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August 24, 2020
GO2-20-118

10 CFR 50.90
10 CFR 50.91

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

Subject: **COLUMBIA GENERATING STATION, DOCKET NO. 50-397 RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION RELATED TO EXIGENT LICENSE AMENDMENT REQUEST FOR CHANGE TO TECHNICAL SPECIFICATION 3.8.7 DISTRIBUTION SYSTEMS – OPERATING**

References:
1. Letter from R.E. Schuetz, Energy Northwest, to NRC, "Exigent License Amendment Request for Change to Technical Specification 3.8.7 Distribution Systems – Operating," dated August 20, 2020 (ADAMS Accession Number ML20233A976)

2. Email from S. Lee, NRC, to D. M. Wolfgramm, Energy Northwest, "Columbia Request for Additional Information: Exigent License Amendment Request to Extend Technical Specification 3.8.7, Distribution Systems – Operating, completion time (EPID: L-2020-LLA-0180)," dated August 22, 2020

Dear Sir or Madam:

By Reference 1, Energy Northwest submitted an exigent License Amendment Request for a change to Technical Specification (TS) 3.8.7 Distribution Systems – Operating. Following the submittal of Reference 1, the NRC issued draft Request for Additional Information (RAI). A clarification call was conducted with the NRC staff to discuss the draft RAIs on August 22, 2020. Subsequent to the clarification call and by Reference 2, the NRC issued a formal RAI. The Enclosure and Attachment 1 to the Enclosure contain the response to the RAIs.

Based upon submittal date of this letter, Energy Northwest is requesting that the proposed TS change be reviewed and approved by September 4, 2020.

The No Significant Hazards Consideration Determination provided in the original submittal is not altered by this submittal. No new commitments are being made by this letter or the enclosure.

If there are any questions or if additional information is needed, please contact Ms. D.M. Wolfgramm, Regulatory Affairs Manager, at 509-377-4792.

I declare under penalty of perjury that the foregoing is true and correct.

Executed this 24th day of August, 2020.

Respectfully,

DocuSigned by:
Robert E. Schuetz
A0D08FB61898465...

R.E. Schuetz
Site Vice President

Enclosure: As stated

cc: NRC RIV Regional Administrator
NRC NRR Project Manager
NRC Senior Resident Inspector
NRC NRR Plant Licensing Branch Chief
CD Sonoda – BPA/1399
EFSECutc.wa.gov – EFSEC
E Fordham – WDOH
R Brice – WDOH
L Albin – WDOH

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

Background

By letter dated August 20, 2020 (ADAMS Accession number ML20233A976), Energy Northwest (the licensee) requested a license amendment to revise the Columbia Generating Station Technical Specification (TS) 3.8.7, "Distribution Systems – Operating." This license amendment request (LAR) would add a one-time extension of the Completion Time of TS Action 3.8.7.A, from 8 hours to 16 hours, specifically associated with Division 2 Alternating Current (AC) electrical power distribution inoperability caused by inoperability of Division 2, 120/240V Power Panel E-PP-8AE during repairs on its supply transformer E-TR-8A/1. The NRC staff has reviewed the LAR and determined that additional information is required to complete the review.

Applicable Regulatory Requirement

The regulation in 10 CFR 50.36(c)(2)(i) states, in part that

Limiting conditions for operation are the lowest functional capability or performance levels of equipment required for safe operation of the facility. When a limiting condition for operation of a nuclear reactor is not met, the licensee shall shut down the reactor or follow any remedial action permitted by the technical specifications until the condition can be met.

The NRC staff's requests for additional information (RAI) and the Energy Northwest response to the RAIs are contained in the Enclosure and Attachment 1 to the Enclosure.

Requests for Additional Information

Electrical Engineering:

RAI No. 1

On Page 2 of Enclosure 1 of the LAR, the table for "AC Power Distribution Subsystems" shows the various safety-related buses and power panels for each division. For a better understanding of line-up of the distribution subsystems, please provide requisite single line drawing for each division showing the distribution transformer connections between various buses and panels listed in the table.

ENERGY NORTHWEST RESPONSE TO RAI No. 1:

The list of requested drawings, which show the AC Power Distribution subsystems with transformer connections are provided below and are placed in Attachment 1 to this Enclosure.

1. E502-1 – Main One Line Diagram (depicts feeds to Divisions 1-3 4160 V switchgear)

2. E502-2 – Main One Line Diagram (depicts Divisions 1-3 4160 V switchgear, SM-7, SM-8, SM-4 feeding 480 V switchgear SL-71, SL-73, SL-81, SL-83 feeding 480V Motor Control Centers (MCCs) 7A, 7B, 7F, 8A, 8B, 8F and 4A)

3. E504-1 – Vital One Line Diagram (depicts Divisions 1&2 120/240 V power panels (PPs) 7A & 8A feeding 120/240 V PPs 7AA, 7AE, 7AF, 8AA, 8AE & 8AF)

4. E503-6 – Auxiliary One Line Diagram (depicts Divisions 1&2 480 V MCCs 7A & 8A feeding 480 V MCCs 7AA & 8AA and 480 V power panels (PPs) 7AB & 8AB)

5. E503-8 – Auxiliary One Line Diagram (depicts Divisions 1&2 480 V MCCs, 7B & 8B feeding 480 V MCCs 7BA, 7BB, 8BA and 8BB)

6. E503-9 – Auxiliary One Line Diagram (depicts Divisions 1-3 480 V MCCs, 7AA, 8AA & 4A feeding 120/208 V PPs 7AAA and 8AAA)

7. E503-11 – Auxiliary One Line Diagram (depicts Divisions 1&2 480V MCCs 7F & 8F)

8. E503-12 – Auxiliary One Line Diagram (depicts Division 1&2 120/240V PPs 7BB & 8BB)

9. PFSS-1 – Auxiliary One Line Diagram (depicts Division 1 120/240V PP 7AG)

10. PFSS-2 – Auxiliary One Line Diagram (depicts Division 2 120/240V PP 8AG)

RAI No. 2

In the LAR, under Reason of the Proposed Change, the licensee stated, “Plant operating experience with these particular transformers suggests a degrading electrolytic capacitor may be causing the voltage anomaly.”

Please explain your operating experience with other similar type of transformers. Also, provide details of other similar distribution transformers in each division such as: voltage and power ratings, any unique characteristic such as voltage regulating feature, make/model, and approximate month/year of installation.

ENERGY NORTHWEST RESPONSE TO RAI No. 2:

Over the past two and a half years, two actions to replace similar transformers prior to the next scheduled replacement or PM activity have been required. Replacements were performed in 2018 (E-TR-4AA/1) and 2019 (E-TR-7A/2) after 9 and 10 years respectively, since date of original installation or last preventive maintenance. In 2007, a similar transformer failed causing a fire and requiring replacement. See RAI 3 response for more details on the 2007 event.

With the exception of the three instances noted above, similar transformers in operation at the plant have been adequately managed in accordance with station preventive maintenance strategy. This conclusion is supported by 4 normal replacements of similar transformers during the last two refueling outages. Expected lifetimes for these types of transformers or their capacitors is nominally 8-10 years with an allowance for a 25% extension. The extension period allows for better coordination of work and reduced operational impact by aligning PM activities for a given component to a specific system, Functional Equipment Group or outage window.

The following table provides the requested information for individual transformers associated with the 120/240 V Class 1E electrical distribution subsystems included in TS.

EPN XFMR	Load PP	Division	Last Installation Date of XFMR	Model of the XFMR	Serial Number of the XFMR	XFMR Rating	Last PM performed on XFMR
E-TR-8A/1	E-PP-8AE	2	5/29/2009	63-28-315-8	24237-001-00002	15KVA, 60HZ, 208,240,480VAC INPUT, 120,208,240VAC OUTPUT	05/30/2015 clean and inspect and capacitor replacement
E-TR-7A/1	E-TR-7AE	1	05/19/2009	63-28-315-8	24237-001-00001	15KVA, 60HZ, 208,240,480VAC INPUT, 120,208,240VAC OUTPUT	5/19/2009 replaced transformer
E-TR-4AA/1	E-PP-4A	3	5/04/2018	63-28-310-8	94229-001-00001	10KVA, 60HZ, 208,240,480VAC INPUT, 120,208,240VAC OUTPUT	5/04/2018 replaced transformer
E-TR-7A/2	E-PP-7AF	1	08/27/2019	63-28-315-8	28341-001-00003	15KVA, 60HZ, 208,240,480VAC INPUT, 120,208,240VAC OUTPUT	8/27/2019 replaced transformer
E-TR-8A/2	E-PP-8AF	2	05/29/2009	63-28-315-8	28341-001-00001	15KVA, 60HZ, 208,240,480VAC INPUT, 120,208,240VAC OUTPUT	05/30/2019 clean and inspect and 6/01/2015 capacitor replacement

