



Order No. EA-12-049

RS-13-131
TMI-13-072

August 28, 2013

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555-0001

Three Mile Island Nuclear Station, Unit 1
Renewed Facility Operating License No. DPR-50
NRC Docket No. 50-289

Subject: First Six-Month Status Report in Response to March 12, 2012 Commission Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events (Order Number EA-12-049)

References:

1. NRC Order Number EA-12-049, " Issuance of Order to Modify Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events," dated March 12, 2012
2. NRC Interim Staff Guidance JLD-ISG-2012-01, "Compliance with Order EA-12-049, Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events," Revision 0, dated August 29, 2012
3. NEI 12-06, "Diverse and Flexible Coping Strategies (FLEX) Implementation Guide," Revision 0, dated August 2012
4. Exelon Generation Company, LLC's Initial Status Report in Response to March 12, 2012 Commission Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events (Order Number EA-12-049), dated October 25, 2012
5. Exelon Generation Company, LLC Overall Integrated Plan in Response to March 12, 2012 Commission Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events (Order Number EA-12-049), dated February 28, 2013 (RS-13-026)

On March 12, 2012, the Nuclear Regulatory Commission ("NRC" or "Commission") issued an order (Reference 1) to Exelon Generation Company, LLC (EGC). Reference 1 was immediately effective and directs EGC to develop, implement, and maintain guidance and strategies to maintain or restore core cooling, containment, and spent fuel pool cooling capabilities in the event of a beyond-design-basis external event. Specific requirements are outlined in Attachment 2 of Reference 1.

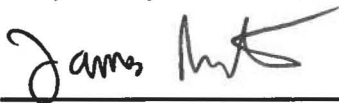
Reference 1 required submission of an initial status report 60 days following issuance of the final interim staff guidance (Reference 2) and an overall integrated plan pursuant to Section IV, Condition C. Reference 2 endorses industry guidance document NEI 12-06, Revision 0 (Reference 3) with clarifications and exceptions identified in Reference 2. Reference 4 provided the EGC initial status report regarding mitigation strategies. Reference 5 provided the Three Mile Island Nuclear Station, Unit 1 overall integrated plan.

Reference 1 requires submission of a status report at six-month intervals following submittal of the overall integrated plan. Reference 3 provides direction regarding the content of the status reports. The purpose of this letter is to provide the first six-month status report pursuant to Section IV, Condition C.2, of Reference 1, that delineates progress made in implementing the requirements of Reference 1. The enclosed report provides an update of milestone accomplishments since the last status report, including any changes to the compliance method, schedule, or need for relief and the basis, if any.

This letter contains no new regulatory commitments. If you have any questions regarding this report, please contact David P. Helker at 610-765-5525.

I declare under penalty of perjury that the foregoing is true and correct. Executed on the 28th day of August 2013.

Respectfully submitted,



James Barstow
Director - Licensing & Regulatory Affairs
Exelon Generation Company, LLC

Enclosure:

1. Three Mile Island Nuclear Station, Unit 1 First Six-Month Status Report for the Implementation of Order EA-12-049, Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events

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bcc: Site Vice President - Three Mile Island Nuclear Station, Unit 1
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Enclosure

Three Mile Island Nuclear Station, Unit 1

**First Six-Month Status Report for the Implementation of Order EA-12-049, Order
Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-
Design-Basis External Events**

(15 pages)

Enclosure

Three Mile Island Nuclear Station, Unit 1 First Six Month Status Report for the Implementation of Order EA-12-049, Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events

1 Introduction

Three Mile Island Nuclear Station, Unit 1 (TMI) developed an Overall Integrated Plan (Reference 1 in Section 8), documenting the diverse and flexible strategies (FLEX), in response to Reference 2. This enclosure provides an update of milestone accomplishments since submittal of the Overall Integrated Plan, including any changes to the compliance method, schedule, or need for relief/relaxation and the basis, if any.

2 Milestone Accomplishments

None

3 Milestone Schedule Status

The following provides an update to Attachment 2 of the Overall Integrated Plan. It provides the activity status of each item, and whether the expected completion date has changed. The dates are planning dates subject to change as design and implementation details are developed.

