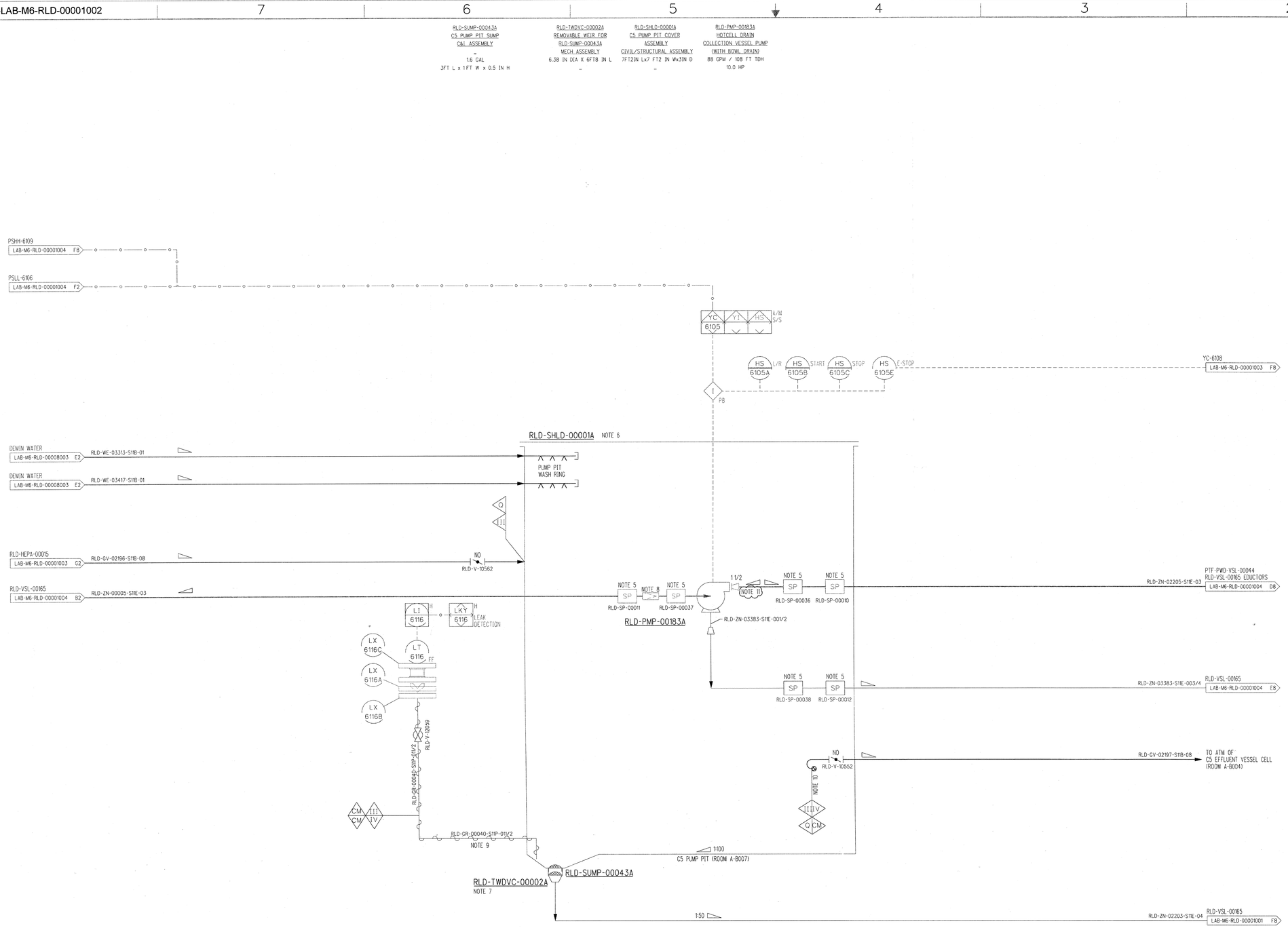


NOTES:

1. SEE DRAWINGS 24590-WTP-M6-50-00001 THROUGH 24590-WTP-M6-50-00008 FOR GENERAL NOTES, SYMBOLS AND LEGEND, AND GENERAL SLOPE REQUIREMENTS.
2. CONTENTS OF THIS DOCUMENT ARE DANGEROUS WASTE PERMIT AFFECTING.
3. THE PRESSURE BOUNDARY FOR ALL COMPONENTS ON THIS DRAWING IS QUALITY LEVEL CM AND SEISMIC CATEGORY SC-IV, UNLESS OTHERWISE NOTED. COLLARS OR SLEEVES FOR PIPING ENTERING THE CELL OR PIT CONFINEMENT BOUNDARY SHALL BE QUALITY LEVEL Q AND SEISMIC CATEGORY SC-III. THE PIT SHIELD PLATES SHALL BE QUALITY LEVEL Q AND SEISMIC CATEGORY SC-III.
4. ALL LINES SHOWN ON THIS DRAWING SHALL BE FREE DRAINING, UNLESS OTHERWISE NOTED.
5. PROVIDE GRAYLOCK TYPE CONNECTORS OR EQUAL FOR PUMP SUCTION, DISCHARGE, AND DRAIN LINES.
6. ALL PRESSURE INSTRUMENTS, ACTUATOR VALVES, AND REMOVABLE WEIR PENETRATE PIT FROM TOP THROUGH THE SHIELD.
7. FOR REMOTELY OPERATED REMOVABLE WEIR DESIGN (RLD-TWDVC-00002A), SEE DRAWING 24590-LAB-MX-RLD-00006.
8. PROVIDE REMOVABLE PIPING SPOOL FOR START-UP STRAINER.
9. SUMP RADAR WAVE GUIDE LINE DESIGNED PER 24590-WTP-J8-50-00004.
10. MESH SCREEN CAP ON VENT INTAKE IS QUALITY LEVEL CM.
11. DISCHARGE PIPE AT CONNECTION TO PUMP MUST HAVE A MINIMUM THREE FOOT (5 FOOT PREFERRED) VERTICAL RISE BETWEEN FLANGE AND PIPE INVERT BEFORE FIRST HORIZONTAL RUN WHICH SLOPES AWAY FROM PUMP TO PROVIDE FOR RETENTION OF PRIMING LIQUID. IF INTERFERENCES PREVENT USE OF A SINGLE VERTICAL PIPE RUN, USE OF 45 DEGREE ELBOWS WITH OR WITHOUT INTERVENING STRAIGHT PIPE ARE PERMITTED WITHIN THIS PIPE SECTION.
12. THIS DRAWING IS CONVERTED FROM A SINGLE SHEET TO MULTI-SHEET DRAWINGS AND, IN PART, SUPERSEDES 24590-LAB-M6-RLD-00001 REV 2. THIS DRAWING INCLUDES INFORMATION FROM 24590-LAB-M6N-60-00001, 24590-LAB-M6N-M80T-00001, 24590-LAB-M6N-RLD-00054, -00065, -00071 AND 24590-WTP-SDDR-PL-06-00018.

HOLD/OPEN ITEMS:

NONE

REFERENCES:

1. 24590-LAB-3YD-RLD-00001, SYSTEM DESCRIPTION FOR THE ANALYTICAL LABORATORY RADIOACTIVE LIQUID WASTE DISPOSAL SYSTEM.

Please note that source, special nuclear, and byproduct materials, as defined in the Atomic Energy Act of 1954 (AEA), are regulated at the Hanford Site by the DOE and its contractors. DOE asserts that DOE acting pursuant to its AEA authority, DOE asserts that pursuant to AEA, it has sole and exclusive jurisdiction and authority to regulate source, special nuclear, and byproduct materials at DOE-owned nuclear facilities. Information contained on non-radionuclides is provided for process description purposes only.

