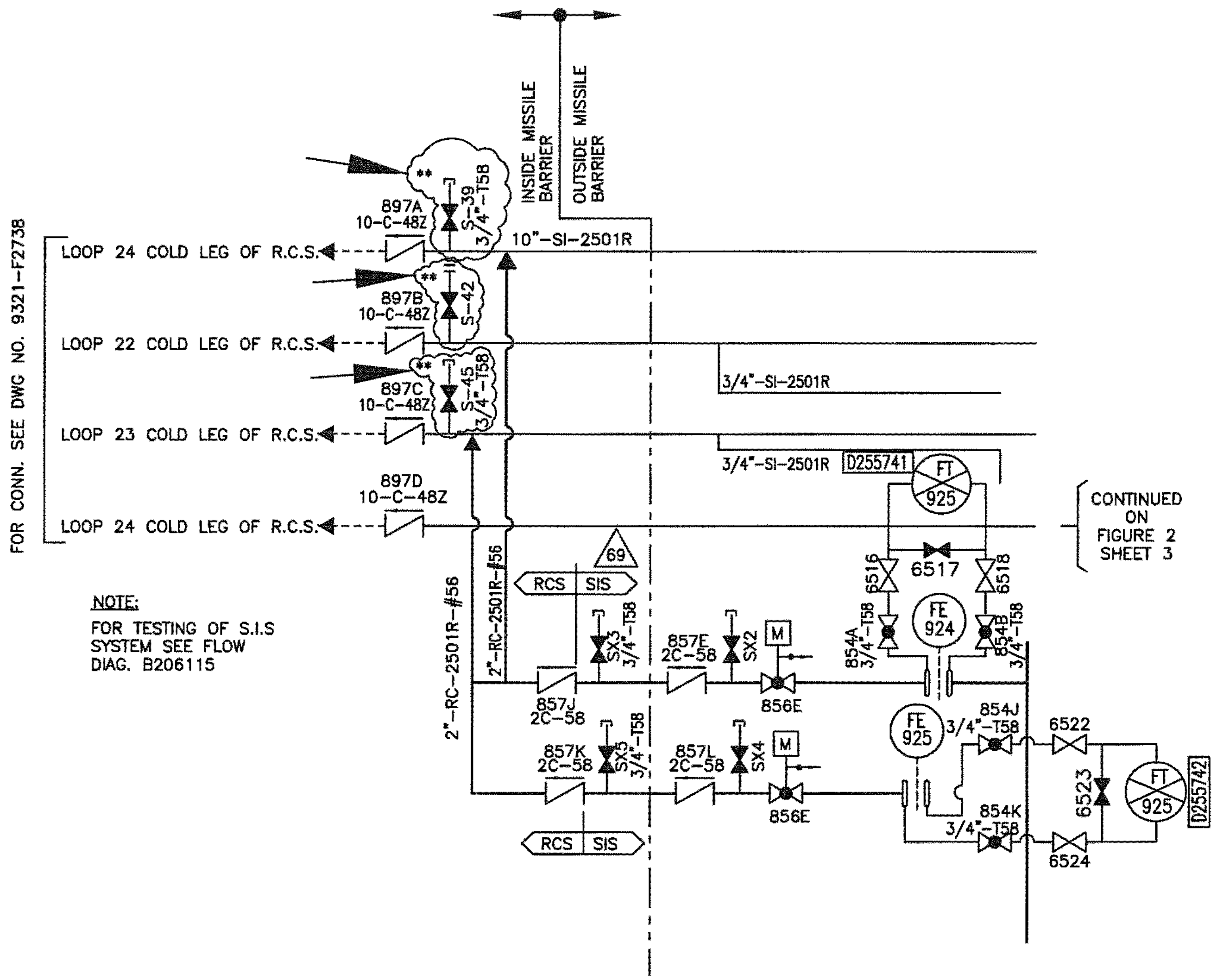


FIGURE 2 (SHEET 1)

TITLE: FLOW DIAGRAM SAFETY INJECTION SYSTEM	Entergy	STATION INDIAN POINT
- UFSAR FIGURE NO. 6.2-1 (SHT. 2)		
DRWN. BY B. JOHN SCALE REC'D	DWG. NO. A235296-	MY



NOTE:
FOR TESTING OF S.I.S SYSTEM SEE FLOW DIAG. B206115

FIGURE 2 (SHEET 2)

TITLE: FLOW DIAGRAM SAFETY INJECTION SYSTEM	Entergy	STATION INDIAN POINT
– UFSAR FIGURE NO. 6.2-1 (SHT. 2)		
DRWN. BY B. JOHN / SCALE / REC'D	DWG. NO. A235296-	MY

RCM Technologies Power System Services	ENTERGY Indian Point Nuclear Station Unit 2	Conceptual Design Package SAMA IP2-021	Rev. 0

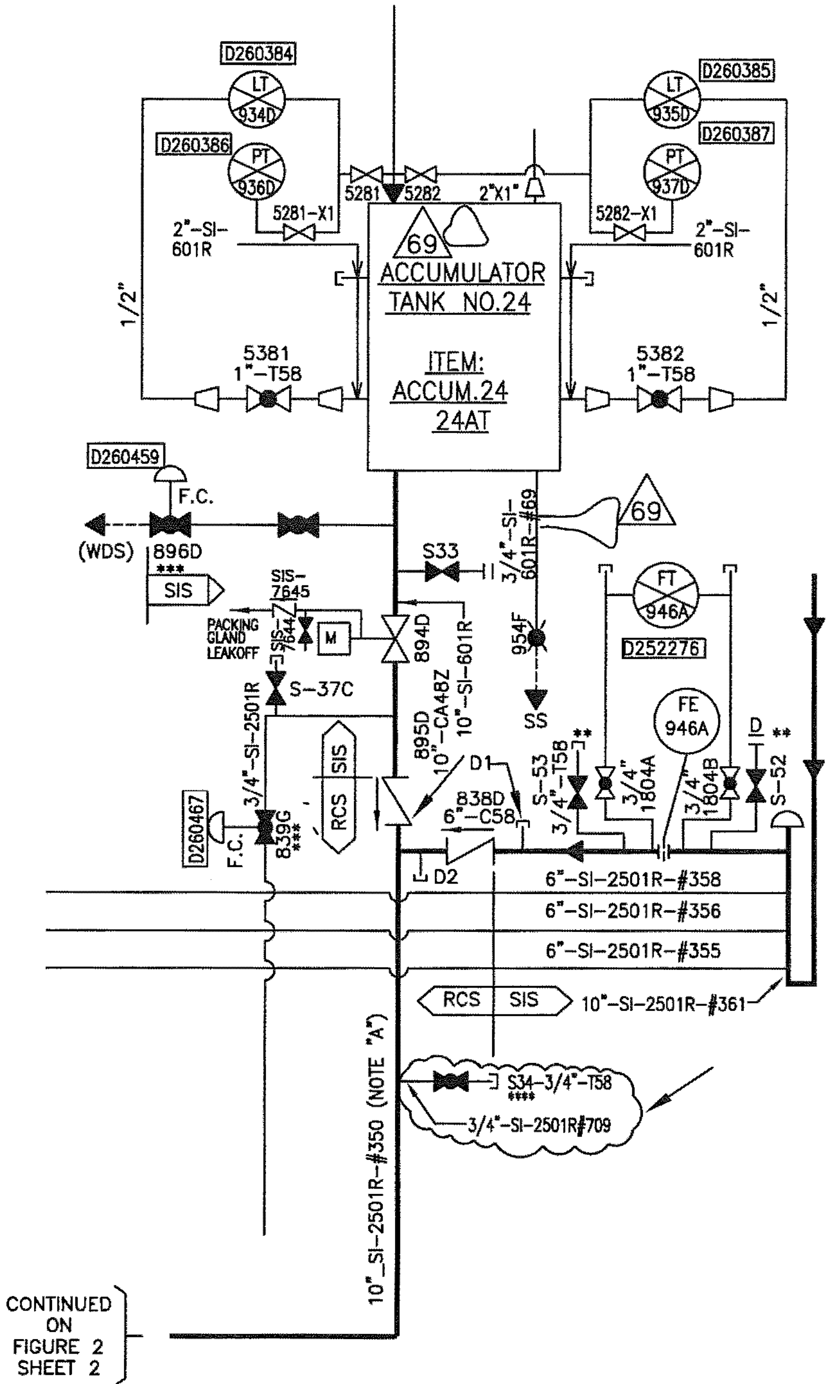


FIGURE 2 (SHEET 3)

TITLE: FLOW DIAGRAM SAFETY INJECTION SYSTEM	Entergy	STATION INDIAN POINT
– UFSAR FIGURE NO. 6.2-1 (SHT. 2)	DWG. NO. A235296-	MY
DRWN. BY B. JOHN · SCALE · REC'D		

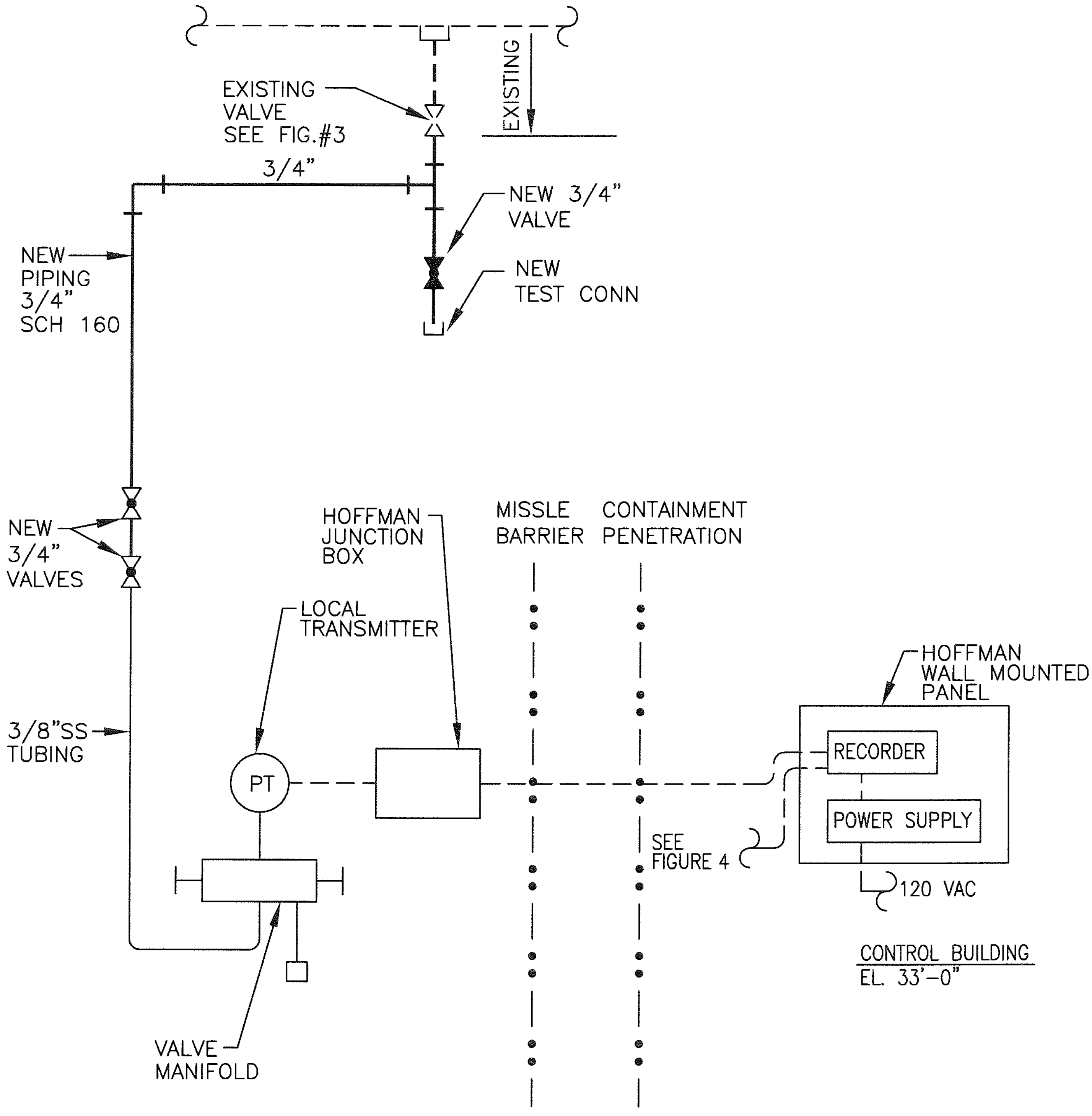


FIGURE #3
TYPICAL LEAK DETECTION
PIPING CONNECTION AT CHECK VALVES

TITLE: FLOW DIAGRAM SAFETY INJECTION SYSTEM	Entergy Nuclear Northeast	STATION INDIAN POINT
– UFSAR FIGURE NO. 6.2-1 (SHT. 2)	DWG. NO. A235296-	MY
DRWN. BY B. JOHN	SCALE	REC'D

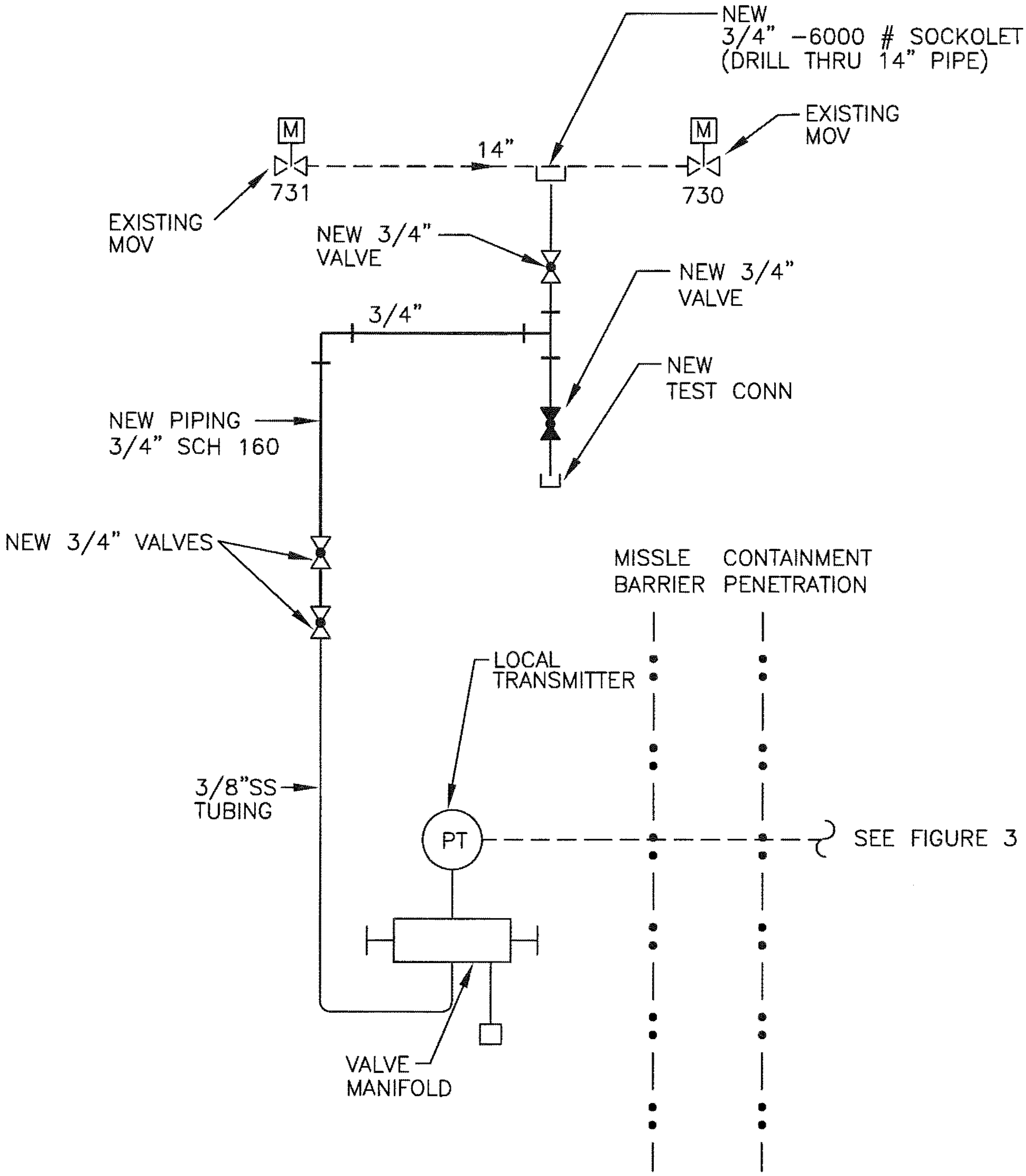


FIGURE 4
LEAK DETECTION
PIPING CONNECTION AT MOV'S

TITLE: FLOW DIAGRAM SAFETY INJECTION SYSTEM	Entergy	STATION INDIAN POINT	
– UFSAR FIGURE NO. 6.2-1 (SHT. 2)			
DRWN. BY B. JOHN	SCALE	REC'D	DWG. NO. A235296-	MY

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 Specification 9321-01-248-18
   Fabrication of Piping Systems-Indian Point Unit No. 2

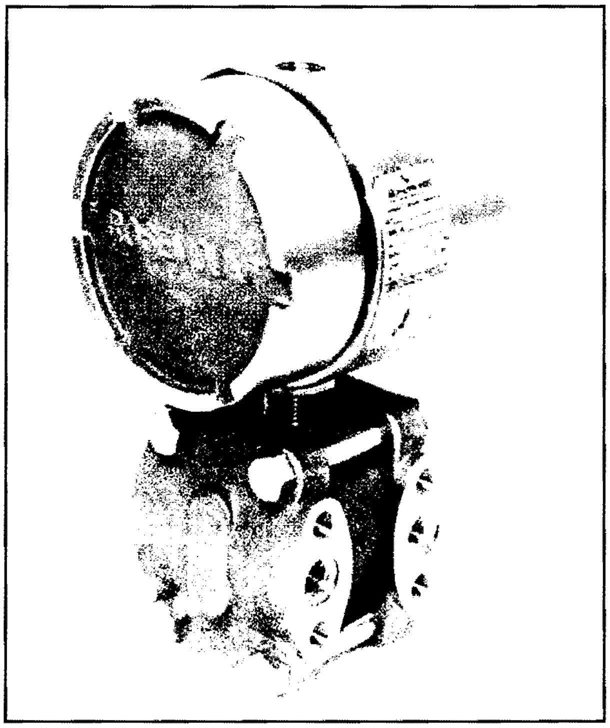
4. Rosemount 1153 Series D Alphaline Nuclear Pressure Transmitter
   (attached here)

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 10^7 rads TID gamma radiation*
- *7 g ZPA seismic*
- *420 °F (215.6 °C) steam temperature*
- *0.25% accuracy*



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Contents

IPEC00269810

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

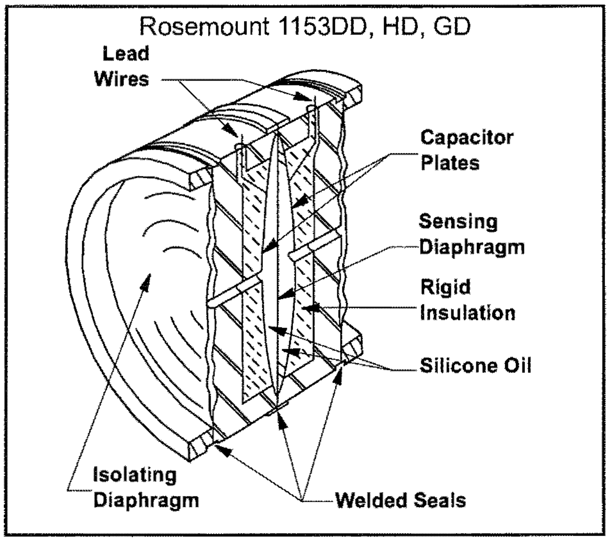
Rosemount 1153 Series D Alphaline Nuclear Pressure Transmitters are uniquely built for Class 1E nuclear service while retaining the basic design of the Rosemount 1151 Series that has become a standard of reliable service. Units are available in absolute (A), gage (G), differential (D), and high-line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

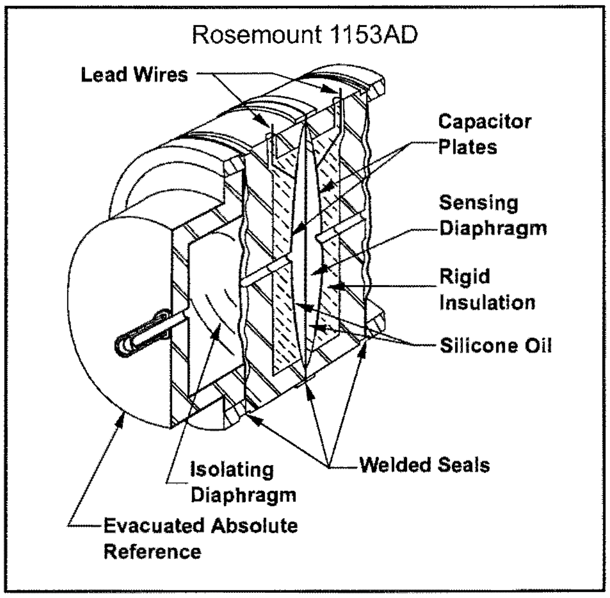
Direct electronic sensing with the completely sealed δ-Cell™ capacitance sensing element (see Figure 1) eliminates mechanical force transfer and problems associated with shock and vibration. Installation and commissioning are simplified by the compact design and 2-wire system compatibility. Wiring terminals 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.

FIGURE 1. The δ-Cell.

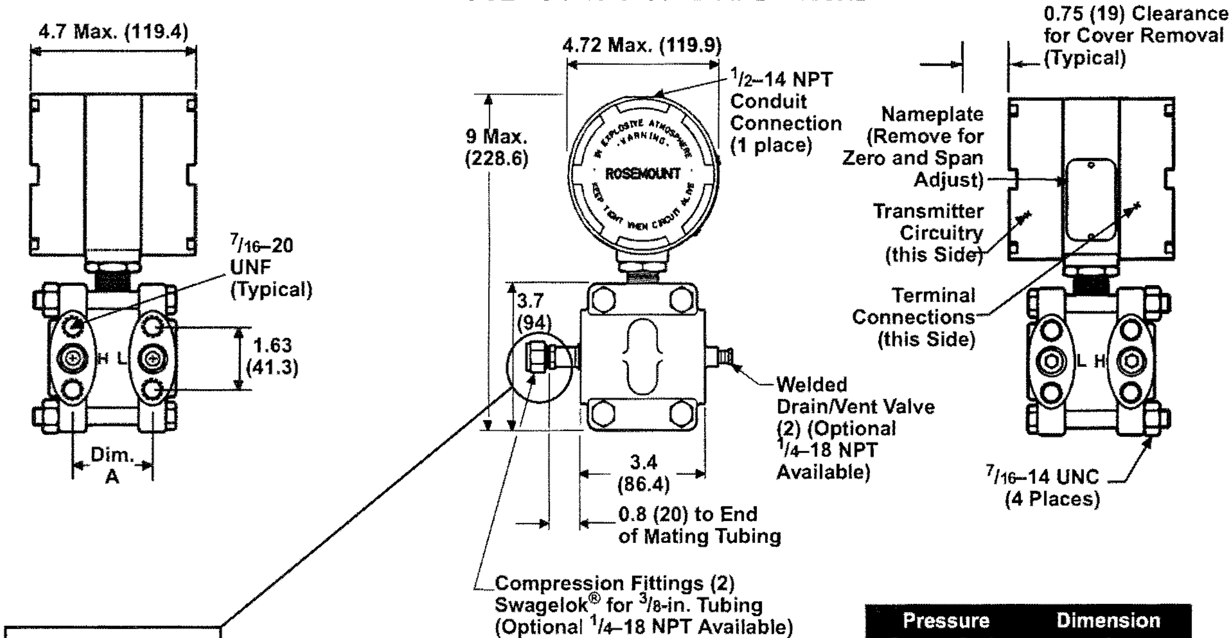


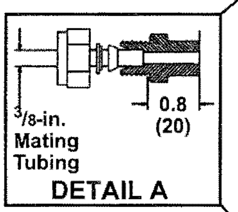


IPEC00269811

DIMENSIONAL DRAWINGS

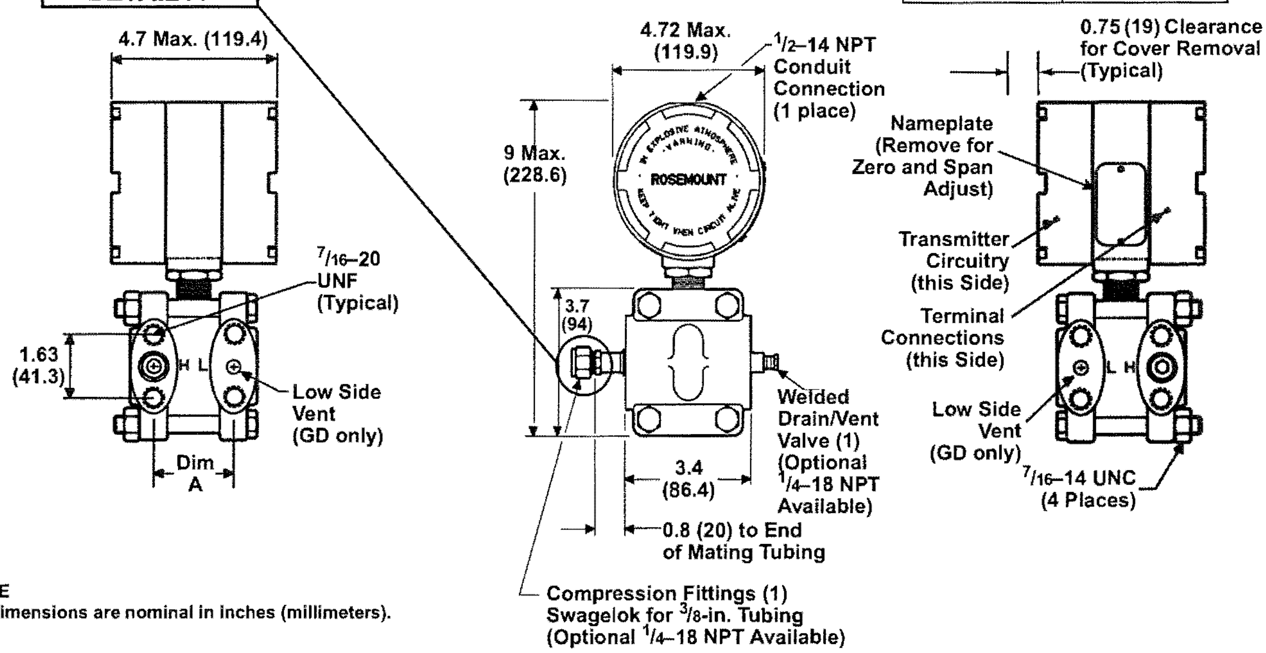
ROSEMOUNT 1153DD AND 1153HD





Pressure Range Code	Dimension A
3, 4, 5	2.13 (54)
6, 7	2.19 (55.6)
8	2.25 (57.2)
9	2.28 (57.9)
0	2.33 (59.1)

ROSEMOUNT 1153AD AND 1153GD



NOTE
All dimensions are nominal in inches (millimeters).

IPEC00269812

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 $\times 10^7$ rads, total integrated dosage.

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

Seismic:
Accuracy within ±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 ±(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 ±1.5% of upper range limit (2.25% for Range Code 0) for one year following DBE.

Output Code R

Radiation:
Accuracy within ±(1.5% of upper range limit + 1.0% span) during and after exposure to 5.5 $\times 10^7$ rads, total integrated dosage.

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

Seismic:
Accuracy within ±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 ±(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: ±(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 $\times 10^7$ rads TID.

Performance: ±(1.5% of upper range limit + 1.0% span).

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

Post DBE Operation:
Accuracy at reference conditions shall be within ±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/ft^2.

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

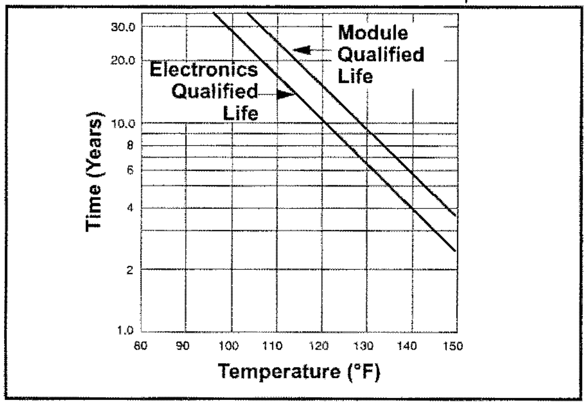
Nuclear Cleaning:
To 1 ppm maximum chloride content.

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.

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.

FIGURE 2. Qualified Life vs. Ambient Temperature.



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

±0.2% of upper range limit for 30 months (±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

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.

FIGURE 3. Output Code P

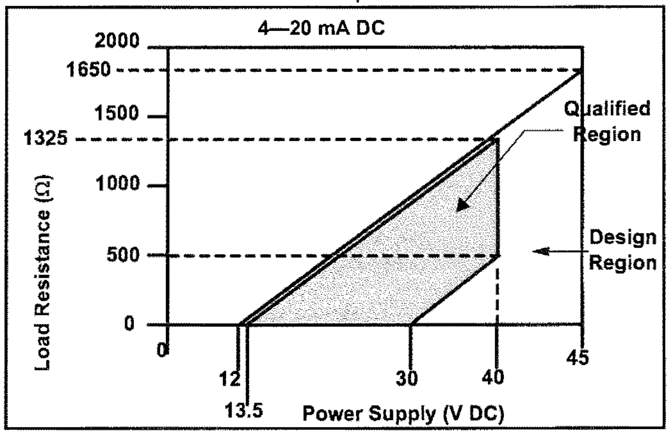
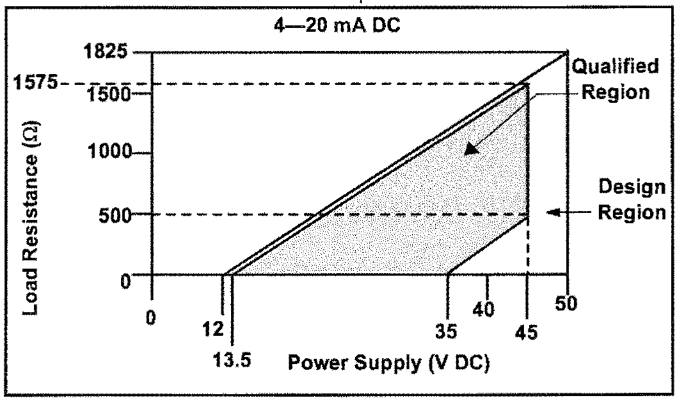


FIGURE 4. Output Code R



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)

Humidity Limits

0–100% relative humidity (NEMA 4X)

Volumetric Displacement

Less than 0.01 in^3 (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) (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) (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 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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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)

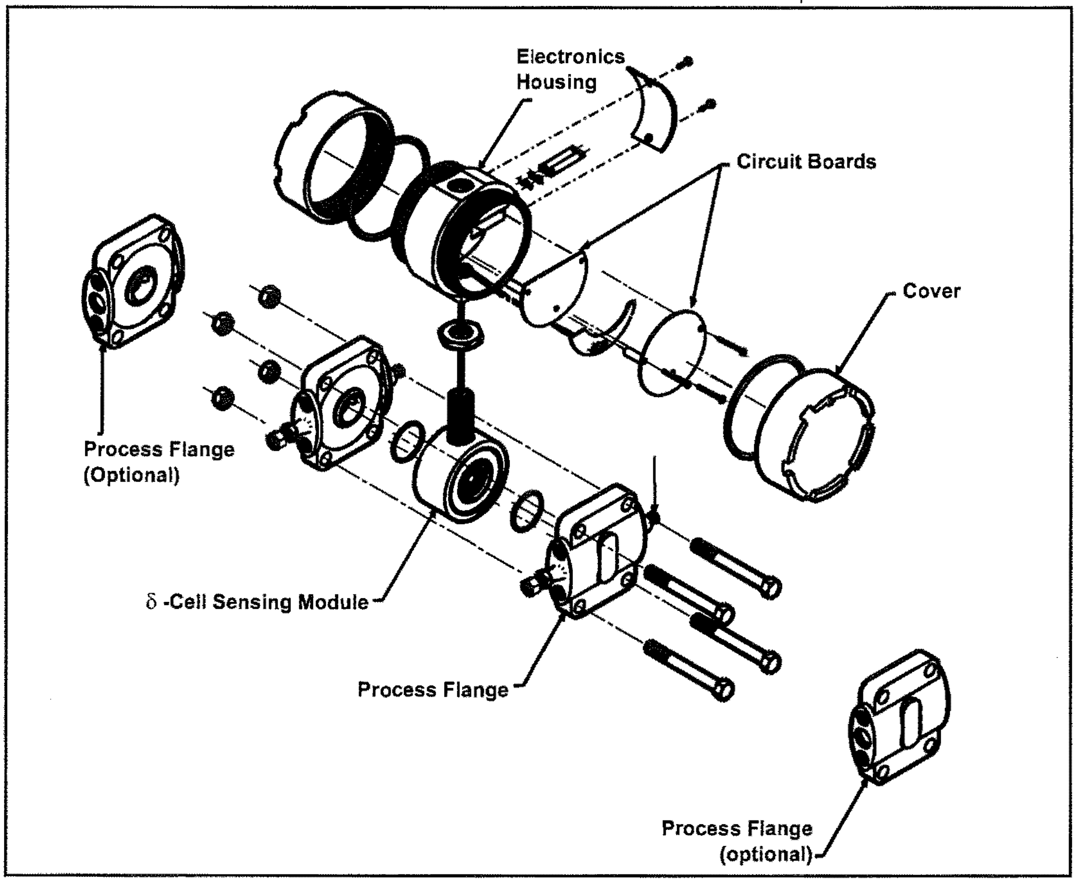
Electrical Connections

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.



IPEC00269817

FIGURE 6. Electric Block Diagram

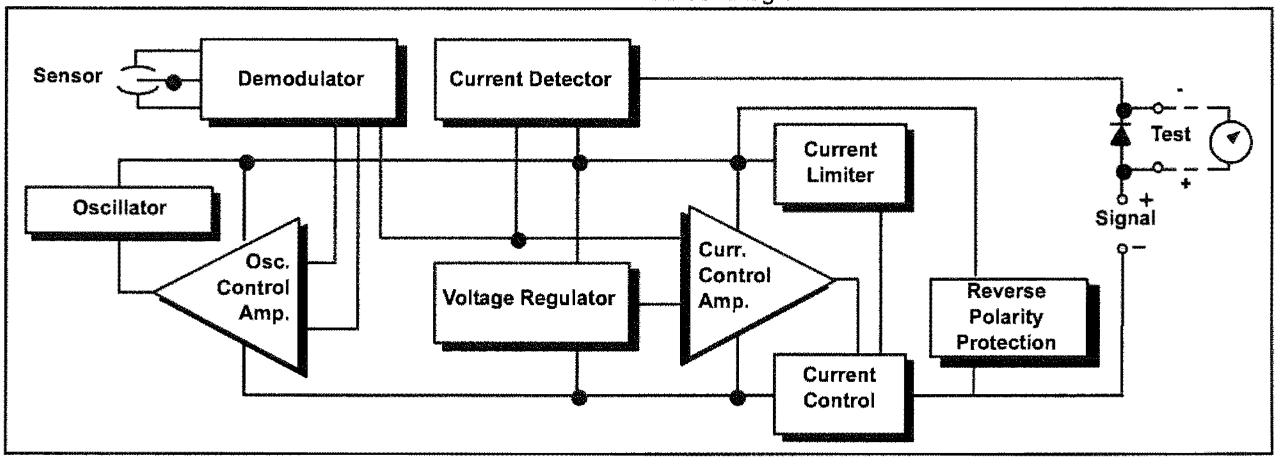


FIGURE 7. Transmitter Wiring Diagram

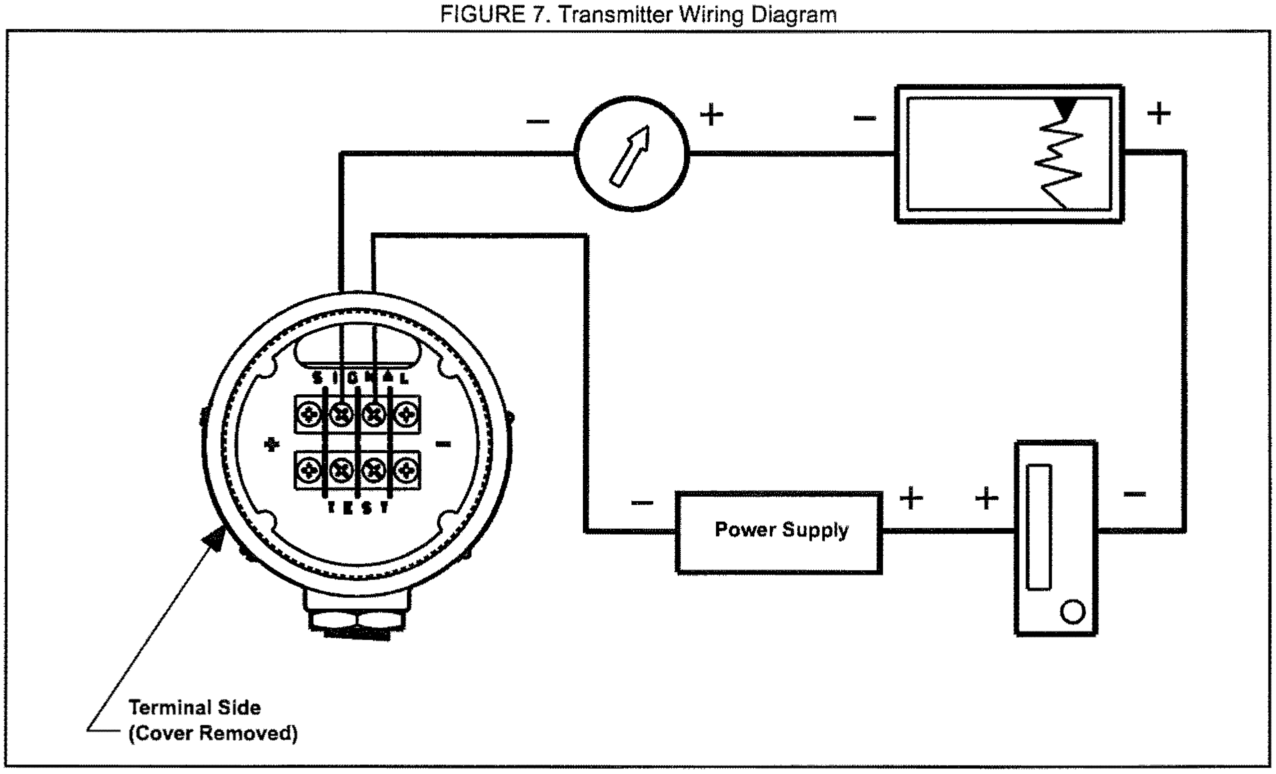
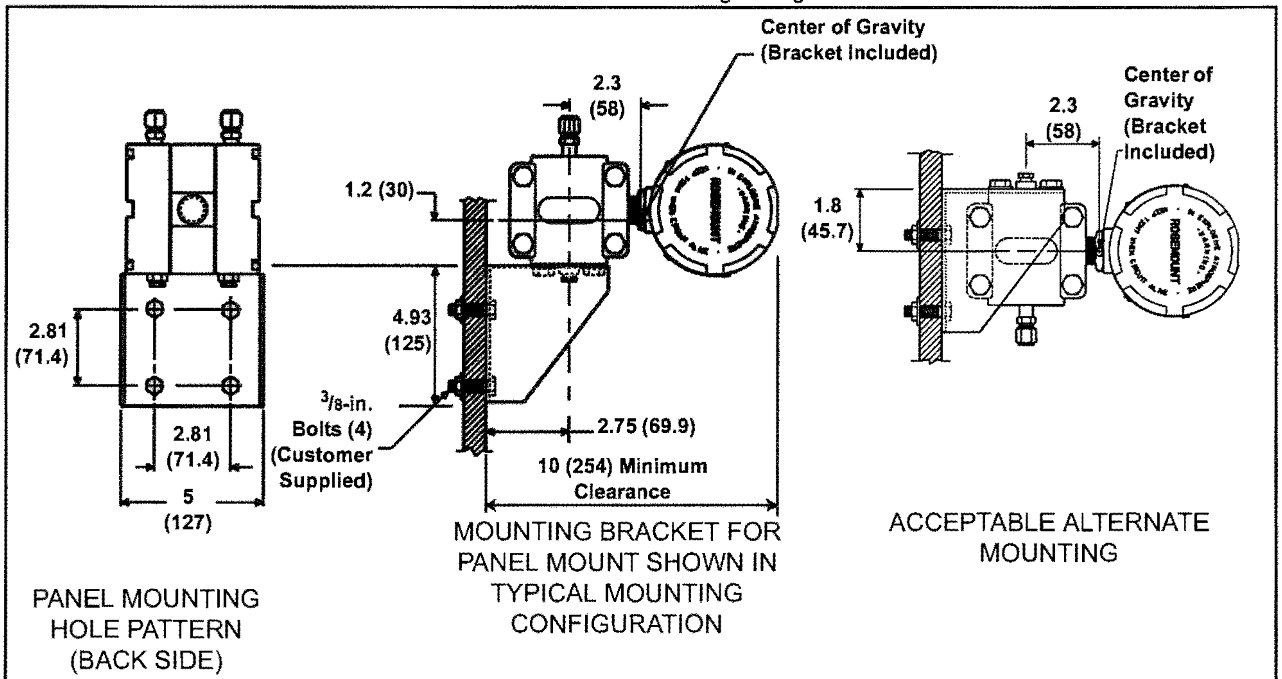


FIGURE 8. Transmitter Mounting Configurations



NOTES
1. Orientation with respect to gravity is not critical.
2. Units can alternately be mounted with process connection adjacent to bracket.
3. All dimensions are nominal in inches (millimeters).

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.

ORDERING INFORMATION

Model	Product Description			
1153	*Alphaline* Pressure Transmitters for Nuclear Applications			
Code	**Pressure Measurement**			
D	Differential Pressure; 2,000 psig (13.8 MPa) Static Pressure Rating			
H	Differential Pressure; 3,000 psig (20.68 MPa) Static Pressure Rating			
A	Absolute Pressure			
G	Gage Pressure			
Code	**Series**			
D	SST Housing; qualified per IEEE 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_2O (0–1.24 to 0–7.46 kPa)	N/A	N/A	0–5 to 0–30 inH_2O (0–1.24 to 0–7.46 kPa)
4	0–25 to 0–150 inH_2O (0–6.22 to 0–37.3 kPa)	0–25 to 0–150 inH_2O (0–6.22 to 0–37.3 kPa)	N/A	0–25 to 0–150 inH_2O (0–6.22 to 0–37.3 kPa)
5	0–125 to 0–750 inH_2O (0–31.08 to 0–186.4 kPa)	0–125 to 0–750 inH_2O (0–31.08 to 0–186.4 kPa)	0–125 to 0–750 inH_2O (0–31.08 to 0–186.4 kPa)	0–125 to 0–750 inH_2O (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	Standard 4–20 mA			
R(1)	Improved Radiation Performance, 4–20 mA			
Code	**Flange Option**			
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			
M(2)	One Flange Option Code J and one Remote Seal			
Typical Model Number:1153 D D 4 R A				

*(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.

Emerson Process Management
Rosemount Nuclear Instruments, Inc.
8200 Market Boulevard
Chanhassen, MN 55317
Tel (952) 949-5210
Fax (952) 949-5201

http://www.rosemountnuclear.com

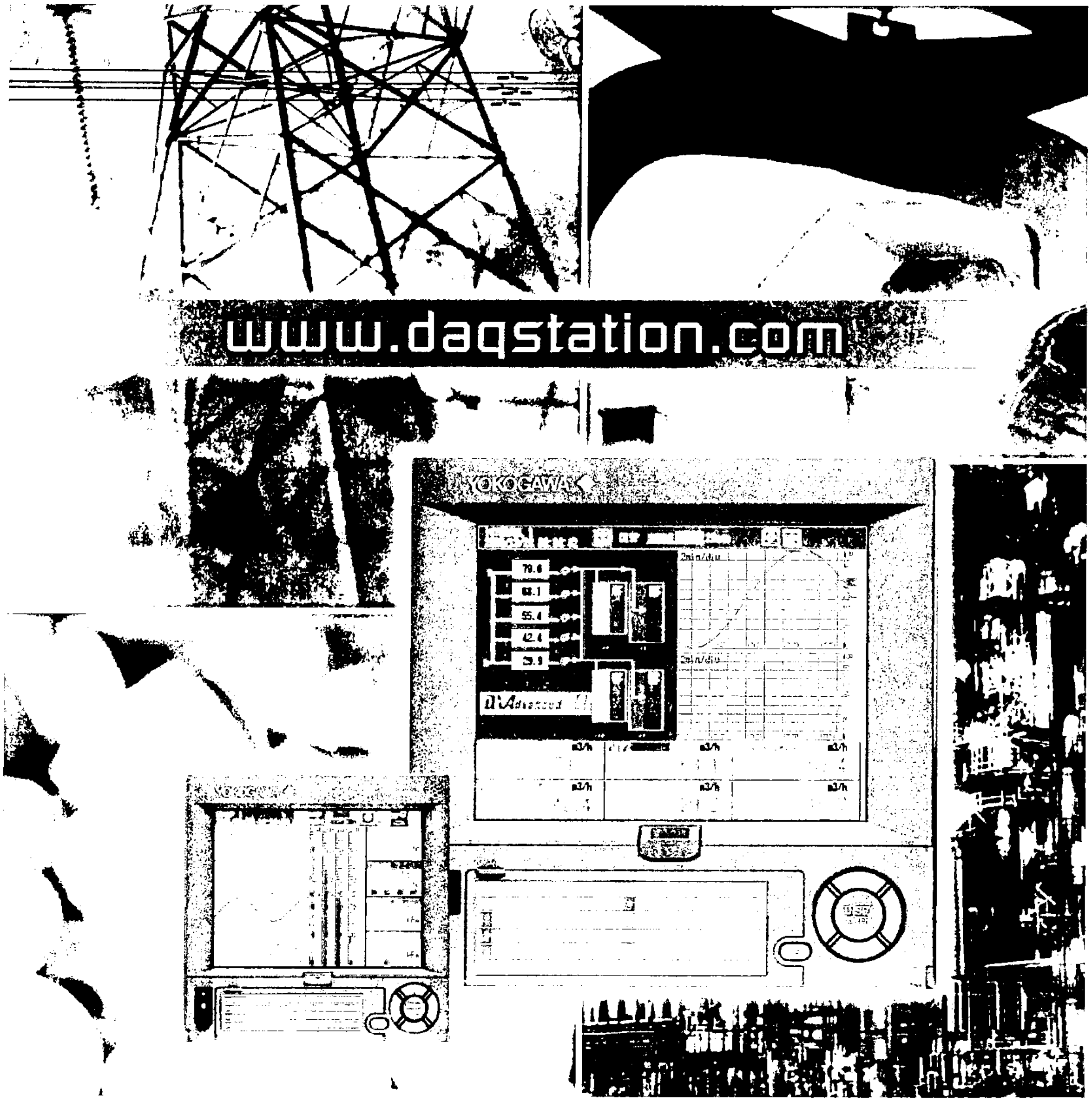
Rosemount Nuclear Instuments, Inc. satisfies all obligations coming from legislation to harmonize product requirements in the European Union.

00813-0100-4388, Rev BA

ROSEMOUNT Nuclear

www.rosemountnuclear.com

EMERSON. Process Management



DXAdvanced

DX1000/DX2000

Daqstation

Bulletin 04L41B01-01E

vigilantplant.
The clear path to operational excellence

YOKOGAWA

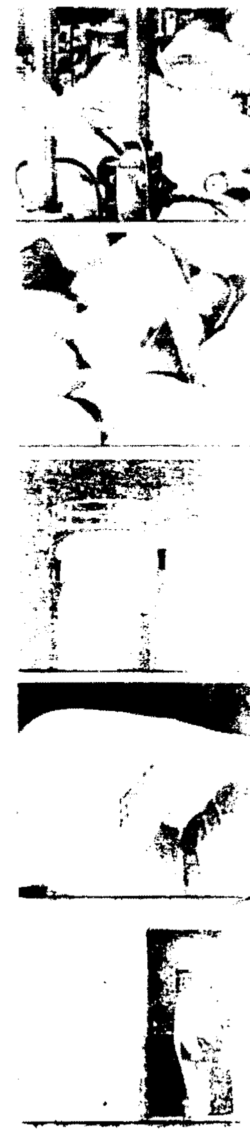
IPEC00269822

The debut of DXAdvanced R4 is here!

DXAdvanced R4

vigilant ®

The clear path to operational excellence



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 functions

- 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

Display & Operation

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

Networking

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

Reliability and Security

- 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

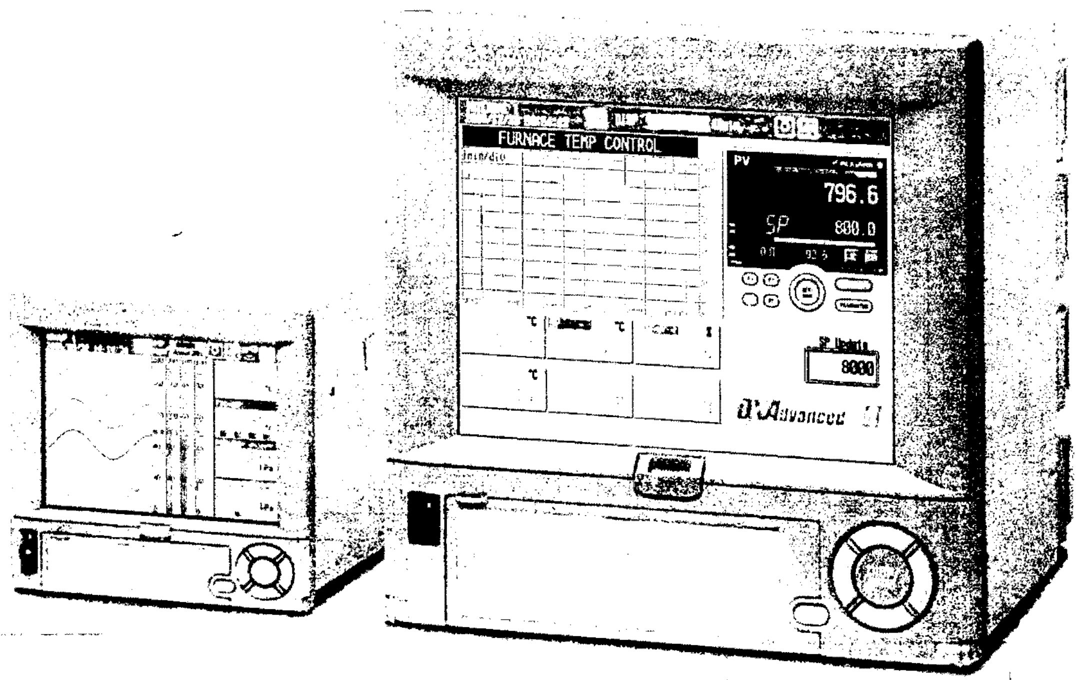
- Software for a variety of tasks including analysis, settings, and acquisition

  DAQSTANDARD:
  Supports settings and data file analysis

  DAQStudio:
  Builder software for custom displays

  DAQWORX:
  Integrated Data Acquisition Software Suite

  DAQManager:
  Data management Software



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.

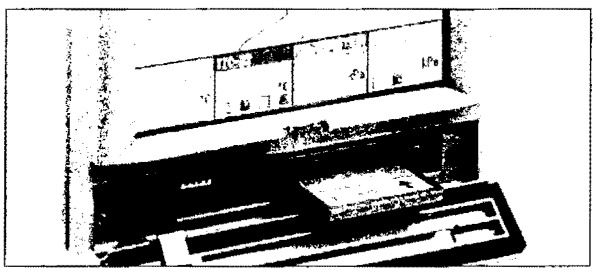
	DX2000 (400 MB)
Display update (minute/div)	30 minutes
Save interval (s)	60 s
Total sample time	**Approx. 5 years**

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

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

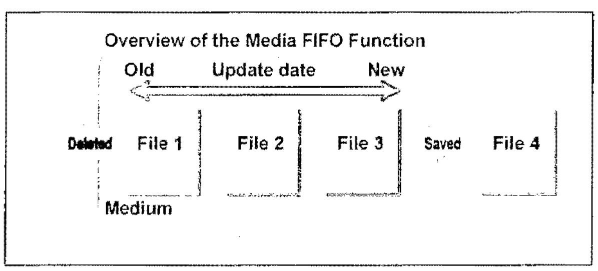
CompactFlash Removable Storage Media

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.



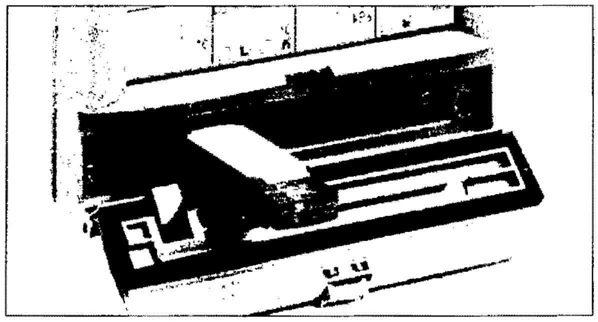
Media FIFO Function

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

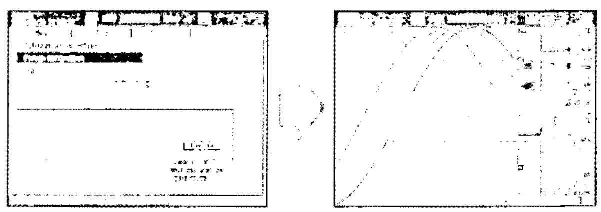
A USB flash drive can be used to transfer data to your PC. The optional front panel USB port also allows an external PC keyboard to be used with the DXAdvanced to facilitate setting and text entry.



Calibration correction schedule control function

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.

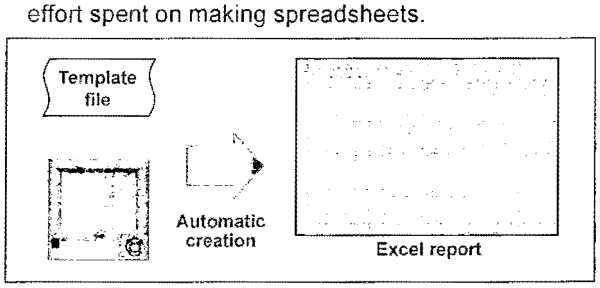
*Nadcap: National Aerospace and Defense Contractors Accreditation Program



Calibration schedule setting — Message to prompt calibration

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.



IPEC00269824

STANDARD SPECIFICATIONS

General Specifications

• Construction
Mounting: Flush panel mounting (on a vertical plane)
Mounting may be inclined downward up to 30 degrees from a horizontal plane.
Allowable Panel Thickness: 2 to 26 mm
Front Panel: Water and dust-proof
(based on IEC529-IP65 and NEMA No.250 TYPE4*)

• Input
Number of Inputs:
DX1000: 2, 4, 6, 12 channels
DX2000: 4, 8, 10, 20, 30, 40, 48 channels
Measurement Interval:
DX1002, DX1004, DX2004, DX2008:
125 ms, 250 ms, 25 ms (fast sampling mode*)
DX1006, DX1012, DX2010, DX2020, DX2030, DX2040, DX2048:
1 s (Not available when A/D integration time is set to 100 ms), 2 s, 5 s, 125 ms (fast sampling mode*)
* A/D integration time is fixed to 1.67 ms in case of fast sampling mode.
Inputs: DCV (20, 60, 200 mV, 2, 6, 20, 50 V, 1-5 V)
TC (R, S, B, K, E, J, T, N, W, L, U, WRe)
RTD (Pt100, JPt100)
DI (Contact input, TTL level)
DCA (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*	K	±(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 accuracy of reference junction compensation

• Display
Display unit:
DX1000: 5.5-inch TFT color LCD (320 x 240 pixels)
DX2000: 10.4-inch TFT color LCD (640 x 480 pixels)
Display group:
Number of display: DX1000: 10 groups, DX2000: 36 groups
Number of assignable channels for one group:
DX1000: 6 channels, DX2000: 10 channels
Display color:
Trend/Bargraph: Selectable from 24 colors
Background: White or black selectable
Trend display:
Trend display type: Vertical, horizontal, landscape, horizontal split or circular* selectable
* Circular display is only for DX2000.
Bargraph display:
Direction: Vertical or horizontal selectable
Digital indication:
Display renewal rate: 1 s
Overview display:
Number of indication channels:
Measuring values and alarm status of all channels
Information display: Alarm summary, message summary, memory information, report information, relay status, Modbus status
Tag display:
Tag number and comment display
No. of displayable characters
Tag no :16 max
Tag comment :32max
Displayable characters: Tag no.: Alphanumerics
Tag comments: Alphanumerics, Japanese, and Chinese
Messages:
Number of characters: 32 characters 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 external memory.

• Custom display function:
User can change display object (trend, numeric, and bar graphs, etc.) sizes and attributes, and add objects freely to create screens.
No. of screens: 28 (3 from internal memory, 25 from external media (CF))
Max no. of placeable display objects:
134 (normal: 80, scale: 4, trend: 4, list: 4, graphic: 40, bitmap: 2)

• Data Saving Function
External storage medium:
Medium: CompactFlash memory card (CF card)
Internal memory:
Medium: Flash memory
Capacity: 400MB
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.
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/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
Rated power supply: 100 to 240 VAC (automatic switching)
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)
Connection: EIA RS-232 (/C2) or RS-422A/485 (/C3)
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.
Modbus communication: 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.

• 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.

IPEC00269825

• Fail & Alarm Output Relays 22 points (/F2, only for DX2000)
Combination of "Fail/Status output function" and "Alarm output relays 22 points".

• Clamped Input Terminal (/H2)
Clamped input terminal (detachable type) is used for input terminal.

• Desk Top Type (/H5[ ], /H5*)
Provides carrying handle and power cord.
* /H5 is only for 24 VDC/AC power supply model (/P1), and does not include power code.

• Mathematical Functions (/M1)
Used for calculating data, displaying trends and digital values, and recording calculated data assigned to channels.
Channel assignable to calculated data:
DX1002, DX1004: 12 channels, DX1006, DX1012: 24 channels
DX2004, DX2008: Up to 12 channels
DX2010, DX2020, DX2030, DX2040, DX2048: 60 channels
Operation:
General arithmetic operations, Statistical operations, Special operations, Conditional operation
Constant: Up to 60 constants (K01 to K60)
Report functions:
Report type: Hourly, daily, hourly + daily, daily +weekly and daily + monthly
Operation: Max. 4 types are selectable from average, maximum, minimum, instantaneous and summation

• Cu10, Cu25 RTD Input /3 leg isolated RTD Input (/N1)
This option allows Cu10 and Cu25 inputs to be added to the standard input types.

• 3 legs Isolated RTD Input (/N2*)
A, B, b legs are of isolated input type.
* Only forDX1006, DX1012, DX2010, DX2020, DX2030, DX2040 and DX2048.

• Extended Input Types (/N3)
This option allows extra inputs types as below to be added to the standard input types.
TC: Kp vs Au7Fe, PLATINEL, PR40-20, NiNiMo, W/Wre26, TypeN (AWG14)
RTD: Pt25, Pt50, Ni100 (SAMA), Ni100 (DIN), Ni120, J263*B, Cu53, Cu100, Pt46, Pt200

• 24 VDC/AC Power Supply (/P1)
Rated power supply: 24 VDC or 24 VAC (50/60Hz)
Allowable power supply voltage range:
21.6 to 26.4 VDC/AC
Max. power consumption:
DX1000: 28 VA (24 VDC), 45 VA (24 VAC (50/60 Hz))
DX2000: 45 VA (24 VDC), 70 VA (24 VAC (50/60 Hz))

• Remote Control (/R1)
This option allows eight functions to be controlled remotely by a contact input.

• 24 VDC transmitter power supply (/TPS2*, /TPS4, /TPS8*)
Output voltage: 22.8 to 25.2 VDC (rated load current)
Rated output current: 4 to 20 mADC
* /TPS2 is only for DX1000, /TPS8 is only for DX2000

• Easy text entry (/KB1, /KB2)
Remote control terminal is available to operate the DX.
Number of units that can be controlled:
Max. 32 units by ID setting

• USB interface (/USB1)
USB interface specification: Based on Rev1.1, host function
Number of ports: 2 ports (Front and rear panel)
Available USB devices:
Keyboard: 104/89 keyboard (US) based on USB HID Class Ver.1.1
External medium: USB flash drive (Some of the USB flash drive may not be supported by DXAdvanced.)

• Pulse input (/PM1)
Pulse input option includes mathematical functions option (/M1) and remote control option (/R1).
Number of inputs: 3 points (8 points are available in case of using remote inputs)
Input format: Photocoupler isolation (shared common)
Isolated power supply for input terminal (approx. 5 V)

• Calibration correction function (/CC1)
Corrects the measurement value of each channel using segment linearizer approximation.
Number of segment points: 2 to 16

• External input function (/MC1, only for DX2000)
Digital input channels via communication are extended to input data from other instruments.
Number of external input channels:
Up to 240 channels (channel number: 201 to 440)
* Only for DX2010, DX2020, DX2030, DX2040 and DX2048
* Fast sampling mode is not available when external input option is equipped.

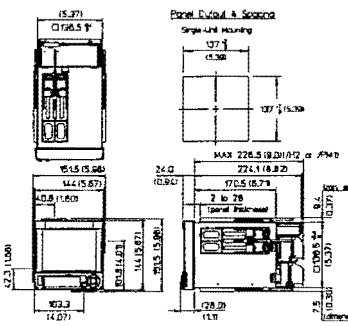
• Multibatch function (/BT2)
User can start/stop recording independently by batch, and create data files.
No. of multibatches: DX1000: 2 to 6 (DX1006,DX1012 only)
DX2000: 2 to 12
(DX2010,DX2020,Dx2030,DX2040,DX2048 only)

• PROFIBUS-DP communication interface function (/CP1)
PROFIBUS-DP master devices can access the following internal data.
Load measurement channel data
Load MATH channel data
Write communication input channel data
Node address setting range: 0 to 125
Interface: PROFIBUS-DP-V0 Slave
Transmission medium: 2 dedicated cables
Transmission speed/distance: 9.6 kbps/1200 m to 12 Mbps/100 m
Termination resistance: None (requires external termination resistance)

• Advanced security function (/AS1)
Security and electronic record/signature functions have been added that are compliant with the USA's FDA title 21 CFR Part 11.
Data anti-tamper function: Settings and measured data are saved as encrypted binary files.
Login function: Using the login function (user name, user ID and password), you can enter security settings on the instrument
User level and number of users:
System administrator: 5 users (all can be operated)
General user: 90 users
Electronic signature function:
After checking data that has finished being recorded, you can add three levels of electronic signature, select a pass/fail, and enter comments
Audit Trail Function: The settings change log and the operation log when the change was made are saved.
Password management function:
Logins are verified by a Kerberos authentication server

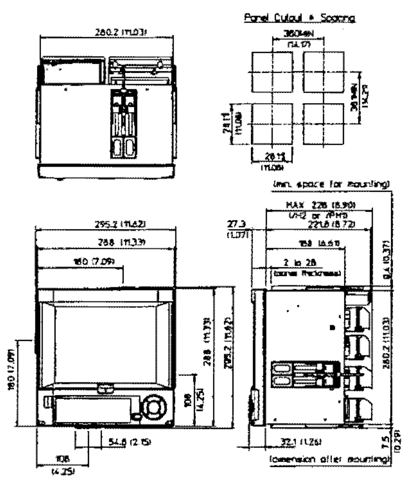
Dimensions

DX1000



Unit : mm
(approx : inch)

DX2000



Two panel brackets are used in panel-mounting the DX1000 and DX2000. They may be used either on the left and right or top and bottom. See Yokogawa's General Specification (GS 04L41B01-01E) for information on panel cutting dimensions for DX1000 vertical or horizontal attachments. Unless otherwise indicated, tolerance is ±3% (or ±0.3 mm for dimensions under 10 mm).

MODEL AND SUFFIX CODES

DX1000

Model code	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 language	-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
		/KB2	Easy text entry (without input terminal) *9
		/USB1	USB interface
		/PM1	Pulse input (including remote control and mathematical functions) *11
		/CC1	Calibration correction function
		/BT2	Multi-batch functions *12
		/CP1	PROFIBUS-DP functions *3
		/AS1	Advanced security functions

*1 /A1, /A2 and /A3 cannot be specified together.
*2 /A3 and /F1 cannot be specified together.
*3 /C2, /C3 and /CP1 cannot be specified together.
*4 In case that 24 VDC/AC power supply (/P1) and desktop type are specified together, /H5 must be specified. /P1 and /H5[] cannot be specified together.
*5 /H5[ ]
- D: Power cord UL, CSA st'd
- F: Power cord VDE st'd
- R: Power cord SAA st'd
- J: Power cord BS st'd
- H: Power cord GB st'd

*6 /N2 can be specified for only DX1006 and DX1012.
*7 In case that /TPS2 is specified, /TPS4, /A2, /A3 or /F1 cannot be specified together.
*8 In case that /TPS4 is specified, /TPS2, /A1, /A2, /A3 or /F1 cannot be specified together.
*9 /KB1 and /KB2 cannot be specified together.
*10 In case that /KB1 is specified, remote input terminal (438227) is included.
*11 In case that /PM1 is specified, /A3, /M1, /R1, /TPS2 or /TPS4 cannot be specified. And combination of /A2/F1 cannot be specified together.
*12 /BT2 can be specified for only DX1006, DX1012.

DX2000

Model code	Suffix code	Optional code	Description
DX2004			4ch, 125ms(Fast sampling mode: 25ms)
DX2008			8ch, 125ms(Fast sampling mode: 25ms)
DX2010			10ch, 1s(Fast sampling mode: 125ms)
DX2020			20ch, 1s(Fast sampling mode: 125ms)
DX2030			30ch, 1s(Fast sampling mode: 125ms)
DX2040			40ch, 1s(Fast sampling mode: 125ms)
DX2048			48ch, 1s(Fast sampling mode: 125ms)
Internal memory	-3		400MB
External media	-4		CF card (with media)
Display language	-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
		/A4	Alarm output 12 points *1
		/A5	Alarm output 24 points *1 *2
		/C2	RS-232 interface *3
		/C3	RS-422-A/485 interface *3
		/D5	VGA output
		/F1	FAIL/Status output *2 *4
		/F2	FAIL + Alarm output 22 points *1 *4
		/H2	Clamped input terminal (detachable)
		/H5	Desktop type (for /P1 model, without power code, screw type power terminal) *5
		/H5[ ]	Desktop type *6
		/M1	Mathematical functions
		/N1	Cu10,Cu25 RTD input/3 leg isolated RTD
		/N2	3 leg isolated RTD *7
		/N3	Extended input type (PR40-20, Pt50, etc.)
		/P1	24VDC/AC power supply
		/R1	Remote control
		/TPS4	24VDC transmitter power supply (4 loops) *8
		/TPS8	24VDC transmitter power supply (8 loops) *9
		/KB1	Easy text entry (with input terminal) *10 *11
		/KB2	Easy text entry (without input terminal) *10
		/USB1	USB interface
		/PM1	Pulse input (including remote control and mathematical functions) *12
		/CC1	Calibration correction function
		/MC1	External input function *13
		/BT2	Multi-batch functions *14
		/CP1	PROFIBUS-DP functions *3
		/AS1	Advanced security functions

*1 /A1, /A2, /A3, /A4, /A5, /F2 cannot be specified together.
*2 /A5 and /F1 cannot be specified together.
*3 /C2, /C3 and /CP1 cannot be specified together.
*4 /F1 and /F2 cannot be specified together.
*5 In case that 24 VDC/AC power supply (/P1) and desktop type are specified together, /H5 must be specified. /P1 and /H5[] cannot be specified together.
*6 /H5[ ]
- D: Power cord UL, CSA st'd
- F: Power cord VDE st'd
- R: Power cord SAA st'd
- J: Power cord BS st'd
- H: Power cord GB st'd

*7 /N2 can be specified for only DX2010, DX2020, DX2030, DX2040 and DX2048.
*8 /TPS4, /TPS8, /A5 and /F2 cannot be specified together.
*9 In case that /TPS8 is specified, combination of /A4/F1 cannot be specified together.
*10 /KB1 and /KB2 cannot be specified together.
*11 In case that /KB1 is specified, remote input terminal (438227) is included.
*12 In case that /PM1 is specified, /A5, /F2, /M1 and /R1 cannot be specified. And combination of /A2/F1 and combination of /A4/TPS8 cannot be specified together.
*13 /MC1 can be specified for only DX2010, DX2020, DX2030, DX2040 and DX2048.
*14 /BT2 can be specified for only DX2010, DX2020, DX2030, DX2040, DX2048.

APPLICATION SOFTWARE

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

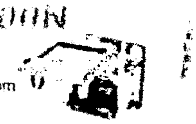
ACCESORIES

Product	Model code (part number)	Specification
Shunt resister (for screw input terminal)	415920	250Ω±0.1%
	415921	100Ω±0.1%
	415922	10Ω±0.1%
Shunt resister (for clamped input terminal)	438920	250Ω±0.1%
	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 /AS1 option

RELATED PRODUCT

DXAdvanced Removable Chassis Model DX1000N

Removable Chassis Model featuring easy maintenance.



·This model enables 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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The clear path to operational excellence

VigilantPlant is Yokogawa's automation concept for safe, reliable, and profitable 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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YOKOGAWA

Attachment 4

Cost Estimate

ENTERGY NUCLEAR NORTHEAST
IMPLEMENTATION ESTIMATE
Indian Point Nuclear Power Station

* ESTIMATE LEVEL *	EC #: SAMA IP2-021		
☑ Conceptual	PROJECT TITLE: Install Leak Monitoring Instrumentation for ISLOCA Pathway Isolation Valves	☑ CAPITAL ☐ O&M	ESTIMATOR: RCMT
☐ Preliminary		PROJECT CODE: TBD	
☐ Definitive	JOB LOCATION: Containment & Control Bldgs.		ORIG. DATE: 06/25/2012
	☑ OUTAGE ☑ NON-OUTAGE	ORIGINATOR:	
	ESTIMATE TOTAL $4,607,051		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 responds to the issue identified in the NRC's staff review of SAMA IP2-021 and provides the technical resolution and associated costs required for implementation.

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

Prepared by: Peter Battaccarol		Approved by: [signature]
Date: 9-20-2012		Date: 9-20-2012

ENTERGY NUCLEAR NORTHEAST
IMPLEMENTATION ESTIMATE
Indian Point Nuclear Power Station

* ESTIMATE LEVEL *	**EC #: SAMA IP2-021**
☑ **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

Item	Description
1.	This estimate assumes that this work will require both non-outage and outage conditions to complete.
2.	This estimate assumes that the non-outage work work will complete during 2014 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 assumes that the non-outage work will not suffer productivity loss due to radiation or hazardous conditions..
5.	This estimate assumes that all work will be performed by trained contract craftspersons in lieu of station maintenance personnel.
6.	This estimate assumes that adequate penetrations exist for routing of wiring from the pressure transmitter junction boxes to the external panel location such that no new containment penetrations will be required.
7.	This estimate assumes that the Outage work will involve radiological conditions requiring additional briefing times, dressout times and reduced production due to dressout requirements.
8.	This estimate assumes that a comercial dedication effort will be required to qualify the Yokogawa Recorder for use in this application.
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 based on the project's current level of scope definition and is classified Class 5 as defined per the AACE International Cost Estimate Classification 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 billing rate increases of 3% per year.
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 fence boundary - 30%
	C. Implementation complexity - 40%
	D. Inside Containment - 50%

Rev. 11-0

INDIAN POINT IMPLEMENTATION ESTIMATE WORK SHEET

EC #: SAMA IP2-021

PROJECT TITLE: Install Leak Monitoring Instrumentation for ISLOCA Pathway Isolation Valves — ☑ CAPITAL ☐ O&M — TAKEOFF:

JOB LOCATION: Containment & Control Bldgs. — PROJECT CODE: TBD — ESTIMATOR: RCMT

EST. STATUS: ☑ OUTAGE ☑ NON-OUTAGE — ORIGINATOR: — ORIG. DATE: 06/25/2012

* ESTIMATE LEVEL *

- ☑ **Conceptual**
- ☐ **Preliminary**
- ☐ **Definitive**

General Notes:

ESTIMATE SUMMARY

		MANHOURS	DOLLARS
EOI ENGINEERING			
01	STUDY, DESIGN, & CLOSEOUT	280	$ 28,000
02	DESIGN ENGR CONST SUPPORT	80	$ 8,000
03	WELDING ENGR EOI SUPPORT	80	$ 8,000
04	SYS ENGR/ S-U ENGR	180	$ 18,000
05	PROJECT MANAGEMENT	600	$ 72,000
06	WORK MANAGEMENT	-	$ -
07	TRAVEL & LIVING EXPENSES		$ -
08	ENGINEERING DCP ACCEPTANCE REVIEW	80	$ 8,000
CONTRACT ENGINEERING			
09	DESIGN ENGR CONTRACT SUPPORT	1,500	$ 180,000
10	SUPL CONTRACT MODS ENGR	-	$ -
11	MODS PLAN & SCHED -CONTRACT	160	$ 16,000
12	FIELD ENGRS / PLANNERS	300	$ 36,000
MATERIALS / MISC CONTRACTS			
13	MATERIALS		$ 457,354
14	OTHER CONTRACTS		$ 27,528
CONTRACT CRAFT LABOR			
15	SWEC CRAFT LABOR/WALKDOWN	4,841	$ 703,273
16	LOST TIME	484	$ 88,054
17	SWEC DISTRIBS		$ 197,098
PLANT CRAFT LABOR			
18	MECH MAINT.	-	$ -
19	ELECT MAINT	-	$ -
20	I&C	240	$ 24,000
21	CSG	-	$ -
MISC EOI SUPPORT			
22	QUALITY CONTROL	180	$ 18,000
23	TRAINING	48	$ 5,760
24	CHEMISTRY	-	$ -
25	OPS / OPS SUPPORT	120	$ 14,400
26	HP / RP	120	$ 12,000
MISC CONTRACT SUPPORT			
27	QUALITY CONTROL	200	$ 15,000
28	NDE	-	$ -
29	HP / RP	-	$ -
30	RADWASTE	-	$ -
31	NURSE	-	$ -
32	ELEVATOR CONTRACTOR	-	$ -
33	WASTE MANAGEMENT	-	$ -
34	HOUSEKEEPING	-	$ -
35	COMMERCIA	-	$ -
36	CGD CONTRACT	-	$ 25,000
37	DECONTAMINATION CONTACTOR	-	$ -
38	RBC'S	-	$ -
39	SECURITY - Wackenhut	-	$ -
40	FIRE WATCH (Rover)	-	$ -
41	SAFETY	102	$ 7,358
CONTINGENCY			
42	CONTINGENCY		$ 984,413
ESTIMATE SUBTOTAL		9,595	$ 2,953,238
	SITE ENCUMBRANCE PREMIUM (20%)		$ 590,648
	Loaders (30%)		$ 1,063,166
	ESTIMATE TOTAL		$ 4,607,051

NON OUTAGE WORK

ITEM	DESCRIPTION	QTY	UOM	CFT	NO.	MANHOURS UNIT	FCTR	TOTAL	$/MH	MATERIAL $ PER UNIT	MATERIAL DOLLARS	LABOR DOLLARS	SUB-CONTRACT	TOTAL $
1.	Gather material and stage tools and materials	1	LT	EL	2	10.00	1.00	20	$ 123.32		$ 2,466	$ 2,466		$ 4,932
2.	Mount new monitoring panel with recorder and power supply	1	LT	EL	2	40.00	1.00	80	$ 123.32		$ 30,000	$ 9,866		$ 39,866
3.	Run conduit and support as required to area of containment penetration.	1	LT	EL	2	40.00	1.00	80	$ 123.32		$ -	$ 9,866		$ 9,866
4.	Prefabricate new spool/valve/cap assemblies (9 sub assemblies).	9	LT	PF	2	25.00	1.00	450	$ 120.71		$ 150,000	$ 54,320		$ 204,320
5.	Perform visual and LP examination on socket welds on new spool/valve assemblies	9	LT	NM	1	16.00	1.00	144	$ 87.00		$ -	$ -	$ 12,528	$ 12,528

OUTAGE WORK

ITEM	DESCRIPTION	QTY	UOM	CFT	NO.	MANHOURS UNIT	FCTR	TOTAL	$/MH	MATERIAL $ PER UNIT	MATERIAL DOLLARS	LABOR DOLLARS	SUB-CONTRACT	TOTAL $
1	Gather and stage tools and materials, Perform	1	LT	PF	2	10.000	1.70	34	$ 120.71		$ -	$ 6,977		$ 6,977
	walkdown and briefing.	1	LT	EL	2	10.000	1.70	34	$ 123.32		$ -	$ 7,128		$ 7,128
2.	Stage, erect & modify scaffolding as required	1	LT	CP	2	80.00	1.70	272	$ 96.00		$ -	$ 44,390		$ 44,390
3.	Stage, erect & modify scaffolding as required	1	LT	LB	1	80.00	1.70	136	$ 78.65		$ -	$ 18,184		$ 18,184
4.	Remove existing cap and install new	8	EA	PF	2	10.000	1.70	272	$ 120.71		$ -	$ 55,816		$ 55,816
5.	Mount new transmiter, valve manifold and support	9	EA	PF	2	10.000	1.70	306	$ 120.71		$ 225,000	$ 62,793		$ 287,793
6.	Route and support new tubing between valve	8	EA	PF	2	15.000	1.70	408	$ 120.71		$ 10,000	$ 83,724		$ 93,724
7.	Weld new sockolet to 14" existing pipe	1	EA	PF	2	12.000	1.70	41	$ 120.71		$ -	$ 8,413		$ 8,413
8.	Mount Prefabricated piping/valve sub assemblies	1	EA	PF	2	10.000	1.70	34	$ 120.71		$ -	$ 6,977		$ 6,977
	to socklet.	1	EA	PF	2	15.000	1.70	51	$ 120.71		$ -	$ 10,466		$ 10,466
9.	Route and support new tubing between valve										$ -			

Rev. 11-0

INDIAN POINT IMPLEMENTATION ESTIMATE WORK SHEET

EC #: SAMA IP2-021

PROJECT TITLE: Install Leak Monitoring Instrumentation for ISLOCA Pathway Isolation Valves — ☑ CAPITAL ☐ O&M — TAKEOFF:

JOB LOCATION: Containment & Control Bldgs. — PROJECT CODE: TBD — ESTIMATOR: RCMT

EST. STATUS: ☑ OUTAGE ☑ NON-OUTAGE — ORIGINATOR: — ORIG. DATE: 06/25/2012

ITEM	DESCRIPTION	QTY	UOM	MANHOURS CFT	NO.	UNIT	FCTR	TOTAL	$/MH	MATERIAL $ PER UNIT	MATERIAL DOLLARS	LABOR DOLLARS	SUB-CONTRACT	TOTAL $
10.	NDE containment welds	36	EA	NM	1	1.000	1.70	61	$ 87.00		$ -	$ 9,022		$ 9,022
11.	Support testing as requested	1	LT	PF	2	10.000	1.70	34	$ 120.71		$ -	$ 6,977		$ 6,977
12.	Mount Hoffman boxes in containment.	2	EA	EL	2	6.000	1.70	41	$ 123.32		$ -	$ 8,595		$ 8,595
13.	Route & Support Conduit from each Transmitter in containment to containment Hoffman Enclosure.	350	LF	EL	2	0	2	214	123		$ 2,000	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 Panel and enclosure and terminate.	1	LT	EL	2	60.00	1.70	204	$ 123.32		$ 4,000	$ 25,157		$ 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 scaffolding to storage	1	LT	EL	2	20.00	1.70	68	$ 123.32		$ -	$ 8,386		$ 8,386
19.	Dismantle scaffolding to storage	1	LT	CP	2	40.00	1.70	136	$ 96.00		$ -	$ 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
		1	LT	PF	4	10.00	1.70	68	$ 120.71		$ -	$ 8,208		$ 8,208
	PAINTING & TOUCH-UP REQUIREMENTS										$ -			
1.	PAINTING & TOUCH-UP			PT				-			$ -	$ -		$ -
2.	PAINTING & TOUCH-UP			PT				-			$ -	$ -		$ -
											$ -			
											$ -			
	FIRE WATCH / BOTTLEWATCH REQUIREMENTS										$ -			
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.	MISC SUB-CONTRACT Commercial Grade	1	LT	NM							$ -		$ 25,000	$ 25,000
											$ -			
	SUBTOTAL CRAFT & SUB-CONTRACTOR							4,232			$ 431,466	$ 608,270	$ 37,528	$1,077,264
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.	WALKDOWN ALLOWANCE	1	LT	EL				20	$ 123.32		$ -	$ 2,466		$ 2,466
2.	WALKDOWN ALLOWANCE	1	LT	PF				30	$ 120.71		$ -	$ 3,621		$ 3,621
3.	WORK PACKAGE REVIEW	1	LT	EL				30	$ 123.32		$ -	$ 3,700		$ 3,700
4.	WORK PACKAGE REVIEW	1	LT	PF				30	$ 120.71		$ -	$ 3,621		$ 3,621
5.	TOOL ROOM ATTENDANTS (~3.5%)	1	LT	EL				160	$ 123.32		$ -	$ 19,731		$ 19,731
6.	GENERAL CRAFT OUTAGE DISTRIBS. (10%)											$ 65,699		$ 65,699
7.	CRAFT IN PROCESSING (20%)											$ 131,399		$ 131,399
8.	HUMAN PERFORMANCE & ALARA TRAINING (1/2 day training, or ~ 2%)	1	LT									$ 13,140		$ 13,140
	SUBTOTAL							4,841			$ 431,466	$ 900,371	$ 37,528	$1,369,365
	PLANT SCOPE													
1.	**MECH MAINTENANCE**			PL				-			$ -	$ -		$ -
				PL				-			$ -	$ -		$ -
	SUBTOTAL MECH MAINT.							-			$ -	$ -	$ -	$ -
1.	**ELECT MAINTENANCE**			EL							$ -	$ -		$ -
				PL				-			$ -	$ -		$ -
	SUBTOTAL ELECT. MAINT.							-			$ -	$ -	$ -	$ -
1.	**I&C (Dev. Calibration and Maintenance Procedures**	1	LT	PL	2	120.00	1.00	240	$ 100.00		$ -	$ 24,000		$ 24,000
				PL				-			$ -	$ -		$ -
	SUBTOTAL I&C MAINT.							240			$ -	$ 24,000	$ -	$ 24,000
1.	**CSG**	1		PL				-			$ -	$ -		$ -
				PL				-			$ -	$ -		$ -
	SUBTOTAL CSG MAINT.							-			$ -	$ -	$ -	$ -
	SUBTOTAL PLANT							240			$ -	$ 24,000	$ -	$ 24,000
	SUBTOTAL CRAFT/PLANT							5,081			$ 431,466	$ 924,371	$ 37,528	$1,393,365

Rev. 11-0

INDIAN POINT IMPLEMENTATION ESTIMATE WORK SHEET

EC #: SAMA IP2-021

PROJECT TITLE: Install Leak Monitoring Instrumentation for ISLOCA Pathway Isolation Valves — ☑ CAPITAL ☐ O&M — TAKEOFF:

JOB LOCATION: Containment & Control Bldgs. — PROJECT CODE: TBD — ESTIMATOR: RCMT

EST. STATUS: ☑ OUTAGE ☑ NON-OUTAGE — ORIGINATOR: — ORIG. DATE: 06/25/2012

ITEM	DESCRIPTION	QTY	UOM	CFT	NO.	MANHOURS UNIT	MANHOURS FCTR	MANHOURS TOTAL	$/MH	MATERIAL $ PER UNIT	MATERIAL DOLLARS	LABOR DOLLARS	SUB-CONTRACT	TOTAL $
	IMPLEMENTATION SUPPORT													
	EOI													
1.	WELDING ENGINEERING	1	LT	NM	1	80.00	1.00	80	$ 100.00			$ 8,000		$ 8,000
2.	DESIGN ENGINEERING SUPT DURING CONST	1	LT	NM	1	80.00	1.00	80	$ 100.00			$ 8,000		$ 8,000
3.	SYSTEMS ENGINEERING - MECHANICAL	1	LT	NM	1	40.00	1.00	40	$ 100.00			$ 4,000		$ 4,000
4.	SYSTEMS ENGINEERING - ELECTRICAL	1	LT	NM	1	40.00	1.00	40	$ 100.00			$ 4,000		$ 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			$ 4,000		$ 4,000
7.	PROJECT MANAGEMENT	1	LT	NM	1	600.00	1.00	600	$ 120.00			$ 72,000		$ 72,000
8.	TRAINING OPS STAFF	12	LT	NM	1	4.00	1.00	48	$ 120.00			$ 5,760		$ 5,760
9.	QA / QC VERIFICATION	1	LT	NM	1	180.00	1.00	180	$ 100.00			$ 18,000		$ 18,000
10.	CHEMISTRY	1	LT	NM				-				$ -		$ -
11.	HP / RP/ ALARA	1	LT	NM	1	120.00	1.00	120	$ 100.00			$ 12,000		$ 12,000
12.	WORK MANAGEMENT											$ -		$ -
13.	OPS / OPS PROCEDURE SUPPORT AND DEVELOPMENT	1	LT	NM	1	120.00	1.00	120	$ 120.00			$ 14,400		$ 14,400
14.	TRAVEL & LIVING EXPENSES	1	LT									$ -		$ -
	CONTRACTOR SUPPORT													
1.	FIS / MODS ENGINEERING - SWEC (Incl Per Diem)	1	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.	FIELD ENGRS/PLAN- SWEC(Incl Per Diem)	1	LT	NM	1	300.00	1.00	300	$ 120.00			$ 36,000		$ 36,000
4.	QA / QC VERIFICATION	1	LT	NM	1	200.00	1.00	200	$ 75.00			$ 15,000	$ 15,000	$ 30,000
5.	NDE	1	LT	NM				-				$ -		$ -
6.	HP / RP	1	LT	NM				-				$ -		$ -
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.	VENDOR STOCKING	1	LT	NM				-						
14.	DECONTAMINATION CONTRACTOR	1	LT	NM				-						
15.	RBC's	1	LT	NM				-						
16.	SECURITY	1	LT	SEC				-						
17.	FIREWATCH (Rover)	1	LT	NM				-						$ -
18.	SAFETY (2%)	1	LT	NM				102	$ 72.14			$ 7,358		$ 7,358
19.	LOST TIME (10%)	1	LT					484	$ 181.93			$ 88,054		$ 88,054
	SUBTOTAL CRAFT/NON-MANUAL							7,735			$ 431,466	$ 1,242,943	$ 52,528	$1,726,937
1.	FREIGHT, SALES TAX, & CONSUMABLES (6%)										$ 25,888			$ 25,888
	SUBTOTAL INSTALLATION COST							7,735			$ 457,354	$ 1,242,943	$ 52,528	$1,752,825
1.	DESIGN ENGINEERING - MECHANICAL	1	LT	NM	1	60.00	1.00	60	$ 100.00			$ 6,000		$ 6,000
2.	DESIGN ENGINEERING - ELECTRICAL	1	LT	NM	1	80.00	1.00	80	$ 100.00			$ 8,000		$ 8,000
3.	DESIGN ENGINEERING - INSTR. & CONTROL	1	LT	NM	1	80.00	1.00	80	$ 100.00			$ 8,000		$ 8,000
4.	DESIGN ENGINEERING - CIVIL/STRUCTURAL	1	LT	NM	1	60.00	1.00	60	$ 100.00			$ 6,000		$ 6,000
5.	CONTRACT ENGR DESIGN SUPPORT	1	LT	NM	1	1,500.00	1.00	1,500	$ 120.00				$ 180,000	$ 180,000
6.	DESIGN ENG. DCP ACCEPTANCE REVIEW	1	LT	NM	1	80.00	1.00	80	$ 100.00			$ 8,000		$ 8,000
	SUBTOTAL DESIGN COST							1,860				$ 36,000	$ 180,000	$ 216,000
	SUBTOTAL INSTALLATION & DESIGN COST							9,595			$ 457,354	$ 1,278,943	$ 232,528	$1,968,825
1.	CONTINGENCY (50%)													$ 984,413
	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: *Peter Buttrand.*	Approved by: [illegible signature]
Date: 9-20-2012	Date: 9-20-2012

TABLE OF CONTENTS

1.0 ISSUE

<u>Severe Accident Mitigation Alternative (SAMA) IP2-022:</u>

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

<u>Check Valves</u>
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.

MOVs
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.

MOVs
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. MOVs

   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. Remote Position Monitoring

   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.

7.0 PRELIMINARY MATERIAL LIST - Mechanical

Item	Description	Quantity
1.	2 inch Check Valve (swing check or similar) 1500# pressure class, 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)	10
2.	6 inch Swing Check Valve, 1500# pressure class, 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)	4
3.	10 inch Swing Check Valve, 1500# pressure class, 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.	9*
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	1
4.	1" Conduit	800 feet
5.	2" Conduit	400 feet
6.	2c #14 cable	7000 feet

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 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.: SAMA IP2-22 **Rev. No.:** CONCEPTUAL 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	☐ 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	☐ 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

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	☐ NO
Cable and Raceway Program • Does the proposed activity involve any changes to cable trays, raceways or the associated documentation?	■ YES	☐ 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) *(if applicable)* • 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 • 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?	■ 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?	☐ 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

PROCESS OR PROGRAM IMPACT SCREENING CHECKLIST	Potential Impact	
Computer Support and Software • Does the proposed activity impact or involve changes to plant computer software or firmware or impact Software Quality Assurance (SQA)?	☐ YES	☒ NO
Chemistry and Environmental Impact • Does the proposed activity impact or involve any changes to plant chemistry requirements, operations or procedures, or any changes to the environment?	☐ YES	☒ NO
Radiation Protection (RP) Program Impact • 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?	■ 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	☐ 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 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

ATTACHMENT 9.3 **IMPACT SCREENING SUMMARY**

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	☒ 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?	☐ 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?	☐ 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

ATTACHMENT 9.3 **IMPACT SCREENING SUMMARY**

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	☒ 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	☐ 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	☐ 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?	☐ 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

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?	■ YES	☐ 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	☐ NO
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. 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)

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

TABLE 1
AFFECTED VALVES

RCM Technologies The Source of Smart Solutions	ENTERGY Indian Point Nuclear Station Unit 2	Conceptual Design Package SAMA IP2-022	Rev. 0

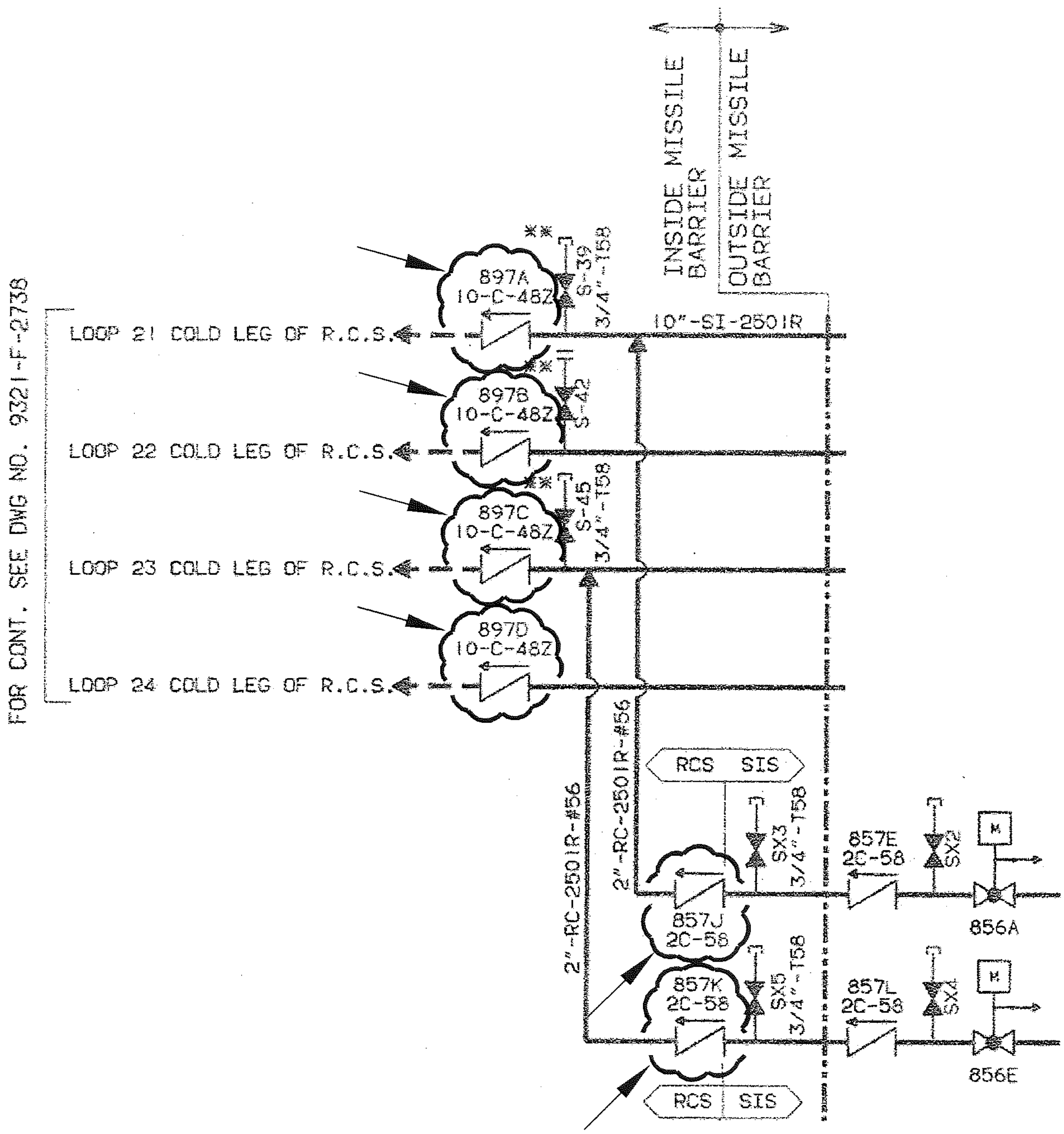


FIGURE 1 (SHEET 1)

TITLE: FLOW DIAGRAM	Entergy Nuclear Northeast	STATION INDIAN POINT
SAFETY INJECTION SYSTEM		
- UFSAR FIGURE NO. 6.2-1 (SHT. 2)	DWG. NO. A235296-	MY
DRWN. BY B. JOHN · SCALE · REC'D		

IPEC00269851

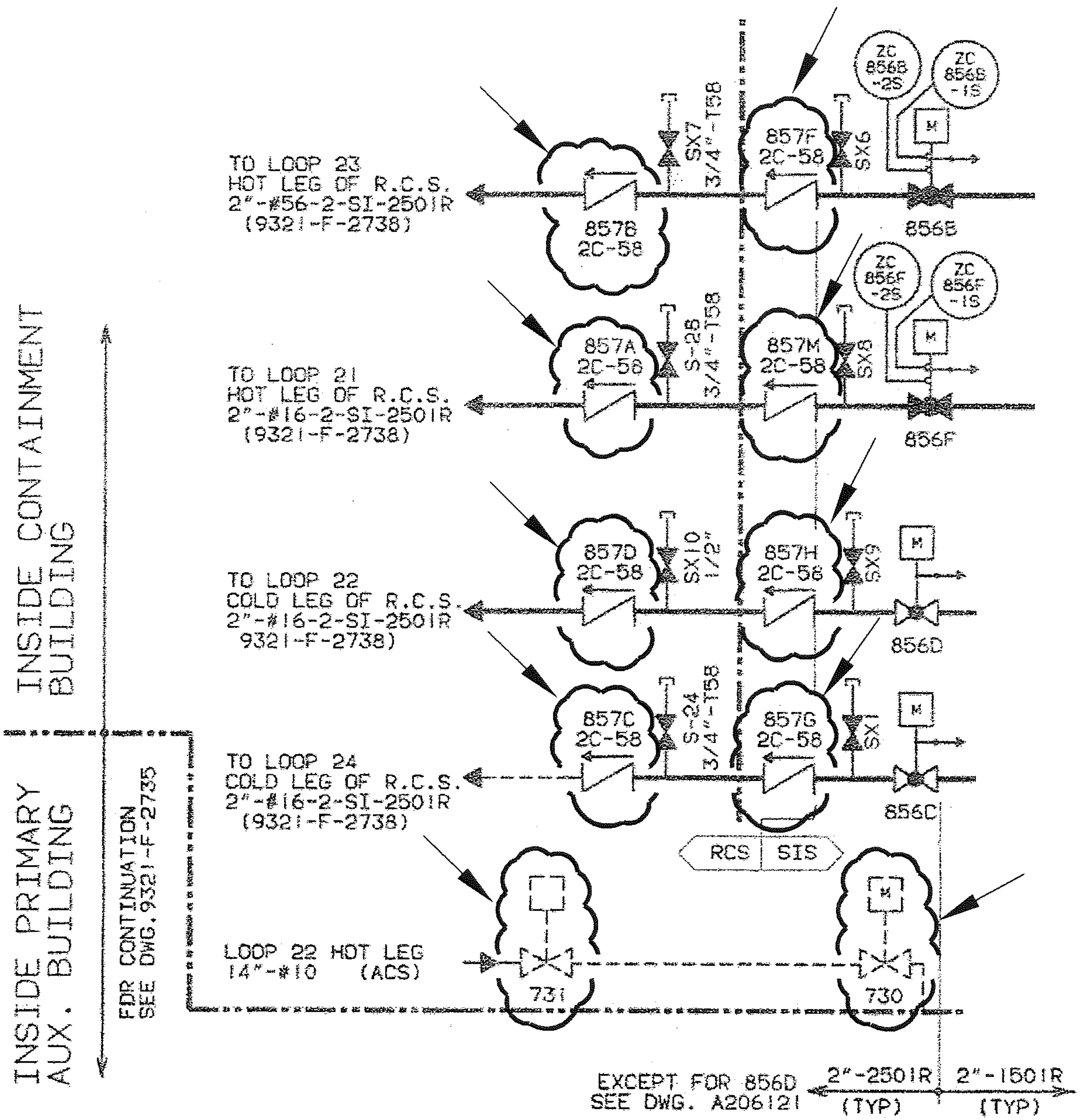


FIGURE 1 (SHEET 2)

TITLE: FLOW DIAGRAM SAFETY INJECTION SYSTEM - UFSAR FIGURE NO. 6.2-1 (SHT. 2)	Entergy Nuclear Northeast	STATION INDIAN POINT
DRWN. BY B. JOHN / SCALE / REC'D	DWG. NO. A235296-	MY

IPEC00269852

RCM Technologies The Source of Smart Solutions	ENTERGY Indian Point Nuclear Station Unit 2	Conceptual Design Package SAMA IP2–022	Rev. 0

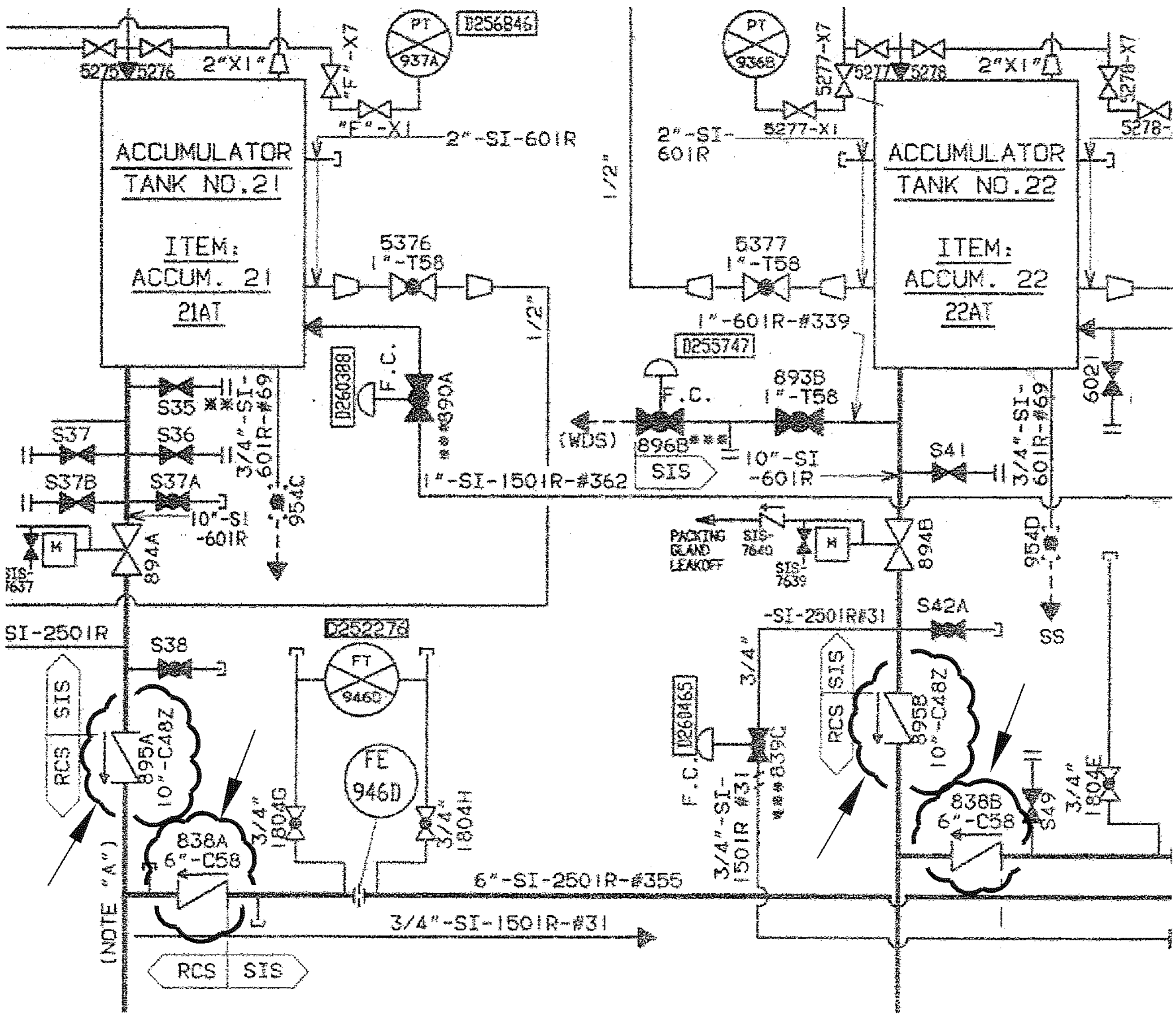


FIGURE 1 (SHEET 3)

TITLE: FLOW DIAGRAM SAFETY INJECTION SYSTEM	Entergy Nuclear Northeast	STATION INDIAN POINT
– UFSAR FIGURE NO. 6.2-1 (SHT. 2)	DWG. NO. A235296-	MY
DRWN. BY B. JOHN · SCALE · REC'D		

IPEC00269853

RCM Technologies *The Source of Smart Solutions*	ENTERGY Indian Point Nuclear Station Unit 2	Conceptual Design Package SAMA IP2-022	Rev. 0

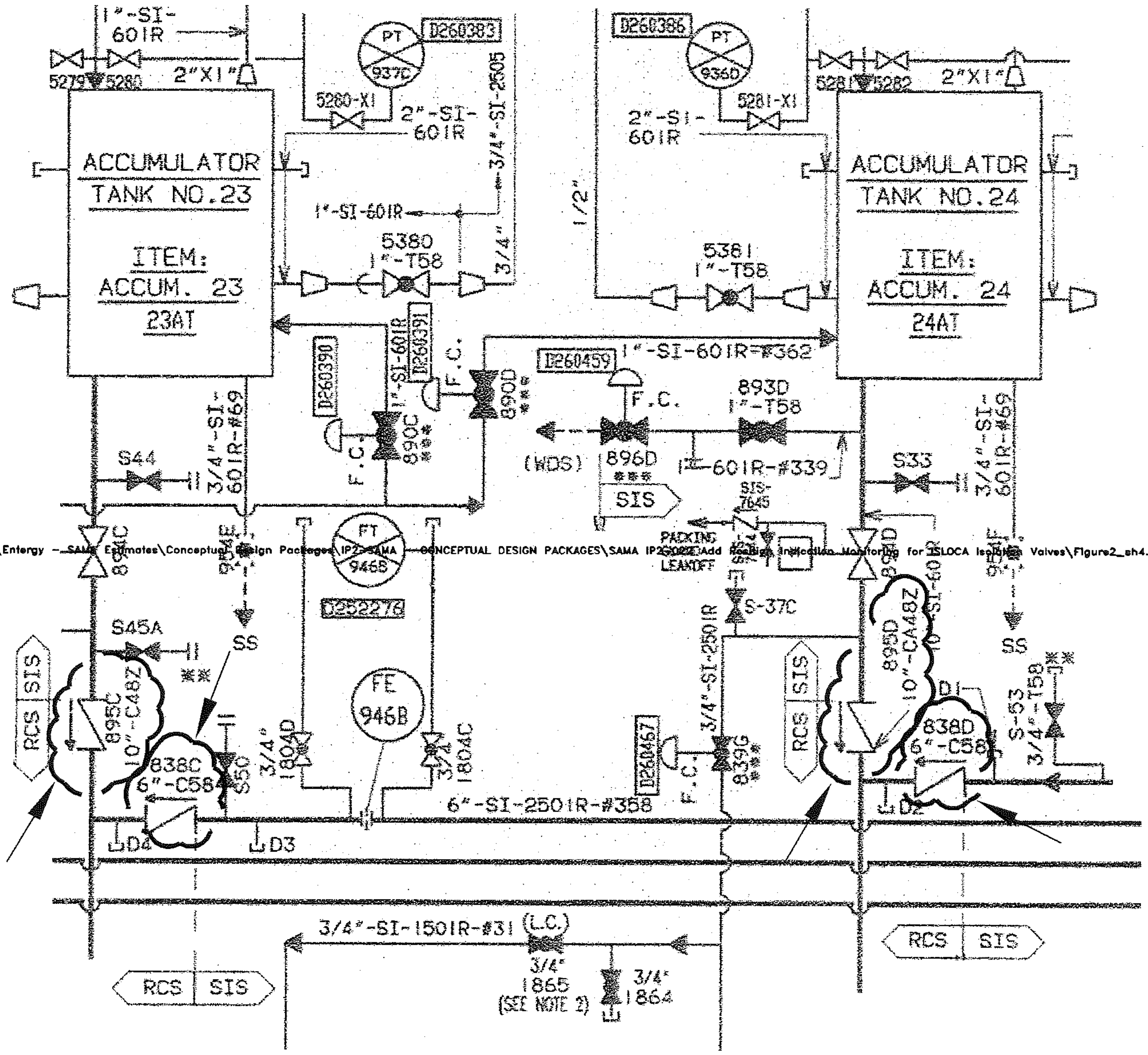


FIGURE 1 (SHEET 4)

TITLE: FLOW DIAGRAM	Entergy Nuclear Northeast	STATION
SAFETY INJECTION SYSTEM		INDIAN POINT
– UFSAR FIGURE NO. 6.2-1 (SHT. 2)	DWG. NO. A235296-	MY
DRWN. BY B. JOHN / SCALE / REC'D		

IPEC00269854

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. 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

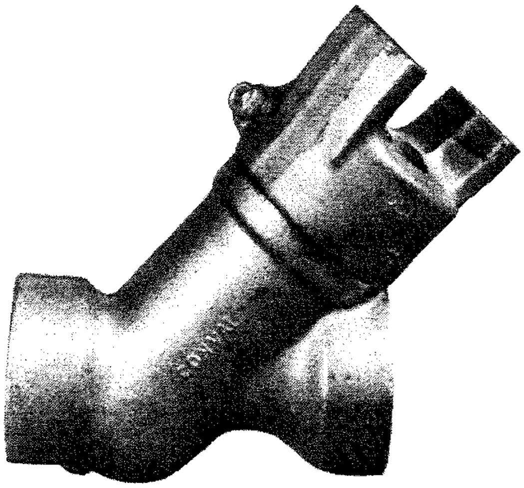
1/2" through 3"
Y, T, angle pattern
Stop Check Optional
SW, BW, FNPT (to 1"), Grayloc or Flanged

PRESSURE RATING

ASME 900 through 3500

STANDARD MATERIALS

A105, F22, F316, 316L
Monel™ 400, Iconel™600, optional

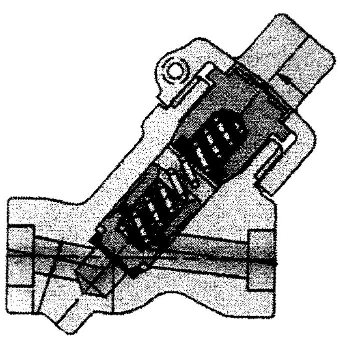


DESIGN FEATURES

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.



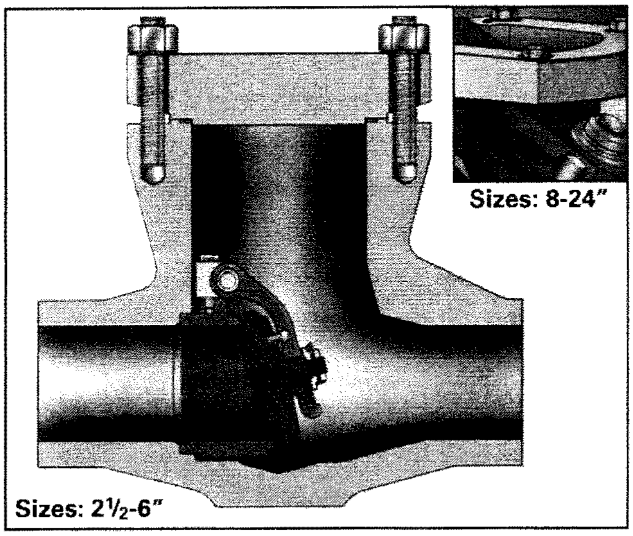
ISO 9001 certified since September 11, 1992

Conval INC.
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

Form Check2008-KIT Printed in USA

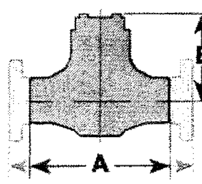
BOLTED COVER SWING CHECK VALVES CARBON, ALLOY OR STAINLESS STEEL

ASME CLASSES 150-900, 2½ -24" (65-600 mm)
ASME CLASS 1500, 2½ -16" (65-400 mm)



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

CLASS	FIG. NO.
150	0114B
300	1114B
600	2114B
900	7114B
1500	3114B



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	MATERIAL			
Body[1] / Cover[1]	A105	A182 Gr. F11	A182 Gr. F22	A182 Gr. F316
Seat[1][2] / Disc[1][2]	A105 or A 216 Gr. WCB	A 182 Gr. F11 or A 217 Gr. WC6	A 182 Gr. F22 or A 217 Gr. WC9	A 182 Gr. F316 or A 351 Gr. CF8M
Hanger	Carbon steel			Stainless
Hex head bolt	Alloy steel			
Lock washer	Stainless			
Hinge pin	Gr. 410			Gr.630 or Gr.660
Bushing	Stellite 6			
Gasket[1]	Spiral wound stainless and graphite			
Body/cover stud	Gr. B7	Gr. B16		Gr.B8M or Gr.630
Body/cover nut	Gr. 2H	Gr. 4		Gr. 8M

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

FLOW COEFFICIENTS Cv *

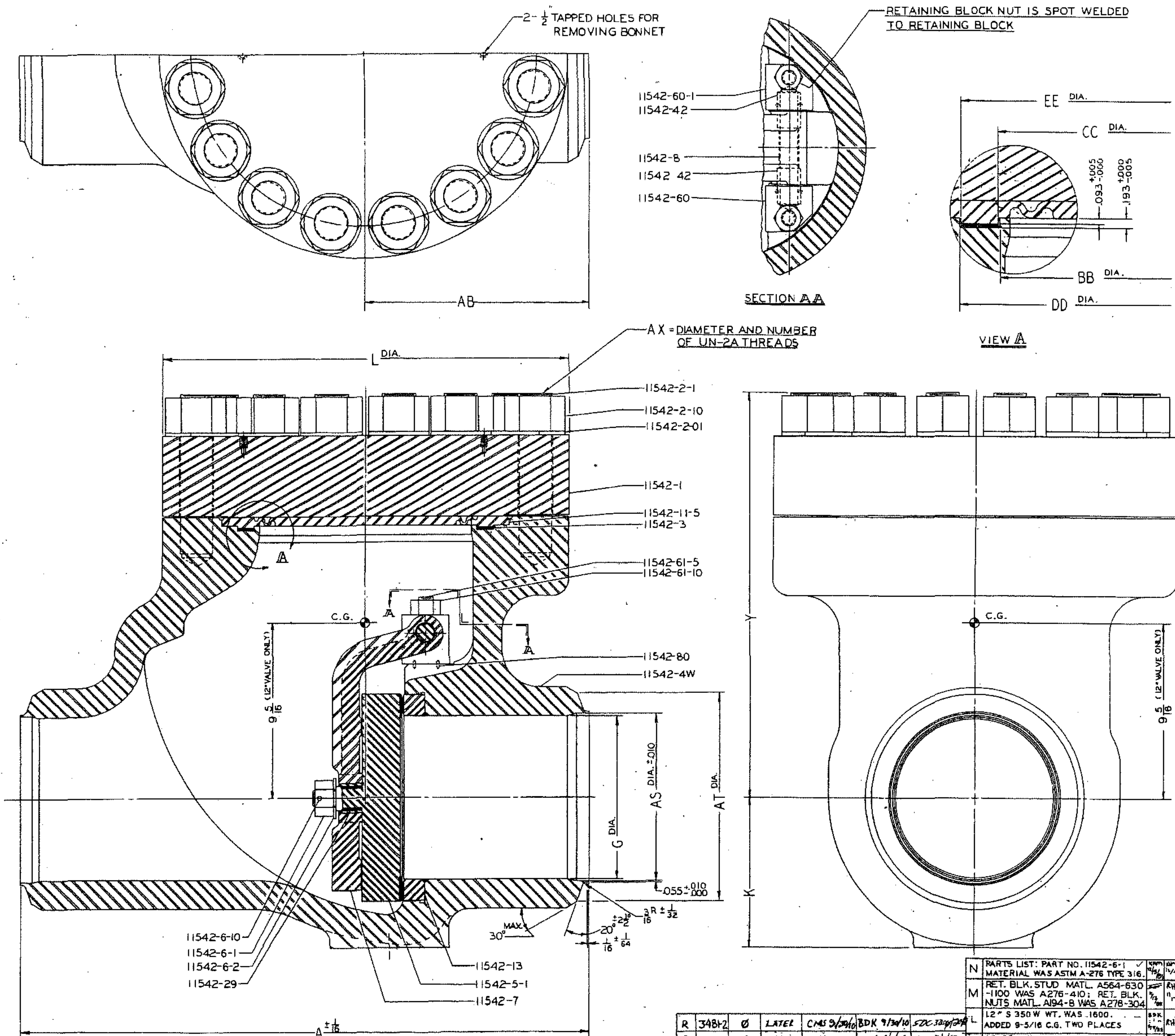
SIZE in (mm)	CLASS 150/300	600	900	1500
2½ (65)	170	170	170	170
3 (80)	170	170	170	170
4 (100)	295	295	295	295
6 (150)	830	830	700	700
8 (200)	1525	1525	1125	1125
10 (250)	2400	2400	1700	1700
12 (300)	3500	3500	2800	2800
14 (350)	5300	5300	3650	3650
16 (400)	7000	7000	6000	4850
18 (450)	8400	8400	7300	—
20 (500)	10,500	10,500	9000	—
24 (600)	15,000	15,000	13,500	—

** Kv = Cv x 0.85*

DIMENSIONS - BUTT WELD END

SIZE	ASME 150 (PN 20)			ASME 300 (PN 50)			ASME 600 (PN 100)			ASME 900 (PN 150)			ASME 1500 (PN 250)		
in mm	A	B	lb kg	A	B	lb kg	A	B	lb kg	A	B	lb kg	A	B	lb kg
2½ 65	8.50 216	7.00 178	50 23	11.50 292	7.00 178	50 23	13.00 330	7.00 178	50 23	10.00 254	7.00 178	50 23	10.00 254	7.00 178	50 23
3 80	9.50 241	9.00 229	100 45	12.50 318	9.00 229	100 45	10.00 254	9.00 229	100 45	12.00 305	9.50 241	100 45	12.00 305	9.50 241	100 45
4 100	11.50 292	10.56 268	150 68	14.00 356	10.56 268	150 68	12.00 305	10.56 268	150 68	14.00 356	10.75 273	150 68	16.00 406	10.75 273	150 68
6 150	14.00 356	13.13 333	300 136	17.50 445	13.13 333	300 136	18.00 457	13.13 333	300 136	20.00 508	16.25 413	450 204	22.00 559	16.50 419	450 204
8 200	19.50 495	16.19 411	700 318	21.00 533	16.19 411	700 318	23.00 584	16.19 411	700 318	26.00 660	19.50 495	850 386	28.00 711	19.50 495	850 386
10 250	24.50 622	19.50 495	800 363	24.50 622	19.50 495	800 363	28.00 711	19.50 495	800 363	31.00 787	21.75 552	1000 454	34.00 864	21.75 552	1000 454
12 300	27.50 699	22.69 576	1200 544	28.00 711	22.69 576	1200 544	32.00 813	22.69 576	1200 544	36.00 914	28.13 715	3000 1361	39.00 991	28.13 715	3000 1361
14 350	31.00 787	23.88 606	1400 635	33.00 838	23.88 606	1400 635	35.00 889	23.88 606	1400 635	39.00 991	26.50 673	3000 1361	39.00 991	27.50 699	3000 1361
16 400	34.00 864	29.00 737	2000 907	34.00 864	29.00 737	2500 1134	39.00 991	30.00 762	2500 1134	43.00 1092	31.00 787	3350 1520	47.00 1194	31.00 787	3350 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] 1194	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] 1397	31.00 787	7000 3175	— —	— —	— —

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



NOTE

1. THE VALVE SHALL BE INSTALLED IN A HORIZONTAL PIPE WITH THE BONNET ABOVE THE CENTERLINE OF THE PIPE.

* NOTES CONTINUE ON SHEET 2.