The revised milestone target completion dates do not impact the order implementation date.

Original Target Completion Date	Activity	Status {Include date changes in this column}
	Submit 60 Day Status Report	Complete
	Submit Overall Integrated Implementation Plan	Complete
	Contract with RRC	Complete
	6 Month Updates	
Update 1	Aug., 2013	Complete with this submittal
Update 2	Feb., 2014	Not Started
Update 3	Aug., 2014	Not Started
Update 4	Feb., 2015	Not Started

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Original Target Completion Date	Activity	Status {Include date changes in this column}
Update 5	Aug., 2015	Not Started
Update 6	Feb., 2016	Not Started
	Modification Development	
Oct 2014	<ul style="list-style-type: none"> Phase 1 modifications 	Not applicable
Oct 2014	<ul style="list-style-type: none"> Phase 2 modifications 	Started
Oct 2014	<ul style="list-style-type: none"> Phase 3 modifications 	Not Started
	Modification Implementation	
Nov 2015	<ul style="list-style-type: none"> Phase 1 modifications 	Not Applicable
Nov 2015	<ul style="list-style-type: none"> Phase 2 modifications 	Not Started
Nov 2015	<ul style="list-style-type: none"> Phase 3 modifications 	Not Started
	Procedure development	
Jun 2015	<ul style="list-style-type: none"> Create Site-Specific Procedures 	Started
Nov 2015	<ul style="list-style-type: none"> Validate Procedures (NEI 12-06, Sect. 11.4.3) 	Started
Jun 2015	<ul style="list-style-type: none"> Create Maintenance Procedures 	Started
Jul 2015	Staffing analysis	Not started
Nov 2015	Storage Plan	Started
Nov 2015	FLEX equipment acquisition	Started
Nov 2015	Training completion	Started
Jul 2015	Regional Response Center Operational	Started
Nov 2015	Unit 1 Implementation date	Not Started

4 Changes to Compliance Method

The following significant changes have been made to the FLEX conceptual designs

- FLEX Diesel Generator Fuel Oil (Reference 1E-919-21-001, DRAFT, attached)

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- One (1) 5000 gallon fuel oil tank replaces the two (2) 2600 gallons fuel oil tanks. This 5000 gallon tank will normally contain 100 gallons, enough to start and initially load the generators.
- Fuel oil tank supply is provided from 30,000 gallon underground tank (DF-T-1) using DF-P-1C or DF-P-1D.
- FLEX Electrical Generation and Distribution (Reference 1E-919-21-002, DRAFT, attached)
 - Flex Diesel Generators now feed a new, separate FLEX MCC/Distribution panel.
 - Output from the generators is fed from the FLEX MCC to the crosstie buswork between the 1P and 1S 480V ES Buses
 - The FLEX Feedwater Pumps will be powered from the FLEX MCC.
- FLEX RCS/Spent Fuel Pool Make-up (Reference 1E-919-21-004, DRAFT, attached)
 - RCS Make Up system tie-in will be upstream of MU-V-16C and MU-V-16D, vice downstream.
 - RCS Low-pressure make-up (when OTSGs are unavailable) is via the Low Pressure Injection lines
- FLEX Feedwater (Reference 1E-919-21-003, DRAFT, attached)
 - A diverse location for staging the FLEX Diesel-driven Feedwater Pump is established.

Sequence of Events Time-line Modifications (See Attachment 1A) – The following significant changes have been made to the time-line based on on-going strategy development:

1. Provisions have been added to isolate RC-P Controlled Bleed-off (CBO) flow early in the sequence.
2. RCS Cooldown has been deferred until Pressurizer Level is recovered and CBO flow has been isolated.
3. Back-up Feedwater capability will not be available until the RCS cooldown has been completed to achieve an OTSG Pressure < 200 psig.
4. Actions to set-up off-site communications trailer have been incorporated.
5. Actions added to line-up and fill FLEX Diesel Generator Fuel Oil Tank.

5 Need for Relief/Relaxation and Basis for the Relief/Relaxation

TMI expects to comply with the order implementation date and no relief/relaxation is required at this time.

