



**U.S. Department of Energy
Hanford Site**

December 14, 2020

20-ECD-0064

Mr. David Bowen, Program Manager
Nuclear Waste Program
Washington State Department of Ecology
3100 Port of Benton Boulevard
Richland, Washington 99354

Dear Mr. Bowen:

**SUBMITTAL OF HANFORD FACILITY RESOURCE CONSERVATION AND RECOVERY
ACT PERMIT MODIFICATION NOTIFICATION FORM 24590-HLW-PCN-ENV-20-003**

The purpose of this Class 1 prime permit modification is to replace the following updated High-Level Waste Piping and Instrumentation Diagrams in Appendix 10.2 of the Dangerous Waste Permit. The U.S. Department of Energy, Office of River Protection is requesting your approval.

If you have any questions, please contact me, or your staff may contact Christopher J. Kemp, Director, Environmental Compliance Division, Office of River Protection, on (509) 376-7828, or Sheila Davis, Bechtel National, Inc., on (509) 827-3185.

Sincerely,

A handwritten signature in black ink that reads "Glyn Trenchard".

Digitally signed by GLYN D. TRENCHARD
DN: c=us, o=u.s. government,
ou=department of energy, ou=Energy IT
Services, ou=Hanford Site, ou=People,
cn=GLYN D. TRENCHARD
Date: 2020.12.14 12:53:25 -08'00'

Glyn D. Trenchard, Assistant Manager
Technical and Regulatory Support
Office of River Protection

ECD:MEB

Attachment

cc: See page 2

Mr. David Bowen
20-ECD-0064

-2-

December 14, 2020

cc w/attach:

J. Cantu, Ecology
M. E. Jones, Ecology
J. K. Perry, MSA
Administrative Record (WTP H-0-8)
Environmental Portal

cc w/o attach:

J. Bell, NPT
L. Contreras, YN
S. L. Dahl, Ecology
J. Decker, Ecology
M. Murphy, CTUIR
M. Woods, Oregon Energy

Attachment
20-ECD-0064

Hanford Facility Resource Conservation and Recovery Act Permit
Modification Notification Form24590-HLW-PCN-ENV-20-003

(45 Pages Including Cover Sheet)

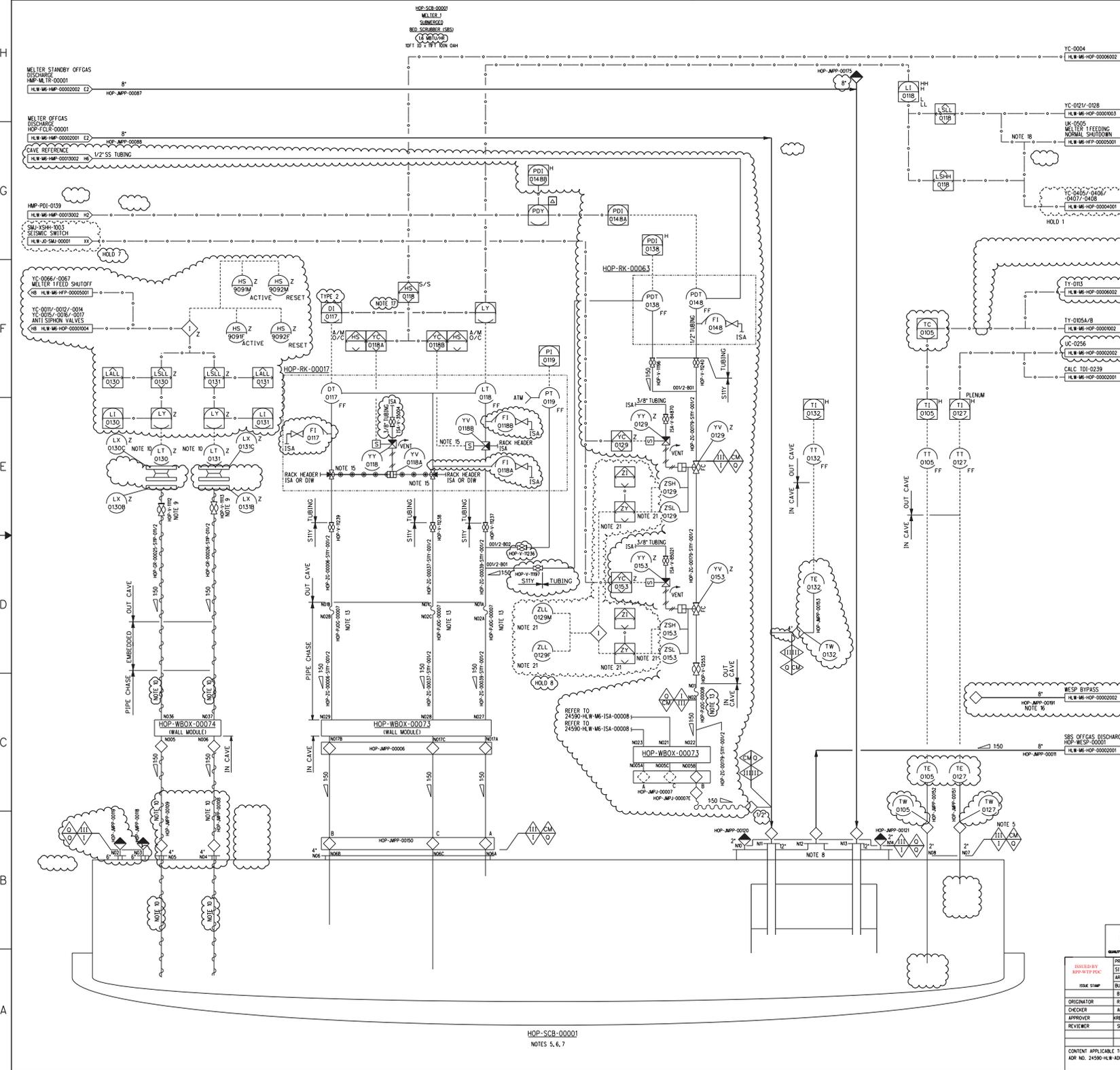


This document has been digitally signed using the Electrosign process.

Document for Signature

Document Number: 24590-HLW-PCN-ENV-20-003 **Rev:** 0

Participants	Signature	Completed	Status	Result	Comments
Signers	11/20/2020 3:27 PM				
Haggard, Robert		11/20/2020 4:31 PM	Completed	Approve	
Final Approver	11/20/2020 4:31 PM				
Haggard, Robert		11/20/2020 4:32 PM	Completed	Approve	



- NOTES:**
- SEE DRAWINGS 24590-WTP-M6-50-00001 THROUGH 24590-WTP-M6-50-00008 FOR GENERAL NOTES, SYMBOLS AND LEGEND, AND GENERAL SLOPE REQUIREMENTS.
 - CONTENTS OF THIS DOCUMENT ARE DANGEROUS WASTE PERMIT AFFECTING.
 - THE PRESSURE BOUNDARY FOR ALL COMPONENTS ON THIS DRAWING IS QUALITY LEVEL 0 AND SEISMIC CATEGORY III, UNLESS OTHERWISE NOTED.
 - ALL LINES SHOWN ON THIS DRAWING SHALL BE FREE DRAINING, UNLESS OTHERWISE NOTED.
 - HOP-SCB-00001, INCLUDING INTERNALS, SHALL BE DESIGNED AS QUALITY LEVEL 0 AND SEISMIC CATEGORY SC-I. THIS IS AIR PERMIT EQUIPMENT.
 - VESSEL INTERNALS TO BE HASTELLOY C-22.
 - REFER TO ENGINEERING SPECIFICATION 24590-WTP-3PS-MV00-10001 FOR VESSEL NOZZLE LOADS. EXCEPTIONS PER 24590-WTP-SDDR-MS-10-00073 ARE AS FOLLOWS:
A. FOR NOZZLES NO3, NO4, AND NO5 USE 2" NOZZLE LOADS.
B. FOR NOZZLE NO6 USE 3" NOZZLE LOADS.
 - MELTER AND SBS OFFGAS LINES ARE DESIGNATED QUALITY LEVEL 0 AND SEISMIC CATEGORY SC-III; THE SLEEVE IN THE SBS THAT PROVIDES THE INSULATING AIR GAP BETWEEN THE OFFGAS DOWNCOMER PIPE AND THE SBS LIQUID IS QUALITY LEVEL 0 AND SEISMIC CATEGORY SC-I TO ENSURE INTEGRITY OF THE HYDRAULIC SEAL.
 - RADAR GUIDE TUBE IS TO BE ROUTED TO TRANSMITTER. A FULL PORT BALL VALVE IS REQUIRED FOR ISOLATION PURPOSES AT TRANSMITTER END OF GUIDE TUBE.
 - COMPONENTS AND INSTRUMENTATION TO SUPPORT THE SBS LOW-LEVEL INTERLOCK ARE QUALITY LEVEL 0 AND SEISMIC CATEGORY I. INSTRUMENT PERFORMANCE AN AIR PERMIT FUNCTION. INDICATION IS DISPLAYED AT PCJ.
 - DELETED
 - DELETED
 - JUGGLES ARE QUALITY LEVEL 0 AND SEISMIC CATEGORY SC-I.
 - THIS DRAWING IS CONSIDERED TO BE A SINGLE SHEET TO MULTI-SHEET DRAWINGS AND, IN PART, SUPERSEDES 24590-HLW-M6-HOP-00001 REV 6. THIS DRAWING INCLUDES INFORMATION FROM 24590-HLW-M6-HOP-00001, 24590-HLW-M6-HOP-00002, 24590-HLW-M6-HOP-00003, 24590-HLW-M6-HOP-00004, 24590-HLW-M6-HOP-00005, 24590-HLW-M6-HOP-00006, 24590-HLW-M6-HOP-00007, 24590-HLW-M6-HOP-00008, 24590-HLW-M6-HOP-00009, 24590-HLW-M6-HOP-00010, 24590-HLW-M6-HOP-00011, 24590-HLW-M6-HOP-00012, 24590-HLW-M6-HOP-00013, 24590-HLW-M6-HOP-00014, 24590-HLW-M6-HOP-00015, 24590-HLW-M6-HOP-00016, 24590-HLW-M6-HOP-00017, 24590-HLW-M6-HOP-00018, 24590-HLW-M6-HOP-00019, 24590-HLW-M6-HOP-00020, 24590-HLW-M6-HOP-00021, 24590-HLW-M6-HOP-00022, 24590-HLW-M6-HOP-00023, 24590-HLW-M6-HOP-00024, 24590-HLW-M6-HOP-00025, 24590-HLW-M6-HOP-00026, 24590-HLW-M6-HOP-00027, 24590-HLW-M6-HOP-00028, 24590-HLW-M6-HOP-00029, 24590-HLW-M6-HOP-00030, 24590-HLW-M6-HOP-00031, 24590-HLW-M6-HOP-00032, 24590-HLW-M6-HOP-00033, 24590-HLW-M6-HOP-00034, 24590-HLW-M6-HOP-00035, 24590-HLW-M6-HOP-00036, 24590-HLW-M6-HOP-00037, 24590-HLW-M6-HOP-00038, 24590-HLW-M6-HOP-00039, 24590-HLW-M6-HOP-00040.
 - FAILURE POSITION OF SOLENOID VALVE IS TO NORMAL STATE.
 - TO INSTALL BYPASS, DISCONNECT HOP-MPP-00031 (SHOWN ON 24590-HLW-M6-HOP-00002) AND HOP-MPP-00032 AND CONNECT HOP-MPP-00091 TO HOP-SCB-00001 N12 AND HOP-FW-00009-N10K-08.
 - HS-118 INITIATES BUBBLER TUBE FLUSH/PURGE CYCLE LEVEL, DENSITY, AND PRESSURE INDICATORS HOLD LAST GOOD VALUE DURING FLUSH/PURGE CYCLE.
 - SBS LEVEL LO/LO OR HI/HI INITIATES NORMAL MELTER FEED SHUTDOWN.
 - INSTRUMENT PROVIDES A POST ACCIDENT MONITORING FUNCTION AND WILL BE WIRED TO THE PROGRAMMABLE PROTECTION SYSTEM (PPS).
 - LINES AND EQUIPMENT THAT NORMALLY CARRY MELTER OFFGAS ARE AIR PERMIT AFFECTING.
 - INSTRUMENT PROVIDES AN SC-I POST ACCIDENT MONITORING INDICATION.

- HOLD/OPEN ITEMS:**
- PENDING PJM/RFD DESIGN.
 - DELETED.
 - PENDING SMJ DESIGN.
 - PENDING UPDATE TO HLW PAM REPORT.

- REFERENCES:**
- 24590-HLW-M6-V171-00003 PROCESS FLOW DIAGRAM, HLW VIT MELTER 1 PRIMARY OFFGAS TREATMENT (SYSTEM HOP).
 - DELETED.
 - 24590-HLW-M6-HOP-00001, HLW PIV AND HOP SYSTEM DESIGN DESCRIPTION.

DWG NO	TITLE
24590-HLW-M6-HOP-00001	HOP SYSTEM MELTER 1 HOP-SCB-00001
24590-HLW-M6-HOP-00002	HOP SYSTEM MELTER 1 HOP-SCB-00001
24590-HLW-M6-HOP-00003	HOP SYSTEM MELTER 1 HOP-SCB-00001
24590-HLW-M6-HOP-00004	HOP SYSTEM MELTER 1 HOP-SCB-00001

APPROVED

ISSUED BY: [Signature] **DATE:** 04/20/20

REVISION HISTORY:

REV	DESCRIPTION	ISSUED BY	DATE
1	REVISED PER NOTE 22	SR	04/20/20
0	ISSUED FOR CONSTRUCTION, SEE NOTE 14	SR	07/20/11

PROJECT: RIVER PROTECTION PROJECT WASTE TREATMENT PLANT
SITE: 2435 STEVENS CENTER PLACE RICHLAND, WA 99354
BUILDING NO.: 30
CONTRACT NO.: DE-AC27-01RW14136

DESIGNER: RIVER PROTECTION PROJECT
CHECKER: MICHELLE BETHANY
APPROVER: KATHLEEN S. SAUNDERS
REVIEWER: SMITH, S/PETERS, II

SCALE: NONE
DATE: 04/20/20

PROJECT NO.: 24590
SHEET NO.: 0001
TITLE: HOP SYSTEM MELTER 1 PRIMARY OFFGAS SCRUBBER HOP-SCB-00001



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Document for Signature

Document Number: 24590-HLW-M6-HOP-00001001 **Rev:** 1

Participants	Signature	Completed	Status	Result	Comments
Final Approver	5/4/2020 7:09 PM				
Cron, Bryan		5/4/2020 11:57 PM	Completed	Approve	



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Document Number: 24590-HLW-M6-HOP-00001001 **Rev:** 1

Participants	Signature	Completed	Status	Result	Comments
Final Approver	5/11/2020 1:41 PM				
Rider, Robert		5/11/2020 1:42 PM	Completed	Approve	

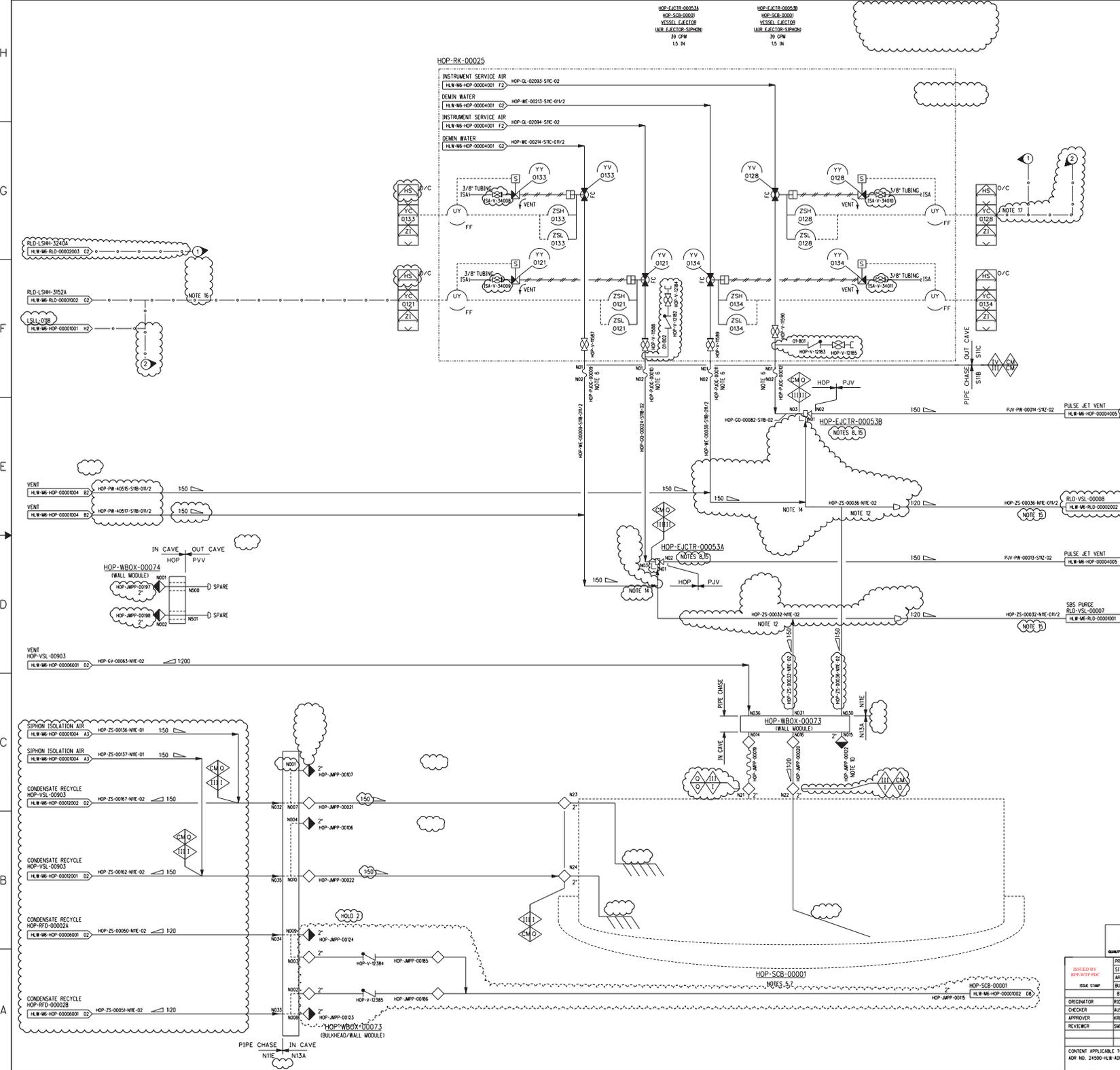


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Document Number: 24590-HLW-M6-HOP-00001002 **Rev:** 1

Participants	Signature	Completed	Status	Result	Comments
Final Approver	5/4/2020 7:10 PM				
Cron, Bryan		5/4/2020 11:58 PM	Completed	Approve	