⊗ RECOMMENDED SPARE PARTS

	DIMENSIONS			
	VALVE SIZE	8 INCH S 350W	10 INCH S 350W	12 INCH S 350W
	A	23 3/4	25 3/4	29
	G	6 13/16	8 1/2	10 1/8
	K	6 1/4	7 3/8	8 7/8
	L	17	19 7/8	22 1/2
	Y	16 3/4	20	22 5/8
	AB	9 3/8	10 3/8	11 3/4
SCHEDULE 140 PIPE	AS	7.163	8.959	10.740
SCHEDULE 160 PIPE	AS	6.998	8.740	10.413
	AT	8 5/8	10 3/4	12 3/4
	WEIGHT	730	1100	1680
	TAG NO.	8-C 48 Z	10-C 48 Z	12-C 48Z
	AX	1 3/8 - 8	1 5/8 - 8	1 3/4 - 8
	BB	9 5/16	11 3/16	13 7/16
	CC	9 3/8	11 1/4	13 1/2
	DD	10.687	12.812	15.062
	EE	10.656	12.781	15.031
	L/D	60	60	60

REV	ADCN NO.	CAP REV	BM DATE	DWN / DATE	CHK'D / DATE	APV'D / DATE
R	3481-2	Ø	LATER	CMS 9/30/10	BDK 9/30/10	SDC 3[illegible]
Q	3481-1	Ø	6/29/07	[illegible] 6/29/07	[illegible] 7/2/07	MVR 7/2/07
P	3481	Ø	CMS 11-17-05	CMS 11-17-05	SBF 1/12/06	[illegible]

LET	DESCRIPTION	DATE	BY
N	PARTS LIST: PART NO. 11542-6-1 MATERIAL WAS ASTM A-276 TYPE 316.	[illegible]	[illegible]
M	RET. BLK. STUD MATL. A564-630 -1100 WAS A276-410; RET. BLK. NUTS MATL. A194-8 WAS A278-304	[illegible]	RHM
L	12" S 350 W WT. WAS 1600. ADDED 9-5/16 C.G. TWO PLACES	[illegible]	RHM
K	APPROX. VALVE WEIGHTS 730, 1100, 1600 WERE 1600, 1800 & 2100 LBS	2/81	[illegible]
J	BONNET, PART NO. 11542-1, MATL WAS ASTM 515 GRADE 65	12/29/[illegible]	JPD
I	BONNET PART 11542-1 MAT'L. WAS ASTM A515 GRADE 55	[illegible]/71	JH
H	ADDED "AS" DIMENSION FOR SCHEDULE 160 PIPE	6/12/70	HOH
G	ADDED RECOMMENDED SPARE PARTS ADDED VIEW A ADDED NOTE 1	5/14/70	ES
F	PART 11542-1 MATERIAL WAS A201 GRADE A	4/28/70	OSW
E	GENERAL & ADDED 12" VALVE	1-29-69	B.F.
D	REVISED "AS" DIMENSION	10-10-67	J.R.
C	ADDED "AX" DIMENSION	9-15-67	J.R.
B	ADDED TAG NO. LOCK WIRE WAS PIN. ADDED 1/4 TAPS	3-27-67	O.S.W.
A	REDRAWN	2-9-67	R.E.B.

REVISIONS

WESTINGHOUSE ELECTRIC CORP.
NUCLEAR ENERGY SYSTEM

DARLING VALVE & MANUFACTURING, CO.
WILLIAMSPORT, PA.

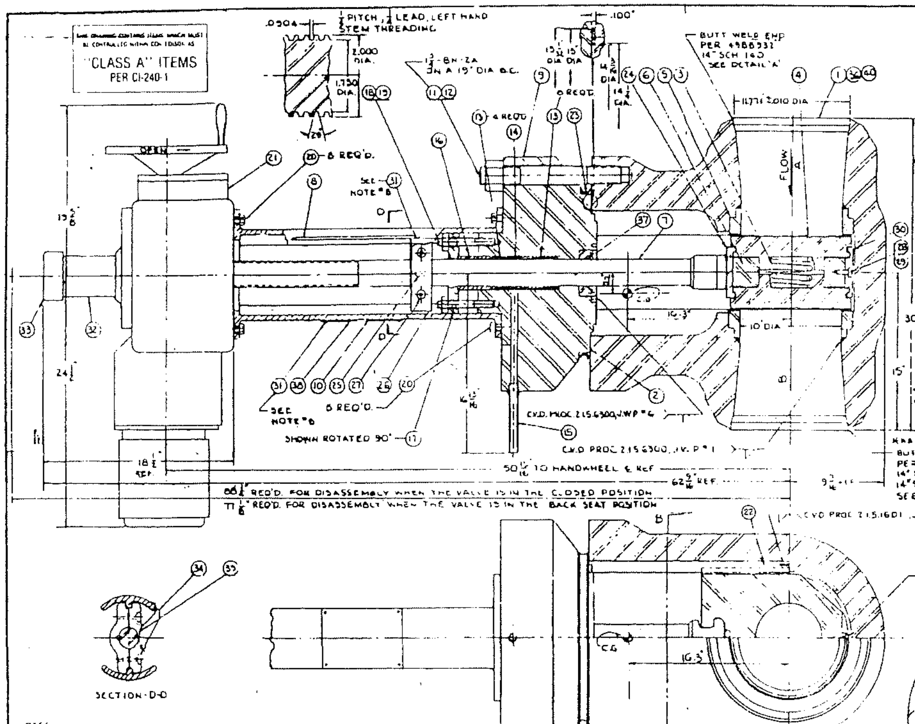
NO. S350W SC CLEAR WATERWAY SWING CHECK VALVE WITH PROVISION FOR SEAL WELDED BONNET

SHT 1 of 2

DRAWN BY REB	DATE 7 DEC. 1966
CHECKED BY JJH	INSTALLATION NO. 11542
DATE	

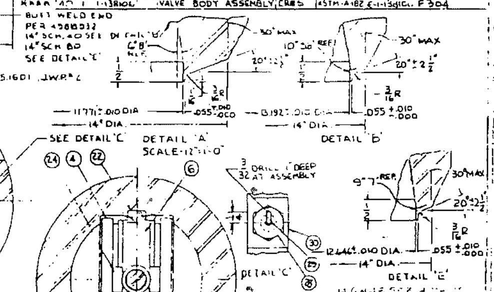
IPEC00269859

INDIAN POINT PROJECTS
UNIT: 2 and 3 SPIN: 14-GM485E2
STATUS: AS MANUFACTURED
CERTIFICATION. LETTER NO.: IPP-4426
AUTHORITY: E. U. POWELL
ENGR. LTR. NO.: PA-HE-11098



LIST OF MATERIALS

ITEM NO	NO REQ	PART NO	PART CODE	DESCRIPTION	MAT'L	MAT'L SPEC	CHG NO	
1	1	1-133600		VALVE BODY ASSEMBLY	CRES	ASTM-A-182	E-1-133600	F 304
2	1	1-134265		GASKET	ASBESTOS & CRES.		M-1-133716	FLEXITALLIC
3	1	1-81595		SPRING	INCONEL-X	COM'L	M-1-81595	
4	2	1-81550		DISC	CRES.	ASTM-A-182	L-1-81550	F 347
5	2	1-133641		SEAT RING	CRES.	ASTM-A-182	L-1-133641	F 304
6	1	1-133560		DISC HOLDER	CRES.	SEE NOTE 6	L-1-133560	TYPE 410
7	1	1-133559		STEM	CRES.	SEE NOTE 7	L-1-133559	17-4PH, COND H-1075
8	1	1-133695		INDICATOR PLATE	STEEL	ASTM-A-366	M-1-133695	
9	1	1-133642		BONNET ASSEMBLY	CRES	ASTM-A-182	L-1-133642	F 304
10	1	1-133558		FRAME	DUC. IRON	ASTM-A-536	E-1-133558	65-45-12
11	16	1-133497		STUD	STEEL	ASTM-A-193	M-1-133497	GR B7
12	16	1-81553		HEX NUT	STEEL	ASTM-A-194	M-1-81553	GR. 2H
13	12	1-133717		PACKING	ASBESTOS	CRANE 187	M-1-133716	[illegible]
14	1	1-133698		LANTERN RING	CRES.	ASTM-A-276	M-1-133698	TYPE 304
15	1	1-133645		DRAIN NIPPLE	CRES	ASTM-A-312	M-1-133716	TYPE 304 SST.
16	1	1-133646		PACKING GLAND	CRES.	ASTM-A-276	M-1-133646	TYPE 304 SST.
17	1	1-133686		GLAND FOLLOWER	STEEL	ASTM-A-7	L-1-133686	
18	2	1-133718		STUD	STEEL	ASTM-A-193	M-1-133716	GR B7
19	2	1-133719		HEX NUT	STEEL	ASTM-A-194	M-1-133716	GR. 2H
20	16	1-133720		HEX HD. CAP SCREW	STEEL	COM'L	M-1-133716	5/8-11 x 1 1/4 LG.
21	1	PG*06 JHI		LIMITORQUE OPERATOR		COM'L		SMB-1
22	2	1-133640		GUIDE RAIL	HAYNES 25	AMS-5759	L-1-133640	
23	1	1-81554		C-RING CANOPY	CRES	ASTM-A-240	M-1-81554	TYPE 304
24	1	1-133643		DISC RETAINER, UPPER	CRES.	ASTM-A-240	M-1-133643	TYPE 410
25	1	1-133712		KEY	CRES	ASTM-A-276	M-1-133712	TYPE 410
26	2	1-133687		TORQUE BAR	CRES	ASTM-A-240	L-1-133687	TYPE 410
27	2	1-133731		SOCKET HEAD CAP SCREW	CRES.	COM'L	M-1-133716	
28	1	1-162491		HEX. HD. CAP SCREW	CRES	COM'L	M-1-162491	TYPE 304
29	1	1-133608		LOCK PIN	CRES	COM'L	M-1-133716	TYPE 304
30	1	1-162490		DISC RETAINER, LOWER	CRES	[illegible]	M-1-162490	TYPE 410
31	6	1-133712		DRIVE SCREW	STEEL	COM'L	M-1-133716	
32	1	1-133685		STEM COVER (GALV)	STEEL	COM'L	M-1-133685	3 1/2 SCH 40 x 7 1/2 LG.
33	1	1-133723		STEM CAP (GALV)	MALL IRON	COM'L	M-1-133716	
34	1	1-134267		INDICATOR ARM	STEEL	ASTM-A-503	M-1-134267	
35	12	1-134260		PACKING	TEFLON	CRANE 1715	M-1-133716	2 1/8 ID x 2 7/8 OD x 3/8 THK
36	1	1-133691		VALVE BODY ASSEMBLY	CRES.	ASTM-A-182	E-1-133691	F 304
37	1	1-133690		STEM BACK SEAT COLLAR	CRES.	ASTM-A-182	M-1-133690	TYPE 304
38	1	1-133696		NAMEPLATE	STEEL	ASTM-A-366	M-1-133696	
39	2	1-134176		ROUND HEAD MACHINE SCREW	STEEL	COM'L	M-1-133716	#6-32 x 1/4 LG.
40	1	1-138106		VALVE BODY ASSEMBLY	CRES	ASTM-A-182	E-1-138106	F 304



NOTES

1. STELLITE #6 HARDFACING ON ITEM NO'S. 4 & 5.
2. APPROX. WEIGHT OF ASSEMBLY = 3543 LBS.
3. L/D COEFFICIENT = 18 MAX.
4. THE VALVE SHALL BE MOUNTED HORIZONTALLY IN THE PIPE LINE WITH THE STEM VERTICAL ABOVE THE CENTERLINE OF THE PIPE.
5. LIMITORQUE NOMINAL MOTOR TORQUE-40FT.LBS, STROKING RATE-4"/MIN, OPERATING DIFFERENTIAL-600 P.S.I., 3 PHASE 60 CYCLE & 440 VOLTAGE.
6. ASTM-A-240 OR ASTM-A-314.
7. AMS-5643 OR ASTM-A-461
8. #37 (.104) DRILL - 1/16 DEEP, 6 HOLES AT ASSEMBLY

*** VALVE BODY WITH 14" SCH. 140 INLET AND SCH 80 OUTLET.
* VALVE BODY WITH 14" SCH. 140 INLET AND OUTLET - VALVE Nº 731
** VALVE BODY WITH 14" SCH. 140 INLET AND SCH. 40 OUTLET - VALVE Nº 730
**** REMOVE TEFLON TEMPORARY PACKING, ITEM NO. 35, AND REPLACE WITH CRANE #187, ITEM NO. 13, BEFORE OPERATION OF VALVE

NO	DATE	REVISION	BY	CHK	NO	DATE	REVISION	BY	CHK
1	[illegible]	REV PER COMMENTS OF PO 7514-10090-B, PARA 1	R.C.L.		3	[illegible]	ADDED ITEM #40, ADDED DETAIL 'E', ADDED 14" SCH 80	G	K
2	[illegible]	COMPLETED BILL OF MATERIALS	2C		4	[illegible]	ADDED [illegible]	G	K
5	[illegible]	ITEM 28 WAS PT. NO. 1-133725; LINE NO. M-1-133716; ITEM 30 WAS PT. NO. 1-133694 ...			6	[illegible]	TITLE BLOCK WAS USA-B-165		

1973M4640

COPES-VULCAN, INC.

14" MOTOR OPERATED GATE VALVE ASSEMBLY DESIGNED IN ACCORDANCE WITH MSS-SP-66 AND RATED AT 2500 PSIG AND 650°F.

DWG. NO. E-1-133420

6740-60180

1321-01-F... -20156-01-1

2015:
05-01-73

FOR MOV INFORMATION
FOR VALVES 730 & 731 SEE
TNMS & PPMIS SYSTEM DATA.

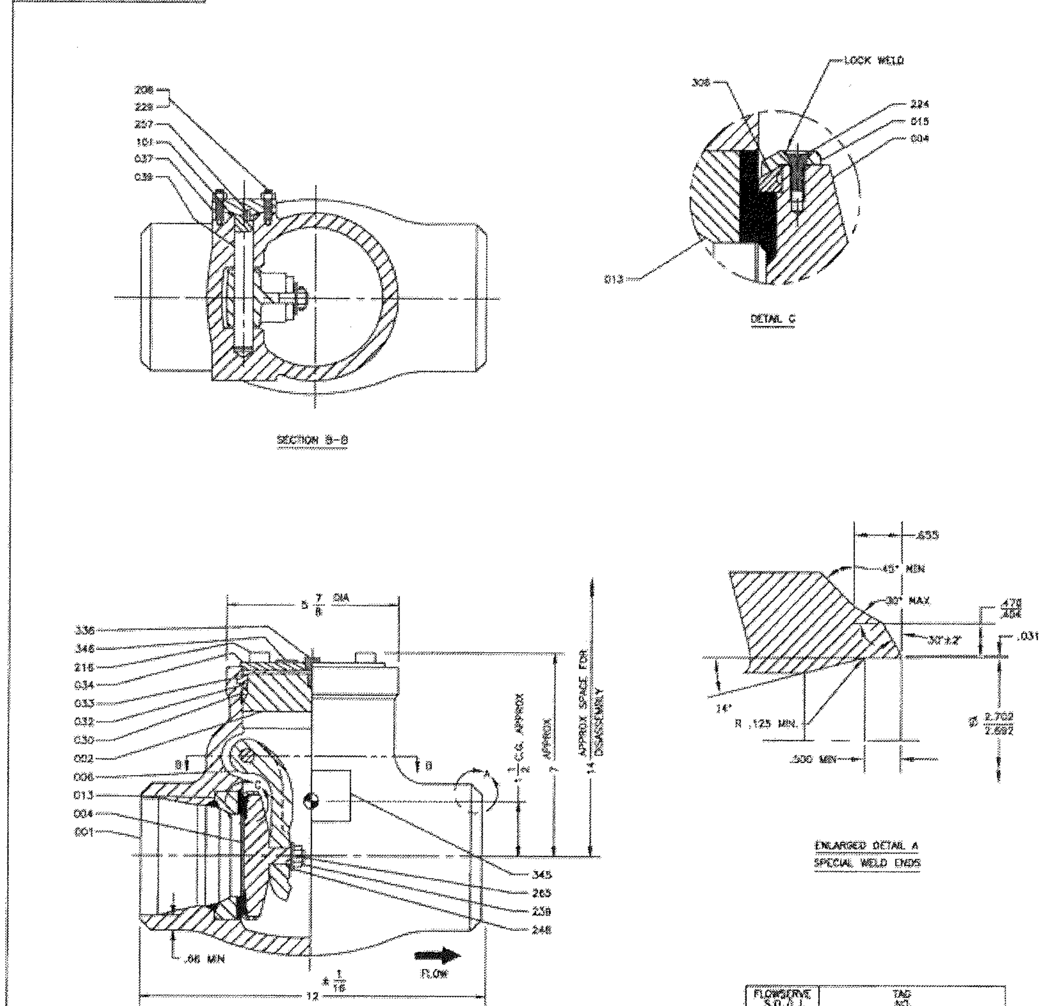
THIS DRAWING CREATED FROM
COPES -VULCAN, INC.
DWG. No. E-1-133420
MICROFILM No. 1973M4640

REVISION			DATE			APPROVALS			TITLE		STATION
	HLS	THIS REVISION IS CLASS "A" PER CI-240-1 REVISED TO SHOW WORK DONE ON DMD 1973M4640-AA REV. 00. PER MOD. PROC. No FFX-92-08169-E PKG. No. 8666. RELEASE AS BUILT. P.N. 08169-92 NP/AD 10/26/93	11/17/93	FLS	FCM	John J Mytykytel 12/8/93			TITLE. 14" MOTOR OPERATED GATE VALVE ASSEMBLY DESIGNED IN ACCORDANCE WITH MSS-SP-66 AND RATED AT 2500 PSIG AND 650°F	Con Edison	INDIAN POINT UNIT #2
	DWG	ATOMETRICS, INC.	DATE	CKR.	SUPV.	DESIGN ENG.	DISC ENG.	ENG MGR.	DRAWN BY / SCALE / REC'D		DWG. NO. B259680-00 MJ
				REVIEW		APPROVALS					

FLOWSERVE

Valve Drawing - Size 3

08-50924-01



PART NO	QTY	DESCRIPTION	MATERIAL	MAT'L NOTE
001	1	BODY	SA351-CF8M	4
002	1	BONNET	SA182-F316	4
004	1	DISC	SA182-F316L WITH NOREM	4
006	1	HINGE	A351-CF8M	5
013	1	SEAT RING	A479-316 WITH NOREM	5
015	1	RETAINER RING (DISC SEAT)	A479-316	5
030	1	PRESSURE SEAL GASKET	GRAPHITE W/304SS CAP	
032	1	SPACER RING	A240-316	
033	1	GASKET RETAINER	SA240-F316	4
034	1	BONNET RETAINER	A240-316	
037	1	HINGE PIN COVER	SA479-316	4
039	1	HINGE PIN	A564-630-1075	5
101	1	GASKET	GRAPHITE	
208	4	COVER STUD	SA453-660B	4
216	4	CAPSCREW BONNET	AISI 316	
224	4	MACHINE SCREW	AISI 316	
229	4	COVER NUT	SA194-8BM	4
239	1	DISC NUT	A194-8M	5
248	1	DISC WASHER	A479-316	
257	1	PIN	A479-316	
265	1	DISC NUT PIN	A479-316	
306	1	RESILIENT SEAT	ETHYLENE PROPYLENE RUBBER	
336	1	PIPE PLUG	AISI 316	
345	1	NAMEPLATE	AISI 304	
346	1	IDENTIFICATION PLATE	AISI 304	

NOTES

1. NOMINAL VALVE WEIGHT = 100 LBS
2. APPROX C_V = 225 GPM
3. VALVE TO BE INSTALLED IN HORIZONTAL RUN OF PIPE WITH THE HINGE PIN HORIZONTAL AND BONNET ON TOP OR IN A VERTICAL RUN OF PIPE WITH FLOW UPWARD
4. DENOTES PRESSURE RETAINING ASME SECTION III PART
5. DENOTES SAFETY RELATED NON-ASME PART
6. PARTS NOT IDENTIFIED BY NOTES 4 OR 5 ARE NON-SAFETY RELATED PARTS
7. RESILIENT SEAT QUALIFIED UP TO 400°F
8. CHAMFER CORNER AT DISC HARDFACING MIN. RADIUS .005
9. TESTING: HYDROSTATIC
   ZERO LEAKAGE @ 150 PSID
   27.5 CC/HR LEAKAGE RATE @ CWP

FLOWSERVE S.O./L.I.	TAG NO.
1	S21204MU018/S21204MU019 S21204MU020/S21204MU021
2	S31204MU018/S31204MU019 S31204MU020/S31204MU021

SOUTHERN CALIFORNIA EDISON COMPANY
SAN ONOFRE NUCLEAR GENERATING STATION UNITS 2 AND 3
CUSTOMER P.O. NUMBER: 4500036722
FLOWSERVE S.O. NUMBER: 50924, ITEM1 (ITEM 2)

VALVE IS ASME CLASS 1 PER ASME SECTION III 1971 ED. THRU SUMMER 1973 ADDENDA WITH N-STAMP

VALVE DESIGN PRESSURE AND TEMPERATURE IS 2485 PSIG @ 650°F
CWP:3800 PSIG

FLOWSERVE Flow Control Division — Anchor/Darling, BW/IP, Durco and Valtek Valves
RALEIGH, NC

SWING CHECK VALVE
STAINLESS STEEL, SPL WELD ENDS
WITH RESILIENT SEAT
SIZE: 3 CLASS: 1500

SCALE: NTS — SIZE: C — DWG NO: 08-50924-01 — REV: A

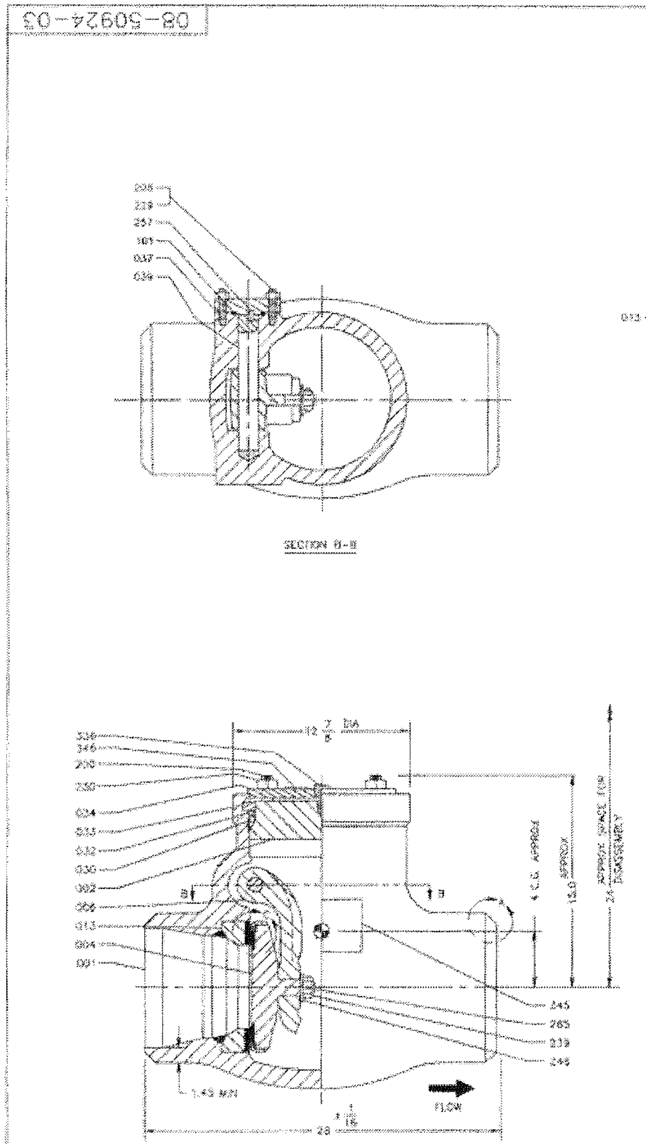
REV	ADCN NO.	QAP REV	BM DATE	DWN / DATE	CHKD / DATE	APVD / DATE
A	4201	Ø	09/25/08	CMS 11/05/08	SLA 11-6-08	[illegible]
Ø	———	Ø	09/25/08	CMS 09/25/08	BDK 09/29/08	JLM 09/30/08

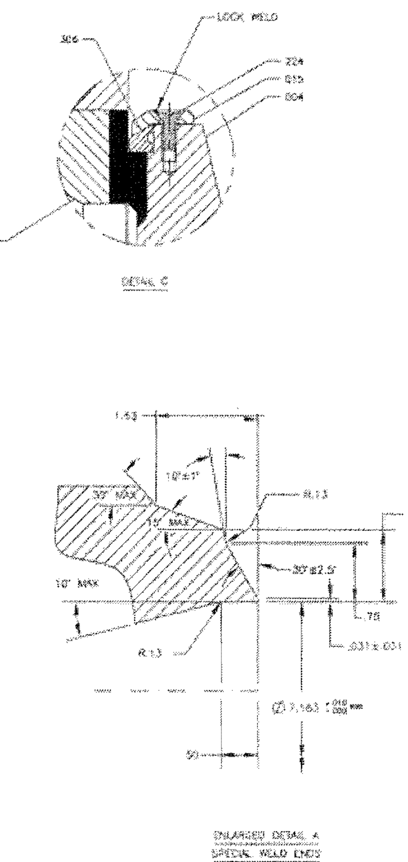
Exper

FLOWSERVE

Valve Drawing - Size 8

08-50924-03





PART NO.	QTY	DESCRIPTION	MATERIAL	MAT'L NOTE
001	1	BODY	SA351-CF8M	4
002	1	BONNET	SA182-F316	4
004	1	DISC	SA182-F316L WITH NOREM	4
006	1	HINGE	A351-CF8M	5
013	1	SEAT RING	A479-316 WITH NOREM	5
015	1	RETAINER RING (DISC SEAT)	A479-316	5
030	1	PRESSURE SEAL GASKET	GRAPHITE W/304SS CAP	
032	1	SPACER RING	A240-316	
033	1	GASKET RETAINER	SA240-F316	4
034	1	BONNET RETAINER	A240-316	
037	1	HINGE PIN COVER	SA479-316	4
039	1	HINGE PIN	A564-630-1075	5
101	1	GASKET	GRAPHITE	
208	4	COVER STUD	SA453-660B	4
200	8	BONNET STUDS	AISI 316	
224	6	MACHINE SCREW	AISI 316	
228	4	COVER NUT	SA194-B8M	4
239	1	DISC NUT	A194-8M	5
248	1	DISC WASHER	A479-316	
257	1	PIN	A479-316	
265	1	DISC NUT PIN	A479-316	
306	1	RESILIENT SEAT	ETHYLENE PROPYLENE RUBBER	
336	1	PIPE PLUG	AISI 316	
345	1	NAMEPLATE	AISI 304	
346	1	IDENTIFICATION PLATE	AISI 304	
230	4	BONNET NUT	SA194-B8M	

NOTES

1. NOMINAL VALVE WEIGHT = 950 LBS
2. APPROX C_v = 1675 GPM
3. VALVE TO BE INSTALLED IN HORIZONTAL RUN OF PIPE WITH THE HINGE PIN HORIZONTAL AND BONNET ON TOP OR IN A VERTICAL RUN OF PIPE WITH FLOW UPWARD
4. DENOTES PRESSURE RETAINING ASME SECTION III PART
5. DENOTES SAFETY RELATED NON-ASME PART
6. PARTS NOT IDENTIFIED BY NOTES 4 OR 5 ARE NON-SAFETY RELATED PARTS
7. RESILIENT SEAT QUALIFIED UP TO 400°F
8. CHAMFER CORNER AT DISC HARDFACING MIN. RADIUS .005
9. TESTING: HYDROSTATIC
   ZERO LEAKAGE @ 150 PSID
   70 CC/HR LEAK RATE @ CWP

FLOWSERVE S.O./LI.	TAG NO.
3	S21204MU072/S21204MU073 S21204MU074/S21204MU075
4	S31204MU072/S31204MU073 S31204MU074/S31204MU075

SOUTHERN CALIFORNIA EDISON COMPANY
SAN ONOFRE NUCLEAR GENERATING STATION UNITS 2 AND 3
CUSTOMER P.O. NUMBER: 4500036722
FLOWSERVE S.O. NUMBER: 50924, ITEM 3 (ITEM 4)

VALVE IS ASME CLASS 1 PER ASME SECTION III 1971 ED. THRU SUMMER 1973 ADDENDA WITH N-STAMP

VALVE DESIGN PRESSURE AND TEMPERATURE IS 2485 PSIG @ 650°F
CWP: 3600 PSIG

FLOWSERVE Flow Control Division — Anchor/Darling, BW/IP, Durco and Valtek Valves — RALEIGH, NC

SWING CHECK VALVE
STAINLESS STEEL, SPL. WELD ENDS
WITH RESILIENT SEAT
SIZE: 8 CLASS: 1500

REV	ADCN NO	GAP REV	BM DATE	DWN/DATE	CHKD/DATE	APVD/DATE
D	4201-3	3	09/25/08	CMS 12/11/08	[illegible]	SLA 12/11/08
C	4201-2	2	09/25/08	CMS 12/03/08	JJM 12/03/08	SLA 12/03/08
B	4201-1	2	09/25/08	CMS 11/25/08	JJM 11/25/08	SAS 11/25/08
A	4201	Ø	09/25/08	CMS 11/06/08	JJM 11/06/08	SLA 11/06/08
Ø	------	Ø	09/25/08	CMS 09/25/08	BDK 09/29/08	JLM 09/30/08

SCALE: NTS | SIZE: C | DWG NO: 08-50924-03 | REV: D

Exper

IPEC00269861

Attachment 4

Cost Estimate

IMPLEMENTATION ESTIMATE Indian Point Nuclear Power Station		
* ESTIMATE LEVEL *	EC #: SAMA IP2-022	
☑ Conceptual	PROJECT TITLE: ISLOCA Pathway Isolation Valve Position Indication	ESTIMATOR: RCMT
☐ Preliminary	JOB LOCATION: Containment & Control Bldgs.	PROJECT CODE: TBD
☐ Definitive	☑ Outage ☑ Non-Outage ORIGINATOR: ☑ CAPITAL ☑ O&M	ORIG. DATE: 07/23/2012
	ESTIMATE TOTAL $7,685,460	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 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: Petros Battocarvol.		Approved by: [signature]
Date: 9-20-2012		Date: 9-20-2012

IPEC00269863

ENTERGY NUCLEAR NORTHEAST
IMPLEMENTATION ESTIMATE
Indian Point Nuclear Power Station

EC #: SAMA IP2-022

ESTIMATE LEVEL *	
Conceptual ☑	PROJECT TITLE: Outage ☑ Non-Outage ISLOCA Pathway Isolation Valve Position Indication ESTIMATOR: RCMT
Preliminary	JOB LOCATION: Containment & Control Bldgs. PROJECT CODE: TBD
Definitive	ORIGINATOR: ORIG. DATE: 07/23/2012

Item	Description
1.	This estimate assumes that this work will require both non-outage and outage conditions to complete.
2.	This estimate assumes that the non-outage work work will complete 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 assumes that the non-outage work will not suffer productivity loss due to radiation or hazardous conditions..
5.	This estimate assumes that all work will be performed by trained contract craftspersons in lieu of station maintenance personnel.
6.	This estimate assumes that adequate penetrations exist for routing of wiring from the position indicating switches to the external panel location such that no new containment penetrations will be required.
7.	This estimate assumes that safe ends will be welded to the valves in the shop and that blue checkes will be performed on valve seating surfaces prior to reassembly for installation. This work will be performed during non-outage conditions.
8.	This estimate assumes that the results of the seat Blue check after welding will not require any machining of the valve seat.
9.	This estimate assumes that (4) Fitter / Welders will be assigned for non-outage work and (2) of those will be assigned to 2nd shift for theOutage and (4) additional personnel will be assigned for the Outage, (2) for each shift.
10.	This estimate assumes that the Outage work will involve radiological conditions requiring additional briefing times, dressout times and reduced production due to dressout requirements.
11.	This estimate assumes NDE requirements include Visual, LP, UT and RT.
12.	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).
13.	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.
14.	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 fence boundary - 30%
	C. Implementation complexity - 40%
	D. Inside Containment - 50%

INDIAN POINT IMPLEMENTATION ESTIMATE WORK SHEET

EC #: SAMA IP2-022

Rev. 11-0

way Isolation Valve Position Indication
ntainment & Control Bldgs. ☑ CAPITAL ☐ O&M
STATUS: ☐ OUTAGE ☑ NON-OUTAGE

PROJECT CODE: TBD
ORIGINATOR:

TAKEOFF:
ESTIMATOR: RCMT
ORIG. DATE: 07/23/2012

* ESTIMATE LEVEL *

☑ Conceptual
☐ Preliminary
☐ Definitive

General Notes:

ESTIMATE SUMMARY

		MANHOURS	DOLLARS
EOI ENGINEERING			
01	STUDY, DESIGN, & CLOSEOUT	400	$ 40,000
02	DESIGN ENGR CONST SUPPORT	160	$ 16,000
03	MODS ENGINEERING EOI SUPPORT	-	$ -
04	SYS ENGR/ S-U ENGR	240	$ 24,000
05	PROJECT MANAGEMENT	600	$ 72,000
06	WORK MANAGEMENT	-	$ -
07	ENGINEERING DCP ACCEPTANCE REVIEW	100	$ 10,000
CONTRACT ENGINEERING			
08	DESIGN ENGR CONTRACT SUPPORT	1,900	$ 228,000
09	SUPL CONTRACT MODS ENGR	-	$ -
10	MODS PLAN & SCHED -CONTRACT	280	$ 28,000
11	FIELD ENGRS / PLANNERS	240	$ 28,800
MATERIALS / MISC CONTRACTS			
12	MATERIALS		$ 1,754,331
13	OTHER CONTRACTS		$ 105,000
CONTRACT CRAFT LABOR			
14	SWEC CRAFT LABOR/WALKDOWN	5,417	$ 577,322
15	LOST TIME	542	$ 72,818
16	SWEC DISTRIBS		$ 156,991
PLANT CRAFT LABOR			
17	MECH MAINT.	-	$ -
18	ELECT MAINT	54	$ 5,400
19	I&C	136	$ 13,600
20	CSG	-	$ -
MISC EOI SUPPORT			
21	QUALITY CONTROL	240	$ 24,000
22	TRAINING	48	$ 5,760
23	CHEMISTRY	-	$ -
24	OPS / OPS SUPPORT	120	$ 14,400
25	HP / RP	120	$ 9,547
MISC CONTRACT SUPPORT			
26	QUALITY CONTROL	260	$ 20,800
27	NDE	-	$ -
28	HP / RP	-	$ -
29	RADWASTE	-	$ 50,000
30	NURSE	-	$ -
31	ELEVATOR CONTRACTOR	-	$ -
32	WASTE MANAGEMENT	-	$ -
33	HOUSEKEEPING	-	$ -
34	EQUIPMENT RENTAL CONTRACTOR	-	$ 10,000
35	VENDOR STOCKING	-	$ -
36	DECONTAMINATION CONTACTOR	-	$ 10,000
37	RBC'S	-	$ -
38	SECURITY - Wackenhut	-	$ -
39	FIRE WATCH (Rover)	-	$ -
40	SAFETY	112	$ 7,616
CONTINGENCY			
41	CONTINGENCY		$ 1,642,192
ESTIMATE SUBTOTAL		**10,969**	**$ 4,926,577**
	SITE ENCUMBRANCE PREMIUM (20%)		**$ 985,315**
	LOADERS (30%)		**$ 1,773,568**
	ESTIMATE TOTAL		**$ 7,685,460**

NON OUTAGE WORK

ITEM	DESCRIPTION	QTY	UOM	MANHOURS CFT	NO.	UNIT	FCTR	TOTAL	$/MH	MATERIAL $ PER UNIT	MATERIAL DOLLARS	LABOR DOLLARS	SUB-CONTRACT	TOTAL $
1.	Gather and stage tools and materials	1	LT	EL	4	10.00	1.00	40	$ 123.32		$ -	$ 4,933		$ 4,933
2.	Gather and stage tools and materials	1	LT	PF	4	10.00	1.00	40	$ 120.71			$ 4,828		
3.	Mount Hoffman wall mounted panel and enclosure and run conduit to selected external penetration.	1	EA	EL	4	30.00	1.00	120	$ 123.32		$ -	$ 14,798		$ 14,798
4.	Pull wire from containment external penetration box to new panel and terminate in new panel.	1	LT	EL	4	24.00	1.00	96	$ 123.32		$ -	$ 11,839		$ 11,839
5.	Cut and prep (20) 2" sch. 160 Pup pieces	1	LT	PF	4	10.00	1.00	40	$ 120.71		$ -	$ 4,828		$ 4,828
6.	Cut and prep (8) 6" sch. 160 Pup pieces	1	LT	PF	4	16.00	1.00	64	$ 120.71		$ -	$ 7,725		$ 7,725
7.	Cut and prep (18) 10" sch. 160 Pup pieces	1	LT	PF	4	44.00	1.00	176	$ 120.71		$ -	$ 21,245		$ 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.	Fit and weld (20) 2" Pup pieces to valves	1	LT	PF	4	16.00	1.00	64	$ 120.71		$ -	$ 7,725		$ 7,725
12.	Fit and weld (8) 6" Pup pieces to valves	1	LT	PF	4	12.00	1.00	48	$ 120.71		$ -	$ 5,794		$ 5,794
13.	Fit and weld (18) 10" Pup pieces to valves	1	LT	PF	4	54.00	1.00	216	$ 120.71		$ -	$ 26,073		$ 26,073
14.	Re-assemble valve internals and perform a seat blue check on (10) 2" valves.	1	LT	PF	4	5.00	1.00	20	$ 120.71		$ -	$ 2,414		$ 2,414
15.	Re-assemble valve internals and perform a seat Blue check on (4) 6" valves.	1	LT	PF	4	3.00	1.00	12	$ 120.71		$ -	$ 1,449		$ 1,449
16.	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

INDIAN POINT IMPLEMENTATION ESTIMATE WORK SHEET

Rev. 11-0 ☑ CAPI ☑ O&M ☑ BUN ☑ NON

EC #: SAMA IP2-022

way Isolation Valve Position Indication
ntainment & Control Bldgs.
STATUS:

PROJECT CODE: TBD
ORIGINATOR:

TAKEOFF:
ESTIMATOR: RCMT
ORIG. DATE: 07/23/2012

☑ M	DESCRIPTION	QTY	UOM	CFT	NO.	MANHOURS UNIT	FCTR	TOTAL	$/MH	MATERIAL $ PER UNIT	MATERIAL DOLLARS	LABOR DOLLARS	SUB-CONTRACT	TOTAL $
							OUTAGE WORK							
1.	Gather and stage tools and materials, walkdown	1	LT	PF	8	10.00	1.70	136	$ 120.71			$ 16,417		$ 16,417
2.	Gather and stage tools and materials, walkdown	1	LT	EL	8	10.00	1.70	136	$ 123.32			$ 16,772		$ 16,772
3.	Remove existing valves and prep ((10) 2" valves)	10	EA	PF	1	3.00	1.70	51	$ 120.71			$ 6,156		$ 6,156
3.	Fit and weld (10) 2" valves	10	EA	PF	1	7.00	1.70	119	$ 120.71			$ 14,364		$ 14,364
4.	Remove existing valves and prep ((4) 6" valves)	4	EA	PF	1	18.00	1.70	122	$ 120.71			$ 14,727		$ 14,727
5.	Fit and weld (4) 6" valves	4	EA	PF	1	15.00	1.70	102	$ 120.71			$ 12,312		$ 12,312
6.	Remove existing valves and prep ((8) 10" valves)	8	EA	PF	1	10.00	1.70	136	$ 120.71			$ 16,417		$ 16,417
7.	Fit and weld (8) 10" valves	8	EA	PF	1	20.00	1.70	272	$ 120.71			$ 32,833		$ 32,833
8.	NDE Profile (20) 2" welds	20	EA	PF	1	2.00	1.70	68	$ 120.71			$ 8,208		$ 8,208
9.	NDE Profile (8) 6" welds	8	EA	PF	1	4.00	1.70	54	$ 120.71			$ 6,518		$ 6,518
10.	NDE Profile (16) 10" welds	16	EA	PF	1	6.00	1.70	163	$ 120.71			$ 19,676		$ 19,676
11.	Route & Support Conduit from each valve in containment.	800	LF	EL	1	0.18	1.70	245	$ 123.32		$ -	$ 30,213		$ 30,213
12.	Mount Hoffman wall mounted panel and enclosure and run conduit to selected in containment	2	LT	EL	1	30.00	1.70	102	$ 123.32		$ -	$ 12,579		$ 12,579
13.	Route & Support Conduit from each junction box to containment Penetration.	400	LT	EL	1	0.20	1.70	136	$ 123.32		$ -	$ 16,772		$ 16,772
14.	Connect power cable to containment penetrations on both sides of containment penetration box.	1	LT	EL	4	60.00	1.70	408	$ 123.32		$ -	$ 50,315		$ 50,315
15.	Provide testing as required	1	LT	PL	2	60.00	1.70	204	$ 60.00		$ -	$ 12,240		$ 12,240
16.	Assist with testing as required	1	LT	EL	2	30.00	1.70	102	$ 123.32		$ -	$ 12,579		$ 12,579
17.	Dismantle scaffolding to storage	1	LT	CP	2	24.00	1.70	82	$ 96.00		$ -	$ 7,872		$ 7,872
18.	Dismantle scaffolding to storage	1	LT	LB	1	24.00	1.70	41	$ 78.15		$ -	$ 3,204		$ 3,204
19.	Cleanup and restore area	1	LT	EL	4	10.00	1.70	68	$ 123.32		$ -	$ 8,386		$ 8,386
20	Cleanup and restore area	1	LT	PF	4	10.00	1.70	68	$ 120.71		$ -	$ 8,208		$ 8,208
												$ -		
	PAINTING & TOUCH-UP REQUIREMENTS											$ -		
1.	PAINTING & TOUCH-UP			PT				-			$ -	$ -		$ -
2.	PAINTING & TOUCH-UP			PT				-			$ -	$ -		$ -
												$ -		
												$ -		
	FIRE WATCH / BOTTLEWATCH REQUIREMENTS											$ -		
1.	CRAFT SUPPORT FOR FIRE WATCH	2	LT	FW	1	300.00	1.70	1,020	$ 53.60		$ -	$ 54,672		$ 54,672
2.	CRAFT SUPPORT FOR BOTTLE WATCH	1	LT	FW				-			$ -	$ -		$ -
												$ -		
	MISC SUB-CONTRACT											$ -		
1.	MISC SUB-CONTRACT NDE Contractor	1	LT	NM								$ -	$ 70,000	$ 70,000
2.	MISC SUB-CONTRACT MOV Contractor	1	LT	NM								$ -	$ 35,000	$ 35,000
												$ -		
	SUBTOTAL CRAFT & SUB-CONTRACTOR							4,687			$ -	$ 484,534	$ 105,000	$ 589,534
1	CONSTRUCTION SUPPORT (8% OF LABOR $)	1	LT					375	$ 103.38	$ -		$ 38,768		$ 38,768
	SUBTOTAL							5,062			$ -	$ 523,302	$ 105,000	$ 628,302
	*** RELATED COSTS ***													
1.	WALKDOWN ALLOWANCE	1	LT	EL				42	$ 123.32			$ 5,179		$ 5,179
2.	WALKDOWN ALLOWANCE	1	LT	PF				38	$ 120.71			$ 4,587		$ 4,587
3.	WORK PACKAGE REVIEW	1	LT	EL				50	$ 123.32			$ 6,166		$ 6,166
4.	WORK PACKAGE REVIEW	1	LT	PF				48	$ 120.71			$ 5,794		$ 5,794
5.	TOOL ROOM ATTENDANTS (~3.5%)	1	LT	EL				177	$ 123.32			$ 21,828		$ 21,828
6.	GENERAL CRAFT OUTAGE DISTRIBS. (10%)											$ 52,330		$ 52,330
7.	CRAFT IN PROCESSING (20%)											$ 104,660		$ 104,660
8.	HUMAN PERFORMANCE & ALARA TRAINING	1	LT									$ 10,466		$ 10,466
9.	(1/2 day training, or ~ 2%)													
	SUBTOTAL							5,417			$ -	$ 734,313	$ 105,000	$ 839,313
	PLANT SCOPE													
1.	**MECH MAINTENANCE**			PL				-			$ -	$ -		$ -
				PL				-			$ -	$ -		$ -
	SUBTOTAL MECH MAINT.							-			$ -	$ -	$ -	$ -
1.	**ELECT MAINTENANCE**	1	LT	PL	2	16.00	1.70	54	100.00		$ -	$ 5,400		$ 5,400
								-			$ -	$ -		$ -
	SUBTOTAL ELECT. MAINT.							54			$ -	$ 5,400	$ -	$ 5,400
1.	**I&C**	1	LT	PL	2	40.00	1.70	136	$ 100.00		$ -	$ 13,600		$ 13,600
								-			$ -	$ -		$ -
	SUBTOTAL I&C MAINT.							136			$ -	$ 13,600	$ -	$ 13,600
1.	**CSG**	1						-			$ -	$ -		$ -
								-			$ -	$ -		$ -
	SUBTOTAL CSG MAINT.							-			$ -	$ -	$ -	$ -
	SUBTOTAL PLANT							190			$ -	$ 19,000	$ -	$ 19,000
	SUBTOTAL CRAFT/PLANT							5,607			$ -	$ 753,313	$ 105,000	$ 858,313

Rev. 11-0

INDIAN POINT IMPLEMENTATION ESTIMATE WORK SHEET

☑ CAPI ☑ D&M

EC #: SAMA IP2-022

☑ BOTH ☑ NON

way Isolation Valve Position Indication
ntainment & Control Bldgs.
STATUS:

PROJECT CODE: TBD
ORIGINATOR:

TAKEOFF:
ESTIMATOR: RCMT
ORIG. DATE: 07/23/2012

ITEM	DESCRIPTION	QTY	UOM	CFT	NO.	MANHOURS UNIT	MANHOURS FCTR	MANHOURS TOTAL	$/MH	MATERIAL $ PER UNIT	MATERIAL DOLLARS	LABOR DOLLARS	SUB-CONTRACT	TOTAL $
	IMPLEMENTATION SUPPORT													
	EOI													
1.	WELDING ENGINEERING	1	LT	NM	1							$ -		$ -
2.	DESIGN ENGINEERING SUPT DURING CONST	1	LT	NM	1	160.00	1	160	$ 100			$ 16,000		$ 16,000
3.	SYSTEMS ENGINEERING - MECHANICAL	1	LT	NM	1	80.00	1	80	$ 100			$ 8,000		$ 8,000
4.	SYSTEMS ENGINEERING - ELECTRICAL	1	LT	NM	1	80.00	1	80	$ 100			$ 8,000		$ 8,000
5.	SYSTEMS EINGINEERING - INSTR & CONTROL	1	LT	NM	1	40.00	1	40	$ 100			$ 4,000		$ 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.	CHEMISTRY	1	LT	NM								$ -		$ -
11.	HP / RP/ ALARA	1	LT	NM	1	120.00	1	120	$ 80			$ 9,547		$ 9,547
12.	WORK MANAGEMENT	1	LT	NM	1							$ -		$ -
13.	OPS / OPS PROCEDURE SUPPORT AND DEVEL	1	LT	NM	1	120.00	1	120	$ 120			$ 14,400		$ 14,400
14.	TRAVEL & LIVING EXPENSES	1	LT									$ -		$ -
	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			$ 28,000		$ 28,000
3.	FIELD ENGRS/PLAN- SWEC	1	LT	NM	1	240.00	1	240	$ 120			$ 28,800		$ 28,800
4.	QA / QC VERIFICATION	1	LT	NM	1	260.00	1	260	$ 80			$ 20,800		$ 20,800
5.	NDE	1	LT	NM				0				$ -		$ -
6.	HP / RP	1	LT	NM				0				$ -		$ -
7.	RADWASTE	1	LT	NM				0					$ 50,000	
8.	NURSE	1	LT	NM				0						
9.	ELEVATOR CONTRACTOR	1	LT	NM				0						
10.	WASTE MANAGEMENT	1	LT	NM				0						
11.	HOUSEKEEPING	1	LT	NM				0						
12.	EQUIPMENT RENTAL CONTRACTOR	1	LT	NM				0					$ 10,000	
13.	VENDOR STOCKING	1	LT	NM				0						
14.	DECONTAMINATION CONTRACTOR	1	LT	NM				0					$ 10,000	
15.	RBC's	1	LT	NM				0						
16.	SECURITY	1	LT	SEC				0						
17.	FIREWATCH (Rover)	1	LT	NM				0						$ -
18.	SAFETY (2%)	1	LT	NM				112	$ 68.00			$ 7,616		$ 7,616
9.	LOST TIME (10%)	1	LT					542	$ 134.35			$ 72,818		$ 72,818
	SUBTOTAL CRAFT/NON-MANUAL							8569			$ -	$ 1,077,054	$ 175,000	$ 1,252,054
1.	FREIGHT, SALES TAX, & CONSUMABLES (6%)										$ 17,508			$ 17,508
2.	Cable, Conduit, Switches, Boxes and Panel	1	LT							$ 30,000	$ 30,000			
3.	2", 6" & 10" A376, TP316, sch. 160 Pipe	1	LT							$ 36,800	$ 36,800			
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							8569			$ 1,754,331	$ 1,077,054	$ 175,000	$ 3,006,385
1.	DESIGN ENGINEERING - MECHANICAL	1	LT	NM	1	80.00	1	80	$ 100			$ 8,000		$ 8,000
2.	DESIGN ENGINEERING - ELECTRICAL	1	LT	NM	1	80.00	1	80	$ 100			$ 8,000		$ 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	1	1900.00	1	1900	$ 120				$ 228,000	$ 228,000
6	ENGINEERING DCP ACCEPTANCE REVIEW	1	LT	NM	1	100.00	1	100	$ 100			$ 10,000		$ 10,000
	SUBTOTAL DESIGN COST							2400				$ 50,000	$ 228,000	$ 278,000
	SUBTOTAL INSTALLATION & DESIGN COST											$ 1,127,054	$ 403,000	$ 3,284,385
1.	CONTINGENCY (50%)													$ 1,642,192
	ESTIMATE SUBTOTAL							10969						$ 4,926,577

IPEC00269867

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: Peter Bottacaro	Approved by: [signature]
Date: 9-20-2012	Date: 9-20-2012

TABLE OF CONTENTS

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 #21	1,500 amp/hours
Battery Bank #22	1,800 amp/hours
Battery Bank #23	495 amp/hours
Battery Bank #24	495 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 yard 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

Item Description	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

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.: SAMA IP2-028 **Rev. No.:** CONCEPTUAL 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	☐ 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	☐ 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

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	☒ NO
Cable and Raceway Program • Does the proposed activity involve any changes to cable trays, raceways or the associated documentation?	■ YES	☐ 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) *(if applicable)* • 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 • 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?	■ 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?	☐ 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

ATTACHMENT 9.3 IMPACT SCREENING SUMMARY

SHEET 3 OF 6

PROCESS OR PROGRAM IMPACT SCREENING CHECKLIST	Potential Impact	
Computer Support and Software • Does the proposed activity impact or involve changes to plant computer software or firmware or impact Software Quality Assurance (SQA)?	☐ YES	☒ NO
Chemistry and Environmental Impact • Does the proposed activity impact or involve any changes to plant chemistry requirements, operations or procedures, or any changes to the environment?	☐ YES	☒ NO
Radiation Protection (RP) Program Impact • 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?	■ 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	☐ 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 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

ATTACHMENT 9.3 IMPACT SCREENING SUMMARY

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	☒ 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?	☐ 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?	☐ 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

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	☐ 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	☒ 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	☐ 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?	☐ 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

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?	■ YES	☐ 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	☐ NO
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: 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

RCM Technologies The Source of Smart Solutions	ENTERGY Indian Point Nuclear Station Unit 2	Conceptual Design Package SAMA IP2–028	Rev. 0

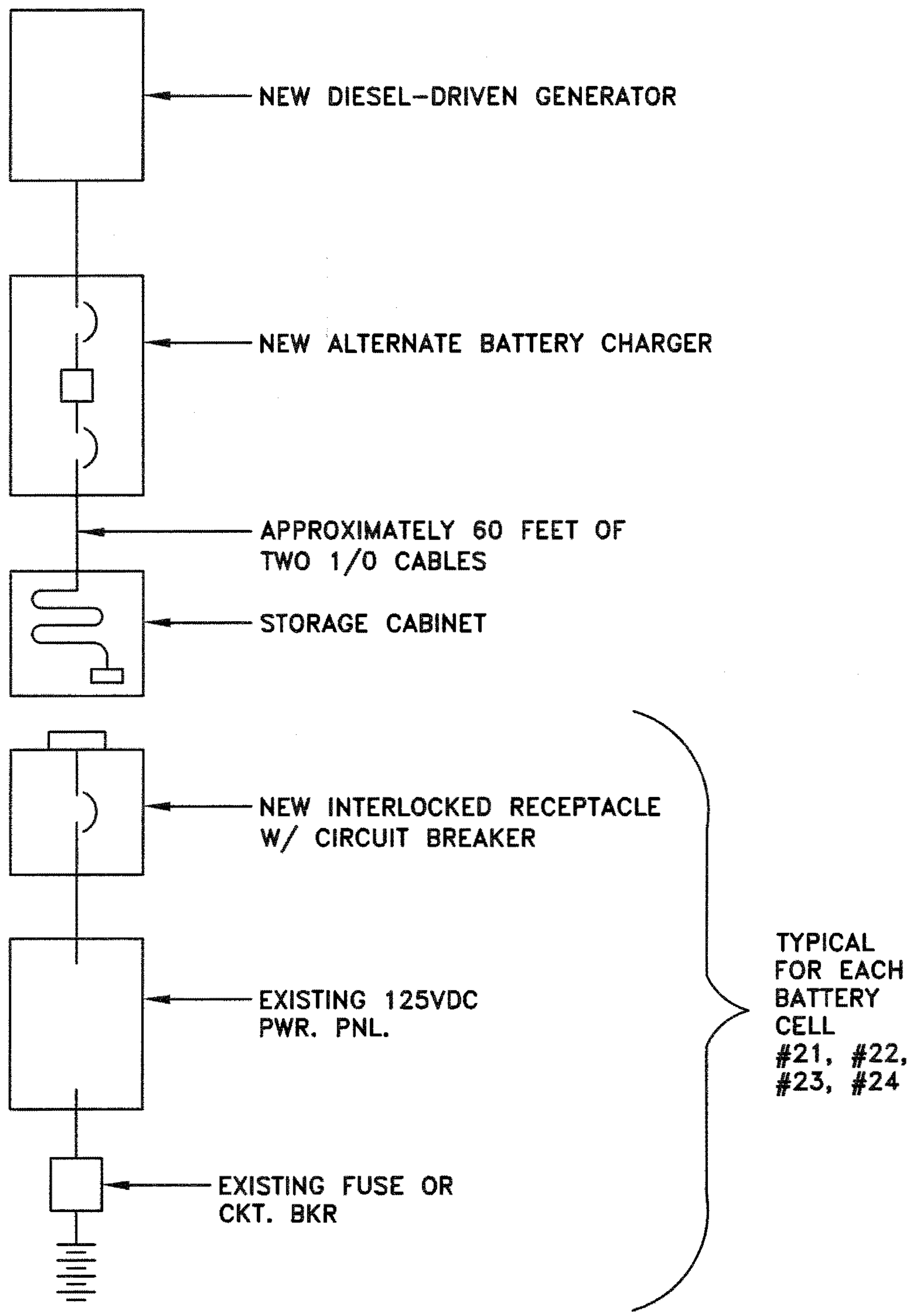


FIGURE 1
TYPICAL SCHEMATIC FOR NEW
DIESEL–GENERATOR AND NEW ALTERNATE BATTERY CHARGER

RCM Technologies The Source of Smart Solutions	ENTERGY Indian Point Nuclear Station Unit 2	Conceptual Design Package SAMA IP2-028	Rev. 0

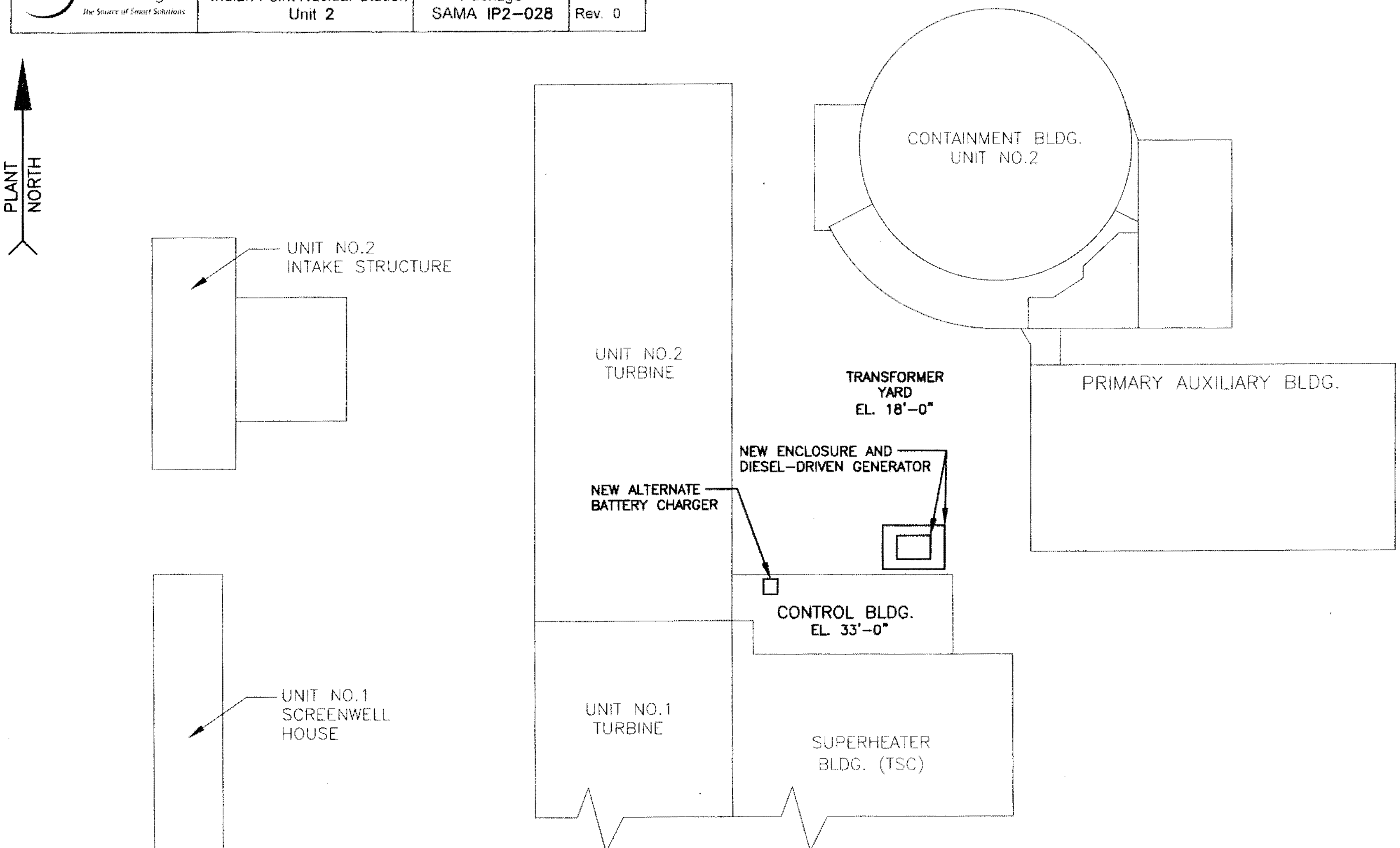


FIGURE 2
PARTIAL SITE PLAN OF AREAS AFFECTED
(NOT TO SCALE)

INSTALL
DIESEL-DRIVEN GENERATOR
IN WEATHERPROOF ENCLOSURE

FIGURE 3
TRANSFORMER YARD AREA
CONTROL BUILDING-NORTH WALL

RCM Technologies The Source of Smart Solutions	ENTERGY Indian Point Nuclear Station Unit 2	Conceptual Design Package SAMA IP2-028	Rev. 0

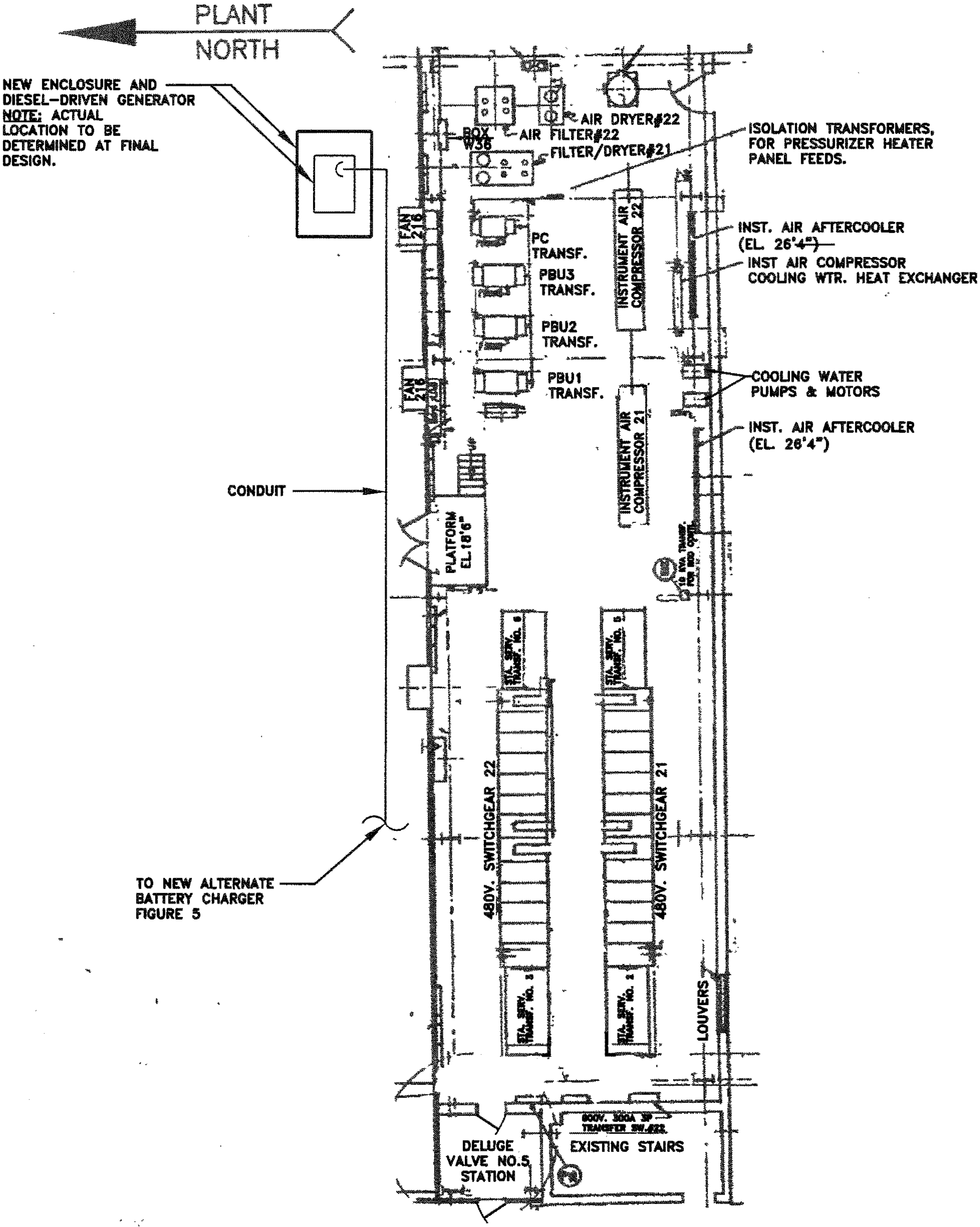


FIGURE 4
EQUIPMENT ARRANGEMENT CONTROL BUILDING AT EL. 15'-0"
ENCLOSURE AND DIESEL-DRIVEN GENERATOR LOCATION
(REFERENCE DWG. 9321-F-3052)
(NOT TO SCALE)

RCM Technologies	ENTERGY Indian Point Nuclear Station Unit 2	Conceptual Design Package SAMA IP2-028	Rev. 0

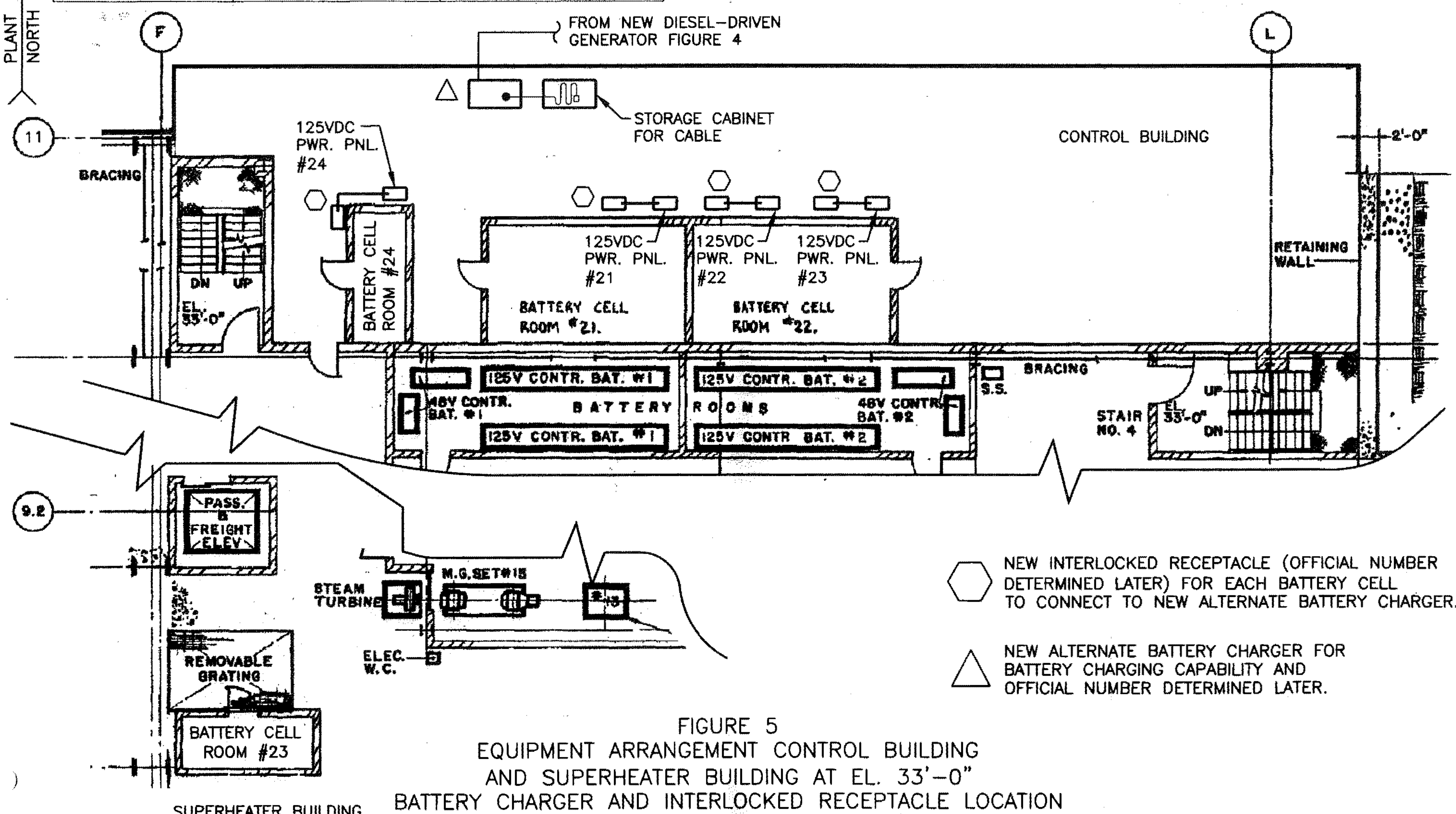


FIGURE 5
EQUIPMENT ARRANGEMENT CONTROL BUILDING
AND SUPERHEATER BUILDING AT EL. 33'-0"
BATTERY CHARGER AND INTERLOCKED RECEPTACLE LOCATION
(REFERENCE DWG. 138001)
(NOT TO SCALE)

Attachment 3

References

1. ENTERGY Nuclear Management Manual, Engineering Change Process, Rev 11

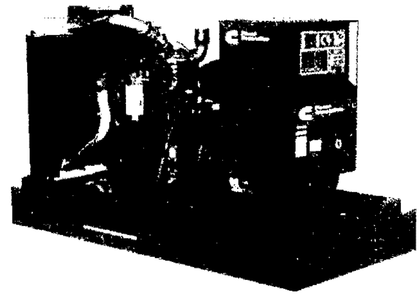
2. Association for the Advancement of Cost Engineering (AACE), Cost Estimate Classification System - As Applied In Engineering, Procurement, and Construction for the Process Industries
   - TCM Framework: 7.3 - Cost Estimating and Budgeting
     - Figure 4 - Estimate Checklist & Maturity Matrix

3. 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



> Specification sheet
35 kW - 80 kW 60 Hz

Our energy working for you.™

Power Generation

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 rating		Continuous 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	

S-1559c (3/08)

Generator set specifications

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	

Engine specifications

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

Alternator specifications

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

Available voltages

60 Hz Three phase line-neutral/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.

Generator set options and accessories

Engine
- ☐ 120 V, 150 W lube oil heater
- ☐ 120/240 V, 1000 W coolant heater

Fuel System
- ☐ 24 hour dual wall sub-base tank
- ☐ 12 hour dual wall sub-base tank

Alternator
- ☐ 105 °C rise alternator
- ☐ 125 °C rise alternator
- ☐ 120 V, 100 W anti-condensation heater
- ☐ PMG excitation
- ☐ Single phase

Exhaust 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
- ☐ 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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S-1559c (3/08)

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.

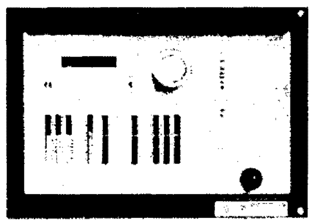
Panel lamps and switch - Operator panel can be illuminated by a series of high-intensity LED lamps controlled by a membrane switch on the panel. Panel lamps include a time delay to automatically switch off after a preset time period.

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.
□ 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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S-1559c (3/08)

IPEC00269890

Standby:

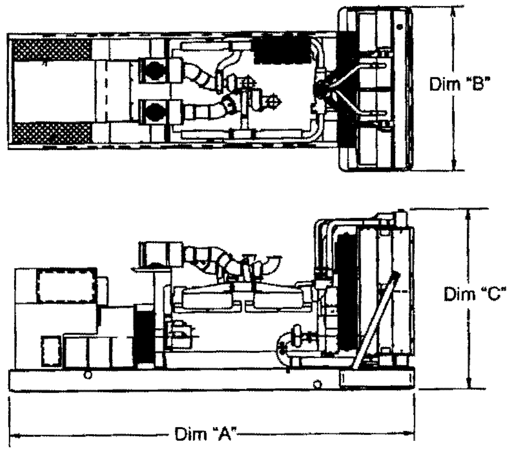
Applicable for supplying emergency power for the duration of normal power interruption. No sustained overload capability is available for this rating (equivalent to fuel stop power in accordance with ISO3046, AS2789, DIN6271 and BS5514). Nominally rated.

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 73rd 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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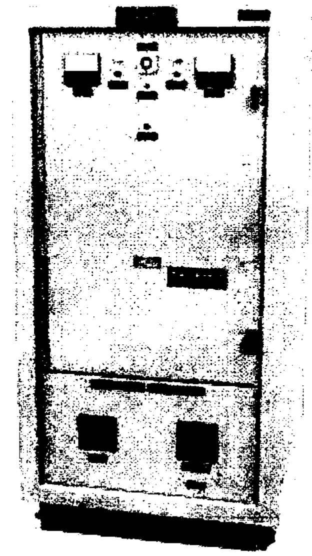
S-1559c (3/08)

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

SOLIDSTATE CONTROLS, INC.

CERTIFIED ISO 9001

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A member of The Marmon Group of Companies

General Specifications

Cabinet
NEMA-1 (IP-20), Seismic Grade

Cable Entry/Termination
Top (rear) Standard
Optional Bottom (front), side and custom entry/termination locations available.....consult the Factory

Environmental

Ambient Temp.:	0°C to 40°C (50°C optional)
Relative Humidity:	0-95% non-condensing
Operating Altitude:	0 to 2500 meters (0-8300 ft.)
Audible Noise:	<60 dB(A) at 1 meter

AC Input

Voltages:	208, 220, 380, 415, 480 & 600 VAC/3-phase, 3 wire *custom voltages available
Range:	+10, -10% for 1% output regulation
Range: Optional	+10, -15% additional ranges available
Frequency:	50 or 60 Hz ±5%

DC Output

Float Voltage:	135, 270 ±5% adjustment
Equalize Voltage:	140, 280 ±5% adjustment *custom output voltages available
Regulation (Float):	±1.0%
Regulation (Equalize):	±1.0%
Ripple:	<2% RMS with battery connected per NEMA PE-5 *optional & custom ripple filters available
Current Limit:	Factory set at 125%, adjustable from 50-135%

Controls
Float/Equalize Push buttons 0-100 Hr Equalize Timer, manual start, auto reset. Independent float and equalize potentiometers on front panel

Standard Features

Circuit Breakers
AC Input: 3 pole molded case (Rated 14 KAIC)
DC Output: 2 pole molded case (Rated 10 KAIC)
(High KAIC ratings optional-*Consult the Factory)

Meters (2% Panel type)
DC Output Voltmeter
DC Output Ammeter
Custom meter locations and meter types available including 1% switchboard and digital. *Consult the Factory

Indicators and Alarms
Standard "LED" Indicators
Isolated Form "C" Contacts

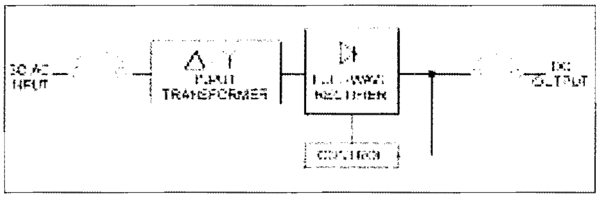
Custom Capabilities
Modular packaging for limited installation access
Multiple alarm capabilities
Fail safe alarms
Custom metering
Transducers
Mimic panels
Louvered recessed breakers
Annunicators

Additional sizes up to 1200 AMPS available-Consult Factory

							Weight (est)			
	Output	AC/DC	Cabinet Style		Heat Loss (Watts)		130 VDC		260 VDC	
Model	Amps	%Eff	130VDC	260VDC	130VDC	260VDC	Lbs.	Kg.	Lbs.	Kg.
85-CC0500-XX	50	91	D	D	642	1200	615	278	740	336
85-CC0750-XX	75	91	D	D	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	A	G	1830	3650	1255	569	1955	887
85-CC3000-XX	300	94	A	G	2350	4580	1535	696	2680	1216
85-CC4000-XX	400	94	G	H	3100	6250	1720	780	2960	1343
85-CC5000-XX	500	94	H	H	3900	7800	1950	885	3535	1603
85-CC6000-XX	600	94	H	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.



Battery Charger Block Diagram

Standard Cabinet Dimensions*

Cabinet Style	Inches (mm) H x W x D	Cabinet Style	Inches(mm) H x W x D
D	57 x 29 x 28 (1448 x 737 x 711)	G	85 x 29 x 36 (2159 x 737 x 914)
A	78 x 29 x 36 (1981 x 737 x 914)	H	85 x 56 x 36 (2159 x 1422 x 914)
GH	85 x 85 x 36 (2159 x 2159 x 914)		

Specifications subject to change without notice

11/2001

IPEC00269893

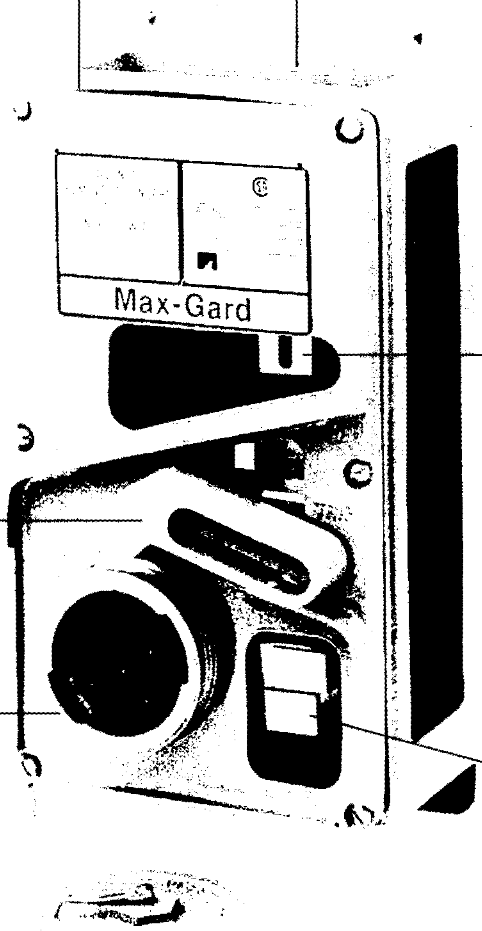
Russellstoll®

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

Cast Aluminum Circuit Breaker Interlocked Receptacle (Cutaway View)



Thick wall cast copper-free aluminum housing with epoxy powder coat finish.

Standard conduit openings through top or side. (cutaway shown) (Optional sizes & locations)

NEMA 4X interlocks available in 30-400 amp ranges through 4P5W, with 2 optional pilot/control contacts.

Standard, high A/C or NA/breaker switch. (cutaway shown)

Options include:
- Shunt Trip
- Auxiliary Switch
- Trip Ratings

Heavy on/off handle adds mechanical to electrical interlock function.

(External Lockout Option kit available)

Gated, rotating dead-front receptacle.

Watertight = Screw cap cover
Splashproof = Flap cover

Heavy duty sliding bar interlock mechanism. (Mates with plug padlock-out access hole)

Protective screw cap (flap cap also available).

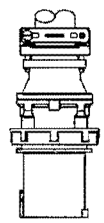
Russellstoll®

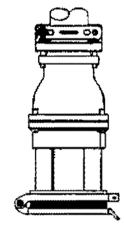
MaxGard® Interconnection Systems

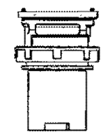
30-400/600 Amp Plugs, Connectors, Receptacles, Inlets and Interlocked Receptacles

All available voltage polarizations on pg. H20.

Maximum 600 VAC 250 VDC, Load Breaking


Male Plug†•


Female Connector•


Male Inlet†

Standard Ratings Poles Wires	Voltage	Male Plug Cat. No. ▼	Std. Bushing I.D.**	Female Connector Cat. No. ♦ ▼	Std. Bushing I.D.**	Male Inlet Cat. No. * ▼
30 Amp / 45*						
2P3W	125	DS3**107**MP000	7/8"	DF3**107**FP000	7/8"	DS3**107**MR000
2P3W	250	DS3**207**MP000	7/8"	DF3**207**FP000	7/8"	DS3**207**MR000
3P4W	125/250	DS3**307**MP000	1"	DF3**307**FP000	1"	DS3**307**MR000
3P4W	3Ø 480	DS3**404**MP000	1"	DF3**404**FP000	1"	DS3**404**MR000
4P5W	3ØY 277/480	DS3**504**MP000	1 3/16"	DF3**504**FP000	1 3/16"	DS3**504**MR000
60 Amp / 90*						
2P3W	250	DS6**207**MP000	1 3/16"	DF6**207**FP000	1 3/16"	DS6**207**MR000
3P4W	125/250	DS6**307**MP000	1 5/16"	DF6**307**FP000	1 5/16"	DS6**307**MR000
3P4W	3Ø 480	DS6**404**MP000	1 5/16"	DF6**404**FP000	1 5/16"	DS6**404**MR000
4P5W	3ØY 277/480	DS6**504**MP000	1 1/2"	DF6**504**FP000	1 1/2"	DS6**504**MR000
100 Amp / 150*						
2P3W	250	DS1**207**MP000	1 11/16"	DF1**207**FP000	1 11/16"	DS1**207**MR000
3P4W	125/250	DS1**307**MP000	1 13/16"	DF1**307**FP000	1 13/16"	DS1**307**MR000
3P4W	3Ø 480	DS1**404**MP000	1 13/16"	DF1**404**FP000	1 13/16"	DS1**404**MR000
4P5W	3ØY 277/480	DS1**504**MP000	2"	DF1**504**FP000	2"	DS1**504**MR000
200 Amp / 300*						
3P4W	277/480	DS2**304**MP000	2 1/4"	DF2**304**FP000	2 1/4"	DS2**304**MR000
3P4W	3Ø 480	DS2**404**MP000	2 1/4"	DF2**404**FP000	2 1/4"	DS2**404**MR000
4P5W	3ØY 277/480	DS2**504**MP000	2 1/2"	DF2**504**FP000	2 1/2"	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	3 1/4"	DF4**504**FP000	3 1/4"	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.

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.**

Attachment 4

Cost Estimate

ENTERGY NUCLEAR NORTHEAST IMPLEMENTATION ESTIMATE Indian Point Nuclear Power Station		
* ESTIMATE LEVEL *	EC #: SAMA IP2-028	
☑ Conceptual	PROJECT TITLE:Dies-Driv Gen Backup Sta Batt Charg	ESTIMATOR: RCMT
☐ Preliminary	JOB LOCATION: Transformer Yard & Control Bldgs. PROJECT CODE: TBD	
☐ Definitive	☐ OUTAGE ☑ NON-OUTAGE ORIGINATOR:	ORIG. DATE: 06/22/2012
	ESTIMATE TOTAL $ 2,137,804 ☑ CAPITAL ☐ O&M	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 IP2-028 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.

Prepared by: Peter Battaurol		Approved by: [signature]
Date: 9-20-2012		Date: 9-20-2012

IPEC00269897

ENTERGY NUCLEAR NORTHEAST
IMPLEMENTATION ESTIMATE
Indian Point Nuclear Power Station

* ESTIMATE LEVEL *	EC #: SAMA IP2-028		
Conceptual	PROJECT TITLE:Dies-Driv Gen Backup Sta Batt Charg		ESTIMATOR: RCMT
Preliminary	JOB LOCATION: Transformer Yard & Control Bldgs.	PROJECT CODE: TBD	
Definitive	ORIGINATOR:		ORIG. DATE: 06/22/2012

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.	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 work will be performed by trained contract craftspersons in lieu of station maintenance personnel.
5.	This estimate assumes that core boring is required between Transformer Yard and 33' - 0" cable spreading area (Control Building).
6.	This estimate assumes that a new diesel generator will be installed in Unit 2 Transformer Yard.
7.	This estimate assumes that a new battery charger will be installed at Elevation 33' - 0" cable spreading area (Control Building).
8.	This estimate assumes 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.
10.	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).
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.	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 fence boundary - 30%
	C. Implementation complexity - 40%
	D. Inside Containment - 50%

IPEC00269898

Rev. 11-0

INDIAN POINT IMPLEMENTATION ESTIMATE WORK SHEET

EC #: SAMA IP2-028

PROJECT TITLE: Dies-Driv Gen Backup Sta Batt Charg
JOB LOCATION: Transformer Yard & Control Bldgs.
EST. STATUS:

PROJECT CODE: TBD
ORIGINATOR:

TAKEOFF:
ESTIMATOR: RCMT
ORIG. DATE: 06/22/2012

* ESTIMATE LEVEL *

- Conceptual
- Preliminary
- Definitive

General Notes:

ESTIMATE SUMMARY

		MANHOURS	*DOLLARS*
EOI ENGINEERING			
01	STUDY, DESIGN, & CLOSEOUT	460	$ 46,000
02	DESIGN ENGR CONST SUPPORT	160	$ 16,000
03	MODS ENGR EOI SUPPORT	-	$ -
04	SYS ENGR/ S-U ENGR	140	$ 14,000
05	PROJECT MANAGEMENT	500	$ 60,000
06	WORK MANAGEMENT	160	$ 16,000
07	TRAVEL & LIVING EXPENSES		$ -
08	ENGINEERING DCP ACCEPTANCE REVIEW	120	$ 12,000
CONTRACT ENGINEERING			
09	DESIGN ENGR CONTRACT SUPPORT	2,700	$ 324,000
10	SUPL CONTRACT MODS ENGR	-	$ -
11	MODS PLAN & SCHED -CONTRACT	60	$ 6,000
12	FIELD ENGRS / PLANNERS	30	$ 3,600
MATERIALS / MISC CONTRACTS			
13	MATERIALS		$ 280,982
14	OTHER CONTRACTS		$ -
CONTRACT CRAFT LABOR			
15	SWEC CRAFT LABOR/WALKDOWN	1,041	$ 118,733
16	LOST TIME	104	$ 14,748
17	SWEC DISTRIBS		$ 32,238
PLANT CRAFT LABOR			
18	MECH MAINT.	-	$ -
19	ELECT MAINT	80	$ 8,000
20	I&C	-	$ -
21	CSG	-	$ -
MISC EOI SUPPORT			
22	QUALITY CONTROL	-	$ -
23	TRAINING	48	$ 5,760
24	CHEMISTRY	-	$ -
25	OPS / OPS SUPPORT	120	$ 14,400
26	HP / RP	-	$ -
MISC CONTRACT SUPPORT			
27	QUALITY CONTROL	60	$ 4,800
28	NDE	-	$ -
29	HP / RP	-	$ -
30	RADWASTE	-	$ -
31	NURSE	-	$ -
32	ELEVATOR CONTRACTOR	-	$ -
33	WASTE MANAGEMENT	-	$ -
34	HOUSEKEEPING	-	$ -
35	EQUIPMENT RENTAL CONTRACTOR	-	$ -
36	VENDOR STOCKING	-	$ -
37	DECONTAMINATION CONTACTOR	-	$ -
38	RBC'S	-	$ -
39	SECURITY - Wackenhut	-	$ -
40	FIRE WATCH (Rover)	-	$ -
41	SAFETY	22	$ 1,587
CONTINGENCY			
42	CONTINGENCY		$ 391,539
ESTIMATE SUBTOTAL		5,805	$ 1,370,387
	SITE ENCUMRANCE PREMIUM (20%)		$ 274,077
	Loaders (30%)		$ 493,339
	ESTIMATE TOTAL		$ 2,137,804

ITEM	DESCRIPTION	QTY	UOM	CFT	NO.	MANHOURS UNIT	MANHOURS FCTR	MANHOURS TOTAL	$/MH	MATERIAL $ PER UNIT	MATERIAL DOLLARS	LABOR DOLLARS	SUB-CONTRACT	TOTAL $
1.	Gather and stage tools and materials	1	LT	EL	4	10.00	1.00	40	$ 123.32		$ -	$ 4,933		$ 4,933
2.	Install concrete pad for diesel generator	1	EA	IW	2	20.00	1.00	40	$ 137.33		$ -	$ 5,493		$ 5,493
3.	Install concrete pad for diesel generator	1	EA	CP	2	20.00	1.00	40	$ 96.00		$ -	$ 3,840		$ 3,840
4.	Install concrete pad for diesel generator	1	EA	LB	1	20.00	1.00	20	$ 78.50		$ -	$ 1,570		$ 1,570
5.	Procure and set new diesel generator	1	EA	EL	4	20.00	1.00	80	$ 123.32	$ 38,000.00	$ 38,000	$ 9,866		$ 47,866
6.	Procure and set enclosure for new diesel	1	EA	CP	2	20.00	1.00	40	$ 96.00	$ 14,000.00	$ 14,000	$ 3,840		$ 17,840
7.	Stage, erect & modify scaffolding as required	1	LT	CP	2	12.00	1.00	24	$ 96.00		$ -	$ 2,304		$ 2,304
8.	Stage, erect & modify scaffolding as required	1	LT	LB	1	12.00	1.00	12	$ 78.65		$ -	$ 944		$ 944
9.	Core drill as required to route new conduit	1	LT	EL	2	10.00	1.00	20	$ 123.32		$ -	$ 2,466		$ 2,466
10.	Procure & install new battery charger in Control	1	EA	EL	2	20.00	1.00	40	$ 123.32	$ 170,000.00	$ 170,000	$ 4,933		$ 174,933
11.	Procure & install storage cabinet and interlocked	1	EA	EL	2	20.00	1.00	40	$ 123.32	$ 42,000.00	$ 42,000	$ 4,933		$ 46,933
12.	Procure and field erect conduit supports	22	EA	EL	5	1.00	1.00	110	$ 123.32	$ 6.00	$ 132	$ 13,565		$ 13,697
13.	Procure and erect 2" conduit as required	160	LF	EL	2	0.20	1.00	72	$ 123.32	$ 1.75	$ 315	$ 8,679		$ 9,194
14.	Procure, pull & route 480VAC 4/c power cable as	120	LF	EL	2	0.03	1.00	7	$ 123.32	$ 1.50	$ 160	$ 863		$ 1,043
15.	Procure, pull & route 1/0 power cable as required	360	LF	EL	2	0.030	1.00	22	$ 123.32	$ 1.25	$ 450	$ 2,713		$ 3,163
16.	Connect 480VAC 4/c power cable to new diesel	1	LT	EL	2	20.00	1.00	40	$ 123.32		$ -	$ 4,933		$ 4,933
17.	Connect 1/0 power cables to interlocked	1	LT	EL	2	60.00	1.00	120	$ 123.32		$ -	$ 14,798		$ 14,798
18.	Connect 1/0 power cable (plug-in jumper) to	1	LT	EL	2	20.00	1.00	40	$ 123.32		$ -	$ 4,933		$ 4,933
19.	Provide testing as required	1	LT	OP	2	10.00	1.00	20	$ 100.00		$ -	$ 2,000		$ 2,000
20.	Assist with testing as required	1	LT	EL	2	20.00	1.00	40	$ 123.32		$ -	$ 4,933		$ 4,933
21.	Dismantle scaffolding to storage	1	LT	CP	2	12.00	1.00	24	$ 96.00		$ -	$ 2,304		$ 2,304
22.	Dismantle scaffolding to storage	1	LT	LB	1	12.00	1.00	12	$ 78.65		$ -	$ 944		$ 944
23.	Cleanup and restore area	1	LT	EL	4	8.00	1.00	32	$ 123.32		$ -	$ 3,946		$ 3,946

Rev. 11-0

INDIAN POINT IMPLEMENTATION ESTIMATE WORK SHEET

EC #: SAMA IP2-028

PROJECT TITLE:Dies-Driv Gen Backup Sta Batt Charg
JOB LOCATION: Transformer Yard & Control Bldgs.
EST. STATUS:

PROJECT CODE: TBD
ORIGINATOR:

TAKEOFF:
ESTIMATOR: RCMT
ORIG. DATE: 06/22/2012

ITEM	DESCRIPTION	QTY	UOM	CFT	NO.	MANHOURS UNIT	FCTR	TOTAL	$/MH	MATERIAL $ PER UNIT	MATERIAL DOLLARS	LABOR DOLLARS	SUB-CONTRACT	TOTAL $
	PAINTING & TOUCH-UP REQUIREMENTS													
1.	PAINTING & TOUCH-UP			PT				-			$ -	$ -		$ -
2.	PAINTING & TOUCH-UP			PT				-			$ -	$ -		$ -
	FIRE WATCH / BOTTLEWATCH REQUIREMENTS													
1.	CRAFT SUPPORT FOR FIRE WATCH	2	LT	FW	1	50.00	1.00	100	$ 53.60		$ -	$ 5,360		$ 5,360
2.	CRAFT SUPPORT FOR BOTTLE WATCH	1	LT	FW				-			$ -	$ -		$ -
	MISC SUB-CONTRACT													
1.	MISC SUB-CONTRACT	1	LT										$ -	$ -
	SUBTOTAL CRAFT & SUB-CONTRACTOR							895			$ 265,077	$ 99,457	$ -	$ 364,534
1.	CONSTRUCTION SUPPORT (8% OF LABOR $)	1	LT					72	$ 111.13	$ -		$ 8,001		$ 8,001
	SUBTOTAL							967			$ 265,077	$ 107,458	$ -	$ 372,535
	*** RELATED COSTS ***													
1.	WALKDOWN ALLOWANCE	1	LT	EL				10	$ 123.32			$ 1,233		$ 1,233
2.	WORK PACKAGE REVIEW	1	LT	EL				30	$ 123.32			$ 3,700		$ 3,700
3.	TOOL ROOM ATTENDANTS (~3.5%)	1	LT	EL				34	$ 123.32			$ 4,193		$ 4,193
4.	GENERAL CRAFT OUTAGE DISTRIBS. (10%)											$ 10,746		$ 10,746
5.	CRAFT IN PROCESSING (20%)											$ 21,492		$ 21,492
6.	HUMAN PERFORMANCE & ALARA TRAINING	1	LT									$ 2,149		$ 2,149
7.	(1/2 day training, or ~ 2%)													
	SUBTOTAL							1,041			$ 265,077	$ 150,971	$ -	$ 416,048
	PLANT SCOPE													
1.	**MECH MAINTENANCE**			PL				-			$ -	$ -		$ -
				PL				-			$ -	$ -		$ -
	SUBTOTAL MECH MAINT.							-			$ -	$ -	$ -	$ -
1.	**ELECT (DEV. MAINTENANCE PROCEDURES)**	1	LT	EL	1	80.00	1.00	80	$ 100.00		$ -	$ 8,000		$ 8,000
				PL				-			$ -	$ -		$ -
	SUBTOTAL ELECT. MAINT.							80			$ -	$ 8,000	$ -	$ 8,000
1.	**I&C**			PL				-			$ -	$ -		$ -
				PL				-			$ -	$ -		$ -
	SUBTOTAL I&C MAINT.							-			$ -	$ -	$ -	$ -
1.	**CSG**			PL				-			$ -	$ -		$ -
				PL				-			$ -	$ -		$ -
	SUBTOTAL CSG MAINT.							-			$ -	$ -	$ -	$ -
	SUBTOTAL PLANT							80			$ -	$ 8,000	$ -	$ 8,000
	SUBTOTAL CRAFT/PLANT							1,121			$ 265,077	$ 158,971	$ -	$ 424,048
	IMPLEMENTATION SUPPORT													
	EOI													
1.	WELDING ENGINEERING	1	LT	NM				-				$ -		$ -
2.	DESIGN ENGINEERING SUPT DURING CONST	1	LT	NM	1	160.00	1.00	160	$ 100.00			$ 16,000		$ 16,000
3.	SYSTEMS ENGINEERING - MECHANICAL	1	LT	NM				-				$ -		$ -
4.	SYSTEMS ENGINEERING - ELECTRICAL	1	LT	NM	1	80.00	1.00	60	$ 100.00			$ 8,000		$ 8,000
5.	SYSTEMS EINGINEERING - INSTR & CONTROL	1	LT	NM	1	20.00	1.00	20	$ 100.00			$ 2,000		$ 2,000
6.	SYSTEMS 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	500.00	1.00	500	$ 120.00			$ 60,000		$ 60,000
8.	TRAINING OPS STAFF	12	LT	NM	1	4.00	1.00	48	$ 120.00			$ 5,760		$ 5,760
9.	QA / QC VERIFICATION	1	LT	NM				-				$ -		$ -
10.	CHEMISTRY	1	LT	NM				-				$ -		$ -
11.	HP / RP/ ALARA	1	LT	NM	1			-				$ -		$ -
12.	WORK MANAGEMENT	1	LT	NM	1	160.00	1.00	160	$ 100.00			$ 16,000		$ 16,000
13.	OPS / OPS PROCEDURE SUPPORT AND	1	LT	NM	1	120.00	1.00	120	$ 120.00			$ 14,400		$ 14,400
14.	TRAVEL & LIVING EXPENSES	1	LT									$ -		$ -
	CONTRACTOR SUPPORT													
1.	FIS / MODS ENGINEERING - SWEC (Incl Per	1	LT	NM				-				$ -		$ -
2.	MODS PLANNING & SCH.- SWEC (Incl Per Diem)	1	LT	NM	1	60.00	1.00	60	$ 100.00			$ 6,000		$ 6,000
3.	FIELD ENGRS/PLAN- SWEC(Incl Per Diem)	1	LT	NM	1	30.00	1.00	30	$ 120.00			$ 3,600		$ 3,600
4.	QA / QC VERIFICATION	1	LT	NM	1	60.00	1.00	60	$ 80.00			$ 4,800		$ 4,800
5.	NDE	1	LT	NM				-				$ -		$ -
6.	HP / RP	1	LT	NM				-				$ -		$ -
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.	VENDOR STOCKING	1	LT	NM				-						
14.	DECONTAMINATION CONTRACTOR	1	LT	NM				-						
15.	RBC's	1	LT	NM				-						
16.	SECURITY	1	LT	SEC				-						
17.	FIREWATCH (Rover)	1	LT	NM				-						$ -
18.	SAFETY (2%)	1	LT	NM				22	$ 72.14			$ 1,587		$ 1,587
19.	LOST TIME (10%)	1	LT					104	$ 141.81			$ 14,748		$ 14,748
	SUBTOTAL CRAFT/NON-MANUAL							2,525			$ 265,077	$ 315,866	$ -	$ 580,943

Rev.
11-0

INDIAN POINT IMPLEMENTATION ESTIMATE WORK SHEET

EC #: SAMA IP2-028

PROJECT TITLE:Dies-Driv Gen Backup Sta Batt Charg
JOB LOCATION: Transformer Yard & Control Bldgs.
EST. STATUS:

PROJECT CODE: TBD
ORIGINATOR:

TAKEOFF:
ESTIMATOR: RCMT
ORIG. DATE: 06/22/2012

ITEM	DESCRIPTION	QTY	UOM	CFT	NO.	MANHOURS UNIT	FCTR	TOTAL	$/MH	MATERIAL $ PER UNIT	MATERIAL DOLLARS	LABOR DOLLARS	SUB-CONTRACT	TOTAL $
1.	FREIGHT, SALES TAX, & CONSUMABLES (6%)										$ 15,905			$ 15,905
	SUBTOTAL INSTALLATION COST							2,525			$ 280,982	$ 315,866	$ -	$ 596,848
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	340.00	1.00	340	$ 100.00			$ 34,000		$ 34,000
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	2,700.00	1.00	2,700	$ 120.00				$ 324,000	$ 324,000
6.	DESIGN ENG. DCP ACCEPTANCE REVIEW	1	LT	NM	1	120.00	1.00	120	$ 100.00			$ 12,000		$ 12,000
	SUBTOTAL DESIGN COST							3,280				$ 58,000	$ 324,000	$ 382,000
	SUBTOTAL INSTALLATION & DESIGN COST											$ 373,866	$ 324,000	$ 978,848
1.	CONTINGENCY (40%)													$ 391,539
	ESTIMATE SUBTOTAL							5,805						$ 1,370,387

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: Peter Bettacaro	Approved by:
Date: 9-20-2012	Date: 9-20-2012

IPEC00269902

TABLE OF CONTENTS

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 re-connecting 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.

6. RECOMMENDED SOLUTION

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 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 diesel-driven backup pump.

3. 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

Item 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 Lighting Mfr. Butler Building PANL-LINE or equal	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

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 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.: SAMA IP2-044 **Rev. No.:** CONCEPTUAL 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	☐ 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	☐ 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

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	☐ NO
Cable and Raceway Program • Does the proposed activity involve any changes to cable trays, raceways or the associated documentation?	■ YES	☐ 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) *(if applicable)* • 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 • 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?	☐ 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?	☐ 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

ATTACHMENT 9.3 IMPACT SCREENING SUMMARY

SHEET 3 OF 6

PROCESS OR PROGRAM IMPACT SCREENING CHECKLIST	Potential Impact	
Computer Support and Software • Does the proposed activity impact or involve changes to plant computer software or firmware or impact Software Quality Assurance (SQA)?	☐ YES	☒ NO
Chemistry and Environmental Impact • Does the proposed activity impact or involve any changes to plant chemistry requirements, operations or procedures, or any changes to the environment?	☐ YES	☒ NO
Radiation Protection (RP) Program Impact • 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?	■ 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	☐ 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 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

ATTACHMENT 9.3 **IMPACT SCREENING SUMMARY**

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	☒ 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?	☐ 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?	☐ 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

ATTACHMENT 9.3 **IMPACT SCREENING SUMMARY**

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	☐ 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	☒ 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	☐ 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?	☐ 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

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?	■ YES	☐ 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	☐ NO
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

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

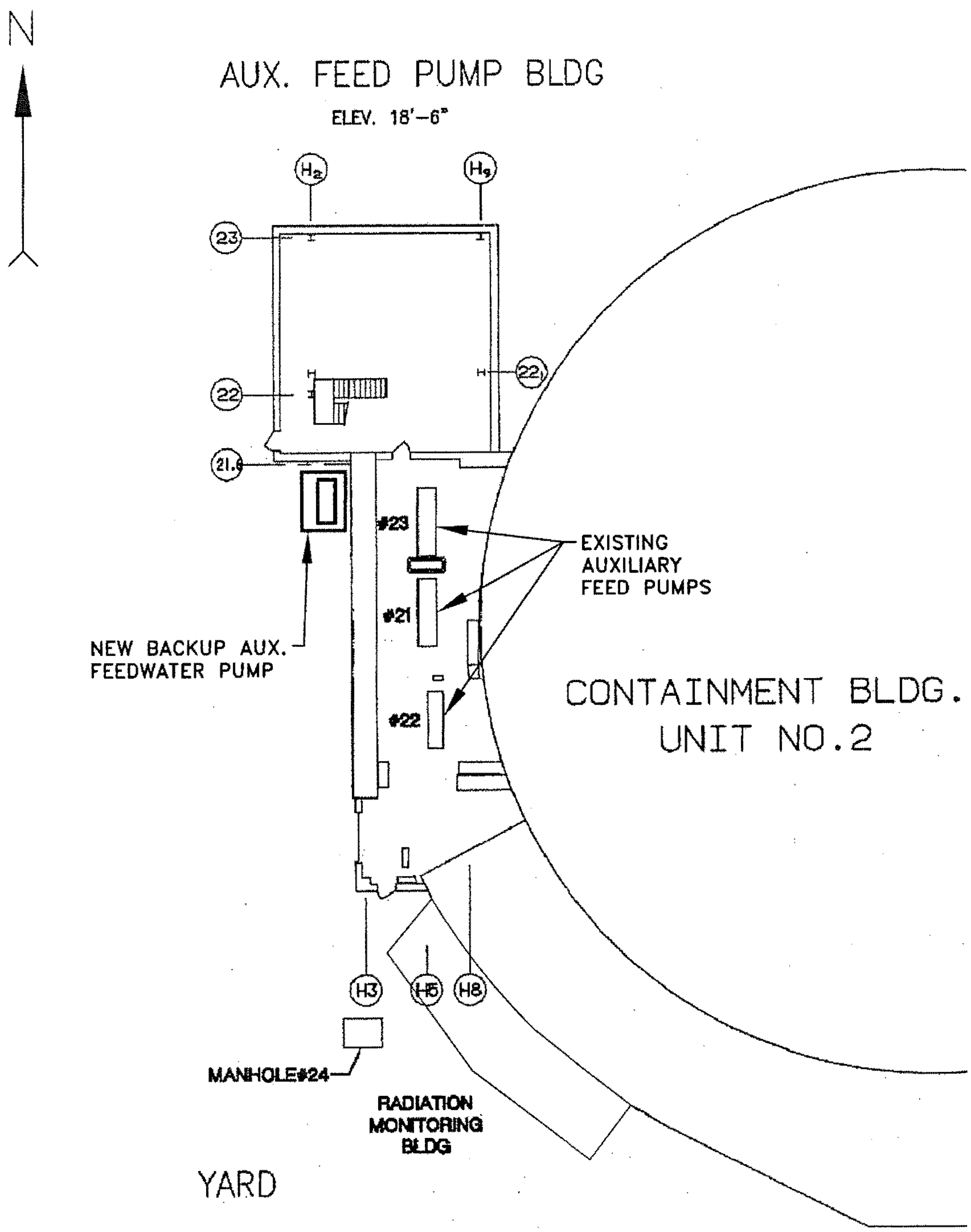


FIGURE 1
LOCATION PLAN
NEW BACKUP AUXILIARY
FEEDWATER PUMP

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

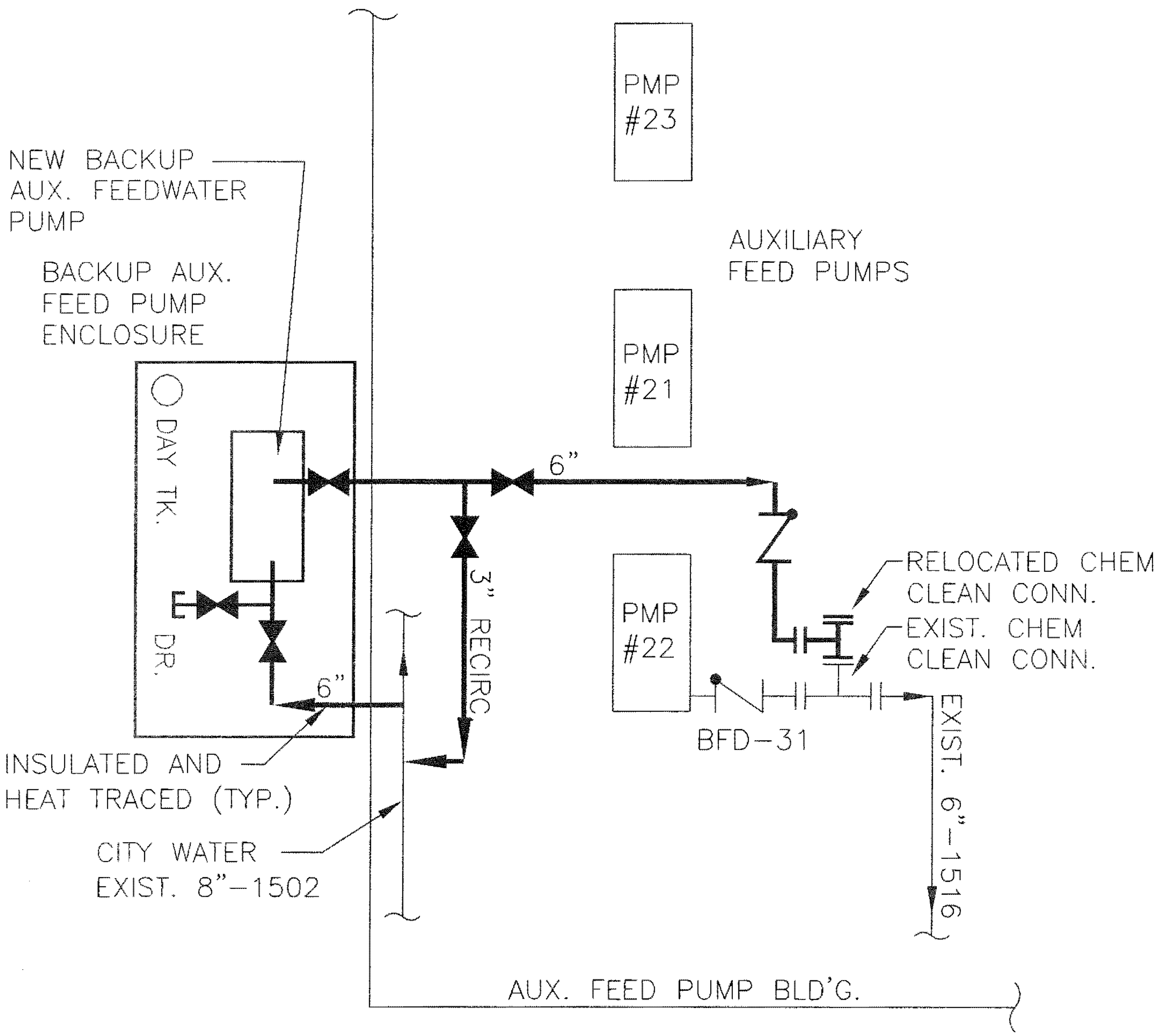
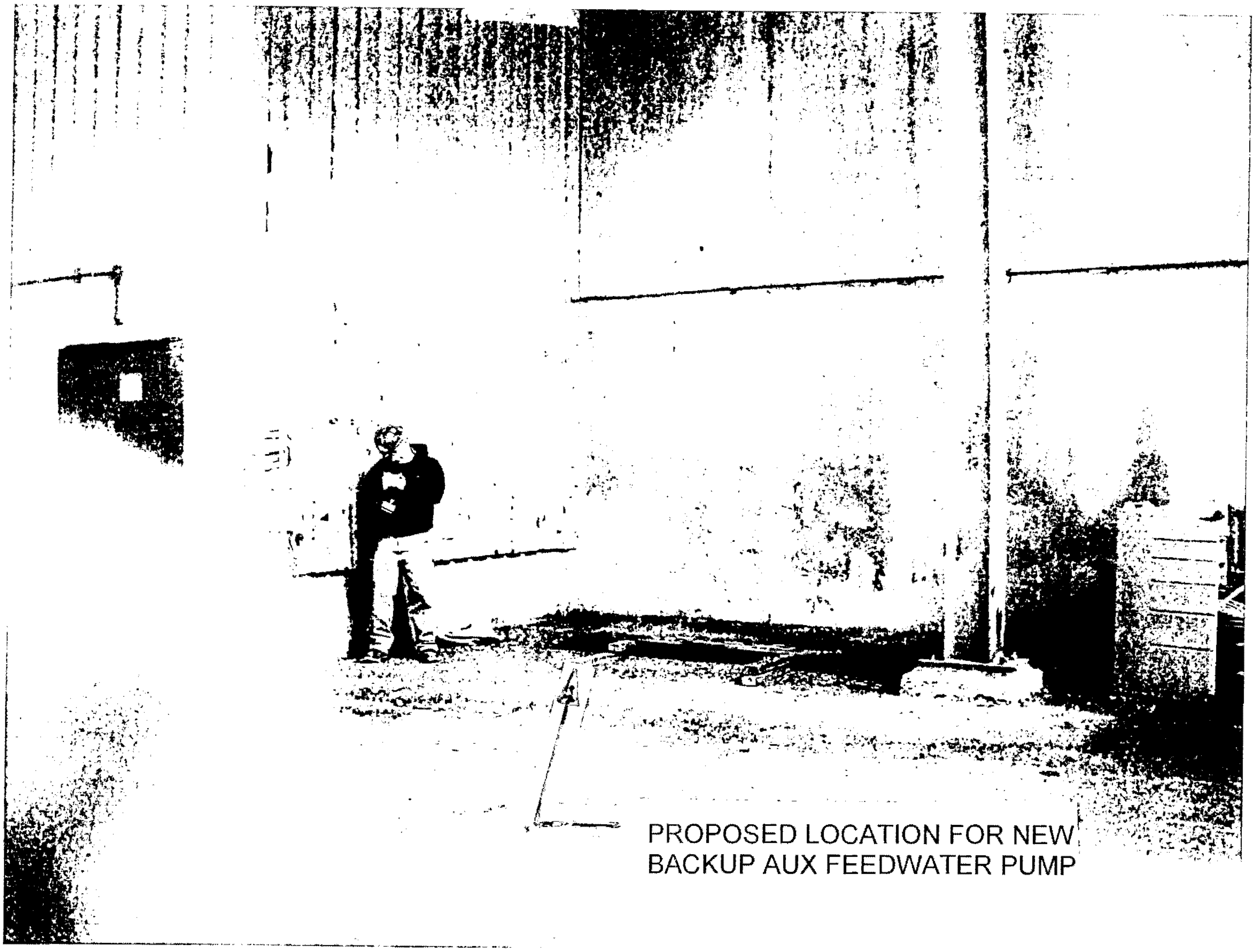


FIGURE 2
NEW BACKUP AUX.
FEEDWATER ADDITION



<u>FIGURE 3</u>
AUX FEED PUMP BUILDING
WEST WALL AREA

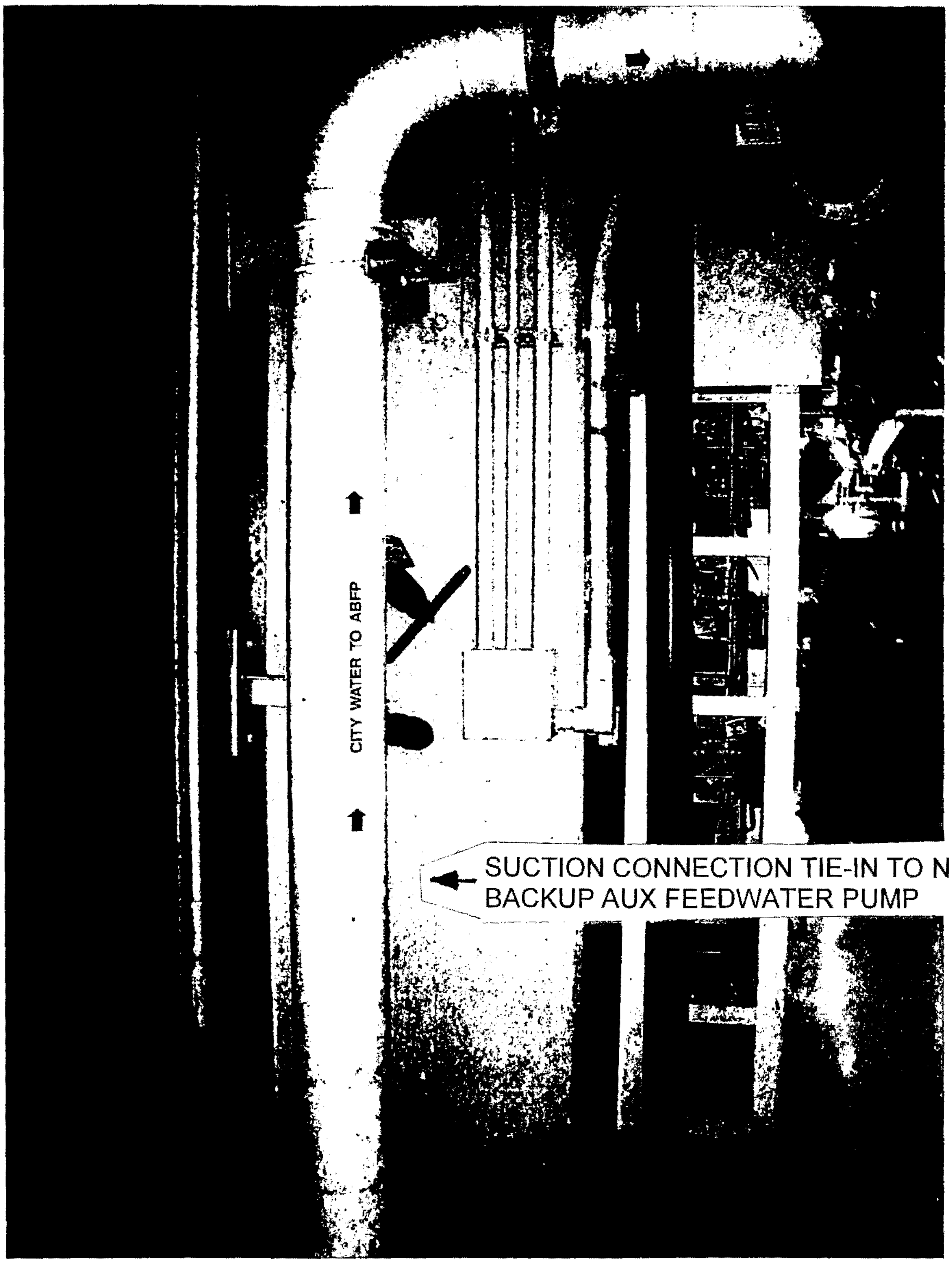


FIGURE 4
CITY WATER SUPPLY HEADER

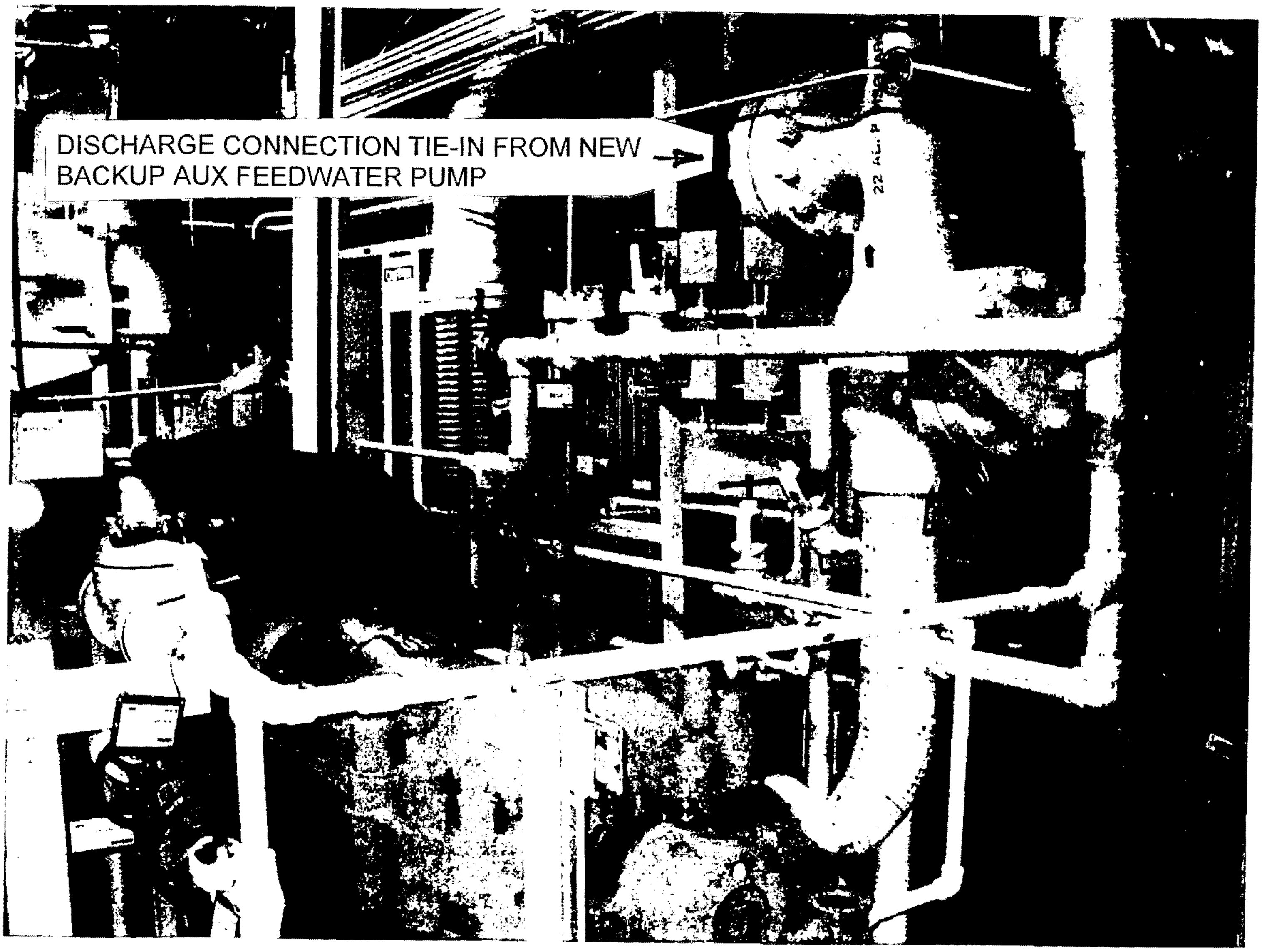


FIGURE 5
AUX FEEDWATER PUMP #22

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. BUTLER Metal Building Systems, - Typical Weatherproof Enclosure
   (attached here)

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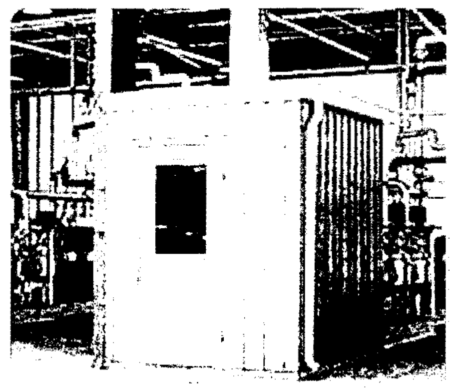


Attachment 4

Cost Estimate

ENTERGY NUCLEAR NORTHEAST IMPLEMENTATION ESTIMATE Indian Point Nuclear Power Station				
* ESTIMATE LEVEL *	EC #: SAMA IP2-044			
☑ Conceptual	PROJECT TITLE: Install an Alternate Water Source as Back Up for Steam Generator Inventory.			ESTIMATOR: RCMT
☐ Preliminary	JOB LOCATION: Yard near Existing Aux Feed Pumps		PROJECT CODE: TBD	
☐ Definitive	☑ OUTAGE ☑ NON-OUTAGE	ORIGINATOR:	☑ CAPITAL ☐ O&M	ORIG. DATE: 7/11/2012
	ESTIMATE TOTAL $3,046,418		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 IP2-044 in accordance with Entergy design engineering practices.

