

From: [Mitman, Jeffrey](#)
To: [Kozak, Laura](#)
Subject: Clinton Report Input
Date: Tuesday, October 02, 2018 11:57:15 PM

Laura, I've uploaded the following to the SharePoint site:

- New model
- Copy of the report of the attached report
- Cutset file
- New Results file (though little has changed)
- Several new HEP files

From: [Kozak, Laura](#)
To: ["Edom, Joseph T:\(Contractor - GenCo-Nuc\)"](#)
Subject: RE: Question 6 Response
Date: Friday, August 17, 2018 10:31:00 AM

Joe

Could you send me the IRs associated with the failures?

Thanks
Laura

From: Edom, Joseph T:(Contractor - GenCo-Nuc) [mailto:Joe.Edom@exeloncorp.com]
Sent: Friday, August 17, 2018 10:12 AM
To: Kozak, Laura <Laura.Kozak@nrc.gov>
Subject: [External_Sender] Question 6 Response

Laura,

Attached is the response to Question 6. Sorry it took me so long to get it to you.

Joe Edom | Senior Corporate Risk Management Engineer

JENSEN HUGHES

Advancing the Science of Safety

(b)(6)

One Trans Am Plaza Drive | Suite 200 | Oakbrook Terrace, IL 60181

O: +1 630-627-2277 | C: F: +1 630-627-2278

JEdom@jensenhughes.com | www.jensenhughes.com

+++++

Exelon E-mail: joe.edom@exeloncorp.com

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From: [Wilk, Brenda](#)
To: [Cook, Christopher](#); [BidsNrrDorLpl3 Resource](#); [BidsNrrPMClinton Resource](#); [NrrDirslrib Resource](#); [West, Steven](#); [Roberts, Darrell](#); [Skokowski, Richard](#); [Barker, Allan](#); [DRSIII](#); [DRPIII](#); [ROPreports Resource](#)
Subject: CLINTON POWER STATION—NRC INSPECTION REPORT 05000461/2018051 AND PRELIMINARY WHITE FINDING
Date: Tuesday, October 16, 2018 11:50:30 AM
Attachments: [image001.png](#)

The below attached document has been added to ADAMS.

[View ADAMS Properties ML18289A556](#)

[Open ADAMS Document \(CLINTON POWER STATION-NRC INSPECTION REPORT 05000461/2018051 AND PRELIMINARY WHITE FINDING \(public\)\)](#)

Thank you,

Brenda Wilk

Lead Administrative Assistant
Division of Reactor Projects
U.S. Nuclear Regulatory Commission
(630) 829-9602



Note to requester: The attached image, and the empty box under the signature file, is the NRC logo. This document is publicly available at <https://www.nrc.gov/docs/ML1828/ML18289A556.pdf>

From: [Lara, Julio](#)
To: [Roberts, Darrell](#); [Lambert, Kenneth](#)
Cc: [Cameron, Jamnes](#); [Orlikowski, Robert](#); [Giessner, John](#)
Subject: RE: Clinton SERP rescheduled to 12:30 pm CT on Thursday, 02/14/19
Date: Friday, February 08, 2019 9:40:31 AM

Probably not.

I expect the SERP will take an hour or so. Hence, Bob will cover DRP if needed.

From: Roberts, Darrell
Sent: Friday, February 08, 2019 9:34 AM
To: Lambert, Kenneth <Kenneth.Lambert@nrc.gov>; Lara, Julio <Julio.Lara@nrc.gov>
Cc: Cameron, Jamnes <Jamnes.Cameron@nrc.gov>; Orlikowski, Robert <Robert.Orlikowski@nrc.gov>; Giessner, John <John.Giessner@nrc.gov>
Subject: RE: Clinton SERP rescheduled to 12:30 pm CT on Thursday, 02/14/19

The last day of EOC meetings is Thursday, beginning at 1pm.

Will the 12:30 SERP be done by then?

DJR

From: Lambert, Kenneth
Sent: Friday, February 08, 2019 9:14 AM
To: Baker, Stephen <Stephen.Baker@nrc.gov>; Bakhsh, Sarah <Sarah.Bakhsh@nrc.gov>; Bickett, Brice <Brice.Bickett@nrc.gov>; Bollock, Douglas <Douglas.Bollock@nrc.gov>; Burgess, Michele <Michele.Burgess@nrc.gov>; Cameron, Jamnes <Jamnes.Cameron@nrc.gov>; Carpenter, Robert <Robert.Carpenter@nrc.gov>; Casey, Lauren <Lauren.Casey@nrc.gov>; Clay, Jim <Jim.Clay@nrc.gov>; Coleman, Nicole <Nicole.Coleman@nrc.gov>; Crisden, Cherie <Cherie.Crisden@nrc.gov>; Daley, Robert <Robert.Daley@nrc.gov>; Dickson, Billy <Billy.Dickson@nrc.gov>; Duncan, Eric <Eric.Duncan@nrc.gov>; Figueroa Toledo, Gladys <Gladys.FigueroaToledo@nrc.gov>; Fretz, Robert <Robert.Fretz@nrc.gov>; Furst, David <David.Furst@nrc.gov>; Giessner, John <John.Giessner@nrc.gov>; Gulla, Gerald <Gerald.Gulla@nrc.gov>; Hasan, Nasreen <Nasreen.Hasan@nrc.gov>; Harrison, John <John.Harrison@nrc.gov>; Heck, Jared <Jared.Heck@nrc.gov>; Hills, Dave <David.Hills@nrc.gov>; Hilton, Nick <Nick.Hilton@nrc.gov>; Holiday, Sophie <Sophie.Holiday@nrc.gov>; Hollcraft, Zachary <Zachary.Hollcraft@nrc.gov>; Jayroe, Peter <Peter.Jayroe@nrc.gov>; Jimenez-Guzman, Jose <Jose.Jimenez-Guzman@nrc.gov>; Jones, David <David.Jones@nrc.gov>; King, Michael <Michael.King@nrc.gov>; Kowal, Mark <Mark.Kowal@nrc.gov>; Kramer, John <John.Kramer@nrc.gov>; Kozak, Laura <Laura.Kozak@nrc.gov>; Kunowski, Michael <Michael.Kunowski@nrc.gov>; Lara, Julio <Julio.Lara@nrc.gov>; Lemoncelli, Mauri <Mauri.Lemoncelli@nrc.gov>; Letourneau, Andrew <Andrew.Letourneau@nrc.gov>; Lipa, Christine <Christine.Lipa@nrc.gov>; Luo, Ming <Ming.Luo@nrc.gov>; Marenchin, Thomas <Thomas.Marenchin@nrc.gov>; Marshfield, Mark <Mark.Marshfield@nrc.gov>; McCraw, Aaron

<Aaron.McCraw@nrc.gov>; McLaughlin, Marjorie <Marjorie.McLaughlin@nrc.gov>; Monteith, Emily <Emily.Monteith@nrc.gov>; NREnforcement Resource <NREnforcement.Resource@nrc.gov>; O'Brien, Kenneth <Kenneth.O'Brien@nrc.gov>; RidsOeMailCenter Resource <RidsOeMailCenter.Resource@nrc.gov>; Olteanu, Carmen <Carmen.Olteanu@nrc.gov>; Orlikowski, Robert <Robert.Orlikowski@nrc.gov>; Orth, Steven <Steven.Orth@nrc.gov>; Pelke, Patricia <Patricia.Pelke@nrc.gov>; Pelke, Paul <Paul.Pelke@nrc.gov>; Peduzzi, Francis <Francis.Peduzzi@nrc.gov>; Peralta, Juan <Juan.Peralta@nrc.gov>; Peterson, Hironori <Hironori.Peterson@nrc.gov>; Pope, Michael <Michael.Pope@nrc.gov>; Purdy, Gary <Gary.Purdy@nrc.gov>; Richardson, Alonzo <Alonzo.Richardson@nrc.gov>; Riemer, Kenneth <Kenneth.Riemer@nrc.gov>; Rodriguez, Sandra <Sandra.Rodriguez@nrc.gov>; Schmidt, Colleen <Colleen.Schmidt@nrc.gov>; Shuaibi, Mohammed <Mohammed.Shuaibi@nrc.gov>; Simonian, Nir <Niry.Simonian@nrc.gov>; Skokowski, Richard <Richard.Skokowski@nrc.gov>; Solorio, Dave <Dave.Solorio@nrc.gov>; Sparks, Scott <Scott.Sparks@nrc.gov>; Sreenivas, Leelavathi <Leelavathi.Sreenivas@nrc.gov>; Stoedter, Karla <Karla.Stoedter@nrc.gov>; Stone, AnnMarie <AnnMarie.Stone@nrc.gov>; Sun, Robert <Robert.Sun@nrc.gov>; Warnek, Nicole <Nicole.Warnek@nrc.gov>; White, Duane <Duane.White@nrc.gov>; Willis, Dori <Dori.Willis@nrc.gov>; Woods, Susanne <Susanne.Woods@nrc.gov>; Williams, Kevin <Kevin.Williams@nrc.gov>; Hanna, John <John.Hanna@nrc.gov>; Corujo-Sandin, Jorge <Jorge.Corujo-Sandin@nrc.gov>; Kennedy, Erin <Erin.Kennedy@nrc.gov>; Grigsby, Carl <Carl.Grigsby@nrc.gov>; West, Steven <Steven.West@nrc.gov>; Kent, Jonathan <Jonathan.Kent@nrc.gov>; Vasquez, Michael <Michael.Vasquez@nrc.gov>; Roberts, Darrell <Darrell.Roberts@nrc.gov>; Rajapakse, Champa <Champa.Rajapakse@nrc.gov>; Torres Collazo, Edgardo <edgardo.torrescollazo@nrc.gov>; Wilson, George <George.Wilson@nrc.gov>
Cc: Kozak, Laura <Laura.Kozak@nrc.gov>; Hanna, John <John.Hanna@nrc.gov>; Sanchez Santiago, Elba <Elba.SanchezSantiago@nrc.gov>; Phillips, Charles <Charles.Phillips@nrc.gov>; Mancuso, Joseph <Joseph.Mancuso@nrc.gov>; Alvarado Guilloty, Lydiana <Lydiana.AlvaradoGuilloty@nrc.gov>; St. Peters, Courtney <Courtney.St.Peters@nrc.gov>; Mitman, Jeffrey <Jeffrey.Mitman@nrc.gov>; Franovich, Mike <Mike.Franovich@nrc.gov>
Subject: Clinton SERP rescheduled to 12:30 pm CT on Thursday, 02/14/19
Importance: High

~~Official Use Only – Predecisional Enforcement Information~~

The Clinton SERP has been rescheduled for 12:30 pm CT (10:30 pm ET) on February 14, 2019, due to the All SES meeting scheduled Thursday morning. Special bridge line: 888-455-2586, passcode (b)(6)

(1) COMING WEEK'S PANELS: February 14, 2019

Region III will hold an enforcement panel/SERP for the case(s) below, **beginning at 12:30 pm CT (01:30 am ET). No VTC/skype. Audio will be thorough a special RIII bridge line 1-888-455-2586, passcode** Participants requested are shown by each case. RIII participants, please meet in the IRC; HQ participants please meet in the OE Conference Room. (b)(6)

12:30 pm CT (01:30 pm ET) - EA-18-104 - Clinton post Regulatory Conference final

SERP. Required participants: OE, NRR, RIII: DRP, EICS

(2) THE FOLLOWING WEEK'S PANEL: THURSDAY, February 21, 2019

None scheduled at this time

(3) IN PROGRESS MODIFIED PANELS CONDUCTED THROUGH EMAILS

(4) ENFORCEMENT CASES BASED ON OI REPORTS, NOT YET PANELED

(5) OTHER CASES TO BE PANELED FURTHER OUT ON THE HORIZON

(6) OTHER INFORMATION OF INTEREST

If information appears to be missing about an enforcement case or you have any questions, please call Ken Lambert at 630-810-4376, Sarah Bakhsh at 630-810-4380, or Paul Pelke at 630-810-4375. If you no longer wish to receive this weekly summary of upcoming RIII panels, please let us know at any time and we will remove your name. If someone needs to be added, please send their name to Ken Lambert, Sarah Bakhsh, or Paul Pelke.

From: [Staffing Resource Bulletin Board](#)
To: [Alvarado Guilloty, Lydiana](#); [Anderson, Alan](#); [Ariano, Carole](#); [Baker, Randal](#); [Bakhsh, Sarah](#); [Barclay, Kevin](#); [Barker, Allan](#); [Bartlett, Bruce](#); [Bell, Stephen](#); [Benjamin, Jamie](#); [Bergeon, Bryan](#); [Betancourt-Roldan, Diana](#); [Bianchi, Glenn](#); [Bigoness, Jay](#); [Bishop, Jennifer](#); [Boettcher, Julie](#); [Bonano, Eugenio](#); [Boston, Brent](#); [Bozga, John](#); [Briley, Thomas](#); [Butler, Rodney](#); [Cameron, Jamnes](#); [Carrington, Kenya](#); [Casey, Colleen](#); [Cassidy, John](#); [Cender, Laura](#); [Chandrathil, Prema](#); [Chang, Jimmy](#); [Christoffer Baruch, Gail](#); [Chyu, Doris](#); [Clay, Jim](#); [Coffman, Ellery](#); [Cole, Christian](#); [Corujo-Sandin, Jorge](#); [Craffey, Ryan](#); [Criscione, Lawrence](#); [Dahbur, Alan](#); [Daley, Robert](#); [Dickson, Billy](#); [Domke, Matthew](#); [Doyle, Matthew](#); [Draper, Jason](#); [Duncan, Eric](#); [Dunlop, Andrew](#); [Edwards, Geoffrey](#); [Edwards, Rhex](#); [Egan, Nathan](#); [Ehrig, Tina](#); [Ellegood, John](#); [Elliott, Roy](#); [Feliz-Adorno, Nestor](#); [Fernandez, Edison](#); [Fields, Nicole](#); [Foltz, Jeffrey](#); [Forster, Sara](#); [Frazier, Cassandra](#); [Garza, Michelle](#); [Gattone, Robert](#); [Gavula, James](#); [Giessner, John](#); [Gilliam, Jasmine](#); [Gladden, Karen](#); [Go, Tony](#); [Gryglak, Magdalena](#); [Grzywa, Mary](#); [Haeg, Lucas](#); [Hafeez, Ijaz](#); [Hansen, Gregory](#); [Hartman, Thomas](#); [Harvey, Edward](#); [Hausman, Cheryl](#); [Hausman, George](#); [Havertape, Joshua](#); [Heck, Jared](#); [Heller, James](#); [Hernandez, Cammie](#); [Hersey, Deborah](#); [Hills, David](#); [Holmberg, Mel](#); [Hunt, Christopher](#); [Jandovitz, John](#); [Jones, Michael](#); [Jones, Rosemary](#); [Jonsson, Dawn](#); [Kardaras, Tom](#); [Kemker, Brian](#); [Kennedy, Erin](#); [Kimble, Daniel](#); [King, Michael](#); [Koester, Nancy](#); [Kozak, Laura](#); [Krause, Donald](#); [Scott.Kryk@nrc.gov](#); [Kunowski, Michael](#); [Kutlesa, Jure](#); [Laflamme, Paul](#); [LaFranzo, Michael](#); [Lambert, Kenneth](#); [Langan, Scott](#); [Lara, Julio](#); [Lattin, Brandi](#); [Learn, Matthew](#); [Lee, Peter](#); [Licitra, Carl](#); [Lin, Bill](#); [Linn, Linda](#); [Lipa, Christine](#); [Logaras, Haral](#); [Lopez, Crystal](#); [Louden, Patrick](#); [Luo, Ming](#); [Magee, Thomas](#); [Mancuso, Joseph](#); [Martinez, Christine](#); [Maynen, Joseph](#); [McCraw, Aaron](#); [McGhee, James](#); [Meghani, Vijay](#); [Meyer, Paul](#); [Mitlyng, Viktoria](#); [Murray, Robert](#); [Nance, James](#); [Neurauter, James](#); [Ng, Raymond](#); [Nguyen, April](#); [Nieves Folch, Luis](#); [Null, Kevin](#); [O'Brien, Kenneth](#); [O'Dowd, Dennis](#); [O'Dwyer, Gerard](#); [Olteanu, Carmen](#); [Orlikowski, Robert](#); [Orth, Steven](#); [Ospino, Tyrone](#); [Parker, Bryan](#); [Park, Joon](#); [Pavon, Sandy](#); [Pelke, Patricia](#); [Pelke, Paul](#); [Peterson, Hironori](#); [Petrella, Vance](#); [Phillips, Charles](#); [Piskura, Deborah](#); [Pope, Michael](#); [Pusateri, Kevin](#); [Ray, Teresa](#); [Reeser, David](#); [Riemer, Kenneth](#); [Roach, Gregory](#); [Robbins, John](#); [Roberts, Darrell](#); [Rodriguez, Lionel](#); [Ruiz, Robert](#); [Rutkowski, John](#); [Sanchez Santiago, Elba](#); [Sandrik, Lauren](#); [Sargis, Daniel](#); [Schaup, William](#); [Schmidt, Colleen](#); [Seymour, Jesse](#); [Shaffer, Vered](#); [Shah, Nirodh](#); [Shaikh, Atif](#); [Shaughnessy, Patrice](#); [Sheldon, Stuart](#); [Shuaibi, Mohammed](#); [Skokowski, Richard](#); [Smagacz, Phillip](#); [Smith, Desiree](#); [Smith, Laura](#); [Sotiropoulos, Dina](#); [Steffes, Jakob](#); [Steward, Jeffery](#); [Stoedter, Karla](#); [Stone, AnnMarie](#); [Stricklin, Rebecca](#); [Strohmeyer, Daniel](#); [Sulaiman, Zahid](#); [Szwarc, Dariusz](#); [Taylor, Thomas](#); [Te, Ryan](#); [Tomczak, Tammy](#); [Tran, Frank](#); [Valos, Nicholas](#); [Vassos, John](#); [Walsh, Mary](#); [Warren, Geoffrey](#); [Wendoll, Rowlene](#); [White-Jackson, Joan](#); [Wilk, Brenda](#); [Wojewoda, Jacquelyn](#); [Zerth, Marjorie](#); [Ziolkowski, Michael](#); [Zoia, Charles](#); [Zurawski, Paul](#)
Subject: New Region III Opportunity
Date: Wednesday, March 14, 2018 10:42:14 AM

Title: 95001 at Clinton for White finding

Click [here](#) for details.

Click [here](#) to unsubscribe

Click on Actions --> Leave the Group

From: [Kozak, Laura](#)
To: [Sanchez Santiago, Elba](#); [Stoedter, Karla](#)
Cc: [Phillips, Charles](#); [Rodriguez, Lionel](#); [Sargis, Daniel](#)
Subject: RE: Update on Div. 2 EDG Unavailability during Outage
Date: Friday, May 18, 2018 4:46:19 PM

Thanks for the info. Two questions – not critical – so whenever you get a chance.

The transition to M4 on 5/12 resulted in a time to boil change from 9.9 hours down to 5 hours – was this a transition from the flooded up M5 down to below the flange level with Rx vessel head installed? Just trying to make sure I have the sequence of events correct.

The shutdown safety procedure, step 4.15 discusses the use of FLEX to minimize or “eliminate” risk. It refers to OU-AA-103, step 4.8. When you get a chance could you forward a copy of that procedure?

Thanks
Laura

From: Sanchez Santiago, Elba
Sent: Friday, May 18, 2018 12:39 PM
To: Stoedter, Karla <Karla.Stoedter@nrc.gov>; Kozak, Laura <Laura.Kozak@nrc.gov>
Cc: Phillips, Charles <Charles.Phillips@nrc.gov>; Rodriguez, Lionel <Lionel.Rodriguez@nrc.gov>; Sargis, Daniel <Daniel.Sargis@nrc.gov>
Subject: RE: Update on Div. 2 EDG Unavailability during Outage

That is correct. I missed that. I corrected it on my version, so when I revise it, it'll be correct.

Thanks!
Elba

From: Stoedter, Karla
Sent: Friday, May 18, 2018 12:37 PM
To: Sanchez Santiago, Elba <Elba.SanchezSantiago@nrc.gov>; Kozak, Laura <Laura.Kozak@nrc.gov>
Cc: Phillips, Charles <Charles.Phillips@nrc.gov>; Rodriguez, Lionel <Lionel.Rodriguez@nrc.gov>; Sargis, Daniel <Daniel.Sargis@nrc.gov>
Subject: RE: Update on Div. 2 EDG Unavailability during Outage

One typo for folks to be aware of. The first line item on the time line says the Division 1 EDG clearance order had been removed. I believe this should be Division 2.

Karla

From: Sanchez Santiago, Elba
Sent: Friday, May 18, 2018 12:25 PM
To: Kozak, Laura <Laura.Kozak@nrc.gov>; Stoedter, Karla <Karla.Stoedter@nrc.gov>
Cc: Phillips, Charles <Charles.Phillips@nrc.gov>; Rodriguez, Lionel <Lionel.Rodriguez@nrc.gov>

Subject: RE: Update on Div. 2 EDG Unavailability during Outage

Karla/Laura,

The attached word document contains the answers to your questions as well as a short timeline on the Division 1 and 2 EDG availability. I also attached the shutdown safety management plan for the outage. I made some annotations on the actual times the pertinent equipment was returned to service. The third document is Clinton's shutdown safety management procedure.

The licensee is also putting a timeline together that will include the availability of the fire pumps. I will share that with you when I receive it.

Let me know if you have any additional questions.

Thanks,
Elba

From: Kozak, Laura

Sent: Friday, May 18, 2018 6:59 AM

To: Stoedter, Karla <Karla.Stoedter@nrc.gov>; Rodriguez, Lionel <Lionel.Rodriguez@nrc.gov>

Cc: Sanchez Santiago, Elba <Elba.SanchezSantiago@nrc.gov>; Phillips, Charles <Charles.Phillips@nrc.gov>

Subject: RE: Update on Div. 2 EDG Unavailability during Outage

I had a couple of other questions –

If the EDG had been demanded and failed to start, would procedures specifically direct operators to check the air system and allow for recovery of the EDG?

Was HPCS and its DG available? (this information will probably be on the shutdown safety assessment)

Were they using/staging/crediting portable or FLEX diesels as any kind of compensatory measure for having an EDG out of service/

Laura

From: Stoedter, Karla

Sent: Friday, May 18, 2018 5:12 AM

To: Rodriguez, Lionel <Lionel.Rodriguez@nrc.gov>

Cc: Sanchez Santiago, Elba <Elba.SanchezSantiago@nrc.gov>; Kozak, Laura <Laura.Kozak@nrc.gov>; Phillips, Charles <Charles.Phillips@nrc.gov>

Subject: RE: Update on Div. 2 EDG Unavailability during Outage

Thanks for the information. I do have a few questions that I believe we will need information on as part of deciding upon a path forward.

1. I'm assuming the Division 1 EDG was available until they took it out of service for the Division 1 outage window. Is this correct
2. Were they crediting the Division 2 EDG as available on May 11 for shutdown safety purposes? We will need copies of their shutdown safety profile from May 11 until yesterday when they restored the Division 2 EDG. This may be important since any risk assessment will also consider Division 1 EDG failures and the need to rely on Division 2.
3. Has there been any change the time to boil since May 11? Please provide a copy of the time to boil procedure.
4. Were they moving fuel on May 11 or any time after this date?
5. Were there any control room alarms or local EDG panel alarms that would have provided an indication the air receiver outlet valves were closed? This could also include an EDG trouble alarm.

That's all I can think of for now, but there will likely be more things we may need as we start looking at the issue this morning.

Great job last night,
Karla

From: Rodriguez, Lionel
Sent: Thursday, May 17, 2018 11:02 PM
To: Stuedter, Karla <Karla.Stuedter@nrc.gov>
Cc: Sanchez Santiago, Elba <Elba.SanchezSantiago@nrc.gov>
Subject: Update on Div. 2 EDG Unavailability during Outage

Hello,

Based on a quick discussion w/ Richard Champley (Senior License Holder), and a search of the Operations Logs, it appears the Air Start Receiver valves were shut for the Division 2 EDG on 5/5/18 during the planned Division 2 System Outage Window through a Clearance Order (C/O 139455). The 1DG160 and 1DG161 valves (Air Receiver Outlet Valves) were supposed to have been restored to their required position during the Final Clear of the Clearance Order by implementation of the Division 2 EDG restoration procedure to standby (3506.01P002). On 5/9/18, the Clearance Order was cleared, but because the Division 2 SX system had not yet been restored the Division 2 EDG was not restored to its standby configuration. This was recognized, and a log entry was generated to track completion of that. It appears to me that the log entry was lost in the shuffle. On 5/11/18, the Division 2 SX system was restored and a separate correction log entry was made which stated the Division 2 EDG was available and in standby.

On 5/14/18 they commenced their Division 1 System Outage Window and began protecting the Division 2 EDG.

We will continue to feed you more information as we get it.

Lionel Rodriguez
Clinton Acting Resident Inspector

From: [Kozak, Laura](#)
To: [Sanchez Santiago, Elba](#)
Subject: RE: Update on Div. 2 EDG Unavailability during Outage
Date: Monday, May 21, 2018 11:06:02 AM

Thanks!

From: Sanchez Santiago, Elba
Sent: Monday, May 21, 2018 8:29 AM
To: Kozak, Laura <Laura.Kozak@nrc.gov>; Stoedter, Karla <Karla.Stoedter@nrc.gov>
Cc: Phillips, Charles <Charles.Phillips@nrc.gov>; Rodriguez, Lionel <Lionel.Rodriguez@nrc.gov>; Sargis, Daniel <Daniel.Sargis@nrc.gov>
Subject: RE: Update on Div. 2 EDG Unavailability during Outage

From: Kozak, Laura
Sent: Friday, May 18, 2018 4:46 PM
To: Sanchez Santiago, Elba <Elba.SanchezSantiago@nrc.gov>; Stoedter, Karla <Karla.Stoedter@nrc.gov>
Cc: Phillips, Charles <Charles.Phillips@nrc.gov>; Rodriguez, Lionel <Lionel.Rodriguez@nrc.gov>; Sargis, Daniel <Daniel.Sargis@nrc.gov>
Subject: RE: Update on Div. 2 EDG Unavailability during Outage

Thanks for the info. Two questions – not critical – so whenever you get a chance.

The transition to M4 on 5/12 resulted in a time to boil change from 9.9 hours down to 5 hours – was this a transition from the flooded up M5 down to below the flange level with Rx vessel head installed? Just trying to make sure I have the sequence of events correct.

Yes. The sequence was cavity drain to below flange level and then install the RX vessel head, which is the specific point they enter Mode 4. Also contributing to the increase in temperature was that as soon as that shortly after entering Mode 4 they transitioned to the pressure test. During this test they shut off shutdown cooling. (permitted per TS with at least one reactor recirc pump running)

The shutdown safety procedure, step 4.15 discusses the use of FLEX to minimize or “eliminate” risk. It refers to OU-AA-103, step 4.8. When you get a chance could you forward a copy of that procedure? **See attached**

Thanks
Laura

From: Sanchez Santiago, Elba
Sent: Friday, May 18, 2018 12:39 PM
To: Stoedter, Karla <Karla.Stoedter@nrc.gov>; Kozak, Laura <Laura.Kozak@nrc.gov>

Cc: Phillips, Charles <Charles.Phillips@nrc.gov>; Rodriguez, Lionel <Lionel.Rodriguez@nrc.gov>; Sargis, Daniel <Daniel.Sargis@nrc.gov>
Subject: RE: Update on Div. 2 EDG Unavailability during Outage

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Sent: Friday, May 18, 2018 12:37 PM
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Sent: Friday, May 18, 2018 6:59 AM
To: Stoedter, Karla <Karla.Stoedter@nrc.gov>; Rodriguez, Lionel <Lionel.Rodriguez@nrc.gov>

Cc: Sanchez Santiago, Elba <Elba.SanchezSantiago@nrc.gov>; Phillips, Charles <Charles.Phillips@nrc.gov>

Subject: RE: Update on Div. 2 EDG Unavailability during Outage

I had a couple of other questions –

If the EDG had been demanded and failed to start, would procedures specifically direct operators to check the air system and allow for recovery of the EDG?

Was HPCS and its DG available? (this information will probably be on the shutdown safety assessment)

Were they using/staging/crediting portable or FLEX diesels as any kind of compensatory measure for having an EDG out of service/

Laura

From: Stoedter, Karla

Sent: Friday, May 18, 2018 5:12 AM

To: Rodriguez, Lionel <Lionel.Rodriguez@nrc.gov>

Cc: Sanchez Santiago, Elba <Elba.SanchezSantiago@nrc.gov>; Kozak, Laura <Laura.Kozak@nrc.gov>; Phillips, Charles <Charles.Phillips@nrc.gov>

Subject: RE: Update on Div. 2 EDG Unavailability during Outage

Thanks for the information. I do have a few questions that I believe we will need information on as part of deciding upon a path forward.

1. I'm assuming the Division 1 EDG was available until they took it out of service for the Division 1 outage window. Is this correct
2. Were they crediting the Division 2 EDG as available on May 11 for shutdown safety purposes? We will need copies of their shutdown safety profile from May 11 until yesterday when they restored the Division 2 EDG. This may be important since any risk assessment will also consider Division 1 EDG failures and the need to rely on Division 2.
3. Has there been any change the time to boil since May 11? Please provide a copy of the time to boil procedure.
4. Were they moving fuel on May 11 or any time after this date?
5. Were there any control room alarms or local EDG panel alarms that would have provided an indication the air receiver outlet valves were closed? This could also include an EDG trouble alarm.

That's all I can think of for now, but there will likely be more things we may need as we start looking at the issue this morning.

Great job last night,

Karla

From: Rodriguez, Lionel
Sent: Thursday, May 17, 2018 11:02 PM
To: Stoedter, Karla <Karla.Stoedter@nrc.gov>
Cc: Sanchez Santiago, Elba <Elba.SanchezSantiago@nrc.gov>
Subject: Update on Div. 2 EDG Unavailability during Outage

Hello,

Based on a quick discussion w/ Richard Champley (Senior License Holder), and a search of the Operations Logs, it appears the Air Start Receiver valves were shut for the Division 2 EDG on 5/5/18 during the planned Division 2 System Outage Window through a Clearance Order (C/O 139455). The 1DG160 and 1DG161 valves (Air Receiver Outlet Valves) were supposed to have been restored to their required position during the Final Clear of the Clearance Order by implementation of the Division 2 EDG restoration procedure to standby (3506.01P002). On 5/9/18, the Clearance Order was cleared, but because the Division 2 SX system had not yet been restored the Division 2 EDG was not restored to its standby configuration. This was recognized, and a log entry was generated to track completion of that. It appears to me that the log entry was lost in the shuffle. On 5/11/18, the Division 2 SX system was restored and a separate correction log entry was made which stated the Division 2 EDG was available and in standby.

On 5/14/18 they commenced their Division 1 System Outage Window and began protecting the Division 2 EDG.

We will continue to feed you more information as we get it.

Lionel Rodriguez
Clinton Acting Resident Inspector

From: [Stoedter, Karla](#)
To: [Kozak, Laura](#)
Subject: Clinton one pager
Date: Friday, May 25, 2018 9:07:54 AM
Attachments: [Recent Operations and Procedure Adherence Issues at Clinton Power Station.docx](#)

Here's the one pager with additional examples of Clinton performance issues.

Recent Operations and Procedure Adherence Issues at Clinton Power Station

- **May 17, 2018 – Division 2 EDG was found out of alignment while concurrently in a Division 1 system outage window causing unplanned entry into shutdown risk RED.**
 - While performing a walk down of the division 2 EDG room an equipment operator identified the isolation valve for the air receivers was shut. This rendered the division 2 EDG inoperable and unavailable. The division 2 EDG had been declared operable on May 11th. On May 14th the Division 1 EDG was taken out of service for planned maintenance on the division 1 AC/DC system that affected the availability of the EDG. Having both EDGs out of service at the same time caused a shutdown risk red condition for electrical power and orange condition for spent fuel pool cooling and decay heat removal.
- **May 13, 2018 – Licensee didn't recognize or resolve procedure issues associated with the RPV pressure test prior to performance.**
 - There is a prerequisite associated with performing the RPV pressure test that requires condensate and condensate booster pumps be available and aligned. It is one of the methods to pressurize the reactor for the test. Alternatives are provided for pressurizing the vessel but the procedure as written does not alleviate them from having the system available. Due to work being performed on the condenser the system was not available for the pressure test and the operators did not take the necessary actions to change the procedure prior to performing the test. The resident inspectors brought this issue to the operations department's attention (SRO, SM, Operations Director). They documented the issue in an AR and are performing a work group evaluation to identify and correct the causes surrounding the failure to follow procedures.
- **May 9, 2018 – An equipment operator over-torqued and broke the stem on the HPSC min flow valve.**
 - The equipment operator was sent into the field to relax the HPSC min flow valve off of its seat because it had been manually operated and prior to using the motor to operate the valve the procedure requires them to relax it. The equipment operator did not recognize the current configuration of the valve (open or closed) and did not take any actions to obtain that information (look at the clearance order, look at the indications on the valve). He assumed the valve was in the closed position and tried to open it. The valve was in the open position and therefore when the operator applied force to try and open it and the valve stem sheared off.
- **May 7, 2018 – During shutdown conditions the plant experienced an unexpected SCRAM signal as a result of maintenance activities.**
 - With one division of IRM instrumentation out of service, the logic for a SCRAM signal is 1/3. While in this configuration the licensee was performing maintenance on another division of IRMs. They had done this previously in the outage and therefore were not concerned it would cause a SCRAM signal. The instructions did not specify and order for disconnecting some of the test equipment. Operations and maintenance did not recognize in their reviews that the order in which these actions were taken could result in a SCRAM signal to be initiated. Therefore this level of specificity was not provided in the instructions. This issue did result in an unplanned SCRAM signal and entry into the SCRAM off-normal procedure. The licensee did not consider this foreseeable and stated it was likely a spike in the IRM and not directly related to the maintenance activity. They do agree if the order of the equipment removal had been different it may have precluded this. The inspectors continue to follow-up.

- **May 1, 2018 - Licensee did not recognize the impact the Division 4 NSPS outage had on the ability to trip the reactor recirculation pump breaker.**
 - The licensee tried to trip the breaker for the reactor recirculation pump and it would not trip. The licensee initially thought there was an issue with the trip circuitry but after further investigation realized the trip circuitry was powered by Division 4 NSPS, which was out of service for planned maintenance.
- **April 2, 2018 – The licensee documented increased leakage past a safety related SX boundary valve and did not document an operability determination.**
 - The inspectors identified by reviewing logs that there was leakage past safety related component cooling water valves. They also identified there was no operability determination associated with this item. When the inspectors questioned the operators on the lack of an operability determination the operators pointed them to a previous condition report for the same issue documented in 2017. When the inspectors reviewed the 2017 condition report it also did not have an operability determination associated with it. It took many questions and multiple iterations for the licensee to document an operability determination that considered all the aspects of the identified condition.
- **January 24, 2018 – An equipment operator performed procedure steps out of sequence causing the RCIC steam supply valve to isolate.**
 - During restoration from a RCIC system outage window an equipment operator closed the breaker associated with the steam supply isolation valve to RCIC prior to the Control Room resetting the logic for this valve. This caused the valve to go closed and rendered the RCIC system inoperable and unavailable. This also resulted in an unplanned entry into online risk Yellow.
- **March – May 2018 – Multiple examples of inadequate work orders (vague instructions, can't be completed as written, missing acceptance criteria) have been identified by the inspectors.**
 - These example spanned multiple departments including maintenance, operations and engineering.

From: [Kozak, Laura](#)
To: [Stoedter, Karla](#); [Sanchez Santiago, Elba](#); [Rodriguez, Lionel](#); [Sargis, Daniel](#); [Phillips, Charles](#)
Cc: [Mitman, Jeffrey](#)
Subject: FLEX and the Clinton shutdown issue
Date: Friday, May 25, 2018 12:53:44 PM

Karla

I was reading the JLD safety assessment of Mitigating Strategies implementation and found the paragraph below about Clinton's implementation of FLEX during shutdown. Could either the SIT or the residents obtain a copy of the position paper?

Thanks
Laura

During the audit process, the licensee referenced the [Exelon Position Paper, EXC-WP-03, "FLEX Guidance for Shutdown/Refueling Modes," Rev 1](#), which includes use of a defense in depth approach to outages and will take risk appropriate steps in preparation for outages. The licensee stated that its approach is fully consistent with the NEI position paper on shutdown/refueling modes and the NRC endorsement letter of the NEI position paper. Based on the evaluation above, the NRC staff concludes that the licensee has developed guidance that if implemented appropriately should maintain or restore core cooling, SFP cooling, and containment following a BDBEE in shutdown and refueling modes consistent with NEI 12-06 guidance, as endorsed, by JLD-ISG-2012-01 and adequately addresses the requirements of the order.

From: [Staffing Resource Bulletin Board](#)
To: [Alvarado Guilloty, Lydiana](#); [Anderson, Alan](#); [Ariano, Carole](#); [Baker, Randal](#); [Bakhsh, Sarah](#); [Barclay, Kevin](#); [Barker, Allan](#); [Bartlett, Bruce](#); [Bell, Stephen](#); [Benjamin, Jamie](#); [Bergeon, Bryan](#); [Betancourt-Roldan, Diana](#); [Bianchi, Glenn](#); [Bigoness, Jay](#); [Bishop, Jennifer](#); [Boettcher, Julie](#); [Bonano, Eugenio](#); [Boston, Brent](#); [Bozga, John](#); [Briley, Thomas](#); [Butler, Rodney](#); [Cameron, Jamnes](#); [Carrington, Kenya](#); [Casey, Colleen](#); [Cassidy, John](#); [Cender, Laura](#); [Chandrarathil, Prema](#); [Chang, Jimmy](#); [Christoffer Baruch, Gail](#); [Chyu, Doris](#); [Clay, Jim](#); [Coffman, Ellery](#); [Cole, Christian](#); [Corujo-Sandin, Jorge](#); [Craffey, Ryan](#); [Criscione, Lawrence](#); [Dahbur, Alan](#); [Daley, Robert](#); [Dickson, Billy](#); [Domke, Matthew](#); [Doyle, Matthew](#); [Draper, Jason](#); [Duncan, Eric](#); [Dunlop, Andrew](#); [Edwards, Geoffrey](#); [Edwards, Rhex](#); [Egan, Nathan](#); [Ehrig, Tina](#); [Ellegood, John](#); [Elliott, Roy](#); [Feliz-Adorno, Nestor](#); [Fernandez, Edison](#); [Fields, Nicole](#); [Foltz, Jeffrey](#); [Forster, Sara](#); [Frazier, Cassandra](#); [Garza, Michelle](#); [Gattone, Robert](#); [Gavula, James](#); [Giessner, John](#); [Gilliam, Jasmine](#); [Gladden, Karen](#); [Go, Tony](#); [Gryglak, Magdalena](#); [Grzywa, Mary](#); [Haeg, Lucas](#); [Hafeez, Ijaz](#); [Hansen, Gregory](#); [Hartman, Thomas](#); [Harvey, Edward](#); [Harvey, Jacquelyn](#); [Hausman, Cheryl](#); [Hausman, George](#); [Havertape, Joshua](#); [Heck, Jared](#); [Heller, James](#); [Hernandez, Cammie](#); [Hersey, Deborah](#); [Hills, David](#); [Holmberg, Mel](#); [Hunt, Christopher](#); [Jandovitz, John](#); [Jones, Michael](#); [Rosemary.Jones@nrc.gov](#); [Jonsson, Dawn](#); [Kardaras, Tom](#); [Kemker, Brian](#); [Kennedy, Erin](#); [Kimble, Daniel](#); [King, Michael](#); [Koester, Nancy](#); [Kozak, Laura](#); [Krause, Donald](#); [Kunowski, Michael](#); [Kutlesa, Jure](#); [Laflamme, Paul](#); [LaFranzo, Michael](#); [Lambert, Kenneth](#); [Langan, Scott](#); [Lara, Julio](#); [Lattin, Brandi](#); [Learn, Matthew](#); [Lee, Peter](#); [Licitra, Carl](#); [Lin, Bill](#); [Linn, Linda](#); [Lipa, Christine](#); [Logaras, Haral](#); [Lopez, Crystal](#); [Louden, Patrick](#); [Luo, Ming](#); [Magee, Thomas](#); [Mancuso, Joseph](#); [Martinez, Christine](#); [Maynen, Joseph](#); [McCraw, Aaron](#); [McGhee, James](#); [Meghani, Vijay](#); [Meyer, Paul](#); [Mitlyng, Viktoria](#); [Murray, Robert](#); [Nance, James](#); [Neurauter, James](#); [Ng, Raymond](#); [Nguyen, April](#); [Nieves Folch, Luis](#); [Null, Kevin](#); [O'Brien, Kenneth](#); [O'Dowd, Dennis](#); [O'Dwyer, Gerard](#); [Olteanu, Carmen](#); [Orlikowski, Robert](#); [Orth, Steven](#); [Ospino, Tyrone](#); [Parker, Bryan](#); [Park, Joon](#); [Pavon, Sandy](#); [Pelke, Patricia](#); [Pelke, Paul](#); [Peterson, Hironori](#); [Petrella, Vance](#); [Phillips, Charles](#); [Piskura, Deborah](#); [Pope, Michael](#); [Pusateri, Kevin](#); [Ray, Teresa](#); [Reeser, David](#); [Riemer, Kenneth](#); [Roach, Gregory](#); [Robbins, John](#); [Roberts, Darrell](#); [Rodriguez, Lionel](#); [Ruiz, Robert](#); [Rutkowski, John](#); [Sanchez Santiago, Elba](#); [Sandrik, Lauren](#); [Sargis, Daniel](#); [Schaup, William](#); [Schmidt, Colleen](#); [Seymour, Jesse](#); [Shaffer, Vered](#); [Shah, Nirodh](#); [Shaikh, Atif](#); [Shaughnessy, Patrice](#); [Sheldon, Stuart](#); [Shuaibi, Mohammed](#); [Skokowski, Richard](#); [Smagacz, Phillip](#); [Smith, Desiree](#); [Smith, Laura](#); [Sotiropoulos, Dina](#); [Steffes, Jakob](#); [Steward, Jeffery](#); [Stoedter, Karla](#); [Stone, AnnMarie](#); [Stricklin, Rebecca](#); [Strohmeyer, Daniel](#); [Sulaiman, Zahid](#); [Szwarc, Dariusz](#); [Taylor, Thomas](#); [Te, Ryan](#); [Tomczak, Tammy](#); [Tran, Frank](#); [Valos, Nicholas](#); [Vassos, John](#); [Walsh, Mary](#); [Warren, Geoffrey](#); [Wendoll, Rowlene](#); [White-Jackson, Joan](#); [Wilk, Brenda](#); [Zerth, Marjorie](#); [Ziolkowski, Michael](#); [Zoia, Charles](#); [Zurawski, Paul](#)
Subject: New Region III Opportunity
Date: Friday, May 25, 2018 2:36:13 PM

Title: Special Inspection Team Member - Clinton

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From: [Rodriguez, Lionel](#)
To: [Phillips, Charles](#)
Cc: [Sanchez Santiago, Elba](#)
Subject: Prompt Investigation for Div. 2 EDG Issue
Date: Friday, May 25, 2018 1:58:59 PM
Attachments: [\[Untitled\].pdf](#)

Attachment is non-responsive due to narrowing the request to exclude licensee originated documents. Attachment is "Human Performance Issue Verbal Report Format", described in this email.

Hello Chuck,

Attached is the Prompt Investigation the licensee performed for the Div. 2 EDG issue from last week. You can add it to your pile of SIT materials for prep.

Lionel R.

From: [Kozak, Laura](#)
To: [Phillips, Charles](#)
Subject: Grand Gulf Shutdown configuration control issue
Date: Tuesday, May 29, 2018 1:41:26 PM
Attachments: [grand gulf report.pdf](#)

Chuck

FYI – significant operating experience for a BWR 6 shutdown configuration control.

This finding went through the SDP process, was preliminarily greater than green but ultimately determined to be green.

Laura



**UNITED STATES
NUCLEAR REGULATORY COMMISSION**
REGION IV
1600 E. LAMAR BLVD
ARLINGTON, TX 76011-4511

Document is publicly
available at
<https://www.nrc.gov/docs/ML1730/ML17303B200.pdf>

October 27, 2017

EA-16-277

Mr. Eric Larson, Site Vice President
Entergy Operations, Inc.
Grand Gulf Nuclear Station
P.O. Box 756
Port Gibson, MS 39150

SUBJECT: GRAND GULF NUCLEAR STATION – NRC SPECIAL INSPECTION REPORT
05000416/2016008

Dear Mr. Larson:

On October 6, 2016, the U.S. Nuclear Regulatory Commission (NRC) completed its initial assessment of configuration control problems, including the unplanned unavailability of the alternate decay heat removal system during the replacement of a residual heat removal pump, which occurred between September 9, 2016 and September 22, 2016, at your Grand Gulf Nuclear Station. Based on this initial assessment, the NRC sent a special inspection team to your site on October 31, 2016.

On May 31, 2017, the NRC completed its special inspection and discussed the results of this inspection with you and other members of your staff. The results of this inspection are documented in the enclosed report.

NRC inspectors documented three findings of very low safety significance (Green) in this report. All of these findings involved violations of NRC requirements. The NRC is treating these violations as non-cited violations (NCVs) consistent with Section 2.3.2.a of the Enforcement Policy.

If you contest the violations or significance of these NCVs, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001; with copies to the Regional Administrator, Region IV; the Director, Office of Enforcement; and the NRC resident inspector at the Grand Gulf Nuclear Station.

If you disagree with a cross-cutting aspect assignment in this report, you should provide a response within 30 days of the date of this inspection report, with the basis for your disagreement, to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001; with copies to the Regional Administrator, Region IV; and the NRC resident inspector at the Grand Gulf Nuclear Station.

This letter, its enclosure, and your response (if any) will be made available for public inspection and copying at <http://www.nrc.gov/reading-rm/adams.html> and at the NRC Public Document Room in accordance with 10 CFR 2.390, "Public Inspections, Exemptions, Requests for Withholding."

Sincerely,

/RA/

Jason Kozal, Chief
Project Branch C
Division of Reactor Projects

Docket No. 50-416
License No. NPF-29

Enclosure:
Inspection Report 05000416/2016008
w/ Attachments:
1. Supplemental Information
2. Detailed Risk Evaluation
3. Special Inspection Charter

GRAND GULF NUCLEAR STATION – NRC SPECIAL INSPECTION REPORT
05000416/2016008 – DATED OCTOBER 27, 2017

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 By: JKozal/dll

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REGION IV

Docket: 05000416

License: NPF-29

Report: 05000416/2016008

Licensee: Entergy Operations, Inc.

Facility: Grand Gulf Nuclear Station, Unit 1

Location: 7003 Baldhill Road
Port Gibson, MS 39150

Dates: October 31, 2016 through May 31, 2017

Team Leader: Mark Haire, Chief, Plant Support Branch 1

Inspectors: David Proulx, Senior Project Engineer
Neil Day, Resident Inspector
David Loveless, Senior Reactor Analyst

Approved By: Jason Kozal, Chief
Project Branch C
Division of Reactor Projects

SUMMARY

IR 05000416/2016008; 10/31/2016 - 5/31/2017; Grand Gulf Nuclear Station; Special Inspection.

The inspection activities described in this report were performed between October 31, 2016, and May 31, 2017, by the resident inspector at Grand Gulf Nuclear Station and two inspectors from the NRC's Region IV office. Three findings of very low safety significance (Green) are documented in this report. All of these findings involved violations of NRC requirements. The significance of inspection findings is indicated by their color (i.e., Green, greater than Green, White, Yellow, or Red), determined using Inspection Manual Chapter 0609, "Significance Determination Process," dated April 29, 2015. Their cross-cutting aspects are determined using Inspection Manual Chapter 0310, "Aspects within the Cross-Cutting Areas," dated December 4, 2014. Violations of NRC requirements are dispositioned in accordance with the NRC Enforcement Policy. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," dated July 2016.

Cornerstone: Initiating Events

- Green. The team identified two examples of a non-cited violation of 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," for the licensee's failure to have adequate procedures for activities affecting quality. Specifically, Grand Gulf Nuclear Station failed to have adequate procedures for feedwater, condensate, and shutdown cooling activities. The licensee implemented corrective actions to revise the procedures. The licensee entered this issue into their corrective action program as Condition Reports CR-GGN-2016-08334, 08273, and 08290.

The failure to have adequate procedures for activities affecting quality was a performance deficiency. Example (1) of this performance deficiency was more than minor, and therefore a finding, because it was associated with the procedure quality attribute of the Mitigating Systems Cornerstone and affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, not having procedural guidance for the alternate decay heat removal system alignment resulted in misalignment of the system and its subsequent inability to perform its required function if needed. A detailed risk evaluation (Attachment 2) calculated an increase in core damage frequency of $3.2\text{E-}7/\text{year}$ and an increase in large early release frequency of $7.3\text{E-}8/\text{year}$, which has a very low safety significance (Green). Example (2) of this performance deficiency was more than minor, and therefore a finding, because it was associated with the procedure quality attribute of the Initiating Events Cornerstone and affected the cornerstone objective to limit the likelihood of events that upset plant stability and challenge critical safety functions during shutdown operations. Specifically, not having procedural guidance for feedwater isolation valve operation resulted in inadvertent overfill of the reactor vessel. This violation is associated with a finding having very low safety significance (Green). The team did not assign a cross-cutting aspect because the performance deficiency was not reflective of current plant performance. (Section 4OA3)

Cornerstone: Mitigating Systems

- Green. The team reviewed a self-revealed, non-cited violation of Technical Specification 3.4.10, "Residual Heat Removal Shutdown Cooling System – Cold Shutdown," for the licensee's failure to verify an alternate method of decay heat removal was available when residual heat removal subsystem A was inoperable and unavailable due to a pump replacement. Specifically, the licensee inappropriately credited the alternate decay heat removal system as an available alternate method of decay heat removal. Credit for this system was inappropriate because, although the licensee believed the system had been aligned in standby, the alternate decay heat removal heat exchanger isolation valves had remained tagged closed, rendering the system unavailable to satisfy the technical specification requirement during the time period that residual heat removal subsystem A was unavailable. The licensee restored compliance by restoring residual heat removal subsystem A to available status. The licensee entered this issue into their corrective action program as Condition Report CR-GGN-2016-07281.

The failure to perform the required action to verify an alternate method of decay heat removal was available, when a residual heat removal shutdown cooling system was inoperable, was a performance deficiency. The performance deficiency was more than minor, and therefore a finding, because it was associated with the human performance attribute of the Mitigating Systems Cornerstone and affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. A detailed risk evaluation (Attachment 2) calculated an increase in core damage frequency of $3.2\text{E-}7/\text{year}$ and an increase in large early release frequency of $7.3\text{E-}8/\text{year}$. Therefore, this violation is associated with a finding having very low safety significance (Green). The team determined the finding had a cross-cutting aspect within the human performance area, field presence, because leaders failed to reinforce standards and expectations in the work areas of the plant [H.2]. (Section 4OA3)

- Green. The team identified a non-cited violation of Technical Specification 5.4.1.a, "Procedures," for the licensee's failure to implement procedures required by Regulatory Guide 1.33, Revision 2, Appendix A, February 1978. Specifically, contrary to procedures, on September 23, 2016, operations personnel failed to verify adequate plant service water flow to the alternate decay heat removal heat exchangers while placing the system in service. The licensee implemented corrective actions which included high intensity training to improve nuclear worker behaviors and clarifying the directions in the procedure. The licensee entered this issue into the corrective action program as Condition Report CR-GGN-2016-08333.

The failure to implement procedures, as required by Technical Specification 5.4.1.a, was a performance deficiency. This performance deficiency was more than minor, and therefore a finding, because, if left uncorrected, the failure to implement procedures as required by Technical Specification would have the potential to lead to a more significant safety concern. Using Inspection Manual Chapter 0609, Appendix G, "Shutdown Operations Significance Determination Process," and Inspection Manual Chapter 0609, Appendix G, Attachment 1, "Shutdown Operations Significance Determination Process Phase 1 Initial Screening and Characterization of Findings," the team determined that the finding was of very low safety significance (Green) because it did not affect the design or qualification of a mitigating system structure, system, or component and did not directly prevent the alternate decay heat removal system from maintaining its functionality. The team identified a cross-cutting aspect the area of human performance, challenge the unknown, because individuals failed

to stop when faced with uncertain conditions and risks were not evaluated and managed before proceeding [H.11]. (Section 4OA3)

Licensee-Identified Violations

None

REPORT DETAILS

4. OTHER ACTIVITIES

4OA3 Follow-up of Events and Notices of Enforcement Discretion

Review of Events Surrounding Unavailability of Alternative Decay Heat Removal System

On September 4, 2016, the residual heat removal (RHR), subsystem A was declared inoperable due to a failure to meet Technical Specification (TS) Surveillance Requirement (SR) 3.5.1.4 for required pump differential pressure. On September 8, 2016, the licensee completed a TS-required shutdown in order to replace the pump. With the plant in Mode 4 and RHR subsystem A inoperable, TS 3.4.10, Action A.1, required that an alternate method of decay heat removal be available. On September 9, 2016, the alternate decay heat removal (ADHR) system was inappropriately credited for compliance with TS 3.4.10, Action A.1, when licensee personnel removed RHR subsystem A from service for maintenance (making it inoperable and unavailable for decay heat removal). Operations personnel believed ADHR was properly aligned in standby mode to serve as the required alternate means of decay heat removal, but because the cooling water supplies to each of the ADHR heat exchangers from the plant service water (PSW) system were danger tagged closed (valves P44F481A, P44F481B, P44F482A, and P44F482B), the ADHR system was not actually in standby or available to satisfy TS 3.4.10. The RHR subsystem A pump was replaced, retested, and returned to available status on September 22, 2016. Therefore, Grand Gulf Nuclear Station failed to comply with TS 3.4.10, Action A.1, since RHR subsystem A was unavailable, and the ADHR system was misaligned/unavailable, from September 9, 2016, until September 22, 2016.

The unavailability of the ADHR system was discovered on September 23, 2016, prior to placing the ADHR system in operation following replacement of the RHR pump. At that time, operations personnel discovered that the cooling water supplies to each of the ADHR heat exchangers from the PSW system were danger tagged closed. This configuration had been established on August 10, 2016, in order to isolate the system for power operations. Following the September 8, 2016, shutdown, operations personnel did not properly align the ADHR system for a standby lineup and did not verify that the system was available to meet TS requirements.

Management Directive (MD) 8.3, "NRC Incident Investigation Program," was used to evaluate the level of NRC response for this event. In evaluating the criteria of MD 8.3, it was determined that the event involved concerns pertaining to licensee operational performance. Specifically, operations personnel failed to recognize that an alternate method of decay heat removal was unavailable for a period of 13 days while operating in Mode 4 with one train of the RHR system inoperable. Based on the best available information at the time, the preliminary estimated conditional core damage probability was determined to be $9.8\text{E-}6/\text{year}$.

Based on the deterministic criteria and risk insights related to the unavailability of the ADHR system, NRC Region IV management determined that the appropriate level of NRC response was to conduct a special inspection. This special inspection was chartered to identify the circumstances surrounding the ADHR event and review the licensee's actions to address the causes of the event.

Additional Operator Performance Concerns

Several other operator performance events influenced the scope of the special inspection charter. These additional events included:

- On June 17, 2016, a malfunction in the electro-hydraulic control (EHC) system during turbine stop valve testing caused reactor power and pressure oscillations that resulted in an automatic reactor scram. Licensed operations personnel did not recognize that EHC control valve fluctuations were reactivity manipulations, and did not recognize that power oscillations should require termination criteria. Troubleshooting continued for over 40 minutes as power oscillations exceeded 20 percent, which was in excess of the station's 10 percent criteria to scram the reactor for thermal hydraulic instability concerns.
- On September 24, 2016, an operational performance issue occurred due to a plant configuration control issue. Prior to opening a main feedwater isolation valve, licensed operations personnel failed to secure a long cycle cleanup alignment of the condensate system, resulting in a rapid and unexpected increase in reactor vessel level from 33 inches to 151 inches. The rapid level increase occurred because licensed operations personnel did not anticipate the system response to opening a main feedwater isolation valve while in the long cycle cleanup alignment.
- On September 27, 2016, Grand Gulf Nuclear Station plant management notified the NRC of their intent to delay startup of the plant, following the forced outage, to implement corrective actions to assess and resolve the plant's operational performance concerns. The plant restart was delayed until January 31, 2017, while corrective actions were implemented in the areas of operator fundamentals, conservative decision-making, procedure quality, and the material condition of plant equipment.

a. Inspection Scope

The special inspection team performed data gathering and fact-finding to address the following items from the inspection charter (Attachment 3):

1. Provide a recommendation to Region IV management as to whether the inspection should be upgraded to an augmented inspection team response. This recommendation should be provided by the end of the first day on site.

An augmented inspection team was not warranted. The scope of and expertise utilized in the special inspection was adequate to review this event.

2. Develop a complete sequence of events related to the unavailability of the ADHR system that was discovered on September 23, 2016. The chronology should include plant mode changes as well as the status of plant decay heat removal systems.

August 10, 2016 – The licensee performed planned maintenance on the ADHR system. For this activity, the PSW supply to ADHR heat exchanger valves (P44F481A and P44F481B) and ADHR heat exchanger return to PSW valves

(P44F482A and P44F482B) were closed and danger tagged per tagout P44-002-1E12B003A/B. Although the planned maintenance was completed on August 15, 2016, these valves were not reopened until September 27, 2016.

September 4, 2016, 2:58 a.m. – The licensee entered TS 3.5.1, Action A, because the RHR subsystem A failed its quarterly surveillance test for required pump differential pressure. Although the pump was not able to maintain the required differential pressure for operability for its emergency core cooling function, the pump remained capable of delivering sufficient flow to support its decay heat removal function, and therefore the system remained available as an alternate means of decay heat removal.

September 8, 2016, 11:04 a.m. – The licensee manually scrammed the reactor for a planned shutdown to conduct repairs to RHR subsystem A. The licensee entered Mode 3.

September 8, 2016, 5:45 p.m. – The licensee entered TS 3.4.9, Condition A, due to RHR subsystem A being inoperable in Mode 3 with reactor steam dome pressure less than the RHR cut in permissive pressure. The required action, verify an alternate method of decay heat removal is available, was satisfied because RHR subsystem A was still available and capable of providing decay heat removal.

September 9, 2016, 3:32 a.m. – The licensee placed RHR, subsystem B, into shutdown cooling operation.

September 9, 2016, 4:39 a.m. – The ADHR system was in isolate mode due to a PSW system tagout (E12-021-ADHR ISOLAT). This tagout was separate from the tagout that was hung on August 10, 2016 (P44-002-1E12B003A/B). The tagout for ADHR isolate mode (E12-021-ADHR ISOLAT) was removed, but the PSW supply and return to the ADHR heat exchangers remained tagged closed (tagout P44-002-1E12B003A/B).

September 9, 2016, 5:09 a.m. – Operations personnel cooldown the plant to Mode 4 and exit TS 3.4.9, Condition A, which is not applicable in Mode 4. The licensee entered TS 3.4.10, Condition A, due to RHR subsystem A being inoperable in Mode 4. The required action was satisfied because RHR subsystem A was still available and capable of providing decay heat removal. The recurring action of verifying the system is available once every 24 hours was done administratively by operations personnel verifying that no work or other manipulations were made to RHR subsystem A.

September 9, 2016, 5:42 p.m. – The tagout for ADHR isolate mode had been cleared, but the ADHR heat exchanger isolation valves were still danger tagged closed from the August 10 PSW tagout, which prevented cooling water flow through the ADHR heat exchangers. Nonlicensed operations personnel who were aligning the system to standby noticed there were valves in the ADHR room with danger tags on them, but they did not recognize that the valves were important to ADHR system operation and did not communicate to the control room the fact that danger tagged valves remained in the ADHR room.

September 9, 2016, 6:10 p.m. – RHR subsystem A was removed from service for a pump replacement. At this point, ADHR was unavailable due to the tagged closed heat exchanger isolation valves. The licensee operations personnel believed ADHR had been placed in standby alignment per Section 4.6 of Procedure 04-1-01-E12-2, "Shutdown Cooling and Alternate Decay Heat Removal Operation," Revision 119. Operations staff inappropriately designated the ADHR system as the alternate method of decay heat removal to satisfy the actions of TS 3.4.10, Condition A. RHR subsystem B was operable and in-service providing decay heat removal for the reactor.

September 22, 2016, 6:47 p.m. – Following pump replacement, RHR subsystem A was tested, and pump flow and discharge pressures showed that the system was capable of supplying shutdown cooling, if needed. At this time, RHR subsystem B was in operation for shutdown cooling, and RHR subsystem A was available as an alternate means of decay heat removal to satisfy the actions of TS 3.4.10, Condition A. RHR subsystem A was not yet declared operable.

September 22, 2016, 8:00 p.m. – The licensee made an operation's log entry discussing shutdown risk and the status of RHR subsystem A as available but not operable.

September 22, 2016, 8:26 p.m. – RHR subsystem A passed its post-maintenance (pump replacement) test, but the licensee did not declare the system operable because they first wanted to remove all maintenance equipment from the area.

September 23, 2016, 2:26 p.m. – The licensee removed RHR subsystem B from shutdown cooling operation in order to perform TS Surveillance Requirement 3.5.1.4 on the subsystem as an extent of condition evaluation based on the previous degradation of RHR subsystem A. The licensee attempted to place the ADHR system into service for shutdown cooling operation to satisfy the actions of TS 3.4.10, Condition A, with the RHR subsystem A serving as the alternate source of decay heat removal.

September 23, 2016, 3:03 p.m. – While attempting to place the ADHR system into service for shutdown cooling operation, the licensee discovered that the PSW supply to ADHR heat exchanger valves (P44F481A and P44F481B) and ADHR heat exchanger return to PSW valves (P44F482A and P44F482B) were closed and danger tagged, rendering ADHR unavailable to provide decay heat removal. The licensee decided to restore shutdown cooling using RHR subsystem B. Operators recognized that the ADHR system had not been in the appropriate configuration to be considered available for decay heat removal as previously believed.

September 24, 2016, 3:40 a.m. – The licensee declared RHR subsystem A operable and exited TS 3.4.10, Condition A since both subsystems of RHR were operable.

September 28, 2016, 6:31 p.m. – The licensee restored the ADHR system to the appropriate standby configuration.

3. Review the licensee's root cause analysis efforts and determine if the evaluation is being conducted at a level of detail commensurate with the significance of the problem.

Condition Report (CR) CR-GGN-2016-07281 was characterized as a Category B condition report. This characterization required an apparent cause evaluation (ACE), which is a second-tier evaluation, rather than a root cause evaluation, which is a top-tier and more probing/extensive evaluation. The team reviewed the licensee's screening process in Procedure EN-LI-102, "Corrective Action Program," Revision 27. The team noted that the general discussion section of the screening criteria defines a "Significance Category A" [significant condition adverse to quality (SCAQ) – requiring corrective actions to prevent repetition] as follows: "Adverse Conditions with high significance due to high risk, high actual or potential consequences." The team noted that the unavailability of ADHR event discussed in CR-GGN-2016-07281 resulted in an inadvertent and unrecognized entry into "Orange Risk," or high risk significance, as defined in the licensee's outage safety plan.

The licensee, however, did not consider this a high-risk event because their initial risk assessment for the event yielded a core damage probability of less than 1E-6/year. In addition, the chart of examples for the screening criteria contained in Attachment 9.1 of Procedure EN-LI-102 required screening events or conditions that resulted in a complete loss of safety function or a greater than Green finding as a Category A (SCAQ). TS violations and reportable events were listed as examples of a Category B CR, requiring an ACE. The unavailability of the ADHR system was reported in a licensee event report as a violation of TS 3.4.10. Thus, the licensee screened CR-GGN-2016-07281 as a Category B, as allowed by their procedure. However, given the complexity and multiple barriers that failed leading to the extended unavailability of ADHR, the team determined that the rigor associated with a root cause evaluation would be the appropriate level of review. Given the definition of a Category A CR, Procedure EN-LI-102 allowed the licensee the latitude to conduct a root cause evaluation instead of an ACE.

Through interviews with the involved operating crews, the team identified details that the licensee did not have in their causal evaluation. For example, crews communicated that some processes that could have prevented this event were considered as infrequently used recommendations and not requirements (e.g. use of "potential LCOs," return to service checklists, and caution tagging abnormal alignments). Also, the team learned through interviews that operators vented the ADHR heat exchangers to the floor adjacent to a contaminated area when they had no indication of ADHR flow, a minor violation of their general operating procedures and the applicable radiation work permit.

Overall, the licensee's ACE for the ADHR unavailability determined that the apparent cause was inadequate fundamental work practices exhibited by operations personnel for configuration control of the ADHR system. A contributing cause was listed as insufficient detail in the system and plant operating procedures. The team agreed that these were the likely apparent and contributing causes. Since this was an ACE, no corrective actions to preclude repetition were required per procedure. The licensee's key corrective actions for the apparent cause were the high intensity training for operator fundamentals and issuance of Standing Order 16-021 (interim until proceduralized), which reiterated management expectations for safe operator practices.

By the end of the on-site inspection, the licensee indicated that they had decided to conduct a formal root cause evaluation of the event. The licensee determined root causes to be inconsistent reinforcement of nuclear professional behaviors in the operators and insufficient detail in operating procedures.

4. Determine the probable causes for the unavailability of the ADHR system during this forced outage.

As stated above, the licensee determined root causes to be inconsistent reinforcement of nuclear professional behaviors in the operators and insufficient detail in operating procedures. Inconsistent nuclear professional behaviors included procedure adherence, cognizance of overall system status, use of recommended operator guidance, proceeding in the face of uncertainty, inadequate pre-evolution briefings, inadequate turnover, and inadequate plant tours.

5. Evaluate the licensee's actions with regard to compliance with applicable TS requirements. Specifically, evaluate the licensee's actions to verify that an alternate method of decay heat removal was available, both initially as well as daily, during the time period in question.

As described above, on September 9, 2016, at 5:42 p.m., Grand Gulf Nuclear Station erroneously concluded they had placed the ADHR system in a standby configuration to satisfy the TS requirement to verify the availability of an alternate means of decay heat removal.

The recurring TS action to verify the system was available once every 24 hours was done administratively by operations personnel verifying no work, or other manipulations, were made to the ADHR system. No walk-downs of the ADHR system, or support systems, to determine appropriate configuration were done, or procedurally required, to comply with the recurring action of TS 3.4.10, Condition A. A non-cited violation associated with the failure to comply with TS 3.4.10 is described in Section 4OA3.b.1 of this report.

6. Review the licensee's cause evaluation efforts for the configuration control event that resulted in a rapid and unexpected increase in reactor vessel level on September 24, 2016, and determine if the evaluation is being conducted at a level of detail commensurate with the significance of the problem.