- NOTES:**
- SEE DRAWINGS 24590-WTP-M6-50-00001 THROUGH 24590-WTP-M6-50-00008 FOR GENERAL NOTES, SYMBOLS AND LEGEND, AND GENERAL SLOPE REQUIREMENTS.
 - CONTENTS OF THIS DOCUMENT ARE DANGEROUS WASTE PERMIT AFFECTING.
 - THE PRESSURE BOUNDARY FOR ALL COMPONENTS ON THIS DRAWING IS QUALITY LEVEL CM AND SEISMIC CATEGORY SC-III, UNLESS OTHERWISE NOTED.
 - ALL LINES SHOWN ON THIS DRAWING SHALL BE FREE DRAINING, UNLESS OTHERWISE NOTED.
 - HOP-SCB-00001, INCLUDING INTERNALS, SHALL BE DESIGNED AS QUALITY LEVEL Q AND SEISMIC CATEGORY SC-I. THIS IS AIR PERMIT EQUIPMENT.
 - JOGGLES ARE QUALITY LEVEL Q AND SEISMIC CATEGORY SC-I.
 - VESSEL INTERNALS TO BE HASTELLOY C-22.
 - EJECTOR TO BE LOCATED MINIMUM 34 FT ABOVE SUBMERGED BED SCRUBBER OVERFLOW.
 - DELETED
 - SPARE JUMPER CONNECTION FOR HOP-SCB-00001, N22.
 - DELETED
 - THE SBS SIPHON TRANSFER CONNECTION TEE CENTERLINE SHOULD BE LOCATED AT AN ELEVATION THAT IS NO MORE THAN 14 FEET ABOVE THE BOTTOM OF THE SBS OVERFLOW NOZZLES (N25, N26, N27). THE TEE WILL BE MOUNTED WITH THE STRAIGHT RUN IN THE VERTICAL POSITION.
 - THIS DRAWING IS CONVERTED FROM A SINGLE SHEET TO MULTI-SHEET DRAWINGS AND, IN PART, SUPERSEDES 24590-HLW-M6-HOP-00001 REV E. THIS DRAWING INCLUDES INFORMATION FROM 24590-HLW-M6-N-HOP-00001, 24590-HLW-M6-N-HOP-00002, -00063, -00171, -00184 AND 24590-HLW-M6-PP-HOP-00001.
 - FLUSH CONNECTION REQUIRED TO BE VIA A LATERAL FITTING WITH FLUSH FLOW DIRECTED DOWNWARD. FITTING TO BE LOCATED NO LESS THAN 14 FEET ABOVE THE SBS OVERFLOW NOZZLES (N25, N26, N27).
 - CONNECT VACUUM SOURCE TO ANY VERTICAL DROP OF PIPE GREATER THAN A 2-FOOT ELEVATION CHANGE, AND WHERE INITIATION OF THE VERTICAL DROP IS ABOVE THE 8-FOOT ELEVATION. VACUUM CONNECTIONS ARE ADDED TO THE TOP OF ANY VERTICAL DROPS. VACUUM EJECTOR TO BE LOCATED MINIMUM 34 FEET ABOVE THE SBS OVERFLOW NOZZLES (N25, N26, N27).
 - ACIDIC WASTE VESSEL LEVEL HIHI OR SBS LEVEL LOLO TRIPS (CLOSES) AIR TO HOP-EJCTR-00053A.
 - PLANT WASH VESSEL LEVEL HIHI OR SBS LEVEL LOLO TRIPS (CLOSES) AIR TO HOP-EJCTR-00053B.
 - REVISION I: THIS DRAWING IS PART SUPERSEDES #7/05/11/20 24590-HLW-M6-50-00008. THIS DRAWING INCLUDES INFORMATION FROM INCORPORATED AND FURTHER REVISED 24590-HLW-M6-N-30-00045, 24590-HLW-M6-N-HOP-00058, 24590-HLW-M6-N-HOP-00036, 24590-HLW-EIE-MS-19-00054 REV D, 24590-WTP-EIE-ENG-14-0002 REV D, 24590-WTP-EIE-MS-14-0003 REV D, 24590-HLW-EIE-MS-19-00056 REV D, 24590-HLW-EIE-MS-19-00059 REV D, 24590-HLW-EIE-MS-19-0008 REV D, REVISED/ADDED/DELETED HOLDS, NOTES, REFERENCES, AND OFF SHEET CONNECTORS.

- HOLD/OPEN ITEMS:**
- DELETED
 - RFD TRANSFER ROUTES ON HOLD PENDING HOP BULGE DESIGN DEVELOPMENT.

- REFERENCES:**
- 24590-HLW-M5-V171-00003, PROCESS FLOW DIAGRAM HOP VIT MELTER 1 PRIMARY OFFGAS TREATMENT (SYSTEM HOP)
 - DELETED
 - 24590-HLW-320-HOP-00001, HLW P/VV AND HOP SYSTEM DESIGN DESCRIPTION.

	1	REVISED PER NOTE 13	ISSUED FOR CONSTRUCTION, SEE NOTE 13	RR	ISA	SS/PP	3/20/11
	REV	DESCRIPTION	ORG	CHKD	RVD	APVD	DATE
REVISION HISTORY							
ISSUED BY HOP-WTP-PSC	PROJECT No. 24590	SITE WAM ORD	BUILDING No. 30	DATE 7-20-11	CONTRACT No. DE-AC27-07R14136		
CHECKER WETSCHMAR, S/AMRSKOLC	ORIGINATOR WICK, ROBERT	ISSUED FOR CONSTRUCTION	DATE 7-20-11	RIVER PROTECTION PROJECT WASTE TREATMENT PLANT 450 HILLS ST. RICHLAND, WA 99354			
REVIEWER SMITH, S/PETERS, R	APPROVER WETSCHMAR, S/AMRSKOLC	DATE 7-20-11	DATE 7-20-11	P&ID - HLW MELTER OFFGAS TREATMENT PROCESS SYSTEM MELTER 1 PRIMARY OFFGAS SCRUBBER HOP-SCB-00001			
CONTENT APPLICABLE TO ALRAY <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	SCALE NONE	ADR No. 24590-HLW-ADR-M-03-001	REV 1	24590-HLW-M6-HOP-0001003			



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Participants	Signature	Completed	Status	Result	Comments
Final Approver	5/4/2020 7:11 PM				
Cron, Bryan		5/4/2020 11:59 PM	Completed	Approve	

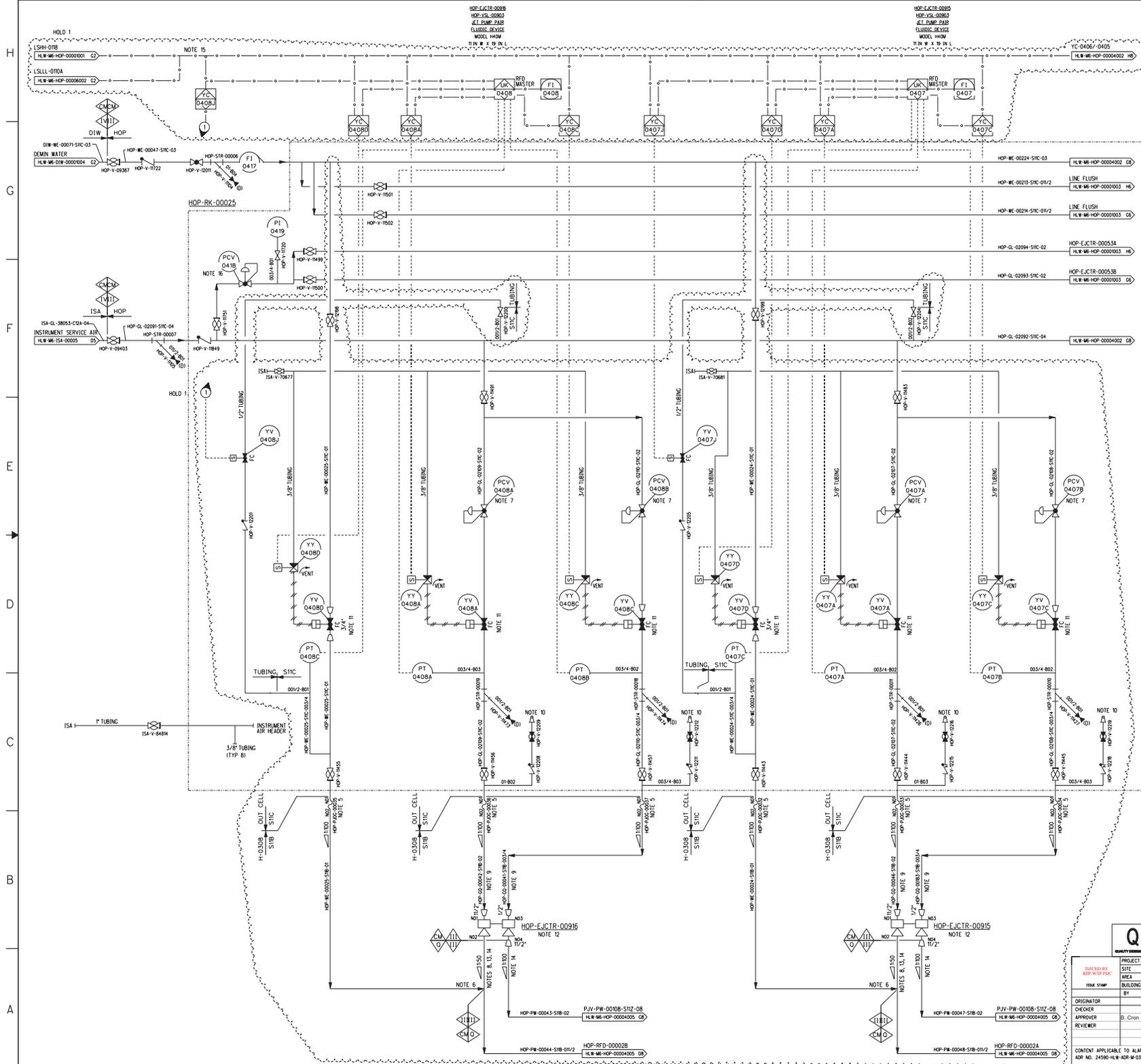


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Document Number: 24590-HLW-M6-HOP-00001003 **Rev:** 1

Participants	Signature	Completed	Status	Result	Comments
Final Approver	5/11/2020 1:51 PM				
Rider, Robert		5/11/2020 1:51 PM	Completed	Approve	



- NOTES:**
- SEE DRAWING 24590-WTP-M6-S0-0001 THROUGH 24590-WTP-M6-S0-0008 FOR GENERAL NOTES, SYMBOLS AND LEGEND, AND GENERAL SLOPE REQUIREMENTS
 - CONTENTS OF THIS DOCUMENT ARE DANGEROUS WASTE PERMIT AFFECTING.
 - THE PRESSURE BOUNDARY FOR ALL COMPONENTS ON THIS DRAWING IS QUALITY LEVEL CM AND SEISMIC CATEGORY SC-II, UNLESS OTHERWISE NOTED.
 - ALL LINES SHOWN ON THIS DRAWING SHALL BE FREE DRAINING, EXCEPT BLACK CELL LINES WHICH ARE SELF-DRAINING, DO NOT POCKET, UNLESS OTHERWISE NOTED.
 - JOGGLES ARE QUALITY LEVEL O AND SEISMIC CATEGORY SC-I.
 - A LATERAL FITTING IS TO BE USED AT THIS LOCATION TO ACCOMMODATE CLEANING OF PIPE AND EQUIPMENT.
 - PCV SETPOINT TO BE DETERMINED DURING PUM COMMISSIONING PER 24590-WTP-320-G01W-0001.
 - PROVIDE VERTICAL CONNECTION OF AIR LINK LINE AT VESSEL NOZZLE AND MAXIMIZE LENGTH BEFORE FIRST BEND. MINIMIZE NUMBER OF BENDS PRIOR TO BAROMETRIC HEAD (34 FEET) ABOVE VESSEL TOP HEAD. DIFFERENCE IN LENGTH OF ALL AIR LINK LINES TO SAME VESSEL SHOULD BE MINIMIZED AND NOT EXCEED 55 FEET.
 - EJECTORS SHALL BE LOCATED 15 FT OR LESS BELOW THE BOTTOM OF THE 58 FT ELEVATION FLOOR, AND A MINIMUM OF 35 FEET ABOVE TOP OF VESSEL HOP-VSL-00903 HEAD.
 - FLUSH CONNECTION PROVIDED FOR PLANT WASH, REAGENT, NITRIC ACID, AND SERVICE AIR.
 - VALVE TYPE SHOWN IS A GENERAL SYMBOL. ANGLE SEAT VALVES ARE USED FOR RFD/PAM APPLICATIONS.
 - JPP EJECTORS ARE QUALITY LEVEL CM PER 24590-PTF-00F-MS-10-0001.
 - ALL JPP EJECTORS ARE TO BE POSITIONED VERTICALLY.
 - ALL PIPING WITH FLUID SERVICE PW IS AIR PERMIT AFFECTING.
 - SBS HIHI AND SBS CRV LO LO LEVEL TRIPS (CLOSE) RFD DRIVE, SUCTION, AND FLUSH VALVES
 - PCV SET POINT TO BE BASED ON VENDOR SUBMITTAL FOR SBS SIPHON EJECTORS.
 - THIS DRAWING IS CONVERTED FROM A SINGLE SHEET TO MULTI-SHEET DRAWINGS AND, IN PART, SUPERSEDES INFORMATION FROM 24590-HLW-M6-HOP-00004, REV. 5. THIS DRAWING INCLUDES INFORMATION FROM 24590-HLW-M6-HOP-00005, 24590-HLW-M6-HOP-00006, 24590-HLW-EIE-M6-17-0003, REV. 0, AND 24590-HLW-EIE-SYS-19-0008, REV. 0. 24590-HLW-EIE-M6-19-0006, REV. 0. ADDED ISOLATION VALVES TO FLUSH LINES AND AIR LINK LINE PRESSURE TRANSMITTERS, REMOVED FLUSH CONNECTION ON DIW AND ISA HEADERS AND ADDED FLUSH CONNECTION ON AIR LINK LINES RE-SEQUENCED RACK CONNECTIONS TO ISA AND DIW HEADERS, REVERSED SLOPE FOR AIR LINK LINES BELOW JPPs.

HOLD/OPEN ITEMS:

- ON HOLD PENDING TENDR ISSUANCE FOR PUMP DESIGN.

REFERENCES:

- 24590-HLW-320-HOP-00001, HLW PVV AND HOP SYSTEM DESIGN DESCRIPTION.

DWG NO.	DATE	TITLE
24590-HLW-M6-HOP-00040001		HOP MELTER 1 OFFGAS FLUIDICS AIR RACK HOP-RK-00025
24590-HLW-M6-HOP-00040002		HOP MELTER 1 OFFGAS FLUIDICS AIR RACK HOP-RK-00025
24590-HLW-M6-HOP-00040003		HOP MELTER 1 OFFGAS FLUIDICS AIR RACK HOP-RK-00025
24590-HLW-M6-HOP-00040004		HOP MELTER 1 OFFGAS FLUIDICS AIR RACK HOP-RK-00025
24590-HLW-M6-HOP-00040005		HOP MELTER 1 OFFGAS FLUIDICS AIR RACK HOP-RK-00025

Originator	Checked	Reviewed	Approved	Approved

REV	DESCRIPTION	ORG	CHKD	RVD	DATE
0	ISSUED FOR CONSTRUCTION. SEE NOTE 17				4/27/2020

REVISION HISTORY	
NO.	DATE
1	4/27/2020

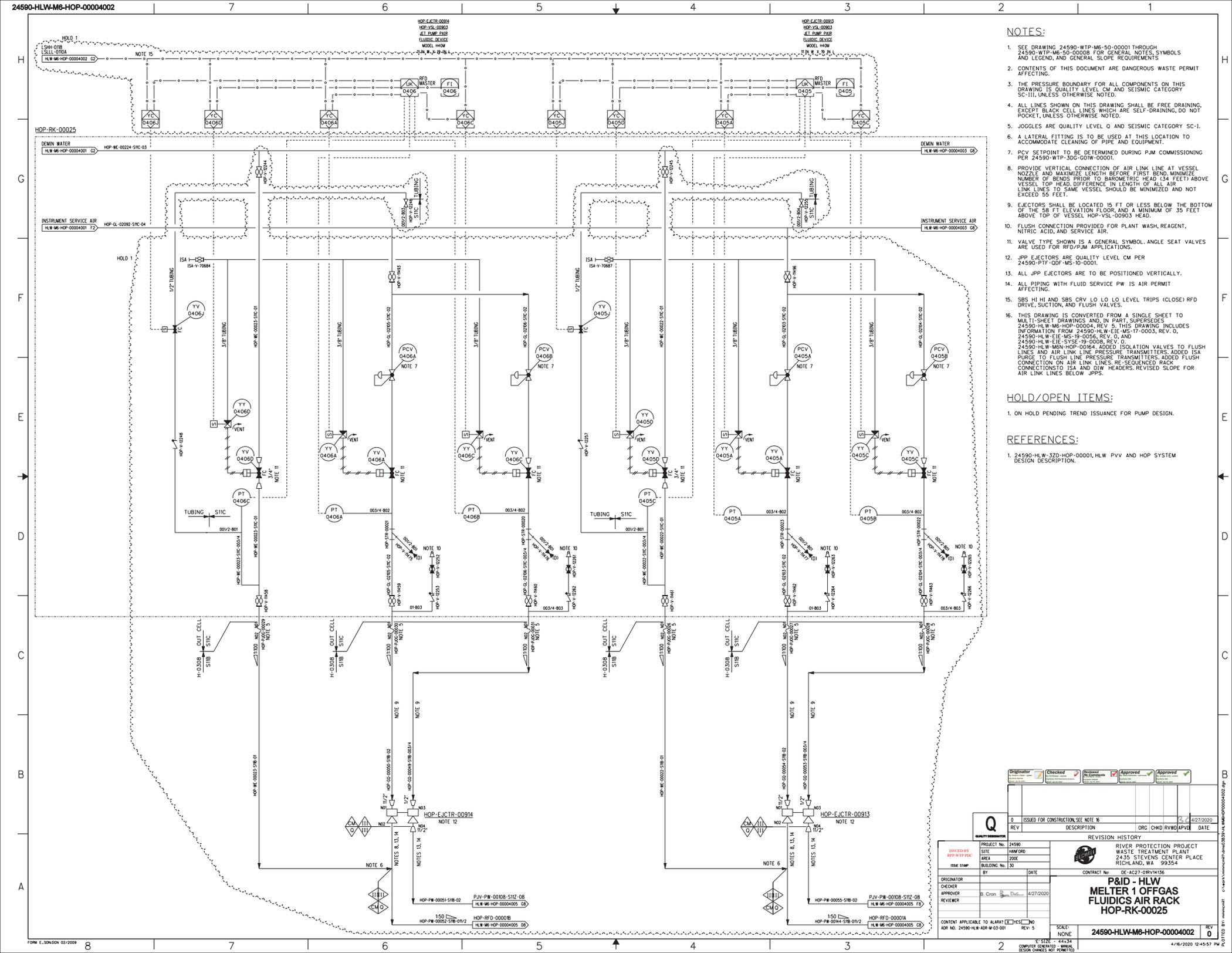


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Document Number: 24590-HLW-M6-HOP-00004001 **Rev:** 0

Participants	Signature	Completed	Status	Result	Comments
Final Approver	4/27/2020 12:48 PM				
Cron, Bryan		4/27/2020 8:42 PM	Completed	Approve	