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

This package will provide an installation using a standby pump and city water as an additional provision for ensuring steam generator water inventory is maintained.

Prepared by: Peter [signature]	Approved by: [signature]
Date: 9-20-2012	Date: 9-20-2012

ENTERGY NUCLEAR NORTHEAST
IMPLEMENTATION ESTIMATE
Indian Point Nuclear Power Station

* ESTIMATE LEVEL *		EC #: SAMA IP2-044	☑ CAPITAL	☐ O&M
☑	Conceptual	PROJECT TITLE: Install an Alternate Water Source as Back Up for Steam Generator Inventory.		ESTIMATOR: RCMT
☐	Preliminary	JOB LOCATION: Yard near Existing Aux Feed Pumps	PROJECT CODE: TBD	
☐	Definitive	☐ OUTAGE ☑ NON-OUTAGE	ORIGINATOR:	ORIG. DATE: 7/11/2012

Item	Description
1.	This estimate assumes that this work will not require outage conditions to complete
2.	This estimate assumes that a Prefabricated building will be purchased for erection on site by skilled local craft.
3.	This estimate assumes that all work will be performed by trained contract craftspersons in lieu of station maintenance personnel.
4.	This estimate provides for continuous fire watch during welding activities.
5.	This estimate assumes training for 12 Plant Ops.Personnel.
6.	This estimate assumes that the discharge piping and valves are Safety Class 1.
7.	This estimate assumes that weld inspections will be limited to visual and LP testing on suction side piping and visual, LP and RT on discharge piping.
8.	The bulk of the work in this estimate is non outage and is assumed to occur in 2014 on a 4 day per week, 10 hour per day schedule.
9.	This estimate assumes the pump discharge piping is 6" diameter schedule 80 and will run approximately 75' outside the building.
10.	This estimate assumes the recirc. Piping downstream of the isolation valve will not be Safety Class 1.
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%
	B. Inside fence boundary - 30%
	C. Implementation complexity - 40%
	D. Inside Containment - 50%

Rev. 11-0

INDIAN POINT IMPLEMENTATION ESTIMATE WORK SHEET

EC #: SAMA IP2-044

PROJECT TITLE: Install an Alternate Water Source as Back Up for Steam Generator Inventory. ☑ CAPITAL ☐ O&M TAKEOFF:
JOB LOCATION: Yard near Existing Aux Feed Pumps PROJECT CODE: TBD ESTIMATOR: RCMT
EST. STATUS: ☐ OUTAGE ☑ NON-OUTAGE ORIGINATOR: ORIG. DATE: 7/11/2012

* ESTIMATE LEVEL *

- ☑ **Conceptual**
- ☐ **Preliminary**
- ☐ **Definitive**

General Notes:

ESTIMATE SUMMARY

		MANHOURS	DOLLARS
ENGINEERING			
01	STUDY, DESIGN, & CLOSEOUT	180	$ 18,000
02	DESIGN ENGR CONST SUPPORT	40	$ 4,000
03	MODS ENGR SUPPORT	-	$ -
04	SYS ENGR/ S-U ENGR	140	$ 14,000
05	PROJECT MANAGEMENT	200	$ 24,000
06	TESTING (Calibration & Testing)	80	$ 8,000
07	CONTRACT DESIGN EVALUATION SUPPORT		
08	ENGINEERING DCP ACCEPTANCE REVIEW	50	$ 5,000
CONTRACT ENGINEERING			
08	DESIGN ENGR CONTRACT SUPPORT	2,150	$ 258,000
09	SUPL CONTRACT MODS ENGR		
10	MODS PLAN & SCHED -CONTRACT	280	$ 22,400
11	OSG FIELD ENGRS / PLANNERS	240	$ 28,800
MATERIALS / MISC CONTRACTS			
12	MATERIALS		$ 458,450
13	OTHER CONTRACTS		$ -
CONTRACT CRAFT LABOR			
14	SWEC CRAFT LABOR/WALKDOWN	3,090	$ 340,933
15	LOST TIME	309	$ 38,786
16	SWEC DISTRIBS		$ 92,067
PLANT CRAFT LABOR			
17	MECH MAINT.	-	$ -
18	ELECT MAINT	40	$ 4,000
19	I&C	20	$ 2,000
20	CSG	-	$ -
MISC SUPPORT			
21	QUALITY CONTROL	240	$ 24,000
22	PLANNING & SCHEDULING	-	$ -
23	TRAINING	48	$ 5,760
24	CHEMISTRY	-	$ -
25	OPS	180	$ 21,600
26	HP / RP	-	$ -
MISC CONTRACT SUPPORT			
27	QUALITY CONTROL	260	$ 20,800
28	NDE	-	$ -
29	HP / RP	-	$ -
30	RADWASTE	-	$ -
31	NURSE	-	$ -
32	ELEVATOR CONTRACTOR	-	$ -
33	WASTE MANAGEMENT	-	$ -
34	HOUSEKEEPING	-	$ -
35	EQUIPMENT RENTAL	-	$ -
36	VENDOR STOCKING	-	$ -
37	DECONTAMINATION CONTRACTOR	-	$ -
38	RBC'S	-	$ -
39	SECURITY	-	$ -
40	FIRE WATCH (Rover)	-	$ -
41	SAFETY	63	$ 4,284
CONTINGENCY			
42	CONTINGENCY		$ 557,952
ESTIMATE SUBTOTAL		**7,610**	**$ 1,952,832**
	SITE ENCUMBRANCE PREMIUM (20%)		**$ 390,566**
	LOADERS (30%)		**$ 703,020**
	ESTIMATE TOTAL		**$ 3,046,418**

Non-Outage Work

Pour Slab for Pump Enclosure with Berm

ITEM	DESCRIPTION	QTY	UOM	CFT	NO.	MANHOURS UNIT	FCTR	TOTAL	$/MH	MATERIAL $ PER UNIT	MATERIAL DOLLARS	LABOR DOLLARS	SUB-CONTRACT	TOTAL $
1.	Perform walkdown of work area.	1	LT	LB	2	8.00	1.00	16	$ 78.15		$ -	$ 1,250		$ 1,250
2.	Gather and stage tools and materials	1	LT	LB	2	4.00	1.00	8	$ 78.15			$ 625		$ 625
3.	Excavate, form and pour slab with oil berm	1	LT	LB	2	40.00	1.00	80	$ 78.15	$ 6,000.00	$ 6,000	$ 6,252		$ 12,252
4.	Excavate, form and pour slab with oil berm	1	LT	OP	1	20.00	1.00	20	$ 115.00		$ -	$ 2,300		$ 2,300
5.	Excavate, form and pour slab with oil berm	1	LT	CP	2	20.00	1.00	40	$ 96.00			$ 3,840		$ 3,840
6.	Backfill and compact excavation	1	LT	OP	1	20.00	1.00	20	$ 115.00		$ -	$ 2,300		$ 2,300
7.	Backfill and compact excavation	1	LT	LB	2	20.00	1.00	40	$ 78.15		$ -	$ 3,126		$ 3,126

Set Pump Assembley and Install Building

ITEM	DESCRIPTION	QTY	UOM	CFT	NO.	MANHOURS UNIT	FCTR	TOTAL	$/MH	MATERIAL $ PER UNIT	MATERIAL DOLLARS	LABOR DOLLARS	SUB-CONTRACT	TOTAL $
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.	1	LT	IW	3	10.00	1.00	30	$ 137.33	$ 1,500.00	$ 1,500	$ 4,120		$ 5,620
3.	Perform walkdown of work area.	1	LT	OP	1	10.00	1.00	10	$ 115.00			$ 1,150		$ 1,150
4.	Obtain Diesel Pump Skid and required tools.	1	LT	MW	2	10.00	1.00	20	$ 134.00	$ 125,000.00	$ 125,000	$ 2,680		$ 127,680
5.	Set Diesel Pump Skid	1	LT	MW	2	20.00	1.00	40	$ 134.00		$ 1,500	$ 5,360		$ 6,860
6.	Set Diesel Pump Skid	1	LT	OP	1	10.00	1.00	10	$ 115.00		$ 1,500	$ 1,150		$ 2,650
7.	Set Diesel Oil Day tank	1	LT	MW	2	10.00	1.00	20	$ 134.00	$ 1,000.00		$ 2,680		$ 2,680
	Set Diesel Oil Day tank	1	LT	OP	1	5.00	1.00	5	$ 115.00			$ 575		$ 575
7.	Obtain and erect insulated steel building.	1	LT	IW	3	40.00	1.00	120	$ 137.33	$ 15,000.00	$ 15,000	$ 16,480		$ 31,480
8.	Obtain and erect insulated steel building.	1	LT	OP	1	40.00	1.00	40	$ 115.00			$ 4,600		$ 4,600
9.	Provide Light, Heat and Ventilation	1	LT	EL	2	40.00	1.00	80	$ 123.32	$ 10,000.00	$ 10,000	$ 9,866		$ 19,866
10.	Demob and Clean Up Area	1	LT	EL	2	10.00	1.00	20	$ 123.32		$ -	$ 2,466		$ 2,466

Rev. 11-0

INDIAN POINT IMPLEMENTATION ESTIMATE WORK SHEET

EC #: SAMA IP2-044

PROJECT TITLE: Install an Alternate Water Source as Back Up for Steam Generator Inventory. ☑ CAPITAL ☐ O&M TAKEOFF:

JOB LOCATION: Yard near Existing Aux Feed Pumps PROJECT CODE: TBD ESTIMATOR: RCMT

EST. STATUS: ☐ OUTAGE ☑ NON-OUTAGE ORIGINATOR: ORIG. DATE: 7/11/2012

ITEM	DESCRIPTION	QTY	UOM	CFT	NO.	MANHOURS UNIT	FCTR	TOTAL	$/MH	MATERIAL $ PER UNIT	MATERIAL DOLLARS	LABOR DOLLARS	SUB-CONTRACT	TOTAL $
	Run and Tie-In Piping from Diesel to Supply and Chem-Clean Lines													
1.	Obtain Material and Erect Pipe Supports on Building.	1	LT	PF	3	40.00	1.00	120	$ 120.71	$ 4,000.00	$ 4,000	$ 14,485		$ 18,485
2.	Perform walkdown and Co-ordinate Core Bore Into Aux. Feed Pump Building	1	LT	PF	3	10.00	1.00	30	$ 120.71			$ 3,621		$ 3,621
3.	Perform walkdown and Co-ordinate Core Bore Into Aux. Feed Pump Building	1	LT	LB	2	20.00	1.00	40	$ 78.15			$ 3,126		$ 3,126
4.	Perform Core Bores (2) Into Aux Feed Pump Room	1	LT	LB	2	20.00	1.00	40	$ 78.15			$ 3,126		$ 3,126
5.	Cut, Fit and Weld 6" diameter Sch. 80 Piping from Diesel discharge to Pene. In Aux. Feed pump room, then to 6" Chem. Clean nozzle. (90 ft.) (12 welds)	1	LT	PF	3	200.00	1.00	600	$ 120.71	$ 190,000.00	$ 190,000	$ 72,426		$ 262,426
7.	Tie in Piping at Pump and Chem. Clean connection.	1	LT	PF	3	40.00	1.00	120	$ 120.71		$ -	$ 14,485		$ 14,485
8.	Cut, Fit and Weld 6" diameter Schedule 40 Piping from 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	1	LT	PF	2	40.00	1.00	80	$ 120.71		$ -	$ 9,657		$ 9,657
11.	Clean-up area and restore	1	LT	PF	2	10.00	1.00	20	$ 120.71		$ -	$ 2,414		$ 2,414
12.	Clean-up area and restore	1	LT	LB	2	10.00	1.00	20	$ 78.15		$ -	$ 1,563		$ 1,563
								-			$ -	$ -		$ -
	Perform Electrical and I&C installations													
								-			$ -	$ -		$ -
1.	Provide Heat Tracing as Required	1	LT	EL	2	20.00	1.00	40	$ 123.32	$ 3,000.00	$ 3,000	$ 4,933		$ 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
											$ -			
											$ -			
	PAINTING & TOUCH-UP REQUIREMENTS										$ -			
1.	PAINTING & TOUCH-UP	1	LT	PT	2	80.00	1.00	160	$ 95.16	$ 1,000.00	$ 1,000	$ 15,226		$ 16,226
	FIRE WATCH / BOTTLEWATCH REQUIREMENTS													
1.	CRAFT SUPPORT FOR FIRE WATCH	1	LT	FW	1	200.00	1.70	340	$ 53.60		$ -	$ 18,224		$ 18,224
2.	CRAFT SUPPORT FOR BOTTLE WATCH							-			$ -	$ -		$ -
	MISC SUB-CONTRACT													
1.	MISC SUB-CONTRACT	1	LT										$ -	$ -
	SUBTOTAL CRAFT & SUB-CONTRACTOR							2,649		$ 430,500.00	$ 432,500	$ 284,150	$ -	$ 716,650
1.	CONSTRUCTION SUPPORT (8% OF LABOR $)	1	LT					212	$ 107.27			$ 22,741		$ 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	1	LT	PF				104	$ 120.71			$ 12,554		$ 12,554
3.	TOOL ROOM ATTENDANTS (~3.5%)	1	LT	EL				100	$ 123.32			$ 12,332		$ 12,332
4.	GENERAL CRAFT DISTRIBS. (10%)											$ 30,689		$ 30,689
5.	CRAFT IN PROCESSING (20%)											$ 61,378		$ 61,378
6.	HUMAN PERFORMANCE & ALARA TRAINING	1	LT									$ 6,138		$ 6,138
7.	(1/2 day training, or ~ 2%)													
	SUBTOTAL							3,090			$ 432,500	$ 433,000	$ -	$ 865,500
	PLANT SCOPE													
1.	**MECH MAINTENANCE**			PL				-	$ -		$ -	$ -		$ -
				PL				-	$ -		$ -	$ -		$ -
	SUBTOTAL MECH MAINT.							-			$ -	$ -	$ -	$ -
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	LT	PL	1	20.00	1.00	20	$ 100.00		$ -	$ 2,000		$ 2,000
				PL				-			$ -	$ -		$ -
	SUBTOTAL I&C MAINT.							20			$ -	$ 2,000	$ -	$ 2,000
1.	**CSG**			PL				-			$ -	$ -		$ -
				PL				-			$ -	$ -		$ -
	SUBTOTAL CSG MAINT.							-			$ -	$ -	$ -	-
	SUBTOTAL PLANT							60			$ -	$ -	$ -	$ -
	SUBTOTAL CRAFT/PLANT							3,150			$ 432,500	$ 439,000	$ -	$ 871,500

Rev.
11-0

INDIAN POINT IMPLEMENTATION ESTIMATE WORK SHEET

EC #: SAMA IP2-044

PROJECT TITLE: Install an Alternate Water Source as Back Up for Steam Generator Inventory. ☑ CAPITAL ☐ O&M TAKEOFF:
JOB LOCATION: Yard near Existing Aux Feed Pumps PROJECT CODE: TBD ESTIMATOR: RCMT
EST. STATUS: ☐ OUTAGE ☑ NON-OUTAGE ORIGINATOR: ORIG. DATE: 7/11/2012

ITEM	DESCRIPTION	QTY	UOM	CFT	NO.	MANHOURS UNIT	FCTR	TOTAL	$/MH	MATERIAL $ PER UNIT	MATERIAL DOLLARS	LABOR DOLLARS	SUB-CONTRACT	TOTAL $
	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
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	1	40.00	1.00	40	$ 100.00			$ 4,000		$ 4,000
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	4.00	1.00	48	$ 120.00			$ 5,760		$ 5,760
9.	QA / QC VERIFICATION	1	LT	NM	1	240.00	1.00	240	$ 100.00			$ 24,000		$ 24,000
10.	PLANNING & SCHEDULING	1	LT	NM	1									
11.	HP / RP/ ALARA	1	LT	NM				-				$ -		$ -
12.	CHEMISTRY	1	LT	NM				-				$ -		$ -
13.	OPS (DEVELOP/REVISE PROCEDURE(S))	1	LT	NM	1	180.00	1.00	180	$ 120.00			$ 21,600		$ 21,600
14.	TRAVEL & LIVING EXPENSES	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	280.00	1.00	280	$ 80.00			$ 22,400		$ 22,400
3.	OSG FIELD ENGRS/PLAN- SWEC(Incl Per Diem)	1	LT	NM	1	240.00	1.00	240	$ 120.00			$ 28,800		$ 28,800
4.	QA / QC VERIFICATION	1	LT	NM	1	260.00	1.00	260	$ 80.00			$ 20,800		$ 20,800
5.	NDE	1	LT	NM								$ -		$ -
6.	HP / RP	1	LT	NM								$ -		$ -
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.	VENDOR STOCKING	1	LT	NM										
14.	DECONTAMINATION CONTRACTOR	1	LT	NM										
15.	RBC's	1	LT	NM										
16.	SECURITY	1	LT	SEC										
17.	FIRE WATCH (Rover)	1	LT	NM								$ -		$ -
18.	SAFETY (2%)	1	LT	NM				63	$ 68.00			$ 4,284		$ 4,284
19.	LOST TIME (10%)	1	LT					309	$ 125.52			$ 38,786		$ 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			$ 458,450	$ 647,430	$ -	$ 1,105,880
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	1	LT	NM	1	20.00	1.00	20	$ 100.00			$ 2,000		$ 2,000
4.	DESIGN ENGINEERING - CIVIL/STRUCTURAL	1	LT	NM	1	80.00	1.00	80	$ 100.00			$ 8,000		$ 8,000
5.	TESTING (Instrument Calibration and testing)	1	LT	NM	2	40.00	1.00	80	$ 100.00			$ 8,000	$ -	$ 8,000
6.	CONTRACT ENGR DESIGN SUPPORT	1	LT	NM	1	2,150.00	1.00	2,150	$ 120.00				$ 258,000	$ 258,000
7.	ENGINEERING DCP ACCEPTANCE REVIEW	1	LT	NM	1	50.00	1.00	50	$ 100.00			$ 5,000		$ 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%)													$ 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:		Approved by:
Date: 9-20-2012		Date: 9-20-2012

TABLE OF CONTENTS

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 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.
3. 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

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

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.

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.: IP2-053 **Rev. No.:** CONCEPTUAL 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	☐ 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	☐ 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

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	☒ NO
Cable and Raceway Program • Does the proposed activity involve any changes to cable trays, raceways or the associated documentation?	■ YES	☐ 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) ***(if applicable)*** • 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 • 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?	■ 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?	☐ 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

ATTACHMENT 9.3 IMPACT SCREENING SUMMARY

SHEET 3 OF 6

PROCESS OR PROGRAM IMPACT SCREENING CHECKLIST	Potential Impact	
Computer Support and Software • Does the proposed activity impact or involve changes to plant computer software or firmware or impact Software Quality Assurance (SQA)?	☐ YES	☒ NO
Chemistry and Environmental Impact • Does the proposed activity impact or involve any changes to plant chemistry requirements, operations or procedures, or any changes to the environment?	☐ YES	☒ NO
Radiation Protection (RP) Program Impact • 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?	■ 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	☒ 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 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

ATTACHMENT 9.3 **IMPACT SCREENING SUMMARY**

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	☒ 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?	☐ 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?	☐ 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

ATTACHMENT 9.3 IMPACT SCREENING SUMMARY

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	☒ 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	☐ 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	☐ 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?	☐ 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

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?	☐ YES	☒ 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	☐ NO
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

N/A

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. 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.

1

115

Closeout Tracking Form - Post Return To Service Checklist (P-RTS)

ER/Mod No: FEX-96-12241-E ER/Mod Rev No. 1 "B" Work Order – IP2-03- 31998

Engineering Change Title: Auto Open of PORV Block Valves

Prepared by: Charles CAruso Date: 11/24/04 Approved by: Walter F. Duda Date 11/30/04
Print/Sign Walter F. Duda

TASK	RESPONSIBLE DEPARTMENT	N/A	COMPLETED	OPEN ITEM	REFERENCE / OPEN ITEM #
1. Appropriate Drawings Transferred	DE	☐	☑	☐	13
2. Department Procedures, including Graphs, Logs, COLs, Preventative Maintenance, etc	SE	☑	☐	☐	12
	I&C	☑	☐	☐	12, 14, 16
	OPS	☐	☑	☐	8
	MAINT	☑	☐	☐	12
	CHEM	☑	☐	☐	12
	Rad Pro	☑	☐	☐	12
3. Surveillance Procedures	Operations & I&C	☐	☑	☐	14, 16
4. Work Packages	PS&O	☐	☑	☐	1, 7, 5
5. UFSAR	Licensing	☐	☑	☐	10, 11, 20, 22
6. Tech Specs	Licensing	☑	☐	☐	11
7. Licensing Commitment Database	Licensing	☑	☐	☐	2[illegible]
8. Design Basis Documents	ES	☐	☑	N/A	17
9. Major Component Database	ES	☐	☑	☐	18
10. Component Function Database	ES	☐	☑	☐	19
11. Plant Equipment Database (Maximo PEDB)	ES	☐	☑	☐	6, 10
12. SPIN	DE	☐	☑	☐	15
13. Calculations	DE	☐	☑	☐	23
14. Condition Reports	Various	☑	☐	N/A	24
15. ALARA	Rad Pro	☑	☐	☐	12, 2
16. EQ Program	DE	☑	☐	☐	10
17. Aluminum in Containment	DE	☑	☐	☐	12
18. NRC 89-10 MOVs	P&CE	☐	☑	☐	25
19. AOV	P&CE	☑	☐	☐	12
20. Check Valve	P&CE	☑	☐	☐	12
21. EPIX Program	P&CE	☑	☐	☐	2
22. Maintenance Rule Program Changes	SE	☑	☐	☐	4
23. ISI ASME section XI	P&CE	☑	☐	☐	1, 10, 2
24. IST	P&CE	☑	☐	☐	2
25. SQUG (Seismic)	DE	☑	☐	☐	26

ATTACHMENT 7.2

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, Student Handouts, and Training Schedules updates identified and planned.	NUC TRAIN	☐	☑	☐	30
28. Technical Training	NUC TRAIN	☐	☑	☐	9,4
29. Simulator	Simulator Training	☐	☑	☐	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	☑	☐	☐	12
36. Vendor Manuals	SE	☑	☐	☐	12,2
37. System Descriptions	Training	☐	☑	☐	27
38. Security Plan	Security	☑	☐	☐	11
39. Emergency Plan	EP	☑	☐	☐	12
40. Procurement Requisitions, Purchase Orders, Warehouse Records and Procurement Specifications updates identified.	Procurement	☑	☐	☐	12
41. Plant Chemistry	SE, Chemistry	☑	☐	☐	12
42.		☐	☐	☐	
43.		☐	☐	☐	
44.		☐	☐	☐	
45.		☐	☐	☐	
46.		☐	☐	☐	
47.		☐	☐	☐	
48.		☐	☐	☐	
49.		☐	☐	☐	

References:

1) Modification Start Up Authorization
2) Mod Tracking Form
3) Pre-Implementation Meeting Checklist
4) Detail Design Review Checklist
5) Report of Installation dated 6/18/97
6) Configuration Management, O.E., database
7) W.O. NP9788405 & 9788406
8) Operation Procedure Database
9) Training database
10) Mod Procedure FEX-96-12241-E Rev. 1

ATTACHMENT 7.2

11) 50.59 Safety Evaluation 97-008-MD Rev. 2
12) Engineering Judgement based on review of MOD & related documents
13) Motiva Print out
14) Surveillance Test PT-R62
15) SPIN database review
16) Surveillance Test PT-Q55
17) DBD for RCS review
18) Major Component database review
19) Component Function database review
20) Online search of the UFSAR (Rev. 18)
21) Online search of the Commitment Tracking Database
22) Condition Report CR-IP2-2004-00096
23) Calculation Database Search
24) PCRS search using "12241" including CRS-IP2-1997-03458, IP2-1998-1004, IP2-2000-0259, IP2-2001-003
25) Included in MOV program & tested in PT-R62
26) IN SQUG database, also this mod. does not affect SQUG
27) Included in approved Reactor Coolant System Description
28) Email sent to S Wilkie requesting a F.P. review
29) No Corrective Maintenance in MAXIMO associated with MOD.
30) Email from C Hayes dated 11/30/4 - Training performed
31)
32)
33)
34)
35)

Post Modification Testing (PMT) - Does the modification involve Reactor Protection System, Engineering Safeguard System, or SSCs that can affect the reliability or power generation of Indian Point 2 (refer to Project Guidance document for further details)?

Yes ☐ No ☑

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

IPEC00269946

Ref 10

FORM W16 (10/96)

CONSOLIDATED EDISON CO.-INDIAN POINT STATION
MODIFICATION PROCEDURE COVER SHEET

Sheet 1 of 3

■ Major ☐ Minor ☐ Set Point Only ☐ Generic Major ☐ Generic Minor ☐ Environmental

Mod No. FEX-96-12241- E Preparer P. Kelly
Title/Subject Auto Open of PORV Block Valves
Project No. 12241-96 ESR/FER No.
Class: ■ A ☐ FP ☐ MET ☐ Non-class
Penetrates Existing Fire Barriers ■ Yes ☐ No
Mandate: ☐ Yes ■ No Mandate Source
Withdrawal Date: Dec 28, 1997

Purpose: This modification adds an interlock to the control circuits of MOV-535 and MOV-536 to open these PORV block valves when the RCS pressure increases near the actuation setpoint of the PORV's

Construction Documents: Attached Drawings

Reference Documents: EI-6009, REV 10.
Safety Evaluation: 97-008-MD Rev 2 Classification: 97-008 CL
Specifications: N/A DBDs: RCS / Steam Generators
Drawings: See attached list

Other: Cleaning: N/A
Special Test Equipment: N/A
Special Precautions and/or Limitations: N/A

Scope of Work: See Sheet 2 and Sheet 3

Procedural Requirements:

Simulator Change?	■ Yes	☐ No
System Descr Change?	■ Yes	☐ No
EQ Equipt/Requirements?	☐ Yes	■ No
Contains an Essential Corrective Action?	☐ Yes	■ No
SAS Change?	☐ Yes	■ No
CCR Human Engrg?	■ Yes	☐ No
Setpoint Chg/Add?	■ Yes	☐ No
Loop Sketch Change?	■ Yes	☐ No
~~TNMS Change?~~	~~☐ Yes~~	~~■ No~~
FSAR Change?	■ Yes	☐ No ← TASK 5

Prerequisite & Corequisite Mods and Projects at Other Stations: N/A

Test Requirements and Acceptance Criteria: Functional tests listed on sheet 2 and other tests as deemed appropriate by NP.
ASME XI Quality Group: ☐ A ☐ B ☐ C ■ Exempt/Outside Boundaries
Weld Requirements: N/A

APPROVAL/DATE:	Rev. 0	Rev. 1	Rev. 2	Rev. 3	Rev. 4
Engineering Section Manager	T Wong 4/21/97	[signature] 5/30/97			
Manager, System Engineering and Analysis	Lawrence Mauela 4/22/97	[signature] 6/3/97			
Manager, Quality Assurance	Serge Waslenko 4/24/97	[signature] 6/3/97			
Manager, Nuclear Safety and Licensing*	NA	NA			
SNSC Meeting No. (As Required)	#2262 Donna Tyner 4/28/97	#2275 6/3/97 JMT			

For Reference Only
NOT FOR FABRICATION
OR INSTALLATION

*Required for Minor and Set Point Only Modifications
~~Rev 0 is for Pre-Outage Work only. This Pre-outage work is described on Sheet 3 of 3~~

JR1

IPEC00269947

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

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

R1

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

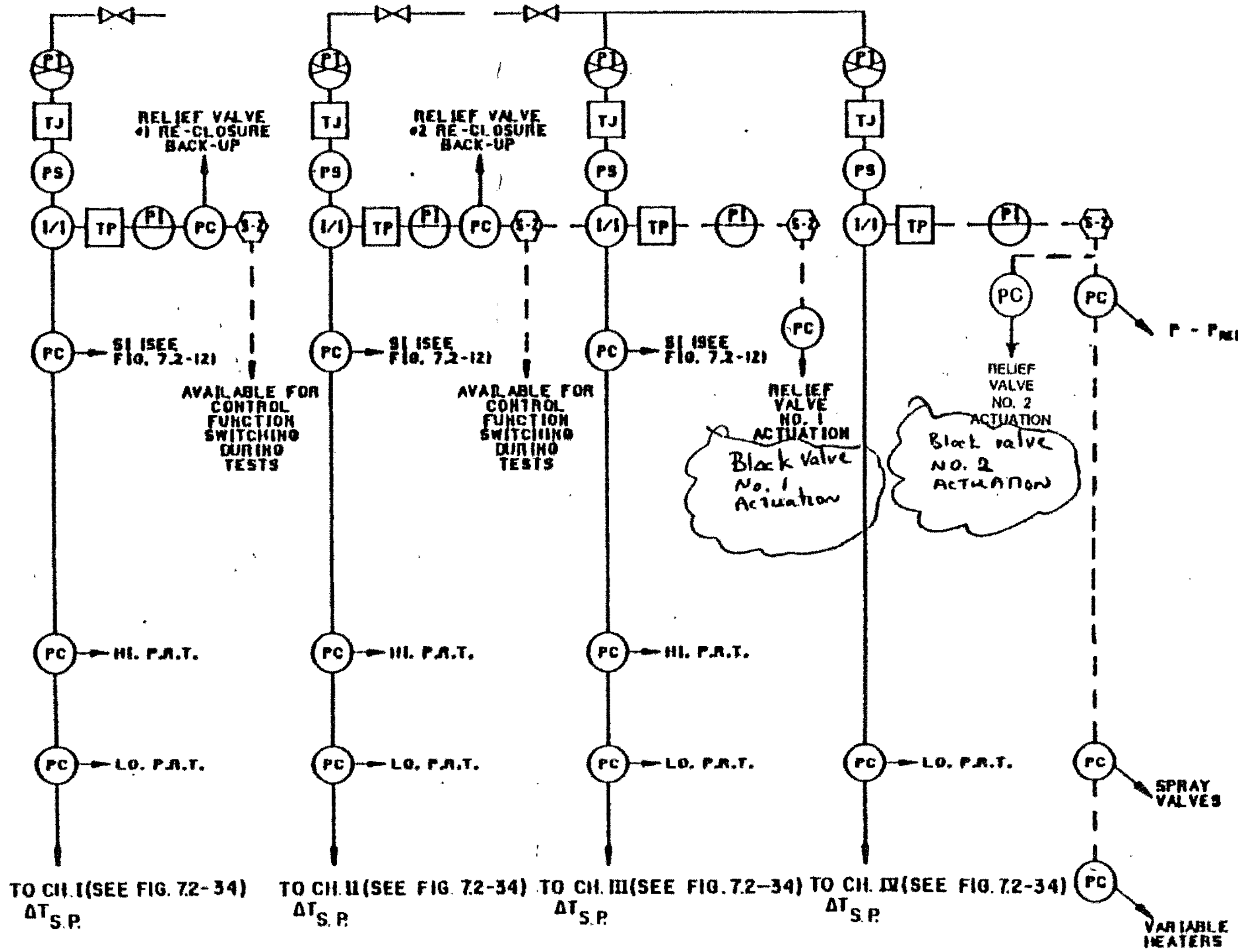
1) Add the following description to the FSAR:

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.

IPEC00269951

Changes to FSAR from Mod Procedure FEX-96-12241-E



CONSOLIDATED EDISON CO.
INDIAN POINT UNIT 2

Figure 7.2-21
Pressurizer Pressure Control and Protection System

Revision 5

NOT FOR FABRICATION OR INSTALLATION

INSTRUMENT LOOP SKETCH
FOR REFERENCE ONLY

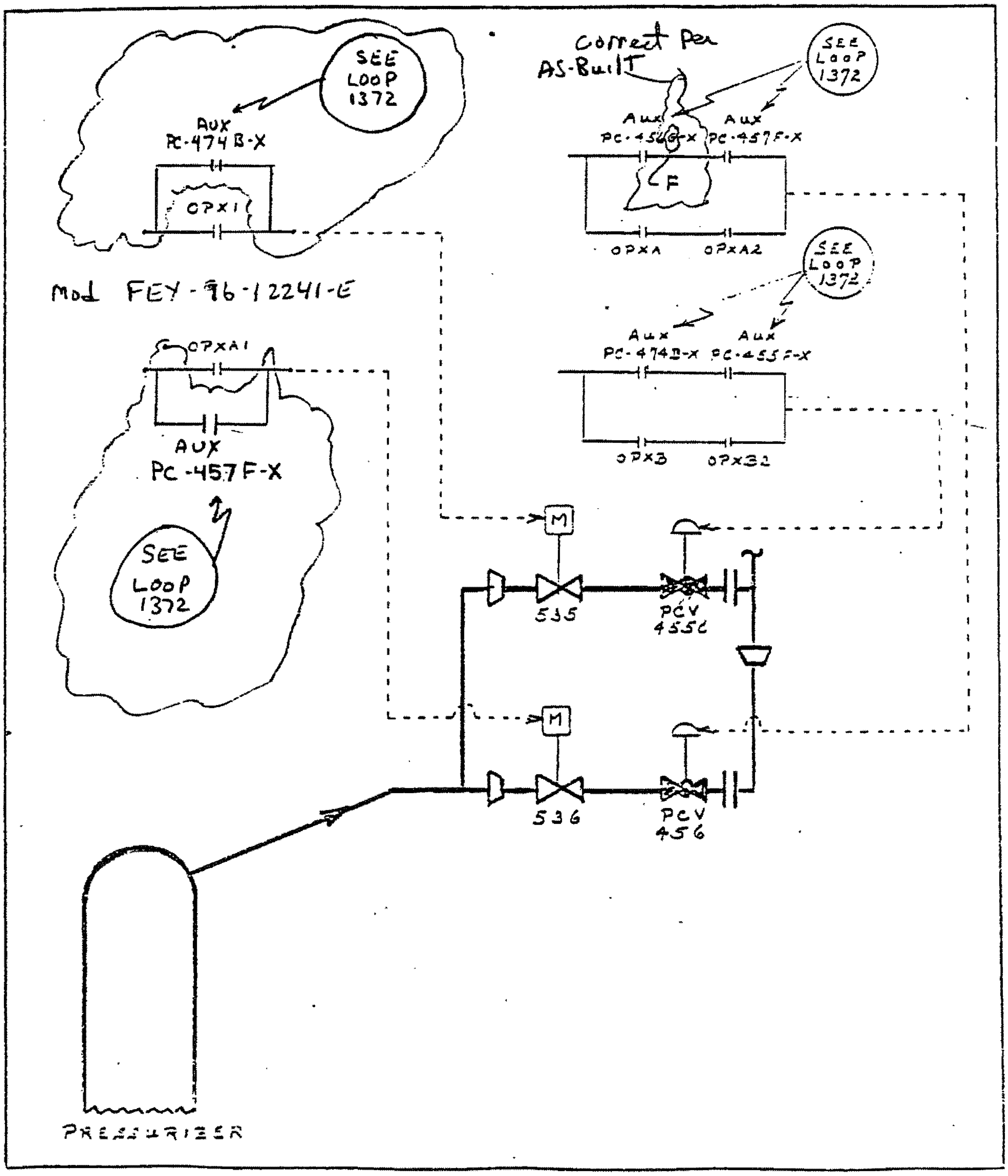
LOOP # 395

KETCH 3 OF 3

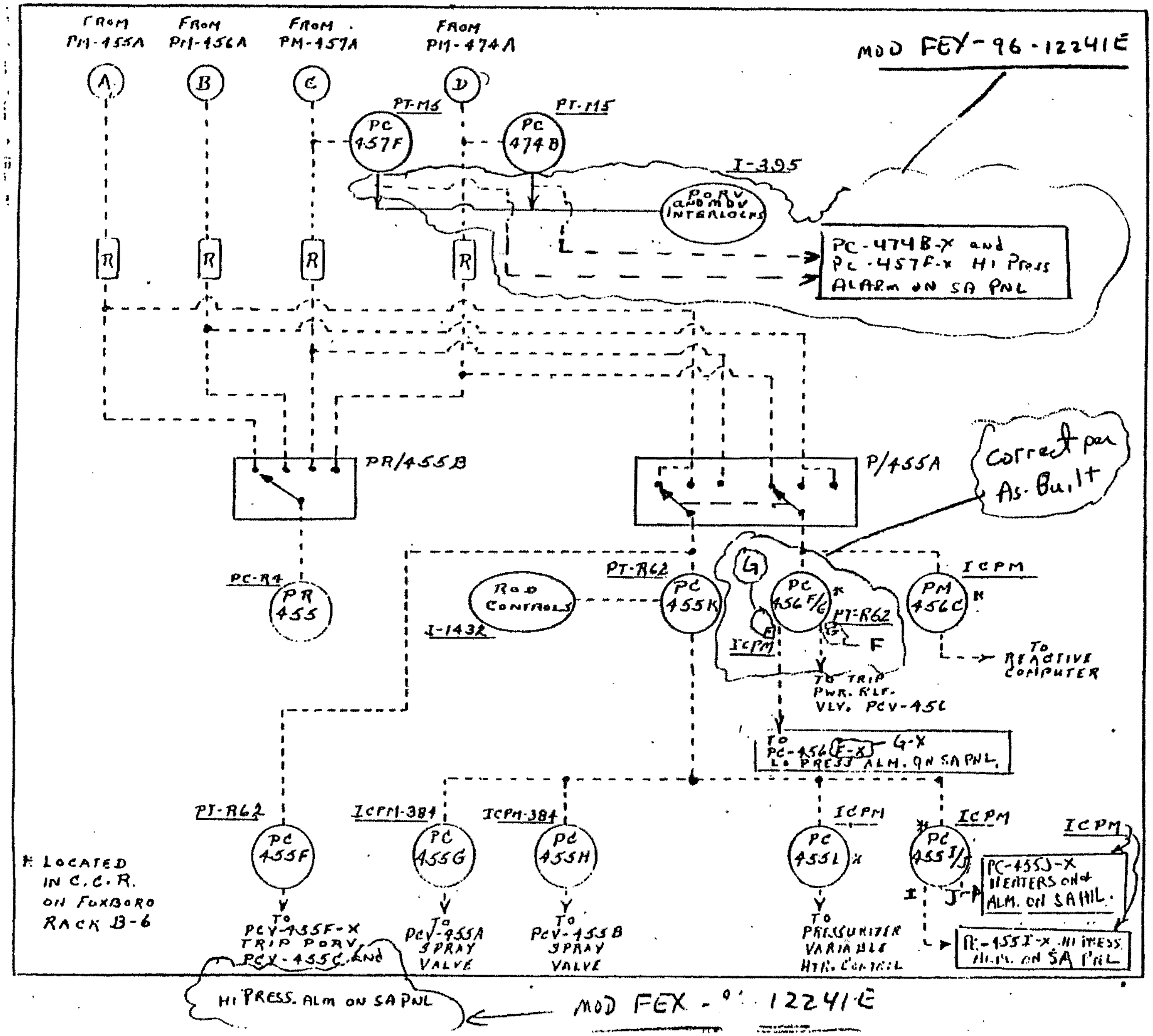
LOOP APPLICATION RCS/OVERPRESSURIZATION PROTECTION SYSTEM

REVISION 0 DATE 4-17-84

REFERENCES F-2733, 206304, Loop #1372, 3E-2[illegible]



IPEC00269952



NOT FOR FABRICATION OR INSTALLATION

SKETCH 2 OF 2

LOOP APPLICATION RCS/ PRESSURIZER PRESSURE CONTROL

REVISION 2 DATE 1-14-86

REFERENCES 16F647, 16F627, SNSC-977-E-1, EGP-85-30775, IC-CM-69 REV. 0

INSTRUMENT LOOP SKETCH FOR REFERENCE ONLY

LOOP # 1372

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) PC-455I

Function: Alarm/Control   ALARM

Action: Incr., Decr./Set, Reset   Incr.

Process Range: (Units: PSIG, F, GPM, Other)   1700-2500 PSIG

Signal Range: (Units: Volts, Millivolts, Amps, Milliamps, PSIG, Other)   10-50 mA

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)   40.0mA

Set Point Tolerance (Process Units)   +/- 0.4 mA

Set Point Source(s) Linear interpolation of previous setpoint of 2310 PSIG at 40.5 mA

Process Critical Value (Signal Units)   N/A

Source of Critical Value
(Tech Spec, MFR, etc) N/A Function is Alarm only, no actuation is based on this alarm

First Consequence of Exceeding Critical Value
(eg, Tank Rupture, Tech Spec Violation) N/A

Overall Channel Accuracy (%)   N/A

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 match the setpoint of the controllers used to generate the PORV block valves auto-open interlock signal (PC-457F and PC-474B).

Prepared by: Peter Kelly   Peter Kelly   Feb 6, 1997
Print/Sign   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 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 valves. The Power Operated Relief Valves are provided to limit the operation of the spring loaded Pressurizer safety valves. 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~~ 14) 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 valves will open when the RCS pressure exceeds 2300 psig. Valves manually closed when the pressure decreases below 2300 psig.

A nitrogen accumulator system 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
Attachment to Mod Procedure FEX-96-12241-E

Pg 1 of 5

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 fails below 2185 psi.

G

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) F 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
F 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.

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 at 2300psig will also open the block valve for PORV PC456. The channel IV interlock at 2300psig will also open the block valve for PORV PCV-455C. These auto-open signals are not present when the RCS pressure is less than 2300 psig. The motor operated PORV block valves are manually closed.

System Description #1 RCS. Attachment to Mod Proced FEY-96-12241-E
Page 2 of 5

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. At a pressure of 2300 psig ~~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 2300 psig. At 2362 psig the Reactor will be tripped on "High Pressurizer Pressure". Finally, at 2485 psig the Pressurizer Safety Valves will lift.

The Power Operated Relief Valve block valves MOV-535 and MOV-536 will OPEN (controlled by PC-474B and PC 457F respectively) at a pressure of 2300 psig. A signal to open either block valve will cause the same alarm on panel SA to alarm.

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.

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 #1 RCS
Attachment to Mod Procedure FEX-96-12241-E
Page 3 of 5

2310 psig -	Sprays Wide Open ~~and Deviation High Pressure Alarm~~
2300 psig -	Power Operated Relief Valve Interlock, Block Valv OPEN and alarm, and Deviation High Pressure Alarm
2260 psig -	Spray Initiated
2250 psig -	Modulating Heaters off
2235 psig -	Normal Pressure
2220 psig -	Modulating Heaters Full On
2210 psig -	Backup Heaters Off (when already on from 2185 setpoint)
2185 psig -	Low Pressure Alarm Backup Heaters On (will stay on until pressure reaches 2210)
1940 psig -	Low Pressurizer Pressure Permissive (SI unblock)
1930 psig -	Low Pressure Reactor Trip
1840 psig -	Low Pressure Safety Injection Actuation

MPE-96-12241-E

SYSTEM Description #1 RCS

Attachment to Mod Procedure

FEX-96-12241-E

Page 4 of 5

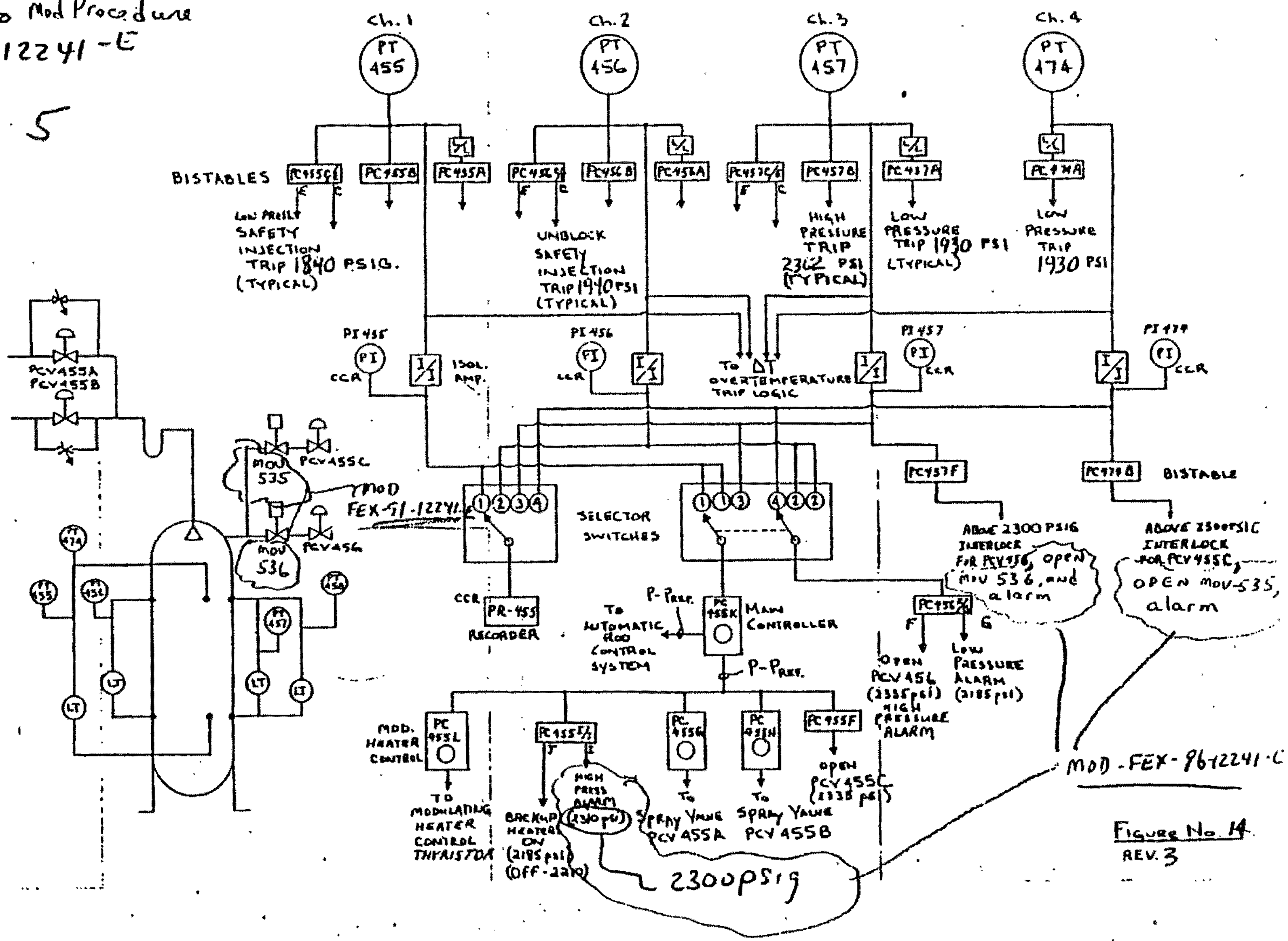
IPEC00269959

FIGURE NO. 14 : PRESSURIZER PRESSURE INSTRUMENTATION

System Description #1
RCS

Attachment to Mod Procedure
FEX-96-12241-E

Page 5 of 5



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:

ANNUNCIATOR POINT	LOCATION	CCR PANEL DRAWING
"Reactor Coolant Pump Standpipe High Level 1 Ft"	CCR Panel SA	7.1.5.1
"Pressurizer High Pressure ~~2310~~ 2300 PSIG"	CCR Panel SA	7.1.5.1
"Pressurizer High Level 70% 5%"	CCR Panel SA	7.1.5.1
"Pressurizer Relief Line High Temp 240°F"	CCR Panel SA	7.1.5.1
"Pressurizer Relief Tank Liquid High Temp 130°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°F"	CCR Panel SA	7.1.5.1
"High-T-AVG 555°F"	CCR Panel SA	7.1.5.1
"Reactor Coolant Pump Motor Oil High Level 1 In."	CCR Panel SA	7.1.5.1

DBD Changes
ATTACHMENT TO Mod Procedure
FEX-96-12241-E
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~~ closed 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 will 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°F and 290°F, to relieve the RCS from exceeding the pressure limits given in 10CFR50 Appendix 'G' (References 7.5.6.26, 7.5.1.1). The valve will also open automatically in response to a Pressurizer high pressure signal of 2300 psig. Modification Procedure FEX-96-12241-E installed this automatic interlock to open the block valves on high Pressurizer pressure to enhance the plant's response to a postulated Appendix R event.

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.

o Pressurizer Heaters

(References 7.5.1.1, 7.1.4.6, 7.1.4.7 and 7.1.4.8)

*PLI-RCS-014

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

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, and to open PORV block valves MOV-536 and MOV-535 respectively, at pressures above 2185 PSIG, and initiate a low pressure alarm on the CCR Panel SA when the pressure falls below 2185 PSIG.

2300

G F

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. 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 Power Operated Relief Valve. The switching circuitry is set up so that the signal to open the valve will never come from the channel 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 windows are labeled as follows:

F

2300

2300

F

PRESSURIZER HIGH PRESS. 2310 PSIG
(Initiating Devices: PC-455I, & PC-456G) PC-474B and PC-457F

PRESSURIZER LOW PRESS. 2185 PSIG
Initiating Devices: PC-455J & PC-456F) G

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

Attachment 4

Cost Estimate

ENTERGY NUCLEAR NORTHEAST
IMPLEMENTATION ESTIMATE
Indian Point Nuclear Power Station

* ESTIMATE LEVEL *	EC #: SAMA IP2-053		
☑ Conceptual	PROJECT TITLE: Keep Pressurizer PORV Block Valves Open		ESTIMATOR: RCMT
☐ Preliminary	JOB LOCATION: Panels FBF, SB2, G3, E1, H4	PROJECT CODE: TBD	
☐ Definitive	☑ OUTAGE ☐ NON-OUTAGE	ORIGINATOR:	ORIG. DATE: 06/22/2012
	ESTIMATE TOTAL $1,467,848	☐ CAPITAL ☑ O&M	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 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: Peter Battaglia		Approved by: [signature]
Date: 9-20-2012		Date: 9-20-2012

ENTERGY NUCLEAR NORTHEAST
IMPLEMENTATION ESTIMATE
Indian Point Nuclear Power Station

* ESTIMATE LEVEL *	EC #: SAMA IP2-053
Conceptual	PROJECT TITLE: Keep Pressurizer PORV Block Valves Open — ESTIMATOR: RCMT
Preliminary	JOB LOCATION: Panels FBF, SB2, G3, E1, H4 — PROJECT CODE: TBD
Definitive	ORIGINATOR: — ORIG. DATE: 06/22/2012

Item	Description
1.	This estimate assumes that this work will require outage conditions to complete
2.	This estimate assumes 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 pulling in the Switchgear Room.
4.	This estimate assumes that all work will be performed by trained contract craftspersons in lieu of station maintenance personnel.
5.	This estimate provides for continuous fire watch during cable tray breeching.
6.	This estimate assumes training for 24 Plant Ops.Personnel.
7.	This estimate assumes that theAppendix R Evaluation will be performed by a Contract person for a cost of $250000.
8.	This estimate is based on the project's current level of scope definition and is classified Class 5 as defined per the AACE International Cost Estimate Classification System (see Attachment 3, Reference 2).
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 allows for and includes a contingency factor related to the complexity and location of the work required. The factor is
	A. Outside fence boundary - 20%
	B. Inside fence boundary - 30%
	C. Implementation complexity - 40%
	D. Inside Containment - 50%

Rev. 11-0

INDIAN POINT IMPLEMENTATION ESTIMATE WORK SHEET

EC #: SAMA IP2-053

PROJECT TITLE: Keep Pressurizer PORV Block Valves Open
JOB LOCATION: Panels FBF, SB2, G3, E1, H4
EST. STATUS: ☑ OUTAGE ☐ NON-OUTAGE ☐ CAPITAL ☑ O&M

PROJECT CODE: TBD
ORIGINATOR:

TAKEOFF:
ESTIMATOR: RCMT
ORIG. DATE: 06/22/2012

* ESTIMATE LEVEL *
- ☐ Conceptual
- ☐ Preliminary
- ☐ Definitive

General Notes:

ESTIMATE SUMMARY

		MANHOURS	DOLLARS
ENGINEERING			
01	STUDY, DESIGN, & CLOSEOUT	140	$ 14,000
02	DESIGN ENGR CONST SUPPORT	80	$ 8,000
03	MODS ENGR SUPPORT	-	$ -
04	SYS ENGR/ S-U ENGR	80	$ 8,000
05	PROJECT MANAGEMENT	200	$ 24,000
06	TESTING (Calibration & Testing)	40	$ 4,000
07	CONTRACT DESIGN EVALUATION SUPPORT		$ 250,000
08	ENGINEERING DCP ACCEPTANCE REVIEW	45	$ 4,500
CONTRACT ENGINEERING			
09	DESIGN ENGR CONTRACT SUPPORT	1,700	$ 204,000
10	SUPL CONTRACT MODS ENGR	-	$ -
11	MODS PLAN & SCHED -CONTRACT	40	$ 3,200
12	FIELD ENGRS / PLANNERS	80	$ 9,600
MATERIALS / MISC CONTRACTS			
13	MATERIALS		$ -
14	OTHER CONTRACTS		$ -
CONTRACT CRAFT LABOR			
15	SWEC CRAFT LABOR/WALKDOWN	970	$ 110,916
16	LOST TIME	97	$ 13,438
17	SWEC DISTRIBS		$ 28,088
PLANT CRAFT LABOR			
18	MECH MAINT.	-	$ -
19	ELECT MAINT	-	$ -
20	I&C	120	$ 12,000
21	CSG	-	$ -
MISC SUPPORT			
22	QUALITY CONTROL	40	$ 4,000
23	PLANNING & SCHEDULING	-	$ -
24	TRAINING	24	$ 2,880
25	CHEMISTRY	-	$ -
26	OPS	80	$ 9,600
27	HP / RP	40	$ 4,000
MISC CONTRACT SUPPORT			
28	QUALITY CONTROL	60	$ 4,800
29	NDE	-	$ -
30	HP / RP	40	$ 3,182
31	RADWASTE	-	$ -
32	NURSE	-	$ -
33	ELEVATOR CONTRACTOR	-	$ -
34	WASTE MANAGEMENT	-	$ -
35	HOUSEKEEPING	-	$ -
36	EQUIPMENT RENTAL	-	$ -
37	VENDOR STOCKING	-	$ -
38	DECONTAMINATION CONTRACTOR	-	$ -
39	RBC'S	-	$ -
40	SECURITY	-	$ -
41	FIRE WATCH (Rover)	-	$ -
42	SAFETY	22	$ 1,587
CONTINGENCY			
43	CONTINGENCY		$ 217,137
ESTIMATE SUBTOTAL		3,898	$ 940,928
	Site Encumbrance Premium (20%)		$ 188,186
	Loaders (30%)		$ 338,734
	ESTIMATE TOTAL		$ 1,467,848

ITEM	DESCRIPTION	QTY	UOM	CFT	NO.	MANHOURS UNIT	MANHOURS FCTR	MANHOURS TOTAL	$/MH	MATERIAL $ PER UNIT	MATERIAL DOLLARS	LABOR DOLLARS	SUB-CONTRACT	TOTAL $
1.	Gather and stage tools and materials	1	LT	EL	2	2.00	1.70	7	$ 123.32		$ -	$ 863		$ 863
2.	Perform walkdown of work area.	1	LT	EL	2	4.00	1.70	14	$ 123.32		$ -	$ 1,726		$ 1,726
3.	Gather and transport materials to work area.	1	LT	EL	2	6.00	1.70	20	$ 123.32			$ 2,466		$ 2,466
4.	Stage, erect and modify scaffolding	1	LT	CP	2	8.00	1.70	27	$ 96.00		$ -	$ 2,592		$ 2,592
5.	Stage, erect and modify scaffolding	1	LT	LB	1	8.00	1.70	14	$ 78.65		$ -	$ 1,101		$ 1,101
6.	Remove Insulation as required	1	LT	AW	2	10.00	1.70	34	$ 97.70		$ -	$ 3,322		$ 3,322
7.	Remove existing modification	1	LT	EL	2	60.00	1.70	204	$ 123.32		$ -	$ 25,157		$ 25,157
8.	Perform wiring modifications.	1	LT	EL	2	40.00	1.70	136	$ 123.32		$ -	$ 16,772		$ 16,772
9.	Perform Testing as Required	1	LT	OPS	2	20.00	1.70	68	$ 123.32		$ -	$ 8,386		$ 8,386
9.	Support Testing as Required	1	LT	EL	2	20.00	1.70	68	$ 123.32		$ -	$ 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.	Dismantle scaffold, return to storage and cleanup	1	LT	CP	2	8.00	1.70	27	$ 96.00		$ -	$ 2,592		$ 2,592
12.	Dismantle scaffold, return to storage and cleanup	1	LT	LB	2	8.00	1.70	27	$ 78.65		$ -	$ 2,124		$ 2,124
13.	Cleanup and restore work areas	1	LT	EL	2	10.00	1.70	34	$ 123.32		$ -	$ 4,193		$ 4,193
								-			$ -	$ -		$ -

Rev. 11-0

INDIAN POINT IMPLEMENTATION ESTIMATE WORK SHEET

EC #: SAMA IP2-053

PROJECT TITLE: Keep Pressurizer PORV Block Valves Open
JOB LOCATION: Panels FBF, SB2, G3, E1, H4
EST. STATUS: ☑ OUTAGE ☐ NON-OUTAGE ☐ CAPITAL ☑ O&M

PROJECT CODE: TBD
ORIGINATOR:

TAKEOFF:
ESTIMATOR: RCMT
ORIG. DATE: 06/22/2012

ITEM	DESCRIPTION	QTY	UOM	CFT	NO.	UNIT (MANHOURS)	FCTR	TOTAL	$/MH	MATERIAL $ PER UNIT	MATERIAL DOLLARS	LABOR DOLLARS	SUB-CONTRACT	TOTAL $
	PAINTING & TOUCH-UP REQUIREMENTS													
1.	PAINTING & TOUCH-UP			PT				-			$ -	$ -		$ -
2.	PAINTING & TOUCH-UP			PT				-			$ -	$ -		$ -
	FIRE WATCH / BOTTLEWATCH REQUIREMENTS													
1.	CRAFT SUPPORT FOR FIRE WATCH	1	LT	FW	1	40.00	1.70	68	$ 53.60		$ -	$ 3,645		$ 3,645
2.	CRAFT SUPPORT FOR BOTTLE WATCH							-			$ -	$ -		$ -
	MISC SUB-CONTRACT													
1.	MISC SUB-CONTRACT	1	LT										$ -	$ -
	SUBTOTAL CRAFT & SUB-CONTRACTOR							782			$ -	$ 86,647	$ -	$ 86,647
1.	CONSTRUCTION SUPPORT (8% OF LABOR $)	1	LT					63	$ 110.80			$ 6,980		$ 6,980
	SUBTOTAL							845			$ -	$ 93,627	$ -	$ 93,627
	*** RELATED COSTS ***													
1.	WALKDOWN ALLOWANCE	1	LT	EL				9	$ 123.32			$ 1,110		$ 1,110
2.	WORK PACKAGE REVIEW & CRAFT TRAINING	1	LT	EL				86	$ 123.32			$ 10,606		$ 10,606
3.	TOOL ROOM ATTENDANTS (~3.5%)	1	LT	EL				30	$ 123.32			$ 3,700		$ 3,700
4.	GENERAL CRAFT DISTRIBS. (10%)											$ 9,363		$ 9,363
5.	CRAFT IN PROCESSING (20%)											$ 18,725		$ 18,725
6.	HUMAN PERFORMANCE & ALARA TRAINING	1	LT									$ 1,873		$ 1,873
7.	(1/2 day training, or ~ 2%)													
	SUBTOTAL							970			$ -	$ 139,004	$ -	$ 139,004
	PLANT SCOPE													
1.	**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	1	120.00	1.00	120	$ 100.00		$ -	$ 12,000		$ 12,000
				PL				-			$ -	$ -		$ -
	SUBTOTAL I&C MAINT.							120			$ -	$ 12,000	$ -	$ 12,000
1.	**CSG**			PL				-			$ -	$ -		$ -
				PL				-			$ -	$ -		$ -
	SUBTOTAL CSG MAINT.							-			$ -	$ -	$ -	$ -
	SUBTOTAL PLANT							120			$ -	$ 12,000	$ -	$ 12,000
	SUBTOTAL CRAFT/PLANT							1,090			$ -	$ 151,004	$ -	$ 151,004
	IMPLEMENTATION SUPPORT													
1.	MODS ENGINEERING	1	LT	NM				-				$ -		$ -
2.	DESIGN ENGINEERING SUPT DURING CONST	1	LT	NM	1	80.00	1.00	80	$ 100.00			$ 8,000		$ 8,000
3.	SYSTEMS ENGINEERING - MECHANICAL	1	LT	NM				-				$ -		$ -
4.	SYS ENGINEERING - ELECTRICAL	1	LT	NM	1	40.00	1.00	40	$ 100.00			$ 4,000		$ 4,000
5.	SYS ENGINEERING - INSTR & CONTROL	1	LT	NM	1	40.00	1.00	40	$ 100.00			$ 4,000		$ 4,000
6.	SYS ENGINEERING - CIVIL STRUCTURAL		LT	NM				-				$ -		$ -
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	24	1.00	1.00	24	$ 120.00			$ 2,880		$ 2,880
9.	QA / QC VERIFICATION	1	LT	NM	1	40.00	1.00	40	$ 100.00			$ 4,000		$ 4,000
10.	PLANNING & SCHEDULING	1	LT	NM	1	-	1.00	-				$ -		$ -
11.	HP / RP/ ALARA	1	LT	NM	1	40.00	1.00	40	$ 100.00			$ 4,000		$ 4,000
12.	CHEMISTRY	1	LT	NM				-				$ -		$ -
13.	OPS (DEVELOP/REVISE PROCEDURE(S))	1	LT	NM	1	80.00	1.00	80	$ 120.00			$ 9,600		$ 9,600
14.	TRAVEL & LIVING EXPENSES	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	40.00	1.00	40	$ 80.00			$ 3,200		$ 3,200
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	60.00	1.00	60	$ 80.00			$ 4,800		$ 4,800
5.	NDE	1	LT	NM				-				$ -		$ -
6.	HP / RP	1	LT	NM	1	40.00	1.00	40	$ 79.56			$ 3,182		$ 3,182
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.	VENDOR STOCKING	1	LT	NM				-						
14.	DECONTAMINATION CONTRACTOR	1	LT	NM				-						
15.	RBC's	1	LT	NM				-						
16.	SECURITY	1	LT	SEC				-						
17.	FIRE WATCH (Rover)	1	LT	NM								$ -		$ -
18.	SAFETY (2%)	1	LT	NM				22	$ 72.14			$ 1,587		$ 1,587
19.	LOST TIME (10%)	1	LT					97	$ 138.54			$ 13,438		$ 13,438

Rev. 11-0

INDIAN POINT IMPLEMENTATION ESTIMATE WORK SHEET

EC #: SAMA IP2-053

PROJECT TITLE: Keep Pressurizer PORV Block Valves Open
JOB LOCATION: Panels FBF, SB2, G3, E1, H4
EST. STATUS: ☑ OUTAGE ☐ NON-OUTAGE ☐ CAPITAL ☑ O&M

PROJECT CODE: TBD
ORIGINATOR:

TAKEOFF:
ESTIMATOR: RCMT
ORIG. DATE: 06/22/2012

ITEM	DESCRIPTION	QTY	UOM	CFT	NO.	MANHOURS UNIT	FCTR	TOTAL	$/MH	MATERIAL $ PER UNIT	MATERIAL DOLLARS	LABOR DOLLARS	SUB-CONTRACT	TOTAL $
	SUBTOTAL CRAFT/NON-MANUAL							1,973			$ -	$ 247,291	$ -	$ 247,291
1.	FREIGHT, SALES TAX, & CONSUMABLES (6%)										$ -			$ -
	SUBTOTAL INSTALLATION COST							1,973			$ -	$ 247,291	$ -	$ 247,291
1.	DESIGN ENGINEERING - MECHANICAL	1	LT	NM				-				$ -		$ -
2.	DESIGN ENGINEERING - ELECTRICAL	1	LT	NM	1	80.00	1.00	80	$ 100.00			$ 8,000		$ 8,000
3.	DESIGN ENGINEERING - INSTR. & CONTROL	1	LT	NM	1	60.00	1.00	60	$ 100.00			$ 6,000		$ 6,000
4.	DESIGN ENGINEERING - CIVIL/STRUCTURAL	1	LT	NM				-				$ -		$ -
5.	TESTING (Instrument Calibration and testing)	1	LT	NM	2	20.00	1.00	40	$ 100.00			$ 4,000	$ -	$ 4,000
6.	CONTRACT ENGR DESIGN SUPPORT	1	LT	NM	1	1,700.00	1.00	1,700	$ 120.00			$ 204,000	$ -	$ 204,000
7.	Appendix R Evaluation	1	LT	NM	1								$ 250,000	$ 250,000
8.	DESIGN ENG. DCP ACCEPTANCE REVIEW	1	LT	NM	1	45.00	1.00	45	$ 100.00			$ 4,500	$ -	$ 4,500
	SUBTOTAL DESIGN COST							1,925				$ 226,500	$ -	$ 476,500
	SUBTOTAL INSTALLATION & DESIGN COST											$ 473,791	$ -	$ 723,791
1.	CONTINGENCY (30%)													$ 217,137
	ESTIMATE SUBTOTAL							3,898						$ 940,928

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: Peter Battaglia	Approved by:
Date: 9-20-2012	Date: 9-20-2012

TABLE OF CONTENTS

1.0 ISSUE

<u>Severe Accident Mitigation Alternative (SAMA) IP2-054:</u>

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.

3.0 EXISTING CONDITIONS

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.

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 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".
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"
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

Item 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

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.: SAMA IP2-054 **Rev. No.:** CONCEPTUAL 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	☐ 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	☐ 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

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	☒ NO
Cable and Raceway Program • Does the proposed activity involve any changes to cable trays, raceways or the associated documentation?	■ YES	☐ 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) *(if applicable)* • 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 • 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?	■ 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?	☐ 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

ATTACHMENT 9.3 IMPACT SCREENING SUMMARY

SHEET 3 OF 6

PROCESS OR PROGRAM IMPACT SCREENING CHECKLIST	Potential Impact	
Computer Support and Software • Does the proposed activity impact or involve changes to plant computer software or firmware or impact Software Quality Assurance (SQA)?	☐ YES	☒ NO
Chemistry and Environmental Impact • Does the proposed activity impact or involve any changes to plant chemistry requirements, operations or procedures, or any changes to the environment?	☐ YES	☒ NO
Radiation Protection (RP) Program Impact • 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?	■ 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	☐ 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 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

IPEC00269978

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?	☐ 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	☒ 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?	☐ 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

ATTACHMENT 9.3 IMPACT SCREENING SUMMARY

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	☒ 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	☒ 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	☐ 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?	☐ 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

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?	■ YES	☐ 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	☐ NO
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: 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
4. 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

RCM Technologies The Source of Smart Solutions	ENTERGY Indian Point Nuclear Station Unit 2	Conceptual Design Package SAMA IP2-054	Rev. 0

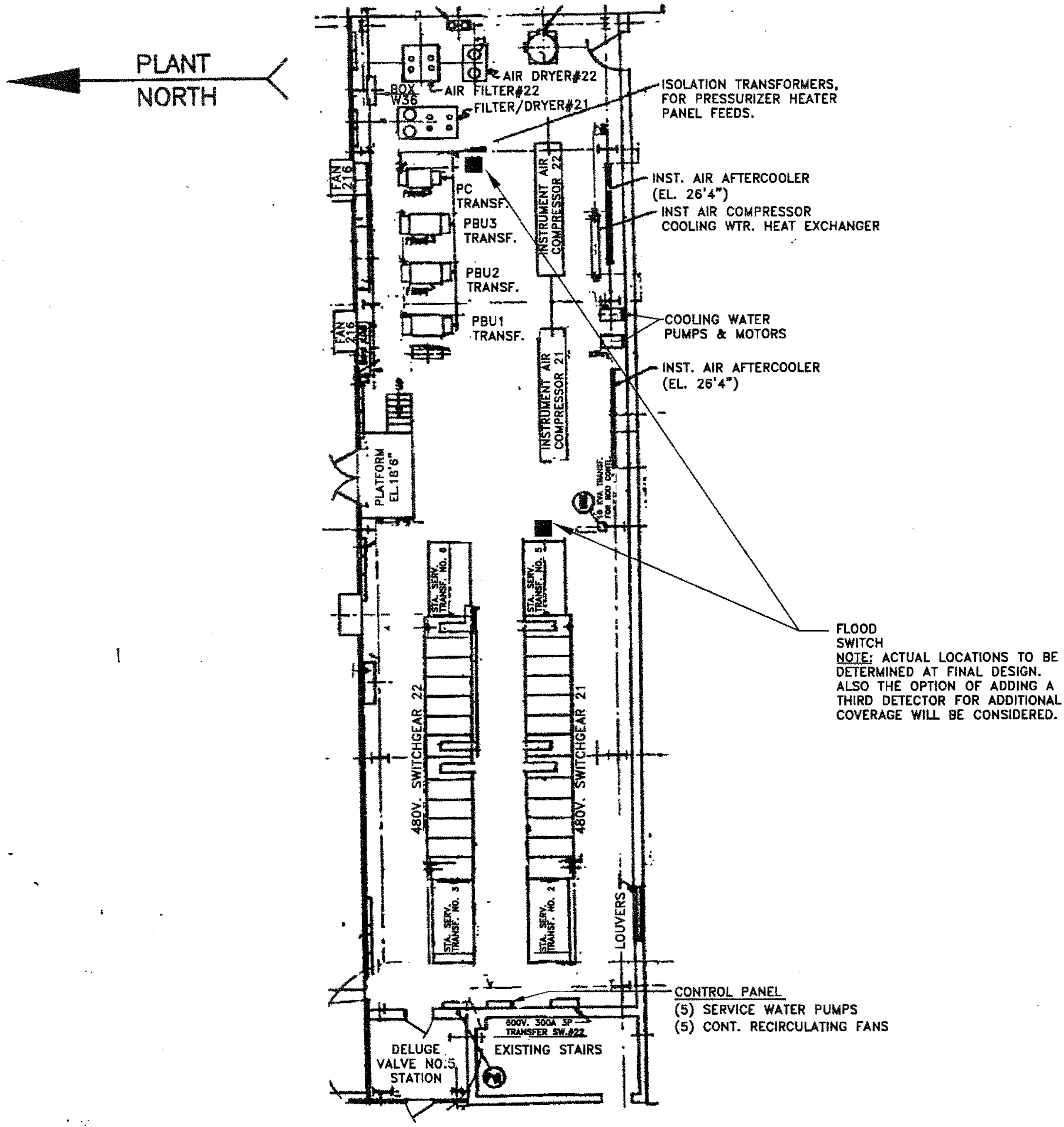


Figure 1
EQUIPMENT ARRANGEMENT CONTROL BUILDING AT EL. 15'-0"-FLOOD SWITCH LOCATION
(REFERENCE DWG. 9321-F-3052)
(NOT TO SCALE)

RCM Technologies	ENTERGY Indian Point Nuclear Station Unit 2	Conceptual Design Package SAMA IP2-054	Rev. 0

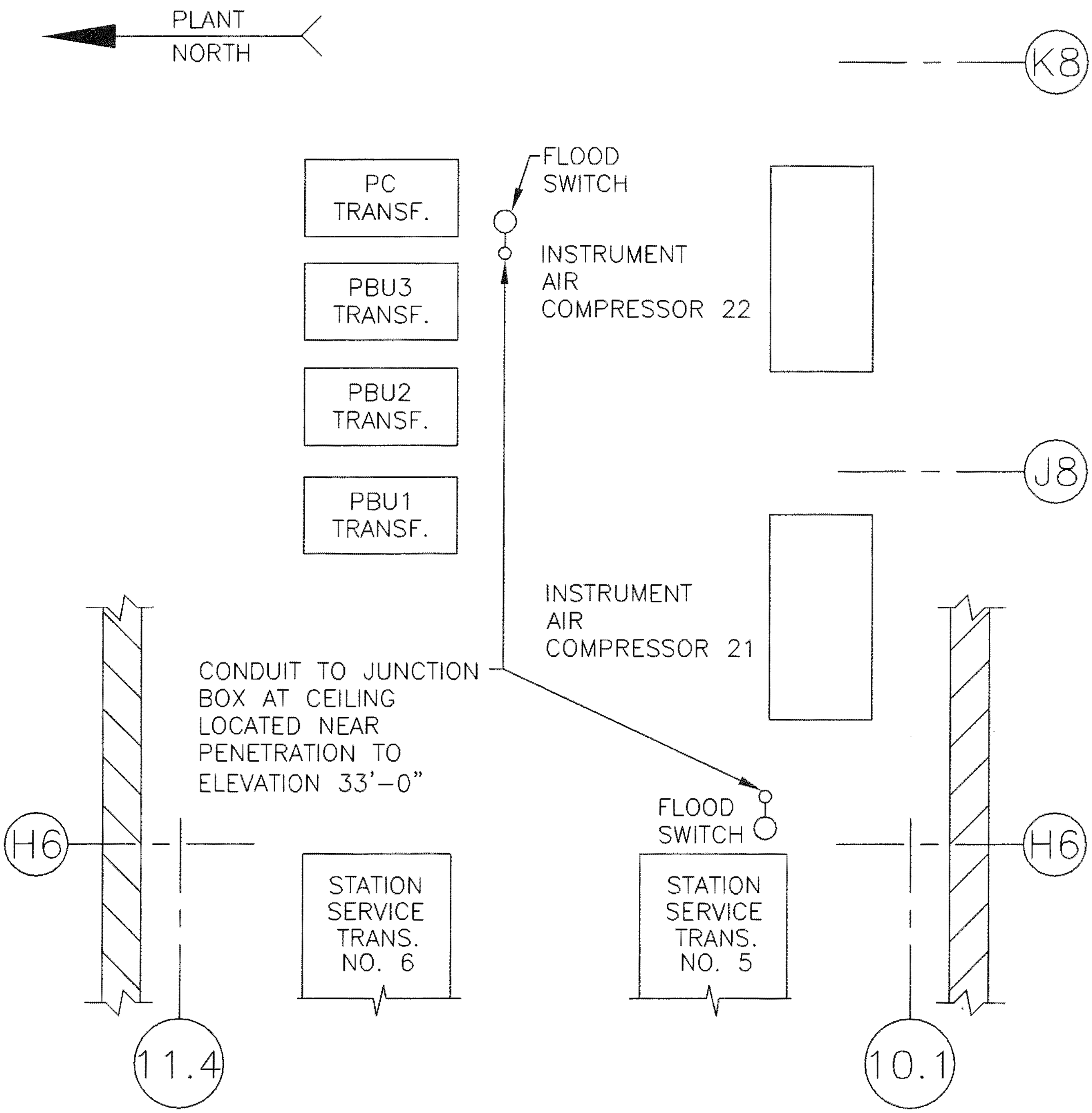


Figure 2
EQUIPMENT ARRANGEMENT CONTROL BUILDING AT EL. 15'-0"-FLOOD SWITCH LOCATION
(REFERENCE DWG. 9321-F-3052)
(NOT TO SCALE)

RCM Technologies — The Source of Smart Solutions	ENTERGY Indian Point Nuclear Station Unit 2	Conceptual Design Package SAMA IP2-054	Rev. 0

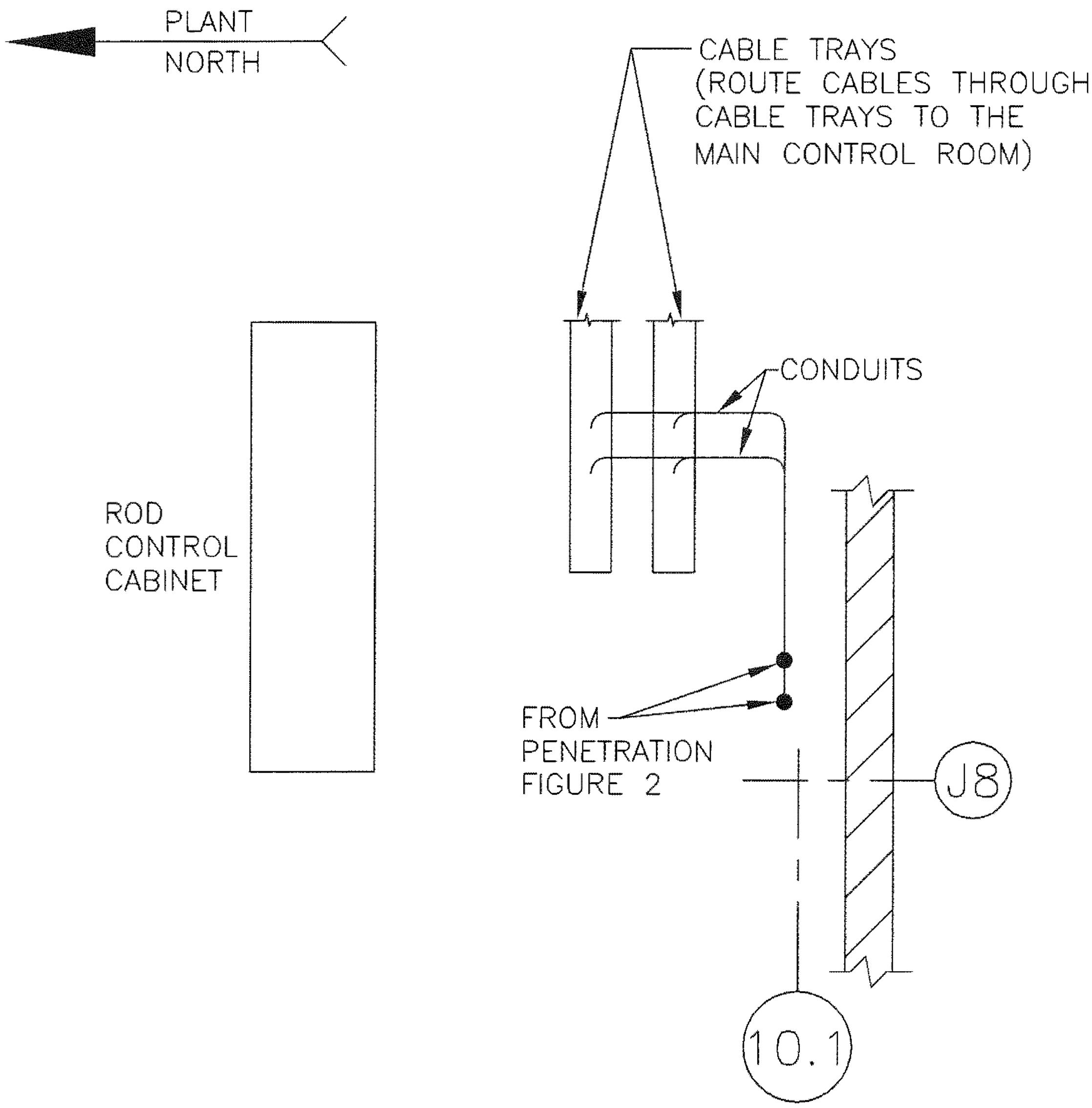


Figure 3
EQUIPMENT ARRANGEMENT CONTROL BUILDING AT EL. 33'-0"
CONDUITS DUMPING INTO CABLE TRAYS
(REFERENCE DWG. 9321-F-3052)
(NOT TO SCALE)

RCM Technologies *The Source of Smart Solutions*	ENTERGY Indian Point Nuclear Station Unit 2	Conceptual Design Package SAMA IP2-054	Rev. 0

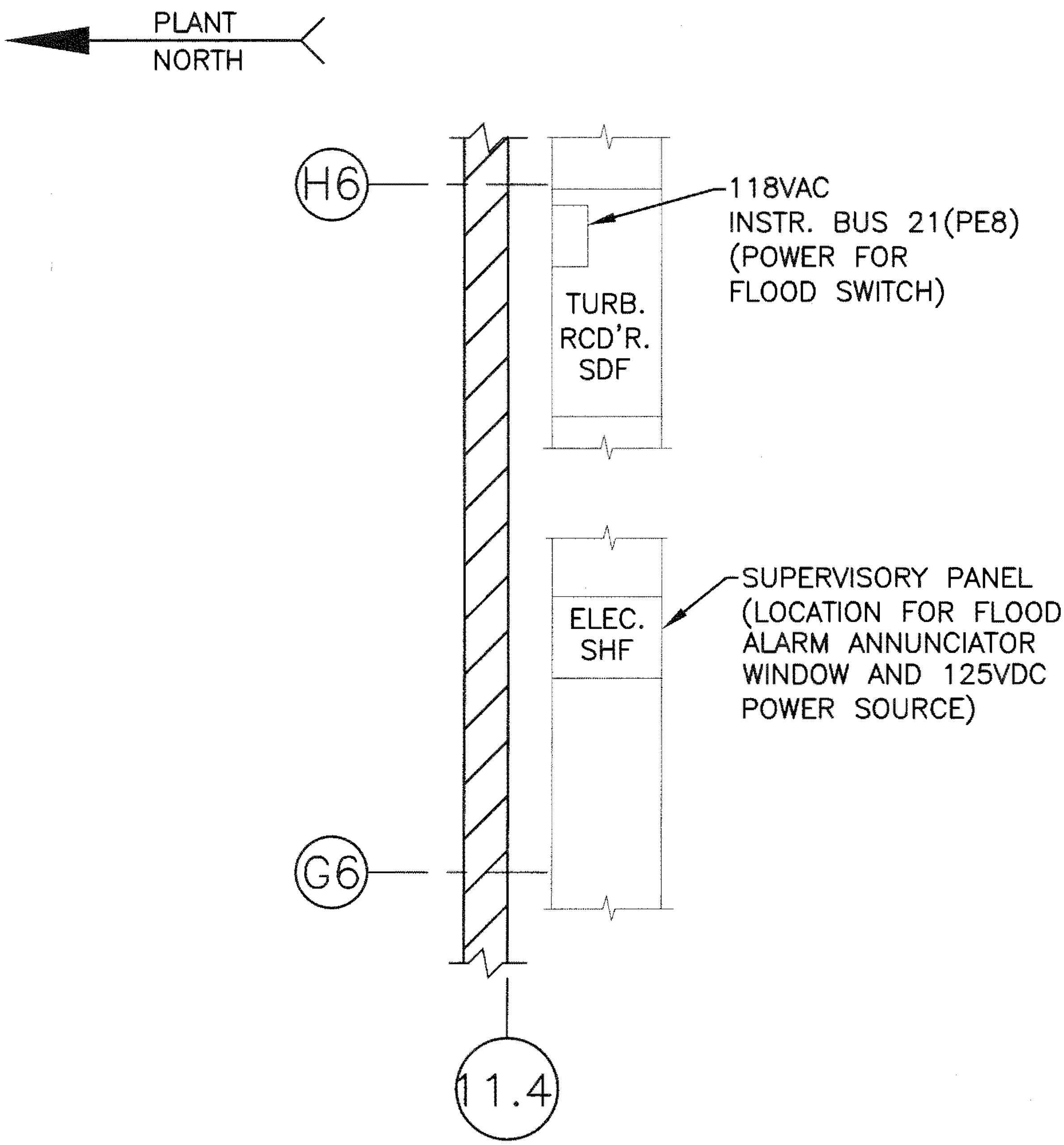
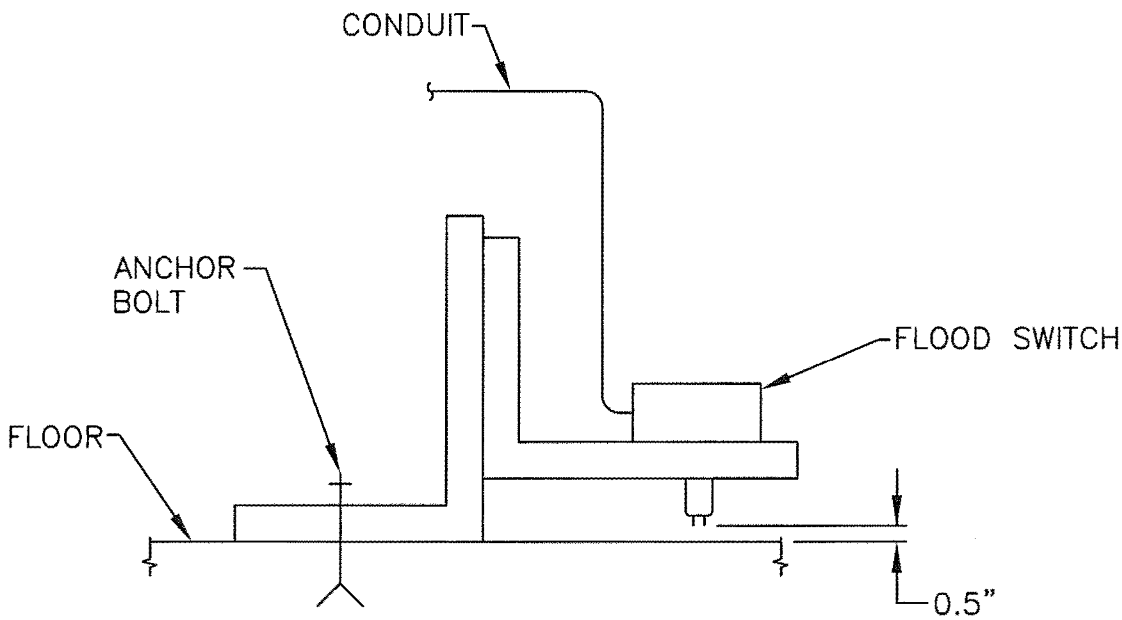


Figure 4
EQUIPMENT ARRANGEMENT CONTROL BUILDING AT EL. 53'-0"
ANNUNCIATOR WINDOW LOCATION AND POWER FOR FLOOD SWITCH
(REFERENCE DWG. 1999MC3415)
(NOT TO SCALE)

IPEC00269986



FLOOD SWITCH
AND SUPPORT

Figure 5
DETAIL FOR FLOOD SWITCH AND SUPPORT
(NOT TO SCALE)

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. FCI Model FLT93S FlexSwitch (included here)

FCI FLUID COMPONENTS INTERNATIONAL LLC

Products

Level Switches

FLT93B

FLT93S

FLT93F

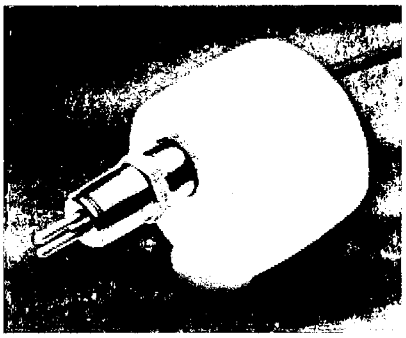
FLT93C

F' 93M

L. 00

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 ± 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/level detection in settling vessels
Interface/sump level detection in separation vessels	Foam or sediment level control
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]

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. Hastelloy 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]
- 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]

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.

 Contact Us at 800-854-1993 or 760-744-6950

Attachment 4

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 ☑ O&M		ESTIMATOR: RCMT
☐ Preliminary	JOB LOCATION: 480 Volt Switchgear Room		PROJECT CODE: TBD	
☐ Definitive	☐ OUTAGE ☑ NON-OUTAGE	ORIGINATOR:		ORIG. DATE: 06/14/2012
	ESTIMATE TOTAL $456,985		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 IP2-054 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: Peter Bottacavolo		Approved by: [signature]
Date: 9-20-2012		Date: 9-20-2012

ENTERGY NUCLEAR NORTHEAST
IMPLEMENTATION ESTIMATE
Indian Point Nuclear Power Station

* ESTIMATE 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 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.	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 work will be performed by trained contract craftspersons in lieu of station maintenance personnel.
5.	This estimate assumes that a three buck scaffold will be required for conduit installation and wire pulling in the Switchgear Room.
6.	This estimate assumes that the detection device mounting brackets will be fabricated in the shop for installation in the Switchgear Room.
7.	This estimate provides for continuous fire watch during cable tray breeching.
8.	This estimate assumes that a blank annunciator panel is available for use in the existing Unit 2 Control Room.
9.	This estimate assumes 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 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%
	B. Inside fence boundary - 30%
	C. Implementation complexity - 40%
	D. Inside Containment - 50%

Rev.
11-0

INDIAN POINT IMPLEMENTATION ESTIMATE WORK SHEET

EC #: SAMA IP2-054

PROJECT TITLE: Flood Detection System
JOB LOCATION: 480 Volt Switchgear Room
EST. STATUS: ☐ OUTAGE ☑ NON-OUTAGE

☐ CAPITAL ☑ O&M
PROJECT CODE: TBD
ORIGINATOR:

TAKEOFF:
ESTIMATOR: RCMT
ORIG. DATE: 06/14/2012

*** ESTIMATE LEVEL ***

- ☑ **Conceptual**
- ☐ **Preliminary**
- ☐ **Definitive**

General Notes:

ESTIMATE SUMMARY

		MANHOURS	DOLLARS
ENGINEERING			
01	STUDY, DESIGN, & CLOSEOUT	80	$ 8,000
02	DESIGN ENGR CONST SUPPORT	40	$ 4,000
03	MODS ENGR SUPPORT	-	$ -
04	SYS ENGR/ S-U ENGR	80	$ 8,000
05	PROJECT MANAGEMENT	240	$ 28,800
06	TESTING (Calibration & Testing)	20	$ 2,000
07	TRAVEL & LIVING EXPENSES		$ -
08	ENGINEERING DCP ACCEPTANCE REVIEW	25	$ 2,500
CONTRACT ENGINEERING			
09	DESIGN ENGR CONTRACT SUPPORT	480	$ 57,600
10	SUPL CONTRACT MODS ENGR	-	$ -
11	MODS PLAN & SCHED -CONTRACT	20	$ 2,000
12	OSG FIELD ENGRS / PLANNERS	80	$ 9,600
MATERIALS / MISC CONTRACTS			
13	MATERIALS		$ -
14	OTHER CONTRACTS		$ -
CONTRACT CRAFT LABOR			
15	SWEC CRAFT LABOR/WALKDOWN	504	$ 54,410
16	LOST TIME	50	$ 5,322
17	SWEC DISTRIBS		$ -
PLANT CRAFT LABOR			
18	MECH MAINT.	-	$ -
19	ELECT MAINT	-	$ -
20	I&C	120	$ 12,000
21	CSG	-	$ -
MISC SUPPORT			
22	QUALITY CONTROL	40	$ 4,000
23	PLANNING & SCHEDULING	-	$ -
24	TRAINING	12	$ 1,440
25	SIMULATOR CHANGES	120	$ 12,000
26	OPS	80	$ 9,600
27	HP / RP	-	$ -
MISC CONTRACT SUPPORT			
28	QUALITY CONTROL	40	$ 3,200
29	NDE	-	$ -
30	HP / RP	-	$ -
31	RADWASTE	-	$ -
32	NURSE	-	$ -
33	ELEVATOR CONTRACTOR	-	$ -
34	WASTE MANAGEMENT	-	$ -
35	HOUSEKEEPING	-	$ -
36	EQUIPMENT RENTAL	-	$ -
37	VENDOR STOCKING	-	$ -
38	DECONTAMINATION CONTRACTOR	-	$ -
39	RBC'S	-	$ -
40	SECURITY	-	$ -
41	FIRE WATCH (Rover)	-	$ -
42	SAFETY	12	$ 866
43	CONTINGENCY		$ 67,601
ESTIMATE SUBTOTAL		**2,043**	**$ 292,939**
	SITE ENCUMBRANCE PREMIUM (20%)		**$ 58,588**
	LOADERS (30%)		**$ 105,458**
ESTIMATE TOTAL			**$ 456,985**

ITEM	DESCRIPTION	QTY	UOM	CFT	NO.	MANHOURS UNIT	MANHOURS FCTR	MANHOURS TOTAL	$/MH	MATERIALS PER UNIT	MATERIAL DOLLARS	LABOR DOLLARS	SUB-CONTRACT	TOTAL $
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	1	LT	EL	2	4.00	1.00	8	$ 123.32		$ -	$ 987		$ 987
3.	Gather and transport detectors, wire and conduit	1	LT	EL	2	6.00	1.00	12	$ 123.32		$ -	$ 1,480		$ 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.	Stage, erect and modify scaffolding	1	LT	CP	2	8.00	1.00	16	$ 96.00		$ -	$ 1,536		$ 1,536
6.	Stage, erect and modify scaffolding	1	LT	LB	1	8.00	1.00	8	$ 78.65		$ -	$ 629		$ 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.	Procure and install conduit supports	10	EA	EL	2	2.00	1.00	40	$ 123.32	$ 10.00	$ 100	$ 4,933		$ 5,033
9.	Procure and install Junction Boxes	2	EA	EL	2	2.00	1.00	8	$ 123.32	$ 10.00	$ 20	$ 987		$ 1,007
10.	Core Bore between EL 15 and EL 33	1	LF	EL	2	10.00	1.00	20	$ 123.32		$ -	$ 2,466		$ 2,466
11.	Procure and install FCI Model FLT 93 FlexSWITCH	2	EA	EL	2	2.00	1.00	8	$ 123.32	$ 1,100.00	$ 2,200	$ 987		$ 3,187
12.	Remove Control Room fire seal and route new wiring	1	LT	EL	2	10.00	1.00	20	$ 123.32		$ -	$ 2,466		$ 2,466
13.	Procure, pull and terminate 125 VDC detector wiring	240	LF	EL	2	0.030	1.00	14	$ 123.32	$ 1.25	$ 300	$ 1,726		$ 2,026
14.	Procure, pull and terminate 120 VAC detector wiring	240	LF	EL	2	0.030	1.00	14	$ 123.32	$ 1.25	$ 300	$ 1,726		$ 2,026
15.	Replace and test Control Room fire seal as required	1	LT	EL	2	6.00	1.00	12	$ 123.32		$ -	$ 1,480		$ 1,480
16.	Procure and install annunciator in Control Room	1	EA	EL	2	12.00	1.00	24	$ 123.32	$ 150.00	$ 150	$ 2,960		$ 3,110
17.	Terminate and test annunciator in Control Room	1	EA	EL	2	4.00	1.00	8	$ 123.32	$ 150.00	$ 150	$ 987		$ 1,137
18.	Dismantle scaffold, return to storage and cleanup	1	LT	CP	2	8.00	1.00	16	$ 96.00		$ -	$ 1,536		$ 1,536
19.	Dismantle scaffold, return to storage and cleanup	1	LT	LB	1	8.00	1.00	8	$ 78.65		$ -	$ 629		$ 629
20.	Cleanup and restore work areas	1	LT	EL	2	4.00	1.00	8	$ 123.32		$ -	$ 987		$ 987
								-			$ -	$ -		$ -
	PAINTING & TOUCH-UP REQUIREMENTS													
1.	PAINTING & TOUCH-UP			PT										$ -
2.	PAINTING & TOUCH-UP			PT										$ -

Rev. 11-0

INDIAN POINT IMPLEMENTATION ESTIMATE WORK SHEET

EC #: SAMA IP2-054

PROJECT TITLE: Flood Detection System
JOB LOCATION: 480 Volt Switchgear Room
EST. STATUS: ☐ OUTAGE ☑ NON-OUTAGE

☐ CAPITAL ☑ O&M
PROJECT CODE: TBD
ORIGINATOR:

TAKEOFF:
ESTIMATOR: RCMT
ORIG. DATE: 06/14/2012

						MANHOURS				MATERIAL$	MATERIAL	LABOR	SUB-	
ITEM	DESCRIPTION	QTY	UOM	CFT	NO.	UNIT	FCTR	TOTAL	$/MH	PER UNIT	DOLLARS	DOLLARS	CONTRACT	TOTAL $
	FIRE WATCH / BOTTLEWATCH REQUIREMENTS													
1.	CRAFT SUPPORT FOR FIRE WATCH	1	LT	FW	1	80.00	1.00	80	$ 53.60		$ -	$ 4,288		$ 4,288
2.	CRAFT SUPPORT FOR BOTTLE WATCH	1	LT	FW				-			$ -	$ -		$ -
	MISC SUB-CONTRACT													
1.	MISC SUB-CONTRACT	1	LT										$ -	$ -
	SUBTOTAL CRAFT & SUB-CONTRACTOR							373	2,376	1,464	$ 3,620	$ 38,832	$ -	$ 43,916
1.	CONSTRUCTION SUPPORT (8% OF LABOR $)	1	LT					30	$ 104.11			$ 3,123		$ 3,123
	SUBTOTAL							403	$ 2,480	1,464	$ 3,620	$ 41,955	$ -	$ 47,039
	*** RELATED COSTS ***													
1.	WALKDOWN ALLOWANCE	1	LT	EL				5	$ 123.32			$ 617		$ 617
2.	WORK PACKAGE REVIEW & CRAFT TRAINING	1	LT	EL				82	$ 123.32			$ 10,112		$ 10,112
3.	TOOL ROOM ATTENDANTS (~3.5%)	1	LT	EL				14	$ 123.32			$ 1,726		$ 1,726
4.	GENERAL CRAFT DISTRIBS. (10%)													$ -
5.	CRAFT IN PROCESSING (20%)													$ -
6.	HUMAN PERFORMANCE & ALARA TRAINING	1	LT											$ -
7.	(1/2 day training, or ~ 2%)													
	SUBTOTAL							504	2,850		$ 3,620	$ 54,410	$ -	$ 58,030
	PLANT SCOPE													
1.	**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	1	120.00	1.00	120	$ 100.00		$ -	$ 12,000		$ 12,000
				PL				-			$ -	$ -		$ -
	SUBTOTAL I&C MAINT.							120			$ -	$ 12,000	$ -	$ 12,000
1.	**CSG**			PL				-			$ -	$ -		$ -
				PL				-			$ -	$ -		$ -
	SUBTOTAL CSG MAINT.							-			$ -	$ -	$ -	$ -
	SUBTOTAL PLANT							120			$ -	$ 12,000	$ -	$ 12,000
	SUBTOTAL CRAFT/PLANT							624			$ 3,620	$ 66,410	$ -	$ 70,030
	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
3.	SYSTEMS ENGINEERING - MECHANICAL	1	LT	NM				-				$ -		$ -
4.	SYSTEMS ENGINEERING - ELECTRICAL	1	LT	NM	1	40.00	1.00	40	$ 100.00			$ 4,000		$ 4,000
5.	SYSTEMS EINGINEERING - INSTR & CONTROL	1	LT	NM	1	40.00	1.00	40	$ 100.00			$ 4,000		$ 4,000
6.	SYSTEMS ENGINEERING - CIVIL STRUCTURAL	1	LT	NM				-				$ -		$ -
7.	PROJECT MANAGEMENT	1	LT	NM	1	240.00	1.00	240	$ 120.00			$ 28,800		$ 28,800
8.	TRAINING (OPS Staff)	1	LT	NM	12	12.00	1.00	12	$ 120.00			$ 1,440		$ 1,440
9.	QA / QC VERIFICATION	1	LT	NM	1	40.00	1.00	40	$ 100.00			$ 4,000		$ 4,000
10.	PLANNING & SCHEDULING	1	LT	NM				-				$ -		$ -
11.	HP / RP/ ALARA	1	LT	NM				-				$ -		$ -
12.	SIMULATOR CHANGES	1	LT	NM	1	120.00	1.00	120	$ 100.00			$ 12,000		$ 12,000
13.	OPS (DEVELOP/REVISE PROCEDURE(S))	1	LT	NM	1	80.00	1.00	80	$ 120.00			$ 9,600		$ 9,600
14.	TRAVEL & LIVING EXPENSES	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	20.00	1.00	20	$ 100.00			$ 2,000		$ 2,000
3.	OSG 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
5.	NDE	1	LT	NM				-				$ -		$ -
6.	HP / RP	1	LT	NM				-				$ -		$ -
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.	VENDOR STOCKING	1	LT	NM										
14.	DECONTAMINATION CONTRACTOR	1	LT	NM										
15.	RBC's	1	LT	NM										
16.	SECURITY	1	LT	SEC										
17.	FIREWATCH (Rover)		LT	NM								$ -		$ -
18.	SAFETY (2%)	1	LT	NM				12	$ 72.14			$ 866		$ 866
19.	LOST TIME (10%)	1	LT					50	$ 106.43			$ 5,322		$ 5,322
	SUBTOTAL CRAFT/NON-MANUAL							1,438			$ 3,620	$ 155,238	$ -	$ 158,858

Rev. 11-0

INDIAN POINT IMPLEMENTATION ESTIMATE WORK SHEET

EC #: SAMA IP2-054

PROJECT TITLE: Flood Detection System
JOB LOCATION: 480 Volt Switchgear Room
EST. STATUS: ☐ OUTAGE ☑ NON-OUTAGE

☐ CAPITAL ☑ O&M
PROJECT CODE: TBD
ORIGINATOR:

TAKEOFF:
ESTIMATOR: RCMT
ORIG. DATE: 06/14/2012

				MANHOURS						MATERIAL$	MATERIAL	LABOR	SUB-	
ITEM	DESCRIPTION	QTY	UOM	CFT	NO.	UNIT	FCTR	TOTAL	$/MH	PER UNIT	DOLLARS	DOLLARS	CONTRACT	TOTAL $
1.	FREIGHT, SALES TAX, & CONSUMABLES (6%)										$ 217			$ 217
	SUBTOTAL INSTALLATION COST							1,438			$ 3,837	$ 155,238	$ -	$ 159,075
1.	DESIGN ENGINEERING - MECHANICAL	1	LT	NM				-				$ -		$ -
2.	DESIGN ENGINEERING - ELECTRICAL	1	LT	NM	1	40.00	1.00	40	$ 100.00			$ 4,000		$ 4,000
3.	DESIGN ENGINEERING - INSTR. & CONTROL	1	LT	NM	1	40.00	1.00	40	$ 100.00			$ 4,000		$ 4,000
4.	DESIGN ENGINEERING - CIVIL/STRUCTURAL	1	LT	NM				-				$ -		$ -
5.	TESTING (Instrument Calibration and testing)	1	LT	NM	2	10.00	1.00	20	$ 100.00			$ 2,000	$ -	$ 2,000
6.	CONTRACT ENGR DESIGN SUPPORT	1	LT	NM	1	480.00	1.00	480	$ 120.00			$ 57,600		$ 57,600
7.	DESIGN ENG. ACCEPTANCE REVIEW	1	LT	NM	1	25.00	1.00	25	$ 100.00			$ 2,500		$ 2,500
	SUBTOTAL DESIGN COST							605				$ 70,100	$ -	$ 70,100
	SUBTOTAL INSTALLATION & DESIGN COST							2,043				$ 225,338	$ -	$ 225,338
1.	CONTINGENCY (30%)													$ 67,601
	ESTIMATE SUBTOTAL							2,043						$ 292,939

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: Peter Buttacavoli	Approved by:
Date: 9-20-2012	Date: 9-20-2012

TABLE OF CONTENTS

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.

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.