REV	DESCRIPTION	ORG	CHKD	RVWD	APVD	DATE
0	ISSUED FOR CONSTRUCTION, SEE NOTE 12					7/22/10

Q QUALITY DESIGNATOR

REVISION HISTORY

ISSUED BY RPP-WTP PDC

PROJECT No.	24590
SITE	HANFORD
AREA	200E
BUILDING No.	60

ISSUE STAMP

	BY	DATE
ORIGINATOR		6/24/10
CHECKER		6/28/10
APPROVER		7/22/10
REVIEWER		6/28/10
		6/30/10

CONTENT APPLICABLE TO ALARA? [X] YES [ ] NO

ADR NO. 24590-LAB-ADR-M-03-013 REV: 4

E&NS SCREENING REQUIRED? [X] YES [ ] NO E&NS INITIAL IF YES

RIVER PROTECTION PROJECT
WASTE TREATMENT PLANT
2435 STEVENS CENTER PLACE
RICHLAND, WA 99354

CONTRACT No: DE-AC27-01RV14136

P&ID - LAB
RADIOACTIVE LIQUID WASTE DISPOSAL SYSTEM
C5 COLLECTION AND TRANSFER
RLD-PMP-00183A

SCALE: NONE

24590-LAB-M6-RLD-00001002

REV 0

SCREENING IS REQUIRED FOR DRAWING TYPES IDENTIFIED IN 24590-WTP-GPP-SREQ-002

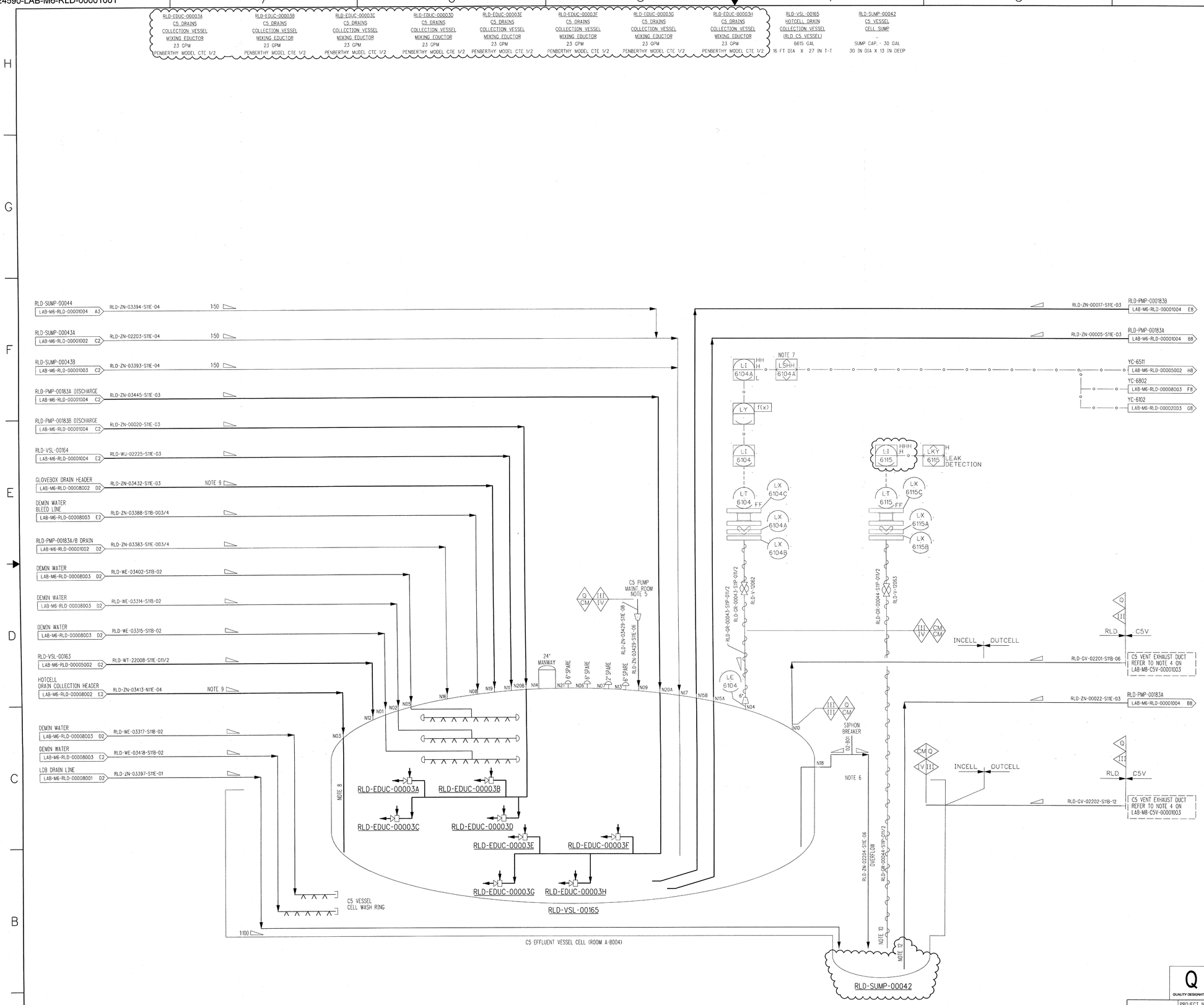
E-SIZE - 44x34
COMPUTER GENERATED - MANUAL DESIGN CHANGES NOT PERMITTED

R1126487

$DATE$ $TIME$

PLOTTED BY: $USERNAME$ $FILE$

FORM E_SDN.DGN 02/2009



NOTES:

1. SEE DRAWINGS 24590-WTP-M6-50-00001 THROUGH 24590-WTP-M6-50-00008 FOR GENERAL NOTES, SYMBOLS AND LEGEND, AND GENERAL SLOPE REQUIREMENTS.
2. CONTENTS OF THIS DOCUMENT ARE DANGEROUS WASTE PERMIT AFFECTING.
3. THE PRESSURE BOUNDARY FOR ALL COMPONENTS ON THIS DRAWING IS QUALITY LEVEL CM AND SEISMIC CATEGORY SC-IV, UNLESS OTHERWISE NOTED. VESSEL IS QUALITY LEVEL CM AND SEISMIC CATEGORY SC-III. COLLARS OR SLEEVES FOR PIPING ENTERING THE CELL OR PIT CONFINEMENT BOUNDARY IS QUALITY LEVEL Q AND SEISMIC CATEGORY SC-III. THE PIT SHIELD PLATES ARE QUALITY LEVEL Q AND SEISMIC CATEGORY SC-III.
4. ALL LINES SHOWN ON THIS DRAWING SHALL BE FREE DRAINING, UNLESS OTHERWISE NOTED.
5. PROVISION FOR FUTURE USE. FLOOR SHIELD PLUG TO BE PROVIDED BY CS&A. SEE DETAIL 24590-LAB-MX-RLD-00005.
6. THE MAXIMUM ELEVATION DIFFERENCE BETWEEN THE INSIDE BOTTOM OF THE VESSEL AND THE INSIDE BOTTOM OF OVERFLOW LINE AT ITS HIGHEST POINT SHALL BE LESS THAN OR EQUAL TO 7.19 FT TO YIELD A MAXIMUM OPERATING VOLUME (MOV) OF 2740 GAL.
7. CLOSES VALVES RLD-YV-6102, RLD-YV-6511, AND RLD-YV-6802 TO ISOLATE VESSEL.
8. THE DIP TUBE FOR NOZZLE N03 CONTAINS SIX ROWS OF 0.5 INCH DIAMETER WEEP HOLES OVER ITS FULL LENGTH, SEE DRAWING 24590-LAB-MV-RLD-00003.
9. SLOPE C5 COLLECTION HEADERS 1/8 INCH PER FOOT AS PRACTICAL WITH A MINIMUM OF 1/16 INCH PER FOOT (1:192 SLOPE).
10. SUMP RADAR WAVE GUIDE LINE DESIGNED PER 24590-WTP-J8-50-00004.
11. THIS DRAWING IS CONVERTED FROM A SINGLE SHEET TO MULTI-SHEET DRAWINGS AND, IN PART, SUPERSEDES 24590-LAB-M6-RLD-00001 REV 2. THIS DRAWING INCLUDES INFORMATION FROM 24590-LAB-M6N-60-00001, 24590-LAB-M6N-M8OT-00001, 24590-LAB-M6N-RLD-00051, -00054, -00058, -00065, AND 24590-LAB-M6PN-RLD-00001.
12. EXTEND END OF PIPE TO 1/2 INCH ABOVE THE BOTTOM CENTER OF THE SUMP.
13. REVISION 1: INCORPORATED 24590-LAB-M6LN-RLD-00004 AND 24590-LAB-M6N-RLD-00075. ADDED NOTE 12.

HOLD/OPEN ITEMS:

NONE

REFERENCES:

1 24590-LAB-3YD-RLD-00001, SYSTEM DESCRIPTION FOR THE ANALYTICAL LABORATORY RADIOACTIVE LIQUID WASTE DISPOSAL SYSTEM.

Please note that source, special nuclear, and byproduct materials, as defined in the Atomic Energy Act of 1954 (AEA), are regulated at the U.S. Department of Energy (DOE) nuclear facilities by DOE acting pursuant to its AEA authority. DOE asserts that pursuant to AEA, it has sole and exclusive responsibility and authority to regulate source, special nuclear, and byproduct materials at DOE-owned nuclear facilities. Information contained herein or hereinunto is provided for process decription purposes only.