- NOTES:**
- SEE DRAWING 24590-WTP-M6-50-0001 THROUGH 24590-WTP-M6-50-0008 FOR GENERAL NOTES, SYMBOLS AND LEGEND, AND GENERAL SLOPE REQUIREMENTS
 - CONTENTS OF THIS DOCUMENT ARE DANGEROUS WASTE PERMIT AFFECTING.
 - THE PRESSURE BOUNDARY FOR ALL COMPONENTS ON THIS DRAWING IS QUALITY LEVEL CM AND SEISMIC CATEGORY SC-II, UNLESS OTHERWISE NOTED.
 - ALL LINES SHOWN ON THIS DRAWING SHALL BE FREE DRAINING, EXCEPT BLACK CELL LINES WHICH ARE SELF-DRAINING, DO NOT POCKET, UNLESS OTHERWISE NOTED.
 - JOGGLES ARE QUALITY LEVEL O AND SEISMIC CATEGORY SC-I.
 - A LATERAL FITTING IS TO BE USED AT THIS LOCATION TO ACCOMMODATE CLEANING OF PIPE AND EQUIPMENT.
 - PCV SETPOINT TO BE DETERMINED DURING PUMP COMMISSIONING PER 24590-WTP-320-G01W-0001.
 - PROVIDE VERTICAL CONNECTION OF AIR LINK LINE AT VESSEL NOZZLE AND MAXIMIZE LENGTH BEFORE FIRST BEND. MINIMIZE NUMBER OF BENDS PRIOR TO BAROMETRIC HEAD (34 FEET) ABOVE VESSEL TOP HEAD. DIFFERENCE IN LENGTH OF ALL AIR LINK LINES TO SAME VESSEL SHOULD BE MINIMIZED AND NOT EXCEED 55 FEET.
 - EJECTORS SHALL BE LOCATED 15 FT OR LESS BELOW THE BOTTOM OF THE 58 FT ELEVATION FLOOR, AND A MINIMUM OF 35 FEET ABOVE TOP OF VESSEL HOP-VSL-0903 HEAD.
 - FLUSH CONNECTION PROVIDED FOR PLANT WASH, REAGENT, NITRIC ACID, AND SERVICE AIR.
 - VALVE TYPE SHOWN IS A GENERAL SYMBOL. ANGLE SEAT VALVES ARE USED FOR RFD/PAM APPLICATIONS.
 - JPP EJECTORS ARE QUALITY LEVEL CM PER 24590-PTF-00F-MS-10-0001.
 - ALL PIPING WITH FLUID SERVICE PW IS AIR PERMIT AFFECTING.
 - SBS HI HI AND SBS CRV LO LO, LO, LE TRIPS (CLOSE) RFD DRIVE, SUCTION, AND FLUSH VALVES.
 - THIS DRAWING IS CONVERTED FROM A SINGLE SHEET TO MULTI-SHEET DRAWINGS AND, IN PART, SUPERSEDES 24590-HLW-M6-HOP-0004, REV. 5. THIS DRAWING INCLUDES INFORMATION FROM 24590-HLW-EIE-MS-17-0003, REV. 0, 24590-HLW-EIE-MS-19-0005, REV. 0, AND 24590-HLW-EIE-SYSE-19-0008, REV. 0. 24590-HLW-M6-HOP-0004: ADDED ISOLATION VALVES TO FLUSH LINES AND AIR LINK LINE PRESSURE TRANSMITTERS; ADDED ISA PURGE TO FLUSH LINE PRESSURE TRANSMITTERS; ADDED FLUSH CONNECTION ON AIR LINK LINES; RE-SEQUENCED RACK CONNECTIONS TO ISA AND DIW HEADERS; REVISED SLOPE FOR AIR LINK LINES BELOW JPPs.

- HOLD/OPEN ITEMS:**
- ON HOLD PENDING TREND ISSUANCE FOR PUMP DESIGN.

- REFERENCES:**
- 24590-HLW-320-HOP-00001, HLW PVP AND HOP SYSTEM DESIGN DESCRIPTION.

Originator	Checked	Reviewed	Approved	Approved														
<table border="1"> <tr> <th>REV</th> <th>DESCRIPTION</th> <th>ORIG</th> <th>CHKD</th> <th>RVWD</th> <th>APV'D</th> <th>DATE</th> </tr> <tr> <td>0</td> <td>ISSUED FOR CONSTRUCTION. SEE NOTE 6</td> <td></td> <td></td> <td></td> <td></td> <td>4/27/2020</td> </tr> </table>					REV	DESCRIPTION	ORIG	CHKD	RVWD	APV'D	DATE	0	ISSUED FOR CONSTRUCTION. SEE NOTE 6					4/27/2020
REV	DESCRIPTION	ORIG	CHKD	RVWD	APV'D	DATE												
0	ISSUED FOR CONSTRUCTION. SEE NOTE 6					4/27/2020												
QUALITY CONTROL PROJECT No: 24590 SITE: HAW ORD AREA: 200 BUILDING No: 30		REVISION HISTORY RIVER PROTECTION PROJECT WASTE TREATMENT PLANT 2435 STEVENS CENTER PLACE RICHLAND, WA 99354																
ORIGINATOR: [Signature] CHECKER: [Signature] APPROVER: B. Cron REVIEWER: [Signature]		CONTRACT No: DE-AC27-01RV14136 P&ID - HLW MELTER 1 OFFGAS FLUIDICS AIR RACK HOP-RK-00025																
CONTENT APPLICABLE TO ALARA: <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO NONE: <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO SCALE: 1" = 4'-0"		24590-HLW-M6-HOP-0004002 REV 0 4/8/2020 12:45:57 PM																



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Participants	Signature	Completed	Status	Result	Comments
Final Approver	4/27/2020 12:49 PM				
Cron, Bryan		4/27/2020 8:44 PM	Completed	Approve	

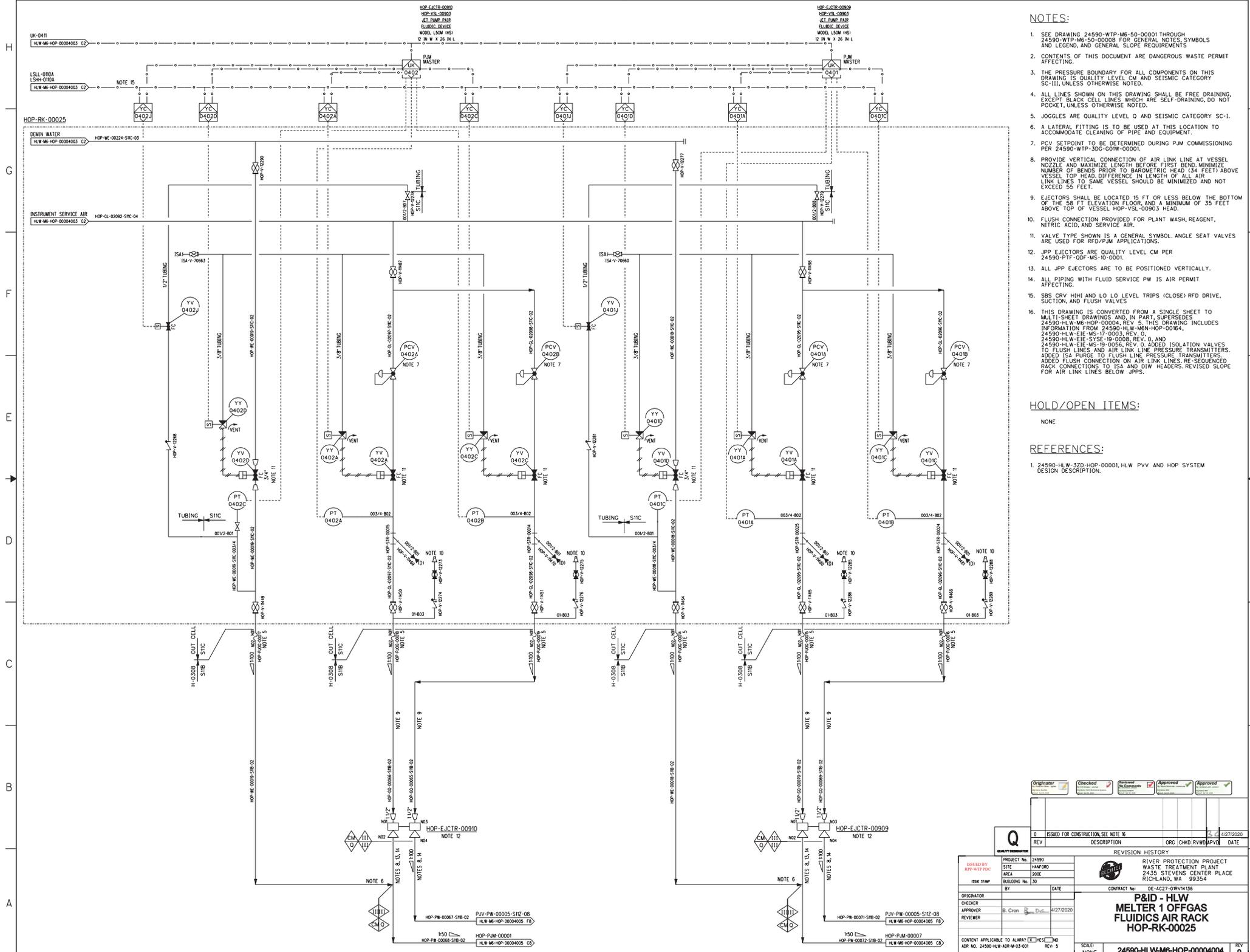


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Document for Signature

Document Number: 24590-HLW-M6-HOP-00004003 **Rev:** 0

Participants	Signature	Completed	Status	Result	Comments
Final Approver	4/27/2020 12:50 PM				
Cron, Bryan		4/27/2020 8:45 PM	Completed	Approve	



- NOTES:**
- SEE DRAWING 24590-WTP-M6-50-0001 THROUGH 24590-WTP-M6-50-0008 FOR GENERAL NOTES, SYMBOLS AND LEGEND, AND GENERAL SLOPE REQUIREMENTS
 - CONTENTS OF THIS DOCUMENT ARE DANGEROUS WASTE PERMIT AFFECTING.
 - THE PRESSURE BOUNDARY FOR ALL COMPONENTS ON THIS DRAWING IS QUALITY LEVEL CM AND SEISMIC CATEGORY SC-II, UNLESS OTHERWISE NOTED.
 - ALL LINES SHOWN ON THIS DRAWING SHALL BE FREE DRAINING, EXCEPT BLACK CELL LINES WHICH ARE SELF-DRAINING, DO NOT POCKET, UNLESS OTHERWISE NOTED.
 - JOOGLES ARE QUALITY LEVEL O AND SEISMIC CATEGORY SC-I.
 - A LATERAL FITTING IS TO BE USED AT THIS LOCATION TO ACCOMMODATE CLEANING OF PIPE AND EQUIPMENT.
 - PCV SETPOINT TO BE DETERMINED DURING P&ID COMMISSIONING PER 24590-WTP-320-G01W-0001.
 - PROVIDE VERTICAL CONNECTION OF AIR LINK LINE AT VESSEL NOZZLE AND MAXIMIZE LENGTH BEFORE FIRST BEND MINIMIZE NUMBER OF BENDS PRIOR TO BAROMETRIC HEAD (34 FEET) ABOVE VESSEL TOP HEAD. DIFFERENCE IN LENGTH OF ALL AIR LINK LINES TO SAME VESSEL SHOULD BE MINIMIZED AND NOT EXCEED 50 FEET.
 - EJECTORS SHALL BE LOCATED 15 FT OR LESS BELOW THE BOTTOM OF THE 50 FT ELEVATION FLOOR, AND A MINIMUM OF 35 FEET ABOVE TOP OF VESSEL HOP-VSL-00903 HEAD.
 - FLUSH CONNECTION PROVIDED FOR PLANT WASH, REAGENT, NITRIC ACID, AND SERVICE AIR.
 - VALVE TYPE SHOWN IS A GENERAL SYMBOL. ANGLE SEAT VALVES ARE USED FOR RFD/P&M APPLICATIONS.
 - JPP EJECTORS ARE QUALITY LEVEL CM PER 24590-PTF-00F-MS-10-0001.
 - ALL JPP EJECTORS ARE TO BE POSITIONED VERTICALLY.
 - ALL PIPING WITH FLUID SERVICE PW IS AIR PERMIT AFFECTING.
 - SBS CRV HH1 AND LO LO LEVEL TRIPS (CLOSE) RFD DRIVE, SUCTION, AND FLUSH VALVES.
 - THIS DRAWING IS CONVERTED FROM A SINGLE SHEET TO MULTI-SHEET DRAWINGS AND, IN PART, SUPERSEDES 24590-HLW-M6-HOP-00004, REV. 5. THIS DRAWING INCLUDES INFORMATION FROM 24590-HLW-M6-HOP-00164, 24590-HLW-EIE-SYSE-19-0008, REV. 0, AND 24590-HLW-EIE-MS-19-0006, REV. 0. ADDED ISOLATION VALVES TO FLUSH LINES AND AIR LINK LINE PRESSURE TRANSMITTERS. ADDED FLUSH CONNECTION ON AIR LINK LINES. RE-SEQUENCED RACK CONNECTIONS TO ISA AND DIW HEADERS. REVISED SLOPE FOR AIR LINK LINES BELOW JPPs.

HOLD/OPEN ITEMS:

NONE

REFERENCES:

- 24590-HLW-320-HOP-00001.HLW PVV AND HOP SYSTEM DESIGN DESCRIPTION.

<table border="1"> <tr> <td>Originator</td> <td>Checked</td> <td>Revised</td> <td>Approved</td> <td>Approved</td> </tr> </table>		Originator	Checked	Revised	Approved	Approved							
Originator	Checked	Revised	Approved	Approved									
<table border="1"> <tr> <th>REV</th> <th>DESCRIPTION</th> <th>DATE</th> </tr> <tr> <td>0</td> <td>ISSUED FOR CONSTRUCTION. SEE NOTE 16</td> <td>4/27/2020</td> </tr> </table>		REV	DESCRIPTION	DATE	0	ISSUED FOR CONSTRUCTION. SEE NOTE 16	4/27/2020						
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0	ISSUED FOR CONSTRUCTION. SEE NOTE 16	4/27/2020											
<table border="1"> <tr> <th colspan="2">REVISION HISTORY</th> </tr> <tr> <td>ORIGINATOR</td> <td>DATE</td> </tr> <tr> <td>CHECKER</td> <td>DATE</td> </tr> <tr> <td>APPROVER</td> <td>DATE</td> </tr> <tr> <td>REVIEWER</td> <td>DATE</td> </tr> </table>		REVISION HISTORY		ORIGINATOR	DATE	CHECKER	DATE	APPROVER	DATE	REVIEWER	DATE		
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<table border="1"> <tr> <td>ISSUED BY</td> <td>PROJECT No.</td> <td>24590</td> </tr> <tr> <td>ISSUE STAMP</td> <td>SITE</td> <td>HAW ORD</td> </tr> <tr> <td></td> <td>AREA</td> <td>200</td> </tr> <tr> <td></td> <td>BUILDING No.</td> <td>30</td> </tr> </table>		ISSUED BY	PROJECT No.	24590	ISSUE STAMP	SITE	HAW ORD		AREA	200		BUILDING No.	30
ISSUED BY	PROJECT No.	24590											
ISSUE STAMP	SITE	HAW ORD											
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<table border="1"> <tr> <td colspan="2">RIVER PROTECTION PROJECT WASTE TREATMENT PLANT 2435 STEVENS CENTER PLACE RICHLAND, WA 99354</td> </tr> <tr> <td colspan="2">CONTRACT No: DE-AC27-01RV14136</td> </tr> <tr> <td colspan="2">P&ID - HLW MELTER 1 OFFGAS FLUIDICS AIR RACK HOP-RK-00025</td> </tr> <tr> <td>CONTENT APPLICABLE TO ALARA#1 YES <input type="checkbox"/> NO <input type="checkbox"/></td> <td>SCALE: NONE</td> </tr> <tr> <td>ADR No. 24590-HLW-ADR-W-03-001 REV: 5</td> <td>24590-HLW-M6-HOP-00004004 REV: 0</td> </tr> </table>		RIVER PROTECTION PROJECT WASTE TREATMENT PLANT 2435 STEVENS CENTER PLACE RICHLAND, WA 99354		CONTRACT No: DE-AC27-01RV14136		P&ID - HLW MELTER 1 OFFGAS FLUIDICS AIR RACK HOP-RK-00025		CONTENT APPLICABLE TO ALARA#1 YES <input type="checkbox"/> NO <input type="checkbox"/>	SCALE: NONE	ADR No. 24590-HLW-ADR-W-03-001 REV: 5	24590-HLW-M6-HOP-00004004 REV: 0		
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ADR No. 24590-HLW-ADR-W-03-001 REV: 5	24590-HLW-M6-HOP-00004004 REV: 0												



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Document for Signature

Document Number: 24590-HLW-M6-HOP-00004004 **Rev:** 0

Participants	Signature	Completed	Status	Result	Comments
Final Approver	4/27/2020 12:50 PM				
Cron, Bryan		4/27/2020 8:46 PM	Completed	Approve	

HOP-PJM-00007 PULSE JET MIXER (FLUIDIC MIXER) FOR HOP-VSL-00903 17' CALLING 18-IN ID X 16-IN H
 HOP-PJM-00001 PULSE JET MIXER (FLUIDIC MIXER) FOR HOP-VSL-00903 17' CALLING 18-IN ID X 16-IN H
 HOP-PJM-00002 PULSE JET MIXER (FLUIDIC MIXER) FOR HOP-VSL-00903 17' CALLING 18-IN ID X 16-IN H
 HOP-PJM-00003 PULSE JET MIXER (FLUIDIC MIXER) FOR HOP-VSL-00903 17' CALLING 18-IN ID X 16-IN H
 HOP-VSL-00004A CHARGE VESSEL (FLUIDIC DEVICE) FOR HOP-RFD-00001A 49' CALLING 24-IN ID X 43-IN H
 HOP-VSL-00004B CHARGE VESSEL (FLUIDIC DEVICE) FOR HOP-RFD-00001B 49' CALLING 24-IN ID X 43-IN H
 HOP-VSL-00004C CHARGE VESSEL (FLUIDIC DEVICE) FOR HOP-RFD-00002A 49' CALLING 24-IN ID X 43-IN H
 HOP-VSL-00004D CHARGE VESSEL (FLUIDIC DEVICE) FOR HOP-RFD-00002B 49' CALLING 24-IN ID X 43-IN H