7.0 PRELIMINARY MATERIAL LIST

Item 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

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 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.: SAMA IP2-056 **Rev. No.:** CONCEPTUAL 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	☐ 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	☐ 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

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	☐ NO
Cable and Raceway Program • Does the proposed activity involve any changes to cable trays, raceways or the associated documentation?	☐ YES	☒ 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) *(if applicable)* • 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 • 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?	■ 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?	☐ 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

PROCESS OR PROGRAM IMPACT SCREENING CHECKLIST	Potential Impact	
Computer Support and Software • Does the proposed activity impact or involve changes to plant computer software or firmware or impact Software Quality Assurance (SQA)?	☐ YES	☒ NO
Chemistry and Environmental Impact • Does the proposed activity impact or involve any changes to plant chemistry requirements, operations or procedures, or any changes to the environment?	☐ YES	☒ NO
Radiation Protection (RP) Program Impact • 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?	■ 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	☐ 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 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

ATTACHMENT 9.3 — IMPACT SCREENING SUMMARY

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	☒ 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?	☐ 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?	☐ 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

ATTACHMENT 9.3 **IMPACT SCREENING SUMMARY**

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	☒ 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	☐ 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	☐ 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?	■ 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

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?	■ YES	☐ 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	☐ NO
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: Addition of Pressure Relief Valves at MOV 746 and MOV 747

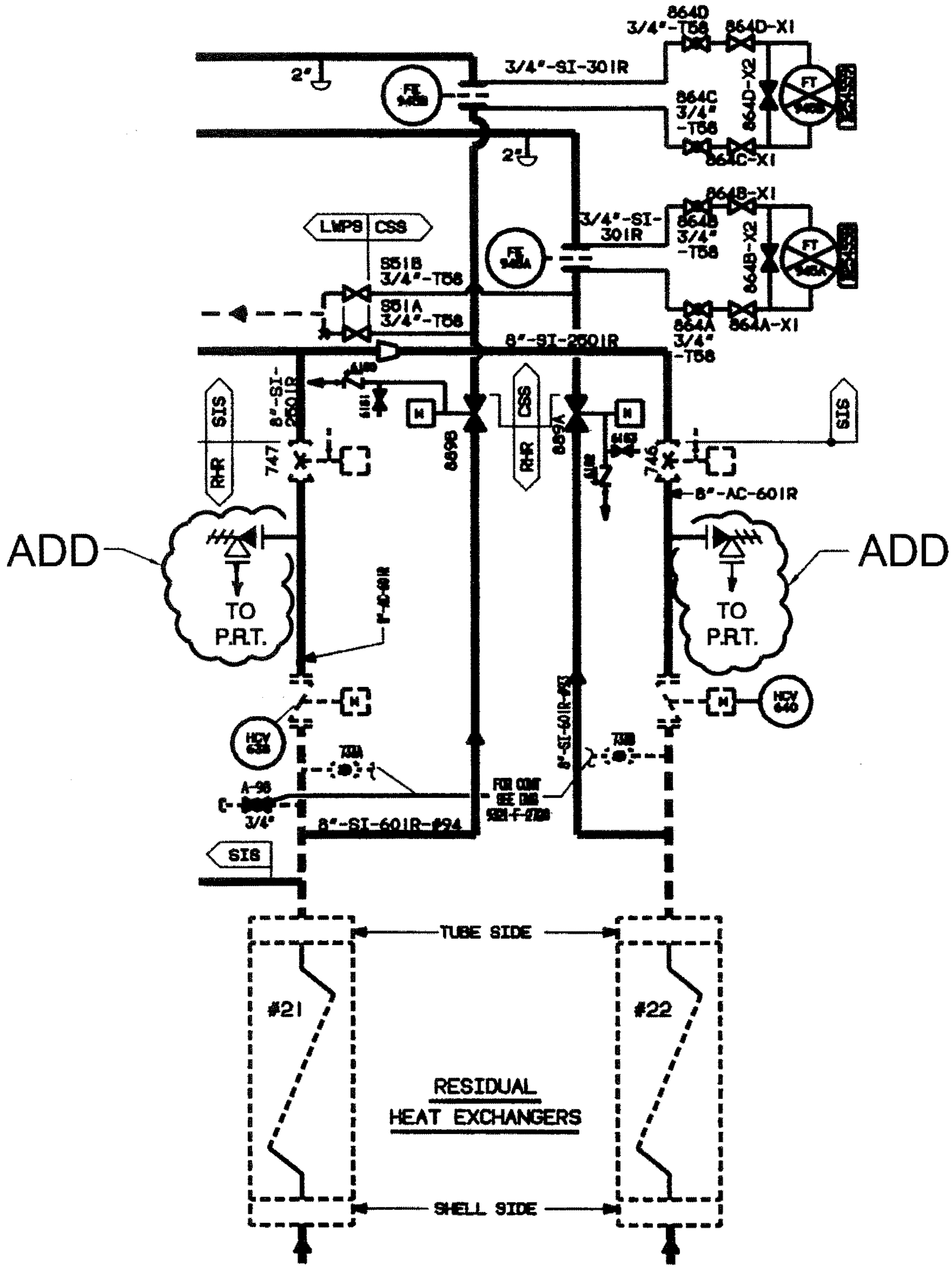


Figure 1
Addition of Pressure Relief Valves at MOV-746 and MOV-747
Ref. Dwg. A235296 FLOW DIAGRAM SAFETY INJECTION SYSTEM

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. 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

Attachment 4

Cost Estimate

IMPLEMENTATION ESTIMATE
Indian Point Nuclear Power Station

* ESTIMATE LEVEL *	EC #: SAMA IP2-056		
☑ Conceptual	PROJECT TITLE: KEEP RHR Hx DISCH MOV's OPEN		ESTIMATOR: RCMT
☐ Preliminary	JOB LOCATION: Containment Building.	PROJECT CODE: TBD	
☐ Definitive	☐ OUTAGE ☑ NON-OUTAGE ORIGINATOR:	☑ CAPITAL ☐ O&M	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:		Approved by:
Date: 9-20-2012		Date: 9-20-2012

ENTERGY NUCLEAR NORTHEAST
IMPLEMENTATION ESTIMATE
Indian Point Nuclear Power Station

EC #: SAMA IP2-056

* ESTIMATE LEVEL *	
☑ **Conceptual**	PROJECT TITLE: KEEP RHR Hx DISCH MOV's OPEN — ESTIMATOR: RCMT
☐ **Preliminary**	JOB LOCATION: Containment Building. — PROJECT CODE: TBD
☐ **Definitive**	☐ OUTAGE ☑ NON-OUTAGE — ORIGINATOR: — ORIG. DATE:02/16/2012

Item	Description
1.	This estimate assumes that this work will require both non-outage and outage conditions to complete.
2.	This estimate assumes that the non-outage work work will complete during 2012.
3.	This estimate assumes that the outage work will be completed in 2012 working (2) 10 hour shifts 6 days per week.
4.	This estimate assumes that the non-outage work will not suffer productivity loss due to radiation or hazardous conditions..
5.	This estimate assumes that all work will be performed by trained contract craftspersons in lieu of station maintenance personnel.
6.	This estimate assumes that the new relief valves will be purchased with all required qualifications and certifications and will be tested just prior to installation.
7.	This estimate assumes that (4) Fitter / Welders will be assigned for non-outage work and (2) of those will be assigned to 2nd shift for theOutage and (4) additional personnel will be assigned for the Outage, (2) for each shift.
8.	This estimate assumes that the Outage work will involve radiological conditions requiring additional briefing times, dressout times and reduced production due to dressout requirements.
9.	This estimate assumes NDE requirements include Visual, LP, UT and RT.
10.	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).
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.	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 fence boundary - 30%
	C. Implementation complexity - 40%
	D. Inside Containment - 50%

Rev. 10-4	INDIAN POINT IMPLEMENTATION ESTIMATE WORK SHEET EC #: SAMA IP2-056		
PROJECT TITLE: KEEP RHR Hx DISCH MOV's OPEN JOB LOCATION: Containment Building. EST. STATUS: ☑ OUTAGE ☑ NON-OUTAGE		☑ CAPITAL ☐ O&M PROJECT CODE: TBD ORIGINATOR:	TAKEOFF: ESTIMATOR: RCMT ORIG. DATE: 2/16/2012

ITEM	DESCRIPTION	QTY	UOM	MANHOURS CFT	NO.	UNIT	FCTR	TOTAL	$/MH	MATERIAL PER UNIT	MATERIAL DOLLARS	LABOR DOLLARS	SUB-CONTRACT	TOTAL $

* ESTIMATE LEVEL *

- ☑ **Conceptual**
- ☐ **Preliminary**
- ☐ **Definitive**

General Notes:

ESTIMATE SUMMARY

		MANHOURS	DOLLARS
EOI ENGINEERING			
01	STUDY, DESIGN, & CLOSEOUT	140	$ 14,000
02	DESIGN ENGR CONST SUPPORT	80	$ 8,000
03	WELDING ENGINEER	80	$ 8,000
04	SYS ENGR/ S-U ENGR	80	$ 8,000
05	PROJECT MANAGEMENT	160	$ 19,200
06	ENGINEERING DCP ACCEPTANCE REVIEW	40	$ 4,000
07	WESTINGHOUSE ANALYSIS AND CALCS		$ 200,000
CONTRACT ENGINEERING			
08	DESIGN ENGR CONTRACT SUPPORT	900	$ 108,000
09	SUPL CONTRACT MODS ENGR	-	$ -
10	MODS PLAN & SCHED -CONTRACT	80	$ 8,000
11	FIELD ENGRS / PLANNERS	60	$ 7,200
MATERIALS / MISC CONTRACTS			
12	MATERIALS		$ 111,108
13	OTHER CONTRACTS		
CONTRACT CRAFT LABOR			
14	SWEC CRAFT LABOR/WALKDOWN	1,611	$ 200,759
15	LOST TIME	161	$ 20,948
16	SWEC DISTRIBS		$ 43,853
PLANT CRAFT LABOR			
17	MECH MAINT.	-	$ -
18	CSG	-	$ -
MISC EOI SUPPORT			
19	QUALITY CONTROL	70	$ 7,000
20	TRAINING	96	$ 11,520
21	CHEMISTRY	-	$ -
22	OPS / OPS SUPPORT	200	$ 22,400
23	HP / RP	120	$ 9,547
MISC CONTRACT SUPPORT			
24	QUALITY CONTROL	90	$ 7,200
25	NDE	-	$ -
26	HP / RP	-	$ -
27	RADWASTE	-	$ -
28	NURSE	-	$ -
29	ELEVATOR CONTRACTOR	-	$ -
30	WASTE MANAGEMENT	-	$ -
31	HOUSEKEEPING	-	$ -
32	EQUIPMENT RENTAL CONTRACTOR	-	$ 10,000
33	VENDOR STOCKING	-	$ -
34	DECONTAMINATION CONTACTOR	-	$ 10,000
35	RCB'S	-	$ -
36	SECURITY - Wackenhut	-	$ -
37	FIRE WATCH (Rover)		
38	SAFETY	32	$ 2,176
CONTINGENCY			
39	CONTINGENCY		$ 252,273
ESTIMATE SUBTOTAL		**4,000**	**$ 1,093,184**
	SITE ENCUMBRANCE PREMIUM (20%)		**$ 218,637**
	LOADERS (30%)		**$ 393,546**
	ESTIMATE TOTAL		**$ 1,705,367**

Rev. 10-4

INDIAN POINT IMPLEMENTATION ESTIMATE WORK SHEET

EC #: SAMA IP2-056

PROJECT TITLE: KEEP RHR Hx DISCH MOV's OPEN
JOB LOCATION: Containment Building.
EST. STATUS: ☑ OUTAGE ☑ NON-OUTAGE

☑ CAPITAL ☐ O&M
PROJECT CODE: TBD
ORIGINATOR:

TAKEOFF:
ESTIMATOR: RCMT
ORIG. DATE: 2/16/2012

ITEM	DESCRIPTION	QTY	UOM	CFT	NO.	MANHOURS UNIT	FCTR	TOTAL	$/MH	MATERIAL PER UNIT	MATERIAL DOLLARS	LABOR DOLLARS	SUB-CONTRACT	TOTAL $
	NON OUTAGE WORK													
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	LT	PF	2	10.00	1.00	20	$ 120.71		$ -	$ 2,414		$ 2,414
3.	Cut and prep 1" sch. 160 pipe	1	LT	PF	4	16.00	1.00	64	$ 120.71		$ -	$ 7,725		$ 7,725
4.	Pop test 1" relief valves prior to installation. (QA verify)	2	LT	PF	2	7.000	1.00	28	$ 120.71		$ -	$ 3,380		$ 3,380
	OUTAGE WORK													
1.	Gather and stage tools and materials, walkdown	1	LT	PF	2	10.00	1.70	34	$ 120.71			$ 4,104		$ 4,104
2.	Prep relief valves (1" valves)	2	EA	PF	2	3.00	1.70	20	$ 120.71			$ 2,414		$ 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	$ 120.71			$ 4,104		$ 4,104
7.	Fit and weld 1" piping, fittings and install supports	4	EA	PF	2	15.00	1.70	204	$ 120.71			$ 24,625		$ 24,625
8.	Provide testing as required (leak test)	1	LT	PF	2	60.00	1.70	204	$ 120.71		$ -	$ 24,625		$ 24,625
9.	Dismantle scaffolding to storage	1	LT	CP	2	24.00	1.70	82	$ 96.00		$ -	$ 7,872		$ 7,872
10.	Dismantle scaffolding to storage	1	LT	LB	2	24.00	1.70	82	$ 78.15		$ -	$ 6,408		$ 6,408
11.	Cleanup and restore area	1	LT	PF	4	10.00	1.70	68	$ 120.71		$ -	$ 8,208		$ 8,208
	PAINTING & TOUCH-UP REQUIREMENTS													
1.	PAINTING & TOUCH-UP			PT										
2.	PAINTING & TOUCH-UP			PT										
	FIRE WATCH / BOTTLEWATCH REQUIREMENTS													
1.	CRAFT SUPPORT FOR FIRE WATCH	2	LT	FW	1	80.00	1.70	272	$ 53.60		$ -	$ 14,579		$ 14,579
2.	CRAFT SUPPORT FOR BOTTLE WATCH	1	LT	FW										
	MISC SUB-CONTRACT													
1.	MISC SUB-CONTRACT NDE Contractor	1	LT	NM									$ 35,000	$ 35,000
	SUBTOTAL							1,364			$ -	$ 135,360	$ 35,000	$ 170,360
1.	CONSTRUCTION SUPPORT (8% OF LABOR $)	1	LT					109	$ 99.24	$ -		$ 10,817		$ 10,817
	SUBTOTAL CRAFT AND SUB-CONTRACTOR							1,473			$ -	$ 146,177	$ 35,000	$ 181,177
	*** RELATED COSTS ***													
1.	WALKDOWN ALLOWANCE	1	LT	PF				38	$ 120.71			$ 4,587		$ 4,587
2.	WORK PACKAGE REVIEW	1	LT	PF				48	$ 120.71			$ 5,794		$ 5,794
3.	TOOL ROOM ATTENDANTS (~3.5%)	1	LT	PF				52	$ 120.71			$ 6,277		$ 6,277
4.	GENERAL CRAFT OUTAGE DISTRIBS. (10%)											$ 14,618		$ 14,618
5.	CRAFT IN PROCESSING (20%)											$ 29,235		$ 29,235
6.	HUMAN PERFORMANCE & ALARA TRAINING	1	LT									$ 2,924		$ 2,924
7.	(1/2 day training, or ~ 2%)													
	SUBTOTAL							1,611			$ -	$ 209,612	$ 35,000	$ 244,612
	PLANT SCOPE													
1.	**MECH MAINTENANCE**	1	LT	PF										
				PL										
1.	**CSG**	1	LT	PL										
				PL										
	SUBTOTAL PLANT							-			$ -	$ -	$ -	$ -
	SUBTOTAL CRAFT/PLANT							1,611			$ -	$ 209,612	$ 35,000	$ 244,612

Rev. 10-4	INDIAN POINT IMPLEMENTATION ESTIMATE WORK SHEET EC #: SAMA IP2-056

PROJECT TITLE: KEEP RHR Hx DISCH MOV's OPEN
JOB LOCATION: Containment Building.
EST. STATUS: ☑ OUTAGE ☑ NON-OUTAGE
PROJECT CODE: TBD
ORIGINATOR:
☑ CAPITAL ☐ O&M
TAKEOFF:
ESTIMATOR: RCMT
ORIG. DATE: 2/16/2012

ITEM	DESCRIPTION	QTY	UOM	CFT	NO.	MANHOURS UNIT	FCTR	TOTAL	$/MH	MATERIAL PER UNIT	MATERIAL DOLLARS	LABOR DOLLARS	SUB-CONTRACT	TOTAL $
	IMPLEMENTATION SUPPORT													
	EOI													
1.	WELDING ENGINEERING	1	LT	NM	1	80.00	1.00	80	$ 100.00			$ 8,000		$ 8,000
2.	DESIGN ENGINEERING SUPT DURING CONST	1	LT	NM	1	80.00	1.00	80	$ 100.00			$ 8,000		$ 8,000
3.	SYSTEMS ENGINEERING - MECHANICAL	1	LT	NM	1	40.00	1.00	40	$ 100.00			$ 4,000		$ 4,000
4.	SYSTEMS ENGINEERING - CIVIL STRUCTURAL	1	LT	NM	1	40.00	1.00	40	$ 100.00			$ 4,000		$ 4,000
5.	PROJECT MANAGEMENT	1	LT	NM	1	160.00	1.00	160	$ 120.00			$ 19,200		$ 19,200
6.	TRAINING OPS STAFF	12	LT	NM	1	8.00	1.00	96	$ 120.00			$ 11,520		$ 11,520
7.	QA / QC VERIFICATION	1	LT	NM	1	70.00	1.00	70	$ 100.00			$ 7,000		$ 7,000
8.	CHEMISTRY	1	LT	NM										
9.	SIMULATOR SUPPORT	1	LT	NM	1	80.00	1.00	80	$ 100.00			$ 8,000		$ 8,000
10.	HP / RP/ ALARA	1	LT	NM	1	120.00	1.00	120	$ 79.56			$ 9,547		$ 9,547
11.	WORK MANAGEMENT	1	LT	NM	1									$ -
12.	OPS / OPS PROCEDURE SUPPORT AND DEVEL	1	LT	NM	1	120.00	1.00	120	$ 120.00			$ 14,400		$ 14,400
13.	TRAVEL & LIVING EXPENSES	1	LT											
	CONTRACTOR SUPPORT													
1.	FIS / MODS ENGINEERING - SWEC (Incl Per Dien	1	LT	NM										
2.	MODS PLANNING & SCH.- SWEC (Incl Per Diem)	1	LT	NM	1	80.00	1.00	80	$ 100.00			$ 8,000		$ 8,000
3.	FIELD ENGRS/PLAN- SWEC(Incl Per Diem)	1	LT	NM	1	60.00	1.00	60	$ 120.00			$ 7,200		$ 7,200
4.	QA / QC VERIFICATION	1	LT	NM	1	90.00	1.00	90	$ 80.00			$ 7,200		$ 7,200
5.	NDE	1	LT	NM										
6	HP / RP	1	LT	NM										
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				-					$ 10,000	$ 10,000
13.	VENDOR STOCKING	1	LT	NM				-						
14.	DECONTAMINATION CONTRACTOR	1	LT	NM				-					$ 10,000	$ 10,000
15.	RBC's	1	LT	NM				-						
16.	SECURITY	1	LT	SEC				-						
17.	FIREWATCH (Rover)	1	LT	NM				-						$ -
18.	SAFETY (2%)	1	LT	NM				32	$ 68.00			$ 2,176		$ 2,176
19.	LOST TIME (10%)	1	LT					161	$ 130.11			$ 20,948		$ 20,948
	SUBTOTAL CRAFT/NON-MANUAL							2,920			$ -	$ - 348,803	$ 55,000	$ 403,803
1.	FREIGHT, SALES TAX, & CONSUMABLES (6%)										$ 4,308			$ 4,308
2.	3/4', 1" A376, TP316, sch. 160 Pipe	1	LT							########	$ 36,800			$ 36,800
3.	1" Relief Valves, 2500 # Class, SR	2	EA							########	$ 70,000			$ 70,000
	SUBTOTAL INSTALLATION COST							2,920			$111,108	$ 348,803	$ 55,000	$ 514,911
1.	DESIGN ENGINEERING - MECHANICAL	1	LT	NM	1	40.00	1	40	$ 100.00			$ 4,000		$ 4,000
2.	DESIGN ENGINEERING - CIVIL/STRUCTURAL	1	LT	NM	1	100.00	1	100	$ 100.00			$ 10,000		$ 10,000
3.	CONTRACT ENGR DESIGN SUPPORT	1	LT	NM	1	900.00	1	900	$ 120.00				$ 108,000	$ 108,000
4.	WESTINGHOUSE ANALYSIS AND CALCS	1	LT	NM	1							$ 200,000		$ 200,000
5.	ENGINEERING DCP ACCEPTANCE REVIEW	1	LT	NM	1	40.00	1	40	$ 100.00			$ 4,000		$ 4,000
	SUBTOTAL DESIGN COST							1,080				$ 218,000	$ 108,000	$ 326,000
	SUBTOTAL INSTALLATION & DESIGN COST							4,000			$111,108	$ 566,803	$ 163,000	$ 840,911
1.	CONTINGENCY (30%)													$ 252,273
	ESTIMATE SUBTOTAL							4,000						$1,093,184

IPEC00270019

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: Pete Buttacavoli	Approved by:
Date: 9-20-2012	Date: 9-20-2012

TABLE OF CONTENTS

1.0 ISSUE

<u>**Severe Accident Mitigation Alternative (SAMA) IP2-060:**</u>

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 one-piece 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 one-piece 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 quickly 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 quickly 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 non-essential 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".

5.0 CONFIRMATION OF DESIGN

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	Quantity
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 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.: SAMA IP2-060 **Rev. No.:** CONCEPTUAL 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	☐ 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	☐ 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

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	☒ NO
Cable and Raceway Program • Does the proposed activity involve any changes to cable trays, raceways or the associated documentation?	■ YES	☐ 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) *(if applicable)* • 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 • 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?	■ 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?	☐ 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

ATTACHMENT 9.3 IMPACT SCREENING SUMMARY

SHEET 3 OF 6

PROCESS OR PROGRAM IMPACT SCREENING CHECKLIST	Potential Impact	
Computer Support and Software • Does the proposed activity impact or involve changes to plant computer software or firmware or impact Software Quality Assurance (SQA)?	☐ YES	☒ NO
Chemistry and Environmental Impact • Does the proposed activity impact or involve any changes to plant chemistry requirements, operations or procedures, or any changes to the environment?	☐ YES	☒ NO
Radiation Protection (RP) Program Impact • 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?	■ 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	☐ 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 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

ATTACHMENT 9.3 IMPACT SCREENING SUMMARY

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	☒ 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?	☐ 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?	☐ 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

ATTACHMENT 9.3 IMPACT SCREENING SUMMARY

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	☒ 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	☒ 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	☐ 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?	☐ 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

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?	■ YES	☐ 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	☐ NO
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: Stairwell Flood Switch Location

2. Figure 2: Flood Switch Installation

RCM Technologies The Source of Smart Solutions	ENTERGY Indian Point Nuclear Station Unit 2	Conceptual Design Package SAMA IP2-060	Rev. 0

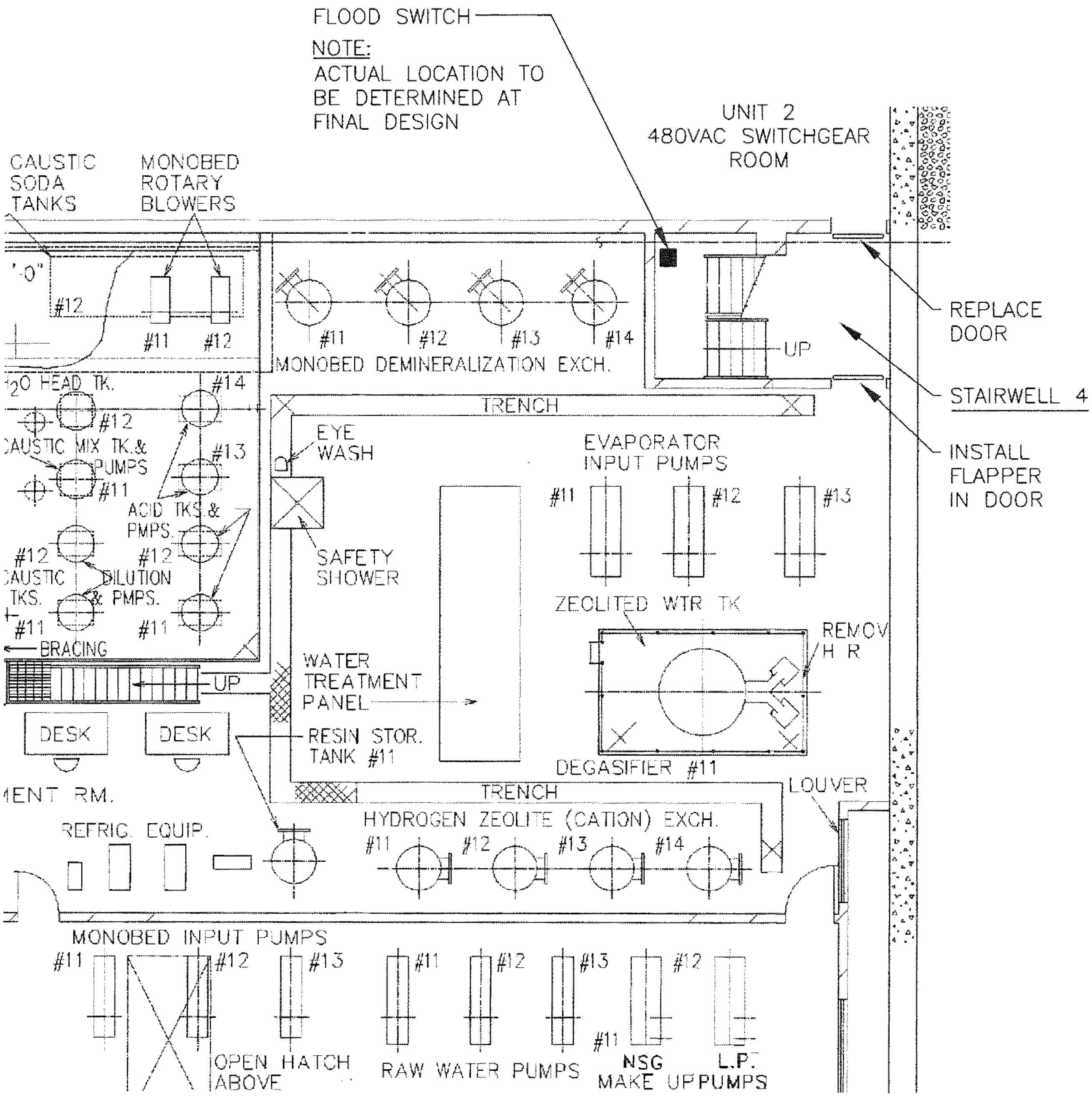


Figure 1

FLOOD SWITCH LOCATION AT ELEV 15'-0"

Dwg Ref: A138000 UNIT 1 GENERATOR-SUPERHEATER BLDGS ARRANGEMENT PLAN

RCM Technologies	ENTERGY Indian Point Nuclear Station Unit 2	Conceptual Design Package SAMA IP2-060	Rev. 0

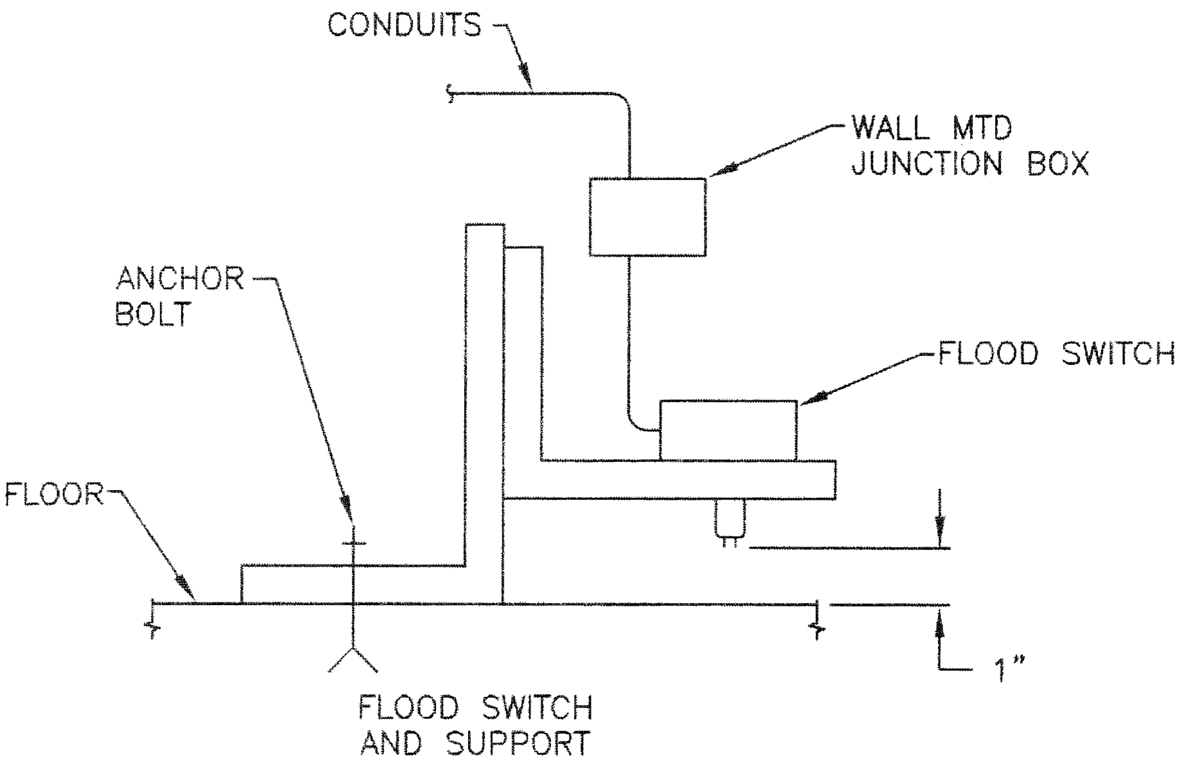


Figure 2
FLOOD SWITCH INSTALLATION
(NOT TO SCALE)

IPEC00270035

Attachment 3

References

1. ENTERGY Nuclear Management Manual, Engineering Change Process, Rev 10

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. FCI Model FLT93S FlexSwitch (included here)

FCI FLUID COMPONENTS INTERNATIONAL LLC

Products

Level Switches

FLT93B

FLT93S

FLT93F

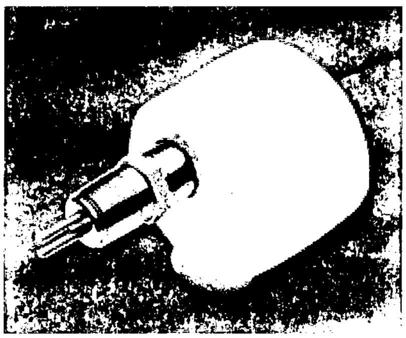
FLT93C

F 3M

L 00

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 ± 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/level detection in settling vessels
Interface/sump level detection in separation vessels	Foam or sediment level control
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]

IPEC00270037

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. Hastelloy 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]
- 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]

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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Legal & Privacy Statements

Attachment 4

Cost Estimate

ENTERGY NUCLEAR NORTHEAST IMPLEMENTATION ESTIMATE Indian Point Nuclear Power Station			
* ESTIMATE LEVEL *	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	☐ CAPITAL ☑ NON-OUTAGE	ORIGINATOR:	ORIG. DATE: 6-19-2012
	ESTIMATE TOTAL $ 715,145		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 IP2-060 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 stairwell 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 stairwell. The package will provide a design that will exhaust the water from the stairwell 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: Peter Battacol.		Approved by:
Date: 9-20-2012		Date: 9-20-2012

IPEC00270041

ENTERGY NUCLEAR NORTHEAST
IMPLEMENTATION ESTIMATE
Indian Point Nuclear Power Station

* ESTIMATE LEVEL *	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

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.	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 work will be performed by trained contract craftspersons in lieu of station maintenance personnel.
5.	This estimate assumes that scaffodling will be required for conduit installation and wire pulling in the stairwell
6.	This estimate assumes the detection devices mounting bracket will be fabricated in the shop.
7.	This estimate assumes a blank annunciator panel is available for use in the Unit 2 Control Room.
8.	This estimate assumes that core boring is required between El. 15' - 0" and 33' - 0" cable spreading area.
9.	This estimate does not include funding for unreviewed safety questions or NRC submittals, but if required the additional cost will be added.
10.	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).
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.	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 fence boundary - 30%
	C. Implementation complexity - 40%
	D. Inside Containment - 50%

Rev. 11-0

INDIAN POINT IMPLEMENTATION ESTIMATE WORK SHEET

EC #: SAMA IP2-060

PROJECT TITLE: SWGR Water Intrusion Protection
JOB LOCATION: U1 Superheater Bldg-Stairwell 4
EST. STATUS: ☐ OUTAGE ☑ NON-OUTAGE

☑ CAPITAL ☐ O&M
PROJECT CODE: TBD
ORIGINATOR:

TAKEOFF:
ESTIMATOR: RCMT
ORIG. DATE: 6-19-2012

* ESTIMATE LEVEL *

☑ **Conceptual**
☐ **Preliminary**
☐ **Definitive**

General Notes:

ESTIMATE SUMMARY

		MANHOURS	***DOLLARS***
EOI ENGINEERING			
01	STUDY, DESIGN, & CLOSEOUT	160	$ 16,000
02	DESIGN ENGR CONST SUPPORT	80	$ 8,000
03	MODS ENGR EOI SUPPORT	-	$ -
04	SYS ENGR/ S-U ENGR	196	$ 19,600
05	PROJECT MANAGEMENT	300	$ 36,000
06	WORK MANAGEMENT	-	$ -
07	TESTING	20	$ 2,000
08	ENGINEERING DCP ACCEPTANCE REVIEW	40	$ 4,000
CONTRACT ENGINEERING			
09	DESIGN ENGR CONTRACT SUPPORT	800	$ 96,000
10	SUPL CONTRACT MODS ENGR	-	$ -
11	MODS PLAN & SCHED -CONTRACT	20	$ 2,000
12	FIELD ENGRS / PLANNERS	80	$ 9,600
MATERIALS / MISC CONTRACTS			
13	MATERIALS		$ 7,856
14	OTHER CONTRACTS		$ -
CONTRACT CRAFT LABOR			
15	SWEC CRAFT LABOR/WALKDOWN	714	$ 80,707
16	LOST TIME	71	$ 9,771
17	SWEC DISTRIBS		$ 22,067
PLANT CRAFT LABOR			
18	MECH MAINT.	-	$ -
19	ELECT MAINT	-	$ -
20	I&C	120	$ 12,000
21	CSG	-	$ -
MISC EOI SUPPORT			
22	QUALITY CONTROL	40	$ 4,000
23	TRAINING	12	$ 1,440
24	SIMULATOR CHANGES	120	$ 12,000
25	OPS	80	$ 9,600
26	HP / RP	-	$ -
MISC CONTRACT SUPPORT			
27	QUALITY CONTROL	40	$ 3,200
28	NDE	-	$ -
29	HP / RP	-	$ -
30	RADWASTE	-	$ -
31	NURSE	-	$ -
32	ELEVATOR CONTRACTOR	-	$ -
33	WASTE MANAGEMENT	-	$ -
34	HOUSEKEEPING	-	$ -
35	EQUIPMENT RENTAL CONTRACTOR	-	$ -
36	VENDOR STOCKING	-	$ -
37	DECONTAMINATION CONTACTOR	-	$ -
38	RBC'S	-	$ -
39	SECURITY - Wackenhut	-	$ -
40	FIRE WATCH (Rover)	-	$ -
41	SAFETY	17	$ 1,226
CONTINGENCY			
42	CONTINGENCY		$ 101,360
ESTIMATE SUBTOTAL		**2,910**	**$ 458,427**
	SITE ENCUMBRANCE PREMIUM (20%)		**$ 91,685**
	Loaders (30%)		**$ 165,034**
	ESTIMATE TOTAL		**$ 715,145**

ITEM	DESCRIPTION	QTY	UOM	CFT	NO.	MANHOURS UNIT	FCTR	TOTAL	$/MH	MATERIAL $ PER UNIT	MATERIAL DOLLARS	LABOR DOLLARS	SUB-CONTRACT	TOTAL $
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		$ -	$ 1,536		$ 1,536
3.	Procure, install and align new solid steel fire door	1	EA	CP	2	12.00	1.00	24	$ 96.00	$ 450.00	$ 450	$ 2,304		$ 2,754
4.	Gather hinged mechanical damper for installation in Unit 1 door	1	EA	IW	2	20.00	1.00	40	$ 137.33		$ -	$ 5,493		$ 5,493
5.	Cut and modify unit 1 door to install hinged mechanical damper	1	EA	IW	2	40.00	1.00	80	$ 137.33	$ 300.00	$ 300	$ 10,986		$ 11,286
6.	Install hinged mechanical damper in Unit 1 door.	1	EA	IW	2	20.00	1.00	40	$ 137.33	$ 5,000.00	$ 5,000	$ 5,493		$ 10,493
7.	Procure & install level detector and support	1	EA	EL	2	4.00	1.00	8	$ 123.32	$ 125.00	$ 125	$ 987		$ 1,112
8.	Stage, erect and modify scaffolding 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	LB	1	6.00	1.00	6	$ 78.65		$ -	$ 472		$ 472
10.	Procure & install conduit to connect level detector	180	LF	EL	2	0.075	2.00	54	$ 123.32	$ 3.00	$ 540	$ 6,659		$ 7,199
11.	Procure and install Junction Box	1	EA	EL	2	6.00	1.00	12	$ 123.32	$ 10.00	$ 10	$ 1,480		$ 1,490
12.	Procure and intall conduit supports	6	EA	EL	2	2.00	1.00	24	$ 123.32	$ 6.00	$ 36	$ 2,960		$ 2,996
13.	Core boring for routing new conduit and wiring	1	LT	EL	2	10.00	1.00	20	$ 123.32		$ -	$ 2,466		$ 2,466
14.	Remove Control Room fire seal and route new wiring	2	EA	EL	2	10.00	2.00	20	$ 123.32		$ -	$ 2,466		$ 2,466
15.	Procure & install wiring from stairwell 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	12.00	1.00	24	$ 123.32	$ 125.00	$ 125	$ 2,960		$ 3,085
17.	Replace and test Control Room fire seal as required	1	LT	EL	2	6.00	1.00	12	$ 123.32	$ 125.00	$ 125	$ 1,480		$ 1,605
18.	Terminate Level detector and annunciator wiring	1	EA	EL	1	4.00	1.00	4	$ 123.32			$ 493		$ 493
19.	Dismantle & store scaffolding	1	LT	CP	2	4.00	1.00	8	$ 96.00		$ -	$ 768		$ 768
20.	Dismantle & store scaffolding	1	LT	LB	1	4.00	1.00	4	$ 78.65		$ -	$ 315		$ 315
21.	Test level detector and annunciator	1	LT	EL	2	16.00	1.00	32	$ 123.32		$ -	$ 3,946		$ 3,946
22.	Cleanup and restore area	1	LT	EL	2	4.00	1.00	8	$ 123.32		$ -	$ 987		$ 987
23.	Cleanup and restore area	1	LT	BL	2	4.00	1.00	8	$ 90.09		$ -	$ 721		$ 721
24.	Cleanup and restore area	1	LT	IW	2	4.00	1.00	8	$ 137.33		$ -	$ 1,099		$ 1,099
	PAINTING & TOUCH-UP REQUIREMENTS													
1.	PAINTING & TOUCH-UP	1	LT	PT	1	20.00	1.00	20	$ 95.16	$ 20.00	$ 400	$ 1,903		$ 2,303
2.	PAINTING & TOUCH-UP			PT				-			$ -	$ -		$ -

Rev. 11-0

INDIAN POINT IMPLEMENTATION ESTIMATE WORK SHEET

EC #: SAMA IP2-060

PROJECT TITLE: SWGR Water Intrusion Protection
JOB LOCATION: U1 Superheater Bldg-Stairwell 4
EST. STATUS: ☐ OUTAGE ☑ NON-OUTAGE

☑ CAPITAL ☐ O&M
PROJECT CODE: TBD
ORIGINATOR:

TAKEOFF:
ESTIMATOR: RCMT
ORIG. DATE: 6-19-2012

ITEM	DESCRIPTION	QTY	UOM	CFT	NO.	MANHOURS UNIT	FCTR	TOTAL	$/MH	MATERIAL $ PER UNIT	MATERIAL DOLLARS	LABOR DOLLARS	SUB-CONTRACT	TOTAL $
	FIRE WATCH / BOTTLEWATCH REQUIREMENTS													
1.	CRAFT SUPPORT FOR FIRE WATCH	1	LT	FW	1	80.00	1.00	80	$ 53.60		$ -	$ 4,288		$ 4,288
2.	CRAFT SUPPORT FOR BOTTLE WATCH	1	LT	FW				-			$ -	$ -		$ -
	MISC SUB-CONTRACT													
1.	MISC SUB-CONTRACT	1	LT										$ -	$ -
	SUBTOTAL CRAFT & SUB-CONTRACTOR							607			$ 7,411	$ 68,061	$ -	$ 75,472
1.	CONSTRUCTION SUPPORT (8% OF LABOR $)	1	LT					49	$ 112.13			$ 5,494		$ 5,494
	SUBTOTAL							656			$ 7,411	$ 73,555	$ -	$ 80,966
	*** RELATED COSTS ***													
1.	WALKDOWN ALLOWANCE	1	LT	EL				7	$ 123.32			$ 863		$ 863
2.	WORK PACKAGE REVIEW	1	LT	EL				28	$ 123.32			$ 3,453		$ 3,453
3.	TOOL ROOM ATTENDANTS (~3.5%)	1	LT	EL				23	$ 123.32			$ 2,836		$ 2,836
4.	GENERAL CRAFT OUTAGE DISTRIBS. (10%)											$ 7,355.50		$ 7,356
5.	CRAFT IN PROCESSING (20%)											$14,711.00		$ 14,711
6.	HUMAN PERFORMANCE & ALARA TRAINING	1	LT									$ -		$ -
7.	(1/2 day training, or ~ 2%)													
	SUBTOTAL							714			$ 7,411	$ 102,774	$ -	$ 110,185
	PLANT SCOPE													
1.	**MECH MAINTENANCE**			PL				-			$ -	$ -		$ -
				PL				-			$ -	$ -		$ -
	SUBTOTAL MECH MAINT.							-			$ -	$ -	$ -	$ -
1.	**ELECT MAINTENANCE**			PL				-			$ -	$ -		$ -
				PL				-			$ -	$ -		$ -
	SUBTOTAL ELECT. MAINT.							-			$ -	$ -	$ -	$ -
1.	**I&C (Dev. Calibration & Maintenance Procedures**	1	LT	PL	1	120.00	1.00	120	$ 100.00		$ -	$ 12,000		$ 12,000
				PL				-			$ -	$ -		$ -
	SUBTOTAL I&C MAINT.							120			$ -	$ 12,000	$ -	$ 12,000
1.	**CSG**			PL				-			$ -	$ -		$ -
				PL				-			$ -	$ -		$ -
	SUBTOTAL CSG MAINT.							-			$ -	$ -	$ -	$ -
	SUBTOTAL PLANT							120			$ -	$ 12,000	$ -	$ 12,000
	SUBTOTAL CRAFT/PLANT							834			$ 7,411	$ 114,774	$ -	$ 122,185
	IMPLEMENTATION SUPPORT													
1.	MODS ENGINEERING	1	LT	NM				-				$ -		$ -
2.	DESIGN ENGINEERING SUPT DURING CONST	1	LT	NM	1	80.00	1.00	80	$ 100.00			$ 8,000		$ 8,000
3.	SYSTEMS ENGINEERING - MECHANICAL	1	LT	NM				-				$ -		$ -
4.	SYSTEMS ENGINEERING - ELECTRICAL	1	LT	NM	1	80.00	1.00	80	$ 100.00			$ 8,000		$ 8,000
5.	SYSTEMS EINGINEERING - INSTR & CONTROL	1	LT	NM	1	36.00	1.00	36	$ 100.00			$ 3,600		$ 3,600
6.	SYSTEMS ENGINEERING - CIVIL STRUCTURAL	1	LT	NM	1	80.00	1.00	80	$ 100.00			$ 8,000		$ 8,000
7.	PROJECT MANAGEMENT	1	LT	NM	1	300.00	1.00	300	$ 120.00			$ 36,000		$ 36,000
8.	WORK MANAGEMENT (w.o Planning)	1	LT	NM								$ -		$ -
9.	QA / QC VERIFICATION	1	LT	NM	1	40.00	1.00	40	$ 100.00			$ 4,000		$ 4,000
10.	TRAINING	12	LT	NM	12	1.00	1.00	12	$ 120.00			$ 1,440		$ 1,440
11.	HP / RP/ ALARA	1	LT	NM				-				$ -		$ -
12.	SIMULATOR CHANGES	1	LT	NM	2	120.00	1.00	120	$ 100.00			$ 12,000		$ 12,000
13.	OPS (Procedure development / revision)	1	LT	NM	1	80.00	1.00	80	$ 120.00			$ 9,600		$ 9,600
14.	TRAVEL & LIVING EXPENSES	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	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
5.	NDE	1	LT	NM				-				$ -		$ -
6.	HP / RP	1	LT	NM				-				$ -		$ -
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.	VENDOR STOCKING	1	LT	NM										
14.	DECONTAMINATION CONTRACTOR	1	LT	NM										
15.	RBC's	1	LT	NM										
16.	SECURITY	1	LT	SEC										
17.	FIREWATCH (Rover)	1	LT	NM								$ -		$ -
18.	SAFETY (2%)	1	LT	NM				17	$ 72.14			$ 1,226		$ 1,226
19.	LOST TIME (10%)	1	LT					71	$ 137.62			$ 9,771		$ 9,771
	SUBTOTAL CRAFT/NON-MANUAL							1,056			$ 7,411	$ 231,211	$ -	$ 238,622
1.	FREIGHT, SALES TAX, & CONSUMABLES (6%)										$ 445			$ 445

Rev. 11-0

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

PROJECT TITLE: SWGR Water Intrusion Protection
JOB LOCATION:U1 Superheater Bldg-Stairwell 4
EST. STATUS: ☐ OUTAGE ☑ NON-OUTAGE

☑ CAPITAL ☐ O&M
PROJECT CODE: TBD
ORIGINATOR:

TAKEOFF:
ESTIMATOR: RCMT
ORIG. DATE: 6-19-2012

				MANHOURS						MATERIAL $	MATERIAL	LABOR	SUB-	
ITEM	DESCRIPTION	QTY	UOM	CFT	NO.	UNIT	FCTR	TOTAL	$/MH	PER UNIT	DOLLARS	DOLLARS	CONTRACT	TOTAL $
	SUBTOTAL INSTALLATION COST							1,056			$ 7,856.00	$ 231,211	$ -	$ 239,067
1.	DESIGN ENGINEERING - MECHANICAL	1	LT	NM				-				$ -		$ -
2.	DESIGN ENGINEERING - ELECTRICAL	1	LT	NM	1	40	1.00	40	$ 100.00			$ 4,000		$ 4,000
3.	DESIGN ENGINEERING - INSTR. & CONTROL	1	LT	NM	1	80	1.00	80	$ 100.00			$ 8,000		$ 8,000
4.	DESIGN ENGINEERING - CIVIL/STRUCTURAL	1	LT	NM	1	40	1.00	40	$ 100.00			$ 4,000		$ 4,000
5.	TESTING (Instrument Calibration and testing)	1	LT	NM	2	10.00	1.00	20	$ 100.00			$ 2,000	$ -	$ 2,000
6.	CONTRACT ENGR DESIGN SUPPORT	1	LT	NM	1	800.00	1.00	800	$ 120.00				$ 96,000	
7.	DESIGN ENG. DCP ACCEPTANCE REVIEW	1	LT	NM	1	40.00	1.00	40	$ 100.00			$ 4,000		$ 4,000
	SUBTOTAL DESIGN COST							1,020				$ 22,000	$ 96,000.00	$ 118,000
	SUBTOTAL INSTALLATION & DESIGN COST										$ 7,856	$ 253,211	$ 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: 9-20-2012

TABLE OF CONTENTS

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.

6. RECOMMENDED SOLUTION

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.

4. Install two (2) limit switches on each 3 HR fire rated blow-out panel as 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

Item Description	Quantity
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

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.: SAMA IP2-061 **Rev. No.:** CONCEPTUAL 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	☒ 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	☐ 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

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	☐ 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) *(if applicable)* • 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 • 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?	■ 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?	☐ 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

PROCESS OR PROGRAM IMPACT SCREENING CHECKLIST	Potential Impact	
Computer Support and Software • Does the proposed activity impact or involve changes to plant computer software or firmware or impact Software Quality Assurance (SQA)?	☐ YES	☒ NO
Chemistry and Environmental Impact • Does the proposed activity impact or involve any changes to plant chemistry requirements, operations or procedures, or any changes to the environment?	☐ YES	☒ NO
Radiation Protection (RP) Program Impact • 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?	■ 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	☐ 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 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

ATTACHMENT 9.3 IMPACT SCREENING SUMMARY

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	☒ 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?	☐ 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?	☐ 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

ATTACHMENT 9.3 IMPACT SCREENING SUMMARY

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	☒ 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	☒ 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	☐ 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?	☐ 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

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?	■ YES	☐ 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	☐ NO
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 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?	■ YES	☐ 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	☐ NO
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Detailed Impact Screening (Attachment 9.4) Attached?	☐ YES	☒ 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

RCM Technologies The Source of Smart Solutions	ENTERGY Indian Point Nuclear Station Unit 2	Conceptual Design Package SAMA IP2 –061	Rev. 0

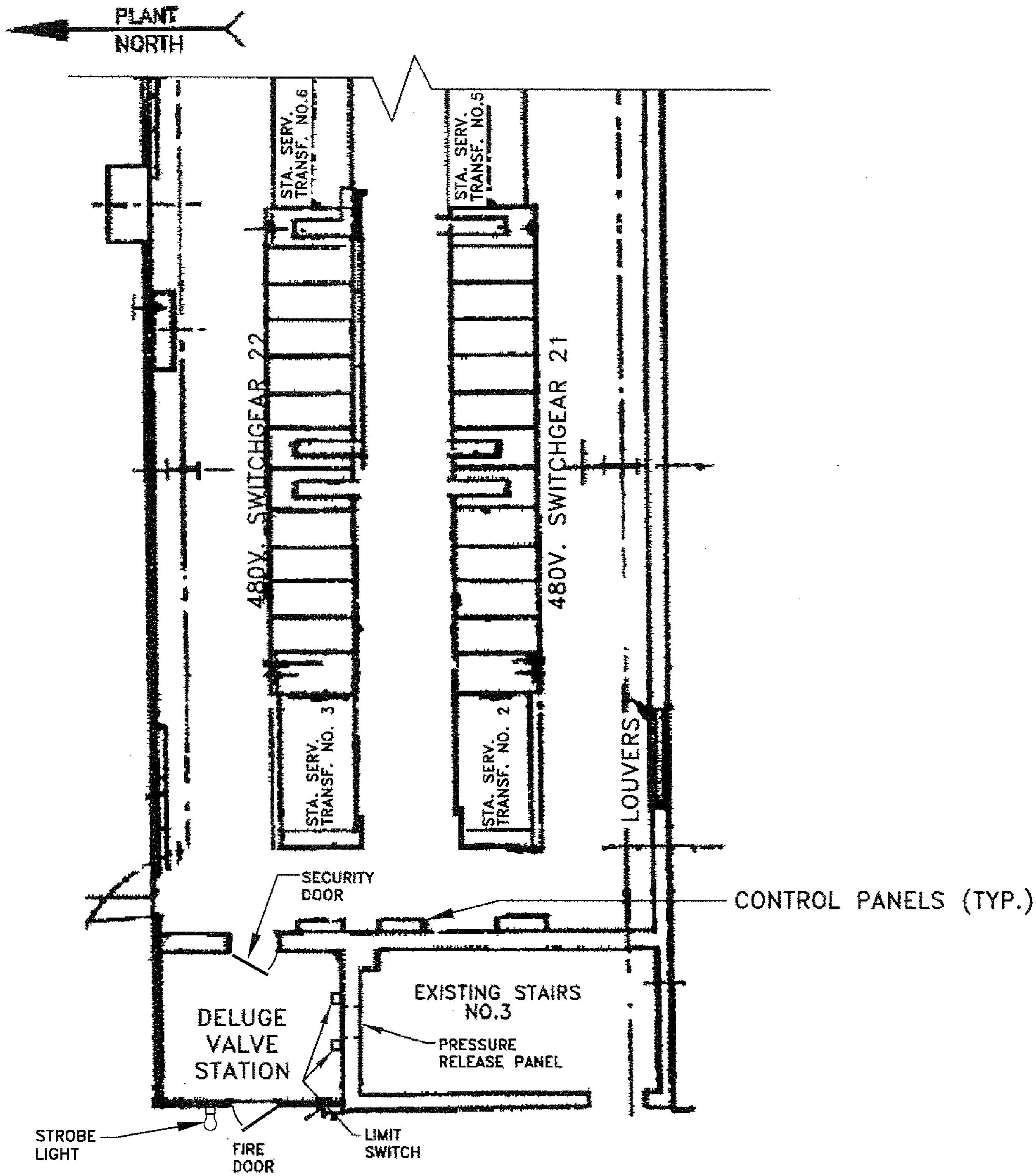


Figure 1

EQUIPMENT ARRANGEMENT CONTROL BUILDING AT EL. 15'-0"-PRESSURE RELEASE PANEL

(REFERENCE DWG. 9321-F-3052)

(NOT TO SCALE)

RCM Technologies *The Source of Smart Solutions*	ENTERGY Indian Point Nuclear Station Unit 2	Conceptual Design Package SAMA IP2-061	Rev. 0

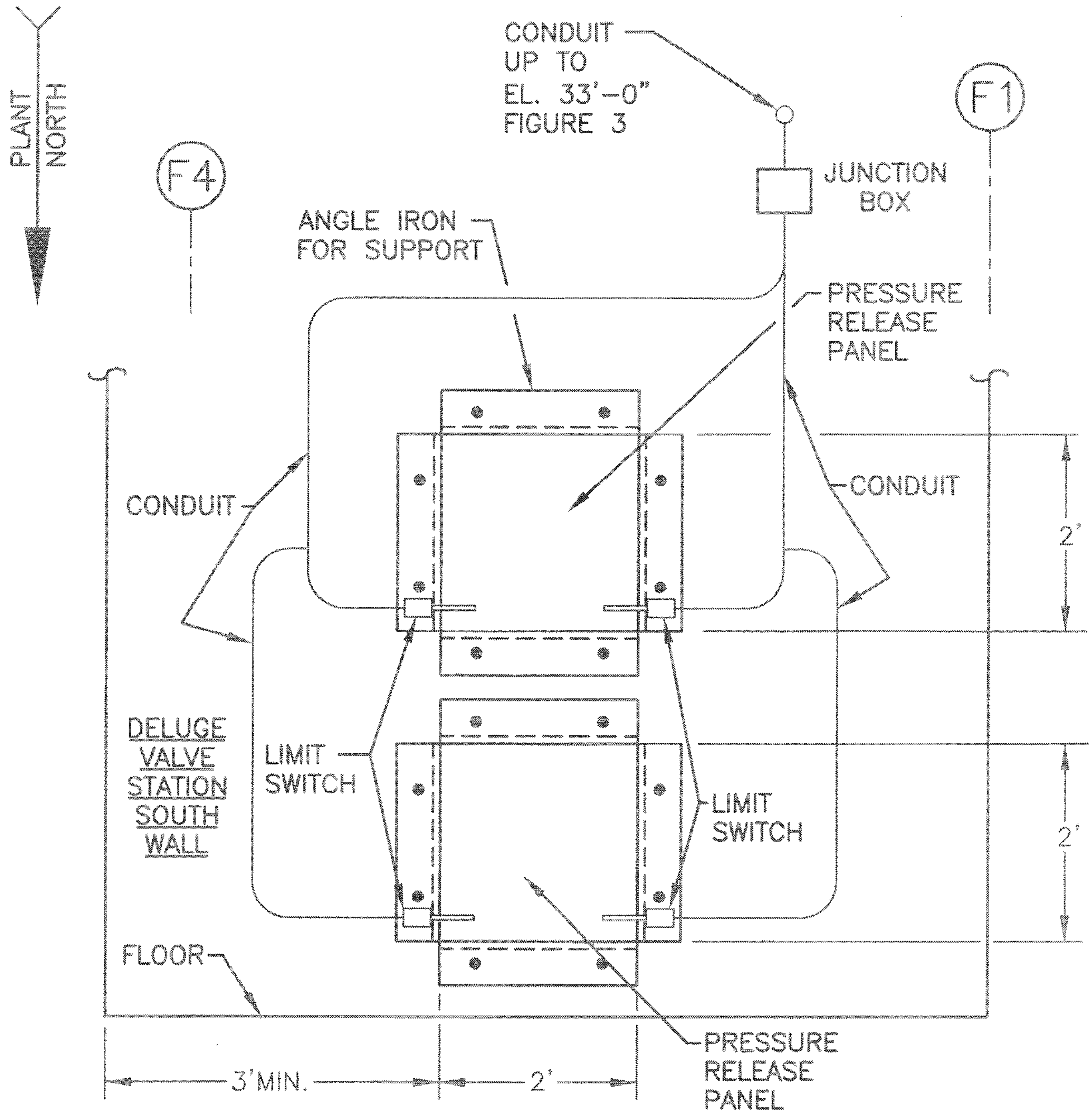


Figure 2
CONTROL BUILDING FLOOR PLANS & SECTIONS AT EL.15'-0"-PRESSURE RELEASE PANELS
(REFERENCE DWG. 9321-F-1381)
(NOT TO SCALE)

	ENTERGY Indian Point Nuclear Station Unit 2	Conceptual Design Package SAMA IP2-061	
RCM Technologies The Source of Smart Solutions			Rev. 0

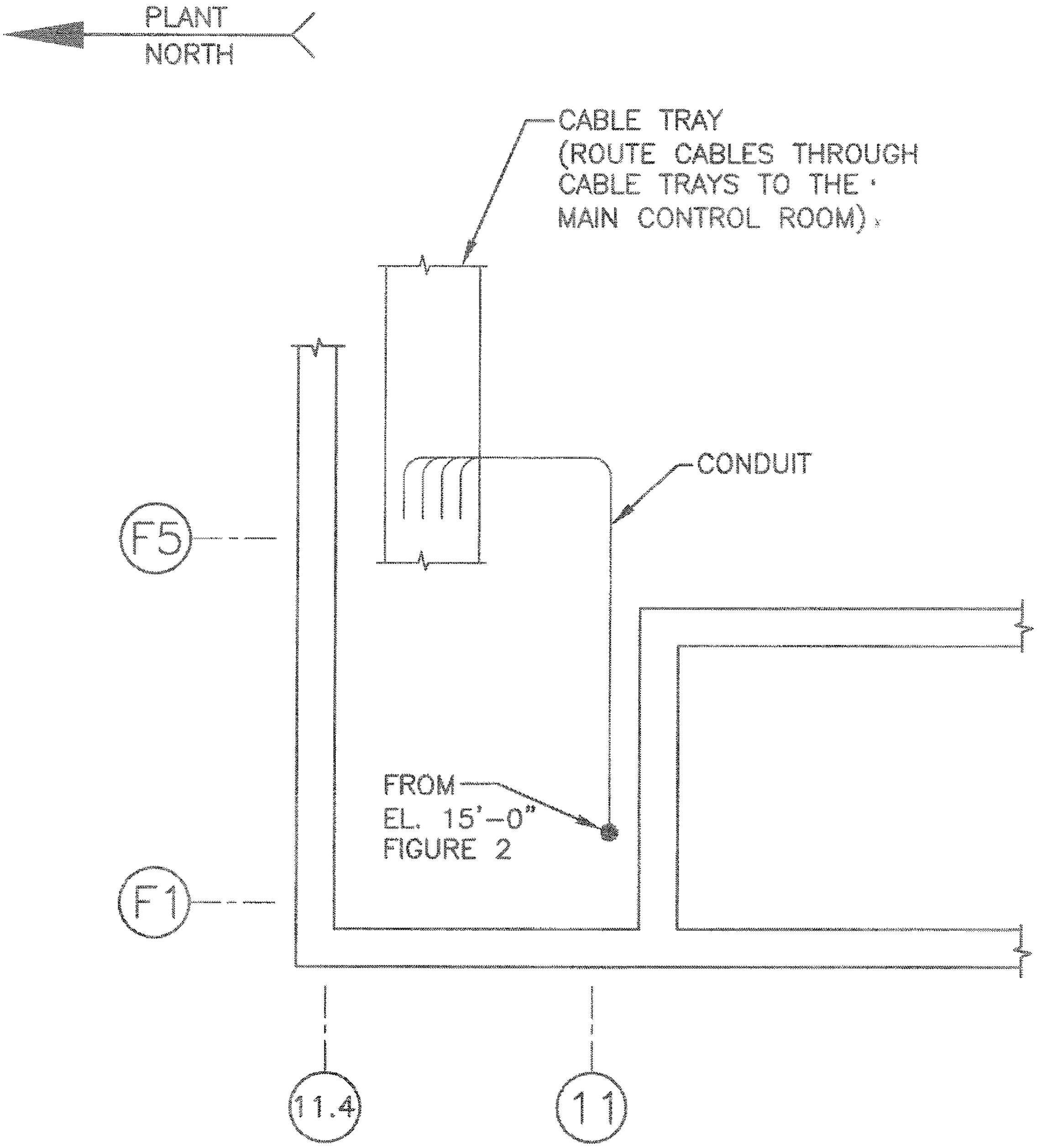


Figure 3
EQUIPMENT ARRANGEMENT CONTROL BUILDING AT EL. 33'-0"
CONDUITS DUMPING INTO CABLE TRAYS
(REFERENCE DWG. 9321-F-3052)
(NOT TO SCALE)

IPEC00270063

Attachment 3

References

1. ENTERGY Nuclear Management Manual, Engineering Change Process, Rev 11

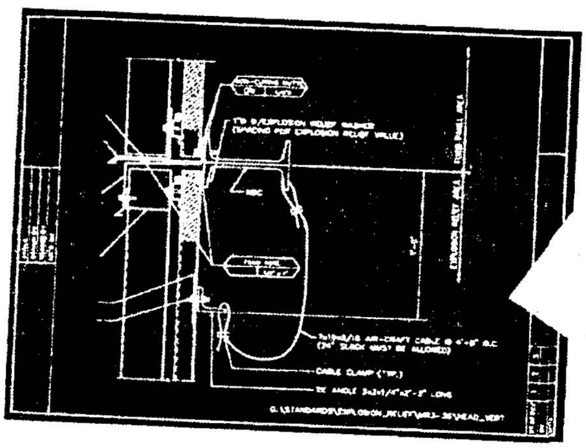
2. Association for the Advancement of Cost Engineering (AACE),
   Cost Estimate Classification System - As Applied In Engineering, Procurement, and Construction for the Process Industries
   - TCM Framework: 7.3 - Cost Estimating and Budgeting
     - Figure 4 - Estimate Checklist & Maturity Matrix

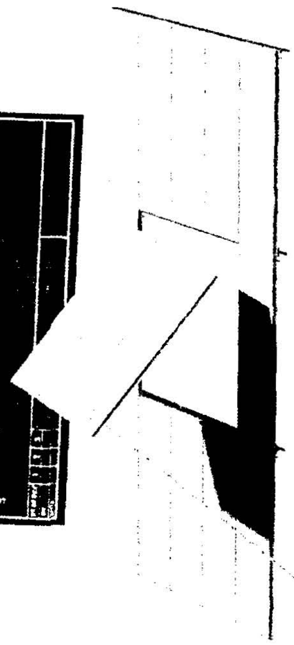
3. CENTRIA Architectural Metal Wall and Roof Systems
   - Pressure Relief Walls (included here)

CENTRIA

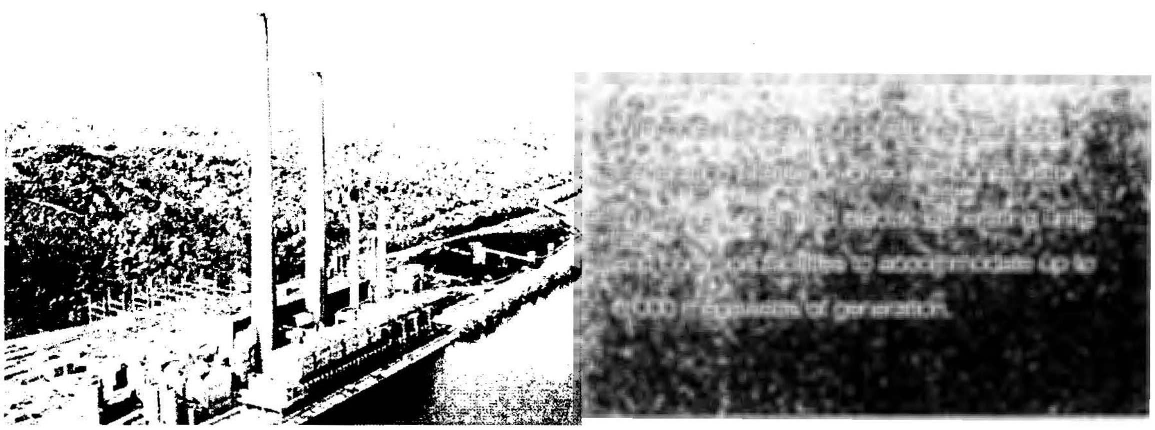
Pressure Release Walls

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.





- *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.*



IPEC00270066

Attachment 4

Cost Estimate

ENTERGY NUCLEAR NORTHEAST
IMPLEMENTATION ESTIMATE
Indian Point Nuclear Power Station

* ESTIMATE LEVEL *	EC #: SAMA IP2-061		
☑ Conceptual	PROJECT TITLE: SWGR Water Intrusion Protection		ESTIMATOR: RCMT
☐ Preliminary	JOB LOCATION: Fire Protection Deluge Room	PROJECT CODE: TBD	
☐ Definitive	☐ OUTAGE ☐ NON-OUTAGE	ORIGINATOR:	ORIG. DATE: 06/11/2012
	ESTIMATE TOTAL $933,981	☑ CAPITAL ☐ O&M	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 IP2-061 in accordance with Entergy design engineering packages.

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 a 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 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 deluge room in the event of a large deluge room pipe rupture. This is required to prevent severe flooding in the switchgear room The dual solid-door concept is intended to capture the ruptured pipe water between the two solid doors of the deluge room. In turn, an escape path will be needed for this constrained water to discharge to a suitable area outside the deluge room. The installation of pressure release (blowout) panels is proposed for the south exterior wall of the deluge room.

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

ENTERGY NUCLEAR NORTHEAST
IMPLEMENTATION ESTIMATE
Indian Point Nuclear Power Station

EC #: SAMA IP2-061

* ESTIMATE LEVEL *	
☑ **Conceptual**	PROJECT TITLE: SWGR Water Intrusion Protection ESTIMATOR: RCMT
☐ **Preliminary**	JOB LOCATION: Fire Protection Deluge Room PROJECT CODE: TBD
☐ **Definitive**	☑ CAPITAL ☐ OUTAGE ORIGINATOR: ☑ NON-OUTAGE ☐ O&M ORIG. DATE: 06/11/2012

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.	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 work will be performed by trained contract craftspersons in lieu of station maintenance personnel.
5.	This estimate assumes that deluge room south wall (including some rebar) must be cut and reinforced to support new pressure relief panels.
6.	This estimate assumes that concrete cutting will be performed by bricklayers/cement masons and ironworkers.
7.	This estimate assumes a blank annunciator panel is available for use in the Unit 2 Control Room.
8.	This estimate assumes that scaffolding will be rquired for conduit installation and wire pulling in the stairwell.
9.	This estimate assumes 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.
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%
	B. Inside fence boundary - 30%
	C. Implementation complexity - 40%
	D. Inside Containment - 50%

IPEC00270069

INDIAN POINT IMPLEMENTATION ESTIMATE WORK SHEET

EC #: SAMA IP2-061

7/5/2012 3:33 PM
IP2-061 Estimate (Rev_6-12-12).xls

PROJECT TITLE: SWGR Water Intrusion Protection
JOB LOCATION: Fire Protection Deluge Room
EST. STATUS: ☐ OUTAGE ☐ NON-OUTAGE ☑ CAPITAL ☐ O&M

PROJECT CODE: TBD
ORIGINATOR:

TAKEOFF:
ESTIMATOR: RCMT
ORIG. DATE: 06/11/2012

* ESTIMATE LEVEL *

- ☐ Conceptual
- ☐ Preliminary
- ☐ Definitive

General Notes:

ESTIMATE SUMMARY

		MANHOURS	DOLLARS
	EOI ENGINEERING		
01	STUDY, DESIGN, & CLOSEOUT	120	$ 12,000
02	DESIGN ENGR CONST SUPPORT	80	$ 8,000
03	MODS ENGR EOI SUPPORT	-	$ -
04	SYS ENGR/ S-U ENGR	196	$ 19,600
05	PROJECT MANAGEMENT	300	$ 36,000
06	WORK MANAGEMENT	-	$ -
07	TESTING	20	$ 2,000
08	ENGINEERING DCP ACCEPTANCE REVIEW	40	$ 4,000
	CONTRACT ENGINEERING		
09	DESIGN ENGR CONTRACT SUPPORT	800	$ 96,000
10	SUPL CONTRACT MODS ENGR	-	$ -
11	MODS PLAN & SCHED -CONTRACT	20	$ 2,000
12	OSG FIELD ENGRS / PLANNERS	100	$ 12,000
	MATERIALS / MISC CONTRACTS		
13	MATERIALS		$ 13,792
14	OTHER CONTRACTS		$ -
	CONTRACT CRAFT LABOR		
15	SWEC CRAFT LABOR/WALKDOWN	1,014	$ 118,188
16	LOST TIME	101	$ 14,455
17	SWEC DISTRIBS		$ 32,113
	PLANT CRAFT LABOR		
18	MECH MAINT.	-	$ -
19	ELECT MAINT	-	$ -
20	I&C	120	$ 12,000
21	CSG	-	$ -
	MISC EOI SUPPORT		
22	QUALITY CONTROL	40	$ 4,000
23	TRAINING	12	$ 1,440
24	SIMULATOR CHANGES	240	$ 24,000
25	OPS	80	$ 9,600
26	HP / RP	-	$ -
	MISC CONTRACT SUPPORT		
27	QUALITY CONTROL	60	$ 4,800
28	NDE	-	$ -
29	HP / RP	-	$ -
30	RADWASTE	-	$ -
31	NURSE	-	$ -
32	ELEVATOR CONTRACTOR	-	$ -
33	WASTE MANAGEMENT	-	$ -
34	HOUSEKEEPING	-	$ -
35	EQUIPMENT RENTAL CONTRACTOR	-	$ -
36	VENDOR STOCKING	-	$ -
37	DECONTAMINATION CONTACTOR	-	$ -
38	RBC'S	-	$ -
39	SECURITY - Wackenhut	-	$ -
40	FIRE WATCH (Rover)	-	$ -
41	SAFETY	23	$ 1,659
	CONTINGENCY		
42	CONTINGENCY		$ 171,059
	ESTIMATE SUBTOTAL	3,366	$ 598,706
	SITE ENCUMBRANCE PREMIUM (20%)		$ 119,741
	LOADERS (30%)		$ 215,534
	ESTIMATE TOTAL		**$ 933,981**

ITEM	DESCRIPTION	QTY	UOM	CFT	NO.	MANHOURS UNIT	FCTR	TOTAL	$/MH	MATERIAL PER UNIT	MATERIAL DOLLARS	LABOR DOLLARS	SUB-CONTRACT	TOTAL $
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		$ -	$ 1,536		$ 1,536
3.	Procure, install and align new solid steel fire door	1	EA	CP	2	12.00	1.00	24	$ 96.00	$ 250.00	$ 250	$ 2,304		$ 2,554
4.	Cut & reinforce deluge room wall for blow out panels	1	LT	BL	2	40.00	1.00	80	$ 90.09		$ -	$ 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	$ 800	$ 10,986		$ 11,586
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.	Procure & install 2 limit switches on 3 HR fire rated blow out panel as required	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	12	$ 96.00		$ -	$ 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
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	$ 10	$ 1,480		$ 1,490
12.	Procure and intall conduit supports	6	EA	EL	2	2.00	1.00	24	$ 123.32	$ 6.00	$ 36	$ 2,960		$ 2,996
13.	Core boring for routing new conduit and wiring	2	LT	EL	2	10.00	1.00	40	$ 123.32		$ -	$ 4,933		$ 4,933
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 wiring 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	12.00	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	40	$ 123.32		$ -	$ 4,933		$ 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
19.	Terminate Devices	6	EA	EL	1	4.00	1.00	24	$ 123.32			$ 2,960		$ 2,960
20.	Dismantle & store scaffolding	1	LT	CP	2	4.00	1.00	8	$ 96.00		$ -	$ 768		$ 768
21.	Dismantle & store scaffolding	1	LT	LB	1	4.00	1.00	4	$ 78.65		$ -	$ 315		$ 315
22.	Test & secure blow out panels, switches & alarms	1	LT	EL	2	16.00	1.00	32	$ 123.32		$ -	$ 3,946		$ 3,946
23.	Cleanup and restore area	1	LT	EL	2	4.00	1.00	8	$ 123.32		$ -	$ 987		$ 987
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

INDIAN POINT IMPLEMENTATION ESTIMATE WORK SHEET

EC #: SAMA IP2-061

PROJECT TITLE: SWGR Water Intrusion Protection
JOB LOCATION: Fire Protection Deluge Room
EST. STATUS: ☐ OUTAGE ☐ NON-OUTAGE ☑ CAPITAL ☐ O&M

PROJECT CODE: TBD
ORIGINATOR:

TAKEOFF:
ESTIMATOR: RCMT
ORIG. DATE: 06/11/2012

ITEM	DESCRIPTION	QTY	UOM	CFT	NO.	MANHOURS UNIT	MANHOURS FCTR	MANHOURS TOTAL	$/MH	MATERIAL PER UNIT	MATERIAL DOLLARS	LABOR DOLLARS	SUB-CONTRACT	TOTAL $
	PAINTING & TOUCH-UP REQUIREMENTS													
1.	PAINTING & TOUCH-UP	1	LT	PT	1	20.00	1.00	20	$ 95.16	$ 20.00	$ 400	$ 1,903		$ 2,303
2.	PAINTING & TOUCH-UP			PT				-			$ -	$ -		$ -
	FIRE WATCH / BOTTLEWATCH REQUIREMENTS													
1.	CRAFT SUPPORT FOR FIRE WATCH	1	LT	FW	1	80.00	1.00	80	$ 53.60		$ -	$ 4,288		$ 4,288
2.	CRAFT SUPPORT FOR BOTTLE WATCH	1	LT	FW				-			$ -	$ -		$ -
	MISC SUB-CONTRACT													
1.	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
	SUBTOTAL							941			$ 13,011	$ 107,044	$ -	$ 120,055
	*** RELATED COSTS ***													
1.	WALKDOWN ALLOWANCE	1	LT	EL				10	$ 123.32			$ 1,233		$ 1,233
2.	WORK PACKAGE REVIEW	1	LT	EL				30	$ 123.32			$ 3,700		$ 3,700
3.	TOOL ROOM ATTENDANTS (~3.5%)	1	LT	EL				33	$ 123.32			$ 4,070		$ 4,070
4.	GENERAL CRAFT OUTAGE DISTRIBS. (10%)											$ 10,704		$ 10,704
5.	CRAFT IN PROCESSING (20%)											$ 21,409		$ 21,409
6.	HUMAN PERFORMANCE & ALARA TRAINING	1	LT									$ 2,141		$ 2,141
7.	(1/2 day training, or ~ 2%)													
	SUBTOTAL							1,014			$ 13,011	$ 150,301	$ -	$ 163,312
	PLANT SCOPE													
1.	**MECH MAINTENANCE**			PL				-			$ -	$ -		$ -
				PL				-			$ -	$ -		$ -
	SUBTOTAL MECH MAINT.							-			$ -	$ -	$ -	$ -
1.	**ELECT MAINTENANCE**			PL				-			$ -	$ -		$ -
				PL				-			$ -	$ -		$ -
	SUBTOTAL ELECT. MAINT.							-			$ -	$ -	$ -	$ -
1.	**I&C (Dev. Calibration & Maintenance Procedures**	1	LT	PL	1	120.00	1.00	120	$ 100.00		$ -	$ 12,000		$ 12,000
				PL				-			$ -	$ -		$ -
	SUBTOTAL I&C MAINT.							120			$ -	$ 12,000	$ -	$ 12,000
1.	**CSG**			PL				-			$ -	$ -		$ -
				PL				-			$ -	$ -		$ -
	SUBTOTAL CSG MAINT.							-			$ -	$ -	$ -	$ -
	SUBTOTAL PLANT							-			$ -	$ 12,000	$ -	$ 12,000
	SUBTOTAL CRAFT/PLANT							1,134			$ 13,011	$ 162,301	$ -	$ 175,312
	IMPLEMENTATION SUPPORT													
1.	MODS ENGINEERING	1	LT	NM				-				$ -		$ -
2.	DESIGN ENGINEERING SUPT DURING CONST	1	LT	NM	1	80.00	1.00	80	$ 100.00			$ 8,000		$ 8,000
3.	SYSTEMS ENGINEERING - MECHANICAL	1	LT	NM				-				$ -		$ -
4.	SYSTEMS ENGINEERING - ELECTRICAL	1	LT	NM	1	80.00	1.00	80	$ 100.00			$ 8,000		$ 8,000
5.	SYSTEMS EINGINEERING - INSTR & CONTROL	1	LT	NM	1	36.00	1.00	36	$ 100.00			$ 3,600		$ 3,600
6.	SYSTEMS ENGINEERING - CIVIL STRUCTURAL	1	LT	NM	1	80.00	1.00	80	$ 100.00			$ 8,000		$ 8,000
7.	PROJECT MANAGEMENT	1	LT	NM	1	300.00	1.00	300	$ 120.00			$ 36,000		$ 36,000
8.	WORK MANAGEMENT (w.o Planning)	1	LT	NM	1							$ -		$ -
9.	QA / QC VERIFICATION	1	LT	NM	1	40.00	1.00	40	$ 100.00			$ 4,000		$ 4,000
10.	TRAINING	12	LT	NM	12	1.00	1.00	12	$ 120.00			$ 1,440		$ 1,440
11.	HP / RP/ ALARA	1	LT	NM				-				$ -		$ -
12.	SIMULATOR CHANGES	1	LT	NM	2	120.00	1.00	240	$ 100.00			$ 24,000		$ 24,000
13.	OPS (Procedure development / revision)	1	LT	NM	1	80.00	1.00	80	$ 120.00			$ 9,600		$ 9,600
14.	TRAVEL & LIVING EXPENSES	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	20.00	1.00	20	$ 100.00			$ 2,000		$ 2,000
3.	OSG FIELD ENGRS/PLAN- SWEC(Incl Per Diem)	1	LT	NM	1	100.00	1.00	100	$ 120.00			$ 12,000		$ 12,000
4.	QA / QC VERIFICATION	1	LT	NM	1	60.00	1.00	60	$ 80.00			$ 4,800		$ 4,800
5.	NDE	1	LT	NM				-				$ -		$ -
6.	HP / RP	1	LT	NM				-				$ -		$ -
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.	VENDOR STOCKING	1	LT	NM										
14.	DECONTAMINATION CONTRACTOR	1	LT	NM										
15.	RBC's	1	LT	NM										

INDIAN POINT IMPLEMENTATION ESTIMATE WORK SHEET

EC #: SAMA IP2-061

7/5/2012 3:33 PM
IP2-061 Estimate (Rev_6-12-12).xls

PROJECT TITLE: SWGR Water Intrusion Protection
JOB LOCATION: Fire Protection Deluge Room
EST. STATUS: ☐ OUTAGE ☐ NON-OUTAGE ☑ CAPITAL ☐ O&M

PROJECT CODE: TBD
ORIGINATOR:

TAKEOFF:
ESTIMATOR: RCMT
ORIG. DATE: 06/11/2012

ITEM	DESCRIPTION	QTY	UOM	CFT	NO.	MANHOURS UNIT	FCTR	TOTAL	$/MH	MATERIAL PER UNIT	MATERIAL DOLLARS	LABOR DOLLARS	SUB-CONTRACT	TOTAL $
16.	SECURITY	1	LT	SEC										
17.	FIREWATCH (Rover)	1	LT	NM								$ -		$ -
18.	SAFETY (2%)	1	LT	NM				23	$ 72.14			$ 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							2,386			$ 13,792	$ 299,855	$ -	$ 313,647
1.	DESIGN ENGINEERING - MECHANICAL	1	LT	NM								$ -		$ -
2.	DESIGN ENGINEERING - ELECTRICAL	1	LT	NM	1	40.00	1.00	40	$100.00			$ 4,000		$ 4,000
3.	DESIGN ENGINEERING - INSTR. & CONTROL	1	LT	NM	1	40.00	1.00	40	$100.00			$ 4,000		$ 4,000
4.	DESIGN ENGINEERING - CIVIL/STRUCTURAL	1	LT	NM	1	40.00	1.00	40	$100.00			$ 4,000		$ 4,000
5.	TESTING (Instrument Calibration and testing)	1	LT	NM	2	10.00	1.00	20	$100.00			$ 2,000		$ 2,000
6.	CONTRACT ENGR DESIGN SUPPORT	1	LT	NM	1	800.00	1.00	800	$120.00			$ 96,000		$ 96,000
7.	DESIGN ENG. DCP ACCEPTANCE REVIEW	1	LT	NM	1	40.00	1.00	40	$100.00			$ 4,000		$ 4,000
	SUBTOTAL DESIGN COST							980				$ 114,000	$ -	$ 114,000
	SUBTOTAL INSTALLATION & DESIGN COST											$ 413,855	$ -	$ 427,647
1.	CONTINGENCY (40%)													$ 171,059
	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: Peter Battaglia	Approved by:
Date: 9-20-2012	Date: 9-20-2012

IPEC00270073

TABLE OF CONTENTS

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.

4.0 DESIGN CONSIDERATIONS

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
2. 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

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.: SAMA IP2-062 **Rev. No.:** CONCEPTUAL 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	☐ 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	☐ 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

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	☒ NO
Cable and Raceway Program • Does the proposed activity involve any changes to cable trays, raceways or the associated documentation?	■ YES	☐ 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) *(if applicable)* • 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 • 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?	■ 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?	☐ 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

PROCESS OR PROGRAM IMPACT SCREENING CHECKLIST	Potential Impact	
Computer Support and Software • Does the proposed activity impact or involve changes to plant computer software or firmware or impact Software Quality Assurance (SQA)?	☐ YES	☒ NO
Chemistry and Environmental Impact • Does the proposed activity impact or involve any changes to plant chemistry requirements, operations or procedures, or any changes to the environment?	☐ YES	☒ NO
Radiation Protection (RP) Program Impact • 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?	■ 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	☐ 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 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

ATTACHMENT 9.3 IMPACT SCREENING SUMMARY

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	☒ 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?	☐ 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?	☐ 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

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	☒ 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	☒ 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	☒ 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?	☐ 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

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?	■ YES	☐ 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	☐ NO
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: PARTIAL SITE PLAN OF AREAS AFFECTED
2. Figure 2: PROVIDE ALTERNATE SAFE SHUTDOWN SYSTEM FOR 22 SI PUMP

IPEC00270087

RCM Technologies The Source of Smart Solutions	ENTERGY Indian Point Nuclear Station Unit 2	Conceptual Design Package SAMA IP2-062	Rev. 0

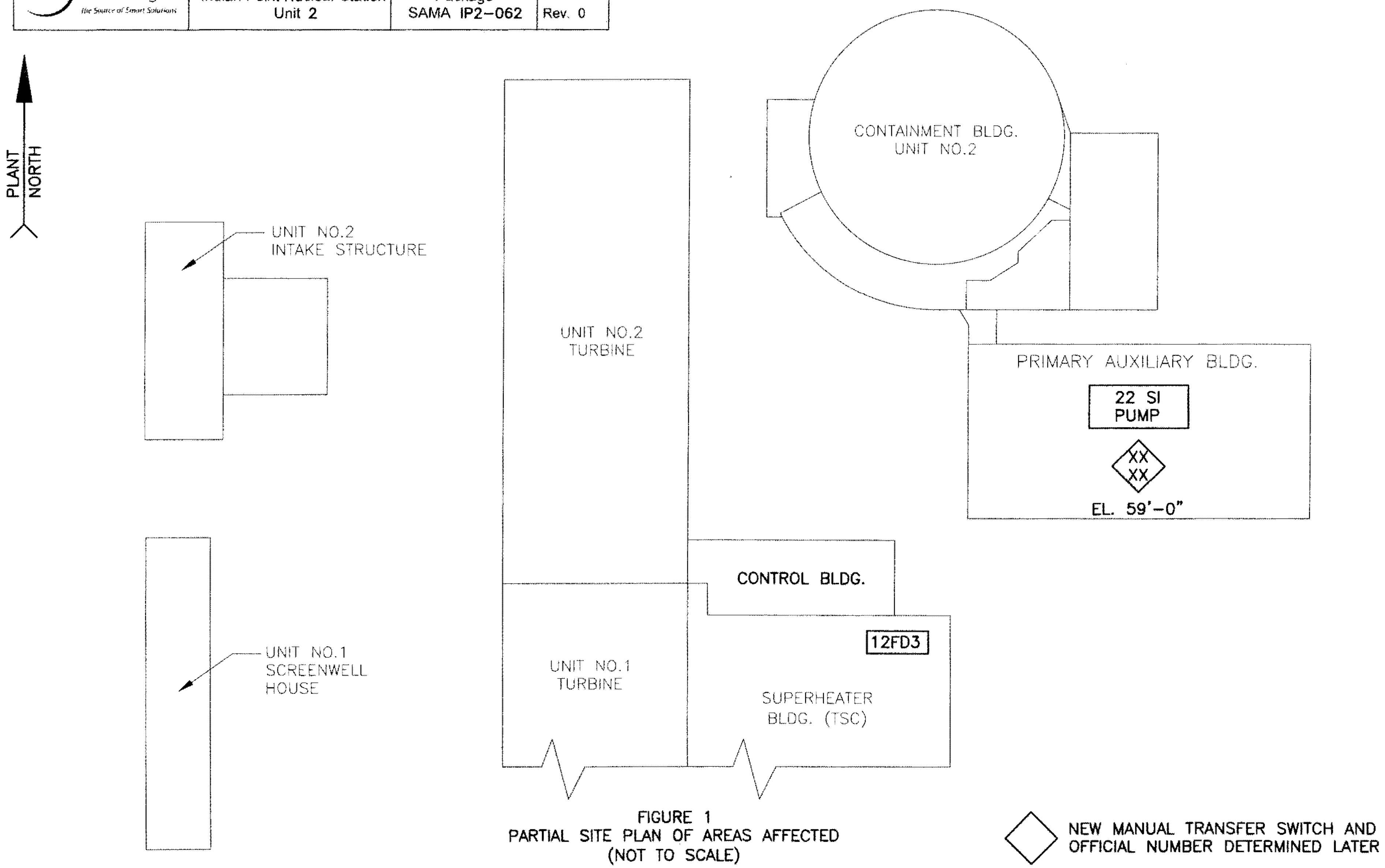


FIGURE 1
PARTIAL SITE PLAN OF AREAS AFFECTED
(NOT TO SCALE)

RCM Technologies The Source of Smart Solutions	ENTERGY Indian Point Nuclear Station Unit 2	Conceptual Design Package SAMA IP2-062	Rev. 0

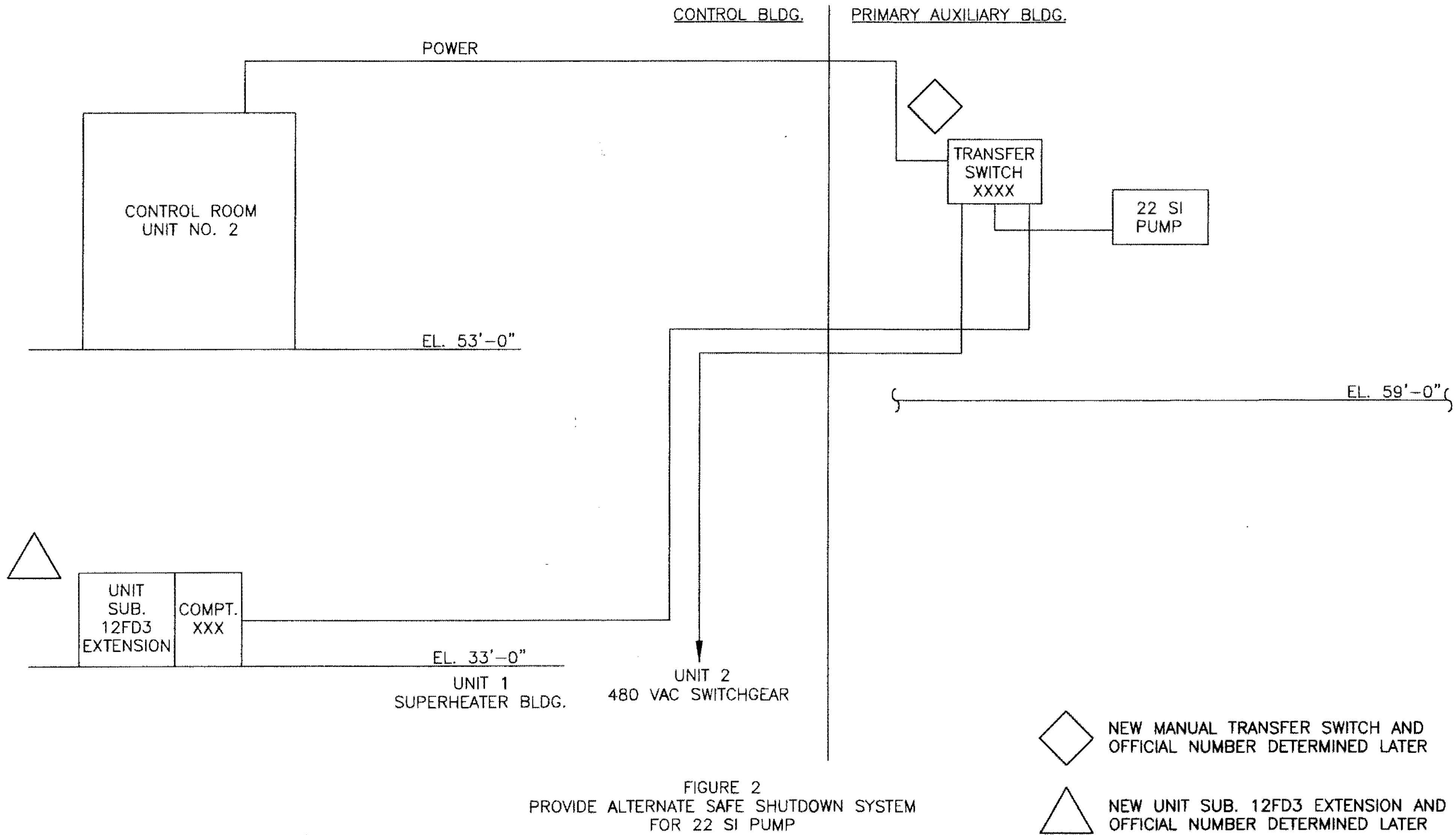


FIGURE 2
PROVIDE ALTERNATE SAFE SHUTDOWN SYSTEM
FOR 22 SI PUMP
(NOT TO SCALE)

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. ASCO Series 386 Non-Automatic Power Transfer Switches or Equivalent

Power Switching & Controls
for Business-Critical Continuity

ASCO SERIES 300 Power Transfer Switches



ASCO®

EMERSON
Network Power

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

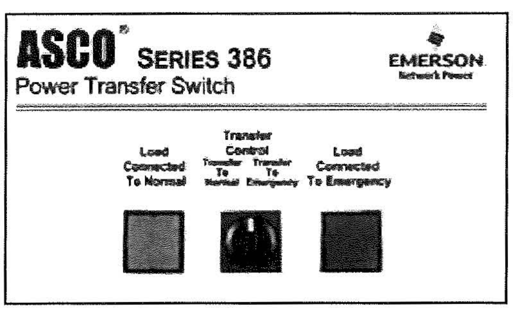


Fig. 15: Control and Display Panel

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

ENTERGY NUCLEAR NORTHEAST
IMPLEMENTATION ESTIMATE
Indian Point Nuclear Power Station

* ESTIMATE LEVEL *	**EC #: SAMA IP2-062**			
☑ Conceptual	PROJECT TITLE: Safety Injection Pump ASSS Power		ESTIMATOR: RCMT	
☐ Preliminary	JOB LOCATION: Aux, Superheater & Control Bldgs.	PROJECT CODE: TBD		
☐ Definitive	☐ OUTAGE ☑ NON-OUTAGE	ORIGINATOR:	ORIG. DATE: 07/13/2012	
	ESTIMATE TOTAL **$1,624,840**	☑ CAPITAL ☐ O&M	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 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.

This project will also replace the existing 13.8kV transformer with with a larger capacity model.

Prepared by: Peter Buttacavoli		Approved by: [signature]
Date: 9-20-2012		Date: 9-20-2012

ENTERGY NUCLEAR NORTHEAST
IMPLEMENTATION ESTIMATE
Indian Point Nuclear Power Station

EC #: SAMA IP2-062

* ESTIMATE LEVEL *	
☑ **Conceptual**	PROJECT TITLE: Safety Injection Pump ASSS Power — ESTIMATOR: RCMT
☐ **Preliminary**	JOB LOCATION: Aux, Superheater & Control Bldgs. — PROJECT CODE: TBD
☐ **Definitive**	☐ OUTAGE ☑ NON-OUTAGE ORIGINATOR: ☑ CAPITAL ☐ O&M ORIG. DATE: 07/13/2012

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.	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 work will be performed by trained contract craftspersons in lieu of station maintenance personnel.
5.	This estimate assumes that core boring is required between El. 53' - 0" and 33' - 0" cable spreading area.
6.	This estimate assumes that a new transformer will be installed in Unit 1 at Elevation 33' - 0" to replace existing transformer at Substation 12FD3.
7.	This estimate assumes that a new motor control center will be installed in Unit 1 at Elevation 33' - 0" near the new transformer at Substation 12FD3.
8.	This estimate assumes 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 if required the additional cost will be added.
10.	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).
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.	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 fence boundary - 30%
	C. Implementation complexity - 40%
	D. Inside Containment - 50%

INDIAN POINT IMPLEMENTATION ESTIMATE WORK SHEET

EC #: SAMA IP2-062

PROJECT TITLE: Safety Injection Pump ASSS Power	☑ CAPITAL ☐ O&M	TAKEOFF:
JOB LOCATION: Aux, Superheater & Control Bldgs.	PROJECT CODE: TBD	ESTIMATOR: RCMT
EST. STATUS: ☐ OUTAGE ☑ NON-OUTAGE	ORIGINATOR:	ORIG. DATE: 07/13/2012

* ESTIMATE LEVEL *

- ☑ Conceptual
- ☐ Preliminary
- ☐ Definitive

General Notes:

ESTIMATE SUMMARY

		MANHOURS	DOLLARS
EOI ENGINEERING			
01	STUDY, DESIGN, & CLOSEOUT	600	$ 60,000
02	DESIGN ENGR CONST SUPPORT	160	$ 16,000
03	MODS ENGR EOI SUPPORT	-	$ -
04	SYS ENGR/ S-U ENGR	160	$ 16,000
05	PROJECT MANAGEMENT	600	$ 60,000
06	WORK MANAGEMENT	-	$ -
07	ENGINEERING DCP ACCEPTANCE REVIEW	150	$ 15,000
CONTRACT ENGINEERING			
08	DESIGN ENGR CONTRACT SUPPORT	1,040	$ 124,800
09	SUPL CONTRACT MODS ENGR	-	$ -
10	MODS PLAN & SCHED -CONTRACT	160	$ 16,000
11	FIELD ENGRS / PLANNERS	140	$ 16,800
MATERIALS / MISC CONTRACTS			
12	MATERIALS		$ 170,459
13	OTHER CONTRACTS		$ -
CONTRACT CRAFT LABOR			
14	SWEC CRAFT LABOR/WALKDOWN	1,316	$ 139,400
15	LOST TIME	132	$ 17,673
16	SWEC DISTRIBS		$ 37,881
PLANT CRAFT LABOR			
17	MECH MAINT.	-	$ -
18	ELECT MAINT	32	$ 3,200
19	I&C	-	$ -
20	CSG	-	$ -
MISC EOI SUPPORT			
21	QUALITY CONTROL	120	$ 12,000
22	TRAINING	48	$ 5,760
23	CHEMISTRY	-	$ -
24	OPS / OPS SUPPORT	120	$ 14,400
25	HP / RP	80	$ 6,365
MISC CONTRACT SUPPORT			
26	QUALITY CONTROL	130	$ 10,400
27	NDE	-	$ -
28	HP / RP	-	$ -
29	RADWASTE	-	$ -
30	NURSE	-	$ -
31	ELEVATOR CONTRACTOR	-	$ -
32	WASTE MANAGEMENT	-	$ -
33	HOUSEKEEPING	-	$ -
34	EQUIPMENT RENTAL CONTRACTOR	-	$ -
35	VENDOR STOCKING	-	$ -
36	DECONTAMINATION CONTACTOR	-	$ -
37	RBC'S	-	$ -
38	SECURITY - Wackenhut	-	$ -
39	FIRE WATCH (Rover)	-	$ -
40	SAFETY	27	$ 1,836
CONTINGENCY			
41	CONTINGENCY		$ 297,590
ESTIMATE SUBTOTAL		**5,015**	**$ 1,041,564**
	SITE ENCUMBRANCE PREMIUM (20%)		**$ 208,313**
	LOADERS (30%)		**$ 374,963**
	ESTIMATE TOTAL		**$ 1,624,840**

ITEM	DESCRIPTION	QTY	UOM	CFT	NO.	MANHOURS UNIT	FCTR	TOTAL	$/MH	MATERIAL $ PER UNIT	MATERIAL DOLLARS	LABOR DOLLARS	SUB-CONTRACT	TOTAL $
1.	Gather and stage tools and materials	1	LT	EL	4	10.00	1.00	40	$ 123.32		$ -	$ 4,933		$ 4,933
2.	Determinate at existing MCC and remove substation 12FD3 Transformer	1	EA	EL	4	20.00	1.00	80	$ 123.32		$ -	$ 9,866		$ 9,866
3.	Procure and set new 3000kVA transformer	1	EA	EL	4	20.00	1.00	80	$ 123.32	$ 150,000.00	$ 150,000	$ 9,866		$ 159,866
4.	Stage, erect & modify scaffolding as required	1	LT	CP	2	12.00	1.00	24	$ 96.00		$ -	$ 2,304		$ 2,304
5.	Stage, erect & modify scaffolding as required	1	LT	LB	1	12.00	1.00	12	$ 78.15		$ -	$ 938		$ 938
6.	Core drill as required to route new conduit	2	LT	EL	2	20.00	1.00	80	$ 123.20		$ -	$ 9,856		$ 9,856
7.	Procure & install new MCC, 2 buckets and 480VAC switchgear as required	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 El. 59' - 0" in the Primary Auxiliary Building	1	EA	EL	2	24.00	1.00	48	$ 123.32	$ 500.00	$ 500	$ 5,919		$ 6,419
9.	Procure and field erect conduit supports	22	EA	EL	5	1.00	1.00	110	$ 123.32	$ 6.00	$ 132	$ 13,565		$ 13,697
10.	Procure and erect 1" conduit as required	80	LF	EL	2	0.18	1.00	29	$ 123.32	$ 1.75	$ 140	$ 3,576		$ 3,716
11.	Procure and erect 2" conduit as required	90	LF	EL	2	0.20	1.00	36	$ 123.32	$ 1.75	$ 158	$ 4,440		$ 4,598
12.	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
13.	Procure, pull & route 480VAC 4/c cable as required	540	LF	EL	2	0.03	1.00	32	$ 123.32	$ 1.50	$ 810	$ 3,946		$ 4,756
14.	Disconnect existing power cable at 22 SI	1	LT	PL	2	30.00	1.00	60	$ 60.00		$ -	$ 3,600		$ 3,600
15.	Connect new power cable to 22 SI & power cables to transfer switch	1	LT	PL	2	20.00	1.00	40	$ 60.00		$ -	$ 2,400		$ 2,400
16.	Connect power cable to new MCC's and transformer	1	LT	PL	2	60.00	1.00	120	$ 60.00		$ -	$ 7,200		$ 7,200
17.	Provide testing as required	1	LT	PL	2	4.00	1.00	8	$ 60.00		$ -	$ 480		$ 480
18.	Assist with testing as required	1	LT	EL	2	20.00	1.00	40	$ 123.32		$ -	$ 4,933		$ 4,933
19.	Dismantle scaffolding to storage	1	LT	CP	2	12.00	1.00	24	$ 96.00		$ -	$ 2,304		$ 2,304
20.	Dismantle scaffolding to storage	1	LT	LB	1	12.00	1.00	12	$ 78.15		$ -	$ 938		$ 938
21.	Cleanup and restore area	1	LT	EL	4	8.00	1.00	32	$ 123.32		$ -	$ 3,946		$ 3,946

INDIAN POINT IMPLEMENTATION ESTIMATE WORK SHEET

EC #: SAMA IP2-062

PROJECT TITLE: Safety Injection Pump ASSS Power
JOB LOCATION: Aux, Superheater & Control Bldgs.
EST. STATUS: ☐ OUTAGE ☑ NON-OUTAGE

☑ CAPITAL ☐ O&M
PROJECT CODE: TBD
ORIGINATOR:

TAKEOFF:
ESTIMATOR: RCMT
ORIG. DATE: 07/13/2012

ITEM	DESCRIPTION	QTY	UOM	CFT	NO	MANHOURS UNIT	FCTR	TOTAL	$/MH	MATERIAL $ PER UNIT	MATERIAL DOLLARS	LABOR DOLLARS	SUB-CONTRACT	TOTAL $
	PAINTING & TOUCH-UP REQUIREMENTS													
1.	PAINTING & TOUCH-UP			PT				-			$ -	$ -		$ -
2.	PAINTING & TOUCH-UP			PT				-			$ -	$ -		$ -
	FIRE WATCH / BOTTLEWATCH REQUIREMENTS													
1.	CRAFT SUPPORT FOR FIRE WATCH	2	LT	FW	1	48.00	1.00	96	$ 53.60		$ -	$ 5,146		$ 5,146
2.	CRAFT SUPPORT FOR BOTTLE WATCH	1	LT	FW				-			$ -	$ -		$ -
	MISC SUB-CONTRACT													
1.	MISC SUB-CONTRACT												$ -	$ -
	SUBTOTAL CRAFT & SUB-CONTRACTOR							1,139			$ 160,810	$ 116,927	$ -	$ 277,737
1.	CONSTRUCTION SUPPORT (8% OF LABOR $)	1	LT					91	$ 102.66	$ -		$ 9,342		$ 9,342
	SUBTOTAL							1,230			$ 160,810	$ 126,269	$ -	$ 287,079
	*** RELATED COSTS ***													
1.	WALKDOWN ALLOWANCE	1	LT	EL				12	$ 123.32			$ 1,480		$ 1,480
2.	WORK PACKAGE REVIEW	1	LT	EL				31	$ 123.32			$ 3,823		$ 3,823
3.	TOOL ROOM ATTENDANTS (~3.5%)	1	LT	EL				43	$ 123.32			$ 5,303		$ 5,303
4.	GENERAL CRAFT OUTAGE DISTRIBS. (10%)											$ 12,627		$ 12,627
5.	CRAFT IN PROCESSING (20%)											$ 25,254		$ 25,254
6.	HUMAN PERFORMANCE & ALARA TRAINING											$ 2,525		$ 2,525
7.	(1/2 day training, or ~ 2%)													
	SUBTOTAL							1,316			$ 160,810	$ 177,281	$ -	$ 338,091
	PLANT SCOPE													
1.	**MECH MAINTENANCE**			PL				-			$ -	$ -		$ -
				PL				-			$ -	$ -		$ -
	SUBTOTAL MECH MAINT.							-			$ -	$ -	$ -	$ -
1.	**ELECT MAINTENANCE**	1	LT	PL	2	16.00	1.00	32	$ 100.00		$ -	$ 3,200		$ 3,200
				PL				-			$ -	$ -		$ -
	SUBTOTAL ELECT. MAINT.							32			$ -	$ 3,200	$ -	$ 3,200
1.	**I&C**			PL				-			$ -	$ -		$ -
				PL				-			$ -	$ -		$ -
	SUBTOTAL I&C MAINT.							-			$ -	$ -	$ -	$ -
1.	**CSG**			PL				-			$ -	$ -		$ -
				PL				-			$ -	$ -		$ -
	SUBTOTAL CSG MAINT.							-			$ -	$ -	$ -	$ -
	SUBTOTAL PLANT							32			$ -	$ 3,200	$ -	$ 3,200
	SUBTOTAL CRAFT/PLANT							1,348			$ 160,810	$ 180,481	$ -	$ 341,291
	IMPLEMENTATION SUPPORT													
	EOI													
1.	WELDING ENGINEERING	1	LT	NM				-				$ -		$ -
2.	DESIGN ENGINEERING SUPT DURING CONST	1	LT	NM	1	160.00	1.00	160	$ 100.00			$ 16,000		$ 16,000
3.	SYSTEMS ENGINEERING - MECHANICAL	1	LT	NM				-				$ -		$ -
4.	SYSTEMS ENGINEERING - ELECTRICAL	1	LT	NM	1	80.00	1.00	80	$ 100.00			$ 8,000		$ 8,000
5.	SYSTEMS EINGINEERING - INSTR & CONTROL	1	LT	NM	1	40.00	1.00	40	$ 100.00			$ 4,000		$ 4,000
6.	SYSTEMS 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	600.00	1.00	600	$ 100.00			$ 60,000		$ 60,000
8.	TRAINING OPS STAFF	12	LT	NM	1	4.00	1.00	48	$ 120.00			$ 5,760		$ 5,760
9.	QA / QC VERIFICATION	1	LT	NM	1	120.00	1.00	120	$ 100.00			$ 12,000		$ 12,000
10.	CHEMISTRY	1	LT	NM				-				$ -		$ -
11.	HP / RP/ ALARA	1	LT	NM	1	80.00	1.00	80	$ 79.56			$ 6,365		$ 6,365
12.	WORK MANAGEMENT	1	LT	NM	1			-				$ -		$ -
13.	OPS / OPS PROCEDURE SUPPORT AND DEVELOPMENT	1	LT	NM	1	120.00	1.00	120	$ 120.00			$ 14,400		$ 14,400
14.	TRAVEL & LIVING EXPENSES	1	LT									$ -		$ -
	CONTRACTOR SUPPORT													
1.	FIS / MODS ENGINEERING - SWEC (Incl Per Diem)	1	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.	FIELD ENGRS/PLAN- SWEC	1	LT	NM	1	140.00	1.00	140	$ 120.00			$ 16,800		$ 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				-				$ -		$ -
6.	HP / RP	1	LT	NM				-				$ -		$ -
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.	VENDOR STOCKING	1	LT	NM				-						
14.	DECONTAMINATION CONTRACTOR	1	LT	NM				-						
15.	RBC's	1	LT	NM				-						
16.	SECURITY	1	LT	SEC				-						
17.	FIREWATCH (Rover)	1	LT	NM				-						$ -
18.	SAFETY (2%)	1	LT	NM				27	$ 68.00			$ 1,836		$ 1,836
19.	LOST TIME (10%)	1	LT					132	$ 133.89			$ 17,673		$ 17,673
	SUBTOTAL CRAFT/NON-MANUAL							3,225			$ 160,810	$ 373,715	$ -	$ 534,525

INDIAN POINT IMPLEMENTATION ESTIMATE WORK SHEET

EC #: SAMA IP2-062

PROJECT TITLE: Safety Injection Pump ASSS Power
JOB LOCATION: Aux, Superheater & Control Bldgs.
EST. STATUS: ☐ OUTAGE ☑ NON-OUTAGE

☑ CAPITAL ☐ O&M
PROJECT CODE: TBD
ORIGINATOR:

TAKEOFF:
ESTIMATOR: RCMT
ORIG. DATE: 07/13/2012

ITEM	DESCRIPTION	QTY	UOM	MANHOURS CFT	NO	UNIT	FCTR	TOTAL	$/MH	MATERIAL $ PER UNIT	MATERIAL DOLLARS	LABOR DOLLARS	SUB-CONTRACT	TOTAL $
1.	FREIGHT, SALES TAX, & CONSUMABLES (6%)										$ 9,649			$ 9,649
	SUBTOTAL INSTALLATION COST							3,225			$ 170,459	$ 373,715	$ -	$ 544,174
1.	DESIGN ENGINEERING - MECHANICAL	1	LT	NM	1	80.00	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		$ 44,000
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	1,040.00	1.00	1,040	$ 120.00			$ 124,800		$ 124,800
6	ENGRG DCP ACCEPTANCE REVIEW	1	LT	NM	1	150.00	1.00	150	$ 100.00			$ 15,000		$ 15,000
	SUBTOTAL DESIGN COST							1,790			$ 170,459	$ 199,800	$ -	$ 370,259
	SUBTOTAL INSTALLATION & DESIGN COST										$ 170,459	$ 573,515	$ -	$ 743,974
1.	CONTINGENCY (40%)													$ 297,590
	ESTIMATE SUBTOTAL							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: Peter Buttrano(?)	Approved by:
Date: 9-20-2012	Date: [illegible]

IPEC00270098

TABLE OF CONTENTS

1.0 ISSUE

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.

7.0 PRELIMINARY MATERIAL LIST

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

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.: SAMA IP2-065 **Rev. No.:** CONCEPTUAL 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	☐ 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	☐ 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

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	☒ NO
Cable and Raceway Program • Does the proposed activity involve any changes to cable trays, raceways or the associated documentation?	■ YES	☐ 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) *(if applicable)* • 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 • 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?	■ 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?	☐ 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

ATTACHMENT 9.3 IMPACT SCREENING SUMMARY

SHEET 3 OF 6

PROCESS OR PROGRAM IMPACT SCREENING CHECKLIST	Potential Impact	
Computer Support and Software • Does the proposed activity impact or involve changes to plant computer software or firmware or impact Software Quality Assurance (SQA)?	☐ YES	☒ NO
Chemistry and Environmental Impact • Does the proposed activity impact or involve any changes to plant chemistry requirements, operations or procedures, or any changes to the environment?	☐ YES	☒ NO
Radiation Protection (RP) Program Impact • 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?	■ 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	☐ 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 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

ATTACHMENT 9.3 IMPACT SCREENING SUMMARY

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	☒ 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?	☐ 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?	☐ 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

ATTACHMENT 9.3 IMPACT SCREENING SUMMARY

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	☒ 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	☒ 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	☒ 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?	☐ 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

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?	■ YES	☐ 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	☐ NO
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: 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

IPEC00270112

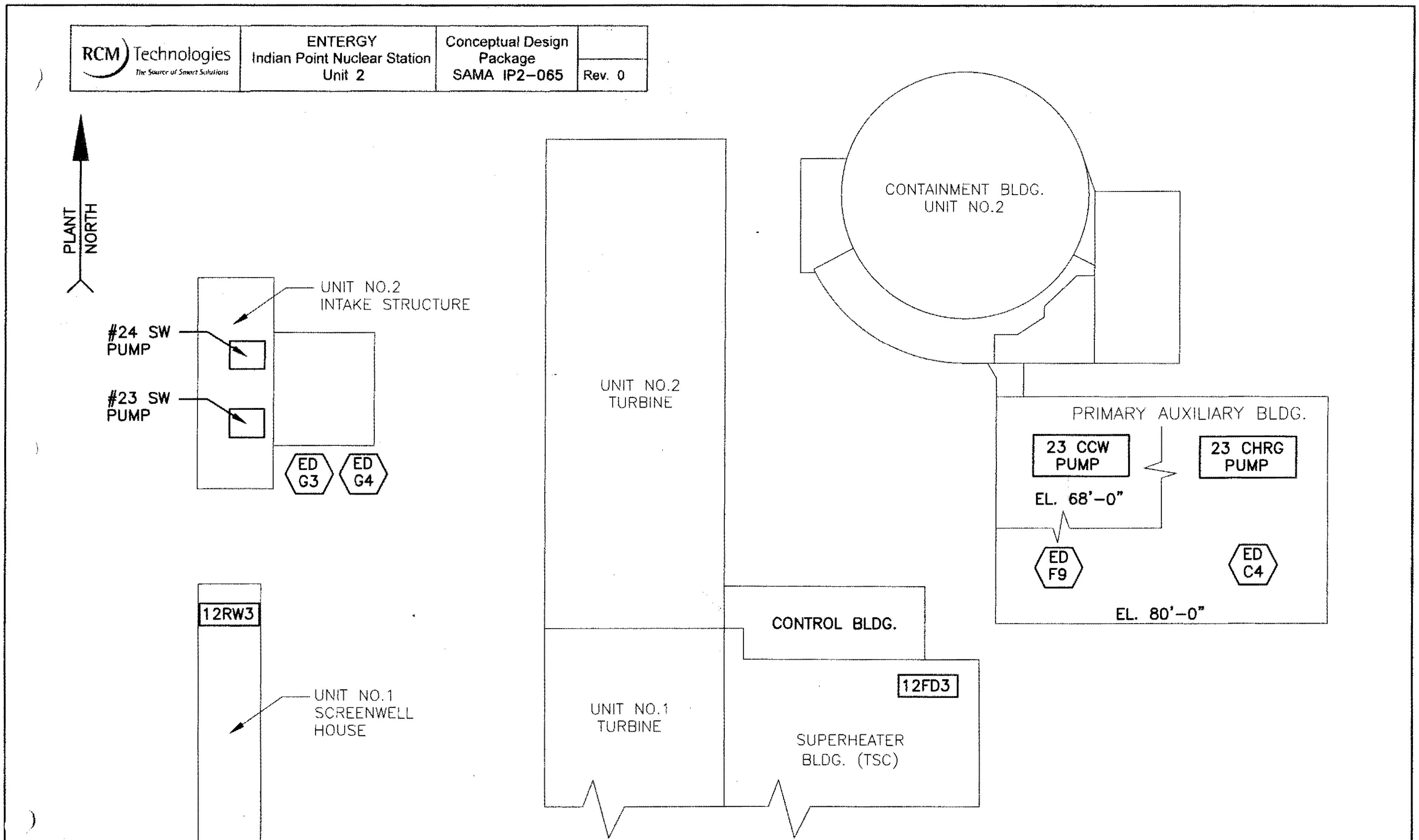


FIGURE 1
PARTIAL SITE PLAN OF AREAS AFFECTED
(NOT TO SCALE)

RCM Technologies	ENTERGY Indian Point Nuclear Station Unit 2	Conceptual Design Package SAMA IP2-065	Rev. 0

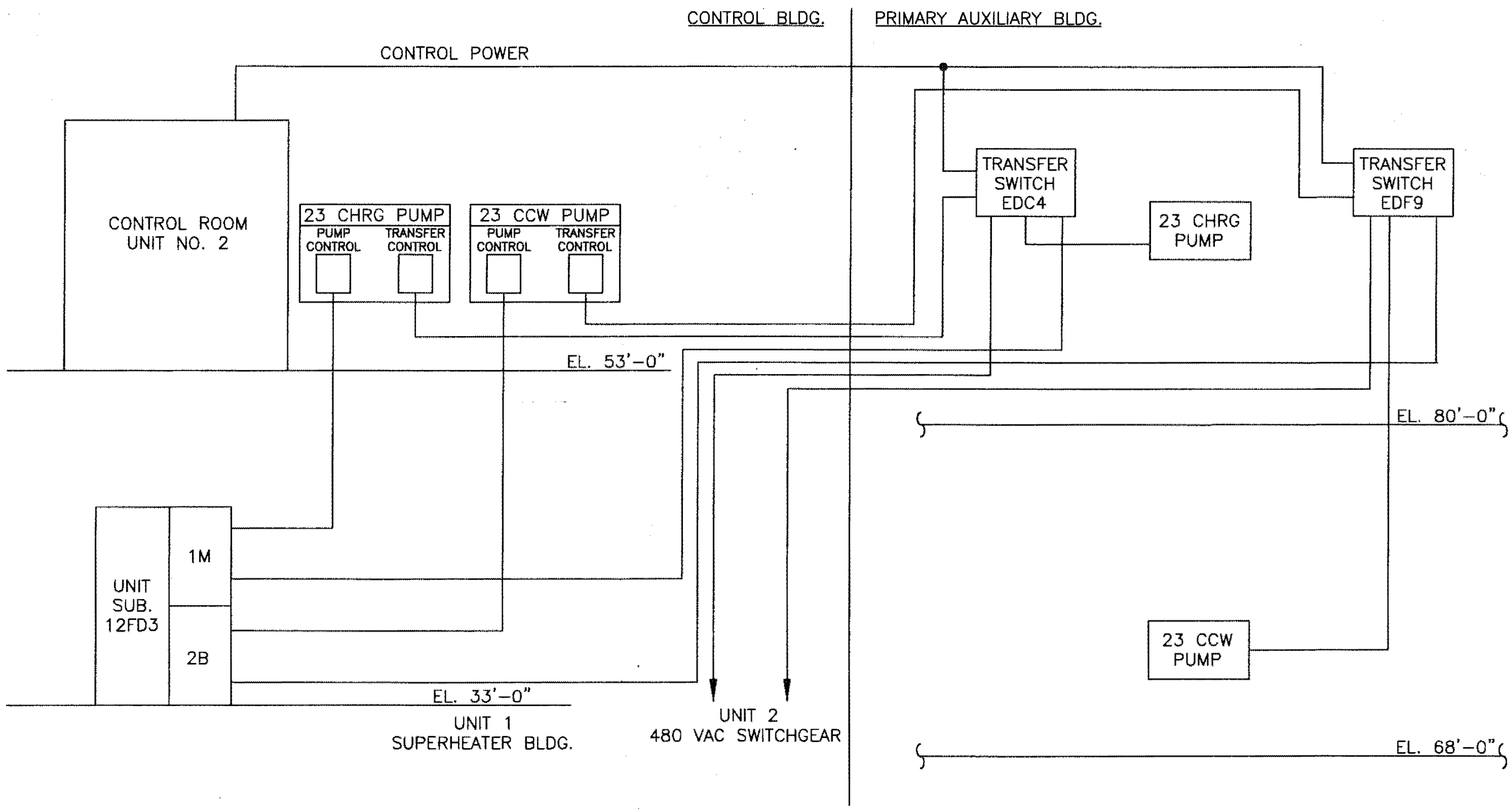


FIGURE 2
UPGRADE ALTERNATE SAFE SHUTDOWN SYSTEM
FOR 23 CHRG AND 23 CCW PUMP
(NOT TO SCALE)

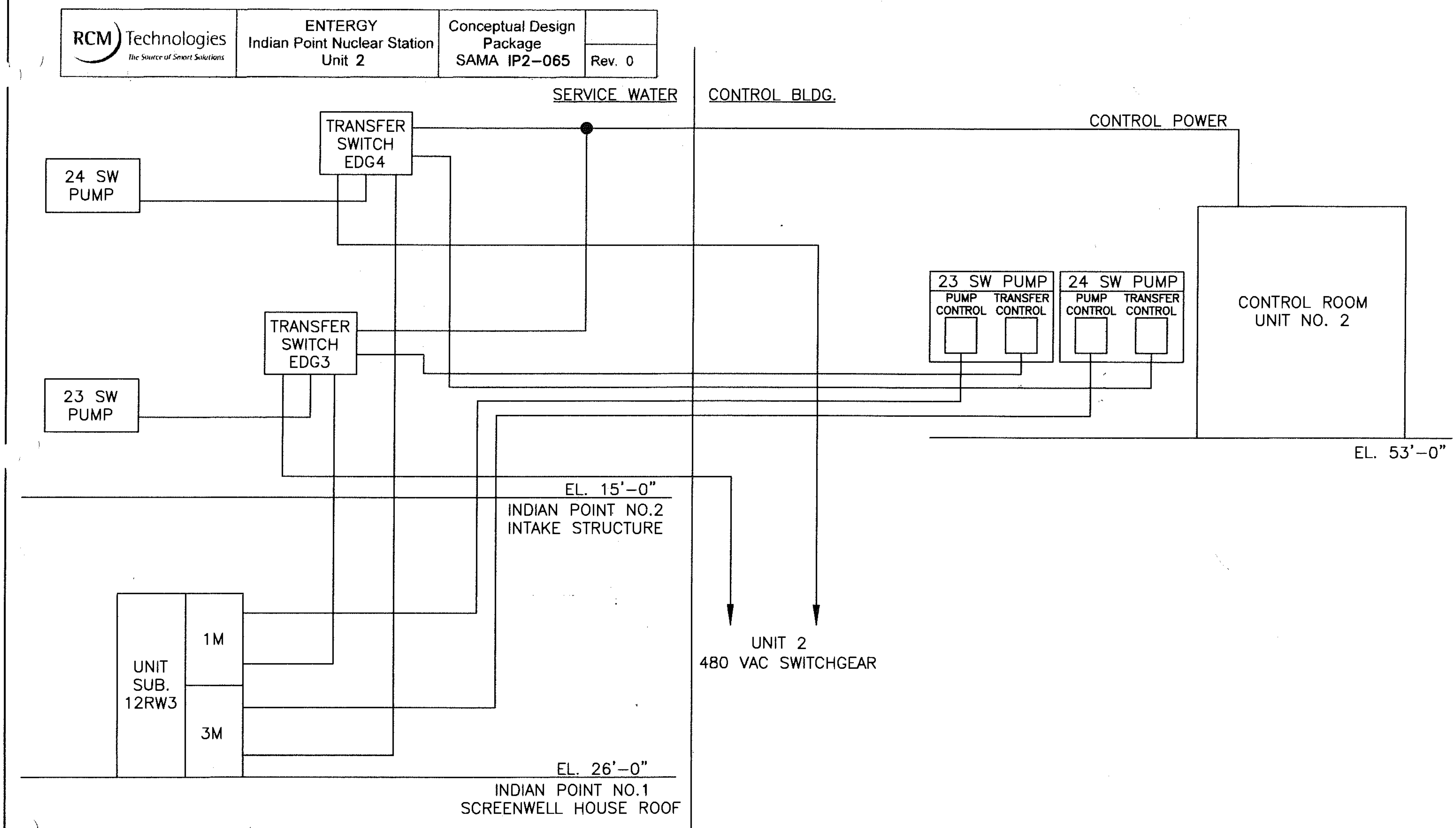


FIGURE 3
UPGRADE ALTERNATE SAFE SHUTDOWN SYSTEM
FOR 23 SW AND 24 SW PUMP
(NOT TO SCALE)

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. ASCO Series 386 Non-Automatic Power Transfer Switches or Equivalent

Power Switching & Controls
for Business-Critical Continuity

ASCO SERIES 300 Power Transfer Switches

ASCO®

EMERSON
Network Power

IPEC00270116

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

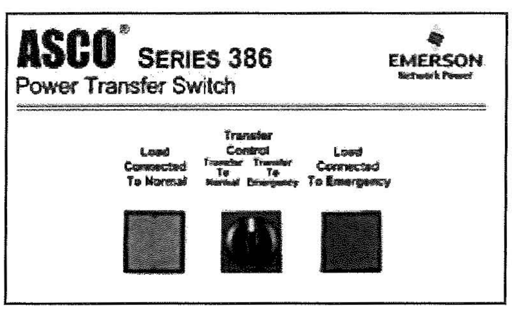


Fig. 15: Control and Display Panel

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

ESTMIATE LEVEL	**ENTERGY NUCLEAR NORTHEAST** **IMPLEMENTATION ESTIMATE** **Indian Point Nuclear Power Station** **EC #: SAMA IP2-065**
☑ **Conceptual**	**PROJECT TITLE: RCP Cooling System Safe Shutdown** ☑ CAPITAL ☐ O&M **ESTIMATOR: RCMT**
☐ **Preliminary**	**JOB LOCATION: Auxiliary, Intake & Turbine Buildings** **PROJECT CODE: TBD**
☐ **Definitive**	☐ OUTAGE ☑ NON-OUTAGE **ORIGINATOR:** **ORIG. DATE: 11/29/10**
	ESTIMATE TOTAL **$1,789,771** **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 provides a conceptual design and implementation cost estimate for SAMA IP2-054 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 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.