EPN XFMR	Load PP	Division	Last Installation Date of XFMR	Model of the XFMR	Serial Number of the XFMR	XFMR Rating	Last PM performed on XFMR
E-TR-IN/3	E-PP-7AA	1	06/12/2007	63-28-315-8	0705FPRB-02	15KVA, 60HZ, 208,240,480VAC INPUT, 120,208,240VAC OUTPUT	5/22/2017 clean and inspect.
E-TR-IN/2	E-PP-8AA	2	09/29/2009	63-28-315-8	0705FPRB-01	15KVA, 60HZ, 208,240,480VAC INPUT, 120,208,240VAC OUTPUT	5/30/2015 clean and inspect and capacitor replacement
E-TR-7AF/1	E-PP-7AG	1	5/21/2017	NLI-39-06-315-6	58036-001-00002	15KVA, 3 PHASE, 208V PRIMARY, 208/120V SECONDARY, 60HZ,	5/21/2017 replaced transformer
E-TR-8AF/1	E-PP-8AG	2	5/20/2019	NLI-39-06-315-6	58036-001-00001	15KVA, 3 PHASE, 208V PRIMARY, 208/120V SECONDARY, 60HZ,	5/20/2019 replaced transformer
E-TR-7AAA/1	E-PP-7AAA	1	5/21/2017	NLI-39-06-315-6	58036-002-00001	15KVA, 3 PHASE, 208V PRIMARY, 208/120V SECONDARY, 60HZ,	5/21/2017 replaced transformer
E-TR-8AAA/1	E-PP-8AAA	2	5/22/2019	NLI-39-06-315-6	58036-002-00002	15KVA, 3 PHASE, 208V PRIMARY, 208/120V SECONDARY, 60HZ,	5/22/2019 replaced transformer

RAI No. 3

In the LAR, under Exigent Circumstances, the licensee stated, “Internal operating experience associated with a failure of this type of transformer in 2007 has shown that lightly loaded transformers of this type are susceptible to accelerated degradation.”

Please explain why a light load would degrade a transformer.

ENERGY NORTHWEST RESPONSE TO RAI No. 3:

The reference in the LAR from 2007 is associated with an event involving transformer E-TR-IN/2 (Division 2) where the station declared an Alert due to a localized fire in the transformer caused by an overheated coil. Although the cause of the 2007 failure was determined to be due to a winding design deficiency that has since been corrected, the resulting investigation did identify that the preventive maintenance strategy for these transformers had failed to consider capacitors as a limiting component for overall service lifetime of these transformers.

As part of the causal evaluation performed in response to the 2007 event, it was identified that these type of low voltage regulating transformers employ a ferroresonant capacitor tank circuit to regulate voltage output which will draw line current (excitation) sufficient to saturate the capacitor tank circuit even at no load or light load operation. This in combination with increased inefficiency at light load means the transformer can experience a temperature rise up to full load temperature rise from waste heat even though the unit itself is operating at light load operation.

A lack of understanding of this operational characteristic of these types of transformers prior to the 2007 event had mistakenly led Energy Northwest to believe that preventive maintenance on the transformer would be required less frequently. Following the 2007 event the preventive maintenance strategy was adjusted to perform maintenance more frequently and to specifically proactively manage capacitor health. The statement related to accelerated degradation of the transformer is based on a simple comparison with other types of transformers operating at no load or light load conditions where aging effects are reduced allowing for less frequent preventive maintenance.

Since the 2007 event, annual thermography scans have been performed for many of these types of transformers. These scans confirm that the regulating transformers have been operating within normal temperature rise limits. As such, all available evidence indicates that the aging of these transformers would be bounded by the original equipment manufacturer recommended service life and replacement frequency of 10 years.

RAI No. 4

In the LAR, under Reason of the Proposed Change, the licensee stated, “On August 7, 2020, Operations prepared and approved an ACMP [Adverse Condition Monitoring Plan] to expedite monitoring and planning of repair or replacement of the transformer.”

Please explain based on previous amendment issued on August 26, 2019, whether the licensee made repairs or replaced the similar transformer in Division 1. If it was replaced, provide details (such as make/model) of the replaced transformer as compared to transformer currently planned to be repaired or replaced. Please provide the basis why the replacement would not experience the same degradation.

ENERGY NORTHWEST RESPONSE TO RAI No. 4:

E-TR-7A/2 (E-PP-7AF) was replaced on August 27, 2019, with the same make and model of regulating transformer. It has shown no step changes in output voltage since it was installed in August 2019. E-TR-8A/1 will be replaced with the same make and model transformer as is currently installed and currently in use with E-TR-7A/2.

With the exception of the current issue with E-TR-8A/1, this particular make and model of transformer regularly attains 8-10 years of service with periodic preventive

maintenance consisting of cleaning and inspection and capacitor replacement. The fact that further reliable operation of E-TR-8A/1 is uncertain only 5 years after its last capacitor replacement is unexpected. A forensic evaluation will be performed on the removed transformer and will serve as input to the living preventive maintenance program for these transformers. The strong performance to date of the replacement to E-TR-7A/2, and overall predictable performance of this make and model of transformer provide confidence that the replacement to E-TR-8A/1 will provide many years of service life and that future replacements will be adequately managed by the overall preventive maintenance program for these transformers.

Risk Insights:

RAI No. 5

An August 15, 2019, LAR requested an extension to an allowable outage time (AOT) to replace failing transformer E-TR-7A/2 (feeds power panel E-PP-7AF) in Division 1. The August 20, 2020, LAR under review requests an extension to an AOT to replace E-TR-8A/1 (feeds power panel E-PP-8AE) in Division 2. The degradation and subsequent need to replace two transformers in this short time may indicate that there is a common degradation mechanism. If a common degradation mechanism is identified, any risk calculations from which risk insights used support changes to technical specifications are developed should include appropriate contributions from common cause failures (CCFs).

1. Please clarify if there is a potential common cause mechanism and identify the systems/sub-systems where the components that could be subjected to this mechanism are located.

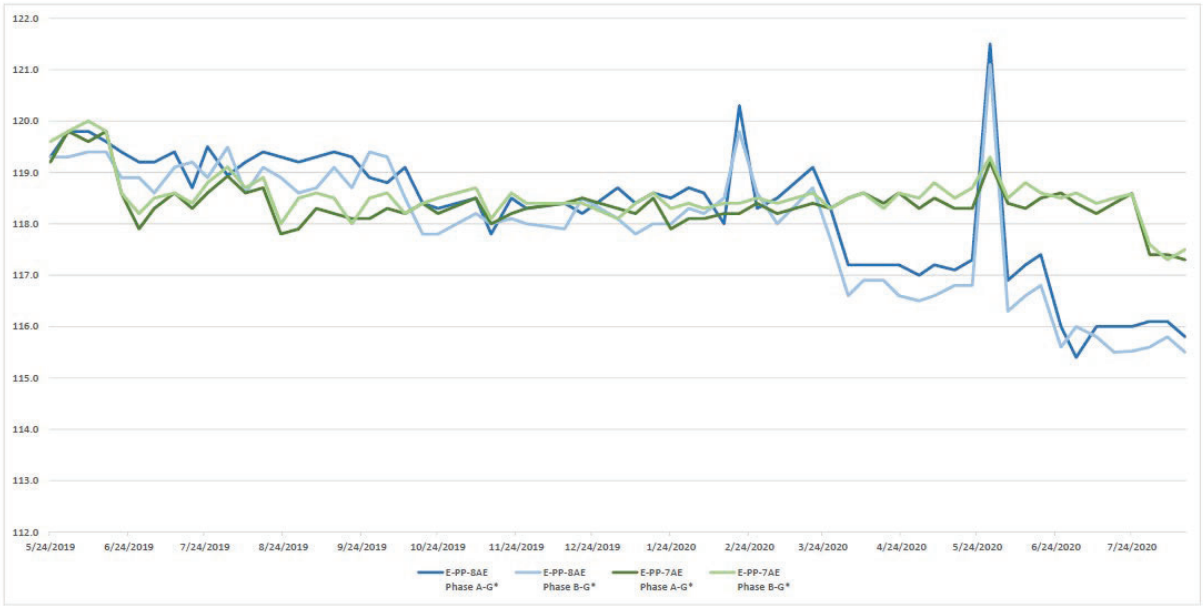
2. Please summarize the impact this potential common cause mechanism has on the capability of the affected components to fail to successfully operate to prevent and/or mitigate transients.

3. Please evaluate and summarize the risk implications of this potential common cause mechanism causing the affected components to fail and the effects of those failures on risk associated with the requested extended AOT.

ENERGY NORTHWEST RESPONSE TO RAI No. 5:

Response to RAI No. 5 Question 1:

TS Bases 3.8.7 AC Distribution Systems Operating notes that OPERABLE AC electrical power distribution subsystems require the associated buses to be energized to their proper voltages. The figure below plots data obtained from weekly voltage surveillances under TS Surveillance Requirement 3.8.7.1 on E-PP-8AE and the Division 1 redundant power panel E-PP-7AE for the current operating cycle. While E-PP-8AE has shown gradual declining performance, the redundant subsystem E-PP-7AE has remained well above its administrative limit of 115 voltage alternating current (VAC). E-PP-7AE has experienced a recent step change in July 2020 however, the power panel output is stable above 117 VAC which is considered to be acceptable margin to the administrative limit of 115 VAC at this time.