The team noted that CR-GGN-2016-07280, which discussed the rapid reactor vessel overfill event of September 24, 2016, was also designated as a Category B CR, requiring an ACE to determine the cause. The team reviewed Procedure EN-LI-102 to determine if this designation was appropriate to the issue. The licensee determined that this issue would likely screen as a Green issue (very low safety significance), and thus, would meet the licensee's threshold for a Category B CR. The team determined that this appeared to be the appropriate classification commensurate with the significance.

The licensee performed a barrier analysis that identified several barriers that broke down and contributed to the event. The listed barriers that failed were as follows:

- a) Procedure 04-1-01-E12-2, "System Operating Instruction Shutdown Cooling and Alternate Decay Heat Removal Operation," Revision 120, was not written with the recognition that opening the feedwater isolation valve B21F065B could result in injection into the vessel if manipulated while the plant was in the long cycle cleanup alignment. The steps required for removing one train of residual heat removal from service restored the system to normal standby lineup, opening valve B21F065B. Following this procedure while the plant is in the long cycle cleanup alignment caused a reactor vessel overfill. No caution or alternative step existed for removing a train of RHR from service while long cycle cleanup was in service.
- b) Procedure 04-1-01-N21-1, "Long Cycle Cleanup," contained no direction to hang caution or danger tags on valve B21F065B to alert or prevent operations personnel from opening these valves while in the long cycle cleanup alignment to prevent inadvertently filling the vessel.
- c) Operators did not consider the interaction between the RHR system and the feedwater system. During planning for the evolution, operations personnel only referenced RHR system diagrams/prints and not interfacing systems (such as the feedwater and condensate systems, etc.) while walking through the procedure.
- d) The pre-shift brief was conducted by supervisory personnel, which inhibited their ability to remain in an oversight role during the briefing process. The pre-evolution brief did not include the potential effects on other systems, or overall status of the plant. The at-the-controls operator was also not included during the briefing.
- e) A contributor to the severity of the event was that operations personnel did not understand the full function of the operating modes of valve B21F065B. The valve has three push buttons: "OPEN," "CLOSE," and "STOP." Operators did not understand that valve movement could be interrupted mid-stroke by pushing the STOP button. This functionality was covered in training material, but not emphasized in training and not practiced in the simulator because no station procedures direct the use of the STOP button on this valve. The operator attempted to mitigate the event by depressing the CLOSE button several times, which had no effect until the valve stroked fully open. Based on simulator runs afterwards, had operators understood the function of the STOP pushbutton, the maximum level would have been approximately +78 inches vs. +151 inches.

The licensee identified two apparent causes of the September 24, 2016, reactor vessel overfill. The first apparent cause, related to the failure to consider system interactions and lack of independent supervisory oversight, was inadequate knowledge or skill resulting in tunnel vision. The second apparent cause was inadequate procedural barriers.

In 2008, a similar inadvertent vessel overfill event occurred by opening valve B21F065B while in long cycle cleanup during inservice testing (IST). The corrective actions only revised the IST procedure to prevent performing this surveillance test during long cycle cleanup. The team considered this a missed opportunity to add a

precaution to the long cycle cleanup procedure or any other interfacing system's procedures to tag or otherwise prevent operation of the valve when inappropriate.

7. Determine whether there were any deficiencies in operator training that contributed to the ADHR unavailability or feedwater control events.

The team concluded that training was not a direct cause to these events. However, training may have contributed to these events. For example:

- a) As discussed in Item 6 above, operations personnel were not fully trained on the function of the "STOP" push-button associated with valve FO-65A/B. This lack of training allowed reactor vessel level to rise uncontrollably to 151 inches.
 - b) Operations personnel were not trained to review interfacing system tagouts when verifying system operability. This lack of training contributed to the failure to recognize, for 13 days, that the ADHR system was unavailable because the cooling water supplies to each of the ADHR heat exchangers from the PSW system were danger tagged closed.
8. Evaluate the licensee's compliance with, and adequacy of, procedural guidance for performing system alignments and for performing equipment tag-outs, as it pertains to the cause(s) of these events.

Following a previous forced outage on August 10, 2016, Grand Gulf Nuclear Station performed planned maintenance on the ADHR system. For this activity, the PSW supply to ADHR heat exchanger valves (P44F481A and P44F481B) and ADHR heat exchanger return to PSW valves (P44F482A and P44F482B) were closed and danger tagged per tagout P44-002-1E12B003A/B. Although the planned maintenance was completed on August 15, 2016, an individual failed to release this tagout by certifying work was complete. Procedure EN-OP-102, "Protective and Caution Tagging," Revision 18, Section 5.3.15 [5], states, "in the work order status window place a check in the work complete box for work orders that you are responsible for that no longer requires this tagout." The team noted that if the individual had certified work complete on this tagout at the appropriate time, in accordance with Procedure EN-OP-102, operations personnel may have opened the misaligned PSW valves in August 2016, which would have prevented the subsequent ADHR unavailability event.

Furthermore, the planned maintenance work was determined to be complete, and the work was closed out as complete in the work management computer program, on August 30, 2016. The team noted that, if the Mechanical Maintenance Supervisor would have appropriately checked the work order and the referenced tagouts before closing the item out in the work management computer program, he would have noted the active tagout. The work order should not have been changed to complete status in the work management software until the tagout was cleared.

Since tagout P44-002-1E12B003A/B was for the PSW system and Section 4.6 of Procedure 04-1-01-E12-2, "System Operating Instruction Shutdown Cooling and Alternate Decay Heat Removal Operation," Revision 120, does not discuss the correct alignment of these four valves, the tagout was not cleared and the valves were not opened during ADHR system alignments. The team concluded

Procedure 04-1-01-E12-2 was inadequate because it failed to direct verification that the PSW supply to ADHR heat exchanger valves were opened. A non-cited violation associated with this procedure inadequacy is described in Section 4OA3.b.2 of this report.

9. Determine whether the licensee's processes for shutdown risk management and plant configuration control were appropriate, including supervisory oversight from operations personnel and the outage control center (OCC).
 - a) Shutdown Risk Management: Grand Gulf Nuclear Station used "Shutdown Operations Protection Plan" (SOPP), Revision 19, for the forced outage to replace RHR pump A. The team reviewed the document, with a focus on the risk and mitigation of risk for SOPP, Condition 1, decay heat removal systems. The SOPP transitions from a traditional quantitative risk assessment to a qualitative outage risk assessment at reactor Mode 4. Per analysis and documentation of the SOPP, the team noted that the risk program and plan were appropriate and were documented before the outage began on September 8, 2016.

During shutdown activities, the licensee utilizes the SOPP in order to establish guidelines to address plant operational conditions in Mode 4 (Cold Shutdown), Mode 5 (Refuel), and in the defueled condition.

Section V of the SOPP discusses and defines different operational conditions and what equipment is needed to determine the plant risk impact. Decay heat removal is one element of the SOPP.

Reactor Mode 4 correlates to SOPP, Condition 1. Specifically, the decay heat removal methods during SOPP, Condition 1, are: RHR A, RHR B, ADHR, and reactor water cleanup (RWCU) (demonstrated or calculated). Green risk is defined as having three methods available. Yellow risk is defined as having two methods available. Orange risk is defined as having one method available. Red risk is defined as having zero methods available.

Before every outage, the licensee performs analyses to determine core decay heat loads and how and when each method of decay heat removal is available for consideration in the risk analysis. For Revision 19 of the SOPP, the ADHR system and RWCU (together) were available as a decay heat removal method approximately 14 hours after plant shutdown. Furthermore, the ADHR system (by itself) was determined to be available approximately 24 hours after plant shutdown.

The ADHR system is considered an available system when it is placed in the standby mode, per Procedure 04-1-01-E12-2, "System Operating Instruction for Shutdown Cooling and Alternate Decay Heat Removal." However, the ADHR system does not begin to remove decay heat until it is placed in reactor pressure vessel cooling mode, per Procedure 04-1-01-E12-2. It takes plant operators approximately 1 hour and 15 minutes (when it is an unplanned transition such as during a loss of shutdown cooling) to transition the ADHR system from standby to reactor pressure vessel cooling mode.

For the first several days following the start of an outage, the time to 200 degrees Fahrenheit (Mode 3) from the onset of a loss of shutdown cooling is typically less than 1 hour and 15 minutes. Furthermore, the ADHR system is not designed to be used during Modes 1, 2, or 3. Entergy Procedure EN-OU-108, "Shutdown Safety Management Program," Revision 8, Section 3.0,[1], discusses what is needed for an available system. This section states, "Credit may be taken for reasonable actions both in the Control Room and in-plant. A reasonable action would include an operator closing a breaker outside of the control room. Actions with implementing time approaching the time to boil are not reasonable."

The team noted that, under certain circumstances (shortly after shutdown), the SOPP allowed the licensee to improperly credit the ADHR system as one of the systems available as an alternative means of decay heat removal. Credit for ADHR under those circumstances would be improper because it takes too long to place the system in service when the transition is unplanned. The team, however, was unable to identify occurrences during past outages where the ADHR system was placed in the standby mode, per Procedure 04-1-01-E12-2, and the licensee's inappropriate crediting of the system resulted in an actual plant risk configuration that was higher than planned. Therefore, the team identified a minor violation of 10 CFR 50.65(a)(4), for the failure to appropriately assess and manage the risk of the decay heat removal safety function for shutdown conditions. Specifically, the SOPP considered the ADHR system available and credited for risk reduction during conditions (shortly after shutdown) when the ADHR system was not capable of being placed in service before the plant decay heat would have caused the plant to return to Mode 3 following a loss of shutdown cooling (Mode 3 conditions are beyond the capability of the ADHR system). This minor violation has been entered into the licensee's corrective action program as Condition Report CR-GGN-2017-00263.

- b) Plant Configuration Control: On September 24, 2016, operations personnel opened valve B21F065B per Procedure 04-1-01-E12-2 while securing RHR, subsystem B, in the shutdown cooling configuration. The result was the inadvertent fill of the reactor vessel with approximately 24,000 gallons of water. The reactor water level was approximately 33 inches on the narrow range at the beginning of the evolution, and the maximum level was 151 inches on the upset range. The team noted that this event revealed planning, team work, communication, and equipment alignment issues between OCC and main control room operations personnel.

10. Review actions taken or planned by the licensee to evaluate and develop plans to address gaps in operations performance at the station, as evidenced by recent events discussed in this charter.

The licensee's evaluation and training plan for operators was still under development during the on-site inspection and was not available for team to review. However, subsequent reviews of the licensee's high intensity training during baseline inspection activities documented in NRC Inspection Reports 05000416/2016004 (ADAMS Accession No. ML17039B078) and 05000416/2017009 (ADAMS Accession No. ML17074A265) showed that the training addressed operator performance gaps and fundamental behaviors.

11. Review licensee corrective action plan(s), in place, prior to recent events in areas of operator fundamentals. Assess whether previous corrective actions in areas that contributed to recent events were appropriate, completed, and/or effective.

None of the corrective action plans from previous recent events were in place, such that they had an opportunity to prevent the September 2016 events. Some of the planned corrective actions could have helped prevent the September 2016 events, but they were not scheduled to have been completed until early 2017.

Corrective actions from the June 17, 2016, EHC event would have been germane to the performance issues observed in September 2016, but had not been implemented prior to the September 2016 events. Of note was planned training focused on conservative decision-making and improved control room communications. From the root cause evaluation for the June 2016 event:

- a) Root Cause: inadequate guidance on conservative decision-making when procedures are not adequate for the circumstance.
- b) Contributing Cause: poor communication in the control room.
- c) These areas of weakness appear to have contributed to the September 2016 events, since procedures were inadequate and operations personnel did not make conservative decisions (procedure inadequacies and failure to properly follow procedures are noted in the findings below). In addition, there was ineffective communication on September 9, 2016, when the operators in the field observed the danger tags hanging on the valves in the ADHR room and notified the control room, but did not use effective communication practices to ensure control room personnel heard and understood the observation.

12. Determine whether applicable internal or external operating experience involving configuration management of the ADHR system existed, and assess the effectiveness of any action(s) taken by the licensee in response to any such operating experience.

The team researched applicable internal and external operating experience to determine if corrective actions from previous events could have prevented the issues reviewed by this special inspection. Two applicable events were identified and the team concluded that both events constituted missed opportunities for the licensee to have implemented actions that might have prevented or mitigated the ADHR system configuration management problems experienced in September 2017.

- a) The licensee had a missed opportunity to prevent the vessel overfill event because a similar event occurred during inservice testing in 2008 (discussed in Item 6 above), as discussed in Condition Report CR-GGN-2008-06110. On October 20, 2008, with the plant in long cycle cleanup, the licensee performed inservice testing of valve B21F065B, in accordance with Procedure 06-OP-1B21-C-0003, "In-service Testing of Feedwater System Valves," Revision 112. Operations personnel were not aware of system status, and thus, reactor vessel level rapidly increased. In this case, however, the operator depressed the STOP pushbutton immediately to stop the valve stroke, and closed valve B21F065B to minimize the reactor vessel level increase.

Corrective actions added a precaution to Procedure 06-OP-1B21-C-0003 to ensure long cycle cleanup is secured prior to performing inservice testing, but did not require caution tags or add a similar precaution to any other applicable procedures that could possibly stroke valve B21F065B while the plant was in long cycle cleanup.

- b) A 1997 event at River Bend Station involved initiation of the alternate decay heat removal system (addressed in Grand Gulf Nuclear Station's interoffice memorandum GIN 1999-01279). The River Bend licensee made an inadvertent mode change to Mode 3 and developed saturation conditions in the reactor vessel while attempting to establish ADHR. Operations personnel were not cognizant that the calculated time to boil from the onset of a loss of shutdown cooling was less than the time required to implement the procedure to establish ADHR. Though not related directly to this event, the Grand Gulf Nuclear Station SOPP credited ADHR as a backup cooling source even though the time to boil during early portions of the outage was approximately 30 minutes, but the time to implement the procedure to establish ADHR was 1 hour and 10 minutes.

13. Evaluate the licensee's actions to comply with reporting requirements associated with this event.

From September 9, 2016, until September 22, 2016, Grand Gulf Nuclear Station failed to identify an alternate method of decay heat removal, when RHR subsystem A was inoperable, as required per Action A.1 of TS 3.4.10.

NUREG-1022, "Event Report Guidelines 10 CFR 50.72 and 50.73," Revision 3, Section 3.2.2, discusses a licensee operating in a condition prohibited by TSs. NUREG-1022 states that there is no 10 CFR 50.72 reporting requirement, but there is a 50.73 requirement to submit a licensee event report (LER), which the licensee completed on October 27, 2016, as LER 2016-008-00.

The team concluded that the licensee's actions to comply with reporting requirements associated with this event were adequate to meet the requirements of 10 CFR 50.72 and 10 CFR 50.73.

14. Collect data necessary to support completion of the significance determination process for any associated finding(s).

Findings were developed and documented below.

b. Findings

(1) Failure to Have Alternate Decay Heat Removal Capability

Introduction. The team reviewed a Green, self-revealed non-cited violation of Technical Specification (TS) 3.4.10, "Residual Heat Removal (RHR) Shutdown Cooling System – Cold Shutdown," for the licensee's failure to verify the availability of an alternate method of decay heat removal when RHR subsystem A was inoperable and unavailable for a pump replacement. Specifically, the licensee inappropriately credited ADHR as an available alternate method of decay heat

removal. The licensee entered this issue into their corrective action program as Condition Report CR-GGN-2016-07281.

Description. On September 8, 2016, at 11:04 a.m., Grand Gulf Nuclear Station inserted a manual reactor scram to enter an outage to replace RHR pump A. Although RHR subsystem A was inoperable for failing to meet its TS Surveillance Requirement 3.5.1.4 for rated flow and pressure for its safety function, it remained capable of providing the necessary flow and pressure for shutdown cooling (log entry September 8, 2016, 6:24 p.m.) until its removal from service on September 9, 2016.

The licensee entered Mode 4 on September 9, 2016, at 5:09 a.m. At this time, TS 3.4.10 was applicable. TS 3.4.10 requires, in part, that two residual heat removal shutdown cooling subsystems be operable in Mode 4. For the condition of one or two RHR shutdown cooling subsystems inoperable, Action A.1 requires the licensee to verify an alternate method of decay heat removal is available for each inoperable RHR shutdown cooling subsystem within 1 hour and once per 24 hours thereafter.

The ADHR system was placed in standby alignment on September 9, 2016, at 5:42 p.m., but the licensee failed to recognize that the ADHR heat exchanger isolation valves (P44F481A, P44F481B, P44F482A, and P44F482B) remained tagged closed, and therefore, the ADHR system was not actually in standby alignment.

On September 9, 2016, at 6:10 p.m., in order to replace the RHR subsystem A pump, it was removed from service. Starting at this time, the licensee inappropriately credited the ADHR system as their alternate method of decay heat removal for compliance with TS 3.4.10, Action A.1. Credit for the ADHR system was inappropriate because, although the licensee believed the ADHR system had been aligned in standby, the ADHR heat exchanger isolation valves had remained tagged closed, rendering the ADHR system unavailable to satisfy the TS requirement during the time period RHR subsystem A was unavailable. In attempting to verify the availability of the ADHR system as an alternate means of decay heat removal to satisfy TS 3.4.10, the licensee's administrative review of tagouts failed to consider tagouts on the PSW system that might impact ADHR system availability (i.e., tagout P44-002-1E12B003A/B that tagged closed the ADHR heat exchanger isolation valves).

The RHR subsystem A pump was replaced, retested, and returned to available status on September 22, 2016, at 8:00 p.m. Therefore, the licensee was not in compliance with TS 3.4.10, Action A.1, since RHR subsystem A was inoperable and the licensee failed to verify an alternate method of decay heat removal available between September 9, 2016, and September 22, 2016.

On September 23, 2016, at 3:03 p.m., the misaligned ADHR heat exchanger isolation valves were identified while the licensee was attempting to put the ADHR system in service. Operations personnel corrected the ADHR system alignment error and put the ADHR system in standby alignment on September 28, 2016, at 6:31 p.m.

Analysis. The failure to perform the TS required action to verify an alternate method of decay heat removal is available when an RHR shutdown cooling subsystem was

inoperable was a performance deficiency. The performance deficiency was more than minor, and therefore a finding, because it was associated with the human performance attribute of the Mitigating Systems Cornerstone and affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the failure to follow TS requirements to ensure the availability, reliability, and capability of the alternate decay heat removal system directly affected the cornerstone objective. Using Inspection Manual Chapter 0609, Appendix G, "Shutdown Operations Significance Determination Process (SDP)," and Inspection Manual Chapter 0609, Appendix G, Attachment 1, "Shutdown Operations Significance Determination Process Phase 1 Initial Screening and Characterization of Findings," the team determined that an Appendix G, Phase 2, risk analysis was appropriate, since the cavity was not flooded, and the finding represents an actual loss of safety function of a non-TS train of equipment during shut down designated as risk-significant, for greater than 4 hours. A detailed risk evaluation (Attachment 2) calculated an increase in core damage frequency of $3.2\text{E-}7/\text{year}$ and an increase in large early release frequency of $7.3\text{E-}8/\text{year}$. Therefore, this violation is associated with a finding having very low safety significance (Green).

The team determined the finding had a cross-cutting aspect within the human performance area, field presence, because leaders failed to reinforce standards and expectations in the work areas of the plant. Specifically, inconsistent procedure use and adherence led to the ADHR system misalignment and the failure to adequately verify the system was available as required by TS. As reflected in the licensee's root cause evaluation, this inconsistent procedure use and adherence indicates leaders were not effectively reinforcing standards and expectations for operators in the field [H.2].

Enforcement. Technical Specification 3.4.10, requires, in part, that two residual heat removal shutdown cooling subsystems be operable in Mode 4. For the condition of one or two RHR shutdown cooling subsystems inoperable, Action A.1 requires the licensee to verify an alternate method of decay heat removal is available for each inoperable RHR shutdown cooling subsystem within 1 hour and once per 24 hours thereafter. Contrary to the above, from September 9, 2016, to September 22, 2016, the licensee failed to verify an alternate method of decay heat removal was available when RHR subsystem A was inoperable. Specifically, the licensee inappropriately credited the ADHR system as their alternate method of decay heat removal even though the ADHR heat exchanger isolation valves were tagged closed, rendering the ADHR system unavailable to satisfy the TS requirement. In attempting to verify the availability of the ADHR system as an alternate means of decay heat removal to satisfy TS 3.4.10, the licensee's administrative review of tagouts failed to consider tagouts on the PSW system that might impact ADHR system availability. Corrective actions involved restoring RHR subsystem A to available status on September 22, 2016. Because this finding was determined to be of very low safety significance and has been entered into the licensee's corrective action program as Condition Report CR-GGN-2016-07281, this violation is being treated as a non-cited violation consistent with Section 2.3.2.a of the NRC Enforcement Policy. (NCV 050000416/2016008-01, "Failure to Have Alternate Decay Heat Removal Capability")

(2) Failure to Have Adequate Procedures

Introduction. The team identified two examples of a Green, non-cited violation of 10 CFR Part 50, Appendix B, Criterion V, for the licensee's failure to have adequate procedures for activities affecting quality. Specifically, Grand Gulf Nuclear Station failed to have adequate procedures for feedwater and shutdown cooling activities. The licensee entered this issue into their corrective action program as Condition Reports CR-GGN-2016-08334, 08273, and 08290.

Description. Example (1) Grand Gulf Nuclear Station Procedure 04-1-01-E-12-2, "Shutdown Cooling and Alternate Decay Heat Removal Operations," Revision 119, provided specific information for operation of the shutdown cooling mode of the RHR system and ADHR operations. Section 4.6 of Procedure 04-1-01-E-12-2 provided steps on how to place the alternate decay heat removal system into a standby configuration. The team identified that the procedure failed to ensure the proper configuration of the ADHR heat exchanger isolation valves, P44F481A, P44F481B, P44F482A, and P44F482B. The licensee entered this issue into their corrective action program as Condition Report CR-GGN-2016-08334.

Example (2) Section 4.3 of Procedure 04-1-01-E-12-2 provided steps to secure an operating RHR subsystem in the shutdown cooling configuration. Step 4.3.2.a(1)(b) of Procedure 04-1-01-E-12-2 required operators to open valve B21F065B. Valve B21F065B serves as a feedwater isolation valve to keep condensate and feedwater from the reactor vessel when the condensate and feedwater system is operating in long cycle cleanup. Long cycle cleanup is a routine feedwater configuration established during reactor outage conditions to ensure the condensate and feedwater systems are being maintained to support reactor restart operations. The team identified that Procedure 04-1-01-E-12-2 failed to prevent an inadvertent reactor vessel fill when the valve B21F065B was opened during the securing of shutdown cooling while the feedwater system is in long cycle cleanup. The licensee entered this issue into their corrective action program as Condition Report CR-GGN-2016-08290.

Analysis. The failure to have adequate procedures for activities affecting quality was a performance deficiency. Example (1) of this performance deficiency was more than minor, and therefore a finding, because it was associated with the procedure quality attribute of the Mitigating Systems Cornerstone and affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, not having adequate procedural guidance for ADHR alignment contributed the system's subsequent unavailability to perform if needed.

Example (2) of this performance deficiency was more than minor, and therefore a finding, because it was associated with the procedure quality attribute of the Initiating Events Cornerstone and affected the cornerstone objective to limit the likelihood of events that upset plant stability and challenge critical safety functions during shutdown operations. Specifically, not having adequate procedural guidance for operation of the feedwater isolation valve resulted in inadvertent overfill of the reactor vessel.

Using Inspection Manual Chapter 0609, Appendix G, "Shutdown Operations Significance Determination Process (SDP)," and Inspection Manual Chapter 0609, Appendix G, Attachment 1, "Shutdown Operations Significance Determination Process Phase 1 Initial Screening and Characterization of Findings," the team determined that an Appendix G, Phase 2, risk analysis was appropriate for Example (1) of this finding, since the cavity was not flooded, and the finding represents an actual loss of safety function of a non-TS train of equipment during shut down designated as risk-significant, for greater than 4 hours. A detailed risk evaluation (Attachment 2) calculated an increase in core damage frequency of $3.2\text{E-}7/\text{year}$ and an increase in large early release frequency of $7.3\text{E-}8/\text{year}$. Therefore, this violation is associated with a finding having very low safety significance (Green). For Example (2) of the finding, the team determined that the finding screened to Green (very low safety significance) because it did not increase the likelihood of a shutdown initiating event, or any other event listed in Inspection Manual Chapter 0609, Appendix G, Attachment 1, "Shutdown Operations Significance Determination Process Phase 1 Initial Screening and Characterization of Findings".

The team did not assign a cross-cutting aspect because the performance deficiency was not reflective of current plant performance, because the portions of the procedures impacting these events have not been revised within the last 3 years.

Enforcement. Title 10 CFR Part 50, Appendix B, Criterion V, requires, in part, "Activities affecting quality shall be prescribed by documented instructions, procedures, or drawings, of a type appropriate to the circumstances." Contrary to the above, the licensee failed to ensure that activities affecting quality were prescribed by documented procedures that were appropriate to the circumstances. Specifically, prior to September 24, 2016, Grand Gulf Nuclear Station Procedure 04-1-01-E-12-2, "Shutdown Cooling and Alternate Decay Heat Removal Operations," Revision 119, failed to have adequate instructions for the activities for which they were written, which contributed to the unavailability of the ADHR system and overfill of the reactor vessel. The licensee implemented corrective actions to revise the procedure. Because this finding was determined to be of very low safety significance and has been entered into the licensee's corrective action program as Condition Reports CR-GGN-2016-08334, 08273, and 08290, this violation is being treated as a non-cited violation consistent with Section 2.3.2.a of the NRC Enforcement Policy. (NCV 050000416/2016008-02, "Failure to Have Adequate Procedures")

(3) Failure to Follow Operations Procedures

Introduction. The team identified a Green, non-cited violation of TS 5.4.1.a, "Procedures," for the licensee's failure to implement procedures required by Regulatory Guide 1.33, Revision 2, Appendix A, February 1978. Specifically, contrary to procedures, on September 23, 2016, operations personnel failed to verify adequate plant service water flow to the ADHR heat exchangers while placing the system in service.

Description. The team identified four instances of the licensee's failure to implement procedures. Three of the examples were determined to be of minor significance, and one was determined to be of Green significance. All four are described as follows:

- Example (1): On August 8, 2016, operations personnel failed to initiate a potential limiting condition for operation (LCO) tracking sheet when initiating a tagout on the ADHR system. Procedure 02-S-01-17, "Control of Limiting Conditions for Operation," Revision 129, Section 5.1, states that a limiting condition for operation tracking record (LCOTR) will be activated for a "Potential TS LCOTR," which is defined as a LCOTR that has been activated, but the associated LCO has not been entered because the system is not required for current plant conditions, but the system would be required if plant mode changed. On August 8, 2016, with the plant in Mode 1 at 100 percent power, the ADHR system was tagged out for heat exchanger cleaning. Since the ADHR system is only credited during Modes 4 and 5 for decay heat removal, no LCO entry was required. However, operations personnel were required to initiate a potential LCOTR to track that the ADHR system may be a credited decay removal system, should the plant enter Mode 4. The failure to initiate a potential LCOTR for tagging out the ADHR system on August 8, 2016, was a minor violation of Procedure 02-S-01-17 and TS 5.4.1.a.
- Example (2): On August 12, 2016, maintenance personnel failed to sign off the tagout when work on the ADHR system was complete. Procedure EN-OP-102, "Protective and Caution Tagging," Revision 18, Step 5.15[5], required tagout holders to place a check in the work complete box of the work order status window for work orders that no longer require the tagout. The tagout holder for the ADHR heat exchanger tagout P44-002-1E12B003A/B, which was in place to support ADHR heat exchanger cleaning, failed to check the work complete box in violation of Procedure EN-OP-102. Because operations personnel were never notified that the work was complete, the tagout remained hanging until September 23, 2016, while the site believed that the ADHR system was available in standby and credited the ADHR system as an available method of decay heat removal. The failure to remove tagout P44-002-1E12B003A/B when work on the ADHR system was complete was a minor violation of Procedure EN-OP-102 and TS 5.4.1.a.
- Example (3): On September 23, 2016, operations personnel failed to verify adequate PSW flow to the ADHR heat exchangers while placing the system in service. Procedure 04-01-E-12-2, "Shutdown Cooling and Alternative Decay Heat Removal Operation," Revision 119, contained instructions for placing the ADHR system in service. Step 4.9.2.a(8) of this procedure required operations personnel to verify plant service water flow to the heat exchangers by observing local flow indication at temporary annubar gage P44-N154, which was installed in the auxiliary building. Further, because gage P44-N154 indicated in inches of H₂O, Procedure 04-01-E-12-2, Step 4.9.2.a(8), contained a conversion factor for calculation of flowrate in gallons per minute ($513.893 \times \sqrt{(\text{inches H}_2\text{O})}$). The SOPP for the outage contained the acceptance criteria of 3000 gallons per minute for plant service water flow to the ADHR heat exchangers.

On September 23, 2016, when placing the ADHR system in service and upon reaching Step 4.9.2.a(8), the equipment operators noted that local gage P44-N154 read 0 inches of H₂O, which they interpreted as not satisfying the step. Operations personnel (including the senior reactor operator directing the task from the control room) believed that annubar gages were often unreliable, and

thus did not believe the indication. In order to continue placing the system in service, in spite of the lack of indicated PSW flow, operations personnel decided to look for alternative indications of PSW flow. To accomplish this, without procedural direction, they opened one of the heat exchanger vent valves, observed a pressurized steady stream of water, concluded that this response was satisfactory indication of PSW system flow, and proceeded forward in the procedure. Operations personnel did not attempt to quantify the PSW flow for adequate heat removal, because they interpreted the step to mean any flow was satisfactory. The failure to verify adequate PSW flow by observing flow on annubar P44-N154 was a Green, non-cited violation of Procedure 04-01-E12-2 and TS 5.4.1.a.

- Example (4) On September 23, 2016, operations personnel failed to follow general operating procedures when they vented the PSW system (as described above) without procedure guidance and without controlling the vented water with hoses to drain systems as required. Operations personnel took no precautions to prevent flooding, wetting of electrical equipment such as motor windings, or the spread of contamination in the area (the area in which the venting occurred was controlled as a contaminated area), and vented the water onto the floor of the room in the auxiliary building contrary to plant procedures. General Operating Procedure 04-S-04-1, "System Fill and Vent," Step 5.1.1, required protection from wetting adjacent equipment and uncontrolled venting by the use of tygon hoses directed to the proper drains when venting systems. On September 23, 2016, by venting the PSW side of the ADHR heat exchangers system to the floor and not taking precautions to install hoses to control the flow of water, operations personnel failed to follow Procedure 04-S-04-1, a minor violation of TS 5.4.1.a.

Analysis. The failure to implement procedures as required by TS 5.4.1.a was a performance deficiency. This performance deficiency was more than minor, and therefore a finding, because, if left uncorrected, the failure to implement procedures as required by TS would have the potential to lead to a more significant safety concern. Using Inspection Manual Chapter 0609, Appendix G, "Shutdown Operations Significance Determination Process (SDP)," and Inspection Manual Chapter 0609, Appendix G, Attachment 1, "Shutdown Operations Significance Determination Process Phase 1 Initial Screening and Characterization of Findings," the team determined that the finding was of very low safety significance (Green) because it did not affect the design or qualification of a mitigating system structure, system or component and did not directly prevent the ADHR system from maintaining its functionality. The team identified a cross-cutting aspect in the area of human performance, challenge the unknown, because individuals failed to stop when faced with uncertain conditions and risks were not evaluated and managed before proceeding [H.11].

Enforcement. Technical Specification 5.4.1.a requires that procedures shall be established, implemented, and maintained covering the applicable procedures recommended in Appendix A of Regulatory Guide 1.33, Revision 2. Section 4.e of Appendix A to Regulatory Guide 1.33, Revision 2, requires procedures for energizing, filling, venting, draining, startup, shutdown, and changing modes of operation for the "Shutdown Cooling System." The licensee established Procedure 04-01-E12-2, "Shutdown Cooling and Alternative Decay Heat Removal

Operation,” Revision 119, to meet the Regulatory Guide 1.33 requirement. Step 4.9.2.a(8) of Procedure 04-01-E12-2 required operations personnel to verify plant service water flow to the heat exchangers by observing local flow indication at temporary annubar gage P44-N154. Contrary to the above, on September 23, 2016, operations personnel did not verify plant service water flow to the heat exchangers by observing local flow indication at temporary annubar gage P44-N154. Specifically, operations personnel observed 0 inches of H₂O indicated on temporary annubar gage P44-N154, but discounted this reading and attempted to verify flow by an alternate means. As a result, operations personnel continued placing the ADHR system in standby without establishing cooling water to the heat exchangers. The licensee implemented corrective actions which included high intensity training for operators to reinforce operator fundamentals and procedure improvements. Because this violation was of very low safety significance and has been entered into the licensee's corrective action program as Condition Report CR-GGN-2016-08333, it is being treated as a non-cited violation consistent with Section 2.3.2.a of the NRC Enforcement Policy. (NCV 05000416/2016008-03, “Failure to Follow Operations Procedures”)

4OA6 Meetings, Including Exit

Exit Meeting Summary

On May 31, 2017, the team presented the inspection results by telephone to Mr. T. Vehec, Director, Recovery, and other members of the licensee's staff. The team asked whether any of the material examined during the inspection should be considered proprietary. No proprietary information was identified.

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee personnel:

A. Boyd, Electrical Maintenance
S. Dupont, Regulatory Assurance
R. Falk, Regulatory Assurance
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M. Giacini, General Manager Plant Operations
J. Hallenback, Manager, Design Engineering
W. Johnson, Operations
R. Liddell, Superintendent, Operations Training
R. Meister, Senior Specialist, Regulatory Assurance
R. Myer, Assistant Operations Manager
J. Nadeau, Manager, Regulatory Assurance
L. Simmons, Work Week Manager
S. Sweet, Engineer, Regulatory Assurance
L. Wilmot, Equipment Reliability Coordinator
S. Wood, Specialist, Regulatory Assurance

NRC Personnel

W. Sifre, Acting Senior Resident Inspector

LIST OF ITEMS OPENED, CLOSED AND DISCUSSED

Opened and Closed

05000416/2016008-01	NCV	Failure to Have Alternate Decay Heat Removal Capability (Section 4OA3)
05000416/2016008-02	NCV	Failure to Have Adequate Procedures (Section 4OA3)
05000416/2016008-03	NCV	Failure to Follow Operations Procedures (Section 4OA3)

LIST OF DOCUMENTS REVIEWED

Section 4OA3: Follow-up of Events and Notices of Enforcement Discretion

Calculations

<u>Number</u>	<u>Title</u>	<u>Date</u>
MC-Q1E12-93008	Calculation of Flow Needed for RHR System Flows	August 23, 1999

Drawings

<u>Number</u>	<u>Title</u>	<u>Revision</u>
M-1085D	Residual Heat Removal System	004
M-1072H	Plant Service Water System	009

Miscellaneous Documents

<u>Number</u>	<u>Title</u>	<u>Revision/Date</u>
	E12-021—ADHR ISOLAT	
	E12-026—1E12C002A Tagout	
	Outage TS 1-OTS-16-0054 Tracker	
	GIN 1999-01279 (RBS Inadvertent Mode Change)	
	P44-002—1E12B003A/B Tagout	
	Risk of Grand Gulf due to 9/26/2016 Site Clock Reset	
	Shutdown Operations Protection Plan	19
	TS 1-TS-16-0343 Tracker	
EN-MA-125	Troubleshooting for RHR Subsystem Pump A	September 7, 2016
LER 05000416/ 2016-008	Entry into Mode of Applicability with the ADHR System Inoperable	0
TS 3.0.2	TSs	152
TS 3.4.9	TSs	142
TS 3.4.10	TSs	142
UFSAR	Section 3C.3.2	5
UFSAR	Section 5.4.7.5	9

Procedures

<u>Number</u>	<u>Title</u>	<u>Revision/Date</u>
01-S-02-9	Procedure Change Process	001
01-S-18-6	Risk Assessment of Maintenance Activities	018
02-S-01-4	Shift Relief and Turnover	043
02-S-01-17	Control of Limiting Conditions for Operation	129
02-S-01-27	Operations Philosophy	066
03-1-01-1	Integrated Operating Instructions for Cold Shutdown to Generator Minimum Load	169
04-1-01-E12-2	Shutdown Cooling and Alternate Decay Heat Removal Operation	119 and 120
04-1-01-N21-1	Feedwater System	074
04-1-01-P44-1	Plant Service Water/Radial Well System	105
04-S-04-1	System Fill and Vent	012
05-1-02-III-1	Inadequate Decay Heat Removal	044

Procedures

<u>Number</u>	<u>Title</u>	<u>Revision/Date</u>
06-OP-1E12-Q-0023	LPCI/RHR Subsystem A Quarterly Functional Test	131
EN-LI-102	Corrective Action Program	027
EN-LI-108	Shutdown Safety Management Program	8
EN-OP-102	Protective and Caution Tagging	018
EN-OP-102-01	Protective and Caution Tagging Forms and Checklist	10
EN-OP-105	Conduct of Operations	017
EN-OU-108	Shutdown Safety Management Program	008
EN-WM-105	Work Order Instructions for Obtaining Pump Curves for RHR Subsystem A Post Replacement	June 21, 2011

Condition Reports (CR-GGN-)

2016-06110	2016-07133	2016-07281	2016-07560	2016-07584
2016-07591	2016-07730	2016-07731	2016-07853	2016-07858
2016-07902	2016-08008	2016-08009	2016-08128	2016-08129
2016-08130	2016-08131	2016-08132	2017-00263	

Work Orders

00450270

Grand Gulf

Detailed Risk Evaluation

CONCLUSION: This analysis concludes the best estimate of risk for this event is a Δ CDF of $3.2\text{E-}7/\text{year}$ (Green) and a Δ LERF of $7.3\text{E-}8/\text{year}$ (Green).

(1) Phase 3 Model Revision Used

Version 8.22 of the Grand Gulf (GG) simplified plant analysis risk (SPAR) model was used to determine the risk significance for this performance deficiency. The GG at-power SPAR model includes shutdown event trees. The shutdown event trees use the same support fault trees as the at-power model, with some modifications. Since the exposure time began one day after shutdown while the plant was in Mode 4, this performance deficiency was modeled using the Mode 4 Early (M4E) event trees in the SPAR-SD model. There are three M4E event trees in the GG SPAR-SD model: loss of inventory outside containment (LOIOC), loss of offside power (LOOP), and loss of shutdown cooling (LOSDC). The LOOP event tree was not quantified because the alternate decay heat removal (ADHR) system is not powered from an emergency bus. As a result, ADHR would not be credited for heat removal during a LOOP, and there would be no change in core damage frequency (Δ CDF) between the base case and the conditional case. The LOIOC and LOSDC event trees were both quantified to determine the risk significance of this performance deficiency. The LOIOC event tree is shown in Figures 1 and 2. The LOSDC event tree is shown in Figures 3 and 4.

(2) Assumptions

Exposure time: The exposure time for calculation of Δ CDF was the period between September 9, 2016 and September 22, 2016, when ADHR was required by technical specification (TS) to be available, but was not available, which was 13 days. GG shut down on September 8, 2016, in order to replace the residual heat removal (RHR) pump A. The RHR A subsystem was removed from service beginning September 9, 2016, until September 22, 2016, for the pump replacement. During this time, the RHR B subsystem was required to be operable, and ADHR was required to be available per TS 3.4.10. However, ADHR was not available because its heat exchanger isolation valves were misaligned. ADHR was restored to an available condition on September 28, 2016. The exposure time for calculation of the change in large early release frequency (Δ LERF) at shutdown is limited to 8 days after shutdown, in accordance with Inspection Manual Chapter (IMC) 0609, Appendix H, "Containment Integrity Significance Determination Process." Because the performance deficiency occurred 1 day after shutdown, the maximum exposure time for calculation of Δ LERF for this finding is 7 days.

LOIOC Initiating Event Frequency (IEF): The best available IEF for the LOIOC event tree was presented in Electric Power Research Institute (EPRI) technical review (TR) 1003113, "An Analysis of Loss of Decay Heat Removal Trends and Initiating Event Frequencies (1989-2000)." This document, which was completed

in 2001, provides industry initiating event frequencies at shutdown using data from 1989-2000. This EPRI report gives an IEF for reactor pressure vessel (RPV) leaks or diversions at shutdown of $3.2\text{E-}5/\text{hour}$ (.27/year). The EPRI IEF of 0.27/year was chosen as the best estimate IEF for this risk evaluation because it is based on the broadest set of data available and has a well-documented basis.

Another EPRI report was published in 2011, EPRI TR 1021176, "An Analysis of Loss of Decay Heat Removal and Loss of Inventory Event Trends (1990-2009)," which updated the trends for loss of inventory (LOI) events with more recent data, but did not provide updated IEFs. The updated trend information shows that LOI events for boiling water reactors (BWRs) are steady from the previous period. This trend information suggests that the IEF reported in the 2001 report is still appropriate.

LOSDC IEF: The best available initiating event frequency for the LOSDC event tree is also presented in the 2001 EPRI report. This report gives IEFs for loss of the running RHR pump or RHR flow, loss of cooling water or heat transfer to the RHR heat exchangers, shutdown cooling (SDC) isolation, and RPV isolation events. When added together, these four IEFs give a total IEF of 1.37/year for LOSDC events in BWRs. The total IEF of 1.37/year was chosen as the best estimate IEF for this risk evaluation because it is based on the broadest set of data available and has a well-documented basis.

The 2011 EPRI report shows that much fewer LOSDC events occurred in BWRs in the time period after 1995 than during the previous period. The updated trend information showed that the number of LOSDC events has continued to decrease slightly since 2000 until 2010. However the time spent in shutdown has also decreased during that time frame. This trend information suggests that the IEF reported in the 2001 report is still appropriate.

Timing of LOIOC: Timing in the top of the LOIOC event tree is based on a 500 gpm leak, which takes 25 minutes to get to the low level SDC isolation setpoint (200 gal/in in RPV) and another 35 minutes to get to top of active fuel (TAF) and cause core damage. Since the top of the LOIOC event tree doesn't assume a loss of SDC, none of this information was influential to the final risk result.

Success in Isolating a LOIOC: Operations personnel could successfully isolate a reactor coolant system leak prior to loss of shutdown cooling. A new branch was added to the bottom branch of the LOIOC event tree that allowed just enough time for operations personnel to isolate the leak if no injection sources were successful. The new branch is shown on the LOIOC event tree and leads to core damage (CD) Sequence 44. The event tree has a human error probability (HEP) of 0.5. This was based on operations personnel having 35 minutes until TAF to isolate the leak.

Time to Boiling in the Core and Containment Isolation: As provided by the licensee, boiling in the core would take place in about 25 minutes and containment isolation would occur in 100 minutes on high drywell (DW) pressure.

Shutdown Cooling Isolation: SDC isolates on 135 psig in the reactor coolant system, high DW pressure, or low RPV level. High DW pressure would occur first, at 100 minutes. This was based on a calculation provided by the licensee.

ADHR Recovery: ADHR was unavailable for recovery because it is unable to pump saturated water (procedurally isolated at 200 degrees Fahrenheit), would take at least 1 hour, 15 minutes to restore, and core boiling would occur within 25 minutes. None of the licensee calculations provided show reactor temperature going back below boiling.

Core Damage Timing: With no operator actions and no injection it would take about 4 hours for level to lower to the top of active fuel. In the dominant sequence, core damage is expected to occur 12-21 hours after reaching the top of active fuel.

Suppression Pool Boiling: It would take 12.5 hours to boil the suppression pool if the 25 megawatts of heat from the core were being directed to the suppression pool. This does not account for heat losses to the RPV/DW environment.

Suppression Pool Cooling: Failure of RHR A and B also fails suppression pool cooling.

Shutdown Cooling Recovery: The average amount of time it took to restore SDC per the data in the 2011 EPRI report was 42 minutes. This was applied to all sequences when RHR, train B, was considered to be in a recoverable condition. The running train was considered to fail in a condition that would not be recoverable 10 percent of the time, as documented in Section (3) b. below.

Reactor Water Cleanup (RWCU) and Control Rod Drive (CRD) Availability: RWCU and CRD were both available during the exposure time. However, they were not capable of providing sufficient core cooling. Therefore, they were not credited in the model.

Power Conversion System (PCS) Availability: The main steam isolation valves (MSIVs) were closed and there was no vacuum in the main condenser during the exposure time. Therefore, the PCS was not credited for decay heat removal from the reactor coolant system (RCS). However, the condensate system was available for injection and was credited as an injection source in the model.

Alternate Heat Removal Success: Because RWCU and PCS were not credited, the top event SD-ALT-HEAT always fails.

Reactor Pressure Vessel Venting: The RPV head was in place and the RPV was vented throughout the exposure period. However, the vent was inadequate to prevent repressurization of the system.

Automatic Pressure Relief: The high pressure core spray (HPCS) system is capable of lifting a safety relief valve (SRV). Therefore, there is no need to depressurize the reactor to avoid core damage whenever HPCS is running. This is modeled in the SPAR.

Automatic Injection: HPCS and low pressure core spray (LPCS) would automatically inject on Level II and Level I low reactor vessel level signals, respectively (given depressurization for LPCS). The shutdown SPAR model was changed to incorporate this.

Availability of RHR Train C: RHR, train C, was available throughout the exposure time. This train is an injection source, but has no heat exchanger and cannot provide decay heat removal or suppression pool cooling.

Reactor Recirculation: A recirculation pump was always running throughout the exposure period. Therefore, complete reactor coolant system mixing was assumed.

Firewater Injection: The firewater system was available for injection throughout the exposure period and was credited as an injection source.

Pressure/Level Control: Immediately following the event, operations personnel would respond in accordance with Procedure 05-1-02-III-1, "Inadequate Decay Heat Removal," Revision 30. This procedure directs the operations personnel to attempt to restore SDC. Upon failure to restore a SDC system, operations personnel are directed to open two SRVs and raise reactor pressure vessel level to get flow through the SRVs to the suppression pool. At some point in the dominant sequences, operations personnel would have transitioned to Emergency Operating Procedure 05-S-01-EP-2, "RPV Control," Revision 38, and may maintain a lower reactor water level band, start steaming, and use SRVs for pressure control. In both procedures, all of the heat is going to the suppression pool via the SRVs.

Emergency Operating Procedures (EOP): Emergency Operating Procedure 05-S-01-EP-3, "Containment Control," Revision 27, would have been used for containment control once the containment isolation setpoint was reached. EOP Attachments 13 and 14, provide direction for containment venting. Operations personnel might attempt venting earlier via normal means but the small vent path provided would not prevent containment isolation. After containment isolation, jumpers need to be installed to vent containment. Procedure 05-S-01-EP-1, "Emergency/Severe Accident Procedure Support Documents," Revision 18, was also referenced.

Late Recovery of Shutdown Cooling: The late recovery was modeled in the plant-specific shutdown SPAR. The values used were based on the NRC's model-makers guide and were as provided by Idaho National Laboratories.

Change in Core Damage Frequency (CDF): The analyst used the change in CDF as the metric for the risk evaluation as documented in the Risk Assessment of Operational Events Handbook, Volume 4, "Shutdown Events," Revision 2.0. The change was calculated as documented in Section 6.0, "Shutdown Condition Analysis – Multiple POSSs."

Shutdown Test and Maintenance: The analyst left the test and maintenance basic events in the SPAR at their nominal values for the risk assessment. These basic event parameters were established for a reactor at power. Therefore,

these events are likely to underestimate the risk of the subject performance deficiency. A sensitivity analysis was performed, as documented in Section (7), "Sensitivities," below.

Containment Venting Human Error Probability: The ability and failure probability for containment venting is uniquely different than the operator failure probability for removing heat from the containment using the power conversion system. Therefore, the analyst added a basic event (SD-XHE-XM-VENT) to Fault Tree SD-CVS, "Containment Venting – SD."

Evacuation Timing: "GGNS Development of Evacuation Time Estimates Report, Rev 1, dated November 2012 states that 100% evacuation of the entire emergency planning zone (EPZ), including special groups which require two waves of busing for evacuation, can be accomplished in less than 7 hours (6 hours 50 min). Evacuation is triggered when a General Emergency is declared. In accordance with Emergency Plan Procedure 10-S-01-1, "Activation of the Emergency Plan," a General Emergency would be declared 30 minutes after level lowered to the top of active fuel if containment was challenged and inventory was lost. The analyst estimated that it would take an additional hour after declaration of a General Emergency for an evacuation to begin.

(3) Internal Events Risk Analysis

Base Case Conditions: The following modifications were made to the base SPAR-SD model in order to align the model with the plant operating state during the exposure time:

- a. The performance deficiency existed because RHR A was inoperable. Both the LOIOC and LOSDC event trees assume that RHR A is the running subsystem and that it is failed as part of the initiating event. This is accomplished by house events (HE-SD-LOIOC, HE-SD-LOSDC) placed in the fault tree for RHR A (SD-SDC-A-M4M5) that are set to TRUE when the respective initiating event occurs. Therefore, no changes were required to model unavailability of the RHR A subsystem in this plant mode.
- b. The EPRI IEFs are based on the full range of possible event severities. The data shows that the vast majority of events do not result in a nonrecoverable LOSDC. Review of the EPRI data and consultation with other probabilistic risk assessment (PRA) analysts concluded that less than 1 percent of loss of inventory (LOI) events and approximately 1 to 10 percent of LOSDC events may be nonrecoverable. Therefore, the analyst assumed that 10 percent of events are nonrecoverable as a best estimate. As a surrogate, the failure to run basic event for the RHR, pump B, RHR-MDP-FR-PUMPB, was set to a probability of 0.1. Sensitivity Evaluation 2 was performed to explore the impact of this assumption.
- c. The original LOIOC event tree assumed that every LOI event caused a nonrecoverable loss of the running SDC train, and therefore, the HEP in the first top event, "Failure to Diagnose LOI before SDC Isolation," was originally set to TRUE (i.e., a failure probability of 1.0). The EPRI IEFs are not based on this assumption. Instead, they are based on any LOI events, regardless of

whether the event caused an LOSDC or not. Therefore, the NRC analyst changed the value of this top event from TRUE to an appropriate probability. As such, the HEP (SD-XHE-XD-LOIM4), was changed from TRUE to 0.01 (nominal time to perform the diagnosis, no action required), to activate the sequences in the top of the event tree in which the LOI is successfully diagnosed prior to loss of the running SDC train. Those sequences which were not previously active were not fully modeled because they did not include any HEPs. The NRC analyst completed modeling of the newly activated sequences. The changes mimic the modeling already in place in the bottom of the event tree and ensure that each fault tree called upon includes an appropriate HEP. These changes are shown in the LOIOC event tree shown in Figure 1.

- d. Station service water (SSW), pump B, which provides cooling water for the RHR B heat exchanger, was running for the duration of the exposure time. Therefore, its failure to start basic event (SSW-MDP-FS-PUMPB) was set to FALSE.
- e. HPCS and LPCS would have automatically initiated on low level during the exposure time. The basic events for failure of auto initiation of the HPCS and LPCS systems (SD-ICC-FC-HCS and SD-ICC-FC-LPI, respectively) were set to their hardware failure values. These basic events were originally set to TRUE in the base model.
- f. RWCU was in service during the exposure time, but would not have been sufficient to provide adequate core cooling. The power conversion system was also unavailable to provide alternate heat removal from the core during the exposure time. A new basic event was created in the alternate heat removal (SD-ALT-HEAT) fault tree and set to TRUE in order to fail the use of these alternate heat removal methods.
- g. CRD was in service during the exposure time, but would not have been sufficient to provide adequate core cooling. The basic event for failure to initiate CRD (SD-XHE-XM-CRD) was set to TRUE to fail use of CRD as a method of core cooling in the SPAR-SD model.
- h. The LOIOC and LOSDC event trees in the SPAR-SD model assume that failure to vent containment results in core damage. This is based on the assumption that containment failure causes an adverse environment in the auxiliary building, which causes failure of the injection systems in the building. This is a conservative assumption because GG has a steel-reinforced concrete containment which is expected to leak when over-pressurized, not rupture. GG provided a calculation, PRA-GG-01-001S01 Rev 0, "GGNS At-Power Level 1 Accident Sequence Analysis," which showed that approximately 1% of containment failures would result in failure of the high pressure core spray (HPCS) system in the lower elevation of the auxiliary building. NRC personnel reviewed the calculation and determined that the licensee's assumptions were reasonable. As a result, the analyst modified the LOSDC event tree to include a new top event, SD-CONTFAIL, "Containment Failure Causes a loss of Injection," after the top event SD-VENT, as shown in Figures 3 and 4. The SD-CONTFAIL top event is

questioned in sequences where an injection source is available but containment venting fails. If a high pressure injection source had succeeded in the sequence, the top event was assigned a value of 0.01 to reflect the 1% probability that containment failure would cause a loss of the high pressuring injection source. If a low pressure injection source had succeeded in the sequence, the top event was assigned a value of 0.04, which is the combined probability that a high pressure source would have failed if demanded, plus the 1% probability that containment failure would have failed the high pressure injection source. The LOIOC event tree was not modified because it does not dominate the risk analysis.

Human Error Probability Screening: The M4E event trees include placeholder HEPs. Precise HEPs were not included in the off-the-shelf model because the model builders did not know what conditions the model would be tasked to resolve. The HEPs would be significantly different for an event that occurs early in an outage when decay heat levels are high and time available to perform the actions is limited in contrast to late in the outage when significantly more time is available. The placeholder HEPs, shown in the table below, have values of 1E-3 or smaller for operator actions to restart SDC, depressurize the reactor coolant system, start HPCS or low pressure injection (LPI), align firewater or other injection sources, provide suppression pool cooling or vent containment.

Human Error Event	Description	Original Value
SD-XHE-XM-RHR-NOM	Fails to establish SDC/SPC cooling (> 2 hours)	1E-3
ADS-XHE-XM-MDEPR	OPERATOR FAILS TO DEPRESSURIZE THE REACTOR	5E-4
SD-XHE-XM-ECS-NOM	FAILS TO ESTABLISH LPI/HPI INJECTION (NOMINAL TIME)	1E-3
SD-XHE-XM-ALTI-NOM	FAIL TO INITIATE ALTERNATE INJECTION GIVEN LO/HI PRESSURE INJECTION (ECCS) FAILS	4E-3
SD-XHE-XM-VENT	OPERATOR FAILURE TO VENT CONTAINMENT	1E-3

Since these HEPs were placeholders, the analyst increased all of these HEPs to a screening value of 1E-2 in order to identify which operator actions significantly influence the final risk results. The SPAR-SD model accounts for dependency between HEPs by replacing the calculated HEP with a combined HEP when multiple individual HEPs appear in a cutset. The combined HEPs were increased from 1E-3 to 1E-2 to account for the increase in the individual HEPs as part of the screening analysis. Using screening values in this manner is consistent with the guidance found in Section 3.3.3.2 of NUREG-1792, "Good Practices for Implementing HRA," regarding post-initiator screening. This screening identified that the HEP associated with venting containment, SD-XHE-XM-VENT, is significant to the results. A detailed evaluation was performed for this operator action and this HEP was assigned a value of 1.1E-3 (extra time for diagnosis and action since depressurization and injection were both successful in the sequences where this dominates). Containment venting

was estimated to be required sometime between 66 and 72 hours after loss of SDC. The analyst considered providing more credit for the time performance shaping factor. As a sensitivity, the HEP was lowered to 2E-4 per demand. This had very little impact to the final result because the valve and equipment failures begin to dominate in this range.

The HEP screening also identified that the HEP associated with depressurizing the reactor, ADS-XHE-XM-DEP, is significant to the results. A detailed evaluation was performed for this operator action and this HEP was assigned a value of 1E-3 (extra time for action since there is more than 5 times the time required for this action where this dominates).

For the nonsignificant HEPs, the NRC analyst determined that the screening values were better estimates than the original placeholder values, so the remaining HEPs were left at their screening values of 1E-2. Since the remaining HEPs were not significant to the analysis, leaving them at their screening value has very little effect on the results, as shown in Sensitivity Evaluation 3.

Results: The conditional case assumes that ADHR is failed due to the misalignment. ADHR was failed in the conditional case by setting the basic event for failure of the ADHR heat exchanger cooling water supply valve to open (ADH-XVM-CC-F483) to TRUE. The internal events Δ CDF was calculated by subtracting the CDF calculated using the base case conditions discussed above from the conditional case CDF with ADHR failed, and multiplying by the exposure time of 13 days. The total internal events Δ CDF was calculated for 2 cases. A total internal events Δ CDF of 5.8E-6 (White) was calculated for Case 1 where containment failure always causes core damage due to loss of all injection sources. A total internal events Δ CDF of 3.2E-7 (Green) was calculated for Case 2 where containment failure only causes loss of injection 1% of the time that high pressure injection is available (Base Case Condition h above). The internal events Δ CDF results for the 2 cases are show in the table below:

<u>Event Tree</u>	<u>Base Case CDF</u>	<u>Conditional Case CDF</u>	<u>ΔCDF (full year)</u>	<u>ΔCDF for exposure time</u>
<u>Case 1: Containment failure always causes core damage</u>				
N-SD-M4E-LOIOC	5.3E-6	5.6E-6	2.8E-7	1E-8
N-SD-M4E-LOSDC	1.5E-5	1.8E-4	1.6E-4	5.8E-6
Total for Internal Events				5.8E-6
<u>Case 2: Containment failure causes core damage 1% of the time that high pressure injection is available</u>				
N-SD-M4E-LOSDC	3.7E-6	1.25E-5	8.8E-6	3.1E-7
Total for Internal Events				3.2E-7

The cut sets for Case 1 that contribute to at least 1 percent of the risk for the LOIOC event tree are shown in Table 1 at the end of this report. The cut sets for Case 1 that contribute to at least 1 percent of the risk for the LOSDC event tree are shown in Table 2 at the end of this report. The cut sets for Case 2 (proposed

Base Case) that contribute to at least 1 percent of the risk for the LOSDC event tree are shown in Table 3 at the end of this report. (The LOIOC was not modified for Case 2 (Base Case) using the new information provided by the licensee because it was not significant to the risk results.) The cut set reports were generated by setting the basic event ADH-XVM-CC-F483 to 1.0 and then viewing only the cut sets that include this basic event.

This analysis concludes the best estimate of risk for this event is represented by Case 2 with a Δ CDF of $3.2\text{E-}7/\text{year}$ (Green).

Dominant Sequence: The dominant sequence for Case 1 is Sequence 7 in the LOSDC event tree (as shown in Figure 3), which includes the following top events:

- Successful diagnosis of the LOSDC before SDC isolation (/SD-XD-SDC)
- Failure of heat removal using SDC (SD-SDC)
- Successful reactor depressurization (/SD-DEP)
- Successful low pressure injection (/SD-LPI)
- Failure of suppression pool cooling (SD-SDC)
- Failure of containment venting (SD-CVS)
- Failure of late recovery of RHR (SD-RECLT-3D)

This sequence accounts for approximately 70 percent of the risk associated with the LOSDC conditional case for Case 1 and approximately 50% of the risk for Case 2 (proposed Base Case).

- (4) External Events Risk Analysis (NOTE: The external event risk analysis was not modified to incorporate the low probability that containment failure would result in core damage (Case 2) because it has no impact on the significance)

Review of the Grand Gulf Nuclear Station Individual Plant Examination of External Events (IPEEE) did not reveal any external events specifically applicable to this performance deficiency because ADHR is not credited for decay heat removal in the IPEEE. In addition, external event data is not available specifically for the shutdown condition. Seismic events and high winds are generally assumed to cause a LOOP, but the LOOP event tree is not applicable to this performance deficiency because ADHR is not powered from an emergency bus. Flooding is not a dominant risk contributor at the site. Therefore, the risk significance of seismic, high winds, and flooding events were determined to be negligible for this evaluation. Fire is the dominant applicable external event. Dominant fire scenarios would include fires that affect the running SDC train.

The licensee provided a calculation showing the fire ignition frequencies (FIF) for all of the fire areas that could impact RHR B. The total FIF, including transient combustibles, was $2\text{E-}3/\text{year}$. The licensee argued that this value would be even lower since transients would be limited in any areas containing RHR B equipment because it was the protected train and because transient combustible fires could be suppressed before affecting RHR B operation. As such, the licensee suggested lowering the transient combustible contribution. This resulted in a reduced total FIF of $4\text{E-}4/\text{year}$. The NRC analyst determined that the higher FIF

was the best estimate for use in this SDP because protecting the running train does not preclude transient combustibles from being taken into the area. An external event risk evaluation was performed using the LOSDC tree with RHR B failed as a surrogate and setting the LOSDC IEF to the FIF of 2E-3/year. The resulting evaluation gives an external event risk due to fire of 5E-8 for the exposure period. Therefore, external event risk is not a significant contributor to risk for this performance deficiency.

(5) Large Early Release Frequency (LERF)

LERF is defined NUREG-1765, "Basis Document for Large Early Release Frequency (LERF) Significance Determination Process (SDP)," as the frequency of all events that involve core damage accidents that can lead to large, unmitigated releases from containment before effective evacuation of the nearby population and, therefore, have the potential to cause prompt fatalities.

The analysts analyzed the LERF issue for the base case (Case 2) only. Overall, the analysts (a) recognized that all dominant sequences had the potential to result in LERF, (b) modified Δ LERF to factor in the differences in exposure time for CDF and LERF, and (c) evaluated the margin between times at which releases could occur against the estimates of the evacuation times for GGNS.

In accordance with Inspection Manual Chapter 0609, Appendix H, "Containment Integrity Significance Determination Process," issued May 6, 2004, the analyst determined that this was a Type A finding, because the finding affected the plant core damage frequency. All of the core damage sequences that contribute to Δ CDF involve failure to vent containment, which results in containment failure. Therefore, all of the core damage sequences that contribute to Δ CDF are also potential contributors to Δ LERF.

The analysts determined the Δ LERF by performing the following hand calculations:

a) Adjustment of exposure time:

As stated in the Assumptions, the exposure time for calculation of the Δ LERF at shutdown is limited to 8 days after shutdown, because, after 8 days, it is assumed that the short-lived, volatile isotopes that are principally responsible for early health effects have decayed sufficiently that the finding would not contribute to LERF. Therefore, since the performance deficiency began 1 day after shutdown, for short core damage sequences, the LERF exposure period was 7 days. For sequences where core damage was assumed to take place after 72 hours, the LERF exposure time was 4 days, because any core damage sequence that started after 4 days would go to core damage after the 8 day limit.

If Δ LERF is assumed to occur in all core damage sequences, but each sequence is adjusted for the more limiting exposure period, the result would be 1.3E-7.

b) Removal of non-early sequences:

There is a note in Chapter 0308, Attachment 3, Appendix H, stating that during a Phase 3 analysis (detailed risk evaluation) the analyst can eliminate some sequences from LERF reducing the color of the finding “because the licensee would have evacuated.”

As shown in Table 3, more than half of the core damage sequences took 72-hours to go to core damage. Those sequences had injection available but containment venting failed. During these sequences, containment failure would not occur until 3 days after the postulated event. It would take approximately 4 hours after containment failure to reach the top of active fuel and an additional 12-21 hours until core damage would occur. Based on site procedures, a general emergency declaration would occur upon reaching the top of active fuel. A timeline, consistent with the licensee’s evacuation time evaluation, indicates that evacuation would start within 1.5 hours of reaching the top of active fuel. Since it would take at least another 10 hours for core damage to occur, sufficient time exists for an effective evacuation of the EPZ since current evacuation time estimates show evacuation can, in all cases, be effected within 7 hours of initiation. Therefore, per the guidance in Chapter 0308, it is appropriate to eliminate these sequences from LERF because the affected population could be evacuated before core damage is postulated to occur.

As shown in Table 3, the analyst removed these sequences and calculated an estimated Δ LERF of 7.3E-8 (Green).

Table 3 ADHR Issue Dominant Sequences					
Length of Sequence	Sequence Number		Case (/year)	Base (/year)	Delta (/year)
Short	30		6.79E-06	3.03E-06	3.76E-06
Long	7		4.99E-06	3.46E-07	4.64E-06
Short	22		5.94E-08	1.31E-09	5.81E-08
Short	54		1.22E-09	1.22E-09	0.00E+00
Short	62		3.17E-07	3.17E-07	0.00E+00
Long	13		2.52E-08	1.70E-10	2.50E-08
Long	19		1.15E-11	0	1.15E-11
Long	28		1.80E-09	7.81E-10	1.02E-09
Long	37		3.28E-07	5.30E-09	3.23E-07
Long	44		1.57E-10	0	1.57E-10
Long	51		0	0	0.00E+00
Long	60		7.81E-11	7.81E-11	0.00E+00
	Totals		1.25E-05	3.70E-06	8.81E-06

Short			7.17E-06	3.35E-06	3.82E-06
Long			5.35E-06	3.52E-07	4.99E-06
Short		7-day Exposure			7.32E-08
Long		4-day Exposure			5.47E-08
Estimated Δ LERF					7.32E-08

c) Sensitivity:

As a sensitivity analysis, the analyst made a bounding assumption that evacuation failed 10% of the time. The analyst noted that a full evaluation using SPAR-H would result in a lower probability. The result of this evaluation was 7.9E-8, indicating that the finding would remain Green.

(6) Uncertainties

Analytical: Shutdown events are generally dominated by HEPs. The HEPs in the SPAR-SD model are point estimates, and an uncertainty analysis could not be performed using the SPAR-SD model. Sensitivity analyses were conducted in order to account for uncertainties.

Qualitative Considerations: ADHR was unavailable because the cooling water isolation valves to the heat exchangers were tagged closed. This failure mechanism is potentially recoverable. The licensee and resident inspectors estimated that it would take more than an hour to restore ADHR to the correct alignment. However, ADHR is designed for operation when the reactor is less than 200 degrees Fahrenheit, and is procedurally directed to be isolated when the reactor is above 200 degrees Fahrenheit. The licensee's calculation estimated that the time to boil one day after shutdown was approximately 25 minutes. Because it is assumed that ADHR is not capable of pumping saturated water, no credit was given for recovery of ADHR in this risk analysis. However, recovery of ADHR may prevent core damage in sequences where depressurization of the reactor was successful and injection was available, if injection was able to maintain water temperature below 200 degrees Fahrenheit.

CRD and RWCU were available and running during the exposure time but were not sufficient to provide adequate core cooling. Therefore, no credit was given for their use. Even though CRD and RWCU were not sufficient to provide adequate core cooling, their use would have potentially increased the time to boil and time to core uncover.

(7) Licensee Results

The licensee provided three risk evaluations related to ADHR being out of service. The NRC assessment of these evaluations is as follows:

Hand Calculation: The licensee does not have a shutdown risk model. Therefore, the licensee prepared a hand calculation to estimate the increased risk of having ADHR out of service for 13 days. The licensee used EPRI data for their initiating event frequency, calculated an HEP for operations personnel responding before RCS boiling, and provided an equipment failure probability for HPCS to fail to automatically start and inject. The resulting conditional core damage probability was $1\text{E-}10$. The NRC analysts identified several issues with this evaluation.