DRAWING INDEX

DWG NO	TITLE
24590-LAB-M6-00001001	RLD DISPOSAL SYSTEM RLD-VSL-00165
24590-LAB-M6-00001002	RLD DISPOSAL SYSTEM RLD-PMP-00183A
24590-LAB-M6-00001003	RLD DISPOSAL SYSTEM RLD-PMP-00183B
24590-LAB-M6-00001004	RLD DISPOSAL SYSTEM VALVE PIT

Q QUALITY DESIGNATOR

REVISION HISTORY

REV	DESCRIPTION	ORG	CHKD	RVWD	APVD	DATE
1	REVISED PER NOTE 13	PH	JB	MS/NS	DJK	6-13-11
0	ISSUED FOR CONSTRUCTION, SEE NOTE 11	RJG	SMT	SS/SK	RS/JS	07/22/2010

ISSUED BY RPP-WTP PDC INIT DATE ISSUE STAMP

PROJECT No.	24590	
SITE	HANFORD	
AREA	200E	
BUILDING No.	60	

	BY	DATE
ORIGINATOR	GIBBS, ROBERT	06/22/2010
CHECKER	THAKKAR, SURENDRA	06/22/2010
APPROVER	STEVENS, ROBERT	7/22/2010
REVIEWER	KRETZSCHMAR, STUART	6/30/2010

CONTENT APPLICABLE TO ALARA? [X] YES [ ] NO
ADR NO. 24590-LAB-ADR-M-03-013 REV: 4
EMS SCREENING REQUIRED? [X] YES [ ] NO EMS INITIAL IF YES

BECHTEL

RIVER PROTECTION PROJECT
WASTE TREATMENT PLANT
2435 STEVENS CENTER PLACE
RICHLAND, WA 99354

CONTRACT No: DE-AC27-01RV14136

P&ID - LAB RADIOACTIVE LIQUID WASTE DISPOSAL SYSTEM C5 COLLECTION AND TRANSFER RLD-VSL-00165

SCALE: NONE

24590-LAB-M6-RLD-00001001

REV 1

SCREENING IS REQUIRED FOR DRAWING TYPES IDENTIFIED IN 24590-WTP-GPP-SREG-002

"E" SIZE - 44x34
COMPUTER GENERATED - MANUAL DESIGN CHANGES NOT PERMITTED

R11378830

6/10/2011 7:09:15 AM

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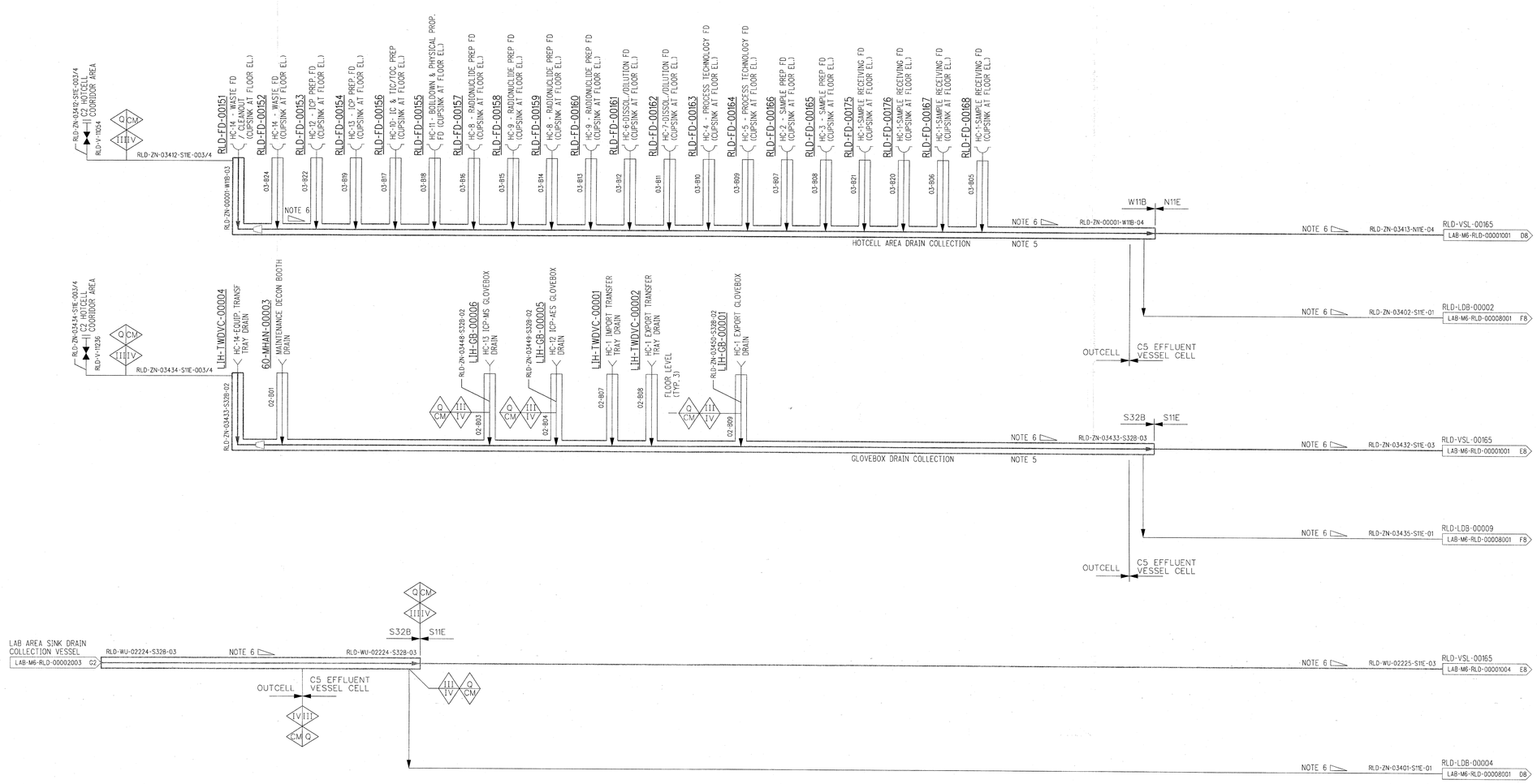
PLOTTED BY: gpadkes

FORM E_SDN.DGN 02/2009



NOTES:

1. SEE DRAWINGS 24590-WTP-M6-50-00001 THROUGH 24590-WTP-M6-50-00008 FOR GENERAL NOTES, SYMBOLS AND LEGEND, AND GENERAL SLOPE REQUIREMENTS.
2. CONTENTS OF THIS DOCUMENT ARE DANGEROUS WASTE PERMIT AFFECTING.
3. THE PRESSURE BOUNDARY FOR ALL COMPONENTS SHOWN ON THIS DRAWING IS QUALITY LEVEL CM AND SEISMIC CATEGORY SC-IV, UNLESS OTHERWISE NOTED.
4. ALL LINES SHOWN ON THIS DRAWING SHALL BE SELF DRAINING, UNLESS OTHERWISE NOTED.
5. ALL PROCESS DRAIN COLLECTION AND TRANSFER PIPING SHOWN SHALL BE DOUBLE-WALL UNLESS PROVIDED WITH ANOTHER FORM OF SECONDARY CONTAINMENT AND LEAK DETECTION. CARBON STEEL PORTIONS OF CONTAINMENT PIPING LOCATED ABOVE THE STAINLESS STEEL LINER AND EXPOSED TO EFFLUENT VESSEL CELL OR BUILDING ATMOSPHERE SHALL BE COATED IN ACCORDANCE WITH SPECIFICATION 24590-WTP-3PS-AFPS-T0001, APPENDIX D, COATING SCHEDULE ITEM 3.90, SYSTEM CODE D.
6. SLOPE C3 COLLECTION HEADERS 1/8 INCH PER FOOT AS PRACTICAL WITH A MINIMUM OF 1/16 INCH PER FOOT (1:192).
7. THIS DRAWING IS CONVERTED FROM A SINGLE SHEET TO MULTI-SHEET DRAWINGS AND, IN PART, SUPERSEDES 24590-LAB-M6-RLD-00008 REV 2. THIS DRAWING INCLUDES INFORMATION FROM 24590-LAB-M6N-M8OT-00001 AND 24590-LAB-M6N-RLD-00054.

HOLD/OPEN ITEMS:

NONE

REFERENCES:

1. 24590-LAB-3YD-RLD-00001, SYSTEM DESCRIPTION FOR THE ANALYTICAL LABORATORY LIQUID WASTE DISPOSAL SYSTEM.

Please note that source, special nuclear, and byproduct materials, as defined in the Atomic Energy Act of 1954 (AEA) are regulated at the U. S. Department of Energy (DOE) facilities exclusively by DOE acting pursuant to its AEA authority. DOE asserts that authority to the exclusion of any regulatory jurisdiction and authority to regulate source, special nuclear, and byproduct materials at DOE-owned nuclear facilities. Information herein on radionuclides is provided for process description purposes only.