Prepared by: Peter Buttacavoli		Approved by: [signature]
Date: 9-20-2012		Date: 9-20-2012

ENTERGY NUCLEAR NORTHEAST
IMPLEMENTATION ESTIMATE
Indian Point Nuclear Power Station
EC #: SAMA IP2-065

ESTMIATE LEVEL*	
Conceptual	PROJECT TITLE: 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%
	B. Inside fence boundary - 30%
	C. Implementation complexity - 40%
	D. Inside Containment - 50%

IPEC00270120

Rev. 10-0

INDIAN POINT IMPLEMENTATION ESTIMATE WORK SHEET

10/4/2012 3:10 PM
IP2-065.xls

☑ CAPITAL ☐ O&M

EC #: SAMA IP2-065

PROJECT TITLE: RCP Cooling System Safe Shutdown
JOB LOCATION: Auxiliary, Intake & Turbine Buildings
EST. STATUS: ☐ OUTAGE ☑ NON-OUTAGE

PROJECT CODE: TBD
ORIGINATOR:

TAKEOFF:
ESTIMATOR: RCMT
ORIG. DATE: 11/29/10

* ESTIMATE LEVEL *

☑ Conceptual
☐ Preliminary
☐ Definitive

General Notes:

ESTIMATE SUMMARY

		MANHOURS	DOLLARS
EOI ENGINEERING			
01	STUDY, DESIGN, & CLOSEOUT	480	$ 48,000
02	DESIGN ENGR CONST SUPPORT	160	$ 16,000
03	MODS ENGR EOI SUPPORT	-	$ -
04	SYS ENGR/ S-U ENGR	280	$ 28,000
05	PROJECT MANAGEMENT	640	$ 76,800
06	WORK MANAGEMENT	-	$ -
07	ENGINEERING DCP ACCEPTANCE REVIEW	120	$ 12,000
CONTRACT ENGINEERING			
08	DESIGN ENGR CONTRACT SUPPORT	1,240	$ 148,800
09	SUPL CONTRACT MODS ENGR	-	$ -
10	MODS PLAN & SCHED -CONTRACT	170	$ 17,000
11	FIELD ENGRS / PLANNERS	150	$ 18,000
MATERIALS / MISC CONTRACTS			
12	MATERIALS		$ 60,712
13	OTHER CONTRACTS		$ -
CONTRACT CRAFT LABOR			
14	SWEC CRAFT LABOR/WALKDOWN	2,467	$ 255,011
15	LOST TIME	247	$ 32,626
16	SWEC DISTRIBS		$ 71,367
PLANT CRAFT LABOR			
17	MECH MAINT.	-	$ -
18	ELECT MAINT	16	$ 1,600
19	I&C	-	$ -
20	CSG	-	$ -
MISC EOI SUPPORT			
21	QUALITY CONTROL	130	$ 13,000
22	TRAINING	96	$ 11,520
23	CHEMISTRY	-	$ -
24	OPS / OPS SUPPORT	320	$ 38,400
25	HP / RP	240	$ 19,094
MISC CONTRACT SUPPORT			
26	QUALITY CONTROL	140	$ 11,200
27	NDE	-	$ -
28	HP / RP	-	$ -
29	RADWASTE	-	$ -
30	NURSE	-	$ -
31	ELEVATOR CONTRACTOR	-	$ -
32	WASTE MANAGEMENT	-	$ -
33	HOUSEKEEPING	-	$ -
34	EQUIPMENT RENTAL CONTRACTOR	-	$ -
35	VENDOR STOCKING	-	$ -
36	DECONTAMINATION CONTACTOR	-	$ -
37	RBC'S	-	$ -
38	SECURITY - Wackenhut	-	$ -
39	FIRE WATCH (Rover)	-	$ -
40	SAFETY	50	$ 3,400
CONTINGENCY			
41	CONTINGENCY		$ 264,759
ESTIMATE SUBTOTAL		**6,946**	**$1,147,289**
	SITE ENCUMBRANCE PREMIUM (20%)		**$ 229,458**
	LOADERS (30%)		**$ 413,024**
	ESTIMATE TOTAL		**$1,789,771**

ITEM	DESCRIPTION	QTY	UOM	CFT	NO.	MANHOURS UNIT	FCTR	TOTAL	$/MH	MATERIAL $ PER UNIT	MATERIAL DOLLARS	LABOR DOLLARS	SUB-CONTRACT	TOTAL $
	Preliminary to Tie-ins													
1.	Gather and stage tools and materials	1	LT	EL	4	10.00	1.00	40	$ 111.84		$ -	$ 4,474		$ 4,474
2.	Stage, erect and modify scaffolding	1	LT	CP	2	60.00	1.00	120	$ 96.00			$ 11,520		$ 11,520
3.	Core drill as required to route new conduits	4	LT	EL	2	20.00	1.00	160	$ 111.84		$ -	$ 17,894		$ 17,894
4.	Procure & erect conduit supports from 23 CCW, 23 CHRG, and 23 & 24 SW pumps.	250	LF	EL	2	0.18	1.00	90	$ 111.84	$ 2.50	$ 625	$ 10,066		$ 10,691
5.	Procure & erect conduit from 23 CCW, 23 CHRG, and 23 & 24 SW pumps.	250	LF	EL	4	0.18	1.00	180	$ 111.84	$ 2.50	$ 625	$ 20,131		$ 20,756
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		$ 20,947
7.	Procure and install new control switches for 23 CCW, 23 CHRG, and 23 & 24 SW pumps.	8	EA	EL	2	4.00	1.00	64	$ 111.84	$ 500.00	$ 4,000	$ 7,158		$ 11,158
8.	Determinate & remove existing manual switches 23 CCW, 23 CHRG, and 23 & 24 SW pumps.	4	EA	EL	2	20.00	1.00	160	$ 111.84		$ -	$ 17,894		$ 17,894
9.	Procure and install non-automatic transfer switches at 23 CCW, 23 CHRG, and 23 & 24 SW pumps.	4	EA	EL	2	24.00	1.00	192	$ 111.84	$ 7,500.00	$ 30,000	$ 21,473		$ 51,473
10.	Procure and pull 4/c control cable	1,500	LF	EL	2	0.04	1.00	120	$ 111.84	$ 1.25	$ 1,875	$ 13,421		$ 15,296
11.	Procure and pull 2/c control cable	1,000	LF	EL	2	0.020	1.00	40	$ 111.84	$ 1.15	$ 1,150	$ 4,474		$ 5,624
								-						$ -

IPEC00270121

INDIAN POINT IMPLEMENTATION ESTIMATE WORK SHEET

☑ CAPITAL ☐ O&M

EC #: SAMA IP2-065

PROJECT TITLE: RCP Cooling System Safe Shutdown
JOB LOCATION: Auxiliary, Intake & Turbine Buildings
EST. STATUS: ☐ OUTAGE ☑ NON-OUTAGE
PROJECT CODE: TBD
ORIGINATOR:
TAKEOFF:
ESTIMATOR: RCMT
ORIG. DATE: 11/29/10

ITEM	DESCRIPTION	QTY	UOM	MANHOURS CFT	NO.	UNIT	FCTR	TOTAL	$/MH	MATERIAL $ PER UNIT	MATERIAL DOLLARS	LABOR DOLLARS	SUB-CONTRACT	TOTAL $
	Tie-ins for New Switches							-						$ -
1.	Connect power feedsand controls to new non-automatic transfer switches	1	LT	PL	2	80.00	1.00	160	$ 60.00		$ -	$ 9,600		$ 9,600
2.	Terminate cables in CR Area and Substations 12FD3 and 12RW3.	2	EA	PL	2	40.00	1.00	160	$ 60.00	$ 3,500.00	$ 7,000	$ 9,600		$ 16,600
3.	Test pump switching for proper operation	1	LT	PL	2	40.00	1.00	80	$ 60.00		$ -	$ 4,800		$ 4,800
4.	Scaffolding Dismantle	1	LT	CP	2	40.00	1.00	80	$ 96.00		$ -	$ 7,680		$ 7,680
5.	Cleanup and restore work areas	1	LT	EL	3	40.00	1.00	120	$ 123.32		$ -	$ 14,798		$ 14,798
	PAINTING & TOUCH-UP REQUIREMENTS													
1.	PAINTING & TOUCH-UP			PT										
2.	PAINTING & TOUCH-UP			PT										
	FIRE WATCH / BOTTLEWATCH REQUIREMENTS													
1.	CRAFT SUPPORT FOR FIRE WATCH	30	LT	FW	3	24.00	1.00	720	$ 50.53		$ -	$ 36,382		$ 36,382
2.	CRAFT SUPPORT FOR BOTTLE WATCH	1	LT	FW										
	MISC SUB-CONTRACT													
1.	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.	OUTAGE WALKDOWN ALLOWANCE	1	LT	PF				21	$106.40			$ 2,234		$ 2,234
2.	WORK PACKAGE REVIEW	1	LT	PF				37	$106.40			$ 3,937		$ 3,937
3.	OUTAGE TOOL ROOM ATTENDANTS (~3.5%)	1	LT	LB				81	$ 76.46			$ 6,193		$ 6,193
4.	GENERAL CRAFT OUTAGE DISTRIBS. (10%)											$ 23,789		$ 23,789
5.	CRAFT IN PROCESSING (20%)											$ 47,578		$ 47,578
6.	HUMAN PERFORMANCE & ALARA TRAINING	1	LT									$ 4,758		$ 4,758
7.	(1/2 day training, or ~ 2%)													
	SUBTOTAL							2,467			$ 57,275	$326,378	$ -	$ 383,653
	PLANT SCOPE													
1.	**MECH MAINTENANCE**			PL PL										
	SUBTOTAL MECH MAINT.							-			$ -	$ -	$ -	$ -
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 PL										
	SUBTOTAL I&C MAINT.							-			$ -	$ -	$ -	$ -
1.	**CSG**			PL PL										
	SUBTOTAL CSG MAINT.							-			$ -	$ -	$ -	$ -
	SUBTOTAL PLANT							16			$ -	$ 1,600	$ -	$ 1,600
	SUBTOTAL CRAFT/PLANT							2,483			$ 57,275	$327,978	$ -	$ 385,253
	IMPLEMENTATION SUPPORT													
	EOI													
1.	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
3.	SYSTEMS ENGINEERING - MECHANICAL	1	LT	NM										
4.	SYSTEMS ENGINEERING - ELECTRICAL	1	LT	NM	1	160.00	1.00	160	$100.00			$ 16,000		$ 16,000
5.	SYSTEMS EINGINEERING - INSTR & CONTROL	1	LT	NM	1	120.00	1.00	120	$100.00			$ 12,000		$ 12,000
6.	SYSTEMS ENGINEERING - CIVIL STRUCTURAL	1	LT	NM										
7.	PROJECT MANAGEMENT	1	LT	NM	1	640.00	1.00	640	$120.00			$ 76,800		$ 76,800
8.	TRAINING (OPS STAFF)	12	LT	NM	1	8.00	1.00	96	$120.00			$ 11,520		$ 11,520
9.	QA / QC VERIFICATION	1	LT	NM	1	130.00	1.00	130	$100.00			$ 13,000		$ 13,000
10.	WORK MANAGEMENT	1	LT	NM										$ -
11.	HP / RP/ ALARA	3	LT	NM	1	80.00	1.00	240	$ 79.56			$ 19,094		$ 19,094
12.	CHEMISTRY	1	LT	NM										
13.	OPS / OPS PROCEDURE SUPPORT & DEVELOPME	1	LT	NM	1	320.00	1.00	320	$120.00			$ 38,400		$ 38,400
14.	TRAVEL & LIVING EXPENSES	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	170.00	1.00	170	$100.00			$ 17,000		$ 17,000
3.	FIELD ENGRS/PLAN- SWEC (Incl Per Diem)	1	LT	NM	1	150.00	1.00	150	$120.00			$ 18,000		$ 18,000
4.	QA / QC VERIFICATION	1	LT	NM	1	140.00	1.00	140	$ 80.00			$ 11,200		$ 11,200

INDIAN POINT IMPLEMENTATION ESTIMATE WORK SHEET

☑ CAPITAL ☐ O&M **EC #: SAMA IP2-065**

PROJECT TITLE: RCP Cooling System Safe Shutdown
JOB LOCATION: Auxiliary, Intake & Turbine Buildings
EST. STATUS: ☐ OUTAGE ☑ NON-OUTAGE

PROJECT CODE: TBD
ORIGINATOR:

TAKEOFF:
ESTIMATOR: RCMT
ORIG. DATE: 11/29/10

						MANHOURS				MATERIAL $	MATERIAL	LABOR	SUB-	
ITEM	DESCRIPTION	QTY	UOM	CFT	NO.	UNIT	FCTR	TOTAL	$/MH	PER UNIT	DOLLARS	DOLLARS	CONTRACT	TOTAL $
5.	NDE	1	LT	NM										
6.	HP / RP	1	LT	NM										
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.	VENDOR STOCKING	1	LT	NM				-						
14.	DECONTAMINATION CONTRACTOR	1	LT	NM				-						
15.	RBC's	1	LT	NM				-						
16.	SECURITY	1	LT	SEC				-						
17.	FIREWATCH (Rover)	1	LT	NM				-						$ -
18.	SAFETY (2%)	1	LT	NM				50	$ 68.00			$ 3,400		$ 3,400
19.	LOST TIME (10%)	1	LT					247	$132.09			$ 32,626		$ 32,626
	SUBTOTAL CRAFT/NON-MANUAL							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.	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							1,840				$ 48,000	$ 160,800	$ 208,800
	SUBTOTAL INSTALLATION & DESIGN COST							6,946				$661,018	$ 160,800	$ 882,530
1.	CONTINGENCY (30%)													$ 264,759
	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: *Peter Buttacavoli*	Approved by:
Date: 9-20-2012	Date: 9-20-2012

IPEC00270124

TABLE OF CONTENTS

1.0 ISSUE

<u>**Severe Accident Mitigation Alternative (SAMA) IP2-GAG:**</u>

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.

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

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.: SAMA IP2-GAG **Rev. No.:** CONCEPTUAL 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	☒ 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	☒ 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

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	☒ NO
Cable and Raceway Program • Does the proposed activity involve any changes to cable trays, raceways or the associated documentation?	☐ YES	☒ 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) *(if applicable)* • 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 • 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?	☐ 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?	☐ 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

ATTACHMENT 9.3 IMPACT SCREENING SUMMARY

SHEET 3 OF 6

PROCESS OR PROGRAM IMPACT SCREENING CHECKLIST	Potential Impact	
Computer Support and Software • Does the proposed activity impact or involve changes to plant computer software or firmware or impact Software Quality Assurance (SQA)?	☐ YES	☒ NO
Chemistry and Environmental Impact • Does the proposed activity impact or involve any changes to plant chemistry requirements, operations or procedures, or any changes to the environment?	☐ YES	☒ NO
Radiation Protection (RP) Program Impact • 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?	☐ 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	☒ 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 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

ATTACHMENT 9.3 IMPACT SCREENING SUMMARY

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	☒ 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?	☐ 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?	☐ 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

ATTACHMENT 9.3 **IMPACT SCREENING SUMMARY**

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	☒ 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	☒ 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	☒ 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?	■ 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

ATTACHMENT 9.3 IMPACT SCREENING SUMMARY

SHEET 6 OF 6

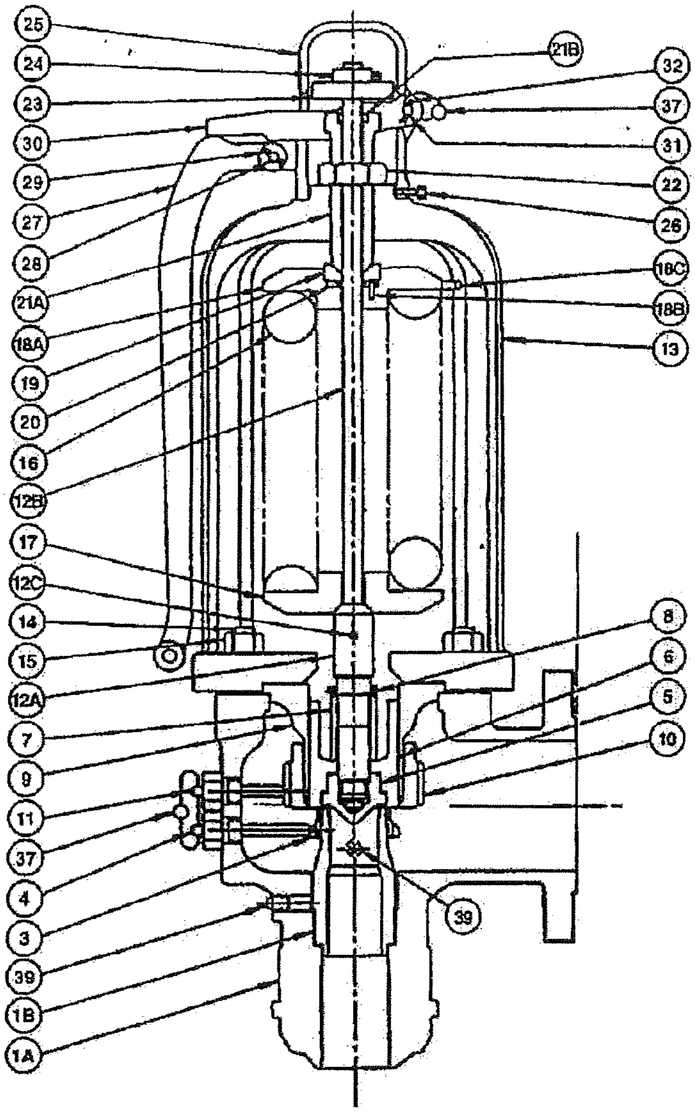
PROGRAMS AND COMPONENTS (CONTINUED)	Potential Impact	
Welding Program • Does the proposed activity impact or involve a special process, such as welding, brazing or soldering?	☐ YES	☒ NO
Safety Program • Does the proposed impact or activity involve personnel or industrial safety?	■ YES	☐ NO
System Engineering • 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	☐ NO
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



PARTS LIST

Part	Part Name	Spare Parts*
1A	Body	
1B	Nozzle	
3	Nozzle Ring	3
4	Nozzle Ring Set Screw	
5	Disc Insert	1
6	Disc Holder	2
7	Disc Holder Retaining Nut	
8	Disc Holder Retaining Cotter	1
9	Guide	3
10	Guide Ring	3
11	Guide Ring Set Screw	
12A	Spindle Point	3
12B	Spindle Rod	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	1
30	Forked Lever	
31	Forked Lever Pin	
32	Forked Lever Pin Cotter	1
34	Test Clamp	
36	Test Rod	
37	Seal and Wire	
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

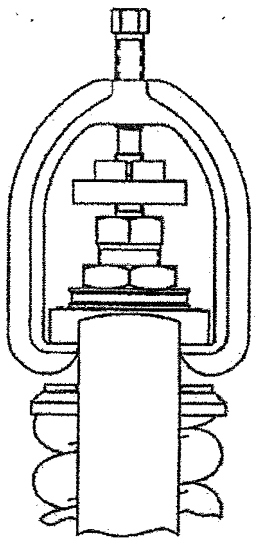


Figure 2

GAG INSTALLED ON VALVE BONNET

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

Attachment 4

Cost Estimate

ENTERGY NUCLEAR NORTHEAST IMPLEMENTATION ESTIMATE Indian Point Nuclear Power Station			
* ESTIMATE LEVEL *	EC #: SAMA IP2 - GAG		
☑ Conceptual	PROJECT TITLE: Unit 2 MSSV Gag ☐ CAPIT ☑ O&I		ESTIMATOR: RCMT
☐ Preliminary	JOB LOCATION: IP2 Turbine Building	PROJECT CODE: TBD	
☐ Definitive	☐ OUTA ☑ NON-OUTAGE ORIGINATOR:		ORIG. DATE: 7/17/12
	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 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 existing procedures and the cost of training station maintenance personnel to the new or existing procedures.

Prepared by: Pete Buttarolli		Approved by: [signature]
Date: 9-20-12		Date: 9-20-12

ENTERGY NUCLEAR NORTHEAST
IMPLEMENTATION ESTIMATE
Indian Point Nuclear Power Station

* ESTIMATE LEVEL *	EC #: SAMA IP2 - GAG			
☑ Conceptual	PROJECT TITLE: Unit 2 MSSV Gag	☐ CAPITA	☑ O&M	ESTIMATOR: RCMT
☐ Preliminary	JOB LOCATION: IP2 Turbine Building		PROJECT CODE: TBD	
☐ Definitive	☐ OUTAG ☑ NON-OUTAGE	ORIGINATOR:		ORIG. DATE: 7/17/12

Item	Description
1.	This estimate assumes that this work will be completed during 2014
2.	This estimate assumes that this work will be performed on a single 10 hours per shift, 4 days per week non-outage schedule.
3.	This estimate assumes that mock-up training for gagging a failed MSSV will be provided to Station Maintenance personnel.
4.	This estimate assumes that a mockup "failed" MSSV will be provided for training purposes.
5.	This estimate assumes that all work will be performed by IP in-house Maintenance personnel.
6.	The estimates assumes 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.
8.	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).
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 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 fence boundary - 30%
	C. Implementation complexity - 40%
	D. Inside Containment - 50%

IPEC00270142

Rev. 10-4

INDIAN POINT IMPLEMENTATION ESTIMATE WORK SHEET

EC #: SAMA IP2 - GAG

PROJECT TITLE: Unit 2 MSSV Gag	☐ OUTAGE ☑ NON-OUTAGE	☐ CAPITAL	☑ O&M	TAKEOFF:
JOB LOCATION: IP2 Turbine Building			PROJECT CODE: TBD	ESTIMATOR: RCMT
EST. STATUS:			ORIGINATOR:	ORIG. DATE: 7/17/12

*** ESTIMATE LEVEL ***

- ☑ Conceptual
- ☐ Preliminary
- ☐ Definitive

General Notes:

All work associated with preparation and training for installation of MSSV gags will be provided by IP Station Mechanical Maintenance personnel.

ESTIMATE SUMMARY

		MANHOURS	DOLLARS
ENGINEERING			
01	STUDY, DESIGN, & CLOSEOUT	80	$ 8,000
02	DESIGN ENGR CONST SUPPORT	24	$ 2,400
03	MODS ENGR SUPPORT	-	$ -
04	SYS ENGR/ S-U ENGR	-	$ -
05	PROJECT MANAGEMENT	120	$ 14,400
06	WELDING ENGR	-	$ -
07	CONTRACT FOR APPLICATION ANALYSIS	-	$ 120,000
08	ENGR'G DCP ACCEPTANCE REVIEW	20	$ 2,000
CONTRACT ENGINEERING			
08	DESIGN ENGR CONTRACT SUPPORT	320	$ 38,400
09	SUPL CONTRACT MODS ENGR	-	$ -
10	MODS PLAN & SCHED -CONTRACT	40	$ 4,000
11	OSG FIELD ENGRS / PLANNERS	20	$ 2,400
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	-	$ -
25	RADWASTE	-	$ -
26	NURSE	-	$ -
27	ELEVATOR CONTRACTOR	-	$ -
28	WASTE MANAGEMENT	-	$ -
29	HOUSEKEEPING	-	$ -
30	EQUIPMENT RENTAL CONTRACTOR	-	$ -
31	VENDOR STOCKING	-	$ -
32	DECONTAMINATION CONTRACTOR	-	$ -
33	RBC'S	-	$ -
34	SECURITY	-	$ -
35	FIRE WATCH (Rover)	-	$ -
36	SAFETY	4	$ 272
37	LOST TIME	18	$ 1,400
CONTINGENCY			
37	CONTINGENCY		$ 67,843
ESTIMATE SUBTOTAL		**990**	**$ 293,985**
	SITE ENCUMBRANCE PREMIUM (20%)		**$ 58,797**
	LOADERS (30%)		**$ 105,835**
	ESTIMATE TOTAL		**$ 458,617**

ITEM	DESCRIPTION	QTY	UOM	CFT	NO.	MANHOURS U/R	FCTR	TOTAL	$/MH	MAT'L $ / UNIT	MATERIAL DOLLARS	LABOR DOLLARS	SUB-CONTRACT	TOTAL $
	Non-Outage Storage Preparation													
1.	Procure one 30" X 30" X 12" storage cabinets	1	EA	PL	2	4.00	1.00	8	$ 60.00	$ 250.00	250	$ 480.00		$ 730.00
2.	Hang one 30" X 30" X 12" storage cabinets	1	EA	PL	2	40.00	1.00	80	$ 60.00		-	$ 4,800.00		$ 4,800.00
3.	Procure MSSV gag	1	EA	PL	2	2.00	1.00	4	$ 60.00	$ 750.00	750	$ 240.00		$ 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		$ 980.00
											-	$ -		$ -
	Non-Outage Training										-	$ -		$ -
1.	Gather and stage gag, tools and materials	1	LT	PL	2	2.00	1.00	4	$ 100.00		-	$ 400.00		$ 400.00
2.	Disassemble mock-up valve per procedure	1	LT	PL	12	4.00	1.00	48	$ 100.00		-	$ 4,800.00		$ 4,800.00
3.	Tag and store removed parts for restoration	1	LT	PL	2	1.00	1.00	2	$ 100.00		-	$ 200.00		$ 200.00
4.	Install and adjust gag per specification	1	LT	PL	12	2.00	1.00	24	$ 100.00		-	$ 2,400.00		$ 2,400.00
5.	Cleanup work area and return tools to storage	1	LT	PL	2	1.00	1.00	2	$ 100.00		-	$ 200.00		$ 200.00
											-	$ -		$ -
											-	$ -		$ -
											-	$ -		$ -
											-	$ -		$ -
											-	$ -		$ -
											-	$ -		$ -

Rev. 10-4

INDIAN POINT IMPLEMENTATION ESTIMATE WORK SHEET

EC #: SAMA IP2 - GAG

PROJECT TITLE: Unit 2 MSSV Gag
JOB LOCATION: *IP2 Turbine Building*
EST. STATUS: ☐ OUTAGE ☑ NON-OUTAGE

☐ CAPITAL ☑ O&M
PROJECT CODE: TBD
ORIGINATOR:

TAKEOFF:
ESTIMATOR: RCMT
ORIG. DATE: 7/17/12

					MANHOURS					MAT'L $	MATERIAL	LABOR	SUB-	
ITEM	DESCRIPTION	QTY	UOM	CFT	NO.	U/R	FCTR	TOTAL	$/MH	/ UNIT	DOLLARS	DOLLARS	CONTRACT	TOTAL $
1.	CONSTRUCTION SUPPORT (8% OF LABOR $)	1	LT											$ -
	SUBTOTAL							180			1,500	$ 14,000.00	$ -	$ 15,500.00
	* OUTAGE RELATED COSTS *													
1.	OUTAGE WALKDOWN ALLOWANCE	1	LT					-	$ -			$ -		$ -
2.	WORK PACKAGE REVIEW	1	LT					-	$ -			$ -		$ -
3.	OUTAGE TOOL ROOM ATTENDANTS (~3.5%)	1	LT					-	$ -			$ -		$ -
4.	GENERAL CRAFT OUTAGE DISTRIBS. (10%)											$ -		$ -
5.	CRAFT IN PROCESSING (20%)											$ -		$ -
6.	HUMAN PERFORMANCE & ALARA TRAINING	1	LT									$ -		$ -
7.	(1/2 day training, or ~ 2%)													
	SUBTOTAL							180			1,500	$ 14,000.00	$ -	$ 15,500.00
	PLANT SCOPE													
1.	**MECH MAINTENANCE**			PL				-			-	$ -		$ -
				PL				-			-	$ -		$ -
	SUBTOTAL MECH MAINT.							-			-	$ -	$ -	$ -
1.	**ELECT MAINTENANCE**			PL				-			-	$ -		$ -
				PL				-			-	$ -		$ -
	SUBTOTAL ELECT. MAINT.							-			-	$ -	$ -	$ -
1.	**I&C**			PL				-			-	$ -		$ -
				PL				-			-	$ -		$ -
	SUBTOTAL I&C MAINT.							-			-	$ -	$ -	$ -
1.	**CSG**			PL				-			-	$ -		$ -
				PL				-			-	$ -		$ -
	SUBTOTAL CSG MAINT.							-			-	$ -	$ -	$ -
	SUBTOTAL PLANT							-			-	0	$ -	0
	SUBTOTAL CRAFT/PLANT							180			1,500	14000	$ -	15,500
	IMPLEMENTATION SUPPORT													
1.	FIS / MODS ENGINEERING	1	LT	NM				-				$ -		$ -
2.	DESIGN ENGINEERING SUPT DURING CONST	1	LT	NM	1	24.00	1.00	24	$ 100.00			$ 2,400.00		$ 2,400.00
3.	SYSTEMS ENGINEERING - MECHANICAL	1	LT	NM	1	-	-	-				$ -		$ -
4.	SYSTEMS ENGINEERING - ELECTRICAL	1	LT	NM				-				$ -		$ -
5.	SYSTEMS EINGINEERING - INSTR & CONTROL	1	LT	NM				-				$ -		$ -
6.	SYSTEMS ENGINEERING - CIVIL STRUCTURAL	1	LT	NM				-				$ -		$ -
7.	PROJECT MANAGEMENT	1	LT	NM	1	120.00	1.00	120	$ 120.00			$ 14,400.00		$ 14,400.00
8.	WELDING ENGR (Program Engr)	1	LT	NM				-				$ -		$ -
9.	QA / QC VERIFICATION	1	LT	NM	1	40.00	1.00	40	$ 100.00			$ 4,000.00		$ 4,000.00
10.	NDE	1	LT	NM				-				$ -		$ -
11.	HP / RP/ ALARA	1	LT	NM	1			-				$ -		$ -
12.	OPS TRAINING	12	LT	NM	1	2.00	1.00	24	$ 120.00			$ 2,880.00		$ 2,880.00
13.	OPS - DEVELOP/REVISE PROCEDURES	1	LT	NM	1	60.00	1.00	60	$ 120.00			$ 7,200.00		$ 7,200.00
14	TRAVEL & LIVING EXPENSES	1	LT											
15	LOST TIME (10%)	1	LT									$ -		$ -
	CONTRACTOR SUPPORT													
1.	FIS / MODS ENGINEERING - SWEC (Incl Per Diem)	1	LT	NM				-				$ -		$ -
2.	MODS PLANNING & SCH.- SWEC (Incl Per Diem)	1	LT	NM	1	40.00	1.00	40	$ 100.00			$ 4,000.00		$ 4,000.00
3.	FIELD ENGRS/PLAN- SWEC	1	LT	NM	1	20.00	1.00	20	$ 120.00			$ 2,400.00		$ 2,400.00
4.	QA / QC VERIFICATION	1	LT	NM	1	40.00	1.00	40	$ 80.00			$ 3,200.00		$ 3,200.00
5.	NDE	1	LT	NM				-				$ -		$ -
6.	HP / RP	1	LT	NM				-				$ -		$ -
7.	RADWASTE CONTRACTOR	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 SUPPLIER	1	LT	NM				-						
13.	VENDOR STOCKING	1	LT	NM				-						
14.	DECONTAMINATION CONTRACTOR	1	LT	NM				-						
15.	RBC's	1	LT	NM				-						
16.	SECURITY	1	LT	SEC				-						
17.	FIREWATCH (Rover)	1	LT	LB				-	$ -			$ -		$ -
18.	SAFETY (2%)	1	LT	NM				4	$ 68.00			$ 272.00		$ 272.00
19.	LOST TIME (10%)	1	LT					18	$ 77.78			$ 1,400.00		$ 1,400.00
	SUBTOTAL CRAFT/NON-MANUAL							570			1,500	$ 56,152.00	$ -	$ 57,652.00
1.	FREIGHT, SALES TAX, & CONSUMABLES (6%)										90			$ 90.00
	SUBTOTAL INSTALLATION COST							570			1,590	$ 56,152.00	$ -	$ 57,742.00

IPEC00270144

Rev. 10-4

INDIAN POINT IMPLEMENTATION ESTIMATE WORK SHEET

EC #: SAMA IP2 - GAG

PROJECT TITLE: Unit 2 MSSV Gag
JOB LOCATION: *IP2 Turbine Building*
EST. STATUS: ☐ OUTAGE ☑ NON-OUTAGE

☐ CAPITAL ☑ O&M
PROJECT CODE: TBD
ORIGINATOR:

TAKEOFF:
ESTIMATOR: RCMT
ORIG. DATE: 7/17/12

ITEM	DESCRIPTION	QTY	UOM	CFT	MANHOURS NO.	U/R	FCTR	TOTAL	$/MH	MAT'L $ / UNIT	MATERIAL DOLLARS	LABOR DOLLARS	SUB-CONTRACT	TOTAL $
1.	DESIGN ENGINEERING - MECHANICAL	1	LT	NM	1	80.00	1.00	80	$ 100.00			$ 8,000.00		$ 8,000.00
2.	DESIGN ENGINEERING - ELECTRICAL	1	LT	NM				-				$ -		$ -
3.	DESIGN ENGINEERING - INSTR. & CONTROL	1	LT	NM				-				$ -		$ -
4.	DESIGN ENGINEERING - CIVIL/STRUCTURAL	1	LT	NM				-				$ -		$ -
5.	CONTRACT ENGR DESIGN SUPPORT	1	LT	NM	1	320.00	1.00	320	$ 120.00			$ 38,400		$ 38,400.00
6.	CONTRACT FOR APPLICATION ANALYSIS	1	LT	NM									$ 120,000	$ 120,000.00
7.	ENGR'G DCP ACCEPTANCE REVIEW	1	LT	NM	1	20.00	1.00	20	$ 100.00			$ 2,000		$ 2,000.00
	SUBTOTAL DESIGN COST							420				$ 46,400.00	$ 120,000	$ 168,400.00
	SUBTOTAL INSTALLATION & DESIGN COST											$ 102,552.00	$ 120,000	$ 226,142.00
1.	CONTINGENCY (30%)													$ 67,843.00
	ESTIMATE SUBTOTAL							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:
Date: 9-20-2012	Date:

TABLE OF CONTENTS

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.

4.0 DESIGN CONSIDERATIONS

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

Item 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 Industrial 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

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.: SAHA IP3-007 **Rev. No.:** CONCEPTUAL DESIGN PKG.

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?	☒ 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

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	☐ NO
Cable and Raceway Program • Does the proposed activity involve any changes to cable trays, raceways or the associated documentation?	■ YES	☐ 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) *(if applicable)* • 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 • 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?	■ 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?	☐ 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

ATTACHMENT 9.3 **IMPACT SCREENING SUMMARY**

SHEET 3 OF 6

PROCESS OR PROGRAM IMPACT SCREENING CHECKLIST	Potential Impact	
Computer Support and Software • Does the proposed activity impact or involve changes to plant computer software or firmware or impact Software Quality Assurance (SQA)?	☐ YES	☒ NO
Chemistry and Environmental Impact • Does the proposed activity impact or involve any changes to plant chemistry requirements, operations or procedures, or any changes to the environment?	☐ YES	☒ NO
Radiation Protection (RP) Program Impact • 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?	■ 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	☐ 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 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

ATTACHMENT 9.3 **IMPACT SCREENING SUMMARY**

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	☒ 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?	☐ 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?	☐ 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

ATTACHMENT 9.3 **IMPACT SCREENING SUMMARY**

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	☐ 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	☒ 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	☐ 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?	☐ 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

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?	■ YES	☐ 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	☐ NO
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

IPEC00270159

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

RCM Technologies The Source of Smart Solutions	ENTERGY Indian Point Nuclear Station UNIT 3	Conceptual Design Package SAMA IP3–007	Rev. 0

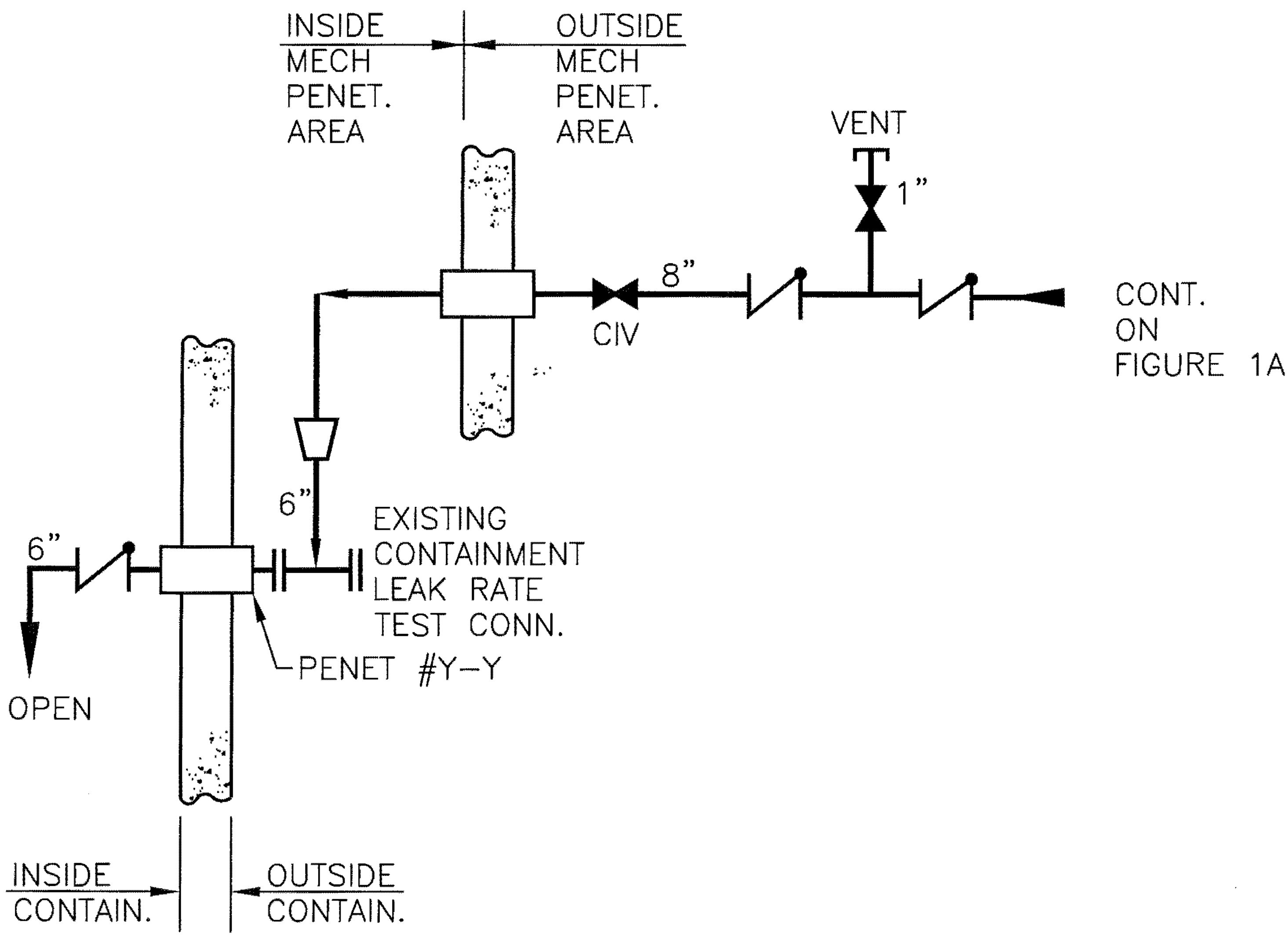


FIGURE 1
REACTOR CAVITY
FLOODING SYSTEM
FLOW DIAGRAM

RCM Technologies *The Source of Smart Solutions*	**ENTERGY** **Indian Point Nuclear Station** UNIT 3	**Conceptual Design Package** IP3–007	**Rev. 0**

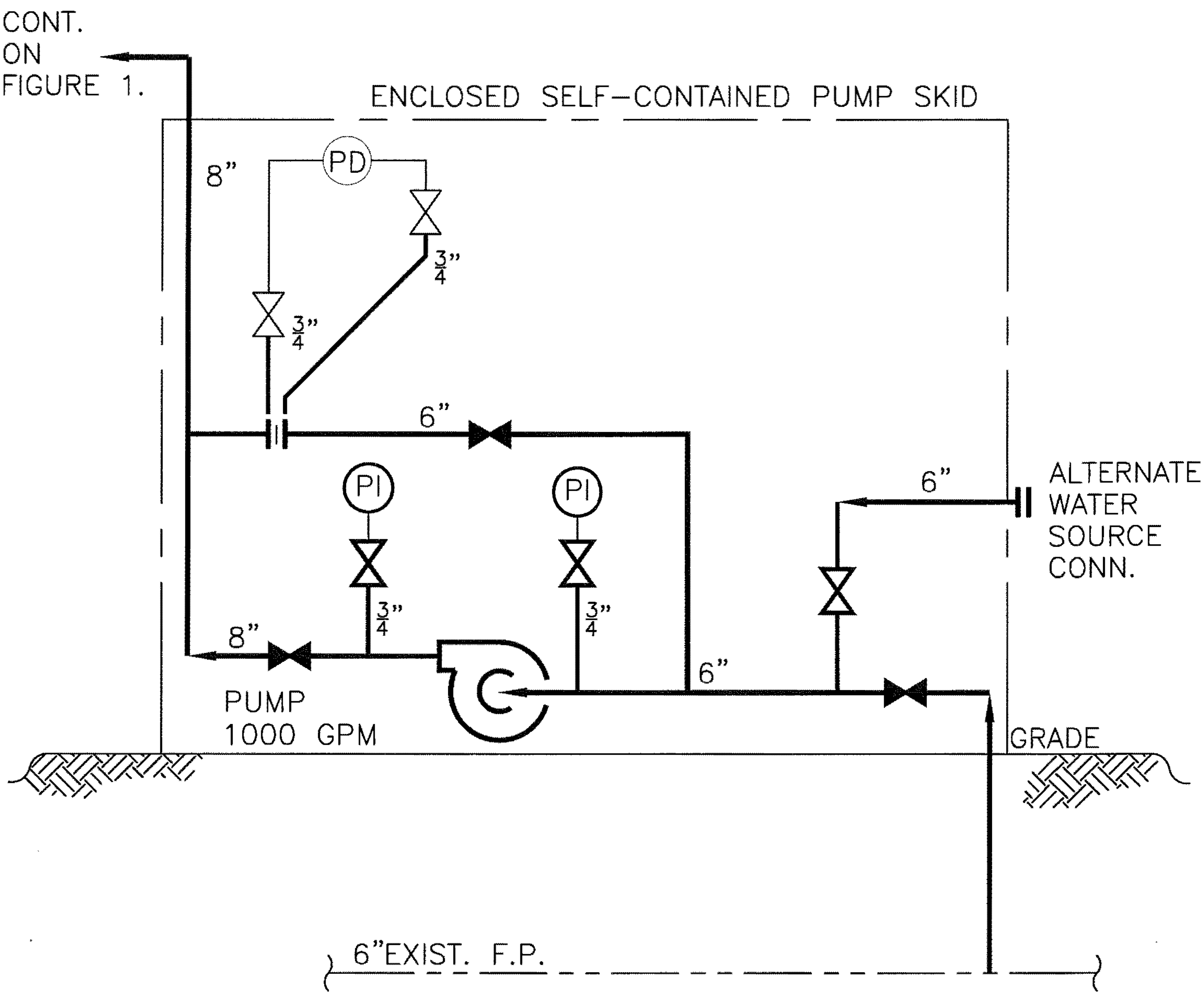


FIGURE 1A
REACTOR CAVITY
FLOODING SYSTEM
FLOW DIAGRAM

IPEC00270162

RCM Technologies *The Source of Smart Solutions*	ENTERGY Indian Point Nuclear Station Unit 3	Conceptual Design Package SAMA IP 3-007	Rev. 0

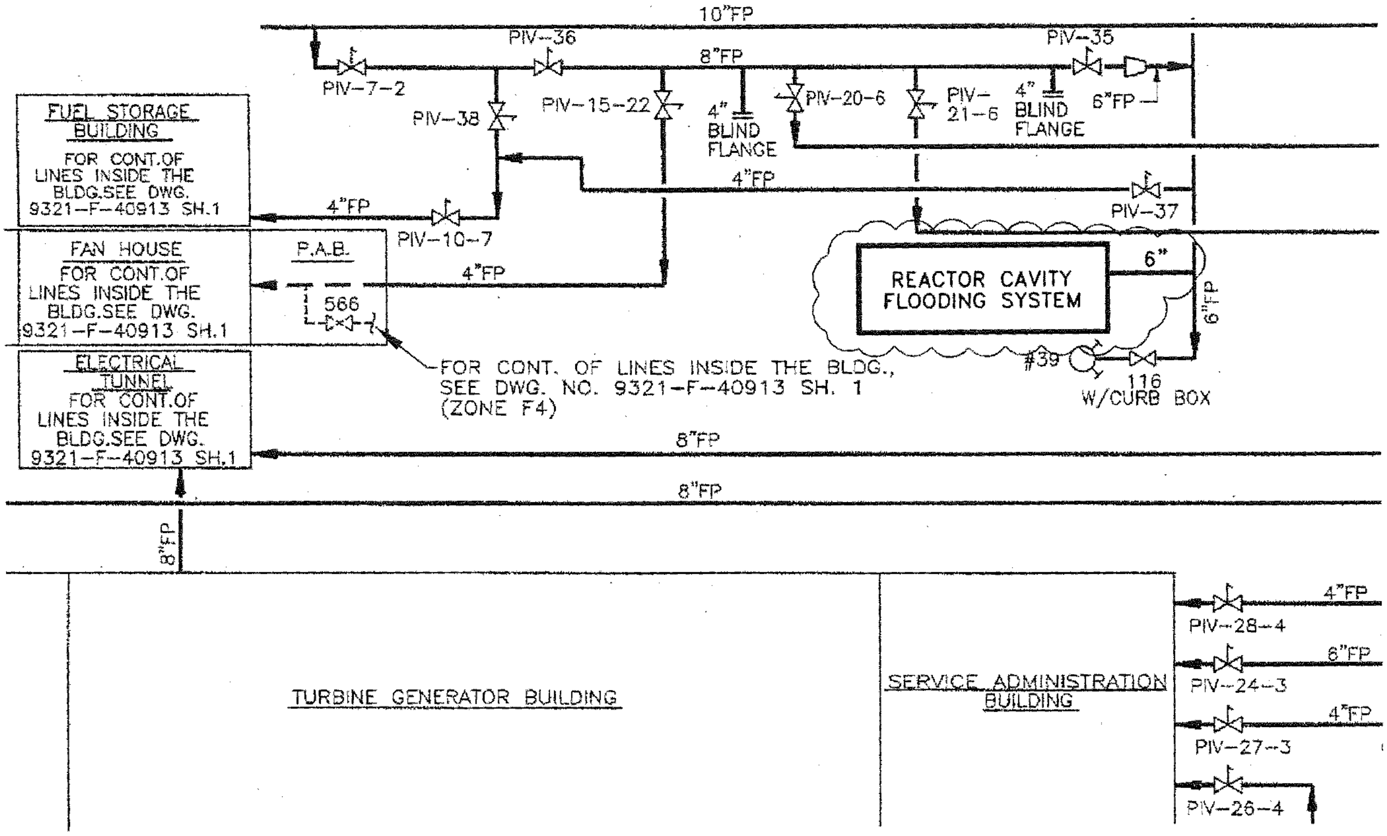


FIGURE 2
REACTOR CAVITY FLOODING SYSTEM FIRE WATER TIE-IN

DWN	CHK'D	INDIAN POINT NO. 3 NUCLEAR POWER PLANT
DES SUPV		
DISCIPLINE ENG		FLOW DIAGRAM OF PLANT FIRE PROTECTION SYSTEM SHEET NO. 1
DISCIPLINE MGR.		
PROJ APPROVAL		
DATE		
Entergy Nuclear Northeast	SCALE NONE	
	DWG NO 9321-F-40903 SHEET	REV 30

RCM Technologies *The Source of Smart Solutions*	ENTERGY Indian Point Nuclear Station Unit 3	Conceptual Design Package SAMA IP3-007	Rev. 0

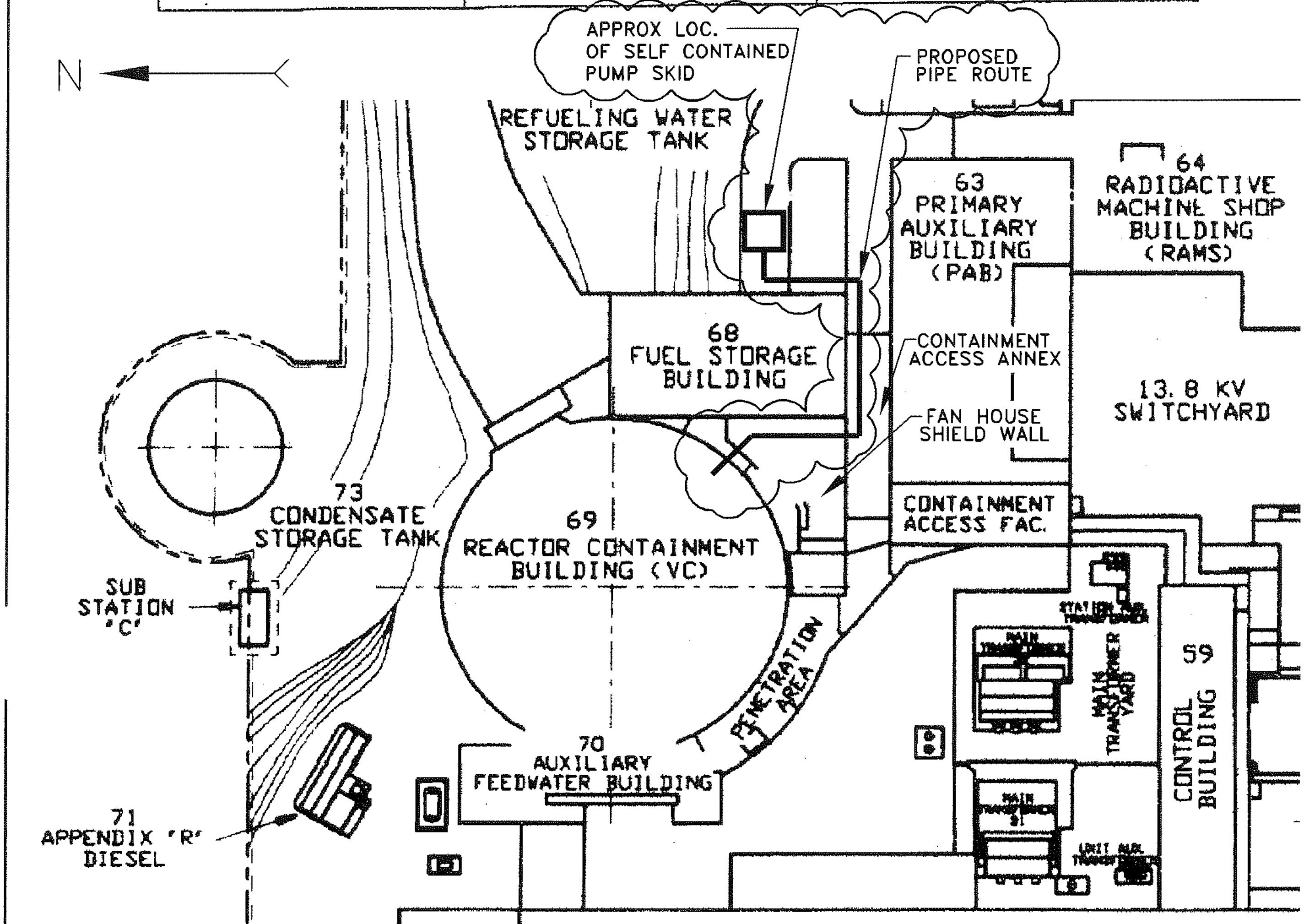


FIGURE 3
REACTOR CAVITY
FLOODING SYSTEM
GENERAL ARRANGEMENT

	NOT NUCLEAR SAFETY RELATED		
DWN / CHK'D	INDIAN POINT NO. 3 NUCLEAR POWER PLANT		
DES SUPV			
DISCIPLINE ENG	INDIAN POINT NO. 3 PLOT PLAN FOR VILLAGE OF BUCHANAN		
DISCIPLINE MGR.			
PROJ APPROVAL			
DATE			
Entergy Nuclear Northeast	SCALE: NONE		
	DWG NO 9321-F-11146	REV 1	SHEET OF

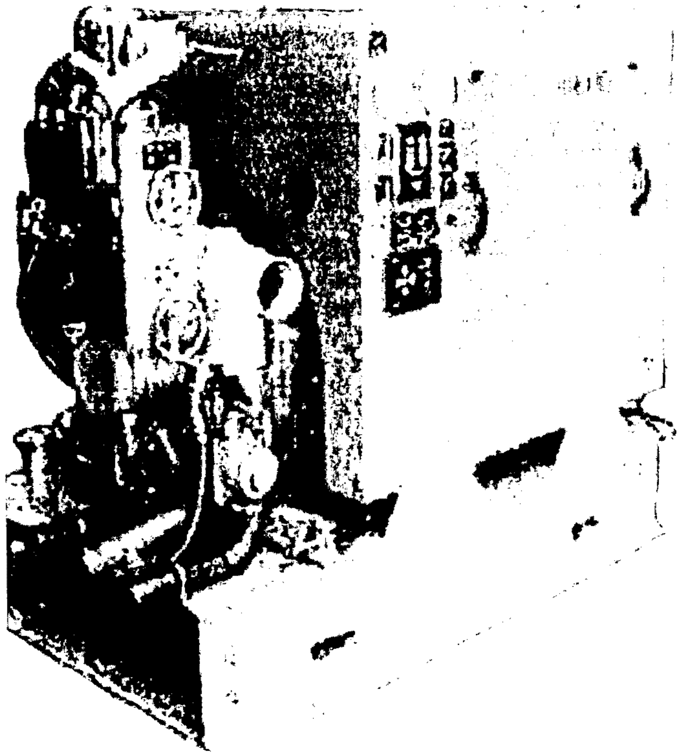
Attachment 3

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. 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.

HALE Products | Class 1

Attachment 4

Cost Estimate

ENTERGY NUCLEAR NORTHEAST IMPLEMENTATION ESTIMATE Indian Point Nuclear Power Station			
* ESTIMATE LEVEL *	EC #: SAMA IP3-007		
☑ Conceptual	PROJECT TITLE: Install a Reactor Cavity Flooding System	☑ CAPITAL ☐ O&M	ESTIMATOR: RCMT
☐ Preliminary	JOB LOCATION: Containment Building, Yard near FSB	PROJECT CODE: TBD	
☐ 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 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 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.

Prepared by: Peter Bettencourt		Approved by: [signature]
Date: 9-20-2012		Date: 9-20-2012

IPEC00270168

ENTERGY NUCLEAR NORTHEAST
IMPLEMENTATION ESTIMATE
Indian Point Nuclear Power Station

* ESTIMATE LEVEL *	**EC #: SAMA IP3-007**		
☑ **Conceptual**	PROJECT TITLE: Install a Reactor Cavity Flooding System	☑ CAPITAL ☐ O&M	ESTIMATOR: RCMT
☐ **Preliminary**	JOB LOCATION: Containment Building, Yard near FSB	PROJECT CODE: TBD	
☐ **Definitive**	☑ OUTAGE ☑ NON-OUTAGE	ORIGINATOR:	ORIG. DATE: 07-12-2012

Item	Description
1.	This estimate assumes that this work will require outage conditions to complete
2.	This estimate assumes that this work will complete during 2014 working a 10 hours per shift, Six days per week schedule.
3.	This estimate assumes that a Prefabricated building will be purchased for erection on site by skilled local craft.
4.	This estimate assumes that all work will be performed by trained contract craftspersons in lieu of station maintenance personnel.
5.	This estimate provides for continuous fire watch during welding activities.
6.	This estimate assumes training for 12 Plant Ops.Personnel.
7.	This estimate assumes that the safety class for piping and valves will only require a C of C.
8.	This estimate assumes that weld inspections will be limited to visual and LP testing.
9.	The bulk of the work in this estimate is non outage and is assumed to occur in 2011 on a 4 day per week, 10 hour per day schedule.
10.	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).
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.	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 fence boundary - 30%
	C. Implementation complexity - 40%
	D. Inside Containment - 50%

10/4/2012 9:32 AM
IP3-007.xlsx

Rev. 11-0

INDIAN POINT IMPLEMENTATION ESTIMATE WORK SHEET

EC #: SAMA IP3-007

PROJECT TITLE: Install a Reactor Cavity Flooding System
JOB LOCATION: Containment Building, Yard near FSB ☑ OUTAGE ☐ NON-OUTAGE
EST. STATUS:

PROJECT CODE: TBD ☑ CAPITAL ☐ O&M
ORIGINATOR:

TAKEOFF:
ESTIMATOR: RCMT
ORIG. DATE: 07-12-2012

ITEM	DESCRIPTION	QTY	UOM	MANHOURS CFT	NO.	UNIT	FCTR	TOTAL	$/MH	MATERIAL $ PER UNIT	MATERIAL DOLLARS	LABOR DOLLARS	SUB-CONTRACT	TOTAL $
☐														

* ESTIMATE LEVEL *

☑ **Conceptual**
☐ **Preliminary**
☐ **Definitive**

General Notes:

ESTIMATE SUMMARY

		MANHOURS	DOLLARS
ENGINEERING			
01	STUDY, DESIGN, & CLOSEOUT	160	$ 16,000
02	DESIGN ENGR CONST SUPPORT	40	$ 4,000
03	MODS ENGR SUPPORT		
04	SYS ENGR/ S-U ENGR	100	$ 10,000
05	PROJECT MANAGEMENT	200	$ 24,000
06	TESTING (Calibration & Testing)	40	$ 4,000
07	TECH SPEC/FSAR, CALCS, ANALYSIS	675	$ 81,000
08	ENGINEERING DCP ACCEPTANCE REVIEW	40	$ 4,000
CONTRACT ENGINEERING			
08	DESIGN ENGR CONTRACT SUPPORT	1,200	$ 144,000
09	SUPL CONTRACT MODS ENGR		
10	MODS PLAN & SCHED -CONTRACT	160	$ 16,000
11	OSG FIELD ENGRS / PLANNERS	140	$ 16,800
MATERIALS / MISC CONTRACTS			
12	MATERIALS		$ 121,900
13	OTHER CONTRACTS		
CONTRACT CRAFT LABOR			
14	SWEC CRAFT LABOR/WALKDOWN	2,446	$ 333,032
15	LOST TIME	245	$ 33,357
16	SWEC DISTRIBS		
PLANT CRAFT LABOR			
17	MECH MAINT.	-	$ -
18	ELECT MAINT	-	$ -
19	I&C	-	$ -
20	CSG	-	$ -
MISC SUPPORT			
21	QUALITY CONTROL	180	$ 18,000
22	PLANNING & SCHEDULING		$ -
23	TRAINING	36	$ 4,320
24	CHEMISTRY	-	$ -
25	OPS	100	$ 12,000
26	HP / RP	-	$ -
MISC CONTRACT SUPPORT			
27	QUALITY CONTROL	130	$ 10,400
28	NDE	-	$ -
29	HP / RP	-	$ -
30	RADWASTE	-	$ -
31	NURSE	-	$ -
32	ELEVATOR CONTRACTOR	-	$ -
33	WASTE MANAGEMENT	-	$ -
34	HOUSEKEEPING	-	$ -
35	EQUIPMENT RENTAL	-	$ -
36	VENDOR STOCKING	-	$ -
37	DECONTAMINATION CONTRACTOR	-	$ -
38	RBC'S	-	$ -
39	SECURITY	-	$ -
40	FIRE WATCH (Rover)	-	$ -
41	SAFETY	49	$ 3,332
CONTINGENCY			
42	CONTINGENCY		$ 342,456
ESTIMATE SUBTOTAL		**5,941**	**$ 1,198,597**
	Site Encumbrance Loaders (20%)		**$ 239,719**
	Loaders (30%)		**$ 431,495**
	ESTIMATE TOTAL		**$ 1,869,811**

Rev.
11-0

INDIAN POINT IMPLEMENTATION ESTIMATE WORK SHEET

EC #: SAMA IP3-007

PROJECT TITLE: Install a Reactor Cavity Flooding System
JOB LOCATION: Containment Building, Yard near FSB ☑ OUTAGE ☐ NON-OUTAGE
EST. STATUS:

PROJECT CODE: TBD ☑ CAPITAL ☐ O&M
ORIGINATOR:

TAKEOFF:
ESTIMATOR: RCMT
ORIG. DATE: 07-12-2012

ITEM	DESCRIPTION	QTY	UOM	CFT	NO.	MANHOURS UNIT	FCTR	TOTAL	$/MH	MATERIAL $ PER UNIT	MATERIAL DOLLARS	LABOR DOLLARS	SUB-CONTRACT	TOTAL $
	Non-Outage Work													
1.	Gather and stage tools and materials	1	LT	LB	2	2.00	1.00	4	$ 78.15		$ -	$ 313		$ 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	$ 115.00		$ -	$ 460		$ 460
4.	Excavate to existing Fire Water Line	1	LT	OP	1	24.00	1.00	24	$ 115.00		$ -	$ 2,760		$ 2,760
5.	Excavate to existing Fire Water Line	1	LT	LB	2	24.00	1.00	48	$ 78.15		$ -	$ 3,751		$ 3,751
6.	Perform tie in to existing fire line	1	LT	PF	3	20.00	1.00	60	$ 120.71		$ -	$ 7,243		$ 7,243
7.	Backfill and compact excavation	1	LT	OP	1	15.00	1.00	15	$ 115.00		$ -	$ 1,725		$ 1,725
8.	Backfill and compact excavation	1	LT	LB	2	15.00	1.00	30	$ 78.15		$ -	$ 2,345		$ 2,345
9.	Excavate, form and pour slab with oil berm	1	LT	OP	1	10.00	1.00	10	$ 115.00		$ -	$ 1,150		$ 1,150
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	LT	CP	2	10.00	1.00	20	$ 96.00		$ -	$ 1,920		$ 1,920
12.	Obtain and erect insulated steel building.	1	LT	MW	3	20.00	1.00	60	$ 134.00	$ 10,000.00	$ 10,000	$ 8,040		$ 18,040
13.	Provide Light, Heat and Ventilation	1	LT	EL	2	30.00	1.00	60	$ 123.32	$ 4,000.00	$ 4,000	$ 7,399		$ 11,399
14.	Set Diesel Pump Skid	1	LT	MW	2	20.00	1.00	40	$ 134.00	$ 50,000.00	$ 50,000	$ 5,360		$ 55,360
15.	Excavate and pour Pipe Support Piers	1	LT	LB	2	60.00	1.00	120	$ 78.15	$ 4,000.00	$ 4,000	$ 9,378		$ 13,378
16.	Excavate and pour Pipe Support Piers	1	LT	CP	1	60.00	1.00	60	$ 96.00		$ -	$ 5,760		$ 5,760
17.	Excavate and pour Pipe Support Piers	1	LT	OP	1	60.00	1.00	60	$ 115.00		$ -	$ 6,900		$ 6,900
18.	Obtain Material and Erect Pipe Supports on Piers	1	LT	PF	3	60.00	1.00	180	$ 120.71	$ 2,000.00	$ 2,000	$ 21,728		$ 23,728
19.	Cut, Fit and Weld Piping from Diesel to Pene.Y-Y	1	LT	PF	3	150.00	1.00	450	$ 120.71		$ -	$ 54,320		$ 54,320
20.	Tie in Piping at Pump and at Penet. Y-Y	1	LT	PF	3	20.00	1.00	60	$ 120.71		$ -	$ 7,243		$ 7,243
21.	Mount and tie in diesel day tank	1	LT	PF	3	10.00	1.00	30	$ 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	$ 120.71		$ -	$ 4,828		$ 4,828
23.	Support testing as required	1	LT	PF	2	20.00	1.00	40	$ 120.71		$ -	$ 4,828		$ 4,828
24.	Clean-up area and restore	1	LT	PF	2	10.00	1.00	20	$ 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
								-			$ -	$ -		$ -
	OUTAGE WORK													
1.	Obtain tools and material	1	LT	PF	2	5.00	1.70	17	$ 120.71		$ -	$ 2,052		$ 2,052
2.	Perform job brief and walk down are	1	LT	PF	2	5.00	1.70	17	$ 120.71		$ -	$ 2,052		$ 2,052
3.	Install prefabricated spool in containment	1	LT	PF	2	10.00	1.70	34	$ 120.71		$ -	$ 4,104		$ 4,104
4.	Clean up and restore area	1	LT	PF	2	5.00	1.70	17	$ 120.71		$ -	$ 2,052		$ 2,052
								-						
								-						
								-						
								-						
	PAINTING & TOUCH-UP REQUIREMENTS													
1.	PAINTING & TOUCH-UP - PRIME	1	LT	PT	2	60.00	1.00	120	$ 95.16		$ 1,500	$ 11,419		$ 12,919
2.	PAINTING & TOUCH-UP	1	LT	PT	2	60.00	1.00	120	$ 95.16		$ 3,000	$ 11,419		$ 14,419
	FIRE WATCH / BOTTLEWATCH REQUIREMENTS													
1.	CRAFT SUPPORT FOR FIRE WATCH	1	LT	FW	1	120.00	1.70	204	$ 53.60		$ -	$ 10,934		$ 10,934
2.	CRAFT SUPPORT FOR BOTTLE WATCH							-						
	MISC SUB-CONTRACT													
1.	MISC SUB-CONTRACT	1	LT											
	SUBTOTAL CRAFT & SUB-CONTRACTOR							2,082			$ 77,000	$ 216,740	$ -	$ 293,740
1.	CONSTRUCTION SUPPORT (8% OF LABOR $)	1	LT					167	$ 104.10			$ 17,385		$ 17,385
	SUBTOTAL							2,249			$ 77,000	$ 234,125	$ -	$ 311,125
	*** RELATED COSTS ***													
1.	WALKDOWN ALLOWANCE	1	LT	PF				20	$ 120.71			$ 2,414		$ 2,414
2.	WORK PACKAGE REVIEW & CRAFT TRAINING	1	LT	PF				98	$ 120.71			$ 11,830		$ 11,830
3.	TOOL ROOM ATTENDANTS (~3.5%)	1	LT	EL				79	$ 123.32			$ 9,742		$ 9,742
4.	GENERAL CRAFT DISTRIBS. (10%)											$ 23,413		$ 23,413
5.	CRAFT IN PROCESSING (20%)											$ 46,825		$ 46,825
6.	HUMAN PERFORMANCE & ALARA TRAINING	1	LT									$ 4,683		$ 4,683
7.	(1/2 day training, or ~ 2%)													
	SUBTOTAL							2,446			$ 77,000	$ 333,032	$ -	$ 410,032
	PLANT SCOPE													
1.	**MECH MAINTENANCE**			PL										
				PL										
	SUBTOTAL MECH MAINT.							-			$ -	$ -	$ -	$ -
1.	**ELECT MAINTENANCE**			PL										
				PL										
	SUBTOTAL ELECT. MAINT.							-			$ -	$ -	$ -	$ -
1.	**I&C (Dev. Instrument Calibration Procedures)**	0	LT	PL	-									
				PL										
	SUBTOTAL I&C MAINT.							-			$ -	$ -	$ -	$ -

Rev. 11-0

INDIAN POINT IMPLEMENTATION ESTIMATE WORK SHEET

EC #: SAMA IP3-007

PROJECT TITLE: Install a Reactor Cavity Flooding System
JOB LOCATION: Containment Building, Yard near FSB ☑ OUTAGE ☐ NON-OUTAGE
EST. STATUS:
PROJECT CODE: TBD ☑ CAPITAL ☐ O&M
ORIGINATOR:
TAKEOFF:
ESTIMATOR: RCMT
ORIG. DATE: 07-12-2012

ITEM	DESCRIPTION	QTY	UOM	CFT	NO.	MANHOURS UNIT	FCTR	TOTAL	$/MH	MATERIAL $ PER UNIT	MATERIAL DOLLARS	LABOR DOLLARS	SUB-CONTRACT	TOTAL $
1.	**CSG**			PL				-						
				PL				-						
	SUBTOTAL CSG MAINT.							-			$ -	$ -	$ -	$ -
	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
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	$ 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.	QA / QC VERIFICATION	1	LT	NM	1	180.00	1.00	180	$ 100.00			$ 18,000		$ 18,000
10.	PLANNING & SCHEDULING	1	LT	NM										
11.	HP / RP/ ALARA	1	LT	NM										
12.	CHEMISTRY	1	LT	NM										
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	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	LT	NM	1	140.00	1.00	140	$ 120.00			$ 16,800		$ 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.	VENDOR STOCKING	1	LT	NM				-						
14.	DECONTAMINATION CONTRACTOR	1	LT	NM				-						
15.	RBC's	1	LT	NM				-						
16.	SECURITY	1	LT	SEC				-						
17.	FIRE WATCH (Rover)	1	LT	NM										
18.	SAFETY (2%)	1	LT	NM				49	$ 68.00			$ 3,332		$ 3,332
19.	LOST TIME (10%)	1	LT					245	$ 136.15			$ 33,357		$ 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
3.	FREIGHT, SALES TAX, & CONSUMABLES (6%)										$ 6,900			$ 6,900
	SUBTOTAL INSTALLATION COST							3,826			$ 121,900	$ 485,241	$ -	$ 607,141
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	$ 100.00			$ 8,000		$ 8,000
5.	TESTING (Instrument Calibration and testing)	1	LT	NM	2	20.00	1.00	40	$ 100.00			$ 4,000	$ -	$ 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											$ 649,241	$ -	$ 856,141
1.	CONTINGENCY (40%)													$ 342,456
	ESTIMATE SUBTOTAL							5,941						$ 1,198,597

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:
Date: 9-20-2012	Date: 9-20-2012

TABLE OF CONTENTS

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.

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 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. CO_2, H_2, 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

Item Description	Quantity
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

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
7. 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
14. 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

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 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.: SAMA IP3-018 **Rev. No.:** CONCEPTUAL 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	☐ 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	☐ 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

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	☐ NO
Cable and Raceway Program • Does the proposed activity involve any changes to cable trays, raceways or the associated documentation?	■ YES	☐ 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) ***(if applicable)*** • 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 • 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?	■ 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?	☐ 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

ATTACHMENT 9.3 IMPACT SCREENING SUMMARY

SHEET 3 OF 6

PROCESS OR PROGRAM IMPACT SCREENING CHECKLIST	Potential Impact	
Computer Support and Software • Does the proposed activity impact or involve changes to plant computer software or firmware or impact Software Quality Assurance (SQA)?	■ YES	☐ NO
Chemistry and Environmental Impact • Does the proposed activity impact or involve any changes to plant chemistry requirements, operations or procedures, or any changes to the environment?	■ YES	☐ NO
Radiation Protection (RP) Program Impact • 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?	■ 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	☐ 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 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

ATTACHMENT 9.3 **IMPACT SCREENING SUMMARY**

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	☐ 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?	☐ 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?	☐ 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

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	☒ 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	☒ 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	☐ 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?	■ 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

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?	■ YES	☐ 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	☐ NO
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

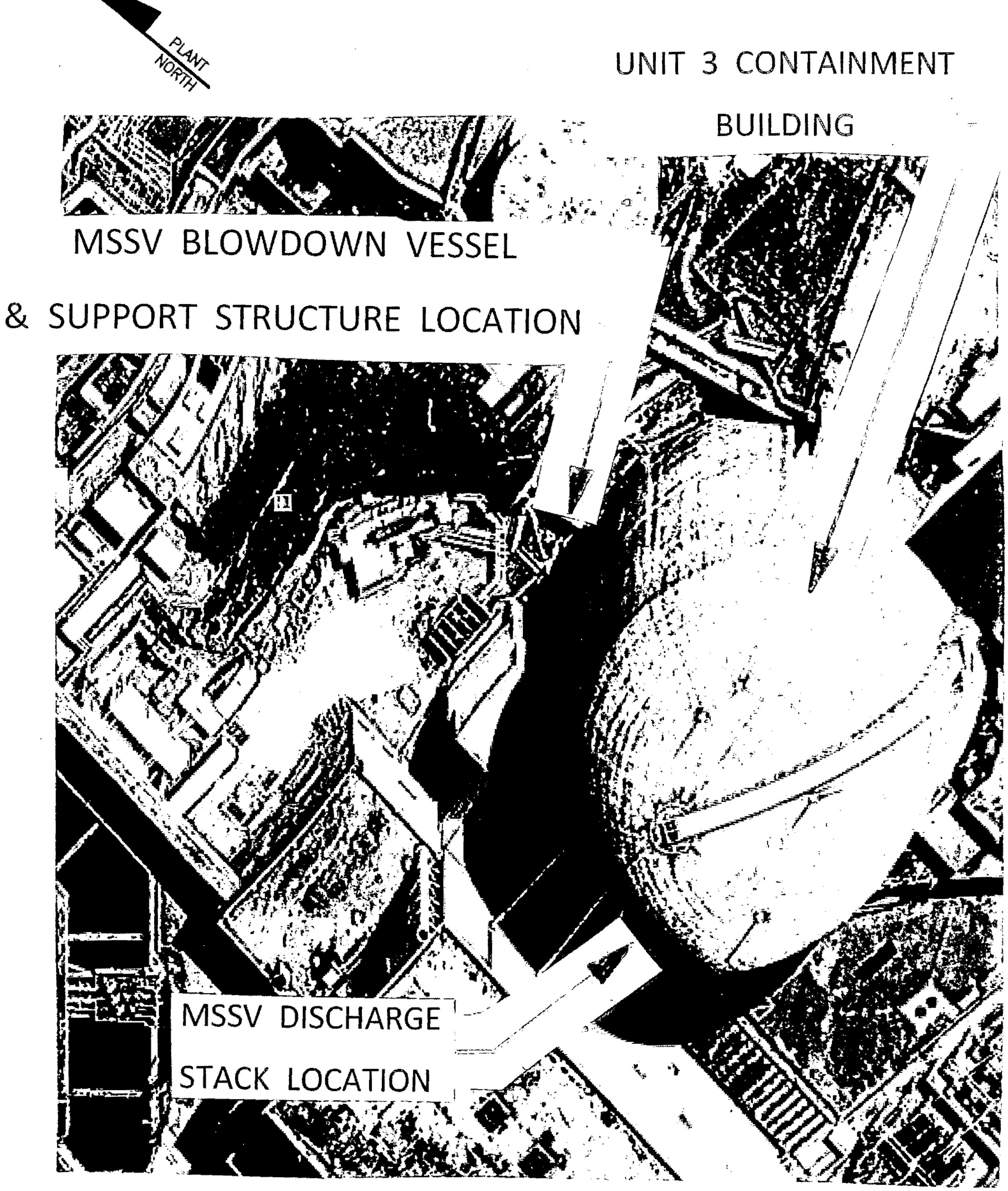
Detailed Impact Screening (Attachment 9.4) Attached?	☐ YES	☒ NO

Attachment 2

Conceptual Design Sketches

FIGURE 1

PARTIAL SITE PLAN OF AREAS AFFECTED



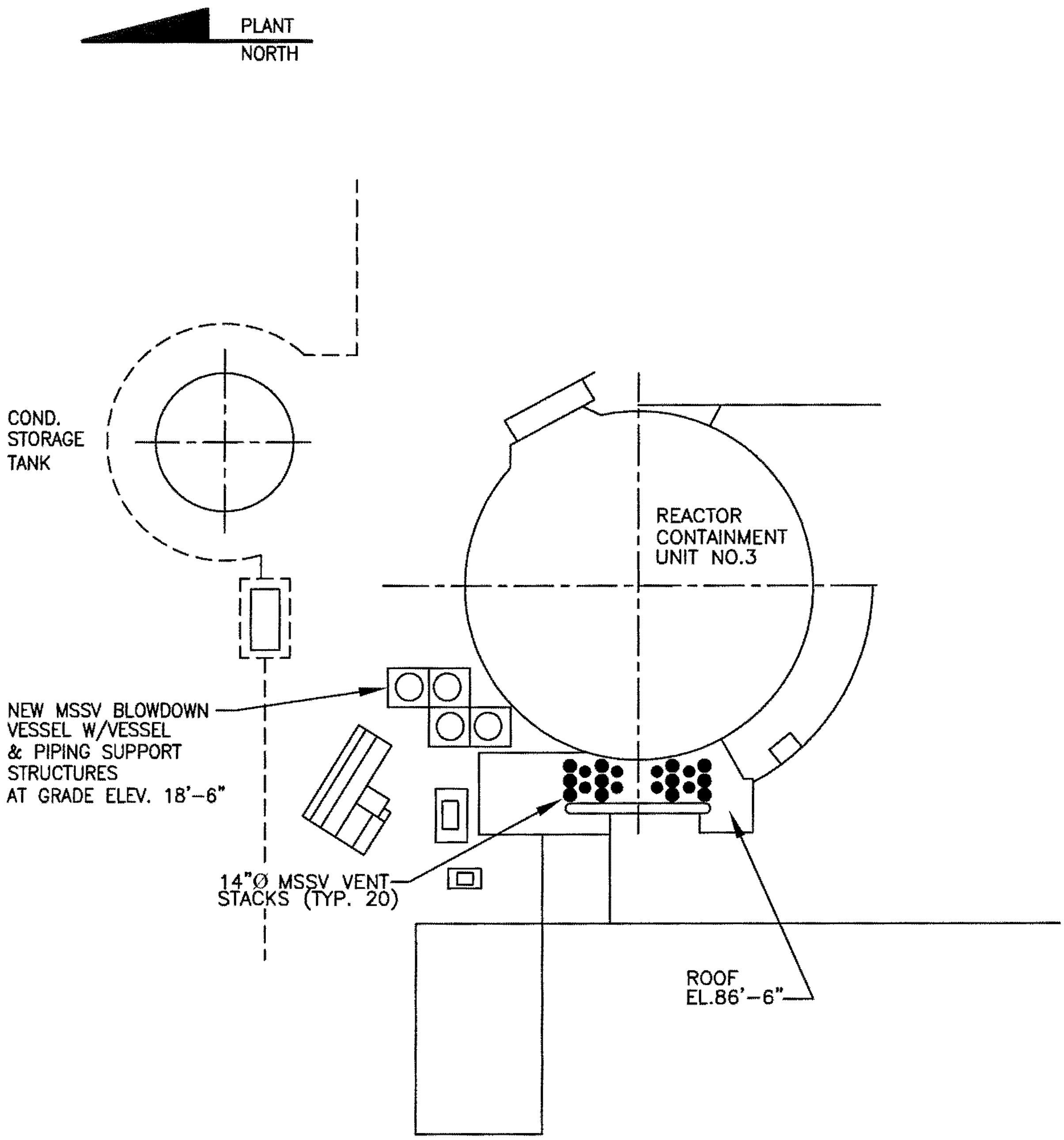


FIGURE 2
GENERAL ARRANGEMENT
BLOWDOWN VESSEL LOCATION

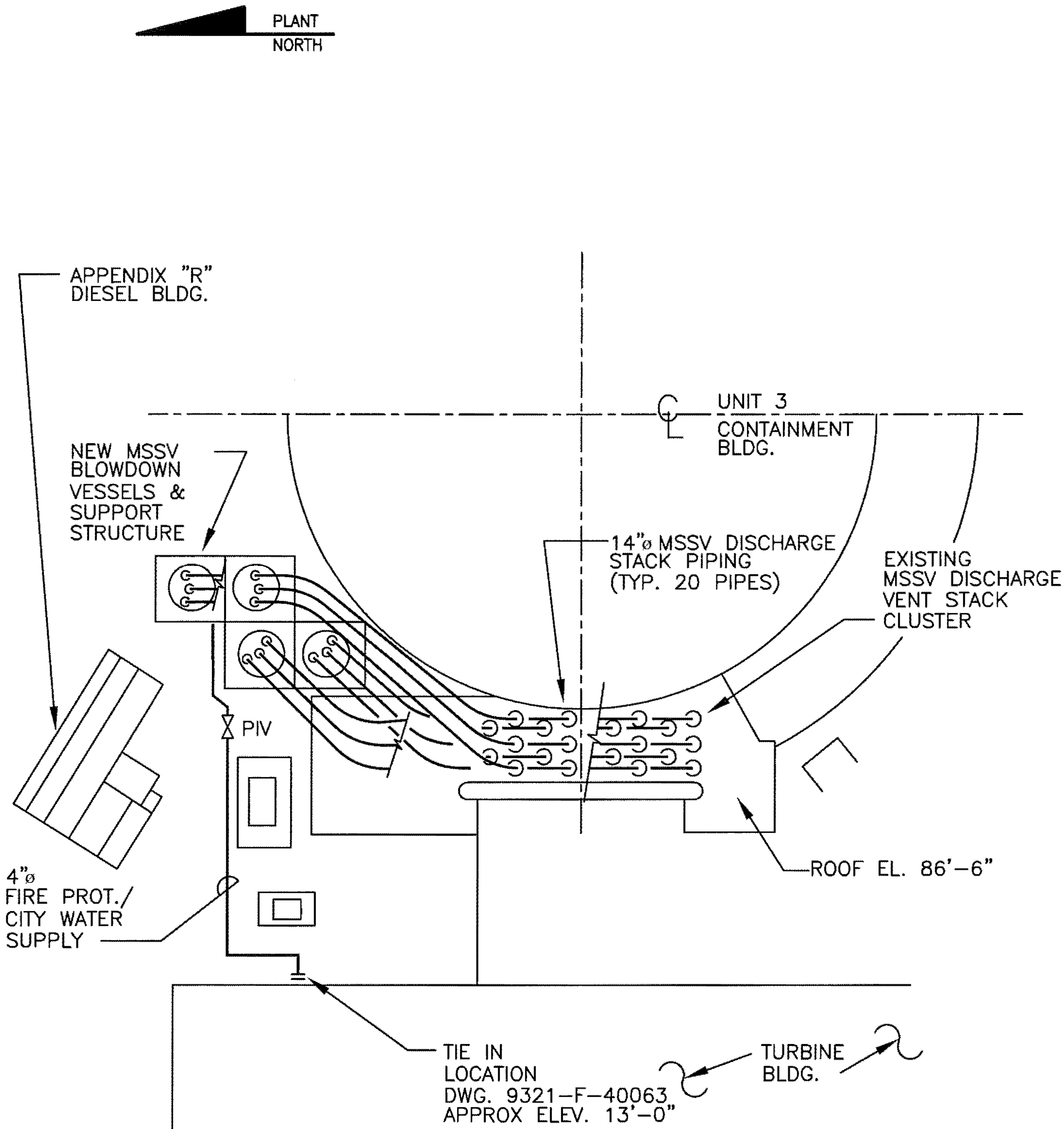


FIGURE 3
GENERAL ARRANGEMENT
PROPOSED PIPING ROUTING

RCM Technologies Power System Services	ENTERGY Indian Point Nuclear Station Unit 3	Conceptual Design Package SAMA IP3-018	Rev. 0

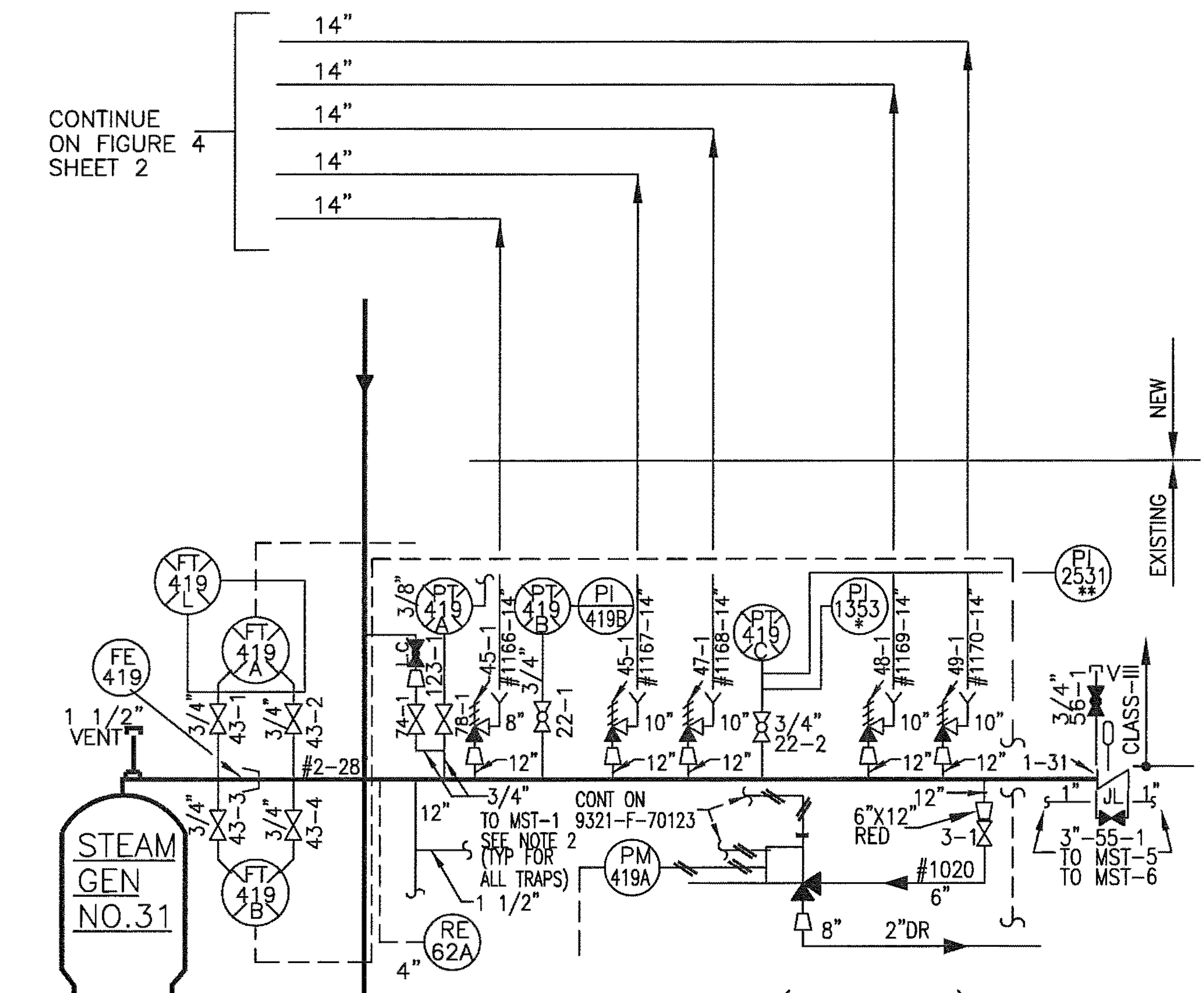


FIGURE 4 (SHEET 1)

DWN	CHK'D	INDIAN POINT NO. 3 NUCLEAR POWER PLANT	
DES SUPV			
DISCIPLINE ENG		FLOW DIAGRAM MAIN STEAM	
DISCIPLINE MGR.			
PROJ APPROVAL			
DATE			
Entergy Nuclear Northeast		SCALE: NONE	
		DWG NO 9321-F-20173	REV 71
		SHEET	

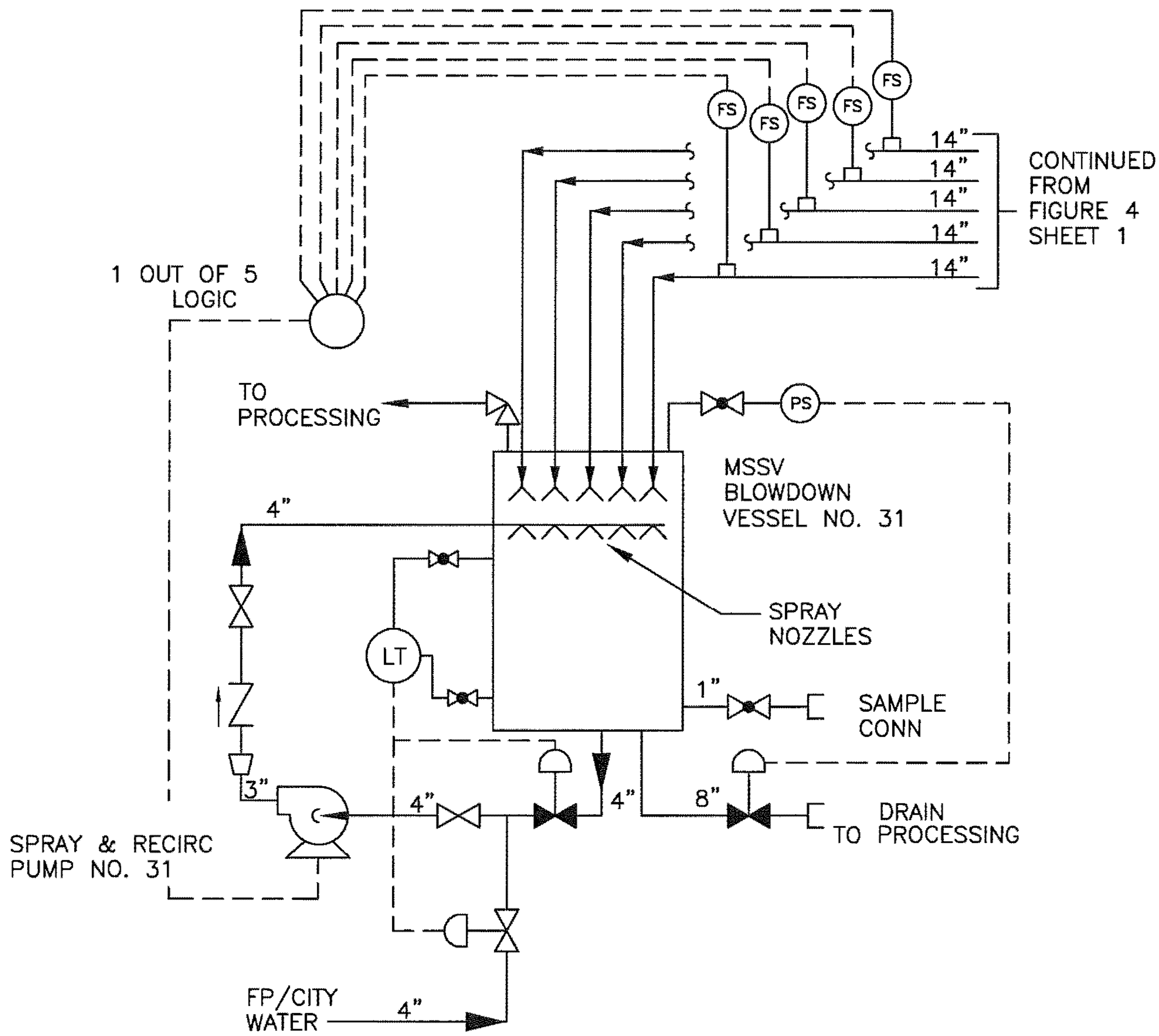


FIGURE 4 (SHEET 2)

DWN	CHK'D	INDIAN POINT NO. 3 NUCLEAR POWER PLANT
DES SUPV		FLOW DIAGRAM MAIN STEAM
DISCIPLINE ENG		
DISCIPLINE MGR.		
PROJ APPROVAL		
DATE		
Entergy Nuclear Northeast		SCALE: NONE
		DWG NO 9321-F-20173 SHEET · REV 71

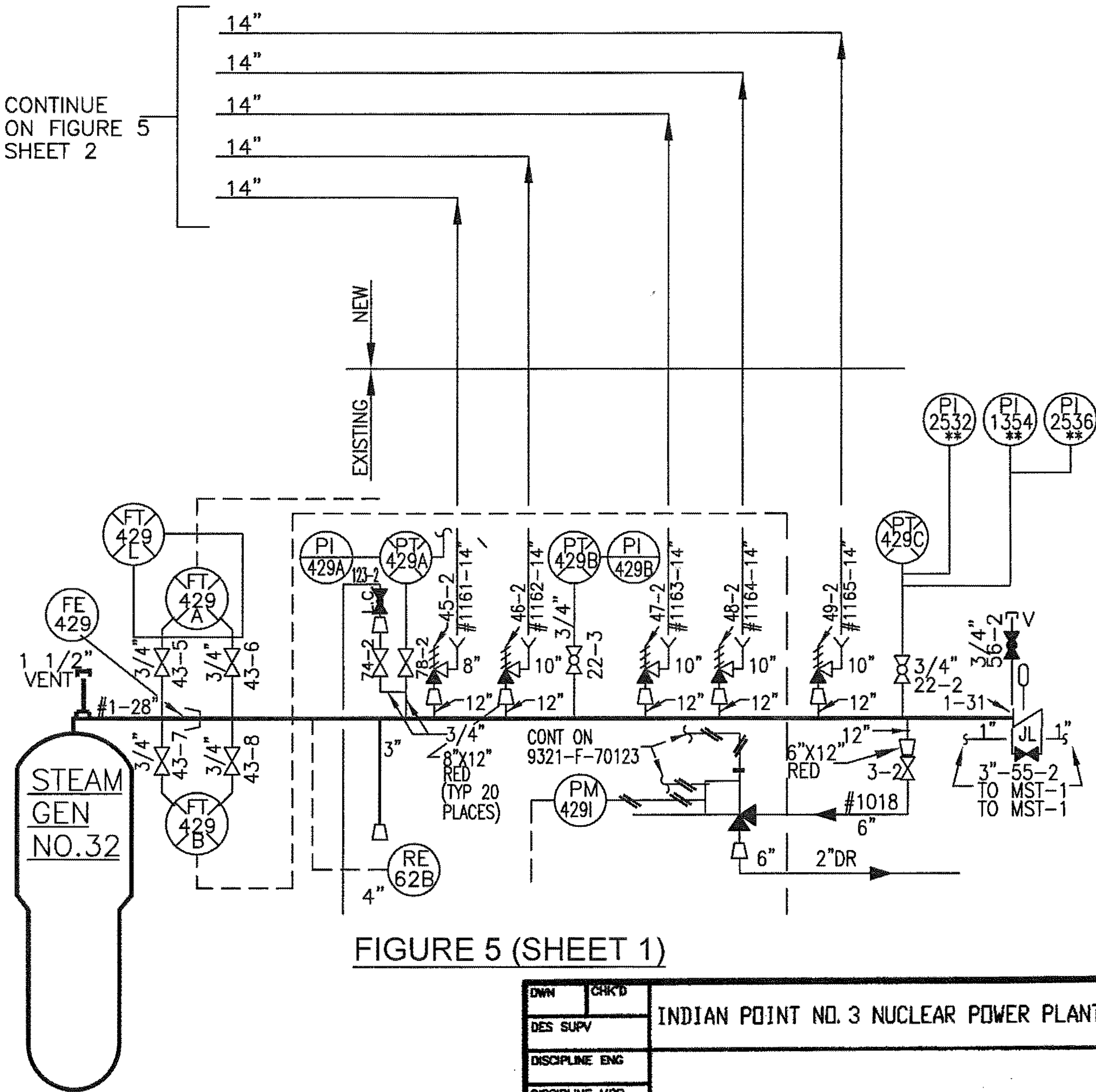


FIGURE 5 (SHEET 1)

DWN / CHK'D	INDIAN POINT NO. 3 NUCLEAR POWER PLANT
DES SUPV	
DISCIPLINE ENG	FLOW DIAGRAM MAIN STEAM
DISCIPLINE MGR.	
PROJ APPROVAL	
DATE	
Entergy Nuclear Northeast	SCALE: NONE
	DWG NO 9321-F-20173 / REV 71 / SHEET

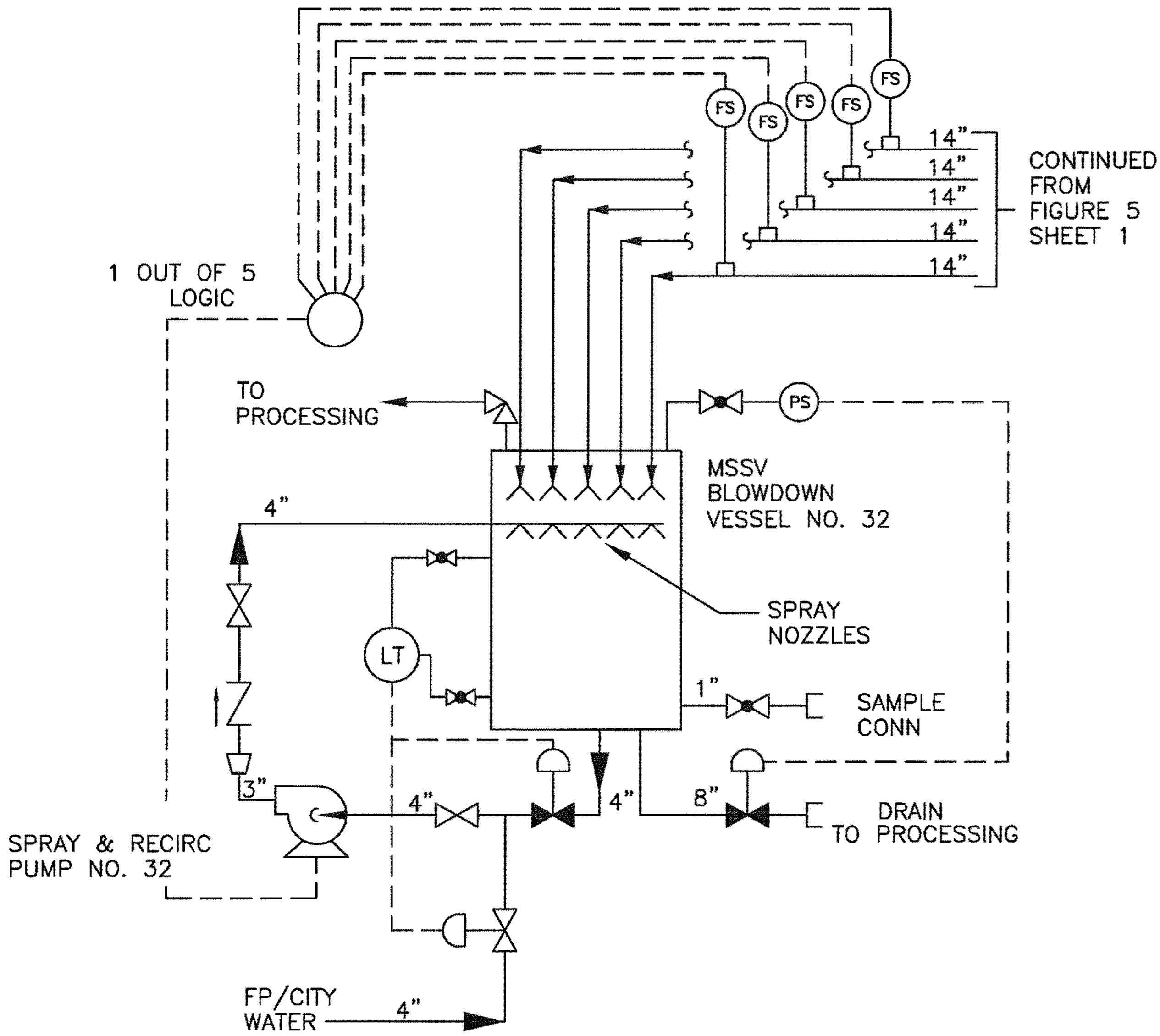


FIGURE 5 (SHEET 2)

DWN	CHK'D	INDIAN POINT NO. 3 NUCLEAR POWER PLANT
DES SUPV		
DISCIPLINE ENG		FLOW DIAGRAM MAIN STEAM
DISCIPLINE MGR.		
PROJ APPROVAL		
DATE		
Entergy Nuclear Northeast	SCALE: NONE	
	DWG NO 9321-F-20173 SHEET	REV 71

RCM Technologies Power System Services	ENTERGY Indian Point Nuclear Station Unit 3	Conceptual Design Package SAMA IP3-018	 Rev. 0

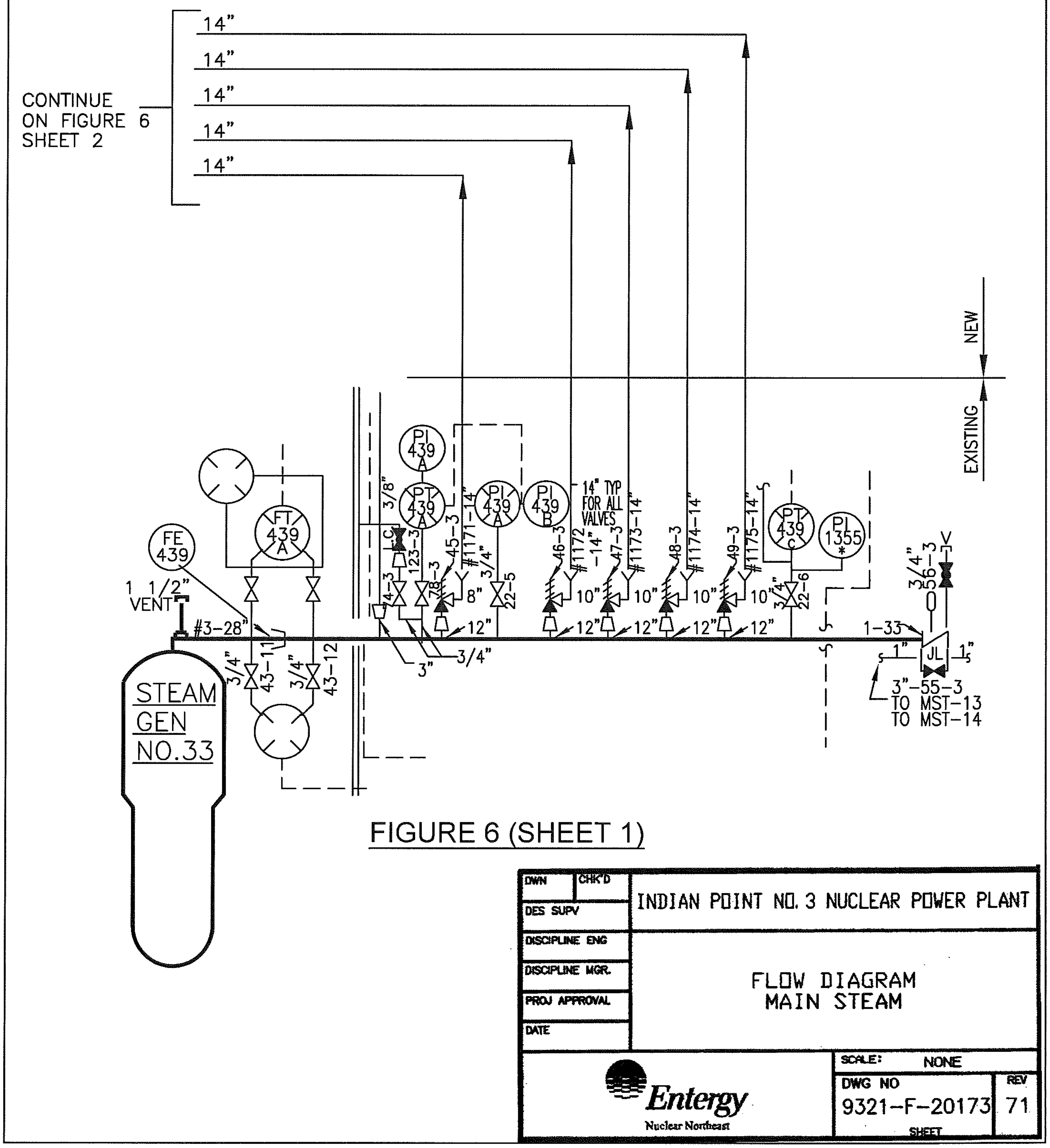


FIGURE 6 (SHEET 1)

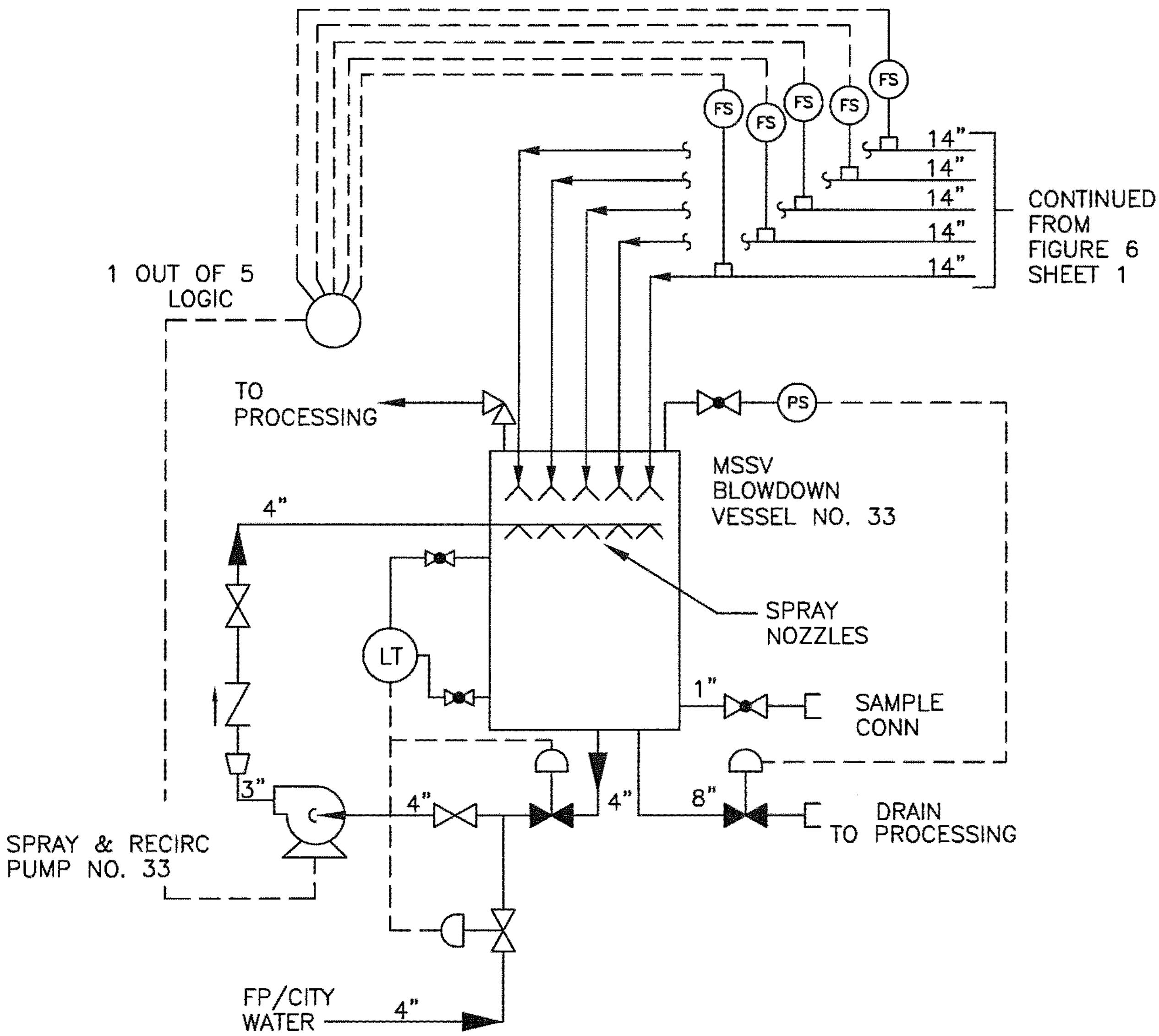


FIGURE 6 (SHEET 2)

DWN	CHK'D	INDIAN POINT NO. 3 NUCLEAR POWER PLANT
DES SUPV		
DISCIPLINE ENG		FLOW DIAGRAM MAIN STEAM
DISCIPLINE MGR.		
PROJ APPROVAL		
DATE		
Entergy Nuclear Northeast		SCALE: NONE; DWG NO 9321-F-20173; REV 71; SHEET

:\Entergy - SAMA Estimat nceptual Design Packages\IP3-SAMA - CONCEPTUAL DESIGN PACKAGES\SAMA IP3-018 r 'e an Installation to Capture MSSV Discharge Steam-Remove Fission Products\IP3-018-' '28/2011

RCM Technologies Power System Services	ENTERGY Indian Point Nuclear Station Unit 3	Conceptual Design Package SAMA IP3-018	Rev. 0

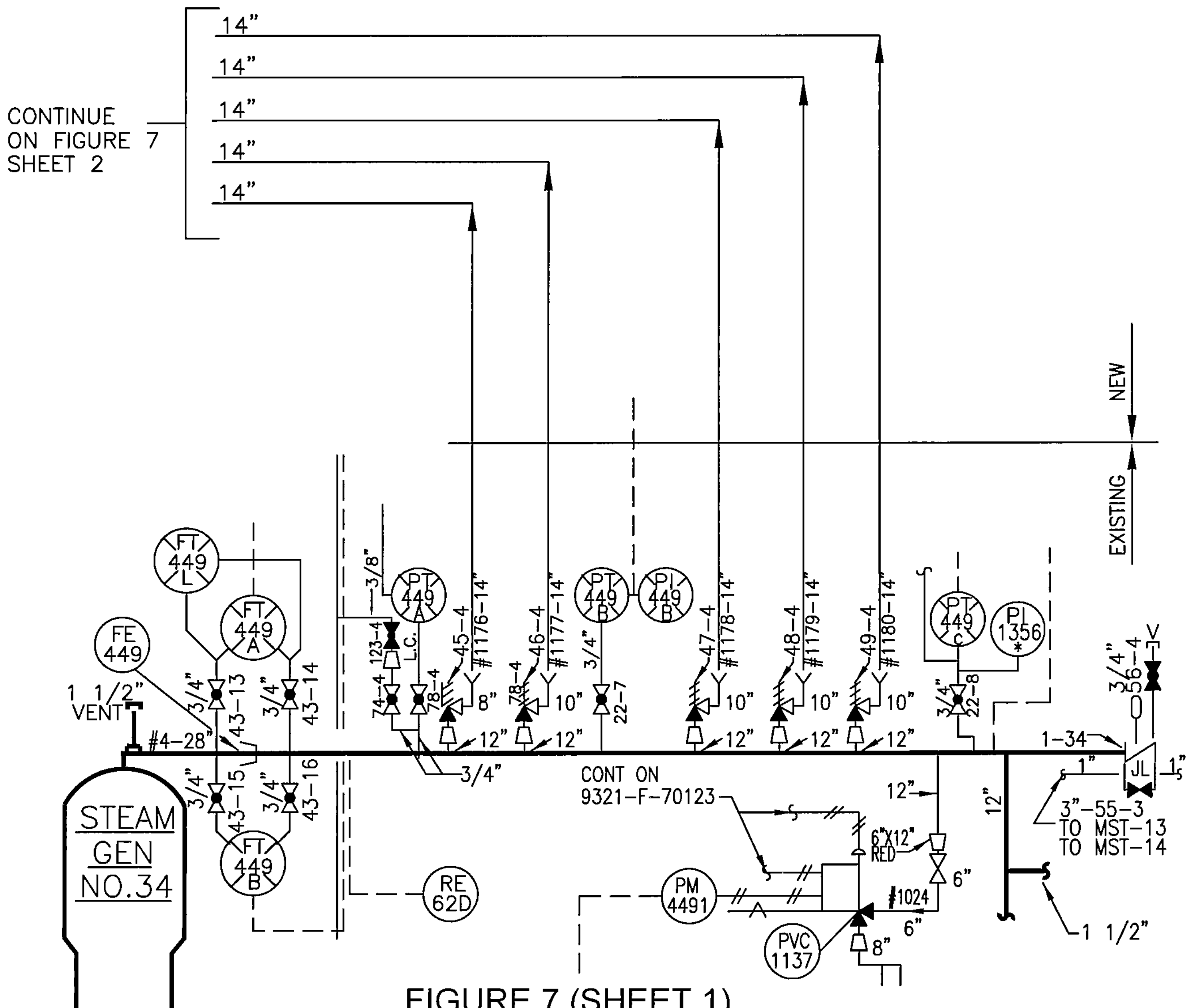


FIGURE 7 (SHEET 1)

DWN / CHK'D	INDIAN POINT NO. 3 NUCLEAR POWER PLANT
DES SUPV / DISCIPLINE ENG / DISCIPLINE MGR. / PROJ APPROVAL / DATE	FLOW DIAGRAM MAIN STEAM
Entergy Nuclear Northeast	SCALE: NONE; DWG NO 9321-F-20173; REV 71; SHEET

IPEC00270201

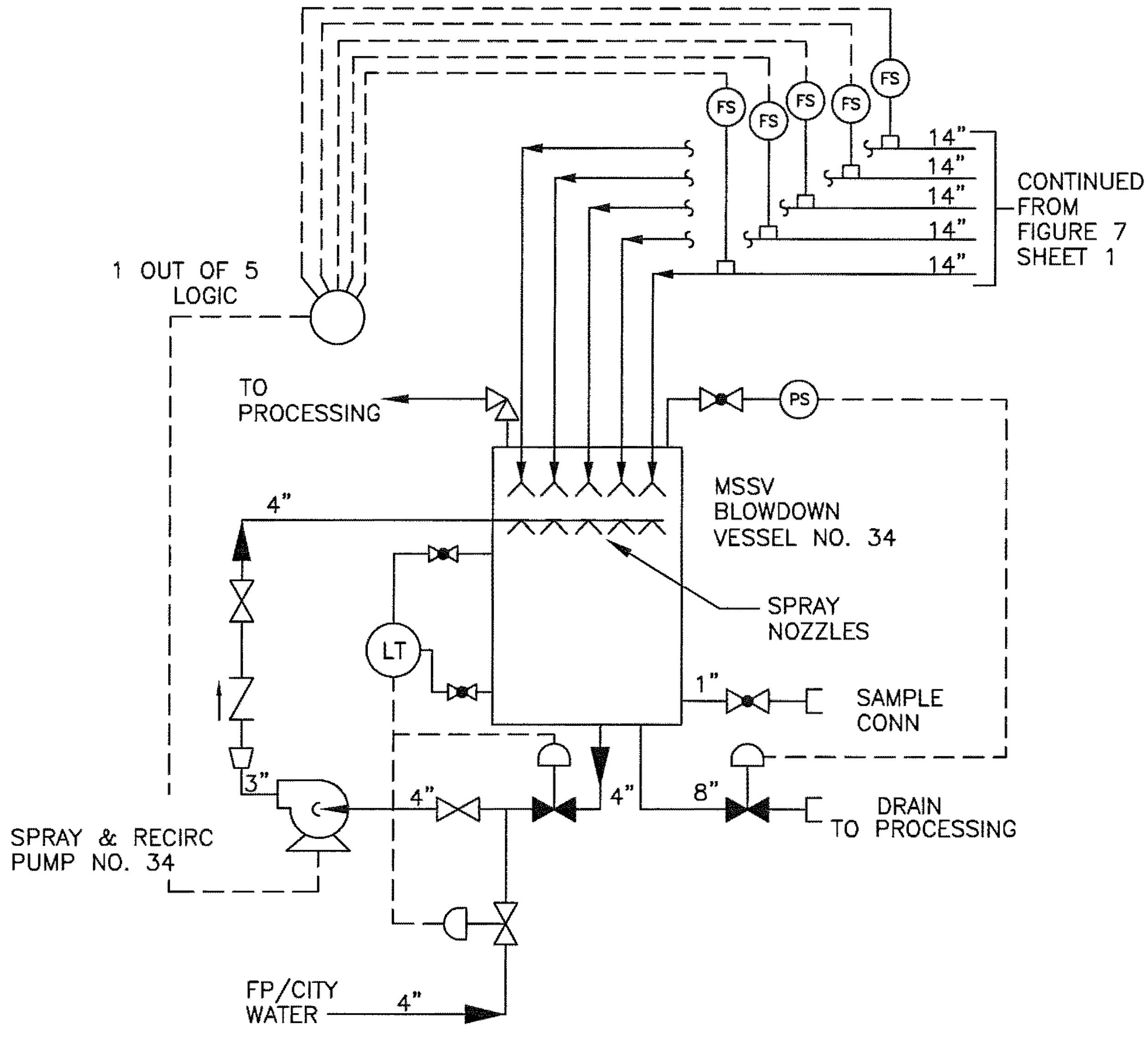


FIGURE 7 (SHEET 2)

DWN	CHK'D	INDIAN POINT NO. 3 NUCLEAR POWER PLANT		
DES SUPV				
DISCIPLINE ENG		FLOW DIAGRAM MAIN STEAM		
DISCIPLINE MGR.				
PROJ APPROVAL				
DATE				
Entergy Nuclear Northeast		SCALE: NONE		
		DWG NO 9321-F-20173	REV 71	
		SHEET		

IPEC00270202

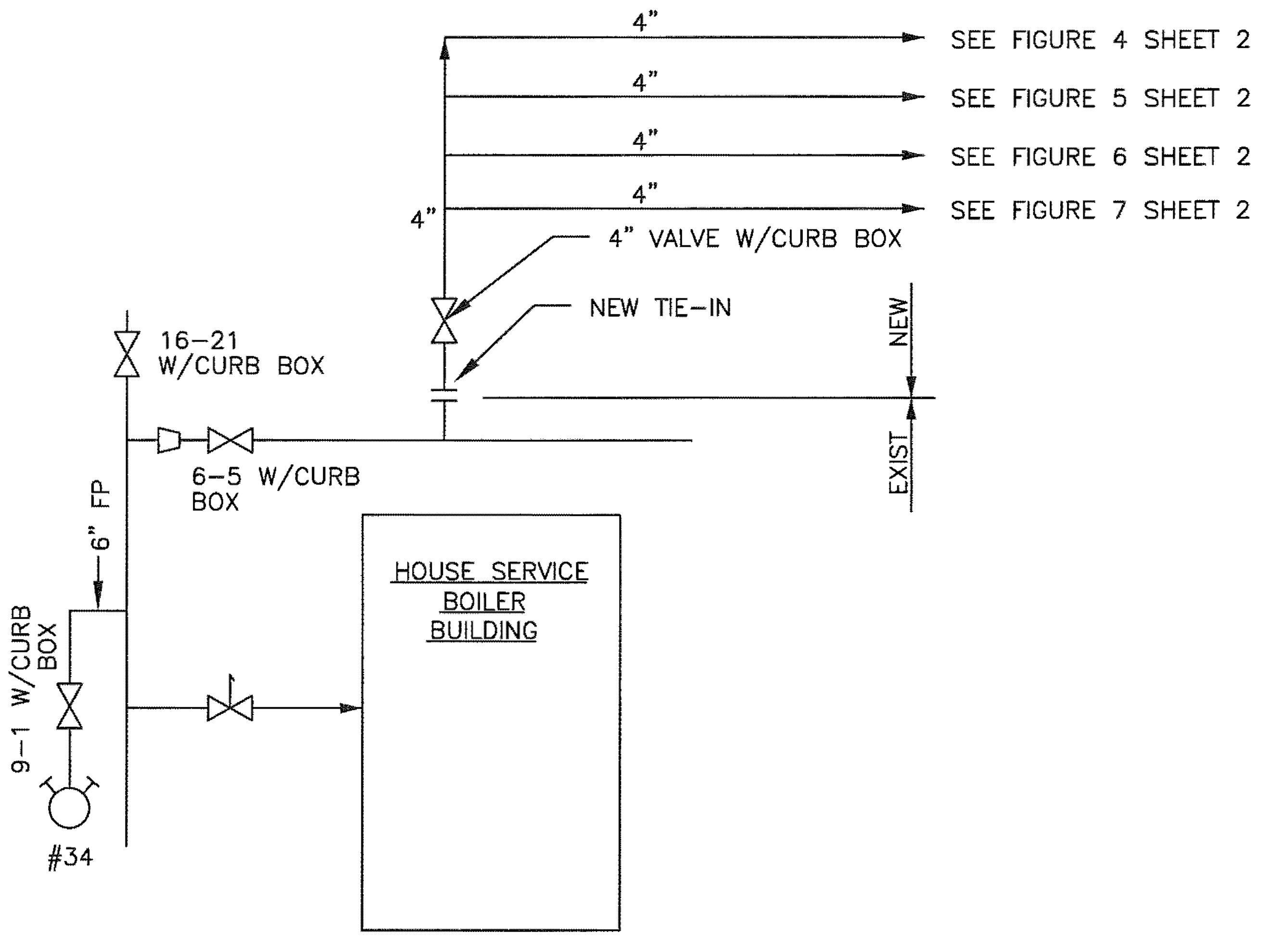


FIGURE 8

DWN	CHK'D	INDIAN POINT NO. 3 NUCLEAR POWER PLANT
DES SUPV		
DISCIPLINE ENG		FLOW DIAGRAM OF PLANT FIRE PROTECTION SYSTEM SHEET 1
DISCIPLINE MGR.		
PROJ APPROVAL		
DATE		
Entergy Nuclear Northeast	SCALE: NONE	
	DWG NO 9321-F-40903 SHEET	REV 30

RCM Technologies Power System Services	ENTERGY Indian Point Nuclear Station Unit 3	Conceptual Design Package SAMA IP3-018	Rev. 0

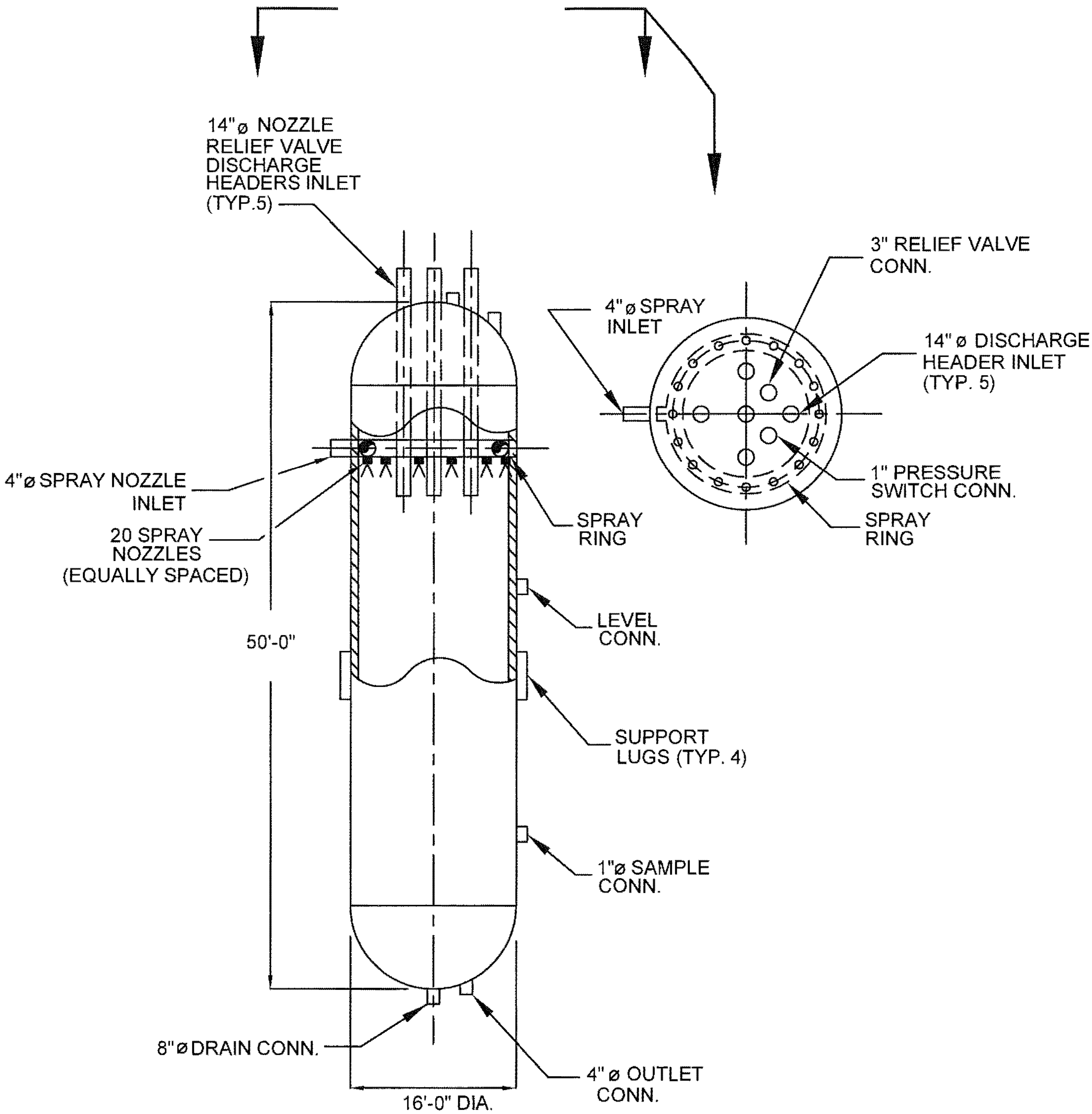


FIGURE 9
MSSV BLOWDOWN
VESSEL

RCM Technologies Power System Services	ENTERGY Indian Point Nuclear Station Unit 3	Conceptual Design Package SAMA IP3-018	Rev. 0

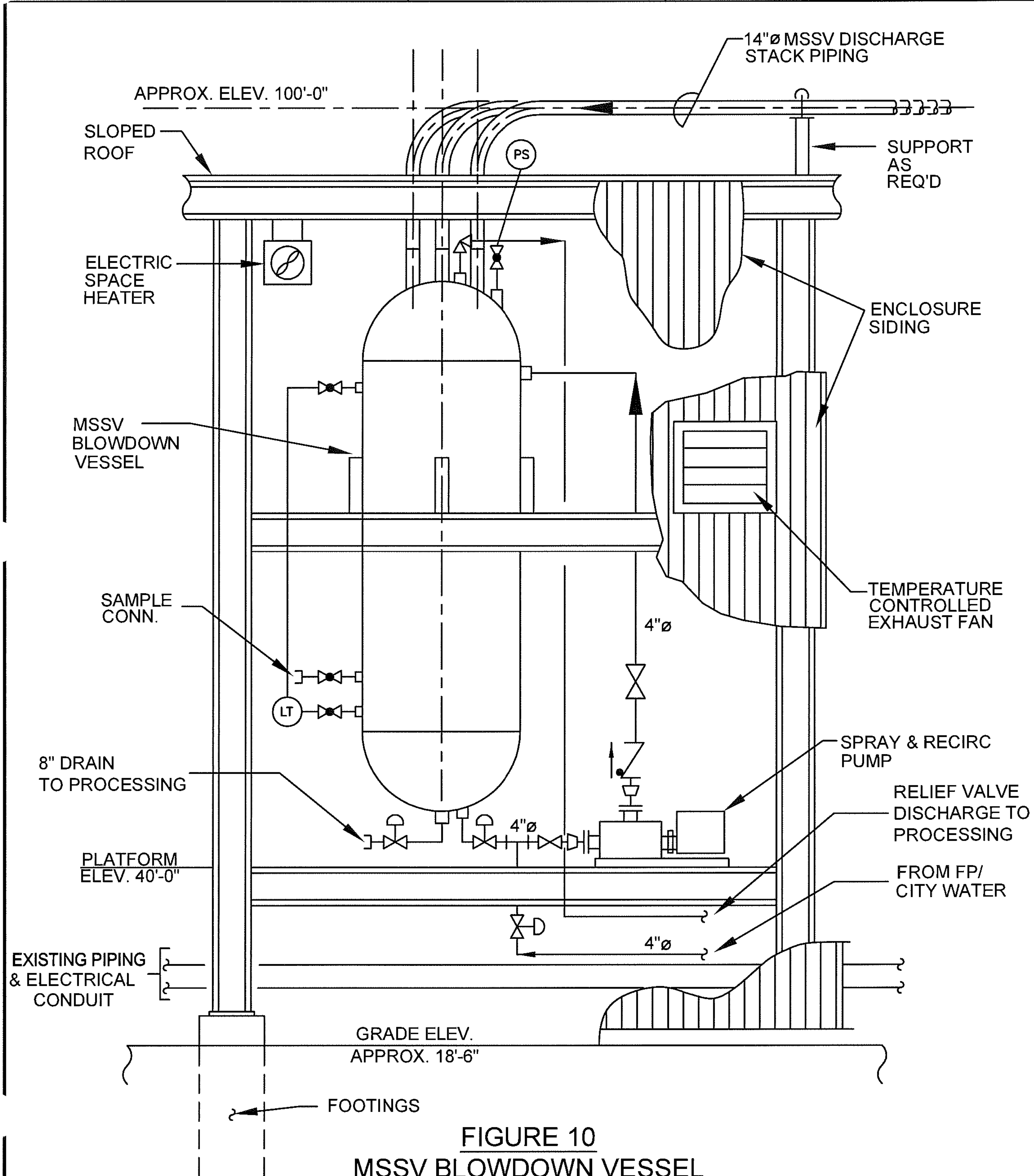


FIGURE 10
MSSV BLOWDOWN VESSEL
& SUPPORT ELEVATION

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)

4. Typical Water Spray Pump (attached here)

5. Flow Switch Model FLT93F Flexswitch (attached here)

6. Rosemount 3051 Pressure Transmitter (attached here)

7. Allen-Bradley Bulletin 836 Pressure Switch (attached here)

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

Griswold Pump Co.
107 Plantation Oak Drive
Thomasville, GA 31792
800-843-9222ph 800-752-2929fax

Customer Name	
Quote Attention To:	
Phone #	
Fax #	
Quoted By	Peter Glauber
Email	pwg@glauber..com
Quote #	

DATA / ESTIMATE SHEET

Total Price for 1 Unit/s
7,477

Total Estimated Weight
497

Estimated Lead-Time
8 weeks

F.O.B. Thomasville, GA

Today's Date February 14, 2008

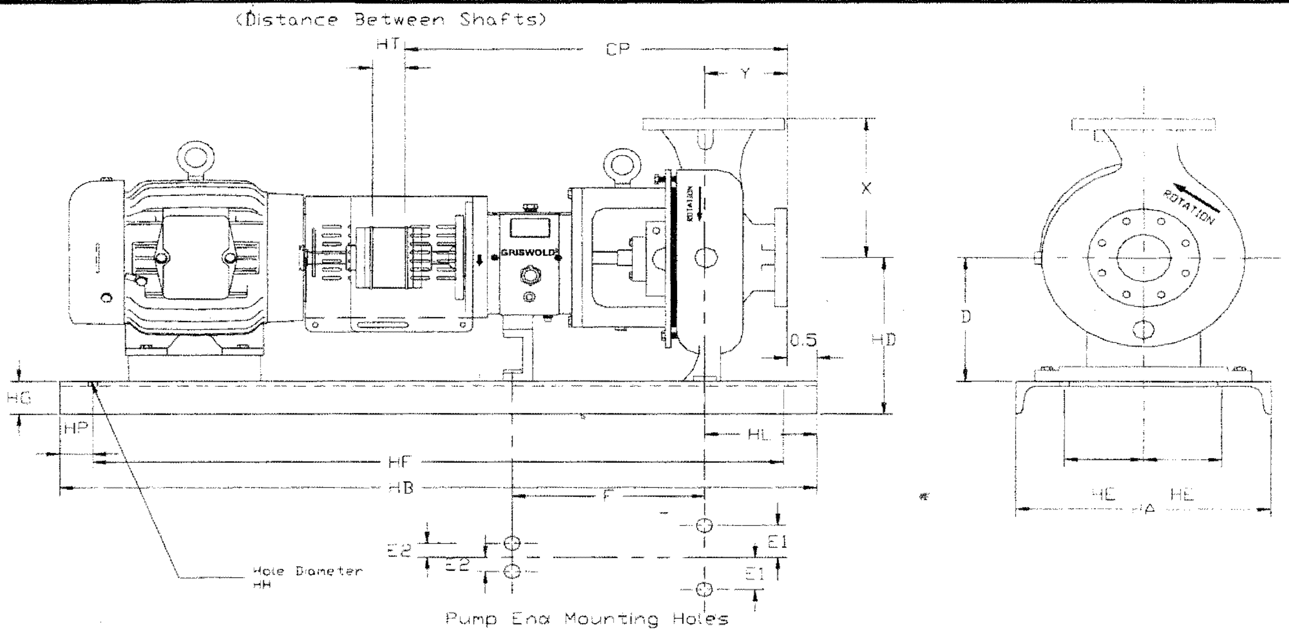
Project Name / Reference

Sheet 1 of 1

Fluid Information

Liquid	Fuel oil unloading
Temperature	80 ° F
Specific Gravity	1
Viscosity	21
GPM	300
TDH	370

Curve #	G-3610	**Driver Info:**	
Impeller Dia.	9.1	HP	5
NPSHr	8.1	Frame	184T
Coupling Info:			TEFC
TB Woods Type SC7			



Pump End Dimensions

Model	Pump Size & Designation	Suction	150# Drilling	Discharge	150# Drilling	D	X	CP	E1	E2	F	Y
811M	4 x 3 - 10 A70	4	(8) 3/7 Holes on 7.50BC	3	(4) 3/4 Holes on 6.0BC	8.25	11	23.5	4 7/8	3 5/8	12.5	4

Steel Base Plate Dimensions

Max Nema Frame	ANSI Baseplate #	HA	HB	HT (min)	HD max (D+HG)	HE	HF	HG (max)	HH	HL	HP
184T	139	12	39	3.5	12	4.5	36.5	3.75	0.75	4.5	1.25

Materials of Construction

Case	Impeller	Stuffing Box	Sleeve	Shaft	Seal / Packing Gland	Seal Type	Material Code
316 SS	316 SS	316 SS	316 SS	CS 4140	316ss	CSSN	Car/Sic

Construction Details

		Shaft Diameter				Bearings				Impeller	
Case Thickness	Corrosive Allowance	At Coupling	Under Impeller	Under Seal	Under Sleeve	Overhang	Radial	Thrust	Span	Eye Area	Maximum Diameter Solids
1/2	1/8	1.125	1	1-3/4	1-1/2	8-3/8	SKF 6309	SKF 5309 A/C3	6-3/4	12.5	5/8

B.H.P. Limits

RPM	BHP
3600	200
1800	100
1200	66.4
880	49.5

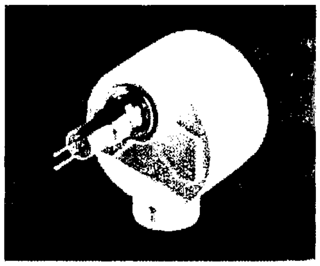
Sealing	
Mechanical Seal Size	Lantern Ring Width
1-3/4	5/8

Std. Stuffing Box		
I.D.	Depth	Distance end of box to nearest obstruction
2-1/2	2-5/8	2-13/16

Oversized Stuffing Box		
I.D.	Depth	Distance end of box to nearest obstruction
3-1/2	2-5/8	2-13/16

IPEC00270208

Flow Switch Model FLT93F FlexSwitch®



Download literature for this product

FLT93 Series has SIL 2 Compliance Rating

Flow Switch Summary

The FLT93F insertion type FlexSwitch for flow 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 ± 100° F.