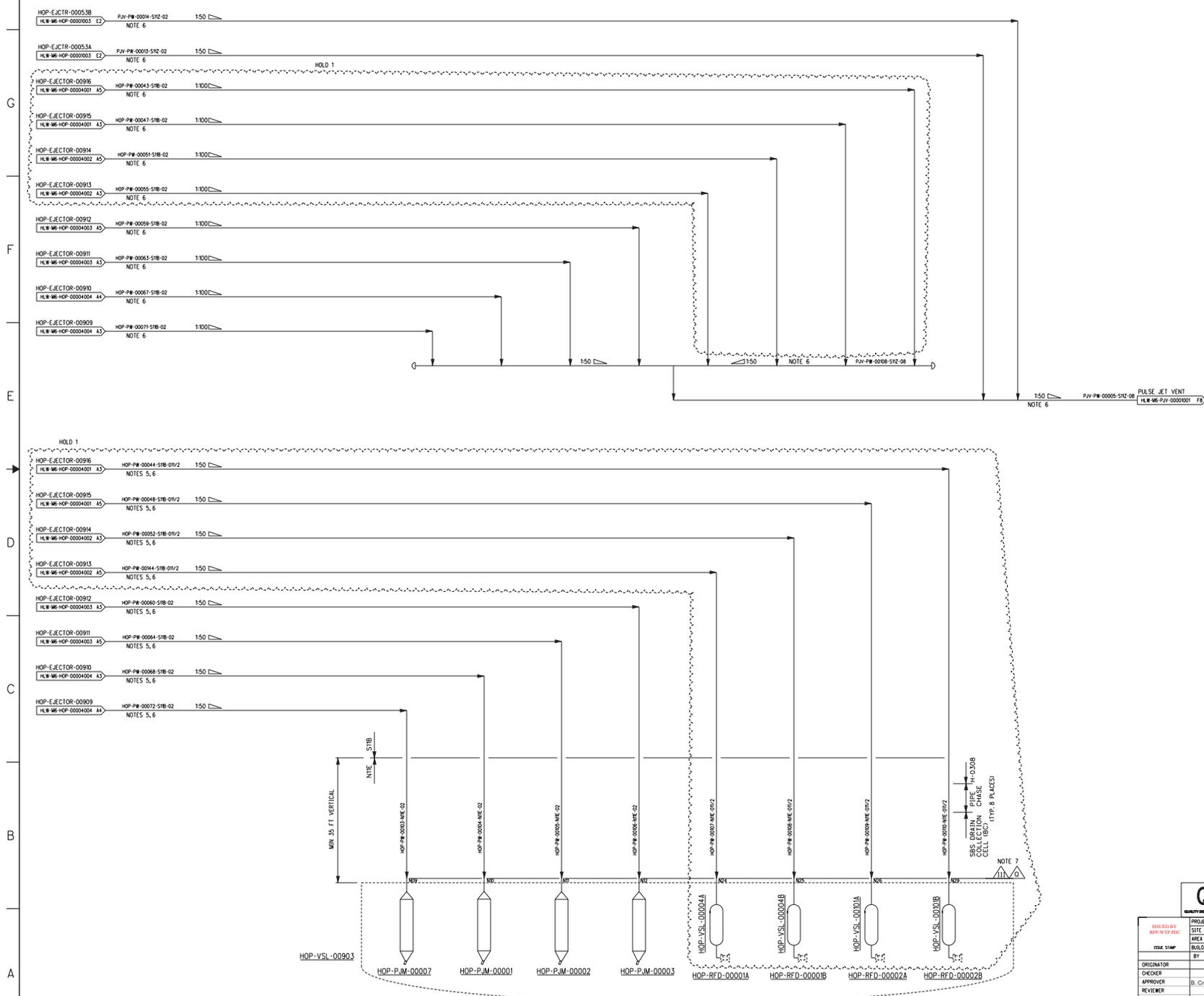
- NOTES:**
- SEE DRAWING 24590-WTP-M6-50-00001 THROUGH 24590-WTP-M6-50-00008 FOR GENERAL NOTES, SYMBOLS AND LEGEND, AND GENERAL SLOPE REQUIREMENTS
 - CONTENTS OF THIS DOCUMENT ARE DANGEROUS WASTE PERMIT AFFECTING.
 - THE PRESSURE BOUNDARY FOR ALL COMPONENTS ON THIS DRAWING IS QUALITY LEVEL 0 AND SEISMIC CATEGORY SC-III, UNLESS OTHERWISE NOTED.
 - ALL LINES SHOWN ON THIS DRAWING SHALL BE FREE DRAINING, EXCEPT BLACK CELL LINES WHICH ARE SELF-DRAINING, DO NOT POCKET, UNLESS OTHERWISE NOTED.
 - PROVIDE VERTICAL CONNECTION OF AIR LINK LINE AT VESSEL NOZZLE AND MAXIMIZE LENGTH BEFORE FIRST BEND. MINIMIZE NUMBER OF BENDS PRIOR TO BAROMETRIC HEAD (34 FEET) ABOVE VESSEL TO HEAD DIFFERENCE IN LENGTH OF ALL AIR LINK LINES TO SAME VESSEL SHOULD BE MINIMIZED AND NOT EXCEED 55 FEET.
 - ALL PIPING WITH FLUID SERVICE PW IS AIR PERMIT AFFECTING.
 - PJM VESSELS AND RFD CHARGE VESSELS ARE QUALITY LEVEL CM AND SEISMIC CATEGORY SC-III. HOP-VSL-00903 IS QUALITY LEVEL 0 AND SEISMIC CATEGORY SC-III.
 - THIS DRAWING IS CONVERTED FROM A SINGLE SHEET TO MULTI-SHEET DRAWINGS AND, IN PART, SUPERSEDES 24590-HLW-M6-HOP-00004, REV. 5. THIS DRAWING INCLUDES INFORMATION FROM 24590-HLW-M6N-HOP-00164, 24590-HLW-EIE-MS-17-0003, REV. 0, AND 24590-HLW-EIE-SYSE-19-0008, REV. 0. REVISED SLOPE FOR AIR LINK LINES BELOW JPPS.

HOLD/OPEN ITEMS:

- ON HOLD PENDING TREND ISSUANCE FOR PUMP DESIGN.

REFERENCES:

- 24590-HLW-32D-HOP-00001, HLW PVV AND HOP SYSTEM DESIGN DESCRIPTION.



Originator	Checked	Reviewed	Approved	Approved																																												
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SCALE:	24590-HLW-M6-HOP-00004005		REV: 0																																													

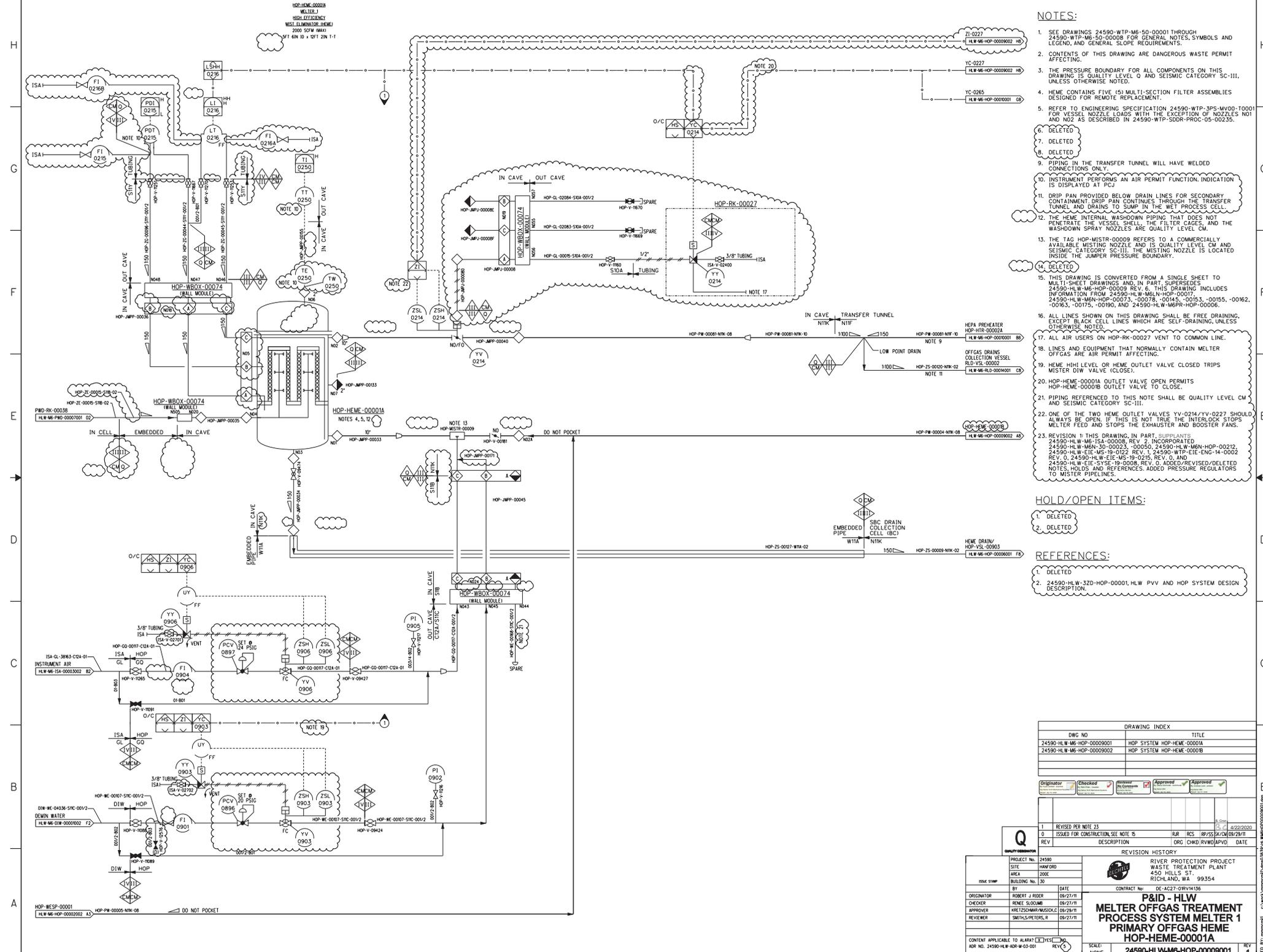


This document has been digitally signed using the ElectroSign process.

Document for Signature

Document Number: 24590-HLW-M6-HOP-00004005 **Rev:** 0

Participants	Signature	Completed	Status	Result	Comments
Final Approver	4/27/2020 12:51 PM				
Cron, Bryan		4/27/2020 8:49 PM	Completed	Approve	



- NOTES:**
- SEE DRAWINGS 24590-WTP-M6-50-00001 THROUGH 24590-WTP-M6-50-00008 FOR GENERAL NOTES, SYMBOLS AND LEGEND AND GENERAL SLOPE AND ELEVATION NOTES.
 - CONTENTS OF THIS DRAWING ARE DANGEROUS WASTE PERMIT AFFECTING.
 - THE PRESSURE BOUNDARY FOR ALL COMPONENTS ON THIS DRAWING IS QUALITY LEVEL 0 AND SEISMIC CATEGORY SC-III, UNLESS OTHERWISE NOTED.
 - HEME CONTAINS FIVE (5) MULTI-SECTION FILTER ASSEMBLIES DESIGNED FOR REMOTE REPLACEMENT.
 - REFER TO ENGINEERING SPECIFICATION 24590-WTP-3PS-MV00-T0001 FOR VESSEL NOZZLE LOADS WITH THE EXCEPTION OF NOZZLES N01 AND N02 AS DESCRIBED IN 24590-WTP-3DOR-PROC-05-00235.
 - DELETED
 - DELETED
 - DELETED
 - PIPING IN THE TRANSFER TUNNEL WILL HAVE WELDED CONNECTIONS ONLY.
 - INSTRUMENT PERFORMS AN AIR PERMIT FUNCTION INDICATION IS DISPLAYED AT PCJ
 - DRIP PAN PROVIDED BELOW DRAIN LINES FOR SECONDARY CONTAINMENT. DRIP PAN CONTIGUES THROUGH THE TRANSFER TUNNEL AND DRAINS TO SUMP IN THE WET PROCESS CELL.
 - THE HEME INTERNAL WASHDOWN PIPING THAT DOES NOT PENETRATE THE VESSEL SHELL, THE FILTER GASKETS, AND THE WASHDOWN SPRAY NOZZLES ARE QUALITY LEVEL CM.
 - THE TAG HOP-MSTR-00009 REFERS TO A COMMERCIALY AVAILABLE MISTING NOZZLE AND IS QUALITY LEVEL CM AND SEISMIC CATEGORY SC-III. THE MISTING NOZZLE IS LOCATED INSIDE THE JUMPER PRESSURE BOUNDARY.
 - DELETED
 - THIS DRAWING IS CONVERTED FROM A SINGLE SHEET TO MULTI-SHEET DRAWINGS AND, IN PART, SUPERSEDES 24590-HLW-M6-HOP-00009 REV. 6. THIS DRAWING INCLUDES INFORMATION FROM 24590-HLW-M6-HOP-00017, 24590-HLW-M6-HOP-00073, -00078, -00145, -00153, -00155, -00162, -00163, -00175, -00180, AND 24590-HLW-M6-HOP-00008.
 - ALL LINES SHOWN ON THIS DRAWING SHALL BE FREE DRAINING, EXCEPT BLACK CELL LINES WHICH ARE SELF-DRAINING, UNLESS OTHERWISE NOTED.
 - ALL AIR USERS ON HOP-RK-00027 VENT TO COMMON LINE.
 - LINES AND EQUIPMENT THAT NORMALLY CONTAIN MELTER OFFGAS ARE AIR PERMIT AFFECTING.
 - HEME HIHI LEVEL OR HEME OUTLET VALVE CLOSED TRIPS MISTER DIW VALVE (CLOSE).
 - HOP-HEME-00001A OUTLET VALVE OPEN PERMITS HOP-HEME-00001B OUTLET VALVE TO CLOSE.
 - PIPING REFERENCED TO THIS NOTE SHALL BE QUALITY LEVEL CM AND SEISMIC CATEGORY SC-III.
 - ONE OF THE TWO HEME OUTLET VALVES YV-0214/YV-0227 SHOULD ALWAYS BE OPEN. IF THIS IS NOT TRUE THE INTERLOCK STOPS MELTER FEED AND STOPS THE EXHAUSTER AND BOOSTER FANS.
 - REVISION 4 THIS DRAWING, IN PART, SUPERSEDES 24590-HLW-M6-HOP-00008, REV. 2, INCORPORATED 24590-HLW-M6-HOP-00023, -00050, 24590-HLW-M6-HOP-00012, 24590-HLW-M6-HOP-00022, REV. 1, 24590-WTP-EIE-ENG-H-0002, REV. 0, 24590-HLW-EIE-MS-19-0215, REV. 0, AND 24590-HLW-EIE-MS-19-0008, REV. 0. ADEDED/REVISED/DELETED NOTES, HOLDS AND REFERENCES. ADDED PRESSURE REGULATORS TO MISTER PIPELINES.

- HOLD/OPEN ITEMS:**
- DELETED
 - DELETED

- REFERENCES:**
- DELETED
 - 24590-HLW-320-HOP-00001, HLW P/VV AND HOP SYSTEM DESIGN DESCRIPTION

DRAWING INDEX	
DWG NO	TITLE
24590-HLW-M6-HOP-00009001	HOP SYSTEM HOP-HEME-00001A
24590-HLW-M6-HOP-00009002	HOP SYSTEM HOP-HEME-00001B

Originator	Checked	Approved	Approved	Approved
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REV	DESCRIPTION	ORG	CHKD	RVD	APVD	DATE
1	REVISED PER NOTE 23					02/22/2020
0	ISSUED FOR CONSTRUCTION SEE NOTE 15	R/R	B/S	B/P/S/S	V/D	08/29/19

PROJECT NO.	24590	RIVER PROTECTION PROJECT
SITE	HANFORD	WASTE TREATMENT PLANT
AREA	200E	4500 HILLS ST.
BUILDING NO.	30	RICHLAND, WA 99354
CONTRACT NO.	DE-AC27-01R14136	
ORIGINATOR	ROBERT J RIDER	DATE
CHECKER	KENET SLOAN	09/27/19
APPROVER	METZSCHMANN/RODOLFO	09/28/19
REVIEWER	SMITHS/PIETERS, R	09/27/19
<p>P&ID - HLW MELTER OFFGAS TREATMENT PROCESS SYSTEM MELTER 1 PRIMARY OFFGAS HEME HOP-HEME-00001A</p>		
CONTENT APPLICABLE TO ALABAMA	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	SCALE: 1"=NONE
ADR NO. 24590-HLW-M6-HOP-03-001	REV. 2	24590-HLW-M6-HOP-00009001

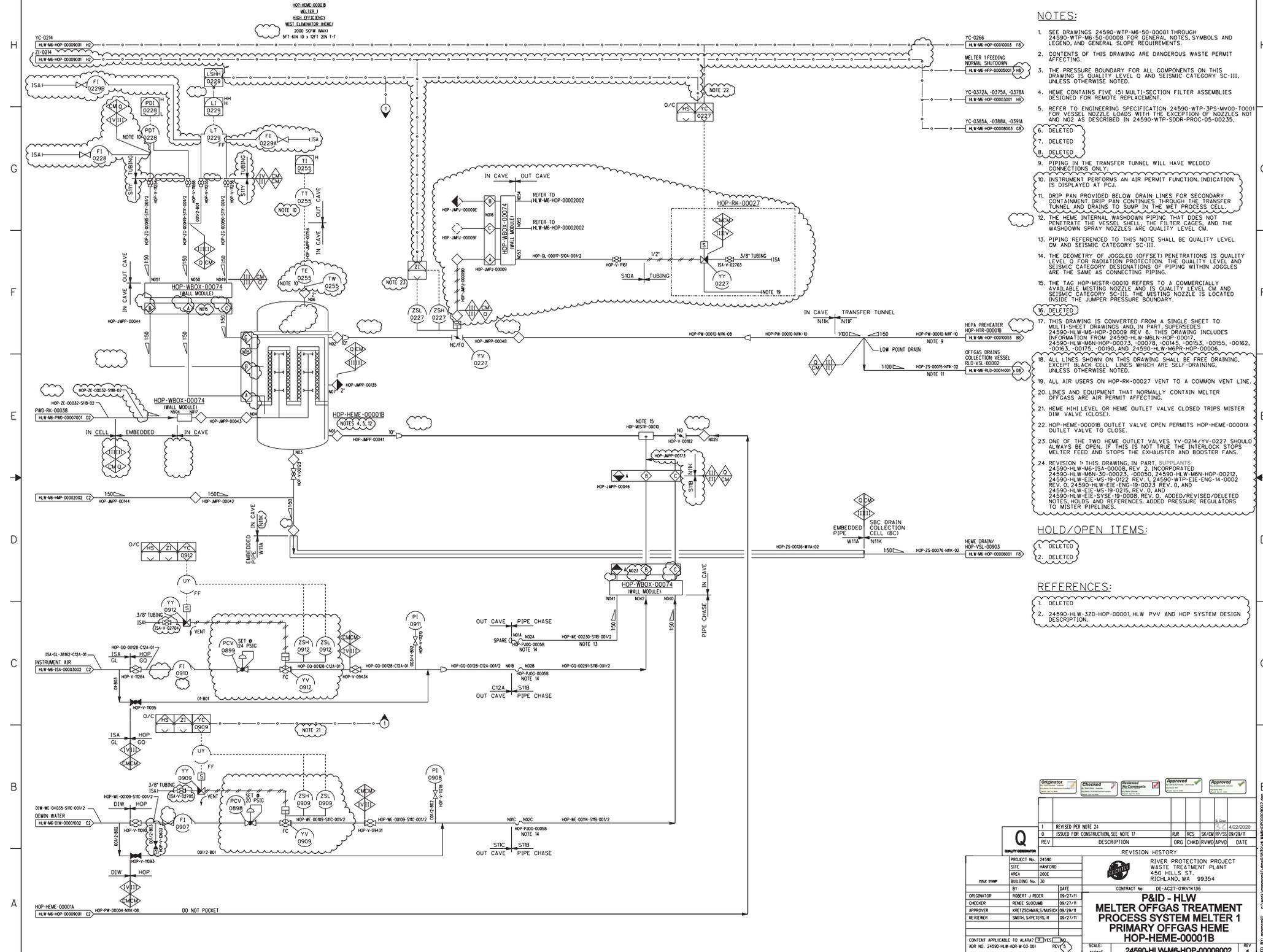


This document has been digitally signed using the ElectroSign process.