First, the licensee provided a human error probability of $1\text{E-}5$ for operations personnel failing to inject before core damage. The analysts determined that this value was too low for an operator failure probability over 4 hours with the same crew and no new cues.

Second, the evaluation the licensee performed was not the dominant sequence in the NRC's evaluation. The dominant sequence in the NRC's evaluation included successful injection with failure to vent primary containment.

Third, the licensee did not include an analysis for LOI events. The licensee argued that LOI events are not applicable to the performance deficiency since any LOI would come from the RHR system. An LOI from the RHR system would require the isolation valves to be closed, making both RHR and ADHR unavailable. The NRC analyst acknowledges that many BWR LOI events are from sources that would be isolated by closing the SDC suction isolation valves but has determined that this does not apply to all LOI events (e.g., improper valve manipulations in either the RWCU or reactor recirculating system have caused LOI events). In fact, the EPRI data is based on LOI events from all locations with the potential to lower level, not just from RHR. However, the NRC analyst agrees that LOI events are not the dominant contributor to risk because they rarely result in an LOSDC at BWRs. The risk results reflect this.

Fourth, the licensee did not use all four of the EPRI IEFs that result in an LOSDC for its evaluation. The licensee argued that the RHR/RPV isolation events and loss of cooling water to RHR events would impact both RHR and ADHR equally, and therefore, there should be no change in risk from these types of LOSDC events. The NRC analyst agrees that isolation events would initially impact both RHR and ADHR; however, the risk model tests and credits all means of recovering from an isolation event, including use of ADHR which was not available for use because of the performance deficiency. Therefore, the NRC analyst determined that the isolation and loss of cooling water initiating events are applicable to this risk evaluation.

Sensitivity Calculation: The licensee performed a sensitivity evaluation using the same approach as in Method 1 above. The resulting conditional core damage probability was $2.3\text{E-}9$. The primary difference in the sensitivity evaluation was to lower the HEP by an order of magnitude. While the NRC analysts still believe this is too low, the lack of understanding and evaluation of the dominant sequence is the major difference between the licensee's and NRC's result.

Inspection Manual Chapter (IMC) 0609, Appendix G, Approach: The licensee utilized the significance determination process Phase 2 method to quantify the risk of ADHR being unavailable. The result included two sequences that added up to 7, which indicates a conditional core damage probability in the Green range. The NRC analysts noted that the licensee used a credit of 3 for operator action in decay heat removal recovery before shutoff head is reached. Worksheet 4 provides this value based on an assumption that operator action was the limiting factor in quantifying this parameter. However, because RHR A was out of service, ADHR was unavailable, and RHR B had just failed, the limiting factor is actually the equipment credit. Providing an equipment recovery value of 1 as indicated by the Phase 2 approach, the Phase 2 result would include two sequences that add up to 5, which indicates a conditional core damage probability in the Yellow range.

The licensee also provided calculations related to heat transfer and timing during the proposed dominant core damage sequences.

The licensee recently provided a new thermal hydraulics calculation indicating that the time to core bulk boiling would be 47 minutes and the time to containment isolation would be 206 minutes. This calculation and its potential impact on the subject evaluation is being reviewed by NRC staff.

(8) References

- EPRI TR 1003113, "An Analysis of Loss of Decay Heat Removal Trends and Initiating Event Frequencies (1989-2000)," November 2001
- EPRI TR 1021176, "An Analysis of Loss of Decay Heat Removal and Loss of Inventory Event Trends (1990-2009)," December 2010
- Grand Gulf IPEEE
- Grand Gulf SPAR Model, Version 8.22
- IMC 0609, Appendix G, "Shutdown Operations Significance Determination Process," dated May 9, 2014
- IMC 0609, Appendix H, "Containment Integrity Significance Determination Process," dated May 6, 2004
- NUREG-1792, "Good Practices for Implementing HRA," April 2005.
- RASP Manual, Volume 1, "Risk Assessment of Operational Events Handbook, Internal Events," Revision 2
- RASP Manual Volume 4, "Risk Assessment of Operational Events Handbook, Shutdown Events," Revision 1
- SPAR-SD Model Makers Guide, Revision 2.4 (ADAMS Accession No. ML092160242)

Figure 1 – Top of the LOIOC Event Tree

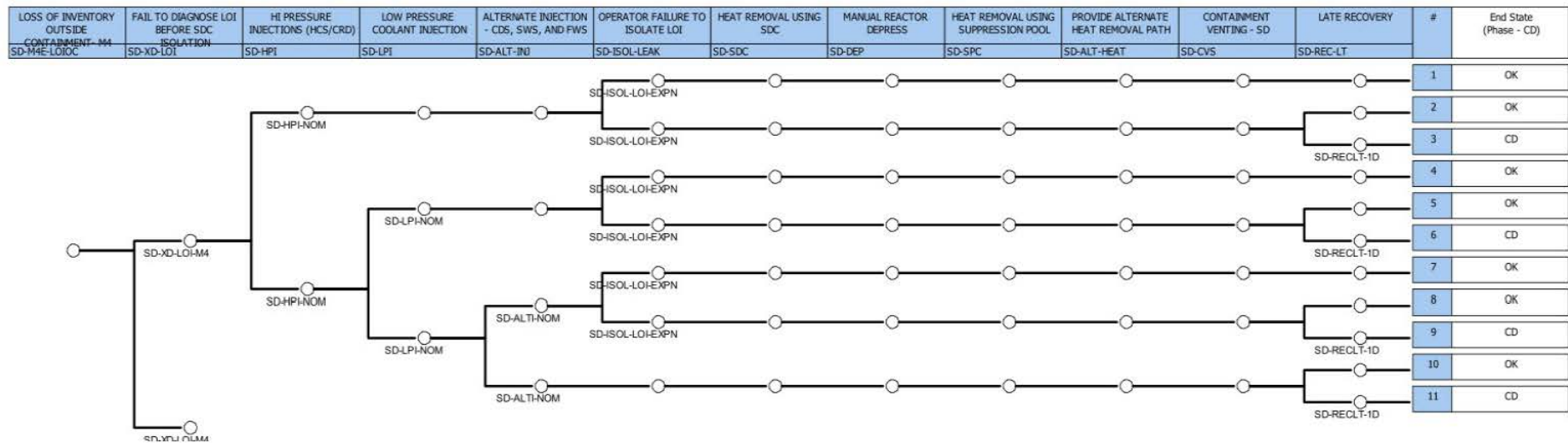


Figure 2 – Bottom of LOIOC Event Tree

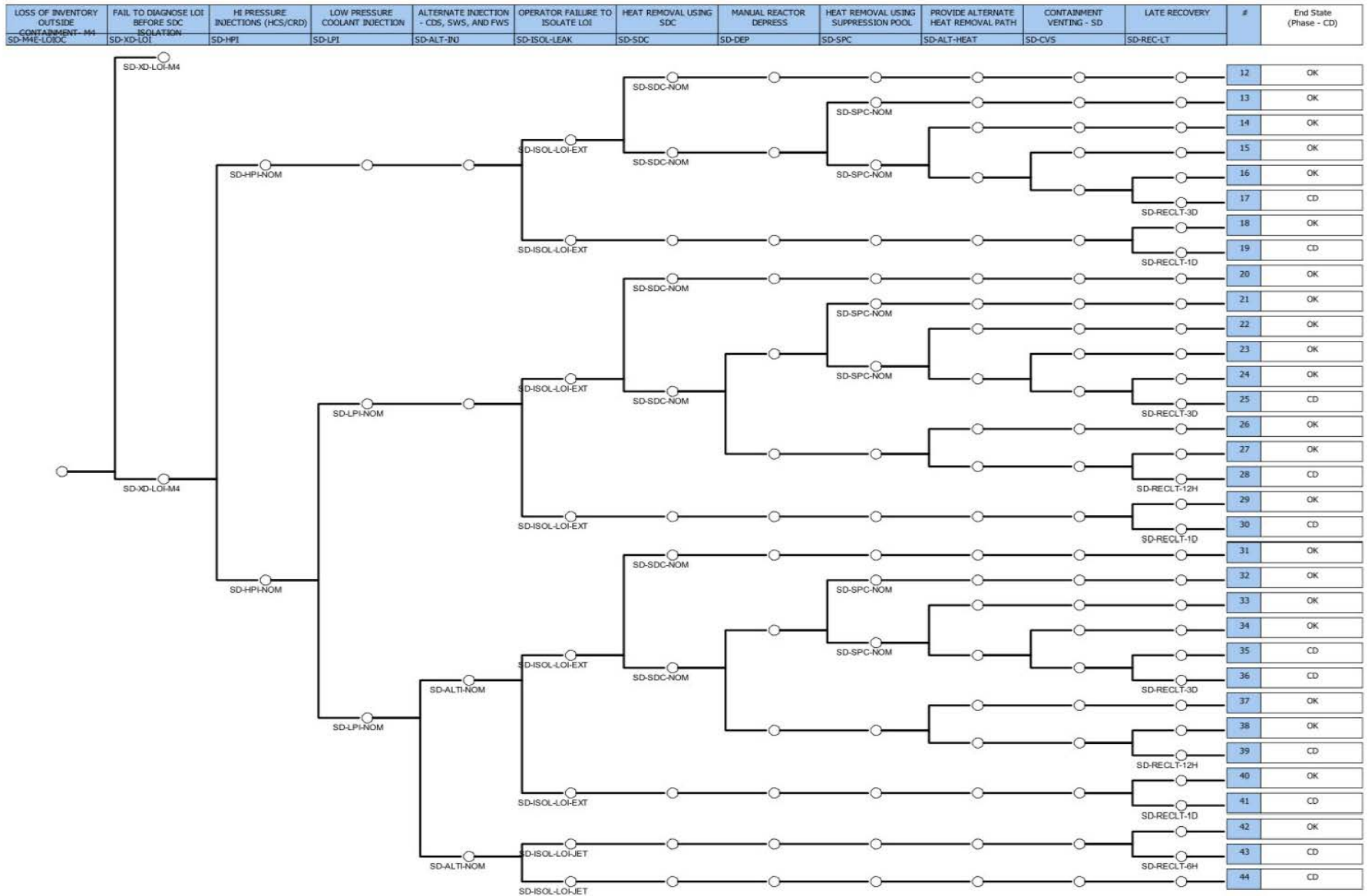


Figure 3 – Top of LOSDC Event Tree

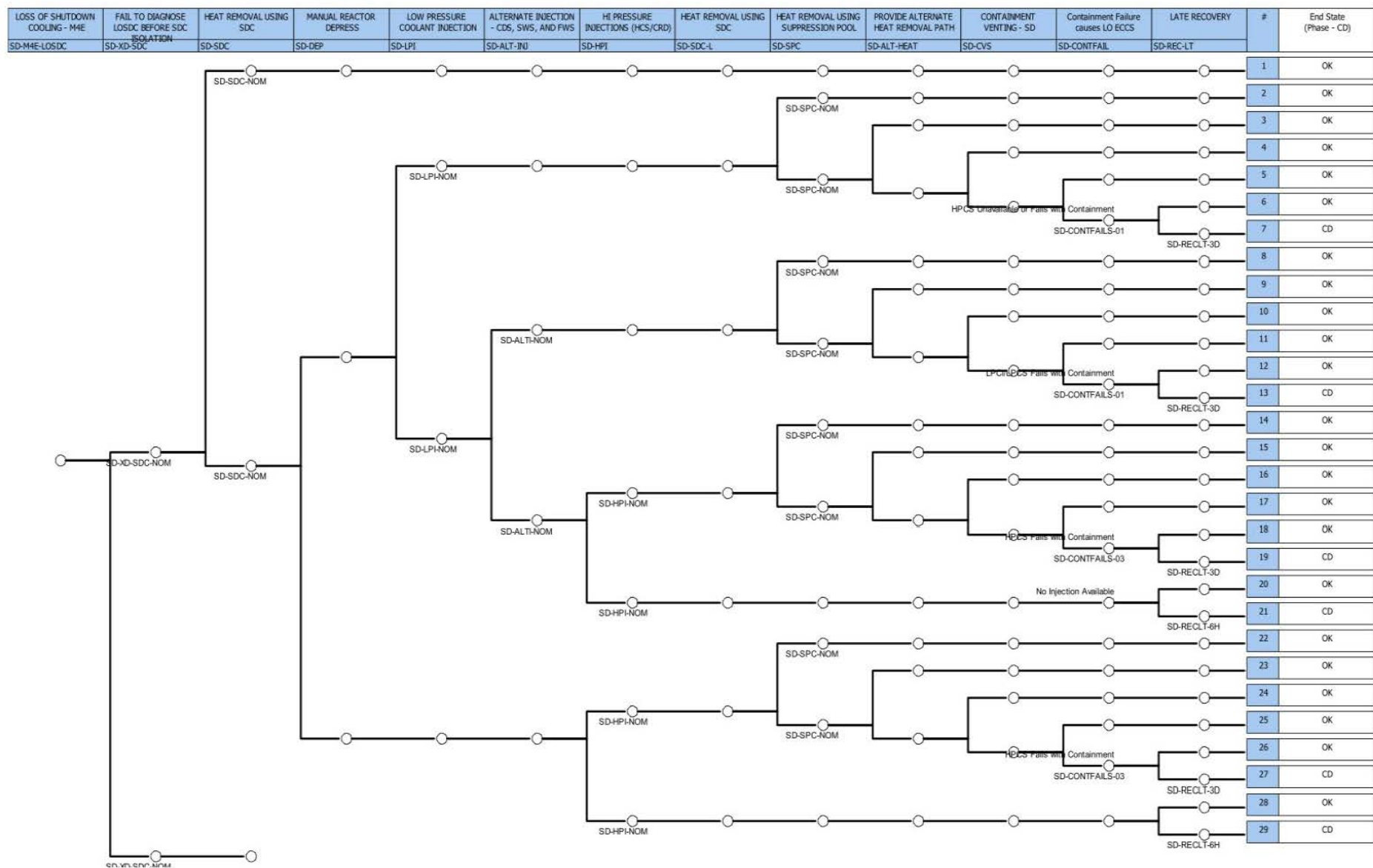


Figure 4 – Bottom of LOSDC Event Tree

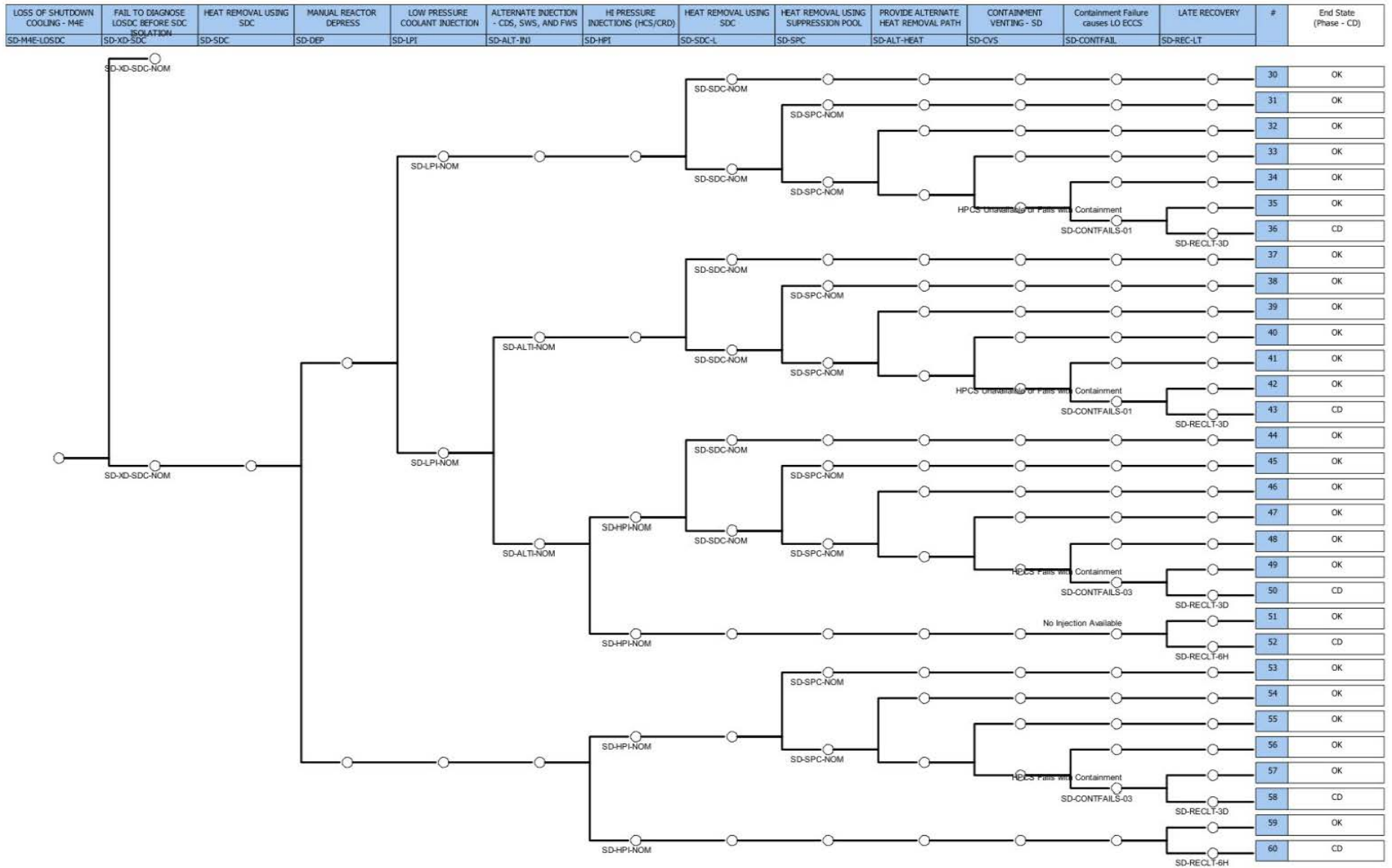


Table 1- LOIOC Event Tree Cut Sets for Case 1
 (NOTE: Cut set sequence numbers do not match Figures 1 and 2)

#	Prob/Freq	Total%	Cut Set	Description
1	5.64E-8	19.83	SD-M4E-LOIOC : 17	
	2.70E-1		SD-M4E-LOIOC	LOSS OF INVENTORY OUTSIDE CONTAINMENT- M4
	1.00E+0		ADH-XVM-CC-F483	ADHR HTX F483 (PSW) XVM FAILS TO OPEN
	1.00E-1		RHR-MDP-FR-PUMPB	RHR PUMP B FAILS TO RUN
	1.00E-2		SD-XHE-XD-LOIM4	FAIL TO DIAGNOSE LOI (OC) BEFORE SDC ISOLTATION ON LOW LEVEL - MODE 4
	1.10E-3		SD-XHE-XM-VENT	OPERATOR FAILURE TO VENT CONTAINMENT
	1.90E-1		SD-XHE-XR-SDC-3D	FAIL TO RECOVER SDC LATE - 3D
2	2.44E-8	8.57	SD-M4E-LOIOC : 17	
	2.70E-1		SD-M4E-LOIOC	LOSS OF INVENTORY OUTSIDE CONTAINMENT- M4
	1.00E+0		ADH-XVM-CC-F483	ADHR HTX F483 (PSW) XVM FAILS TO OPEN
	9.51E-4		CVS-AOV-CC-AV36	VENT VALVE FAILS TO OPEN
	1.00E-1		RHR-MDP-FR-PUMPB	RHR PUMP B FAILS TO RUN
	1.00E-2		SD-XHE-XD-LOIM4	FAIL TO DIAGNOSE LOI (OC) BEFORE SDC ISOLTATION ON LOW LEVEL - MODE 4
	5.00E-1		SD-XHE-XM-CVS	OPERATOR FAILS TO OPEN CVS VALVE MANUALLY
	1.90E-1		SD-XHE-XR-SDC-3D	FAIL TO RECOVER SDC LATE - 3D
3	2.44E-8	8.57	SD-M4E-LOIOC : 17	
	2.70E-1		SD-M4E-LOIOC	LOSS OF INVENTORY OUTSIDE CONTAINMENT- M4
	1.00E+0		ADH-XVM-CC-F483	ADHR HTX F483 (PSW) XVM FAILS TO OPEN
	9.51E-4		CVS-AOV-CC-AV34	VENT VALVE FAILS TO OPEN
	1.00E-1		RHR-MDP-FR-PUMPB	RHR PUMP B FAILS TO RUN
	1.00E-2		SD-XHE-XD-LOIM4	FAIL TO DIAGNOSE LOI (OC) BEFORE SDC ISOLTATION ON LOW LEVEL - MODE 4
	5.00E-1		SD-XHE-XM-CVS	OPERATOR FAILS TO OPEN CVS VALVE MANUALLY
	1.90E-1		SD-XHE-XR-SDC-3D	FAIL TO RECOVER SDC LATE - 3D
4	2.44E-8	8.57	SD-M4E-LOIOC : 17	

#	Prob/Freq	Total%	Cut Set	Description
	2.70E-1		SD-M4E-LOIOC	LOSS OF INVENTORY OUTSIDE CONTAINMENT- M4
	1.00E+0		ADH-XVM-CC-F483	ADHR HTX F483 (PSW) XVM FAILS TO OPEN
	9.51E-4		CVS-AOV-CC-AV37	VENT VALVE FAILS TO OPEN
	1.00E-1		RHR-MDP-FR-PUMPB	RHR PUMP B FAILS TO RUN
	1.00E-2		SD-XHE-XD-LOIM4	FAIL TO DIAGNOSE LOI (OC) BEFORE SDC ISOLTATION ON LOW LEVEL - MODE 4
	5.00E-1		SD-XHE-XM-CVS	OPERATOR FAILS TO OPEN CVS VALVE MANUALLY
	1.90E-1		SD-XHE-XR-SDC-3D	FAIL TO RECOVER SDC LATE - 3D
5	2.44E-8	8.57	SD-M4E-LOIOC : 17	
	2.70E-1		SD-M4E-LOIOC	LOSS OF INVENTORY OUTSIDE CONTAINMENT- M4
	1.00E+0		ADH-XVM-CC-F483	ADHR HTX F483 (PSW) XVM FAILS TO OPEN
	9.51E-4		CVS-AOV-CC-AV35	VENT VALVE FAILS TO OPEN
	1.00E-1		RHR-MDP-FR-PUMPB	RHR PUMP B FAILS TO RUN
	1.00E-2		SD-XHE-XD-LOIM4	FAIL TO DIAGNOSE LOI (OC) BEFORE SDC ISOLTATION ON LOW LEVEL - MODE 4
	5.00E-1		SD-XHE-XM-CVS	OPERATOR FAILS TO OPEN CVS VALVE MANUALLY
	1.90E-1		SD-XHE-XR-SDC-3D	FAIL TO RECOVER SDC LATE - 3D
6	1.79E-8	6.28	SD-M4E-LOIOC : 28	
	2.70E-1		SD-M4E-LOIOC	LOSS OF INVENTORY OUTSIDE CONTAINMENT- M4
	1.00E+0		ADH-XVM-CC-F483	ADHR HTX F483 (PSW) XVM FAILS TO OPEN
	1.00E-2		ADS-XHE-XM-MDEPR	OPERATOR FAILS TO DEPRESSURIZE THE REACTOR
	1.00E-1		RHR-MDP-FR-PUMPB	RHR PUMP B FAILS TO RUN
	1.00E-2		SD-XHE-XD-LOIM4	FAIL TO DIAGNOSE LOI (OC) BEFORE SDC ISOLTATION ON LOW LEVEL - MODE 4
	5.00E-1		SD-XHE-XR-SDC-12H	FAIL TO RECOVER SDC LATE - 12 HRS
	1.32E-2		SSW-MDP-TM-PUMPC	SSW PUMP C IS UNAVAILABLE BECAUSE OF MAINTENANCE
7	1.71E-8	6.01	SD-M4E-LOIOC : 17	

#	Prob/Freq	Total%	Cut Set	Description
	2.70E-1		SD-M4E-LOIOC	LOSS OF INVENTORY OUTSIDE CONTAINMENT- M4
	3.33E-5		ACP-BAC-LP-DII	4160 V BUS 16AB HARDWARE FAILURES
	1.00E+0		ADH-XVM-CC-F483	ADHR HTX F483 (PSW) XVM FAILS TO OPEN
	1.00E-2		SD-XHE-XD-LOIM4	FAIL TO DIAGNOSE LOI (OC) BEFORE SDC ISOLTATION ON LOW LEVEL - MODE 4
	1.90E-1		SD-XHE-XR-SDC-3D	FAIL TO RECOVER SDC LATE - 3D
8	9.21E-9	3.24	SD-M4E-LOIOC : 28	
	2.70E-1		SD-M4E-LOIOC	LOSS OF INVENTORY OUTSIDE CONTAINMENT- M4
	1.00E+0		ADH-XVM-CC-F483	ADHR HTX F483 (PSW) XVM FAILS TO OPEN
	1.00E-2		ADS-XHE-XM-MDEPR	OPERATOR FAILS TO DEPRESSURIZE THE REACTOR
	6.82E-3		HCS-MDP-TM-HPCS	HPCI TRAIN IS UNAVAILABLE BECAUSE OF MAINTENANCE
	1.00E-1		RHR-MDP-FR-PUMPB	RHR PUMP B FAILS TO RUN
	1.00E-2		SD-XHE-XD-LOIM4	FAIL TO DIAGNOSE LOI (OC) BEFORE SDC ISOLTATION ON LOW LEVEL - MODE 4
	5.00E-1		SD-XHE-XR-SDC-12H	FAIL TO RECOVER SDC LATE - 12 HRS
9	7.47E-9	2.63	SD-M4E-LOIOC : 17	
	2.70E-1		SD-M4E-LOIOC	LOSS OF INVENTORY OUTSIDE CONTAINMENT- M4
	1.00E+0		ADH-XVM-CC-F483	ADHR HTX F483 (PSW) XVM FAILS TO OPEN
	1.00E-2		SD-XHE-XD-LOIM4	FAIL TO DIAGNOSE LOI (OC) BEFORE SDC ISOLTATION ON LOW LEVEL - MODE 4
	1.10E-3		SD-XHE-XM-VENT	OPERATOR FAILURE TO VENT CONTAINMENT
	1.90E-1		SD-XHE-XR-SDC-3D	FAIL TO RECOVER SDC LATE - 3D
	1.32E-2		SSW-MDP-TM-PUMPB	SSW PUMP B IS UNAVAILABLE BECAUSE OF MAINTENANCE
10	7.22E-9	2.54	SD-M4E-LOIOC : 17	
	2.70E-1		SD-M4E-LOIOC	LOSS OF INVENTORY OUTSIDE CONTAINMENT- M4
	1.00E+0		ADH-XVM-CC-F483	ADHR HTX F483 (PSW) XVM FAILS TO OPEN
	1.41E-5		DCP-BAT-LP-BATTB	DIVISION II BATTERIES FAIL

#	Prob/Freq	Total%	Cut Set	Description
	1.00E-2		SD-XHE-XD-LOIM4	FAIL TO DIAGNOSE LOI (OC) BEFORE SDC ISOLTATION ON LOW LEVEL - MODE 4
	1.90E-1		SD-XHE-XR-SDC-3D	FAIL TO RECOVER SDC LATE - 3D
11	4.05E-9	1.42	SD-M4E-LOIOC : 28	
	2.70E-1		SD-M4E-LOIOC	LOSS OF INVENTORY OUTSIDE CONTAINMENT- M4
	1.00E+0		ADH-XVM-CC-F483	ADHR HTX F483 (PSW) XVM FAILS TO OPEN
	1.00E-2		ADS-XHE-XM-MDEPR	OPERATOR FAILS TO DEPRESSURIZE THE REACTOR
	3.00E-3		HCS-MOV-FT-SUCTR	HPCS SUCTION TRANSFER FAILS
	1.00E-1		RHR-MDP-FR-PUMPB	RHR PUMP B FAILS TO RUN
	1.00E-2		SD-XHE-XD-LOIM4	FAIL TO DIAGNOSE LOI (OC) BEFORE SDC ISOLTATION ON LOW LEVEL - MODE 4
	5.00E-1		SD-XHE-XR-SDC-12H	FAIL TO RECOVER SDC LATE - 12 HRS
12	3.23E-9	1.14	SD-M4E-LOIOC : 17	
	2.70E-1		SD-M4E-LOIOC	LOSS OF INVENTORY OUTSIDE CONTAINMENT- M4
	1.00E+0		ADH-XVM-CC-F483	ADHR HTX F483 (PSW) XVM FAILS TO OPEN
	9.51E-4		CVS-AOV-CC-AV35	VENT VALVE FAILS TO OPEN
	1.00E-2		SD-XHE-XD-LOIM4	FAIL TO DIAGNOSE LOI (OC) BEFORE SDC ISOLTATION ON LOW LEVEL - MODE 4
	5.00E-1		SD-XHE-XM-CVS	OPERATOR FAILS TO OPEN CVS VALVE MANUALLY
	1.90E-1		SD-XHE-XR-SDC-3D	FAIL TO RECOVER SDC LATE - 3D
	1.32E-2		SSW-MDP-TM-PUMPB	SSW PUMP B IS UNAVAILABLE BECAUSE OF MAINTENANCE
13	3.23E-9	1.14	SD-M4E-LOIOC : 17	
	2.70E-1		SD-M4E-LOIOC	LOSS OF INVENTORY OUTSIDE CONTAINMENT- M4
	1.00E+0		ADH-XVM-CC-F483	ADHR HTX F483 (PSW) XVM FAILS TO OPEN
	9.51E-4		CVS-AOV-CC-AV34	VENT VALVE FAILS TO OPEN
	1.00E-2		SD-XHE-XD-LOIM4	FAIL TO DIAGNOSE LOI (OC) BEFORE SDC ISOLTATION ON LOW LEVEL - MODE 4
	5.00E-1		SD-XHE-XM-CVS	OPERATOR FAILS TO OPEN CVS VALVE MANUALLY

#	Prob/Freq	Total%	Cut Set	Description
	1.90E-1		SD-XHE-XR-SDC-3D	FAIL TO RECOVER SDC LATE - 3D
	1.32E-2		SSW-MDP-TM-PUMPB	SSW PUMP B IS UNAVAILABLE BECAUSE OF MAINTENANCE
14	3.23E-9	1.14	SD-M4E-LOIOC : 17	
	2.70E-1		SD-M4E-LOIOC	LOSS OF INVENTORY OUTSIDE CONTAINMENT- M4
	1.00E+0		ADH-XVM-CC-F483	ADHR HTX F483 (PSW) XVM FAILS TO OPEN
	9.51E-4		CVS-AOV-CC-AV37	VENT VALVE FAILS TO OPEN
	1.00E-2		SD-XHE-XD-LOIM4	FAIL TO DIAGNOSE LOI (OC) BEFORE SDC ISOLTATION ON LOW LEVEL - MODE 4
	5.00E-1		SD-XHE-XM-CVS	OPERATOR FAILS TO OPEN CVS VALVE MANUALLY
	1.90E-1		SD-XHE-XR-SDC-3D	FAIL TO RECOVER SDC LATE - 3D
	1.32E-2		SSW-MDP-TM-PUMPB	SSW PUMP B IS UNAVAILABLE BECAUSE OF MAINTENANCE
15	3.23E-9	1.14	SD-M4E-LOIOC : 17	
	2.70E-1		SD-M4E-LOIOC	LOSS OF INVENTORY OUTSIDE CONTAINMENT- M4
	1.00E+0		ADH-XVM-CC-F483	ADHR HTX F483 (PSW) XVM FAILS TO OPEN
	9.51E-4		CVS-AOV-CC-AV36	VENT VALVE FAILS TO OPEN
	1.00E-2		SD-XHE-XD-LOIM4	FAIL TO DIAGNOSE LOI (OC) BEFORE SDC ISOLTATION ON LOW LEVEL - MODE 4
	5.00E-1		SD-XHE-XM-CVS	OPERATOR FAILS TO OPEN CVS VALVE MANUALLY
	1.90E-1		SD-XHE-XR-SDC-3D	FAIL TO RECOVER SDC LATE - 3D
	1.32E-2		SSW-MDP-TM-PUMPB	SSW PUMP B IS UNAVAILABLE BECAUSE OF MAINTENANCE
16	2.89E-9	1.02	SD-M4E-LOIOC : 17	
	2.70E-1		SD-M4E-LOIOC	LOSS OF INVENTORY OUTSIDE CONTAINMENT- M4
	1.00E+0		ADH-XVM-CC-F483	ADHR HTX F483 (PSW) XVM FAILS TO OPEN
	5.64E-6		DCP-BDC-LP-DII	DIVISION II 125VDC BUS FAILS
	1.00E-2		SD-XHE-XD-LOIM4	FAIL TO DIAGNOSE LOI (OC) BEFORE SDC ISOLTATION ON LOW LEVEL - MODE 4
	1.90E-1		SD-XHE-XR-SDC-3D	FAIL TO RECOVER SDC LATE - 3D

Table 2: LOSDC Event Tree Cut Sets for Case 1
(NOTE: Cut set sequence numbers do not match Figures 3 and 4)

#	Prob/Freq	Total%	Cut Set	Description
1	2.86E-5	17.44	SD-M4E-LOSDC : 06	
	1.37E+0		SD-M4E-LOSDC	LOSS OF SHUTDOWN COOLING - M4E
	1.00E+0		ADH-XVM-CC-F483	ADHR HTX F483 (PSW) XVM FAILS TO OPEN
	1.00E-1		RHR-MDP-FR-PUMPB	RHR PUMP B FAILS TO RUN
	1.10E-3		SD-XHE-XM-VENT	OPERATOR FAILURE TO VENT CONTAINMENT
	1.90E-1		SD-XHE-XR-SDC-3D	FAIL TO RECOVER SDC LATE - 3D
2	1.36E-5	8.29	SD-M4E-LOSDC : 25	
	1.37E+0		SD-M4E-LOSDC	LOSS OF SHUTDOWN COOLING - M4E
	1.00E+0		ADH-XVM-CC-F483	ADHR HTX F483 (PSW) XVM FAILS TO OPEN
	1.00E-2		ADS-XHE-XM-MDEPR	OPERATOR FAILS TO DEPRESSURIZE THE REACTOR
	1.00E-1		RHR-MDP-FR-PUMPB	RHR PUMP B FAILS TO RUN
	7.50E-1		SD-XHE-XR-SDC-6H	FAIL TO RECOVER SDC LATE - 6 HRS
	1.32E-2		SSW-MDP-TM-PUMPC	SSW PUMP C IS UNAVAILABLE BECAUSE OF MAINTENANCE
3	1.24E-5	7.54	SD-M4E-LOSDC : 06	
	1.37E+0		SD-M4E-LOSDC	LOSS OF SHUTDOWN COOLING - M4E
	1.00E+0		ADH-XVM-CC-F483	ADHR HTX F483 (PSW) XVM FAILS TO OPEN
	9.51E-4		CVS-AOV-CC-AV35	VENT VALVE FAILS TO OPEN
	1.00E-1		RHR-MDP-FR-PUMPB	RHR PUMP B FAILS TO RUN
	5.00E-1		SD-XHE-XM-CVS	OPERATOR FAILS TO OPEN CVS VALVE MANUALLY
	1.90E-1		SD-XHE-XR-SDC-3D	FAIL TO RECOVER SDC LATE - 3D
4	1.24E-5	7.54	SD-M4E-LOSDC : 06	
	1.37E+0		SD-M4E-LOSDC	LOSS OF SHUTDOWN COOLING - M4E
	1.00E+0		ADH-XVM-CC-F483	ADHR HTX F483 (PSW) XVM FAILS TO OPEN
	9.51E-4		CVS-AOV-CC-AV34	VENT VALVE FAILS TO OPEN
	1.00E-1		RHR-MDP-FR-PUMPB	RHR PUMP B FAILS TO RUN
	5.00E-1		SD-XHE-XM-CVS	OPERATOR FAILS TO OPEN CVS VALVE MANUALLY
	1.90E-1		SD-XHE-XR-SDC-3D	FAIL TO RECOVER SDC LATE - 3D
5	1.24E-5	7.54	SD-M4E-LOSDC : 06	

#	Prob/Freq	Total%	Cut Set	Description
	1.37E+0		SD-M4E-LOSDC	LOSS OF SHUTDOWN COOLING - M4E
	1.00E+0		ADH-XVM-CC-F483	ADHR HTX F483 (PSW) XVM FAILS TO OPEN
	9.51E-4		CVS-AOV-CC-AV37	VENT VALVE FAILS TO OPEN
	1.00E-1		RHR-MDP-FR-PUMPB	RHR PUMP B FAILS TO RUN
	5.00E-1		SD-XHE-XM-CVS	OPERATOR FAILS TO OPEN CVS VALVE MANUALLY
	1.90E-1		SD-XHE-XR-SDC-3D	FAIL TO RECOVER SDC LATE - 3D
6	1.24E-5	7.54	SD-M4E-LOSDC : 06	
	1.37E+0		SD-M4E-LOSDC	LOSS OF SHUTDOWN COOLING - M4E
	1.00E+0		ADH-XVM-CC-F483	ADHR HTX F483 (PSW) XVM FAILS TO OPEN
	9.51E-4		CVS-AOV-CC-AV36	VENT VALVE FAILS TO OPEN
	1.00E-1		RHR-MDP-FR-PUMPB	RHR PUMP B FAILS TO RUN
	5.00E-1		SD-XHE-XM-CVS	OPERATOR FAILS TO OPEN CVS VALVE MANUALLY
	1.90E-1		SD-XHE-XR-SDC-3D	FAIL TO RECOVER SDC LATE - 3D
7	8.67E-6	5.28	SD-M4E-LOSDC : 06	
	1.37E+0		SD-M4E-LOSDC	LOSS OF SHUTDOWN COOLING - M4E
	3.33E-5		ACP-BAC-LP-DII	4160 V BUS 16AB HARDWARE FAILURES
	1.00E+0		ADH-XVM-CC-F483	ADHR HTX F483 (PSW) XVM FAILS TO OPEN
	1.90E-1		SD-XHE-XR-SDC-3D	FAIL TO RECOVER SDC LATE - 3D
8	7.01E-6	4.27	SD-M4E-LOSDC : 25	
	1.37E+0		SD-M4E-LOSDC	LOSS OF SHUTDOWN COOLING - M4E
	1.00E+0		ADH-XVM-CC-F483	ADHR HTX F483 (PSW) XVM FAILS TO OPEN
	1.00E-2		ADS-XHE-XM-MDEPR	OPERATOR FAILS TO DEPRESSURIZE THE REACTOR
	6.82E-3		HCS-MDP-TM-HPCS	HPCI TRAIN IS UNAVAILABLE BECAUSE OF MAINTENANCE
	1.00E-1		RHR-MDP-FR-PUMPB	RHR PUMP B FAILS TO RUN
	7.50E-1		SD-XHE-XR-SDC-6H	FAIL TO RECOVER SDC LATE - 6 HRS
9	3.79E-6	2.31	SD-M4E-LOSDC : 06	
	1.37E+0		SD-M4E-LOSDC	LOSS OF SHUTDOWN COOLING - M4E
	1.00E+0		ADH-XVM-CC-F483	ADHR HTX F483 (PSW) XVM FAILS TO OPEN
	1.10E-3		SD-XHE-XM-VENT	OPERATOR FAILURE TO VENT CONTAINMENT
	1.90E-1		SD-XHE-XR-SDC-3D	FAIL TO RECOVER SDC LATE - 3D

#	Prob/Freq	Total%	Cut Set	Description
	1.32E-2		SSW-MDP-TM-PUMPB	SSW PUMP B IS UNAVAILABLE BECAUSE OF MAINTENANCE
10	3.66E-6	2.23	SD-M4E-LOSDC : 06	
	1.37E+0		SD-M4E-LOSDC	LOSS OF SHUTDOWN COOLING - M4E
	1.00E+0		ADH-XVM-CC-F483	ADHR HTX F483 (PSW) XVM FAILS TO OPEN
	1.41E-5		DCP-BAT-LP-BATTB	DIVISION II BATTERIES FAIL
	1.90E-1		SD-XHE-XR-SDC-3D	FAIL TO RECOVER SDC LATE - 3D
11	3.08E-6	1.88	SD-M4E-LOSDC : 25	
	1.37E+0		SD-M4E-LOSDC	LOSS OF SHUTDOWN COOLING - M4E
	1.00E+0		ADH-XVM-CC-F483	ADHR HTX F483 (PSW) XVM FAILS TO OPEN
	1.00E-2		ADS-XHE-XM-MDEPR	OPERATOR FAILS TO DEPRESSURIZE THE REACTOR
	3.00E-3		HCS-MOV-FT-SUCTR	HPCS SUCTION TRANSFER FAILS
	1.00E-1		RHR-MDP-FR-PUMPB	RHR PUMP B FAILS TO RUN
	7.50E-1		SD-XHE-XR-SDC-6H	FAIL TO RECOVER SDC LATE - 6 HRS
12	2.86E-6	1.74	SD-M4E-LOSDC : 31	
	1.37E+0		SD-M4E-LOSDC	LOSS OF SHUTDOWN COOLING - M4E
	1.00E+0		ADH-XVM-CC-F483	ADHR HTX F483 (PSW) XVM FAILS TO OPEN
	1.00E-2		SD-XHE-XD-SDC-NOM	FAIL TO DIAGNOSE LOSDC BEFORE SDC ISOLATION ON HI PRESSURE - NOMINAL TIME
	1.10E-3		SD-XHE-XM-VENT	OPERATOR FAILURE TO VENT CONTAINMENT
	1.90E-1		SD-XHE-XR-SDC-3D	FAIL TO RECOVER SDC LATE - 3D
13	1.64E-6	1.00	SD-M4E-LOSDC : 06	
	1.37E+0		SD-M4E-LOSDC	LOSS OF SHUTDOWN COOLING - M4E
	1.00E+0		ADH-XVM-CC-F483	ADHR HTX F483 (PSW) XVM FAILS TO OPEN
	9.51E-4		CVS-AOV-CC-AV36	VENT VALVE FAILS TO OPEN
	5.00E-1		SD-XHE-XM-CVS	OPERATOR FAILS TO OPEN CVS VALVE MANUALLY
	1.90E-1		SD-XHE-XR-SDC-3D	FAIL TO RECOVER SDC LATE - 3D
	1.32E-2		SSW-MDP-TM-PUMPB	SSW PUMP B IS UNAVAILABLE BECAUSE OF MAINTENANCE
14	1.64E-6	1.00	SD-M4E-LOSDC : 06	
	1.37E+0		SD-M4E-LOSDC	LOSS OF SHUTDOWN COOLING - M4E

#	Prob/Freq	Total%	Cut Set	Description
	1.00E+0		ADH-XVM-CC-F483	ADHR HTX F483 (PSW) XVM FAILS TO OPEN
	9.51E-4		CVS-AOV-CC-AV34	VENT VALVE FAILS TO OPEN
	5.00E-1		SD-XHE-XM-CVS	OPERATOR FAILS TO OPEN CVS VALVE MANUALLY
	1.90E-1		SD-XHE-XR-SDC-3D	FAIL TO RECOVER SDC LATE - 3D
	1.32E-2		SSW-MDP-TM-PUMPB	SSW PUMP B IS UNAVAILABLE BECAUSE OF MAINTENANCE
15	1.64E-6	1.00	SD-M4E-LOSDC : 06	
	1.37E+0		SD-M4E-LOSDC	LOSS OF SHUTDOWN COOLING - M4E
	1.00E+0		ADH-XVM-CC-F483	ADHR HTX F483 (PSW) XVM FAILS TO OPEN
	9.51E-4		CVS-AOV-CC-AV37	VENT VALVE FAILS TO OPEN
	5.00E-1		SD-XHE-XM-CVS	OPERATOR FAILS TO OPEN CVS VALVE MANUALLY
	1.90E-1		SD-XHE-XR-SDC-3D	FAIL TO RECOVER SDC LATE - 3D
	1.32E-2		SSW-MDP-TM-PUMPB	SSW PUMP B IS UNAVAILABLE BECAUSE OF MAINTENANCE
16	1.64E-6	1.00	SD-M4E-LOSDC : 06	
	1.37E+0		SD-M4E-LOSDC	LOSS OF SHUTDOWN COOLING - M4E
	1.00E+0		ADH-XVM-CC-F483	ADHR HTX F483 (PSW) XVM FAILS TO OPEN
	9.51E-4		CVS-AOV-CC-AV35	VENT VALVE FAILS TO OPEN
	5.00E-1		SD-XHE-XM-CVS	OPERATOR FAILS TO OPEN CVS VALVE MANUALLY
	1.90E-1		SD-XHE-XR-SDC-3D	FAIL TO RECOVER SDC LATE - 3D
	1.32E-2		SSW-MDP-TM-PUMPB	SSW PUMP B IS UNAVAILABLE BECAUSE OF MAINTENANCE

Table 2: LOSDC Event Tree Cut Sets for Case 2

#	Prob/Freq	Total%	Cut Set	Description
1	1.36E-6	10.87	SD-M4E-LOSDC : 29	
	1.37E+0		SD-M4E-LOSDC	LOSS OF SHUTDOWN COOLING - M4E
	1.00E+0		ADH-XVM-CC-F483	ADHR HTX F483 (PSW) XVM FAILS TO OPEN
	1.00E-3		ADS-XHE-XM-MDEPR	OPERATOR FAILS TO DEPRESSURIZE THE REACTOR
	1.00E-1		RHR-MDP-FR-PUMPB	RHR PUMP B FAILS TO RUN
	7.50E-1		SD-XHE-XR-SDC-6H	FAIL TO RECOVER SDC LATE - 6 HRS
	1.32E-2		SSW-MDP-TM-PUMPC	SSW PUMP C IS UNAVAILABLE BECAUSE OF MAINTENANCE
2	1.36E-6	10.87	SD-M4E-LOSDC : 29	
	1.37E+0		SD-M4E-LOSDC	LOSS OF SHUTDOWN COOLING - M4E
	1.00E-4		SD-XHE-XM-REPLC1	MULTIPLE OPERATOR FAILURES < 1.E-06 - 5.0E-07
	7.50E-1		SD-XHE-XR-SDC-6H	FAIL TO RECOVER SDC LATE - 6 HRS
	1.32E-2		SSW-MDP-TM-PUMPC	SSW PUMP C IS UNAVAILABLE BECAUSE OF MAINTENANCE
	1.00E+0		XADS-XHE-XM-MDEPR	OPERATOR FAILS TO DEPRESSURIZE THE REACTOR
	1.00E+0		XSD-XHE-XM-RHR-NOM	Fails to establish SDC/SPC cooling (> 2 hours)
3	1.14E-6	9.10	SD-M4E-LOSDC : 07	
	1.37E+0		SD-M4E-LOSDC	LOSS OF SHUTDOWN COOLING - M4E
	1.00E+0		ADH-XVM-CC-F483	ADHR HTX F483 (PSW) XVM FAILS TO OPEN
	3.98E-2		HPCS-SP-SURVIVE	HPCS is Available and Survives Containment Failure
	1.00E-1		RHR-MDP-FR-PUMPB	RHR PUMP B FAILS TO RUN
	1.10E-3		SD-XHE-XM-VENT	OPERATOR FAILURE TO VENT CONTAINMENT
	1.90E-1		SD-XHE-XR-SDC-3D	FAIL TO RECOVER SDC LATE - 3D
4	7.01E-7	5.60	SD-M4E-LOSDC : 29	
	1.37E+0		SD-M4E-LOSDC	LOSS OF SHUTDOWN COOLING - M4E
	6.82E-3		HCS-MDP-TM-HPCS	HPCI TRAIN IS UNAVAILABLE BECAUSE OF MAINTENANCE
	1.00E-4		SD-XHE-XM-REPLC1	MULTIPLE OPERATOR FAILURES < 1.E-06 - 5.0E-07

#	Prob/Freq	Total%	Cut Set	Description
	7.50E-1		SD-XHE-XR-SDC-6H	FAIL TO RECOVER SDC LATE - 6 HRS
	1.00E+0		XADS-XHE-XM-MDEPR	OPERATOR FAILS TO DEPRESSURIZE THE REACTOR
	1.00E+0		XSD-XHE-XM-RHR-NOM	Fails to establish SDC/SPC cooling (> 2 hours)
5	7.01E-7	5.60	SD-M4E-LOSDC : 29	
	1.37E+0		SD-M4E-LOSDC	LOSS OF SHUTDOWN COOLING - M4E
	1.00E+0		ADH-XVM-CC-F483	ADHR HTX F483 (PSW) XVM FAILS TO OPEN
	1.00E-3		ADS-XHE-XM-MDEPR	OPERATOR FAILS TO DEPRESSURIZE THE REACTOR
	6.82E-3		HCS-MDP-TM-HPCS	HPCI TRAIN IS UNAVAILABLE BECAUSE OF MAINTENANCE
	1.00E-1		RHR-MDP-FR-PUMPB	RHR PUMP B FAILS TO RUN
	7.50E-1		SD-XHE-XR-SDC-6H	FAIL TO RECOVER SDC LATE - 6 HRS
6	4.93E-7	3.94	SD-M4E-LOSDC : 07	
	1.37E+0		SD-M4E-LOSDC	LOSS OF SHUTDOWN COOLING - M4E
	1.00E+0		ADH-XVM-CC-F483	ADHR HTX F483 (PSW) XVM FAILS TO OPEN
	9.51E-4		CVS-AOV-CC-AV37	VENT VALVE FAILS TO OPEN
	3.98E-2		HPCS-SP-SURVIVE	HPCS is Available and Survives Containment Failure
	1.00E-1		RHR-MDP-FR-PUMPB	RHR PUMP B FAILS TO RUN
	5.00E-1		SD-XHE-XM-CVS	OPERATOR FAILS TO OPEN CVS VALVE MANUALLY
	1.90E-1		SD-XHE-XR-SDC-3D	FAIL TO RECOVER SDC LATE - 3D
7	4.93E-7	3.94	SD-M4E-LOSDC : 07	
	1.37E+0		SD-M4E-LOSDC	LOSS OF SHUTDOWN COOLING - M4E
	1.00E+0		ADH-XVM-CC-F483	ADHR HTX F483 (PSW) XVM FAILS TO OPEN
	9.51E-4		CVS-AOV-CC-AV34	VENT VALVE FAILS TO OPEN
	3.98E-2		HPCS-SP-SURVIVE	HPCS is Available and Survives Containment Failure
	1.00E-1		RHR-MDP-FR-PUMPB	RHR PUMP B FAILS TO RUN
	5.00E-1		SD-XHE-XM-CVS	OPERATOR FAILS TO OPEN CVS VALVE MANUALLY
	1.90E-1		SD-XHE-XR-SDC-3D	FAIL TO RECOVER SDC LATE - 3D
8	4.93E-7	3.94	SD-M4E-LOSDC : 07	

#	Prob/Freq	Total%	Cut Set	Description
	1.37E+0		SD-M4E-LOSDC	LOSS OF SHUTDOWN COOLING - M4E
	1.00E+0		ADH-XVM-CC-F483	ADHR HTX F483 (PSW) XVM FAILS TO OPEN
	9.51E-4		CVS-AOV-CC-AV36	VENT VALVE FAILS TO OPEN
	3.98E-2		HPCS-SP-SURVIVE	HPCS is Available and Survives Containment Failure
	1.00E-1		RHR-MDP-FR-PUMPB	RHR PUMP B FAILS TO RUN
	5.00E-1		SD-XHE-XM-CVS	OPERATOR FAILS TO OPEN CVS VALVE MANUALLY
	1.90E-1		SD-XHE-XR-SDC-3D	FAIL TO RECOVER SDC LATE - 3D
9	4.93E-7	3.94	SD-M4E-LOSDC : 07	
	1.37E+0		SD-M4E-LOSDC	LOSS OF SHUTDOWN COOLING - M4E
	1.00E+0		ADH-XVM-CC-F483	ADHR HTX F483 (PSW) XVM FAILS TO OPEN
	9.51E-4		CVS-AOV-CC-AV35	VENT VALVE FAILS TO OPEN
	3.98E-2		HPCS-SP-SURVIVE	HPCS is Available and Survives Containment Failure
	1.00E-1		RHR-MDP-FR-PUMPB	RHR PUMP B FAILS TO RUN
	5.00E-1		SD-XHE-XM-CVS	OPERATOR FAILS TO OPEN CVS VALVE MANUALLY
	1.90E-1		SD-XHE-XR-SDC-3D	FAIL TO RECOVER SDC LATE - 3D
10	3.45E-7	2.76	SD-M4E-LOSDC : 07	
	1.37E+0		SD-M4E-LOSDC	LOSS OF SHUTDOWN COOLING - M4E
	3.33E-5		ACP-BAC-LP-DII	4160 V BUS 16AB HARDWARE FAILURES
	1.00E+0		ADH-XVM-CC-F483	ADHR HTX F483 (PSW) XVM FAILS TO OPEN
	3.98E-2		HPCS-SP-SURVIVE	HPCS is Available and Survives Containment Failure
	1.90E-1		SD-XHE-XR-SDC-3D	FAIL TO RECOVER SDC LATE - 3D
11	3.08E-7	2.46	SD-M4E-LOSDC : 29	
	1.37E+0		SD-M4E-LOSDC	LOSS OF SHUTDOWN COOLING - M4E
	1.00E+0		ADH-XVM-CC-F483	ADHR HTX F483 (PSW) XVM FAILS TO OPEN
	1.00E-3		ADS-XHE-XM-MDEPR	OPERATOR FAILS TO DEPRESSURIZE THE REACTOR
	3.00E-3		HCS-MOV-FT-SUCTR	HPCS SUCTION TRANSFER FAILS
	1.00E-1		RHR-MDP-FR-PUMPB	RHR PUMP B FAILS TO RUN

#	Prob/Freq	Total%	Cut Set	Description
	7.50E-1		SD-XHE-XR-SDC-6H	FAIL TO RECOVER SDC LATE - 6 HRS
12	3.08E-7	2.46	SD-M4E-LOSDC : 29	
	1.37E+0		SD-M4E-LOSDC	LOSS OF SHUTDOWN COOLING - M4E
	3.00E-3		HCS-MOV-FT-SUCTR	HPCS SUCTION TRANSFER FAILS
	1.00E-4		SD-XHE-XM-REPLC1	MULTIPLE OPERATOR FAILURES < 1.E-06 - 5.0E-07
	7.50E-1		SD-XHE-XR-SDC-6H	FAIL TO RECOVER SDC LATE - 6 HRS
	1.00E+0		XADS-XHE-XM-MDEPR	OPERATOR FAILS TO DEPRESSURIZE THE REACTOR
	1.00E+0		XSD-XHE-XM-RHR-NOM	Fails to establish SDC/SPC cooling (> 2 hours)
13	1.51E-7	1.21	SD-M4E-LOSDC : 07	
	1.37E+0		SD-M4E-LOSDC	LOSS OF SHUTDOWN COOLING - M4E
	1.00E+0		ADH-XVM-CC-F483	ADHR HTX F483 (PSW) XVM FAILS TO OPEN
	3.98E-2		HPCS-SP-SURVIVE	HPCS is Available and Survives Containment Failure
	1.10E-3		SD-XHE-XM-VENT	OPERATOR FAILURE TO VENT CONTAINMENT
	1.90E-1		SD-XHE-XR-SDC-3D	FAIL TO RECOVER SDC LATE - 3D
	1.32E-2		SSW-MDP-TM-PUMPB	SSW PUMP B IS UNAVAILABLE BECAUSE OF MAINTENANCE
14	1.46E-7	1.16	SD-M4E-LOSDC : 07	
	1.37E+0		SD-M4E-LOSDC	LOSS OF SHUTDOWN COOLING - M4E
	1.00E+0		ADH-XVM-CC-F483	ADHR HTX F483 (PSW) XVM FAILS TO OPEN
	1.41E-5		DCP-BAT-LP-BATTB	DIVISION II BATTERIES FAIL
	3.98E-2		HPCS-SP-SURVIVE	HPCS is Available and Survives Containment Failure
	1.90E-1		SD-XHE-XR-SDC-3D	FAIL TO RECOVER SDC LATE - 3D
15	1.40E-7	1.12	SD-M4E-LOSDC : 29	
	1.37E+0		SD-M4E-LOSDC	LOSS OF SHUTDOWN COOLING - M4E
	1.00E+0		ADH-XVM-CC-F483	ADHR HTX F483 (PSW) XVM FAILS TO OPEN
	1.00E-3		ADS-XHE-XM-MDEPR	OPERATOR FAILS TO DEPRESSURIZE THE REACTOR
	1.00E-1		RHR-MDP-FR-PUMPB	RHR PUMP B FAILS TO RUN
	7.50E-1		SD-XHE-XR-SDC-6H	FAIL TO RECOVER SDC LATE - 6 HRS

#	Prob/Freq	Total%	Cut Set	Description
	1.36E-3		SSW-MDP-FS-PUMPC	SSW PUMP C FAILS TO START
16	1.40E-7	1.12	SD-M4E-LOSDC : 29	
	1.37E+0		SD-M4E-LOSDC	LOSS OF SHUTDOWN COOLING - M4E
	1.00E-4		SD-XHE-XM-REPLC1	MULTIPLE OPERATOR FAILURES < 1.E-06 - 5.0E-07
	7.50E-1		SD-XHE-XR-SDC-6H	FAIL TO RECOVER SDC LATE - 6 HRS
	1.36E-3		SSW-MDP-FS-PUMPC	SSW PUMP C FAILS TO START
	1.00E+0		XADS-XHE-XM-MDEPR	OPERATOR FAILS TO DEPRESSURIZE THE REACTOR
	1.00E+0		XSD-XHE-XM-RHR-NOM	Fails to establish SDC/SPC cooling (> 2 hours)
17	1.36E-7	1.09	SD-M4E-LOSDC : 60	
	1.37E+0		SD-M4E-LOSDC	LOSS OF SHUTDOWN COOLING - M4E
	1.00E-3		ADS-XHE-XM-MDEPR	OPERATOR FAILS TO DEPRESSURIZE THE REACTOR
	1.00E-2		SD-XHE-XD-SDC-NOM	FAIL TO DIAGNOSE LOSDC BEFORE SDC ISOLATION ON HI PRESSURE - NOMINAL TIME
	7.50E-1		SD-XHE-XR-SDC-6H	FAIL TO RECOVER SDC LATE - 6 HRS
	1.32E-2		SSW-MDP-TM-PUMPC	SSW PUMP C IS UNAVAILABLE BECAUSE OF MAINTENANCE



**UNITED STATES
NUCLEAR REGULATORY COMMISSION**

REGION IV
1600 E. LAMAR BLVD.
ARLINGTON, TX 76011-4511

October 20, 2016

MEMORANDUM TO: Mark Haire, Chief
Plant Support Branch 1
Division of Reactor Safety

FROM: Troy Pruett, Director
Division of Reactor Projects

SUBJECT: SPECIAL INSPECTION CHARTER TO EVALUATE ALTERNATE
DECAY HEAT REMOVAL SYSTEM UNAVAILABILITY AT GRAND
GULF NUCLEAR STATION

In response to the unplanned unavailability of the alternate decay heat removal system during the replacement of a residual heat removal pump, a Special Inspection will be performed. This event revealed weaknesses in the operator fundamentals area associated with configuration control, turnover, risk management, and oversight. You are hereby designated as the Special Inspection team leader. The following members are assigned to your team:

- David Proulx, Senior Project Engineer, Division of Reactor Projects
- Neil Day, Resident Inspector, Division of Reactor Projects

A. Basis

On September 4, 2016, residual heat removal (RHR) train A was declared inoperable due to a failure to meet Technical Specification (TS) Surveillance Requirement (SR) 3.5.1.4 for required pump differential pressure. On September 8, the licensee completed a TS-required shutdown in order to replace the pump. With RHR train A inoperable, TS 3.4.9 and 3.4.10 required that an alternate method of decay heat removal be available in Modes 3 and 4, respectively. The alternate decay heat removal (ADHR) system was identified as the alternate method of decay heat removal to meet the requirements of TS.

On September 23, prior to placing the ADHR system in operation following replacement of the RHR pump, operators discovered that the cooling water supplies to each of the ADHR heat exchangers from the plant service water (PSW) system were danger tagged closed. This configuration had been established on August 10, 2016, to isolate the system for power operations. Following the September 8 shutdown, operators did not properly align the ADHR system for a standby lineup and did not verify that the system was available to meet TS requirements.

Management Directive 8.3, "NRC Incident Investigation Program," was used to evaluate the level of NRC response for this event. In evaluating the criteria of MD 8.3, it was determined that the event involved concerns pertaining to licensee operational performance. Specifically, operators failed to recognize that the designated alternate method of decay heat removal was unavailable for a period of 14 days while operating in

Mode 4. Licensed operators did not identify the system misalignment that caused the ADHR system to be unavailable until September 23. The preliminary Estimated Conditional Core Damage Probability was determined to be 9.8×10^{-6} .

Based on the deterministic criteria and risk insights related to the unavailability of the ADHR system, Region IV management determined that the appropriate level of NRC response was to conduct a Special Inspection. This Special Inspection is chartered to identify the circumstances surrounding the ADHR event and review the licensee's actions to address the causes of the event.

Additional Operator Performance Concerns

On September 24, 2016, an operational performance issue occurred due to a plant configuration control issue. Prior to opening a main feedwater isolation valve, licensed operators failed to secure long cycle cleanup, resulting in a rapid and unexpected increase in reactor vessel level from 33 inches to 151 inches. The rapid level increase occurred because licensed operators did not understand the controls for the feedwater isolation valve.

On June 17, 2016, a malfunction in the electro-hydraulic control (EHC) system during turbine stop valve testing caused reactor power and pressure oscillations that resulted in an automatic reactor scram. Licensed operators did not recognize that EHC control valve fluctuations were reactivity manipulations, and did not recognize that power oscillations should require termination criteria. Troubleshooting continued for over 40 minutes as power oscillations exceeded 20 percent, which was in excess of the station's 10 percent criteria to scram the reactor for thermal hydraulic instability concerns.

On September 27, 2016, Grand Gulf Nuclear Station plant management notified the NRC of their intent to delay startup of the plant, following the forced outage, to implement corrective actions to assess and resolve the operational performance concerns. The timeline for a plant restart is under review by plant leadership while they determine a path forward.

B. Scope

The inspection is expected to perform data gathering and fact-finding in order to address the following:

1. Provide a recommendation to Region IV management as to whether the inspection should be upgraded to an augmented inspection team response. This recommendation should be provided by the end of the first day on site.
2. Develop a complete sequence of events related to the unavailability of the ADHR system that was discovered on September 23, 2016. The chronology should include plant mode changes as well as the status of plant decay heat removal systems.
3. Review the licensee's root cause analysis efforts and determine if the evaluation is being conducted at a level of detail commensurate with the significance of the problem.

4. Determine the probable causes for the unavailability of the ADHR system during this forced outage.
5. Evaluate the licensee's actions with regard to compliance with applicable technical specification requirements. Specifically, evaluate the licensee's actions to verify that an alternate method of decay heat removal was available, both initially as well as daily, during the time period in question.
6. Review the licensee's cause evaluation efforts for the configuration control event that resulted in a rapid and unexpected increase in reactor vessel level on September 24, 2016, and determine if the evaluation is being conducted at a level of detail commensurate with the significance of the problem.
7. Determine whether there were any deficiencies in operator training that contributed to the ADHR unavailability or feedwater control events.
8. Evaluate the licensee's compliance with, and adequacy of, procedural guidance for performing system alignments, and for performing equipment tag-outs, as it pertains to the cause(s) of these events.
9. Determine whether the licensee's processes for shutdown risk management and plant configuration control were appropriate, including supervisory oversight from operations personnel and the outage control center (OCC).
10. Review actions taken or planned by the licensee to evaluate and develop plans to address gaps in operations performance at the station, as evidenced by recent events discussed in this charter.
11. Review licensee corrective action plan(s) in place prior to recent events in areas of operator fundamentals. Assess whether previous corrective actions in areas that contributed to recent events were appropriate, completed, and/or effective.
12. Determine whether applicable internal or external operating experience involving configuration management of the ADHR system existed, and assess the effectiveness of any action(s) taken by the licensee in response to any such operating experience.
13. Evaluate the licensee's actions to comply with reporting requirements associated with this event.
14. Collect data necessary to support completion of the significance determination process for any associated finding(s).

C. Guidance

Inspection Procedure 93812, "Special Inspection," provides additional guidance to be used by the Special Inspection Team. Your duties will be as described in Inspection Procedure 93812. The inspection should emphasize fact-finding in its review of the circumstances surrounding the event. It is not the responsibility of the team to examine

the regulatory process. Safety concerns identified that are not directly related to the event should be reported to the Region IV office for appropriate action.

You will formally begin the Special Inspection with an entrance meeting to be conducted no later than October 31, 2016. You should provide a daily briefing to Region IV management during the course of your inspections and prior to your exit meeting. A report documenting the results of the inspection should be issued within 45 days of the completion of the inspection.

This Charter may be modified should you develop significant new information that warrants additional review.

CONTACT: Greg G. Warnick, Chief, DRP Branch C
817-200-1144

From: [Kozak, Laura](#)
To: [Lara, Julio](#)
Subject: brief summary - Clinton
Date: Thursday, May 31, 2018 10:12:00 AM
Attachments: [summary.docx](#)

Here is my brief summary of why we need a special and what it should it be about.

The focus of the inspection should be to better understand the increased shutdown risk condition that existed when no emergency power sources were available for a period of approximately 3.5 days and the reasons why the condition existed. The inspection team will independently assess the sequence of events that led to the plant condition, the planned shutdown safety configuration compared to the actual configuration that existed, and will evaluate the plant's ability to respond and mitigate a loss of offsite power event given the unavailability of both onsite emergency AC power sources.

The MD8.3 risk evaluation determined that the risk of the condition could be greater than very low safety significance ($>1E-6$). If a loss of offsite power had occurred, the plant would have immediately been in a station blackout condition with no decay heat removal. Mitigation of the event would require recovering power or implementing complex operator actions to provide alternative cooling methods before core uncover and damage.