The FLT93F offers fast response time and is suitable for small process connections. This product 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

- Pump protection
- Cooling water/heat exchangers
- Drain line flow
- Safety spray nozzle monitoring
- Oil well system testing
- Relief valve monitoring

Specifications

For Flow Service - Setpoint Range:
- **Water-based Liquids:**
  0.01 to 3.0 fps [0.003 to 0.9 mps] Must be validated
- **Hydrocarbon-based Liquids:**
  0.01 to 5.0 fps [0.003 to 1.5 mps] Must be validated
- **Air/Gas:**
  0.25 to 120 sfps [0.08 to 37 smps] at standard conditions of 70° F [21.1° C] and 14.7 psia [1.013 bar(g)].

Accuracy: (whichever reading is higher)
- **Liquids:** ± 0.5% reading or ± 0.04 fps [± 0.012 mps]
- **Gases:** ± 0.5% reading or ± 2 sfps [± 0.06 nmps]

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

Response Time: As low as 0.5 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. Hastelloy C, Monel 400 and Titanium are available as an option.
Process Connection:
- **Standard:** 0.75 inch male NPT.
- **Optional:** 1 inch or 0.25 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]
- 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.

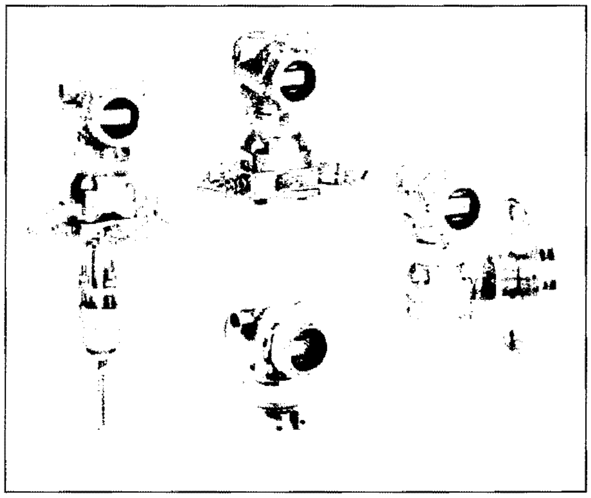
Optional N.I.S.T. Flow Calibration Services

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.

Rosemount 3051 Pressure Transmitter

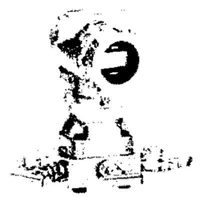
THE PROVEN INDUSTRY LEADER IN PRESSURE MEASUREMENT

- *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*



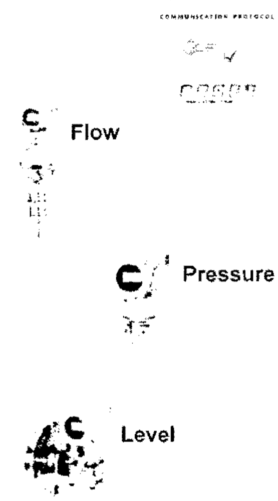
Contents

Setting the Standard for Pressure Measurement



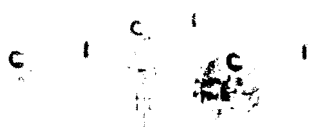
Proven best-in-class performance, reliability and safety

- Over 4 million installed
- Meet your application needs with extensive offering
- Real world total performance of ±0.15%
- Reference accuracy of ±0.04%



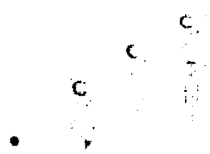
Maximize Installation Flexibility with Coplanar Platform

- Improve reliability and performance with integrated DP Flowmeters, DP Level and manifolds
- Easy installation with all solutions fully assembled, leak-tested and calibrated
- Meet your application needs with an unsurpassed offering



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

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
★ 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.

Model	**Transmitter Type**			
3051C	Coplanar Pressure Transmitter			
Measurement Type				
Standard				**Standard**
D	Differential			★
G	Gage			★
Expanded				
A	Absolute			
Pressure Range				
	3051CD	**3051CG**	**3051CA**	
Standard				**Standard**
1	–25 to 25 inH_2O (–62.2 to 62.2 mbar)	–25 to 25 inH_2O (–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_2O (–621 to 623 mbar)	0 to 150 psia (0 to 10.3 bar)	★
3	–1000 to 1000 inH_2O (–2.5 to 2.5 bar)	–393 to 1000 inH_2O (–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 to137.9 bar)	–14.2 to 2000 psi (–0.98 to 137.9 bar)	Not Applicable	★
Expanded				
0(1)	–3 to 3 inH_2O (–7.5 to 7.5 mbar)	Not Applicable	Not Applicable	
Transmitter Output				
Standard				**Standard**
A	4–20 mA with Digital Signal Based on HART Protocol			★
F	FOUNDATION fieldbus Protocol			★
W(2)	Profibus PA Protocol			★

Table 1. 3051C Coplanar Pressure Transmitters Ordering Information

★ 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				
M	Low-Power, 1–5 V dc with Digital Signal Based on HART 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 Connection			★
Isolating Diaphragm				
Standard				**Standard**
2(3)	316L SST			★
3(3)	Alloy C-276			★
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			★
B	Graphite-filled PTFE			★
Sensor Fill Fluid				
Standard				**Standard**
1	Silicone			★
2	Inert (Differential and Gage only)			★
Housing Material			**Conduit Entry Size**	
Standard				**Standard**
A	Aluminum		½–14 NPT	★
B	Aluminum		M20 × 1.5	★
J	SST		½–14 NPT	★
K	SST		M20 × 1.5	★
Expanded				
D	Aluminum		G½	
M	SST		G½	

Options (Include with selected model number)

Plantweb Control Functionality		
Standard		**Standard**
A01	FOUNDATION fieldbus Advanced Control Function Block Suite	★
Plantweb Diagnostic Functionality		
Standard		**Standard**
D01	FOUNDATION fieldbus Diagnostics Suite	★

Table 1. 3051C Coplanar Pressure Transmitters Ordering Information

★ 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.

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 Assembly[5][9]		
Standard		**Standard**
S5	Assemble to Rosemount 305 Integral Manifold	★
S6	Assemble to Rosemount 304 Manifold or Connection System	★
Integral Mount 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 Assemblies[9]		
Standard		**Standard**
S1[7]	Assemble to one Rosemount 1199 seal	★
S2[8]	Assemble to two Rosemount 1199 seals	★
All-Welded Seal Assemblies (for high vacuum applications)[9]		
Standard		**Standard**
S0	One Seal, All-Welded System (Direct Mount Connection Type)	★
S7	One Seal, All-Welded System (Capillary Connection Type)	★
S8	Two Seals, All-Welded System (Capillary Connection Type)	★
S9	Two Seals, All-Welded System (One Direct Mount and One Capillary Connection Type)	★
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 Flange 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	★

Table 1. 3051C Coplanar Pressure Transmitters Ordering Information
★ 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.

Product Certifications		
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	★
I1(11)	ATEX Intrinsic Safety and Dust	★
I2(11)	INMETRO Intrinsic Safety	★
I3	China Intrinsic Safety	★
I4(12)	TIIS Intrinsic Safety	★
I5	FM Intrinsically Safe, Division 2	★
I7(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 Water Approval		
Standard		**Standard**
DW(13)	NSF drinking water approval	★
Shipboard Approvals		
Standard		**Standard**
SBS	American Bureau of Shipping	★
Custody Transfer		
Standard		**Standard**
C5(16)	Measurement Canada Accuracy Approval *(Limited availability depending on transmitter type and range. Contact an Emerson Process Management representative)*	★
Bolting Material		
Standard		**Standard**
L4	Austenitic 316 SST Bolts	★
L5	ASTM A 193, Grade B7M Bolts	★
L6	Alloy K-500 Bolts	★
Display and 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)	★

Table 1. 3051C Coplanar Pressure Transmitters Ordering Information

★ 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.

Calibration Certificate		
Standard		**Standard**
Q4	Calibration Certificate	★
QG	Calibration Certificate and GOST Verification Certificate	★
QP	Calibration certification and tamper evident seal	★
Material Traceability Certification		
Standard		**Standard**
Q8	Material Traceability Certification per EN 10204 3.1.B	★
Quality Certification 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 Power Output		
Expanded		
C2	0.8–3.2 V dc Output with Digital Signal Based on HART Protocol (Output Code M only)	
Gage Pressure Calibration		
Standard		**Standard**
C3	Gage Calibration (Model 3051CA4 only)	★
Alarm Limit		
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 Testing		
Expanded		
P1	Hydrostatic Testing with Certificate	
Cleaning 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)*	
Performance		
Standard		**Standard**
P8(20)	High Performance Option	★

IPEC00270217

Table 1. 3051C Coplanar Pressure Transmitters Ordering Information

★ 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 Valves		
Expanded		
D7	Coplanar Flange Without Drain/Vent Ports	
Conduit Plug		
Standard		**Standard**
DO(22)	316 SST Conduit Plug	★
RC1/4 RC1/2 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 Finish		
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 Electrical Connector		
Standard		**Standard**
GE	M12, 4-pin, Male Connector (eurofast®)	★
GM	A size Mini, 4-pin, Male Connector (minifast®)	★
Typical Model 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

(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

IPEC00270220

Attachment 4

Cost Estimate

ENTERGY NUCLEAR NORTHEAST IMPLEMENTATION ESTIMATE Indian Point Nuclear Power Station			
* ESTIMATE LEVEL *	EC #: SAMA IP3-018		
☑ Conceptual	PROJECT TITLE: Install a Facility to Capture MSSV Discharge Steam and Remove Fission Products.		ESTIMATOR: RCMT
☐ Preliminary	JOB LOCATION: Yard North and East of MSSV Vent Stacks		PROJECT CODE: TBD
☐ Definitive	☑ OUTAGE ☑ NON-OUTAGE	ORIGINATOR:	☑ CAPITAL ☐ O&M ORIG. DATE: 07/24/12
	ESTIMATE TOTAL $35,676,701		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 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: Peter Battaccarol		Approved by:
Date: 9-20-2012		Date: 9-20-2012

ENTERGY NUCLEAR NORTHEAST
IMPLEMENTATION ESTIMATE
Indian Point Nuclear Power Station

* ESTIMATE LEVEL *		**EC #: SAMA IP3-018** ☑ CAPITAL ☐ O&M
☑	**Conceptual**	PROJECT TITLE: Install a Facility to Capture MSSV Discharge Steam and Remove F ESTIMATOR: RCMT
☐	**Preliminary**	JOB LOCATION: Yard North and East of MSSV Vent Stacks PROJECT CODE: TBD
☐	**Definitive**	☑ OUTAGE ☑ NON-OUTAGE ORIGINATOR: ORIG. DATE: 07/24/12

Item	Description
1.	This estimate assumes that this work will not require outage conditions to complete
3.	This estimate assumes that Sheet Prodtuct for siding will be Installed by Sheet Metal Craft Using Manlifts with assistance from a crane.
4.	This estimate assumes that all work will be performed by trained contract craftspersons in lieu of station maintenance personnel.
5.	This estimate provides for continuous fire watch during welding cutting and grinding activities.
6.	This estimate assumes training for 12 Plant Ops.Personnel.
7.	This estimate assumes that the safety class for piping and valves and tanks will be Safety Class 1.
8.	This estimate assumes that weld inspections will be for Safety Class 1 Piping.
9.	The work in this estimate is non outage except for final connections to the steam lines and is assumed to occur in 2014 on a 4 day per week, 10 hour per day schedule.
10.	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).
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.	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 fence boundary - 30%
	C. Implementation complexity - 40%
	D. Inside Containment - 50%

Rev. 11-0

INDIAN POINT IMPLEMENTATION ESTIMATE WORK SHEET

EC #: SAMA IP3-018

PROJECT TITLE: Install a Facility to Capture MSSV Discharge Steam and Remove Fission Products.
JOB LOCATION: Yard North and East of MSSV Vent Stacks
EST. STATUS: ☑ OUTAGE ☑ NON-OUTAGE

☑ CAPITAL ☐ O&M
PROJECT CODE: TBD
ORIGINATOR:

TAKEOFF:
ESTIMATOR: RCMT
ORIG. DATE: 07/24/12

*** ESTIMATE LEVEL ***

- ☑ **Conceptual**
- ☐ **Preliminary**
- ☐ **Definitive**

General Notes:

ESTIMATE SUMMARY

		MANHOURS	DOLLARS
ENGINEERING			
01	STUDY, DESIGN, & CLOSEOUT	1,600	$ 160,000
02	DESIGN ENGR CONST SUPPORT	200	$ 20,000
03	MODS ENGR SUPPORT	-	$ -
04	SYS ENGR/ S-U ENGR	220	$ 22,000
05	PROJECT MANAGEMENT	900	$ 108,000
06	TESTING (Calibration & Testing)	160	$ 16,000
07	ENGINEERING DCP ACCEPTANCE REVIEW	200	$ 20,000
CONTRACT ENGINEERING			
08	DESIGN ENGR CONTRACT SUPPORT	7,800	$ 936,000
09	SUPL CONTRACT MODS ENGR	-	$ -
10	MODS PLAN & SCHED -CONTRACT	960	$ 96,000
11	OSG FIELD ENGRS / PLANNERS	800	$ 96,000
MATERIALS / MISC CONTRACTS			
12	MATERIALS		$ 7,432,190
13	OTHER CONTRACTS		$ 180,000
CONTRACT CRAFT LABOR			
14	SWEC CRAFT LABOR/WALKDOWN	37,920	$ 4,152,773
15	LOST TIME	3,792	$ 531,600
16	SWEC DISTRIBS		$ 1,167,945
PLANT CRAFT LABOR			
17	MECH MAINT.	-	$ -
18	ELECT MAINT	-	$ -
19	I&C	120	$ 12,000
20	CSG	-	$ -
MISC SUPPORT			
21	QUALITY CONTROL	600	$ 60,000
22	PLANNING & SCHEDULING	-	$ -
23	TRAINING	72	$ 8,640
24	CHEMISTRY	40	$ 4,000
25	OPS	200	$ 24,000
26	HP / RP	40	$ 3,182
MISC CONTRACT SUPPORT			
27	QUALITY CONTROL	720	$ 57,600
28	NDE	120	$ 10,184
29	HP / RP	20	$ 1,591
30	RADWASTE	-	$ -
31	NURSE	-	$ -
32	ELEVATOR CONTRACTOR	-	$ -
33	WASTE MANAGEMENT	-	$ -
34	HOUSEKEEPING	-	$ -
35	EQUIPMENT RENTAL	-	$ 50,000
36	VENDOR STOCKING	-	$ 25,000
37	DECONTAMINATION CONTRACTOR	-	$ -
38	RBC'S	-	$ -
39	SECURITY	-	$ -
40	FIRE WATCH (Rover)	-	$ -
41	SAFETY	761	$ 51,748
CONTINGENCY			
42	CONTINGENCY		$ 7,623,227
ESTIMATE SUBTOTAL		**57,245**	**$ 22,869,680**
	SITE ENCUMBRANCE PREMIUM (20%)		**$ 4,573,936**
	LOADERS (30%)		**$ 8,233,085**
	ESTIMATE TOTAL		**$ 35,676,701**

ITEM	DESCRIPTION	QTY	UOM	CFT	NO.	MANHOURS UNIT	FCTR	TOTAL	$/MH	MATERIAL $ PER UNIT	MATERIAL DOLLARS	LABOR DOLLARS	SUB-CONTRACT	TOTAL $
	Non-Outage Work													
	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.	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.	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.	Erect barriers, platforms, walkways, stairs, supports	1	LT	LB	2	80.00	1.00	160	$ 78.15			$ 12,504		$ 12,504
	Tie Into City Water													
1.	Excavate to existing City Water Line	1	LT	OP	1	32.00	1.00	32	$ 115.00		$ -	$ 3,680		$ 3,680
2.	Excavate 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.	Backfill and compact excavation	1	LT	LB	2	20.00	1.00	40	$ 78.15		$ -	$ 3,126		$ 3,126

Rev. 11-0	INDIAN POINT IMPLEMENTATION ESTIMATE WORK SHEET

EC #: SAMA IP3-018

PROJECT TITLE: Install a Facility to Capture MSSV Discharge Steam and Remove Fission Products. ☑ CAPITAL ☐ O&M TAKEOFF:

JOB LOCATION: Yard North and East of MSSV Vent Stacks PROJECT CODE: TBD ESTIMATOR: RCMT

EST. STATUS: ☑ OUTAGE ☑ NON-OUTAGE ORIGINATOR: ORIG. DATE: 07/24/12

ITEM	DESCRIPTION	QTY	UOM	CFT	NO.	MANHOURS UNIT	FCTR	TOTAL	$/MH	MATERIAL $ PER UNIT	MATERIAL DOLLARS	LABOR DOLLARS	SUB-CONTRACT	TOTAL $
	Blowdown Vessel Supports													
1.	Excavate, form and pour Blowdown Vessel Support piers	1	LT	OP	1	120.00	1.00	120	$ 115.00		$0	$ 13,800	$ 10,000	$ 23,800
2.	Excavate, form and pour Blowdown Vessel Support piers	1	LT	LB	3	120.00	1.00	360	$ 78.15	$ 6,000.00	$6,000	$ 28,134		$ 34,134
3.	Excavate, form and pour Blowdown Vessel Support piers	1	LT	CP	2	80.00	1.00	160	$ 96.00		$0	$ 15,360		$ 15,360
3.	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		$ 490,330
4.	Obtain and erect steel support structure for vessel support and enclosure siding.	1	LT	OP	2	200.00	1.00	400	$ 115.00		$0	$ 46,000	$ 30,000	$ 76,000
	Set Blowdown Vessels													
1.	Perform walkdown of work area.	1	LT	BM	5	10.00	1.00	50	$ 130.83		$0	$ 6,542		$ 6,542
2.	Perform walkdown of work area.	1	LT	OP	2	10.00	1.00	20	$ 115.00		$0	$ 2,300		$ 2,300
3.	Obtain and Set (4) ASME Pressure Vessels.	4	LT	BM	5	100.00	1.00	2,000	$ 130.83	$ 500,000.00	$2,000,000	$ 261,660		$ 2,261,660
4.	Obtain and Set (4) ASME Pressure Vessels.	4	LT	OP	2	50.00	1.00	400	$ 115.00		$0	$ 46,000	$ 25,000	$ 71,000
5.	Clean Up and Restore Area/Demob	1	LT	BM	5	20.00	1.00	100	$ 130.83		$0			
6.	Clean Up and Restore Area/Demob	1	LT	OP	2	20.00	1.00	40	$ 115.00		$0			
	Excavate and Pour Piping Support Piers													
1.	Perform walkdown of work area.	1	LT	LB	6	10.00	1.00	60	$ 78.15		$0	$ 4,689		$ 4,689
2.	Perform walkdown of work area.	1	LT	CP	3	10.00	1.00	30	$ 96.00			$ 2,880		$ 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	1	LT	LB	6	20.00	1.00	120	$ 78.15	$ 20,000.00	$10,000	$ 9,378		$ 19,378
5.	Gather and stage tools and materials	1	LT	CP	3	20.00	1.00	60	$ 96.00	$ 4,000.00	$4,000	$ 5,760		$ 9,760
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.	Excavate, form and pour Piping Support piers	1	LT	LB	6	200.00	1.00	1,200	$ 78.15			$ 93,780		$ 93,780
8.	Excavate, form and pour Piping Support piers	1	LT	CP	3	200.00	1.00	600	$ 96.00			$ 57,600		$ 57,600
9.	Excavate, form and pour Piping Support piers	1	LT	OP	1	200.00	1.00	200	$ 115.00			$ 23,000		$ 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	1	LT	CP	3	20.00	1.00	60	$ 96.00			$ 5,760		$ 5,760
12.	Clean Up and Restore Area/Demob	1	LT	OP	1	20.00	1.00	20	$ 115.00			$ 2,300		$ 2,300
	Erect Yard Area Pipe Supports From MSSV Blowdown Pipes to New Vessels													
1.	Perform walkdown of work area.	1	LT	IW	5	10.00	1.00	50	$ 137.33			$ 6,867		$ 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.	Gather and stage tools and materials	1	LT	IW	5	20.00	1.00	100	$ 137.33			$ 13,733		$ 13,733
5.	Gather and stage tools and materials	1	LT	LB	2	20.00	1.00	40	$ 78.15			$ 3,126		$ 3,126
6.	Gather and stage tools and materials	1	LT	OP	1	10.00	1.00	10	$ 115.00			$ 1,150	$ 10,000	$ 11,150
7.	Erect Piping Supports	1	LT	IW	5	200.00	1.00	1,000	$ 137.33		$90,000	$ 137,330		$ 227,330
8.	Erect Piping Supports	1	LT	LB	2	200.00	1.00	400	$ 78.15			$ 31,260		$ 31,260
9.	Erect Piping Supports	1	LT	OP	1	200.00	1.00	200	$ 115.00			$ 23,000		$ 23,000
10.	Prime and paint Pipe supports	1	LT	PT	4	80.00	1.00	320	$ 95.16		$4,000	$ 30,451		$ 34,451
	(OUTAGE) Prep, Install and Weld 14" Blow Down Pipe from Existing Pipe to New Vessels													
1.	Perform walkdown of work area.	1	LT	PF	6	10.00	1.70	102	$ 120.71			$ 12,312		$ 12,312
2.	Perform walkdown of work area.	1	LT	OP	1	10.00	1.70	17	$ 115.00			$ 1,955		$ 1,955
3.	Perform walkdown of work area.	1	LT	CP	4	10.00	1.70	68	$ 96.00			$ 6,528		$ 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		$ 2,024,625
5.	Gather and stage tools and materials	1	LT	OP	1	10.00	1.70	17	$ 115.00			$ 1,955		$ 1,955
6.	Gather and stage tools and materials	1	LT	CP	4	20.00	1.70	136	$ 96.00			$ 13,056		$ 13,056
7.	Erect Scaffolding as Required	4	LT	CP	4	80.00	1.70	2,176	$ 96.00			$ 208,896		$ 208,896
8.	Erect Scaffolding as Required	4	LT	LB	2	80.00	1.70	1,088	$ 78.15			$ 85,027		$ 85,027
9.	Cut, Fit and Weld Piping from existing MSSV Stack 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	$ 1,179,496
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		$ 127,534
11.	Remove Scaffolding and Store	4	LT	CP	4	40.00	1.70	1,088	$ 96.00			$ 104,448		$ 104,448
12.	Remove Scaffolding and Store	4	LT	LB	2	40.00	1.70	544	$ 78.15			$ 42,514		$ 42,514
												$ -		$ -
	Install Spray/Recirc Pump, Piping and Related Hardware													
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.	1	LT	PF	6	10.00	1.00	60	$ 120.71			$ 7,243		$ 7,243
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	1	LT	MW	2	20.00	1.00	40	$ 134.00			$ 5,360		$ 5,360
5.	Gather and stage tools and materials	1	LT	PF	6	20.00	1.00	120	$ 120.71			$ 14,485		$ 14,485
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.	Install the Spray/Recirc Pump on the platform.	4	LT	MW	2	10.00	1.00	80	$ 134.00	$ 25,000.00	$100,000	$ 10,720		$ 110,720
8.	Install the Spray/Recirc Pump on the platform.	4	LT	OP	1	5.00	1.00	20	$ 115.00		$0	$ 2,300		$ 2,300
9.	Install , Fit and Weld 8" Drain Line and Valve	4	LT	PF	2	40.00	1.00	320	$ 120.71	$ 78,000.00	$312,000	$ 38,627		$ 350,627
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		$ 294,314
11.	Install, Fit and Weld 4" Recirc line from Pump Inlet to Vessel recirc. connection, including Valves.	4	LT	PF	2	16.00	1.00	128	$ 120.71	$ 68,750.00	$275,000	$ 15,451		$ 290,451
12.	Install, Fit and Weld 4" Pipe from City Water previously 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		$ 87,725
13.	Install Fit and Weld 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		$ 91,588
14.	Install and tie in Level Transmitter, Relief Valve, Pressure and Flow Switches.	4	LT	PF	2	20.00	1.00	160	$ 120.71	$ 100,000.00	$400,000	$ 19,314		$ 419,314
15.	Clean up Area	1	LT	PF	6	10.00	1.00	60	$ 120.71			$ 7,243		$ 7,243

Rev.
11-0

INDIAN POINT IMPLEMENTATION ESTIMATE WORK SHEET

EC #: SAMA IP3-018

PROJECT TITLE: Install a Facility to Capture MSSV Discharge Steam and Remove Fission Products. ☑ CAPITAL ☐ O&M TAKEOFF:
JOB LOCATION: Yard North and East of MSSV Vent Stacks PROJECT CODE: TBD ESTIMATOR: RCMT
EST. STATUS: ☑ OUTAGE ☑ NON-OUTAGE ORIGINATOR: ORIG. DATE: 07/24/12

ITEM	DESCRIPTION	QTY	UOM	CFT	NO.	MANHOURS UNIT	FCTR	TOTAL	$/MH	MATERIAL $ PER UNIT	MATERIAL DOLLARS	LABOR DOLLARS	SUB-CONTRACT	TOTAL $
	Install Conduit, Cable, Power Supply and Local Controllers and Make Connections to Switches/Transmitters													
1.	Perform walkdown of work area.	1	LT	EL	4	10.00	1.00	40	$ 123.32		$0	$ 4,933		$ 4,933
2.	Gather and stage tools and materials	1	LT	EL	4	20.00	1.00	80	$ 123.32		$0	$ 9,866		$ 9,866
3.	Install Hoffman Junction Box with Terminal Blocks	4	LT	EL	2	20.00	1.00	160	$ 123.32	$ 3,000.00	$12,000	$ 19,731		$ 31,731
4.	Install Hoffman Panel, then Install loop power supply 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.	Run and Support Conduit from Flow Switches to each new Hoffman Box	4	LT	EL	2	80.00	1.00	640	$ 123.32	$ 50,000.00	$200,000	$ 78,925		$ 278,925
6.	Pull Cable from flow switches to Hoffman boxes and 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 HoffmanPanel and terminate.	4	LT	EL	2	60.00	1.00	480	$ 123.32	$ 6,000.00	$24,000	$ 59,194		$ 83,194
11.	Route and support Conduit from the Pump and valves to the new Hoffman Panel.	4	LT	EL	2	80.00	1.00	640	$ 123.32			$ 78,925		$ 78,925
12.	Install and connect wiring from Pump and valves to new Hoffman Panel.	4	LT	EL	2	60.00	1.00	480	$ 123.32			$ 59,194		$ 59,194
13.	Erect Scaffolding to support Electrical work of cable, conduit and box installations.	1	LT	CP	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.	Remove/dismantle and store Scaffolding	1	LT	CP	4	40.00	1.00	160	$ 96.00			$ 15,360		
16.	Remove/dismantle and store Scaffolding	1	LT	LB	2	40.00	1.00	80	$ 78.15			$ 6,252		
17.	Support testing and calibration as required	1	LT	EL	2	40.00	1.00	80	$ 123.32		$0	$ 9,866		$ 9,866
18.	Clean-up area and restore	1	LT	EL	4	20.00	1.00	80	$ 123.32		$0	$ 9,866		$ 9,866
19.	Clean-up area and restore	1	LT	LB	2	20.00	1.00	40	$ 78.15		$0	$ 3,126		$ 3,126
								-						$ -
	Install New MCC Extension 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.	Perform walkdown of work area and job brief	1	LT	OP	1	10.00	1.00	10	$ 115.00		$0	$ 1,150		$ 1,150
3.	Gather Materials and tools and transport to areas	1	LT	EL	3	20.00	1.00	60	$ 123.32	$ 14,000.00	$14,000	$ 7,399		$ 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.	Install New MCC extension in Unit 3 Turbine bldg at Elev. 15' at existing MCC312A.	1	LT	EL	3	20.00	1.00	60	$ 123.32		$0	$ 7,399		$ 7,399
6.	Power new MCC Extension from Existing MCC 312A.	1	LT	EL	3	10.00	1.00	30	$ 123.32		$0	$ 3,700		$ 3,700
7.	Install New 480/120V Transformer in MSSV building 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	CP	4	40.00	1.00	160	$ 96.00		$0	$ 15,360		$ 15,360
10.	Erect scaffolding as required to support conduit/cable installation.	1	LT	LB	2	40.00	1.00	80	$ 78.15		$0	$ 6,252		$ 6,252
11.	Install and Support Conduit from new MCC extension to new Transformer	1	LT	EL	3	50.00	1.00	150	$ 123.32		$0	$ 18,498		$ 18,498
12.	Pull Cable from new MCC extension to new Transformer and connect.	1	LT	EL	3	15.00	1.00	45	$ 123.32		$0	$ 5,549		$ 5,549
13.	Run local conduit from new transformer to equipment as required.	1	LT	EL	3	20.00	1.00	60	$ 123.32		$0	$ 7,399		$ 7,399
14.	Pull cable from new transformer to equipment as required and terminate.	1	LT	EL	3	20.00	1.00	60	$ 123.32		$0	$ 7,399		$ 7,399
15.	Dismantle and Store Scaffolding.	1	LT	CP	4	20.00	1.00	80	$ 96.00		$0	$ 7,680		$ 7,680
16.	Dismantle and Store Scaffolding.	1	LT	LB	2	20.00	1.00	40	$ 78.15		$0	$ 3,126		$ 3,126
								-						
	SIDING, ROOFING AND BUILDING UTILITIES INSTALLATION													
								-						
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.	Perform walkdown of work area and job brief	1	LT	OP	1	10.00	1.00	10	$ 115.00		$0	$1,150		$1,150
3.	Gather Materials and tools and transport to areas	1	LT	SM	4	30.00	1.00	120	$ 106.94	$120,000.00	$120,000	$12,833		$132,833
4.	Gather Materials and tools and transport to areas	1	LT	OP	1	30.00	1.00	30	$ 115.00		$0	$3,450	$25,000	$28,450
5.	Install Siding on Tank Support Structure	1	LT	SM	4	250	1.00	1000	$ 106.94		$0	$106,940		$106,940
6.	Install Siding on Tank Support Structure	1	LT	OP	1	250	1.00	250	$ 115.00		$0	$28,750		$28,750
7.	Install Sheet metal roofing	1	LT	RF	4	60	1.00	240	$ 87.92	$20,000.00	$20,000	$21,101		$41,101
8.	Support Roofing Installation and Bldg. Elec. Work.	1	LT	OP	1	80	1.00	80	$ 115.00		$0	$9,200	$10,000	$19,200
9.	Install Unit Heaters	1	LT	EL	3	20	1.00	60	$ 123.32	$11,500.00	$11,500	$7,399		$18,899
10.	Install Exhaust fans with dampers	1	LT	EL	3	20	1.00	60	$ 123.32	$4,000.00	$4,000	$7,399		$11,399
11.	Install Lighting	1	LT	EL	3	20	1.00	60	$ 123.32	$4,000.00	$4,000	$7,399		$11,399
12.	Demob and clean area	1	LT	EL	3	20	1.00	60	$ 123.32			$7,399		$7,399
13.	Demob and clean area	1	LT	SM	4	20	1.00	80	$ 106.94			$8,555		$8,555
14.	Demob and clean area	1	LT	OP	1	20	1.00	20	$ 115.00			$2,300		$2,300

Rev. 11-0

INDIAN POINT IMPLEMENTATION ESTIMATE WORK SHEET

EC #: SAMA IP3-018

PROJECT TITLE: Install a Facility to Capture MSSV Discharge Steam and Remove Fission Products.	☑ CAPITAL ☐ O&M	TAKEOFF:
JOB LOCATION: Yard North and East of MSSV Vent Stacks	PROJECT CODE: TBD	ESTIMATOR: RCMT
EST. STATUS: ☑ OUTAGE ☑ NON-OUTAGE	ORIGINATOR:	ORIG. DATE: 07/24/12

						MANHOURS				MATERIAL $	MATERIAL	LABOR	SUB-	
ITEM	DESCRIPTION	QTY	UOM	CFT	NO.	UNIT	FCTR	TOTAL	$/MH	PER UNIT	DOLLARS	DOLLARS	CONTRACT	TOTAL $
	PAINTING & TOUCH-UP REQUIREMENTS													$ -
1.	PAINTING & TOUCH-UP	1	LT	PT	4	160.00	1.00	640	$ 95.16		$4,000	$ 60,902		$ 64,902
2.	PAINTING & TOUCH-UP			PT				-				$ -		$ -
	FIRE WATCH / BOTTLEWATCH REQUIREMENTS													
1.	CRAFT SUPPORT FOR FIRE WATCH	1	LT	FW	1	600.00	1.00	600	$ 53.60			$ 32,160		$ 32,160
2.	CRAFT SUPPORT FOR BOTTLE WATCH							-						$ -
	MISC SUB-CONTRACT													
1.	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
	*** RELATED COSTS ***													
1.	WALKDOWN ALLOWANCE											$ -		$ -
	WALKDOWN ALLOWANCE											$ -		$ -
2.	WORK PACKAGE REVIEW & CRAFT TRAINING	1	LT	PF				100	$120.71			$ 12,071		$ 12,071
2a.	WORK PACKAGE REVIEW & CRAFT TRAINING	1	LT	EL				100	$123.32			$ 12,332		$ 12,332
3.	TOOL ROOM ATTENDANTS (~3.5%)	1	LT	EL				1,276	$123.32			$ 157,356		$ 157,356
4.	GENERAL CRAFT DISTRIBS. (10%)											$ 389,315		$ 389,315
5.	CRAFT IN PROCESSING (20%)											$ 778,630		$ 778,630
6.	HUMAN PERFORMANCE & ALARA TRAINING	1	LT									$ 77,863		$ 77,863
7.	(1/2 day training, or ~ 2%)													
	SUBTOTAL							37,920			$ 7,011,500	$5,320,718	$ 180,000	$12,512,218
	PLANT SCOPE													
1.	**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	1	120.00	1.00	120	$100.00		$ -	$ 12,000		$ 12,000
				PL				-			$ -	$ -		$ -
	SUBTOTAL I&C MAINT.							120			$ -	$ 12,000	$ -	$ 12,000
1.	**CSG**			PL				-			$ -	$ -		$ -
				PL				-			$ -	$ -		$ -
	SUBTOTAL CSG MAINT.							-			$ -	$ -	$ -	$ -
	SUBTOTAL PLANT							120			$ -	$ 12,000	$ -	$ 12,000
	SUBTOTAL CRAFT/PLANT							38,040			$ 7,011,500	$5,332,718	$ 180,000	$12,524,218
	IMPLEMENTATION SUPPORT													
1.	MODS ENGINEERING	1	LT	NM				-				$ -		$ -
2.	DESIGN ENGINEERING SUPT DURING CONST	1	LT	NM	1	200.00	1.00	200	$100.00			$ 20,000		$ 20,000
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	40.00	1.00	40	$100.00			$ 4,000		$ 4,000
5.	SYS ENGINEERING - INSTR & CONTROL	1	LT	NM	1	60.00	1.00	60	$100.00			$ 6,000		$ 6,000
6.	SYS ENGINEERING - CIVIL STRUCTURAL	1	LT	NM	1	80.00	1.00	80	$100.00			$ 8,000		$ 8,000
7.	PROJECT MANAGEMENT	1	LT	NM	1	900.00	1.00	900	$120.00			$ 108,000		$ 108,000
8.	TRAINING (OPS Staff)	1	LT	NM	12	6.00	1.00	72	$120.00			$ 8,640		$ 8,640
9.	QA / QC VERIFICATION	1	LT	NM	1	600.00	1.00	600	$100.00			$ 60,000		$ 60,000
10.	PLANNING & SCHEDULING	1	LT	NM	1							$ -		$ -
11.	HP / RP/ ALARA	1	LT	NM	1	40.00	1.00	40	$ 79.56			$ 3,182		$ 3,182
12.	CHEMISTRY	1	LT	NM	1	40.00	1.00	40	$100.00			$ 4,000		$ 4,000
13.	OPS (DEVELOP/REVISE PROCEDURE(S))	1	LT	NM	1	200.00	1.00	200	$120.00			$ 24,000		$ 24,000
14.	TRAVEL & LIVING EXPENSES	1	LT									$ -		$ -

Rev. 11-0

INDIAN POINT IMPLEMENTATION ESTIMATE WORK SHEET

EC #: SAMA IP3-018

PROJECT TITLE: Install a Facility to Capture MSSV Discharge Steam and Remove Fission Products. ☑ CAPITAL ☐ O&M

TAKEOFF:

JOB LOCATION: Yard North and East of MSSV Vent Stacks

PROJECT CODE: TBD

ESTIMATOR: RCMT

EST. STATUS: ☑ OUTAGE ☑ NON-OUTAGE

ORIGINATOR:

ORIG. DATE: 07/24/12

ITEM	DESCRIPTION	QTY	UOM	CFT	NO.	MANHOURS UNIT	FCTR	TOTAL	$/MH	MATERIAL $ PER UNIT	MATERIAL DOLLARS	LABOR DOLLARS	SUB-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	LT	NM	1	800.00	1.00	800	$ 120.00			$ 96,000		$ 96,000
4.	QA / QC VERIFICATION	1	LT	NM	1	720.00	1.00	720	$ 80.00			$ 57,600		$ 57,600
5.	NDE	1	LT	NM	1	120.00	1.00	120	$ 84.87			$ 10,184		$ 10,184
6.	HP / RP	1	LT	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	1	LT	NM										
12.	EQUIPMENT RENTAL CONTRACTOR-Crane	1	LT	NM	1							$ 50,000		
13.	EQUIPMENT RENTAL CONTRACTOR-Welding	1	LT	NM	1							$ 25,000		
14.	DECONTAMINATION CONTRACTOR	1	LT	NM										
15.	RBC's	1	LT	NM										
16.	SECURITY	1	LT	SEC										
17.	FIRE WATCH (Rover)	1	LT	NM								$ -		$ -
18.	SAFETY (2%)	1	LT	NM				761	$ 68.00			$ 51,748		$ 51,748
19.	LOST TIME (10%)	1	LT					3,792	$ 140.19			$ 531,600		$ 531,600
	SUBTOTAL CRAFT/NON-MANUAL							47,485			$ 7,011,500	$ 6,502,263	$ 180,000	$ 13,693,763
3.	FREIGHT, SALES TAX, & CONSUMABLES (6%)										$ 420,690			$ 420,690
	SUBTOTAL INSTALLATION COST							47,485			$ 7,432,190	$ 6,502,263	$ 180,000	$ 14,114,453
1.	DESIGN ENGINEERING - MECHANICAL	1	LT	NM	2	200.00	1.00	400	$ 100.00			$ 40,000		$ 40,000
2.	DESIGN ENGINEERING - ELECTRICAL	1	LT	NM	2	200.00	1.00	400	$ 100.00			$ 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	$ -	$ 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
	SUBTOTAL INSTALLATION & DESIGN COST											$ 6,678,263	$ 1,116,000	$ 15,246,453
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

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. MOVs
   - 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

Item 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. ¾" Schedule 160 Seamless Pipe, A376 Type 316	80 Feet
15. ¾"-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

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.: SAMA IP3-019 **Rev. No.:** CONCEPTUAL 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	☐ 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	☐ 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

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	☐ NO
Cable and Raceway Program • Does the proposed activity involve any changes to cable trays, raceways or the associated documentation?	■ YES	☐ 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) *(if applicable)* • 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 • 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?	■ 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?	☐ 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

PROCESS OR PROGRAM IMPACT SCREENING CHECKLIST	Potential Impact	
Computer Support and Software • Does the proposed activity impact or involve changes to plant computer software or firmware or impact Software Quality Assurance (SQA)?	☐ YES	☒ NO
Chemistry and Environmental Impact • Does the proposed activity impact or involve any changes to plant chemistry requirements, operations or procedures, or any changes to the environment?	☐ YES	☒ NO
Radiation Protection (RP) Program Impact • 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?	■ 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	☐ 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 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

ATTACHMENT 9.3 IMPACT SCREENING SUMMARY

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	☒ 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?	☐ 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?	☐ 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

ATTACHMENT 9.3 IMPACT SCREENING SUMMARY

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	☒ 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	☒ 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	☐ 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?	☐ 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

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?	■ YES	☐ 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	☐ NO
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

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

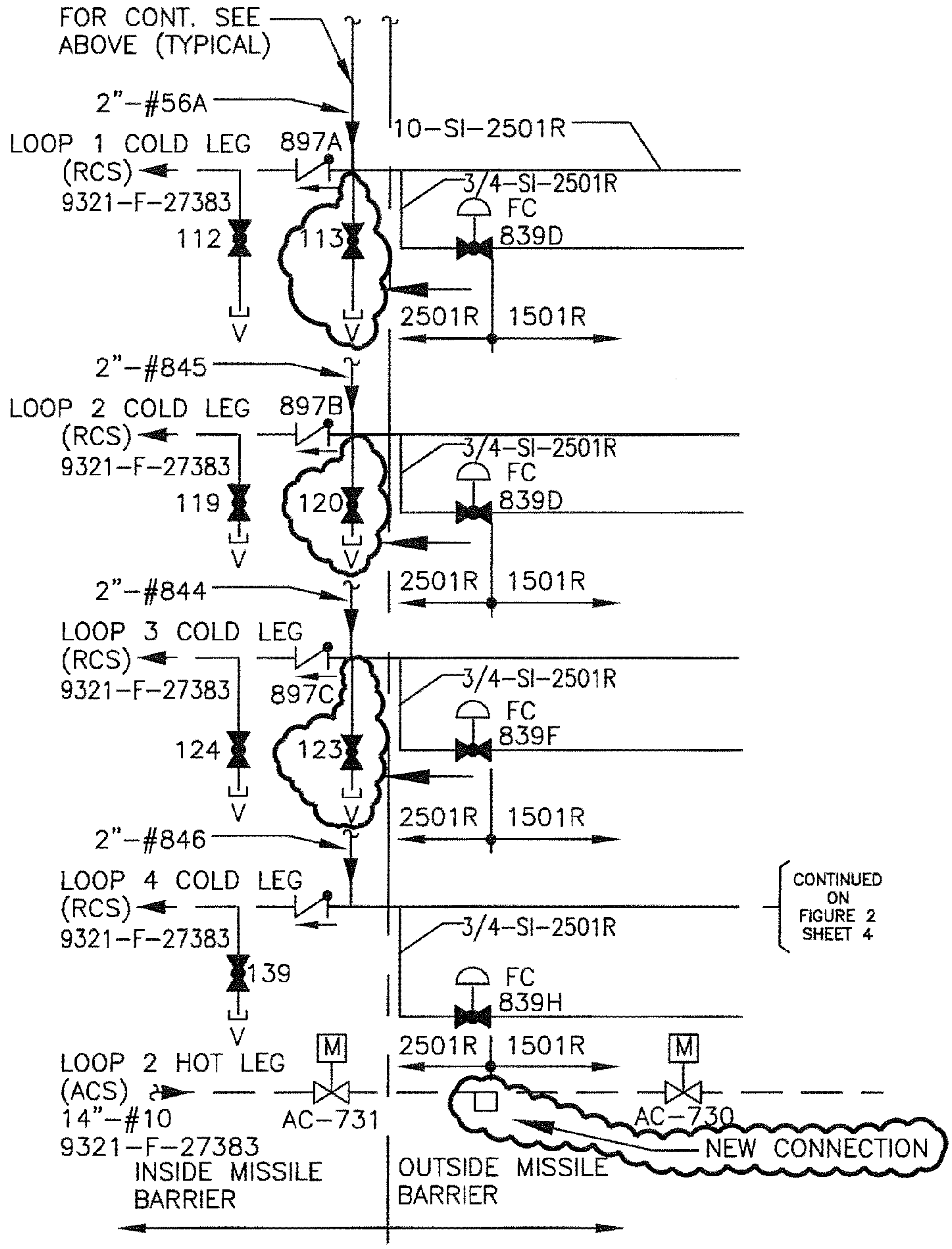


FIGURE 2 (SHEET 1)

DWN/CHK'D	INDIAN POINT NO. 3 NUCLEAR POWER PLANT
DES SUPV	
DISCIPLINE ENG	FLOW DIAGRAM SAFETY INJECTION SYSTEM SHEET NO. 1
DISCIPLINE DIR	
PROJ APPROVAL	
DATE	
Entergy Nuclear Northeast	SCALE : NONE; DWG NO 9321-F-27353; SHEET; REV 40

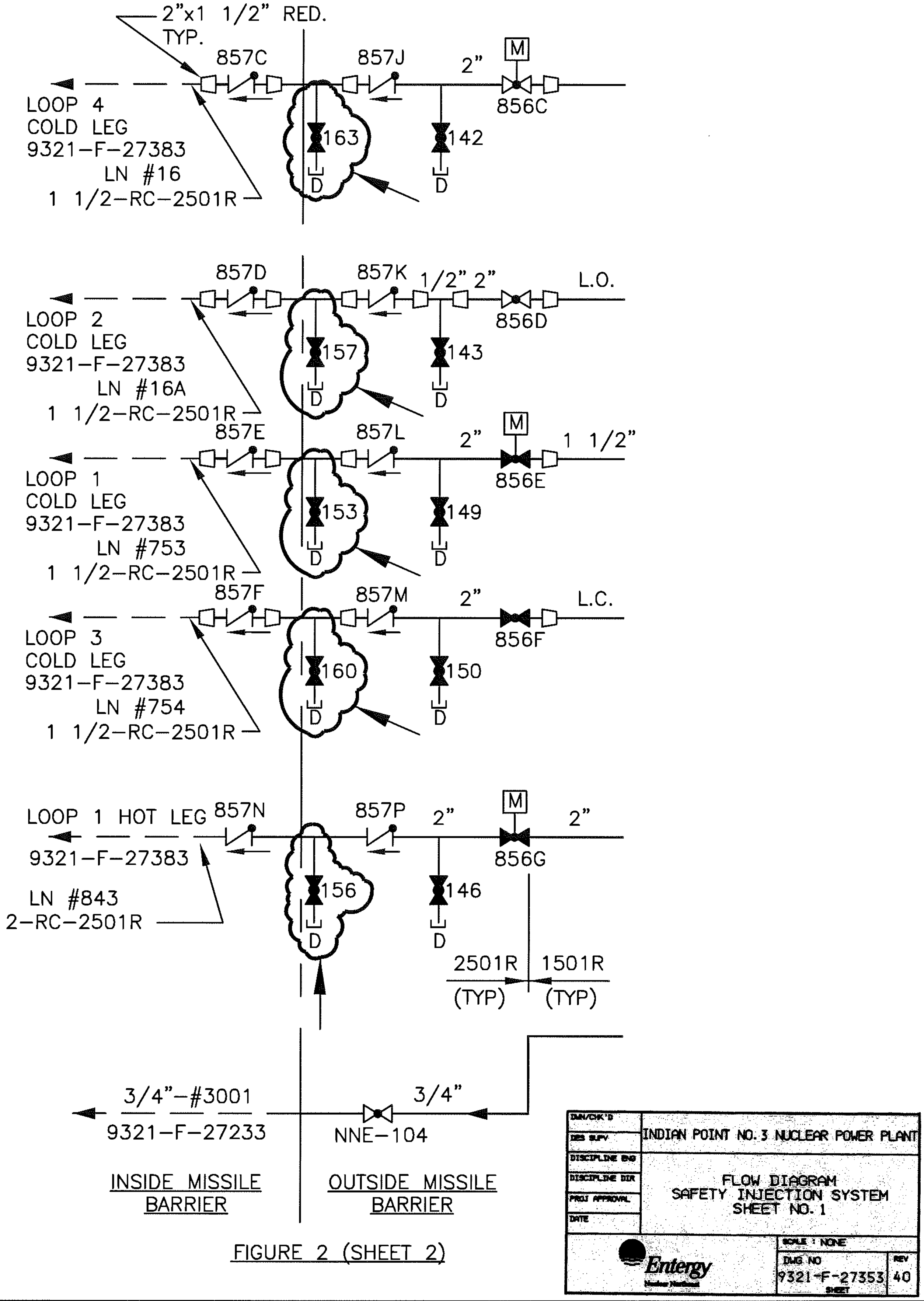


FIGURE 2 (SHEET 2)

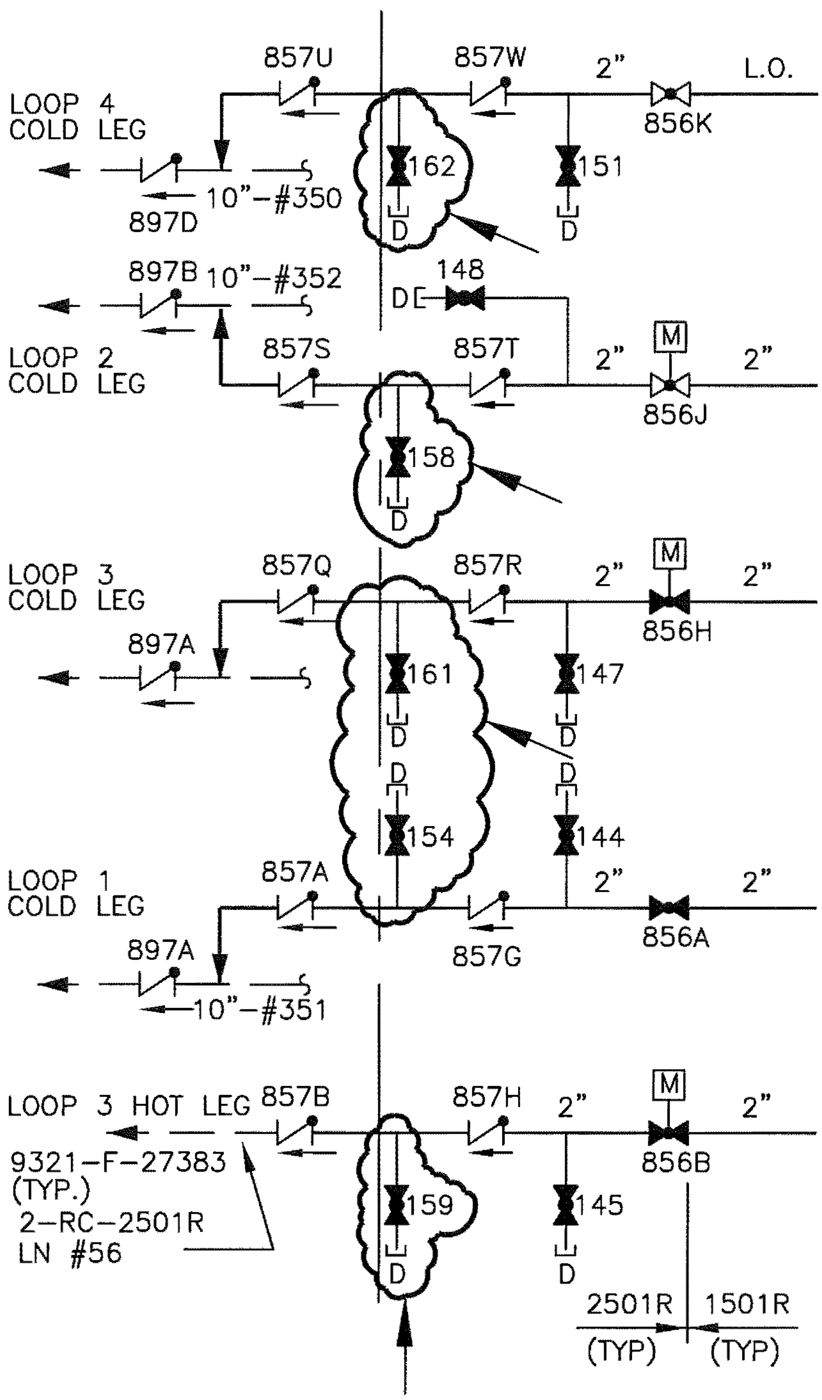


FIGURE 2 (SHEET 3)

DWN/CHK'D	INDIAN POINT NO. 3 NUCLEAR POWER PLANT
DES SUPV	
DISCIPLINE ENG	FLOW DIAGRAM SAFETY INJECTION SYSTEM SHEET NO. 1
DISCIPLINE DIR	
PROJ APPROVAL	
DATE	
Entergy Nuclear Northeast	SCALE: NONE
	DWG NO 9321-F-27353 SHEET — REV 40

RCM Technologies Power System Services	ENTERGY Indian Point Nuclear Station Unit 3	Conceptual Design Package SAMA IP3-019	Rev. 0

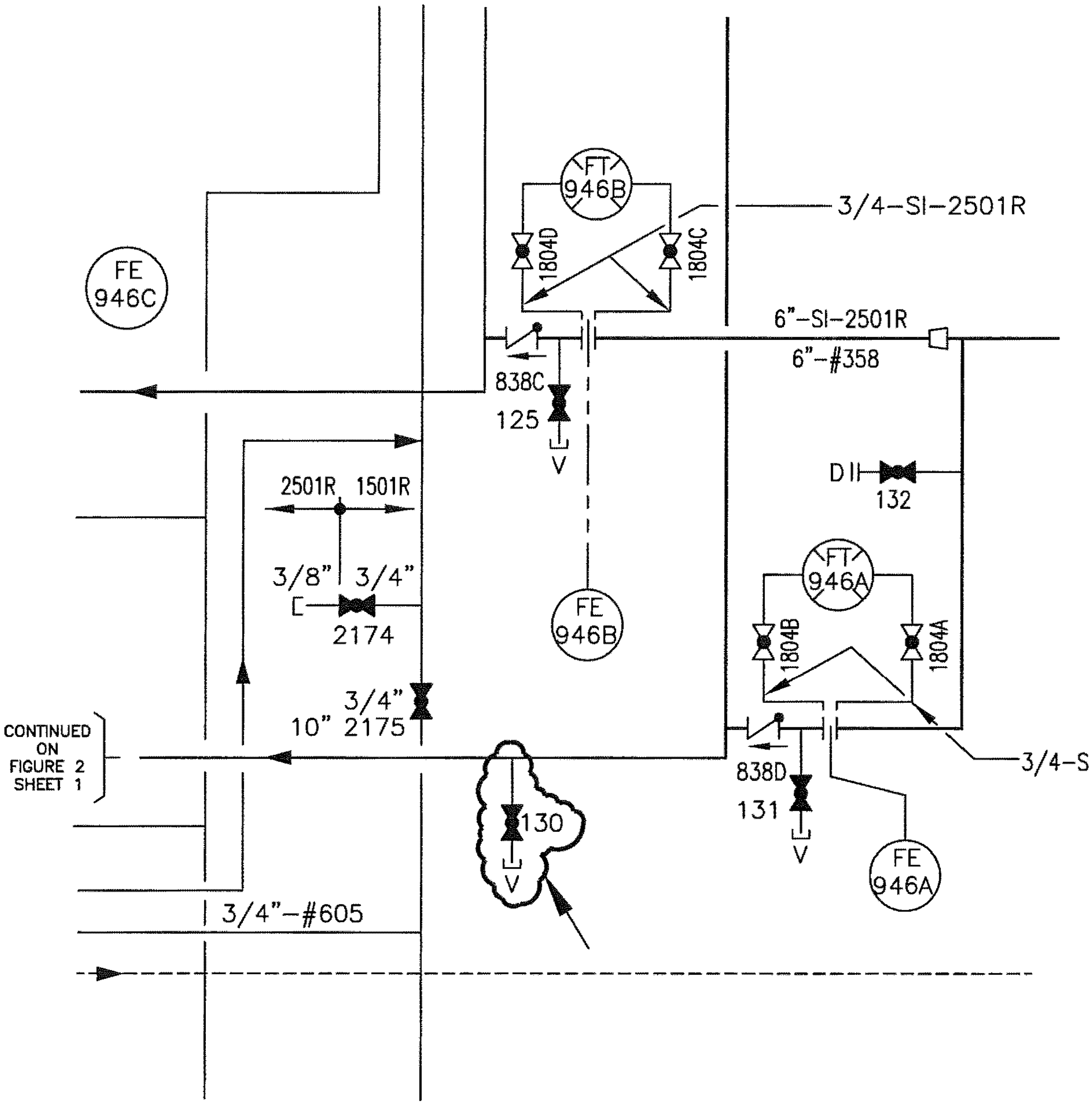


FIGURE 2 (SHEET 4)

DWN/CHK'D / DES SUPV / DISCIPLINE ENG / DISCIPLINE DIR / PROJ APPROVAL / DATE	INDIAN POINT NO. 3 NUCLEAR POWER PLANT FLOW DIAGRAM SAFETY INJECTION SYSTEM SHEET NO. 1
Entergy	SCALE : NONE DWG NO 9321-F-27353 SHEET REV 40

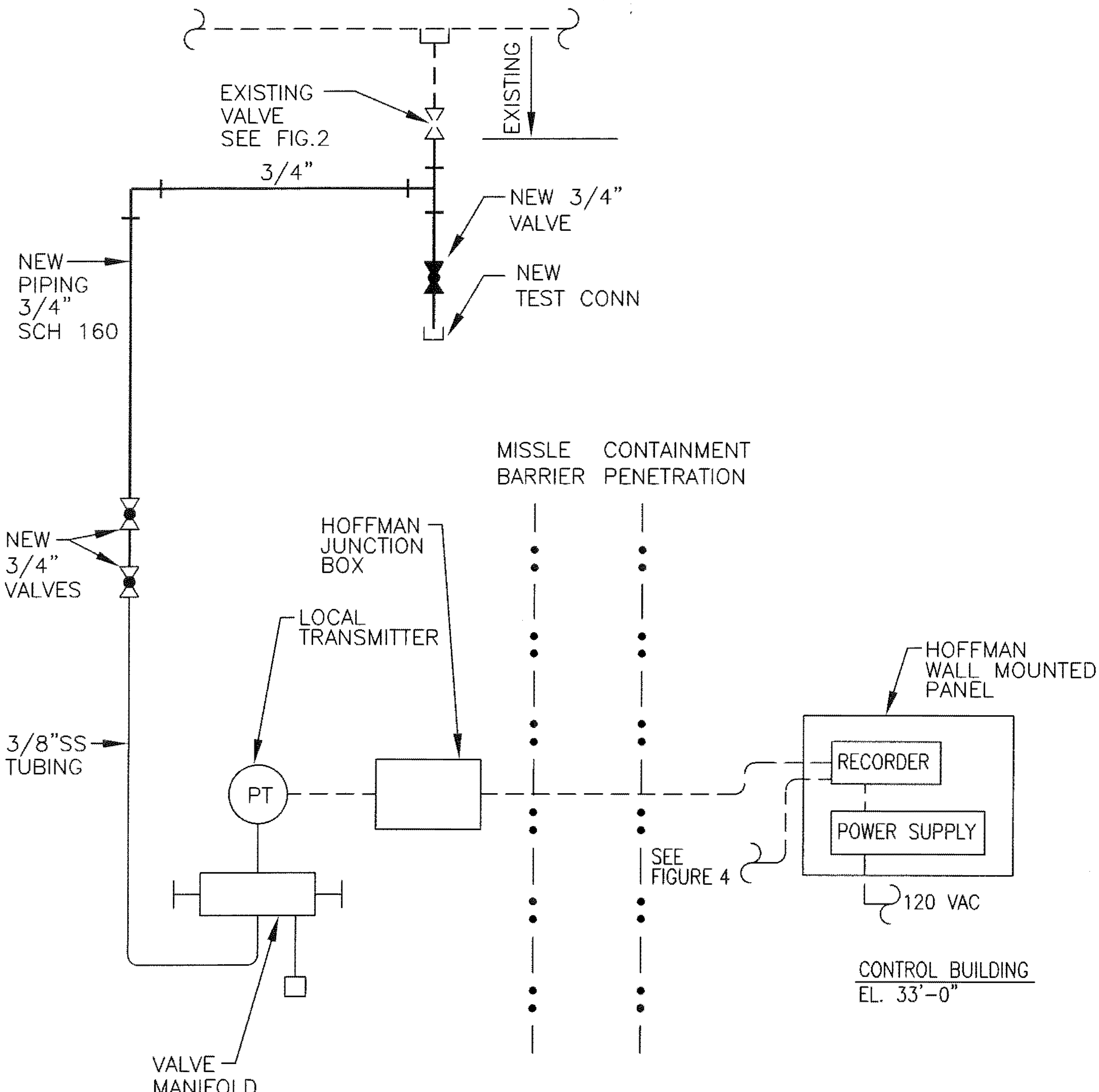


FIGURE 3
TYPICAL LEAK DETECTION
PIPING CONNECTION AT CHECK VALVES

DWN/CHK'D	INDIAN POINT NO. 3 NUCLEAR POWER PLANT
DES SUPV	
DISCIPLINE ENG	FLOW DIAGRAM SAFETY INJECTION SYSTEM SHEET NO. 1
DISCIPLINE DIR	
PROJ APPROVAL	
DATE	
Entergy Nuclear Northeast	SCALE : NONE DWG NO 9321-F-27353 SHEET REV 40

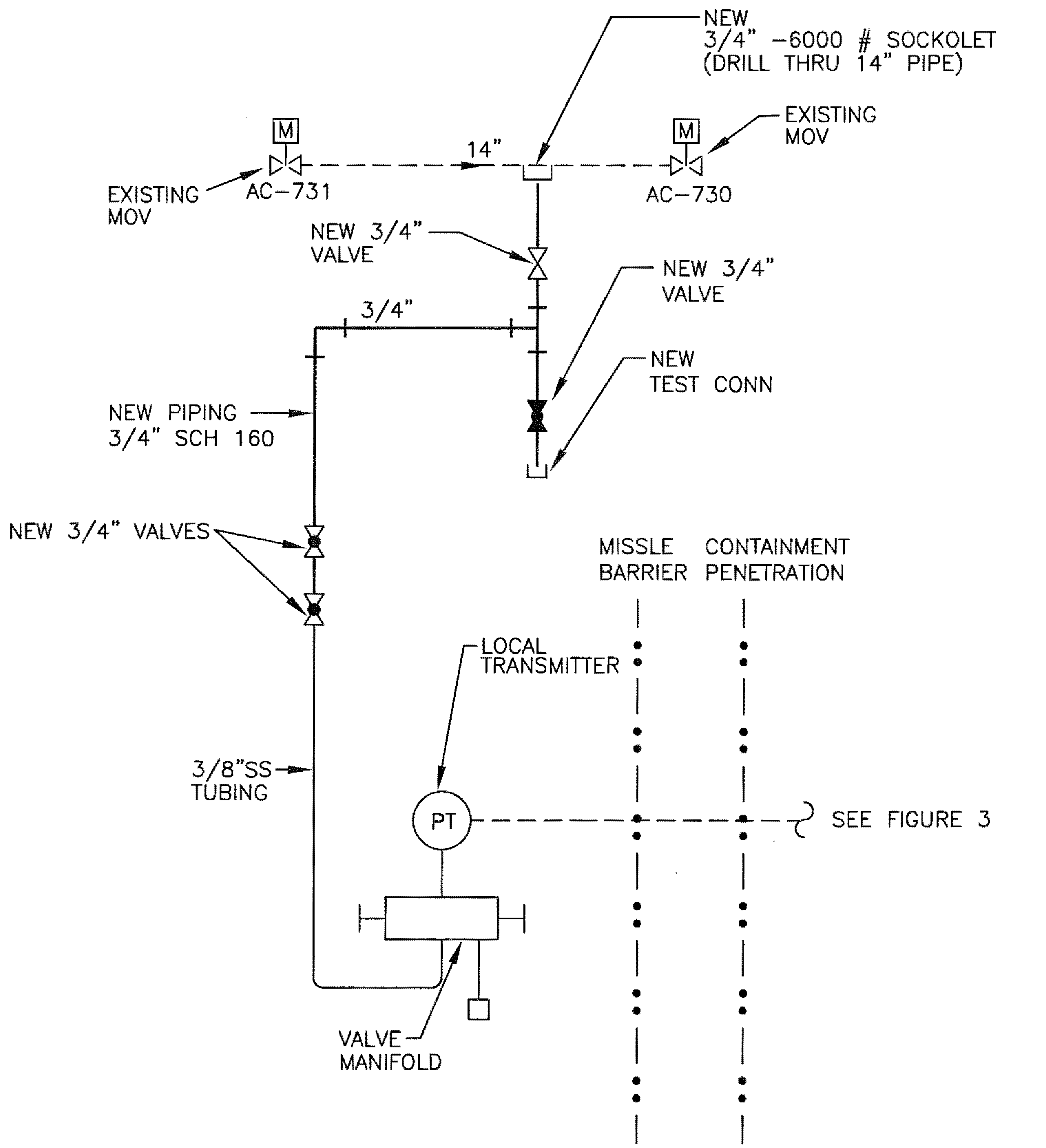


FIGURE 4
LEAK DETECTION
PIPING CONNECTION AT MOV'S

DWN/CHK'D	INDIAN POINT NO. 3 NUCLEAR POWER PLANT
DES SUPV	
DISCIPLINE ENG	FLOW DIAGRAM
DISCIPLINE DIR	SAFETY INJECTION SYSTEM
PROJ APPROVAL	SHEET NO. 1
DATE	
Entergy	SCALE : NONE
	DWG NO 9321-F-27353 SHEET; REV 40

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 Material Specification Indian Point Unit No. 3, NYPA Spec. TS-MS-024

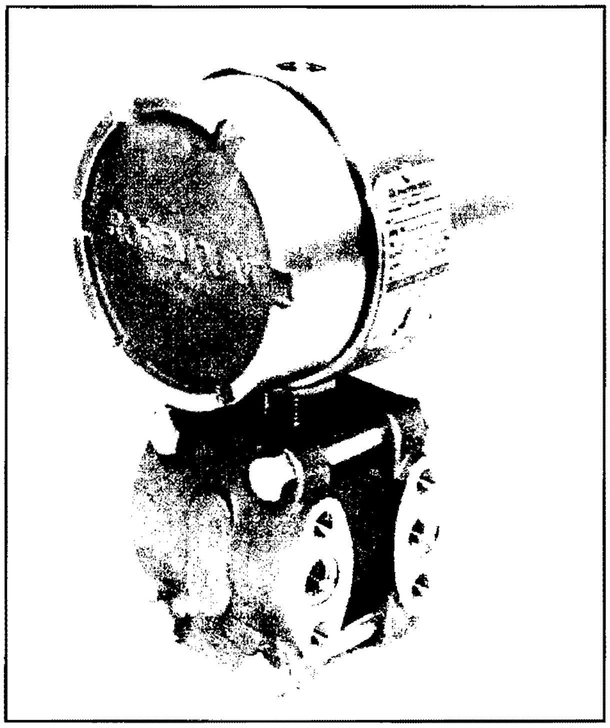
4. Rosemount 1153 Series D Alphaline Nuclear Pressure Transmitter
   (attached here)

5. Yokogawa – DXAdvanced R4 - DX1000 Recorder
   (attached here)

Rosemount 1153 Series D Alphaline® Nuclear Pressure Transmitter

INDUSTRY LEADING PERFORMANCE

- *Qualified per IEEE Std 323-1974 and IEEE Std 344-1975*
- *5.0 x 10^7 rads TID gamma radiation*
- *7 g ZPA seismic*
- *420 °F (215.6 °C) steam temperature*
- *0.25% accuracy*



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Contents

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

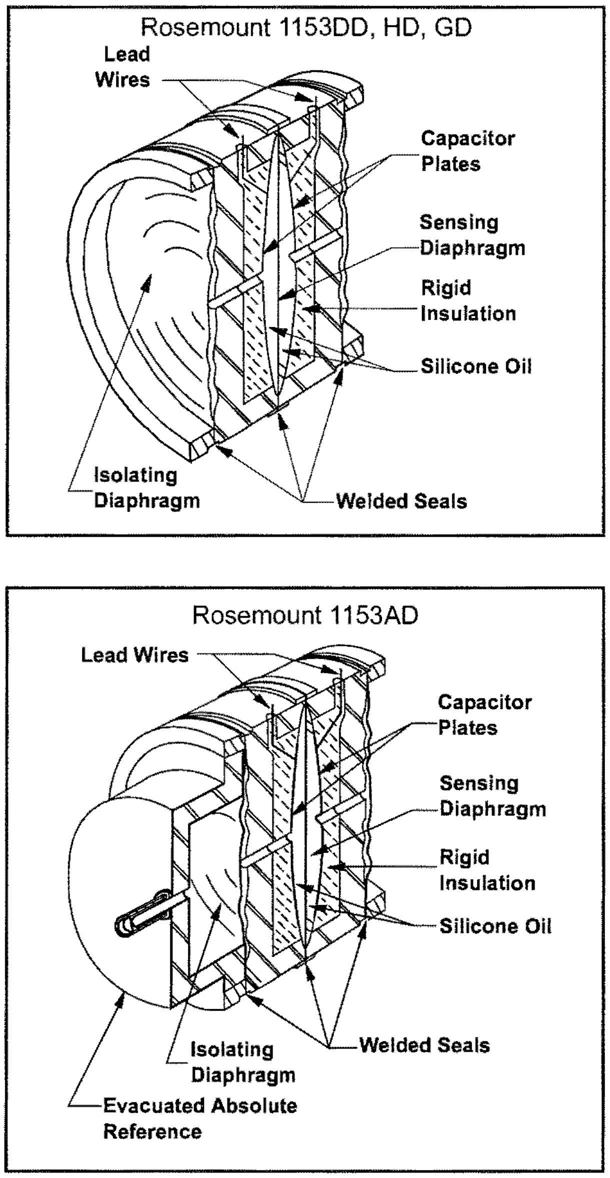
Rosemount 1153 Series D Alphaline Nuclear Pressure Transmitters are uniquely built for Class 1E nuclear service while retaining the basic design of the Rosemount 1151 Series that has become a standard of reliable service. Units are available in absolute (A), gage (G), differential (D), and high-line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

Direct electronic sensing with the completely sealed δ-Cell™ 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

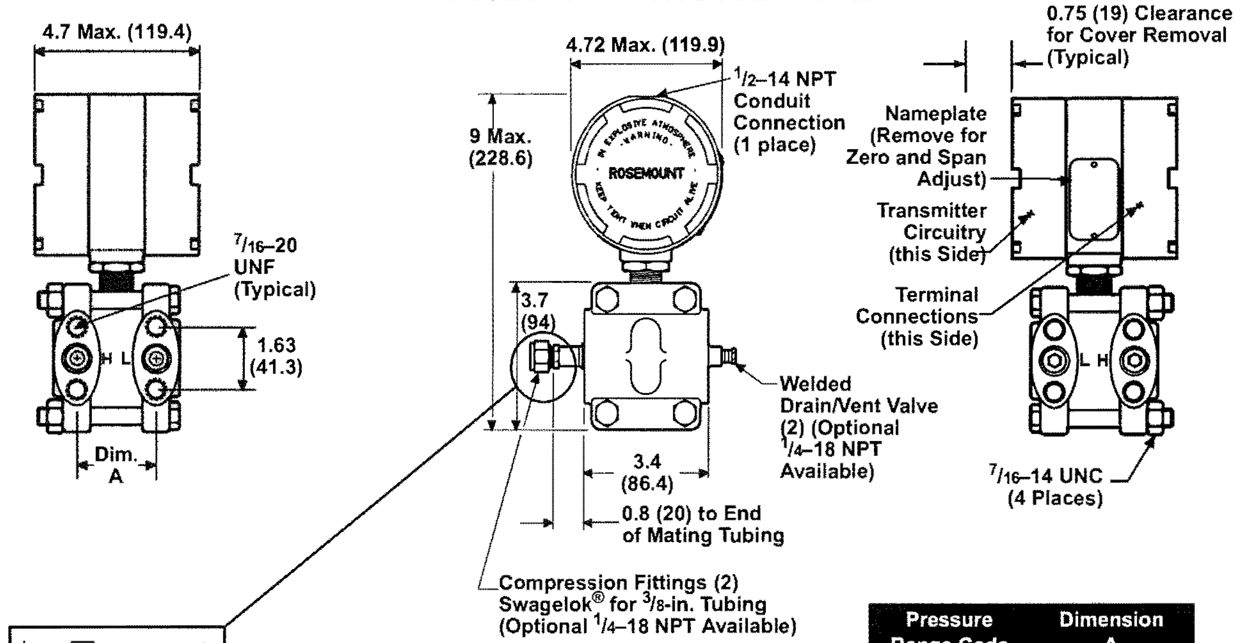
The completely sealed δ-Cell capacitance sensing element is the key to the unequalled performance and reliability of the Rosemount 1153 Series D Pressure Transmitter. Process pressure is transmitted through an isolating diaphragm and silicone oil fill fluid to a sensing diaphragm in the center of the 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.

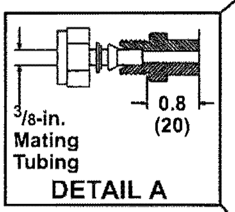
FIGURE 1. The δ-Cell.



DIMENSIONAL DRAWINGS

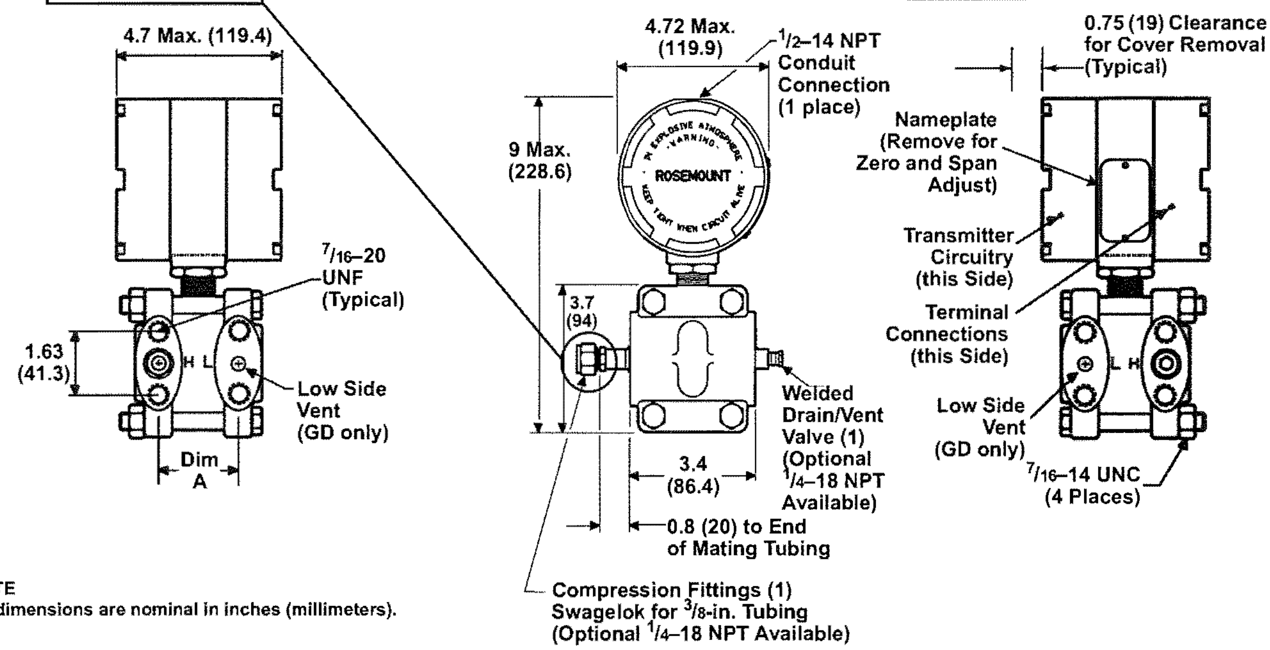
ROSEMOUNT 1153DD AND 1153HD





Pressure Range Code	Dimension A
3, 4, 5	2.13 (54)
6, 7	2.19 (55.6)
8	2.25 (57.2)
9	2.28 (57.9)
0	2.33 (59.1)

ROSEMOUNT 1153AD AND 1153GD



NOTE
All dimensions are nominal in inches (millimeters).

IPEC00270253

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 $\times$ 10^7 rads, total integrated dosage.

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

Seismic:
Accuracy within ±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 ±(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 ±1.5% of upper range limit (2.25% for Range Code 0) for one year following DBE.

Output Code R

Radiation:
Accuracy within ±(1.5% of upper range limit + 1.0% span) during and after exposure to 5.5 $\times$ 10^7 rads, total integrated dosage.

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

Seismic:
Accuracy within ±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 ±(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: ±(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 $\times$ 10^7 rads TID.

Performance: ±(1.5% of upper range limit + 1.0% span).

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

Post DBE Operation:
Accuracy at reference conditions shall be within ±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/ft^2.

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

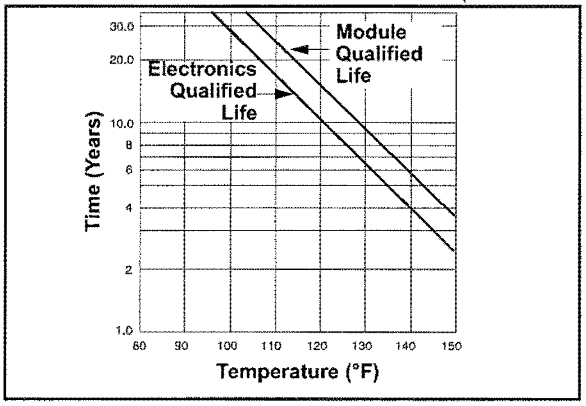
Nuclear Cleaning:
To 1 ppm maximum chloride content.

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.

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.

FIGURE 2. Qualified Life vs. Ambient Temperature.



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

±0.2% of upper range limit for 30 months (±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

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.

FIGURE 3. Output Code P

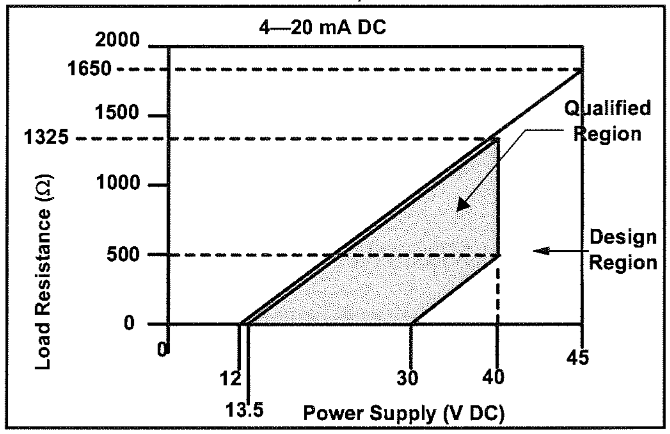
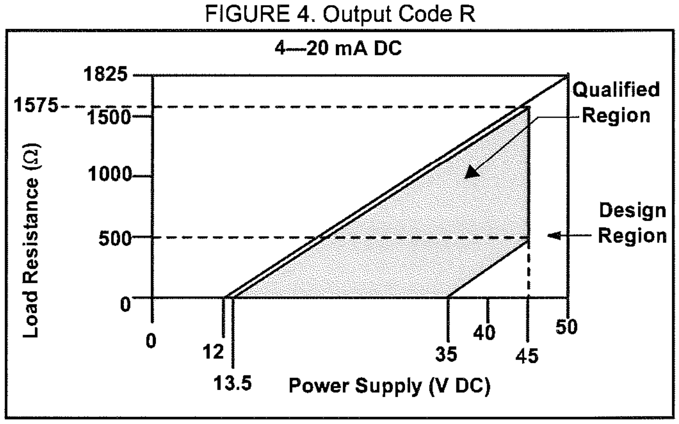


FIGURE 4. Output Code R



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)

Humidity Limits

0–100% relative humidity (NEMA 4X)

Volumetric Displacement

Less than 0.01 in^3 (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) (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) (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 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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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.

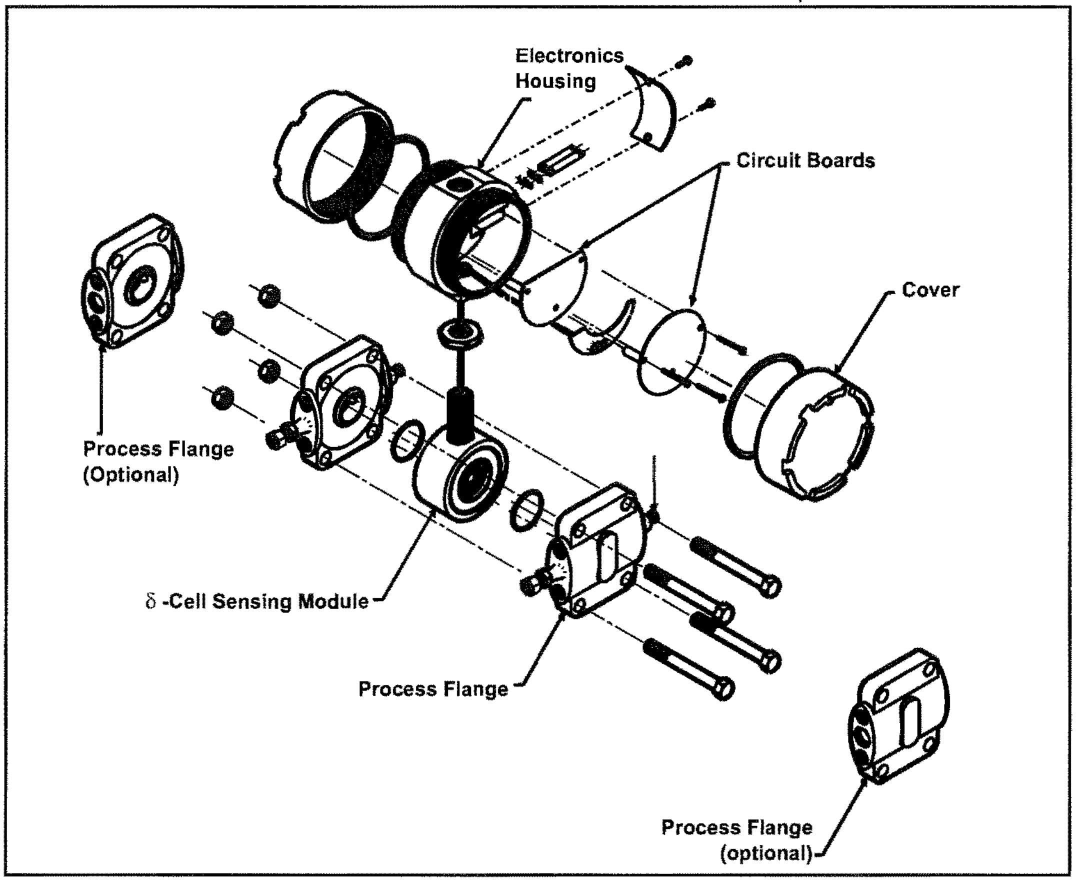

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FIGURE 6. Electric Block Diagram

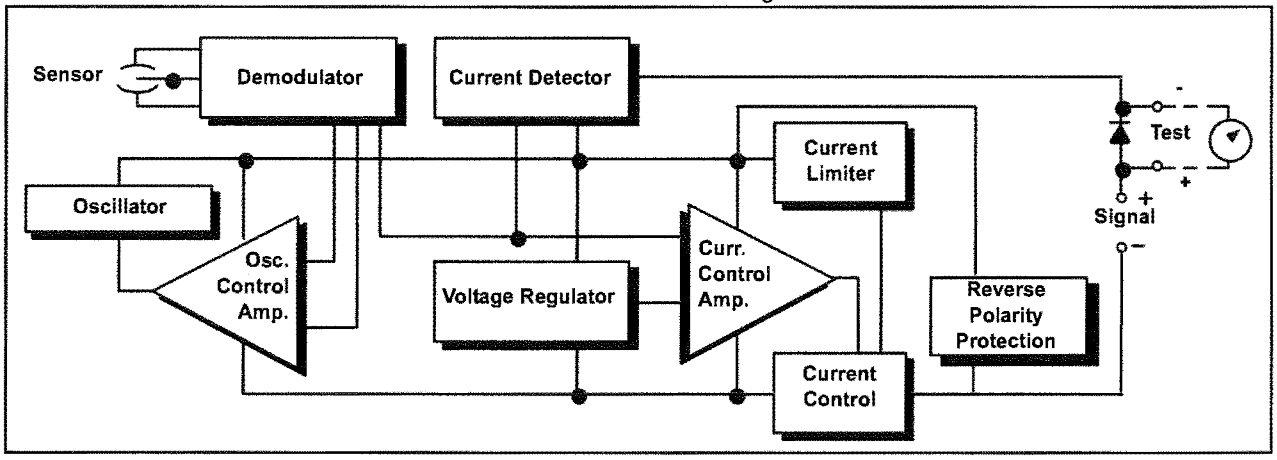

FIGURE 7. Transmitter Wiring Diagram

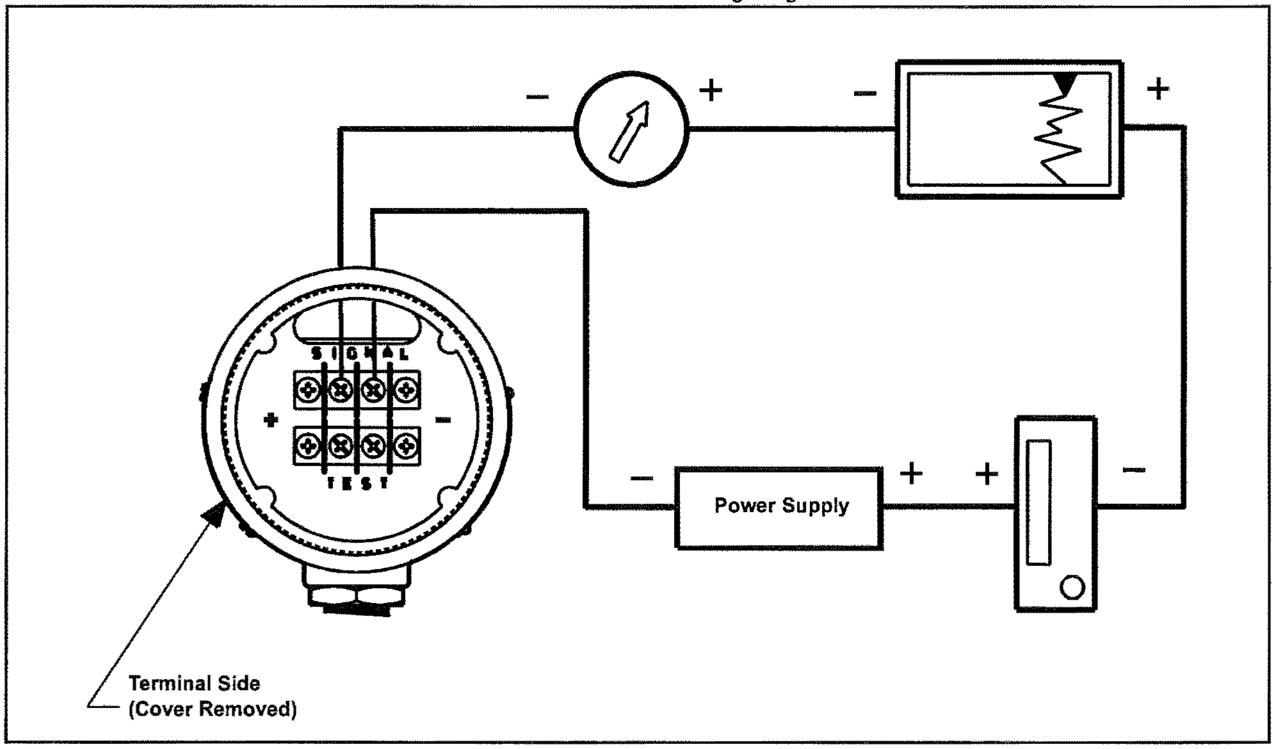

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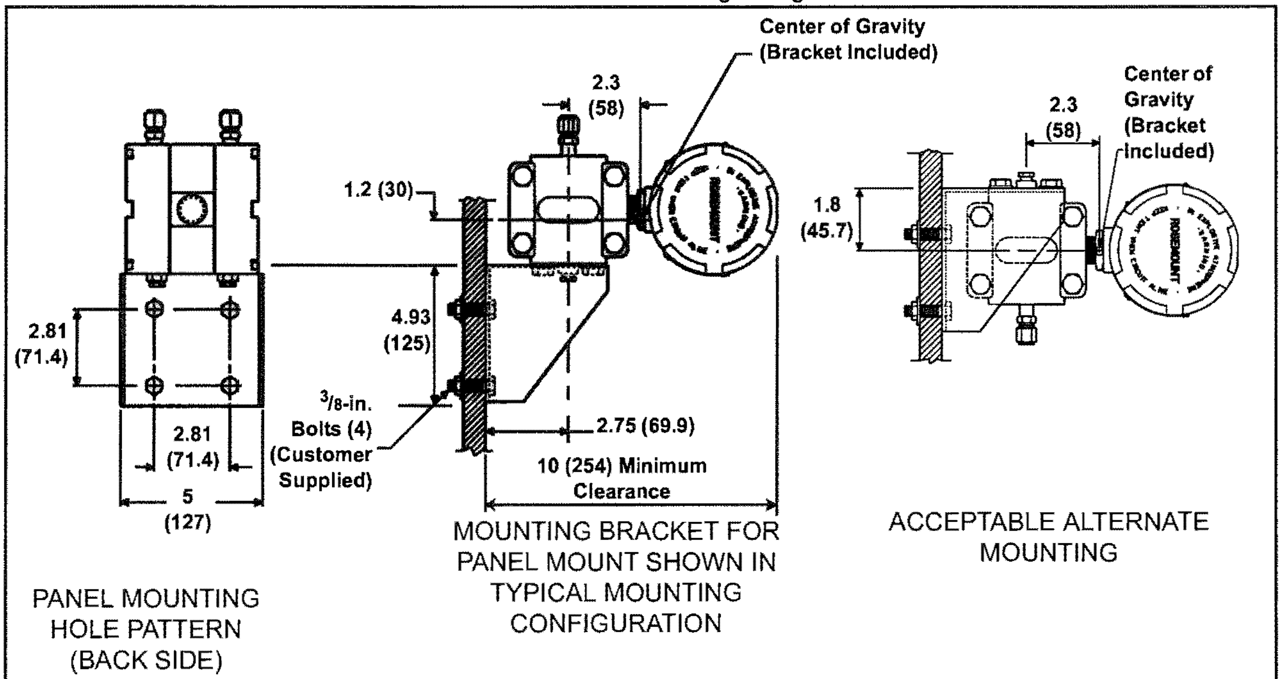
FIGURE 8. Transmitter Mounting Configurations



NOTES
1. **Orientation with respect to gravity is not critical.**
2. **Units can alternately be mounted with process connection adjacent to bracket.**
3. **All dimensions are nominal in inches (millimeters).**

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.

ORDERING INFORMATION

Model	Product Description			
1153	*Alphaline* Pressure Transmitters for Nuclear Applications			
Code	**Pressure Measurement**			
D	Differential Pressure; 2,000 psig (13.8 MPa) Static Pressure Rating			
H	Differential Pressure; 3,000 psig (20.68 MPa) Static Pressure Rating			
A	Absolute Pressure			
G	Gage Pressure			
Code	**Series**			
D	SST Housing; qualified per IEEE 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_2O (0–1.24 to 0–7.46 kPa)	N/A	N/A	0–5 to 0–30 inH_2O (0–1.24 to 0–7.46 kPa)
4	0–25 to 0–150 inH_2O (0–6.22 to 0–37.3 kPa)	0–25 to 0–150 inH_2O (0–6.22 to 0–37.3 kPa)	N/A	0–25 to 0–150 inH_2O (0–6.22 to 0–37.3 kPa)
5	0–125 to 0–750 inH_2O (0–31.08 to 0–186.4 kPa)	0–125 to 0–750 inH_2O (0–31.08 to 0–186.4 kPa)	0–125 to 0–750 inH_2O (0–31.08 to 0–186.4 kPa)	0–125 to 0–750 inH_2O (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	Standard 4–20 mA			
R(1)	Improved Radiation Performance, 4–20 mA			
Code	**Flange Option**			
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			
M(2)	One Flange Option Code J and one Remote Seal			
Typical Model Number:1153 D D 4 R A				

*(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.

IPEC00270261

Emerson Process Management
Rosemount Nuclear Instruments, Inc.
8200 Market Boulevard
Chanhassen, MN 55317
Tel (952) 949-5210
Fax (952) 949-5201

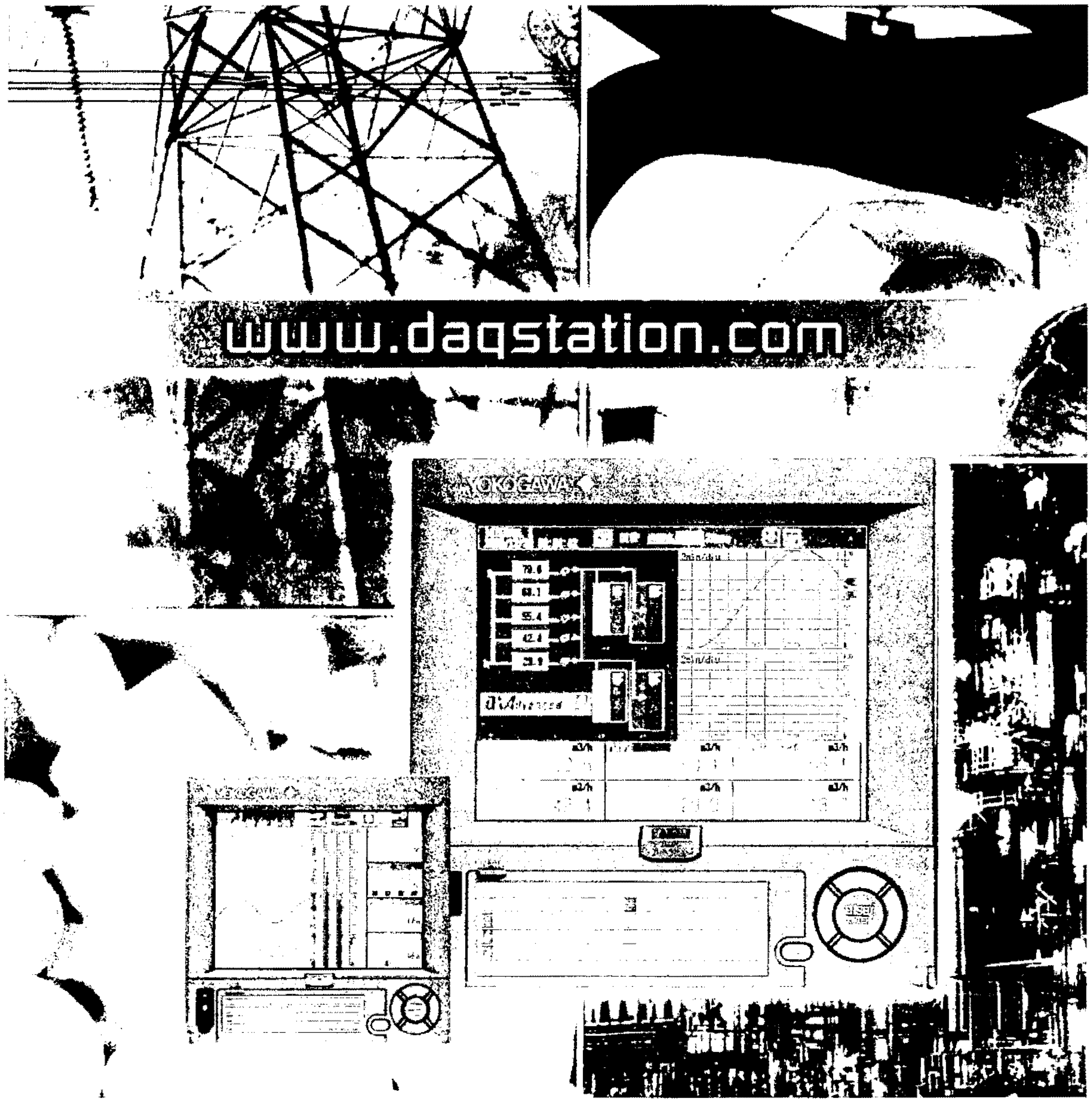
http://www.rosemountnuclear.com

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

00813-0100-4388, Rev BA

ROSEMOUNT Nuclear

EMERSON. Process Management



DXAdvanced

DX1000/DX2000

Daqstation

Bulletin 04L41B01-01E

vigilantplant.
The clear path to operational excellence

YOKOGAWA

IPEC00270263

The debut of DXAdvanced R4 is here!

DXAdvanced R4

vigilant®

The clear path to operational excellence

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 Functions

- 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

Display & Operation

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

Networking

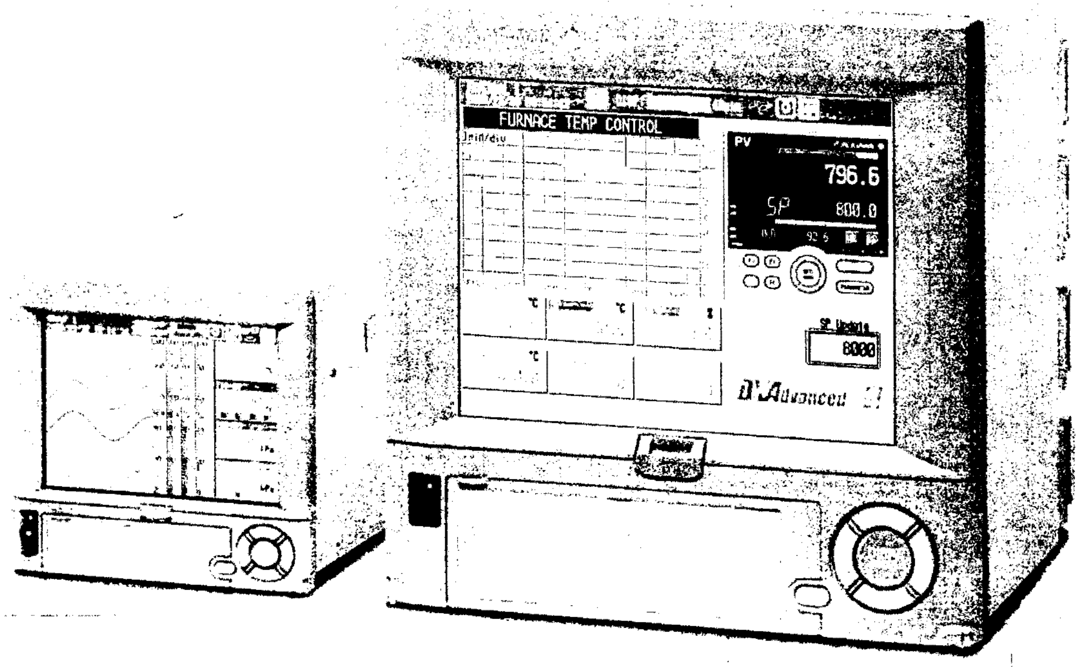
- Standard Ethernet interface
- Supports the PROFIBUS-DP and EtherNet/IP protocols!
- Expanded Web and networking functions!

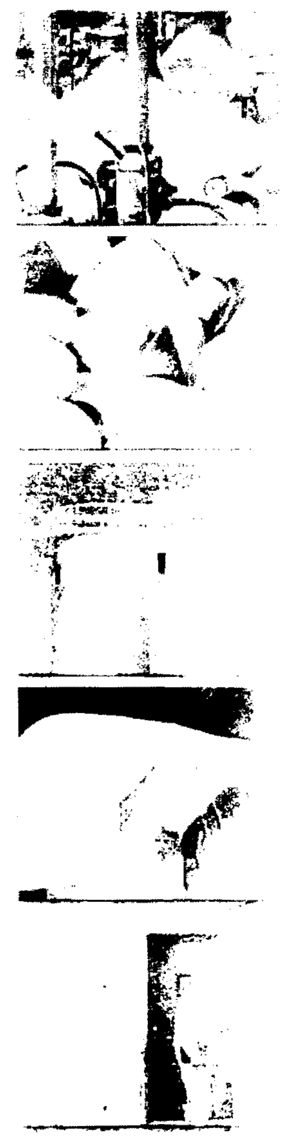
Reliability and Security

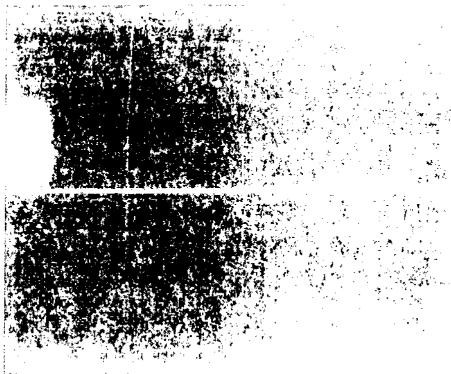
- Dust- and splash-proof front panel (IP65, NEMA4 compliant)
- Highly reliable internal memory with error-correction function
- Front panel door lock and login function

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







DXAdvanced R4

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**

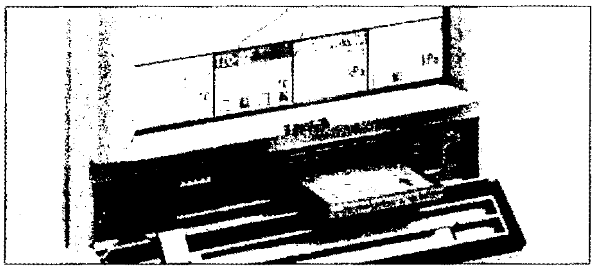
[illegible]

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

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

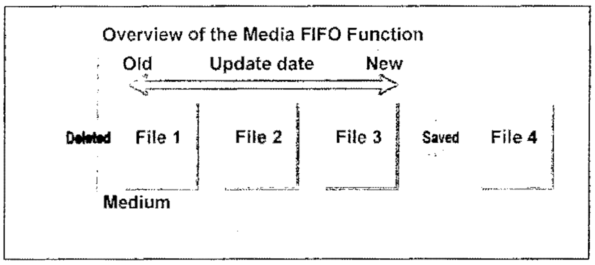
CompactFlash Removable Storage Media

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.