REV	DESCRIPTION	ORG	CHKD	RVWD	APVD	DATE
0	ISSUED FOR CONSTRUCTION, SEE NOTE 7	RG	ST	SK	DPH	7/22/10

REVISION HISTORY

Q — QUALITY DESIGNATOR

ISSUED BY RPP-WTP PDC

ISSUE STAMP

PROJECT No.	24590	
SITE	HANFORD	
AREA	200E	
BUILDING No.	60	
	BY	DATE
ORIGINATOR	[signature]	6/18/10
CHECKER	S Thakker	6/21/10
APPROVER	[signature]	7/22/10
REVIEWER	[signature]	6/29/10
	[signature]	6/30/10

CONTENT APPLICABLE TO ALARA? [X] YES [ ] NO

ADR NO. 24590-LAB-ADR-M-03-013 REV: 4

EMS SCREENING REQUIRED? [X] YES [ ] NO EMS INITIAL IF YES DEK

SCREENING IS REQUIRED FOR DRAWING TYPES IDENTIFIED IN 24590-WTP-GPP-SREG-002

'E' SIZE 44 x 34

COMPUTER GENERATED - MANUAL DESIGN CHANGES NOT PERMITTED

RIVER PROTECTION PROJECT WASTE TREATMENT PLANT
2435 STEVENS CENTER PLACE
RICHLAND, WA 99354

CONTRACT No: DE-AC27-01RV14136

P&ID - LAB RADIOACTIVE LIQUID WASTE DISPOSAL SYSTEM C5 DRAIN COLLECTION HEADERS

SCALE: NONE

24590-LAB-M6-RLD-00008002

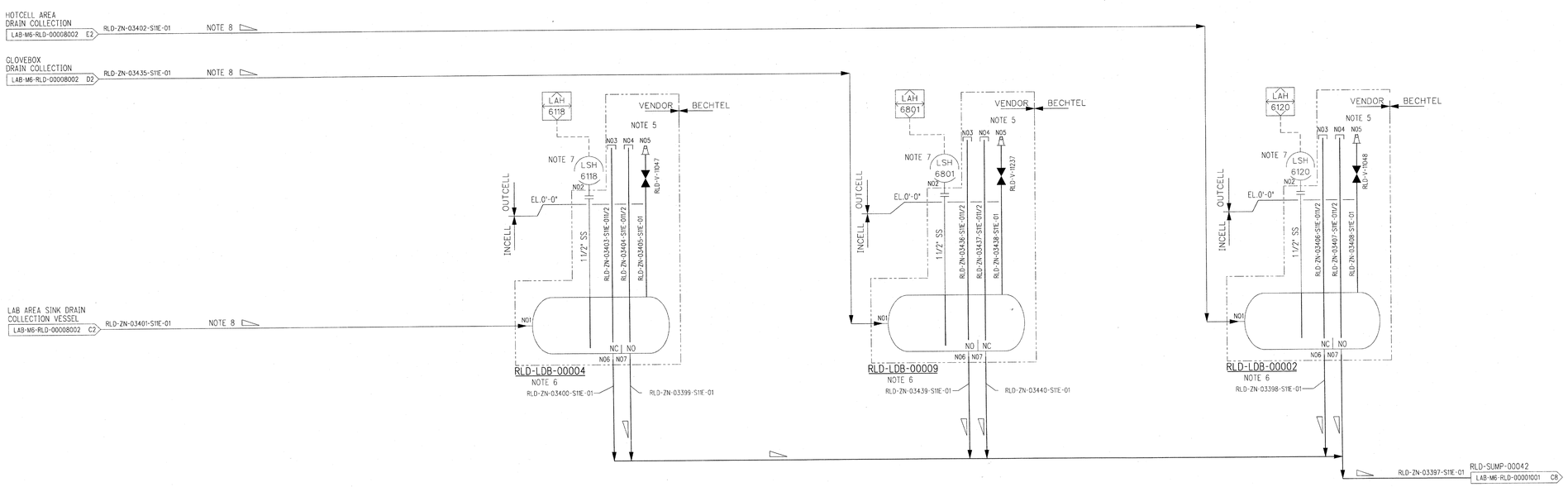
REV 0

R1125048S

$DATE$ $TIME$

PLOTTED BY: $USERNAME$ $FILE$

FORM E_SDN.DGN 02/2009



NOTES:

1. SEE DRAWINGS 24590-WTP-M6-50-00001 THROUGH 24590-WTP-M6-50-00008 FOR GENERAL NOTES, SYMBOLS AND LEGEND, AND GENERAL SLOPE REQUIREMENTS.
2. CONTENTS OF THIS DOCUMENT ARE DANGEROUS WASTE PERMIT AFFECTING.
3. THE PRESSURE BOUNDARY FOR ALL COMPONENTS SHOWN ON THIS DRAWING IS QUALITY LEVEL CM AND SEISMIC CATEGORY SC-IV, UNLESS OTHERWISE NOTED.
4. ALL LINES SHOWN ON THIS DRAWING SHALL BE SELF DRAINING, UNLESS OTHERWISE NOTED.
5. QUICK CONNECTION IS PROVIDED FOR PNEUMATIC TESTING OF THE LEAK DETECTION BOX AND THE PIPE JACKET.
6. OVERFLOW AND DRAIN PLUGS OPERATED REMOTELY VIA RODS THAT EXTEND UP TO GRADE ELEVATION (0'-0") THROUGH PIPE SLEEVES. DRAIN PLUG INSTALLED IN THE CLOSED POSITION TO CREATE A DETECTABLE LEVEL. UPON LEVEL DETECTION, THE PLUG IS LIFTED TO DRAIN THE LEAK DETECTION BOX. THE OVERFLOW PLUG IS NORMALLY OPEN FOR OVERFLOW PROTECTION. BOTH PLUGS WILL BE CLOSED FOR PNEUMATIC TESTING.
7. LEVEL SENSOR TO BE MOUNTED DIRECTLY TO THE VENDOR FLANGE.
8. SLOPE C3 COLLECTION HEADER 1/8 INCH PER FOOT AS PRACTICAL WITH A MINIMUM OF 1/16 INCH PER FOOT (1:192 SLOPE).
9. THIS DRAWING IS CONVERTED FROM A SINGLE SHEET TO MULTI-SHEET DRAWINGS AND, IN PART, SUPERSEDES 24590-LAB-M6-RLD-00008 REV 2. THIS DRAWING INCLUDES INFORMATION FROM 24590-LAB-M6N-M80T-00001 AND 24590-LAB-M6N-RLD-00054.

HOLD/OPEN ITEMS:

NONE

REFERENCES:

1. 24590-LAB-3YD-RLD-00001, SYSTEM DESCRIPTION FOR THE ANALYTICAL LABORATORY LIQUID WASTE DISPOSAL SYSTEM.

Please note that source, special nuclear, and byproduct materials, as defined in the Atomic Energy Act of 1954 (AEA) are regulated at the U.S. Department of Energy (DOE) facilities exclusively by DOE under the AEA. DOE, as the licensing authority pursuant to AEA, it has sole and exclusive responsibility and authority to regulate source, special nuclear, and byproduct materials at DOE-owned nuclear facilities. Information contained herein on radionuclides is provided for process description purposes only.

DRAWING INDEX

DWG NO	TITLE
24590-LAB-M6-RLD-00008001	RLD LEAK DETECTION BOXES
24590-LAB-M6-RLD-00008002	RLD C5 DRAIN COLLECTION HEADERS
24590-LAB-M6-RLD-00008003	RLD C5 TRANSFER LINES

CM
QUALITY DESIGNATOR

REVISION HISTORY

REV	DESCRIPTION	ORG	CHKD	RVWD	APVD	DATE
0	ISSUED FOR CONSTRUCTION, SEE NOTE 9	R.G.	S. Thakkar	DPK	DJG	7/22/10

ISSUED BY RPP-WTP PDC
ISSUE STAMP

PROJECT No.	24590	
SITE	HANFORD	
AREA	200E	
BUILDING No.	60	

	BY	DATE
ORIGINATOR	R.G.	6/18/10
CHECKER	S. Thakkar	6/21/10
APPROVER	D.J. Gillanders	7/22/10
REVIEWER		6/24/10
		6/30/10

CONTENT APPLICABLE TO ALARA? [X] YES [ ] NO
ADR NO. 24590-LAB-ADR-M-03-013 REV: 4
EMS SCREENING REQUIRED? [X] YES [ ] NO EMS INITIAL IF YES: DSK