From: [Lara, Julio](#)
To: [Kozak, Laura](#)
Subject: RE: brief summary - Clinton
Date: Thursday, May 31, 2018 12:49:56 PM
Attachments: [image001.png](#)

An add at the end could be "these alternate cooling methods could be xxx"

From: Lara, Julio
Sent: Thursday, May 31, 2018 12:49 PM
To: Kozak, Laura <Laura.Kozak@nrc.gov>
Subject: RE: brief summary - Clinton

As we discussed, I think the yellow test is what is missing from our dialogue – internal and external

The focus of the inspection should be to better understand the increased shutdown risk condition that existed when no emergency power sources were available for a period of approximately 3.5 days and the reasons why the condition existed. The inspection team will independently assess the sequence of events that led to the plant condition, the planned shutdown safety configuration compared to the actual configuration that existed, and will evaluate the plant's ability to respond and mitigate a loss of offsite power event given the unavailability of both onsite emergency AC power sources. ¶

¶

The MD8.3 risk evaluation determined that the risk of the condition could be greater than very low safety significance ($>1E-6$). If a loss of offsite power had occurred, the plant would have immediately been in a station blackout condition with no decay heat removal. Mitigation of the event would require recovering power or implementing complex operator actions to provide alternative cooling methods before core uncover and damage. ¶

From: Kozak, Laura
Sent: Thursday, May 31, 2018 10:13 AM
To: Lara, Julio <Julio.Lara@nrc.gov>
Subject: brief summary - Clinton

Here is my brief summary of why we need a special and what it should be about.

From: [Mitman, Jeffrey](#)
To: [Kozak, Laura](#)
Cc: [Phillips, Charles](#)
Subject: RE: Clinton
Date: Thursday, May 31, 2018 9:48:58 AM

Laura, thanks for the details. I understand the focus of the SIT is on the inspection of the condition.

I look forward to helping in any way I can.

Jeff Mitman

From: Kozak, Laura
Sent: Thursday, May 31, 2018 9:40 AM
To: Mitman, Jeffrey <Jeffrey.Mitman@nrc.gov>
Cc: Phillips, Charles <Charles.Phillips@nrc.gov>
Subject: Clinton

Jeff

For travel to Clinton, the inspection begins onsite June 25. I will not be onsite until June 26 and I will be there through June 28.

Chuck Phillips will be the team leader. I usually stay at the Fairfield Inn in Champaign, IL or the Marriott in Bloomington, IL but I haven't made any reservations yet. There are other hotels in both cities.

Once you complete your site access, let me know and I can make sure a good guy letter is sent so you can get badged at the site and will not have to be escorted.

Chuck and I just discussed that since this is the inspection, not SDP, we are focused on helping the inspectors and developing a good understanding of the plant condition and plant response if a LOOP had occurred during the period of the time that no emergency AC was available.

The team is being formed and a charter is under development. We have not yet informed the licensee that you and I will be onsite assisting the team but will do so in the coming weeks.

Appreciate your support.

Laura

From: [Kozak, Laura](#)
To: [Mitman, Jeffrey](#)
Subject: FW: FW: Info Request - Div 2 DG Starting Air
Date: Tuesday, June 05, 2018 3:35:00 PM

FYI – Some info about equipment status at Clinton

From: Sanchez Santiago, Elba
Sent: Monday, May 21, 2018 8:34 AM
To: Stoedter, Karla <Karla.Stoedter@nrc.gov>; Kozak, Laura <Laura.Kozak@nrc.gov>
Cc: Phillips, Charles <Charles.Phillips@nrc.gov>; Rodriguez, Lionel <Lionel.Rodriguez@nrc.gov>; Sargis, Daniel <Daniel.Sargis@nrc.gov>
Subject: FW: FW: Info Request - Div 2 DG Starting Air

Below are the equipment availability times the licensee put together in response to the Division 2 DG issue. This includes the availability of the fire pumps. At Clinton both fire pumps are diesel driven. I verified via the logs the availability of the fire pumps and reached the same conclusion stated below.

I included some comments (in red) next to some of the statements to clarify some points.

The licensee also included a statement below regarding the ability and time it would take to recover the EDG.

From: Antonelli, Michael K.:(GenCo-Nuc)
Sent: Friday, May 18, 2018 1:15 PM
To: Bonham, Mark J:(GenCo-Nuc) <Mark.Bonham@exeloncorp.com>; Shelton, Dale A:(GenCo-Nuc) <Dale.Shelton@exeloncorp.com>
Subject: RE: Info Request - Div 2 DG Starting Air

Diesel driven fire pump A was non-functional due to low fuel oil until 5/16/18 at 18:00 per our logs. It was capable of operation, but only had 205 gallons (spec is 275 gal minimum). FP-B was functional the whole time and capable of auto start. (The 'A' Fire Pump was declared unavailable on 5/13)

RHR-A and LPCS were unavailable during the 5/14/18 window.

RHR-C and RHR-B were available for LPCI injection (no DG though) during the 5/14 to 5/18 window.

HPCS was declared available on 5/17/18 at 14:47:19 when we ran HPCS in pool to pool mode for testing. It could have injected if required and we would have used it. The div 3 DG and AC/DC/SX systems were OPERABLE during this window. There were windows where HPCS was capable of injecting though, we actually ran it on 5/16/18 at 12:30, and had some CLOC/Leak rate testing after that. Talking to the supervisors running the test, we likely could have recovered from the test and make it injectable within 4 hours if required. (We are gathering supporting information but it is our understanding that during a portion of the repair performed on the HPCS min flow valve, the clearance order put the system in a configuration which would had made it more difficult to recover

the system if needed. We did confirm the date and time the pump was declared available as well as the time the pump was run for a portion of the PMTs are in accordance with what was entered into the logs.)

Div 3 DG could have been cross-tied to div 2 per 4303.01P023, and this would have been possible in less than 4 hours due to available support and electrical maintenance presence. This would allow a single LPCI pump (B/C) to operate, and I would need to review component loading to determine if I could place an emergency service water pump in service for decay heat removal. (We haven't verified there wasn't equipment out of service that could affect the realignment)

Condensate/boost/feedwater were not readily available. They were not filled/vented, and the feedwater isolation valves were shut and had no power due to the div 1 bus outage until the middle of 5/17/18.

Rod drive were available, both pumps capable of injecting.

Reactor water cleanup was available for decay heat removal and SF for decay heat removal using FC heat exchangers available, but no DG to support.

The estimated DRAIN TIME of the RPV was 10.2 hours (50 gpm) based on makeup/letdown rates assuming no isolation valves close due to a LOOP event. This was entirely due to letdown. There are no known pressure boundary leaks of the RPV. The drain time and rate were based on 3006.01P001 Table 1 assuming water level is at +35 inches at the time of the LOOP (actual level was between 85-100" Shutdown range).

For mitigation: 4306.01P017 is for establishing FLEX capabilities during an outage. The quickest success path would be using the FLEX DG to energize the SF pump, and use portable hoses to align SF for LPCI/LPCS injection. The FLEX pump could be directly aligned for LPCS/LPCI injection as well. The timeline per 4306.01 assuming minimum staffing is 6 hours (this includes a 1 hour evaluation period for the shift to determine if an ELAP exists). Realistically, based on available outage resources, I believe this would be closer to 4-5 hours as you have more bodies to move hoses/cables/etc, and we would have the resources to pursue FLEX in parallel with recovering the div 2 DG. The 6 hour FLEX timeline is based on minimum staffing and includes the 1 hour evaluation time which may be waived as the FLEX procedure allows pre-staging equipment at any time.

For the div 2 DG: The DG would get a start signal and then trip due to the overcrank relay. We would get a Div 2 DG trouble alarm and send an operator to the room who should see alarm 5285-3D. Seeing the overcrank alarm directs the operators to verify the DG is ready to start per 3506.01, and we would be looking at support system lineups. I would expect an operator to identify the air receivers isolated within an hour with the procedure in hand. There's a potential that the main control room operators would insert a div 2 LOCA signal to override the diesel trips and try to restart it. If they did, the overcrank trip would still occur as it is not bypassed by the LOCA signal, but it would let the control room know that the trip was likely a fail to start. There's a potential the control room may direct 4303.01P024 to attempt to start the DG manually without control power. This would not be successful with air isolated, but it would allow the DG to restart even if control power was later lost.

The required actions to get the DG started are to place the DG switch to lockout and reset the lockout relays, perform the necessary portions of 3506.01P002 to place the DG air start system in standby, then take the DG maintenance switch to OPERATE, which would auto start/load the DG. All field actions, and all directed by 3506.01P002 section for placing the DG in standby. It is reasonable in my opinion, that this could be completed in under 4 hours (less than time to boil and DRAIN TIME).

Mike Antonelli

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From: [Stoedter, Karla](#)
To: [Lara, Julio](#); [Louden, Patrick](#)
Subject: Clinton SIT
Date: Wednesday, June 06, 2018 3:39:53 PM

I talked with Brad Kapellas today while I'm at the site. He let me know that he now believes the root cause team may be done with their activities by the end of next week and be in the writing mode when Chuck goes to the site on the 20th. Don't know if that makes a difference to folks, but I wanted to make sure you were aware.

Karla

From: [Stoedter, Karla](#)
To: [Werner, Greg](#)
Cc: [Bowen, Jeremy](#)
Subject: Clinton SIT start date
Date: Wednesday, June 13, 2018 12:40:00 PM

Hi Greg,

I received your voice mail about the Clinton SIT start date. The date on the letter is correct. The team leader is going to the site for two days next week to meet with members of the licensee's root cause team while they are at the site. The full team will travel to the site on June 25 to complete the remainder of the inspection.

Please let me know if you have additional questions,

Karla

From: [Stoedter, Karla](#)
To: [Shelton, Dale A:\(GenCo-Nuc\)](#)
Cc: [Phillips, Charles](#); [Sanchez Santiago, Elba](#); [Sargis, Daniel](#)
Subject: RE: Clinton SIT logistics
Date: Thursday, June 14, 2018 5:35:00 AM

Dale,

Chuck is still planning on coming to the site next Wednesday and Thursday. As I discussed with Brad, we will do a short entrance (covering the area(s) Chuck plans to inspect) the two days he is here. Brad asked for the entrance to be late in the day on Wednesday to allow station management to participate by phone or in person. We plan to perform another entrance with the full team on June 25th. Pat Loudon will also be in attendance on June 25th and would like to speak with Brad and/or Ted following the entrance and your planned presentation.

I will be out of the office beginning tomorrow through July 4th. If you need anything, please contact Chuck Phillips at 630-829-9572 or Ken Riemer (who is acting for me) at 630-829-9628.

Thanks,
Karla

From: Shelton, Dale A:(GenCo-Nuc) [mailto:Dale.Shelton@exeloncorp.com]

Sent: Wednesday, June 13, 2018 1:25 PM

To: Stoedter, Karla <Karla.Stoedter@nrc.gov>

Subject: [External_Sender] Clinton SIT logistics

Karla, I just wanted to check in regarding plans for the SIT entrance meeting. I know there had been discussions regarding whether Chuck will be down 6/20 and 21 and whether you will still be wanting to conduct an entrance at that time. I know that you were out to the station last week and had the opportunity to observe some of the Root Cause team activities. As you are aware, Ted, Brad and the Senior OPS and Training teams will be offsite at that time and I just wanted to close the loop with you.

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From: [Stoedter, Karla](#)
To: [Phillips, Charles](#); [Shelton, Dale A:\(GenCo-Nuc\)](#)
Cc: [Santos, Nicholas A:\(GenCo-Nuc\)](#)
Subject: RE: Re: [EXTERNAL] RE: Clinton SIT logistics
Date: Thursday, June 14, 2018 7:38:00 AM

I spoke with Brad Kapellas this morning. He said 0930 works for them because they can call in from Atlanta. Dale, please go ahead and plan on having us perform the entrance at 0930 next Wednesday.

Thanks,
Karla

From: Phillips, Charles
Sent: Thursday, June 14, 2018 6:57 AM
To: Shelton, Dale A:(GenCo-Nuc) <Dale.Shelton@exeloncorp.com>
Cc: Stoedter, Karla <Karla.Stoedter@nrc.gov>; Santos, Nicholas A:(GenCo-Nuc) <Nicholas.Santos@exeloncorp.com>
Subject: RE: Re: [EXTERNAL] RE: Clinton SIT logistics
"Brad asked for the entrance to be **late in the day on Wednesday** to allow station management to participate by phone or in person." Right now the entrance is scheduled for **9:30 am** on Wed. It doesn't matter to me just let me know if you change it.

From: Shelton, Dale A:(GenCo-Nuc) [<mailto:Dale.Shelton@exeloncorp.com>]
Sent: Thursday, June 14, 2018 6:05 AM
To: Stoedter, Karla <Karla.Stoedter@nrc.gov>
Cc: Phillips, Charles <Charles.Phillips@nrc.gov>; Sanchez Santiago, Elba <Elba.SanchezSantiago@nrc.gov>; Sargis, Daniel <Daniel.Sargis@nrc.gov>
Subject: [External_Sender] Re: [EXTERNAL] RE: Clinton SIT logistics
Thank you very much. I know there had been a little back and forth and I wanted to make sure I understood where we landed so that we can be prepared to fully support the inspection. Get [Outlook for iOS](#)

From: Stoedter, Karla <Karla.Stoedter@nrc.gov>
Sent: Thursday, June 14, 2018 6:35:35 AM
To: Shelton, Dale A:(GenCo-Nuc)
Cc: Phillips, Charles; Elba Sanchez Santiago; Sargis, Daniel
Subject: [EXTERNAL] RE: Clinton SIT logistics

Dale,
Chuck is still planning on coming to the site next Wednesday and Thursday. As I discussed with Brad, we will do a short entrance (covering the area(s) Chuck plans to inspect) the two days he is here. Brad asked for the entrance to be late in the day on Wednesday to allow station management to participate by phone or in person. We plan to perform another entrance with the full team on June 25th. Pat Loudon will also be in attendance on June 25th and would like to speak with Brad and/or Ted following the entrance and your planned presentation.

I will be out of the office beginning tomorrow through July 4th. If you need anything, please contact Chuck Phillips at 630-829-9572 or Ken Riemer (who is acting for me) at 630-829-9628.

Thanks,
Karla

From: Shelton, Dale A:(GenCo-Nuc) [<mailto:Dale.Shelton@exeloncorp.com>]

Sent: Wednesday, June 13, 2018 1:25 PM

To: Stodter, Karla <Karla.Stodter@nrc.gov>

Subject: [External_Sender] Clinton SIT logistics

Karla, I just wanted to check in regarding plans for the SIT entrance meeting. I know there had been discussions regarding whether Chuck will be down 6/20 and 21 and whether you will still be wanting to conduct an entrance at that time. I know that you were out to the station last week and had the opportunity to observe some of the Root Cause team activities. As you are aware, Ted, Brad and the Senior OPS and Training teams will be offsite at that time and I just wanted to close the loop with you.

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From: [Sanchez, Santiago, Elba](#)
To: [Phillips, Charles](#); [Draper, Jason](#); [Murray, Robert](#); [Kozak, Laura](#); [Mitman, Jeffrey](#)
Cc: [Riemer, Kenneth](#)
Subject: FW: Logistics: NRC SIT Internet Access (Clinton)
Date: Friday, June 15, 2018 11:02:38 AM
Attachments: [image003.png](#)
[image015.png](#)

Below you'll find the wi-fi internet access information for when you are onsite for the SIT. We have one NRC laptop on-site if anyone needs to use it. Let me know if you have any questions or requests I can help with.

Thanks,

Elba Sanchez Santiago

Senior Resident Inspector
Clinton Power Station
RIII/DRP/Branch 1
(217) 935-9521

From: Santos, Nicholas A:(GenCo-Nuc) [mailto:Nicholas.Santos@exeloncorp.com]
Sent: Friday, June 15, 2018 10:48 AM
To: Sanchez Santiago, Elba <Elba.SanchezSantiago@nrc.gov>; Sargis, Daniel <Daniel.Sargis@nrc.gov>
Cc: Shelton, Dale A:(GenCo-Nuc) <Dale.Shelton@exeloncorp.com>; Joseph, Carolyn M:(GenCo-Nuc) <Carolyn.Joseph@exeloncorp.com>; Ford Jr, Guy V:(GenCo-Nuc) <guy.ford@exeloncorp.com>; Weissinger, Hoy John:(GenCo-Nuc) <John.Weissinger@exeloncorp.com>; Sanders, Garrett R: (GenCo-Nuc) <Garrett.Sanders@exeloncorp.com>
Subject: [External_Sender] Logistics: NRC SIT Internet Access

Kenneth Riemer

Username:	jeff.mitman@nrc.gov
Password:	<div></div> (b)(6)
First name:	Jeff
Last name:	Mitman
Email address:	Jeff.Mitman@NRC.gov
Company:	NRC
Person being visited (email):	Nicholas.Santos@exeloncorp.com
Guest type:	Exelon Guest
State:	Created
From date (yyyy-mm-dd):	2018-06-25 06:30
To date (yyyy-mm-dd):	2018-06-29 15:30
Location:	Exelon
SSID:	
Language:	English
Group tag:	
Time left:	4D 09H 00M

Username:	kenneth.riemer@nrc.gov
Password:	(b)(6)
First name:	Kenneth
Last name:	Riemer
Email address:	Kenneth.Riemer@NRC.gov
Company:	NRC
Person being visited (email):	Nicholas.Santos@exeloncorp.com
Guest type:	Exelon Guest
State:	Created
From date (yyyy-mm-dd):	2018-06-25 06:30
To date (yyyy-mm-dd):	2018-06-29 15:30
Location:	Exelon
SSID:	
Language:	English
Group tag:	
Time left:	4D 09H 00M

Laura Kozak

Username:	laura.kozak@nrc.gov
Password:	(b)(6)
First name:	Laura
Last name:	Kozak
Email address:	Laura.Kozak@NRC.gov
Company:	NRC
Person being visited (email):	Nicholas.Santos@exeloncorp.com
Guest type:	Exelon Guest
State:	Created
From date (yyyy-mm-dd):	2018-06-25 06:30
To date (yyyy-mm-dd):	2018-06-29 15:30
Location:	Exelon
SSID:	
Language:	English
Group tag:	
Time left:	4D 09H 00M

Robert Murray

Username:	robert.murray@nrc.gov
Password:	(b)(6)
First name:	Robert
Last name:	Murray
Email address:	Robert.Murray@NRC.gov
Company:	NRC
Person being visited (email):	Nicholas.Santos@exeloncorp.com
Guest type:	Exelon Guest
State:	Created
From date (yyyy-mm-dd):	2018-06-25 06:30
To date (yyyy-mm-dd):	2018-06-29 15:30
Location:	Exelon
SSID:	
Language:	English
Group tag:	
Time left:	4D 09H 00M

Jason Draper

Username:	jason.draper@nrc.gov
Password:	(b)(6)
First name:	Jason
Last name:	Draper
Email address:	Jason.Draper@NRC.gov
Company:	NRC
Person being visited (email):	Nicholas.Santos@exeloncorp.com
Guest type:	Exelon Guest
State:	Created
From date (yyyy-mm-dd):	2018-06-25 06:30
To date (yyyy-mm-dd):	2018-06-29 15:30
Location:	Exelon
SSID:	
Language:	English
Group tag:	
Time left:	4D 09H 00M

Jeff Mitman

Username:	jeff.mitman@nrc.gov
Password:	(b)(6)
First name:	Jeff
Last name:	Mitman
Email address:	Jeff.Mitman@NRC.gov
Company:	NRC
Person being visited (email):	Nicholas.Santos@exeloncorp.com
Guest type:	Exelon Guest
State:	Created
From date (yyyy-mm-dd):	2018-06-25 06:30
To date (yyyy-mm-dd):	2018-06-29 15:30
Location:	Exelon
SSID:	
Language:	English
Group tag:	
Time left:	4D 09H 00M

Charles Phillips

Username:	charles.phillips@nrc.gov
Password:	(b)(6)
First name:	Charles
Last name:	Phillips
Email address:	Charles.Phillips@NRC.gov
Company:	NRC
Person being visited (email):	Nicholas.Santos@exeloncorp.com
Guest type:	Exelon Guest
State:	Created
From date (yyyy-mm-dd):	2018-06-20 06:30
To date (yyyy-mm-dd):	2018-06-29 15:30
Location:	Exelon
SSID:	
Language:	English
Group tag:	
Time left:	9D 09H 00M

Pat Loudon

Username:	patrick.louden@nrc.gov
Password:	(b)(6)
First name:	Patrick
Last name:	Louden
Email address:	Patrick.Louden@NRC.gov
Company:	NRC
Person being visited (email):	Nicholas.Santos@exeloncorp.com
Guest type:	Exelon Guest
State:	Created
From date (yyyy-mm-dd):	2018-06-25 06:30
To date (yyyy-mm-dd):	2018-06-29 15:30
Location:	Exelon
SSID:	
Language:	English
Group tag:	
Time left:	4D 09H 00M

Nicholas Santos



Clinton Power Station

8401 Power Road, Clinton, IL 61727

Office: (217) 937 2811 | Fax: (217) 937 3999

Nicholas.Santos@exeloncorp.com www.exeloncorp.com

CPS - NSRB Coordinator

CPS - NRC Coordinator

CPS - PORC Coordinator

CPS - Commitment Coordinator

CPS - RA PMMR

CPS - Procedure Point of Contact

CPS - NERC Compliance

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From: [Murray, Robert](#)
To: [Phillips, Charles](#)
Cc: [Draper, Jason](#)
Subject: notes
Date: Wednesday, June 20, 2018 1:32:00 PM
Attachments: [image001.png](#)

Chuck-

Do you want Jason and I to take our own notes somewhere? Can I add to the file on the S-drive? If I add a note or question to the file I can write it in blue so you know its from me. Or I will keep my own file and pass issues to you separately...

Rob Murray
Quad Cities Senior Resident Inspector
Office (309)654-2227
Cell (b)(6)



From: [Murray, Robert](#)
To: [Kozak, Laura](#)
Subject: RE: Discuss Clinton MD8.3 risk evaluation
Date: Monday, June 18, 2018 10:49:00 AM

Yes- I attended the session you discussed. I will let you know if I have any additional questions

Thanks!

Rob

From: Kozak, Laura
Sent: Monday, June 18, 2018 10:37 AM
To: Murray, Robert <Robert.Murray@nrc.gov>
Subject: RE: Discuss Clinton MD8.3 risk evaluation

Don't worry Rob. Please don't feel obligated to call in while you are on (b)(6) Were you at the seminar when I discussed this? If you have any questions let me know. I will be onsite for part of the time with the team, so I can answer any questions you have then.

-----Original Appointment-----

From: Murray, Robert
Sent: Monday, June 18, 2018 10:10 AM
To: Kozak, Laura
Cc: Phillips, Charles
Subject: Tentative: Discuss Clinton MD8.3 risk evaluation
When: Tuesday, June 19, 2018 9:00 AM-10:00 AM (UTC-06:00) Central Time (US & Canada).
Where:

Laura-

I am on (b)(6) tomorrow – I am going to (b)(6) I will try and call in if I am available.

From: [Kozak, Laura](#)
To: [Phillips, Charles](#)
Subject: OU-CL-104
Date: Tuesday, June 19, 2018 2:03:00 PM
Attachments: [image001.png](#)

Chuck, I found the statement below in the procedure. Are these the turnover sheets that you recently requested?

4.1.8 Shift Management shall:

- Verify plant safety system status is documented during shift turnover using OU-CL-104 Attachment 1.
- Validate any changes in scheduled / expected plant shutdown risk.

From: [Ray, Teresa](#)
To: [Phillips, Charles](#); [Murray, Robert](#); [Draper, Jason](#); [Mitman, Jeffrey](#); [Kozak, Laura](#)
Cc: [Louden, Patrick](#); [Rierner, Kenneth](#); [Chandrathil, Prema](#); [Sanchez Santiago, Elba](#); [Sargis, Daniel](#)
Subject: RE: Upcoming Clinton SIT
Date: Tuesday, June 19, 2018 11:29:55 AM

Sorry, I didn't mention where the additional NRC parking spots will be located. They will be in the fourth row.

From: Ray, Teresa
Sent: Tuesday, June 19, 2018 10:55 AM
To: Phillips, Charles <Charles.Phillips@nrc.gov>; Murray, Robert <Robert.Murray@nrc.gov>; Draper, Jason <Jason.Draper@nrc.gov>; Mitman, Jeffrey <Jeffrey.Mitman@nrc.gov>; Kozak, Laura <Laura.Kozak@nrc.gov>
Cc: Louden, Patrick <Patrick.Louden@nrc.gov>; Rierner, Kenneth <Kenneth.Rierner@nrc.gov>; Chandrathil, Prema <Prema.Chandrathil@nrc.gov>; Sanchez Santiago, Elba <Elba.SanchezSantiago@nrc.gov>; Sargis, Daniel <Daniel.Sargis@nrc.gov>
Subject: Upcoming Clinton SIT

At some point next week all of you will be visiting the Clinton site for the upcoming SIT. I have attached site maps for your use.

For parking: there is one permanent NRC spot in the first row, two permanent NRC spots in the second row, and (for this SIT) there will be seven additional NRC parking spots in the parking lot north of the Nuclear Support Annex building (NSA) (this building is outlined in brown on the attached map). If for some reason one of the NRC spots is unavailable, you may park in any parking spot that is NOT NUMBERED.

If you haven't visited the Clinton site in some time, please stop into the badging office located in the NSA building (first door on your left when entering the building) to have your biometrics checked to avoid any delay in entry.

The NRC office is located on the first floor of the administration building. When entering the building, you will take the elevator or stairs down to first floor. The NRC office is around the corner to the left, the first door on your left. The outside numbers are 217-935-9521/9522. The internal lines are Please call if you run into any issues.

(b)(4)

Safe travels, and we will see you next week.

T

Teresa Ray

Resident Office Assistant
U. S. Nuclear Regulatory Commission

Quad Cities Nuclear Power Station/Clinton Nuclear Power Station
309-654-2227/2228 (Quad) 217-935-9521/9522 (Clinton)
txr2@nrc.gov

From: [Kozak, Laura](#)
To: ["Edom, Joseph T.:\(Contractor - GenCo-Nuc\)"](#)
Subject: RE: SIT Inspection at Clinton
Date: Wednesday, June 20, 2018 4:33:42 PM

Hi Joe

There is nothing you need to prepare. Anything the team needs will come through the requests of the team members. Jeff Mitman and I are support. The team (and Jeff) are onsite Monday but I will not be there until Tuesday. Certainly would like to sit down and talk next week.

Thanks
Laura

From: Edom, Joseph T:(Contractor - GenCo-Nuc) [mailto:Joe.Edom@exeloncorp.com]
Sent: Tuesday, June 19, 2018 4:19 PM
To: Kozak, Laura <Laura.Kozak@nrc.gov>
Subject: [External_Sender] SIT Inspection at Clinton

Hello Laura.

Is there any material or information that I need to prepare or have available for you during your visit next week?

I will be at Clinton all week.

Joe Edom | Senior Corporate Risk Management Engineer

JENSEN HUGHES

Advancing the Science of Safety

(b)(6)

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Exelon E-mail: joe.edom@exeloncorp.com

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From: [Murray, Robert](#)
To: [Phillips, Charles](#)
Subject: Operator Rounds Finding no Vio
Date: Friday, June 29, 2018 9:52:40 AM
Attachments: [operator rounds.docx](#)

see attached

The inspectors identified a performance deficiency for the licensee's failure to perform operator rounds and general area checks in accordance with procedure OP-AA-102-102, "General Area Checks and Operator Field Rounds," Revision 15, which states, in part:

3.2 Equipment Operators (EOs) are responsible for:

3.2.5. Validating parameters through multiple, independent means, avoiding undue focus on any single indicator.

4.4.4. **PERFORM** the General Area Checks while conducting rounds. Area checks may include, but are **not** limited to the following:

...
— Gauges, meters, **and** indications within normal bands

...
4.4.7. **PERFORM** Equipment Checks to monitor equipment condition. Equipment checks may include, but are **not** limited to the following:

...
— Suction, discharge, **and** recirculation flowpaths available
— Suction **and** discharge pressure normal

...
4.4.8. **PERFORM** the Operator Field Rounds.

1. **VALIDATE** parameters through multiple, independent means, avoiding undue focus on any single indicator...

Contrary to the above, from May 11-17, 2018, five separate equipment operators performed operator rounds in the DG 2 room on at least 12 occasions, and failed to perform equipment checks to monitor equipment conditions by validating parameters using multiple independent means. Specifically, equipment operators failed to identify two diesel generator air start isolation valves were in the closed position (air start flow path), in addition to failing to identify multiple downstream air pressure indications, on two separate local diesel control panels, was not within the normal band.

Inspectors determined this issue was more than minor because it was associated with the Mitigating Systems cornerstone attribute of Configuration Control and adversely affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences (i.e., core damage).

The inspectors evaluated the significance of the finding using IMC 0609, Appendix G, Shutdown Operations Significance Determination Process Phase 1 Initial Screening and Characterization of Findings, Exhibit 3, Mitigating Systems, and determined the finding screened as having very low safety significance (Green).

The inspectors did not identify a violation of regulatory requirements associated with this finding.

From: [Kozak, Laura](#)
To: "Edom, Joseph T:(Contractor - GenCo-Nuc)"
Subject: RE: RE: Electronic Copies of Procedures
Date: Friday, June 29, 2018 1:48:00 PM

Joe - We already have the loss of AC procedure so don't worry about that one

From: Edom, Joseph T:(Contractor - GenCo-Nuc) [mailto:Joe.Edom@exeloncorp.com]
Sent: Friday, June 29, 2018 12:42 PM
To: Kozak, Laura <Laura.Kozak@nrc.gov>
Subject: [External_Sender] RE: Electronic Copies of Procedures

Laura,

Do you want these today or will Monday be OK?

Joe Edom | Senior Corporate Risk Management Engineer

JENSEN HUGHES

Advancing the Science of Safety

(b)(6)

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JEdom@jensenhughes.com | www.jensenhughes.com

+++++

Exelon E-mail: joe.edom@exeloncorp.com

From: Kozak, Laura [mailto:Laura.Kozak@nrc.gov]
Sent: Friday, June 29, 2018 12:40 PM
To: Edom, Joseph T:(Contractor - GenCo-Nuc) <Joe.Edom@exeloncorp.com>
Subject: [EXTERNAL] RE: Electronic Copies of Procedures

Thanks Joe. Appreciate all the help. Laura

Here is a list:

Flex procedures – CPS 4306.01P001, P002, P003 and P004

RHR – Shutdown Cooling and Fuel Pool Cooling Assist CPS 3312.03

Heat-up and Pressurization CPS 3002.01

Secondary Containment Access Integrity CPS 9065.01

DC Load Shedding during SBO CPS 4200.01C002

Loss of Shutdown Cooling CPS 4006.01

Loss of AC Power CPS 4200.01

Failure to Start CPS 5285

Division 2 Diesel Generator Operations CPS 3506.01P002 (old and new versions)

Diesel Generator and Support Systems CPS 3506.01 (old and new versions)

From: Edom, Joseph T:(Contractor - GenCo-Nuc) [<mailto:Joe.Edom@exeloncorp.com>]

Sent: Thursday, June 28, 2018 5:13 PM

To: Kozak, Laura <Laura.Kozak@nrc.gov>

Subject: [External_Sender] Electronic Copies of Procedures

Laura,

I confirmed with Dale Shelton that it is OK to send you electronic copies of procedures. So if you send me a list of the procedures, I will do my best to turn that around as quickly as I can. I do not have Jeff's e-mail but if you could communicate that to him, I would appreciate it. Thank you.

Joe Edom | Senior Corporate Risk Management Engineer

JENSEN HUGHES

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From: [Kozak, Laura](#)
To: "Edom, Joseph T:(Contractor - GenCo-Nuc)"
Subject: RE: RE: RE: Electronic Copies of Procedures
Date: Monday, July 02, 2018 11:18:00 AM

Thanks Joe. I received all of the emails.

Laura

From: Edom, Joseph T:(Contractor - GenCo-Nuc) [mailto:Joe.Edom@exeloncorp.com]
Sent: Monday, July 02, 2018 8:36 AM
To: Kozak, Laura <Laura.Kozak@nrc.gov>
Subject: [External_Sender] RE: RE: Electronic Copies of Procedures

Final one.

Joe Edom | Senior Corporate Risk Management Engineer

JENSEN HUGHES

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(b)(6)

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JEdom@jensenhughes.com | www.jensenhughes.com

+++++

Exelon E-mail: joe.edom@exeloncorp.com

From: Kozak, Laura [mailto:Laura.Kozak@nrc.gov]
Sent: Friday, June 29, 2018 1:48 PM
To: Edom, Joseph T:(Contractor - GenCo-Nuc) <Joe.Edom@exeloncorp.com>
Subject: [EXTERNAL] RE: RE: Electronic Copies of Procedures

Joe - We already have the loss of AC procedure so don't worry about that one

From: Edom, Joseph T:(Contractor - GenCo-Nuc) [mailto:Joe.Edom@exeloncorp.com]
Sent: Friday, June 29, 2018 12:42 PM
To: Kozak, Laura <Laura.Kozak@nrc.gov>
Subject: [External_Sender] RE: Electronic Copies of Procedures

Laura,

Do you want these today or will Monday be OK?

Joe Edom | Senior Corporate Risk Management Engineer

JENSEN HUGHES

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Exelon E-mail: joe.edom@exeloncorp.com

From: Kozak, Laura [<mailto:Laura.Kozak@nrc.gov>]

Sent: Friday, June 29, 2018 12:40 PM

To: Edom, Joseph T:(Contractor - GenCo-Nuc) <Joe.Edom@exeloncorp.com>

Subject: [EXTERNAL] RE: Electronic Copies of Procedures

Thanks Joe. Appreciate all the help. Laura

Here is a list:

Flex procedures – CPS 4306.01P001, P002, P003 and P004

RHR – Shutdown Cooling and Fuel Pool Cooling Assist CPS 3312.03

Heat-up and Pressurization CPS 3002.01

Secondary Containment Access Integrity CPS 9065.01

DC Load Shedding during SBO CPS 4200.01C002

Loss of Shutdown Cooling CPS 4006.01

Loss of AC Power CPS 4200.01

Failure to Start CPS 5285

Division 2 Diesel Generator Operations CPS 3506.01P002 (old and new versions)

Diesel Generator and Support Systems CPS 3506.01 (old and new versions)

From: Edom, Joseph T:(Contractor - GenCo-Nuc) [<mailto:Joe.Edom@exeloncorp.com>]

Sent: Thursday, June 28, 2018 5:13 PM

To: Kozak, Laura <Laura.Kozak@nrc.gov>

Subject: [External_Sender] Electronic Copies of Procedures

Laura,

I confirmed with Dale Shelton that it is OK to send you electronic copies of procedures. So if you send me a list of the procedures, I will do my best to turn that around as quickly as I can. I do not have Jeff's e-mail but if you could communicate that to him, I would appreciate it. Thank you.

Joe Edom | Senior Corporate Risk Management Engineer

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Exelon E-mail: joe.edom@exeloncorp.com

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From: [Bowen, Jeremy](#)
To: [Phillips, Charles](#)
Subject: RE: QUERY - Clinton SIT
Date: Tuesday, July 03, 2018 8:28:19 AM
Attachments: [image001.png](#)

Thanks!

From: Phillips, Charles
Sent: Tuesday, July 03, 2018 8:48 AM
To: Bowen, Jeremy <Jeremy.Bowen@nrc.gov>
Cc: Stoedter, Karla <Karla.Stoedter@nrc.gov>; Riemer, Kenneth <Kenneth.Riemer@nrc.gov>
Subject: RE: QUERY - Clinton SIT

Jeremy,

The single prevalent issue at Clinton was a failure to follow procedure. To recap the event, the air receiver isolation valves for the Div 2 EDG were not open when it was declared available and operable. The Div 1 EDG was taken OOS for bus maintenance with the belief the Div 2 EDG was operable. The positions of the Div 2 EDG air receiver isolation valves were identified several days later by a non-licensed operator.

The operations supervisors thought it was acceptable to track changes in configuration control using the shift logs. It was not. There were 4 procedures/work instructions, regarding configuration control that had the operations supervisors followed one of them the event might not have occurred.

1. The licensee does not return valves/switches to the correct position when clearing OOS cards (this is different than the other Midwest Exelon plants) in this case the OOS clearance instruction stated to perform a procedure that would put the Div 2 EDG into a standby lineup in conjunction with clearance of the OOS. The SRO that cleared the OOS delayed that action and put in the logs the standby procedure needed to be performed at later time, because of existing plant conditions, which never happened. Two other licensee procedures required that if a valve were left in an abnormal position than special tracking actions were required. These procedures were not followed.
2. Later, a second SRO gave direction to perform a partial performance of the EDG standby procedure but it did not include the portion of the procedure that contained the air receiver valves. The licensee's procedures require that when a partial procedure is performed that the procedure cover is marked such that it is clear that only a partial procedure was performed. The SRO did not take that action.
3. The partial procedure was returned to a third SRO who mistakenly believed it was a complete procedure. At this point there was a return to service checklist that had it been properly performed would have caught the problem.

In addition, the licensee had 10 or more opportunities to identify that the valves were in the wrong position by non-licensed operators, after the EDG was declared available, before it was actually found. These valves were in plain sight about chest high when you walk in the

Div 2 EDG room and directly below a required operator round data collection point.

If you have any questions I'm working from home today. My cell number is below.



Chuck Phillips

Project Engineer

630-829-9572 - Office

(b)(6) [redacted] - Cell

Charles.Phillips@nrc.gov

From: Bowen, Jeremy

Sent: Tuesday, July 03, 2018 6:19 AM

To: Phillips, Charles <Charles.Phillips@nrc.gov>

Subject: QUERY - Clinton SIT

Hi Chuck,

I saw the daily note that you all exited the Clinton SIT last week. I was wondering if you could share a high level summary of the issues identified? I anticipate the Commission offices asking for some additional details beyond what's in the Daily Note.

Thanks,
Jeremy

From: [Kozak, Laura](#)
To: [Mitman, Jeffrey](#)
Subject: Clinton MS order integrated plan
Date: Thursday, July 05, 2018 12:53:00 PM

FYI – this is an excerpt from the licensee’s integrated plan. I have yet to find any discussion on the role of Division 3, and in particular the cross-tie.

After determination that installed emergency diesel generators cannot be restarted and off-site power cannot be restored for a period greater than the SBO coping time (4 hours), the operating crew determines the event is an ELAP. It is assumed that this determination is made less than one 1 hour into the event. Overall coping time for core cooling in Phase 1 is 6 hours.

From: [Kozak, Laura](#)
To: [Stoedter, Karla](#); [Phillips, Charles](#); [Louden, Patrick](#); [Lara, Julio](#)
Cc: [Hanna, John](#); [Mitman, Jeffrey](#)
Subject: Options for completing the SDP evaluation for Clinton
Date: Friday, July 06, 2018 11:15:05 AM

For consideration – Karla and I just briefly discussed.

Option 1 – Exit with significance TBD (complete). Issue report with TBD in 45 days. Conduct IFRB and planning SERP. Complete preliminary SDP evaluation – if green, document as necessary. If GTG, need SERP prior to issuing preliminary determination letter. 120 day metric from the event applies, 90 day SDP metric from report with TBD applies, and OE 120 day metric from exit on 6/27 applies. Timeline may be difficult to meet. Technical work expected to take 6 to 8 weeks. The technical work combined with the development of packages, conducting meetings, issuing letters, having regulatory conferences

Option 2 – Similar to above initially, but take phase 2 SDP result to a SERP panel. Get alignment on proposing a GTG finding, issue a preliminary determination letter. Conduct detailed risk evaluation in parallel. While this is allowed by our process, people have been reluctant to put out such a preliminary result that we know is subject to change. This approach creates more internal work as multiple SERPs will be necessary.

Option 3 – Complete DRE, re-exit with the licensee once the SDP is complete. If GTG and a SERP is necessary, the 120 day metric may be difficult to meet.

I will continue to work with Karla and Jeff to figure out the best path forward.

Laura

From: [Murray, Robert](#)
To: [Phillips, Charles](#)
Cc: [Draper, Jason](#)
Subject: Violations first draft
Date: Monday, July 09, 2018 10:36:00 AM
Attachments: [image001.png](#)

I saved the two issues I wrote up on the S Drive. I will be working on my report sections later this week. I need to start working on our quarterly report today and tomorrow- I plan to get you my input by Thursday.

Rob Murray
Quad Cities Senior Resident Inspector
Office (309)654-2227
Cell (b)(6)



From: [Stoedter, Karla](#)
To: [Louden, Patrick](#); [Kozak, Laura](#); [Phillips, Charles](#)
Subject: Clinton IFRB
Date: Tuesday, July 10, 2018 1:34:00 PM

Looks like we will need to hold an IFRB next week (likely Thursday) for the Clinton SIT issue. We will send out the package by the end of the week.

From: [Kozak, Laura](#)
To: [Mitman, Jeffrey](#); [Montecalvo, Michael](#); [Stoedter, Karla](#); [Phillips, Charles](#); [Sanchez Santiago, Elba](#); [Sargis, Daniel](#)
Subject: Clinton SDP update
Date: Thursday, July 12, 2018 3:28:46 PM

Just FYI

I spoke with Joe Edom today (Clinton PRA) and make some requests for information that we need. Specifically I asked when their T/H calculation will be complete so that we can review it and I asked for training information related to FLEX, declaration of ELAP, and the Division 3 cross-tie. Joe said that the calculation is nearing completion and he will check on the date it will be available. Jeff – the calculation will have information about the drain rate from the reactor had a loop occurred in the small window where the drain valves were open. Joe will also gather some information about what training material exists and the frequency and then we will specify what we actually want to see.

In the interest of good communication, I told Joe that we were tentatively planning the IFRB for next week and I went over the purpose of the IFRB. Joe asked me about “clocks” and I explained that the 90 day clock to establish a PD – the new metric - was running already and that we were also on a clock for exiting with “TBD”.

Joe said he would get back to me as soon as he could.

Laura

From: [Kozak, Laura](#)
To: [Mitman, Jeffrey](#)
Subject: FW: Any Information Needed
Date: Thursday, July 12, 2018 6:44:14 AM

Anything you need

I was going to ask for training material for the cross-tie, ELAP/FLEX, and the use of the installed DD fp and SRVs. I want to try and better understand if the training aligns with what they tell us they would do.

From: Edom, Joseph T:(Contractor - GenCo-Nuc) [mailto:Joe.Edom@exeloncorp.com]
Sent: Wednesday, July 11, 2018 5:28 PM
To: Kozak, Laura <Laura.Kozak@nrc.gov>
Subject: [External_Sender] Any Information Needed

Hi Laura,

Just wanted to check in with you and see if there was any information you needed that I could track down for you. I am at Clinton today and tomorrow. Thank you.

Joe Edom | Senior Corporate Risk Management Engineer

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From: [Kozak, Laura](#)
To: [Draper, Jason](#)
Subject: FW: Clinton Time Line from SIT
Date: Thursday, July 12, 2018 3:05:23 PM
Attachments: [Time Line from SIT\(2\).pdf](#)

Jason

FYI. Do you have your timeline put together, if so, can you share it with us so we can compare/

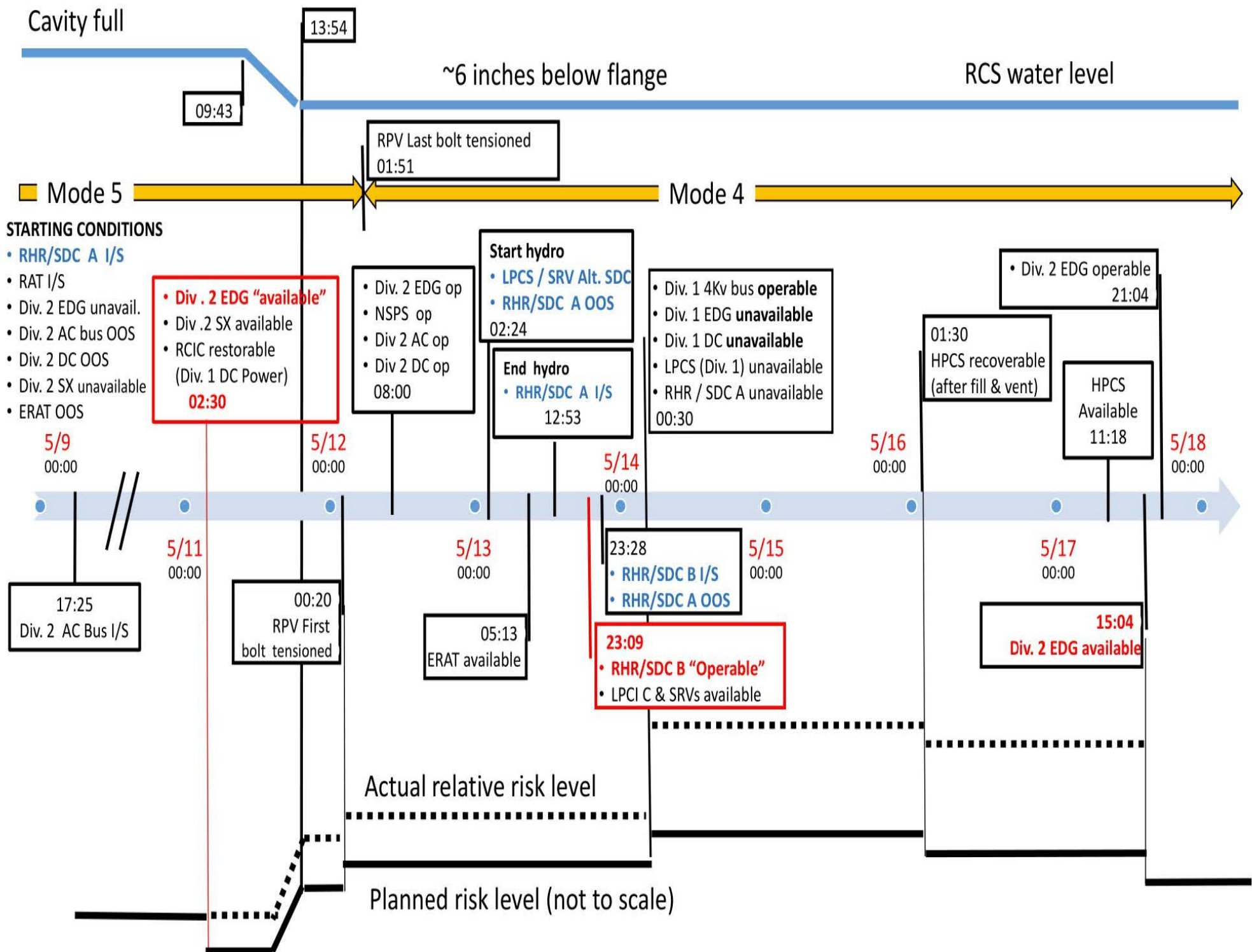
Laura

From: Mitman, Jeffrey
Sent: Tuesday, July 10, 2018 8:20 AM
To: Kozak, Laura <Laura.Kozak@nrc.gov>
Subject: Clinton Time Line from SIT

Laura, I've converted the timeline I had on the white board to a pdf. Please take a look and see if there are errors. I suspect there are some.

Thanks.

Jeff Mitman



From: [Draper, Jason](#)
To: [Kozak, Laura](#)
Subject: RE: Clinton Time Line from SIT
Date: Thursday, July 12, 2018 3:34:18 PM
Attachments: [Sequence of Events.docx](#)
[Timeline.xlsx](#)

Laura,

Sure, I've attached two forms of it. The Excel is the timeline I put together while we were onsite. The Word file is a narrative sequence of events that are pertinent to the event and is what will go in the report.

Jason

From: Kozak, Laura
Sent: Thursday, July 12, 2018 3:05 PM
To: Draper, Jason <Jason.Draper@nrc.gov>
Subject: FW: Clinton Time Line from SIT

Jason

FYI. Do you have your timeline put together, if so, can you share it with us so we can compare/

Laura

From: Mitman, Jeffrey
Sent: Tuesday, July 10, 2018 8:20 AM
To: Kozak, Laura <Laura.Kozak@nrc.gov>
Subject: Clinton Time Line from SIT

Laura, I've converted the timeline I had on the white board to a pdf. Please take a look and see if there are errors. I suspect there are some.

Thanks.

Jeff Mitman

Sequence of Events

On May 9, 2018, at 9:36 pm, Clinton Power Station, Unit 1, was in Mode 5 during refueling outage C1R18. The reactor cavity was filled, and the Division 2 4160 volt alternating current bus (1B1) was energized following a scheduled maintenance window. The Division 1 alternating current system, Division 1 emergency diesel generator (DG), and residual heat removal (RHR) 'A' system were operable during the 1B1 bus outage and remained operable upon restoration of the 1B1 bus.

The Division 2 DG had been inoperable and unavailable as a result the 1B1 outage. Earlier on May 9, at 5:25 pm, Clearance Order (CO) 139455 was removed from the Division 2 DG as part of 1B1 restoration activities. This CO included a Special Instruction that stated "Restore Div 2 DG to standby per 3506.01P002 [Division 2 DG Operations] in conjunction with C/O removal." This procedure was not performed prior to closure of the CO, however, as a Senior Reactor Operator (SRO 1) noted in the Operations narrative logs that the Division 2 DG remained in maintenance lockout pending restoration of the Division 2 shutdown service water (SX) system from its planned maintenance window, and that restoration per 3506.01P002 would need to be performed to restore the Division 2 DG to standby. Following the closure of the CO, this log entry was the only method the licensee used to track the need to restore the Division 2 DG to standby per 3506.01P002.

On May 10, 2018, during the day shift, a Senior Reactor Operator (SRO 2) directed a non-licensed operator to perform a portion of 3506.01P002 to restore fuses and the Division 2 DG lubrication system, which had previously been removed prior to the 1B1 maintenance. When the non-licensed operator had completed the partial procedure, SRO 2 had turned over duties to a different Senior Reactor Operator (SRO 3), so the non-licensed operator returned the completed partial procedure to SRO 3. SRO 3 completed additional sections of 3506.01P002, but failed to recognize that uncompleted steps remained in the procedure such that when Division 2 SX was restored and available, SRO 3 declared the Division 2 DG available on May 11, 2018, at 2:30 am. At this time, the Division 2 DG air receiver outlet valves (1DG160 and 1DG161) remained closed, preventing starting air from reaching the DG air start motors, making the DG unable to start on any demand signal.

On May 11, 2018, at 5:10 am, the licensee installed the reactor cavity gate in preparation for cavity drain down and reactor head installation. The cavity drain began at 9:43 am and completed at 1:54 pm. The licensee began tensioning the reactor head studs at 12:20 am on May 12, and completed tensioning the studs at 1:51 am, at which time operations declared the Unit in Mode 4.

On May 12, 2018, at 8:00 am, operations completed OP-AA-108-106, "Equipment Return to Service" for the Division 2 Nuclear System Protection System (NSPS), Division 2 essential switchgear cooling (VX), Division 2 direct current (DC) and Division 2 DG, and declared each of these systems operable. The licensee did not perform post-maintenance testing on the Division 2 DG as no maintenance was performed on the DG.

On May 13, 2018, operations secured RHR 'A' pump from operation in Shutdown Cooling mode from 2:24 am until 12:53 pm to facilitate the reactor pressure vessel pressure test. During this time, the emergency reserve auxiliary transformer (ERAT) was declared available at 5:15 am. At 11:09 pm, RHR 'B' was declared operable for Shutdown Cooling mode, and at 11:28 pm, RHR 'A' was secured and RHR 'B' was started in Shutdown Cooling mode.

On May 14, 2018, at 12:30 am, since the licensee was unaware that the Division 2 DG was inoperable and unavailable due to its inability to start caused by the 1DG160 and 1DG161 valves being close, the licensee began a scheduled maintenance window for the Division 1 4160 volt alternating current bus (1A1). As a result of taking the bus out of service, the Division 1 DG was declared inoperable along with other equipment powered from bus 1A1, including the low pressure core spray (LPCS) and RHR 'A' systems.

On May 16, 2018, at 1:30 am, the licensee completed filling and venting the high pressure core spray (HPCS) system following an extended maintenance window. On May 17, 2018, at 11:18 am, operations declared HPCS available, and after post maintenance testing of the system.

On May 17, 2018, at 3:03 pm, a non-licensed operator performing shiftly rounds identified that the 1DG160 and 1DG161 valves were closed and reported this condition to the control room. The licensee declared the Division 2 DG inoperable and investigated the condition. The licensee restored the valves to the open position and declared the Division 2 DG available at 3:45 pm. After the licensee performed OP-AA-108-106, the licensee declared the Division 2 DG operable at 9:04 pm.

Timeline	Rx Status	Div 1 AC	Div 2 AC	Div 3 AC	HPCS	RCIC	ERAT/RAT	FLEX	Fire Pumps	SDC	LPCS	LPCI B/C	DC
05/01/18 0815	Mode 5												
05/05/18 1240			DG Unavailable										
05/08/18 0551							ERAT Unavailable						
05/09/18 1130					Valve Stem Broken								
05/09/18 1725			Div 2 Bus CO removed from Div 2 DG										
05/09/18 2136			Div 2 Bus 1B1 energized										
05/11/18 0230			DG Declared Available										
05/11/18 0510	Cavity Gate Installed												
05/11/18 0943	Cavity Drain Started												
05/11/18 1354	Cavity Drain Completed												
05/12/18 0020	First head bolt tensioned												
05/12/18 0151	Mode 4												
05/12/18 0800			DG Declared Operable										
05/12/18 0800													Div 2 Operable
05/13/18 0224										RHR A Secured for Pressure Test			
05/13/18 0513							ERAT Available						
05/13/18 1019									FP A Functional				
05/13/18 1253										RHR A Started			
05/13/18 2027									FP A non-Functional				
05/13/18 2309										RHR B Operable for SDC			
05/13/18 2328										RHR A Secured			
05/13/18 2328										RHR B Started			
05/14/18 0030		Unavailable											
05/14/18 0030													
05/14/18 0600													
05/16/18 0130					Recoverable Available				FP A Functional			Inoperable	
05/17/18 1118													
05/17/18 1503			Valves Identified Closed										
05/17/18 1545			DG Available										
05/17/18 2104			DG Operable										
05/17/18 2315							RCIC Available						
05/18/18 1821					Operable								

From: [Kozak, Laura](#)
To: [Montecalvo, Michael](#); [Mitman, Jeffrey](#)
Subject: RE: Clinton
Date: Friday, July 13, 2018 7:39:00 AM

I just added Jason's sequence of events and timeline spreadsheet from the inspection

From: Montecalvo, Michael
Sent: Thursday, July 12, 2018 2:43 PM
To: Kozak, Laura <Laura.Kozak@nrc.gov>; Mitman, Jeffrey <Jeffrey.Mitman@nrc.gov>
Subject: Clinton

Laura and Jeff,

I created a folder on the SDP Repository SharePoint for ease of file transfer. Link below:

<http://fusion.nrc.gov/nrr/team/dra/aphb/SDP%20Repository/Forms/AllItems.aspx?RootFolder=%2Fenrr%2Fteam%2Fdra%2Faphb%2FSDP%20Repository%2FClinton%2FClinton%20%2D%20SD%20EDG%202018>

Mike

From: [Edom, Joseph T:\(Contractor - GenCo-Nuc\)](#)
To: [Kozak, Laura](#)
Cc: [Joe Edom - Jensen Hughes \(JEdom@jensenhughes.com\)](#)
Subject: [External_Sender] RE: Any Information Needed
Date: Monday, July 16, 2018 10:48:24 AM
Attachments: [NRC Requested Info.rtf](#)

Attachment is non-responsive due to narrowing the request to exclude licensee originated documents. Attached is "Operations Training Topics".

Laura,

Attached is the list of training material from Clinton. Please let me know if you need copies of any of this information.

We are still resolving comments on the GOTHIC analysis and I don't have an exact date right now but it is close. I will see what I can find out today.

Joe Edom | Senior Corporate Risk Management Engineer

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Exelon E-mail: joe.edom@exeloncorp.com

From: Kozak, Laura [mailto:Laura.Kozak@nrc.gov]

Sent: Thursday, July 12, 2018 6:46 AM

To: Edom, Joseph T:(Contractor - GenCo-Nuc) <Joe.Edom@exeloncorp.com>

Subject: [EXTERNAL] RE: Any Information Needed

Hi Joe

Thanks for your note about Nick. We will miss him greatly.

There are a couple of things I would like to see and I am checking with Jeff M. Is there a good phone number to call you at?

Laura

From: Edom, Joseph T:(Contractor - GenCo-Nuc) [mailto:Joe.Edom@exeloncorp.com]

Sent: Wednesday, July 11, 2018 5:28 PM

To: Kozak, Laura <Laura.Kozak@nrc.gov>

Subject: [External_Sender] Any Information Needed

Hi Laura,

Just wanted to check in with you and see if there was any information you needed that I could track down for you. I am at Clinton today and tomorrow. Thank you.

Joe Edom | Senior Corporate Risk Management Engineer

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From: [Kozak, Laura](#)
To: [Mitman, Jeffrey](#)
Subject: Comments on IFRB package?
Date: Monday, July 16, 2018 8:05:00 AM

We need to get the package in today, so if you could give me any comments by noon.

Thanks
Laura

From: [Edom, Joseph T.:\(Contractor - GenCo-Nuc\)](#)
To: [Kozak, Laura](#)
Subject: [External_Sender] Document Based Instruction Guide Information
Date: Thursday, July 19, 2018 2:49:53 PM

Laura,

Here is a definition of the Document Based Instruction Guide that I received from the Operations Training organization:

NUCLEAR INDUSTRY STANDARD PROCESS TRAINING (NISP-TR- 01 Systematic Approach to Training) defines Document Based Instruction Guide (DBIG) as documents used to establish the instructional format and objectives for presentation of a reference document, such as procedures, policies, memorandums, letters, presentations, other similar documents. These documents may also be used to define specific objectives to be taught from existing lesson plans (such as in Licensed Operator Requalification Training).

To put it simply, it is a way for us to create training where the governing document is the material vice creating a document that just parrots what the reference material is stating. For example, if we want to give training on how a new tool or tractor works we can use the vendor manuals to teach from after we have identified the objectives. This streamlines the process of creating new training material because all the info we need to conduct the training is contained within the references. From there we can either do infield hands on type of training or create a classroom presentation that ties it all together.

The documents are being retrieved and will get sent to me by the end of the day and I will forward them on to you today or tomorrow morning.

Joe Edom | Senior Corporate Risk Management Engineer

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From: [Edom, Joseph T. \(Contractor - GenCo-Nuc\)](#)
To: [Kozak, Laura](#)
Subject: [External_Sender] Requested Training Material - 1
Date: Thursday, July 19, 2018 4:50:47 PM
Attachments: [DB430301, DBIG-Extensive Damage Mitigation Guide, Rev. 005.pdf](#)
[N-CL-OPS-DB430601-FLEX, FLEX, Rev 000.doc](#)
[N-CL-OPS-DB-FLEX-ELECT, FLEX Electrical Connections Communications Instrumentation and Ventilation Procedures, Rev 000.doc](#)
[SE-LOR-162, Extensive Damage Mitigation, Rev 000.pdf](#)
[SE-LOR-4306-FLEX, FLEX Event, Rev 000.pdf](#)

All attachments are non-responsive due to narrowing the request to exclude licensee originated documents.

Laura,

Attached is the requested training material. There is a PowerPoint file that is ~12MB. Will your e-mail receive files that big from external e-mail addresses?

I am going to send it separately so you have the majority of the requested material.

Joe Edom | Senior Corporate Risk Management Engineer

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Exelon E-mail: joe.edom@exeloncorp.com

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From: [Kozak, Laura](#)
To: [Louden, Patrick](#)
Cc: [Stoedter, Karla](#)
Subject: Clinton
Date: Thursday, July 19, 2018 12:29:00 PM

Pat

For your call with the SVP

We are working towards completing our risk evaluation by 8/28 for a SERP, if necessary, on 9/13.

To consider any licensee information prior to the SERP, we would need it by 8/17.

We will communicate periodically with licensee PRA staff (contact is Joe Edom) as we conduct our evaluation. I will share this schedule with Joe also.

I will keep you and Karla up to date as to where things are heading.

Laura

From: Montecalvo, Michael
To: Mitman, Jeffrey; Kozak, Laura
Subject: LOOP IEFs
Date: Thursday, July 19, 2018 12:07:56 PM

Jeff/Laura,

Found the answer on where plant vs. switchyard centered LOOPS is divided (below) for initiating event frequencies.

Plant-centered loss of offsite power event—a LOOP event in which the design and operational characteristics of the nuclear power plant unit itself play the major role in the cause and duration of the loss of offsite power. Plant-centered failures typically involve hardware failures, design deficiencies, human errors, and localized weather-induced faults such as lightning. The line of demarcation between plant-centered and switchyard-centered events is the nuclear power plant main and station power transformers high-voltage terminals.

I'm sure you know of the HOC eLibrary, but for Clinton specifically there are some awesome plant drawings at this link. If you haven't looked yet, they might be helpful moving forward.

[http://elibrary.nrc.gov/home.htm?
submitFrom=home&operation=disp&defaultView=&path=eLibrary%2FOperatingNuclearReactors%2FRegionIII%2FClinton%2FN20080523094916468](http://elibrary.nrc.gov/home.htm?submitFrom=home&operation=disp&defaultView=&path=eLibrary%2FOperatingNuclearReactors%2FRegionIII%2FClinton%2FN20080523094916468)

Mike

From: [Edom, Joseph T:\(Contractor - GenCo-Nuc\)](#)
To: [Kozak, Laura](#)
Subject: [External_Sender] RE: Requested Training Material - 1
Date: Friday, July 20, 2018 7:43:26 AM

I get a message that the delivery had failed due to exceeding the size limit. I am sending you a file download e-mail where you can get the file.

Joe Edom | Senior Corporate Risk Management Engineer

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JEdom@jensenhughes.com | www.jensenhughes.com

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Exelon E-mail: joe.edom@exeloncorp.com

From: Kozak, Laura [mailto:Laura.Kozak@nrc.gov]
Sent: Friday, July 20, 2018 7:41 AM
To: Edom, Joseph T:(Contractor - GenCo-Nuc) <Joe.Edom@exeloncorp.com>
Subject: [EXTERNAL] RE: Requested Training Material - 1

Thanks Joe

I did not get the large file. Not sure what the limit is here. I will check.

Laura

From: Edom, Joseph T:(Contractor - GenCo-Nuc) [mailto:Joe.Edom@exeloncorp.com]
Sent: Thursday, July 19, 2018 4:50 PM
To: Kozak, Laura <Laura.Kozak@nrc.gov>
Subject: [External_Sender] Requested Training Material - 1

Laura,

Attached is the requested training material. There is a PowerPoint file that is ~12MB. Will your e-mail receive files that big from external e-mail addresses?

I am going to send it separately so you have the majority of the requested material.

Joe Edom | Senior Corporate Risk Management Engineer

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From: [Kozak, Laura](#)
To: [Mitman, Jeffrey](#); [Montecalvo, Michael](#)
Subject: training documents for Clinton - crosstie and Flex now on sharepoint EOM
Date: Friday, July 20, 2018 11:09:00 AM

From: [Kozak, Laura](#)
To: [Riemer, Kenneth](#)
Subject: RE: IFRB status - open items
Date: Monday, July 23, 2018 9:39:00 AM

Yes IFRB happened. Planning SERP is this Thursday

From: Riemer, Kenneth
Sent: Monday, July 23, 2018 7:28 AM
To: Kozak, Laura <Laura.Kozak@nrc.gov>
Subject: RE: IFRB status - open items

Did the IFRB occur on 7/19 for Clinton? I was in but don't recall hearing anything about it. If it's still pending, can you let me know the date? Thanks,

Ken

From: Kozak, Laura
Sent: Friday, July 13, 2018 3:03 PM
To: Loudon, Patrick <Patrick.Loudon@nrc.gov>; Lara, Julio <Julio.Lara@nrc.gov>; Stone, AnnMarie <AnnMarie.Stone@nrc.gov>; Skokowski, Richard <Richard.Skokowski@nrc.gov>; Stoedter, Karla <Karla.Stoedter@nrc.gov>; Riemer, Kenneth <Kenneth.Riemer@nrc.gov>; Duncan, Eric <Eric.Duncan@nrc.gov>; Cameron, Jamnes <Jamnes.Cameron@nrc.gov>; Dickson, Billy <Billy.Dickson@nrc.gov>; O'Brien, Kenneth <Kenneth.O'Brien@nrc.gov>; Shuaibi, Mohammed <Mohammed.Shuaibi@nrc.gov>; Daley, Robert <Robert.Daley@nrc.gov>; Jeffers, Mark <Mark.Jeffers@nrc.gov>; Orlikowski, Robert <Robert.Orlikowski@nrc.gov>; Hills, David <David.Hills@nrc.gov>; Peterson, Hironori <Hironori.Peterson@nrc.gov>; Orth, Steven <Steven.Orth@nrc.gov>; Hanna, John <John.Hanna@nrc.gov>
Subject: IFRB status - open items

Please see attached list of open IFRB items. Let me know if you have questions.

From: [Sanchez, Santiago, Elba](#)
To: [Stoedter, Karla](#)
Cc: [Sargis, Daniel](#)
Subject: RE: documents
Date: Tuesday, July 24, 2018 5:06:40 PM

Karla,

Dan and I reviewed the list of issues you provided us and determined the following as it relates to identification credit and similarities to Clinton:

Grand Gulf 2016008 – ML 17303B200

- 1- Failure to have alternate decay heat removal capability
 - a. **Issue:** Self-Revealed: The licensee credited RHR B as alternate decay heat removal, but the heat exchanger service water valves were tagged shut. It was identified while the licensee was trying to place the system in service.
 - b. It is not clear whether the licensee identified the issue because they were going to manipulate these specific valves to place the system in service or whether they were in the vicinity of the equipment being manipulated and were then noticed by the licensee personnel. Either way this example seems more like a self-revealed violation because there it wasn't identified during a deliberate process to identify degraded or abnormal conditions. They came across it when trying to put the system in service. The write-up did not include a specific discussion on thought process for ID credit.
- 2- Failure to have adequate procedures.
 - a. **Issue:** NRC Identified: The procedure to place alternate decay heat removal in service did not have the operator open the heat exchanger service water isolations.
 - b. No specific discussion of how it was identified, but this is very similar to the issue we are proposing for Clinton. Cooper has a similar example but called it self-revealed. (see below)
- 3- Failure to follow operations procedures
 - a. **Issue:** NRC Identified: The procedure to place alternate decay heat removal in service said to verify plant service water flow, but the licensee did not do that.
 - b. No specific discussion of ID credit. This issue is also very similar to one of the findings we are proposing as a result of the SIT.
- 4- **The team lead/ POC for this inspection was Mark Haire, Chief, Plant Support Branch 1: (817) 200-1148**

Watts Bar 1 2015-004 – ML 16034A214

- 1- Licensee Identified Violation associated with ice condenser doors.
 - a. **Issue:** Scaffolds were erected that prevented the ice condenser doors from opening rendering them inoperable for 9 days of a 14 day LCO.
 - b. No specific indication as to how the licensee discovered it, just that the licensee identified the issue and took immediate actions, therefore it is difficult to draw a comparison to the Clinton issues.