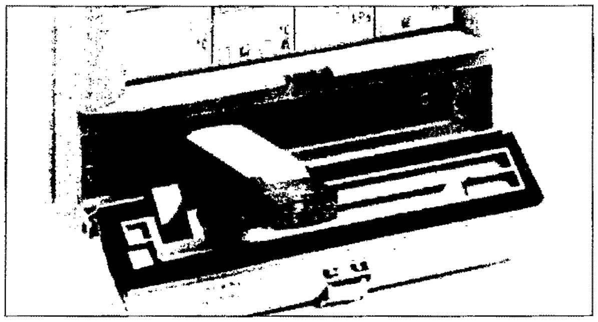
Media FIFO Function

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

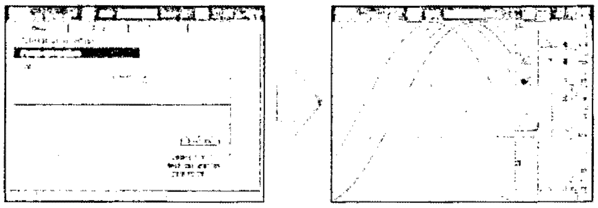
A USB flash drive can be used to transfer data to your PC. The optional front panel USB port also allows an external PC keyboard to be used with the DXAdvanced to facilitate setting and text entry.



Calibration correction schedule control function

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

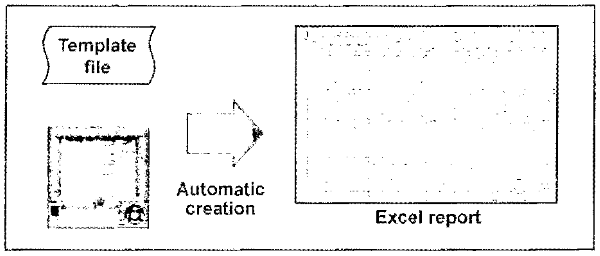


Calibration schedule setting

Message to prompt calibration

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.



STANDARD SPECIFICATIONS

General Specifications

- Construction
  - Mounting: Flush panel mounting (on a vertical plane) Mounting may be inclined downward up to 30 degrees from a horizontal plane.
  - Allowable Panel Thickness: 2 to 26 mm
  - Front Panel: Water and dust-proof (based on IEC529-IP65 and NEMA No.250 TYPE4*)
- Input
  - Number of Inputs:
    - DX1000: 2, 4, 6, 12 channels
    - DX2000: 4, 8, 10, 20, 30, 40, 48 channels
  - Measurement Interval:
    - DX1002, DX1004, DX2004, DX2008: 125 ms, 250 ms, 25 ms (fast sampling mode*)
    - DX1006, DX1012, DX2010, DX2020, DX2030, DX2040, DX2048: 1 s (Not available when A/D integration time is set to 100 ms), 2 s, 5 s, 125 ms (fast sampling mode*)
    - * A/D integration time is fixed to 1.67 ms in case of fast sampling mode.
  - Inputs: DCV (20, 60, 200 mV, 2, 6, 20, 50 V, 1-5 V) TC (R, S, B, K, E, J, T, N, W, L, U, WRe) RTD (Pt100, JPt100) DI (Contact input, TTL level) DCA (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*	K	±(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 accuracy of reference junction compensation

- Display
  - Display unit:
    - DX1000: 5.5-inch TFT color LCD (320 x 240 pixels)
    - DX2000: 10.4-inch TFT color LCD (640 x 480 pixels)
  - Display group:
    - Number of display: DX1000: 10 groups, DX2000: 36 groups
    - Number of assignable channels for one group: DX1000: 6 channels, DX2000: 10 channels
  - Display color:
    - Trend/Bargraph: Selectable from 24 colors
    - Background: White or black selectable
  - Trend display:
    - Trend display type: Vertical, horizontal, landscape, horizontal split or circular* selectable
    - * Circular display is only for DX2000.
  - Bargraph display:
    - Direction: Vertical or horizontal selectable
  - Digital indication:
    - Display renewal rate: 1 s
  - Overview display:
    - Number of indication channels: Measuring values and alarm status of all channels
  - Information display: Alarm summary, message summary, memory information, report information, relay status, Modbus status
  - Tag display:
  - Tag number and comment display: No. of displayable characters Tag no :16 max Tag comment :32max
    - Displayable characters: Tag no.: Alphanumerics Tag comments: Alphanumerics, Japanese, and Chinese
  - Messages:
    - Number of characters: 32 characters 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 external memory.
- Custom display function:
  User can change display object (trend, numeric, and bar graphs, etc.) sizes and attributes, and add objects freely to create screens.
  - No. of screens: 28 (3 from internal memory, 25 from external media (CF))
  - Max no. of placeable display objects: 134 (normal: 80, scale: 4, trend: 4, list: 4, graphic: 40, bitmap: 2)
- Data Saving Function
  - External storage medium:
    - Medium: CompactFlash memory card (CF card)
  - Internal memory:
    - Medium: Flash memory
    - Capacity: 400MB
    - 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.
  - 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/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
  - Rated power supply: 100 to 240 VAC (automatic switching)
  - 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)
  - Connection: EIA RS-232 (/C2) or RS-422A/485 (/C3)
  - 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.
  - Modbus communication: 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.
- 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.

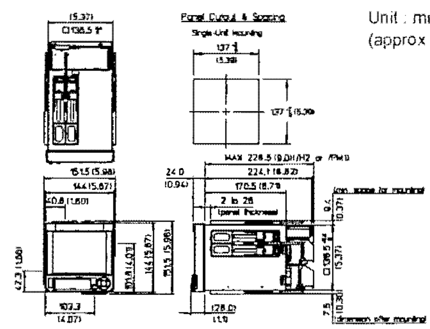
IPEC00270266

- Fail & Alarm Output Relays 22 points (/F2, only for DX2000)
  Combination of "Fail/Status output function" and "Alarm output relays 22 points".
- Clamped Input Terminal (/H2)
  Clamped input terminal (detachable type) is used for input terminal.
- Desk Top Type (/H5[ ], /H5*)
  Provides carrying handle and power cord.
  * /H5 is only for 24 VDC/AC power supply model (/P1), and does not include power code.
- Mathematical Functions (/M1)
  Used for calculating data, displaying trends and digital values, and recording calculated data assigned to channels.
  Channel assignable to calculated data:
  DX1002, DX1004: 12 channels, DX1006, DX1012: 24 channels
  DX2004, DX2008: Up to 12 channels
  DX2010, DX2020, DX2030, DX2040, DX2048: 60 channels
  Operation:
  General arithmetic operations, Statistical operations, Special operations, Conditional operation
  Constant: Up to 60 constants (K01 to K60)
  Report functions:
  Report type: Hourly, daily, hourly + daily, daily +weekly and daily + monthly
  Operation: Max. 4 types are selectable from average, maximum, minimum, instantaneous and summation
- Cu10, Cu25 RTD Input /3 leg isolated RTD Input (/N1)
  This option allows Cu10 and Cu25 inputs to be added to the standard input types.
- 3 legs Isolated RTD Input (/N2*)
  A, B, b legs are of isolated input type.
  * Only forDX1006, DX1012, DX2010, DX2020, DX2030, DX2040 and DX2048.
- Extended Input Types (/N3)
  This option allows extra inputs types as below to be added to the standard input types.
  TC: Kp vs Au7Fe, PLATINEL, PR40-20, NiNiMo, W/Wre26, TypeN (AWG14)
  RTD: Pt25, Pt50, Ni100 (SAMA), Ni100 (DIN), Ni120, J263*B, Cu53, Cu100, Pt46, Pt200
- 24 VDC/AC Power Supply (/P1)
  Rated power supply: 24 VDC or 24 VAC (50/60Hz)
  Allowable power supply voltage range:
  21.6 to 26.4 VDC/AC
  Max. power consumption:
  DX1000: 28 VA (24 VDC), 45 VA (24 VAC (50/60 Hz))
  DX2000: 45 VA (24 VDC), 70 VA (24 VAC (50/60 Hz))
- Remote Control (/R1)
  This option allows eight functions to be controlled remotely by a contact input.
- 24 VDC transmitter power supply (/TPS2*, /TPS4, /TPS8*)
  Output voltage: 22.8 to 25.2 VDC (rated load current)
  Rated output current: 4 to 20 mADC
  * /TPS2 is only for DX1000, /TPS8 is only for DX2000
- Easy text entry (/KB1, /KB2)
  Remote control terminal is available to operate the DX.
  Number of units that can be controlled:
  Max. 32 units by ID setting
- USB interface (/USB1)
  USB interface specification: Based on Rev1.1, host function
  Number of ports: 2 ports (Front and rear panel)
  Available USB devices:
  Keyboard: 104/89 keyboard (US) based on USB HID Class Ver.1.1
  External medium: USB flash drive (Some of the USB flash drive may not be supported by DXAdvanced.)
- Pulse input (/PM1)
  Pulse input option includes mathematical functions option (/M1) and remote control option (/R1).
  Number of inputs: 3 points (8 points are available in case of using remote inputs)
  Input format: Photocoupler isolation (shared common)
  Isolated power supply for input terminal (approx. 5 V)
- Calibration correction function (/CC1)
  Corrects the measurement value of each channel using segment linearizer approximation.
  Number of segment points: 2 to 16
- External input function (/MC1, only for DX2000)
  Digital input channels via communication are extended to input data from other instruments.
  Number of external input channels:
  Up to 240 channels (channel number: 201 to 440)
  * Only for DX2010, DX2020, DX2030, DX2040 and DX2048
  * Fast sampling mode is not available when external input option is equipped.
- Multibatch function (/BT2)
  User can start/stop recording independently by batch, and create data files.
  No. of multibatches: DX1000: 2 to 6 (DX1006,DX1012 only)
  DX2000: 2 to 12
  (DX2010,DX2020,Dx2030,DX2040,DX2048 only)
- PROFIBUS-DP communication interface function (/CP1)
  PROFIBUS-DP master devices can access the following internal data.
  Load measurement channel data
  Load MATH channel data
  Write communication input channel data
  Node address setting range: 0 to 125
  Interface: PROFIBUS-DP-V0 Slave
  Transmission medium: 2 dedicated cables
  Transmission speed/distance: 9.6 kbps/1200 m to 12 Mbps/100 m
  Termination resistance: None (requires external termination resistance)
- Advanced security function (/AS1)
  Security and electronic record/signature functions have been added that are compliant with the USA's FDA title 21 CFR Part 11.
  Data anti-tamper function: Settings and measured data are saved as encrypted binary files.
  Login function: Using the login function (user name, user ID and password), you can enter security settings on the instrument
  User level and number of users:
  System administrator: 5 users (all can be operated)
  General user: 90 users
  Electronic signature function:
  After checking data that has finished being recorded, you can add three levels of electronic signature, select a pass/fail, and enter comments
  Audit Trail Function: The settings change log and the operation log when the change was made are saved.
  Password management function:
  Logins are verified by a Kerberos authentication server

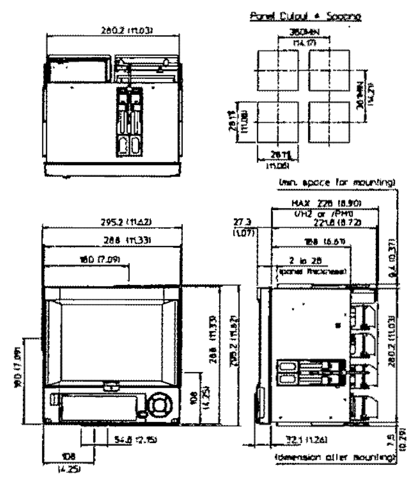
Dimensions

Unit : mm
(approx · inch)

DX1000



DX2000



Two panel brackets are used in panel-mounting the DX1000 and DX2000. They may be used either on the left and right or top and bottom. See Yokogawa's General Specification (GS 04L41B01-01E) for information on panel cutting dimensions for DX1000 vertical or horizontal attachments. Unless otherwise indicated, tolerance is ±3% (or ±0.3 mm for dimensions under 10 mm).

MODEL AND SUFFIX CODES

DX1000

Model code	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 language	-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
		/KB2	Easy text entry (without input terminal) *9
		/USB1	USB interface
		/PM1	Pulse input (including remote control and mathematical functions) *11
		/CC1	Calibration correction function
		/BT2	Multi-batch functions *12
		/CP1	PROFIBUS-DP functions *3
		/AS1	Advanced security functions

*1 /A1, /A2 and /A3 cannot be specified together.
*2 /A3 and /F1 cannot be specified together.
*3 /C2, /C3 and /CP1 cannot be specified together.
*4 In case that 24 VDC/AC power supply (/P1) and desktop type are specified together, /H5 must be specified. /P1 and /H5[] cannot be specified together.
*5 /H5[ ]
- D: Power cord UL, CSA st'd
- F: Power cord VDE st'd
- R: Power cord SAA st'd
- J: Power cord BS st'd
- H: Power cord GB st'd

*6 /N2 can be specified for only DX1006 and DX1012.
*7 In case that /TPS2 is specified, /TPS4, /A2, /A3 or /F1 cannot be specified together.
*8 In case that /TPS4 is specified, /TPS2, /A1, /A2, /A3 or /F1 cannot be specified together.
*9 /KB1 and /KB2 cannot be specified together.
*10 In case that /KB1 is specified, remote input terminal (438227) is included.
*11 In case that /PM1 is specified, /A3, /M1, /R1, /TPS2 or /TPS4 cannot be specified. And combination of /A2/F1 cannot be specified together.
*12 /BT2 can be specified for only DX1006, DX1012.

DX2000

Model code	Suffix code	Optional code	Description
DX2004			4ch, 125ms(Fast sampling mode: 25ms)
DX2008			8ch, 125ms(Fast sampling mode: 25ms)
DX2010			10ch, 1s(Fast sampling mode: 125ms)
DX2020			20ch, 1s(Fast sampling mode: 125ms)
DX2030			30ch, 1s(Fast sampling mode: 125ms)
DX2040			40ch, 1s(Fast sampling mode: 125ms)
DX2048			48ch, 1s(Fast sampling mode: 125ms)
Internal memory	-3		400MB
External media	-4		CF card (with media)
Display language	-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
		/A4	Alarm output 12 points *1
		/A5	Alarm output 24 points *1 *2
		/C2	RS-232 interface *3
		/C3	RS-422-A/485 interface *3
		/D5	VGA output
		/F1	FAIL/Status output *2 *4
		/F2	FAIL + Alarm output 22 points *1 *4
		/H2	Clamped input terminal (detachable)
		/H5	Desktop type (for /P1 model, without power code, screw type power terminal) *5
		/H5[ ]	Desktop type *6
		/M1	Mathematical functions
		/N1	Cu10,Cu25 RTD input/3 leg isolated RTD
		/N2	3 leg isolated RTD *7
		/N3	Extended input type (PR40-20, Pt50, etc.)
		/P1	24VDC/AC power supply
		/R1	Remote control
		/TPS4	24VDC transmitter power supply (4 loops) *8
		/TPS8	24VDC transmitter power supply (8 loops) *9
		/KB1	Easy text entry (with input terminal) *10 *11
		/KB2	Easy text entry (without input terminal) *10
		/USB1	USB interface
		/PM1	Pulse input (including remote control and mathematical functions) *12
		/CC1	Calibration correction function
		/MC1	External input function *13
		/BT2	Multi-batch functions *14
		/CP1	PROFIBUS-DP functions *3
		/AS1	Advanced security functions

*1 /A1, /A2, /A3, /A4, /A5, /F2 cannot be specified together.
*2 /A5 and /F1 cannot be specified together.
*3 /C2, /C3 and /CP1 cannot be specified together.
*4 /F1 and /F2 cannot be specified together.
*5 In case that 24 VDC/AC power supply (/P1) and desktop type are specified together, /H5 must be specified. /P1 and /H5[] cannot be specified together.
*6 /H5[ ]
- D: Power cord UL, CSA st'd
- F: Power cord VDE st'd
- R: Power cord SAA st'd
- J: Power cord BS st'd
- H: Power cord GB st'd

*7 /N2 can be specified for only DX2010, DX2020, DX2030, DX2040 and DX2048.
*8 /TPS4, /TPS8, /A5 and /F2 cannot be specified together.
*9 In case that /TPS8 is specified, combination of /A4/F1 cannot be specified together.
*10 /KB1 and /KB2 cannot be specified together.
*11 In case that /KB1 is specified, remote input terminal (438227) is included.
*12 In case that /PM1 is specified, /A5, /F2, /M1 and /R1 cannot be specified. And combination of /A2/F1 and combination of /A4/TPS8 cannot be specified together.
*13 /MC1 can be specified for only DX2010, DX2020, DX2030, DX2040 and DX2048.
*14 /BT2 can be specified for only DX2010, DX2020, DX2030, DX2040, DX2048.

APPLICATION SOFTWARE

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 (for screw input terminal)	415920	250Ω±0.1%
	415921	100Ω±0.1%
	415922	10Ω±0.1%
Shunt resister (for clamped input terminal)	438920	250Ω±0.1%
	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 /AS1 option

RELATED PRODUCT

DXAdvanced Removable Chassis Model DX1000N

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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YOKOGAWA

Attachment 4

Cost Estimate

ENTERGY NUCLEAR NORTHEAST IMPLEMENTATION ESTIMATE Indian Point Nuclear Power Station			
* ESTIMATE LEVEL *	**EC #: SAMA IP3-019**		
☑ Conceptual ☐ Preliminary ☐ Definitive	PROJECT TITLE: Install Leak Monitoring Instrumentation for ISLOCA Pathway Isolation Valves	PROJECT CODE: TBD	ESTIMATOR: RCMT
	JOB LOCATION: Containment & Control Bldgs.		ORIG. DATE: 06-25-2012
	☑ OUTAGE ☑ NON-OUTAGE	ORIGINATOR: ☑ CAPITAL ☐ O&M	
	ESTIMATE TOTAL $6,462,470		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 responds to the issue identified in the NRC's staff review of SAMA IP3-019 and provides the technical resolution and associated costs required for implementation.

For SAMA IP3-019, resolution is required to provide remote monitoring of any fluid leakage past the isolation valves in ISLOCA pathways.

Prepared by: Peter Buttacavoli		Approved by: [signature]
Date: 9-20-2012		Date: 9-20-2012

IPEC00270270

ENTERGY NUCLEAR NORTHEAST
IMPLEMENTATION ESTIMATE
Indian Point Nuclear Power Station

* ESTIMATE LEVEL *	**EC #: SAMA IP3-019**
☑ **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

Item	Description
1.	This estimate assumes that this work will require both non-outage and outage conditions to complete.
2.	This estimate assumes that the non-outage work work will complete during 2014 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 assumes that the non-outage work will not suffer productivity loss due to radiation or hazardous conditions..
5.	This estimate assumes that all work will be performed by trained contract craftspersons in lieu of station maintenance personnel.
6.	This estimate assumes that adequate penetrations exist for routing of wiring from the pressure transmitter junction boxes to the external panel location such that no new containment penetrations will be required.
7.	This estimate assumes that the Outage work will involve radiological conditions requiring additional briefing times, dressout times and reduced production due to dressout requirements.
8.	This estimate assumes that a comercial dedication effort will be required to qualify the Yokogawa Recorder for use in this application.
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 based on the project's current level of scope definition and is classified Class 5 as defined per the AACE International Cost Estimate Classification 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 billing rate increases of 3% per year.
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 fence boundary - 30%
	C. Implementation complexity - 40%
	D. Inside Containment - 50%

Rev. 11-0

INDIAN POINT IMPLEMENTATION ESTIMATE WORK SHEET

☑ CAPIT ☐ OI

EC #: SAMA IP3-019

PROJECT TITLE: ☑ OUT ☑ NON-OI Install Leak Monitoring Instrumentation for ISLOCA Pathway Isolation Valves

JOB LOCATION: Containment & Control Bldgs. | PROJECT CODE: TBD

EST. STATUS: | ORIGINATOR:

TAKEOFF:
ESTIMATOR: RCMT
ORIG. DATE: 06-25-2012

* ESTIMATE LEVEL *

- ☐ **Conceptual**
- ☐ **Preliminary**
- ☐ **Definitive**

General Notes:

ESTIMATE SUMMARY

		MANHOURS	DOLLARS
EOI ENGINEERING			
01	STUDY, DESIGN, & CLOSEOUT	360	$ 36,000
02	DESIGN ENGR CONST SUPPORT	120	$ 12,000
03	WELDING ENGR EOI SUPPORT	120	$ 12,000
04	SYS ENGR/ S-U ENGR	180	$ 18,000
05	PROJECT MANAGEMENT	700	$ 84,000
06	WORK MANAGEMENT	200	$ 20,000
07	TRAVEL & LIVING EXPENSES		$ -
08	ENGINEEWRING DCP ACCEPTANCE REVIEW	120	$ 12,000
CONTRACT ENGINEERING			
09	DESIGN ENGR CONTRACT SUPPORT	1,700	$ 204,000
10	SUPL CONTRACT MODS ENGR	-	$ -
11	MODS PLAN & SCHED -CONTRACT	300	$ 30,000
12	FIELD ENGRS / PLANNERS	320	$ 38,400
MATERIALS / MISC CONTRACTS			
13	MATERIALS		$ 763,200
14	OTHER CONTRACTS		$ 20,880
CONTRACT CRAFT LABOR			
15	SWEC CRAFT LABOR/WALKDOWN	6,547	$ 968,114
16	LOST TIME	655	$ 122,085
17	SWEC DISTRIBS		$ 272,889
PLANT CRAFT LABOR			
18	MECH MAINT.	-	$ -
19	ELECT MAINT	-	$ -
20	I&C	240	$ 24,000
21	CSG	-	$ -
MISC EOI SUPPORT			
22	QUALITY CONTROL	300	$ 30,000
23	TRAINING	48	$ 5,760
24	CHEMISTRY	-	$ -
25	OPS / OPS SUPPORT	120	$ 14,400
26	HP / RP	200	$ 20,000
MISC CONTRACT SUPPORT			
27	QUALITY CONTROL	240	$ 19,200
28	NDE	-	$ -
29	HP / RP	-	$ -
30	RADWASTE	-	$ -
31	NURSE	-	$ -
32	ELEVATOR CONTRACTOR	-	$ -
33	WASTE MANAGEMENT	-	$ -
34	HOUSEKEEPING	-	$ -
35	COMMERCIA	-	$ -
36	CGD CONTRACT	-	$ 25,000
37	DECONTAMINATION CONTACTOR	-	$ -
38	RBC'S	-	$ -
39	SECURITY - Wackenhut	-	$ -
40	FIRE WATCH (Rover)	-	$ -
41	SAFETY	136	$ 9,811
CONTINGENCY			
42	CONTINGENCY		$ 1,380,870
ESTIMATE SUBTOTAL		**12,606**	**$ 4,142,609**
	SITE ENCUMBRANCE PREMIUM (20%)		**$ 828,522**
	LOADERS (30%)		**$ 1,491,339**
	ESTIMATE TOTAL		**$ 6,462,470**

NON OUTAGE WORK

ITEM	DESCRIPTION	QTY	UOM	CFT	NO.	MANHOURS UNIT	FCTR	TOTAL	$/MH	MATERIAL $ PER UNIT	MATERIAL DOLLARS	LABOR DOLLARS	SUB-CONTRACT	TOTAL $
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 power supply	1	LT	EL	2	40.00	1.00	80	$ 123.32		$ 35,000	$ 9,866		$ 44,866
3.	Run conduit and support as required to area of containment penetration.	1	LT	EL	2	40.00	1.00	80	$ 123.32			$ 9,866		$ 9,866
4.	Prefabricate new spool/valve/cap assemblies (15 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 welds on new spool/valve assemblies	15	LT	NM	1	16.00	1.00	240	$ 87.00			$ -	$ 20,880	$ 20,880
								-						

Rev. 11-0

INDIAN POINT IMPLEMENTATION ESTIMATE WORK SHEET

☑ CAPIT. ☐ O

EC #: SAMA IP3-019

PROJECT TITLE: Install Leak Monitoring Instrumentation for ISLOCA Pathway Isolation Valves
JOB LOCATION: Containment & Control Bldgs.
EST. STATUS:

PROJECT CODE: TBD
ORIGINATOR:

TAKEOFF:
ESTIMATOR: RCMT
ORIG. DATE: 06-25-2012

ITEM	DESCRIPTION	QTY	UOM	CFT	NO.	MANHOURS UNIT	FCTR	TOTAL	$/MH	MATERIAL $ PER UNIT	MATERIAL DOLLARS	LABOR DOLLARS	SUB-CONTRACT	TOTAL $
	OUTAGE WORK													
1.	Gather and stage tools and materials, Perform walkdown and briefing.	1	LT	PF	2	10.00	1.70	34	$ 120.71			$ 6,977		$ 6,977
2.	Gather and stage tools and materials, Perform walkdown and briefing.	1	LT	EL	2	10.00	1.70	34	$ 123.32			$ 7,128		$ 7,128
3.	Stage, erect & modify scaffolding as required	1	LT	CP	2	80.00	1.70	272	$ 96.00		$ -	$ 44,390		$ 44,390
4.	Stage, erect & modify scaffolding as required	1	LT	LB	1	80.00	1.70	136	$ 78.65		$ -	$ 18,184		$ 18,184
5.	Remove existing cap and install new pipe/valve/cap sub assembley(14 valve locations).	14	EA	PF	2	10.00	1.70	476	$ 120.71			$ 97,679		$ 97,679
6.	Mount new transmiter, valve manifold and support.	15	EA	PF	2	10.00	1.70	510	$ 120.71		$ 375,000	$ 104,656		$ 479,656
7.	Route and support new tubing between valve manifold and new piping.	14	EA	PF	2	15.00	1.70	714	$ 120.71		$ 18,000	$ 146,518		$ 164,518
8.	Weld new sockolet to 14" existing pipe.	1	EA	PF	2	12.00	1.70	41	$ 120.71			$ 8,413		$ 8,413
9.	Mount Prefabricated piping/valve sub assemblie to socklet.	1	EA	PF	2	10.00	1.70	34	$ 120.71			$ 6,977		$ 6,977
10.	Route and support new tubing between valve manifold and new piping.	1	EA	PF	2	15.00	1.70	51	$ 120.71			$ 10,466		$ 10,466
11.	NDE containment welds welds	60	EA	NM	1	1.00	1.70	102	$ 87.00			$ 15,086		$ 15,086
12.	Support testing as requested	1	LT	PF	2	20.00	1.70	68	$ 120.71			$ 13,954		$ 13,954
13.	Mount Hoffman boxes in containment.	2	EA	EL	2	6.00	1.70	41	$ 123.32			$ 8,595		$ 8,595
14.	Route & Support Conduit from each Transmitter in containment to containment Hoffman Enclosure.	450	LF	EL	2	0.18	1.70	275	$ 123.32		$ 4,000	$ 33,913		$ 37,913
15.	Route and support conduit from (2) Hoffman boxes to penetration and tie in with external conduit.	2	LT	EL	2	40.00	1.70	272	$ 123.32		$ 3,000	$ 33,543		$ 36,543
16.	Pull cable from each transmitter to Hoffman boxes and terminate at transmitter and Hoffman box terminal strips.	1	LT	EL	2	100.00	1.70	340	$ 123.32		$ 8,000	$ 41,929		$ 49,929
17.	Pull cable from 2 Containment boxes to external Hoffman Panel and enclosure and terminate.	1	LT	EL	2	80.00	1.70	272	$ 123.32		$ 9,000	$ 33,543		$ 42,543
18.	Provide testing as required.	1	LT	OP	2	100.00	1.00	200	$ 100.00		$ -	$ 20,000		$ 20,000
19.	Assist with testing as required	1	LT	EL	2	40.00	1.70	136	$ 123.32		$ -	$ 16,772		$ 16,772
20.	Dismantle scaffolding to storage	1	LT	CP	2	40.00	1.70	136	$ 96.00		$ -	$ 22,195		$ 22,195
21.	Dismantle scaffolding to storage	1	LT	LB	1	40.00	1.70	68	$ 78.65		$ -	$ 9,092		$ 9,092
22.	Cleanup and restore area	1	LT	EL	4	10.00	1.70	68	$ 123.32		$ -	$ 8,386		$ 8,386
23.	Cleanup and restore area	1	LT	PF	4	10.00	1.70	68	$ 120.71		$ -	$ 8,208		$ 8,208
	PAINTING & TOUCH-UP REQUIREMENTS													
1.	PAINTING & TOUCH-UP			PT				-			$ -	$ -		$ -
2.	PAINTING & TOUCH-UP			PT				-			$ -	$ -		$ -
	FIRE WATCH / BOTTLEWATCH REQUIREMENTS													
1.	CRAFT SUPPORT FOR FIRE WATCH	2	LT	FW	1	120.00	1.00	240	$ 53.60		$ -	$ 12,864		$ 12,864
2.	CRAFT SUPPORT FOR BOTTLE WATCH	1	LT	FW				-			$ -	$ -		$ -
	MISC SUB-CONTRACT													
1.	MISC SUB-CONTRACT Commercial Grade Dedication	1	LT	NM									$ 25,000	$ 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
	SUBTOTAL							6,219			$ 720,000	$ 909,629	$ 45,880	$ 1,675,509
	*** RELATED COSTS ***													
1.	WALKDOWN ALLOWANCE	1	LT	EL				20	$ 123.32			$ 2,466		$ 2,466
2.	WALKDOWN ALLOWANCE	1	LT	PF				30	$ 120.71			$ 3,621		$ 3,621
3.	WORK PACKAGE REVIEW	1	LT	EL				30	$ 123.32			$ 3,700		$ 3,700
4.	WORK PACKAGE REVIEW	1	LT	PF				30	$ 120.71			$ 3,621		$ 3,621
5.	TOOL ROOM ATTENDANTS (~3.5%)	1	LT	EL				218	$ 123.32			$ 26,884		$ 26,884
6.	GENERAL CRAFT OUTAGE DISTRIBS. (10%)											$ 90,963		$ 90,963
7.	CRAFT IN PROCESSING (20%)											$ 181,926		$ 181,926
8.	HUMAN PERFORMANCE & ALARA TRAINING (1/2 day training, or ~ 2%)	1	LT									$ 18,193		$ 18,193
	SUBTOTAL							6,547			$ 720,000	$ 1,241,003	$ 45,880	$ 2,006,883
	PLANT SCOPE													
1.	**MECH MAINTENANCE**			PL				-			$ -	$ -		$ -
				PL				-			$ -	$ -		$ -
	SUBTOTAL MECH MAINT.							-			$ -	$ -	$ -	$ -
1.	**ELECT MAINTENANCE**			EL							$ -	$ -		$ -
				PL				-			$ -	$ -		$ -
	SUBTOTAL ELECT. MAINT.							-			$ -	$ -	$ -	$ -
1.	**I&C Dev. Calibration and Maintenance Procedures**	1	LT	PL	2	120.00	1.00	240	$ 100.00		$ -	$ 24,000		$ 24,000
								-			$ -	$ -		$ -
	SUBTOTAL I&C MAINT.							240			$ -	$ 24,000	$ -	$ 24,000

Rev. 11-0

INDIAN POINT IMPLEMENTATION ESTIMATE WORK SHEET

☑ CAPIT ☐ O

EC #: SAMA IP3-019

PROJECT TITLE: Install Leak Monitoring Instrumentation for ISLOCA Pathway Isolation Valves

JOB LOCATION: Containment & Control Bldgs.

EST. STATUS:

PROJECT CODE: TBD

ORIGINATOR:

TAKEOFF:

ESTIMATOR: RCMT

ORIG. DATE: 06-25-2012

ITEM	DESCRIPTION	QTY	UOM	CFT	NO.	MANHOURS UNIT	FCTR	TOTAL	$/MH	MATERIAL $ PER UNIT	MATERIAL DOLLARS	LABOR DOLLARS	SUB-CONTRACT	TOTAL $
1.	CSG			PL				-			$ -	$ -		$ -
	SUBTOTAL CSG MAINT.							-			$ -	$ -	$ -	$ -
	SUBTOTAL PLANT							240			$ -	$ 24,000	$ -	$ 24,000
	SUBTOTAL CRAFT/PLANT							6,787			$ 720,000	$ 1,265,003	$ 45,880	$ 2,030,883
	IMPLEMENTATION SUPPORT													
	EOI													
1.	WELDING ENGINEERING	1	LT	NM	1	120.00	1.00	120	$ 100.00			$ 12,000		$ 12,000
2.	DESIGN ENGINEERING SUPT DURING CONST	1	LT	NM	1	120.00	1.00	120	$ 100.00			$ 12,000		$ 12,000
3.	SYSTEMS ENGINEERING - MECHANICAL	1	LT	NM	1	40.00	1.00	40	$ 100.00			$ 4,000		$ 4,000
4.	SYSTEMS ENGINEERING - ELECTRICAL	1	LT	NM	1	40.00	1.00	40	$ 100.00			$ 4,000		$ 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			$ 4,000		$ 4,000
7.	PROJECT MANAGEMENT	1	LT	NM	1	700.00	1.00	700	$ 120.00			$ 84,000		$ 84,000
8.	TRAINING OPS STAFF	12	LT	NM	1	4.00	1.00	48	$ 120.00			$ 5,760		$ 5,760
9.	QA / QC VERIFICATION	1	LT	NM	1	300.00	1.00	300	$ 100.00			$ 30,000		$ 30,000
10.	CHEMISTRY	1	LT	NM				-				$ -		$ -
11.	HP / RP/ ALARA	1	LT	NM	1	200.00	1.00	200	$ 100.00			$ 20,000		$ 20,000
12.	WORK MANAGEMENT	1	LT	NM	1	200.00	1.00	200	$ 100.00			$ 20,000		$ 20,000
13.	OPS / OPS PROCEDURE SUPPORT AND DEVELOPMENT	1	LT	NM	1	120.00	1.00	120	$ 120.00			$ 14,400		$ 14,400
14.	TRAVEL & LIVING EXPENSES	1	LT									$ -		$ -
	CONTRACTOR SUPPORT													
1.	FIS / MODS ENGINEERING - SWEC (Incl Per Diem)	1	LT	NM				-				$ -		$ -
2.	MODS PLANNING & SCH.- SWEC (Incl Per Diem)	1	LT	NM	1	300.00	1.00	300	$ 100.00			$ 30,000		$ 30,000
3.	FIELD ENGRS/PLAN- SWEC(Incl Per Diem)	1	LT	NM	1	320.00	1.00	320	$ 120.00			$ 38,400		$ 38,400
4.	QA / QC VERIFICATION	1	LT	NM	1	240.00	1.00	240	$ 80.00			$ 19,200		$ 19,200
5.	NDE	1	LT	NM				-				$ -		$ -
6.	HP / RP	1	LT	NM				-				$ -		$ -
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.	VENDOR STOCKING	1	LT	NM				-						
14.	DECONTAMINATION CONTRACTOR	1	LT	NM				-						
15.	RBC's	1	LT	NM				-						
16.	SECURITY	1	LT	SEC				-						
17.	FIREWATCH (Rover)	1	LT	NM				-						$ -
18.	SAFETY (2%)	1	LT	NM				136	$ 72.14			$ 9,811		$ 9,811
19.	LOST TIME (10%)	1	LT					655	$ 186.39			$ 122,085		$ 122,085
	SUBTOTAL CRAFT/NON-MANUAL							10,426			$ 720,000	$ 1,700,659	$ 45,880	$ 2,466,539
1.	FREIGHT, SALES TAX, & CONSUMABLES (6%)										$ 43,200			$ 43,200
	SUBTOTAL INSTALLATION COST							10,426			$ 763,200	$ 1,700,659	$ 45,880	$ 2,509,739
1.	DESIGN ENGINEERING - MECHANICAL	1	LT	NM	1	80.00	1.00	80	$ 100.00			$ 8,000		$ 8,000
2.	DESIGN ENGINEERING - ELECTRICAL	1	LT	NM	1	100.00	1.00	100	$ 100.00			$ 10,000		$ 10,000
3.	DESIGN ENGINEERING - INSTR. & CONTROL	1	LT	NM	1	100.00	1.00	100	$ 100.00			$ 10,000		$ 10,000
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	1,700.00	1.00	1,700	$ 120.00				$ 204,000	$ 204,000
6.	DESIGN EGN. DCP ACCEPTANCE REVIEW	1	LT	NM	1	120.00	1.00	120	$ 100.00			$ 12,000		$ 12,000
	SUBTOTAL DESIGN COST							2,180				$ 48,000	$ 204,000	$ 252,000
	SUBTOTAL INSTALLATION & DESIGN COST										$ 763,200	$ 1,748,659	$ 249,880	$ 2,761,739
1.	CONTINGENCY (50%)													$ 1,380,870
	ESTIMATE SUBTOTAL							12,606						$ 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:
Date: 9-20-2012	Date: 9-20-2012

IPEC00270275

TABLE OF CONTENTS

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.

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.

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 **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.: SAMA IP3-052 **Rev. No.:** CONCEPTUAL 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	☒ 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	☒ 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

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	☒ NO
Cable and Raceway Program • Does the proposed activity involve any changes to cable trays, raceways or the associated documentation?	☐ YES	☒ 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) *(if applicable)* • 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 • 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?	☐ 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?	☐ 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

ATTACHMENT 9.3 **IMPACT SCREENING SUMMARY**

SHEET 3 OF 6

PROCESS OR PROGRAM IMPACT SCREENING CHECKLIST	Potential Impact	
Computer Support and Software • Does the proposed activity impact or involve changes to plant computer software or firmware or impact Software Quality Assurance (SQA)?	☐ YES	☒ NO
Chemistry and Environmental Impact • Does the proposed activity impact or involve any changes to plant chemistry requirements, operations or procedures, or any changes to the environment?	☐ YES	☒ NO
Radiation Protection (RP) Program Impact • 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?	■ 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	☒ 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 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

IPEC00270283

ATTACHMENT 9.3 **IMPACT SCREENING SUMMARY**

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	☒ 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?	☐ 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?	☐ 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

ATTACHMENT 9.3 **IMPACT SCREENING SUMMARY**

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	☒ 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	☒ 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	☒ 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?	☐ 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

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?	☐ YES	☒ 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	☐ NO
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

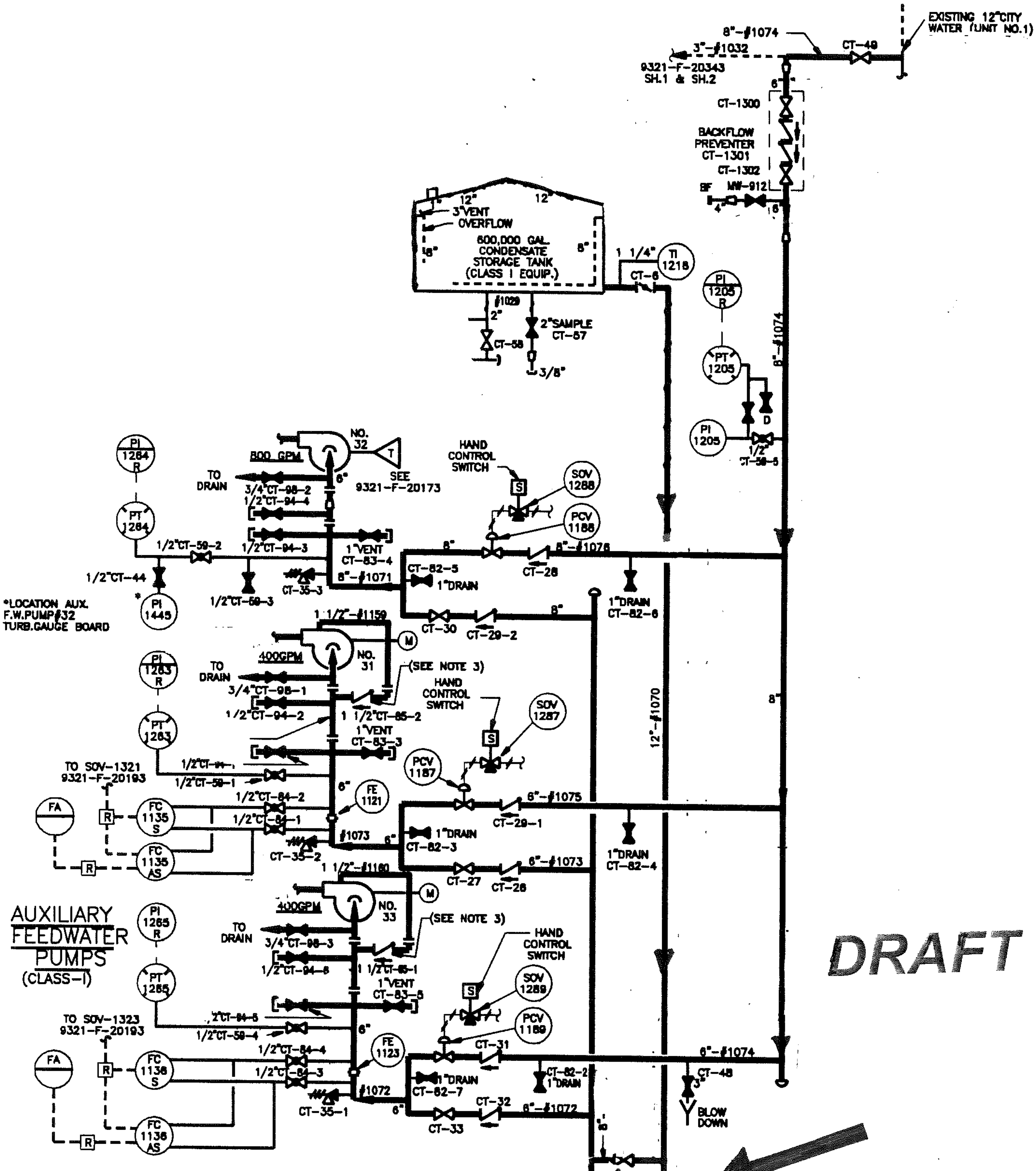
Detailed Impact Screening (Attachment 9.4) Attached?	☐ YES	☒ NO

Attachment 2

Conceptual Design Sketches

1. Figure 1: AFW Pump Suction Flow Arrangement (simplified for clarity)

RCM Technologies The Source of Smart Solutions	ENTERGY Indian Point Nuclear Station Unit 3	Conceptual Design Package SAMA IP3 -052	



DRAFT

OTE: FC-1135S,FC-1136S SET TO OPEN .FEED PUMPS RECIRC.VALVES FCV-1121, -1123 AT 40GPM DECREASING FC-1135AS, C-1136AS ARE SET TO CLOSE RECIRC. VALVES AT 170 GPM INCREASING AND TO ALARM AT 75GPM DECREASING.

Figure 1

AFW Pump Suction Flow Arrangement (simplified for clarity)

Ref. Dwg: 9321-F-20183 FLOW DIAGRAM CONDENSATE & BOILER FEED PUMP SUCTION

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. 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

Attachment 4

Cost Estimate

ENTERGY NUCLEAR NORTHEAST IMPLEMENTATION ESTIMATE Indian Point Nuclear Power Station				
* ESTIMATE LEVEL *	EC #: SAMA IP3-052			
☑ Conceptual	PROJECT TITLE: IP3 AFW Pump Backup Water Supply	☐ CAPITAL ☑ O&M		ESTIMATOR: RCMT
☐ Preliminary	JOB LOCATION: IP3 AFW Pump Building	PROJECT CODE: TBD		
☐ Definitive	☐ OUTAGE ☑ NON-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 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: Peter B. Haarvold		Approved by: [signature]
Date: 9-20-2012		Date: 9-20-2012

ENTERGY NUCLEAR NORTHEAST
IMPLEMENTATION ESTIMATE
Indian Point Nuclear Power Station

* ESTIMATE LEVEL *	EC #: SAMA IP3-052		
☑ 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 assumes that this work will be completed during 2014
2.	This estimate assumes that all work will be performed by IP in-house personnel.
3.	The estimates assumes training for 12 people
4.	This estimate does not include funding for unreviewed safety questions or NRC submittals, but if required the additional cost will be added.
5.	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).
6.	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.
7.	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 fence boundary - 30%
	C. Implementation complexity - 40%
	D. Inside Containment - 50%

IPEC00270292

INDIAN POINT IMPLEMENTATION ESTIMATE WORK SHEET

EC #: SAMA IP3-052

PROJECT TITLE: IP3 AFW Pump Backup Water Supply
JOB LOCATION: IP3 AFW Pump Building
EST. STATUS: ☐ OUTAGE ☑ NON-OUTAGE

☐ CAPITAL ☑ O&M
PROJECT CODE: TBD
ORIGINATOR:

TAKEOFF:
ESTIMATOR: RCMT
ORIG. DATE: 06-22-2012

*** ESTIMATE LEVEL ***

- ☑ Conceptual
- ☐ Preliminary
- ☐ Definitive

General Notes:

ESTIMATE SUMMARY

		MANHOURS	*DOLLARS*
ENGINEERING			
01	STUDY, DESIGN, & CLOSEOUT	-	$ -
02	DESIGN ENGR CONST SUPPORT	-	$ -
03	MODS ENGR SUPPORT	-	$ -
04	SYS ENGR/ S-U ENGR	-	$ -
05	PROJECT MANAGEMENT	120	$ 14,400
06	TESTING (Calibration & Testing)	-	$ -
07	TRAVEL & LIVING EXPENSES		$ -
CONTRACT ENGINEERING			
08	DESIGN ENGR CONTRACT SUPPORT	-	$ -
09	SUPL CONTRACT MODS ENGR	-	$ -
10	MODS PLAN & SCHED -CONTRACT	-	$ -
11	CONTRACT ENGR - TRAINING SUPPORT	80	$ 9,600
MATERIALS / MISC CONTRACTS			
12	MATERIALS		$ -
13	OTHER CONTRACTS		$ -
CONTRACT CRAFT LABOR			
14	SWEC CRAFT LABOR/WALKDOWN		$ -
15	LOST TIME	-	$ -
16	SWEC DISTRIBS		
PLANT CRAFT LABOR			
17	MECH MAINT.	-	$ -
18	ELECT MAINT	-	$ -
19	I&C	-	$ -
20	CSG	-	$ -
MISC SUPPORT			
21	QUALITY CONTROL	-	$ -
22	PLANNING & SCHEDULING	-	$ -
23	TRAINING	96	$ 11,520
24	CHEMISTRY	-	$ -
25	OPS	320	$ 38,400
26	HP / RP	-	$ -
MISC CONTRACT SUPPORT			
27	QUALITY CONTROL	-	$ -
28	NDE	-	$ -
29	HP / RP	-	$ -
30	RADWASTE	-	$ -
31	NURSE	-	$ -
32	ELEVATOR CONTRACTOR	-	$ -
33	WASTE MANAGEMENT	-	$ -
34	HOUSEKEEPING	-	$ -
35	EQUIPMENT RENTAL	-	$ -
36	VENDOR STOCKING	-	$ -
37	DECONTAMINATION CONTRACTOR	-	$ -
38	RBC'S	-	$ -
39	SECURITY	-	$ -
40	FIRE WATCH (Rover)	-	$ -
41	SAFETY	-	$ -
CONTINGENCY			
42	CONTINGENCY		$ 14,784
ESTIMATE SUBTOTAL		616	$ 88,704
	Site Encumbrance Premium (20%)		$ 17,741
	Loaders (30%)		$ 31,933
	ESTIMATE TOTAL		$ 138,378

ITEM	DESCRIPTION	QTY	UOM	MANHOURS CFT	NO.	UNIT	FCTR	TOTAL	$/MH	MATERIAL $ PER UNIT	MATERIAL DOLLARS	LABOR DOLLARS	SUB-CONTRACT	TOTAL $
1.	CONSTRUCTION SUPPORT (8% OF LABOR $)	1	LT						$ -			$ -		$ -
	SUBTOTAL										$ -	$ -	$ -	$ -
	*** RELATED COSTS ***													
1.	WALKDOWN ALLOWANCE	1	LT	EL								$ -		$ -
2.	WORK PACKAGE REVIEW & CRAFT TRAINING	1	LT	EL								$ -		$ -
3.	TOOL ROOM ATTENDANTS (~3.5%)	1	LT	EL				-				$ -		$ -
4.	GENERAL CRAFT DISTRIBS. (10%)											$ -		$ -
5.	CRAFT IN PROCESSING (20%)											$ -		$ -
6.	HUMAN PERFORMANCE & ALARA TRAINING	1	LT									$ -		$ -
7.	(1/2 day training, or ~ 2%)													
	SUBTOTAL										$ -	$ -	$ -	$ -
	PLANT SCOPE													
1.	**MECH MAINTENANCE**			PL				-			$ -	$ -		$ -
				PL				-			$ -	$ -		$ -
	SUBTOTAL MECH MAINT.							-			$ -	$ -	$ -	$ -
1.	**ELECT MAINTENANCE**			PL				-			$ -	$ -		$ -
				PL				-			$ -	$ -		$ -
	SUBTOTAL ELECT. MAINT.							-			$ -	$ -	$ -	$ -

INDIAN POINT IMPLEMENTATION ESTIMATE WORK SHEET

EC #: SAMA IP3-052

7/5/2012 2:55 PM
IP3-052 Estimate AFW Pp Backup Sply (06-22-12).xls

PROJECT TITLE: IP3 AFW Pump Backup Water Supply
JOB LOCATION: IP3 AFW Pump Building
EST. STATUS: ☐ OUTAGE ☑ NON-OUTAGE

☐ CAPITAL ☑ O&M
PROJECT CODE: TBD
ORIGINATOR:

TAKEOFF:
ESTIMATOR: RCMT
ORIG. DATE: 06-22-2012

ITEM	DESCRIPTION	QTY	UOM	CFT	NO.	MANHOURS UNIT	FCTR	TOTAL	$/MH	MATERIAL $ PER UNIT	MATERIAL DOLLARS	LABOR DOLLARS	SUB-CONTRACT	TOTAL $
1.	I&C (Dev. Instrument Calibration Procedures)	1	LT	PL				-			$ -	$ -		$ -
	SUBTOTAL I&C MAINT.							-			$ -	$ -	$ -	$ -
1.	CSG			PL				-			$ -	$ -		$ -
				PL				-			$ -	$ -		$ -
	SUBTOTAL CSG MAINT.							-			$ -	$ -	$ -	$ -
	SUBTOTAL PLANT							-			$ -	$ -	$ -	$ -
	SUBTOTAL CRAFT/PLANT							-			$ -	$ -	$ -	$ -
	IMPLEMENTATION SUPPORT													
1.	MODS ENGINEERING		LT	NM				-				$ -		$ -
2.	DESIGN ENGINEERING SUPT DURING CONST		LT	NM				-				$ -		$ -
3.	SYSTEMS ENGINEERING - MECHANICAL		LT	NM				-				$ -		$ -
4.	SYS ENGINEERING - ELECTRICAL		LT	NM				-				$ -		$ -
5.	SYS ENGINEERING - INSTR & CONTROL		LT	NM				-				$ -		$ -
6.	SYS ENGINEERING - CIVIL STRUCTURAL		LT	NM				-				$ -		$ -
7.	PROJECT MANAGEMENT	1	LT	NM	1	120.00	1.00	120	$120.00			$ 14,400		$ 14,400
8.	TRAINING (OPS Staff)	1	LT	NM	12	8.00	1.00	96	$120.00			$ 11,520		$ 11,520
9.	QA / QC VERIFICATION		LT	NM				-				$ -		$ -
10.	PLANNING & SCHEDULING		LT	NM				-				$ -		$ -
11.	HP / RP/ ALARA		LT	NM				-				$ -		$ -
12.	CHEMISTRY		LT	NM				-				$ -		$ -
13.	OPS (DEVELOP/REVISE PROCEDURE(S))	1	LT	NM	1	320.00	1.00	320	$120.00			$ 38,400		$ 38,400
14.	TRAVEL & LIVING EXPENSES		LT									$ -		$ -
	CONTRACTOR SUPPORT													
1.	FIS / MODS ENGINEERING - SWEC (Incl Per Diem)		LT	NM				-				$ -		$ -
2.	MODS PLANNING & SCH.- SWEC (Incl Per Diem)		LT	NM				-				$ -		$ -
3.	OSG FIELD ENGRS/PLAN- SWEC(Incl Per Diem)		LT	NM				-				$ -		$ -
4.	QA / QC VERIFICATION		LT	NM				-				$ -		$ -
5.	NDE		LT	NM				-				$ -		$ -
6.	HP / RP		LT	NM				-				$ -		$ -
7.	RADWASTE		LT	NM				-						
8.	NURSE		LT	NM				-						
9.	ELEVATOR CONTRACTOR		LT	NM				-						
10.	WASTE MANAGEMENT		LT	NM				-						
11.	HOUSEKEEPING		LT	NM				-						
12.	EQUIPMENT RENTAL CONTRACTOR		LT	NM				-						
13.	VENDOR STOCKING		LT	NM				-						
14.	DECONTAMINATION CONTRACTOR		LT	NM				-						
15.	RBC's		LT	NM				-						
16.	SECURITY		LT	SEC				-						
17.	FIRE WATCH (Rover)		LT	NM								$ -		$ -
18.	SAFETY (2%)		LT	NM								$ -		$ -
19.	LOST TIME (10%)		LT											$ -
	SUBTOTAL CRAFT/NON-MANUAL							536			$ -	$ 64,320	$ -	$ 64,320
1.	FREIGHT, SALES TAX, & CONSUMABLES (6%)													$ -
	SUBTOTAL INSTALLATION COST							536			$ -	$ 64,320	$ -	$ 64,320
1.	DESIGN ENGINEERING - MECHANICAL	1	LT	NM				-				$ -		$ -
2.	DESIGN ENGINEERING - ELECTRICAL	1	LT	NM				-				$ -		$ -
3.	DESIGN ENGINEERING - INSTR. & CONTROL	1	LT	NM				-				$ -		$ -
4.	DESIGN ENGINEERING - CIVIL/STRUCTURAL	1	LT	NM				-				$ -		$ -
5.	TESTING (Instrument Calibration and testing)	1	LT	NM				-				$ -	$ -	$ -
6.	CONTRACT ENGR DESIGN SUPPORT	1	LT	NM				-				$ -	$ -	$ -
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
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:
Peter Dellacroce (signature)	(signature)
Date: 9-20-2012	Date: 9-20-2012

TABLE OF CONTENTS

1.0 ISSUE

<u>Severe Accident Mitigation Alternative (SAMA) IP3-053:</u>

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 un-prescribed 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

6. RECOMMENDED SOLUTION

1. Install a 1-1/2" M-XF Series Safety Excess Flow Valve manufactured by 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	Quantity
1. MALEMA M-XF Series Excess Flow Valve with built-in Reset, 1-1/2" – 300# Flanged, S.S., or equal	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
4. MALEMA M-XF Series Excess Flow Valve with built-in Reset, 1" – 300#, Socket Weld, S.S., or equal	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 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.: SAMA IP3-053 **Rev. No.:** CONCEPTUAL 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	☒ 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	☒ 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

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	☒ NO
Cable and Raceway Program • Does the proposed activity involve any changes to cable trays, raceways or the associated documentation?	☐ YES	☒ 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) ***(if applicable)*** • 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 • 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?	☐ 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?	☐ 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

ATTACHMENT 9.3 IMPACT SCREENING SUMMARY

SHEET 3 OF 6

PROCESS OR PROGRAM IMPACT SCREENING CHECKLIST	Potential Impact	
Computer Support and Software • Does the proposed activity impact or involve changes to plant computer software or firmware or impact Software Quality Assurance (SQA)?	☐ YES	☒ NO
Chemistry and Environmental Impact • Does the proposed activity impact or involve any changes to plant chemistry requirements, operations or procedures, or any changes to the environment?	☐ YES	☒ NO
Radiation Protection (RP) Program Impact • 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?	■ 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	☐ 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 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

ATTACHMENT 9.3 IMPACT SCREENING SUMMARY

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	☒ 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?	☐ 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?	☐ 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

ATTACHMENT 9.3 IMPACT SCREENING SUMMARY

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	☒ 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	☒ 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	☒ 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?	■ 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

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?	■ YES	☐ 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	☐ NO
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

RCM Technologies — The Source of Smart Solutions	ENTERGY Indian Point Nuclear Station Unit 3	Conceptual Design Package SAMA IP3-053	Rev. 0

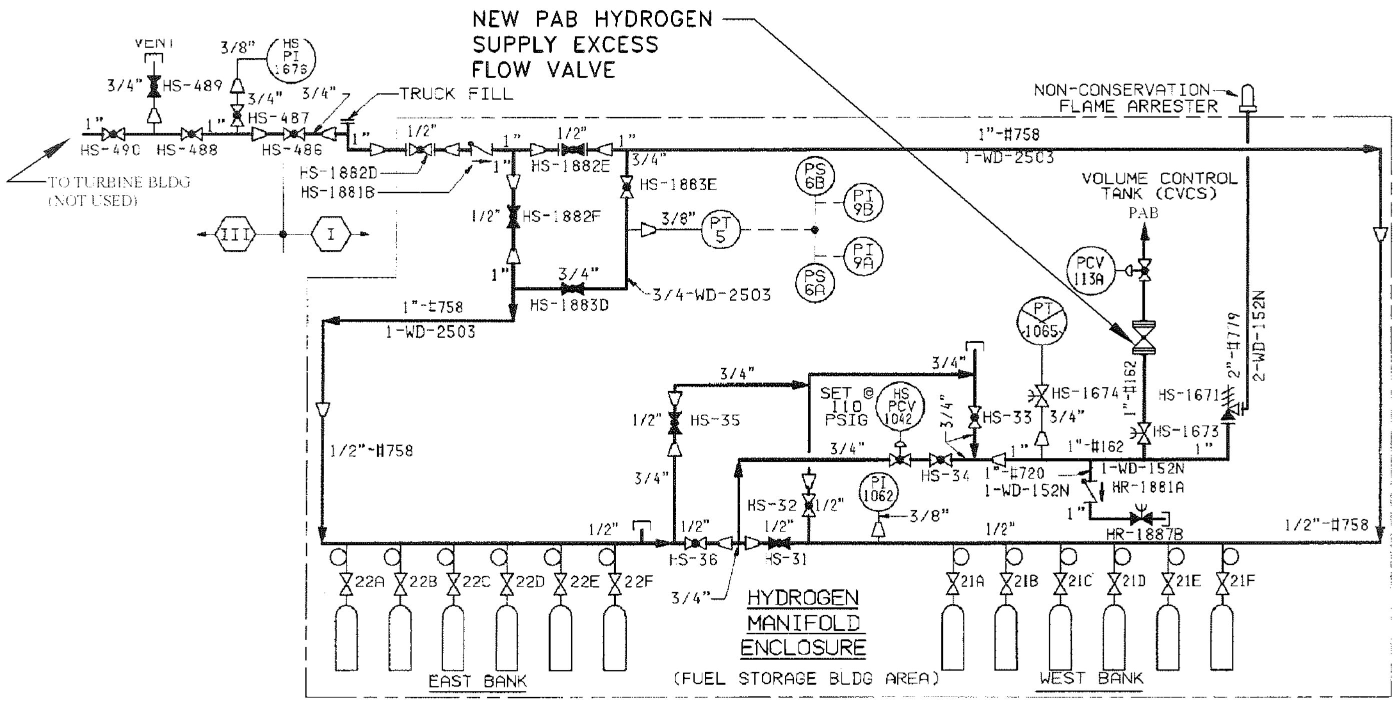


FIGURE 1
PAB HYDROGEN SUPPLY
FLOW DIAGRAM

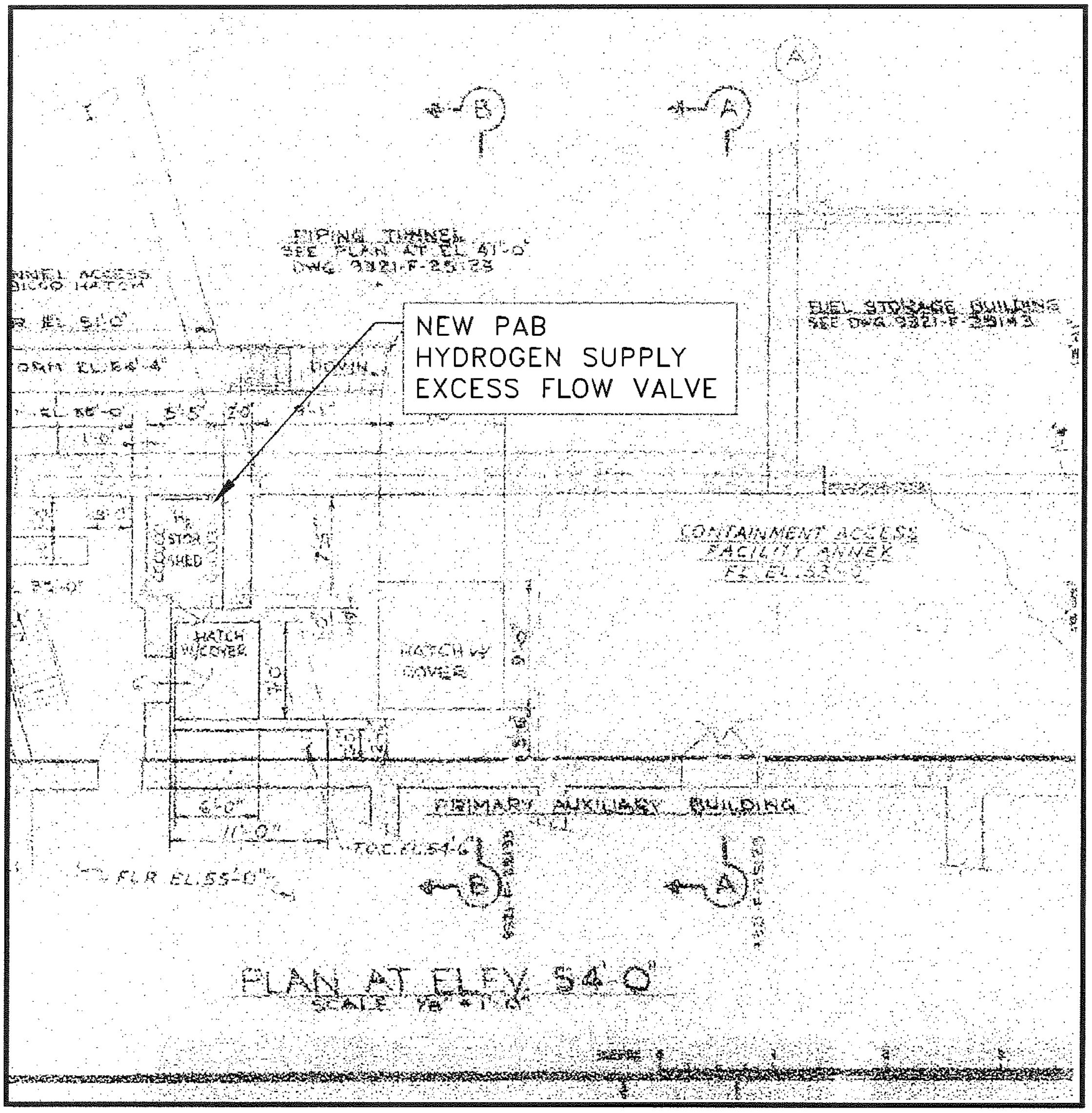


FIGURE 2
PAB HYDROGEN SUPPLY
SHED LOCATION

INSTALL NEW
HYDROGEN SUPPLY
EXCESS FLOW VALVE

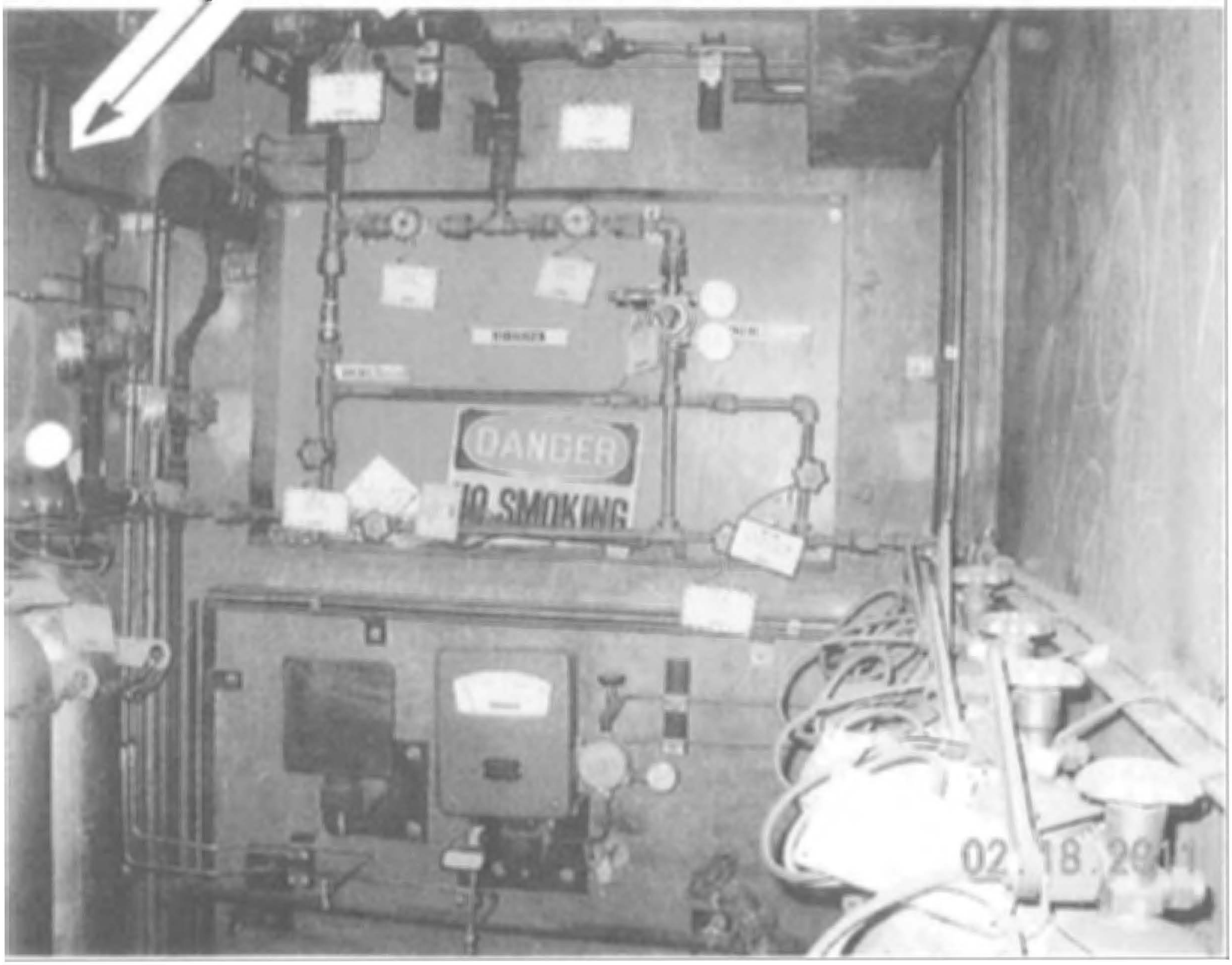


FIGURE 3
PAB
HYDROGEN SUPPLY SHED

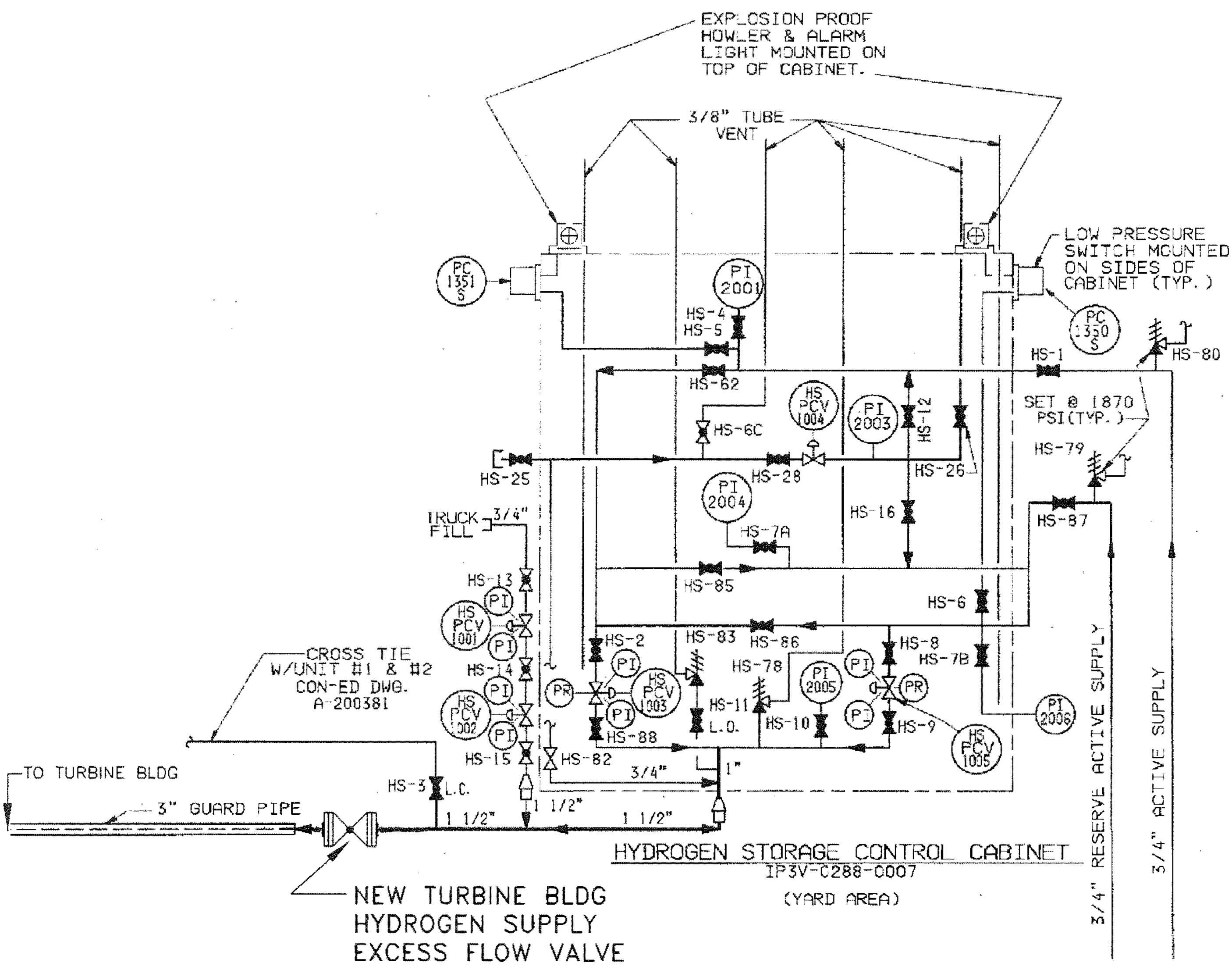


FIGURE 4

TURBINE BUILDING HYDROGEN SUPPLY FLOW DIAGRAM

NEW TURBINE BLDG HYDROGEN SUPPLY EXCESS FLOW VALVE

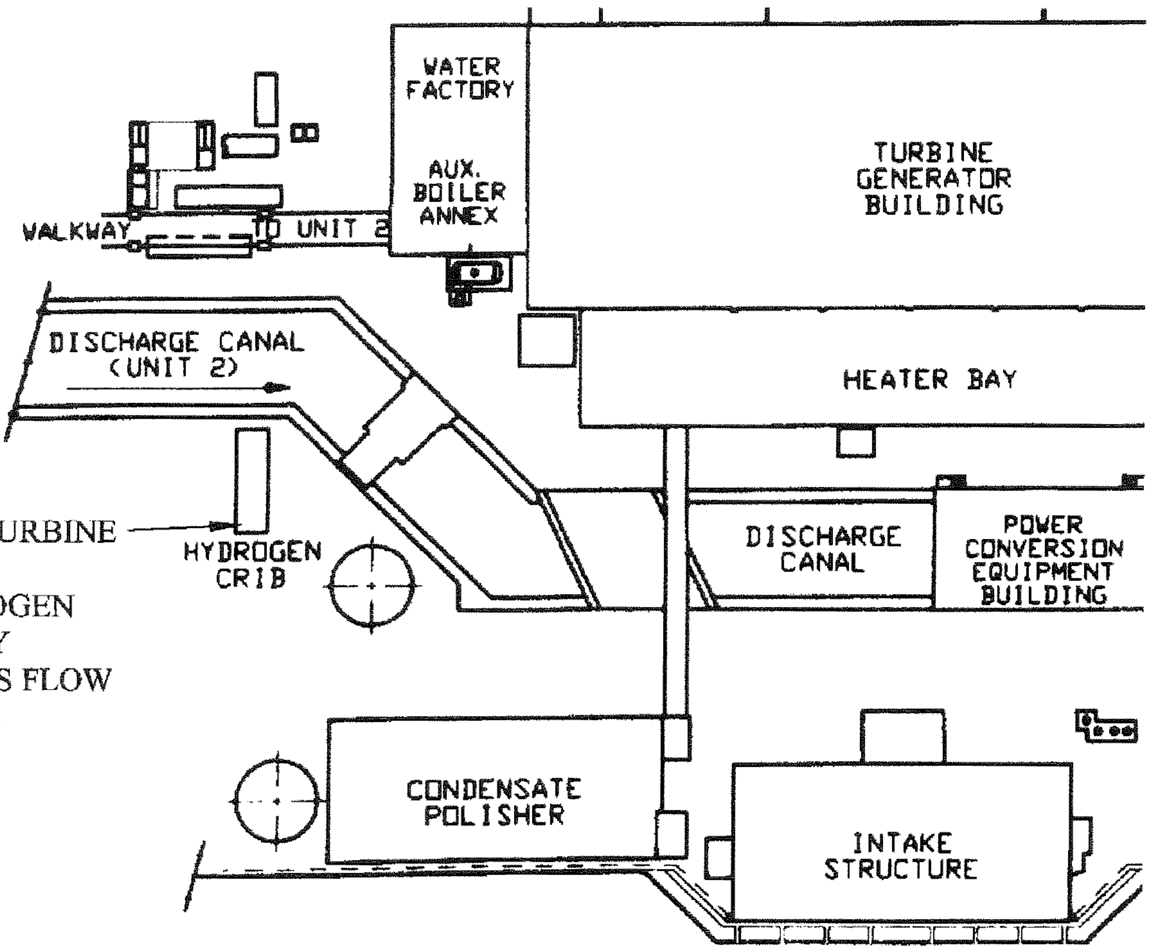


FIGURE 5

TURBINE BUILDING HYDROGEN SUPPLY CRIB LOCATION

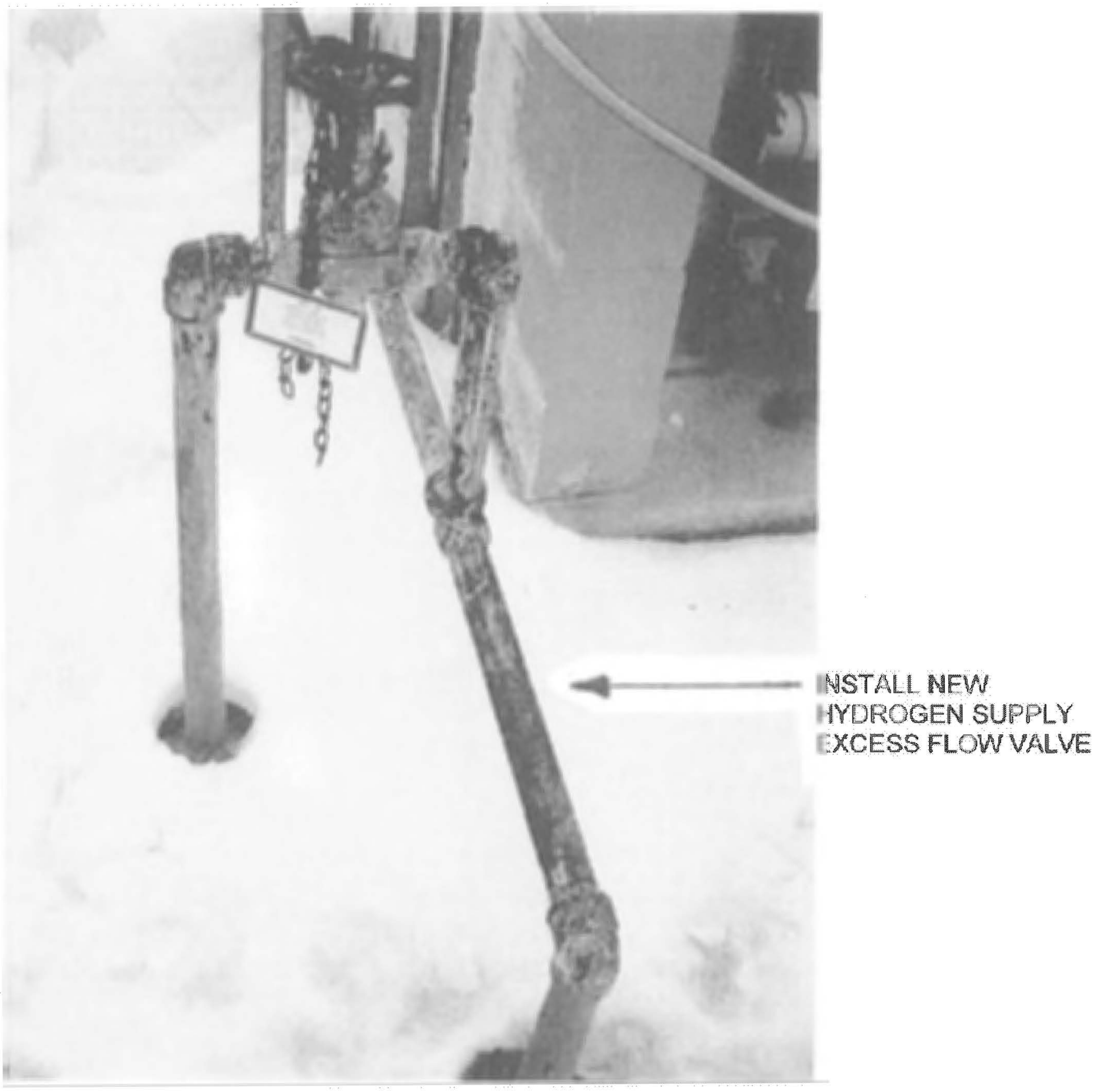


FIGURE 6
TURBINE BUILDING
HYDROGEN SUPPLY CRIB

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. 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 H_2, propane, and acetylene are used during normal operations of nuclear power plants in limited quantities and for relatively short periods of time. H_2, 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, H_2 piping is field-run and its location is plant-specific.

The concern in this issue is that leaks or breaks in the H_2 piping and supply system could result in the accumulation of a combustible or explosive mixture of air and H_2 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. H_2 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 H_2 leakage and subsequent uncontrolled combustion or explosion. This issue primarily affected operating reactors licensed prior to the issuance of SRP[11] Section 9.5-1, "Fire Protection," which addresses the safe use of combustible gases on site.

This issue was identified in NUREG-0705[44] 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 H_2 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. SRP[11] 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 SRP[11] 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 SRP[11] 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 H_2. Unlike most other gases used in small quantities at nuclear power plants, H_2 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. H_2 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 H_2 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 SRP[11] 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 SRP[11] 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 analysis[64] 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 ¾" 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 SRP[11] 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 ¾" in diameter. Based on the results of WASH-1400[16] (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 H_2 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 H_2 release due to pipe break (f_p) was estimated to be:

(10^{-9})(25 sections)(8760 hours/year)(0.7) = $(1.5)(10^{-4})$ pipe breaks/RY

A review of 96 H_2 accidents by NASA[1030] indicated that about 52% could have been attributed to causes that relate to use of H_2 in a gaseous state and about 48% to causes that relate to the use of H_2 in its liquid (cryogenic) state; only about 2% was attributed to piping breaks. Therefore, it was assumed that an H_2 accident from a gaseous state cause was (52% ÷ 2%) or 26 times more likely to occur than an H_2 accident due to a pipe break. The probability (P) of an H_2 release (leak) was given by:

P = (26)(Probability of Pipe Break)
$= (26)(1.5 \times 10^{-4})$
$= 3.9 \times 10^{-3}$

The probability of failing both RHR heat exchangers, f(RHR), is the product of the probability of an H_2 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 H_2 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	$= 5.46 \times 10^{-6}$/RY
Adjusted Case	$= 2.26 \times 10^{-7}$/RY
Reduction in Core-melt Frequency	$= 5.20 \times 10^{-6}$/RY

Consequence Estimate

For the time required to come to hot shutdown (12 hours), the results of a PNL analysis[64] 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 H_2 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 H_2 resulting from a piping system break, but it was not a solution for H_2 accidents arising from slow leaks in valves or fittings, purging errors, material degradation problems, contamination, etc. Other "fixes" are required to reduce or preclude H_2 accidents from scenarios other than pipe breaks. These other "fixes" would include the installation or upgrading of existing H_2 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:

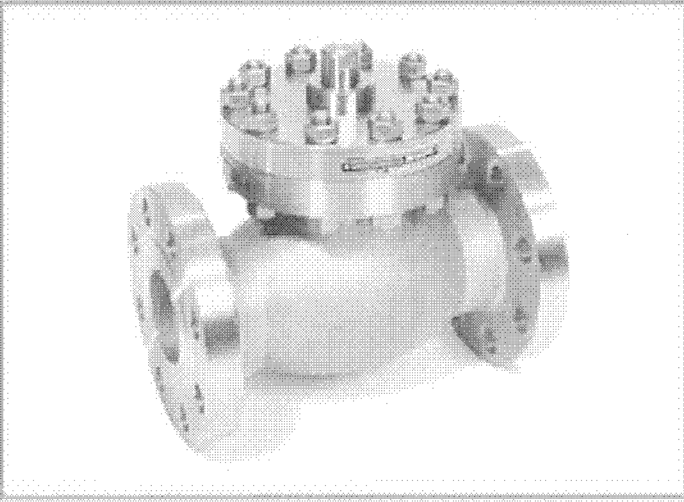
Other Considerations

Based on the potential reduction in core-melt frequency of 5.2×10^{-6}/RY for PWRs, the cost savings from accident avoidance was (\$1.65 billion)(5.2×10^{-6}/RY) (47 reactors)(27.7 years) or approximately \$11.4M.[64]

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-5759[1544] and NUREG-1364,[1545] respectively. The issue was RESOLVED with no new requirements[1546] and Generic Letter 93-06[1547] was issued to inform OLs and CPs. However, RES recommended that the SRP[11] be revised to: (1) include the information contained in Generic Letter 93-06[1547]; 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.



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 shut-off valves
- Operates effectively with liquids or gases
- In-line flow

Applications

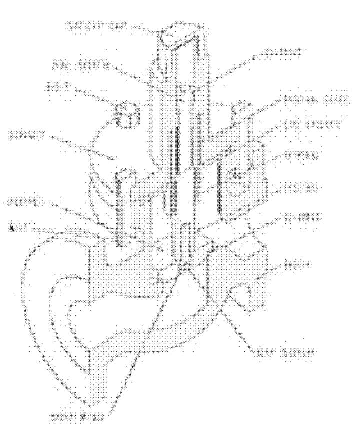
- Fuel lines
- Pollution control
- Chemical processing
- Gas and hydraulic lines
- Petroleum and gas installations

Malema's valves provide instant shut off in the event of a hose break or line 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 orifice 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.



Illustrated is the M-XF Model.

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.

Calibration Range *

Air: 0.5 to 40,000 scfm
Water: 0.1 to 2,500 gpm

* These ranges are over different valve sizes.

Specifications

Set Point Accuracy:	±10% maximum
Repeatability:	± 5%

Material Versions *

- Bronze
- Carbon Steel
- Cast Iron
- Forged Steel
- 316 Stainless Steel

* Other materials available on request.

Port Sizes *

• 3/4"	• 2"	• 6"
• 1"	• 3"	• 8"
• 1 1/2"	• 4"	• 10"

(ANSI Flanged, FNPT, and Socket Welded port types are available)

* Other sizes available on request.

IPEC00270322

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 approximately 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	CV	Shut Off Range (Air/scfm)		Shut Off Range (Water/gpm)	
3/4"	3	0.5	180	0.1	15
1"	5.5	2	400	0.5	25
1-1/2"	17	4	800	1	50
2"	38	8	1,500	2	90
3"	84	20	4,700	5	190
4"	160	40	5,800	10	350
6"	380	60	13,000	15	850
8"	660	72	18,000	18	1,450
10"	1,200	80	40,000	20	2,500

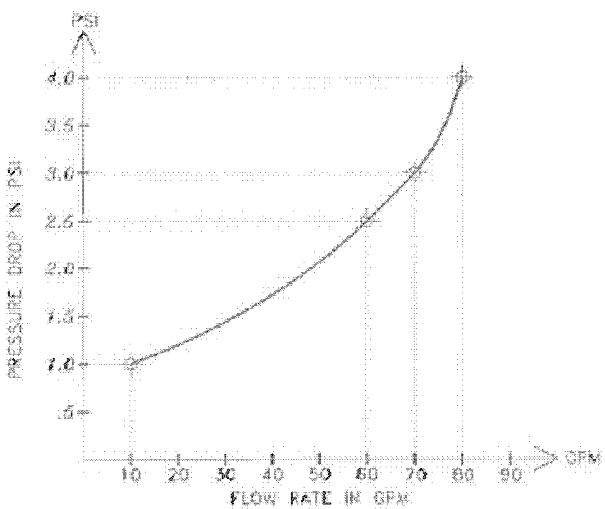
* Air @ STP (i.e. Pressure at 14.7 psig & Temperature at 70° F)

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.

(The following graph is included as an example only)

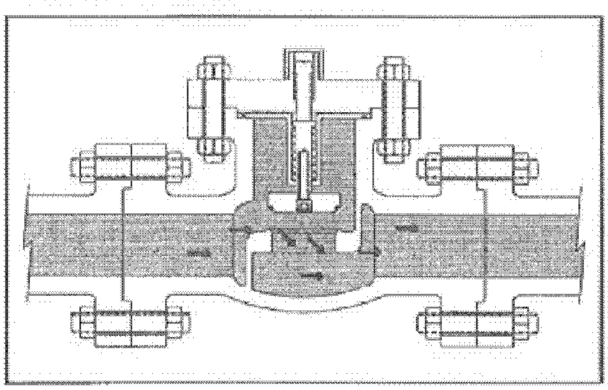


Pressure Drop Graph for M-XF-2.00-SS-300-FL

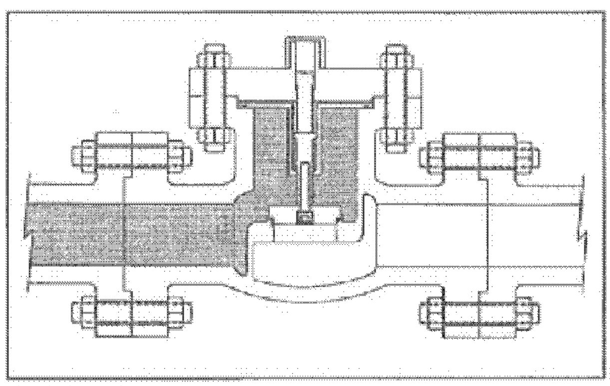
For pressure drops on other sizes, call factory.

Safety Excess Flow Valves

How It Works



Valve Open - Normal Flow

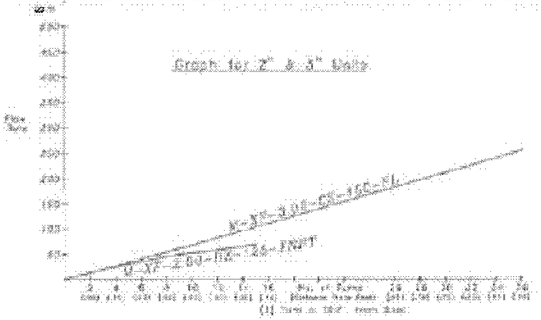


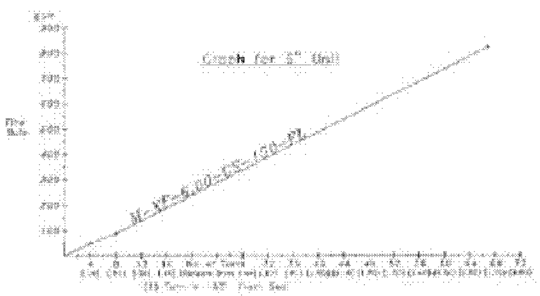
Valve Tripped Flow Shut Off

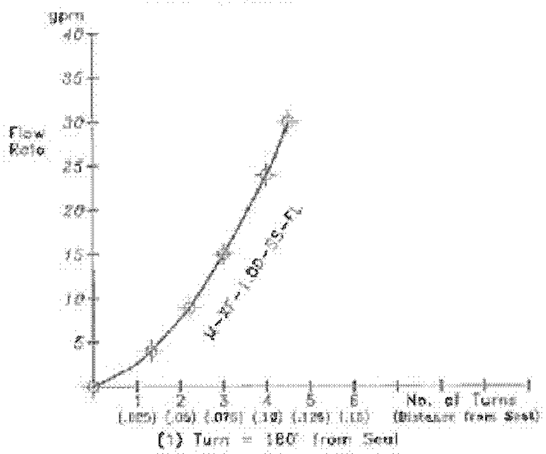
IPEC00270323

Adjustment Screw Turns vs. Flow Trip Point Settings

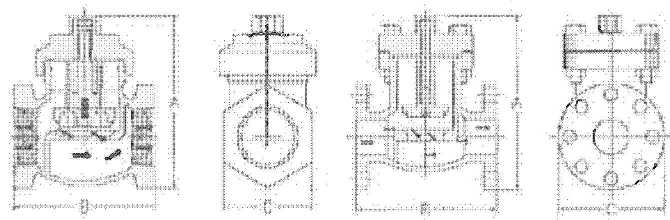
(The following graphs are included as examples only. They should not be used to calibrate individual valves)







Dimensional Drawing



Size	Connection	Class	Material	"A" (Height)	"B" (End to End)	"C" (Flange or Port OD)
0.75"	FL	150	CS or SS	5.60"	4.63"	3.90"
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"
1.50"	FL	150	CS or SS	**	6.50"	5.00"
1.50"	FL	300	CS or SS	**	9.00"	6.13"
2.00"	FL	150	CS or SS	8.10"	8.00"	6.00"
2.00"	FL	300	CS or SS	8.50"	10.50"	6.50"
3.00"	FL	150	CS or SS	11.60"	9.50"	7.50"
3.00"	FL	300	CS or SS	9.25"	12.50"	8.25"
4.00"	FL	300	CS or SS	15.30"	14.00"	10.00"
6.00"	FL	300	CS or SS	**	17.50"	12.50"
8.00"	FL	300	CS or SS	**	22.00"	15.00"
10.00"	FL	300	CS or SS	**	24.50"	17.50"

Note 1: Dimension "A" may be different if the globe bodies that Malema uses are sourced from different vendors.

Note 2: Please contact factory for dimensions of bodies that are not listed here.

ANSI Flange Data I

ANSI B 16.5, Class 150 [Steel]

Size	OD	Flange Thickness	Raised Face Diameter	Number of Holes	Hole Diameter	Hole Circle Diameter
3/4"	3-7/8"	7/16"	1-11/16"	4	5/8"	2-3/4"
1-1/2"	5"	9/16"	2-7/8"	4	3/4"	3-7/8"
2"	6"	5/8"	3-5/8"	4	3/4"	4-3/4"
3"	7-1/2"	3/4"	4-1/8"	4	3/4"	6"
4"	9"	15/16"	6-3/16"	8	3/4"	7-1/2"
6"	11"	1"	8-1/2"	8	7/8"	9-1/2"
8"	13-1/2"	1-1/8"	10-5/8"	8	7/8"	11-3/4"
10"	16"	1-3/16"	12-3/4"	12	1"	14-1/4"

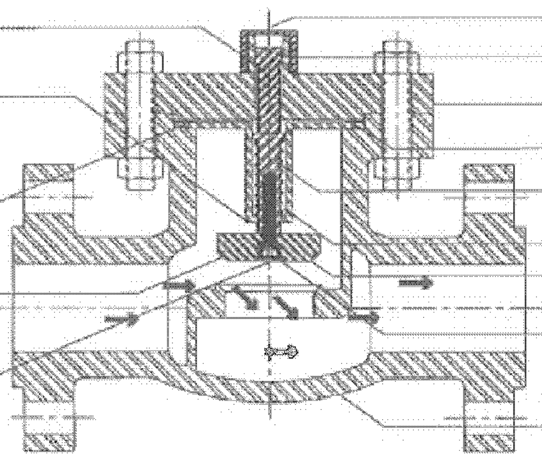
ANSI Flange Data II

ANSI B 16.5, Class 300 [Steel]

Size	OD	Flange Thickness	Raised Face Diameter	Number of Holes	Hole Diameter	Hole Circle Diameter
1-1/2"	6-1/8"	13/16"	2-7/8"	4	7/8"	4-1/2"
2"	6-1/2"	7/8"	3-5/8"	8	3/4"	5"
3"	8-1/4"	1-1/8"	5"	8	7/8"	6-5/8"
4"	10"	1-1/4"	6-3/16"	8	7/8"	7-7/8"
6"	12-1/2"	1-7/16"	8-1/2"	12	7/8"	10-5/8"
8"	15"	1-5/8"	10-5/8"	12	1"	12"
10"	17-1/2"	1-7/8"	12-3/4"	16	1-1/8"	15-1/4"

Safety Excess Flow Valves

Cut-Away Drawing



Ordering Information

M - XF - 1.00 - SS - 300 - FL - V

Valve Size	
Code	Size
0.75	3/4"
1.00	1"
1.50	1-1/2"
2.00	2"
3.00	3"
4.00	4"
6.00	6"
8.00	8"
10.00	10"

Body Material		
Code	Body	Trim
BZ/BN	Bronze	Brass
CS/SS	A352-LCB (Cast Carbon Steel)	316SS
FS/SS	A105 (Forged Carbon Steel)	316SS
SS	A351-CF-8M (Cast 316 Stainless Steel)	316SS

Valve Class	
Code	Pressure Rating
125	200
150	285
300	740
600	1,480
800	1,975
1,500	3,705

Connection Type	
Code	Type
FL	Flanged
FN	FNPT
SW	Socket Weld
BW	Butt Weld

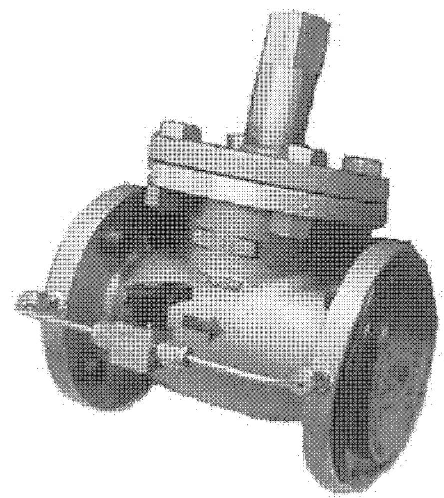
Oring	
V	Viton
E	EPDM
K	Kalrez

Safety Excess Flow Valves

Malema Flow Sensors • 1060 South Rogers Circle • Boca Raton, Florida 33487 • 1-800-637-6418
561.995.0595 • Fax (561) 995.0622 • http://www.malema.com

Malema Excess Flow Valve with built-in Reset

- Reset mechanism is integrated to the excess flow valve
- Eliminates additional piping and hardware required upstream of the valve
- Reduces the cost installation



Attachment 4

Cost Estimate

ENTERGY NUCLEAR NORTHEAST IMPLEMENTATION ESTIMATE Indian Point Nuclear Power Station		
* ESTIMATE LEVEL *	EC #: SAMA IP3-053	
☑ Conceptual	PROJECT TITLE: Hydrogen Excess-Flow Valve Installation ☑ CAPITAL ☐ O&M	ESTIMATOR: RCMT
☐ Preliminary	JOB LOCATION: Fan Room, Yard Area	PROJECT CODE: TBD
☐ Definitive	☑ OUTAGE ☐ NON-OUTAGE ORIGINATOR:	ORIG. DATE: 06/22/2012
	ESTIMATE TOTAL $340,790	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 IP3-053 in accordance with Entergy design engineering practices.

For SAMA IP3-053, resolution is required to shut down hydrogen supply 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.

Prepared by:		Approved by:
Pete Bettaurol [signature]		[signature]
Date: 9-20-2012		Date: 9-20-2012

IPEC00270328

ENTERGY NUCLEAR NORTHEAST
IMPLEMENTATION ESTIMATE
Indian Point Nuclear Power Station

* ESTIMATE 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
1.	This estimate assumes that this work will 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.	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 work will be performed by trained contract craftspersons in lieu of station maintenance personnel.
5.	This estimate provides 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 $250,000.
8.	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).
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 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 fence boundary - 30%
	C. Implementation complexity - 40%
	D. Inside Containment - 50%

IPEC00270329

INDIAN POINT IMPLEMENTATION ESTIMATE WORK SHEET

EC #: SAMA IP3-053

PROJECT TITLE: Hydrogen Excess-Flow Valve Installation	☑ CAPITAL ☐ O&M	TAKEOFF:
JOB LOCATION: Fan Room, Yard Area	PROJECT CODE: TBD	ESTIMATOR: RCMT
EST. STATUS: ☑ OUTAGE ☐ NON-OUTAGE	ORIGINATOR:	ORIG. DATE: 06/22/2012

* ESTIMATE LEVEL *

- ☑ **Conceptual**
- ☐ **Preliminary**
- ☐ **Definitive**

General Notes:

ESTIMATE SUMMARY

		MANHOURS	DOLLARS
EOI ENGINEERING			
01	STUDY, DESIGN, & CLOSEOUT	180	$ 18,000
02	DESIGN ENGR CONST SUPPORT	40	$ 4,000
03	MODS ENGR EOI SUPPORT	-	$ -
04	SYS ENGR/ S-U ENGR	160	$ 16,000
05	PROJECT MANAGEMENT	80	$ 9,600
06	TRAVEL & LIVING EXPENSES		$ -
07	ENGINEERING DCP ACCEPTANCE REVIEW	20	$ 2,000
CONTRACT ENGINEERING			
08	DESIGN ENGR CONTRACT SUPPORT	200	$ 24,000
09	SUPL CONTRACT MODS ENGR	-	$ -
10	MODS PLAN & SCHED -CONTRACT	40	$ 4,000
11	FIELD ENGRS / PLANNERS	40	$ 4,800
MATERIALS / MISC CONTRACTS			
12	MATERIALS		$ 9,498
13	OTHER CONTRACTS		$ -
CONTRACT CRAFT LABOR			
14	SWEC CRAFT LABOR/WALKDOWN	345	$ 35,513
15	LOST TIME	35	$ 4,232
16	SWEC DISTRIBS		$ 8,922
PLANT CRAFT LABOR			
17	MECH MAINT.	10	$ 1,000
18	ELECT MAINT	-	$ -
19	I&C	120	$ 12,000
20	CSG	-	$ -
MISC EOI SUPPORT			
21	QUALITY CONTROL	10	$ 1,000
22	NDE	10	$ 1,000
23	OPS / OPS SUPPORT	80	$ 9,600
24	HP / RP	60	$ 6,000
25	TRAINING OPS STAFF	48	$ 5,760
MISC CONTRACT SUPPORT			
26	QUALITY CONTROL	30	$ 2,400
27	NDE	-	$ -
28	HP / RP	-	$ -
29	WORK MANAGEMENT	-	$ -
30	RADWASTE	-	$ -
31	NURSE	-	$ -
32	ELEVATOR CONTRACTOR	-	$ -
33	WASTE MANAGEMENT	-	$ -
34	HOUSEKEEPING	-	$ -
35	EQUIPMENT RENTAL CONTRACTOR	-	$ -
36	VENDOR STOCKING	-	$ -
37	DECONTAMINATION CONTACTOR	-	$ -
38	RBC'S	-	$ -
39	SECURITY - Wackenhut	-	$ -
40	FIRE WATCH (Rover)	-	$ -
41	SAFETY	10	$ 721
CONTINGENCY			
42	CONTINGENCY		$ 36,409
ESTIMATE SUBTOTAL		1,538	$ 218,455
	SITE ENCUMBRANCE PREMIUM (20%)		$ 43,691
	LOADERS (30%)		$ 78,644
	ESTIMATE TOTAL		$ 340,790

ITEM	DESCRIPTION	QTY	UOM	CFT	NO.	MANHOURS UNIT	FCTR	TOTAL	$/MH	MATERIAL $ PER UNIT	MATERIAL DOLLARS	LABOR DOLLARS	SUB-CONTRACT	TOTAL $
1.	Gather and stage tools and materials	2	LT	PF	2	10.00	1.00	40	$ 120.71		$ -	$ 4,828		$ 4,828
2.	Tag-out (close) required valves	2	LT	OP	1	2.00	1.00	4	$ 100.00		$ -	$ 400		$ 400
3.	Purge or Vent 1" line of all Gas	1	LT	OP	1	8.00	1.00	8	$ 100.00			$ 800		$ 800
4.	Purge or Vent 1 1/2" line of all Gas	1	LT	OP	1	8.00	1.00	8	$ 100.00		$ -	$ 800		$ 800
5.	Cut and Remove required Section of 1" pipe	1	LT	PF	2	8.00	1.00	16	$ 120.71		$ -	$ 1,931		$ 1,931
6.	Cut and Remove required Section of 1 1/2 " pipe	1	LT	PF	2	8.00	1.00	18	$ 120.71		$ -	$ 1,931		$ 1,931
7.	Procure and install new 1" Excess Flow Valve	1	LT	PF	2	20.00	1.00	40	$ 120.71	$ 4,200.00	$ 4,200	$ 4,828		$ 9,028
8.	Procure and install new 1 1/2" Excess Flow Valve, Two Flanges and Isolation Kit	1	LT	PF	2	30.00	1.00	60	$ 120.71	$ 4,600.00	$ 4,600	$ 7,243		$ 11,843
9.	Provide testing as required	2	LT	OP	1	8.00	1.00	16	$ 100.00		$ -	$ 1,600		$ 1,600
10.	Assist with testing as required	2	LT	EL	1	8.00	1.00	16	$ 123.32		$ -	$ 1,973		$ 1,973
11.	Return Systems to service	2	LT	OP	1	4.00	1.00	8	$ 100.00		$ -	$ 800		$ 800
12.	Cleanup and restore area	2	LT	LB	2	4.00	1.00	16	$ 78.65		$ -	$ 1,258		$ 1,258
	PAINTING & TOUCH-UP REQUIREMENTS													
1.	PAINTING & TOUCH-UP	2	LF	PT	1	4.00	1.00	8	$ 95.18	$ 20.00	$ 160	$ 761		$ 921
2.	PAINTING & TOUCH-UP			PT				-			$ -	$ -		$ -
	FIRE WATCH / BOTTLEWATCH REQUIREMENTS													
1.	CRAFT SUPPORT FOR FIRE WATCH	1	LT	FW	1	70.00		70	$ 53.60		$ -	$ 3,752		$ 3,752
2.	CRAFT SUPPORT FOR BOTTLE WATCH	1	LT	FW				-			$ -	$ -		$ -
	MISC SUB-CONTRACT													
1.	MISC SUB-CONTRACT	1	LT										$ -	$ -
	SUBTOTAL CRAFT & SUB-CONTRACTOR							282			$ 8,960	$ 27,677	$ -	$ 36,637
1.	CONSTRUCTION SUPPORT (8% OF LABOR $)	1	LT					21	$ 98.15	$ -		$ 2,061		$ 2,061
	SUBTOTAL							303			$ 8,960	$ 29,738	$ -	$ 38,698

INDIAN POINT IMPLEMENTATION ESTIMATE WORK SHEET

EC #: SAMA IP3-053

PROJECT TITLE: Hydrogen Excess-Flow Valve Installation
JOB LOCATION: Fan Room, Yard Area
EST. STATUS: ☑ OUTAGE ☐ NON-OUTAGE

☑ CAPITAL ☐ O&M
PROJECT CODE: TBD
ORIGINATOR:

TAKEOFF:
ESTIMATOR: RCMT
ORIG. DATE: 06/22/2012

ITEM	DESCRIPTION	QTY	UOM	CFT	NO.	MANHOURS UNIT	FCTR	TOTAL	$/MH	MATERIAL $ PER UNIT	MATERIAL DOLLARS	LABOR DOLLARS	SUB-CONTRACT	TOTAL $
	* RELATED COSTS *													
1.	WALKDOWN ALLOWANCE	1	LT	EL				4	$ 123.32			$ 493		$ 493
2.	WORK PACKAGE REVIEW	1	LT	EL				27	$ 123.32			$ 3,330		$ 3,330
3.	TOOL ROOM ATTENDANTS (~3.5%)	1	LT	EL				11	$ 123.32			$ 1,357		$ 1,357
4.	GENERAL CRAFT OUTAGE DISTRIBS. (10%)											$ 2,974		$ 2,974
5.	CRAFT IN PROCESSING (20%)											$ 5,948		$ 5,948
6.	HUMAN PERFORMANCE & ALARA TRAINING	1	LT									$ 595		$ 595
7.	(1/2 day training, or ~ 2%)													
	SUBTOTAL							345			$ 8,960	$ 44,435	$ -	$ 53,395
	PLANT SCOPE													
1.	MECH MAINTENANCE	1	LT	PL	1	10.00	1.00	10	$ 100.00		$ -	$ 1,000		$ 1,000
								-			$ -	$ -		$ -
	SUBTOTAL MECH MAINT.							10			$ -	$ 1,000	$ -	$ 1,000
1.	ELECT MAINTENANCE	1	LT	EL				-			$ -	$ -		$ -
								-			$ -	$ -		$ -
	SUBTOTAL ELECT. MAINT.							-			$ -	$ -	$ -	$ -
1.	I&C (Develop Calibration and Maintenance Proce-	1	LT	PL	1	120.00	1.00	120	$ 100.00		$ -	$ 12,000		$ 12,000
2.	dures)							-			$ -	$ -		$ -
	SUBTOTAL I&C MAINT.							120			$ -	$ 12,000	$ -	$ 12,000
1.	CSG			PL				-			$ -	$ -		$ -
								-			$ -	$ -		$ -
	SUBTOTAL CSG MAINT.							-			$ -	$ -	$ -	$ -
	SUBTOTAL PLANT							130			$ -	$ 13,000	$ -	$ 13,000
	SUBTOTAL CRAFT/PLANT							475			$ 8,960	$ 57,435	$ -	$ 66,395
	IMPLEMENTATION SUPPORT													
	EOI													
1.	FIS / 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
3.	SYSTEMS ENGINEERING - MECHANICAL	1	LT	NM	1	20.00	1.00	20	$ 100.00			$ 2,000		$ 2,000
4.	SYSTEMS ENGINEERING - ELECTRICAL	1	LT	NM	1	80.00	1.00	80	$ 100.00			$ 8,000		$ 8,000
5.	SYSTEMS EINGINEERING - INSTR & CONTROL	1	LT	NM	1	20.00	1.00	20	$ 100.00			$ 2,000		$ 2,000
6.	SYSTEMS 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	80.00	1.00	80	$ 120.00			$ 9,600		$ 9,600
8.	TRAINING OPS STAFF	12	LT	NM	1	4.00	1.00	48	$ 120.00			$ 5,760		$ 5,760
9.	QA / QC VERIFICATION	1	LT	NM	1	10.00	1.00	10	$ 100.00			$ 1,000		$ 1,000
10.	NDE	1	LT	NM	1	10.00	1.00	10	$ 100.00			$ 1,000		$ 1,000
11.	HP / RP/ ALARA	1	LT	NM	1	80.00	1.00	80	$ 100.00			$ 8,000		$ 8,000
12.	WORK MANAGEMENT	1	LT	NM				-				$ -		$ -
13.	OPS / OPS PROCEDURE SUPPORT AND DEVELOPMENT	1	LT	NM	1	80.00	1.00	80	$ 120.00			$ 9,600		$ 9,600
14.	TRAVEL & LIVING EXPENSES	1	LT									$ -		$ -
	CONTRACTOR SUPPORT													
1.	FIS / MODS ENGINEERING - SWEC (Incl Per Diem)	1	LT	NM				-				$ -		$ -
2.	MODS PLANNING & SCH.- SWEC (Incl Per Diem)	1	LT	NM	1	40.00	1.00	40	$ 100.00			$ 4,000		$ 4,000
3.	FIELD ENGRS/PLAN- SWEC(Incl Per Diem)	1	LT	NM	1	40.00	1.00	40	$ 120.00			$ 4,800		$ 4,800
4.	QA / QC VERIFICATION	1	LT	NM	1	30.00	1.00	30	$ 80.00			$ 2,400		$ 2,400
5.	NDE	1	LT	NM								$ -		$ -
6.	HP / RP	1	LT	NM				-				$ -		$ -
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.	VENDOR STOCKING	1	LT	NM				-						
14.	DECONTAMINATION CONTRACTOR	1	LT	NM				-						
15.	RBC's	1	LT	NM				-						
16.	SECURITY	1	LT	SEC				-						
17.	FIREWATCH (Rover)	1	LT	NM				-						
18.	SAFETY (2%)	1	LT	NM				10	$ 72.14			$ 721		$ 721
19.	LOST TIME (10%)	1	LT					35	$ 120.92			$ 4,232		$ 4,232
	SUBTOTAL CRAFT/NON-MANUAL							1,138			$ 8,960	$ 128,548	$ -	$ 137,508
1.	FREIGHT, SALES TAX, & CONSUMABLES (6%)										$ 538			$ 538
	SUBTOTAL INSTALLATION COST							1,138			$ 9,498	$ 128,548	$ -	$ 138,046

INDIAN POINT IMPLEMENTATION ESTIMATE WORK SHEET

EC #: SAMA IP3-053

PROJECT TITLE: Hydrogen Excess-Flow Valve Installation
JOB LOCATION: Fan Room, Yard Area
EST. STATUS: ☑ OUTAGE ☐ NON-OUTAGE

☑ CAPITAL ☐ O&M
PROJECT CODE: TBD
ORIGINATOR:

TAKEOFF:
ESTIMATOR: RCMT
ORIG. DATE: 06/22/2012

ITEM	DESCRIPTION	QTY	UOM	MANHOURS CFT	NO.	UNIT	FCTR	TOTAL	$/MH	'MATERIAL $ PER UNIT	MATERIAL DOLLARS	LABOR DOLLARS	SUB-CONTRACT	TOTAL $
1.	DESIGN ENGINEERING - MECHANICAL	1	LT	NM	1	60.00	1.00	60	$ 100.00			$ 6,000		$ 6,000
2.	DESIGN ENGINEERING - ELECTRICAL	1	LT	NM	1	40.00	1.00	40	$ 100.00			$ 4,000		$ 4,000
3.	DESIGN ENGINEERING - INSTR. & CONTROL	1	LT	NM	1	40.00	1.00	40	$ 100.00			$ 4,000		$ 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	$ 2,000
	SUBTOTAL DESIGN COST							400				$ 18,000	$ 26,000	$ 44,000
	SUBTOTAL INSTALLATION & DESIGN COST											$ 146,548	$ 26,000	$ 182,046
1.	CONTINGENCY (20%)													$ 36,409
	ESTIMATE SUBTOTAL							1,538						$ 218,455

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: Peter Battaglia	Approved by: [signature]
Date: 9-20-2012	Date: 9-20-2012

TABLE OF CONTENTS

1.0 ISSUE

<u>**Severe Accident Mitigation Alternative (SAMA) IP3-055:**</u>

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

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
6. 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

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 **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.: SAMA IP3-055 **Rev. No.:** CONCEPTUAL 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	☐ 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	☐ 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

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	☒ NO
Cable and Raceway Program • Does the proposed activity involve any changes to cable trays, raceways or the associated documentation?	■ YES	☐ 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) *(if applicable)* • 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 • 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?	■ 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?	☐ 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

ATTACHMENT 9.3 IMPACT SCREENING SUMMARY

SHEET 3 OF 6

PROCESS OR PROGRAM IMPACT SCREENING CHECKLIST	Potential Impact	
Computer Support and Software • Does the proposed activity impact or involve changes to plant computer software or firmware or impact Software Quality Assurance (SQA)?	☐ YES	☒ NO
Chemistry and Environmental Impact • Does the proposed activity impact or involve any changes to plant chemistry requirements, operations or procedures, or any changes to the environment?	☐ YES	☒ NO
Radiation Protection (RP) Program Impact • 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?	■ 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	☐ 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 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

ATTACHMENT 9.3 IMPACT SCREENING SUMMARY

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	☒ 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?	☐ 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?	☐ 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

ATTACHMENT 9.3 IMPACT SCREENING SUMMARY

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	☒ 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	☒ 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	☒ 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?	☐ 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

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?	■ YES	☐ 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	☐ NO
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: PARTIAL SITE PLAN OF AREAS AFFECTED
2. Figure 2: PROVIDE ALTERNATE SAFE SHUTDOWN SYSTEM FOR 31 RHR AND 31 SI PUMP

RCM Technologies The Source of Smart Solutions	ENTERGY Indian Point Nuclear Station Unit 3	Conceptual Design Package SAMA IP3-055	Rev. 0

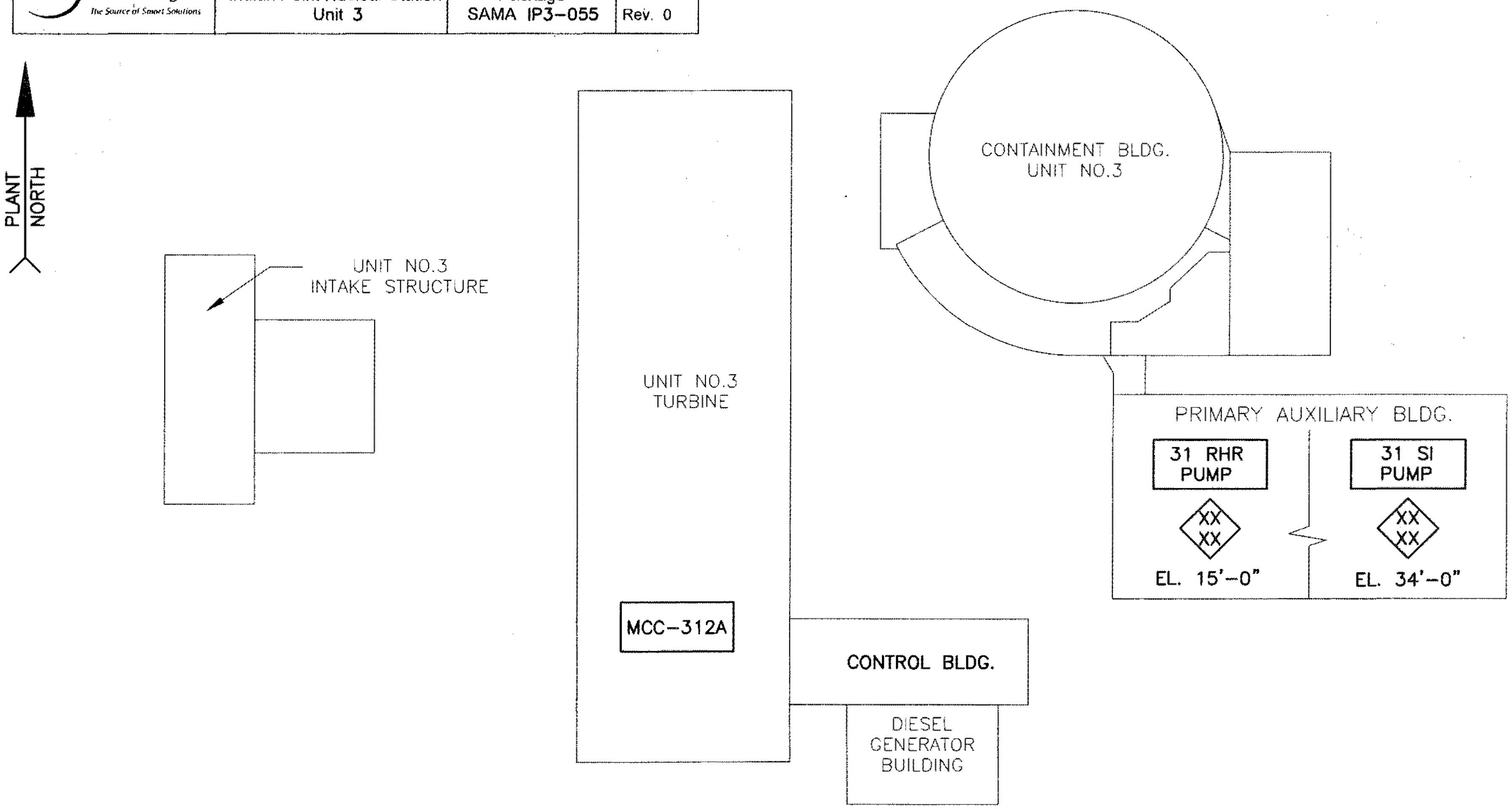
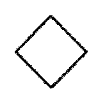


FIGURE 1
PARTIAL SITE PLAN OF AREAS AFFECTED
(NOT TO SCALE)


NEW MANUAL TRANSFER SWITCH AND OFFICIAL NUMBER DETERMINED LATER

RCM Technologies The Source of Smart Solutions	ENTERGY Indian Point Nuclear Station Unit 3	Conceptual Design Package SAMA IP3-055	Rev. 0