Common cause effects that can reduce overall reliability of the affected distribution system are considered at both the immediate upstream power source common to other distribution buses in the same division as well as across redundant distribution subsystem buses. The latter is of particular importance with regard to preservation of redundant safety functions.

E-PP-8AE is supplied by E-PP-8A via E-TR-8A/1. Other branch circuits sharing common power source E-PP-8A are operating at nominal voltages within expected voltage output of 120 VAC ± 3% further indicating satisfactory health of the source available at E-PP-8A and eliminating a common cause concern that could impact additional Division 2 electrical distribution subsystems.

For potential cross divisional common cause, weekly surveillance tests have demonstrated voltage readings remain well above the administrative limit on Division 1 and all components remain operable and available. The inherent separation between E-TR-8A/1 and Division 1 electrical components does not lend itself to a common cause existing. Therefore, a loss of safety function scenario is not considered to be a credible concern.

In August 2019, E-TR-7A/2 was replaced. While the two transformers, E-TR-7A/2 and the currently degraded transformer E-TR-8A/1 have exhibited similar degradation manifested as reduced voltage being supplied to downstream loads, there are key distinctions between E-TR-7A/2 and E-TR-8A/1. The degradation of E-TR-7A/2 occurred as the transformer was nearing expected end of service life. By contrast E-TR-8A/1 degradation has been noted to be occurring at approximately half of the expected service life and following a capacitor replacement. These differences do not support a common cause conclusion between the transformers involved with the 2019 LAR and the current LAR.

Response to RAI No. 5 Question 2:

As noted above, since there is no evidence to suggest a common cause exists at this time, all the auxiliary power subsystems subject to TS 3.8.7 are operating within normal limits and are considered operable such that potentially affected supported engineered safety feature systems are capable and available to successfully prevent and/or mitigate plant transients.

Response to RAI No. 5 Question 3:

From response to RAI No. 5 Question 1 above (a deterministic snapshot based upon current operating conditions and known data collected from the weekly surveillance results for this operating cycle), there is no common cause effect in play at this time, all the auxiliary power subsystems subject to TS 3.8.7 are operating within normal limits and are considered operable.

Although a deterministic review has determined that there is no common cause, a sensitivity study of risk impacts was performed assuming a common cause yielding the following results:

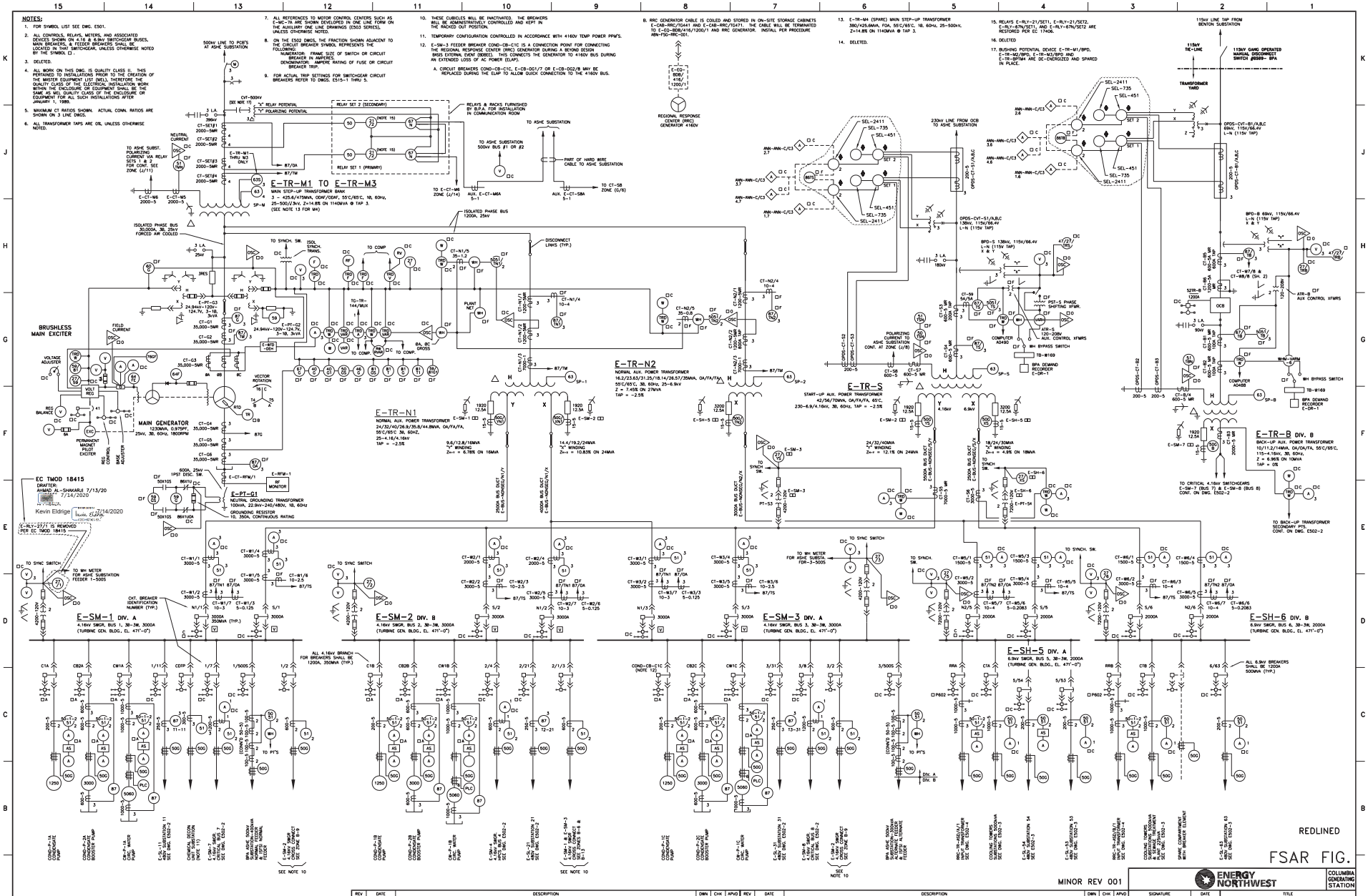
CDF	Baseline	E-PP-8AE	Delta	ICCDP	Criteria
Internal	2.35E-6	2.59E-6	2.40E-07	6.58E-10	

There is no change in Internal Event LERF, Fire CDF and LERF, Seismic CDF and LERF. The analysis shows a small increase in the internal event CDF due to CC

between E-TR-8A/1 and E-TR-7A/1. All quantitative results for ICCDP and ICLERP for the allowed outage time extension are less than the guidance thresholds.