Cooper 2017-009 – ML 17179A282

- 1- Exceeding the Technical Specification Allowed Out of Service Time of the Division 1 RHR System

- a. **Issue:** Self-Revealed: The licensee failed to restore the Division 1 RHR system during clearance restoration, which resulted in exceeding the applicable technical specification action completion time.
 - b. This issue seems very similar to the Clinton issue in that it was identified by the licensee during a specific deliberate process (Seal audits) but was considered self-revealed. The write-up does not discuss why that determination was made though. The other similarity with the Clinton issues was that it was missed on multiple occasions (other audits of the same thing) before it was finally identified. We also looked at other Cooper reports and this specific issue was mentioned in a trend review but no additional violations were written nor was any additional discussion on identification credit documented.
- 2- Failure to Implement an Adequate Procedure for Equipment Control
- a. **Issue:** Self-Revealed: The licensee conduct of ops for conducting sealed valve audits only checked that seals were installed and did not check that the valves were in the correct position. This resulted in an extended period of time that the Division 1 RHR system was unknowingly inoperable.
 - b. This issue seems very similar to the issue we're proposing for inadequate rounds instructions. My assumption is that they called this self-revealed because the overarching configuration control issue that led us to look at the procedure was considered self-revealed.

3- The team lead/ POC for this inspection was Rich Smith, Nuclear System Engineer, Response Coordination Branch (817) 200-1472

Davis-Besse 2016-008 – ML 16138A562

- 1- This is a choice letter following an OI investigation about a licensed operator taking blood pressure medication. We're not sure that we're looking at the right thing.

Clinton's response to the INPO IER:

- 1- I did a search in the licensees CAP and didn't identify a specific AR documenting this INPO IER. I did find it mentioned in two ARs but the action to perform a review, which was initially scheduled for April 2018, was moved to October 2018. Therefore, so far I haven't identified anything specific the licensee has done in response to the IER apart from talking about it in their meetings. I have a feeling it's out there and I just haven't found it.

In summary, I think the most relevant examples are the Cooper and Grand Gulf examples. These were also the two issued that resulted in SITs, therefore we could conclude they were more risk significant and involved gross failures in operator performance which is another similarity to the Clinton issue. I think there is merit in reaching out to the team leads to gain additional insights on why it was determined these issues were self-revealed.

Let me know if you have any questions or need additional information from us.

Thanks,
Elba

From: Stuedter, Karla

Sent: Tuesday, July 24, 2018 9:59 AM

To: Sanchez Santiago, Elba <Elba.SanchezSantiago@nrc.gov>

Subject: documents

Here's what I'm looking for:

Watts Bar 1 inspection report 2015-004 - ML 16034A214

Davis Besse inspection report 2016008

Grand Gulf report on the alternate decay heat removal issue (the event happened on September 23, 2016)

SIT report from Cooper on the Division 1 RHR minimum flow isolation (SIT was done in March 2017 but I have no idea whether the issue was in the SIT report or not)

INPO IER 1-17-5 ML17171A309

Thanks for helping,
Karla

From: [Edom, Joseph T.:\(Contractor - GenCo-Nuc\)](#)
To: [Kozak, Laura](#)
Subject: [External_Sender] Question Topics
Date: Wednesday, July 25, 2018 1:32:42 PM

Laura,

I am preparing an e-mail to the station to give them the heads up that the questions are coming and wanted to make sure I had the categories correct. What I have is:

- Containment status and closure capability, including the decision on when to initiate containment closure
- FLEX Equipment reliability
- FLEX Training

I thought there was a fourth area. Could you remind me what the fourth category was? Thank you.

Joe Edom | Senior Corporate Risk Management Engineer

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From: [Stoedter, Karla](#)
To: [Phillips, Charles](#)
Subject: FW: documents
Date: Wednesday, July 25, 2018 6:37:00 AM

More support for our position.

From: Sanchez Santiago, Elba
Sent: Tuesday, July 24, 2018 5:07 PM
To: Stoedter, Karla <Karla.Stoedter@nrc.gov>
Cc: Sargis, Daniel <Daniel.Sargis@nrc.gov>
Subject: RE: documents

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Branch 1: (817) 200-1148**

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Thanks,
Elba

From: Stoedter, Karla

Sent: Tuesday, July 24, 2018 9:59 AM

To: Sanchez Santiago, Elba <Elba.SanchezSantiago@nrc.gov>

Subject: documents

Here's what I'm looking for:

Watts Bar 1 inspection report 2015-004 - ML 16034A214

Davis Besse inspection report 2016008

Grand Gulf report on the alternate decay heat removal issue (the event happened on September 23, 2016)

SIT report from Cooper on the Division 1 RHR minimum flow isolation (SIT was done in March 2017 but I have no idea whether the issue was in the SIT report or not)

INPO IER 1-17-5 ML17171A309

Thanks for helping,

Karla

From: [Kozak, Laura](#)
To: [Louden, Patrick](#)
Subject: RE: Clinton planning SERP
Date: Wednesday, July 25, 2018 12:02:46 PM

I don't see a problem with 30 minutes.

The presentation is for the briefing today, not for the planning SERP – just to be clear.

From: Loudon, Patrick
Sent: Wednesday, July 25, 2018 11:57 AM
To: Kozak, Laura <Laura.Kozak@nrc.gov>
Subject: RE: Clinton planning SERP

Laura – Thanks for the forwarding the info.

We need to drive this meeting to be no more than 30 minutes if possible. We are backed up against the DEDO All Hands meeting

From: Kozak, Laura
Sent: Wednesday, July 25, 2018 11:54 AM
To: Stoedter, Karla <Karla.Stoedter@nrc.gov>; Riemer, Kenneth <Kenneth.Riemer@nrc.gov>; Loudon, Patrick <Patrick.Louden@nrc.gov>
Cc: Lara, Julio <Julio.Lara@nrc.gov>; Hanna, John <John.Hanna@nrc.gov>
Subject: Clinton planning SERP

FYI. NRR/DRA will be briefing NRR management this afternoon in preparation for the planning SERP. Attached is the presentation they are using. We anticipate agreement tomorrow with the plan to go forward with HQ in the lead for the DRE and committing to completing the DRE by the end of August.

The presentation has a schedule for resolving the issue that is very draft. I cautioned NRR that right now we need to focus on the re-exit, issuing the report, completing the DRE and conducting a SERP if necessary by the dates we have committed to.

If you have any questions, let me know.

Laura

From: [Hanna, John](#)
To: [Kozak, Laura](#)
Subject: Clinton EDG issue
Date: Thursday, July 26, 2018 8:59:26 AM

Laura,

I saw your door was closed so I didn't want to bother you... but I looked at Jeff's presentation and had a couple of questions. Would you have 2 minutes to talk before the planning SERP?

Nothing major. Just wanted to explore a couple of technical points. Thanks.

John

From: [Kozak, Laura](#)
To: [Mitman, Jeffrey](#)
Subject: Clinton
Date: Thursday, July 26, 2018 3:37:00 PM

I sent the questions to Joe and had a brief discussion about them. He will get back to me next week about when they will have answers to discuss.

Laura

From: [Kozak, Laura](#)
To: [Mitman, Jeffrey](#)
Subject: Questions for Clinton
Date: Thursday, July 26, 2018 8:25:00 AM
Attachments: [questions july 26.docx](#)

Jeff

See attached. I drafted a question on FLEX reliability data and added my questions about training. I'd like to send this to Joe today. Comments/

Laura

1. Are there any other airlocks besides those at 737 and 828?
2. What was the status of the primary containment airlocks during the entire time of the unavailability of the Div. 2 EDG?
3. Where there any other openings in containment that would prevent containment pressurization upon loss of SDC and subsequent steaming into primary containment during the entire period of Div. 2 EDG unavailability?
4. Exelon supplied a containment closure procedure. If penetrations were open, is there any reason why primary containment could not or would not be closed during any period of Div. 2 EDG unavailability?
5. Base HEP analysis assumes appropriate instrumentation is available. Of most importance is RPV level. The two ranges that appear to be calibrated for the conditions of interest are the shutdown and fuel zone instruments. What level instruments were available during the period of Div. 2 EDG unavailability?
6. Please provide reliability data for FLEX equipment (number of starts, duration of runs, and number of failures to start or run). For equipment failures, please provide the associated condition report.
7. For the simulator exercise related to FLEX, was the Division 3 DG available? The guide indicates the HPCS pump shaft was damaged but is silent on the availability of the DG.
8. Training material for the Division 3 cross-tie includes a 5 minute discussion of the procedure during an EDMG-based simulator exercise and a DBIG training session covering all EDMGs with 2 slides showing the cross-tie procedure and a diagram of the electrical line-up. Does training include required walk-throughs of the procedure in the field?

From: [Kozak, Laura](#)
To: ["Edom, Joseph T.:\(Contractor - GenCo-Nuc\)"](#)
Subject: Questions
Date: Thursday, July 26, 2018 2:37:00 PM

Joe – Here are the questions that I mentioned yesterday. Please give me a call at your convenience to discuss.

Laura

1. Are there any other airlocks besides those at 737 and 828?
2. What was the status of the primary containment airlocks during the entire time of the unavailability of the Div. 2 EDG?
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From: [Kozak, Laura](#)
To: ["Edom, Joseph T:\(Contractor - GenCo-Nuc\)"](#)
Subject: RE: Question Topics
Date: Thursday, July 26, 2018 7:15:00 AM

Available level instrumentation

From: Edom, Joseph T:(Contractor - GenCo-Nuc) [mailto:Joe.Edom@exeloncorp.com]
Sent: Wednesday, July 25, 2018 1:32 PM
To: Kozak, Laura <Laura.Kozak@nrc.gov>
Subject: [External_Sender] Question Topics

Laura,

I am preparing an e-mail to the station to give them the heads up that the questions are coming and wanted to make sure I had the categories correct. What I have is:

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I thought there was a fourth area. Could you remind me what the fourth category was? Thank you.

Joe Edom | Senior Corporate Risk Management Engineer

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From: [Mitman, Jeffrey](#)
To: [Kozak, Laura](#)
Subject: RE: Questions for Clinton
Date: Thursday, July 26, 2018 12:20:38 PM
Attachments: [questions july 26.docx](#)

One addition to your data question. See attached.

Jeff Mitman

From: Kozak, Laura
Sent: Thursday, July 26, 2018 9:26 AM
To: Mitman, Jeffrey <Jeffrey.Mitman@nrc.gov>
Subject: Questions for Clinton

Jeff

See attached. I drafted a question on FLEX reliability data and added my questions about training. I'd like to send this to Joe today. Comments/

Laura

1. Are there any other airlocks besides those at 737 and 828?
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From: [Edom, Joseph T:\(Contractor - GenCo-Nuc\)](#)
To: [Kozak, Laura](#)
Cc: [Joe Edom - Jensen Hughes \(JEdom@jensenhughes.com\)](#)
Subject: [External_Sender] RE: Questions
Date: Friday, July 27, 2018 1:07:03 PM

Laura,

For questions 2, 3, 4 and 5, there is a statement similar to “during the entire period of Div. 2 EDG unavailability”. Does this mean only the time from when the Division 2 DG was declared Operable and available but really wasn't due to the starting air valves being closed or for the entire period when the Division 2 DG was inoperable and unavailable?

In question 4, it refers to “any period of Division 2 DG unavailability. Again does this only refer to the time from when the Division 2 DG was declared Operable and available but really wasn't due to the starting air valves being closed or for the entire period when the Division 2 DG was inoperable and unavailable?

Thank you.

Joe Edom | Senior Corporate Risk Management Engineer

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O: +1 630-627-2277 | [\[REDACTED\]](#) F: +1 630-627-2278
JEdom@jensenhughes.com | www.jensenhughes.com

+++++

Exelon E-mail: joe.edom@exeloncorp.com

From: Kozak, Laura [mailto:Laura.Kozak@nrc.gov]
Sent: Thursday, July 26, 2018 2:37 PM
To: Edom, Joseph T:(Contractor - GenCo-Nuc) <Joe.Edom@exeloncorp.com>
Subject: [EXTERNAL] Questions

Joe – Here are the questions that I mentioned yesterday. Please give me a call at your convenience to discuss.

Laura

1. Are there any other airlocks besides those at 737 and 828?
2. What was the status of the primary containment airlocks during the entire time of the unavailability of the Div. 2 EDG?
3. Where there any other openings in containment that would prevent containment pressurization upon loss of SDC and subsequent steaming into primary containment during the entire period of Div. 2 EDG unavailability?

4. Exelon supplied a containment closure procedure. If penetrations were open, is there any reason why primary containment could not or would not be closed during any period of Div. 2 EDG unavailability?
5. Base HEP analysis assumes appropriate instrumentation is available. Of most importance is RPV level. The two ranges that appear to be calibrated for the conditions of interest are the shutdown and fuel zone instruments. What level instruments were available during the period of Div. 2 EDG unavailability?
6. Please provide reliability data for FLEX equipment (number of starts, duration of runs, and number of failures to start or run). Please provide failure probabilities derived from the previous data. For equipment failures, please provide the associated condition report.
7. For the simulator exercise related to FLEX, was the Division 3 DG available? The guide indicates the HPCS pump shaft was damaged but is silent on the availability of the DG.
8. Training material for the Division 3 cross-tie includes a 5 minute discussion of the procedure during an EDMG-based simulator exercise and a DBIG training session covering all EDMGs with 2 slides showing the cross-tie procedure and a diagram of the electrical line-up. Does training include required walk-throughs of the procedure in the field?

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From: [Phillips, Charles](#)
To: [Kozak, Laura](#)
Subject: FW: Root Cause
Date: Monday, July 30, 2018 9:56:05 AM
Attachments: [Root Cause Report - 4138790 July 18 Hoops rev 2.docx](#)

Attachment is non-responsive due to narrowing the request to exclude licensee originated documents. Attachment is: Root Cause Investigation Report, "Division 2 Emergency Diesel Generator Air Receivers Found Isolated During Rounds" (PI-AA-125-1001, Rev. 3, 6/26/18)

From: Sanders, Garrett R:(GenCo-Nuc) [mailto:Garrett.Sanders@exeloncorp.com]
Sent: Wednesday, July 18, 2018 4:18 PM
To: Phillips, Charles <Charles.Phillips@nrc.gov>
Cc: Shelton, Dale A:(GenCo-Nuc) <Dale.Shelton@exeloncorp.com>
Subject: [External_Sender] Root Cause

Chuck,

The root cause report you requested is attached. Please let me know if you have any questions or require further information.

Garrett

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From: [Kozak, Laura](#)
To: [Mitman, Jeffrey](#); [Montecalvo, Michael](#)
Subject: new documents on share point - Clinton
Date: Monday, July 30, 2018 1:17:00 PM

I uploaded the root cause evaluation and the LER that was submitted.

From: [Edom, Joseph T:\(Contractor - GenCo-Nuc\)](#)
To: [Kozak, Laura](#)
Cc: [Joe Edom - Jensen Hughes \(JEdom@jensenhughes.com\)](#)
Subject: [External_Sender] RE: Questions
Date: Thursday, August 02, 2018 10:21:00 AM

Hi Laura.

Just wanted to update you on the status of the question responses. We are working to get the majority of them to you by the end of the week. I requested the site prepare a written response that we could send you and then set up a call to discuss them. My guess is that question 6 on the reliability will take a little bit longer, probably into next week.

We are also looking to have the GOTHIC analysis signed off by Friday or Monday and the risk assessment that we prepared will follow that sign off.

Does that still meet your needs?

Thank you.

Joe Edom | Senior Corporate Risk Management Engineer

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Exelon E-mail: joe.edom@exeloncorp.com

From: Kozak, Laura [mailto:Laura.Kozak@nrc.gov]
Sent: Thursday, July 26, 2018 2:37 PM
To: Edom, Joseph T:(Contractor - GenCo-Nuc) <Joe.Edom@exeloncorp.com>
Subject: [EXTERNAL] Questions

Joe – Here are the questions that I mentioned yesterday. Please give me a call at your convenience to discuss.

Laura

1. Are there any other airlocks besides those at 737 and 828?
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From: [Kozak, Laura](#)
To: [Mitman, Jeffrey](#)
Cc: [Montecalvo, Michael](#)
Subject: FW: RE: Questions
Date: Thursday, August 02, 2018 10:23:00 AM

From: Edom, Joseph T:(Contractor - GenCo-Nuc) [mailto:Joe.Edom@exeloncorp.com]
Sent: Thursday, August 02, 2018 10:20 AM
To: Kozak, Laura <Laura.Kozak@nrc.gov>
Cc: Joe Edom - Jensen Hughes (JEdom@jensenhughes.com) <JEdom@jensenhughes.com>
Subject: [External_Sender] RE: Questions

Hi Laura.

Just wanted to update you on the status of the question responses. We are working to get the majority of them to you by the end of the week. I requested the site prepare a written response that we could send you and then set up a call to discuss them. My guess is that question 6 on the reliability will take a little bit longer, probably into next week.

We are also looking to have the GOTHIC analysis signed off by Friday or Monday and the risk assessment that we prepared will follow that sign off.

Does that still meet your needs?

Thank you.

Joe Edom | Senior Corporate Risk Management Engineer

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Exelon E-mail: joe.edom@exeloncorp.com

From: Kozak, Laura [mailto:Laura.Kozak@nrc.gov]
Sent: Thursday, July 26, 2018 2:37 PM
To: Edom, Joseph T:(Contractor - GenCo-Nuc) <Joe.Edom@exeloncorp.com>
Subject: [EXTERNAL] Questions

Joe – Here are the questions that I mentioned yesterday. Please give me a call at your convenience to discuss.

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From: [Kozak, Laura](#)
To: [Mitman, Jeffrey](#)
Subject: RE: RE: Questions
Date: Thursday, August 02, 2018 12:37:00 PM

Forgot to mention – Chuck planning to re-exit tomorrow with Clinton. The re-exit is because the two green findings were slightly changed. The finding we are dealing with has not changed.

The report is in draft and will likely be issued in the next couple of weeks (my guess). It describes the significance of the issue we are working on from the phase 1 and 2 perspective and calls it TBD because a phase 3 or DRE is ongoing.

Laura

From: Mitman, Jeffrey
Sent: Thursday, August 02, 2018 10:33 AM
To: Kozak, Laura <Laura.Kozak@nrc.gov>
Subject: RE: RE: Questions

Laura, do you know what Exelon is using Gothic to calculate? I assume it is the TTB and TTCU analysis or it could be some containment calcs.

Thanks.

Jeff Mitman

From: Kozak, Laura
Sent: Thursday, August 02, 2018 11:24 AM
To: Mitman, Jeffrey <Jeffrey.Mitman@nrc.gov>
Cc: Montecalvo, Michael <Michael.Montecalvo@nrc.gov>
Subject: FW: RE: Questions

From: Edom, Joseph T:(Contractor - GenCo-Nuc) [<mailto:Joe.Edom@exeloncorp.com>]
Sent: Thursday, August 02, 2018 10:20 AM
To: Kozak, Laura <Laura.Kozak@nrc.gov>
Cc: Joe Edom - Jensen Hughes (JEdom@jensenhughes.com) <JEdom@jensenhughes.com>
Subject: [External_Sender] RE: Questions

Hi Laura.

Just wanted to update you on the status of the question responses. We are working to get the majority of them to you by the end of the week. I requested the site prepare a written response that we could send you and then set up a call to discuss them. My guess is that question 6 on the reliability will take a little bit longer, probably into next week.

We are also looking to have the GOTHIC analysis signed off by Friday or Monday and the risk assessment that we prepared will follow that sign off.

Does that still meet your needs?

Thank you.

Joe Edom | Senior Corporate Risk Management Engineer

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Exelon E-mail: joe.edom@exeloncorp.com

From: Kozak, Laura [<mailto:Laura.Kozak@nrc.gov>]

Sent: Thursday, July 26, 2018 2:37 PM

To: Edom, Joseph T:(Contractor - GenCo-Nuc) <Joe.Edom@exeloncorp.com>

Subject: [EXTERNAL] Questions

Joe – Here are the questions that I mentioned yesterday. Please give me a call at your convenience to discuss.

Laura

1. Are there any other airlocks besides those at 737 and 828?
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From: [Edom, Joseph T:\(Contractor - GenCo-Nuc\)](#)
To: [Kozak, Laura](#)
Subject: [External_Sender] RE: out of the office
Date: Monday, August 06, 2018 12:35:23 PM

Hi Laura.

Yes, I think that could work. I am still working to get the responses put together. Can I check in with you on Thursday?

Joe Edom | Senior Corporate Risk Management Engineer

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Exelon E-mail: joe.edom@exeloncorp.com

From: Kozak, Laura [mailto:Laura.Kozak@nrc.gov]
Sent: Monday, August 06, 2018 11:56 AM
To: Edom, Joseph T:(Contractor - GenCo-Nuc) <Joe.Edom@exeloncorp.com>
Subject: [EXTERNAL] out of the office

Joe

I wanted to let you know that I will be out of the office until Thursday. We had talked about discussing the answers to our questions this week – maybe Thursday or Friday? If that works for you, if not we will discuss a time next week.

Laura

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Attachment is non-responsive due to
narrowing the request to exclude
licensee originated documents.
Attachment is: EC 624344 R/000

From: [Edom, Joseph T. \(Contractor - GenCo-Nuc\)](#)
To: [Kozak, Laura](#)
Cc: [Joe Edom - Jensen Hughes \(JEdom@jensenhughes.com\)](#)
Subject: [External_Sender] GOTHIC Analysis Used in Support of the Clinton Division 2 DG UA Risk Assessment
Date: Thursday, August 09, 2018 1:51:11 PM
Attachments: [EC624344.pdf](#)

Laura,

Attached is EC 624344, which performed the GOTHIC analysis used to support the HEP developments in the Clinton Division 2 DG unavailability risk assessment.

Joe Edom | Senior Corporate Risk Management Engineer

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From: [Stoedter, Karla](#)
To: [Sanchez Santiago, Elba](#); [Sargis, Daniel](#)
Subject: FW: Update on Clinton SDP
Date: Thursday, August 09, 2018 2:17:00 PM

FYI

From: Kozak, Laura

Sent: Thursday, August 09, 2018 1:34 PM

To: Stoedter, Karla <Karla.Stoedter@nrc.gov>; Phillips, Charles <Charles.Phillips@nrc.gov>; Loudon, Patrick <Patrick.Loudon@nrc.gov>

Cc: Lara, Julio <Julio.Lara@nrc.gov>; Hanna, John <John.Hanna@nrc.gov>; Mitman, Jeffrey <Jeffrey.Mitman@nrc.gov>

Subject: Update on Clinton SDP

FYI –

We continue to make progress on the Clinton SDP but no preliminary results as of yet. Today we received the licensee's signed off risk evaluation and supporting thermo-hydraulic analysis – 400+ pages of material. The licensee's conclusion is that the delta CDF is approximately $1E-8/yr.$, or Green. We have not reviewed their evaluation yet. The licensee also provided answers to 6 of the 7 questions that we asked approximately 2 weeks ago. The outstanding question is related to FLEX equipment reliability – that information and answer is still under licensee development and should be provided soon. Please let me know if you have any questions.

Laura

From: [Kozak, Laura](#)
To: [Phillips, Charles](#)
Subject: licensee risk evaluation on the G:
Date: Thursday, August 09, 2018 5:01:00 PM

Hi Chuck

Just to keep you in the loop – I put the licensees risk evaluation and supporting information on the G drive.

Laura

From: [Helton, Donald](#)
To: [Kozak, Laura](#)
Subject: OE metric
Date: Thursday, August 09, 2018 12:31:00 PM

Laura,

I (re-)found the relevant part of the Enforcement Manual w.r.t. the issue we talked about this morning. For the 120-day metric, the “start date” is defined as:

Start Date: The measuring period starts on the latest of the following dates: (1) inspection exit date, (2) the date the results of an agency investigation are forwarded to the staff, (3) the date that the Department of Justice (DOJ) says NRC may proceed, for cases referred to the DOJ, or (4) the date of the Department of Labor decision that is the basis for the action. The inspection exit date will be defined by the region or office performing the inspection and may be the date of the telephone re-exit. For investigation cases, the start date will typically not be the re-exit date. However, on rare occasions, when significant additional inspection effort is needed after issuance of the investigation results are forwarded to the staff, the re-exit date will be used as the start date.

I presume that the region would almost always invoke the re-exit...

Don

- - - - -

Don Helton
Division of Inspection and Regional Support (Rotational)
Office of Nuclear Reactor Regulation
US Nuclear Regulatory Commission
(301) 415-1545

From: [Kozak, Laura](#)
To: ["Edom, Joseph T:\(Contractor - GenCo-Nuc\)"](#)
Subject: RE: GOTHIC Analysis Used in Support of the Clinton Division 2 DG UA Risk Assessment
Date: Thursday, August 09, 2018 2:04:00 PM

Joe

I got the documents. Thank you. Laura

From: Edom, Joseph T:(Contractor - GenCo-Nuc) [mailto:Joe.Edom@exeloncorp.com]
Sent: Thursday, August 09, 2018 1:50 PM
To: Kozak, Laura <Laura.Kozak@nrc.gov>
Cc: Joe Edom - Jensen Hughes (JEdom@jensenhughes.com) <JEdom@jensenhughes.com>
Subject: [External_Sender] GOTHIC Analysis Used in Support of the Clinton Division 2 DG UA Risk Assessment

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Attached is EC 624344, which performed the GOTHIC analysis used to support the HEP developments in the Clinton Division 2 DG unavailability risk assessment.

Joe Edom | Senior Corporate Risk Management Engineer

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From: [Mitman, Jeffrey](#)
To: [Kozak, Laura](#)
Cc: [Montecalvo, Michael](#)
Subject: Clinton Model Status
Date: Friday, August 10, 2018 7:47:00 AM

Laura, I've downloaded the model that Bob Buell created from the Sapphire website. I've created change sets that set the HPCS pump TM, Div. 1 EDG TM terms to True (all other TM terms to False) and the Div. 2 EDG FS term to True. I have not incorporated any of the FLEX systems yet. The model is quantifying in the Yellow range for a 3.6 day exposure time. Because I've not credited FLEX, I believe this quantification is significantly conservative. The model is uploaded to SharePoint if you want to look at it.

Jeff Mitman

From: [Stoedter, Karla](#)
To: [Skokowski, Richard](#)
Cc: [Wilk, Brenda](#); [Phillips, Charles](#)
Subject: Clinton SIT report
Date: Monday, August 13, 2018 11:13:00 AM

Rick,

We are putting the final touches on the Clinton SIT report. You have looked at the report previously due to the Criterion XVI violation that Chuck Phillips discussed with you. The report also has an EA number on it due to the TBD issue Chuck worked on with Ken Lambert. We plan to put you on concurrence. Is this correct?

Thanks,

Karla

From: [Hunter, Christopher](#)
To: [Kozak, Laura](#)
Subject: Clinton LER 461-2018-002
Date: Tuesday, August 14, 2018 1:55:52 PM

Laura,

Are you working this issue (<https://www.nrc.gov/docs/ML1819/ML18199A106.pdf>)? I wasn't on my radar yesterday during the SRA call, but I think this was the event you mentioned.

Thanks,
Chris

From: [Edom, Joseph T. \(Contractor - GenCo-Nuc\)](#)
To: [Kozak, Laura](#)
Subject: [External_Sender] Requested Copy of CPS 1401.09
Date: Wednesday, August 15, 2018 3:28:08 PM
Attachments: [CPS 1401.09_Rev9f.pdf](#)

Attachment is non-responsive due to narrowing the request to exclude licensee originated documents.

Laura,

Attached is the requested copy of CPS procedure 1401.09.

Joe Edom | Senior Corporate Risk Management Engineer

JENSEN HUGHES

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From: [Kozak, Laura](#)
To: [Mitman, Jeffrey](#)
Subject: PRA notebook for AC power on share point
Date: Thursday, August 16, 2018 2:57:00 PM

Jeff

I just put Clinton's PRA notebook for AC power on share point. It is old so a caveat there. At the very end of the document is a write-up about the use of the Division 2 cross tie that I found interesting. Note that it was written in 2014 before FLEX was implemented and there is no mention of FLEX.

Laura

From: [Edom, Joseph T. \(Contractor - GenCo-Nuc\)](#)
To: [Kozak, Laura](#)
Subject: [External_Sender] Conference Call for Clinton Questions
Date: Friday, August 17, 2018 1:48:52 PM

Laura,

I am working to setup the call you requested. Would you have availability on Tuesday and Thursday. I had initially wanted to do Tuesday but based on EP drills on Tuesday and Wednesdays, the site folks may have better availability on Thursday.

Any preference on any days of next week?

Thank you.

Joe Edom | Senior Corporate Risk Management Engineer

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From: [Edom, Joseph T. \(Contractor - GenCo-Nuc\)](#)
To: [Kozak, Laura](#)
Subject: [External_Sender] Question 6 Response
Date: Friday, August 17, 2018 10:13:30 AM
Attachments: [Question6_Response_Final.pdf](#)

Attachment is non-responsive due to narrowing the request to exclude licensee originated documents.

Laura,

Attached is the response to Question 6. Sorry it took me so long to get it to you.

Joe Edom | Senior Corporate Risk Management Engineer

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From: [Edom, Joseph T:\(Contractor - GenCo-Nuc\)](#)
To: [Kozak, Laura](#)
Subject: [External_Sender] RE: Question 6 Response
Date: Friday, August 17, 2018 10:42:33 AM
Attachments: [AR_2686374.pdf](#)
[AR_2688011.pdf](#)
[AR_4163408_1FX01PA.pdf](#)

All attachments are non-responsive due to narrowing the request to exclude licensee originated documents.

Sorry. Forgot to attach them.

Joe Edom | Senior Corporate Risk Management Engineer

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From: Kozak, Laura [mailto:Laura.Kozak@nrc.gov]
Sent: Friday, August 17, 2018 10:32 AM
To: Edom, Joseph T:(Contractor - GenCo-Nuc) <Joe.Edom@exeloncorp.com>
Subject: RE: Question 6 Response

Joe

Could you send me the IRs associated with the failures?

Thanks
Laura

From: Edom, Joseph T:(Contractor - GenCo-Nuc) [mailto:Joe.Edom@exeloncorp.com]
Sent: Friday, August 17, 2018 10:12 AM
To: Kozak, Laura <Laura.Kozak@nrc.gov>
Subject: [External_Sender] Question 6 Response

Laura,

Attached is the response to Question 6. Sorry it took me so long to get it to you.

Joe Edom | Senior Corporate Risk Management Engineer

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From: [Kozak, Laura](#)
To: [Mitman, Jeffrey](#)
Cc: [Montecalvo, Michael](#)
Subject: Clinton Shutdown SDP - Flex reliability data - answer to Question 6
Date: Friday, August 17, 2018 10:17:00 AM

Jeff, Mike

I just received the answer from the licensee about the FLEX equipment reliability data. I put it on the share point site.

Laura

From: [Kozak, Laura](#)
To: [Mitman, Jeffrey](#)
Subject: RE: Conference Call for Clinton Questions
Date: Friday, August 17, 2018 2:58:00 PM

Sounds good. Thank you.

Laura

From: Mitman, Jeffrey
Sent: Friday, August 17, 2018 2:58 PM
To: Kozak, Laura <Laura.Kozak@nrc.gov>
Subject: RE: Conference Call for Clinton Questions

Laura, I'm currently scheduled off next Thursday and Friday. However, my personal plans may need to be changed, I'll be in a good position to let you know if I'm available first thing Monday morning.

Jeff Mitman

From: Kozak, Laura
Sent: Friday, August 17, 2018 3:41 PM
To: Edom, Joseph T:(Contractor - GenCo-Nuc) <Joe.Edom@exeloncorp.com>
Cc: Mitman, Jeffrey <Jeffrey.Mitman@nrc.gov>
Subject: RE: Conference Call for Clinton Questions

Joe

Thursday works for me. I copied Jeff to see about his availability on Thursday.

Laura

From: Edom, Joseph T:(Contractor - GenCo-Nuc) [<mailto:Joe.Edom@exeloncorp.com>]
Sent: Friday, August 17, 2018 1:48 PM
To: Kozak, Laura <Laura.Kozak@nrc.gov>
Subject: [External_Sender] Conference Call for Clinton Questions

Laura,

I am working to setup the call you requested. Would you have availability on Tuesday and Thursday. I had initially wanted to do Tuesday but based on EP drills on Tuesday and Wednesdays, the site folks may have better availability on Thursday.

Any preference on any days of next week?

Thank you.

Joe Edom | Senior Corporate Risk Management Engineer

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From: [Kozak, Laura](#)
To: ["Edom, Joseph T.:\(Contractor - GenCo-Nuc\)"](#)
Subject: RE: Question 6 Response
Date: Friday, August 17, 2018 10:15:00 AM

Got it.

Thanks Joe

Laura

From: Edom, Joseph T:(Contractor - GenCo-Nuc) [mailto:Joe.Edom@exeloncorp.com]
Sent: Friday, August 17, 2018 10:12 AM
To: Kozak, Laura <Laura.Kozak@nrc.gov>
Subject: [External_Sender] Question 6 Response

Laura,

Attached is the response to Question 6. Sorry it took me so long to get it to you.

Joe Edom | Senior Corporate Risk Management Engineer

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From: [Kozak, Laura](#)
To: [Arner, Frank](#); [Cahill, Christopher](#); [Hanna, John](#); [Macdonald, George](#); [Freeman, Scott](#); [Deese, Rick](#); [Loveless, David](#)
Cc: [Mitman, Jeffrey](#)
Subject: EDG SDPs
Date: Monday, August 20, 2018 2:56:29 PM

SRAs

I am looking for examples of SDPs related to EDG failures that were recoverable. If you have an example, especially one that was GTG, can you send me the info, or point me in the right direction?

As you might know, RIII is working a shutdown SDP for Clinton – Jeff M. has the lead for the analysis. I am thinking a bit ahead to comparing this issue with other issues in the past when we thought the EDG was recoverable.

Thanks for any examples!

Laura

From: [Kozak, Laura](#)
To: [Hunter, Christopher](#)
Subject: RE: ASP that credited recovery of EDG FTS
Date: Monday, August 20, 2018 4:10:00 PM

Chris

That would be great. Thanks
Laura

From: Hunter, Christopher
Sent: Monday, August 20, 2018 4:07 PM
To: Kozak, Laura <Laura.Kozak@nrc.gov>
Subject: RE: ASP that credited recovery of EDG FTS

Laura,

I will start a search to see what I can come up with. I hope to have any examples to you by tomorrow afternoon. Is that okay?

Chris

From: Kozak, Laura
Sent: Monday, August 20, 2018 4:13 PM
To: Hunter, Christopher <Christopher.Hunter@nrc.gov>
Subject: ASP that credited recovery of EDG FTS

Chris

I am looking for any ASP events that credited recovery of an EDG FTS using SPAR-H, rather than data.

As Jeff and I are working the Clinton shutdown issue where the starting air to the EDG was isolated while the other division of AC power was out of service, I am anticipating debate over recovery. So I am looking for SDPs and ASP events that may have modeled similar recovery conditions.

Any examples you have would be useful.

Thanks
Laura

From: [Kozak, Laura](#)
To: ["Edom, Joseph T:\(Contractor - GenCo-Nuc\)"](#)
Cc: [Mitman, Jeffrey](#)
Subject: RE: RE: Conference Call for Clinton Questions
Date: Monday, August 20, 2018 7:44:00 AM

Thursday will work for both of us. Thanks.

Laura

From: Edom, Joseph T:(Contractor - GenCo-Nuc) [mailto:Joe.Edom@exeloncorp.com]
Sent: Friday, August 17, 2018 3:24 PM
To: Kozak, Laura <Laura.Kozak@nrc.gov>
Cc: Mitman, Jeffrey <Jeffrey.Mitman@nrc.gov>
Subject: [External_Sender] RE: Conference Call for Clinton Questions

Thanks.

Joe Edom | Senior Corporate Risk Management Engineer

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Exelon E-mail: joe.edom@exeloncorp.com

From: Kozak, Laura [mailto:Laura.Kozak@nrc.gov]
Sent: Friday, August 17, 2018 2:41 PM
To: Edom, Joseph T:(Contractor - GenCo-Nuc) <Joe.Edom@exeloncorp.com>
Cc: Mitman, Jeffrey <Jeffrey.Mitman@nrc.gov>
Subject: RE: Conference Call for Clinton Questions

Joe

Thursday works for me. I copied Jeff to see about his availability on Thursday.

Laura

From: Edom, Joseph T:(Contractor - GenCo-Nuc) [mailto:Joe.Edom@exeloncorp.com]
Sent: Friday, August 17, 2018 1:48 PM
To: Kozak, Laura <Laura.Kozak@nrc.gov>
Subject: [External_Sender] Conference Call for Clinton Questions

Laura,

I am working to setup the call you requested. Would you have availability on

Tuesday and Thursday. I had initially wanted to do Tuesday but based on EP drills on Tuesday and Wednesdays, the site folks may have better availability on Thursday.

Any preference on any days of next week?

Thank you.

Joe Edom | Senior Corporate Risk Management Engineer

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From: [Kozak, Laura](#)
To: [Hunter, Christopher](#)
Subject: RE: ASP that credited recovery of EDG FTS
Date: Tuesday, August 21, 2018 9:30:00 AM

Thanks Chris!

From: Hunter, Christopher
Sent: Monday, August 20, 2018 4:50 PM
To: Kozak, Laura <Laura.Kozak@nrc.gov>
Subject: RE: ASP that credited recovery of EDG FTS

Another one can be seen here

[http://fusion.nrc.gov/res/team/dra/PRB/ASP/ASP%20Document%20Library/Final%20ASP%20Analysis%20Reports%20\(FYs%201969-2014\)/2003/Final%20ASP%20Analysis_Kewuane%20\(LER%20305-03-002\).pdf](http://fusion.nrc.gov/res/team/dra/PRB/ASP/ASP%20Document%20Library/Final%20ASP%20Analysis%20Reports%20(FYs%201969-2014)/2003/Final%20ASP%20Analysis_Kewuane%20(LER%20305-03-002).pdf)

I think that is about it. Most of the recent EDG failures have been either evaluated by the SDP or involved more severe failures.

I don't know if you have the latest copy, but I attached are master ASP datasheet that contains a list of all precursor and includes ML numbers and hyperlinks.

From: Kozak, Laura
Sent: Monday, August 20, 2018 4:13 PM
To: Hunter, Christopher <Christopher.Hunter@nrc.gov>
Subject: ASP that credited recovery of EDG FTS

Chris

I am looking for any ASP events that credited recovery of an EDG FTS using SPAR-H, rather than data.

As Jeff and I are working the Clinton shutdown issue where the starting air to the EDG was isolated while the other division of AC power was out of service, I am anticipating debate over recovery. So I am looking for SDPs and ASP events that may have modeled similar recovery conditions.

Any examples you have would be useful.

Thanks
Laura

From: [Kozak, Laura](#)
To: [Hunter, Christopher](#)
Subject: RE: Clinton EDG Issue
Date: Tuesday, August 21, 2018 12:27:00 PM

Yes. This being a shutdown issue, it is configuration specific. The PD is only on one EDG but the unavailability occurred with the opposite division was OOS.

From: Hunter, Christopher
Sent: Tuesday, August 21, 2018 12:18 PM
To: Kozak, Laura <Laura.Kozak@nrc.gov>
Subject: Clinton EDG Issue

Laura,

Is the SDP evaluation accounting for the unavailability of both EDGs?

Thanks,
Chris

Sr. Reliability and Risk Engineer
RES/DRA/PRB
T-10A50
Phone: (301) 415-1394
Home Phone: [REDACTED] (b)(6)
Mobile Phone: [REDACTED] (b)(6)
Email: Christopher.Hunter@nrc.gov

From: [Kozak, Laura](#)
To: [Macdonald, George](#)
Subject: RE: EDG SDPs
Date: Tuesday, August 21, 2018 7:25:00 AM

Thanks George. I'd be interested in the green issue if you can send it to me. Did you use SPAR-H for recovery credit?

From: Macdonald, George
Sent: Tuesday, August 21, 2018 6:24 AM
To: Kozak, Laura <Laura.Kozak@nrc.gov>
Subject: RE: EDG SDPs

Laura,
Hope you all are doing well in RIII. I had an EDG issue at Farley which was mostly recoverable but it was not >Green. This was a very small jacket water leak resulting from maintenance re-using a pipe nipple after screwing up the threads with a pipe wrench. The EDG would likely have operated for most of the 24 hour period prior to the expansion tank alarm. This was not a shutdown issue. I don't have any recoverable >Green examples to send you.

From: Kozak, Laura
Sent: Monday, August 20, 2018 3:56 PM
To: Arner, Frank <Frank.Arner@nrc.gov>; Cahill, Christopher <Christopher.Cahill@nrc.gov>; Hanna, John <John.Hanna@nrc.gov>; Macdonald, George <George.MacDonald@nrc.gov>; Freeman, Scott <Scott.Freeman@nrc.gov>; Deese, Rick <Rick.Deese@nrc.gov>; Loveless, David <David.Loveless@nrc.gov>
Cc: Mitman, Jeffrey <Jeffrey.Mitman@nrc.gov>
Subject: EDG SDPs

SRAs

I am looking for examples of SDPs related to EDG failures that were recoverable. If you have an example, especially one that was GTG, can you send me the info, or point me in the right direction?

As you might know, RIII is working a shutdown SDP for Clinton – Jeff M. has the lead for the analysis. I am thinking a bit ahead to comparing this issue with other issues in the past when we thought the EDG was recoverable.

Thanks for any examples!

Laura

From: [Edom, Joseph T. \(Contractor - GenCo-Nuc\)](#)
To: [Kozak, Laura](#); [Mitman, Jeffrey](#)
Cc: [Joe Edom - Jensen Hughes \(JEdom@jensenhughes.com\)](#)
Subject: [External_Sender] Clinton DG Discussion Tomorrow
Date: Wednesday, August 22, 2018 7:07:14 PM

Laura and Jeff,

I just found out that Mike Antonelli from Operations and Mark McClure from Operations Training will be participating on the call tomorrow.

Joe Edom | Senior Corporate Risk Management Engineer

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From: [Edom, Joseph T. \(Contractor - GenCo-Nuc\)](#)
To: [Kozak, Laura](#)
Cc: [Joe Edom - Jensen Hughes \(JEdom@jensenhughes.com\)](#)
Subject: [External_Sender] Phone Call tomorrow
Date: Wednesday, August 22, 2018 3:26:25 PM

Laura,

I am having difficulty in getting commitments from the station on having personnel available for the call. I am working to see if Mike Antonelli would be available after 3PM Central tomorrow (he is in requal training this week).

Would a 3PM maybe 3:30PM call be acceptable? I would still need to get Operations Training to support another call.

Thank you

Joe Edom | Senior Corporate Risk Management Engineer

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From: [Edom, Joseph T. \(Contractor - GenCo-Nuc\)](#)
To: [Kozak, Laura](#); [Mitman, Jeffrey](#)
Subject: [External_Sender] CPS Procedure 4306.01P010
Date: Thursday, August 23, 2018 11:11:41 AM
Attachments: [4306.01P010.pdf](#)

Attachment is non-responsive due to narrowing the request to exclude licensee originated documents.
Attachment is: CPS Procedure 4306.01P010

Laura and Jeff,

The procedure you requested.

Joe Edom | Senior Corporate Risk Management Engineer

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From: [Edom, Joseph T. \(Contractor - GenCo-Nuc\)](#)
To: [Kozak, Laura](#); [Mitman, Jeffrey](#)
Subject: [External_Sender] CPS Procedure 4411.06
Date: Thursday, August 23, 2018 12:21:40 PM
Attachments: [CPS 4411.06.pdf](#)

Attachment is non-responsive due to narrowing the request to exclude licensee originated documents.
Attachment is: CPS Procedure 4411.06

Laura and Jeff,

Procedure 4411.06 as requested.

Joe Edom | Senior Corporate Risk Management Engineer

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From: [Kozak, Laura](#)
To: [Mitman, Jeffrey](#)
Subject: Clinton inspection report
Date: Thursday, August 23, 2018 6:46:00 AM

Just FYI. The inspection report with the finding characterized as TBD will be issued today.
This starts the 90 day clock.

Laura

From: [Wilk, Brenda](#)
To: [Bowen, Jeremy](#); [RidsNrrDorILpl3 Resource](#); [RidsNrrPMClinton Resource](#); [NrrDrsIrib Resource](#); [West, Steven](#); [Roberts, Darrell](#); [Skokowski, Richard](#); [Barker, Allan](#); [DRSIII](#); [DRPIII](#); [ROPAssessment Resource](#)
Subject: CLINTON POWER STATION—NRC SPECIAL INSPECTION REPORT 05000461/2018050
Date: Thursday, August 23, 2018 10:24:16 AM
Attachments: [image001.png](#)

The below attached document has been added to ADAMS.

[View ADAMS Properties ML18235A170](#)

[Open ADAMS Document \(CLINTON POWER STATION-NRC SPECIAL INSPECTION REPORT 05000461/2018050\)](#)

Thank you,

Brenda Wilk

Lead Administrative Assistant
Division of Reactor Projects
U.S. Nuclear Regulatory Commission
(630) 829-9602



From: [nrc_mail_r3 resource](#)
To: [Ng, Raymond](#)
Subject: CLINTON POWER STATION—NRC SPECIAL INSPECTION REPORT 05000461/2018050
Date: Friday, August 24, 2018 9:06:49 PM
Attachments: [CLI 2018050 SIT.pdf](#)

SUBJECT: CLINTON POWER STATION—NRC SPECIAL INSPECTION REPORT
05000461/2018050

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UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION III
2443 WARRENVILLE ROAD, SUITE 210
LISLE, ILLINOIS 60532-4352

August 23, 2018

EA-18-104

Mr. Bryan C. Hanson
Senior VP, Exelon Generation Company, LLC
President and CNO, Exelon Nuclear
4300 Winfield Road
Warrenville, IL 60555

SUBJECT: CLINTON POWER STATION—NRC SPECIAL INSPECTION REPORT
05000461/2018050

Dear Mr. Hanson:

On June 29, 2018, the U.S. Nuclear Regulatory Commission (NRC) completed a reactive inspection at your Clinton Power Station. On August 3, 2018, the NRC inspectors discussed the results of this inspection with Mr. T. Stoner and other members of your staff. The results of this inspection are documented in the enclosed report.

Based on the results of this inspection, the NRC identified two issues that were evaluated under the risk significance determination process. Both of these issues were determined as having very-low safety significance (Green). The NRC has also determined that two violations are associated with these issues. Because the licensee initiated condition reports to address these issues, these violations are being treated as Non-Cited Violations (NCVs), consistent with Section 2.3.2 of the Enforcement Policy. These NCVs are described in the subject inspection report.

Additionally, Results Section (4) of the enclosed report discusses a finding with an associated apparent violation for which the NRC has not reached a preliminary significance determination. This finding involved the apparent failure of licensee personnel to follow multiple procedures resulting in the unavailability of the Division 2 Emergency Diesel Generator when it was relied upon for plant safety. Since the NRC has not made a final determination in this matter, a Notice of Violation is not being issued for this inspection finding at this time. In addition, please be advised that the characterization of the apparent violation described in the enclosed inspection report may change as a result of further NRC review.

If you contest the violations or significance of these NCVs, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001; with copies to the Regional Administrator, Region III; the Director, Office of Enforcement; and the NRC Resident Inspector at the Clinton Power Station.

If you disagree with a cross-cutting aspect assignment or a finding not associated with a regulatory requirement in this report, you should provide a response within 30 days of the date of this inspection report, with the basis for your disagreement, to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001; with copies to the Regional Administrator, Region III; and the NRC resident inspector at Clinton Power Station.

This letter, its enclosure, and your response (if any) will be made available for public inspection and copying at <http://www.nrc.gov/reading-rm/adams.html> and at the NRC Public Document Room in accordance with 10 CFR 2.390, "Public Inspections, Exemptions, Requests for Withholding."

Sincerely,

/RA/

Karla Stoedter, Chief
Branch 1
Division of Reactor Projects

Docket No. 50-461
License No. NPF-62

Enclosure:
Inspection Report 05000461/2018050

cc: Distribution via LISTSERV®

Letter to Bryan Hanson from Karla Stoedter dated August 23, 2018

SUBJECT: CLINTON POWER STATION—NRC SPECIAL INSPECTION REPORT
05000461/2018050

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U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Docket Numbers: 50-461

License Numbers: NPF-62

Report Numbers: 05000461/2018050

Enterprise Identifier: I-2018-050-0002

Licensee: Exelon Generation Company, LLC

Facility: Clinton Power Station

Location: Clinton, IL

Dates: June 25 through June 29, 2018

Inspectors: C. Phillips, Project Engineer
R. Murray, Senior Resident Inspector, Quad Cities
J. Draper, Health Physicist

Approved by: K. Stoedter, Chief
Branch 1
Division of Reactor Projects

Enclosure

SUMMARY

The U.S. Nuclear Regulatory Commission (NRC) monitored the licensee's performance by conducting a Special Inspection at Clinton Nuclear Power Station in accordance with the Reactor Oversight Process. The Reactor Oversight Process is the NRC's program for overseeing the safe operation of commercial nuclear power reactors. Refer to <https://www.nrc.gov/reactors/operating/oversight.html> for more information. Findings and violations being considered in the NRC's assessment are summarized in the table below.

List of Findings and Violations

Failure to Follow Multiple Procedures			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Mitigating Systems	TBD AV 05000461/2018050-01 Open EA-18-104	[H.2] – Human Performance, Field Presence	93812-Special Inspection
On May 17, 2018, a To-Be-Determined (TBD) finding and an associated Apparent Violation of Title 10 of the <i>Code of Federal Regulations</i> (10 CFR) Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," and Technical Specification 3.8.2, Condition B.3, were self-revealed for the licensee's failure to follow multiple procedures that affected quality. This resulted in the unavailability and inoperability of the Division 2 Emergency Diesel Generator when it was relied upon for plant safety.			

Failure to Identify a Condition Adverse to Quality			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Mitigating Systems	Green NCV 05000461/2018050-02 Open/Closed	[H.12] – Human Performance, Avoid Complacency	93812-Special Inspection
On May 17, 2018, a Green finding and an associated Non-Cited Violation of 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action," were self-revealed for the licensee's failure to promptly identify that the safety-related Division 2 Emergency Diesel Generator had its starting air receivers isolated, which was a condition adverse to quality that rendered the emergency diesel generator inoperable and unavailable.			

Equipment Operator Rounds Points Inadequate Acceptance Criteria			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Mitigating Systems	Green NCV 05000461/2018050-03 Open/Closed	[H.6] – Human Performance, Design Margins	93812–Special Inspection
On May 17, 2018, a Green finding and an associated Non-Cited Violation of 10 CFR Part 50, Appendix B, Criterion V, “Instructions, Procedures, and Drawings,” were self-revealed for the licensee’s failure to include appropriate quantitative acceptance criteria for the Division 2 Emergency Diesel Generator parameters to ensure the Division 2 Emergency Diesel Generator could perform its safety function.			

Additional Tracking Items

None.

INSPECTION SCOPE

Inspections were conducted using the appropriate portions of the inspection procedure (IP) in effect at the beginning of the inspection unless otherwise noted. Currently approved IPs with their attached revision histories are located on the public website at <http://www.nrc.gov/reading-rm/doc-collections/insp-manual/inspection-procedure/index.html>. Samples were declared complete when the IP requirements most appropriate to the inspection activity were met consistent with Inspection Manual Chapter (IMC) 2515, "Light-Water Reactor Inspection Program - Operations Phase." The inspectors reviewed selected procedures and records, observed activities, and interviewed personnel to assess licensee performance and compliance with Commission rules and regulations, license conditions, site procedures, and standards.

OTHER ACTIVITIES—TEMPORARY INSTRUCTIONS, INFREQUENT AND ABNORMAL

93812—Special Inspection

In accordance with the Special Inspection Team Charter (ADAMS Accession Number ML18158A170), the inspection team conducted a detailed review of the event that led to both Division 1 and Division 2 Emergency Diesel Generators (EDGs) being inoperable and unavailable. The inspectors reviewed the following areas.

- (1) Develop a complete sequence of events related to the inoperability and unavailability of the Division 1 and Division 2 alternating current (AC) power systems from May 9 through May 17, 2018. The chronology should include plant mode changes, changes in the electrical power, decay heat removal, and inventory control shutdown safety/risk areas.
- (2) Understand the increased shutdown risk condition which existed when no emergency AC power sources were available for a period of approximately 3.5 days. Review the planned shutdown safety configuration compared to the actual configuration that existed. Understand the licensee's ability to respond to and mitigate a loss of offsite power event given the unavailability of both onsite emergency AC power sources.
- (3) Review the licensee's cause analysis efforts and determine if the evaluation's level of detail is commensurate with the significance of the problem.
- (4) Determine the probable cause(s) for the unavailability of the Division 1 and Division 2 EDGs during the 2018 refueling outage.
- (5) Understand whether there were any deficiencies in operator training (both licensed and non-licensed operators) which contributed to the EDG unavailability and the failure to identify the condition across multiple operating shifts.
- (6) Evaluation of the licensee's compliance with, and adequacy of, procedural guidance for performing system alignments, controlling equipment configuration, performing equipment tag-outs and control room log keeping as it pertains to the cause(s) of the event.

The inspectors identified several examples of situations where procedures and work instructions that were in place at the time of the event were not followed. These

examples are discussed in detail in an observation box in the results section associated with paragraph (4) of this report.

- (7) Evaluate licensee planned and completed corrective actions following the EDG event to the extent possible and assess if prior opportunities (e.g., surveillances, maintenance, and self or nuclear oversight assessments) existed to have identified the problem at an earlier point in time.
- (8) Determine whether recent internal and external operating experience involving configuration control, risk management and oversight of activities were appropriately evaluated and determine the adequacy of any corrective actions planned or completed.

INSPECTION RESULTS

93812—Special Inspection

- (1) Develop a complete sequence of events related to the inoperability and unavailability of the Division 1 and Division 2 AC power systems from May 9 through May 17, 2018. The chronology should include plant mode changes, changes in the electrical power, decay heat removal, and inventory control shutdown safety/risk areas.

Observation	IP 93812
<p>On May 9, 2018, Clinton Power Station (CPS), Unit 1, was in Mode 5 during Refueling Outage C1R18. The reactor cavity was filled, and at 9:36 p.m. the Division 2 4160 Volt alternating current (Vac) bus (1B1) was energized from the reserve auxiliary transformer (RAT) to end a scheduled bus 1B1 maintenance window. The Division 1 AC distribution system, Division 1 EDG, and residual heat removal (RHR) 'A' system were operable during the 1B1 bus outage and remained operable upon restoration of bus 1B1.</p> <p>Earlier on May 9, 2018, the Division 2 EDG had been inoperable and unavailable as a result of the 1B1 bus outage. At 5:25 p.m., Clearance Order (C/O) 139455 was removed from the Division 2 EDG as part of 1B1 restoration activities. This C/O included a Special Instruction that stated "Restore Div 2 DG [diesel generator] to standby per CPS 3506.01P002 [Division 2 Diesel Generator Operations; Revision 3a] in conjunction with C/O removal." The inspectors found procedure CPS 3506.01P002 was not performed in conjunction with the C/O closure. Instead, a senior reactor operator (SRO 1) placed a note in the control room log stating CPS 3506.01P002 needed to be performed after restoration of the Division 2 shutdown service water (SX) system. Because CPS 3506.01P002 was not completed as part of the C/O closure, the position of the Division 2 EDG air receiver isolation valves was being controlled by the control room log entry instead of through an approved licensee process. By not completing CPS 3506.01P002 at that time, Division 2 EDG air receiver isolation valves (1DG160 and 1DG161) were left shut. Following the closure of the C/O, this log entry was the only method the licensee used to track the need to restore the Division 2 EDG to standby per CPS 3506.01P002.</p> <p>On May 10, 2018, during the day shift, a senior reactor operator (SRO 2) directed a non-licensed operator to perform a portion of CPS 3506.01P002 to restore fuses for the Division 2 EDG lubrication system, which had previously been removed from service prior to the 1B1 bus maintenance. When the non-licensed operator had completed the partial procedure, SRO 2 had already turned over duties to a different senior reactor operator (SRO 3), so the non-licensed operator returned the partial completed procedure to SRO 3.</p>	

Even though the complete CPS 3506.01P002 procedure had not been performed, SRO 3 believed that all activities required to restore the Division 2 EDG had been completed.

On May 11, 2018, at 2:30 a.m., SRO 3 declared the Division 2 EDG available after Division 2 SX was restored and made available. At this time, the Division 2 EDG starting air valves (1DG160 and 1DG161) remained closed, isolating starting air from the EDG air start motors, making the EDG unable to start on any demand signal. On May 11, 2018, at 5:10 a.m., the licensee installed the reactor cavity gate in preparation for cavity drain down and reactor head installation. The cavity drain began at 9:43 a.m. and was completed at 1:54 p.m. The licensee began tensioning the reactor head studs at 12:20 a.m. on May 12, 2018, and completed tensioning the studs at 1:51 a.m., at which time operations department personnel declared the Unit in Mode 4.

On May 12, 2018, at 8:00 a.m., the licensee completed OP-AA-108-106, "Equipment Return to Service," Revision 5, for the Division 2 Nuclear System Protection System (NSPS), Division 2 essential switchgear cooling (VX), Division 2 direct current (DC), and Division 2 EDG, and declared each of these systems operable. The licensee did not perform post-maintenance testing on the Division 2 EDG as no maintenance was performed on the EDG.

On May 13, 2018, operations secured the RHR 'A' pump from operation in shutdown cooling mode from 2:24 a.m. until 12:53 p.m. to facilitate the reactor pressure vessel pressure test. During this time, the emergency reserve auxiliary transformer (ERAT) (which had been unavailable since May 5, 2018, at 5:03 p.m.), the second source of offsite power to the 4160 Vac safety-related buses, was declared available at 5:15 a.m. At 11:09 p.m., RHR 'B' was declared operable for shutdown cooling mode, and at 11:28 p.m., RHR 'A' was secured and RHR 'B' was started in shutdown cooling mode.

On May 14, 2018, at 12:30 a.m., since the licensee was unaware that the Division 2 EDG was inoperable and unavailable due to its inability to start caused by the 1DG160 and 1DG161 valves being closed, the licensee began a scheduled maintenance window for the Division 1 4160 Vac bus (1A1). As a result of taking bus 1A1 out of service, the Division 1 EDG was declared inoperable and unavailable along with other equipment powered from bus 1A1, including the low pressure core spray (LPCS) and RHR 'A' systems.

On May 16, 2018, at 1:30 a.m., the licensee completed filling and venting the high pressure core spray (HPCS) system following an extended maintenance window. On May 17, 2018, at 11:18 a.m., operations declared HPCS available, and after post-maintenance testing of the system on May 18, 2018, at 6:21 p.m., HPCS was declared operable.

On May 17, 2018, at 3:03 p.m., a non-licensed operator performing shift rounds identified that the 1DG160 and 1DG161 valves were closed and reported this condition to the control room. The licensee declared the Division 2 EDG inoperable and unavailable and investigated the condition. The licensee restored the valves to the open position and declared the Division 2 EDG available at 3:45 p.m. After the licensee performed OP-AA-108-106, the licensee declared the Division 2 EDG operable at 9:04 p.m.

- (2) Understand the increased shutdown risk condition which existed when no emergency AC power sources were available for a period of approximately 3.5 days. Review the planned shutdown safety configuration compared to the actual configuration that existed.

Understand the licensee's ability to respond to and mitigate a loss of offsite power event given the unavailability of both onsite emergency AC power sources.

Observation	IP 93812
<p>As a result of several human performance errors the Division 2 EDG was inoperable and unavailable for over 6 days without the licensee's knowledge. Both Division 1 and Division 2 EDGs were inoperable and unavailable for over 3 days, May 14 through May 17, 2018, which was not allowed per Technical Specification (TS) 3.8.2 (this violation is in the results section of the report for Paragraph (4)).</p> <p>Had a loss of offsite power event occurred between May 14 and May 17, 2018, there would have been an immediate station blackout (SBO) event. The inspectors determined that the Division 2 EDG was recoverable. The inspectors determined that there were no other plant conditions that deviated from the stations shutdown risk plan during the time that both EDGs were unavailable. The inspectors determined that the licensee could have responded to an SBO in one of at least three ways. The licensee could have declared an extended loss of AC power (ELAP) event and deployed FLEX equipment. Additionally, the smaller Division 3 EDG could have been started and cross-tied to the Division 2 4160 Vac bus. The inspectors determined that the Division 3 EDG would have supported enough loads to restore one train of shutdown cooling. Finally, two diesel driven fire pumps and the safety-relief valves were available to provide feed and bleed cooling to the reactor core if necessary.</p>	

- (3) Review the licensee's cause analysis efforts and determine if the evaluation's level of detail is commensurate with the significance of the problem.

Observation	IP 93812
<p>The inspectors interviewed the licensee's root cause team lead and two additional root cause team members. At the time the inspection team arrived on site the licensee had completed their initial analysis of the events but had neither documented the results of their review nor had station management reviewed and approved the results. The inspectors reviewed numerous procedures, toured the applicable locations in the plant, and interviewed several operators involved in this event. The inspectors determined that the licensee appeared to be following their guidance for root cause investigations.</p>	

- (4) Determine the probable cause(s) for the unavailability of the Division 1 and Division 2 EDGs during the 2018 refueling outage.

Observation	IP 93812
<p>The inspectors determined that the cause of the event was the licensee's failure to follow multiple procedures and work instructions. The restoration instructions associated with the clearing of C/O 139455 that resulted in this event were not followed. The instructions stated that the performance of CPS 3506.01P002, "Division 2 Diesel Generator Operations," was required to be in conjunction with the clearance of the C/O. The standard Clinton operation's process for clearing out-of-service tags was to leave the valves in the out-of-service position and then complete a standby lineup afterwards to reposition the valves to the correct position. The SRO (SRO 1) that cleared C/O 139455 did not perform the standby lineup (CPS 3506.01P002) in conjunction with the clearing of the out-of-service because safety-related cooling water (SX) to the EDG was still inoperable. This resulted in the EDG air receiver isolation valves (1DG160 and 1DG161) remaining closed when the out-of-service cards were cleared. The inspectors asked the licensee if 1DG160 and 1DG161 needed to</p>	

remain closed to protect the EDG based solely on the status of the safety-related cooling water to the EDG at the time. The licensee responded that it was not required for 1DG160 and 1DG161 to remain closed to protect the EDG based on the plant status at the time C/O 139455 was cleared. The failure to follow the C/O direction to complete procedure CPS 3506.01P002 was a failure to follow work instructions.

The SRO (SRO 1) stated in the control room operating logs that CPS 3506.01P002 was required to be performed at some later date. The inspectors identified that the specific abnormal positions of 1DG160 and 1DG161 were not logged into the operations log, only the requirement to complete CPS 3506.01P002. The inspectors also identified that no Exelon procedure existed that required or allowed the tracking of valves in an abnormal position by the use of the control room logs. A Clinton site specific procedure existed that allowed tracking of the status of some specific equipment in the operator logs until the end of the shift but that procedure was not applicable to this situation.

Valves 1DG160 and 1DG161 were normally locked open valves. Exelon procedure OP-AA-108-103, "Locked Equipment Program," Revision 2, Step 4.1.5, stated, "If plant conditions require a locked component to be positioned in a manner other than that indicated on the locked equipment checklist or approved procedure, then UNLOCK and REPOSITION equipment in accordance with OP-AA-108-101, 'Control of Equipment and System Status.'" Procedure OP-AA-108-101, "Control of Equipment and System Status," Revision 14, Step 4.1.1.1, stated, "Utilize an ACPS [abnormal component positioning sheet] for aligning equipment outside of routine operations. For situations, excluding routine operation, where a component, system, or structure is required to be placed in a position differing from its normal lineup, the alignment must be done utilizing an Abnormal Component Position Sheet (ACPS). The ACPS will document proper evaluation, performance and restoration of the alignment, ensuring plant configuration control is maintained." An ACPS was not used to track the positions of 1DG160 and 1DG161. This was a failure to follow procedure.

Exelon procedure OP-AA-108-106, "Equipment Return to Service," Revision 5, Step 4.3, required that "if equipment will not be restored to the Equipment Line-up/Restoration position or the original condition, then another approved equipment status control mechanism shall be used to document equipment status (i.e. Equipment Status Tag, administrative clearance/tagout). Procedure OP-AA-108-101, 'Control of Equipment and System Status,' shall be used to document abnormal equipment configuration and shall be immediately applied following equipment restoration." This was not performed and constituted a failure to follow procedure.

In addition, Exelon procedure OP-AA-109-101, "Clearance and Tagging," Revision 12, Step 10.2.1, stated, "If a lift position is determined to be different from the normal lineup position for the present plant condition and not tracked by another C/O or procedure, then Shift Management shall be notified and equipment tracking initiated." In an interview between the inspectors and SRO 1, he stated that he thought the positions of 1DG160 and 1DG161 were being tracked via a procedure (CPS 3506.01P002). Licensee operations management stated that entering the procedure into the operations log was not the same as tracking via procedure. Tracking the position of the air start valves by the use of another C/O or procedure was not performed and constituted a failure to follow procedure.

When the licensee restored safety-related cooling water to the EDG, a second SRO (SRO 2) directed a partial performance of CPS 3506.01P002 in order to restore fuses for control power for the EDG lube oil pumps. Per the inspectors interview with SRO 2 the fuses were pulled

during a previous outage activity to prevent starting of the DC lube oil pumps when the AC power was removed for the 1B1 bus outage.

When the non-licensed operator returned with the partially performed copy of CPS 3506.01P002, he turned it over to a third SRO (SRO 3). Since procedure CPS 3506.01P002 was not marked as a partially performed procedure, SRO 3 believed it to be a fully performed procedure.

Even though the complete CPS 3506.01P002 procedure had not been performed, SRO 3 believed that all restoration activities on the Division 2 EDG had been performed. Therefore after Division 2 SX was restored and made available on May 11, 2018, SRO 3 declared the Division 2 EDG available. At this time, the Division 2 EDG starting air valves (1DG160 and 1DG161) remained closed, preventing starting air from reaching the EDG air start motors, making the EDG unable to start on any demand signal.

The next day on May 12, 2018, at 8:00 a.m., the licensee determined that OP-AA-108-106, "Equipment Return to Service," for the Division 2 NSPS, Division 2 essential switchgear cooling (VX), Division 2 direct current (DC) and Division 2 EDG, was complete and declared each of these systems operable. The licensee did not perform post-maintenance testing on the Division 2 EDG as no maintenance was performed on the EDG. The inspectors determined operating management personnel did not perform procedure OP-AA-108-106, "Equipment Return To Service," Revision 5, Step 4.4.9, which stated, "Applicable Operating procedures are complete and any equipment line-ups directed to be completed by the Operating Procedures are completed," because CPS 3506.01P002 had not been completed. In addition, licensee operations department management personnel did not perform Step 4.4.14, which stated, "The system/equipment has been walked down as appropriate to verify that it can be safely operated to fulfill its design function." The SRO told the inspectors that because no maintenance was performed on the EDG he did not think it was necessary. The failure to perform these steps was a failure to follow procedure.