6 Open Items from Overall Integrated Plan and Draft Safety Evaluation

The following tables provide a summary of the open items documented in the Overall Integrated Plan or the Draft Safety Evaluation (SE) and the status of each item.

Section Reference	Overall Integrated Plan Open Item	Status
Key Site Assumptions (pg 3) and Strategy Deployment (pg 5)	Routes from the storage locations have not yet been assessed for hazard impact.	Started

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Section Reference	Overall Integrated Plan Open Item	Status
	This will be completed and communicated in a future 6-month update following evaluation.	
Sequence of Events (pg 4)	The times to complete actions in the Events Timeline are based on operating judgment, the conceptual designs, and the current supporting analyses. The final timeline will be validated once detailed designs are completed, procedures are developed, and the results will be provided in a future six (6) month update.	Started
Maintain RCS Inventory (pg 17)	Core cooling and RCS inventory analysis is not complete at this time. Completion of this analysis is an open item. Closure of this item will be documented in a future six (6) month update.	Started
Maintain Core Cooling and Heat Removal (pg 10)	ECR 13-00071 FLEX Feedwater System is not finalized. Changes will be provided in a 6-month update.	Started
Maintain Core Cooling and Heat Removal (pg 10)	ECR 13-00074 FLEX Storage Building is not finalized. Changes will be provided in a six (6) month update.	Started
Maintain RCS Inventory (pg 16)	ECR 13-00099 RC-P Low Leakage Seals is not finalized. Changes will be provided in a six (6) month update.	Started
New ECR, no reference.	ECR 13-00078 Turbine Building Structural Modifications is not finalized. Changes will be provided in a six (6) month update.	Started
New ECR, no reference.	ECR 13-00164 FLEX Fuel Oil and Fire Protection is not finalized. Changes will be provided in a six (6) month update.	Started
Maintain Core Cooling and Heat Removal (pg 14)	A portable refueling vehicle with a large diesel oil bladder will be available on site to support refilling our portable equipment diesel tanks. An additional means (river makeup is available) of delivering condensate may also be developed, details to be provided in a	Started

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Section Reference	Overall Integrated Plan Open Item	Status
	future 6-month update.	
Maintain Spent Fuel Pool Cooling (pg 29)	Spent Fuel Pool - These strategies utilize a vent path for steam. The effects of this steam on other systems and equipment will be evaluated, and the results will be provided in a future six month update.	Started
Maintain Spent Fuel Pool Cooling (pg 30)	ECR 13-00084 for Spent Fuel Pool Instrumentation. This ECR is an open item. Closure of this item will be documented in a future six (6) month update.	Started
Maintain RCS Inventory (pg 18)	ECR 13-00072, FLEX RCS Make-up System - This ECR is an open item. Closure of this item will be documented in a future six (6) month update.	Started
Maintain RCS Inventory (pg 22)	A plan will be developed to re-supply borated water to the BWST or SF pool.	Started
Maintain RCS Inventory (pg 17)	TM-FLEX-001, <i>Core Cooling Analysis</i> , DRAFT, is not approved. The results of this analysis will be integrated into a future 6-month update.	Started
Maintain Containment (pg 26)	TM-FLEX-002, <i>RB Pressure Analysis</i> , Rev 0 (Reference 4), results show that Reactor Building pressure will remain below design pressure without any active means of RB cooling for any event where the OTSG is available to remove core heat.	Complete
Safety Function Support (pg 37)	ECR 13-00070 FLEX Electrical Power Supply. This ECR is an open item. Closure of this item will be documented in a future six (6) month update.	Started
Safety Function Support (pg 37)	Within the Main Control Room, habitability conditions will be evaluated and a strategy will be developed to maintain Main Control Room habitability. The strategy will be provided in a future six (6) month update.	Started

Section Reference	Overall Integrated Plan Open Item	Status
	Draft Safety Evaluation Open Item	Status
	TMI has not received a Draft Safety Evaluation	Not applicable

7 Potential Draft Safety Evaluation Impacts

There are no potential impacts to the Draft Safety Evaluation identified at this time.

8 References

The following references support the updates to the Overall Integrated Plan described in this 6-month update.