GO2-20-118
Enclosure, Attachment 1

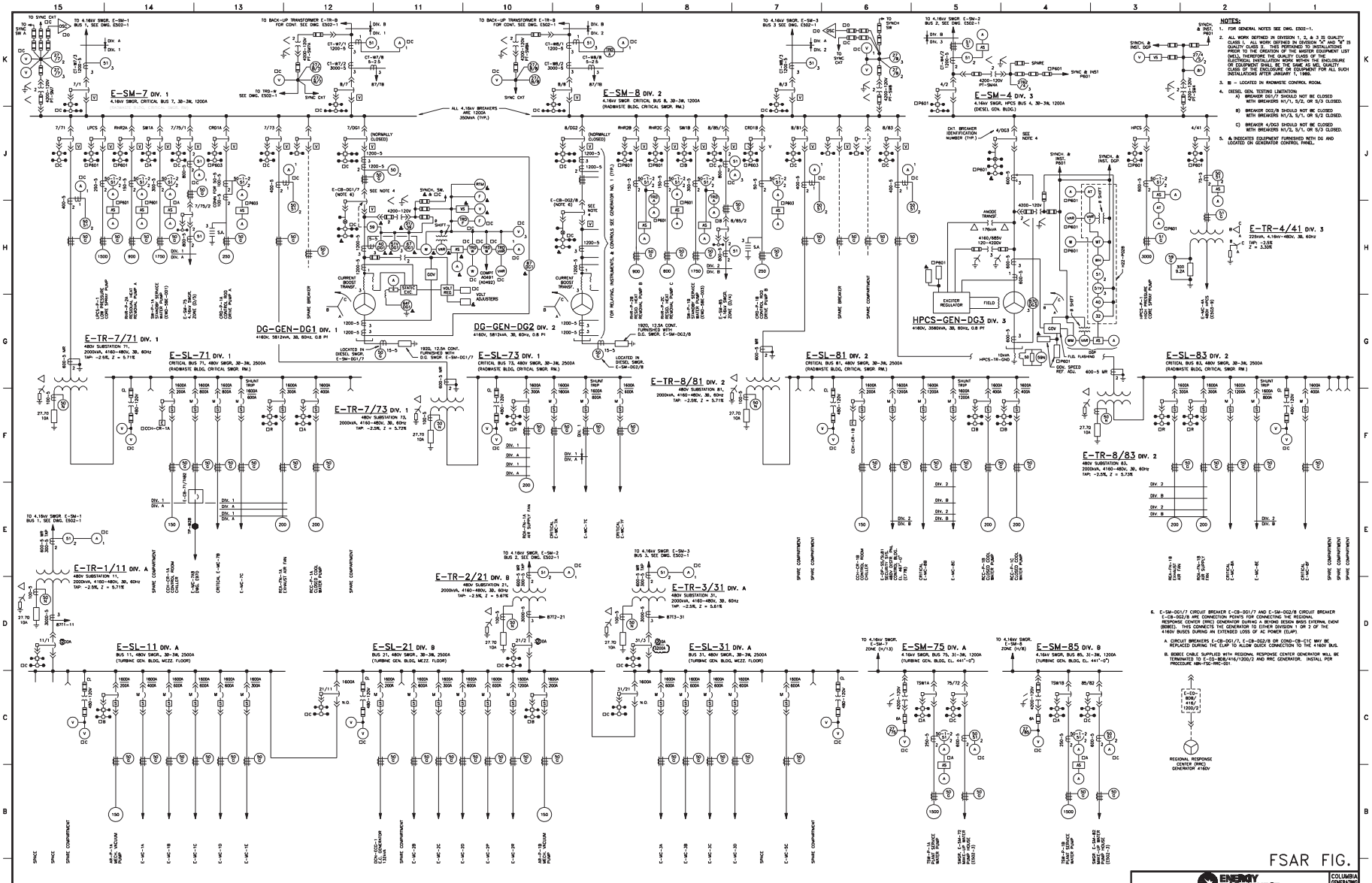
Drawings



REV	DATE	DESCRIPTION	DWN	CHK	APVD
59	9-4-18	REV PER 15502-46.11 (B/7)	AHA	JLC	GHM
60	3-21-19	REV PER 17651 (D-E/12), 12272-252M R006 (H/12, K/5-6)	H.AL	JLC	DGW
61	5/15/19	REV PER 17406-14.3 (J/11, J-K/13, K/3-5)	DRG	KB	JAL
62	12/9/19	REV PER 18088 (F/2)	AHA	JAL	SRP
63	2/6/20	REV PER 18076 (H-J/6-7, J-K/3-4)	AHA	JAL	DGW

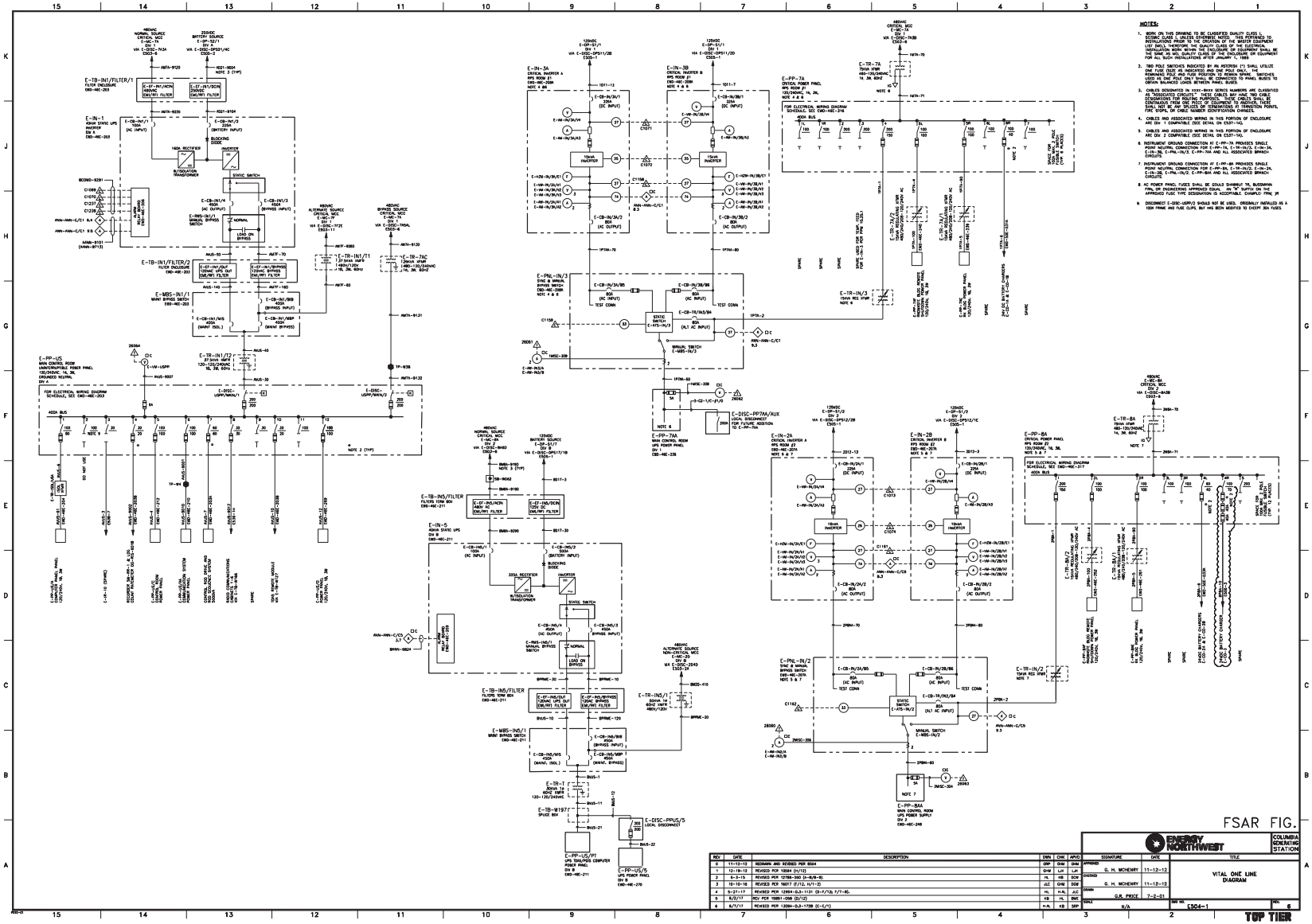
REV	DATE	DESCRIPTION	DWN	CHK	APVD
52	2-25-15	REVISED PER 12229-100 (D/8; J/4), 12229-101 (K/3-4).	HL	GHM	JLC
53	5-28-15	REVISED PER 12272-253A (H-J/11-13), 12272-253B (K/5-6), 11261-225 (H-J/12-13), 11261-226 (K/5-6).	HL	DGW	GHM
54	5-17-17	REVISED PER 16047-442 (J/11, J/13, K/5-6).	HL	GHM	JLC
55	5-27-17	REVISED PER 13851-400 (G-J/5-7).	HL	KB	JAL
56	6-13-17	REVISED PER 13901-400 (F-K/2-5).	HL	GHM	JLC
57	12-19-17	REVISED PER 13417-505 (B/14)	H.AL	HL	GHM
58	1-8-18	REVISED PER 15499-46.11 (B/10-11)	TC	H.AL	GHM

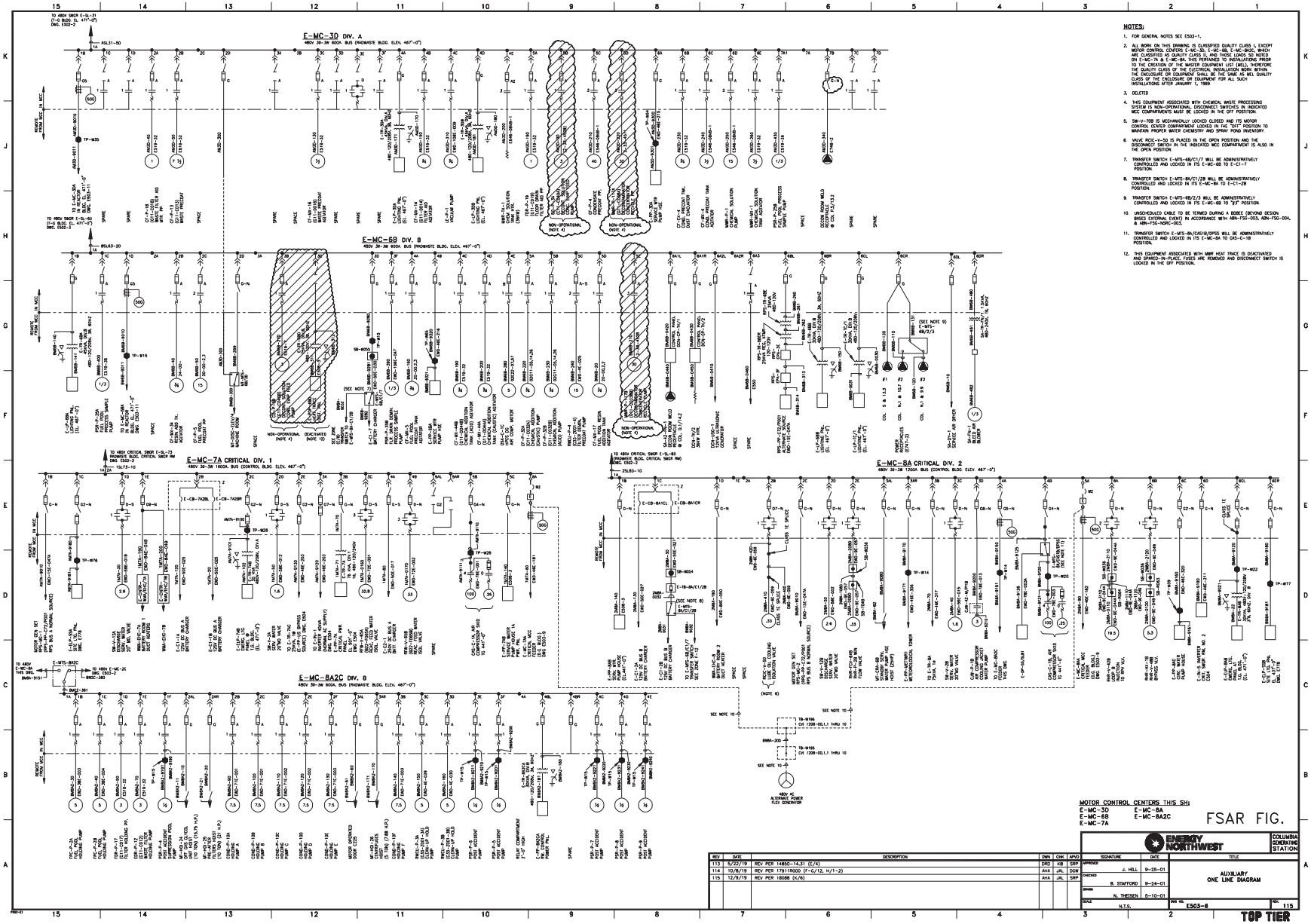
	SIGNATURE	DATE
APPROVED	J. HILL	12-14-01
CHECKED	H. LE	11-26-01
DRAWN	B. L. STAFFORD	08-13-01
SCALE	N.T.S.	
DWG NO.	E502-1	REV: 63

