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Date: 1/17/03 5:28PM
Subject: Additional Information

Rebecca : • Appears that fire models are conservative in that they assume all cables are damaged because they assumed ~~non-IEEE 383~~ cables (thermo plastic)

In the attached Excel file, you will find

• ANO has a ~~mixture of~~ thermo set (700°) ~~& thermoplastic~~ but may have some that are thermo plastic (400°)

1) Cable Data - This worksheet contains a list of cables with the applicable insulation type. All of the listed cables (with one exception) were determined to have thermoset insulation. Therefore, the failure temperature of these cables would be 700F. The one exception was a cable (RCB5721D1) that was installed in the 90's. As of today, we have been unable to locate the work package that recorded the cable reel number. However, all other listed instances of this cable type (i.e. R74) are thermoset cables. We believe that this cable is also a thermoset cable.

2) Cable Routing - For the cables listed in the above item, the associated raceways in Zone 99-M are listed.

3) Raceway Layout - This worksheet contains a sketch identifying the location of the raceways of interest in Zone 99-M.

4) Ignition Sources - This worksheet contains a sketch of the relative locations of the electrical cabinets located in Zone 99-M.

• Knew this in Nov/Dec timeframe

Items to Consider

Note : Focus has been placed on Zone 99-M (vs. 98-J) since there is no suppression system installed. Most of the listed cables are also routed through Zone 98-J. Similar consideration should be given to Zone 98-J.

1) From our teleconference of 01/15/03, NRR did not predict a hot gas layer reaching 700F in any of the modeled scenarios. Accordingly, all components will not 'fail' due to development of a hot gas layer. Instead, dependent on which ignition source is modeled, a certain set of components may incur damage (due to plume or ceiling jet effects) whereas others will not experience damage temperature due to the location of the circuits within the room. Without having run specific fire models, we would theorize the potential damage of circuits routed in raceways along the west wall of Zone 99-M (i.e. those associated with EFW) whereas those routed in the eastern half of the room (i.e. associated with HPI) would not incur damage. Conversely, if the ignition sources are on the eastern half of the room, we would theorize damage to HPI related cabling, whereas EFW cabling in the western half of the room would not incur damage. With one success path undamaged by fire, the HR!
A values for performing any manual actions will most likely be impacted.

2) For those components that do incur damage, there is a finite amount of time available prior to

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• Time avail to restore functions may be greater if op's don't have to restore EFW and/or HPI until 30 min. into the fire (This depends on location

failure. Those closest to the ignition source would fail first, whereas those further away would fail sequentially as you progress to the least severe exposure. Availability of the systems during this interval could have a significant impact on the amount of time available to perform manual actions. For example, assume the EFW valves do not fail closed for approximately 15 minutes. A considerable amount of decay heat can be removed by the EFW system during this 15 minute time span. This will impact (positively) the amount of time available to manually reestablish EFW and potentially impact the HRA values.

3) When preparing the IPEEE submittal, ANO assumed that the Main Feedwater System would be unavailable in all fire scenarios. As a result, the PSA model built to support the IPEEE (and utilized for this SDP) assumed that a fire caused a loss of all MFW. In the process of evaluating this SDP, we have determined that one flow path of MFW will be available. Thus, the associated MFW pump will continue to run until failures occur in the support systems (e.g. loss of cooling water for the lubrication system). Similar to Item 2, above, the availability of MFW to remove decay heat will impact the time available to perform recovery actions to restore EFW.

4) One of the conclusions of NUREG/CR-6776 was that in all the observed test cases, when a cable failure occurred, the failure ultimately resulted in the conductors shorting to ground. There are two flow paths from the motor driven EFW pump (i.e. P7B) to the steam generators. In order to lose a flow path (i.e. fail a valve closed), the controller for the solenoid valve (i.e. CV2646 or CV2648) must receive a spurious close signal. To fully close the valve, the close signal must be approximately 20mA (vs. a 4mA (or less) signal that results in a fully open valve). The valve position signal is provided by the EFIC system and is normally a 4 mA signal (i.e. valve is normally open). With all related conductors ultimately failing to ground in a fire scenario, the prospect of maintaining a 20mA signal for an indefinite period of time is virtually impossible. The NUREG/CR notes that the duration of hot short (for thermoset cable) is limited to a matter of minutes after t!
he onset of cable damge. Thus, while one (or both) flow path(s) from P7B may be temporarily impacted by fire damage, ultimately the flow control valve will reopen and allow EFW flow to the steam generators.

While ANO has received nothing 'official' from the NRC concerning the significance of a Zone 99-M fire scenario, the above factors should be considered in the evaluation. All of the factors increase the availability of a method for removing decay heat, without requiring the performance of recovery actions during the initial stages of the event.

If you have questions on any of this information, please don't hesitate to contact me @ (479) 858-4923.

Woody Walker

ANO - Fire Protection Engineering

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All of these are thermoset:

Equip	Cable	Raceways		
A308	RCA308G	EC1175	EC1237	EC1236
A3	RCD1104A	EC1175	EC1190	EC1176
	RCD1104B	EC1175	EC1190	EC1176
P36A	RCA306D	EC1258	EC1190	EC1275
B5	RCB512C	EC1258	EC1237	EC1257
P64A	RCB5721D1	EC1088	EC1093	
	RCB5721D	EC1175	EC1163	
P64B	B801B1	EC1088	EC1093	
	B801B	EC1175	EC1165	EC1164
K4A	RCA11C	EC1175	EC1236	EC1237
	RCA11D	EC1175	EC1236	EC1237
	RCE11C	EC1258	EC1236	EC1237
CV2680	RCB5124F	EC1504		
	RCB5124G	EC1504		
CV2620	RCD1514D	EC1504		
	RCD1514E	EC1504		
CV2627	RCD1522D	EC1504		
	RCD1522E	EC1504		
CV2646	RJI423A1	EJ1004		
CV2648	RJI423B1	EJ1004		
CV2800	RCB5173E	EC1530		
D15	RPD0121A1	EC1589		
	RPD0121A2	EC1589		
P7A (RS2)	GCY2200A	EC2184		
	GCY2200B	EC2184		
	GCD0242AA	EC2212	EC2213	
	GCD0242AB	EC2212	EC2213	