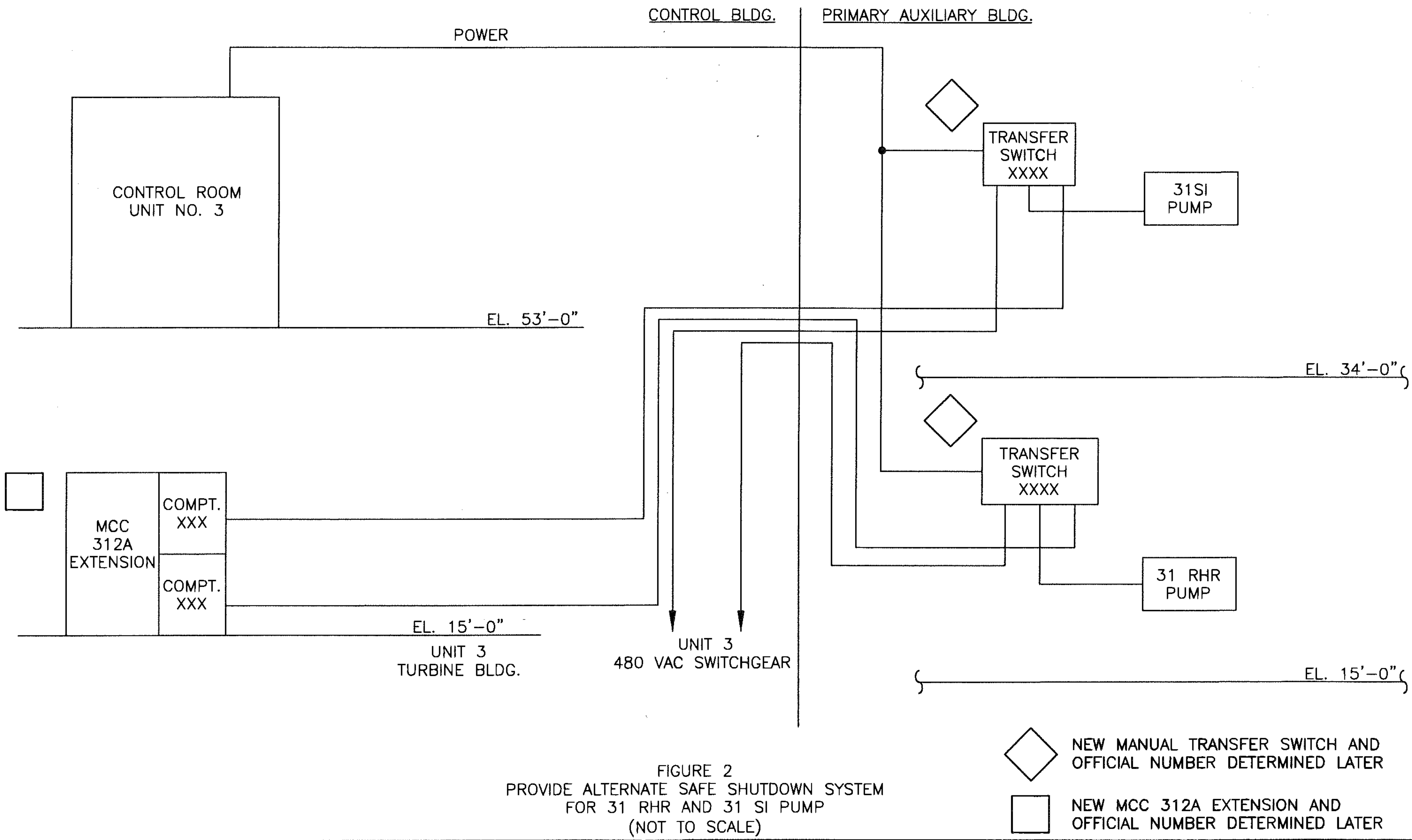


FIGURE 2
PROVIDE ALTERNATE SAFE SHUTDOWN SYSTEM
FOR 31 RHR AND 31 SI PUMP
(NOT TO SCALE)

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. ASCO Series 386 Non-Automatic Power Transfer Switches or Equivalent

Power Switching & Controls
for Business-Critical Continuity

ASCO SERIES 300 Power Transfer Switches

ASCO®

EMERSON
Network Power

IPEC00270350

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

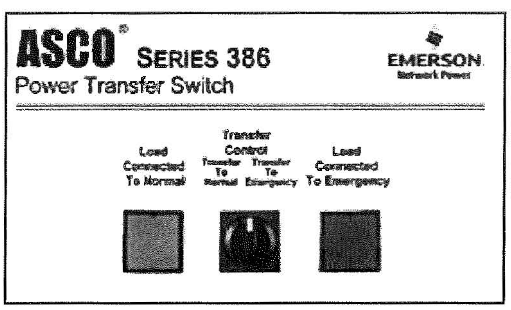


Fig. 15: Control and Display Panel

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

ENTERGY NUCLEAR NORTHEAST
IMPLEMENTATION ESTIMATE
Indian Point Nuclear Power Station

* ESTIMATE LEVEL *		EC #: SAMA IP3-055			
☑	Conceptual	PROJECT TITLE: 31 SI & 32 RHR Pumps Safe Shutdown	☑ CAPITAL ☐ O&M	ESTIMATOR: Doug Staton	
☐	Preliminary	JOB LOCATION: Primary Auxiliary & Turbine Buildings	PROJECT CODE: TBD		
☐	Definitive	☐ OUTAGE ☑ NON-OUTAGE	ORIGINATOR:	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, 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. Since the pumps are presently powered only from the Unit 3 switchgear room, the new requirement for the two pumps to be powered from an alternate source requires a load analysis for the 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: Peter Bettencourt		Approved by: [signature]
Date: 9-20-2012		Date: 9-20-2012

ENTERGY NUCLEAR NORTHEAST
IMPLEMENTATION ESTIMATE
Indian Point Nuclear Power Station

* ESTIMATE LEVEL *	**EC #: SAMA IP3-055**		
☑ **Conceptual**	PROJECT TITLE: 31 SI & 32 RHR Pumps Safe Shutdown		ESTIMATOR: Doug Staton
☐ **Preliminary**	JOB LOCATION: Primary Auxiliary & Turbine Buildings	PROJECT CODE: TBD	
☐ **Definitive**	ORIGINATOR:		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.	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 work will be performed by trained contract craftspersons in lieu of station maintenance personnel.
5.	This estimate assumes that core boring is required between El. 15' - 0" and 33' - 0" cable spreading area.
6.	This estimate assumes that a new motor control center will be installed in Unit 3 at Elevation 15' - 0" near MCC 312A.
7.	This estimate assumes that new MCC will be connected and powered by Station Maintenance personnel.
8.	This estimate does not include funding for unreviewed safety questions or NRC submittals, but if required the additional cost will be added.
9.	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).
10.	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.
11.	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 fence boundary - 30%
	C. Implementation complexity - 40%
	D. Inside Containment - 50%

INDIAN POINT IMPLEMENTATION ESTIMATE WORK SHEET

EC #: SAMA IP3-055

PROJECT TITLE: 31 SI & 32 RHR Pumps Safe Shutdown
JOB LOCATION: Primary Auxiliary & Turbine Buildings
EST. STATUS:

PROJECT CODE: TBD
ORIGINATOR:

TAKEOFF:
ESTIMATOR: Doug Staton
ORIG. DATE: 12/01/10

* ESTIMATE LEVEL *

- [x] Conceptual
- [ ] Preliminary
- [ ] Definitive

General Notes:

ESTIMATE SUMMARY

		MANHOURS	DOLLARS
EOI ENGINEERING			
01	STUDY, DESIGN, & CLOSEOUT	800	$ 80,000
02	DESIGN ENGR CONST SUPPORT	160	$ 16,000
03	MODS ENGR EOI SUPPORT	-	$ -
04	SYS ENGR/ S-U ENGR	280	$ 28,000
05	PROJECT MANAGEMENT	600	$ 72,000
06	WORK MANAGEMENT	-	$ -
07	ENGINEERING DCP ACCEPTANCE REVIEW	200	$ 20,000
CONTRACT ENGINEERING			
08	DESIGN ENGR CONTRACT SUPPORT	1,440	$ 172,800
09	SUPL CONTRACT MODS ENGR	-	$ -
10	MODS PLAN & SCHED -CONTRACT	160	$ 16,000
11	FIELD ENGRS / PLANNERS	140	$ 16,800
MATERIALS / MISC CONTRACTS			
12	MATERIALS		$ 14,804
13	OTHER CONTRACTS		$ -
CONTRACT CRAFT LABOR			
14	SWEC CRAFT LABOR/WALKDOWN	1,995	$ 205,269
15	LOST TIME	200	$ 26,108
16	SWEC DISTRIBS		$ 56,130
PLANT CRAFT LABOR			
17	MECH MAINT.	-	$ -
18	ELECT MAINT	32	$ 3,200
19	I&C	-	$ -
20	CSG	-	$ -
MISC EOI SUPPORT			
21	QUALITY CONTROL	120	$ 12,000
22	TRAINING	48	$ 5,760
23	CHEMISTRY	-	$ -
24	OPS / OPS SUPPORT	160	$ 19,200
25	HP / RP	80	$ 6,365
MISC CONTRACT SUPPORT			
26	QUALITY CONTROL	130	$ 10,400
27	NDE	-	$ -
28	HP / RP	-	$ -
29	RADWASTE	-	$ -
30	NURSE	-	$ -
31	ELEVATOR CONTRACTOR	-	$ -
32	WASTE MANAGEMENT	-	$ -
33	HOUSEKEEPING	-	$ -
34	EQUIPMENT RENTAL CONTRACTOR	-	$ -
35	VENDOR STOCKING	-	$ -
36	DECONTAMINATION CONTACTOR	-	$ -
37	RBC'S	-	$ -
38	SECURITY - Wackenhut	-	$ -
39	FIRE WATCH (Rover)	-	$ -
40	SAFETY	41	$ 2,788
CONTINGENCY			
41	CONTINGENCY		$ 235,087
ESTIMATE SUBTOTAL		**6,586**	**$ 1,018,711**
	SITE ENCUMBRANCE PREMIUM (20%)		**$ 203,742**
	LOADERS (30%)		**$ 366,736**
	ESTIMATE TOTAL		**$ 1,589,189**

ITEM	DESCRIPTION	QTY	UOM	CFT	NO.	MANHOURS UNIT	MANHOURS FCTR	MANHOURS TOTAL	$/MH	MATERIAL $ PER UNIT	MATERIAL DOLLARS	LABOR DOLLARS	SUB-CONTRACT	TOTAL $
	Preliminary to Tie-ins													
1.	Gather and stage tools and materials	1	LT	EL	4	10.00	1.00	40	$ 123.32		$ -	$ 4,933		$ 4,933
2.	Stage, erect & modify scaffolding as required	1	LT	CP	2	16.00	1.00	32	$ 96.00		$ -	$ 3,072		$ 3,072
3.	Stage, erect & modify scaffolding as required	1	LT	LB	1	16.00	1.00	16	$ 78.15		$ -	$ 1,250		$ 1,250
4.	Core drill as required to route new conduit	3	LT	EL	2	20.00	1.00	120	$ 123.32		$ -	$ 14,798		$ 14,798
5.	Procure & install new MCC312A EXT, 2 buckets and 480VAC switchgear as required	1	EA	EL	4	30.00	1.00	120	$ 123.32	$ 8,500.00	$ 8,500	$ 14,798		$ 23,298
6.	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	96	$ 123.32	$ 500.00	$ 1,000	$ 11,839		$ 12,839
7.	Procure and erect 1" conduit as required	200	LF	EL	2	0.18	1.00	72	$ 123.32	$ 1.75	$ 350	$ 8,879		$ 9,229
8.	Procure and erect 2" conduit as required	280	LF	EL	2	0.20	1.00	112	$ 123.32	$ 2.50	$ 700	$ 13,812		$ 14,512
9.	Procure and field erect junction box as required	14	EA	EL	2	1.00	1.00	28	$ 123.32	$ 10.00	$ 140	$ 3,453		$ 3,593
10.	Procure and field erect conduit support	60	EA	EL	5	1.00	1.00	300	$ 123.32	6.00	$ 360	$ 36,996		$ 37,356
11.	Procure, pull & route 2/c cable as required	720	LF	EL	2	0.018	1.00	26	$ 123.32	$ 1.25	$ 900	$ 3,206		$ 4,106
12.	Procure, pull & route 480VAC 4/c cable as required	1,344	LF	EL	2	0.03	1.00	81	$ 123.32	$ 1.50	$ 2,016	$ 9,989		$ 12,005
	Tie-ins for New Switches													
1.	Disconnect existing power cable at 31 SI & 31 RHR	2	LT	PL	2	30.00	1.00	120	$ 60.00		$ -	$ 7,200		$ 7,200
2.	Connect new power cable to 31 SI, 31 RHR & transfer switches	2	LT	PL	2	20.00	1.00	80	$ 60.00		$ -	$ 4,800		$ 4,800
3.	Connect power cable in MCC312A and MCC312A EXT	1	LT	PL	2	60.00	1.00	120	$ 60.00		$ -	$ 7,200		$ 7,200
4.	Provide testing as required	1	LT	PL	2	8.00	1.00	16	$ 60.00		$ -	$ 960		$ 960

INDIAN POINT IMPLEMENTATION ESTIMATE WORK SHEET

EC #: SAMA IP3-055

PROJECT TITLE: 31 SI & 32 RHR Pumps Safe Shutdown
JOB LOCATION: Primary Auxiliary & Turbine Buildings
EST. STATUS:
PROJECT CODE: TBD
ORIGINATOR:
TAKEOFF:
ESTIMATOR: Doug Staton
ORIG. DATE: 12/01/10

				MANHOURS						MATERIAL $	MATERIAL	LABOR	SUB-	
ITEM	DESCRIPTION	QTY	UOM	CFT	NO.	UNIT	FCTR	TOTAL	$/MH	PER UNIT	DOLLARS	DOLLARS	CONTRACT	TOTAL $
5.	Assist with testing as required	1	LT	EL	2	40.00	1.00	80	$ 123.32		$ -	$ 9,866		$ 9,866
6.	Dismantle scaffolding to storage	1	LT	CP	2	16.00	1.00	32	$ 96.00		$ -	$ 3,072		$ 3,072
7.	Dismantle scaffolding to storage	1	LT	LB	1	16.00	1.00	16	$ 78.15		$ -	$ 1,250		$ 1,250
8.	Cleanup and restore area	1	LT	EL	4	8.00	1.00	32	$ 123.32		$ -	$ 3,946		$ 3,946
	PAINTING & TOUCH-UP REQUIREMENTS													
1.	PAINTING & TOUCH-UP			PT				-			$ -	$ -		$ -
2.	PAINTING & TOUCH-UP			PT				-			$ -	$ -		$ -
	FIRE WATCH / BOTTLEWATCH REQUIREMENTS													
1.	CRAFT SUPPORT FOR FIRE WATCH	10	LT	FW	2	24.00	1.00	240	$ 53.60		$ -	$ 12,864		$ 12,864
2.	CRAFT SUPPORT FOR BOTTLE WATCH	1	LT	FW				-			$ -	$ -		$ -
	MISC SUB-CONTRACT													
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
	*** RELATED COSTS ***													
1.	WALKDOWN ALLOWANCE	1	LT	EL				17	$ 123.32			$ 2,096		$ 2,096
2.	WORK PACKAGE REVIEW	1	LT	EL				34	$ 123.32			$ 4,193		$ 4,193
3.	TOOL ROOM ATTENDANTS (~3.5%)	1	LT	EL				66	$ 123.32			$ 8,139		$ 8,139
4.	GENERAL CRAFT OUTAGE DISTRIBS. (10%)											$ 18,710		$ 18,710
5.	CRAFT IN PROCESSING (20%)											$ 37,420		$ 37,420
6.	HUMAN PERFORMANCE & ALARA TRAINING	1	LT									$ 3,742		$ 3,742
7.	(1/2 day training, or ~ 2%)													
	SUBTOTAL							1,995			$ 13,966	$ 261,399	$ -	$ 275,365
	PLANT SCOPE													
1.	**MECH MAINTENANCE**			PL				-			$ -	$ -		$ -
				PL				-			$ -	$ -		$ -
	SUBTOTAL MECH MAINT.							-			$ -	$ -	$ -	$ -
1.	**ELECT MAINTENANCE**	1	LT	PL	2	16.00	1.00	32	$ 100.00		$ -	$ 3,200		$ 3,200
				PL				-			$ -	$ -		$ -
	SUBTOTAL ELECT. MAINT.							32			$ -	$ 3,200	$ -	$ 3,200
1.	**I&C**			PL				-			$ -	$ -		$ -
				PL				-			$ -	$ -		$ -
	SUBTOTAL I&C MAINT.							-			$ -	$ -	$ -	$ -
1.	**CSG**			PL				-			$ -	$ -		$ -
				PL				-			$ -	$ -		$ -
	SUBTOTAL CSG MAINT.							-			$ -	$ -	$ -	$ -
	SUBTOTAL PLANT							32			$ -	$ 3,200	$ -	$ 3,200
	SUBTOTAL CRAFT/PLANT							2,027			$ 13,966	$ 264,599	$ -	$ 278,565
	IMPLEMENTATION SUPPORT													
	EOI													
1.	FIS / MODS ENGINEERING	1	LT	NM				-				$ -		$ -
2.	DESIGN ENGINEERING SUPT DURING CONST	1	LT	NM	1	160.00	1.00	160	$ 100.00			$ 16,000		$ 16,000
3.	SYSTEMS ENGINEERING - MECHANICAL	1	LT	NM				-				$ -		$ -
4.	SYSTEMS ENGINEERING - ELECTRICAL	1	LT	NM	1	160.00	1.00	160	$ 100.00			$ 16,000		$ 16,000
5.	SYSTEMS EINGINEERING - INSTR & CONTROL	1	LT	NM	1	40.00	1.00	40	$ 100.00			$ 4,000		$ 4,000
6.	SYSTEMS ENGINEERING - CIVIL STRUCTURAL	1	LT	NM	1	80.00	1.00	80	$ 100.00			$ 8,000		$ 8,000
7.	PROJECT MANAGEMENT	1	LT	NM	1	600.00	1.00	600	$ 120.00			$ 72,000		$ 72,000
8.	WORK MANAGEMENT(W.O. Development)	1	LT	NM	1									
9.	QA / QC VERIFICATION	1	LT	NM	1	120.00	1.00	120	$ 100.00			$ 12,000		$ 12,000
10.	TRAINING OPS STAFF	12	LT	NM	1	4.00	1.00	48	$ 120.00			$ 5,760		$ 5,760
11.	HP / RP/ ALARA	1	LT	NM	1	80.00	1.00	80	$ 79.56			$ 6,365		$ 6,365
12.	CHEMISTRY	1	LT	NM				-				$ -		$ -
13.	OPS(New proc dev / rev existing proc)	1	LT	NM	1	160.00	1.00	160	$ 120.00			$ 19,200		$ 19,200
14.	TRAVEL & LIVING EXPENSES	1	LT									$ -		$ -
	CONTRACTOR SUPPORT													
1.	FIS / MODS ENGINEERING - SWEC (Incl Per Diem	1	LT	NM	1			-				$ -		$ -
2.	MODS PLANNING & SCH.- SWEC (Incl Per Diem)	1	LT	NM	1	160.00	1.00	160	$ 100.00			$ 16,000		$ 16,000
3.	FIELD ENGRS/PLAN- SWEC	1	LT	NM	1	140.00	1.00	140	$ 120.00			$ 16,800		$ 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				-				$ -		$ -
6.	HP / RP	1	LT	NM				-				$ -		$ -
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				-						

INDIAN POINT IMPLEMENTATION ESTIMATE WORK SHEET

EC #: SAMA IP3-055

PROJECT TITLE: 31 SI & 32 RHR Pumps Safe Shutdown
JOB LOCATION: Primary Auxiliary & Turbine Buildings
EST. STATUS:

PROJECT CODE: TBD
ORIGINATOR:

TAKEOFF:
ESTIMATOR: Doug Staton
ORIG. DATE: 12/01/10

ITEM	DESCRIPTION	QTY	UOM	MANHOURS CFT	NO.	UNIT	FCTR	TOTAL	$/MH	MATERIAL $ PER UNIT	MATERIAL DOLLARS	LABOR DOLLARS	SUB-CONTRACT	TOTAL $
13.	VENDOR STOCKING	1	LT	NM				-						
14.	DECONTAMINATION CONTRACTOR	1	LT	NM				-						
15.	RBC's	1	LT	NM				-						
16.	SECURITY	1	LT	SEC				-						
17.	FIREWATCH (Rover)	1	LT	NM				-				$ -		$ -
18.	SAFETY (2%)	1	LT	NM				41	$ 68.00			$ 2,788		$ 2,788
19.	LOST TIME (10%)	1	LT					200	$ 130.54			$ 26,108		$ 26,108
	SUBTOTAL CRAFT/NON-MANUAL							4,146			$ 13,966	$ 496,020	$ -	$ 509,986
1.	FREIGHT, SALES TAX, & CONSUMABLES (6%)										$ 838			$ 838
	SUBTOTAL INSTALLATION COST							4,146			$ 14,804	$ 496,020	$ -	$ 510,824
1.	DESIGN ENGINEERING - MECHANICAL	1	LT	NM				-				$ -		$ -
2.	DESIGN ENGINEERING - ELECTRICAL	1	LT	NM	1	800.00	1.00	800	$ 100.00			$ 80,000		$ 80,000
3.	DESIGN ENGINEERING - INSTR. & CONTROL	1	LT	NM				-				$ -		$ -
4.	DESIGN ENGINEERING - CIVIL/STRUCTURAL	1	LT	NM				-				$ -		$ -
5.	CONTRACT ENGR DESIGN SUPPORT	1	LT	NM	1	1,440.00	1.00	1,440	$ 120.00				$ 172,800	$ 172,800
6.	ENGINEERING DCP ACCEPTANCE REVIEW	1	LT	NM	1	200.00	1.00	200	$ 100.00				$ 20,000	$ 20,000
	SUBTOTAL DESIGN COST							2,440				$ 80,000	$ 192,800	$ 272,800
	SUBTOTAL INSTALLATION & DESIGN COST							6,586				$ 576,020	$ 192,800	$ 783,624
1.	CONTINGENCY (30%)													$ 235,087
	ESTIMATE SUBTOTAL													$ 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: Peter Battaglia		Approved by:
Date: 9-20-2012		Date:

TABLE OF CONTENTS

1.0 ISSUE

<u>Severe Accident Mitigation Alternative (SAMA) IP3-061:</u>

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

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
7. 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

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.: SAMA IP3-061 **Rev. No.:** CONCEPTUAL 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	☐ 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	☐ 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

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	☒ NO
Cable and Raceway Program • Does the proposed activity involve any changes to cable trays, raceways or the associated documentation?	■ YES	☐ 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) *(if applicable)* • 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 • 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?	■ 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?	☐ 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

ATTACHMENT 9.3 IMPACT SCREENING SUMMARY

SHEET 3 OF 6

PROCESS OR PROGRAM IMPACT SCREENING CHECKLIST	Potential Impact	
Computer Support and Software • Does the proposed activity impact or involve changes to plant computer software or firmware or impact Software Quality Assurance (SQA)?	☐ YES	☒ NO
Chemistry and Environmental Impact • Does the proposed activity impact or involve any changes to plant chemistry requirements, operations or procedures, or any changes to the environment?	☐ YES	☒ NO
Radiation Protection (RP) Program Impact • 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?	■ 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	☐ 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 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

ATTACHMENT 9.3 **IMPACT SCREENING SUMMARY**

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	☒ 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?	☐ 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?	☐ 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

ATTACHMENT 9.3 — IMPACT SCREENING SUMMARY

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	☒ 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	☒ 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	☒ 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?	☐ 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

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?	■ YES	☐ 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	☐ NO
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: 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

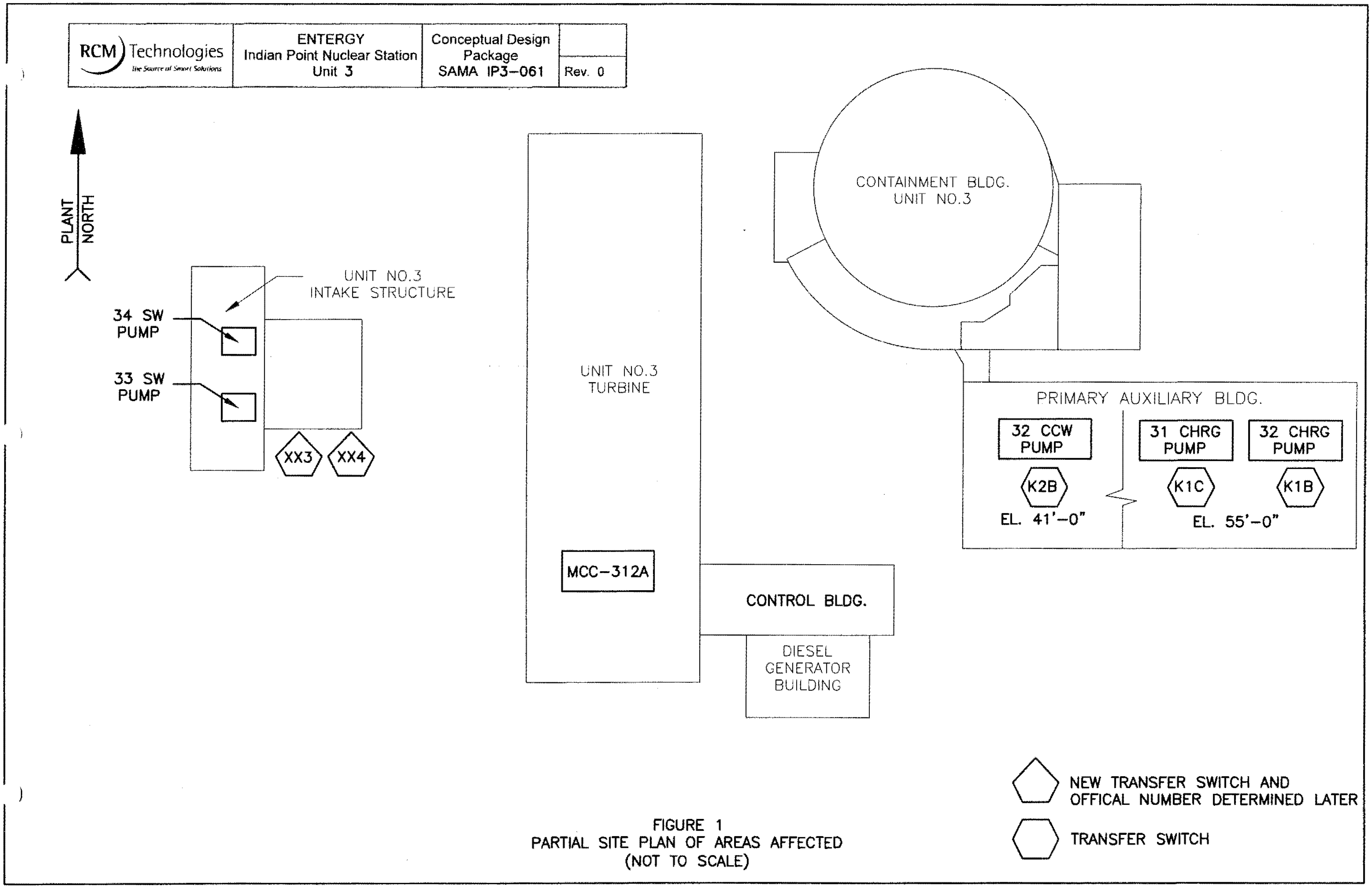


FIGURE 1
PARTIAL SITE PLAN OF AREAS AFFECTED
(NOT TO SCALE)

RCM Technologies The Source of Smart Solutions	ENTERGY Indian Point Nuclear Station Unit 3	Conceptual Design Package SAMA IP3-061	Rev. 0

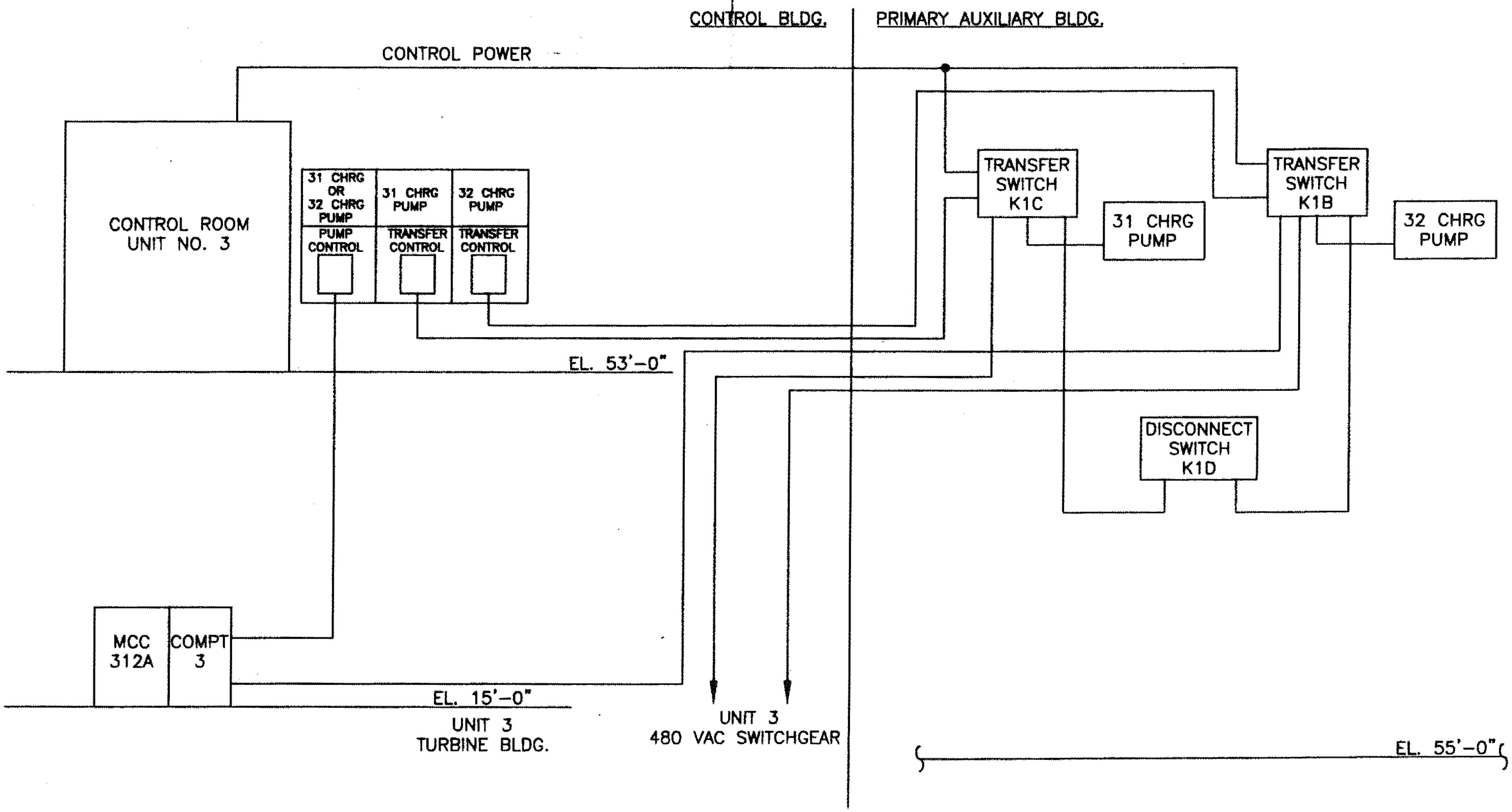


FIGURE 2
UPGRADE ALTERNATE SAFE SHUTDOWN SYSTEM
FOR 31 CHRG AND 32 CHRG PUMP
(NOT TO SCALE)

IPEC00270375

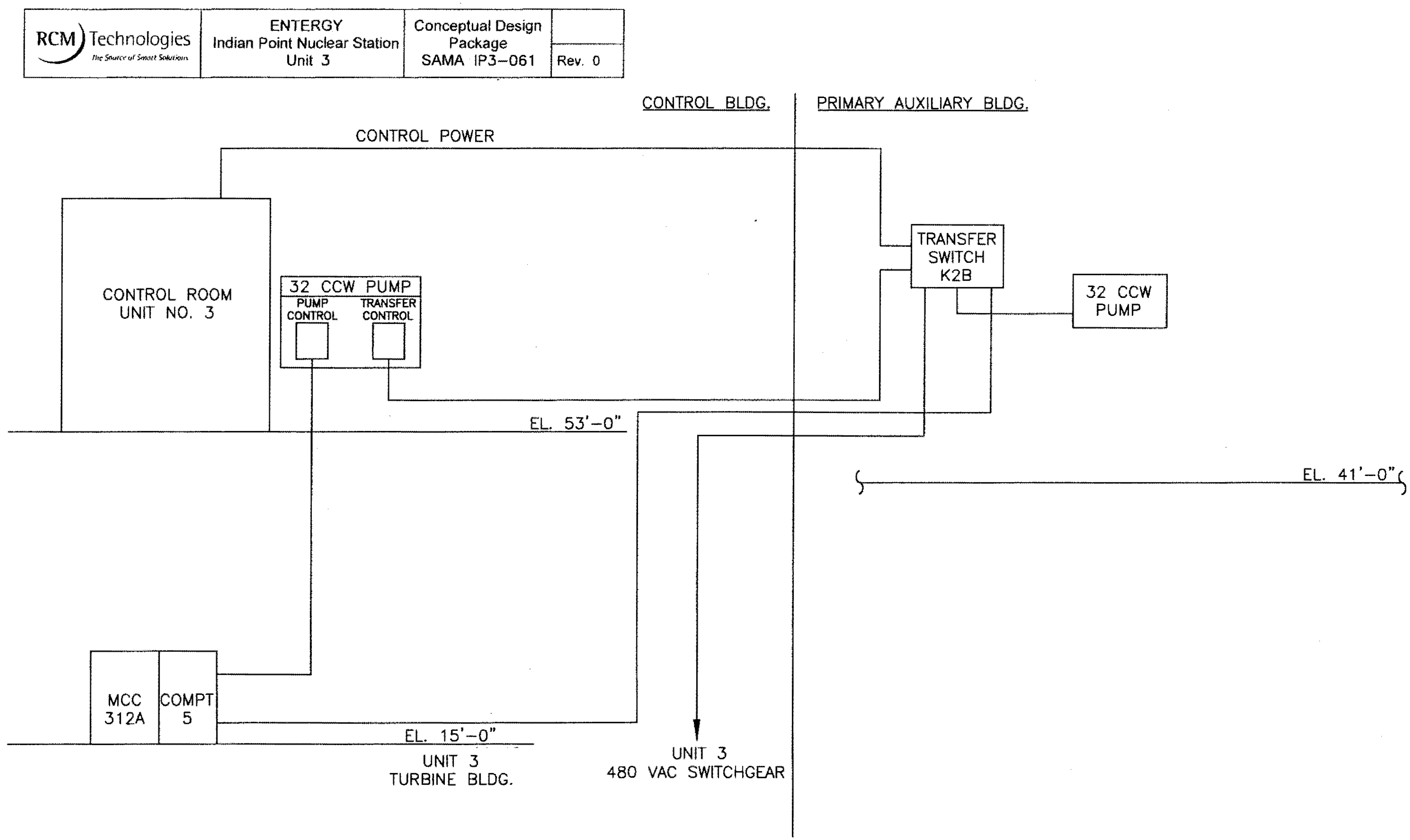


FIGURE 3
UPGRADE ALTERNATE SAFE SHUTDOWN SYSTEM
FOR 32 CCW PUMP
(NOT TO SCALE)

IPEC00270376

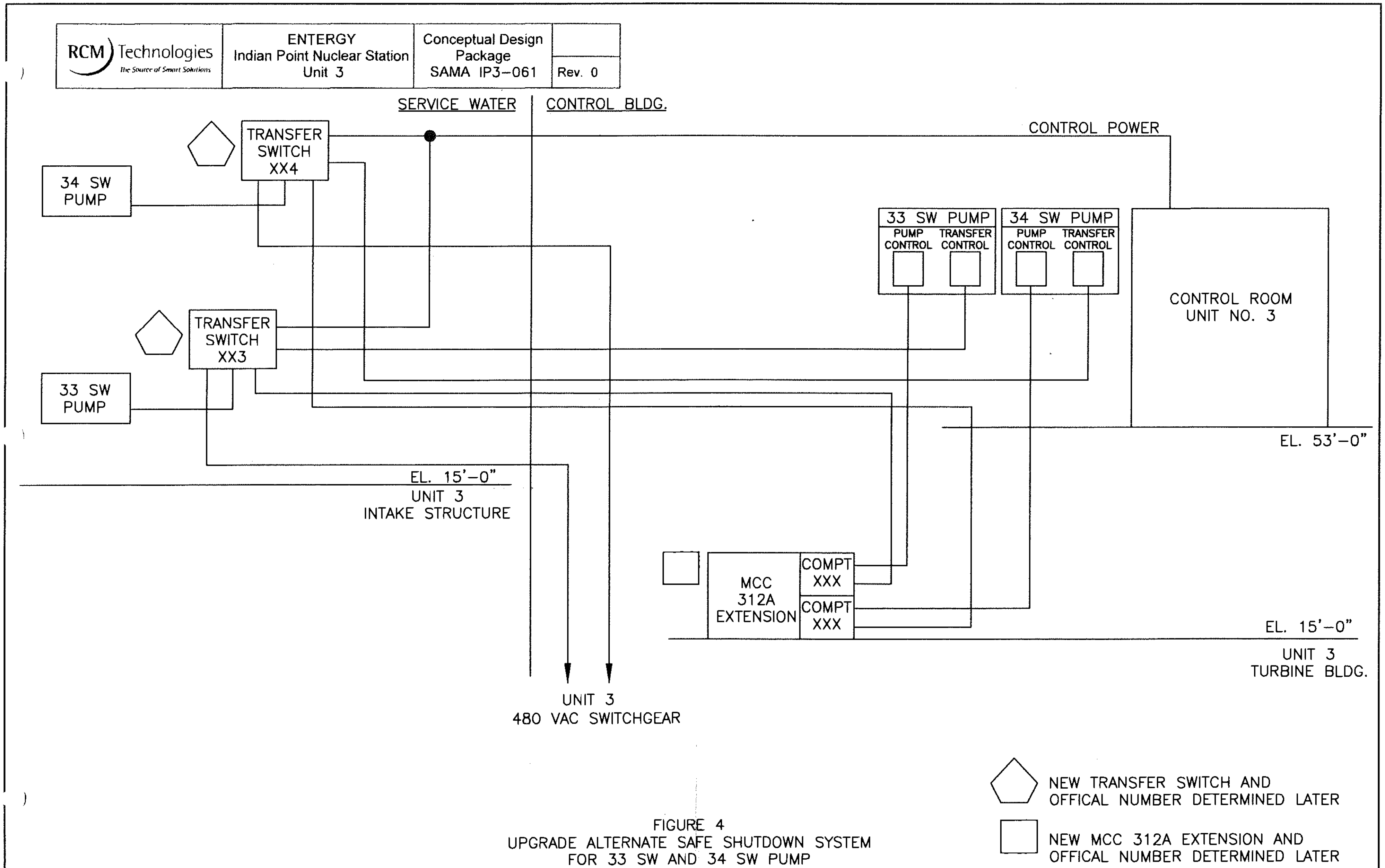


FIGURE 4
UPGRADE ALTERNATE SAFE SHUTDOWN SYSTEM
FOR 33 SW AND 34 SW PUMP
(NOT TO SCALE)

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. ASCO Series 386 Non-Automatic Power Transfer Switches or Equivalent (attached here)

Power Switching & Controls
for Business-Critical Continuity

ASCO SERIES 300 Power Transfer Switches



ASCO®

EMERSON
Network Power

IPEC00270378

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

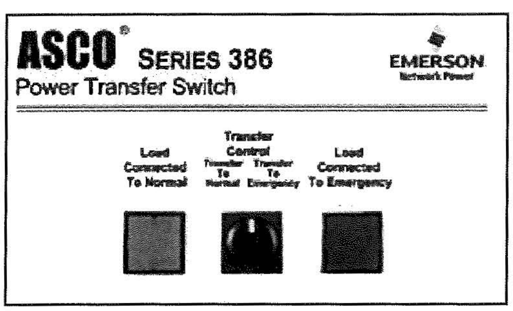


Fig. 15: Control and Display Panel

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

ENTERGY NUCLEAR NORTHEAST IMPLEMENTATION ESTIMATE Indian Point Nuclear Power Station			
* ESTIMATE LEVEL *	EC #: SAMA IP3-061		
☑ Conceptual	PROJECT TITLE: RCP Cooling System Safe Shutdown		ESTIMATOR: RCMT
☐ Preliminary	JOB LOCATION: Auxiliary, Intake & Turbine Buildings		PROJECT CODE: TBD
☐ Definitive	☐ OUTAGE ☑ NON-OUTAGE ORIGINATOR:	☑ CAPITAL ☐ O&M	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, resolution is required to provide the ability to switch Pump 32 CCW, and Pumps 33 CHRG and 34 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

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: Peter Battaccoli		Approved by:
Date: 9-20-2012		Date: 9-20-2012

ENTERGY NUCLEAR NORTHEAST
IMPLEMENTATION ESTIMATE
Indian Point Nuclear Power Station

* ESTIMATE LEVEL *	**EC #: SAMA IP3-061**
☑ **Conceptual**	PROJECT TITLE: RCP Cooling System Safe Shutdown ☑ CAPITAL ☐ O&M ESTIMATOR: RCMT
☐ **Preliminary**	JOB LOCATION: Auxiliary, Intake & Turbine Buildings PROJECT CODE: TBD
☐ **Definitive**	☐ OUTAGE ☑ NON-OUTAGE ORIGINATOR: ORIG. DATE: 07/19/2012

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 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).
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.	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 fence boundary - 30%
	C. Implementation complexity - 40%
	D. Inside Containment - 50%

Rev. 10-0

INDIAN POINT IMPLEMENTATION ESTIMATE WORK SHEET

EC #: SAMA IP3-061

10/3/2012 5:17 PM
IP3-061.xlsx

PROJECT TITLE: RCP Cooling System Safe Shutdown
JOB LOCATION: Auxiliary, Intake & Turbine Buildings
EST. STATUS: ☐ OUTAGE ☑ NON-OUTAGE

☑ CAPITAL ☐ O&M
PROJECT CODE: TBD
ORIGINATOR:

TAKEOFF:
ESTIMATOR: RCMT
ORIG. DATE: 07/19/2012

*** ESTIMATE LEVEL ***

- Conceptual
- Preliminary
- Definitive

General Notes:

ESTIMATE SUMMARY

		MANHOURS	DOLLARS
EOI ENGINEERING			
01	STUDY, DESIGN, & CLOSEOUT	480	$ 48,000
02	DESIGN ENGR CONST SUPPORT	160	$ 16,000
03	MODS ENGR EOI SUPPORT	-	$ -
04	SYS ENGR/ S-U ENGR	280	$ 28,000
05	PROJECT MANAGEMENT	640	$ 76,800
06	WORK MANAGEMENT	-	$ -
07	ENGINEERING DCP ACCEPTANCE REVIEW	120	$ 12,000
CONTRACT ENGINEERING			
08	DESIGN ENGR CONTRACT SUPPORT	1,680	$ 201,600
09	SUPL CONTRACT MODS ENGR	-	$ -
10	MODS PLAN & SCHED -CONTRACT	260	$ 26,000
11	FIELD ENGRS / PLANNERS	220	$ 26,400
MATERIALS / MISC CONTRACTS			
12	MATERIALS		$ 73,447
13	OTHER CONTRACTS		$ -
CONTRACT CRAFT LABOR			
14	SWEC CRAFT LABOR/WALKDOWN	3,180	$ 349,291
15	LOST TIME	318	$ 44,600
16	SWEC DISTRIBS		$ 97,976
PLANT CRAFT LABOR			
17	MECH MAINT.	-	$ -
18	ELECT MAINT	32	$ 3,200
19	I&C	-	$ -
20	CSG	-	$ -
MISC EOI SUPPORT			
21	QUALITY CONTROL	200	$ 20,000
22	TRAINING	96	$ 11,520
23	CHEMISTRY	-	$ -
24	OPS / OPS SUPPORT	320	$ 38,400
25	HP / RP	240	$ 19,094
MISC CONTRACT SUPPORT			
26	QUALITY CONTROL	210	$ 16,800
27	NDE	-	$ -
28	HP / RP	-	$ -
29	RADWASTE	-	$ -
30	NURSE	-	$ -
31	ELEVATOR CONTRACTOR	-	$ -
32	WASTE MANAGEMENT	-	$ -
33	HOUSEKEEPING	-	$ -
34	EQUIPMENT RENTAL CONTRACTOR	-	$ -
35	VENDOR STOCKING	-	$ -
36	DECONTAMINATION CONTACTOR	-	$ -
37	RBC'S	-	$ -
38	SECURITY - Wackenhut	-	$ -
39	FIRE WATCH (Rover)	-	$ -
40	SAFETY	64	$ 4,352
CONTINGENCY			
41	CONTINGENCY		$ 334,044
ESTIMATE SUBTOTAL		**8,500**	**$ 1,447,524**
	SITE ENCUMBRANCE PREMIUM (20%)		**$ 289,505**
	LOADERS (30%)		**$ 521,109**
	ESTIMATE TOTAL		**$ 2,258,137**

ITEM	DESCRIPTION	QTY	UOM	CFT	NO.	MANHOURS UNIT	FCTR	TOTAL	$/MH	MATERIAL $ PER UNIT	MATERIAL DOLLARS	LABOR DOLLARS	SUB-CONTRACT	TOTAL $
	Preliminary to Tie-ins													
1.	Gather and stage tools and materials	1	LT	EL	4	10.00	1.00	40	$ 123.32		$ -	$ 4,933		$ 4,933
2.	Stage, erect and modify scaffolding	1	LT	CP	2	60.00	1.00	120	$ 96.00			$ 11,520		$ 11,520
3.	Core drill as required to route new conduits	4	LT	EL	2	20.00	1.00	160	$ 123.32		$ -	$ 19,731		$ 19,731
4.	Procure & erect conduit supports from 32 CCW, 31 & 32 CHRG and 33 & 34 SW pumps	350	LF	EL	2	0.18	1.00	126	$ 123.32	$ 2.50	$ 875	$ 15,538		$ 16,413
5.	Procure & erect conduit from 32 CCW, 31 & 32 CHRG and 33 & 34 SW pumps	350	LF	EL	4	0.18	1.00	252	$ 123.32	$ 2.50	$ 875	$ 31,077		$ 31,952
6.	Procure and install Hoffman boxes for switches	4	EA	EL	2	10.00	1.00	80	$ 123.32	$ 3,000.00	$ 12,000	$ 9,866		$ 21,866
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	$ 500.00	$ 4,500	$ 8,879		$ 13,379
8.	Determinate & removie existing manual switches 32CCW, 33CHRG, 34CHRG.	3	EA	EL	2	20.00	1.00	120	$ 123.32		$ -	$ 14,798		$ 14,798
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	$ 7,500.00	$ 22,500	$ 17,758		$ 40,258
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	$ 7,500.00	$ 15,000	$ 19,731		$ 34,731
11.	Procure and install MCC extension ofr MCC 312A	1	EA	EL	2	60.00	1.00	120	$ 123.32	$ 1,200.00	$ 1,200	$ 14,798		$ 15,998
12.	Procure and pull 480VAC 4/c power cable	720	LF	EL	2	0.06	1.00	86	$ 123.32	$ 1.50	$ 1,080	$ 10,606		$ 11,686
13.	Procure and pull 4/c control cable	1,200	LF	EL	2	0.04	1.00	96	$ 123.32	$ 1.25	$ 1,500	$ 11,839		$ 13,339
14.	Procure and pull 2/c control cable	2,400	LF	EL	2	0.020	1.00	96	$ 123.32	$ 1.15	$ 2,760	$ 11,839		$ 14,599
								-						$ -

INDIAN POINT IMPLEMENTATION ESTIMATE WORK SHEET

EC #: SAMA IP3-061

PROJECT TITLE: RCP Cooling System Safe Shutdown
JOB LOCATION: Auxiliary, Intake & Turbine Buildings
EST. STATUS: ☐ OUTAGE ☑ NON-OUTAGE
☑ CAPITAL ☐ O&M
PROJECT CODE: TBD
ORIGINATOR:
TAKEOFF:
ESTIMATOR: RCMT
ORIG. DATE: 07/19/2012

ITEM	DESCRIPTION	QTY	UOM	CFT	NO.	MANHOURS UNIT	FCTR	TOTAL	$/MH	MATERIAL $ PER UNIT	MATERIAL DOLLARS	LABOR DOLLARS	SUB-CONTRACT	TOTAL $
	Tie-ins for New Switches							-						$ -
1.	Disconnect power feeds at 33 SW and 34 SW	1	LT	PL	2	60.00	1.00	120	$ 60.00		$ -	$ 7,200		$ 7,200
2.	Connect power feeds and controls to new switches	1	LT	PL	2	40.00	1.00	80	$ 60.00		$ -	$ 4,800		$ 4,800
3.	Disconnect power feeds at 32 CCW, 33 CHRG and 34 CHRG	1	LT	PL	2	60.00	1.00	120	$ 60.00		$ -	$ 7,200		$ 7,200
4.	Connect power feedsand controls to new switches	1	LT	PL	2	40.00	1.00	80	$ 60.00		$ -	$ 4,800		$ 4,800
5.	Terminate cables in CR Area, MCC312A, MCC312A EXT	2	EA	PL	2	40.00	1.00	160	$ 60.00	$ 3,500.00	$ 7,000	$ 9,600		$ 16,600
6.	Test pump switching for proper operation	1	LT	PL	2	40.00	1.00	80	$ 60.00		$ -	$ 4,800		$ 4,800
7.	Scaffolding Dismantle	1	LT	CP	2	40.00	1.00	80	$ 96.00		$ -	$ 7,680		$ 7,680
8.	Cleanup and restore work areas	1	LT	EL	3	40.00	1.00	120	$ 123.32		$ -	$ 14,798		$ 14,798
	PAINTING & TOUCH-UP REQUIREMENTS													
1.	PAINTING & TOUCH-UP			PT				-			$ -	$ -		$ -
2.	PAINTING & TOUCH-UP			PT				-			$ -	$ -		$ -
	FIRE WATCH / BOTTLEWATCH REQUIREMENTS													
1.	CRAFT SUPPORT FOR FIRE WATCH	30	LT	FW	3	24.00	1.00	720	$ 53.60		$ -	$ 38,592		$ 38,592
2.	CRAFT SUPPORT FOR BOTTLE WATCH	1	LT	FW				-			$ -	$ -		$ -
	MISC SUB-CONTRACT													
1.	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.	OUTAGE WALKDOWN ALLOWANCE	1	LT	PF				26	$ 120.71			$ 3,138		$ 3,138
2.	WORK PACKAGE REVIEW	1	LT	PF				40	$ 120.71			$ 4,828		$ 4,828
3.	OUTAGE TOOL ROOM ATTENDANTS (~3.5%)	1	LT	LB				105	$ 78.15			$ 8,206		$ 8,206
4.	GENERAL CRAFT OUTAGE DISTRIBS. (10%)											$ 32,659		$ 32,659
5.	CRAFT IN PROCESSING (20%)											$ 65,317		$ 65,317
6.	HUMAN PERFORMANCE & ALARA TRAINING	1	LT									$ 6,532		$ 6,532
7.	(1/2 day training, or ~ 2%)													
	SUBTOTAL							3,180			$ 69,290	$447,267	$ -	$ 516,557
	PLANT SCOPE													
1.	**MECH MAINTENANCE**			PL				-			$ -	$ -		$ -
				PL				-			$ -	$ -		$ -
	SUBTOTAL MECH MAINT.							-			$ -	$ -	$ -	$ -
1.	**ELECT MAINTENANCE**	1	LT	PL	2	16.00	1.00	32	$ 100.00		$ -	$ 3,200		$ 3,200
				PL				-			$ -	$ -		$ -
	SUBTOTAL ELECT. MAINT.							32			$ -	$ 3,200	$ -	$ 3,200
1.	**I&C**			PL				-			$ -	$ -		$ -
				PL				-			$ -	$ -		$ -
	SUBTOTAL I&C MAINT.							-			$ -	$ -	$ -	$ -
1.	**CSG**			PL				-			$ -	$ -		$ -
				PL				-			$ -	$ -		$ -
	SUBTOTAL CSG MAINT.							-			$ -	$ -	$ -	$ -
	SUBTOTAL PLANT							32			$ -	$ 3,200	$ -	$ 3,200
	SUBTOTAL CRAFT/PLANT							3,212			$ 69,290	$450,467	$ -	$ 519,757
	IMPLEMENTATION SUPPORT													
	EOI													
1.	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
3.	SYSTEMS ENGINEERING - MECHANICAL	1	LT	NM				-				$ -		$ -
4.	SYSTEMS ENGINEERING - ELECTRICAL	1	LT	NM	1	160.00	1.00	160	$ 100.00			$ 16,000		$ 16,000
5.	SYSTEMS EINGINEERING - INSTR & CONTROL	1	LT	NM	1	120.00	1.00	120	$ 100.00			$ 12,000		$ 12,000
6.	SYSTEMS ENGINEERING - CIVIL STRUCTURAL	1	LT	NM				-				$ -		$ -
7.	PROJECT MANAGEMENT	1	LT	NM	1	640.00	1.00	640	$ 120.00			$ 76,800		$ 76,800
8.	TRAINING (OPS STAFF)	12	LT	NM	1	8.00	1.00	96	$ 120.00			$ 11,520		$ 11,520
9.	QA / QC VERIFICATION	1	LT	NM	1	200.00	1.00	200	$ 100.00			$ 20,000		$ 20,000
10.	WORK MANAGEMENT	1	LT	NM										
11.	HP / RP/ ALARA	3	LT	NM	1	80.00	1.00	240	$ 79.56			$ 19,094		$ 19,094
12.	CHEMISTRY	1	LT	NM				-				$ -		$ -
13.	OPS / OPS PROCEDURE SUPPORT & DEVELOPMENT	1	LT	NM	1	320.00	1.00	320	$ 120.00			$ 38,400		$ 38,400
14.	TRAVEL & LIVING EXPENSES	1	LT									$ -		$ -
	CONTRACTOR SUPPORT													
1.	FIS / MODS ENGINEERING - SWEC (Incl Per Diem)													
2.	MODS PLANNING & SCH.- SWEC (Incl Per Diem)	1	LT	NM	1	260.00	1.00	260	$ 100.00			$ 26,000		$ 26,000
3.	FIELD ENGRS/PLAN- SWEC (Incl Per Diem)	1	LT	NM	1	220.00	1.00	220	$ 120.00			$ 26,400		$ 26,400
4.	QA / QC VERIFICATION	1	LT	NM	1	210.00	1.00	210	$ 80.00			$ 16,800		$ 16,800
5.	NDE	1	LT	NM				-				$ -		$ -
6.	HP / RP	1	LT	NM				-				$ -		$ -
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.	VENDOR STOCKING	1	LT	NM				-						
14.	DECONTAMINATION CONTRACTOR	1	LT	NM				-						
15.	RBC's	1	LT	NM				-						
16.	SECURITY	1	LT	SEC				-						
17.	FIREWATCH (Rover)	1	LT	NM				-				$ -		$ -
18.	SAFETY (2%)	1	LT	NM				64	$ 68.00			$ 4,352		$ 4,352
19.	LOST TIME (10%)	1	LT					318	$ 140.25			$ 44,600		$ 44,600
	SUBTOTAL CRAFT/NON-MANUAL							6,220			$ 69,290	$778,433	$ -	$ 847,723

INDIAN POINT IMPLEMENTATION ESTIMATE WORK SHEET

EC #: SAMA IP3-061

PROJECT TITLE: RCP Cooling System Safe Shutdown
JOB LOCATION: Auxiliary, Intake & Turbine Buildings
T. STATUS: ☐ OUTAGE ☑ NON-OUTAGE

☑ CAPITAL ☐ O&M
PROJECT CODE: TBD
ORIGINATOR:

TAKEOFF:
ESTIMATOR: RCMT
ORIG. DATE: 07/19/2012

ITEM	DESCRIPTION	QTY	UOM	MANHOURS CFT	NO.	UNIT	FCTR	TOTAL	$/MH	MATERIAL $ PER UNIT	MATERIAL DOLLARS	LABOR DOLLARS	SUB-CONTRACT	TOTAL $
1.	FREIGHT, SALES TAX, & CONSUMABLES (6%)										$ 4,157			$ 4,157
	SUBTOTAL INSTALLATION COST							6,220			$ 73,447	$778,433	$ -	$ 851,880
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	1,680.00	1.00	1,680	$ 120.00				$ 201,600	$ 201,600
6.	ENGINEERING DCP ACCEPTANCE REVIEW	1	LT	NM	1	120.00	1.00	120	$ 100.00			$ 12,000		$ 12,000
	SUBTOTAL DESIGN COST							2,280				$ 60,000	$ 201,600	$ 261,600
	SUBTOTAL INSTALLATION & DESIGN COST											$838,433	$ 201,600	$ 1,113,480
1.	CONTINGENCY (30%)													$ 334,044
	ESTIMATE SUBTOTAL							8,500						$ 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: Peter B. Hoard	Approved by:
Date: 9-20-2012	Date:

TABLE OF CONTENTS

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"
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

Item 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

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 **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.: SAMA IP3-062 **Rev. No.:** CONCEPTUAL 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	☐ 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	☐ 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

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	☒ NO
Cable and Raceway Program • Does the proposed activity involve any changes to cable trays, raceways or the associated documentation?	■ YES	☐ 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) *(if applicable)* • 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 • 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?	■ 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?	☐ 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

PROCESS OR PROGRAM IMPACT SCREENING CHECKLIST	Potential Impact	
Computer Support and Software • Does the proposed activity impact or involve changes to plant computer software or firmware or impact Software Quality Assurance (SQA)?	☐ YES	☒ NO
Chemistry and Environmental Impact • Does the proposed activity impact or involve any changes to plant chemistry requirements, operations or procedures, or any changes to the environment?	☐ YES	☒ NO
Radiation Protection (RP) Program Impact • 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?	■ 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	☐ 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 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

ATTACHMENT 9.3 IMPACT SCREENING SUMMARY

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	☒ 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?	☐ 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?	☐ 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

ATTACHMENT 9.3 IMPACT SCREENING SUMMARY

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	☒ 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	☒ 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	☐ 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?	☐ 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

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?	■ YES	☐ 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	☐ NO
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: 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
4. 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

RCM Technologies — The Source of Smart Solutions	ENTERGY Indian Point Nuclear Station Unit 3	Conceptual Design Package SAMA IP3-062	Rev. 0

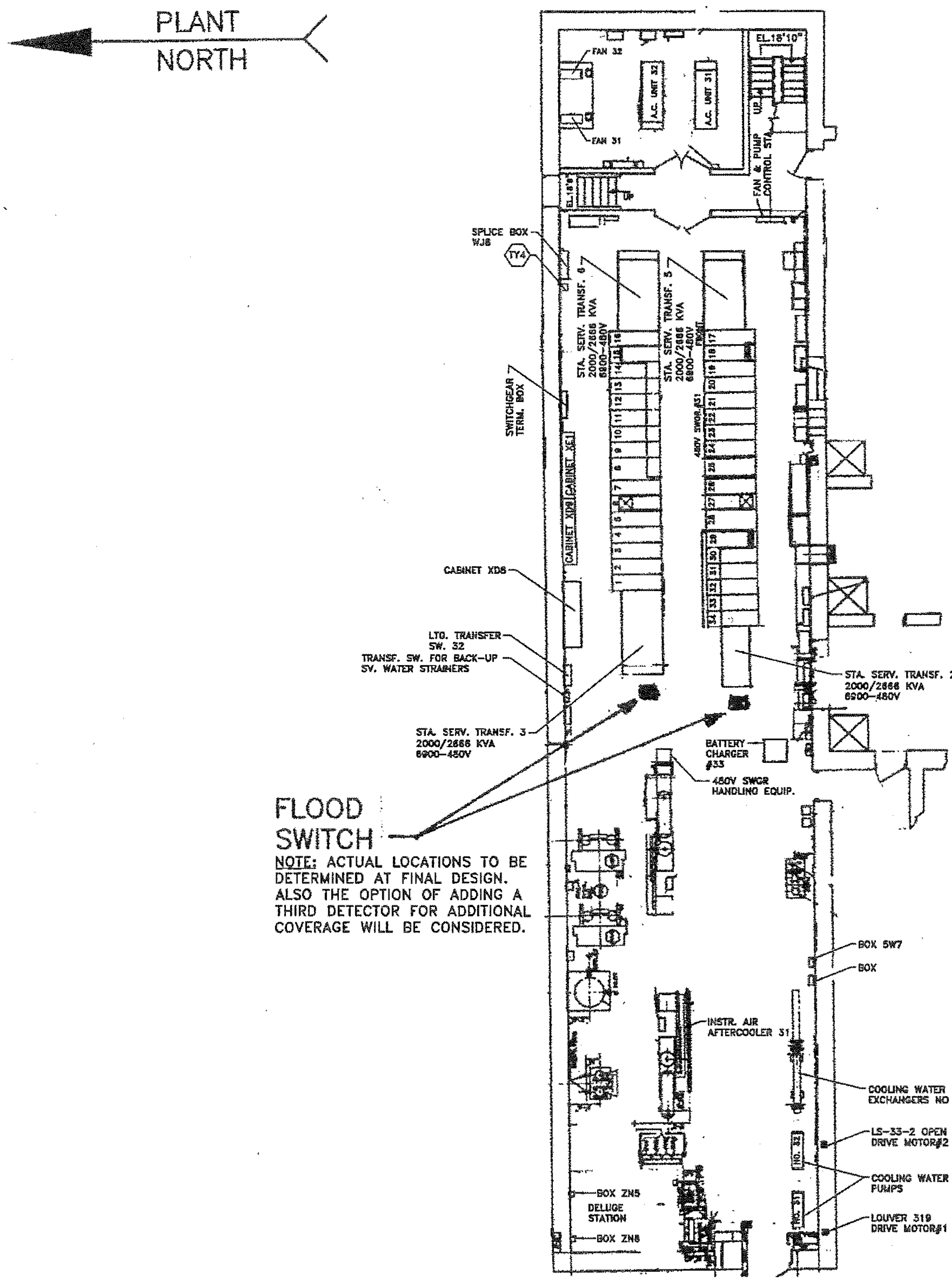


Figure 1
EQUIPMENT ARRANGEMENT CONTROL BUILDING AT EL. 15'-0"-FLOOD SWITCH LOCATION
(REFERENCE DWG. 9321-F-30523)
(NOT TO SCALE)

RCM Technologies The Source of Smart Solutions	ENTERGY Indian Point Nuclear Station Unit 3	Conceptual Design Package SAMA IP3-062	Rev. 0

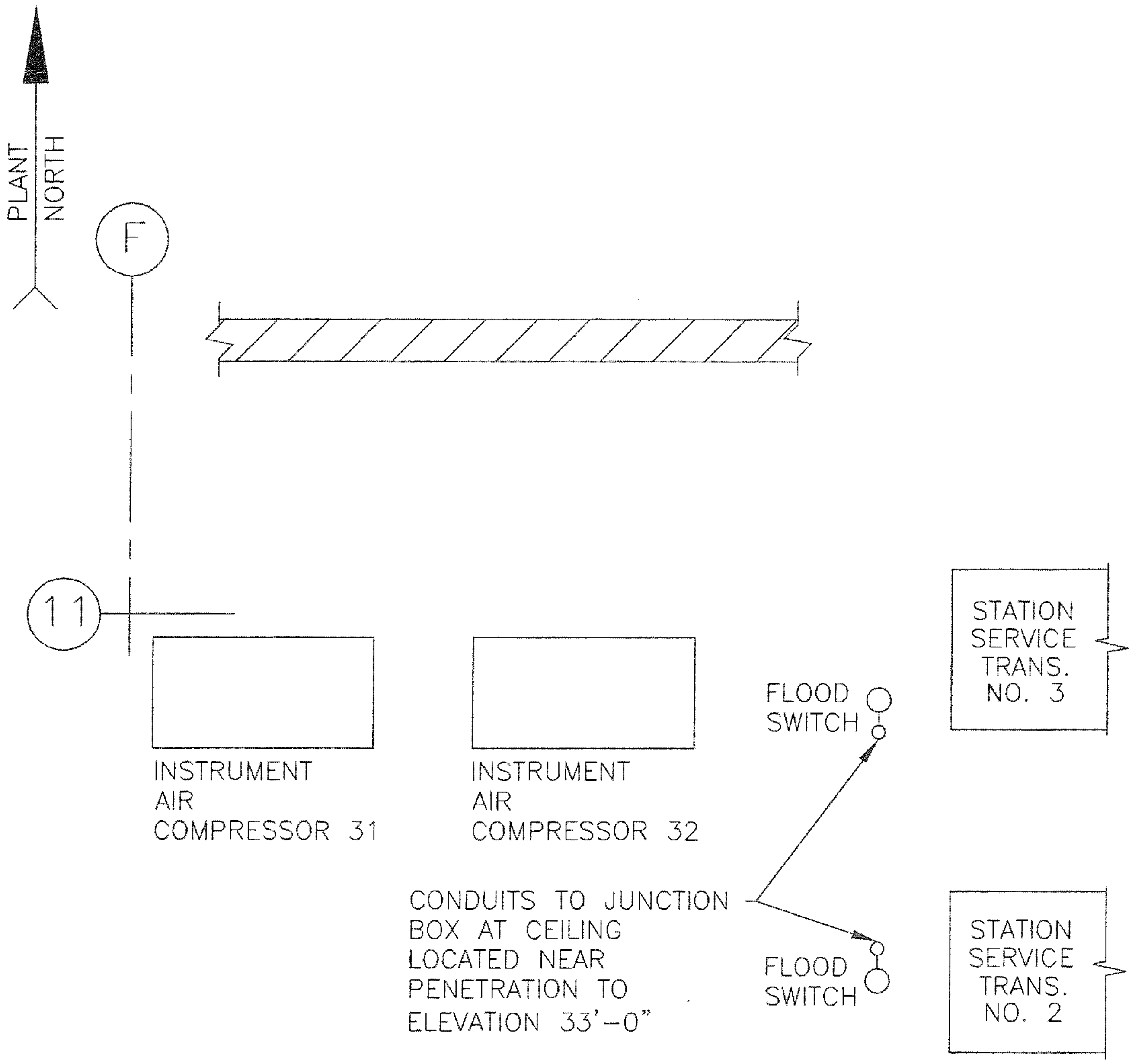


Figure 2
EQUIPMENT ARRANGEMENT CONTROL BUILDING AT EL. 15'-0"-FLOOD SWITCH LOCATION
(REFERENCE DWG. 9321-F-30523)
(NOT TO SCALE)

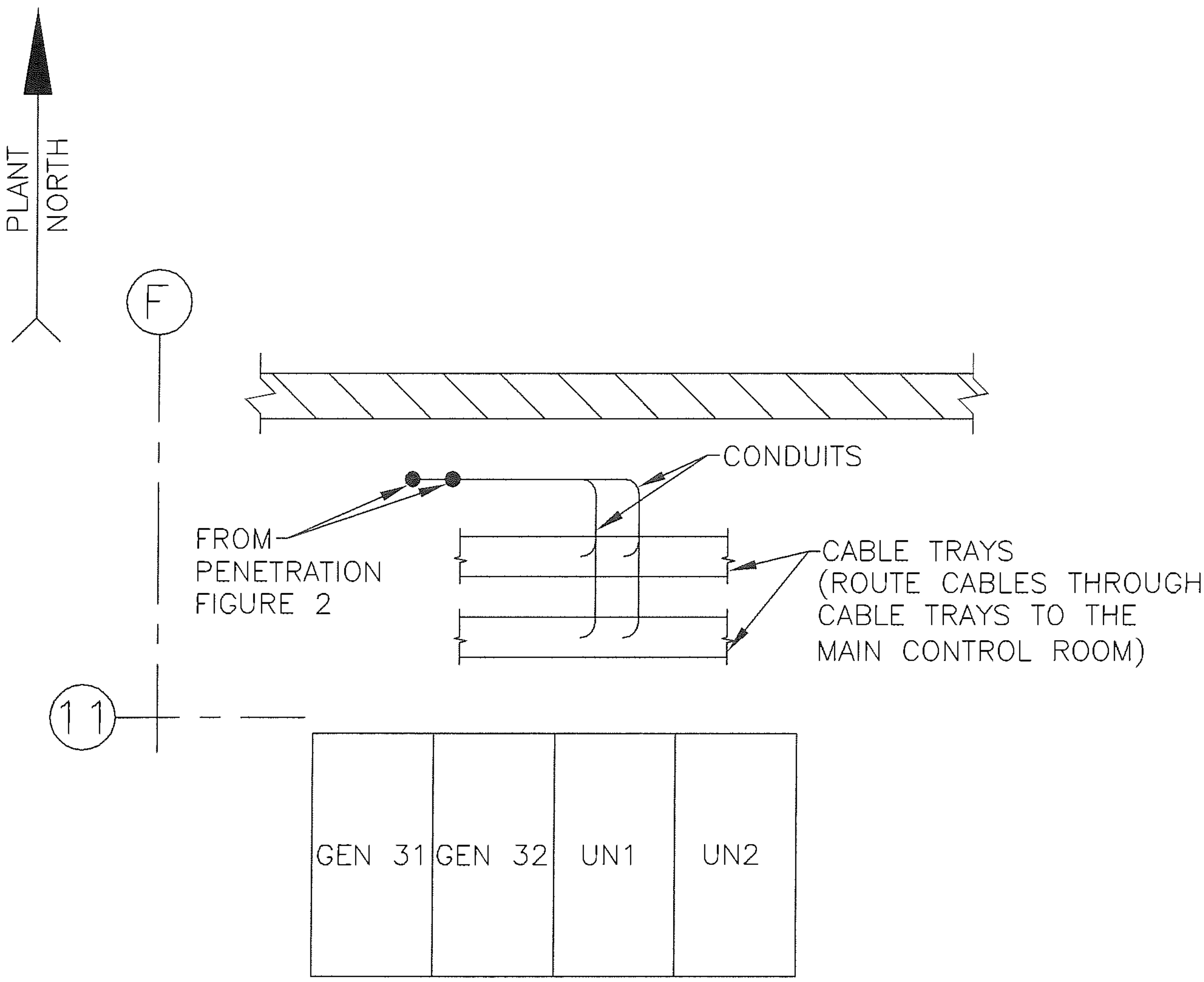


Figure 3
EQUIPMENT ARRANGEMENT CONTROL BUILDING AT EL. 33'-0"
CONDUITS DUMPING INTO CABLE TRAYS
(REFERENCE DWG. 9321-F-30523)
(NOT TO SCALE)

RCM Technologies *The Source of Smart Solutions*	ENTERGY Indian Point Nuclear Station Unit 3	Conceptual Design Package SAMA IP3-062	Rev. 0

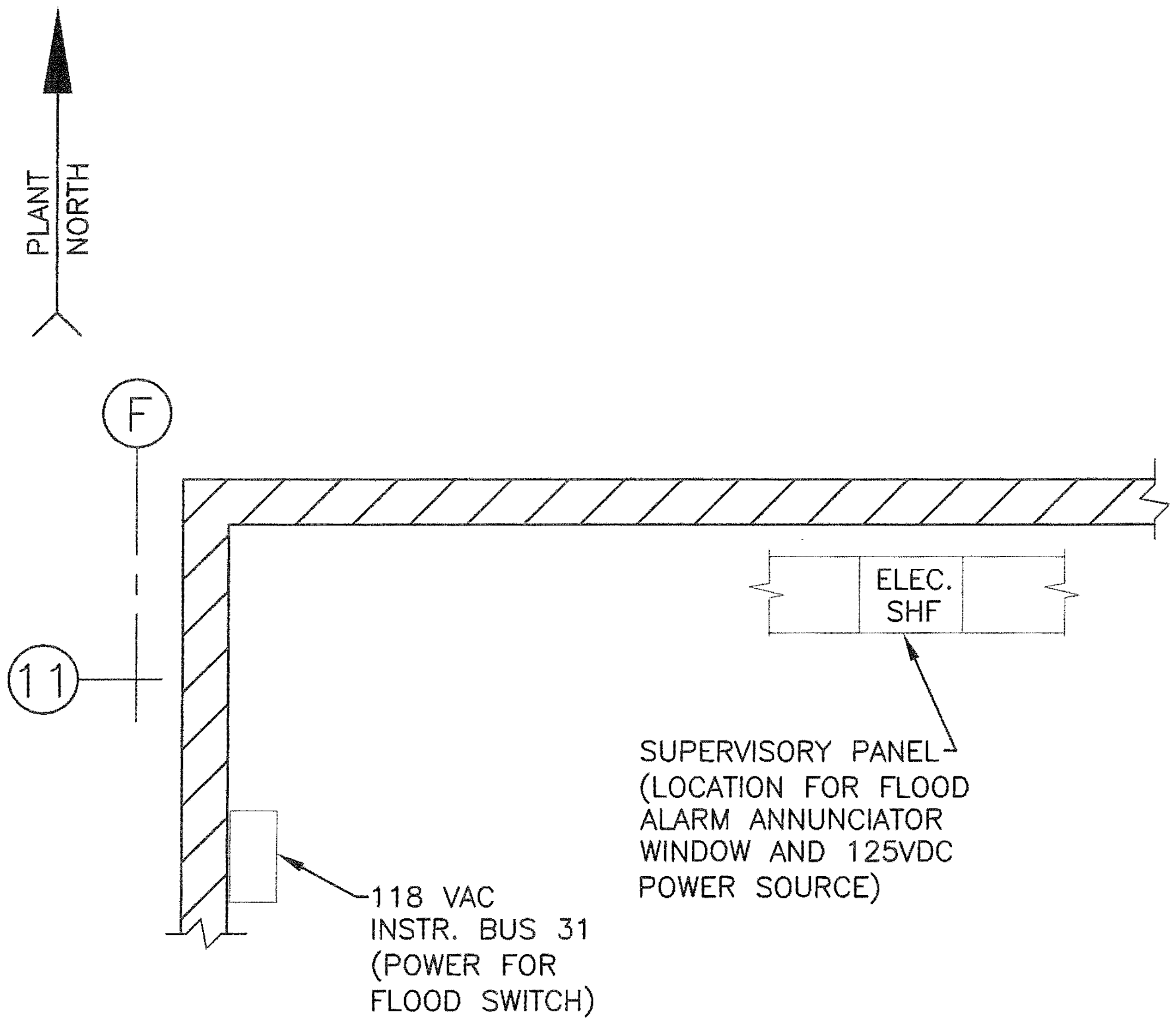


Figure 4
EQUIPMENT ARRANGEMENT CONTROL BUILDING AT EL. 53'-0"
ANNUNCIATOR WINDOW LOCATION AND POWER FOR FLOOD SWITCH
(REFERENCE DWG. 9321-F-30523)
(NOT TO SCALE)

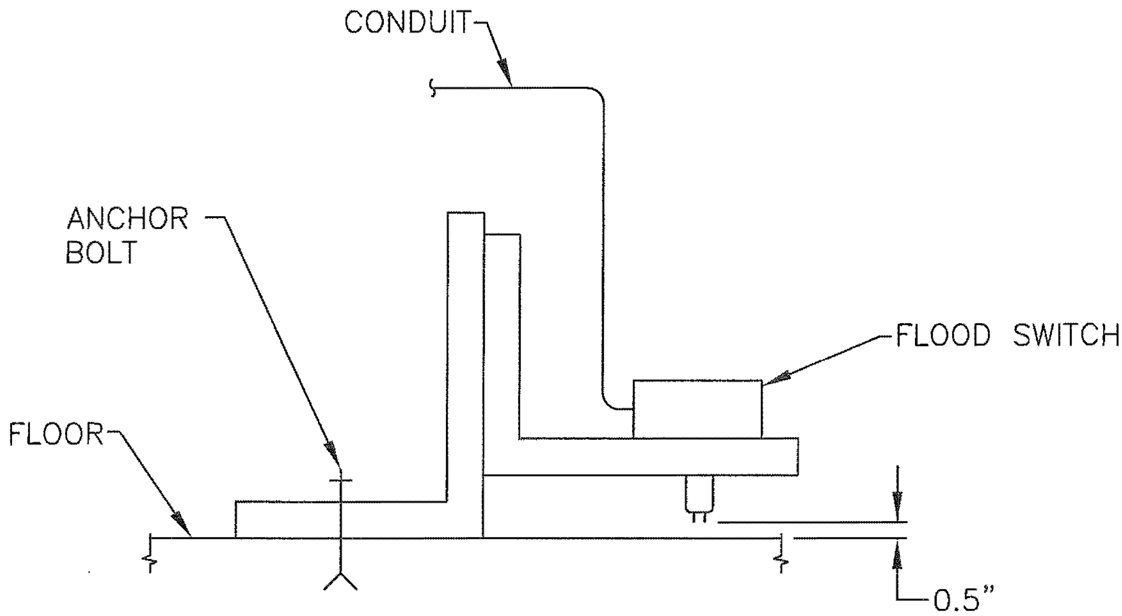


Figure 5

DETAIL FOR FLOOD SWITCH AND SUPPORT

(NOT TO SCALE)

Attachment 3

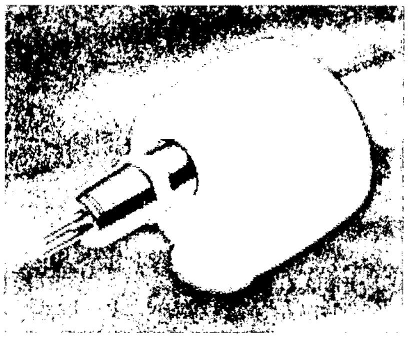
References

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. FCI Model FLT93S FlexSwitch (included here)

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 ± 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/level detection in settling vessels
Interface/sump level detection in separation vessels	Foam or sediment level control
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]

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. Hastelloy 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]
- 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]

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.

Attachment 4

Cost Estimate

ENTERGY NUCLEAR NORTHEAST
IMPLEMENTATION ESTIMATE
Indian Point Nuclear Power Station

* ESTIMATE LEVEL *	**EC #: SAMA IP3-062**			
☑ **Conceptual**	**PROJECT TITLE: Flood Detection System**	☐ CAPITAL ☑ O&M		**ESTIMATOR: RCMT**
☐ **Preliminary**	**JOB LOCATION: 480 Volt Switchgear Room**		**PROJECT CODE: TBD**	
☐ **Definitive**	☐ OUTAGE ☑ NON-OUTAGE	**ORIGINATOR:**		**ORIG. DATE: 06/19/2012**
	ESTIMATE TOTAL **$494,175**		**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 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"

Prepared by: Peter Battaarola		Approved by: [signature]
Date: 9-20-2012		Date: 9-20-2012

IPEC00270410

ENTERGY NUCLEAR NORTHEAST
IMPLEMENTATION ESTIMATE
Indian Point Nuclear Power Station

* ESTIMATE LEVEL *	**EC #: SAMA IP3-062**		
☑ **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

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.	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 work will be performed by trained contract craftspersons in lieu of station maintenance personnel.
5.	This estimate assumes that a three buck scaffold will be required for conduit installation and wire pulling in the Switchgear Room.
6.	This estimate assumes that the detection device mounting brackets will be fabricated in the shop for installation in the Switchgear Room.
7.	This estimate provides for continuous fire watch during cable tray breeching.
8.	This estimate assumes that a blank annunciator panel is available for use in the existing Unit 3 Control Room.
9.	This estimate assumes 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 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
	A. Outside fence boundary - 20%
	B. Inside fence boundary - 30%
	C. Implementation complexity - 40%
	D. Inside Containment - 50%

IPEC00270411

Rev. 11-0

INDIAN POINT IMPLEMENTATION ESTIMATE WORK SHEET

EC #: SAMA IP3-062

PROJECT TITLE: Flood Detection System	☐ CAPITAL ☐ O&M	TAKEOFF:
JOB LOCATION: 480 Volt Switchgear Room	PROJECT CODE: TBD	ESTIMATOR: RCMT
EST. STATUS: ☐ OUTAGE ☑ NON-OUTAGE	ORIGINATOR:	ORIG. DATE: 06/19/2012

* ESTIMATE LEVEL *

- ☐ Conceptual
- ☐ Preliminary
- ☐ Definitive

General Notes:

ESTIMATE SUMMARY

		MANHOURS	DOLLARS
	ENGINEERING		
01	STUDY, DESIGN, & CLOSEOUT	80	$ 8,000
02	DESIGN ENGR CONST SUPPORT	40	$ 4,000
03	MODS ENGR EOI SUPPORT	-	$ -
04	SYS ENGR/ S-U ENGR	80	$ 8,000
05	PROJECT MANAGEMENT	240	$ 28,800
06	TESTING (Calibration & Testing)	20	$ 2,000
07	TRAVEL & LIVING EXPENSES		$ -
08	ENGINEERING DCP ACCEPTANCE REVIEW	25	$ 2,500
	CONTRACT ENGINEERING		
09	DESIGN ENGR CONTRACT SUPPORT	480	$ 57,600
10	SUPL CONTRACT MODS ENGR	-	$ -
11	MODS PLAN & SCHED -CONTRACT	20	$ 2,000
12	OSG FIELD ENGRS / PLANNERS	80	$ 9,600
	MATERIALS / MISC CONTRACTS		
13	MATERIALS		$ 3,837
14	OTHER CONTRACTS		$ -
	CONTRACT CRAFT LABOR		
15	SWEC CRAFT LABOR/WALKDOWN	504	$ 67,836
16	LOST TIME	50	$ 6,397
17	SWEC DISTRIBS		
	PLANT CRAFT LABOR		
18	MECH MAINT.	-	$ -
19	ELECT MAINT	-	$ -
20	I&C	120	$ 12,000
21	CSG	-	$ -
	MISC SUPPORT		
22	QUALITY CONTROL	40	$ 4,000
23	PLANNING & SCHEDULING	-	$ -
24	TRAINING	12	$ 1,440
25	SIMULATOR CHANGES	120	$ 12,000
26	OPS	80	$ 9,600
27	HP / RP	-	$ -
	MISC CONTRACT SUPPORT		
28	QUALITY CONTROL	40	$ 3,200
29	NDE	-	$ -
30	HP / RP	-	$ -
31	RADWASTE	-	$ -
32	NURSE	-	$ -
33	ELEVATOR CONTRACTOR	-	$ -
34	WASTE MANAGEMENT	-	$ -
35	HOUSEKEEPING	-	$ -
36	EQUIPMENT RENTAL	-	$ -
37	VENDOR STOCKING	-	$ -
38	DECONTAMINATION CONTRACTOR	-	$ -
39	RBC'S	-	$ -
40	SECURITY	-	$ -
41	FIRE WATCH (Rover)	-	$ -
42	SAFETY	12	$ 866
	CONTINGENCY		
43	CONTINGENCY		$ 73,103
	ESTIMATE SUBTOTAL	**2,043**	**$ 316,779**
	SITE ENCUMBRANCE PREMIUM (20%)		**$ 63,356**
	LOADERS (30%)		**$ 114,040**
	ESTIMATE TOTAL		**$ 494,175**

ITE	DESCRIPTION	QTY	UOM	CFT	NO.	MANHOURS UNIT	FCTR	TOTAL	$/MH	MATERIAL $ PER UNIT	MATERIAL DOLLARS	LABOR DOLLARS	SUB-CONTRACT	TOTAL $
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	1	LT	EL	2	4.00	1.00	8	$ 123.32		$ -	$ 987		$ 987
3.	Gather and transport detectors, wire and conduit	1	LT	EL	2	6.00	1.00	12	$ 123.32		$ -	$ 1,480		$ 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.	Stage, erect and modify scaffolding	1	LT	CP	2	8.00	1.00	16	$ 96.00		$ -	$ 1,536		$ 1,536
6.	Stage, erect and modify scaffolding	1	LT	LB	1	8.00	1.00	8	$ 78.65		$ -	$ 629		$ 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.	Procure and install conduit supports	10	EA	EL	2	2.00	1.00	40	$ 123.32	$ 10.00	$ 100	$ 4,933		$ 5,033
9.	Procure and install Junction Boxes	2	EA	EL	2	2.00	1.00	8	$ 123.32	$ 10.00	$ 20	$ 987		$ 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	cure and install FCI Model FLT 93 FlexSWITCH	2	EA	EL	2	2.00	1.00	8	$ 123.32	$ 1,100.00	$ 2,200	$ 987		$ 3,187
12.	Remove Control Room fire seal and route new wiri	1	LT	EL	2	10.00	1.00	20	$ 123.32		$ -	$ 2,466		$ 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.	Procure, pull and terminate 120 VAC detector wirir	240	LF	EL	2	0.030	1.00	14	$ 123.32	$ 1.25	$ 300	$ 1,726		$ 2,026
15.	Replace and test Control Room fire seal as require	1	LT	EL	2	6.00	1.00	12	$ 123.32		$ -	$ 1,480		$ 1,480

Rev. 11-0

INDIAN POINT IMPLEMENTATION ESTIMATE WORK SHEET

EC #: SAMA IP3-062

PROJECT TITLE: Flood Detection System
JOB LOCATION: 480 Volt Switchgear Room
EST. STATUS: ☐ OUTAGE ☑ NON-OUTAGE

☐ CAPITAL ☐ O&M
PROJECT CODE: TBD
ORIGINATOR:

TAKEOFF:
ESTIMATOR: RCMT
ORIG. DATE: 06/19/2012

ITE.	DESCRIPTION	QTY	UOM	CFT	NO.	MANHOURS UNIT	FCTR	TOTAL	$/MH	MATERIAL $ PER UNIT	MATERIAL DOLLARS	LABOR DOLLARS	SUB-CONTRACT	TOTAL $
16.	Procure and install annunciator in Control Room	1	EA	EL	2	12.00	1.00	24	$ 123.32	$ 150.00	$ 150	$ 2,960		$ 3,110
17.	Terminate and test annunciator in Control Room	1	EA	EL	2	4.00	1.00	8	$ 123.32	$ 150.00	$ 150	$ 987		$ 1,137
18.	Dismantle scaffold, return to storage and cleanup	1	LT	CP	2	8.00	1.00	16	$ 96.00		$ -	$ 1,536		$ 1,536
19.	Dismantle scaffold, return to storage and cleanup	1	LT	LB	1	8.00	1.00	8	$ 78.65		$ -	$ 629		$ 629
20.	Cleanup and restore work areas	1	LT	EL	2	4.00	1.00	8	$ 123.32		$ -	$ 987		$ 987
								-			$ -	$ -		$ -
								-			$ -	$ -		$ -
								-			$ -	$ -		$ -
								-			$ -	$ -		$ -
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								-			$ -	$ -		$ -
								-			$ -	$ -		$ -
								-			$ -	$ -		$ -
	PAINTING & TOUCH-UP REQUIREMENTS													
1.	PAINTING & TOUCH-UP			PT				-			$ -	$ -		$ -
2.	PAINTING & TOUCH-UP			PT				-			$ -	$ -		$ -
	FIRE WATCH / BOTTLEWATCH REQUIREMENTS													
1.	CRAFT SUPPORT FOR FIRE WATCH	1	LT	FW	1	80.00	1.00	80	$ 53.60		$ -	$ 4,288		$ 4,288
2.	CRAFT SUPPORT FOR BOTTLE WATCH	1	LT	FW				-			$ -	$ -		$ -
	MISC SUB-CONTRACT													
1.	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.	WALKDOWN ALLOWANCE	1	LT	EL				5	$ 123.32			$ 617		$ 617
2.	WORK PACKAGE REVIEW & CRAFT TRAINING	1	LT	EL				82	$ 123.32			$ 10,112		$ 10,112
3.	TOOL ROOM ATTENDANTS (~3.5%)	1	LT	EL				14	$ 123.32			$ 1,726		$ 1,726
4.	GENERAL CRAFT DISTRIBS. (10%)											$ 4,196		$ 4,196
5.	CRAFT IN PROCESSING (20%)											$ 8,391		$ 8,391
6.	HUMAN PERFORMANCE & ALARA TRAINING	1	LT									$ 839		$ 839
7.	(1/2 day training, or ~ 2%)													
	SUBTOTAL							504			$ 3,620	$ 67,836	$ -	$ 71,456
	PLANT SCOPE													
1.	**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	1	120.00	1.00	120	$ 100.00		$ -	$ 12,000		$ 12,000
				PL				-			$ -	$ -		$ -
	SUBTOTAL I&C MAINT.							120			$ -	$ 12,000	$ -	$ 12,000
1.	**CSG**			PL				-			$ -	$ -		$ -
				PL				-			$ -	$ -		$ -
	SUBTOTAL CSG MAINT.							-			$ -	$ -	$ -	$ -
	SUBTOTAL PLANT							120			$ -	$ 12,000	$ -	$ 12,000
	SUBTOTAL CRAFT/PLANT							624			$ 3,620	$ 79,836	$ -	$ 83,456
	IMPLEMENTATION SUPPORT													
1	DS ENGINEERING	1	LT	NM				-				$ -		$ -
2.	ESIGN ENGINEERING SUPT DURING CONST	1	LT	NM	1	40.00	1.00	40	$ 100.00			$ 4,000		$ 4,000
3.	SYSTEMS ENGINEERING - MECHANICAL	1	LT	NM				-				$ -		$ -
4.	SYS ENGINEERING - ELECTRICAL	1	LT	NM	1	40.00	1.00	40	$ 100.00			$ 4,000		$ 4,000
5.	SYS ENGINEERING - INSTR & CONTROL	1	LT	NM	1	40.00	1.00	40	$ 100.00			$ 4,000		$ 4,000
6	SYS ENGINEERING - CIVIL STRUCTURAL		LT	NM				-				$ -		$ -
7.	PROJECT MANAGEMENT	1	LT	NM	1	240.00	1.00	240	$ 120.00			$ 28,800		$ 28,800
8.	TRAINING (OPS Staff)	1	LT	NM	12	1.00	1.00	12	$ 120.00			$ 1,440		$ 1,440
9.	QA / QC VERIFICATION	1	LT	NM	1	40.00	1.00	40	$ 100.00			$ 4,000		$ 4,000

Rev. 11-0

INDIAN POINT IMPLEMENTATION ESTIMATE WORK SHEET

EC #: SAMA IP3-062

PROJECT TITLE: Flood Detection System
JOB LOCATION: 480 Volt Switchgear Room
EST. STATUS: ☐ OUTAGE ☑ NON-OUTAGE

☐ CAPITAL ☐ O&M
PROJECT CODE: TBD
ORIGINATOR:

TAKEOFF:
ESTIMATOR: RCMT
ORIG. DATE: 06/19/2012

					MANHOURS					MATERIAL $	MATERIAL	LABOR	SUB-	
ITE	DESCRIPTION	QTY	UOM	CFT	NO.	UNIT	FCTR	TOTAL	$/MH	PER UNIT	DOLLARS	DOLLARS	CONTRACT	TOTAL $
10.	PLANNING & SCHEDULING	1	LT	NM										$ -
11.	HP / RP/ ALARA	1	LT	NM				-				$ -		$ -
12.	SIMULATOR CHANGES	1	LT	NM	1	120.00	1.00	120	$ 100.00			$ 12,000		$ 12,000
13.	OPS (DEVELOP/REVISE PROCEDURE(S))	1	LT	NM	1	80.00	1.00	80	$ 120.00			$ 9,600		$ 9,600
14.	TRAVEL & LIVING EXPENSES	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	20.00	1.00	20	$ 100.00			$ 2,000		$ 2,000
3.	OSG FIELD ENGRS/PLAN- SWEC(Incl Per Diem)		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
5.	NDE	1	LT	NM				-				$ -		$ -
6.	HP / RP	1	LT	NM				-				$ -		$ -
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.	VENDOR STOCKING	1	LT	NM				-						
14.	DECONTAMINATION CONTRACTOR	1	LT	NM				-						
15.	RBC's	1	LT	NM				-						
16.	SECURITY	1	LT	SEC				-						
17.	FIRE WATCH (Rover)	1	LT	NM								$ -		$ -
18.	SAFETY (2%)	1	LT	NM				12	$ 72.14			$ 866		$ 866
19.	LOST TIME (10%)	1	LT					50	$ 127.94			$ 6,397		$ 6,397
	SUBTOTAL CRAFT/NON-MANUAL							1,438			$ 3,620	$ 169,739	$ -	$ 173,359
1.	FREIGHT, SALES TAX, & CONSUMABLES (6%)										$ 217			$ 217
	SUBTOTAL INSTALLATION COST							1,438			$ 3,837	$ 169,739	$ -	$ 173,576
1.	DESIGN ENGINEERING - MECHANICAL	1	LT	NM				-				$ -		$ -
2.	DESIGN ENGINEERING - ELECTRICAL	1	LT	NM	1	40.00	1.00	40	$ 100.00			$ 4,000		$ 4,000
3.	DESIGN ENGINEERING - INSTR. & CONTROL	1	LT	NM	1	40.00	1.00	40	$ 100.00			$ 4,000		$ 4,000
4.	DESIGN ENGINEERING - CIVIL/STRUCTURAL	1	LT	NM				-				$ -		$ -
5	STING (Instrument Calibration and testing)	1	LT	NM	2	10.00	1.00	20	$ 100.00			$ 2,000	$ -	$ 2,000
6.	NTRACT ENGR DESIGN SUPPORT	1	LT	NM	1	480.00	1.00	480	$ 120.00			$ 57,600	$ -	$ 57,600
7.	DESING ENG. DCP ACCEPTANCE REVIEW	1	LT	NM	1	25.00	1.00	25	$ 100.00			$ 2,500	$ -	$ 2,500
	SUBTOTAL DESIGN COST							605				$ 70,100	$ -	$ 70,100
	SUBTOTAL INSTALLATION & DESIGN COST											$ 239,839	$ -	$ 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 by: Peter Battaccarol	Approved by:
Date: 9-20-2012	Date: 9-20-2012

TABLE OF CONTENTS

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

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.

Engineering Change No.: SAMA IP3-GAG **Rev. No.:** CONCEPTUAL 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	☒ 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	☒ 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

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	☒ 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) *(if applicable)* • 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 • 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?	☐ 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?	☐ 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

PROCESS OR PROGRAM IMPACT SCREENING CHECKLIST	Potential Impact	
Computer Support and Software • Does the proposed activity impact or involve changes to plant computer software or firmware or impact Software Quality Assurance (SQA)?	☐ YES	☒ NO
Chemistry and Environmental Impact • Does the proposed activity impact or involve any changes to plant chemistry requirements, operations or procedures, or any changes to the environment?	☐ YES	☒ NO
Radiation Protection (RP) Program Impact • 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?	☐ 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	☒ 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 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

ATTACHMENT 9.3 **IMPACT SCREENING SUMMARY**

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	☒ 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?	☐ 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?	☐ 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

ATTACHMENT 9.3 **IMPACT SCREENING SUMMARY**

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	☒ 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	☒ 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	☒ 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?	■ 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

ATTACHMENT 9.3 IMPACT SCREENING SUMMARY

SHEET 6 OF 6

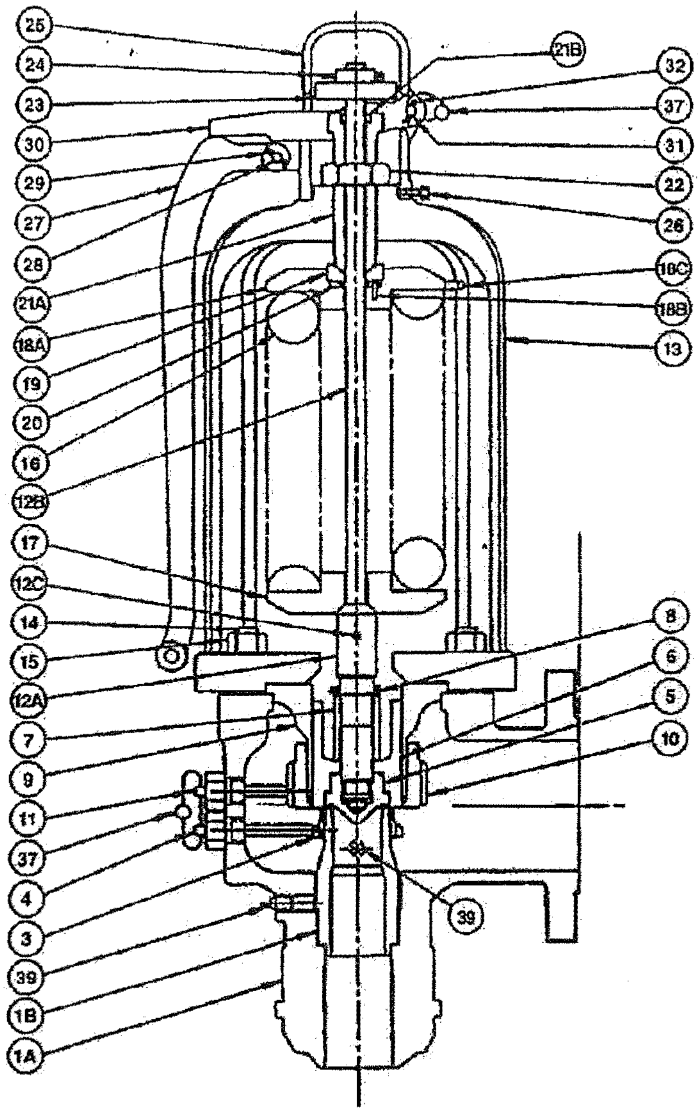
PROGRAMS AND COMPONENTS (CONTINUED)	Potential Impact	
Welding Program • Does the proposed activity impact or involve a special process, such as welding, brazing or soldering?	☐ YES	☒ NO
Safety Program • Does the proposed impact or activity involve personnel or industrial safety?	■ YES	☐ NO
System Engineering • 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	☐ NO
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



PARTS LIST

Part	Part Name	Spare Parts*
1A	Body	
1B	Nozzle	
3	Nozzle Ring	3
4	Nozzle Ring Set Screw	
5	Disc Insert	1
6	Disc Holder	2
7	Disc Holder Retaining Nut	
8	Disc Holder Retaining Cotter	1
9	Guide	3
10	Guide Ring	3
11	Guide Ring Set Screw	
12A	Spindle Point	3
12B	Spindle Rod	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	1
30	Forked Lever	
31	Forked Lever Pin	
32	Forked Lever Pin Cotter	1
34	Test Clamp	
36	Test Rod	
37	Seal and Wire	
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

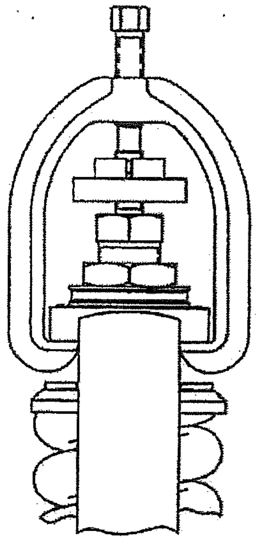


Figure 2

GAG INSTALLED ON VALVE BONNET

RCM Technologies The Source of Smart Solutions	ENTERGY Indian Point Nuclear Station Unit 3	Conceptual Design Package SAMA IP3 -GAG	Rev. 0

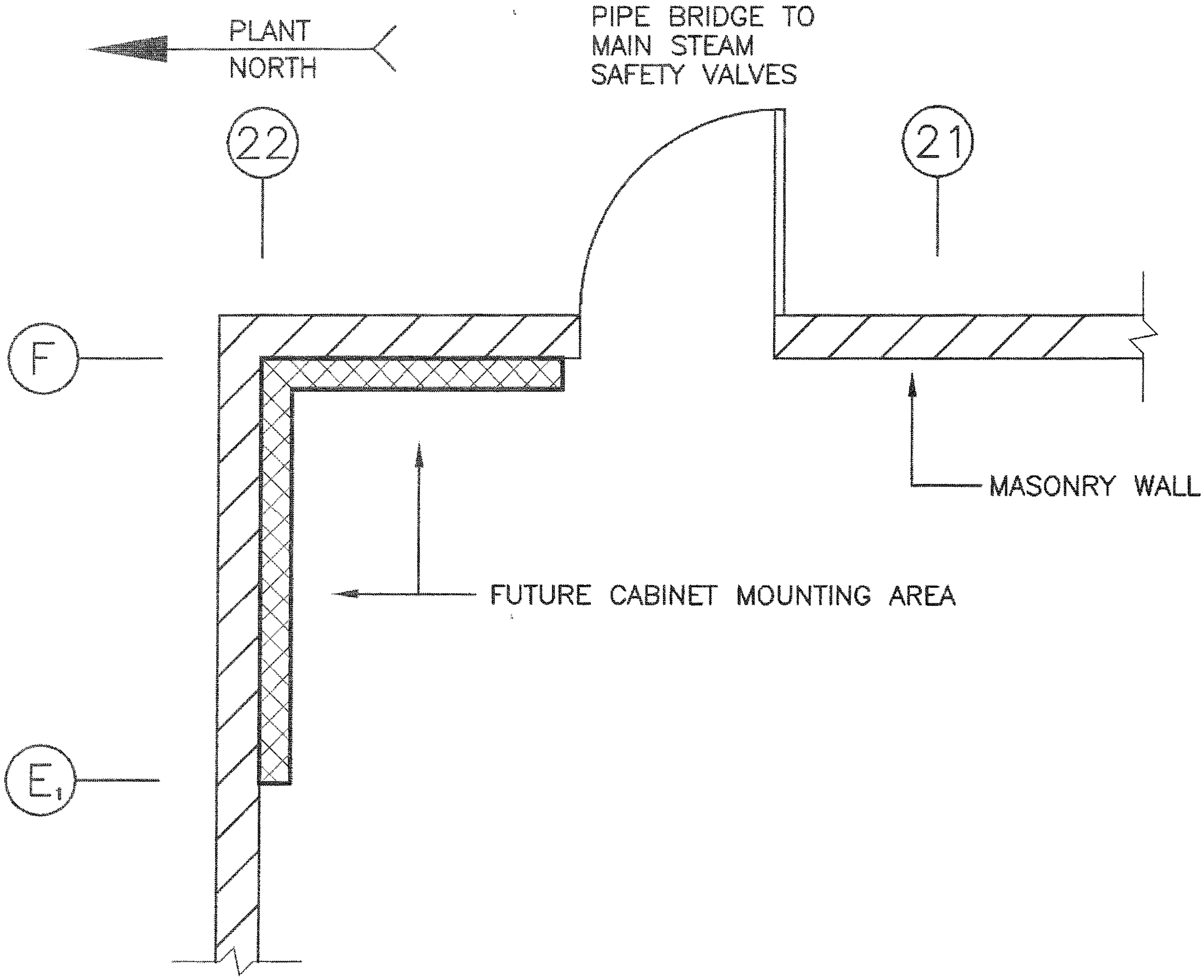


Figure 3
TURBINE BLDG FLOOR PLAN AT EL. 53'–0" – STORAGE CABINET LOCATION
(REFERENCE DWG. 9321–F–20043)
(NOT TO SCALE)

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

Attachment 4

Cost Estimate

ENTERGY NUCLEAR NORTHEAST IMPLEMENTATION ESTIMATE Indian Point Nuclear Power Station			
*☑STIMATE LEVEL *	☐ CAPIT ☑ O#: SAMA IP3 - GAG		
☐ Conceptual ☐ OUTA ☑ NON-OUT	PROJECT TITLE: Unit 3 MSSV Gag		ESTIMATOR: RCMT
☐ Preliminary	JOB LOCATION: IP3 Turbine Building	PROJECT CODE: TBD	
☐ 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: Peter Bettencourt		Approved by: [signature]
Date: 9-20-2012		Date: 9-20-2012

IPEC00270433

ENTERGY NUCLEAR NORTHEAST
IMPLEMENTATION ESTIMATE
Indian Point Nuclear Power Station

* ESTIMATE LEVEL *	**EC #: SAMA IP3 - GAG**			
☑ **Conceptual**	PROJECT TITLE: Unit 3 MSSV Gag	☐ CAPI	☑ O&M	ESTIMATOR: RCMT
☐ **Preliminary**	JOB LOCATION: IP3 Turbine Building		PROJECT CODE: TBD	
☐ **Definitive**	☐ OUTAG ☑ NON-OUTAGE	ORIGINATOR:		ORIG. DATE: 7/17/2012

Item	Description
1.	This estimate assumes that this work will be completed during 2014
2.	This estimate assumes that this work will be performed on a single 10 hours per shift, 4 days per week non-outage schedule.
3.	This estimate assumes that mock-up training for gagging a failed MSSV will be provided to Station Maintenance personnel.
4.	This estimate assumes that a mockup "failed" MSSV will be provided for training purposes.
5.	This estimate assumes that all work will be performed by IP in-house Maintenance personnel.
6.	The estimates assumes the training for 12 people was conducted under IP2 - GAG Implementation Package.
7.	The estimate assumes that IP3 - GAG is developed in conjunction with or after IP2 - GAG Implementation Package.
8.	This estimate does not include funding for unreviewed safety questions or NRC submittals, but if required the additional cost will be added.
9.	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).
10.	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.
11.	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 fence boundary - 30%
	C. Implementation complexity - 40%
	D. Inside Containment - 50%

IPEC00270434

Rev. 10-4

INDIAN POINT IMPLEMENTATION ESTIMATE WORK SHEET

☐ CAPIT ☑ O&M **EC #: SAMA IP3 - GAG**

PROJECT TITLE: Unit 3 MSSV Gag
JOB LOCATION: IP3 Turbine Building
EST. STATUS: ☑ O&M ☑ NON-OUTAGE

PROJECT CODE: TBD
ORIGINATOR:

TAKEOFF:
ESTIMATOR: RCMT
ORIG. DATE: 7/17/2012

*** ESTIMATE LEVEL ***

- **Conceptual**
- **Preliminary**
- **Definitive**

General Notes:

All work associated with preparation and training for installation of MSSV gags will be provided by IP Station Mechanical Maintenance personnel.

ESTIMATE SUMMARY

		MANHOURS	DOLLARS
ENGINEERING			
01	STUDY, DESIGN, & CLOSEOUT	80	$ 8,000
02	DESIGN ENGR CONST SUPPORT	24	$ 2,400
03	MODS ENGR SUPPORT	-	$ -
04	SYS ENGR/ S-U ENGR	-	$ -
05	PROJECT MANAGEMENT	120	$ 14,400
06	WELDING ENGR	-	$ -
07	CONTRACT FOR APPLICATION ANALYSIS	-	$ 120,000
08	ENGR'G DCP ACCEPTANCE REVIEW	20	$ 2,000
CONTRACT ENGINEERING			
08	DESIGN ENGR CONTRACT SUPPORT	320	$ 38,400
09	SUPL CONTRACT MODS ENGR	-	$ -
10	MODS PLAN & SCHED -CONTRACT	40	$ 4,000
11	OSG FIELD ENGRS / PLANNERS	20	$ 2,400
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	-	$ -
25	RADWASTE	-	$ -
26	NURSE	-	$ -
27	ELEVATOR CONTRACTOR	-	$ -
28	WASTE MANAGEMENT	-	$ -
29	HOUSEKEEPING	-	$ -
30	EQUIPMENT RENTAL CONTRACTOR	-	$ -
31	VENDOR STOCKING	-	$ -
32	DECONTAMINATION CONTRACTOR	-	$ -
33	RBC'S	-	$ -
34	SECURITY	-	$ -
35	FIRE WATCH (Rover)	-	$ -
36	SAFETY	4	$ 272
37	LOST TIME	18	$ 1,400
CONTINGENCY			
37	CONTINGENCY		$ 67,843
ESTIMATE SUBTOTAL		**990**	**$ 293,985**
	SITE ENCUMBRANCE PREMIUM (20%)		**$ 58,797**
	LOADERS (30%)		**$ 105,835**
	ESTIMATE TOTAL		**$ 458,617**

ITEM	DESCRIPTION	QTY	UOM	CFT	NO.	MANHOURS U/R	FCTR	TOTAL	$/MH	MAT'L $ / UNIT	MATERIAL DOLLARS	LABOR DOLLARS	SUB-CONTRACT	TOTAL $
	Non-Outage Storage Preparation													
1.	Procure one 30" X 30" X 12" storage cabinets	1	EA	PL	2	4.00	1.00	8	$ 60.00	$ 250.00	250	$ 480.00		$ 730.00
2.	Hang one 30" X 30" X 12" storage cabinets	1	EA	PL	2	40.00	1.00	80	$ 60.00	$ -	-	$ 4,800.00		$ 4,800.00
3.	Procure MSSV gag	1	EA	PL	2	2.00	1.00	4	$ 60.00	$ 750.00	750	$ 240.00		$ 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		$ 980.00
											-	$ -		$ -
	Non-Outage Training													$ -
1.	Gather and stage gag, tools and materials	1	LT	PL	2	2.00	1.00	4	$ 100.00			$ 400.00		$ 400.00
2.	Disassemble mock-up valve per procedure	1	LT	PL	12	4.00	1.00	48	$ 100.00			$ 4,800.00		$ 4,800.00
3.	Tag and store removed parts for restoration	1	LT	PL	2	1.00	1.00	2	$ 100.00			$ 200.00		$ 200.00
4.	Install and adjust gag per specification	1	LT	PL	12	2.00	1.00	24	$ 100.00			$ 2,400.00		$ 2,400.00
5.	Cleanup work area and return tools to storage	1	LT	PL	2	1.00	1.00	2	$ 100.00		-	$ 200.00		$ 200.00
											-	$ -		$ -
											-	$ -		$ -
											-	$ -		$ -
											-	$ -		$ -
											-	$ -		$ -

Rev. 10-4

INDIAN POINT IMPLEMENTATION ESTIMATE WORK SHEET

☐ CAPITA ☑ O&M EC #: SAMA IP3 - GAG

PROJECT TITLE: Unit 3 MSSV Gag
JOB LOCATION: IP3 Turbine Building
EST. STATUS: ☑ O&M ☑ NON-OUTAGE

PROJECT CODE: TBD
ORIGINATOR:

TAKEOFF:
ESTIMATOR: RCMT
ORIG. DATE: 7/17/2012

ITEM	DESCRIPTION	QTY	UOM	CFT	NO.	MANHOURS U/R	MANHOURS FCTR	MANHOURS TOTAL	$/MH	MAT'L $ / UNIT	MATERIAL DOLLARS	LABOR DOLLARS	SUB-CONTRACT	TOTAL $
	SUBTOTAL CRAFT & SUB-CONTRACTOR							180			1,500	$ 14,000.00	$ -	$ 15,500.00
1.	CONSTRUCTION SUPPORT (8% OF LABOR $)	1	LT					-				$ -		$ -
	SUBTOTAL							180			1,500	$ 14,000.00	$ -	$ 15,500.00
	* OUTAGE RELATED COSTS *													
1.	OUTAGE WALKDOWN ALLOWANCE	1	LT					-	$ -			$ -		$ -
2.	WORK PACKAGE REVIEW	1	LT					-	$ -			$ -		$ -
3.	OUTAGE TOOL ROOM ATTENDANTS (~3.5%)	1	LT					-	$ -			$ -		$ -
4.	GENERAL CRAFT OUTAGE DISTRIBS (10%)											$ -		$ -
5.	CRAFT IN PROCESSING (20%)											$ -		$ -
6.	HUMAN PERFORMANCE & ALARA TRAINING	1	LT									$ -		$ -
7.	(1/2 day training, or ~ 2%)													
	SUBTOTAL							180			1,500	$ 14,000.00	$ -	$ 15,500.00
	PLANT SCOPE													
1.	**MECH MAINTENANCE**			PL				-			-	$ -		$ -
				PL				-			-	$ -		$ -
	SUBTOTAL MECH MAINT.							-			-	$ -	$ -	$ -
1.	**ELECT MAINTENANCE**			PL				-			-	$ -		$ -
				PL				-			-	$ -		$ -
	SUBTOTAL ELECT. MAINT.							-			-	$ -	$ -	$ -
1.	**I&C**			PL				-			-	$ -		$ -
				PL				-			-	$ -		$ -
	SUBTOTAL I&C MAINT.							-			-	$ -	$ -	$ -
1.	**CSG**			PL				-			-	$ -		$ -
				PL				-			-	$ -		$ -
	SUBTOTAL CSG MAINT.							-			-	$ -	$ -	$ -
	SUBTOTAL PLANT							-			-	0	$ -	0
	SUBTOTAL CRAFT/PLANT							180			1,500	$ 14,000.00	$ -	15,500
	IMPLEMENTATION SUPPORT													
1.	FIS / MODS ENGINEERING	1	LT	NM				-				$ -		$ -
2.	DESIGN ENGINEERING SUPT DURING CONST	1	LT	NM	1	24.00	1.00	24	$ 100.00			$ 2,400.00		$ 2,400.00
3.	SYSTEMS ENGINEERING - MECHANICAL	1	LT	NM	1	-	-	-				$ -		$ -
4.	SYSTEMS ENGINEERING - ELECTRICAL	1	LT	NM				-				$ -		$ -
5.	SYSTEMS EINGINEERING - INSTR & CONTROL	1	LT	NM				-				$ -		$ -
6.	SYSTEMS ENGINEERING - CIVIL STRUCTURAL	1	LT	NM				-				$ -		$ -
7.	PROJECT MANAGEMENT	1	LT	NM	1	120.00	1.00	120	$ 120.00			$ 14,400.00		$ 14,400.00
8.	WELDING ENGR (Program Engr)	1	LT	NM				-				$ -		$ -
9.	QA / QC VERIFICATION	1	LT	NM	1	40.00	1.00	40	$ 100.00			$ 4,000.00		$ 4,000.00
10.	NDE	1	LT	NM				-				$ -		$ -
11.	HP / RP/ ALARA	1	LT	NM	1			-				$ -		$ -
12.	OPS - TRAINING	12	LT	NM	1	2.00	1.00	24	$ 120.00			$ 2,880.00		$ 2,880.00
13.	OPS - DEVELOP/REVISE PROCEDURES	1	LT	NM	1	60.00	1.00	60	$ 120.00			$ 7,200.00		$ 7,200.00
14	TRAVEL & LIVING EXPENSES	1	LT											
	CONTRACTOR SUPPORT													
1.	FIS / MODS ENGINEERING - SWEC (Incl Per Diem)	1	LT	NM	1			-				$ -		$ -
2.	MODS PLANNING & SCH.- SWEC (Incl Per Diem)	1	LT	NM	1	40.00	1.00	40	$ 100.00			$ 4,000.00		$ 4,000.00
3.	FIELD ENGRS/PLAN- SWEC	1	LT	NM	1	20.00	1.00	20	$ 120.00			$ 2,400.00		$ 2,400.00
4.	QA / QC VERIFICATION	1	LT	NM	1	40.00	1.00	40	$ 80.00			$ 3,200.00		$ 3,200.00
5.	NDE	1	LT	NM				-				$ -		$ -
6.	HP / RP	1	LT	NM				-				$ -		$ -
7.	RADWASTE CONTRACTOR	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 SUPPLIER	1	LT	NM				-						
13.	VENDOR STOCKING	1	LT	NM				-						
14.	DECONTAMINATION CONTRACTOR	1	LT	NM				-						
15.	RBC's	1	LT	NM				-						
16.	SECURITY	1	LT	SEC				-						
17.	FIREWATCH (Rover)	1	LT	LB				-	$ -			$ -		$ -
18.	SAFETY (2%)	1	LT	NM	1		1.00	4	$ 68.00			$ 272.00		$ 272.00
19.	LOST TIME (10%)	1	LT					18	$ 77.78			$ 1,400.00		$ 1,400.00

IPEC00270436

Rev. 10-4

INDIAN POINT IMPLEMENTATION ESTIMATE WORK SHEET

☐ CAPITA ☑ O&M EC #: SAMA IP3 - GAG

PROJECT TITLE: Unit 3 MSSV Gag
JOB LOCATION: IP3 Turbine Building
EST. STATUS: ☑ O&M ☑ NON-OUTAGE

PROJECT CODE: TBD
ORIGINATOR:

TAKEOFF:
ESTIMATOR: RCMT
ORIG. DATE: 7/17/2012

ITEM	DESCRIPTION	QTY	UOM	CFT	NO.	MANHOURS U/R	MANHOURS FCTR	MANHOURS TOTAL	$/MH	MAT'L $ / UNIT	MATERIAL DOLLARS	LABOR DOLLARS	SUB-CONTRACT	TOTAL $
	SUBTOTAL CRAFT/NON-MANUAL							570			1,500	$ 56,152.00	$ -	$ 57,652.00
1.	FREIGHT, SALES TAX, & CONSUMABLES (6%)										90			$ 90.00
	SUBTOTAL INSTALLATION COST							570			1,590	$ 56,152.00	$ -	$ 57,742.00
1.	DESIGN ENGINEERING - MECHANICAL	1	LT	NM	1	80.00	1.00	80	$ 100.00			$ 8,000.00		$ 8,000.00
2.	DESIGN ENGINEERING - ELECTRICAL	1	LT	NM				-				$ -		$ -
3.	DESIGN ENGINEERING - INSTR. & CONTROL	1	LT	NM				-				$ -		$ -
4.	DESIGN ENGINEERING - CIVIL/STRUCTURAL	1	LT	NM				-				$ -		$ -
5.	CONTRACT ENGR DESIGN SUPPORT	1	LT	NM	1	320.00	1.00	320	$ 120.00			$ 38,400.00		$ 38,400.00
6.	CONTRACT FOR APPLICATION ANALYSIS	1	LT	NM								$ -	$ 120,000	$ 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							990				$ 48,400.00	$ 120,000	$ 168,400.00
	SUBTOTAL INSTALLATION & DESIGN COST											$ 104,552.00	$ 120,000	$ 226,142.00
1.	CONTINGENCY (30%)													$ 67,843.00
	ESTIMATE SUBTOTAL							990						$ 293,985.00