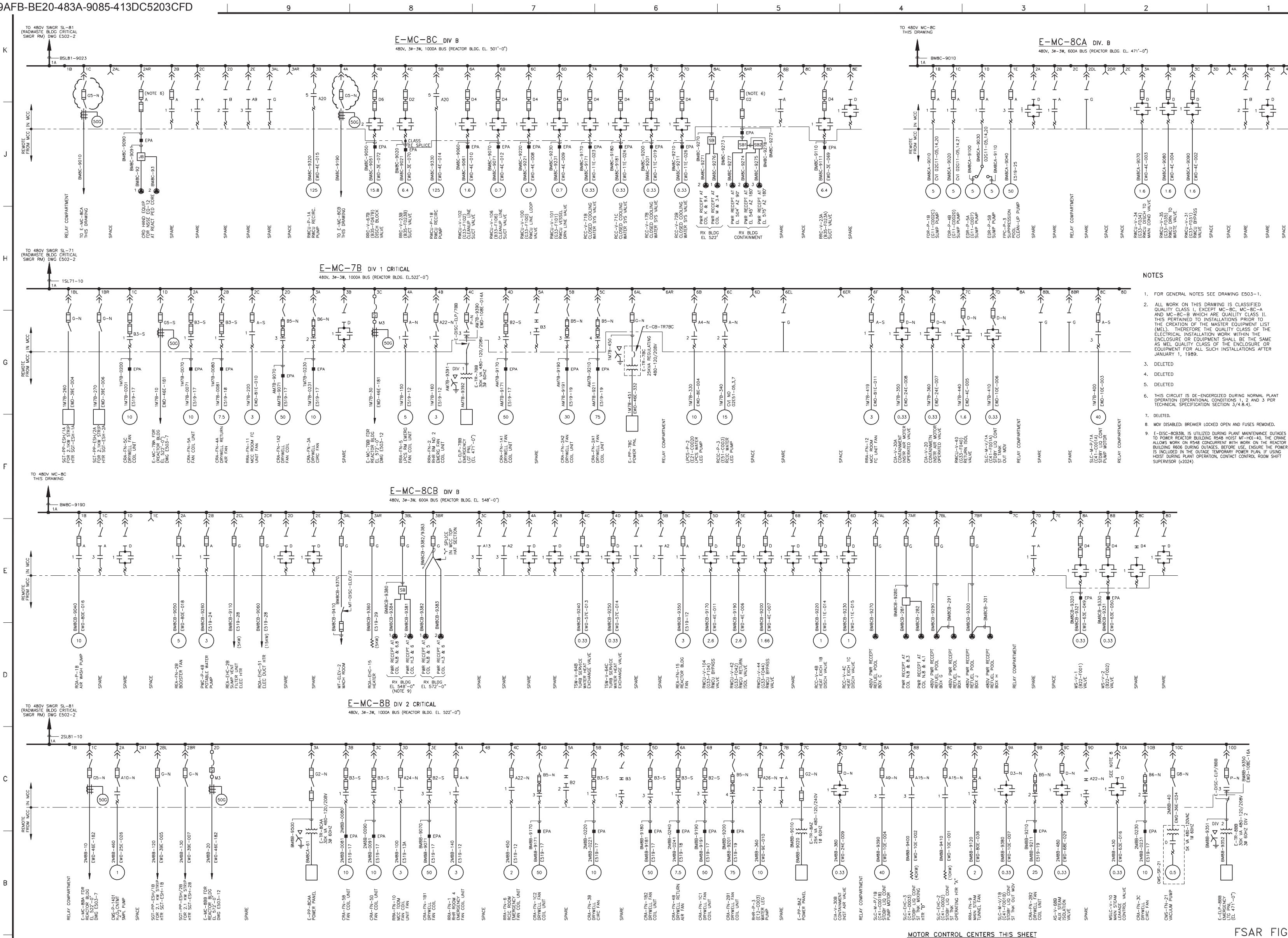


REV	DATE	DESCRIPTION	DWN	CHK	APVD
57	1/15/13	CORRECTED REV 55 & 56 DESCRIPTION REFERENCE, DOCUMENT UPDATED PER 10739-299, 10740-299 & 10741-299.	HL	KB	DGW
58	2-28-13	REVISED PER 11583 (C/6).	HL	GHM	DGW
59	5/7/13	REVISED PER 11198-303 (H/9).	HL	DGW	DGW
60	5-31-13	REVISED PER 11331-200 (K/2,4).	HL	KB	DGW
61	2-25-15	REVISED PER 12229-102 (B-C/2-3. H/8; J/12). 12229-103 (B-D/1-3).	HL	GHM	JLC
62	5/26/15	REVISED PER 12482-208 (C/8, 11) AND CORRECTED INCORPORATION OF 12229-103 (C/2).	HL	DGW	GHM
63	12-19-15	REVISED PER 15050 (F/3).	HL	GHM	DGW
64	12/11/18	REV PER 14635-0.3-46 (H/14)	HAL	JLC	GHM
65	5-19-19	REV PER 17061-23 (D/8, 10, 15).	EWF	JLC	DGW

SIGNATURE	DATE
APPROVED J. HILL	12-14-01
CHECKED H. LE	11-26-01
DRAWN B. L. STAFFORD	8-2-01
SCALE N/A	DWG NO. E502-2 REV. 65







NOTES

1. FOR GENERAL NOTES SEE DRAWING E503-1.
2. ALL WORK ON THIS DRAWING IS CLASSIFIED QUALITY CLASS I, EXCEPT MC-8C, MC-8C-A AND MC-8C-B WHICH ARE QUAILITY CLASS II. THIS PERTAINED TO INSTALLATIONS PRIOR TO THE CREATION OF THE MASTER EQUIPMENT LIST (MEL). THEREFORE THE QUALITY CLASS OF THE ELECTRICAL INSTALLATION WORK WITHIN THE ENCLOSURE OR EQUIPMENT SHALL BE THE SAME AS MEL QUALITY CLASS OF THE ENCLOSURE OR EQUIPMENT FOR ALL SUCH INSTALLATIONS AFTER JANUARY 1, 1989.
3. DELETED
4. DELETED
5. DELETED
6. THIS CIRCUIT IS DE-ENGERGIZED DURING NORMAL PLANT OPERATION (OPERATIONAL CONDITIONS 1, 2 AND 3 PER TECHNICAL SPECIFICATION SECTION 3/4.8.4).
7. DELETED.
8. MOV DISABLED: BREAKER LOCKED OPEN AND FUSES REMOVED.
9. E-DISC-8CB3BL IS UTILIZED DURING PLANT MAINTENANCE OUTAGES TO POWER REACTOR BUILDING R548 HOIST MT-HOI-40. THE CRANE ALLOWS WORK ON R548 CONCURRENT WITH WORK ON THE REACTOR BUILDING R606 DURING OUTAGES. BEFORE USE, ENSURE THE POWER IS INCLUDED IN THE OUTAGE TEMPORARY POWER PLAN. IF USING HOIST DURING PLANT OPERATION, CONTACT CONTROL ROOM SHIFT SUPERVISOR (x2024).

MOTOR CONTROL CENTERS THIS SHEET
E-MC-7B E-MC-8B
E-MC-8C E-MC-8CA
E-MC-8CB

FSAR FIG.