1. Three Mile Island Nuclear Station, Unit 1, Overall Integrated Plan in Response to March 12, 2012 Commission Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events (Order Number EA-12-049), dated February 28, 2013.
2. NRC Order Number EA-12-049, Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events, dated March 12, 2012.
3. NEI 12-06, Rev. 0, Diverse and Flexible Coping Strategies (FLEX) Implementation Guide, dated August 2012.
4. TM-FLEX-002, *Reactor Building Pressure Analysis for FLEX*, Rev. 0

9 Attachments

- 1A. Sequence of Events Timeline

Attachment 1A

Sequence of Events Timeline

Action item	Elapsed Time	Action	Time Constraint Y/N ¹	Remarks / Applicability
1	0	Earthquake or Tornado Event Causes LOOP and damages unprotected equipment	NA	Plant @100% power
2	0	All control rods inserted and reactor is shutdown. Emergency Diesel Generators fail to energize ES buses.	NA	Failures per JLD-ISG-2012-01 and NEI 12-06
3	0	EFW actuated. Steam driven pump, EF-P-1, supplies feedwater. MSSV & ADV control OTSG pressure	N	Automatic plant response
4	< 1 min	EOP initiated	N	
5	< 2 min	Letdown isolates (MU-V-3) automatically on high temperature.	N	
6	3 min	Operators ensure each of the following are closed: Letdown isolation (MU-V-3) RCP Controlled Bleed Off Isolation Valve (MU-V-26)	N	
7	< 5 min	Operators attempt to start and load SBO Diesel Generator, and identify SBO DG is inoperable.	N	Failures per JLD-ISG-2012-01 and NEI 12-06. This signals an ELAP condition.
8	< 10 min	Operators verify core cooling via OTSG with RCS natural circulation, and throttle ADV to stabilize OTSG pressure	N	
9	15 min	Operator places ES Pumps, DC Pumps and Breaker Extension	N	

¹ Instructions: Provide justification if No or NA is selected in the remark column
If yes include technical basis discussion as requires by NEI 12-06 section 3.2.1.7

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Action item	Elapsed Time	Action	Time Constraint Y/N ¹	Remarks / Applicability
		Controls in PULL-TO-LOCK		
10	15 min	Operators locally open Main Condenser vent to atmosphere (Break Vacuum) and line up valves to vent Main Generator H2 to atmosphere	N	This is a pre-condition to reduce DC loads, LO-P-6 and GN-P-2.
11	0:15 – 1:15	Operator opens breakers on vital instrument buses to shutdown instrument systems not required for ELAP mitigation.	Y	Load shedding required to maintain instrument buses. <i>(C-1101-734-E420-009, TMI-1 Extending Station Battery Life to 6 hours under ELAP, DRAFT).</i>
12	0:15 – 1:15	Operators locally strip loads from 1P/1S 480V Buses, 1A & 1B ES MCC	N	Pre-condition to Item 21
13	0:15 – 1:15	Operators locally lineup FLEX RCS Charging Pump from BWST or Spent Fuel Pool to RCS, strip loads on 1A ESV MCC and 1A RADWASTE MCC	N	Pre-condition to Item 21
14	0:15 – 2:15	Dispatch personnel to move diesel-driven feedwater pump into the turbine building.	N	Provide B/U for Steam Driven Emergency Feedwater Pump
15	25 min	Operator secures FW Pump lube oil pumps LO-P-9A and LO-P-9B	Y	DC load shedding required to maintain instrument buses. <i>(C-1101-734-E420-009, TMI-1 Extending Station Battery Life to 6 hours under ELAP, DRAFT).</i>
16	35 min	Main Generator pressure is less than 15 psig, operator secures Main Generator Seal Oil Pump (GN-P-2).	Y	DC load shedding required to maintain instrument buses. <i>(C-1101-734-E420-009, TMI-1 Extending Station Battery Life to 6 hours under ELAP, DRAFT).</i>
17	1 hour	When Main Turbine speed is reduced or within one hour of the event, Main Turbine Lube Oil Pump LO-P-6 is shutdown.	Y	DC load shedding required to maintain instrument buses for 6 hours <i>(C-1101-734-E420-009, TMI-1 Extending Station Battery Life to 6 hours under ELAP, DRAFT).</i>
18	1:15 – 2:00	Operator connects temporary cable between 1A ESV MCC	N	