Document for Signature

Document Number: 24590-HLW-M6-HOP-00009001 **Rev:** 1

Participants	Signature	Completed	Status	Result	Comments
Final Approver	4/21/2020 6:14 PM				
Cron, Bryan		4/22/2020 1:49 PM	Completed	Approve	



- NOTES:**
- SEE DRAWINGS 24590-WTP-M6-50-00001 THROUGH 24590-WTP-M6-50-00008 FOR GENERAL NOTES, SYMBOLS AND LEGEND AND GENERAL SLOPE REQUIREMENTS.
 - CONTENTS OF THIS DRAWING ARE DANGEROUS WASTE PERMIT AFFECTING.
 - THE PRESSURE BOUNDARY FOR ALL COMPONENTS ON THIS DRAWING IS QUALITY LEVEL 0 AND SEISMIC CATEGORY SC-III, UNLESS OTHERWISE NOTED.
 - HEME CONTAINS FIVE (5) MULTI-SECTION FILTER ASSEMBLIES DESIGNED FOR REMOTE REPLACEMENT.
 - REFER TO ENGINEERING SPECIFICATION 24590-WTP-3PS-MV00-T0001 FOR VESSEL NOZZLE LOADS WITH THE EXCEPTION OF NOZZLES N01 AND N02 AS DESCRIBED IN 24590-WTP-3DOR-PROC-05-00235.
 - DELETED
 - DELETED
 - DELETED
 - PIPING IN THE TRANSFER TUNNEL WILL HAVE WELDED CONNECTIONS ONLY.
 - INSTRUMENT PERFORMS AN AIR PERMIT FUNCTION INDICATION IS DISPLAYED AT PCJ.
 - DRIP PAN PROVIDED BELOW DRAIN LINES FOR SECONDARY CONTAINMENT DRIP PAN CONTIGUES THROUGH THE TRANSFER TUNNEL AND DRAINS TO SUMP IN THE WET PROCESS CELL.
 - THE HEME INTERNAL WASHDOWN PIPING THAT DOES NOT PENETRATE THE VESSEL SHELL, THE FILTER CASES, AND THE WASHDOWN SPRAY NOZZLES ARE QUALITY LEVEL CM.
 - PIPING REFERENCED TO THIS NOTE SHALL BE QUALITY LEVEL CM AND SEISMIC CATEGORY SC-III.
 - THE GEOMETRY OF JOGGLED (OFFSET) PENETRATIONS IS QUALITY LEVEL 0 FOR RADIATION PROTECTION, THE QUALITY LEVEL CM AND SEISMIC CATEGORY DESIGNATIONS OF PIPING WITHIN JOGGLES ARE THE SAME AS CONNECTING PIPING.
 - THE TAG HOP-MISTR-00010 REFERS TO A COMMERCIALLY AVAILABLE MISTING NOZZLE AND IS QUALITY LEVEL CM AND SEISMIC CATEGORY SC-III; THE MISTING NOZZLE IS LOCATED INSIDE THE JUMPER PRESSURE BOUNDARY.
 - DELETED
 - THIS DRAWING IS CONVERTED FROM A SINGLE SHEET TO MULTI-SHEET DRAWINGS AND, IN PART, SUPERSEDES 24590-HLW-M6-HOP-20009 REV 6. THIS DRAWING INCLUDES INFORMATION FROM 24590-HLW-M6-HOP-00017, 24590-HLW-M6-HOP-00073, -00078, -00145, -00153, -00155, -00162, -00163, -00175, -00190, AND 24590-HLW-M6PR-HOP-00006.
 - ALL LINES SHOWN ON THIS DRAWING SHALL BE FREE DRAINING, EXCEPT BLACK CELL LINES WHICH ARE SELF-DRAINING, UNLESS OTHERWISE NOTED.
 - ALL AIR USERS ON HOP-RK-00027 VENT TO A COMMON VENT LINE.
 - LINES AND EQUIPMENT THAT NORMALLY CONTAIN MELTER OFFGASS ARE AIR PERMIT AFFECTING.
 - HEME HIHI LEVEL OR HEME OUTLET VALVE CLOSED TRIPS MISTER DIW VALVE (LOW NOZZLES ARE QUALITY LEVEL CM).
 - HEME HIHI LEVEL OR HEME OUTLET VALVE CLOSED TRIPS MISTER DIW VALVE (LOW NOZZLES ARE QUALITY LEVEL CM).
 - ONE OF THE TWO HEME OUTLET VALVES YY-0214/YY-0227 SHOULD ALWAYS BE OPEN, IF THIS IS NOT TRUE THE INTERLOCK STOPS MELTER FEED AND STOPS THE EXHAUSTER AND BOOSTER FANS.
 - REVISION 1: THIS DRAWING, IN PART, SUPPLANTS 24590-HLW-M6-ISA-00008, REV 2, INCORPORATED 24590-HLW-M6-ISA-00021, -00050, 24590-HLW-M6-HOP-00212, 24590-HLW-EIE-MS-19-0122 REV 1, 24590-WTP-EIE-ENG-14-0002 REV 0, 24590-HLW-EIE-ENG-19-0023 REV 0, AND 24590-HLW-EIE-MS-19-0215, REV 0, AND 24590-HLW-EIE-SYSE-19-0008, REV 0, ADDED/REVISED/DELETED NOTES, HODS, AND REFERENCES; ADDED PRESSURE REGULATORS TO MISTER PIPELINES.

- HOLD/OPEN ITEMS:**
- DELETED
 - DELETED

- REFERENCES:**
- DELETED
 - 24590-HLW-320-HOP-00001, HLW PVV AND HOP SYSTEM DESIGN DESCRIPTION

Originator	Checked	Reviewed	Approved	Approved																																								
<table border="1"> <thead> <tr> <th>REV</th> <th>DESCRIPTION</th> <th>ORG</th> <th>CHKD</th> <th>RVWD</th> <th>APVD</th> <th>DATE</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>REVISED PER NOTE 24</td> <td></td> <td></td> <td></td> <td></td> <td>4/22/2020</td> </tr> <tr> <td>0</td> <td>ISSUED FOR CONSTRUCTION SEE NOTE 17</td> <td>RJR</td> <td>BKS</td> <td>SK/DW</td> <td>SS/DB</td> <td>09/29/11</td> </tr> </tbody> </table>					REV	DESCRIPTION	ORG	CHKD	RVWD	APVD	DATE	1	REVISED PER NOTE 24					4/22/2020	0	ISSUED FOR CONSTRUCTION SEE NOTE 17	RJR	BKS	SK/DW	SS/DB	09/29/11																			
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1	REVISED PER NOTE 24					4/22/2020																																						
0	ISSUED FOR CONSTRUCTION SEE NOTE 17	RJR	BKS	SK/DW	SS/DB	09/29/11																																						
<table border="1"> <thead> <tr> <th colspan="2">PROJECT No.</th> <th colspan="2">REVISION HISTORY</th> </tr> </thead> <tbody> <tr> <td>24590</td> <td>DE-AC27-01RV14136</td> <td></td> <td></td> </tr> <tr> <td colspan="2">SITE</td> <td colspan="2">RIVER PROTECTION PROJECT</td> </tr> <tr> <td colspan="2">HAMFORD</td> <td colspan="2">450 HILLS ST.</td> </tr> <tr> <td colspan="2">BUILDING No.</td> <td colspan="2">RICHLAND, WA 99354</td> </tr> <tr> <td colspan="2">CONTRACT No.</td> <td colspan="2">DE-AC27-01RV14136</td> </tr> <tr> <td colspan="2">ORIGINATOR</td> <td colspan="2">BY</td> </tr> <tr> <td colspan="2">CHECKER</td> <td colspan="2">DATE</td> </tr> <tr> <td colspan="2">APPROVER</td> <td colspan="2">DATE</td> </tr> <tr> <td colspan="2">REVIEWER</td> <td colspan="2">DATE</td> </tr> </tbody> </table>					PROJECT No.		REVISION HISTORY		24590	DE-AC27-01RV14136			SITE		RIVER PROTECTION PROJECT		HAMFORD		450 HILLS ST.		BUILDING No.		RICHLAND, WA 99354		CONTRACT No.		DE-AC27-01RV14136		ORIGINATOR		BY		CHECKER		DATE		APPROVER		DATE		REVIEWER		DATE	
PROJECT No.		REVISION HISTORY																																										
24590	DE-AC27-01RV14136																																											
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CONTRACT No.		DE-AC27-01RV14136																																										
ORIGINATOR		BY																																										
CHECKER		DATE																																										
APPROVER		DATE																																										
REVIEWER		DATE																																										
<p>P&ID - HLW MELTER OFFGAS TREATMENT PROCESS SYSTEM MELTER 1 PRIMARY OFFGAS HEME HOP-HEME-00001B</p>																																												
<p>CONTENT APPLICABLE TO ALABAMA YES <input type="checkbox"/> NO <input checked="" type="checkbox"/></p>																																												



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Document Number: 24590-HLW-M6-HOP-00009002 **Rev:** 1

Participants	Signature	Completed	Status	Result	Comments
Final Approver	4/21/2020 6:15 PM				
Cron, Bryan		4/22/2020 1:50 PM	Completed	Approve	



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Document Number: 24590-HLW-M6-HOP-20001001 **Rev:** 1

Participants	Signature	Completed	Status	Result	Comments
Final Approver	5/4/2020 7:14 PM				
Cron, Bryan		5/5/2020 12:04 AM	Completed	Approve	

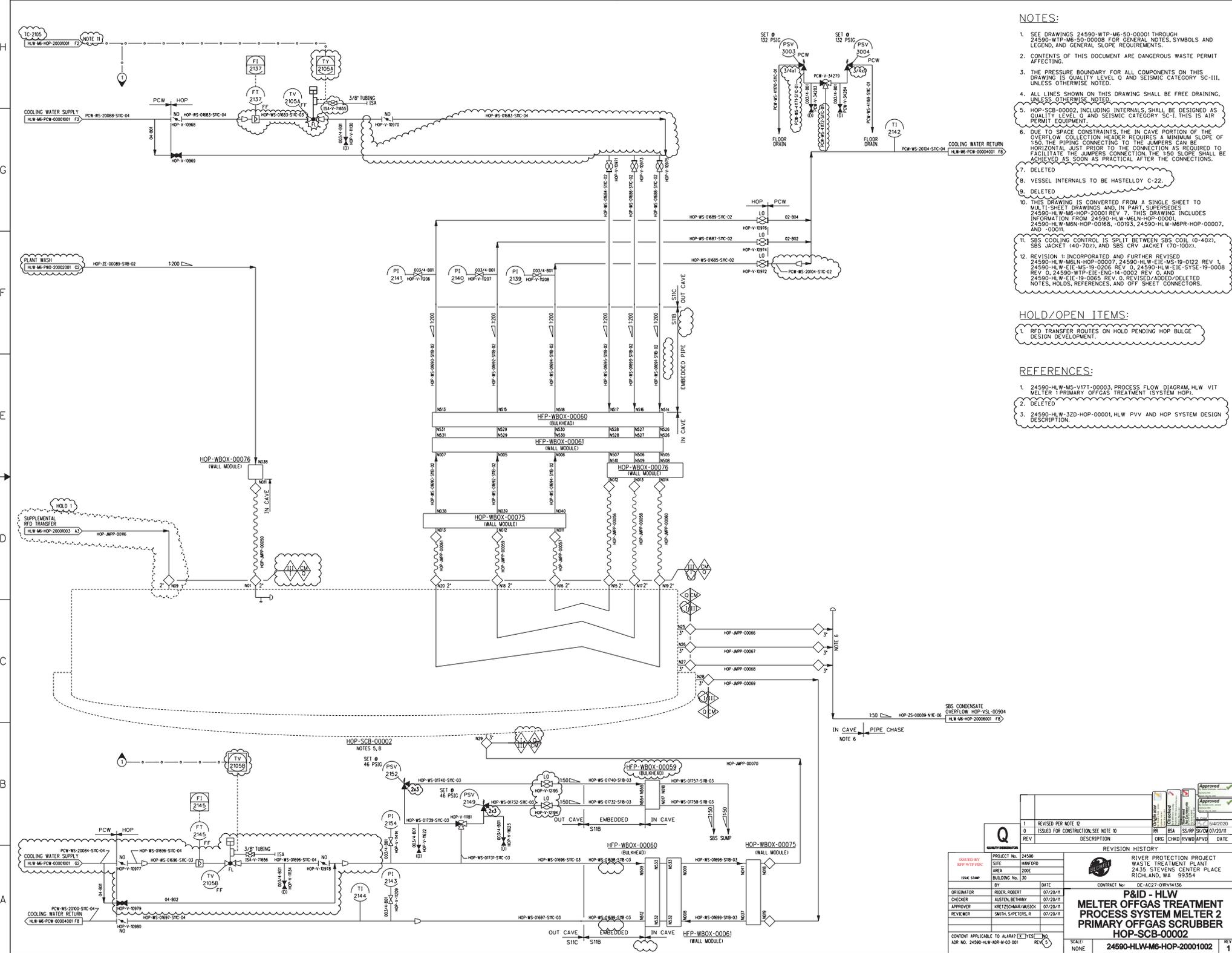


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Document for Signature

Document Number: 24590-HLW-M6-HOP-20001001 **Rev:** 1

Participants	Signature	Completed	Status	Result	Comments
Final Approver	5/11/2020 1:53 PM				
Rider, Robert		5/11/2020 1:53 PM	Completed	Approve	



- NOTES:**
- SEE DRAWINGS 24590-WTP-M6-50-00001 THROUGH 24590-WTP-M6-50-00008 FOR GENERAL NOTES, SYMBOLS AND LEGEND, AND GENERAL SLOPE REQUIREMENTS.
 - CONTENTS OF THIS DOCUMENT ARE DANGEROUS WASTE PERMIT AFFECTING.
 - THE PRESSURE BOUNDARY FOR ALL COMPONENTS ON THIS DRAWING IS QUALITY LEVEL Q AND SEISMIC CATEGORY SC-III, UNLESS OTHERWISE NOTED.
 - ALL LINES SHOWN ON THIS DRAWING SHALL BE FREE DRAINING, UNLESS OTHERWISE NOTED.
 - HOP-SCB-00002, INCLUDING INTERNALS, SHALL BE DESIGNED AS QUALITY LEVEL Q AND SEISMIC CATEGORY SC-I. THIS IS AIR PERMIT EQUIPMENT.
 - DUE TO SPACE CONSTRAINTS, THE IN CAVE PORTION OF THE OVERFLOW COLLECTION HEADER REQUIRES A MINIMUM SLOPE OF 1:50. THE PIPING CONNECTING TO THE JUMPERS CAN BE HORIZONTAL JUST PRIOR TO THE CONNECTION AS REQUIRED TO FACILITATE THE JUMPERS CONNECTION. THE 1:50 SLOPE SHALL BE ACHIEVED AS SOON AS PRACTICAL AFTER THE CONNECTIONS.
 - DELETED
 - VESSEL INTERNALS TO BE HASTELLOY C-22.
 - DELETED
 - THIS DRAWING IS CONVERTED FROM A SINGLE SHEET TO MULTI-SHEET DRAWINGS AND, IN PART, SUPERSEDES 24590-HLW-M6-HOP-20001 REV 7. THIS DRAWING INCLUDES INFORMATION FROM 24590-HLW-MELN-HOP-00001, 24590-HLW-MEN-HOP-00065, -00063, 24590-HLW-M6PR-HOP-00007, AND -00011.
 - SBS COOLING CONTROL IS SPLIT BETWEEN SBS COIL LO-4021, SBS JACKET 140-7021, AND SBS DRV JACKET 170-10021.
 - REVISION 1: INCORPORATED AND FURTHER REVISED 24590-HLW-MELN-HOP-00007, 24590-HLW-EIE-MS-19-0205 REV 0, 24590-HLW-EIE-SYSE-19-0008 REV 0, 24590-WTP-EIE-ENG-HA-0002 REV 0, AND 24590-HLW-EIE-19-0065 REV 0. REVISED/ADDED/DELETED NOTES, HOLDs, REFERENCES, AND OIT SHEET CONNECTIONS.

- HOLD/OPEN ITEMS:**
- HFD TRANSFER ROUTES ON HOLD PENDING HOP BULGE DESIGN DEVELOPMENT.

- REFERENCES:**
- 24590-HLW-M5-V171-00003, PROCESS FLOW DIAGRAM, HLW VIT MELTER 1 PRIMARY OFFGAS TREATMENT (SYSTEM HOP).
 - DELETED
 - 24590-HLW-32D-HOP-00001, HLW P/VV AND HOP SYSTEM DESIGN DESCRIPTION

ISSUED BY		PROJECT No.	DATE
RPP-WTP-FDC		24590	07/20/11
SITE		HAW ORD	07/20/11
AREA		2006	07/20/11
ISSUE STAMP		BUILDING No. 30	07/20/11
BY		DATE	DATE
ORIGINATOR		RUBIN, ROBERT	07/20/11
CHECKER		MCELLEN, BETHANY	07/20/11
APPROVER		KRETZSCHMAR, MICKO	07/20/11
REVIEWER		SMITH, SYNETERS, II	07/20/11

REV	DESCRIPTION	ORG	CHKD	RVWD	APVD	DATE
1	REVISED PER NOTE 10	SR	BSA	SS/RP	SK/DW	07/20/11
0	ISSUED FOR CONSTRUCTION, SEE NOTE 10	SR	BSA	SS/RP	SK/DW	07/20/11

QUALITY ASSURANCE		REVISION HISTORY	
ISSUED BY	PROJECT No.	DATE	DATE
RPP-WTP-FDC	24590	07/20/11	07/20/11
SITE	HAW ORD	07/20/11	07/20/11
AREA	2006	07/20/11	07/20/11
ISSUE STAMP	BUILDING No. 30	07/20/11	07/20/11
BY	DATE	DATE	DATE
ORIGINATOR	RUBIN, ROBERT	07/20/11	07/20/11
CHECKER	MCELLEN, BETHANY	07/20/11	07/20/11
APPROVER	KRETZSCHMAR, MICKO	07/20/11	07/20/11
REVIEWER	SMITH, SYNETERS, II	07/20/11	07/20/11

PROJECT INFORMATION		CONTRACT No.	
RIVER PROTECTION PROJECT WASTE TREATMENT PLANT 2435 STEVENS CENTER PLACE RICHLAND, WA 99354		DE-AC27-01RV14136	
P&ID - HLW MELTER OFFGAS TREATMENT PRIMARY OFFGAS SCRUBBER HOP-SCB-00002		SCALE: NONE	
CONTENT APPLICABLE TO ALARMA () YES () NO ()		SCALE: NONE	
ADR No. 24590-HLW-ADR-W-03-001		SCALE: NONE	