REV	DATE	DESCRIPTION	DWN	CHK	APVD
113	5-19-19	REV PER 14761-014 (C/4-5)	H.AL	KB	DGW
114	5/22/19	REV PER 16821-14.29 (J-K/11), 16823-14.29 (J-K/9)	KB	DGW	JLC

REV	DATE	DESCRIPTION	DWN	CHK	APVD
106	10-18-18	REV PER 12163-525 (C/1, C/4-5, C/8-9, C/11, G/6)	AHA	JLC	GHM
107	10-23-18	REV PER 15711-003 (B-C/2)	H.AL	JLC	GHM
108	12-5-18	REV PER 16110-003 (G-H/8)	AHA	JLC	GHM
109	1-16-19	REV PER 12162-462 (C/3, G/3, G/5, G/8).	AHA	JLC	DGW
110	1-22-19	REV PER 17012-003 (G/6)	AHA	JLC	DGW
111	4-4-19	CORECTIVE INCORPORATION OF 15711-003 (B-C/6)	AHA	JLC	DGW
112	4/30/19	REV PER 17010-003 (G/7)	AHA	JAL	DGW

ENERGY NORTHWEST
COLUMBIA GENERATING STATION

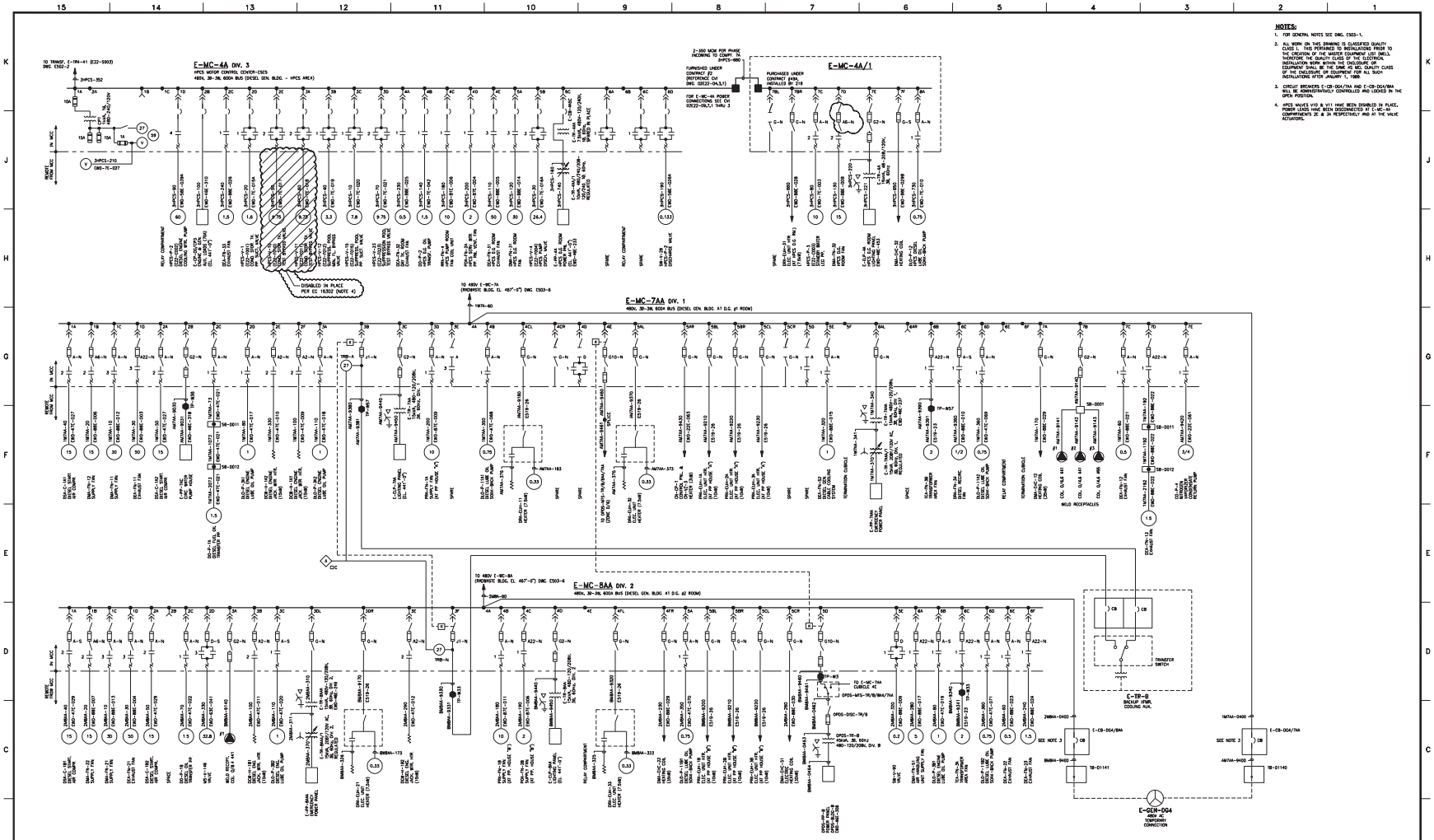
SIGNATURE		DATE
APPROVED	J. HILL	10-11-01
CHECKED	K.LUCAS	10-11-01
DRAWN	K. BOOTHROYD	10-10-01
SCALE	N.T.S.	

TITLE: AUXILIARY ONE LINE DIAGRAM

DWG NO. E503-8 REV. 114

ELECT\500\E503-8.DWG

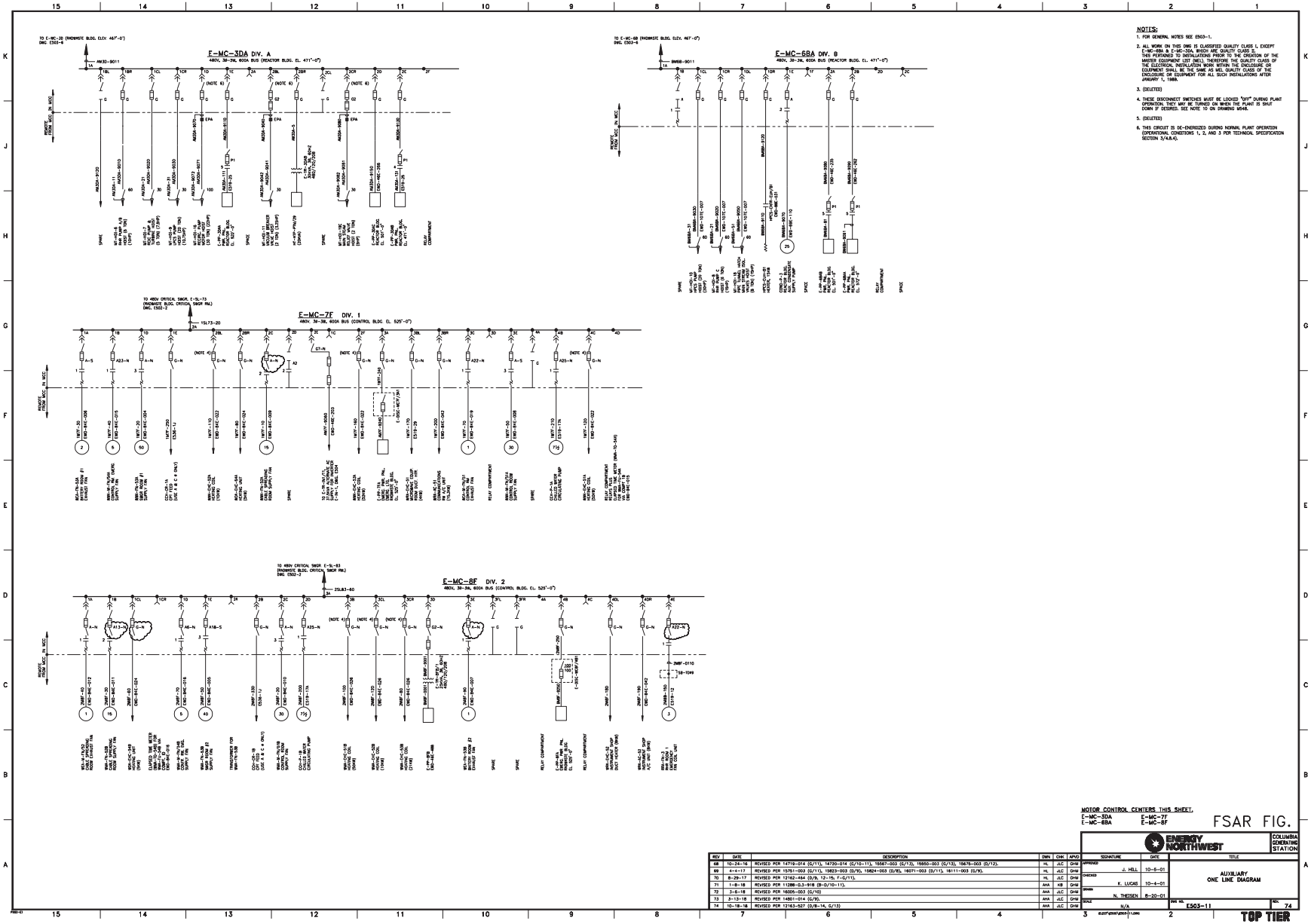
TOP TIER



REV	DATE	DESCRIPTION	DWN	CHK	APVD
89	4-18-17	REVISED PER 16197-003 (D/B-91, 16198-003 (D/B),	HL	JLC	GHM
90	6-13-17	REVISED PER 13901-0,3-403 (B-0/4-9)	TC	HL	JLC
91	1-3-18	REVISED PER 16302-210 (H-J/12-13, J-H/1-2)	AHA	HJL	JLC
92	7-27-20	REV PER 18173M000-13.34 (J-K/7)	JES	JLC	DDR