RIVER PROTECTION PROJECT
WASTE TREATMENT PLANT
2435 STEVENS CENTER PLACE
RICHLAND, WA 99354

CONTRACT No: DE-AC27-01RV14136

P&ID - LAB RADIOACTIVE LIQUID WASTE DISPOSAL SYSTEM - C5 LEAK DETECTION BOXES

SCALE: NONE
24590-LAB-M6-RLD-00008001
REV 0

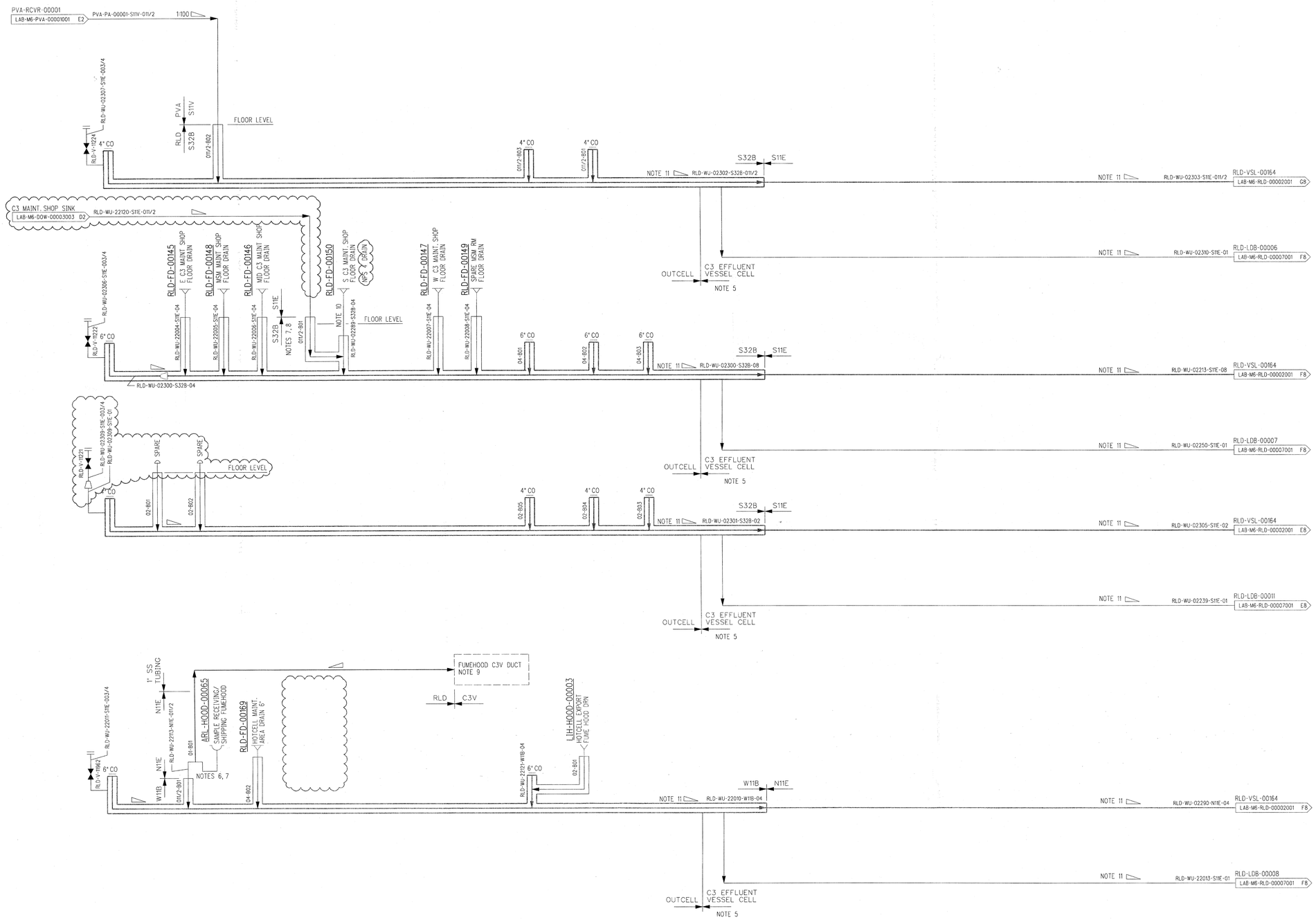
SCREENING IS REQUIRED FOR DRAWING TYPES IDENTIFIED IN 24590-WTP-GPP-SREQ-002

'E' SIZE - 44x34
COMPUTER GENERATED - MANUAL DESIGN CHANGES NOT PERMITTED

FORM E_SDN.DGN 02/2009

$DATE$ $TIME$

PLOTTED BY: $USERNAME$ $FILE$



NOTES:

1. SEE DRAWINGS 24590-WTP-M6-50-00001 THROUGH 24590-WTP-M6-50-00008 FOR GENERAL NOTES, SYMBOLS AND LEGEND, AND GENERAL SLOPE REQUIREMENTS.
2. CONTENTS OF THIS DOCUMENT ARE DANGEROUS WASTE PERMIT AFFECTING.
3. THE PRESSURE BOUNDARY FOR ALL COMPONENTS ON THIS DRAWING IS QUALITY LEVEL CM AND SEISMIC CATEGORY SC-IV, UNLESS OTHERWISE NOTED.
4. ALL LINES SHOWN ON THIS DRAWING SHALL BE SELF DRAINING, UNLESS OTHERWISE NOTED.
5. DRAIN COLLECTION PIPING SHOWN SHALL BE DOUBLE-WALL UNLESS PROVIDED WITH ANOTHER FORM OF SECONDARY CONTAINMENT AND LEAK DETECTION. CARBON STEEL PORTIONS OF CONTAINMENT PIPING LOCATED ABOVE THE STAINLESS STEEL LINER AND EXPOSED TO EFFLUENT VESSEL CELL OR BUILDING ATMOSPHERE SHALL BE COATED IN ACCORDANCE WITH SPECIFICATION 24590-WTP-3PS-AFPS-T0001, APPENDIX D, COATING SCHEDULE ITEM 3.90, SYSTEM CODE D*.
6. P-TRAPS SHALL BE ACCESSIBLE AND MAINTAINABLE (I.E., CAPABLE OF REPLACEMENT). LOOP PRIMING SHALL BE DONE ADMINISTRATIVELY. LINES WITH THESE FEATURES ARE NOT SELF DRAINING.
7. AN UNDER SINK DRAIN PAN WILL DIRECT POTENTIAL LEAKAGE TO ANNULAR REGION OF DOUBLE-WALL PIPE FOR LEAKAGE COLLECTION AND MONITORING. DRAIN PAN CONNECTION SHALL PERMIT PERIODIC PNEUMATIC TESTING OF THE CONTAINMENT PIPING AND THE FLUSHING OF THE ANNULAR REGION IN THE EVENT OF LEAKAGE.
8. PROVIDE A RECESSED PLUG-PLATE AT DOUBLE-/SINGLE-WALL TRANSITION FOR PERIODIC PNEUMATIC TESTING OF THE PIPE JACKET AND ALLOW FOR FLUSHING OF THE ANNULAR SPACE IN THE EVENT OF A LEAK.
9. TUBING CONNECTS TO C3V DUCTWORK. SEE NOTE 3 ON 24590-LAB-M8-C3V-00002 FOR 1 1/2" NPT TAP PROVIDED BY HVAC SUB-CONTRACTOR.
10. THE PIPELINE SHOWN IS AN EXTENSION OF THE CORE PIPE TO THE FLOOR DRAIN.
11. SLOPE C3 COLLECTION HEADERS 1/8 INCH PER FOOT AS PRACTICAL WITH A MINIMUM OF 1/16 INCH PER FOOT (1:192).
12. THIS DRAWING IS CONVERTED FROM A SINGLE SHEET TO MULTI-SHEET DRAWINGS AND IN PART SUPERSEDES 24590-LAB-M6-RLD-00007 REV 2. THIS DRAWING INCLUDES INFORMATION FROM 24590-LAB-M6N-M80T-00001, 24590-LAB-M6N-RLD-00030, -00050, -00063, AND 24590-WTP-FC-P-05-0012.

HOLDS/OPEN ITEMS:

NONE

REFERENCES:

1. 24590-LAB-3YD-RLD-00001, SYSTEM DESCRIPTION FOR THE ANALYTICAL LABORATORY RADIOACTIVE LIQUID WASTE DISPOSAL SYSTEM.

Please note that source, special nuclear, and byproduct materials, as defined in the Atomic Energy Act of 1954 (AEA) are regulated at the U. S. Department of Energy (DOE) facilities, including DOE acting pursuant to its AEA authority. DOE asserts that pursuant to AEA, it has sole and exclusive responsibility and authority to regulate source, special nuclear, and byproduct materials at DOE-owned nuclear facilities. Information contained herein on radionuclides is provided for process description purposes only.

CM
QUALITY DESIGNATOR

REV	DESCRIPTION	ORG	CHKD	RVWD	APVD	DATE
0	ISSUED FOR CONSTRUCTION, SEE NOTE 12	RL				7/22/10

REVISION HISTORY

ISSUED BY RPP-WTP PDC ISSUE STAMP

PROJECT No.	24590
SITE	HANFORD
AREA	200E
BUILDING No.	60

	BY	DATE
ORIGINATOR		6/18/10
CHECKER		6/21/10
APPROVER		7/22/10
REVIEWER		6/28/10
		6/30/10

CONTENT APPLICABLE TO ALARA? [X] YES [ ] NO
ADR NO. 24590-LAB-ADR-M-03-013 REV: 4
EMS SCREENING REQUIRED? [X] YES [ ] NO EMS INITIAL IF YES D.E.K.