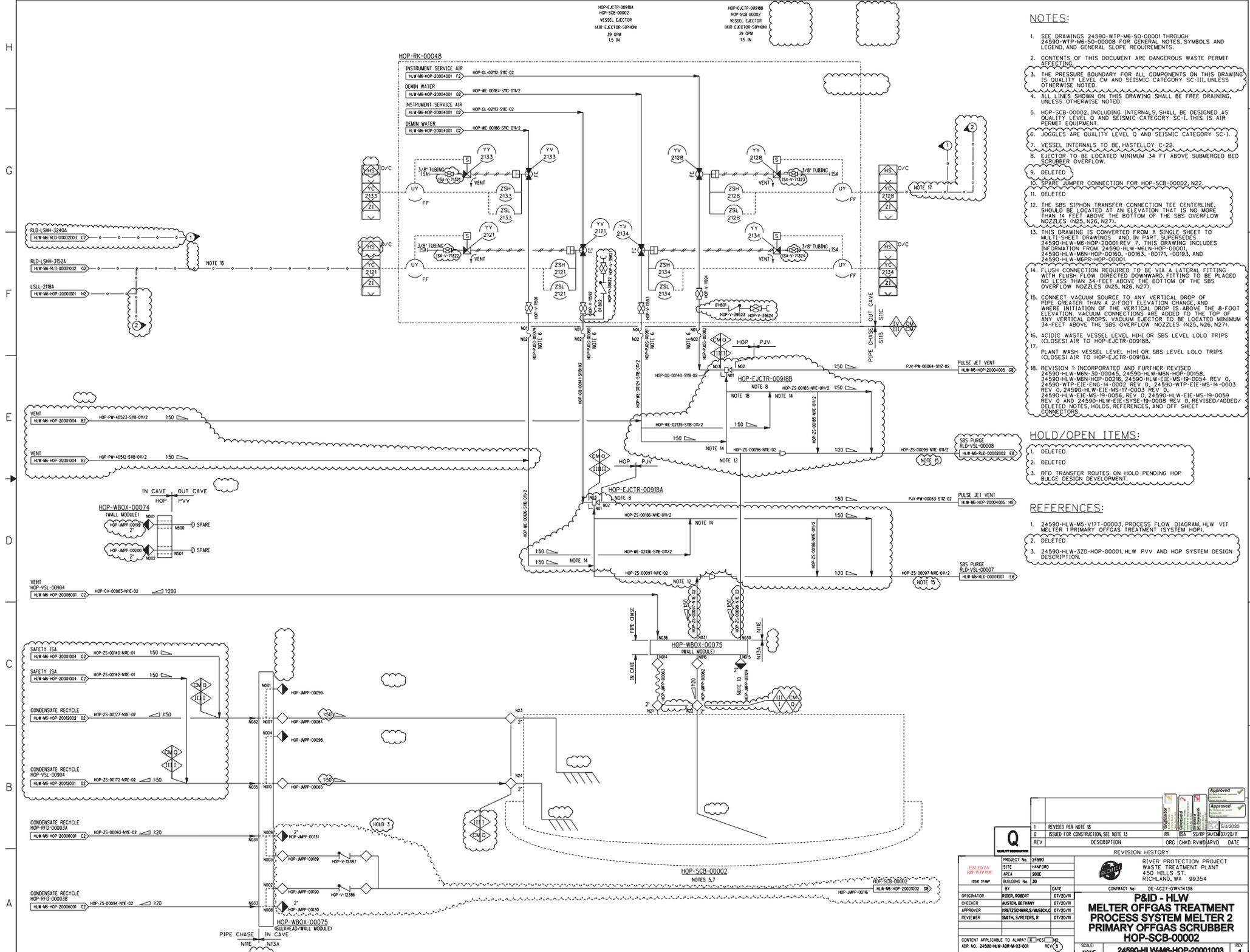


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Document for Signature

Document Number: 24590-HLW-M6-HOP-20001002 **Rev:** 1

Participants	Signature	Completed	Status	Result	Comments
Final Approver	5/4/2020 7:15 PM				
Cron, Bryan		5/5/2020 12:05 AM	Completed	Approve	



- NOTES:**
- SEE DRAWINGS 24590-WTP-M6-50-00001 THROUGH 24590-WTP-M6-50-00008 FOR GENERAL NOTES, SYMBOLS AND LEGEND, AND GENERAL SLOPE REQUIREMENTS.
 - CONTENTS OF THIS DOCUMENT ARE DANGEROUS WASTE PERMIT AFFECTING.
 - THE PRESSURE BOUNDARY FOR ALL COMPONENTS ON THIS DRAWING IS QUALITY LEVEL QM AND SEISMIC CATEGORY SC-III UNLESS OTHERWISE NOTED.
 - ALL LINES SHOWN ON THIS DRAWING SHALL BE FREE DRAINING, UNLESS OTHERWISE NOTED.
 - HOP-SCB-00002, INCLUDING INTERNALS, SHALL BE DESIGNED AS QUALITY LEVEL Q AND SEISMIC CATEGORY SC-I. THIS IS AIR PERMIT EQUIPMENT.
 - JOGGLES ARE QUALITY LEVEL Q AND SEISMIC CATEGORY SC-I.
 - VESSEL INTERNALS TO BE HASTELLOY C-22.
 - EJECTOR TO BE LOCATED MINIMUM 34 FT ABOVE SUBMERGED BED SCRUBBER OVERFLOW.
 - DELETED
 - SPARE JUMPER CONNECTION FOR HOP-SCB-00002, N22.
 - DELETED
 - THE SBS SIPHON TRANSFER CONNECTION TEE CENTERLINE, SHOULD BE LOCATED AT AN ELEVATION THAT IS NO MORE THAN 14 FEET ABOVE THE BOTTOM OF THE SBS OVERFLOW NOZZLES (N25, N26, N27).
 - THIS DRAWING IS CONVERTED FROM A SINGLE SHEET TO MULTI-SHEET DRAWINGS AND, IN PART, SUPERSEDES 24590-HLW-M6-HOP-20001 REV 7. THIS DRAWING INCLUDES INFORMATION FROM 24590-HLW-M6LN-HOP-00001, 24590-HLW-M6LN-HOP-00002, 00003, 00013, 00193, AND 24590-HLW-M6PR-HOP-00001.
 - FLUSH CONNECTION REQUIRED TO BE VIA A LATERAL FITTING WITH FLUSH FLOW DIRECTED DOWNWARD. FITTING TO BE PLACED NO LESS THAN 34 FEET ABOVE THE BOTTOM OF THE SBS OVERFLOW NOZZLES (N25, N26, N27).
 - CONNECT VACUUM SOURCE TO ANY VERTICAL DROP OF PIPE GREATER THAN A 2 FOOT ELEVATION CHANGE, AND WHERE INITIATION OF THE VERTICAL DROP IS ABOVE THE 8-FOOT ELEVATION. VACUUM CONNECTIONS ARE ADDED TO THE TOP OF ANY VERTICAL DROPS. VACUUM EJECTOR TO BE LOCATED MINIMUM 34 FEET ABOVE THE SBS OVERFLOW NOZZLES (N25, N26, N27).
 - ACIDIC WASTE VESSEL LEVEL HH1 OR SBS LEVEL LOLO TRIPS (CLOSES) AIR TO HOP-EJCTR-00918B.
 - PLANT WASH VESSEL LEVEL HH1 OR SBS LEVEL LOLO TRIPS (CLOSES) AIR TO HOP-EJCTR-00918A.
 - REVISION I: INCORPORATED AND FURTHER REVISED 24590-HLW-M6N-30-00045, 24590-HLW-M6N-HOP-00058, 24590-HLW-M6N-HOP-00059, 24590-HLW-EIE-MS-14-0003 REV 0, 24590-WTP-EIE-ENC-14-0002 REV 0, 24590-WTP-EIE-MS-14-0003 REV 0, 24590-HLW-EIE-MS-17-0003 REV 0, 24590-HLW-EIE-MS-19-0056, REV 0, 24590-HLW-EIE-MS-19-0059 REV 0 AND 24590-HLW-EIE-SS-19-0008 REV 0 REVISED/ADDED/DELETED, NOTES, HOLDS, REFERENCES, AND OFF SHEET CONNECTIONS.

- HOLD/OPEN ITEMS:**
- DELETED
 - DELETED
 - RFD TRANSFER ROUTES ON HOLD PENDING HOP RULGE DESIGN DEVELOPMENT.

- REFERENCES:**
- 24590-HLW-M5-V171-00003, PROCESS FLOW DIAGRAM, HLW VIT MELTER 1 PRIMARY OFFGAS TREATMENT (SYSTEM HOP).
 - DELETED
 - 24590-HLW-32D-HOP-00001, HLW P/VV AND HOP SYSTEM DESIGN DESCRIPTION.

<p>Q QUALITY INDICATOR</p>	1	REVISED PER NOTE 13		24/02/20		
	0	ISSUED FOR CONSTRUCTION, SEE NOTE 13	RR	SEA	SS/PP	24/01/20/21
REV		DESCRIPTION	ORG	CHWD	RW/MD/VD	DATE
<p>REVISION HISTORY</p>						
<p>PROJECT No: 24590</p>		<p>RIVER PROTECTION PROJECT WASTE TREATMENT PLANT 450 HILLS ST. RICHLAND, WA 99354</p>				
<p>ISSUED BY: HAW ORD</p>		<p>CONTRACT No: DE-AC27-01RW14136</p>				
<p>BUILDING No: 30</p>		<p>P&ID - HLW MELTER OFFGAS TREATMENT PROCESS SYSTEM MELTER 2 PRIMARY OFFGAS SCRUBBER HOP-SCB-00002</p>				
<p>BY: [Signature]</p>		<p>SCALE: NONE</p>				
<p>DATE: 07/20/11</p>		<p>24590-HLW-M6-HOP-20001003</p>				
<p>CHECKER: [Signature]</p>		<p>SCALE: 1</p>				
<p>DATE: 07/20/11</p>		<p>4/30/2020 3:24:30 PM</p>				
<p>APPROVER: [Signature]</p>		<p>COMPUTER GENERATED - MANUAL DESIGN CHANGES NOT PERMITTED</p>				
<p>DATE: 07/20/11</p>		<p>REV 5</p>				
<p>REVIEWER: [Signature]</p>		<p>CONTENT APPLICABLE TO ALARA: YES [X] NO []</p>				
<p>DATE: 07/20/11</p>		<p>ADR No. 24590-HLW-ADR-01-03-01</p>				

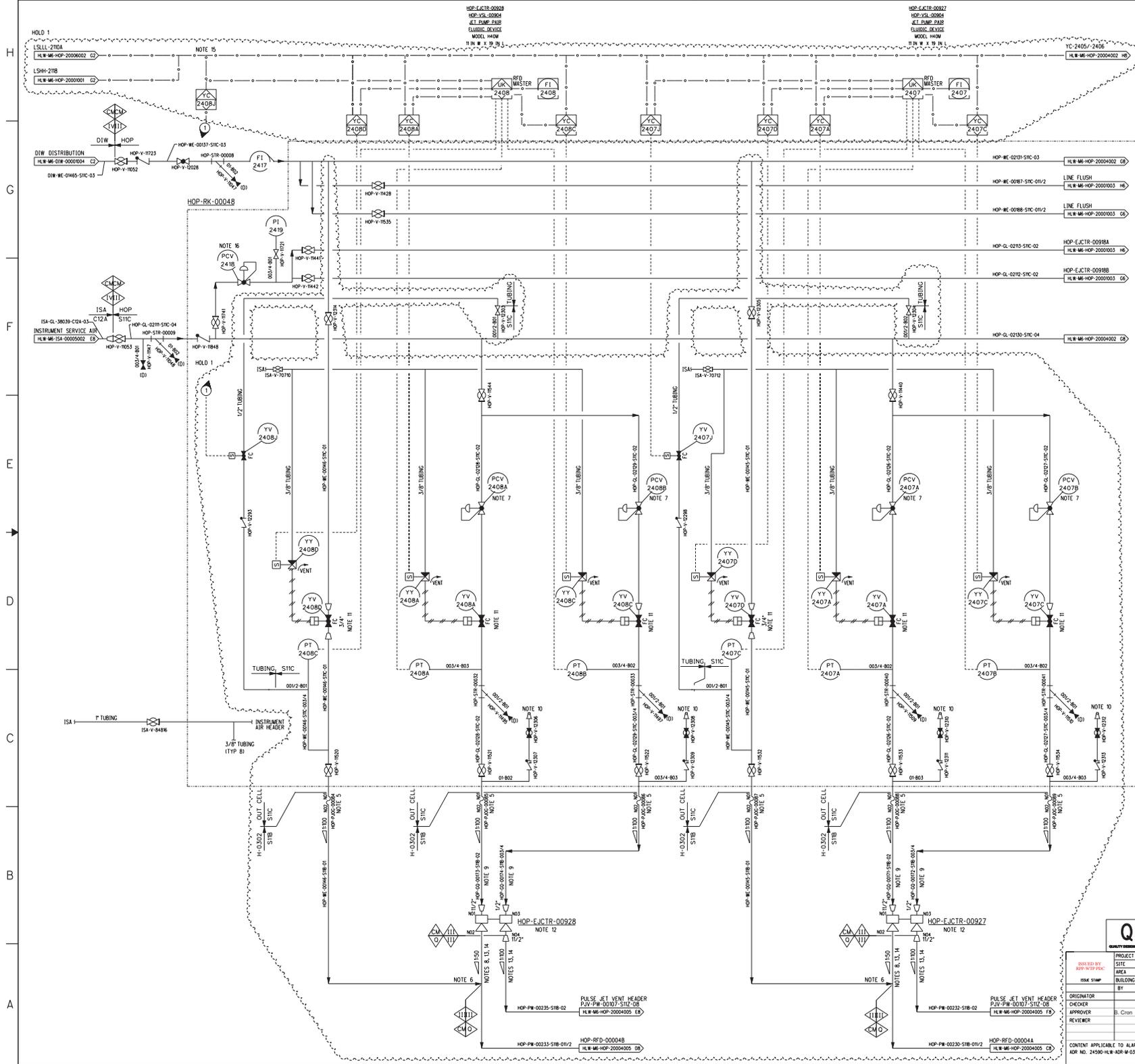


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Document Number: 24590-HLW-M6-HOP-20001003 **Rev:** 1

Participants	Signature	Completed	Status	Result	Comments
Final Approver	5/4/2020 7:16 PM				
Cron, Bryan		5/5/2020 12:06 AM	Completed	Approve	



- NOTES:**
- SEE DRAWING 24590-WTP-M6-S0-00001 THROUGH 24590-WTP-M6-S0-00008 FOR GENERAL NOTES, SYMBOLS AND LEGEND, AND GENERAL SLOPE REQUIREMENTS
 - CONTENTS OF THIS DOCUMENT ARE DANGEROUS WASTE PERMIT AFFECTING.
 - THE PRESSURE BOUNDARY FOR ALL COMPONENTS ON THIS DRAWING IS QUALITY LEVEL CM AND SEISMIC CATEGORY SC-II, UNLESS OTHERWISE NOTED.
 - ALL LINES SHOWN ON THIS DRAWING SHALL BE FREE DRAINING, EXCEPT BLACK CELL LINES WHICH ARE SELF-DRAINING, DO NOT POCKET, UNLESS OTHERWISE NOTED.
 - JOOGLES ARE QUALITY LEVEL Q AND SEISMIC CATEGORY SC-I.
 - A LATERAL FITTING IS TO BE USED AT THIS LOCATION TO ACCOMMODATE CLEANING OF PIPE AND EQUIPMENT.
 - PCV SETPOINT TO BE DETERMINED DURING PUM COMMISSIONING PER 24590-WTP-J00-G01W-00001.
 - PROVIDE VERTICAL CONNECTION OF AIR LINK LINE AT VESSEL NOZZLE AND MAXIMIZE LENGTH BEFORE FIRST BEND. MINIMIZE NUMBER OF BENDS PRIOR TO BAROMETRIC HEAD (34 FEET) ABOVE VESSEL TOP HEAD. DIFFERENCE IN LENGTH OF ALL AIR LINK LINES TO SAME VESSEL SHOULD BE MINIMIZED AND NOT EXCEED 50 FEET.
 - EJECTORS SHALL BE LOCATED 15 FT OR LESS BELOW THE BOTTOM OF THE 58 FT ELEVATION FLOOR, AND A MINIMUM OF 35 FEET ABOVE TOP OF VESSEL HOP-VSL-00904 HEAD.
 - FLUSH CONNECTION PROVIDED FOR PLANT WASH, REAGENT, NITRIC ACID, AND SERVICE AIR.
 - VALVE TYPE SHOWN IS A GENERAL SYMBOL. ANGLE SEAT VALVES ARE USED FOR RFD/PAM APPLICATIONS.
 - JPP EJECTORS ARE TO BE POSITIONED VERTICALLY.
 - ALL PIPING WITH FLUID SERVICE PW IS AIR PERMIT AFFECTING.
 - SBS HI HI AND SBS CRV LO LO LEVEL TRIPS (CLOSE) RFD DRIVE, SUCTION, AND FLUSH VALVES.
 - PCV SETPOINT TO BE BASED ON SBS SIPHON EJECTOR VENDOR SUBMITTAL.
 - THIS DRAWING IS CONVERTED FROM A SINGLE SHEET TO MULTI-SHEET DRAWINGS AND, IN PART, SUPERSEDES 24590-HLW-M6-HOP-20004, REV. 6. THIS DRAWING INCLUDES INFORMATION FROM 24590-HLW-M6-HOP-00055, 24590-HLW-M6-HOP-00064, 24590-HLW-M6-HOP-00209, 24590-HLW-M6-HOP-00012, 24590-HLW-EIE-SYS-19-0008, REV. D, AND 24590-HLW-EIE-19-0056, REV. D. ADDED ISOLATION VALVES TO FLUSH LINES AND AIR LINK LINE PRESSURE TRANSMITTERS. ADDED ISA PURGE TO FLUSH LINE PRESSURE TRANSMITTERS. REMOVED FLUSH CONNECTION ON DIW AND ISA HEADERS AND ADDED FLUSH CONNECTION ON AIR LINK LINES. RE-SEQUENCED RACK CONNECTIONS TO ISA AND DIW HEADERS. REVISED SLOPE FOR AIR LINK LINES BELOW JPPs.

HOLD/OPEN ITEMS:

- ON HOLD PENDING TENDR ISSUANCE FOR PUMP DESIGN.

REFERENCES:

- 24590-HLW-320-HOP-00001, HLW PVV AND HOP SYSTEM DESIGN DESCRIPTION.