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Action item	Elapsed Time	Action	Time Constraint Y/N ¹	Remarks / Applicability
		Welding Receptacle and 1A RW MCC welding Receptacle		
19	1:15	Operator Lines up Fuel Oil for FX- Y-1A/B and begins filling FX-T-2	N	
20	1:30	Operators locally lineup FLEX Emergency Diesel Generator for operation.	N	Pre-condition to Item 21
21	1:30 – 1:45	Operator locally starts FLEX Emergency Diesel Generator and locally closes breakers to energize 1P and 1S 480V bus Cross-tie Feed	N	
22	1:45 – 2:30	Energize Cross tie between 1P & 1S 480V Buses to energize 1P and 1S 4 to energize 1P and 1S 480V ES Buses Energize 1A/1B ES MCC from 1P/1S 480V Bus	N	
23	2:00 – 3:00	Operators take LOCAL MANUAL control of EFW Valves and ADVs	N	
24	2:15 – 3:00	Maintenance personnel return to U2 IPSH to get the Satellite Trailer	N	
25	2:15 – 6:00	Maintenance personnel Connect Diesel Driven FLEX Feedwater Pump to FLEX EFW Header	N	
26	2:30 – 3:00	Energize selected loads on 1A and 1B ES MCC Battery Chargers AC Sources to Inverters FLEX Emergency RCS Charging Pumps FLEX Emergency Lighting	Y	Must be accomplished prior to 6 hours to ensure vital instrument power is maintained (C-1101-734-E420-009, TMI-1 Extending Station Battery Life to 6 hours under ELAP, DRAFT).
27	2:45	Start FLEX Emergency RCS Charging Pumps to restore RCS inventory and initiate boration.	Y	Must be accomplished prior to 4 hours to ensure OTSG heat removal is maintained. TM-FLEX-001, DRAFT
28	3:00 – 4:00	Operator locally opens doors in Control Tower to establish ventilation	Y	This condition is part of the basis for acceptable FLEX equipment cooling.