Failure to Follow Multiple Procedures			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Mitigating Systems	TBD 05000261/2018050-01 Open EA-18-104	[H.2] – Human Performance, Field Presence	93812–Special Inspection

On May 17, 2018, a To-Be-Determined (TBD) finding and an associated Apparent Violation of 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," and Technical Specification 3.8.2, Condition B.3, were self-revealed for the licensee's failure to follow multiple procedures that affected quality. This resulted in the unavailability and inoperability of the Division 2 Emergency Diesel Generator when it was relied upon for plant safety.

Description:

Earlier on May 9, 2018, the Division 2 EDG was inoperable and unavailable as a result of the 1B1 bus outage. At 5:25 p.m., C/O 139455 was removed from the Division 2 EDG as part of bus 1B1 restoration activities. This C/O included a Special Instruction that stated "Restore Div 2 DG to standby per CPS 3506.01P002 [Division 2 Diesel Generator Operations; Revision 3a)] in conjunction with C/O removal." This procedure (CPS 3506.01P002) was not performed prior to closure of the C/O; and an SRO (SRO 1) noted in the control room

narrative logs that the Division 2 EDG remained in maintenance lockout pending restoration of the Division 2 shutdown SX system from its planned maintenance window, and that restoration per CPS 3506.01P002 would need to be performed to restore the Division 2 EDG to standby. By not completing CPS 3506.01P002, isolation valves from the EDG starting air receiver (1DG160 and 1DG161) were left shut. Following the closure of the C/O, this log entry was the only method the licensee used to track the need to restore the Division 2 EDG to standby per CPS 3506.01P002.

On May 10, 2018, during the day shift, a senior reactor operator (SRO 2) directed a non-licensed operator to perform a portion of CPS 3506.01P002 to restore fuses for the Division 2 EDG lubrication system, which had previously been removed from service prior to the 1B1 bus maintenance. When the non-licensed operator had completed the partial procedure, SRO 2 had already turned over duties to a different senior reactor operator (SRO 3), so the non-licensed operator returned the completed partial procedure to SRO 3. Even though the complete CPS 3506.01P002 procedure had not been performed, SRO 3 believed that all restoration activities had been performed. After Division 2 SX was restored and available on May 11, 2018, at 2:30 a.m., SRO 3 declared the Division 2 EDG available. At this time, the Division 2 EDG starting air valves (1DG160 and 1DG161) remained closed, isolating starting air from the EDG air start motors, making the EDG unable to start on any demand signal.

On May 14, 2018, at 12:30 a.m., since the licensee was unaware that the Division 2 EDG was inoperable and unavailable due to its inability to start caused by the 1DG160 and 1DG161 valves being closed, the licensee began a scheduled maintenance window for the Division 1 4160 Vac bus (1A1). As a result of taking bus 1A1 out of service, the Division 1 EDG was declared inoperable.

On May 17, 2018, at 3:03 p.m., a non-licensed operator performing shift rounds identified that the 1DG160 and 1DG161 valves were closed and reported this condition to the control room. The licensee declared the Division 2 EDG inoperable and investigated the condition.

Corrective Actions: Operations Director memos were sent to the operations shift managers related to accountability and procedure use and adherence. These memos, which were required to be acknowledged by all operations department personnel and briefed by the operations shift managers, covered various administrative procedural requirements including: procedure use and adherence, control of plant equipment, stop work criteria, operations decision making, and operability procedure requirements. The inspectors reviewed an operations director memo from May 18, 2018, "Issue Response Expectation for Clinton Operations Management." The inspectors also reviewed an operations director memo from May 23, 2018, "Manager Accountability for Performance." Interviews with operations department personnel indicated personnel were aware of the content of the memos.

The Operations Director and operations department leaders conducted face-to-face discussions with each member of the operations department.

Just-in-time training was given to all operations department staff on the requirements of HU-AA-104-101, "Procedure Use and Adherence," Revision 5. The inspectors' Interviews with operations personnel indicated that personnel were aware of the requirements of HU-AA-104-101.

The licensee changed the clearance and tagging method to include signed restoration steps. Restoration steps were previously included as restoration instruction "notes." These notes were expected to be completed as a procedure; however, the clearance order was allowed to be closed without documenting that these restoration steps had been completed. The inspectors reviewed several clearance orders and verified the licensee's corrective action was being implemented.

The licensee implemented a "Procedure-in-Progress" program for procedures that are not completed within one shift. The inspectors toured the control room and discussed the process with operators and observed it was being implemented.

The licensee conducted a three day stand-down with all station personnel and covered case studies and learnings from the event. The inspectors reviewed the material covered during the stand-down and interviewed plant personnel, who were aware of the details of the stand-down.

The licensee revised the equipment operator rounds points to include logging emergency diesel generator starting air manifold pressures, located down-stream of the air tank isolation valves. The inspectors reviewed the revised 'C' area rounds points and verified operators were logging EDG air manifold pressures.

Operations shift managers were reviewing logs and at least two completed procedures at the end-of-each shift. The inspectors requested to review any condition reports associated with these reviews and were informed that since this had been implemented, there had been no condition reports generated as a result of these shift manager reviews.

Corrective Action Reference: Action Request (AR) 4138790, "Division 2 DG Air Receiver Found Isolated Rounds," dated May 17, 2018.

Performance Assessment:

Performance Deficiency: The licensee failed to perform activities affecting quality in accordance with prescribed procedures and work instructions as required by 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures and Drawings," that resulted in the unavailability of the Division 2 EDG when it was relied upon for plant safety. Specifically, the licensee failed to:

Perform CPS 3506.01P002, "Division 2 Diesel Generator Operations," Revision 3a, in conjunction with the removal of C/O 139455 as required by the C/O restoration instructions on May 9, 2018.

Perform OP-AA-108-103, "Locked Equipment Program," Revision 2, Step 4.1.5, which stated, "If plant conditions require a locked component to be positioned in a manner other than that indicated on the locked equipment checklist or approved procedure, then UNLOCK and REPOSITION equipment in accordance with OP-AA-108-101, 'Control of Equipment and System Status.'" Valves 1DG160 and 1DG161 were normally locked open valves. Licensee procedure OP-AA-108-101, "Control of Equipment and System Status," Revision 14, Step 4.1.1.1, stated, "Utilize an ACPS [abnormal component positioning sheet] for aligning equipment outside of routine operations. For situations, excluding routine operation, where a component, system, or structure is required to be placed in a position differing from its normal lineup, the alignment must be done utilizing an Abnormal Component

Position Sheet. The ACPS will document proper evaluation, performance and restoration of the alignment, ensuring plant configuration control is maintained.”

Perform OP-AA-108-106, “Equipment Return to Service,” Revision 5, Step 4.3, which required that “if equipment will not be restored to the Equipment Line-up/Restoration position or the original condition, then another approved equipment status control mechanism shall be used to document equipment status (i.e. Equipment Status Tag, administrative clearance/tagout). Procedure OP-AA-108-101, ‘Control of Equipment and System Status,’ shall be used to document abnormal equipment configuration and shall be immediately applied following equipment restoration.” In addition, neither Step 4.4.9 of OP-AA-108-106 which stated, “Applicable Operating Procedures are complete and any equipment line-ups directed to be completed by the Operating Procedures are completed,” nor Step 4.4.14, which stated, “The system/equipment has been walked down as appropriate to verify that it can be safely operated to fulfill its design function,” were completed as required.

Perform OP-AA-109-101, “Clearance and Tagging,” Revision 12, Step 10.2.1, which stated, “If a lift position is determined to be different from the normal lineup position for the present plant condition and not tracked by another C/O or procedure, then Shift Management shall be notified and equipment tracking initiated.” In an interview between the inspectors and SRO 1, he stated that he thought the positions of 1DG160 and 1DG161 were being tracked via a procedure (CPS 3506.01P002). Licensee operations management stated that entering the procedure into the operations log was not the same as tracking via procedure.

Screening: The inspectors determined the performance deficiency was more than minor because it adversely affected the configuration control attribute of the Mitigating Systems Cornerstone and its objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the failure to follow the above station procedures/work instructions resulted in the unavailability of the Division 2 EDG when it was relied upon for plant safety in a shutdown condition.

Significance: The inspectors evaluated the finding against the guidance of IMC 0609 Appendix G, Attachment 1, “Shutdown Operations Significance Determination Process Phase 1 Initial Screening and Characterization of Findings.” The finding impacted the Mitigating Systems Cornerstone, specifically the Electric Power Availability Safety Function. The finding represented a loss of system safety function for the EDGs for greater than its TS 3.8.2, Condition B.3, allowed outage time of Immediately which required a phase 2 Appendix G evaluation.

The phase 2 evaluation was conducted using IMC 0609 Appendix G, Attachment 3, and “Phase 2 Significance Determination Process Template for BWR during Shutdown.” A Region III senior reactor analyst (SRA) completed the phase 2 evaluation and concluded that a phase 3, or detailed risk evaluation, would be needed to refine the phase 2 evaluation.

For the phase 2 evaluation, the applicable initiating event was a loss of offsite power (LOOP) event. The phase 2 evaluation focused on the 3 day exposure period in which both EDGs were unavailable and the plant was in plant operating state (POS) 1, with the reactor vessel head installed. The full exposure period for the finding is approximately 6 days. During the first 3 days, the Division 1 EDG remained available. The time to boil was approximately 5 hours and the time to uncover the core was approximately 12 hours, based on information provided by the licensee during the NRC’s Management Directive (MD) 8.3 evaluation of the condition.

To solve the phase 2 worksheet for a loss of offsite power in POS 1, the following assumptions were made:

The LOOP initiating event likelihood (IEL) was assigned a value of "3" consistent with an exposure time of less than 3 days. Although the actual time that both EDGs were unavailable was slightly over 3 days, the SRA determined that it would be overly conservative to use the IEL for an exposure time of 3 to 30 days.

The emergency AC power function was assigned a value of "0" because neither EDG was available.

The recovery of LOOP in 20 hours was assigned a value of "2" which is the maximum value used in phase 2 of the shutdown SDP. The function represents the recovery of AC power after battery depletion with successful injection from an AC-independent source.

The AC-independent injection before core damage (ACI) function was assigned a value of "3," the maximum value used in phase 2, to represent the potential to use an AC power independent source of injection such as the permanently installed diesel-driven fire pump. The inspectors and the SRA determined that other plant-specific options to mitigate the event were more likely to be used by operators. The plant-specific options included the use of the Division 3 EDG to power Division 2 equipment or FLEX equipment.

The recovery of LOOP in 8 hours was assigned a value of "1," the maximum value used in phase 2.

Recovery of the Division 2 EDG was assigned a value of "1," the maximum value used in phase 2. The inspectors determined that annunciator response and operating procedures would direct actions to restore the air receiver outlet valves to the open position.

Using the assumptions above, the two core damage sequences were solved with a value of "6" and "8," representing an overall delta core damage probability (CDP) in the range of E-6. The dominant core damage sequence is a LOOP event, no emergency AC power, successful AC-independent injection, but failure to recover offsite power in 20 hours (after battery depletion but before core damage).

A phase 3 SDP evaluation will be performed to further evaluate recovery of the Division 2 EDG, plant-specific mitigating system strategies such as the Division 3 cross-tie to Division 2, use of FLEX, and the recovery of offsite power. As a result the significance of this finding is to be determined (TBD).

Cross-cutting Aspect: The finding had a cross-cutting aspect in the Field Presence component of the Human Performance cross-cutting area, which states that Leaders are commonly seen in the work areas of the plant observing, coaching, and reinforcing standards and expectations. Deviations from standards and expectations are corrected promptly. Senior managers ensure supervisory and management oversight of work activities, including contractors and supplemental personnel. Specifically, the operators controlling the return to service of the Division 2 EDG were not properly coached to ensure that procedures required to maintain configuration control of the Division 2 EDG were carried out to ensure that it became and remained operable and available when relied upon for nuclear safety. (H.2)

Enforcement:

Apparent Violation: Title 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," requires, in part, that activities affecting quality be prescribed by documented procedures of a type appropriate to the circumstances and be accomplished in accordance with these procedures.

Clearance Order 139455 instructions required the performance of CPS 3506.01P002, "Division 2 Diesel Generator Operations," Revision 3a, in conjunction with the removal of out-of-service tags on May 9, 2018.

Procedure OP-AA-108-103, "Locked Equipment Program," Revision 2, Step 4.1.5, stated, "If plant conditions require a locked component to be positioned in a manner other than that indicated on the locked equipment checklist or approved procedure, then UNLOCK and REPOSITION equipment in accordance with OP-AA-108-101, "Control of Equipment and System Status." Procedure OP-AA-108-101, "Control of Equipment and System Status," Revision 14, Step 4.1.1.1, stated, "Utilize an ACPS for aligning equipment outside of routine operations."

Procedure OP-AA-108-106, "Equipment Return to Service," Revision 5, Step 4.3, required that "if equipment will not be restored to the Equipment Line-up/Restoration position or the original condition, then another approved equipment status control mechanism shall be used to document equipment status (i.e. Equipment Status Tag, administrative clearance/tagout). Procedure OP-AA-108-101, 'Control of Equipment and System Status,' shall be used to document abnormal equipment configuration and shall be immediately applied following equipment restoration."

Procedure OP-AA-108-106, "Equipment Return to Service," Revision 5, Step 4.4.9, which stated, "Applicable Operating procedures are complete and any equipment line-ups directed to be completed by the Operating Procedures are completed."

Procedure OP-AA-108-106, "Equipment Return to Service," Revision 5, Step 4.4.14, stated, "The system/equipment has been walked down as appropriate to verify that it can be safely operated to fulfill its design function."

Procedure OP-AA-109-101, "Clearance and Tagging," Revision 12, Step 10.2.1 stated, "If a lift position is determined to be different from the normal lineup position for the present plant condition and not tracked by another C/O or procedure, then the Shift Management shall be notified and equipment tracking initiated."

Technical Specification 3.8.2, "AC Sources-Shutdown," Condition B.3, states, in part, that an inoperable EDG be restored to an operable status immediately.

Between May 9 and May 17, 2018, the licensee apparently failed to:

Perform CPS 3506.01P002, "Division 2 Diesel Generator Operations," Revision 3a, in conjunction with the removal of C/O 139455 as required by the C/O restoration instructions.

Perform OP-AA-108-103, "Locked Equipment Program," Revision 2, Step 4.3, valves 1DG160 and 1DG161 were normally locked open valves and an ACPS was not utilized to track valve status.

Perform OP-AA-108-106, "Equipment Return to Service," Revision 5, Step 4.3, when valves 1DG160 and 1DG161 were left in an abnormal position an approved equipment status control mechanism was not used to track equipment status.

Perform OP-AA-108-106, "Equipment Return to Service," Revision 5, Step 4.4.9, when the equipment was declared operable the applicable operating procedure CPS 3506.01P002 had not been completed and equipment line-ups directed to be completed by the operating procedures were not completed.

Perform OP-AA-108-106, "Equipment Return to Service," Revision 5, Step 4.4.14, when the system was declared operable without being walked down.

Perform OP-AA-109-101, "Clearance and Tagging," Revision 12, Step 10.2.1, when the lift position was different from the normal lineup for the present plant condition and equipment tracking was not initiated.

Additionally, because the licensee was not aware of the EDG's inoperability the required action in TS 3.8.2, Condition B.3 was not followed.

Disposition: The disposition of this violation is TBD.

- (5) Understand whether there were any deficiencies in operator training (both licensed and non-licensed operators) which contributed to the EDG unavailability and the failure to identify the condition across multiple operating shifts.

Observation	IP 93812
<p>The inspectors reviewed training materials and had discussions with training management about the training program aspects and topics related to the event for the previous 2 years. Training related to configuration control, including clearance and tagging processes used at CPS, was given in formal classroom training sessions during initial training for equipment operators (EOs), reactor operators (ROs), and SROs. Additional training on the implementation of configuration control procedures was given during initial qualifications and continuing training as "on-the-job" training. Passport was the software program used at CPS for implementing the clearance and tagging program. Similar to configuration control, the licensee gives initial training to operators on the use of Passport, and additional training related to Passport is considered on-the-job training. The inspectors did not identify any formal continuing training related to configuration control that was conducted in the previous 2 years, with the exception of one lesson related to clearance and tagging. The inspectors determined that the initial training material reviewed covered the requirements of station administrative procedures for configuration control. However, based on inspector discussions with SROs and members of the root cause team, the inspectors determined that SROs believed that component configuration was allowed to be tracked in the logs. This practice had been normalized at CPS. The practice of tracking configuration of components in the narrative log was not in accordance with any procedural guidance reviewed by the inspectors.</p> <p>The knowledge gap between what was allowed by approved processes and procedures versus the actual methods and standards that CPS had been implementing was addressed in immediate station corrective actions that were implemented following this event. Corrective actions taken by the licensee are discussed in Section (7) of this report.</p>	

Additionally, the inspectors reviewed training materials and held discussions with training management related to training of equipment operators associated with plant tours and general area observations (i.e. "operator rounds"). The inspectors confirmed the equipment operators are given both initial and continuing training related to operator rounds performance standards. Inspector reviews and discussion with training management indicated a thorough training program related to operator rounds. The inspectors did not conclude that training deficiencies for equipment operators contributed to this event; however, the inspectors were concerned that equipment operators' standards for thorough tours, attention to detail in the plant, perceived time pressure, and understanding of plant status were contributors to the event.

Failure to Promptly Identify a Condition Adverse to Quality

Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Mitigating Systems	Green NCV 05000461/2018050-02 Open/Closed	[H.12] – Human Performance, Avoid Complacency	93812–Special Inspection

On May 17, 2018, a Green finding and an associated NCV of 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action," were self-revealed for the licensee's failure to promptly identify that the safety-related Division 2 EDG had its starting air receivers isolated, which was a condition adverse to quality that rendered the EDG inoperable and unavailable.

Description:

On May 11, 2018, at 2:30 a.m., the licensee declared the Division 2 EDG available following the removal of a clearance order supporting maintenance; at 8:00 a.m. on May 12, 2018, the licensee declared the Division 2 EDG operable. On May 14, 2018, the Division 2 EDG was put into a protected status for maintenance on the Division 1 EDG, when the Division 2 EDG would be the only source of emergency power available to the station. On May 17, 2018, at 3:03 p.m., an equipment operator on rounds found the two starting air receiver isolation valves, 1DG160 and 1DG161, in the closed position, which prevented starting air from reaching the Division 2 EDG, and the licensee declared the Division 2 EDG inoperable and unavailable.

After the licensee declared the Division 2 EDG available on May 11, 2018, the licensee performed area rounds checks of the Division 2 EDG room at least once per shift. From May 11 through May 17, 2018, five different equipment operators performed 'C' area rounds checks, which included the D2 EDG room. Those five operators had at least 12 opportunities to identify the problem before it was finally found. The licensee's failure to promptly identify the isolated valves resulted in the plant being in an elevated risk condition that was not allowed by plant procedures for three and one half days without their knowledge.

On May 17, 2018, at approximately 5:35 p.m., a sixth equipment operator identified that isolation valves 1DG160 and 1DG161 were in the closed position and reported them to the control room. The inspectors interviewed the operator that found the valves in the closed position and he stated that it was obvious that the valves were in the wrong position as soon as he entered the room. During a tour of the diesel room, the inspectors noted the relative large size of the air receiver isolation valves (2 inch ball valves with a handle approximately 6 inches long) that were located at knee level while standing on the platform adjacent to the air receivers and were also strapped in the closed position by long black plastic straps. The

inspectors also noted that there were two indications for air manifold pressures on each of the two local EDG panels in the Division 2 EDG room. At the time of the event these air manifold pressure gages read zero psig which was a clear indication that there was no starting air pressure available to the Division 2 EDG.

The inspectors conducted interviews with licensee personnel, reviewed the licensee's procedure for operator rounds, toured the Division 2 EDG room, and concluded that it was reasonably within the licensee's ability to identify the condition of the Division 2 EDG prior to return to service and during several opportunities following return to service, during normal equipment operator rounds. Considering all of the information reviewed, the inspectors determined that the licensee did not promptly identify this condition adverse to quality when it was reasonably within their ability to do so.

Normally, items found by the licensee while conducting operator rounds would be considered licensee identified in accordance with IMC 0612, "Issue Screening." However, Block 5 of IMC 0612, Appendix B, states that past experience, related precedents and the over-arching regulatory message should be considered when determining a finding's identification credit. After careful consideration of the above items, the inspectors characterized the finding as self-revealing to align with the NRC's over-arching message regarding the need for improved operation department performance.

Corrective Actions: The licensee placed valves 1DG160 and 1DG161 into their correct position and performed a valve lineup of the Division 2 EDG system. Subsequent corrective actions included adding the EDG air start manifold pressure indications to the 'C' area rounds points log.

Corrective Action Reference: Action Request 4138790, "Division 2 DG Air Receiver Found Isolated Rounds," dated May 17, 2018

Performance Assessment:

Performance Deficiency: The inspectors determined that the licensee's failure to promptly identify the Division 2 EDG air start receiver isolation valves were not in the correct position was a performance deficiency.

Screening: The inspectors determined this issue was more than minor because it was associated with the Mitigating Systems Cornerstone attribute of Human Performance and adversely affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the licensee, including multiple equipment operators, failed to promptly identify a condition adverse to quality, when multiple indications were available, that indicated the Division 2 EDG was inoperable and unavailable when it was being relied upon as a source of emergency power. As a result, the Division 2 EDG was not capable of responding to initiating events such as a loss of offsite power which placed the plant in an elevated risk condition.

Significance: The inspectors evaluated the significance of the finding using IMC 0609, Appendix G, Shutdown Operations Significance Determination Process Phase 1 Initial Screening and Characterization of Findings, Exhibit 3, Mitigating Systems, and determined the finding screened as having very low safety significance (Green) because all of screening questions were answered "no". Specifically, the failure to promptly identify the valves in the wrong position was not considered to be the proximate cause of the valves being in the wrong position.

Cross-cutting Aspect: The finding had a cross-cutting aspect in the Avoid Complacency component of the Human Performance cross-cutting area, which states that individuals recognize and plan for the possibility of mistakes, latent issues, and inherent risk, even while expecting successful outcomes. Individuals implement appropriate error reduction tools. Specifically, equipment operators that toured the Division 2 EDG room on multiple occasions did not identify the latent issues that existed on the EDG and did not implement appropriate human performance tools to conduct intrusive tours of the EDG room with a questioning attitude and attention to detail. (H.12)

Enforcement:

Violation: Title 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action," requires, in part, that conditions adverse to quality, such as failures, deficiencies, deviations, and non-conformances are promptly identified.

Contrary to the above, from May 11 to May 17, 2018, the licensee failed to promptly identify a condition adverse to quality. Specifically, over the course of 6 days, the safety-related Division 2 EDG starting air receivers were isolated from the EDG air start motors, while it was relied upon for plant safety, which was a condition adverse to quality that rendered the EDG inoperable and unavailable.

Disposition: This violation is being treated as a Non-Cited Violation, consistent with Section 2.3.2 of the Enforcement Policy.

Equipment Operator Rounds Points Inadequate Acceptance Criteria

Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Mitigating Systems	Green NCV 05000461/2018050-03 Open/Closed	[H.6] – Human Performance, Design Margins	93812-Special Inspection

On May 17, 2018, a Green finding and an associated NCV of 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," were self-revealed for the licensee's failure to include appropriate quantitative acceptance criteria for the Division 2 EDG parameters to ensure the Division 2 EDG could perform its safety function.

Description:

On May 11, 2018, at 2:30 a.m., the licensee declared the Division 2 EDG available; at 8:00 a.m. on May 12, 2018, the licensee declared the Division 2 EDG operable. On May 17, 2018, at 3:03 p.m., an equipment operator on rounds in the field found the two air receiver isolation valves, 1DG160 and 1DG161, in the closed position and the licensee declared the Division 2 EDG inoperable and unavailable. During the review into this issue, the licensee noted that the EDG air start manifold pressures were not a recorded value in the 'C' area round points performed by equipment operators. The inspectors were concerned that the 'C' area rounds points did not contain readily available information (air start manifold pressures) that would provide an indication of the EDGs ability to perform its safety function. With the air start tanks isolated, the air start manifold pressures read 0 psig which would have provided an additional indication that the diesel was not available to start.

Corrective Action: On May 29, 2018, during the root cause investigation, the licensee revised the 'C' area rounds points to include EDG air start manifold pressure indications on the local EDG control panels.

Corrective Action Reference: Action Request 4138790, "Division 2 DG Air Receiver Found Isolated Rounds," dated May 17, 2018

Performance Assessment:

Performance Deficiency: The inspectors determined that the licensee's failure to include the Division 2 EDG air start manifold pressures in the 'C' area rounds points was a performance deficiency.

Screening: The inspectors determined this issue was more than minor because it was associated with the Mitigating Systems Cornerstone attribute of Equipment Performance and adversely affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, by not including the air start manifold pressures in the operator round points, the licensee failed to recognize the Division 2 EDG was inoperable when it was being relied upon as a source of emergency power.

Significance: The inspectors evaluated the significance of the finding using IMC 0609, Appendix G, Shutdown Operations Significance Determination Process Phase 1 Initial Screening and Characterization of Findings, Exhibit 3, Mitigating Systems, and determined the finding screened as having very low safety significance (Green). The failure to have the air manifold pressures in the rounds points was not considered to be the proximate cause of the valves being in the wrong position.

Cross-cutting Aspect: The inspectors determined the finding had a cross-cutting aspect of Design Margin in the Human Performance area, which states that the organization operates and maintains equipment within design margins and special attention is placed on maintaining safety related equipment (WP.2). Specifically, the operator round points which did not include the EDG air start manifold pressures failed to verify the EDG could maintain its safety function. (H.6)

Enforcement:

Violation: Title 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," requires, in part, that activities affecting quality shall be prescribed by documented instructions, procedures, or drawings, of a type appropriate to the circumstances and shall be accomplished in accordance with these instructions, procedures, or drawings. Instructions and procedures shall include appropriate quantitative or qualitative acceptance criteria for determining that important activities have been satisfactorily accomplished. The licensee established the 'C' area round points as the implementing procedure for logging Division 2 EDG parameters to ensure its ability to perform its intended safety function, an activity affecting quality.

Contrary to the above, prior to May 29, 2018, the licensee's 'C' area rounds points failed to include appropriate quantitative acceptance criteria for the Division 2 EDG parameters to ensure the Division 2 EDG could perform its safety function.

Disposition: This violation is being treated as an NCV, consistent with Section 2.3.2 of the Enforcement Policy.

- (7) Evaluate licensee planned and completed corrective actions following the EDG event to the extent possible and assess if prior opportunities (e.g., surveillances, maintenance, and self or nuclear oversight assessments) existed to have identified the problem at an earlier point in time.

Observation	IP 93812
<p>At the time of this inspection, the licensee had not completed their root cause evaluation; however, the inspectors reviewed the following immediate corrective actions taken by the licensee:</p> <ul style="list-style-type: none"> • Operations director memos were sent to the operations shift managers related to accountability and procedure use and adherence. These memos, which were required to be acknowledged by all operations department personnel and briefed by the operations shift managers, covered various administrative procedural requirements including: procedure use and adherence, control of plant equipment, stop work criteria, operations decision making, and operability procedure requirements. The inspectors reviewed an operations director memo from May 18, 2018, "Issue Response Expectation for Clinton Operations Management." The inspectors also reviewed an operations director memo from May 23, 2018, "Manager Accountability for Performance." Interviews with operations department personnel indicated personnel were aware of the content of the memos. • The operations director and operations department leaders conducted face-to-face discussions with each member of the operations department. • Just-in-time training was given to all operations department staff on the requirements of HU-AA-104-101, "Procedure Use and Adherence," Revision 5. The inspectors' Interviews with operation's personnel indicated that they were aware of the requirements of HU-AA-104-101. • The licensee changed the clearance and tagging method to include signed restoration steps. Restoration steps were previously included as restoration instruction "notes." These notes were expected to be completed as a procedure; however, the clearance order was allowed to be closed without documenting that these restoration steps had been completed. The inspectors reviewed several clearance orders and verified the licensee's corrective action was being implemented. • The licensee implemented a "Procedure-in-Progress" program for procedures that are not completed within one shift. The inspectors toured the control room and discussed the process with operators and observed it was being implemented. • The licensee conducted a three day stand-down with all station personnel and covered case studies and learnings from the event. The inspectors reviewed the material covered during the stand-down and interviewed plant personnel, who were aware of the details of the stand-down. Revised the equipment operator rounds points to include logging emergency diesel generator starting air manifold pressures, located down-stream of the air tank isolation valves. The inspectors reviewed the revised 'C' area rounds points and verified operators were logging EDG air manifold pressures. • Operations shift managers were reviewing logs and at least two completed procedures at the end-of-each shift. The inspectors requested to review any condition reports associated with these reviews and were informed that since this had been implemented, there had been no condition reports generated as a result of these shift manager reviews. <p>The inspectors conducted observations and interviews and concluded that the immediate corrective actions taken by the licensee were appropriate, and station personnel were generally aware of the EDG event, its causes, and corrective actions implemented.</p>	

The inspectors reviewed Operations Functional Area Audit Report, NOSA-CPS-17-08, dated October 3, 2017. The inspectors reviewed Configuration Control Self-Assessments conducted in 2017 and 2016, under ARs 4026575 and 2664637, respectively. The inspectors reviewed the 2017 Clinton Clearance and Tagging Self-Assessment conducted under AR 4047333. A review of the above items did not identify any gaps noted by nuclear oversight personnel or operations department staff that would have indicated similar issues that lead to the cause the Division 2 EDG inoperability

The inspectors reviewed the Operator Fundamentals Self-Assessment, dated January 29, 2018, under AR 4042011. The inspectors noted that in Recommendation #1 the licensee stated, "Senior Leadership Team [SLT] observations are not entered in the Exelon Observation System in a thorough and consistent manner/ format making it difficult to assess operator fundamental performance related to SLT observations." However, the licensee also concluded that, "the CPS SLT is monitoring and reinforcing operator fundamentals... and meaningful gaps to excellence were identified..." The inspectors also noted that the number of observations documented in the second and third quarters of 2017 dropped to 45 from 138 total in 2015.

The inspectors did not identify any surveillance tests or maintenance activities that would have been able to identify the condition of the Division 2 EDG at an earlier time. However, as previously discussed, the inspectors did note that multiple (5) equipment operators had toured the Division 2 EDG room on several occasions (12) and had the opportunity to identify the condition of the EDG being inoperable.

- (8) Determine whether recent internal and external operating experience involving configuration control, risk management and oversight of activities were appropriately evaluated and determine the adequacy of any corrective actions planned or completed.

Observation	IP 93812
<p>There were two operating experience cases that were immediately relevant and available to the licensee. The first was an external operating event that occurred at Grand Gulf in September 2016. In this event alternate decay heat removal was being relied upon by the licensee as a second source of decay heat removal required by the TS. However, cooling to the alternate decay heat removal system had been tagged out-of-service for several weeks.</p> <p>The licensee was made aware of this event through an industry communication and NRC Information Notice 2018-03, "Operating Experience Regarding Failure To Meet Technical Specification Requirements For Changing Plant Conditions," dated February 26, 2018. This event was discussed with plant management at the Plan of the Day meeting on April 23, 2017. The licensee addressed the NRC Information Notice with AR 4108876, "OPEX: IN 2018-03 Failure To Meet TS For Change Conditions," dated February 27, 2018. The due date for the licensee's response was not until July 13, 2018.</p> <p>The second was an internal operating event that occurred at Clinton Station between May 24 and September 22, 2016.</p> <p>On September 22, 2016, when an area operator was on rounds, the position of CO2 isolation valve to the generator exciter, 1CO609, was questioned when the operator observed that the valve was unlocked. Further investigation determined that 1CO609 was closed with a required position of locked open. A review of controlling documents determined that there was no open documentation controlling this valve for its current position. A line up was</p>	

completed and 1CO609 was restored to its required locked open position. An evaluation was performed to determine the cause of 1CO609 being left in a position different from its required position. The review concluded that the last time 1CO609 was manipulated was in accordance with C/O 131019 which was hung to support generator inspections during C1R16. Clearance Order 131019 was removed on May 24, 2016, with the position of 1CO609 left in the closed position (per C/O restoration position) and was required to be restored per CPS 3213.01P001, "Placing Turbine Generator Exciter CO2 System in Standby," Section 8.27, as identified in the clearance order special instructions under the restoration instruction.

The licensee determined that the operators failed to follow OP-AA-108-103, "Locked Equipment Program," Revision 2. Specifically, upon clearing of out-of-service tags associated with C/O 131019 valves 1CO609 and 1CO001 were left in the closed position which was abnormal from the required position. Valve 1CO609 was a locked valve left in an abnormal condition and the procedural requirements of OP-AA-108-103 when a locked valve was left in an abnormal position were not followed.

The licensee's corrective actions were to put the valve into its correct position and to require each operator to read a daily order, which was effective from September 30 through October 3, 2016, that discussed the requirements for tracking the status of plant equipment. The daily order stated that equipment status could be tracked in one of five approved methods. One of those methods, an example given by the licensee, was an open procedure and that the open procedure must be documented in the control room log. This was essentially what the SRO told the inspectors happened in the case of the Division 2 EDG air receiver isolation valves. The SRO stated he was required to log the out-of-service activity in the control room logs and he believed that CPS 3506.01P002 was the procedure in progress to control equipment status. The inspectors concluded the licensee's response to the internal operating experience was ineffective and may have actually reinforced the behavior of tracking equipment status using the control room logs which contributed to the EDG air receiver valves being left in the wrong position.

Observation—Licensee Identified Failure to Follow Procedure	IP 93812
<p>The licensee identified a Green finding for the failure to follow licensee procedure OP-AA-103, "Locked Equipment Program," Revision 2. Specifically, the licensee failed to track the status of a locked valve that was left in an abnormal position in accordance with the procedural requirements.</p> <p>On September 22, 2016, when an area operator was on rounds, the position of CO2 isolation valve to the generator exciter, 1CO609, was questioned. The inspectors gave the licensee identification credit for finding this valve out of position, even though it had been out of position for several months, because the valve was about 10 feet in the air and the valve position was not identifiable from the ground. The operator noticed the valve was not locked, which was difficult to see from the ground, and questioned its position. Further investigation determined that 1CO609 was closed with a required position of locked open. A review of controlling documents determined that there was no open documentation controlling this valve for its current position. A line up was completed and 1CO609 was restored to its required locked open position. An evaluation was performed to determine the cause of 1CO609 being left in a position different from its required position. The review concluded that the last time 1CO609 was manipulated was in accordance with C/O 131019 which was hung to support generator inspections during C1R16. Clearance Order 131019 was removed on May 24, 2016, with the position of 1CO609 left in the closed position (per C/O restoration</p>	

position) and was required to be restored per CPS 3213.01P001, "Placing Turbine Generator Exciter CO2 System in Standby," Section 8.27, as identified in the clearance order special instructions under the restoration instruction.

The licensee determined that the operators failed to follow OP-AA-108-103, "Locked Equipment Program," Revision 2. Exelon procedure OP-AA-108-103, "Locked Equipment Program," Revision 2, Step 4.1.5, stated, "If plant conditions require a locked component to be positioned in a manner other than that indicated on the locked equipment checklist or approved procedure, then UNLOCK and REPOSITION equipment in accordance with OP-AA-108-101, 'Control of Equipment and System Status.'" Valves 1DG160 and 1DG161 were normally locked open valves. Procedure OP-AA-108-101, "Control of Equipment and System Status," Step 4.1.1.1, stated, "Utilize an ACPS [abnormal component positioning sheet] for aligning equipment outside of routine operations." Specifically, upon clearing of out-of-service tags associated with CO 131019 valves 1CO609 and 1CO001 were left in the closed position which was abnormal from the required position. Valve 1CO609 was a locked valve left in an abnormal condition and an ACPS was not used to track the position of the valve.

Screening: The inspectors determined the performance deficiency was more than minor because it could reasonably be viewed as a precursor to a significant event. Specifically, the failure to effectively correct the above performance deficiency regarding locked equipment left in an abnormal condition eventually resulted in the unavailability of the Division 2 EDG when it was relied upon for plant safety in a shutdown condition.

Significance: The finding affected the Mitigating Systems Cornerstone and was screened in accordance with IMC 0609, Appendix F, Table 1.2.1., which was answered "no." The inspectors determined that Step 1.4.2 was answered no and therefore the finding screened as Green.

Corrective Actions: The licensee's corrective action, at the time, was to put the valve into its correct position and put out a Daily Order, which was good September 30 through October 3, 2016, that discussed the requirements for tracking the status of plant equipment. The licensee documented this event in AR 2718753, "EIOD: 1CO609, 1CO01T Tank Outlet Valve Found Open," September 22, 2018.

Enforcement: The inspectors did not identify a violation of regulatory requirements associated with this finding. The equipment associated with this finding was non-safety related.

EXIT MEETINGS AND DEBRIEFS

The inspectors confirmed that proprietary information was controlled to protect from public disclosure. No proprietary information was documented in this report.

- On June 29, 2018, the inspectors presented the initial Special Inspection results to Mr. T. Stoner, Clinton Power Station, Site Vice President and other members of the licensee staff during an interim exit meeting.
- On August 3, 2018, the inspectors presented the final Special Inspection results to Mr. T. Stoner, Clinton Power Station, Site Vice President and other members of the licensee staff during a final exit meeting.

THIRD PARTY REVIEWS

None.

DOCUMENTS REVIEWED

93812—Special Inspection

Paragraph (1)

- Control Room Logs May 5 through May 18, 2018
- AR 04150624; NRCID: C1R18 Risk Log Entries Inconsistent; 06/26/2018
- AR 04150906; Log Discrepancies Found During NRC SIT; 06/27/2018

Paragraph (2)

- C1R18 Shutdown Safety Management Program Safety Analysis; 04/09/2018

Paragraph (3)

- Root Cause Charter for the Event Associated with IR 4138790; Division 2 DG Air Receivers Found Isolated during Rounds; 05/17/2018

Paragraph (4)

- HU-AA-104-101; Procedure Use and Adherence; Revision 5

Paragraph (6)

- AR 04151037; Delete CPS 1409.01 Section 8.5—It Is Out of Date; 06/27/2018
- CO 00139455, Checklist 4; C1R18—4.16kV Bus 1B1 Outage (AP-1B1)
- CPS 1052.01; Conduct of System Lineups; Revision 9a
- CPS 1401.09; Control of System and Equipment Status; Revision 9d
- CPS 1401.09; Control of System and Equipment Status; Revision 9e
- CPS 3506.01P002; Division 2 Diesel Generator Operations; Revision 3a
- CPS 3506.01P002; Division 2 Diesel Generator Operations; Revision 3b
- ER-AA-310; Implementation of the Maintenance Rule; Revision 11
- OP-AA-10; Clearance and Tagging Process Description; Revision 4
- OP-AA-108-103; Locked Equipment Program; Revision 2
- OP-AA-108-105; Equipment Deficiency Identification and Documentation; Revision 11
- OP-AA-108-106; Equipment Return to Service; Revision 5
- OP-AA-108-115; Operability Determinations (CM-1); Revision 20
- OP-AA-109-101; Clearance and Tagging; Revision 12
- OP-AA-111-101; Operating Narrative Logs and Records; Revision 18
- OP-CL-108-101-1003; Operations Department Standards and Expectations; Revision 37
- OU-AA-103; Shutdown Safety Management Program; Revision 20

Paragraph (7)

- Unit 01 Standing Order 2018-06; Prerequisite Steps in Operating Procedures Directing Line-ups; 06/15/2018

- Unit 01 Standing Order 2018-03; Configuration Control Event IR# 04138790; 05/18/2018

Paragraph (8)

Nuclear Plant Plan of the Day Package, dated 04/13/201

From: [Kozak, Laura](#)
To: [Mitman, Jeffrey](#)
Subject: FW: CLINTON POWER STATION—NRC SPECIAL INSPECTION REPORT 05000461/2018050
Date: Thursday, August 23, 2018 10:55:00 AM
Attachments: [image002.png](#)

From: Wilk, Brenda

Sent: Thursday, August 23, 2018 10:24 AM

To: Bowen, Jeremy <Jeremy.Bowen@nrc.gov>; RidsNrrDorlPl3 Resource <RidsNrrDorlPl3.Resource@nrc.gov>; RidsNrrPMClinton Resource <RidsNrrPMClinton.Resource@nrc.gov>; NrrDirslrib Resource <NrrDirslrib.Resource@nrc.gov>; West, Steven <Steven.West@nrc.gov>; Roberts, Darrell <Darrell.Roberts@nrc.gov>; Skokowski, Richard <Richard.Skokowski@nrc.gov>; Barker, Allan <Allan.Barker@nrc.gov>; DRSIII <DRSIII@nrc.gov>; DRPIII <DRPIII@nrc.gov>; ROPAssessment Resource <ROPAssessment.Resource@nrc.gov>

Subject: CLINTON POWER STATION—NRC SPECIAL INSPECTION REPORT 05000461/2018050

The below attached document has been added to ADAMS.

[View ADAMS Properties ML18235A170](#)

[Open ADAMS Document \(CLINTON POWER STATION-NRC SPECIAL INSPECTION REPORT 05000461/2018050\)](#)

Thank you,

This document is publicly available at: https://www.nrc.gov/docs/ML1823/ML18235A170.pdf
--

Brenda Wilk

Lead Administrative Assistant
Division of Reactor Projects
U.S. Nuclear Regulatory Commission
(630) 829-9602



From: [Edom, Joseph](#)
To: [Kozak, Laura](#); [Mitman, Jeffrey](#); [Edom, Joseph T:\(Contractor - GenCo-Nuc\)](#)
Cc: [Brinsfield, Wes](#); [Teagarden, Grant](#); [Antonelli, Michael K.:\(GenCo-Nuc\)](#)
Subject: [External_Sender] RE: RE: Power Supply for Back-up Battery Charger 1DC11E
Date: Friday, August 24, 2018 3:38:41 PM

Thanks Laura. I will get a phone call invite out on Monday.

Joe Edom | Consultant I

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JEdom@jensenhughes.com | www.jensenhughes.com

From: Kozak, Laura [<mailto:Laura.Kozak@nrc.gov>]
Sent: Friday, August 24, 2018 3:35 PM
To: Mitman, Jeffrey <Jeffrey.Mitman@nrc.gov>; Edom, Joseph <JEdom@jensenhughes.com>; Edom, Joseph T:(Contractor - GenCo-Nuc) <Joe.Edom@exeloncorp.com>
Cc: Brinsfield, Wes <WBrinsfield@jensenhughes.com>; Teagarden, Grant <GTeagarden@jensenhughes.com>; Antonelli, Michael K.:(GenCo-Nuc) <Michael.Antonelli@exeloncorp.com>
Subject: RE: RE: Power Supply for Back-up Battery Charger 1DC11E

Tuesday good for me as well – morning or early afternoon.

Laura

From: Mitman, Jeffrey
Sent: Friday, August 24, 2018 3:34 PM
To: Edom, Joseph <JEdom@jensenhughes.com>; Kozak, Laura <Laura.Kozak@nrc.gov>; Edom, Joseph T:(Contractor - GenCo-Nuc) <Joe.Edom@exeloncorp.com>
Cc: Brinsfield, Wes <WBrinsfield@jensenhughes.com>; Teagarden, Grant <GTeagarden@jensenhughes.com>; Antonelli, Michael K.:(GenCo-Nuc) <Michael.Antonelli@exeloncorp.com>
Subject: RE: RE: Power Supply for Back-up Battery Charger 1DC11E

Tuesday works for me.

Jeff Mitman

From: Edom, Joseph [<mailto:JEdom@jensenhughes.com>]
Sent: Friday, August 24, 2018 4:32 PM
To: Kozak, Laura <Laura.Kozak@nrc.gov>; Edom, Joseph T:(Contractor - GenCo-Nuc) <Joe.Edom@exeloncorp.com>; Mitman, Jeffrey <Jeffrey.Mitman@nrc.gov>

Cc: Brinsfield, Wes <WBrinsfield@jensenhughes.com>; Teagarden, Grant <GTeagarden@jensenhughes.com>; Antonelli, Michael K.:(GenCo-Nuc) <Michael.Antonelli@exeloncorp.com>
Subject: [External_Sender] RE: Power Supply for Back-up Battery Charger 1DC11E

Hi Laura.

I understand you want to discuss this back-up Battery Charger further. How would Tuesday work for you and Jeff?

Joe Edom | Consultant I

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From: Kozak, Laura [<mailto:Laura.Kozak@nrc.gov>]
Sent: Friday, August 24, 2018 9:48 AM
To: Edom, Joseph T:(Contractor - GenCo-Nuc) <Joe.Edom@exeloncorp.com>; Mitman, Jeffrey <Jeffrey.Mitman@nrc.gov>
Cc: Edom, Joseph <JEdom@jensenhughes.com>; Brinsfield, Wes <WBrinsfield@jensenhughes.com>; Teagarden, Grant <GTeagarden@jensenhughes.com>; Antonelli, Michael K.:(GenCo-Nuc) <Michael.Antonelli@exeloncorp.com>
Subject: RE: Power Supply for Back-up Battery Charger 1DC11E

Joe,

We would like to discuss this next week. Can you let me know when a good time would be?

There are a few questions about the line-up and we would like to make sure we understand.

Thanks
Laura

From: Edom, Joseph T:(Contractor - GenCo-Nuc) [<mailto:Joe.Edom@exeloncorp.com>]
Sent: Thursday, August 23, 2018 12:48 PM
To: Kozak, Laura <Laura.Kozak@nrc.gov>; Mitman, Jeffrey <Jeffrey.Mitman@nrc.gov>
Cc: Joe Edom - Jensen Hughes (JEdom@jensenhughes.com) <JEdom@jensenhughes.com>; Wes Brinsfield (WBrinsfield@jensenhughes.com) <WBrinsfield@jensenhughes.com>; Teagarden, Grant <gteagarden@jensenhughes.com>; Antonelli, Michael K.:(GenCo-Nuc) <Michael.Antonelli@exeloncorp.com>
Subject: [External_Sender] Power Supply for Back-up Battery Charger 1DC11E

Laura and Jeff,

Based on a review by Mike Antonelli:

- 1DC11E is powered by non-vital power from aux building MCC 1E (Fed from unit sub 1M – 6.9kV 1B side).
- Reviewing 4306.01C001, unit sub 1M or MCC 1E is not directly powered up by FLEX actions. It would take more extensive efforts to try and power these busses up.
- The most likely path would be to power up the associated safety related 480V bus and restore that division's own battery charger.

Joe Edom | Senior Corporate Risk Management Engineer

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From: [Kozak, Laura](#)
To: [Louden, Patrick](#); [Stoedter, Karla](#); [Sanchez, Santiago, Elba](#); [Sargis, Daniel](#); [Lara, Julio](#); [Hanna, John](#)
Cc: [Mitman, Jeffrey](#)
Subject: Update on Clinton SDP
Date: Friday, August 24, 2018 10:54:34 AM

Work continues on the Clinton SDP but is proceeding slower than expected due to the complexity of considering multiple AC power recovery actions, including FLEX and the Division 3 DG cross-tie. Also, some responses from the licensee and discussion necessary were slightly delayed. We still anticipate that the analysis will be far enough along next week as committed to project whether we think this is a greater than green issue.

From: [Edom, Joseph T. \(Contractor - GenCo-Nuc\)](#)
To: [Kozak, Laura](#); [Mitman, Jeffrey](#)
Cc: [Joe Edom - Jensen Hughes \(JEdom@jensenhughes.com\)](#)
Subject: [External_Sender] Two Additional Requested Procedures
Date: Tuesday, August 28, 2018 2:55:31 PM
Attachments: [4303.01P001_R3.pdf](#)
[4303.01P004_R3c.pdf](#)

Attachment is non-responsive due to narrowing the request to exclude licensee originated documents.

Laura and Jeff,

Attached are the remaining two procedures you requested copies of:

4303.01P001
4303.01P004

Joe Edom | Senior Corporate Risk Management Engineer

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From: [Kozak, Laura](#)
To: "Edom, Joseph T:(Contractor - GenCo-Nuc)"; [Mitman, Jeffrey](#)
Cc: [Joe Edom - Jensen Hughes \(JEdom@jensenhughes.com\)](#)
Subject: RE: Two Additional Requested Procedures
Date: Tuesday, August 28, 2018 5:11:00 PM

Got the procedures. Thanks Joe.

From: Edom, Joseph T:(Contractor - GenCo-Nuc) [mailto:Joe.Edom@exeloncorp.com]
Sent: Tuesday, August 28, 2018 2:55 PM
To: Kozak, Laura <Laura.Kozak@nrc.gov>; Mitman, Jeffrey <Jeffrey.Mitman@nrc.gov>
Cc: Joe Edom - Jensen Hughes (JEdom@jensenhughes.com) <JEdom@jensenhughes.com>
Subject: [External_Sender] Two Additional Requested Procedures

Laura and Jeff,

Attached are the remaining two procedures you requested copies of:

4303.01P001
4303.01P004

Joe Edom | Senior Corporate Risk Management Engineer

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From: [Stoedter, Karla](#)
To: [Kozak, Laura](#); [Mitman, Jeffrey](#)
Subject: Clinton DRE
Date: Wednesday, August 29, 2018 12:33:08 PM

Laura and Jeff,

I talked with Pat Loudon briefly about information I received from Laura this morning about things looking like we are heading for a SERP. The good news is Pat asked that we push the SERP back by a week because he is out of the office the week of 9/10. He also loved the idea of you discussing the DRE information with the site. Pat indicated Region III is willing to pay for Jeff's travel if travel money is tight in Jeff's branch. However, we would need Jeff's authorization to be in eTravel this week since HQ will be sweeping travel funds by the end of the week.

Thanks again for your work on this issue,

Karla

From: [Kozak, Laura](#)
To: [Stoedter, Karla](#)
Cc: [Mitman, Jeffrey](#); [Phillips, Charles](#)
Subject: Clinton
Date: Thursday, August 30, 2018 1:21:00 PM

Karla

Jeff and I are talking to the licensee about the Division 3 crosstie to Division 2 next week. One of Jeff's questions that potentially impacts the risk modeling is whether this procedure can be accomplished without DC power. We wondered if the residents or maybe Chuck could take a look at the procedure/walk it down, and give us any thoughts?

Laura

From: [Edom, Joseph](#)
To: [Kozak, Laura](#); [Mitman, Jeffrey](#)
Subject: [External_Sender] RE: RE: Discussion of Preliminary Clinton Results
Date: Tuesday, September 04, 2018 6:05:03 PM

Laura,

I should be back home by the afternoon on Wednesday. I will call if it isn't too late. What number do you want me to call?

Also, would you be amenable to an early to mid-morning meeting?

And , how long do you think it will take to go over the results?

This is to let the California folks plan flights.

Thank you.

Joe Edom | Consultant I

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From: Kozak, Laura [mailto:Laura.Kozak@nrc.gov]
Sent: Tuesday, September 04, 2018 11:57 AM
To: Edom, Joseph <JEdom@jensenhughes.com>; Mitman, Jeffrey <Jeffrey.Mitman@nrc.gov>
Subject: RE: RE: Discussion of Preliminary Clinton Results

Let's plan for Tuesday meeting at Clinton.

Joe, please call me when you are back from your time off to discuss any other details.

Thanks
Laura

From: Edom, Joseph [mailto:JEdom@jensenhughes.com]
Sent: Monday, September 03, 2018 8:22 AM
To: Kozak, Laura <Laura.Kozak@nrc.gov>; Mitman, Jeffrey <Jeffrey.Mitman@nrc.gov>
Subject: [External_Sender] RE: Discussion of Preliminary Clinton Results

Thanks Laura.

Joe Edom | Consultant I

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From: Kozak, Laura [<mailto:Laura.Kozak@nrc.gov>]

Sent: Monday, September 03, 2018 8:21 AM

To: Edom, Joseph <JEdom@jensenhughes.com>; Mitman, Jeffrey <Jeffrey.Mitman@nrc.gov>

Subject: RE: Discussion of Preliminary Clinton Results

Joe,

I think that will work. But let's let Jeff weigh in also.

We would prefer to meet at Clinton.

Laura

From: Edom, Joseph [<mailto:JEdom@jensenhughes.com>]

Sent: Monday, September 03, 2018 9:18 AM

To: Kozak, Laura <Laura.Kozak@nrc.gov>; Mitman, Jeffrey <Jeffrey.Mitman@nrc.gov>

Subject: [External_Sender] Discussion of Preliminary Clinton Results

Laura and Jeff,

In working to setup some logistics for this discussion, how would the day of September 11 work out for you? We have some folks travelling from California and Washington and I want to let them get plane tickets as early as I can.

Also, would meeting at the Jensen Hughes Oakbrook Terrace office be acceptable? If so, would it just be yourselves attending or would there be additional participants?

We would have, in addition to myself, the following folks:

- Grant Teagarden
- Wes Brinsfield
- CJ Standridge

Thank you.

Joe Edom | Consultant I

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From: [Stoedter, Karla](#)
To: [Skokowski, Richard](#); [Lambert, Kenneth](#)
Subject: Clinton SERP
Date: Tuesday, September 04, 2018 2:10:00 PM

Rick and Ken,

Pat has asked that we move the SERP for the Clinton EDG issue to 9/20. Laura is planning a trip to the site early next week to get some final pieces of information. She has indicated she should be able to finish the SERP package by COB 9/13. Does this give you enough time to support a SERP the following week?

Karla

From: [Bakhsh, Sarah](#)
To: [Stone, AnnMarie](#); [Stoedter, Karla](#); [Skokowski, Richard](#); [Dickson, Billy](#); [Kozak, Laura](#); [Hanna, John](#)
Subject: FW: Start of 90 day clock
Date: Tuesday, September 04, 2018 12:57:46 PM

By choice letter I mean the exit date mentioned in prelim letter

We don't put in the start dates for the cases until we get the information from the division, so the table is now updated.

From: Bakhsh, Sarah
Sent: Tuesday, September 04, 2018 12:54 PM
To: Stone, AnnMarie <AnnMarie.Stone@nrc.gov>; Stoedter, Karla <Karla.Stoedter@nrc.gov>; Skokowski, Richard <Richard.Skokowski@nrc.gov>; Dickson, Billy <Billy.Dickson@nrc.gov>; Kozak, Laura <Laura.Kozak@nrc.gov>; Hanna, John <John.Hanna@nrc.gov>
Subject: RE: Start of 90 day clock

It's the exit date of the prelim color (choice letter)

From: Stone, AnnMarie
Sent: Tuesday, September 04, 2018 12:45 PM
To: Bakhsh, Sarah <Sarah.Bakhsh@nrc.gov>; Stoedter, Karla <Karla.Stoedter@nrc.gov>; Skokowski, Richard <Richard.Skokowski@nrc.gov>; Dickson, Billy <Billy.Dickson@nrc.gov>; Kozak, Laura <Laura.Kozak@nrc.gov>; Hanna, John <John.Hanna@nrc.gov>
Subject: RE: Start of 90 day clock

You may want to take a look at the start date for the enforcement 120 day metric....is it the exit date of the TBD or the exit date of the prelim color?

From: Bakhsh, Sarah
Sent: Tuesday, September 04, 2018 12:40 PM
To: Stone, AnnMarie <AnnMarie.Stone@nrc.gov>; Stoedter, Karla <Karla.Stoedter@nrc.gov>; Skokowski, Richard <Richard.Skokowski@nrc.gov>; Dickson, Billy <Billy.Dickson@nrc.gov>; Kozak, Laura <Laura.Kozak@nrc.gov>; Hanna, John <John.Hanna@nrc.gov>
Subject: RE: Start of 90 day clock

Will do, thanks for the update

From: Stone, AnnMarie
Sent: Tuesday, September 04, 2018 12:38 PM
To: Stoedter, Karla <Karla.Stoedter@nrc.gov>; Skokowski, Richard <Richard.Skokowski@nrc.gov>; Dickson, Billy <Billy.Dickson@nrc.gov>; Bakhsh, Sarah <Sarah.Bakhsh@nrc.gov>; Kozak, Laura <Laura.Kozak@nrc.gov>; Hanna, John <John.Hanna@nrc.gov>
Subject: Start of 90 day clock

Confirmation.....the 90 day clocks have started for Clinton and Fermi. Please reflect this

in the enforcement tables so no one is surprised!

From: Gibbs, Russell

Sent: Tuesday, September 04, 2018 12:34 PM

To: Stone, AnnMarie <AnnMarie.Stone@nrc.gov>

Cc: Ferdas, Marc <Marc.Ferdas@nrc.gov>; Sandal, Shane <Shane.Sandal@nrc.gov>; Miller, Geoffrey <Geoffrey.Miller@nrc.gov>; Garmoe, Alex <Alex.Garmoe@nrc.gov>; Aird, David <David.Aird@nrc.gov>

Subject: RE: Start of 90 day clock

You got it! Many, if not most folks wait to exit and then issue the report once the preliminary decision has been established but this approach better meets the spirit of the metric. In essence, they are using the 120-day margin to accomplish the front end SDP work. The approach taken here may cause the SDP metric to not be met.

BTW – I'm a big fan of a single reported metric = 255 days. And then let the regions work within this metric as they choose.

Russell

From: Stone, AnnMarie

Sent: Tuesday, September 04, 2018 1:20 PM

To: Gibbs, Russell <Russell.Gibbs@nrc.gov>

Cc: Ferdas, Marc <Marc.Ferdas@nrc.gov>; Sandal, Shane <Shane.Sandal@nrc.gov>; Miller, Geoffrey <Geoffrey.Miller@nrc.gov>

Subject: Start of 90 day clock

Importance: High

Russell,

Sometimes I feel like a broken record....I have to save your response to my question below:

An event occurred on June 5, 2018. An inspector performs an independent inspection and exits on August 2 with an apparent violation of TBD significance. The report is issued on August 28. A report with a preliminary color is NOT expected until September 20 ish.....

Based on the definition in IMC 0307 (below), I am assuming the following with respect to metrics:

Upfront 120: June 5 to August 2

Report timeliness: August 2 to August 28 (with TBD)

90 day metric: August 28 to Final determination (In other words, the date of the prelim is moot for this example)

Is this correct?

03.05

E-5 Completion of Final Significance Determinations

Definition:

Inspection items are finalized as Greater-than-Green within 90 days since:

- (1) The date of initial licensee notification of the preliminary significance in an inspection report, or
- (2) The item was otherwise documented in an inspection report as an apparent violation or finding pending completion of a significance determination and not counted in the above category.

Ann Marie

From: [Kozak, Laura](#)
To: [Mitman, Jeffrey](#)
Subject: RE: Discussion of Preliminary Clinton Results
Date: Tuesday, September 04, 2018 11:56:00 AM

Elba is available to meet with us on Monday. If you think we can get all we need done in the afternoon, then traveling Monday is fine. If you want more time at the site before the meeting, then you should travel Sunday. I will leave this decision to you.

I will travel Monday morning, but will leave early so that I am at the site by around 8.
Laura

From: Mitman, Jeffrey
Sent: Tuesday, September 04, 2018 7:51 AM
To: Kozak, Laura <Laura.Kozak@nrc.gov>
Subject: RE: Discussion of Preliminary Clinton Results

Yes, that works for me.

If you want to meet at the site first thing Monday, I'll travel on Sunday.

Otherwise, I'll see what the first flight out on Monday is and see if I can get to the site at a reasonable time on Monday

Jeff Mitman

From: Kozak, Laura
Sent: Tuesday, September 04, 2018 8:31 AM
To: Mitman, Jeffrey <Jeffrey.Mitman@nrc.gov>
Subject: RE: Discussion of Preliminary Clinton Results

Jeff

I was thinking we could meet at the site on the 10th for any discussion with Elba and to prepare for the meeting on the 11th with the licensee.

I would like to be able to leave the site and travel home after the meeting on the 11th.

Does that work for you?

Laura

From: Mitman, Jeffrey
Sent: Tuesday, September 04, 2018 7:17 AM
To: Kozak, Laura <Laura.Kozak@nrc.gov>; 'Edom, Joseph' <JEdom@jensenhughes.com>
Subject: RE: Discussion of Preliminary Clinton Results

Tuesday the 11th works for me.

Are we planning for a one day meeting on the 22th or should I plan on additional work on the 12th?

Jeff Mitman

From: Kozak, Laura

Sent: Monday, September 03, 2018 9:21 AM

To: 'Edom, Joseph' <JEdom@jensenhughes.com>; Mitman, Jeffrey <Jeffrey.Mitman@nrc.gov>

Subject: RE: Discussion of Preliminary Clinton Results

Joe,

I think that will work. But let's let Jeff weigh in also.

We would prefer to meet at Clinton.

Laura

From: Edom, Joseph [<mailto:JEdom@jensenhughes.com>]

Sent: Monday, September 03, 2018 9:18 AM

To: Kozak, Laura <Laura.Kozak@nrc.gov>; Mitman, Jeffrey <Jeffrey.Mitman@nrc.gov>

Subject: [External_Sender] Discussion of Preliminary Clinton Results

Laura and Jeff,

In working to setup some logistics for this discussion, how would the day of September 11 work out for you? We have some folks travelling from California and Washington and I want to let them get plane tickets as early as I can.

Also, would meeting at the Jensen Hughes Oakbrook Terrace office be acceptable? If so, would it just be yourselves attending or would there be additional participants?

We would have, in addition to myself, the following folks:

- Grant Teagarden
- Wes Brinsfield
- CJ Standridge

Thank you.

Joe Edom | Consultant I

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JEdom@jensenhughes.com | www.jensenhughes.com

From: [Stone, AnnMarie](#)
To: [Skokowski, Richard](#); [Bakhsh, Sarah](#)
Cc: [Dickson, Billy](#); [Stoedter, Karla](#); [Hanna, John](#); [Kozak, Laura](#)
Subject: start date for 90 day metric for Clinton and Fermi
Date: Tuesday, September 04, 2018 12:10:28 PM

Rick/Sarah,

I reviewed the 8/24/18 allegation and enforcement summary and noted that the 90 day clocks for the Clinton EDG air receiver and the Fermi RHRSW issues were not listed. Per IMC 0307, the start date for the completion of the final determination is either the prelim color OR documented as an apparent violation (TBD). Both of these items were documented as TBD so the clock has started. For Clinton, use 8/23/18 and for Fermi, use 8/14/18.

IMC 0307, Appendix A:

03.05 E-5 Completion of Final Significance Determinations

Definition: Inspection items are finalized as Greater-than-Green within 90 days since:
 (1) The date of initial licensee notification of the preliminary significance in an inspection report, or
 (2) The item was otherwise documented in an inspection report as an apparent violation or finding pending completion of a significance determination and not counted in the above category.

I will confirm with HQ....but I believe clocks have started with the TBD reports issued.

Thanks!
Ann Marie

From: [Kozak, Laura](#)
To: [Mitman, Jeffrey](#)
Subject: Division 3 cross-tie to Division 2
Date: Wednesday, September 05, 2018 10:36:00 AM

Elba called and said she reviewed the cross-tie procedure and discussed it with licensee personnel. The feedback she provided is that the lockouts that are required to be re-set can't be performed without AC and DC power.

From: [Mitman, Jeffrey](#)
To: [Kozak, Laura](#)
Subject: Model Punch List and Notes 09-05-2018.xlsx
Date: Wednesday, September 05, 2018 2:42:57 PM
Attachments: [Model Punch List and Notes 09-05-2018.xlsx](#)

Laura, I've created the attached punch list to keep track of work to be done. The original is up on the SharePoint site.

Jeff Mitman

Punch List

<u>Item</u>	<u>Description</u>	<u>Responsible Person</u>	<u>Resolution</u>	<u>Status</u>
1	Change first top event on ET to <DUMMY-FT>	Mitman		
2	There are currently 3 FLEX injection methods. Do I need to add more?	Mitman		
3	Fix SD-CVS ET top event	Mitman		
4	Add manual (is not dependent on electrical power) method to vent containment	Mitman		
5	Should I credit opening primary containment airlock as a method to vent PC?	Mitman		
6	Add method to power SRVs using B5b diesel using CPS 4303.01P004. Modify FT: DEP-SS.	Mitman		
7	Should I credit B5b fire pump as injection method?	Mitman		
8	Should I modify ET to credit low pressure injection without depressurization (prior to boiling)? This is only feasible if procedures direct operator to establish letdown path, which currently we have no evidence of! This would require second set of HEPs with shorter time available.	Mitman		
9	Should offsite power non-recovery probability be based on battery life or 24 hours?	Mitman		
10	Revisit Div. 2 EDG non-recovery probability	Mitman		
11	Revisit offsite power non-recovery probability	Mitman		
12	Consider solving all ET top event FTs using success criteria	Mitman		
13	Find issue with RCIC support system FT	Kozak		
14	Ask Bob Buell to check for model FT renaming errors	Mitman		
15	Sensitivity Cases:	Mitman		
	a Set HEPs to Exelon values			
	b Decrease HEPs by factor of 0.1			
	c Increased Div. 2 EDG recovery probability			
	d No FLEX credit and non-recovery probabilities based on 24 hours			
	e Case using single dependent HEP for injection methods instead of indep. HEPs			
	f			
16	HEP ADS-XHE-XM-MDEPR has a value of 5E-4 from at-power model. Check to see if this is appropriate for SD	Mitman		
17	Compare FLEX DG FS/FR/TM values to Exelon values	Mitman		
18	Compare FLEX diesel driven pump FS/FR/TM values to Exelon values	Mitman		
19	Add HEPs for FLEX diesel driven pump transportation and T&M	Mitman		
20	FT: SD-SDC Make sure there is no transfer to Alter SDC which is an artifact of the Grand Gulf model	Mitman		
	Re-look at HEP times available: My recollection is that TTUC is about 24 hours at low pressure and about 10 hours at high pressure (this time delta makes sense because of the lower heat capacity at ~1000 psig). The implication is that low pressure sequences will have about 24 to core uncover while high pressure sequences will have half the time.			
21		Mitman		
22				
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Notes

Items

- 1 Division 1 electrical system powers outboard containment isolation valves. Div. 2 powers inboard valves.
Div. 3 to Div. 2 crosstie: The required lockout resets cannot be performed with AC and DC power (per discussion between SRI and licensee). AC power will be available on Div. 3 if the EDG is running. DC power on Div. 3 should be available. However, DC power will be available on Div. 2 after the Div. 2 battery depletes - this assumes that FLEX electrical has failed.
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From: [Stoedter, Karla](#)
To: [Lambert, Kenneth](#); [Skokowski, Richard](#)
Subject: RE: Clinton SERP
Date: Wednesday, September 05, 2018 4:50:00 AM

Ken,

We should have a good violation because it will be the same as we issued in the SIT inspection report. This is also the violation you worked with Chuck Phillips to write. The only difference is the apparent violation was issued with a TBD significance in the report. The SERP will just finalize a preliminary color that will need to be documented in a choice letter assuming the risk determination ends up greater than green (which is what it currently looks like).