DWG NO	DRAWING INDEX	TITLE
24590-HLW-M6-HOP-200040001	HOP MELTER 2 OFFGAS FLUIDICS AIR RACK	HOP-RK-00048
24590-HLW-M6-HOP-200040002	HOP MELTER 2 OFFGAS FLUIDICS AIR RACK	HOP-RK-00048
24590-HLW-M6-HOP-200040003	HOP MELTER 2 OFFGAS FLUIDICS AIR RACK	HOP-RK-00048
24590-HLW-M6-HOP-200040004	HOP MELTER 2 OFFGAS FLUIDICS AIR RACK	HOP-RK-00048
24590-HLW-M6-HOP-200040005	HOP MELTER 2 OFFGAS FLUIDICS AIR RACK	HOP-VSL-00904

Originator	Checked	Reviewed/Complete	Approved	Approved
[Signature]	[Signature]	[Signature]	[Signature]	[Signature]

ISSUED BY: RFP-WTP-PDC	PROJECT No: 24590	DATE: 4/27/2020
AREA: 2000	SITE: HAW ORD	
ISSUE NO: 30	REV: 000	
BY: [Signature]	DATE: 4/27/2020	
CHECKER: [Signature]		
APPROVER: B. Cron		
REVIEWER: [Signature]		

CONTRACT No: DE-AC27-01RV14136	PROJECT: RIVER PROTECTION PROJECT
	WASTE TREATMENT PLANT
	2435 STEVENS CENTER PLACE
	RICHLAND, WA 99354
P&ID - HLW MELTER OFFGAS TREATMENT PROCESS SYSTEM	
MELTER 2 OFFGAS FLUIDICS AIR RACK - HOP-RK-00048	
CONTENT APPLICABLE TO ALARA: <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	SCALE: NONE
FOR NO. 24590-HLW-ADR-W-03-001	REV. 5
24590-HLW-M6-HOP-200040001	

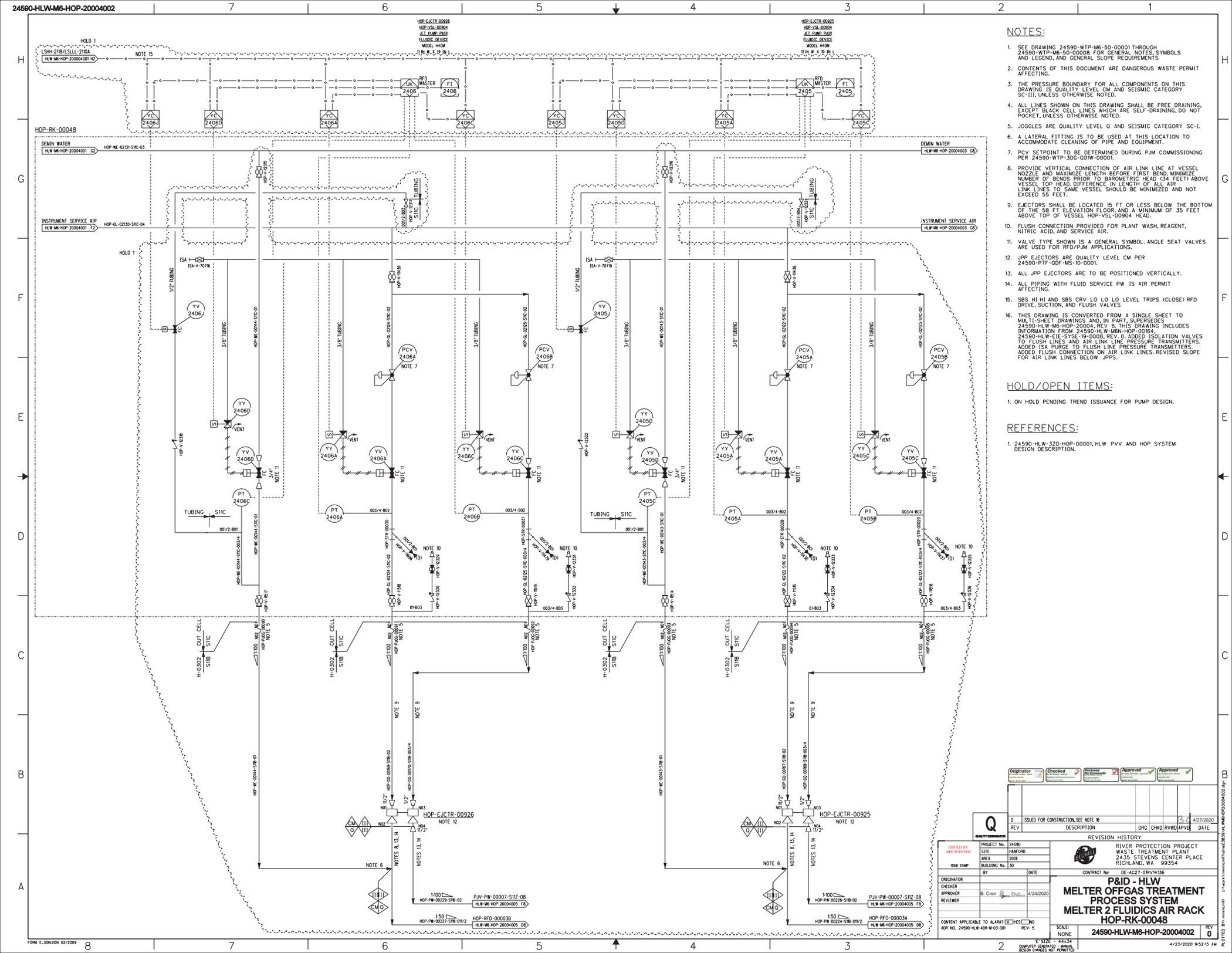


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Document Number: 24590-HLW-M6-HOP-20004001 **Rev:** 0

Participants	Signature	Completed	Status	Result	Comments
Final Approver	4/27/2020 12:53 PM				
Cron, Bryan		4/27/2020 8:56 PM	Completed	Approve	



- NOTES:**
- SEE DRAWING 24590-WTP-M6-50-0001 THROUGH 24590-WTP-M6-50-0008 FOR GENERAL NOTES, SYMBOLS AND LEGEND, AND GENERAL SLOPE REQUIREMENTS
 - CONTENTS OF THIS DOCUMENT ARE DANGEROUS WASTE PERMIT AFFECTING.
 - THE PRESSURE BOUNDARY FOR ALL COMPONENTS ON THIS DRAWING IS QUALITY LEVEL CM AND SEISMIC CATEGORY SC-III, UNLESS OTHERWISE NOTED.
 - ALL LINES SHOWN ON THIS DRAWING SHALL BE FREE DRAINING, EXCEPT BLACK CELL LINES WHICH ARE SELF-DRAINING, DO NOT POCKET, UNLESS OTHERWISE NOTED.
 - JOGGLES ARE QUALITY LEVEL O AND SEISMIC CATEGORY SC-1.
 - A LATERAL FITTING IS TO BE USED AT THIS LOCATION TO ACCOMMODATE CLEANING OF PIPE AND EQUIPMENT.
 - PCV SETPOINT TO BE DETERMINED DURING PUMP COMMISSIONING PER 24590-WTP-320-G01W-0001.
 - PROVIDE VERTICAL CONNECTION OF AIR LINK LINE AT VESSEL NOZZLE AND MAXIMIZE LENGTH BEFORE FIRST BEND. MINIMIZE NUMBER OF BENDS PRIOR TO BAROMETRIC HEAD (34 FEET) ABOVE VESSEL TOP HEAD. DIFFERENCE IN LENGTH OF ALL AIR LINK LINES TO SAME VESSEL SHOULD BE MINIMIZED AND NOT EXCEED 55 FEET.
 - EJECTORS SHALL BE LOCATED 15 FT OR LESS BELOW THE BOTTOM OF THE 58 FT ELEVATION FLOOR, AND A MINIMUM OF 35 FEET ABOVE TOP OF VESSEL HOP-VSL-00904 HEAD.
 - FLUSH CONNECTION PROVIDED FOR PLANT WASH, REAGENT, NITRIC ACID, AND SERVICE AIR.
 - VALVE TYPE SHOWN IS A GENERAL SYMBOL. ANGLE SEAT VALVES ARE USED FOR RFD/PAM APPLICATIONS.
 - JPP EJECTORS ARE QUALITY LEVEL CM PER 24590-PTF-00F-MS-10-0001.
 - ALL JPP EJECTORS ARE TO BE POSITIONED VERTICALLY.
 - ALL PIPING WITH FLUID SERVICE PW IS AIR PERMIT AFFECTING.
 - SBS HI HI AND SBS CRV LO LO LO LEVEL TRIPS (CLOSE) RFD DRIVE, SUCTION, AND FLUSH VALVES
 - THIS DRAWING IS CONVERTED FROM A SINGLE SHEET TO MULTI-SHEET DRAWINGS AND, IN PART, SUPERSEDES 24590-HLW-M6-HOP-0004, REV. 6. THIS DRAWING INCLUDES INFORMATION FROM 24590-HLW-M6N-HOP-0014, 24590-HLW-EIE-SYS-19-0008, REV. D. ADDED ISOLATION VALVES TO FLUSH LINES AND AIR LINK LINE PRESSURE TRANSMITTERS. ADDED FLUSH CONNECTION ON AIR LINK LINES. REVISED SLOPE FOR AIR LINK LINES BELOW JPPS.

- HOLD/OPEN ITEMS:**
- ON HOLD PENDING TREND ISSUANCE FOR PUMP DESIGN.

- REFERENCES:**
- 24590-HLW-320-HOP-00001, HLW PVV AND HOP SYSTEM DESIGN DESCRIPTION.

<table border="1"> <tr> <td>Originator</td> <td>Checked</td> <td>Reviewed</td> <td>Approved</td> <td>Approved</td> </tr> </table>		Originator	Checked	Reviewed	Approved	Approved
Originator	Checked	Reviewed	Approved	Approved		
ISSUED BY	PROJECT No.	DATE	REV	DESCRIPTION	DATE	
HOP-WTP-PDC	24590	4/24/2020	0	ISSUED FOR CONSTRUCTION. SEE NOTE 6	4/27/2020	
ISSUE STAMP	SITE AREA	BUILDING No.	30	ORG	CHWD/RVWD/APVE	
BY	DATE	REVISION HISTORY RIVER PROTECTION PROJECT WASTE TREATMENT PLANT 2435 STEVENS CENTER PLACE RICHLAND, WA 99354				
CHECKER	DATE	CONTRACT No.: DE-AC27-01RV14136 P&ID - HLW MELTER OFFGAS TREATMENT PROCESS SYSTEM MELTER 2 FLUIDICS AIR RACK HOP-RK-00048				
APPROVER	DATE	SCALE: 1" = 442.34' 24590-HLW-M6-HOP-20004002				
REVIEWER	DATE	CONTENT APPLICABLE TO ALARA? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO ADR No. 24590-HLW-ADR-W-03-001 REV. 5				

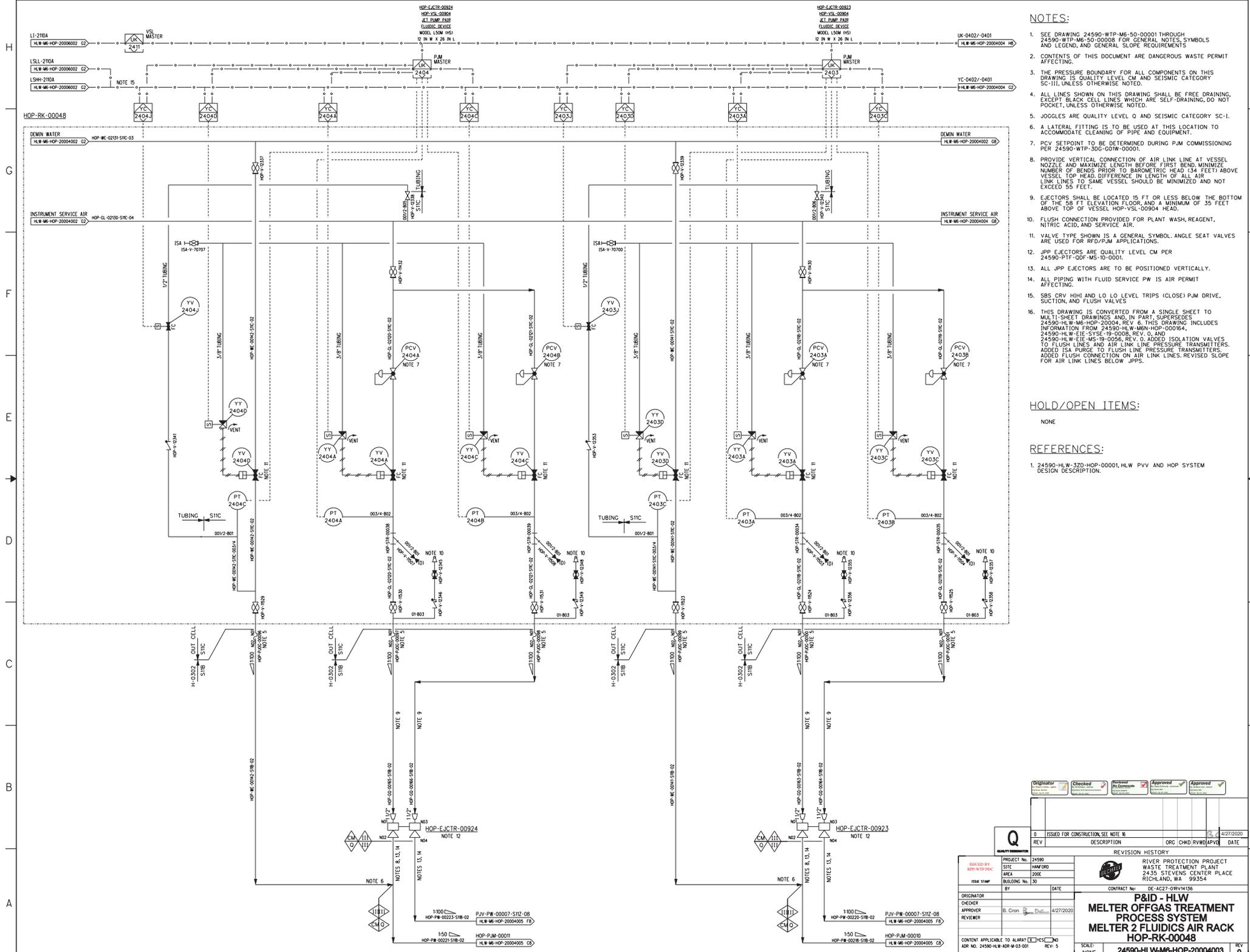


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Document for Signature

Document Number: 24590-HLW-M6-HOP-20004002 **Rev:** 0

Participants	Signature	Completed	Status	Result	Comments
Final Approver	4/27/2020 12:54 PM				
Cron, Bryan		4/27/2020 8:57 PM	Completed	Approve	



- NOTES:**
- SEE DRAWING 24590-WTP-M6-50-00001 THROUGH 24590-WTP-M6-50-00008 FOR GENERAL NOTES, SYMBOLS AND LEGEND, AND GENERAL SLOPE REQUIREMENTS
 - CONTENTS OF THIS DOCUMENT ARE DANGEROUS WASTE PERMIT AFFECTING.
 - THE PRESSURE BOUNDARY FOR ALL COMPONENTS ON THIS DRAWING IS QUALITY LEVEL CM AND SEISMIC CATEGORY SC-II, UNLESS OTHERWISE NOTED.
 - ALL LINES SHOWN ON THIS DRAWING SHALL BE FREE DRAINING, EXCEPT BLACK CELL LINES WHICH ARE SELF-DRAINING, DO NOT POCKET, UNLESS OTHERWISE NOTED.
 - JOGGLES ARE QUALITY LEVEL O AND SEISMIC CATEGORY SC-I.
 - A LATERAL FITTING IS TO BE USED AT THIS LOCATION TO ACCOMMODATE CLEANING OF PIPE AND EQUIPMENT.
 - PCV SETPOINT TO BE DETERMINED DURING PCV COMMISSIONING PER 24590-WTP-300-G07W-00001.
 - PROVIDE VERTICAL CONNECTION OF AIR LINK LINE AT VESSEL NOZZLE AND MAXIMIZE LENGTH BEFORE FIRST BEND. MINIMIZE NUMBER OF BENDS PRIOR TO BAROMETRIC HEAD (34 FEET) ABOVE VESSEL TOP HEAD. DIFFERENCE IN LENGTH OF ALL AIR LINK LINES TO SAME VESSEL SHOULD BE MINIMIZED AND NOT EXCEED 50 FEET.
 - EJECTORS SHALL BE LOCATED 15 FT OR LESS BELOW THE BOTTOM OF THE 50 FT ELEVATION FLOOR, AND A MINIMUM OF 35 FEET ABOVE TOP OF VESSEL HOP-VSL-00904 HEAD.
 - FLUSH CONNECTION PROVIDED FOR PLANT WASH, REAGENT, NITRIC ACID, AND SERVICE AIR.
 - VALVE TYPE SHOWN IS A GENERAL SYMBOL. ANGLE SEAT VALVES ARE USED FOR RFD/PAM APPLICATIONS.
 - JPP EJECTORS ARE QUALITY LEVEL CM PER 24590-PTF-QDF-MS-10-0001.
 - ALL JPP EJECTORS ARE TO BE POSITIONED VERTICALLY.
 - ALL PIPING WITH FLUID SERVICE PW IS AIR PERMIT
 - SBS CRV HMI AND LO LO LEVEL TRIPS (CLOSE) P.M. DRIVE, SUCTION, AND FLUSH VALVES.
 - THIS DRAWING IS CONVERTED FROM A SINGLE SHEET TO MULTI-SHEET DRAWINGS AND, IN PART, SUPERSEDES 24590-HLW-M6-HOP-20004, REV. 5. THIS DRAWING INCLUDES INFORMATION FROM 24590-HLW-M6-M6-HOP-000164, 24590-HLW-EIE-SYS-19-0008, REV. 0, AND 24590-HLW-EIE-MS-19-0056, REV. 0. ADDED ISOLATION VALVES TO FLUSH LINES AND AIR LINK LINE PRESSURE TRANSMITTERS. ADDED FLUSH PURGE TO FLUSH LINE PRESSURE TRANSMITTERS. ADDED FLUSH CONNECTION ON AIR LINK LINES. REVISED SLOPE FOR AIR LINK LINES BELOW JPPs.

HOLD/OPEN ITEMS:

NONE

REFERENCES:

- 24590-HLW-320-HOP-00001.HLW PVV AND HOP SYSTEM DESIGN DESCRIPTION.