SIGNATURE	DATE
APPROVED J. HILL	10-11-01
CHECKED K. LUCAS	10-9-01
DRAWN B. L. STAFFORD	9-6-01

SCALE NTS | DWG NO. E503-9 | REV. 92



MOTOR CONTROL CENTERS THIS SHEET.
E-MC-3DA E-MC-7F
E-MC-6BA E-MC-8F

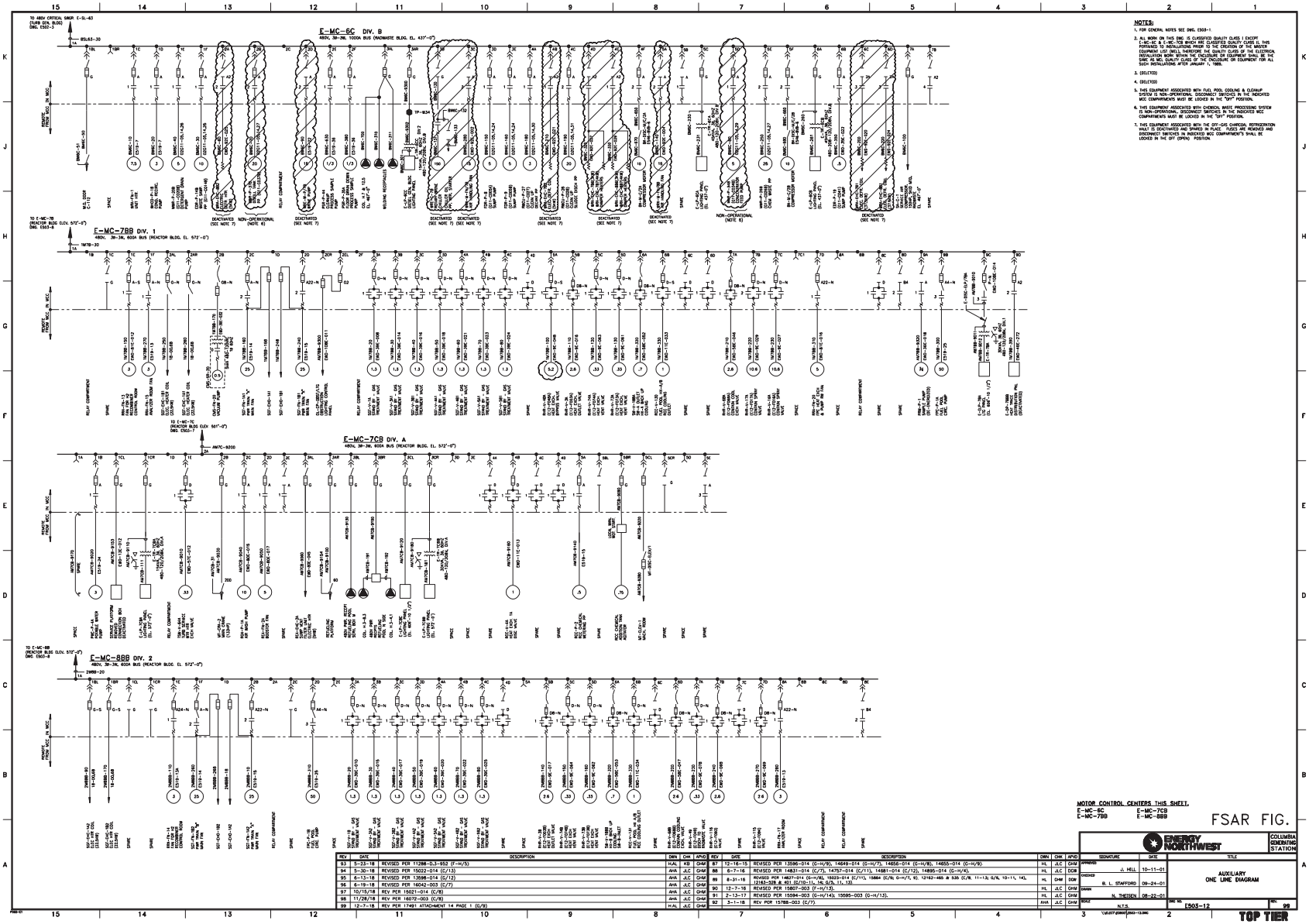
FSAR FIG.

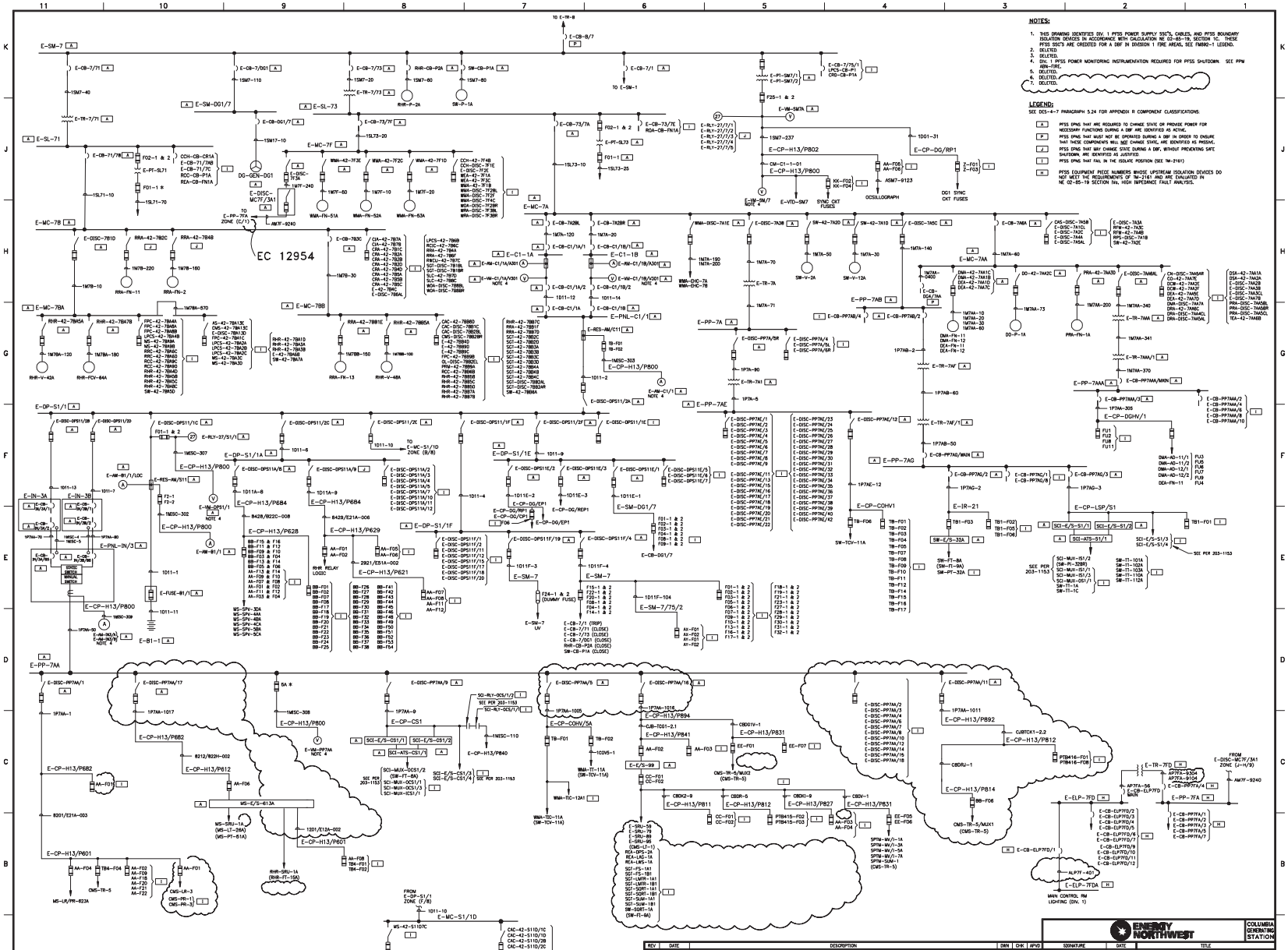
REV	DATE	DESCRIPTION	DWN	CHK	APVD
68	10-24-16	REVISED PER 14719-074 (D/11), 14720-014 (D/10-11), 15567-003 (D/13), 15550-003 (D/13), 15678-003 (D/12).	HL	JLC	GHM
69	4-4-17	REVISED PER 15751-003 (D/11), 15823-003 (D/9), 15824-003 (D/8), 16071-003 (D/11), 16111-003 (D/9).	HL	JLC	GHM
70	8-29-17	REVISED PER 12162-166 (D/9, 12-15, F-G/11).	HL	JLC	GHM
71	1-8-18	REVISED PER 11288-0.3-918 (B-D/10-11).	AHA	KB	GHM
72	3-6-18	REVISED PER 16005-003 (D/10)	AHA	JLC	GHM
73	3-13-18	REVISED PER 14801-014 (G/9).	AHA	JLC	GHM
74	10-18-18	REVISED PER 12163-527 (D/8-14, G/13)	AHA	JLC	GHM