BECHTEL

RIVER PROTECTION PROJECT
WASTE TREATMENT PLANT
2435 STEVENS CENTER PLACE
RICHLAND, WA 99354

CONTRACT No: DE-AC27-01RV14136

P&ID - LAB RADIOACTIVE LIQUID WASTE DISPOSAL SYSTEM C3 COLLECTION DRAIN HEADER

SCALE: NONE

24590-LAB-M6-RLD-00007002

REV 0

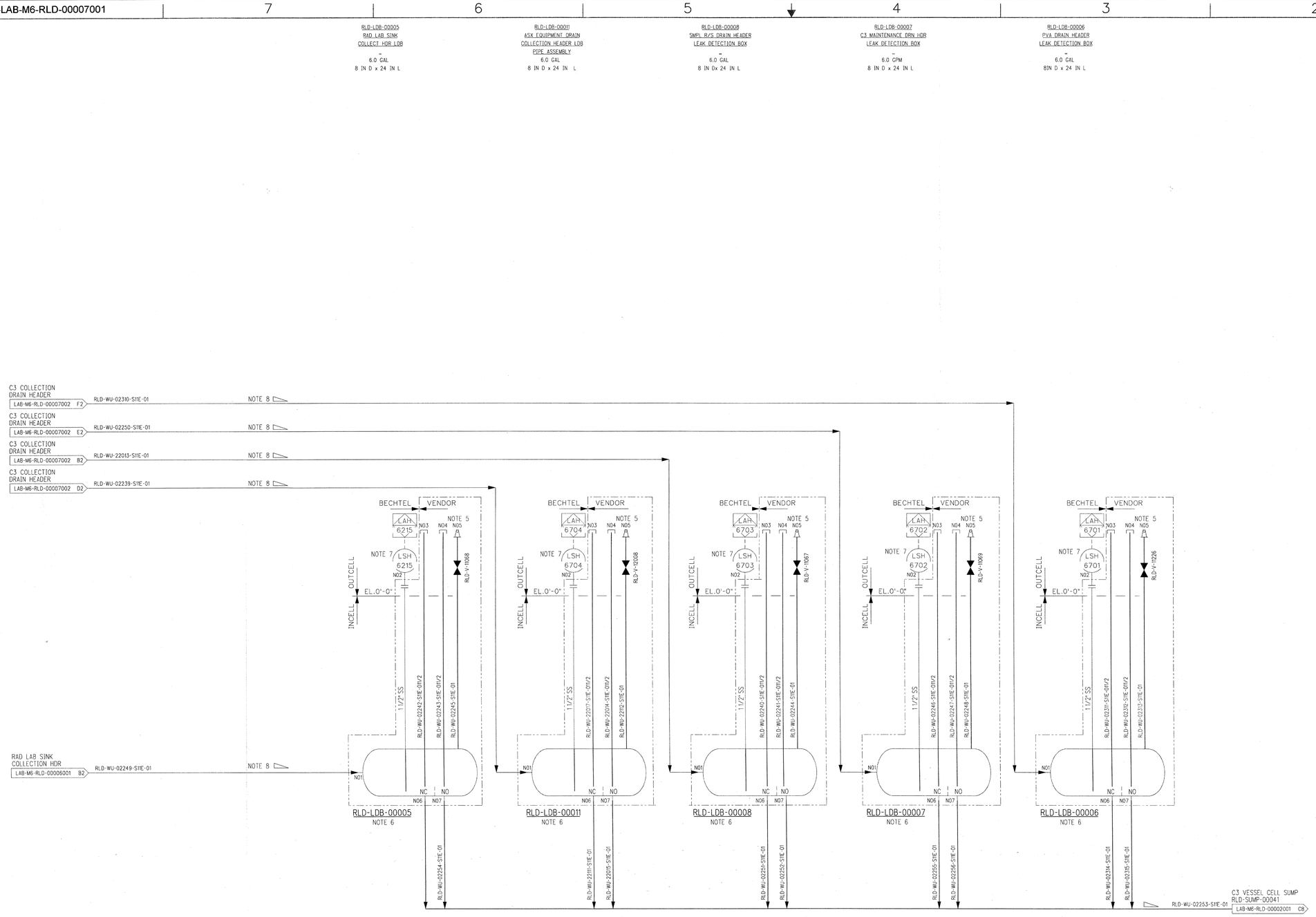
SCREENING IS REQUIRED FOR DRAWING TYPES IDENTIFIED IN 24590-WTP-GPP-SREG-002

"E" SIZE - 44x34
COMPUTER GENERATED - MANUAL DESIGN CHANGES NOT PERMITTED

$DATE$ $TIME$

PLOTTED BY: $USERNAME$ $FILE$

FORM E_SDN.DGN 02/2009



NOTES:

1. SEE DRAWINGS 24590-WTP-M6-50-00001 THROUGH 24590-WTP-M6-50-00008 FOR GENERAL NOTES, SYMBOLS AND LEGEND, AND GENERAL SLOPE REQUIREMENTS.
2. CONTENTS OF THIS DOCUMENT ARE DANGEROUS WASTE PERMIT AFFECTING.
3. THE PRESSURE BOUNDARY FOR ALL COMPONENTS ON THIS DRAWING IS QUALITY LEVEL CM AND SEISMIC CATEGORY SC-IV, UNLESS OTHERWISE NOTED.
4. ALL LINES SHOWN ON THIS DRAWING SHALL BE SELF DRAINING, UNLESS OTHERWISE NOTED.
5. QUICK CONNECTION IS PROVIDED FOR PNEUMATIC TESTING OF THE LEAK DETECTION BOX AND THE PIPE JACKET.
6. OVERFLOW (N04 AND N07) AND DRAIN PLUGS (N03 AND N06) OPERATED REMOTELY VIA RODS THAT EXTEND UP TO GRADE ELEVATION (0'-0"). DRAIN PLUG INSTALLED IN THE CLOSED POSITION TO CREATE A DETECTABLE LEVEL. UPON LEVEL DETECTION, THE PLUG IS LIFTED TO DRAIN THE LEAK DETECTION BOX. THE OVERFLOW PLUG IS NORMALLY OPEN FOR OVERFLOW PROTECTION. BOTH PLUGS WILL BE CLOSED FOR PNEUMATIC TESTING. SEE 24590-LAB-MX-RLD-00001 FOR DETAILS.
7. LEVEL SENSOR TO BE MOUNTED DIRECTLY TO THE VENDOR FLANGE.
8. SLOPE C3 COLLECTION HEADERS AND ENCASEMENT PIPE DRAIN LINES 1/8 INCH PER FOOT AS PRACTICAL WITH A MINIMUM OF 1/16 INCH PER FOOT (1:192 SLOPE).
9. THIS DRAWING IS CONVERTED FROM A SINGLE SHEET TO MULTI-SHEET DRAWINGS AND IN PART SUPERSEDES 24590-LAB-M6-RLD-00007 REV 2. THIS DRAWING INCLUDES INFORMATION FROM 24590-LAB-M6N-M80T-00001 AND 24590-LAB-M6N-RLD-00050.

HOLDS/OPEN ITEMS:

NONE

REFERENCES:

1. 24590-LAB-3YD-RLD-00001, SYSTEM DESCRIPTION FOR THE ANALYTICAL LABORATORY RADIOACTIVE LIQUID WASTE DISPOSAL SYSTEM.

Please note that source, special nuclear, and byproduct materials, as defined in the Atomic Energy Act of 1954 (AEA) are regulated at the U. S. Department of Energy (DOE) facilities exclusively by DOE acting pursuant to its AEA authority. DOE asserts that authority to the AEA, and DOE does not recognize any other authority to require source, special nuclear, and byproduct materials at DOE-owned nuclear facilities. Information contained herein on radionuclides is provided for process description purposes only.

DRAWING INDEX

DWG NO	TITLE
24590-LAB-M6-RLD-00007001	RLD C3 LEAK DETECTION BOXES
24590-LAB-M6-RLD-00007002	RLD C3 COLLECTION DRAIN HEADER

CM
QUALITY DESIGNATOR

REVISION HISTORY

REV	DESCRIPTION	ORG	CHKD	RVWD	APVD	DATE
0	ISSUED FOR CONSTRUCTION, SEE NOTE 9	RG	SJ	SDK	RJH	7/22/10

ISSUED BY RPP-WTP PDC
ISSUE STAMP

PROJECT No.	24590	
SITE	HANFORD	
AREA	200E	
BUILDING No.	60	
	BY	DATE
ORIGINATOR	R. G. Gaddis	6/17/10
CHECKER	S. Jackson	6/21/10
APPROVER	R. J. Hall	7/22/10
REVIEWER		6/24/10
		6/24/10

CONTENT APPLICABLE TO ALARA? [X] YES [ ] NO
ADR NO. 24590-LAB-ADR-M-03-013 REV: 4
EMS SCREENING REQUIRED? [X] YES [ ] NO EMS INITIAL IF YES DCK