Originator	Checked	Reviewed	Approved	Approved
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Q 0 ISSUED FOR CONSTRUCTION. SEE NOTE 6		4/27/2020 0
REV	DESCRIPTION	DATE
REVISION HISTORY		
PROJECT No.	24590	
SITE AREA	HAW ORD	
BUILDING No.	30	
ISSUED BY		
CHECKER		
APPROVER	B. Cron	4/27/2020
REVIEWER		
CONTRACT No: DE-AC27-08RV14136		
P&ID - HLW MELTER OFFGAS TREATMENT PROCESS SYSTEM MELTER 2 FLUIDICS AIR RACK HOP-RK-00048		
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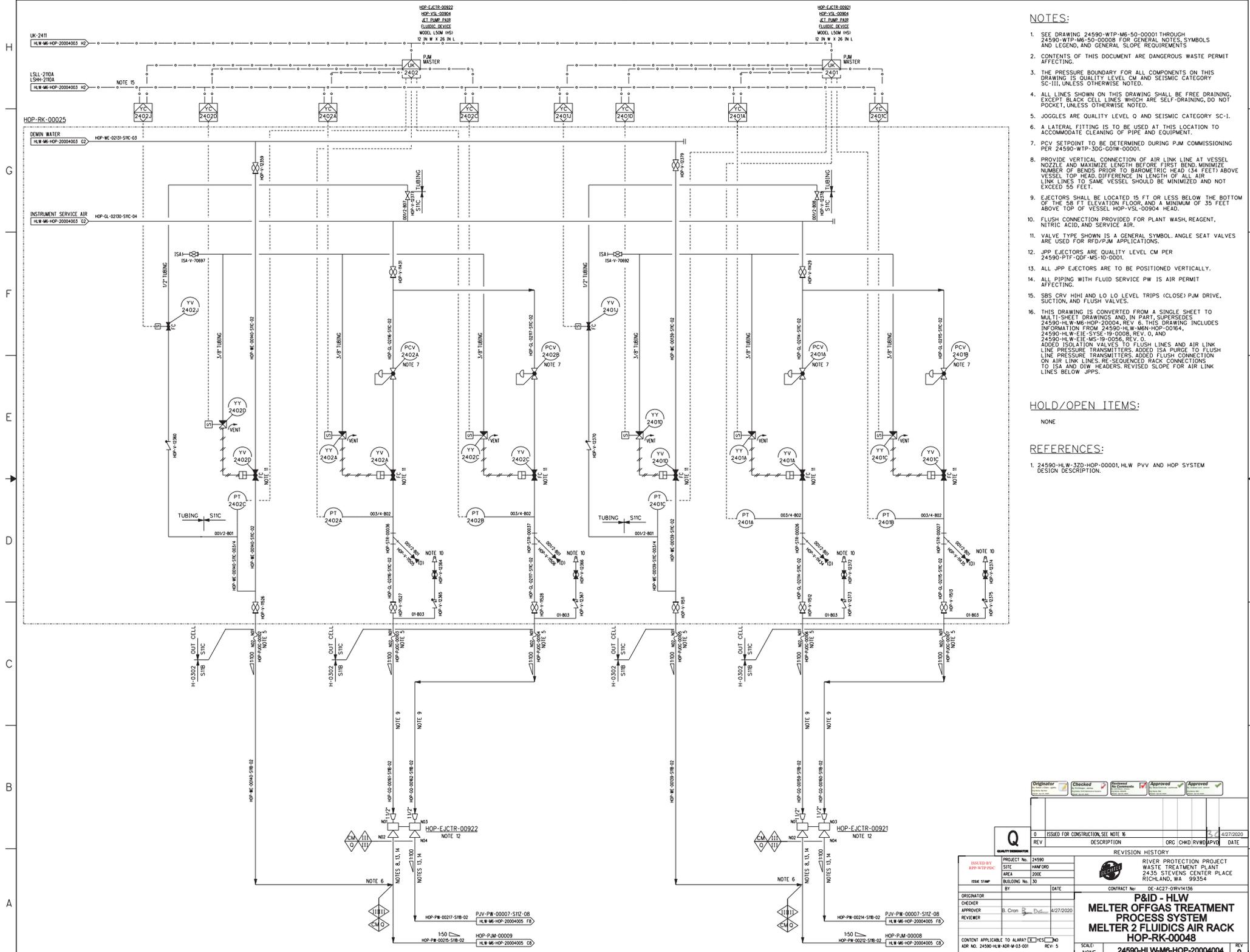


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Document for Signature

Document Number: 24590-HLW-M6-HOP-20004003 **Rev:** 0

Participants	Signature	Completed	Status	Result	Comments
Final Approver	4/27/2020 12:55 PM				
Cron, Bryan		4/27/2020 9:01 PM	Completed	Approve	



- NOTES:**
- SEE DRAWING 24590-WTP-M6-50-0001 THROUGH 24590-WTP-M6-50-0008 FOR GENERAL NOTES, SYMBOLS AND LEGEND, AND GENERAL SLOPE REQUIREMENTS
 - CONTENTS OF THIS DOCUMENT ARE DANGEROUS WASTE PERMIT AFFECTING.
 - THE PRESSURE BOUNDARY FOR ALL COMPONENTS ON THIS DRAWING IS QUALITY LEVEL CM AND SEISMIC CATEGORY SC-II, UNLESS OTHERWISE NOTED.
 - ALL LINES SHOWN ON THIS DRAWING SHALL BE FREE DRAINING, EXCEPT BLACK CELL LINES WHICH ARE SELF-DRAINING, DO NOT POCKET, UNLESS OTHERWISE NOTED.
 - JOOGLES ARE QUALITY LEVEL O AND SEISMIC CATEGORY SC-I.
 - A LATERAL FITTING IS TO BE USED AT THIS LOCATION TO ACCOMMODATE CLEANING OF PIPE AND EQUIPMENT.
 - PCV SETPOINT TO BE DETERMINED DURING PUMP COMMISSIONING PER 24590-WTP-320-G01W-0001.
 - PROVIDE VERTICAL CONNECTION OF AIR LINK LINE AT VESSEL NOZZLE AND MAXIMIZE LENGTH BEFORE FIRST BEND MINIMIZE NUMBER OF BENDS PRIOR TO BAROMETRIC HEAD (34 FEET) ABOVE VESSEL TOP HEAD. DIFFERENCE IN LENGTH OF ALL AIR LINK LINES TO SAME VESSEL SHOULD BE MINIMIZED AND NOT EXCEED 55 FEET.
 - EJECTORS SHALL BE LOCATED 15 FT OR LESS BELOW THE BOTTOM OF THE 58 FT ELEVATION FLOOR, AND A MINIMUM OF 35 FEET ABOVE TOP OF VESSEL HOP-VSL-00904 HEAD.
 - FLUSH CONNECTION PROVIDED FOR PLANT WASH, REAGENT, NITRIC ACID, AND SERVICE AIR.
 - VALVE TYPE SHOWN IS A GENERAL SYMBOL. ANGLE SEAT VALVES ARE USED FOR RFD/PAM APPLICATIONS.
 - JPP EJECTORS ARE QUALITY LEVEL CM PER 24590-PTF-00F-MS-10-0001.
 - ALL JPP EJECTORS ARE TO BE POSITIONED VERTICALLY.
 - ALL PIPING WITH FLUID SERVICE PW IS AIR PERMIT AFFECTING.
 - SBS CRV HH1 AND LO LO LEVEL TRIPS (CLOSE) P.M DRIVE, SUCTION, AND FLUSH VALVES.
 - THIS DRAWING IS CONVERTED FROM A SINGLE SHEET TO MULTI-SHEET DRAWINGS AND, IN PART, SUPERSEDES 24590-HLW-M6-HOP-0004, REV 6. THIS DRAWING INCLUDES INFORMATION FROM 24590-HLW-M6-HOP-00164, 24590-HLW-EIE-SYS-19-0008, REV. 0, AND 24590-HLW-EIE-MS-19-0056, REV. 0. ADDED ISOLATION VALVES TO FLUSH LINES AND AIR LINK LINE PRESSURE TRANSMITTERS. ADDED ISOLATION VALVES TO AIR LINK LINES. RE-SEQUENCED RACK CONNECTIONS TO ISA AND DIM HEADERS. REVISED SLOPE FOR AIR LINK LINES BELOW JPPs.

HOLD/OPEN ITEMS:
NONE

- REFERENCES:**
- 24590-HLW-320-HOP-00001, HLW PVV AND HOP SYSTEM DESIGN DESCRIPTION.

Originator <input checked="" type="checkbox"/> Checked <input checked="" type="checkbox"/> Reviewed <input checked="" type="checkbox"/> Approved <input checked="" type="checkbox"/> Approved <input checked="" type="checkbox"/>						
Q 0 ISSUED FOR CONSTRUCTION. SEE NOTE 6						
REV	DESCRIPTION	ORG	CHW	RWB	MPV	DATE
REVISION HISTORY						
PROJECT No: 24590 SITE: HAW ORD AREA: 2006 BUILDING No: 30						
RIVER PROTECTION PROJECT WASTE TREATMENT PLANT 2435 STEVENS CENTER PLACE RICHLAND, WA 99354						
CONTRACT No: DE-AC27-03RV14136						
P&ID - HLW MELTER OFFGAS TREATMENT PROCESS SYSTEM MELTER 2 FLUIDICS AIR RACK HOP-RK-00048						
ORIGINATOR CHECKER APPROVER REVIEWER	BY B. Cron	DATE 4/27/2020	CONTENT APPLICABLE TO ALARA? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO			
SCALE: NONE		REVISION: 0		DRAWING NO: 24590-HLW-M6-HOP-20004004		REV: 0



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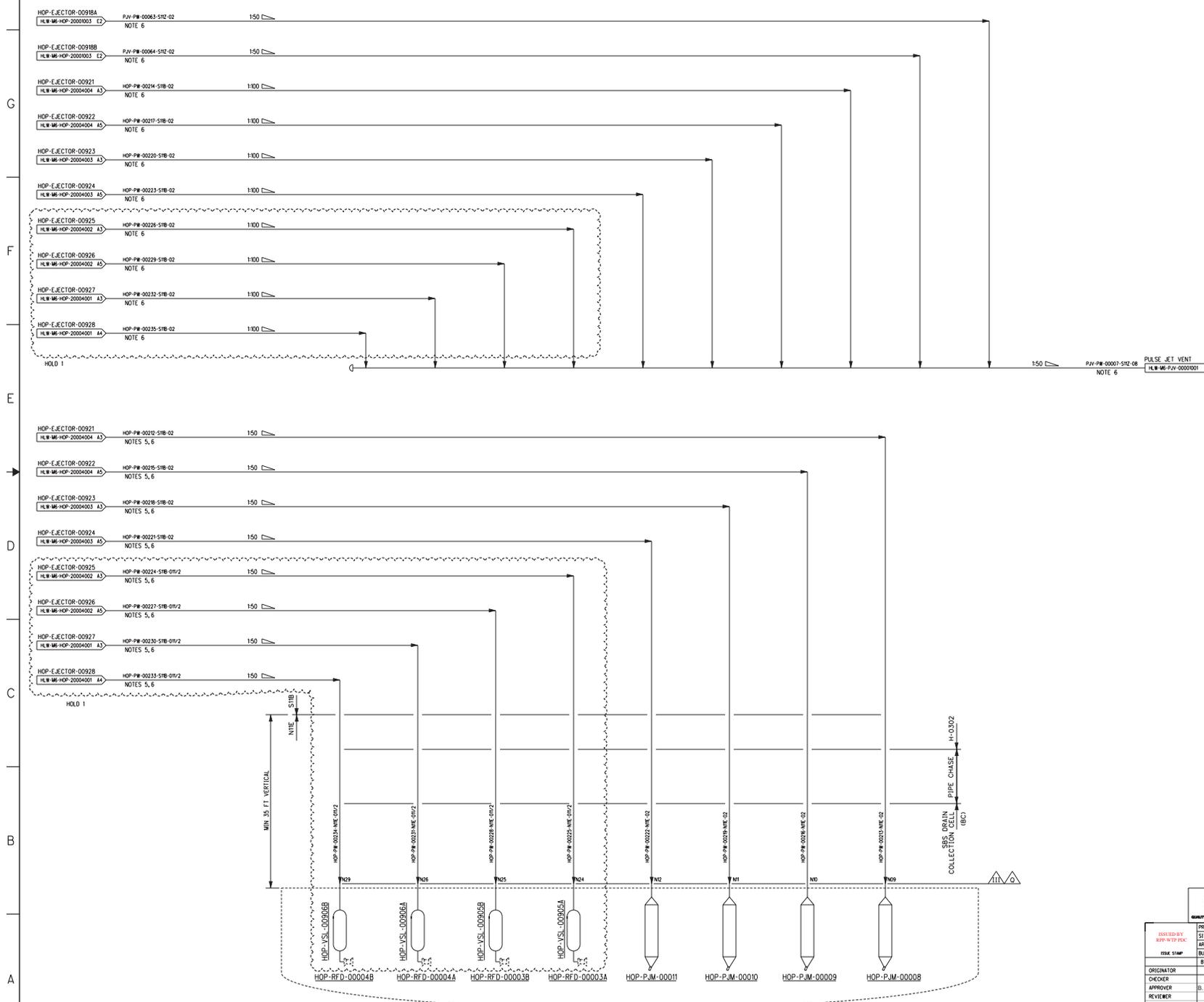
Document Number: 24590-HLW-M6-HOP-20004004 **Rev:** 0

Participants	Signature	Completed	Status	Result	Comments
Final Approver	4/27/2020 12:56 PM				
Cron, Bryan		4/27/2020 9:03 PM	Completed	Approve	

HOP-VSL-00904B CHARGE VESSEL FLUIDIC DEVICE FOR HOP-RFD-00004B 9.2 CU FT 24 IN ID X 39 IN L	HOP-VSL-00904A CHARGE VESSEL FLUIDIC DEVICE FOR HOP-RFD-00004A 9.2 CU FT 24 IN ID X 39 IN L	HOP-VSL-00905B CHARGE VESSEL FLUIDIC DEVICE FOR HOP-RFD-00003B 9.2 CU FT 24 IN ID X 39 IN L	HOP-VSL-00905A CHARGE VESSEL FLUIDIC DEVICE FOR HOP-RFD-00003A 9.2 CU FT 24 IN ID X 39 IN L	HOP-PJM-00011 PULSE JET MELTER HOP-VSL-00904 19 GAL 18 IN ID X 13 IN L	HOP-PJM-00010 PULSE JET MELTER HOP-VSL-00904 19 GAL 18 IN ID X 13 IN L	HOP-PJM-00009 PULSE JET MELTER HOP-VSL-00904 19 GAL 18 IN ID X 13 IN L	HOP-PJM-00008 PULSE JET MELTER HOP-VSL-00904 19 GAL 18 IN ID X 13 IN L
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- NOTES:**
- SEE DRAWING 24590-WTP-M6-SO-00001 THROUGH 24590-WTP-M6-SO-00008 FOR GENERAL NOTES, SYMBOLS AND LEGEND, AND GENERAL SLOPE REQUIREMENTS
 - CONTENTS OF THIS DOCUMENT ARE DANGEROUS WASTE PERMIT AFFECTING.
 - THE PRESSURE BOUNDARY FOR ALL COMPONENTS ON THIS DRAWING IS QUALITY LEVEL 0 AND SEISMIC CATEGORY SC-III, UNLESS OTHERWISE NOTED.
 - ALL LINES SHOWN ON THIS DRAWING SHALL BE FREE DRAINING, EXCEPT BLACK CELL LINES WHICH ARE SELF-DRAINING, DO NOT POCKET, UNLESS OTHERWISE NOTED.
 - PROVIDE VERTICAL CONNECTION OF AIR LINK LINE AT VESSEL NOZZLE AND MAXIMIZE LENGTH BEFORE FIRST BEND. MINIMIZE NUMBER OF BENDS PRIOR TO BAROMETRIC HEAD (34 FEET) ABOVE VESSEL TO HEAD DIFFERENCE IN LENGTH OF ALL AIR LINK LINES TO SAME VESSEL SHOULD BE MINIMIZED AND NOT EXCEED 55 FEET.
 - ALL PIPING WITH FLUID SERVICE PW IS AIR PERMIT AFFECTING.
 - PJM VESSELS AND RFD CHARGE VESSELS ARE QUALITY LEVEL CM AND SEISMIC CATEGORY SC-III. HOP-VSL-00904 IS QUALITY LEVEL 0 AND SEISMIC CATEGORY SC-III.
 - THIS DRAWING IS CONVERTED FROM A SINGLE SHEET TO MULTI-SHEET DRAWINGS AND, IN PART, SUPERSEDES 24590-HLW-M6-HOP-20004, REV. 6. THIS DRAWING INCLUDES INFORMATION FROM 24590-HLW-M6N-HOP-00164, 24590-HLW-M6N-HOP-00209, 24590-HLW-EIE-SYS-19-0008, REV. 0, AND 24590-HLW-EIE-MS-19-0056, REV. 0. REVISED SLOPE AND FLUID CODE FOR AIR LINK LINES BELOW JPPS.

- HOLD/OPEN ITEMS:**
- ON HOLD PENDING TREND ISSUANCE FOR PUMP DESIGN.
- REFERENCES:**
- 24590-HLW-32D-HOP-00001, HLW PVV AND HOP SYSTEM DESIGN DESCRIPTION.



HOP-VSL-00904
NOTE 7

<table border="1"> <tr> <th>REV</th> <th>DESCRIPTION</th> <th>ORG</th> <th>CHWD</th> <th>RWBD</th> <th>APVE</th> <th>DATE</th> </tr> <tr> <td>0</td> <td>ISSUED FOR CONSTRUCTION SEE NOTE 8</td> <td></td> <td></td> <td></td> <td></td> <td>4/27/2020</td> </tr> </table>	REV	DESCRIPTION	ORG	CHWD	RWBD	APVE	DATE	0	ISSUED FOR CONSTRUCTION SEE NOTE 8					4/27/2020	<table border="1"> <tr> <th colspan="2">REVISION HISTORY</th> </tr> <tr> <td>ORIGINATOR</td> <td>BY</td> </tr> <tr> <td>CHECKER</td> <td>DATE</td> </tr> <tr> <td>APPROVER</td> <td></td> </tr> <tr> <td>REVIEWER</td> <td></td> </tr> </table>	REVISION HISTORY		ORIGINATOR	BY	CHECKER	DATE	APPROVER		REVIEWER	
REV	DESCRIPTION	ORG	CHWD	RWBD	APVE	DATE																			
0	ISSUED FOR CONSTRUCTION SEE NOTE 8					4/27/2020																			
REVISION HISTORY																									
ORIGINATOR	BY																								
CHECKER	DATE																								
APPROVER																									
REVIEWER																									
<table border="1"> <tr> <td>ISSUED BY</td> <td>PROJECT No.</td> </tr> <tr> <td>RFP-WTP-PJC</td> <td>24590</td> </tr> <tr> <td>SITE</td> <td>NAME</td> </tr> <tr> <td>AREA</td> <td>ORD</td> </tr> <tr> <td>BUILDING No.</td> <td>30</td> </tr> <tr> <td>ISSUE STAMP</td> <td></td> </tr> </table>	ISSUED BY	PROJECT No.	RFP-WTP-PJC	24590	SITE	NAME	AREA	ORD	BUILDING No.	30	ISSUE STAMP		<table border="1"> <tr> <td>CONTRACT No.</td> <td>DE-AC27-01RV14136</td> </tr> <tr> <td colspan="2"> </td> </tr> <tr> <td colspan="2"> RIVER PROTECTION PROJECT WASTE TREATMENT PLANT 450 HILLS ST. RICHLAND, WA 99354 </td> </tr> <tr> <td colspan="2"> P&ID - HLW MELTER OFFGAS TREATMENT PROCESS SYSTEM MELTER 2 FLUIDICS AIR RACK HOP-VSL-00904 </td> </tr> <tr> <td> CONTENT APPLICABLE TO ALARA: <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO ADR NO. 24590-HLW-ADR-W-03-001 </td> <td> SCALE: NONE 24590-HLW-M6-HOP-20004005 REV: 0 </td> </tr> </table>	CONTRACT No.	DE-AC27-01RV14136			RIVER PROTECTION PROJECT WASTE TREATMENT PLANT 450 HILLS ST. RICHLAND, WA 99354		P&ID - HLW MELTER OFFGAS TREATMENT PROCESS SYSTEM MELTER 2 FLUIDICS AIR RACK HOP-VSL-00904		CONTENT APPLICABLE TO ALARA: <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO ADR NO. 24590-HLW-ADR-W-03-001	SCALE: NONE 24590-HLW-M6-HOP-20004005 REV: 0		
ISSUED BY	PROJECT No.																								
RFP-WTP-PJC	24590																								
SITE	NAME																								
AREA	ORD																								
BUILDING No.	30																								
ISSUE STAMP																									
CONTRACT No.	DE-AC27-01RV14136																								
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P&ID - HLW MELTER OFFGAS TREATMENT PROCESS SYSTEM MELTER 2 FLUIDICS AIR RACK HOP-VSL-00904																									
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Document Number: 24590-HLW-M6-HOP-20004005 **Rev:** 0

Participants	Signature	Completed	Status	Result	Comments
Final Approver	4/27/2020 12:57 PM				
Cron, Bryan		4/27/2020 9:04 PM	Completed	Approve	



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Document for Signature

Document Number: 24590-HLW-M6-HOP-20009001 **Rev:** 1

Participants	Signature	Completed	Status	Result	Comments
Final Approver	4/21/2020 6:15 PM				
Cron, Bryan		4/22/2020 1:51 PM	Completed	Approve	



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Document for Signature

Document Number: 24590-HLW-M6-HOP-20009002 **Rev:** 1

Participants	Signature	Completed	Status	Result	Comments
Final Approver	4/21/2020 6:16 PM				
Cron, Bryan		4/22/2020 1:52 PM	Completed	Approve	