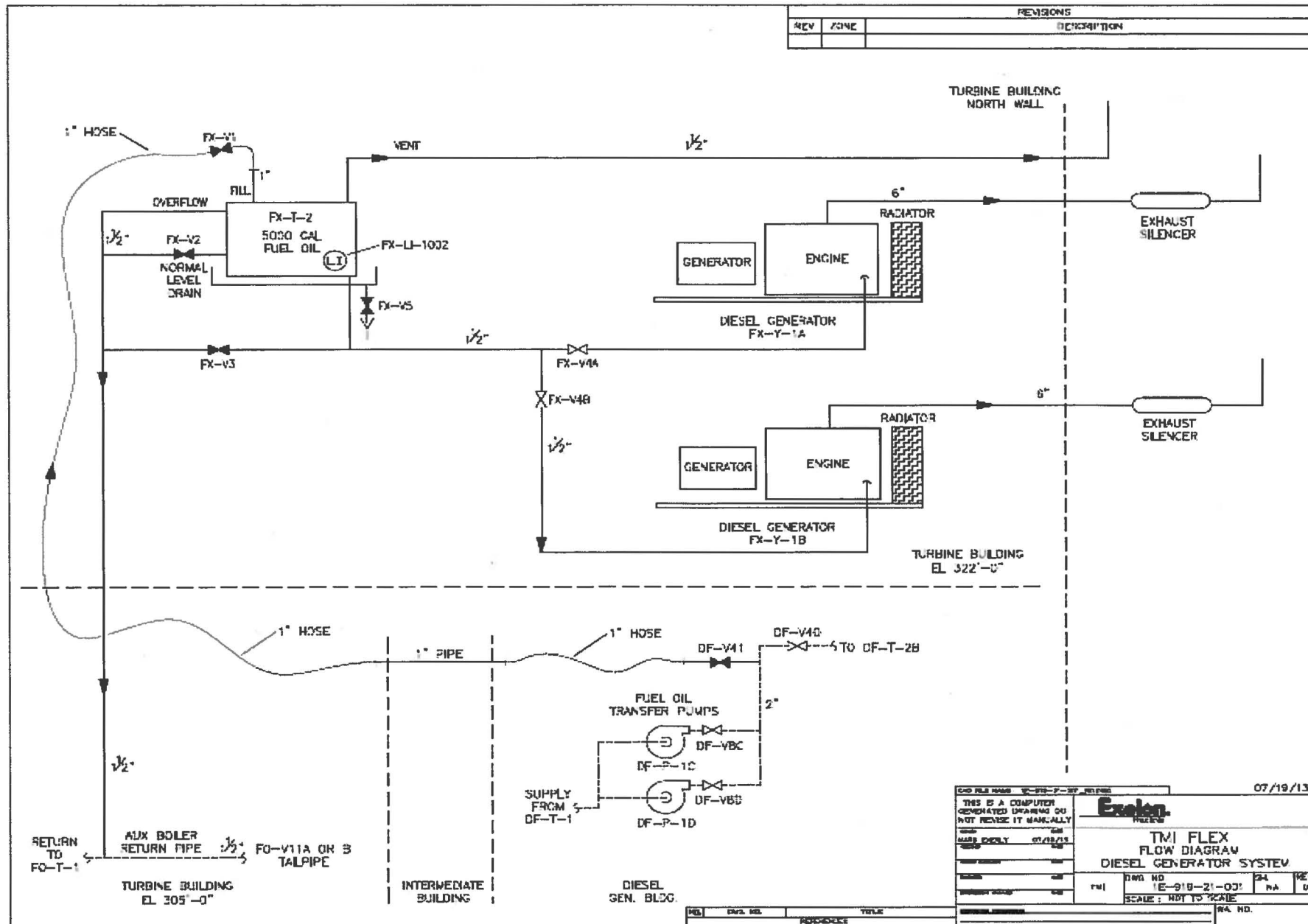
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Action item	Elapsed Time	Action	Time Constraint Y/N ¹	Remarks / Applicability
29	3:00 – 4:00	Operators energize 1A ESV MCC and 1A RW MCC to CLOSE MU-V-33A/B/C/D (RCP CBO)	Y	Within six (6) hours of event initiation (TM-FLEX-001, DRAFT)
30	3:00 – 4:30	Maintenance personnel position Satellite trailer outside U1 MAF	N	
31	4:30 – 6:00	Maintenance personnel return to U2 IPSH	N	
32	5:00	PZR Level recovered, commence RCS cooldown at 10°F/ Hr	N	
33	5:00	RCS boron concentration sufficient to maintain Reactor Shutdown without Xenon reactivity.	Y	Xenon reactivity worth reduces below initial equilibrium concentration at approx. 24 hours.
34	6:00	Complete backup feedwater pump connections to condensate supply and feedwater header. Backup feedwater capability will be available when OTSG Pressure is < 200 psig	N	Provide B/U for Steam Driven Emergency Feedwater Pump
35	6:00 – 10:30	Maintenance personnel position a diesel-driven portable pump at the ramp to the river, and route discharge hose to a functional condensate source (B CST or hotwell).	N	Precondition for item 36
36	10:30	Diesel-driven portable pump is set up to draft water from the river and makeup to a Condensate Storage Tank or directly to the hotwell.	Y	After a tornado, condensate may be depleted in 20 hours.
37	12:00	Line-up FLEX condensate feed to the Spent Fuel Pool. Monitor SF pool level and add water as needed to maintain level.	Y	Spent fuel pool would not boil within 40 hours.
38	24:00	RRC (Regional Response Center) resources begin arriving on site.	N	Reference: JLD-ISG-2012-01 and NEI 12-06
39	24 – 72 Hours	Continue to maintain critical functions of Core Cooling, RCS Inventory Control and spent fuel	N	End of analytical simulation.

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Action item	Elapsed Time	Action	Time Constraint Y/N ¹	Remarks / Applicability
		cooling.		