RIVER PROTECTION PROJECT
WASTE TREATMENT PLANT
2435 STEVENS CENTER PLACE
RICHLAND, WA 99354

CONTRACT No: DE-AC27-01RV14136

P&ID - LAB
RADIOACTIVE LIQUID WASTE DISPOSAL SYSTEM
C3 LEAK DETECTION BOXES

SCALE: NONE
24590-LAB-M6-RLD-00007001
REV 0

R1125482

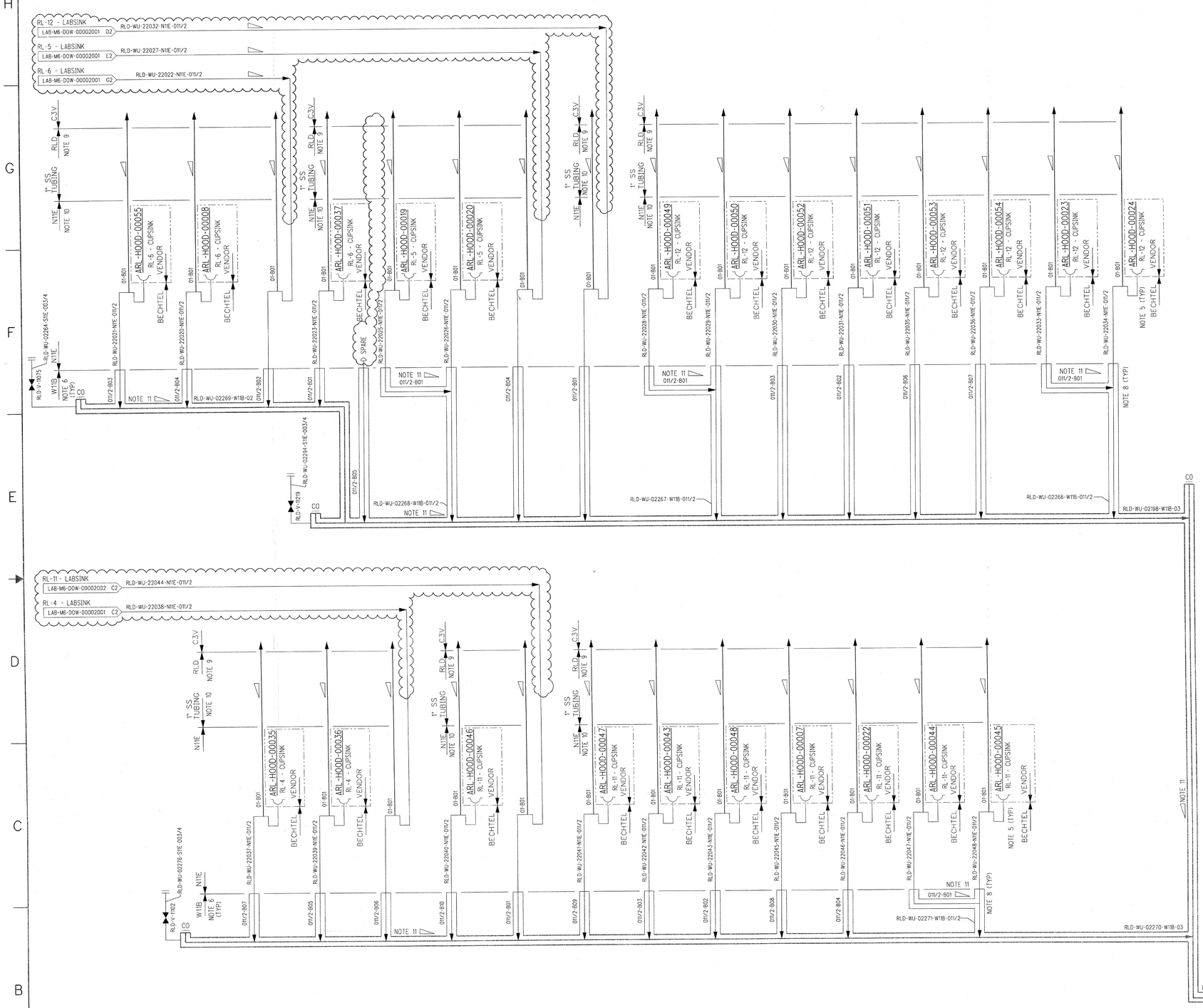
$DATE$ $TIME$

PLOTTED BY: $USERNAME$ $FILE$

FORM E_SDN.DGN 02/2009

SCREENING IS REQUIRED FOR DRAWING TYPES IDENTIFIED IN 24590-WTP-GPP-SEQ-002

"E" SIZE - 44x34
COMPUTER GENERATED - MANUAL DESIGN CHANGES NOT PERMITTED



NOTES:

1. SEE DRAWINGS 24590-WTP-M6-50-00001 THROUGH 24590-WTP-M6-50-00008 FOR GENERAL NOTES, SYMBOLS AND LEGEND, AND GENERAL SLOPE REQUIREMENTS.
2. CONTENTS OF THIS DOCUMENT ARE DANGEROUS WASTE PERMIT AFFECTING.
3. THE PRESSURE BOUNDARY FOR ALL COMPONENTS ON THIS DRAWING IS QUALITY LEVEL CM AND SEISMIC CATEGORY SC-IV, UNLESS OTHERWISE NOTED.
4. ALL LINES SHOWN ON THIS DRAWING SHALL BE FREE DRAINING UNLESS OTHERWISE NOTED.
5. ALL P-TRAPS AND LOOP SEALS SHOWN ON THIS DRAWING SHALL BE ACCESSIBLE AND MAINTAINABLE (I.E., CAPABLE OF REPLACEMENT). LOOP PRIMING SHALL BE DONE ADMINISTRATIVELY. LINES CONTAINING THESE FEATURES ARE NOT FREE DRAINING.
6. AN UNDER SINK SECONDARY CONTAINMENT PAN WILL DIRECT POTENTIAL LEAKAGE TO THE ANNULAR SPACE OF THE DOUBLE-WALL PIPE FOR LEAK COLLECTION AND DETECTION. DRAIN PAN CONNECTION SHALL ALLOW FOR PERIODIC PNEUMATIC TESTING OF THE PIPE JACKET AND ALLOW FOR FLUSHING OF THE ANNULAR SPACE IN THE EVENT OF A LEAK.
7. ALL PROCESS DRAIN COLLECTION PIPING SHOWN SHALL BE DOUBLE-WALLED UNLESS PROVIDED WITH ANOTHER FORM OF SECONDARY CONTAINMENT AND LEAK DETECTION. CARBON STEEL PORTIONS OF CONTAINMENT PIPING LOCATED ABOVE THE STAINLESS STEEL LINER AND EXPOSED TO EFFLUENT VESSEL CELL ATMOSPHERE SHALL BE COATED IN ACCORDANCE WITH SPECIFICATION 24590-WTP-3PS-AFPS-T0001, APPENDIX D, COATING SCHEDULE ITEM 3.90, SYSTEM CODE D.
8. COAT EXPOSED CARBON STEEL JACKET PER SPECIFICATION 24590-WTP-3PS-AFPS-T0001, APPENDIX D, COATING SCHEDULE ITEM 3.90, SYSTEM CODE D.
9. TUBING IS CONNECTED TO C3V DUCTWORK. SEE NOTE 3 ON 24590-LAB-M8-C3V-00002 FOR 1 1/2" NPT TAP PROVIDED BY HVAC SUBCONTRACTOR.
10. FOR CONNECTION OF TUBING TO DRAIN LINE, SEE DETAIL 1 ON DRAWING 24590-LAB-MX-RLD-00002.
11. SLOPE C3 COLLECTION HEADERS 1/8 INCH PER FOOT AS PRACTICAL WITH A MINIMUM OF 1/16 INCH PER FOOT (1:192 SLOPE).
12. THIS DRAWING IS CONVERTED FROM A SINGLE SHEET TO MULTI-SHEET DRAWINGS AND, IN PART, SUPERSEDES 24590-LAB-M6-RLD-00006 REV 3. THIS DRAWING INCLUDES INFORMATION FROM 24590-LAB-M6N-M80T-00001, 24590-LAB-M6N-RLD-00049, -00054, AND -00059.

HOLD/OPEN ITEMS:

NONE

REFERENCES:

1. 24590-LAB-3YD-RLD-00001, SYSTEM DESCRIPTION FOR THE ANALYTICAL LABORATORY RADIOACTIVE LIQUID WASTE DISPOSAL SYSTEM.

Please note that source, special nuclear, and byproduct materials, as defined in the Atomic Energy Act of 1954 (AEA) are regulated at the U. S. Department of Energy (DOE) facilities exclusively by DOE acting pursuant to its AEA authority. DOE asserts that pursuant to AEA, it has sole and exclusive responsibility and authority regarding radiation protection and control of nuclear materials at DOE-owned nuclear facilities. Information contained herein on radionuclides is provided for process description purposes only.

CM
QUALITY DESIGNATOR

REV	DESCRIPTION	ORG	CHKD	RVWD	APVD	DATE
0	ISSUED FOR CONSTRUCTION, SEE NOTE 12	R.B.	S.Thakkar	SPK	RJH	7/22/10

REVISION HISTORY

ISSUED BY RPP-WTP PDC
ISSUE STAMP

PROJECT No.	24590	
SITE	HANFORD	
AREA	200E	
BUILDING No.	60	

	BY	DATE
ORIGINATOR	R.B.	6/15/10
CHECKER	S.Thakkar	6/22/10
APPROVER	R.J.Hall	7/22/10
REVIEWER	Brian Dzik	6/28/10
	Paul Dzik	6/30/10

CONTENT APPLICABLE TO ALARA? [X] YES [ ] NO
ADR NO. 24590-LAB-ADR-M-03-013 REV: 4
EMS SCREENING REQUIRED? [X] YES [ ] NO EMS INITIAL IF YES DEK