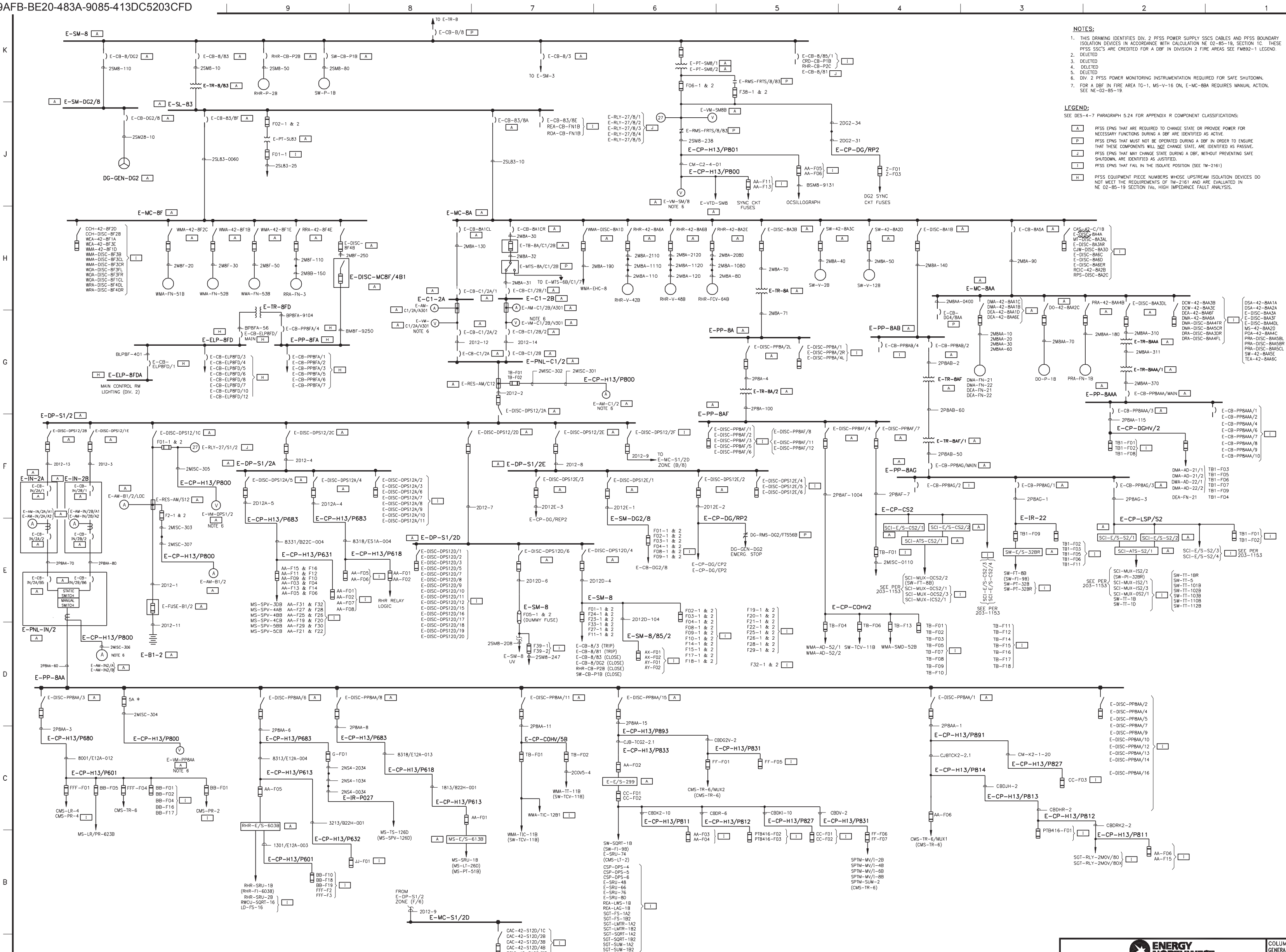
ENERGY NORTHWEST — COLUMBIA GENERATING STATION

SIGNATURE	DATE	TITLE
APPROVED J. HILL	10-5-01	AUXILIARY ONE LINE DIAGRAM
CHECKED K. LUCAS	10-4-01	
DRAWN N. THEISEN	8-20-01	
SCALE N/A	DWG NO. E603-11	REV. 74

TOP TIER







NOTES:

1. THIS DRAWING IDENTIFIES DIV. 2 PFSS POWER SUPPLY SSCS CABLES AND PFSS BOUNDARY ISOLATION DEVICES IN ACCORDANCE WITH CALCULATION NE 02-85-19, SECTION 1C. THESE PFSS SSC'S ARE CREDITED FOR A DBF IN DIVISION 2 FIRE AREAS SEE FM892-1 LEGEND.
2. DELETED
3. DELETED
4. DELETED
5. DELETED
6. DIV. 2 PFSS POWER MONITORING INSTRUMENTATION REQUIRED FOR SAFE SHUTDOWN.
7. FOR A DBF IN FIRE AREA TG-1, MS-V-16 ON, E-MC-8BA REQUIRES MANUAL ACTION. SEE NE-02-85-19.

LEGEND:

SEE DES-4-7 PARAGRAPH 5.24 FOR APPENDIX R COMPONENT CLASSIFICATIONS:

A	PFSS EPNS THAT ARE REQUIRED TO CHANGE STATE OR PROVIDE POWER FOR NECESSARY FUNCTIONS DURING A DBF ARE IDENTIFIED AS ACTIVE.
P	PFSS EPNS THAT MUST NOT BE OPERATED DURING A DBF IN ORDER TO ENSURE THAT THESE COMPONENTS WILL NOT CHANGE STATE, ARE IDENTIFIED AS PASSIVE.
J	PFSS EPNS THAT MAY CHANGE STATE DURING A DBF, WITHOUT PREVENTING SAFE SHUTDOWN, ARE IDENTIFIED AS JUSTIFIED.
I	PFSS EPNS THAT FAIL IN THE ISOLATE POSITION (SEE TM-2161)
H	PFSS EQUIPMENT PIECE NUMBERS WHOSE UPSTREAM ISOLATION DEVICES DO NOT MEET THE REQUIREMENTS OF TM-2161 AND ARE EVALUATED IN NE 02-85-19 SECTION IVa, HIGH IMPEDANCE FAULT ANALYSIS.

REV	DATE	DESCRIPTION	DWN	CHK	APVD
14	10-21-15	REV PER 12909-221 (E-F/10, G/7)	H.AL	HL	GHM
15	4-1-16	REV PER 12321 (B/6, C/5)	HL	GHM	DGW
16	4-2-18	REV PER 17064 (C/9, C/11)	TC	JLC	GHM
17	5/22/19	REV PER 14850-32 (H/2)	DRD	KB	DGW

REV	DATE	DESCRIPTION	DWN	CHK	APVD
7	5-29-07	REV PER 97-0045-1C-1206 (B/6)	KB	HL	DGW
8	5-9-08	REV PER 07036 (E/2; H/2, 11; K/5).	BLS	HL	LJK
9	2-19-09	REV PER 07297-311 (A/4)	H.AL	HL	DGW
10	5-8-09	REV PER 07979 (A-B/3-4; B/8-9; B-C/10; C/4-5; C-D/1-2; D/3-4; D-E/5, 7; K/1-5, 7-8)	BLS	HL	LJK
11	10-31-12	REV PER 11220 (A-B/7-8; G/3).	HL	LJK	LJK
12	6-6-13	REV PER 08632-223 (F/5)	H.AL	HL	DGW
13	6-3-15	REV PER 12788-610 (A-D/1-9, G-H/8-11, J-K/1-3)	H.AL	KB	DGW

ENERGY NORTHWEST — COLUMBIA GENERATING STATION

SIGNATURE		DATE
APPROVED	J HILL	5-19-00
CHECKED	V. CICHOCKI	5-4-00
DRAWN	GERRY MCHENRY	5-4-00
SCALE	N/A	

TITLE: APPENDIX R POST FIRE SAFE SHUTDOWN (PFSS) DIVISION 2 BOUNDARIES ONE LINE DIAGRAM

DWG NO. PFSS-2 REV. 17

\\ELECT\PFSS\PFSS-2.DWG

TOP TIER