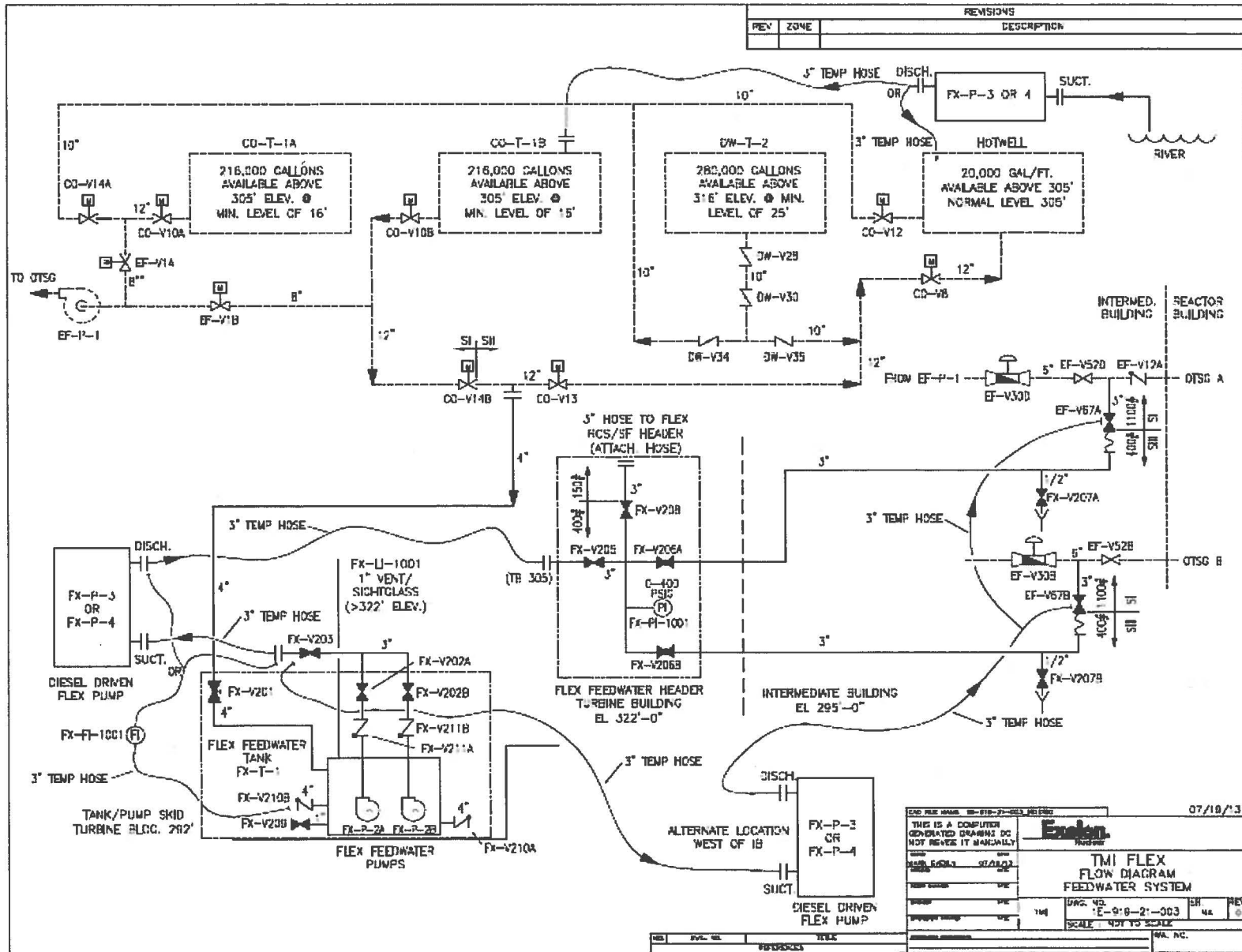
Note: This timeline is based on best available information. It is subject to change based on outstanding analysis results and will be updated during a 6-month update



REV		ZONE		REVISIONS		DESCRIPTION	

CADD FILE NAME: 10-010-F-01-REVISED		DATE: 07/19/13	
THIS IS A COMPUTER GENERATED DRAWING DO NOT REVISE IT MANUALLY			
Evolve			
TM FLEX FLOW DIAGRAM DIESEL GENERATOR SYSTEM			
SCALE: NOT TO SCALE	DATE: 10-01-03	REV: 0	NA
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