Karla

From: Lambert, Kenneth
Sent: Tuesday, September 04, 2018 3:40 PMt
To: Stoedter, Karla <Karla.Stoedter@nrc.gov>; Skokowski, Richard <Richard.Skokowski@nrc.gov>
Subject: RE: Clinton SERP

Karla,

It could be doable. We usually do not make any changes to the SRA analysis section. We would need to ensure we have a good violation, which we can do ahead of time. I will discuss with Rick tomorrow, as he is not in this afternoon.

Ken

Ken Lambert
Sr. Enforcement Specialist
Region III
U.S. Nuclear Regulatory Commission
630-810-4376
kenneth.lambert@nrc.gov

From: Stoedter, Karla
Sent: Tuesday, September 04, 2018 2:10 PM
To: Skokowski, Richard <Richard.Skokowski@nrc.gov>; Lambert, Kenneth <Kenneth.Lambert@nrc.gov>
Subject: Clinton SERP

Rick and Ken,

Pat has asked that we move the SERP for the Clinton EDG issue to 9/20. Laura is planning a trip to the site early next week to get some final pieces of information. She has indicated she should be able to finish the SERP package by COB 9/13. Does this give you enough time to support a SERP the following week?

Karla

From: [Kozak, Laura](#)
To: ["Edom, Joseph"; Mitman, Jeffrey](#)
Subject: RE: RE: RE: Discussion of Preliminary Clinton Results
Date: Wednesday, September 05, 2018 6:50:00 AM

Joe

Call my work number. I will be in all day.

Yes, early to mid-morning start time is fine.

I expect it will take several hours but we can work to your schedule, make sure that we discuss the model structure in person. Further discussion, if necessary can be over the phone.

Laura

From: Edom, Joseph [mailto:JEdom@jensenhughes.com]
Sent: Tuesday, September 04, 2018 6:05 PM
To: Kozak, Laura <Laura.Kozak@nrc.gov>; Mitman, Jeffrey <Jeffrey.Mitman@nrc.gov>
Subject: [External_Sender] RE: RE: Discussion of Preliminary Clinton Results

Laura,

I should be back home by the afternoon on Wednesday. I will call if it isn't too late. What number do you want me to call?

Also, would you be amenable to an early to mid-morning meeting?

And , how long do you think it will take to go over the results?

This is to let the California folks plan flights.

Thank you.

Joe Edom | Consultant I

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O: +1 630-627-2277 | C: | F: +1 630-627-2278
JEdom@jensenhughes.com | www.jensenhughes.com

From: Kozak, Laura [mailto:Laura.Kozak@nrc.gov]
Sent: Tuesday, September 04, 2018 11:57 AM
To: Edom, Joseph <JEdom@jensenhughes.com>; Mitman, Jeffrey <Jeffrey.Mitman@nrc.gov>
Subject: RE: RE: Discussion of Preliminary Clinton Results

Let's plan for Tuesday meeting at Clinton.

Joe, please call me when you are back from your time off to discuss any other details.

Thanks
Laura

From: Edom, Joseph [<mailto:JEdom@jensenhughes.com>]
Sent: Monday, September 03, 2018 8:22 AM
To: Kozak, Laura <Laura.Kozak@nrc.gov>; Mitman, Jeffrey <Jeffrey.Mitman@nrc.gov>
Subject: [External_Sender] RE: Discussion of Preliminary Clinton Results

Thanks Laura.

Joe Edom | Consultant I

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JEdom@jensenhughes.com | www.jensenhughes.com

From: Kozak, Laura [<mailto:Laura.Kozak@nrc.gov>]
Sent: Monday, September 03, 2018 8:21 AM
To: Edom, Joseph <JEdom@jensenhughes.com>; Mitman, Jeffrey <Jeffrey.Mitman@nrc.gov>
Subject: RE: Discussion of Preliminary Clinton Results

Joe,

I think that will work. But let's let Jeff weigh in also.

We would prefer to meet at Clinton.

Laura

From: Edom, Joseph [<mailto:JEdom@jensenhughes.com>]
Sent: Monday, September 03, 2018 9:18 AM
To: Kozak, Laura <Laura.Kozak@nrc.gov>; Mitman, Jeffrey <Jeffrey.Mitman@nrc.gov>
Subject: [External_Sender] Discussion of Preliminary Clinton Results

Laura and Jeff,

In working to setup some logistics for this discussion, how would the day of September 11 work out for you? We have some folks travelling from California and Washington and I want to let them get plane tickets as early as I can.

Also, would meeting at the Jensen Hughes Oakbrook Terrace office be acceptable? If so, would it just be yourselves attending or would there be additional participants?

We would have, in addition to myself, the following folks:

- Grant Teagarden
- Wes Brinsfield
- CJ Standridge

Thank you.

Joe Edom | Consultant I

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JEdom@jensenhughes.com | www.jensenhughes.com

From: [Kozak, Laura](#)
To: [Mitman, Jeffrey](#)
Subject: Clinton - recovery of Div 2 DG
Date: Friday, September 07, 2018 4:23:00 PM

So here is how they describe "high assurance" in the body of their evaluation:

Note that procedure CPS 4200.01, Loss of AC Power, contains statements that direct the operators to stop attempts to restore the DG if, within one (1) hour of a SBO there is not high assurance of restoration of Division 1 and/or Division 2 power within the four (4) hour SBO coping period. With the availability of resources, the ability to complete the DG restoration effort within 40-45 minutes, and the slow evolution of the scenario, it is assumed that the operators will have high assurance of power restoration. They or designated responsible parties (e.g., ERO staff) will continue efforts to restore the DG even if more than one hour since the start of the SBO has transpired.

Attachment is non-responsive due to narrowing the request to exclude licensee originated documents.
Attachment is: OP-CL-108-101-1001, Rev. 12a, "General Equipment Operating Requirements"

From: [Kozak, Laura](#)
To: [Sanchez Santiago, Elba](#)
Subject: FW: Clinton Risk assessment followup questions
Date: Friday, September 07, 2018 3:35:00 PM
Attachments: [OP-CL-108-101-1001.pdf](#)

FYI

From: Shelton, Dale A:(GenCo-Nuc) [mailto:Dale.Shelton@exeloncorp.com]
Sent: Friday, September 07, 2018 3:30 PM
To: Kozak, Laura <Laura.Kozak@nrc.gov>
Cc: Edom, Joseph T:(Contractor - GenCo-Nuc) <Joe.Edom@exeloncorp.com>; Rush, Robert Charles: (GenCo-Nuc) <Robert.Rush@exeloncorp.com>; Antonelli, Michael K.:(GenCo-Nuc) <Michael.Antonelli@exeloncorp.com>; Lux, Gregory Allan:(GenCo-Nuc) <gregory.lux@exeloncorp.com>
Subject: [External_Sender] Clinton Risk assessment followup questions

Jeff/Laura,

In response to your questions regarding whether DC or AC power is required to reset lockout relays in 4303.01P023 steps 1.2.9 and 1.2.10 – the 86 lockout relay is purely a mechanical reset and does not require AC or DC power availability. The relay is reset by rotating the handle and the relay latches in when rotated. One of our System Engineers has a training relay that he can demonstrate this with you on Monday when you are here.

Regarding your second question, I have attached OP-CL-108-101-1001 that describes general requirements for resetting protective devices that have tripped. There is no specific guidance related to these relays, but the general guidance located in sections 3.6 and 3.7 would be applicable. The guidance states that before resetting, you should understand why the relay tripped. Depending on the way that power was lost, it would not be expected to have tripped. There are other indications available that would help the team determine if a fault caused the trip. Greg can also walk through what would be expected and indications that would be available. At the point in time of an event that the operators would be performing these steps, the ERO would be staffed and Electrical Engineers like Greg would be available in the TSC to support step completion.

Look forward to more discussions on Monday and Tuesday. Safe travels.

Just so you are aware, the inner parking lots will be closed on Monday only due to a station safety fair. Everyone will be parking in the outer "contractor" parking lot.

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From: [Mitman, Jeffrey](#)
To: [Kozak, Laura](#)
Subject: New Clinton Model
Date: Friday, September 07, 2018 5:05:01 PM

Laura, a new version of the model is on SharePoint.

Jeff Mitman

From: [Kozak, Laura](#)
To: ["Shelton, Dale A.:\(GenCo-Nuc\)"](#)
Subject: RE: Clinton Risk assessment followup questions
Date: Friday, September 07, 2018 3:36:00 PM

Dale,

Thank you for the response and the information.

Laura

From: Shelton, Dale A:(GenCo-Nuc) [mailto:Dale.Shelton@exeloncorp.com]
Sent: Friday, September 07, 2018 3:30 PM
To: Kozak, Laura <Laura.Kozak@nrc.gov>
Cc: Edom, Joseph T:(Contractor - GenCo-Nuc) <Joe.Edom@exeloncorp.com>; Rush, Robert Charles: (GenCo-Nuc) <Robert.Rush@exeloncorp.com>; Antonelli, Michael K.:(GenCo-Nuc) <Michael.Antonelli@exeloncorp.com>; Lux, Gregory Allan:(GenCo-Nuc) <gregory.lux@exeloncorp.com>
Subject: [External_Sender] Clinton Risk assessment followup questions

Jeff/Laura,

In response to your questions regarding whether DC or AC power is required to reset lockout relays in 4303.01P023 steps 1.2.9 and 1.2.10 – the 86 lockout relay is purely a mechanical reset and does not require AC or DC power availability. The relay is reset by rotating the handle and the relay latches in when rotated. One of our System Engineers has a training relay that he can demonstrate this with you on Monday when you are here.

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Look forward to more discussions on Monday and Tuesday. Safe travels.

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From: [Stoedter, Karla](#)
To: [Skokowski, Richard](#); [Pelke, Paul](#)
Subject: Division of Risk Assessment rep availability for Clinton SERP
Date: Monday, September 10, 2018 10:37:00 AM

Rick and Paul,

Can you give me the time we would plan to have a Clinton SERP on 9/20? I'm hearing that Mike Franovich may be unavailable, and we may need to reschedule.

Thanks,

Karla

From: [Sargis, Daniel](#)
To: [Hafeez, Ijaz](#); [Dahbur, Alan](#)
Cc: [Robbins, John](#); [Sanchez Santiago, Elba](#); [Kozak, Laura](#); [Mitman, Jeffrey](#)
Subject: FW: Electrical Drawings
Date: Monday, September 10, 2018 3:44:15 PM
Attachments: [E02-1AP03_Sh1.tiff](#)
[E02-1AP99_Sh109.tiff](#)
[E02-1AP99_Sh106.tiff](#)
[E02-1AP99_Sh107.tiff](#)
[E02-1AP99_Sh108.tiff](#)
[E02-1AP99_Sh15.tiff](#)
[E02-1AP99_Sh17.tiff](#)
[E02-1AP99_Sh11.tiff](#)
[E02-1AP99_Sh12.tiff](#)
[E02-1AP99_Sh39.tiff](#)

All the attachments are non-responsive due to narrowing the request to exclude licensee originated documents.

Here are what I believe are the drawings that will show what you need to know. I spoke with one of their system engineers and he was using these drawings to step through the cross-tie procedure.

-Dan

From: Sargis, Daniel:(Contractor - GenCo-Nuc) [mailto:Daniel.Sargis@exeloncorp.com]
Sent: Monday, September 10, 2018 3:36 PM
To: Sargis, Daniel <Daniel.Sargis@nrc.gov>
Subject: [External_Sender] Electrical Drawings

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From: [Stoedter, Karla](#)
To: [Franovich, Mike](#)
Subject: Schedule for Clinton SERP
Date: Monday, September 10, 2018 11:26:00 AM

Hi Mike,

Jeff Mitman let me know that you have a conflict with the schedule for the planned Clinton SERP on 9/20. I am the branch chief responsible for the SERP. Are there other times on 9/20 you would be available? If not, is there another time and date that would work for you?

Thanks,

Karla Stoedter

630-829-9731

From: [Chandrathil, Prema](#)
To: [West, Steven](#); [Roberts, Darrell](#); [Louden, Patrick](#); [Lara, Julio](#); [O'Brien, Kenneth](#); [Shuaibi, Mohammed](#); [Heck, Jared](#); [Giessner, John](#); [Lipa, Christine](#); [Stoedter, Karla](#); [Riemer, Kenneth](#); [Sanchez Santiago, Elba](#); [Sargis, Daniel](#); [Phillips, Charles](#); [Murray, Robert](#); [Draper, Jason](#); [Kozak, Laura](#); [Mitman, Jeffrey](#)
Cc: [Mitlyng, Viktoria](#)
Subject: Clinton SIT report is discussed in Lochbaum's blog
Date: Tuesday, September 11, 2018 8:25:05 AM

FYI-

Lochbaum talks about the Clinton special inspection and recently issued report in his blog.

<https://allthingsnuclear.org/dlochbaum/clinton-power-problems>

Prema

Prema Chandrathil
Public Affairs Officer
U.S. NRC Region III
630-829-9663

From: [Stoedter, Karla](#)
To: [Skokowski, Richard](#)
Subject: FW: Schedule for Clinton SERP
Date: Tuesday, September 11, 2018 4:59:00 AM

Rick,

It looks like the SERP will need to be on Thursday afternoon. I'm guessing we can't have it at noon CDT. I'm just asking due to a need to also support the Clinton 95001 effort that will be exiting the following day. Let me know.

Karla

From: Franovich, Mike
Sent: Monday, September 10, 2018 2:18 PM
To: Stoedter, Karla <Karla.Stoedter@nrc.gov>
Subject: RE: Schedule for Clinton SERP

Hello Karla,

My calender is now open from 1 to 4 pm (edt).

Best,

Mike

From: Stoedter, Karla
Sent: Monday, September 10, 2018 2:04 PM
To: Franovich, Mike <Mike.Franovich@nrc.gov>
Subject: Schedule for Clinton SERP

Hi Mike,

Jeff Mitman let me know that you have a conflict with the schedule for the planned Clinton SERP on 9/20. I am the branch chief responsible for the SERP. Are there other times on 9/20 you would be available? If not, is there another time and date that would work for you?

Thanks,

Karla Stoedter

630-829-9731

From: [Kozak, Laura](#)
To: [Hafeez, Ijaz](#); [Dahbur, Alan](#); [Sanchez Santiago, Elba](#); [Stoedter, Karla](#); [Hanna, John](#)
Cc: [Daley, Robert](#); [Robbins, John](#); [Sargis, Daniel](#)
Subject: RE: Clinton Questions.docx
Date: Tuesday, September 11, 2018 3:59:14 PM

Thank you! Very helpful.

Laura

From: Hafeez, Ijaz
Sent: Tuesday, September 11, 2018 4:26 PM
To: Dahbur, Alan <Alan.Dahbur@nrc.gov>; Sanchez Santiago, Elba <Elba.SanchezSantiago@nrc.gov>; Stoedter, Karla <Karla.Stoedter@nrc.gov>; Kozak, Laura <Laura.Kozak@nrc.gov>; Hanna, John <John.Hanna@nrc.gov>
Cc: Daley, Robert <Robert.Daley@nrc.gov>; Robbins, John <John.Robbins@nrc.gov>; Sargis, Daniel <Daniel.Sargis@nrc.gov>
Subject: Clinton Questions.docx

All,

Please call if you have additional questions.

Thanks

From: [Shelton, Dale A. \(GenCo-Nuc\)](#)
To: [Kozak, Laura](#); [Mitman, Jeffrey](#)
Cc: [Sanchez Santiago, Elba](#); [Sargis, Daniel](#)
Subject: [External_Sender] Clinton Risk Analysis Followup from 9/11 meeting
Date: Wednesday, September 12, 2018 3:22:44 PM

Jeff/Laura,

We appreciated the opportunity to review your risk modeling with us yesterday. We heard your feedback regarding human error success probabilities and the complexity of decisions that would have to be made during such an event. We believe that a couple of clarifying points would be helpful in reducing some of the uncertainty.

First, during the time validations that were performed shortly after the event, the operators were able to identify that the air isolation valves were closed within the first 16 minutes. The remainder of the total recovery time of 42 minutes was spent working through the steps to place the DG back in a standby configuration to allow auto start on the undervoltage condition. This included 10 minutes for restoring DC control power back to the DG as directed by the procedure. Interviews with the operator that identified the condition stated that the isolated valves were immediately obvious to him as soon as he entered the room, even without the cues of a failure to start. This observation supports a very short identification time. As described in 4306.01, the first two hours of implementing the FLEX power strategy involves briefing operators and pulling cables. It is reasonable to assume that there would be at least an additional hour of recovery time available to the operators to restore Div. 2 DG.

The Loss of AC procedure 4200.01 step 4.4.1 does not state to exit the procedure, it states to "STOP executing Station Blackout actions and immediately execute CPS 4306.01 Extended Loss of AC Power/Loss of UHS." The procedure would not be exited, but the focus would turn to the FLEX procedure. With the additional operators on-shift during the refueling outage, these FLEX actions would be started by additional operators and not impact those operators already working on the DG restoration. Section 6.2, provides the bases for this step and identifies that "These actions parallel SBO actions through the 4 hour assumed coping period. These actions will provide alternate power and water sources and allow containment heat removal." This provides additional context that actions would continue in parallel to restore the Div. 2 DG while implementing the FLEX strategies.

One final piece of information to clarify is that the Div 1 and 2 SX pumps are powered from 4.16kV and would be immediately available upon DG start. However, alignment of the cooling water valves to the DG Heat Exchanger and SX crosstie valve would require 480V realignment to repower or manual operation.

We would like to have Mike Antonelli discuss this information with you tomorrow to get your feedback. Thank you and have a great day!

Dale Shelton
Regulatory Assurance Manager
Clinton Power Station



8401 Power Road

Clinton, Illinois 61727

(217) 937-2800 Office

(b)(6) Mobile

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From: [Shelton, Dale A:\(GenCo-Nuc\)](#)
To: [Kozak, Laura](#); [Mitman, Jeffrey](#)
Cc: [Sanchez Santiago, Elba](#); [Sargis, Daniel](#)
Subject: [External_Sender] RE: Clinton Risk Analysis Followup from 9/11 meeting
Date: Wednesday, September 12, 2018 4:24:52 PM

Thank you for getting back to me. We would like to discuss this at your earliest convenience. I know that you are on a short clock to make your recommendation and we want to ensure that we have our discussion in time to support that recommendation. Please let me know when you are available.


Regarding 4200.01, I was also referencing Revision 25a, which was issued on 5/16/18. I was referring to the SBO Section:

4.4 STATION BLACKOUT (SBO) «CM-1»

1. The Shift Manager shall conduct a continuous assessment of the prognosis for restoration of power to Div 1 and/or Div 2.

IF Within 1 HOUR of the Station Blackout, there has not been action taken that would provide a HIGH ASSURANCE of restoration of Div 1 and/or Div 2 power within the 4 hour SBO coping period,

THEN STOP executing Station Blackout actions and immediately execute CPS 4306.01 Extended Loss of AC Power/Loss of UHS.

 **At this point, executing CPS 4306.01 Extended Loss of AC Power/Loss of UHS takes precedence over attempts to restore offsite AC and/or DGs.**

2. The Shift Manager shall continue to monitor SBO recovery actions.

IF While executing SBO actions, recovery actions prove to be unsuccessful

THEN STOP executing Station Blackout actions and immediately execute CPS 4306.01 Extended Loss of AC Power/Loss of UHS.

Looks like there is an inconsistency between the global actions and the specific sections. I have captured this in IR 4172512.

From: Kozak, Laura <Laura.Kozak@nrc.gov>
Sent: Wednesday, September 12, 2018 3:46 PM
To: Shelton, Dale A:(GenCo-Nuc) <Dale.Shelton@exeloncorp.com>; Mitman, Jeffrey

<Jeffrey.Mitman@nrc.gov>

Cc: Elba Sanchez Santiago <Elba.SanchezSantiago@nrc.gov>; Sargis, Daniel <Daniel.Sargis@nrc.gov>

Subject: RE: Clinton Risk Analysis Followup from 9/11 meeting

Dale

Thanks for the follow-up. I don't think tomorrow will work for a discussion. Let me check with Jeff. Can you propose an alternate day/ time?

What revision of 4200.01 are you referring to?

The revision we have – 25a - was provided to us and has the following statement:

4.1 Global Subsequent Actions

1. **IF** An ELAP exists (see step 1.5 for Definition)

THEN EXIT this procedure **AND** enter CPS 4306.01

Extended Loss of AC Power/Loss of UHS.

Thanks

Laura

m: Shelton, Dale A:(GenCo-Nuc) [<mailto:Dale.Shelton@exeloncorp.com>]

Sent: Wednesday, September 12, 2018 4:22 PM

To: Kozak, Laura <Laura.Kozak@nrc.gov>; Mitman, Jeffrey <Jeffrey.Mitman@nrc.gov>

Cc: Sanchez Santiago, Elba <Elba.SanchezSantiago@nrc.gov>; Sargis, Daniel <Daniel.Sargis@nrc.gov>

Subject: [External_Sender] Clinton Risk Analysis Followup from 9/11 meeting

Jeff/Laura,

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First, during the time validations that were performed shortly after the event, the operators were able to identify that the air isolation valves were closed within the first 16 minutes. The remainder of the total recovery time of 42 minutes was spent working through the steps to place the DG back in a standby configuration to allow auto start on the undervoltage condition. This included 10 minutes for restoring DC control power back to the DG as directed by the procedure. Interviews with the operator that identified the condition stated that the isolated valves were immediately obvious to him as soon as he entered the room, even without the cues of a failure to start. This observation supports a very short identification time. As described in 4306.01, the first two hours of implementing the FLEX power strategy involves briefing operators and pulling cables. It is reasonable to assume that there would be at least an additional hour of recovery time available to the operators to restore Div. 2 DG.

The Loss of AC procedure 4200.01 step 4.4.1 does not state to exit the procedure, it states to "STOP executing Station Blackout actions and immediately execute CPS 4306.01 Extended Loss of AC Power/Loss of UHS." The procedure would not be exited, but the focus would turn to the FLEX procedure. With the additional operators on-shift during the refueling outage, these FLEX actions would be started by additional operators and not impact those operators already working on the DG restoration. Section 6.2, provides the bases for this step and identifies that "These actions parallel SBO actions through the 4 hour assumed coping period. These actions will provide alternate power and water sources and allow containment heat removal." This provides additional context that actions would continue in parallel to restore the Div. 2 DG while implementing the FLEX strategies.

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Dale Shelton
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From: [Shelton, Dale A:\(GenCo-Nuc\)](#)
To: [Kozak, Laura](#); [Mitman, Jeffrey](#)
Cc: [Sanchez Santiago, Elba](#); [Sargis, Daniel](#)
Subject: [External_Sender] RE: RE: Clinton Risk Analysis Followup from 9/11 meeting
Date: Wednesday, September 12, 2018 5:54:01 PM

That will work for us. I will send a meeting invite.

From: Kozak, Laura <Laura.Kozak@nrc.gov>
Sent: Wednesday, September 12, 2018 5:24 PM
To: Shelton, Dale A:(GenCo-Nuc) <Dale.Shelton@exeloncorp.com>; Mitman, Jeffrey <Jeffrey.Mitman@nrc.gov>
Cc: Elba Sanchez Santiago <Elba.SanchezSantiago@nrc.gov>; Sargis, Daniel <Daniel.Sargis@nrc.gov>
Subject: RE: RE: Clinton Risk Analysis Followup from 9/11 meeting

Dale

Jeff and I can support a discussion tomorrow at noon central, 1:00pm eastern. Does that work for you?

Laura

From: Shelton, Dale A:(GenCo-Nuc) [<mailto:Dale.Shelton@exeloncorp.com>]
Sent: Wednesday, September 12, 2018 5:23 PM
To: Kozak, Laura <Laura.Kozak@nrc.gov>; Mitman, Jeffrey <Jeffrey.Mitman@nrc.gov>
Cc: Sanchez Santiago, Elba <Elba.SanchezSantiago@nrc.gov>; Sargis, Daniel <Daniel.Sargis@nrc.gov>
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Sent: Wednesday, September 12, 2018 4:22 PM

To: Kozak, Laura <Laura.Kozak@nrc.gov>; Mitman, Jeffrey <Jeffrey.Mitman@nrc.gov>
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From: [Kozak, Laura](#)
To: [Mitman, Jeffrey](#)
Subject: RE: Model up loaded to SP
Date: Wednesday, September 12, 2018 2:54:49 PM

Thanks. I just updated the punch list on share point

From: Mitman, Jeffrey
Sent: Wednesday, September 12, 2018 2:52 PM
To: Kozak, Laura <Laura.Kozak@nrc.gov>
Subject: Model up loaded to SP

Laura, I've uploaded the model we developed while at Clinton.

Also uploaded is the "HEP" spreadsheet for the EDG2 recovery developed at the site.

Jeff Mitman

From: [Edom, Joseph T.\(Contractor - GenCo-Nuc\)](#)
To: [Kozak, Laura](#); [Mitman, Jeffrey](#)
Cc: [Joe Edom - Jensen Hughes \(JEdom@jensenhughes.com\)](#)
Subject: [External_Sender] Containment Phenomenological Events Leading to Injection Failure
Date: Thursday, September 13, 2018 12:56:47 PM

Jeff and Laura,

Here are the containment phenomenological events we have in the internal events model that fail injection:

Basic Event	Description	Probability
1CTSYSTEAMBIND--	CONT. RUPTURE RAPIDLY DEPRESSURIZES CONT. CAUSING ST. BINDING	2.04E-01
1CTSY-WWLOSS-R--	WW RUPTURE CAUSES LOSS OF WATER IN POOL	2.00E-01
1CTSYLRGPCFLLR--	CONT. CATASTROPHIC FAILURE MODE	2.00E-01

Sorry for not getting this to you yesterday.

Joe Edom | Senior Corporate Risk Management Engineer

JENSEN HUGHES

Advancing the Science of Safety

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From: [Stoedter, Karla](#)
To: [Pelke, Paul](#)
Subject: Clinton SERP
Date: Thursday, September 13, 2018 2:45:00 PM

Paul,

Don't give away the 30 minutes we asked for on Thursday. There is the potential we will stick to Region III's original time slot on Thursday morning. Pat needs to talk to Mike Franovich in NRR. We plan to move forward with a SERP and should have the package to you later today.

I'll let you know when I have more information,
Karla

From: [Kozak, Laura](#)
To: [Sanchez Santiago, Elba](#)
Subject: pictures
Date: Thursday, September 13, 2018 8:35:00 AM

Can you send the pictures of the division 2 diesel – valves, gauges, etc.

From: [Kozak, Laura](#)
To: [Fredrickson, Michael](#); [Fong, CJ](#); [Mitman, Jeffrey](#)
Subject: RASP manual excerpt on considering impacts of load shed on diesel and offsite power recovery
Date: Thursday, September 13, 2018 9:05:00 AM
Attachments: [image001.png](#)

- **Using Data to Estimate Nonrecovery Probabilities.** Nominal failure probability for a *repair* action is normally based on the evaluation of industry-wide operating experience data. Examples of data-based nonrecovery probabilities used in SPAR models include recovery/repair of emergency diesel generator (EDG) failures and loss of offsite power (LOOP) events.
 - Guidance on the process for collecting and reducing recovery and repair data is provided in Section 5.3 of [NUREG/CR-6823](#). This guidance includes a description of the type of data that is reviewed and guidelines for allocating data.
 - A decision or procedural direction to perform deep direct-current (DC) load shed early in some events [e.g., station blackout (SBO)] may complicate recovery of AC power or EDGs, and this condition should be taken into consideration by the analyst when estimating nonrecovery probabilities.
 - Analysts specializing in parameter data collection, reduction, and statistical analysis should be consulted for estimating a nonrecovery probability using operational experience data.

From: [Kozak, Laura](#)
To: "Edom, Joseph T:(Contractor - GenCo-Nuc)"
Subject: RE: Containment Phenomenological Events Leading to Injection Failure
Date: Thursday, September 13, 2018 1:20:00 PM

Got it. Thanks Joe.

From: Edom, Joseph T:(Contractor - GenCo-Nuc) [mailto:Joe.Edom@exeloncorp.com]
Sent: Thursday, September 13, 2018 12:56 PM
To: Kozak, Laura <Laura.Kozak@nrc.gov>; Mitman, Jeffrey <Jeffrey.Mitman@nrc.gov>
Cc: Joe Edom - Jensen Hughes (JEdom@jensenhughes.com) <JEdom@jensenhughes.com>
Subject: [External_Sender] Containment Phenomenological Events Leading to Injection Failure

Jeff and Laura,

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Basic Event	Description	Probability
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1CTSYLRGPCFLLR--	CONT. CATASTROPHIC FAILURE MODE	2.00E-01

Sorry for not getting this to you yesterday.

Joe Edom | Senior Corporate Risk Management Engineer

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+++++

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From: [Kozak, Laura](#)
To: [Sanchez Santiago, Elba](#)
Subject: RE: pictures
Date: Thursday, September 13, 2018 4:44:00 PM

No worries. I thought the pictures might help the SERP decision-makers.

From: Sanchez Santiago, Elba
Sent: Thursday, September 13, 2018 3:27 PM
To: Kozak, Laura <Laura.Kozak@nrc.gov>
Subject: RE: pictures

My computer is acting up and not recognizing the camera. I will contact IT tomorrow if its still not working and get those to you.

From: Kozak, Laura
Sent: Thursday, September 13, 2018 8:36 AM
To: Sanchez Santiago, Elba <Elba.SanchezSantiago@nrc.gov>
Subject: pictures

Can you send the pictures of the division 2 diesel – valves, gauges, etc.

From: [Kozak, Laura](#)
To: [Skokowski, Richard](#); [Stoedter, Karla](#); [Lambert, Kenneth](#)
Subject: SERP next week for Clinton
Date: Thursday, September 13, 2018 10:47:00 AM

FYI.

Jeff Mitman (HQ risk analyst) believe that the discussion next week could take over an hour. He briefed his management today and it took over an hour. It is a complex issue and there were a number of questions.

Can we make sure we are prepared for a longer than typical discussion next week?

Laura

From: [Shelton, Dale A.:\(GenCo-Nuc\)](#)
To: [Kozak, Laura](#); [Mitman, Jeffrey](#)
Cc: [Antonelli, Michael K.:\(GenCo-Nuc\)](#); [Edom, Joseph T.:\(Contractor - GenCo-Nuc\)](#)
Subject: [External_Sender] FW: Availability of SF pumps
Date: Friday, September 14, 2018 8:30:49 AM

Jeff/Laura, Attached is our response for availability of the SF pumps used for FLEX suppression pool cooling. If there is any other information that would be helpful in your review, please reach out to me and we will pull together that data as soon as possible. Thank you!

Dale Shelton
Regulatory Assurance Manager
Clinton Power Station



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Clinton, Illinois 61727
(217) 937-2800 Office

Mobile

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From: Antonelli, Michael K.:(GenCo-Nuc)
Sent: Thursday, September 13, 2018 11:57 PM
To: Shelton, Dale A.:(GenCo-Nuc) <Dale.Shelton@exeloncorp.com>
Cc: Champley, Richard Blaine:(GenCo-Nuc) <Richard.Champley@exeloncorp.com>; Siegmund, Andrew C.:(GenCo-Nuc) <Andrew.Siegmund@exeloncorp.com>; Weissinger, Hoy John:(GenCo-Nuc) <John.Weissinger@exeloncorp.com>
Subject: RE: Availability of SF pumps

Short Answer:

SF Pump "A" was available the entire time. SF Pump "B" was available starting at 5/11/18 at 10:00 following completion of Unit Sub 1G restoration.

Details:

1SF01PA (Suppression pool cleanup pump A) is powered from 480V Unit Sub 1F (1AP16E)

1SF01PB (Suppression pool cleanup pump B) is powered from 480V Unit Sub 1G (1AP17E)

From 5/6/18 until 5/11/18 at 04:14 the SF pumps were danger tagged out of service to support suppression pool diving/cleaning activities. The pumps were intact and were recoverable via emergency clearance order lift in under an hour.

1SF01PA and 1SF01PB had no work performed on them during C1R18

Unit sub 1F (1AP16E) had no work performed on it during C1R18 and was available during the entire window.

1SF01PB had no work performed on it, however unit sub 1G was out of service from 5/5/18 at approximately 13:00 until 5/11/18 at 10:00 due to a 6.9kV 1B bus outage window and a clean/inspect on unit sub 1G requiring it to be de-energized. During the most critical time of interest (when Div 1 and Div 2 DGs were out of service), the "B" SF pump was available.

I also looked at control power, relays, and optical isolators. The key relays all fail to a position which allows the SF pump to run (loss of control logic = pump will not auto trip on a CTMT isolation). Control logic power comes from OAP22E (CB MCC C) and is not required to run the SF pumps.

I performed a review of the C1R18 schedule for SF and the related Aux power system schedules and a review of associated clearance orders, and did not identify any reasons the SF pumps would be unavailable other than what was listed above.

Print References:

E02-1AP03

E02-1LV99 Sh 006 and 009

E02-1SX99 Sh 001 and 002

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To: [Kozak, Laura](#); [Mitman, Jeffrey](#); [Sanchez Santiago, Elba](#)
Cc: [Edom, Joseph T.:\(Contractor - GenCo-Nuc\)](#); [Antonelli, Michael K.:\(GenCo-Nuc\)](#); [Weissinger, Hoy John:\(GenCo-Nuc\)](#)
Subject: [External_Sender] RE: FW: Availability of SF pumps
Date: Friday, September 14, 2018 5:05:37 PM

I have received your request and we will be working on it. We will get you the requested information as soon as possible.

From: Kozak, Laura <Laura.Kozak@nrc.gov>
Sent: Friday, September 14, 2018 4:24 PM
To: Shelton, Dale A.:(GenCo-Nuc) <Dale.Shelton@exeloncorp.com>; Mitman, Jeffrey <Jeffrey.Mitman@nrc.gov>; Elba Sanchez Santiago <Elba.SanchezSantiago@nrc.gov>
Cc: Edom, Joseph T.:(Contractor - GenCo-Nuc) <Joe.Edom@exeloncorp.com>
Subject: RE: FW: Availability of SF pumps

Dale

Thanks again for the information. As we discussed briefly, we would like to confirm the status of the following equipment:

The following buses are part of the alternate strategies described in CPS 4306.01P001 Revision 0c dated 7/10/17.

Section 4.3.2

- 480v Unit Sub 1L
- 480v Unit Sub 1M
- AB 480v MCC 1E
- 480v Unit Sub 1B
- AB 480v MCC 1B3
- AB 480v MCC 1B4
- AB 480v MCC 1B2
- AB 480v MCC 1B1
- DG 480v MCC 1B

Section 4.3.3

- 480v Unit Sub B
- CB 480v MCC F1
- CB 480v MCC F1
- CB 480v MCC H
- Damper 480v MCC B

Section 4.3.4 (refers back to Section 4.2.3)

- 480v Unit Sub F
- 480v Unit Sub G

Was all of the above equipment available from May 11th at 02:30 through May 17 at

21:04? If any was not, specify which equipment was not available and when?

Was the swing 125v DC battery charger 1DC11E and all of the connections between it and AB 480V MCC 1E available from May 11th at 02:30 through May 17 at 21:04? If any was not, specify which equipment was not available and when?

Was the swing 125v DC battery charger 1DC11E energized from AB 480V MCC 1E prior to May 11th at 02:30?

Was the swing 125v DC battery charger 1DC11E energized from AB 480V MCC 1E from May 11th at 02:30 through May 17 at 21:04? If at any time it was not, specify when and why?

Thank you
Laura

From: Shelton, Dale A:(GenCo-Nuc) [<mailto:Dale.Shelton@exeloncorp.com>]
Sent: Friday, September 14, 2018 8:29 AM
To: Kozak, Laura <Laura.Kozak@nrc.gov>; Mitman, Jeffrey <Jeffrey.Mitman@nrc.gov>
Cc: Antonelli, Michael K.:(GenCo-Nuc) <Michael.Antonelli@exeloncorp.com>; Edom, Joseph T: (Contractor - GenCo-Nuc) <Joe.Edom@exeloncorp.com>
Subject: [External_Sender] FW: Availability of SF pumps

Jeff/Laura, Attached is our response for availability of the SF pumps used for FLEX suppression pool cooling. If there is any other information that would be helpful in your review, please reach out to me and we will pull together that data as soon as possible. Thank you!

Dale Shelton
Regulatory Assurance Manager
Clinton Power Station



8401 Power Road
Clinton, Illinois 61727
(217) 937-2800 Office

Mobile

(b)(6)

From: Antonelli, Michael K.:(GenCo-Nuc)
Sent: Thursday, September 13, 2018 11:57 PM

To: Shelton, Dale A:(GenCo-Nuc) <Dale.Shelton@exeloncorp.com>

Cc: Champley, Richard Blaine:(GenCo-Nuc) <Richard.Champley@exeloncorp.com>; Siegmund, Andrew C:(GenCo-Nuc) <Andrew.Siegmund@exeloncorp.com>; Weissinger, Hoy John:(GenCo-Nuc) <John.Weissinger@exeloncorp.com>

Subject: RE: Availability of SF pumps

Short Answer:

SF Pump "A" was available the entire time. SF Pump "B" was available starting at 5/11/18 at 10:00 following completion of Unit Sub 1G restoration.

Details:

1SF01PA (Suppression pool cleanup pump A) is powered from 480V Unit Sub 1F (1AP16E)

1SF01PB (Suppression pool cleanup pump B) is powered from 480V Unit Sub 1G (1AP17E)

From 5/6/18 until 5/11/18 at 04:14 the SF pumps were danger tagged out of service to support suppression pool diving/cleaning activities. The pumps were intact and were recoverable via emergency clearance order lift in under an hour.

1SF01PA and 1SF01PB had no work performed on them during C1R18

Unit sub 1F (1AP16E) had no work performed on it during C1R18 and was available during the entire window.

1SF01PB had no work performed on it, however unit sub 1G was out of service from 5/5/18 at approximately 13:00 until 5/11/18 at 10:00 due to a 6.9kV 1B bus outage window and a clean/inspect on unit sub 1G requiring it to be de-energized. During the most critical time of interest (when Div 1 and Div 2 DGs were out of service), the "B" SF pump was available.

I also looked at control power, relays, and optical isolators. The key relays all fail to a position which allows the SF pump to run (loss of control logic = pump will not auto trip on a CTMT isolation). Control logic power comes from 0AP22E (CB MCC C) and is not required to run the SF pumps.

I performed a review of the C1R18 schedule for SF and the related Aux power system schedules and a review of associated clearance orders, and did not identify any reasons the SF pumps would be unavailable other than what was listed above.

Print References:

E02-1AP03

E02-1LV99 Sh 006 and 009

E02-1SX99 Sh 001 and 002

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EXCIP

From: [Sanchez Santiago, Elba](#)
To: [Mitman, Jeffrey](#); [Kozak, Laura](#)
Cc: [Stoedter, Karla](#)
Subject: Loss of AC power procedure changes
Date: Friday, September 14, 2018 12:24:55 PM
Attachments: [AR 04172512.pdf](#)

Attachment is non-responsive due to narrowing the request to exclude licensee originated documents.

Laura/Jeff,

I am sending you the attached AR just as an FYI. The licensee wrote the AR in response to the questions you asked on how they would implement their loss of AC power during an SBO, specifically the portion that states to exit the procedure and enter ELAP.

-Elba

From: elba.sanchezsantiago@nrc.gov [mailto:elba.sanchezsantiago@nrc.gov]

Sent: Sunday, September 16, 2018 7:44 AM

To: Sanchez Santiago, Elba <Elba.SanchezSantiago@nrc.gov>

Subject:

From: [Kozak, Laura](#)
To: ["Shelton, Dale A.:\(GenCo-Nuc\)"](#)
Subject: RE: Status of Clinton FLEX equipment
Date: Monday, September 17, 2018 3:10:00 PM

Got it. Thanks Dale.

From: Shelton, Dale A:(GenCo-Nuc) [mailto:Dale.Shelton@exeloncorp.com]
Sent: Monday, September 17, 2018 2:54 PM
To: Kozak, Laura <Laura.Kozak@nrc.gov>; Mitman, Jeffrey <Jeffrey.Mitman@nrc.gov>
Cc: Antonelli, Michael K.:(GenCo-Nuc) <Michael.Antonelli@exeloncorp.com>; Weissinger, Hoy John: (GenCo-Nuc) <John.Weissinger@exeloncorp.com>; Siegmund, Andrew C.:(GenCo-Nuc) <Andrew.Siegmund@exeloncorp.com>; Edom, Joseph T:(Contractor - GenCo-Nuc) <Joe.Edom@exeloncorp.com>
Subject: [External_Sender] Status of Clinton FLEX equipment

Laura/Jeff,

Below is the response that I received from Mike Antonelli regarding status of FLEX equipment availability during C1R19. If there is additional information or clarification required, do not hesitate to ask.

Window = May 11 @02:30 through May 17 at 21:04

Section 4.3.2

- 480v Unit Sub 1L – Available during the window
- 480v Unit Sub 1M – Available during the window
- AB 480v MCC 1E – Available during the window
- 480v Unit Sub 1B – Available during the window
- AB 480v MCC 1B3 – Available during the window
- AB 480v MCC 1B4 – Available during the window
- AB 480v MCC 1B2 – Available during the window
- AB 480v MCC 1B1 – Available during the window
- DG 480v MCC 1B – Available during the window

Section 4.3.3

- 480v Unit Sub B – Available during the window
- CB 480v MCC F1 – Available during the window
- CB 480v MCC F1 – Available during the window
- CB 480v MCC H – Available during the window
- Damper 480v MCC B – Available during the window

Section 4.3.4 (refers back to Section 4.2.3)

- 480v Unit Sub F – Available during the window
- 480v Unit Sub G – Returned to service (energized) on 5-11-18 at 10:00. PMT was completed on 5-11-18 at 1700

Was all of the above equipment available from May 11th at 02:30 through May 17 at 21:04? If any was not, specify which equipment was not available and when?

Was the swing 125v DC battery charger 1DC11E and all of the connections between it and AB 480V MCC 1E available from May 11th at 02:30 through May 17 at 21:04? If any was not, specify which equipment was not available and when?

The 125 VDC swing charger 1DC11E was available during the window.

Was the swing 125v DC battery charger 1DC11E energized from AB 480V MCC 1E prior to May 11th at 02:30?

The last time the swing charger was energized PRIOR to May 11 at 02:30 was on 12/09/17 during a forced outage

Was the swing 125v DC battery charger 1DC11E energized from AB 480V MCC 1E from May 11th at 02:30 through May 17 at 21:04? If at any time it was not, specify when and why?

1DC11E was energized powering the Div 1 DC battery from 5-14-18 starting at 02:00 until removal on 5-18-18 at 06:00. This was to support the division 1 480V 1A transformer replacement. This transformer replacement de-energized the division 1 DC battery charger, and the swing charger was utilized to supply the division 1 DC battery during this window.

Dale Shelton
Regulatory Assurance Manager
Clinton Power Station



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[Redacted] Mobile

(b)(6)

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Attachment is non-responsive due to narrowing the request to exclude licensee originated documents. Attachment is: CPS Review Comments of NRC's SDP In-Process SPAR Model Results

From: [Sanchez Santiago, Elba](#)
To: [Sargis, Daniel](#)
Subject: FW: Clinton DG Risk Assessment comments
Date: Tuesday, September 18, 2018 9:00:50 AM
Attachments: [NRC CPS SDP SPAR Model Review Comments.docx](#)

FYI

From: Shelton, Dale A:(GenCo-Nuc) [mailto:Dale.Shelton@exeloncorp.com]
Sent: Tuesday, September 18, 2018 8:23 AM
To: Mitman, Jeffrey <Jeffrey.Mitman@nrc.gov>; Kozak, Laura <Laura.Kozak@nrc.gov>
Cc: Sanchez Santiago, Elba <Elba.SanchezSantiago@nrc.gov>; Edom, Joseph T:(Contractor - GenCo-Nuc) <Joe.Edom@exeloncorp.com>; Brinsfield, Wesley A:(Contractor - GenCo-Nuc) <Wesley.Brinsfield@exeloncorp.com>
Subject: [External_Sender] Clinton DG Risk Assessment comments

Jeff/Laura – Following our review of the model last week, the PRA folks have identified a couple of areas for additional consideration. The attached document provides these comments. If it would be helpful to review these comments with the PRA folks, I would arrange that at your earliest convenience. Thank you again for the opportunity to continue to have an open dialogue throughout this process.

Dale Shelton
Regulatory Assurance Manager
Clinton Power Station

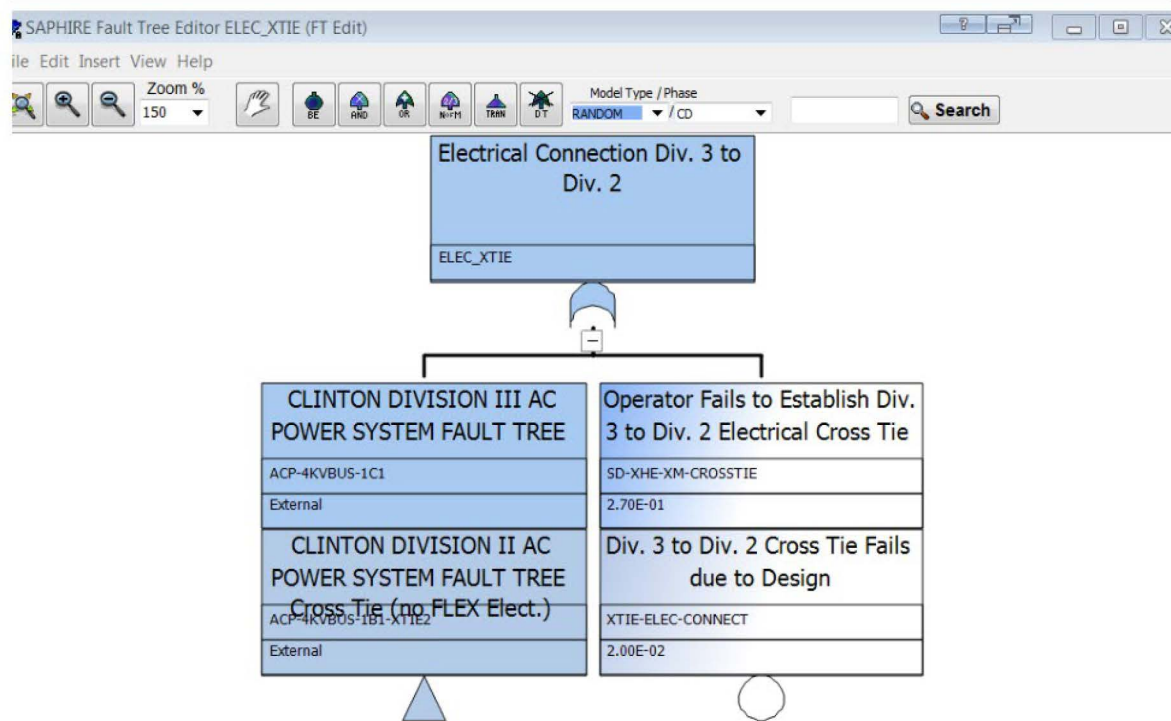


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From: [Korak, Laura](#)
To: [Lara, Julie](#)
Subject: Jeff's model - fault tree - not very complicated - not the resource sink - how long should it take? EOM
Date: Wednesday, September 19, 2018 11:44:00 AM
Attachments: [image001.png](#)

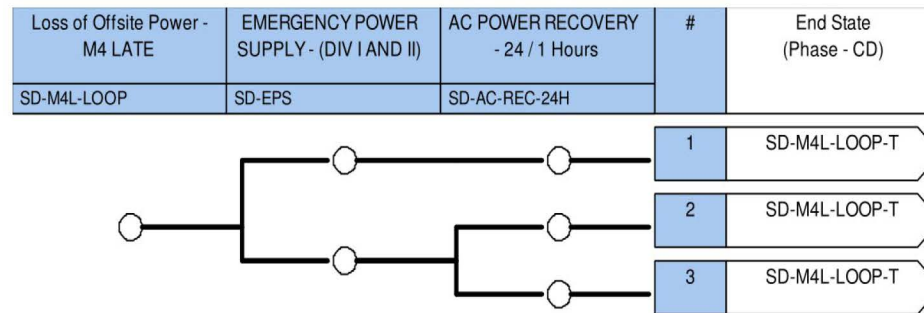


From: [Kozak, Laura](#)
To: [Pelke, Paul](#); [Lambert, Kenneth](#)
Subject: Clinton
Date: Thursday, September 20, 2018 1:37:00 PM
Attachments: [Clinton Event Trees.pdf](#)

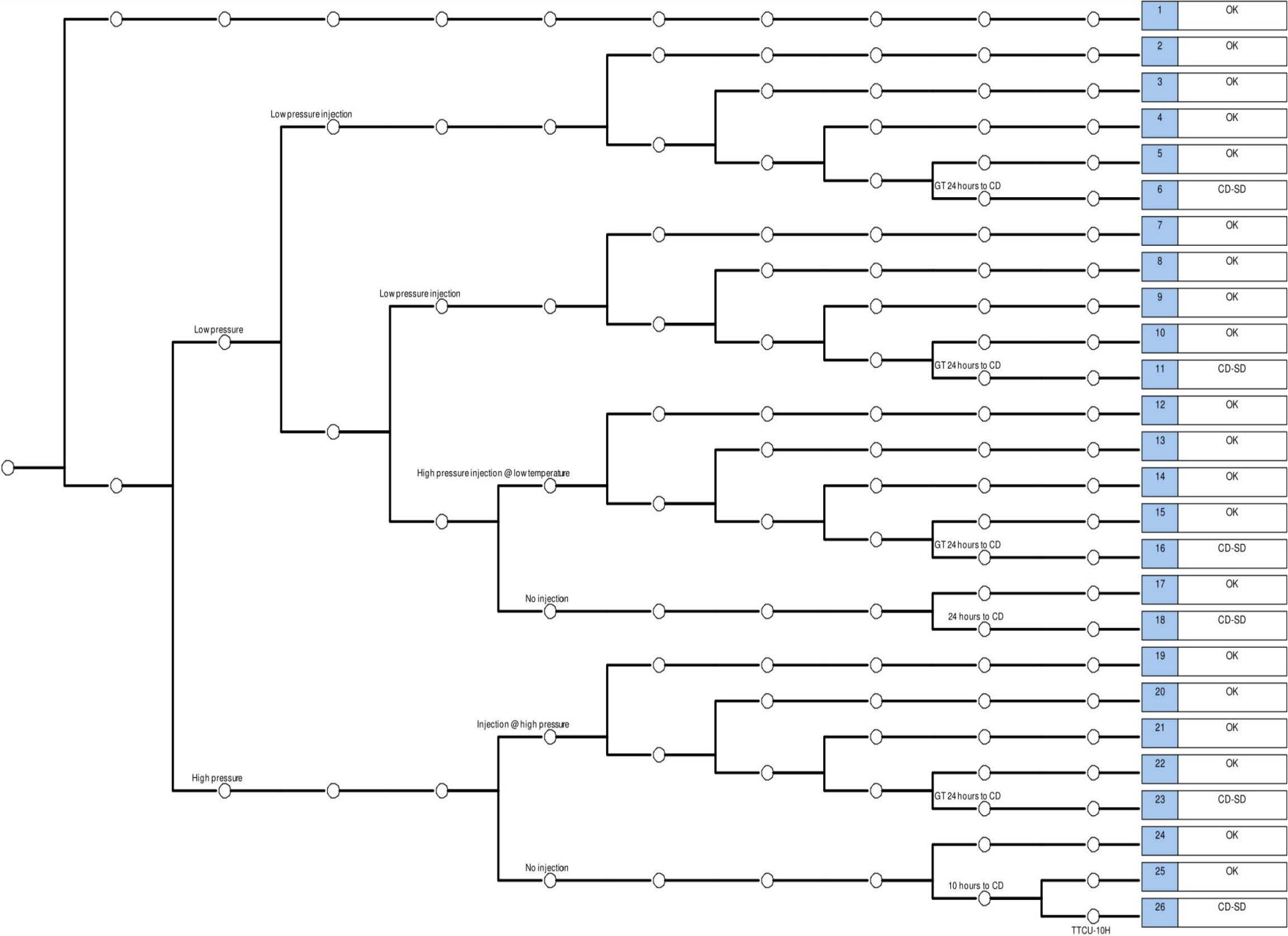
Jeff intends to hand out this document also.

Laura

Clinton Event Trees



	SDC (no FLEX credit here - Always Fails during ELAP)	MANUAL REACTOR DEPRESS (include credit for FLEX DC Power)	LOW PRESSURE COOLANT INJECTION (no FLEX credit here - Always Fails during ELAP))	ALTERNATE INJECTION - CDS SWS FWS and FLEX	HI PRESSURE INJECTIONS (HCS/CRD)	HEAT REMOVAL USING SUPPRESSION POOL including FLEX	ALTERNATE HEAT REMOVAL (Always Fails during ELAP)	CONTAINMENT VENTING - SD	Electrical Connection Div. 3 to Div. 2	Power Recovery Correction Factor for Different Time to Core	#	End State (Phase - CD)
<DUMMY-FT>	SD-SDC	SD-DEP	SD-LPI	SD-ALT-INJ	SD-HPI	SD-SPC-EXT	SD-ALT-HEAT	SD-CVS	ELEC_XTIE	TTCU Uncovery		



From: [Stoedter, Karla](#)
To: [Cameron, Jamnes](#); [Biemer, Kenneth](#); [West, Steven](#)
Subject: Clinton EDG information
Date: Thursday, September 20, 2018 10:28:00 AM
Attachments: [CLI 2018 050 SIT.docx](#)
[Clinton SERP package.msg](#)

The IFRB/SERP worksheets and the SIT report (which contains the documented PD and apparent violation) are attached for your convenience. Let us know if you have further questions.

Karla



UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION III
2443 WARRENVILLE ROAD, SUITE 210
LISLE, ILLINOIS 60532-4352

August 23, 2018

EA-18-104

Document is also publicly available at
<https://www.nrc.gov/docs/ML1823/ML18235A170.pdf>

Mr. Bryan C. Hanson
Senior VP, Exelon Generation Company, LLC
President and CNO, Exelon Nuclear
4300 Winfield Road
Warrenville, IL 60555

SUBJECT: CLINTON POWER STATION—NRC SPECIAL INSPECTION REPORT
05000461/2018050

Dear Mr. Hanson:

On June 29, 2018, the U.S. Nuclear Regulatory Commission (NRC) completed a reactive inspection at your Clinton Power Station. On August 3, 2018, the NRC inspectors discussed the results of this inspection with Mr. T. Stoner and other members of your staff. The results of this inspection are documented in the enclosed report.

Based on the results of this inspection, the NRC identified two issues that were evaluated under the risk significance determination process. Both of these issues were determined as having very-low safety significance (Green). The NRC has also determined that two violations are associated with these issues. Because the licensee initiated condition reports to address these issues, these violations are being treated as Non-Cited Violations (NCVs), consistent with Section 2.3.2 of the Enforcement Policy. These NCVs are described in the subject inspection report.

Additionally, Results Section (4) of the enclosed report discusses a finding with an associated apparent violation for which the NRC has not reached a preliminary significance determination. This finding involved the apparent failure of licensee personnel to follow multiple procedures resulting in the unavailability of the Division 2 Emergency Diesel Generator when it was relied upon for plant safety. Since the NRC has not made a final determination in this matter, a Notice of Violation is not being issued for this inspection finding at this time. In addition, please be advised that the characterization of the apparent violation described in the enclosed inspection report may change as a result of further NRC review.

If you contest the violations or significance of these NCVs, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001; with copies to the Regional Administrator, Region III; the Director, Office of Enforcement; and the NRC Resident Inspector at the Clinton Power Station.

If you disagree with a cross-cutting aspect assignment or a finding not associated with a regulatory requirement in this report, you should provide a response within 30 days of the date of this inspection report, with the basis for your disagreement, to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001; with copies to the Regional Administrator, Region III; and the NRC resident inspector at Clinton Power Station.

This letter, its enclosure, and your response (if any) will be made available for public inspection and copying at <http://www.nrc.gov/reading-rm/adams.html> and at the NRC Public Document Room in accordance with 10 CFR 2.390, "Public Inspections, Exemptions, Requests for Withholding."

Sincerely,

/RA/

Karla Stoedter, Chief
Branch 1
Division of Reactor Projects

Docket No. 50-461
License No. NPF-62

Enclosure:
Inspection Report 05000461/2018050

cc: Distribution via LISTSERV®

Letter to Bryan Hanson from Karla Stoedter dated August 23, 2018

SUBJECT: CLINTON POWER STATION—NRC SPECIAL INSPECTION REPORT
05000461/2018050

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DRPIII

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ADAMS Accession Number: ML18235A170

OFFICE	RIII	RIII	RIII	
NAME	CPhillips:bw	RSkokowski	KStoedter	
DATE	8/15/2018	8/15/2018	8/23/2018	

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U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Docket Numbers: 50-461

License Numbers: NPF-62

Report Numbers: 05000461/2018050

Enterprise Identifier: I-2018-050-0002

Licensee: Exelon Generation Company, LLC

Facility: Clinton Power Station

Location: Clinton, IL

Dates: June 25 through June 29, 2018

Inspectors: C. Phillips, Project Engineer
R. Murray, Senior Resident Inspector, Quad Cities
J. Draper, Health Physicist

Approved by: K. Stoedter, Chief
Branch 1
Division of Reactor Projects

Enclosure

SUMMARY

The U.S. Nuclear Regulatory Commission (NRC) monitored the licensee's performance by conducting a Special Inspection at Clinton Nuclear Power Station in accordance with the Reactor Oversight Process. The Reactor Oversight Process is the NRC's program for overseeing the safe operation of commercial nuclear power reactors. Refer to <https://www.nrc.gov/reactors/operating/oversight.html> for more information. Findings and violations being considered in the NRC's assessment are summarized in the table below.

List of Findings and Violations

Failure to Follow Multiple Procedures			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Mitigating Systems	TBD AV 05000461/2018050-01 Open EA-18-104	[H.2] – Human Performance, Field Presence	93812-Special Inspection
On May 17, 2018, a To-Be-Determined (TBD) finding and an associated Apparent Violation of Title 10 of the <i>Code of Federal Regulations</i> (10 CFR) Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," and Technical Specification 3.8.2, Condition B.3, were self-revealed for the licensee's failure to follow multiple procedures that affected quality. This resulted in the unavailability and inoperability of the Division 2 Emergency Diesel Generator when it was relied upon for plant safety.			

Failure to Identify a Condition Adverse to Quality			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Mitigating Systems	Green NCV 05000461/2018050-02 Open/Closed	[H.12] – Human Performance, Avoid Complacency	93812-Special Inspection
On May 17, 2018, a Green finding and an associated Non-Cited Violation of 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action," were self-revealed for the licensee's failure to promptly identify that the safety-related Division 2 Emergency Diesel Generator had its starting air receivers isolated, which was a condition adverse to quality that rendered the emergency diesel generator inoperable and unavailable.			

Equipment Operator Rounds Points Inadequate Acceptance Criteria			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Mitigating Systems	Green NCV 05000461/2018050-03 Open/Closed	[H.6] – Human Performance, Design Margins	93812-Special Inspection
On May 17, 2018, a Green finding and an associated Non-Cited Violation of 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," were self-revealed for the licensee's failure to include appropriate quantitative acceptance criteria for the Division 2 Emergency Diesel Generator parameters to ensure the Division 2 Emergency Diesel Generator could perform its safety function.			

Additional Tracking Items

None.

INSPECTION SCOPE

Inspections were conducted using the appropriate portions of the inspection procedure (IP) in effect at the beginning of the inspection unless otherwise noted. Currently approved IPs with their attached revision histories are located on the public website at <http://www.nrc.gov/reading-rm/doc-collections/insp-manual/inspection-procedure/index.html>. Samples were declared complete when the IP requirements most appropriate to the inspection activity were met consistent with Inspection Manual Chapter (IMC) 2515, "Light-Water Reactor Inspection Program - Operations Phase." The inspectors reviewed selected procedures and records, observed activities, and interviewed personnel to assess licensee performance and compliance with Commission rules and regulations, license conditions, site procedures, and standards.

OTHER ACTIVITIES—TEMPORARY INSTRUCTIONS, INFREQUENT AND ABNORMAL

93812—Special Inspection

In accordance with the Special Inspection Team Charter (ADAMS Accession Number ML18158A170), the inspection team conducted a detailed review of the event that led to both Division 1 and Division 2 Emergency Diesel Generators (EDGs) being inoperable and unavailable. The inspectors reviewed the following areas.

- (1) Develop a complete sequence of events related to the inoperability and unavailability of the Division 1 and Division 2 alternating current (AC) power systems from May 9 through May 17, 2018. The chronology should include plant mode changes, changes in the electrical power, decay heat removal, and inventory control shutdown safety/risk areas.
- (2) Understand the increased shutdown risk condition which existed when no emergency AC power sources were available for a period of approximately 3.5 days. Review the planned shutdown safety configuration compared to the actual configuration that existed. Understand the licensee's ability to respond to and mitigate a loss of offsite power event given the unavailability of both onsite emergency AC power sources.
- (3) Review the licensee's cause analysis efforts and determine if the evaluation's level of detail is commensurate with the significance of the problem.
- (4) Determine the probable cause(s) for the unavailability of the Division 1 and Division 2 EDGs during the 2018 refueling outage.
- (5) Understand whether there were any deficiencies in operator training (both licensed and non-licensed operators) which contributed to the EDG unavailability and the failure to identify the condition across multiple operating shifts.
- (6) Evaluation of the licensee's compliance with, and adequacy of, procedural guidance for performing system alignments, controlling equipment configuration, performing equipment tag-outs and control room log keeping as it pertains to the cause(s) of the event.

The inspectors identified several examples of situations where procedures and work instructions that were in place at the time of the event were not followed. These

examples are discussed in detail in an observation box in the results section associated with paragraph (4) of this report.

- (7) Evaluate licensee planned and completed corrective actions following the EDG event to the extent possible and assess if prior opportunities (e.g., surveillances, maintenance, and self or nuclear oversight assessments) existed to have identified the problem at an earlier point in time.
- (8) Determine whether recent internal and external operating experience involving configuration control, risk management and oversight of activities were appropriately evaluated and determine the adequacy of any corrective actions planned or completed.

INSPECTION RESULTS

93812—Special Inspection

- (1) Develop a complete sequence of events related to the inoperability and unavailability of the Division 1 and Division 2 AC power systems from May 9 through May 17, 2018. The chronology should include plant mode changes, changes in the electrical power, decay heat removal, and inventory control shutdown safety/risk areas.

Observation	IP 93812
<p>On May 9, 2018, Clinton Power Station (CPS), Unit 1, was in Mode 5 during Refueling Outage C1R18. The reactor cavity was filled, and at 9:36 p.m. the Division 2 4160 Volt alternating current (Vac) bus (1B1) was energized from the reserve auxiliary transformer (RAT) to end a scheduled bus 1B1 maintenance window. The Division 1 AC distribution system, Division 1 EDG, and residual heat removal (RHR) 'A' system were operable during the 1B1 bus outage and remained operable upon restoration of bus 1B1.</p> <p>Earlier on May 9, 2018, the Division 2 EDG had been inoperable and unavailable as a result of the 1B1 bus outage. At 5:25 p.m., Clearance Order (C/O) 139455 was removed from the Division 2 EDG as part of 1B1 restoration activities. This C/O included a Special Instruction that stated "Restore Div 2 DG [diesel generator] to standby per CPS 3506.01P002 [Division 2 Diesel Generator Operations; Revision 3a] in conjunction with C/O removal." The inspectors found procedure CPS 3506.01P002 was not performed in conjunction with the C/O closure. Instead, a senior reactor operator (SRO 1) placed a note in the control room log stating CPS 3506.01P002 needed to be performed after restoration of the Division 2 shutdown service water (SX) system. Because CPS 3506.01P002 was not completed as part of the C/O closure, the position of the Division 2 EDG air receiver isolation valves was being controlled by the control room log entry instead of through an approved licensee process. By not completing CPS 3506.01P002 at that time, Division 2 EDG air receiver isolation valves (1DG160 and 1DG161) were left shut. Following the closure of the C/O, this log entry was the only method the licensee used to track the need to restore the Division 2 EDG to standby per CPS 3506.01P002.</p> <p>On May 10, 2018, during the day shift, a senior reactor operator (SRO 2) directed a non-licensed operator to perform a portion of CPS 3506.01P002 to restore fuses for the Division 2 EDG lubrication system, which had previously been removed from service prior to the 1B1 bus maintenance. When the non-licensed operator had completed the partial procedure, SRO 2 had already turned over duties to a different senior reactor operator (SRO 3), so the non-licensed operator returned the partial completed procedure to SRO 3.</p>	

Even though the complete CPS 3506.01P002 procedure had not been performed, SRO 3 believed that all activities required to restore the Division 2 EDG had been completed.

On May 11, 2018, at 2:30 a.m., SRO 3 declared the Division 2 EDG available after Division 2 SX was restored and made available. At this time, the Division 2 EDG starting air valves (1DG160 and 1DG161) remained closed, isolating starting air from the EDG air start motors, making the EDG unable to start on any demand signal. On May 11, 2018, at 5:10 a.m., the licensee installed the reactor cavity gate in preparation for cavity drain down and reactor head installation. The cavity drain began at 9:43 a.m. and was completed at 1:54 p.m. The licensee began tensioning the reactor head studs at 12:20 a.m. on May 12, 2018, and completed tensioning the studs at 1:51 a.m., at which time operations department personnel declared the Unit in Mode 4.

On May 12, 2018, at 8:00 a.m., the licensee completed OP-AA-108-106, "Equipment Return to Service," Revision 5, for the Division 2 Nuclear System Protection System (NSPS), Division 2 essential switchgear cooling (VX), Division 2 direct current (DC), and Division 2 EDG, and declared each of these systems operable. The licensee did not perform post-maintenance testing on the Division 2 EDG as no maintenance was performed on the EDG.

On May 13, 2018, operations secured the RHR 'A' pump from operation in shutdown cooling mode from 2:24 a.m. until 12:53 p.m. to facilitate the reactor pressure vessel pressure test. During this time, the emergency reserve auxiliary transformer (ERAT) (which had been unavailable since May 5, 2018, at 5:03 p.m.), the second source of offsite power to the 4160 Vac safety-related buses, was declared available at 5:15 a.m. At 11:09 p.m., RHR 'B' was declared operable for shutdown cooling mode, and at 11:28 p.m., RHR 'A' was secured and RHR 'B' was started in shutdown cooling mode.

On May 14, 2018, at 12:30 a.m., since the licensee was unaware that the Division 2 EDG was inoperable and unavailable due to its inability to start caused by the 1DG160 and 1DG161 valves being closed, the licensee began a scheduled maintenance window for the Division 1 4160 Vac bus (1A1). As a result of taking bus 1A1 out of service, the Division 1 EDG was declared inoperable and unavailable along with other equipment powered from bus 1A1, including the low pressure core spray (LPCS) and RHR 'A' systems.

On May 16, 2018, at 1:30 a.m., the licensee completed filling and venting the high pressure core spray (HPCS) system following an extended maintenance window. On May 17, 2018, at 11:18 a.m., operations declared HPCS available, and after post-maintenance testing of the system on May 18, 2018, at 6:21 p.m., HPCS was declared operable.

On May 17, 2018, at 3:03 p.m., a non-licensed operator performing shift rounds identified that the 1DG160 and 1DG161 valves were closed and reported this condition to the control room. The licensee declared the Division 2 EDG inoperable and unavailable and investigated the condition. The licensee restored the valves to the open position and declared the Division 2 EDG available at 3:45 p.m. After the licensee performed OP-AA-108-106, the licensee declared the Division 2 EDG operable at 9:04 p.m.

- (2) Understand the increased shutdown risk condition which existed when no emergency AC power sources were available for a period of approximately 3.5 days. Review the planned shutdown safety configuration compared to the actual configuration that existed.

Understand the licensee's ability to respond to and mitigate a loss of offsite power event given the unavailability of both onsite emergency AC power sources.

Observation	IP 93812
<p>As a result of several human performance errors the Division 2 EDG was inoperable and unavailable for over 6 days without the licensee's knowledge. Both Division 1 and Division 2 EDGs were inoperable and unavailable for over 3 days, May 14 through May 17, 2018, which was not allowed per Technical Specification (TS) 3.8.2 (this violation is in the results section of the report for Paragraph (4)).</p> <p>Had a loss of offsite power event occurred between May 14 and May 17, 2018, there would have been an immediate station blackout (SBO) event. The inspectors determined that the Division 2 EDG was recoverable. The inspectors determined that there were no other plant conditions that deviated from the stations shutdown risk plan during the time that both EDGs were unavailable. The inspectors determined that the licensee could have responded to an SBO in one of at least three ways. The licensee could have declared an extended loss of AC power (ELAP) event and deployed FLEX equipment. Additionally, the smaller Division 3 EDG could have been started and cross-tied to the Division 2 4160 Vac bus. The inspectors determined that the Division 3 EDG would have supported enough loads to restore one train of shutdown cooling. Finally, two diesel driven fire pumps and the safety-relief valves were available to provide feed and bleed cooling to the reactor core if necessary.</p>	

- (3) Review the licensee's cause analysis efforts and determine if the evaluation's level of detail is commensurate with the significance of the problem.

Observation	IP 93812
<p>The inspectors interviewed the licensee's root cause team lead and two additional root cause team members. At the time the inspection team arrived on site the licensee had completed their initial analysis of the events but had neither documented the results of their review nor had station management reviewed and approved the results. The inspectors reviewed numerous procedures, toured the applicable locations in the plant, and interviewed several operators involved in this event. The inspectors determined that the licensee appeared to be following their guidance for root cause investigations.</p>	

- (4) Determine the probable cause(s) for the unavailability of the Division 1 and Division 2 EDGs during the 2018 refueling outage.

Observation	IP 93812
<p>The inspectors determined that the cause of the event was the licensee's failure to follow multiple procedures and work instructions. The restoration instructions associated with the clearing of C/O 139455 that resulted in this event were not followed. The instructions stated that the performance of CPS 3506.01P002, "Division 2 Diesel Generator Operations," was required to be in conjunction with the clearance of the C/O. The standard Clinton operation's process for clearing out-of-service tags was to leave the valves in the out-of-service position and then complete a standby lineup afterwards to reposition the valves to the correct position. The SRO (SRO 1) that cleared C/O 139455 did not perform the standby lineup (CPS 3506.01P002) in conjunction with the clearing of the out-of-service because safety-related cooling water (SX) to the EDG was still inoperable. This resulted in the EDG air receiver isolation valves (1DG160 and 1DG161) remaining closed when the out-of-service cards were cleared. The inspectors asked the licensee if 1DG160 and 1DG161 needed to</p>	

remain closed to protect the EDG based solely on the status of the safety-related cooling water to the EDG at the time. The licensee responded that it was not required for 1DG160 and 1DG161 to remain closed to protect the EDG based on the plant status at the time C/O 139455 was cleared. The failure to follow the C/O direction to complete procedure CPS 3506.01P002 was a failure to follow work instructions.

The SRO (SRO 1) stated in the control room operating logs that CPS 3506.01P002 was required to be performed at some later date. The inspectors identified that the specific abnormal positions of 1DG160 and 1DG161 were not logged into the operations log, only the requirement to complete CPS 3506.01P002. The inspectors also identified that no Exelon procedure existed that required or allowed the tracking of valves in an abnormal position by the use of the control room logs. A Clinton site specific procedure existed that allowed tracking of the status of some specific equipment in the operator logs until the end of the shift but that procedure was not applicable to this situation.

Valves 1DG160 and 1DG161 were normally locked open valves. Exelon procedure OP-AA-108-103, "Locked Equipment Program," Revision 2, Step 4.1.5, stated, "If plant conditions require a locked component to be positioned in a manner other than that indicated on the locked equipment checklist or approved procedure, then UNLOCK and REPOSITION equipment in accordance with OP-AA-108-101, 'Control of Equipment and System Status.'" Procedure OP-AA-108-101, "Control of Equipment and System Status," Revision 14, Step 4.1.1.1, stated, "Utilize an ACPS [abnormal component positioning sheet] for aligning equipment outside of routine operations. For situations, excluding routine operation, where a component, system, or structure is required to be placed in a position differing from its normal lineup, the alignment must be done utilizing an Abnormal Component Position Sheet (ACPS). The ACPS will document proper evaluation, performance and restoration of the alignment, ensuring plant configuration control is maintained." An ACPS was not used to track the positions of 1DG160 and 1DG161. This was a failure to follow procedure.

Exelon procedure OP-AA-108-106, "Equipment Return to Service," Revision 5, Step 4.3, required that "if equipment will not be restored to the Equipment Line-up/Restoration position or the original condition, then another approved equipment status control mechanism shall be used to document equipment status (i.e. Equipment Status Tag, administrative clearance/tagout). Procedure OP-AA-108-101, 'Control of Equipment and System Status,' shall be used to document abnormal equipment configuration and shall be immediately applied following equipment restoration." This was not performed and constituted a failure to follow procedure.

In addition, Exelon procedure OP-AA-109-101, "Clearance and Tagging," Revision 12, Step 10.2.1, stated, "If a lift position is determined to be different from the normal lineup position for the present plant condition and not tracked by another C/O or procedure, then Shift Management shall be notified and equipment tracking initiated." In an interview between the inspectors and SRO 1, he stated that he thought the positions of 1DG160 and 1DG161 were being tracked via a procedure (CPS 3506.01P002). Licensee operations management stated that entering the procedure into the operations log was not the same as tracking via procedure. Tracking the position of the air start valves by the use of another C/O or procedure was not performed and constituted a failure to follow procedure.

When the licensee restored safety-related cooling water to the EDG, a second SRO (SRO 2) directed a partial performance of CPS 3506.01P002 in order to restore fuses for control power for the EDG lube oil pumps. Per the inspectors interview with SRO 2 the fuses were pulled

during a previous outage activity to prevent starting of the DC lube oil pumps when the AC power was removed for the 1B1 bus outage.

When the non-licensed operator returned with the partially performed copy of CPS 3506.01P002, he turned it over to a third SRO (SRO 3). Since procedure CPS 3506.01P002 was not marked as a partially performed procedure, SRO 3 believed it to be a fully performed procedure.

Even though the complete CPS 3506.01P002 procedure had not been performed, SRO 3 believed that all restoration activities on the Division 2 EDG had been performed. Therefore after Division 2 SX was restored and made available on May 11, 2018, SRO 3 declared the Division 2 EDG available. At this time, the Division 2 EDG starting air valves (1DG160 and 1DG161) remained closed, preventing starting air from reaching the EDG air start motors, making the EDG unable to start on any demand signal.

The next day on May 12, 2018, at 8:00 a.m., the licensee determined that OP-AA-108-106, "Equipment Return to Service," for the Division 2 NSPS, Division 2 essential switchgear cooling (VX), Division 2 direct current (DC) and Division 2 EDG, was complete and declared each of these systems operable. The licensee did not perform post-maintenance testing on the Division 2 EDG as no maintenance was performed on the EDG. The inspectors determined operating management personnel did not perform procedure OP-AA-108-106, "Equipment Return To Service," Revision 5, Step 4.4.9, which stated, "Applicable Operating procedures are complete and any equipment line-ups directed to be completed by the Operating Procedures are completed," because CPS 3506.01P002 had not been completed. In addition, licensee operations department management personnel did not perform Step 4.4.14, which stated, "The system/equipment has been walked down as appropriate to verify that it can be safely operated to fulfill its design function." The SRO told the inspectors that because no maintenance was performed on the EDG he did not think it was necessary. The failure to perform these steps was a failure to follow procedure.

Failure to Follow Multiple Procedures			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Mitigating Systems	TBD 05000261/2018050-01 Open EA-18-104	[H.2] – Human Performance, Field Presence	93812–Special Inspection
<p>On May 17, 2018, a To-Be-Determined (TBD) finding and an associated Apparent Violation of 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," and Technical Specification 3.8.2, Condition B.3, were self-revealed for the licensee's failure to follow multiple procedures that affected quality. This resulted in the unavailability and inoperability of the Division 2 Emergency Diesel Generator when it was relied upon for plant safety.</p> <p><u>Description:</u></p> <p>Earlier on May 9, 2018, the Division 2 EDG was inoperable and unavailable as a result of the 1B1 bus outage. At 5:25 p.m., C/O 139455 was removed from the Division 2 EDG as part of bus 1B1 restoration activities. This C/O included a Special Instruction that stated "Restore Div 2 DG to standby per CPS 3506.01P002 [Division 2 Diesel Generator Operations; Revision 3a)] in conjunction with C/O removal." This procedure (CPS 3506.01P002) was not performed prior to closure of the C/O; and an SRO (SRO 1) noted in the control room</p>			

Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Mitigating Systems	TBD 05000261/2018050-01 Open EA-18-104	[H.2] – Human Performance, Field Presence	93812–Special Inspection

On May 17, 2018, a To-Be-Determined (TBD) finding and an associated Apparent Violation of 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," and Technical Specification 3.8.2, Condition B.3, were self-revealed for the licensee's failure to follow multiple procedures that affected quality. This resulted in the unavailability and inoperability of the Division 2 Emergency Diesel Generator when it was relied upon for plant safety.

Description:

Earlier on May 9, 2018, the Division 2 EDG was inoperable and unavailable as a result of the 1B1 bus outage. At 5:25 p.m., C/O 139455 was removed from the Division 2 EDG as part of bus 1B1 restoration activities. This C/O included a Special Instruction that stated "Restore Div 2 DG to standby per CPS 3506.01P002 [Division 2 Diesel Generator Operations; Revision 3a)] in conjunction with C/O removal." This procedure (CPS 3506.01P002) was not performed prior to closure of the C/O; and an SRO (SRO 1) noted in the control room

narrative logs that the Division 2 EDG remained in maintenance lockout pending restoration of the Division 2 shutdown SX system from its planned maintenance window, and that restoration per CPS 3506.01P002 would need to be performed to restore the Division 2 EDG to standby. By not completing CPS 3506.01P002, isolation valves from the EDG starting air receiver (1DG160 and 1DG161) were left shut. Following the closure of the C/O, this log entry was the only method the licensee used to track the need to restore the Division 2 EDG to standby per CPS 3506.01P002.

On May 10, 2018, during the day shift, a senior reactor operator (SRO 2) directed a non-licensed operator to perform a portion of CPS 3506.01P002 to restore fuses for the Division 2 EDG lubrication system, which had previously been removed from service prior to the 1B1 bus maintenance. When the non-licensed operator had completed the partial procedure, SRO 2 had already turned over duties to a different senior reactor operator (SRO 3), so the non-licensed operator returned the completed partial procedure to SRO 3. Even though the complete CPS 3506.01P002 procedure had not been performed, SRO 3 believed that all restoration activities had been performed. After Division 2 SX was restored and available on May 11, 2018, at 2:30 a.m., SRO 3 declared the Division 2 EDG available. At this time, the Division 2 EDG starting air valves (1DG160 and 1DG161) remained closed, isolating starting air from the EDG air start motors, making the EDG unable to start on any demand signal.

On May 14, 2018, at 12:30 a.m., since the licensee was unaware that the Division 2 EDG was inoperable and unavailable due to its inability to start caused by the 1DG160 and 1DG161 valves being closed, the licensee began a scheduled maintenance window for the Division 1 4160 Vac bus (1A1). As a result of taking bus 1A1 out of service, the Division 1 EDG was declared inoperable.

On May 17, 2018, at 3:03 p.m., a non-licensed operator performing shift rounds identified that the 1DG160 and 1DG161 valves were closed and reported this condition to the control room. The licensee declared the Division 2 EDG inoperable and investigated the condition.

Corrective Actions: Operations Director memos were sent to the operations shift managers related to accountability and procedure use and adherence. These memos, which were required to be acknowledged by all operations department personnel and briefed by the operations shift managers, covered various administrative procedural requirements including: procedure use and adherence, control of plant equipment, stop work criteria, operations decision making, and operability procedure requirements. The inspectors reviewed an operations director memo from May 18, 2018, "Issue Response Expectation for Clinton Operations Management." The inspectors also reviewed an operations director memo from May 23, 2018, "Manager Accountability for Performance." Interviews with operations department personnel indicated personnel were aware of the content of the memos.

The Operations Director and operations department leaders conducted face-to-face discussions with each member of the operations department.

Just-in-time training was given to all operations department staff on the requirements of HU-AA-104-101, "Procedure Use and Adherence," Revision 5. The inspectors' Interviews with operations personnel indicated that personnel were aware of the requirements of HU-AA-104-101.

The licensee changed the clearance and tagging method to include signed restoration steps. Restoration steps were previously included as restoration instruction "notes." These notes were expected to be completed as a procedure; however, the clearance order was allowed to be closed without documenting that these restoration steps had been completed. The inspectors reviewed several clearance orders and verified the licensee's corrective action was being implemented.

The licensee implemented a "Procedure-in-Progress" program for procedures that are not completed within one shift. The inspectors toured the control room and discussed the process with operators and observed it was being implemented.

The licensee conducted a three day stand-down with all station personnel and covered case studies and learnings from the event. The inspectors reviewed the material covered during the stand-down and interviewed plant personnel, who were aware of the details of the stand-down.

The licensee revised the equipment operator rounds points to include logging emergency diesel generator starting air manifold pressures, located down-stream of the air tank isolation valves. The inspectors reviewed the revised 'C' area rounds points and verified operators were logging EDG air manifold pressures.

Operations shift managers were reviewing logs and at least two completed procedures at the end-of-each shift. The inspectors requested to review any condition reports associated with these reviews and were informed that since this had been implemented, there had been no condition reports generated as a result of these shift manager reviews.

Corrective Action Reference: Action Request (AR) 4138790, "Division 2 DG Air Receiver Found Isolated Rounds," dated May 17, 2018.

Performance Assessment:

Performance Deficiency: The licensee failed to perform activities affecting quality in accordance with prescribed procedures and work instructions as required by 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures and Drawings," that resulted in the unavailability of the Division 2 EDG when it was relied upon for plant safety. Specifically, the licensee failed to:

Perform CPS 3506.01P002, "Division 2 Diesel Generator Operations," Revision 3a, in conjunction with the removal of C/O 139455 as required by the C/O restoration instructions on May 9, 2018.

Perform OP-AA-108-103, "Locked Equipment Program," Revision 2, Step 4.1.5, which stated, "If plant conditions require a locked component to be positioned in a manner other than that indicated on the locked equipment checklist or approved procedure, then UNLOCK and REPOSITION equipment in accordance with OP-AA-108-101, 'Control of Equipment and System Status.'" Valves 1DG160 and 1DG161 were normally locked open valves. Licensee procedure OP-AA-108-101, "Control of Equipment and System Status," Revision 14, Step 4.1.1.1, stated, "Utilize an ACPS [abnormal component positioning sheet] for aligning equipment outside of routine operations. For situations, excluding routine operation, where a component, system, or structure is required to be placed in a position differing from its normal lineup, the alignment must be done utilizing an Abnormal Component

Position Sheet. The ACPS will document proper evaluation, performance and restoration of the alignment, ensuring plant configuration control is maintained."

Perform OP-AA-108-106, "Equipment Return to Service," Revision 5, Step 4.3, which required that "if equipment will not be restored to the Equipment Line-up/Restoration position or the original condition, then another approved equipment status control mechanism shall be used to document equipment status (i.e. Equipment Status Tag, administrative clearance/tagout). Procedure OP-AA-108-101, 'Control of Equipment and System Status,' shall be used to document abnormal equipment configuration and shall be immediately applied following equipment restoration." In addition, neither Step 4.4.9 of OP-AA-108-106 which stated, "Applicable Operating Procedures are complete and any equipment line-ups directed to be completed by the Operating Procedures are completed," nor Step 4.4.14, which stated, "The system/equipment has been walked down as appropriate to verify that it can be safely operated to fulfill its design function," were completed as required.

Perform OP-AA-109-101, "Clearance and Tagging," Revision 12, Step 10.2.1, which stated, "If a lift position is determined to be different from the normal lineup position for the present plant condition and not tracked by another C/O or procedure, then Shift Management shall be notified and equipment tracking initiated." In an interview between the inspectors and SRO 1, he stated that he thought the positions of 1DG160 and 1DG161 were being tracked via a procedure (CPS 3506.01P002). Licensee operations management stated that entering the procedure into the operations log was not the same as tracking via procedure.

Screening: The inspectors determined the performance deficiency was more than minor because it adversely affected the configuration control attribute of the Mitigating Systems Cornerstone and its objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the failure to follow the above station procedures/work instructions resulted in the unavailability of the Division 2 EDG when it was relied upon for plant safety in a shutdown condition.

Significance: The inspectors evaluated the finding against the guidance of IMC 0609 Appendix G, Attachment 1, "Shutdown Operations Significance Determination Process Phase 1 Initial Screening and Characterization of Findings." The finding impacted the Mitigating Systems Cornerstone, specifically the Electric Power Availability Safety Function. The finding represented a loss of system safety function for the EDGs for greater than its TS 3.8.2, Condition B.3, allowed outage time of Immediately which required a phase 2 Appendix G evaluation.

The phase 2 evaluation was conducted using IMC 0609 Appendix G, Attachment 3, and "Phase 2 Significance Determination Process Template for BWR during Shutdown." A Region III senior reactor analyst (SRA) completed the phase 2 evaluation and concluded that a phase 3, or detailed risk evaluation, would be needed to refine the phase 2 evaluation.

For the phase 2 evaluation, the applicable initiating event was a loss of offsite power (LOOP) event. The phase 2 evaluation focused on the 3 day exposure period in which both EDGs were unavailable and the plant was in plant operating state (POS) 1, with the reactor vessel head installed. The full exposure period for the finding is approximately 6 days. During the first 3 days, the Division 1 EDG remained available. The time to boil was approximately 5 hours and the time to uncover the core was approximately 12 hours, based on information provided by the licensee during the NRC's Management Directive (MD) 8.3 evaluation of the condition.

To solve the phase 2 worksheet for a loss of offsite power in POS 1, the following assumptions were made:

The LOOP initiating event likelihood (IEL) was assigned a value of "3" consistent with an exposure time of less than 3 days. Although the actual time that both EDGs were unavailable was slightly over 3 days, the SRA determined that it would be overly conservative to use the IEL for an exposure time of 3 to 30 days.

The emergency AC power function was assigned a value of "0" because neither EDG was available.

The recovery of LOOP in 20 hours was assigned a value of "2" which is the maximum value used in phase 2 of the shutdown SDP. The function represents the recovery of AC power after battery depletion with successful injection from an AC-independent source.

The AC-independent injection before core damage (ACI) function was assigned a value of "3," the maximum value used in phase 2, to represent the potential to use an AC power independent source of injection such as the permanently installed diesel-driven fire pump. The inspectors and the SRA determined that other plant-specific options to mitigate the event were more likely to be used by operators. The plant-specific options included the use of the Division 3 EDG to power Division 2 equipment or FLEX equipment.

The recovery of LOOP in 8 hours was assigned a value of "1," the maximum value used in phase 2.

Recovery of the Division 2 EDG was assigned a value of "1," the maximum value used in phase 2. The inspectors determined that annunciator response and operating procedures would direct actions to restore the air receiver outlet valves to the open position.

Using the assumptions above, the two core damage sequences were solved with a value of "6" and "8," representing an overall delta core damage probability (CDP) in the range of E-6. The dominant core damage sequence is a LOOP event, no emergency AC power, successful AC-independent injection, but failure to recover offsite power in 20 hours (after battery depletion but before core damage).

A phase 3 SDP evaluation will be performed to further evaluate recovery of the Division 2 EDG, plant-specific mitigating system strategies such as the Division 3 cross-tie to Division 2, use of FLEX, and the recovery of offsite power. As a result the significance of this finding is to be determined (TBD).

Cross-cutting Aspect: The finding had a cross-cutting aspect in the Field Presence component of the Human Performance cross-cutting area, which states that Leaders are commonly seen in the work areas of the plant observing, coaching, and reinforcing standards and expectations. Deviations from standards and expectations are corrected promptly. Senior managers ensure supervisory and management oversight of work activities, including contractors and supplemental personnel. Specifically, the operators controlling the return to service of the Division 2 EDG were not properly coached to ensure that procedures required to maintain configuration control of the Division 2 EDG were carried out to ensure that it became and remained operable and available when relied upon for nuclear safety. (H.2)

Enforcement:

Apparent Violation: Title 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," requires, in part, that activities affecting quality be prescribed by documented procedures of a type appropriate to the circumstances and be accomplished in accordance with these procedures.

Clearance Order 139455 instructions required the performance of CPS 3506.01P002, "Division 2 Diesel Generator Operations," Revision 3a, in conjunction with the removal of out-of-service tags on May 9, 2018.

Procedure OP-AA-108-103, "Locked Equipment Program," Revision 2, Step 4.1.5, stated, "If plant conditions require a locked component to be positioned in a manner other than that indicated on the locked equipment checklist or approved procedure, then UNLOCK and REPOSITION equipment in accordance with OP-AA-108-101, "Control of Equipment and System Status." Procedure OP-AA-108-101, "Control of Equipment and System Status," Revision 14, Step 4.1.1.1, stated, "Utilize an ACPS for aligning equipment outside of routine operations."

Procedure OP-AA-108-106, "Equipment Return to Service," Revision 5, Step 4.3, required that "if equipment will not be restored to the Equipment Line-up/Restoration position or the original condition, then another approved equipment status control mechanism shall be used to document equipment status (i.e. Equipment Status Tag, administrative clearance/tagout). Procedure OP-AA-108-101, 'Control of Equipment and System Status,' shall be used to document abnormal equipment configuration and shall be immediately applied following equipment restoration."

Procedure OP-AA-108-106, "Equipment Return to Service," Revision 5, Step 4.4.9, which stated, "Applicable Operating procedures are complete and any equipment line-ups directed to be completed by the Operating Procedures are completed."

Procedure OP-AA-108-106, "Equipment Return to Service," Revision 5, Step 4.4.14, stated, "The system/equipment has been walked down as appropriate to verify that it can be safely operated to fulfill its design function."

Procedure OP-AA-109-101, "Clearance and Tagging," Revision 12, Step 10.2.1 stated, "If a lift position is determined to be different from the normal lineup position for the present plant condition and not tracked by another C/O or procedure, then the Shift Management shall be notified and equipment tracking initiated."

Technical Specification 3.8.2, "AC Sources-Shutdown," Condition B.3, states, in part, that an inoperable EDG be restored to an operable status immediately.

Between May 9 and May 17, 2018, the licensee apparently failed to:

Perform CPS 3506.01P002, "Division 2 Diesel Generator Operations," Revision 3a, in conjunction with the removal of C/O 139455 as required by the C/O restoration instructions.

Perform OP-AA-108-103, "Locked Equipment Program," Revision 2, Step 4.3, valves 1DG160 and 1DG161 were normally locked open valves and an ACPS was not utilized to track valve status.

Perform OP-AA-108-106, "Equipment Return to Service," Revision 5, Step 4.3, when valves 1DG160 and 1DG161 were left in an abnormal position an approved equipment status control mechanism was not used to track equipment status.

Perform OP-AA-108-106, "Equipment Return to Service," Revision 5, Step 4.4.9, when the equipment was declared operable the applicable operating procedure CPS 3506.01P002 had not been completed and equipment line-ups directed to be completed by the operating procedures were not completed.

Perform OP-AA-108-106, "Equipment Return to Service," Revision 5, Step 4.4.14, when the system was declared operable without being walked down.

Perform OP-AA-109-101, "Clearance and Tagging," Revision 12, Step 10.2.1, when the lift position was different from the normal lineup for the present plant condition and equipment tracking was not initiated.

Additionally, because the licensee was not aware of the EDG's inoperability the required action in TS 3.8.2, Condition B.3 was not followed.

Disposition: The disposition of this violation is TBD.

- (5) Understand whether there were any deficiencies in operator training (both licensed and non-licensed operators) which contributed to the EDG unavailability and the failure to identify the condition across multiple operating shifts.

Observation	IP 93812
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The inspectors reviewed training materials and had discussions with training management about the training program aspects and topics related to the event for the previous 2 years. Training related to configuration control, including clearance and tagging processes used at CPS, was given in formal classroom training sessions during initial training for equipment operators (EOs), reactor operators (ROs), and SROs. Additional training on the implementation of configuration control procedures was given during initial qualifications and continuing training as "on-the-job" training. Passport was the software program used at CPS for implementing the clearance and tagging program. Similar to configuration control, the licensee gives initial training to operators on the use of Passport, and additional training related to Passport is considered on-the-job training. The inspectors did not identify any formal continuing training related to configuration control that was conducted in the previous 2 years, with the exception of one lesson related to clearance and tagging. The inspectors determined that the initial training material reviewed covered the requirements of station administrative procedures for configuration control. However, based on inspector discussions with SROs and members of the root cause team, the inspectors determined that SROs believed that component configuration was allowed to be tracked in the logs. This practice had been normalized at CPS. The practice of tracking configuration of components in the narrative log was not in accordance with any procedural guidance reviewed by the inspectors.

The knowledge gap between what was allowed by approved processes and procedures versus the actual methods and standards that CPS had been implementing was addressed in immediate station corrective actions that were implemented following this event. Corrective actions taken by the licensee are discussed in Section (7) of this report.

Additionally, the inspectors reviewed training materials and held discussions with training management related to training of equipment operators associated with plant tours and general area observations (i.e. "operator rounds"). The inspectors confirmed the equipment operators are given both initial and continuing training related to operator rounds performance standards. Inspector reviews and discussion with training management indicated a thorough training program related to operator rounds. The inspectors did not conclude that training deficiencies for equipment operators contributed to this event; however, the inspectors were concerned that equipment operators' standards for thorough tours, attention to detail in the plant, perceived time pressure, and understanding of plant status were contributors to the event.

Failure to Promptly Identify a Condition Adverse to Quality

Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Mitigating Systems	Green NCV 05000461/2018050-02 Open/Closed	[H.12] – Human Performance, Avoid Complacency	93812–Special Inspection

On May 17, 2018, a Green finding and an associated NCV of 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action," were self-revealed for the licensee's failure to promptly identify that the safety-related Division 2 EDG had its starting air receivers isolated, which was a condition adverse to quality that rendered the EDG inoperable and unavailable.

Description:

On May 11, 2018, at 2:30 a.m., the licensee declared the Division 2 EDG available following the removal of a clearance order supporting maintenance; at 8:00 a.m. on May 12, 2018, the licensee declared the Division 2 EDG operable. On May 14, 2018, the Division 2 EDG was put into a protected status for maintenance on the Division 1 EDG, when the Division 2 EDG would be the only source of emergency power available to the station. On May 17, 2018, at 3:03 p.m., an equipment operator on rounds found the two starting air receiver isolation valves, 1DG160 and 1DG161, in the closed position, which prevented starting air from reaching the Division 2 EDG, and the licensee declared the Division 2 EDG inoperable and unavailable.

After the licensee declared the Division 2 EDG available on May 11, 2018, the licensee performed area rounds checks of the Division 2 EDG room at least once per shift. From May 11 through May 17, 2018, five different equipment operators performed 'C' area rounds checks, which included the D2 EDG room. Those five operators had at least 12 opportunities to identify the problem before it was finally found. The licensee's failure to promptly identify the isolated valves resulted in the plant being in an elevated risk condition that was not allowed by plant procedures for three and one half days without their knowledge.

On May 17, 2018, at approximately 5:35 p.m., a sixth equipment operator identified that isolation valves 1DG160 and 1DG161 were in the closed position and reported them to the control room. The inspectors interviewed the operator that found the valves in the closed position and he stated that it was obvious that the valves were in the wrong position as soon as he entered the room. During a tour of the diesel room, the inspectors noted the relative large size of the air receiver isolation valves (2 inch ball valves with a handle approximately 6 inches long) that were located at knee level while standing on the platform adjacent to the air receivers and were also strapped in the closed position by long black plastic straps. The

inspectors also noted that there were two indications for air manifold pressures on each of the two local EDG panels in the Division 2 EDG room. At the time of the event these air manifold pressure gages read zero psig which was a clear indication that there was no starting air pressure available to the Division 2 EDG.

The inspectors conducted interviews with licensee personnel, reviewed the licensee's procedure for operator rounds, toured the Division 2 EDG room, and concluded that it was reasonably within the licensee's ability to identify the condition of the Division 2 EDG prior to return to service and during several opportunities following return to service, during normal equipment operator rounds. Considering all of the information reviewed, the inspectors determined that the licensee did not promptly identify this condition adverse to quality when it was reasonably within their ability to do so.

Normally, items found by the licensee while conducting operator rounds would be considered licensee identified in accordance with IMC 0612, "Issue Screening." However, Block 5 of IMC 0612, Appendix B, states that past experience, related precedents and the over-arching regulatory message should be considered when determining a finding's identification credit. After careful consideration of the above items, the inspectors characterized the finding as self-revealing to align with the NRC's over-arching message regarding the need for improved operation department performance.

Corrective Actions: The licensee placed valves 1DG160 and 1DG161 into their correct position and performed a valve lineup of the Division 2 EDG system. Subsequent corrective actions included adding the EDG air start manifold pressure indications to the 'C' area rounds points log.

Corrective Action Reference: Action Request 4138790, "Division 2 DG Air Receiver Found Isolated Rounds," dated May 17, 2018

Performance Assessment:

Performance Deficiency: The inspectors determined that the licensee's failure to promptly identify the Division 2 EDG air start receiver isolation valves were not in the correct position was a performance deficiency.

Screening: The inspectors determined this issue was more than minor because it was associated with the Mitigating Systems Cornerstone attribute of Human Performance and adversely affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the licensee, including multiple equipment operators, failed to promptly identify a condition adverse to quality, when multiple indications were available, that indicated the Division 2 EDG was inoperable and unavailable when it was being relied upon as a source of emergency power. As a result, the Division 2 EDG was not capable of responding to initiating events such as a loss of offsite power which placed the plant in an elevated risk condition.

Significance: The inspectors evaluated the significance of the finding using IMC 0609, Appendix G, Shutdown Operations Significance Determination Process Phase 1 Initial Screening and Characterization of Findings, Exhibit 3, Mitigating Systems, and determined the finding screened as having very low safety significance (Green) because all of screening questions were answered "no". Specifically, the failure to promptly identify the valves in the wrong position was not considered to be the proximate cause of the valves being in the wrong position.

Cross-cutting Aspect: The finding had a cross-cutting aspect in the Avoid Complacency component of the Human Performance cross-cutting area, which states that individuals recognize and plan for the possibility of mistakes, latent issues, and inherent risk, even while expecting successful outcomes. Individuals implement appropriate error reduction tools. Specifically, equipment operators that toured the Division 2 EDG room on multiple occasions did not identify the latent issues that existed on the EDG and did not implement appropriate human performance tools to conduct intrusive tours of the EDG room with a questioning attitude and attention to detail. (H.12)

Enforcement:

Violation: Title 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action," requires, in part, that conditions adverse to quality, such as failures, deficiencies, deviations, and non-conformances are promptly identified.

Contrary to the above, from May 11 to May 17, 2018, the licensee failed to promptly identify a condition adverse to quality. Specifically, over the course of 6 days, the safety-related Division 2 EDG starting air receivers were isolated from the EDG air start motors, while it was relied upon for plant safety, which was a condition adverse to quality that rendered the EDG inoperable and unavailable.

Disposition: This violation is being treated as a Non-Cited Violation, consistent with Section 2.3.2 of the Enforcement Policy.

Equipment Operator Rounds Points Inadequate Acceptance Criteria

Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Mitigating Systems	Green NCV 05000461/2018050-03 Open/Closed	[H.6] – Human Performance, Design Margins	93812-Special Inspection

On May 17, 2018, a Green finding and an associated NCV of 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," were self-revealed for the licensee's failure to include appropriate quantitative acceptance criteria for the Division 2 EDG parameters to ensure the Division 2 EDG could perform its safety function.

Description:

On May 11, 2018, at 2:30 a.m., the licensee declared the Division 2 EDG available; at 8:00 a.m. on May 12, 2018, the licensee declared the Division 2 EDG operable. On May 17, 2018, at 3:03 p.m., an equipment operator on rounds in the field found the two air receiver isolation valves, 1DG160 and 1DG161, in the closed position and the licensee declared the Division 2 EDG inoperable and unavailable. During the review into this issue, the licensee noted that the EDG air start manifold pressures were not a recorded value in the 'C' area round points performed by equipment operators. The inspectors were concerned that the 'C' area rounds points did not contain readily available information (air start manifold pressures) that would provide an indication of the EDGs ability to perform its safety function. With the air start tanks isolated, the air start manifold pressures read 0 psig which would have provided an additional indication that the diesel was not available to start.

Corrective Action: On May 29, 2018, during the root cause investigation, the licensee revised the 'C' area rounds points to include EDG air start manifold pressure indications on the local EDG control panels.

Corrective Action Reference: Action Request 4138790, "Division 2 DG Air Receiver Found Isolated Rounds," dated May 17, 2018

Performance Assessment:

Performance Deficiency: The inspectors determined that the licensee's failure to include the Division 2 EDG air start manifold pressures in the 'C' area rounds points was a performance deficiency.

Screening: The inspectors determined this issue was more than minor because it was associated with the Mitigating Systems Cornerstone attribute of Equipment Performance and adversely affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, by not including the air start manifold pressures in the operator round points, the licensee failed to recognize the Division 2 EDG was inoperable when it was being relied upon as a source of emergency power.

Significance: The inspectors evaluated the significance of the finding using IMC 0609, Appendix G, Shutdown Operations Significance Determination Process Phase 1 Initial Screening and Characterization of Findings, Exhibit 3, Mitigating Systems, and determined the finding screened as having very low safety significance (Green). The failure to have the air manifold pressures in the rounds points was not considered to be the proximate cause of the valves being in the wrong position.

Cross-cutting Aspect: The inspectors determined the finding had a cross-cutting aspect of Design Margin in the Human Performance area, which states that the organization operates and maintains equipment within design margins and special attention is placed on maintaining safety related equipment (WP.2). Specifically, the operator round points which did not include the EDG air start manifold pressures failed to verify the EDG could maintain its safety function. (H.6)

Enforcement:

Violation: Title 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," requires, in part, that activities affecting quality shall be prescribed by documented instructions, procedures, or drawings, of a type appropriate to the circumstances and shall be accomplished in accordance with these instructions, procedures, or drawings. Instructions and procedures shall include appropriate quantitative or qualitative acceptance criteria for determining that important activities have been satisfactorily accomplished. The licensee established the 'C' area round points as the implementing procedure for logging Division 2 EDG parameters to ensure its ability to perform its intended safety function, an activity affecting quality.

Contrary to the above, prior to May 29, 2018, the licensee's 'C' area rounds points failed to include appropriate quantitative acceptance criteria for the Division 2 EDG parameters to ensure the Division 2 EDG could perform its safety function.

Disposition: This violation is being treated as an NCV, consistent with Section 2.3.2 of the Enforcement Policy.

- (7) Evaluate licensee planned and completed corrective actions following the EDG event to the extent possible and assess if prior opportunities (e.g., surveillances, maintenance, and self or nuclear oversight assessments) existed to have identified the problem at an earlier point in time.

Observation	IP 93812
<p>At the time of this inspection, the licensee had not completed their root cause evaluation; however, the inspectors reviewed the following immediate corrective actions taken by the licensee:</p> <ul style="list-style-type: none"> • Operations director memos were sent to the operations shift managers related to accountability and procedure use and adherence. These memos, which were required to be acknowledged by all operations department personnel and briefed by the operations shift managers, covered various administrative procedural requirements including: procedure use and adherence, control of plant equipment, stop work criteria, operations decision making, and operability procedure requirements. The inspectors reviewed an operations director memo from May 18, 2018, "Issue Response Expectation for Clinton Operations Management." The inspectors also reviewed an operations director memo from May 23, 2018, "Manager Accountability for Performance." Interviews with operations department personnel indicated personnel were aware of the content of the memos. • The operations director and operations department leaders conducted face-to-face discussions with each member of the operations department. • Just-in-time training was given to all operations department staff on the requirements of HU-AA-104-101, "Procedure Use and Adherence," Revision 5. The inspectors' Interviews with operation's personnel indicated that they were aware of the requirements of HU-AA-104-101. • The licensee changed the clearance and tagging method to include signed restoration steps. Restoration steps were previously included as restoration instruction "notes." These notes were expected to be completed as a procedure; however, the clearance order was allowed to be closed without documenting that these restoration steps had been completed. The inspectors reviewed several clearance orders and verified the licensee's corrective action was being implemented. • The licensee implemented a "Procedure-in-Progress" program for procedures that are not completed within one shift. The inspectors toured the control room and discussed the process with operators and observed it was being implemented. • The licensee conducted a three day stand-down with all station personnel and covered case studies and learnings from the event. The inspectors reviewed the material covered during the stand-down and interviewed plant personnel, who were aware of the details of the stand-down. Revised the equipment operator rounds points to include logging emergency diesel generator starting air manifold pressures, located down-stream of the air tank isolation valves. The inspectors reviewed the revised 'C' area rounds points and verified operators were logging EDG air manifold pressures. • Operations shift managers were reviewing logs and at least two completed procedures at the end-of-each shift. The inspectors requested to review any condition reports associated with these reviews and were informed that since this had been implemented, there had been no condition reports generated as a result of these shift manager reviews. <p>The inspectors conducted observations and interviews and concluded that the immediate corrective actions taken by the licensee were appropriate, and station personnel were generally aware of the EDG event, its causes, and corrective actions implemented.</p>	

The inspectors reviewed Operations Functional Area Audit Report, NOSA-CPS-17-08, dated October 3, 2017. The inspectors reviewed Configuration Control Self-Assessments conducted in 2017 and 2016, under ARs 4026575 and 2664637, respectively. The inspectors reviewed the 2017 Clinton Clearance and Tagging Self-Assessment conducted under AR 4047333. A review of the above items did not identify any gaps noted by nuclear oversight personnel or operations department staff that would have indicated similar issues that lead to the cause the Division 2 EDG inoperability

The inspectors reviewed the Operator Fundamentals Self-Assessment, dated January 29, 2018, under AR 4042011. The inspectors noted that in Recommendation #1 the licensee stated, "Senior Leadership Team [SLT] observations are not entered in the Exelon Observation System in a thorough and consistent manner/ format making it difficult to assess operator fundamental performance related to SLT observations." However, the licensee also concluded that, "the CPS SLT is monitoring and reinforcing operator fundamentals... and meaningful gaps to excellence were identified..." The inspectors also noted that the number of observations documented in the second and third quarters of 2017 dropped to 45 from 138 total in 2015.

The inspectors did not identify any surveillance tests or maintenance activities that would have been able to identify the condition of the Division 2 EDG at an earlier time. However, as previously discussed, the inspectors did note that multiple (5) equipment operators had toured the Division 2 EDG room on several occasions (12) and had the opportunity to identify the condition of the EDG being inoperable.

- (8) Determine whether recent internal and external operating experience involving configuration control, risk management and oversight of activities were appropriately evaluated and determine the adequacy of any corrective actions planned or completed.

Observation	IP 93812
<p>There were two operating experience cases that were immediately relevant and available to the licensee. The first was an external operating event that occurred at Grand Gulf in September 2016. In this event alternate decay heat removal was being relied upon by the licensee as a second source of decay heat removal required by the TS. However, cooling to the alternate decay heat removal system had been tagged out-of-service for several weeks.</p> <p>The licensee was made aware of this event through an industry communication and NRC Information Notice 2018-03, "Operating Experience Regarding Failure To Meet Technical Specification Requirements For Changing Plant Conditions," dated February 26, 2018. This event was discussed with plant management at the Plan of the Day meeting on April 23, 2017. The licensee addressed the NRC Information Notice with AR 4108876, "OPEX: IN 2018-03 Failure To Meet TS For Change Conditions," dated February 27, 2018. The due date for the licensee's response was not until July 13, 2018.</p> <p>The second was an internal operating event that occurred at Clinton Station between May 24 and September 22, 2016.</p> <p>On September 22, 2016, when an area operator was on rounds, the position of CO2 isolation valve to the generator exciter, 1CO609, was questioned when the operator observed that the valve was unlocked. Further investigation determined that 1CO609 was closed with a required position of locked open. A review of controlling documents determined that there was no open documentation controlling this valve for its current position. A line up was</p>	

completed and 1CO609 was restored to its required locked open position. An evaluation was performed to determine the cause of 1CO609 being left in a position different from its required position. The review concluded that the last time 1CO609 was manipulated was in accordance with C/O 131019 which was hung to support generator inspections during C1R16. Clearance Order 131019 was removed on May 24, 2016, with the position of 1CO609 left in the closed position (per C/O restoration position) and was required to be restored per CPS 3213.01P001, "Placing Turbine Generator Exciter CO2 System in Standby," Section 8.27, as identified in the clearance order special instructions under the restoration instruction.

The licensee determined that the operators failed to follow OP-AA-108-103, "Locked Equipment Program," Revision 2. Specifically, upon clearing of out-of-service tags associated with C/O 131019 valves 1CO609 and 1CO001 were left in the closed position which was abnormal from the required position. Valve 1CO609 was a locked valve left in an abnormal condition and the procedural requirements of OP-AA-108-103 when a locked valve was left in an abnormal position were not followed.

The licensee's corrective actions were to put the valve into its correct position and to require each operator to read a daily order, which was effective from September 30 through October 3, 2016, that discussed the requirements for tracking the status of plant equipment. The daily order stated that equipment status could be tracked in one of five approved methods. One of those methods, an example given by the licensee, was an open procedure and that the open procedure must be documented in the control room log. This was essentially what the SRO told the inspectors happened in the case of the Division 2 EDG air receiver isolation valves. The SRO stated he was required to log the out-of-service activity in the control room logs and he believed that CPS 3506.01P002 was the procedure in progress to control equipment status. The inspectors concluded the licensee's response to the internal operating experience was ineffective and may have actually reinforced the behavior of tracking equipment status using the control room logs which contributed to the EDG air receiver valves being left in the wrong position.

Observation—Licensee Identified Failure to Follow Procedure	IP 93812
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The licensee identified a Green finding for the failure to follow licensee procedure OP-AA-103, "Locked Equipment Program," Revision 2. Specifically, the licensee failed to track the status of a locked valve that was left in an abnormal position in accordance with the procedural requirements.

On September 22, 2016, when an area operator was on rounds, the position of CO2 isolation valve to the generator exciter, 1CO609, was questioned. The inspectors gave the licensee identification credit for finding this valve out of position, even though it had been out of position for several months, because the valve was about 10 feet in the air and the valve position was not identifiable from the ground. The operator noticed the valve was not locked, which was difficult to see from the ground, and questioned its position. Further investigation determined that 1CO609 was closed with a required position of locked open. A review of controlling documents determined that there was no open documentation controlling this valve for its current position. A line up was completed and 1CO609 was restored to its required locked open position. An evaluation was performed to determine the cause of 1CO609 being left in a position different from its required position. The review concluded that the last time 1CO609 was manipulated was in accordance with C/O 131019 which was hung to support generator inspections during C1R16. Clearance Order 131019 was removed on May 24, 2016, with the position of 1CO609 left in the closed position (per C/O restoration

position) and was required to be restored per CPS 3213.01P001, "Placing Turbine Generator Exciter CO2 System in Standby," Section 8.27, as identified in the clearance order special instructions under the restoration instruction.

The licensee determined that the operators failed to follow OP-AA-108-103, "Locked Equipment Program," Revision 2. Exelon procedure OP-AA-108-103, "Locked Equipment Program," Revision 2, Step 4.1.5, stated, "If plant conditions require a locked component to be positioned in a manner other than that indicated on the locked equipment checklist or approved procedure, then UNLOCK and REPOSITION equipment in accordance with OP-AA-108-101, 'Control of Equipment and System Status.'" Valves 1DG160 and 1DG161 were normally locked open valves. Procedure OP-AA-108-101, "Control of Equipment and System Status," Step 4.1.1.1, stated, "Utilize an ACPS [abnormal component positioning sheet] for aligning equipment outside of routine operations." Specifically, upon clearing of out-of-service tags associated with CO 131019 valves 1CO609 and 1CO001 were left in the closed position which was abnormal from the required position. Valve 1CO609 was a locked valve left in an abnormal condition and an ACPS was not used to track the position of the valve.

Screening: The inspectors determined the performance deficiency was more than minor because it could reasonably be viewed as a precursor to a significant event. Specifically, the failure to effectively correct the above performance deficiency regarding locked equipment left in an abnormal condition eventually resulted in the unavailability of the Division 2 EDG when it was relied upon for plant safety in a shutdown condition.

Significance: The finding affected the Mitigating Systems Cornerstone and was screened in accordance with IMC 0609, Appendix F, Table 1.2.1., which was answered "no." The inspectors determined that Step 1.4.2 was answered no and therefore the finding screened as Green.

Corrective Actions: The licensee's corrective action, at the time, was to put the valve into its correct position and put out a Daily Order, which was good September 30 through October 3, 2016, that discussed the requirements for tracking the status of plant equipment. The licensee documented this event in AR 2718753, "EOID: 1CO609, 1CO01T Tank Outlet Valve Found Open," September 22, 2018.

Enforcement: The inspectors did not identify a violation of regulatory requirements associated with this finding. The equipment associated with this finding was non-safety related.

EXIT MEETINGS AND DEBRIEFS

The inspectors confirmed that proprietary information was controlled to protect from public disclosure. No proprietary information was documented in this report.

- On June 29, 2018, the inspectors presented the initial Special Inspection results to Mr. T. Stoner, Clinton Power Station, Site Vice President and other members of the licensee staff during an interim exit meeting.
- On August 3, 2018, the inspectors presented the final Special Inspection results to Mr. T. Stoner, Clinton Power Station, Site Vice President and other members of the licensee staff during a final exit meeting.

THIRD PARTY REVIEWS

None.

DOCUMENTS REVIEWED

93812—Special Inspection

Paragraph (1)

- Control Room Logs May 5 through May 18, 2018
- AR 04150624; NRCID: C1R18 Risk Log Entries Inconsistent; 06/26/2018
- AR 04150906; Log Discrepancies Found During NRC SIT; 06/27/2018

Paragraph (2)

- C1R18 Shutdown Safety Management Program Safety Analysis; 04/09/2018

Paragraph (3)

- Root Cause Charter for the Event Associated with IR 4138790; Division 2 DG Air Receivers Found Isolated during Rounds; 05/17/2018

Paragraph (4)

- HU-AA-104-101; Procedure Use and Adherence; Revision 5

Paragraph (6)

- AR 04151037; Delete CPS 1409.01 Section 8.5—It Is Out of Date; 06/27/2018
- CO 00139455, Checklist 4; C1R18—4.16kV Bus 1B1 Outage (AP-1B1)
- CPS 1052.01; Conduct of System Lineups; Revision 9a
- CPS 1401.09; Control of System and Equipment Status; Revision 9d
- CPS 1401.09; Control of System and Equipment Status; Revision 9e
- CPS 3506.01P002; Division 2 Diesel Generator Operations; Revision 3a
- CPS 3506.01P002; Division 2 Diesel Generator Operations; Revision 3b
- ER-AA-310; Implementation of the Maintenance Rule; Revision 11
- OP-AA-10; Clearance and Tagging Process Description; Revision 4
- OP-AA-108-103; Locked Equipment Program; Revision 2
- OP-AA-108-105; Equipment Deficiency Identification and Documentation; Revision 11
- OP-AA-108-106; Equipment Return to Service; Revision 5
- OP-AA-108-115; Operability Determinations (CM-1); Revision 20
- OP-AA-109-101; Clearance and Tagging; Revision 12
- OP-AA-111-101; Operating Narrative Logs and Records; Revision 18
- OP-CL-108-101-1003; Operations Department Standards and Expectations; Revision 37
- OU-AA-103; Shutdown Safety Management Program; Revision 20

Paragraph (7)

- Unit 01 Standing Order 2018-06; Prerequisite Steps in Operating Procedures Directing Line-ups; 06/15/2018

- Unit 01 Standing Order 2018-03; Configuration Control Event IR# 04138790; 05/18/2018

Paragraph (8)

Nuclear Plant Plan of the Day Package, dated 04/13/201

From: Kozak, Laura
Sent: Thu, 13 Sep 2018 21:26:03 +0000
To: Pelke, Paul;Skokowski, Richard;Lambert, Kenneth;Stoedter, Karla;Sanchez Santiago, Elba;Sargis, Daniel
Cc: Phillips, Charles;Hanna, John;Louden, Patrick;Lara, Julio;Mitman, Jeffrey
Subject: Clinton SERP package

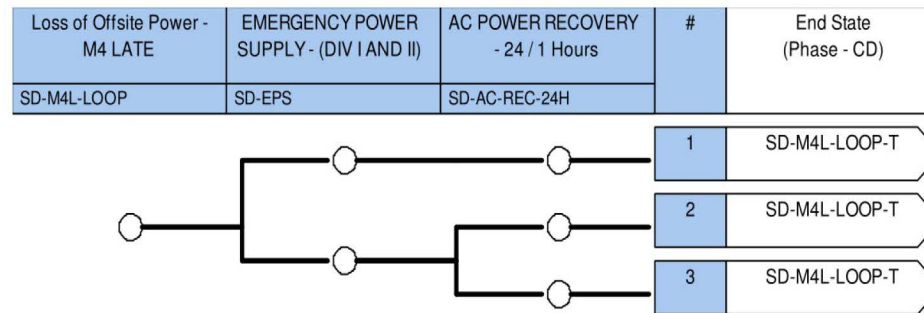
Please see attached SERP package for a SERP on 9/20 for the Clinton EDG issue

From: [Mitman, Jeffrey](#)
To: [Kozak, Laura](#)
Cc: [Sanchez Santiago, Elba](#)
Subject: Clinton Event Trees.pdf
Date: Thursday, September 20, 2018 9:03:27 AM
Attachments: [Clinton Event Trees.pdf](#)

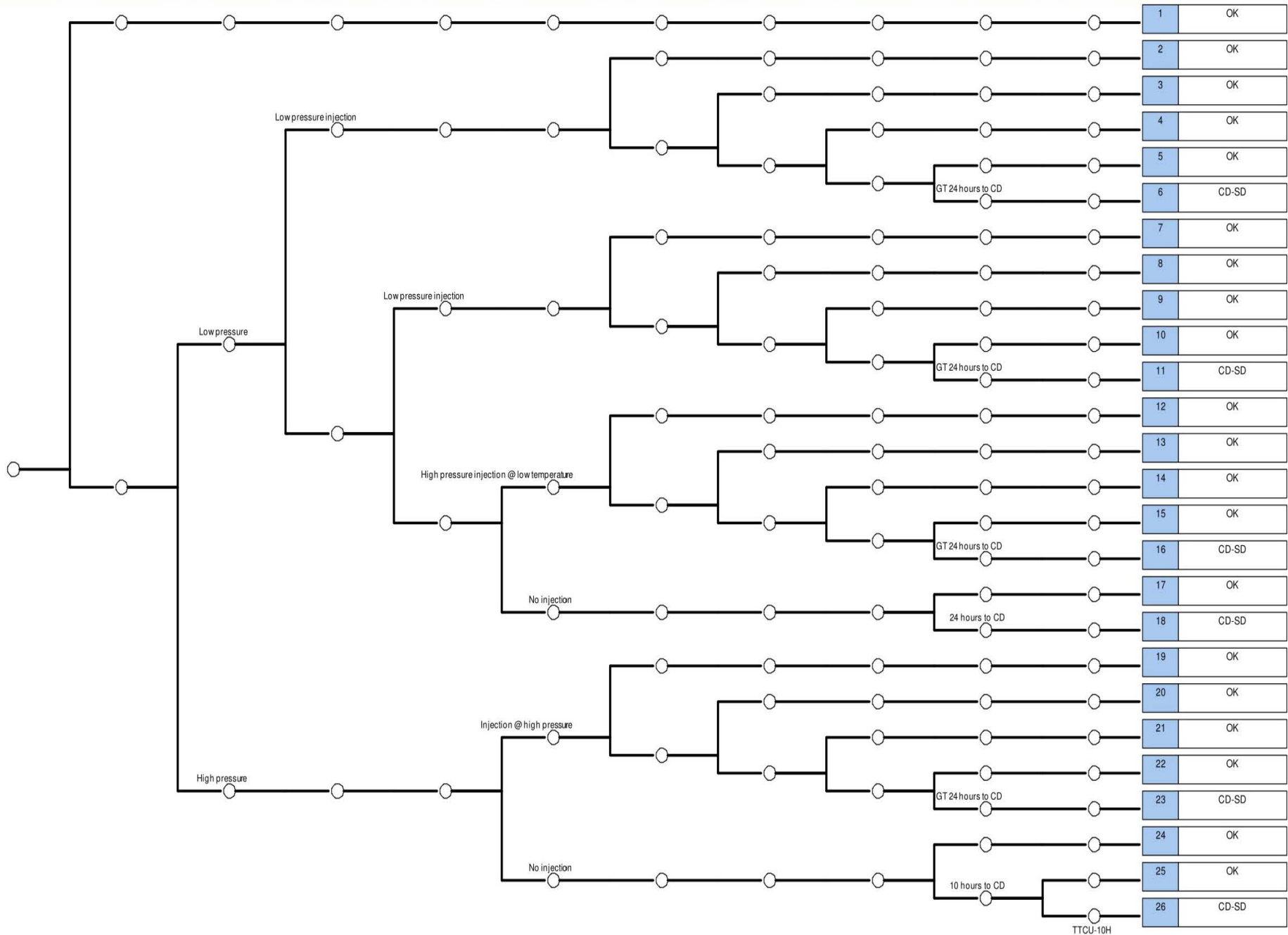
Laura, I intend to hand out the attachment here at HQ. You may want to do the same in Region III.

Jeff Mitman

Clinton Event Trees



	SDC (no FLEX credit here - Always Fails during ELAP)	MANUAL REACTOR DEPRESS (include credit for FLEX DC Power)	LOW PRESSURE COOLANT INJECTION (no FLEX credit here - Always Fails during ELAP))	ALTERNATE INJECTION - CDS SWS FWS and FLEX	HI PRESSURE INJECTIONS (HCS/CRD)	HEAT REMOVAL USING SUPPRESSION POOL including FLEX	ALTERNATE HEAT REMOVAL (Always Fails during ELAP)	CONTAINMENT VENTING - SD	Electrical Connection Div. 3 to Div. 2	Power Recovery Correction Factor for Different Time to Core	#	End State (Phase - CD)
<DUMMY-FT>	SD-SDC	SD-DEP	SD-LPI	SD-ALT-INJ	SD-HPI	SD-SPC-EXT	SD-ALT-HEAT	SD-CVS	ELEC_XTIE	TTCU Uncovery		



From: [Sanchez Santiago, Elba](#)
To: [Kozak, Laura](#)
Cc: [Mitman, Jeffrey](#); [Stoedter, Karla](#)
Subject: Emergency Lighting in the Division 2 EDG room
Date: Thursday, September 20, 2018 8:02:37 AM
Attachments: [Document1.docx](#)

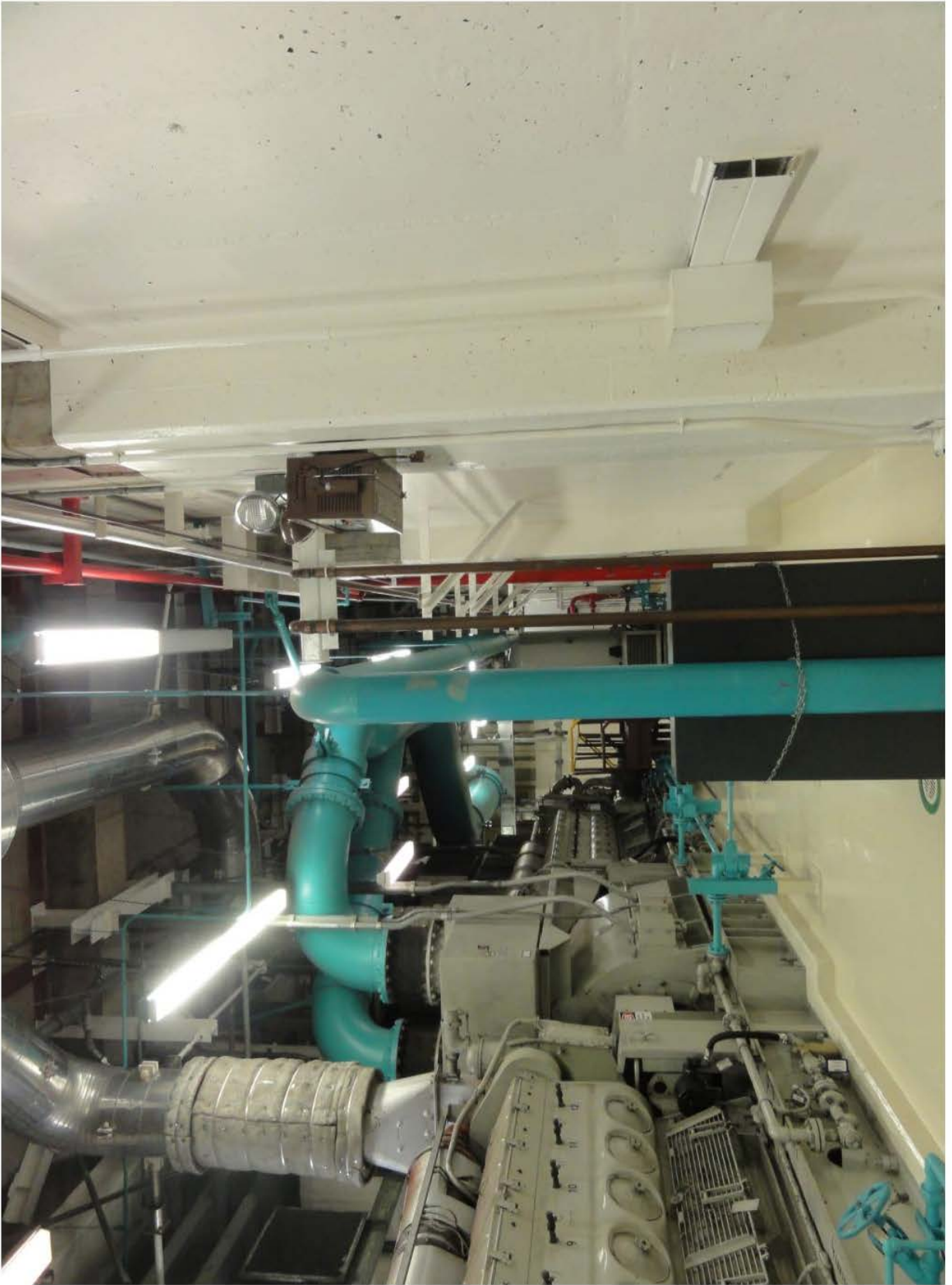
Laura,

As I mentioned to you yesterday, there are two emergency lighting battery assemblies (ELBAs; I didn't come up with the acronym) in the Division 2 diesel room. They are classified as non-safe shutdown emergency lighting, which means they are meant mostly for safe egress from the room. I reviewed the testing procedures and the USAR to identify how long they are required to last. Per the USAR they are equipped with batteries that have a capacity of 8 hours. Because they are not safe shutdown emergency lights they are not required to last 8 hours. Per their procedures they are only required to last 1.5 hours and that is what they are tested to.

I attached pictures of both ELBAs along with some pictures I took trying to simulate the direction of the light.

Let me know if you have any questions or if there is anything else you need more detail on in preparation of today's SERP.

Thanks,
Elba

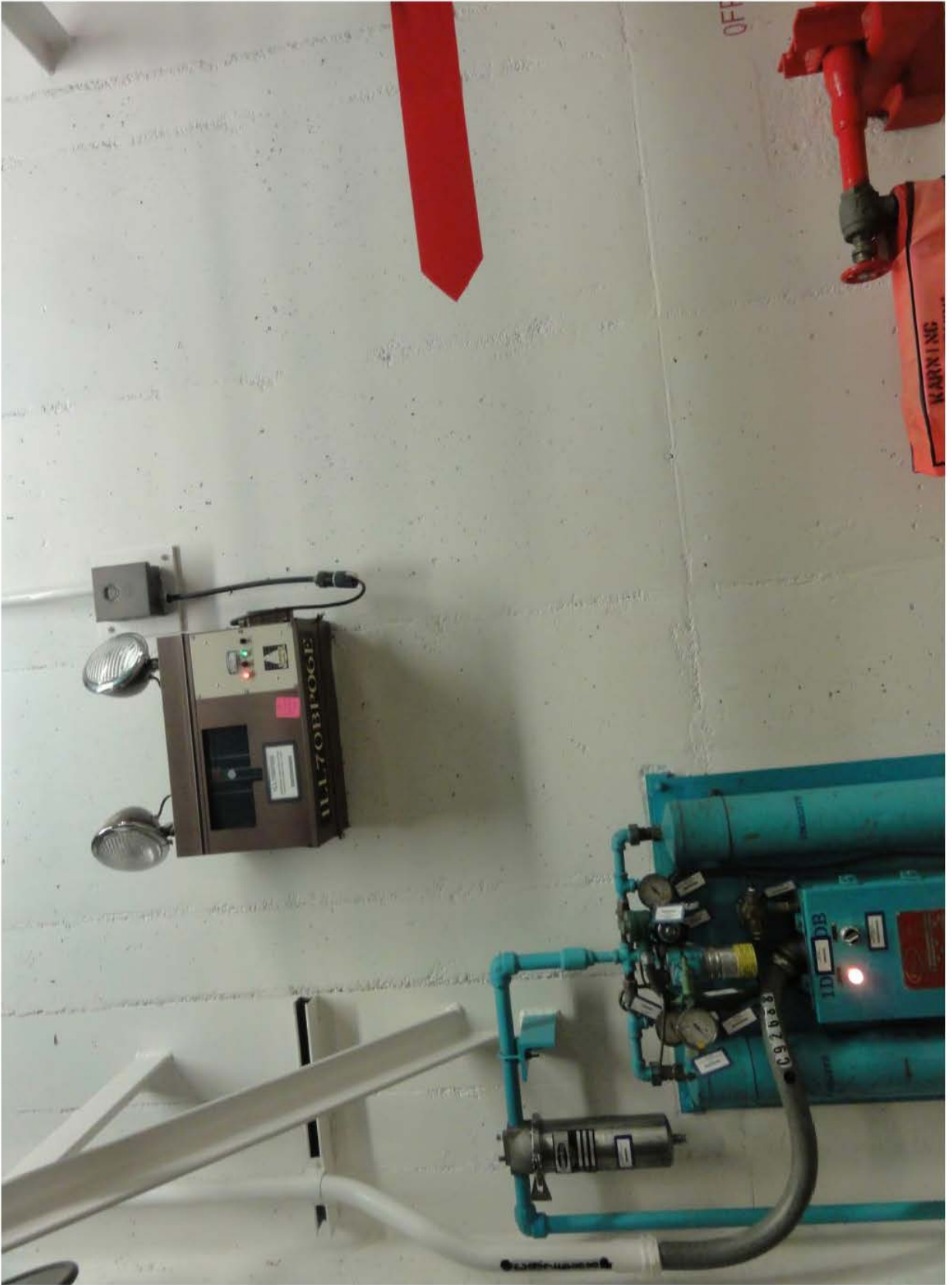
















From: [Kozak, Laura](#)
To: [West, Steven](#); [Lara, Julio](#); [Louden, Patrick](#); [Stoedter, Karla](#); [Riemer, Kenneth](#); [Cameron, Jamnes](#); [Sanchez Santiago, Elba](#)
Subject: Excerpts from Clinton loss of AC procedure regarding declaring ELAP, exiting the procedure, and high assurance
Date: Thursday, September 20, 2018 10:58:00 AM
Attachments: [image001.png](#)
[image002.png](#)

FYI based on our discussion. Two separate relevant sections below. Let me know if you would like the entire procedure.

Laura

3.0 IMMEDIATE OPERATOR ACTIONS

Within a maximum of 1 hour, the Shift Manager SHALL determine if an Extended Loss of AC Power (ELAP) exists.

4.0 SUBSEQUENT ACTIONS

NOTE

Security SHALL be notified any time the 138 kV system, the 12kV system, or circuit switchers 4508/4538 are de-energized OR re-energized and to evaluate for the implementation of compensatory measures in accordance with SY-CL-101-102 and SY-AA-101-102.

Ensure that appropriate Security actions are taken for a loss of AC power.

[CA#4010227-60] <<CM-10>>

4.1 Global Subsequent Actions

1. IF An ELAP exists (see step 1.5 for Definition)
THEN EXIT this procedure AND enter CPS 4306.01
Extended Loss of AC Power/Loss of UHS.
2. IF 4160V Bus 1A1 OR 1B1 auto transferred to the
alternate power supply and re-energized
THEN Proceed quickly to 4.2.1 4160v 1A1(1B1) Dead
Bus Transfer

4.4 STATION BLACKOUT (SBO) «CM-1»

1. The Shift Manager shall conduct a continuous assessment of the prognosis for restoration of power to Div 1 and/or Div 2.

IF Within 1 HOUR of the Station Blackout, there has not been action taken that would provide a HIGH ASSURANCE of restoration of Div 1 and/or Div 2 power within the 4 hour SBO coping period,

THEN STOP executing Station Blackout actions and immediately execute CPS 4306.01 Extended Loss of AC Power/Loss of UHS.

- ③ At this point, executing CPS 4306.01 Extended Loss of AC Power/Loss of UHS takes precedence over attempts to restore offsite AC and/or DGs.

2. The Shift Manager shall continue to monitor SBO recovery actions.

IF While executing SBO actions, recovery actions prove to be unsuccessful

THEN STOP executing Station Blackout actions and immediately execute CPS 4306.01 Extended Loss of AC Power/Loss of UHS.