BECHTEL
RIVER PROTECTION PROJECT
WASTE TREATMENT PLANT
2435 STEVENS CENTER PLACE
RICHLAND, WA 99354

CONTRACT No: DE-AC27-01RV14136

P&ID - LAB
RADIOACTIVE LIQUID WASTE DISPOSAL SYSTEM
C3 RAD LAB COLLECTION

SCALE: NONE
24590-LAB-M6-RLD-00006003
REV 0

SCREENING IS REQUIRED FOR DRAWING TYPES IDENTIFIED IN 24590-WTP-GPP-SREQ-002

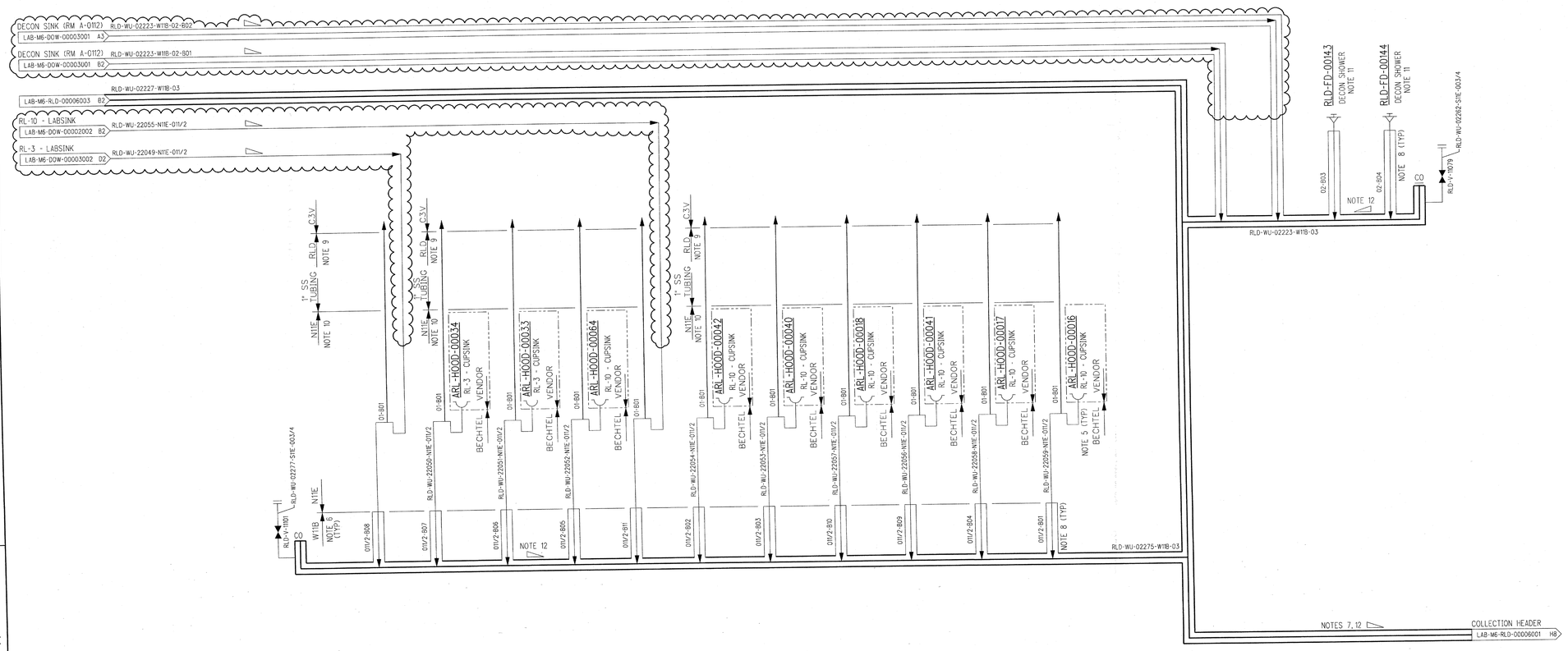
"E" SIZE - 44x34
COMPUTER GENERATED - MANUAL DESIGN CHANGES NOT PERMITTED

F1125481

$DATE$ $TIME$

PLOTTED BY: $USERNAME$ $FILE$

FORM E_SDN.DGN 02/2009



NOTES:

1. SEE DRAWINGS 24590-WTP-M6-50-00001 THROUGH 24590-WTP-M6-50-00008 FOR GENERAL NOTES, SYMBOLS AND LEGEND, AND GENERAL SLOPE REQUIREMENTS.
2. CONTENTS OF THIS DOCUMENT ARE DANGEROUS WASTE PERMIT AFFECTING.
3. THE PRESSURE BOUNDARY FOR ALL COMPONENTS ON THIS DRAWING IS QUALITY LEVEL CM AND SEISMIC CATEGORY SC-IV, UNLESS OTHERWISE NOTED.
4. ALL LINES SHOWN ON THIS DRAWING SHALL BE FREE DRAINING, UNLESS OTHERWISE NOTED.
5. ALL P-TRAPS AND LOOP SEALS SHOWN ON THIS DRAWING SHALL BE ACCESSIBLE AND MAINTAINABLE (I.E., CAPABLE OF REPLACEMENT). LOOP PRIMING SHALL BE DONE ADMINISTRATIVELY. LINES CONTAINING THESE FEATURES ARE NOT FREE DRAINING.
6. AN UNDER SINK SECONDARY CONTAINMENT PAN WILL DIRECT POTENTIAL LEAKAGE TO THE ANNULAR SPACE OF THE DOUBLE-WALL PIPE FOR LEAK COLLECTION AND DETECTION. DRAIN PAN CONNECTION SHALL ALLOW FOR PERIODIC PNEUMATIC TESTING OF THE PIPE JACKET AND ALLOW FOR FLUSHING OF THE ANNULAR SPACE IN THE EVENT OF A LEAK.
7. ALL PROCESS DRAIN COLLECTION PIPING SHOWN SHALL BE DOUBLE-WALLED UNLESS PROVIDED WITH ANOTHER FORM OF SECONDARY CONTAINMENT AND LEAK DETECTION. CARBON STEEL PORTIONS OF CONTAINMENT PIPING LOCATED ABOVE THE STAINLESS STEEL LINER AND EXPOSED TO EFFLUENT VESSEL CELL ATMOSPHERE SHALL BE COATED IN ACCORDANCE WITH SPECIFICATION 24590-WTP-3PS-AFPS-T0001, APPENDIX D, COATING SCHEDULE ITEM 3.90, SYSTEM CODE D.
8. COAT EXPOSED CARBON STEEL JACKET PER SPECIFICATION 24590-WTP-3PS-AFPS-T0001, APPENDIX D, COATING SCHEDULE ITEM 3.90, SYSTEM CODE D.
9. TUBING IS CONNECTED TO C3V DUCTWORK. SEE NOTE 3 ON 24590-LAB-M8-C3V-00002 FOR 1 1/2" NPT TAP PROVIDED BY HVAC SUBCONTRACTOR.
10. FOR CONNECTION OF TUBING TO DRAIN LINE, SEE DETAIL 1 ON DRAWING 24590-LAB-MX-RLD-00002.
11. DRAIN LINE IS PLUGGED WHEN NOT IN USE TO MINIMIZE CASCADE OF AIRFLOW AND SATISFY DRAIN TRAP REQUIREMENTS OF NFPA 801-1998, SECTION 3-10.3. SEE DETAIL 2 OF 24590-LAB-MX-RLD-00002 FOR DRAIN PLUG DESIGN.
12. SLOPE C3 COLLECTION HEADERS 1/8 INCH PER FOOT AS PRACTICAL WITH A MINIMUM OF 1/16 INCH PER FOOT (1:192 SLOPE).
13. THIS DRAWING IS CONVERTED FROM A SINGLE SHEET TO MULTI-SHEET DRAWINGS AND IN PART SUPERSEDES 24590-LAB-M6-RLD-00006 REV 3. THIS DRAWING INCLUDES INFORMATION FROM 24590-LAB-M6N-M801-00001, 24590-LAB-M6N-RLD-00054, AND -00059.

HOLD/OPEN ITEMS:

NONE

REFERENCES:

1. 24590-LAB-3YD-RLD-00001, SYSTEM DESCRIPTION FOR THE ANALYTICAL LABORATORY RADIOACTIVE LIQUID WASTE DISPOSAL SYSTEM.

Please note that source, special nuclear, and byproduct materials, as defined in the Atomic Energy Act of 1954 (AEA) are regulated by the U.S. Nuclear Regulatory Commission (NRC) exclusively by DOE acting pursuant to its AEA authority. DOE asserts that pursuant to AEA, it has sole and exclusive responsibility and authority to regulate source, special nuclear, and byproduct materials at DOE-owned nuclear facilities. Information contained herein on radionuclides is provided for process description purposes only.

REV	DESCRIPTION	ORG	CHKD	RVWD	APVD	DATE
0	ISSUED FOR CONSTRUCTION, SEE NOTE 13	RJ	YGA	SDS	DEK	7/22/10

CM — QUALITY DESIGNATOR

REVISION HISTORY

ISSUED BY RPP-WTP PDC

ISSUE STAMP

	BY	DATE
ORIGINATOR	R. Jeffrey	6/22/10
CHECKER	S. Thakkar	6/22/10
APPROVER	R. Johnson	7/22/10
REVIEWER	Y. Gao	6/22/10
	S. Dhand	6/22/10

CONTENT APPLICABLE TO ALARA? [X] YES [ ] NO

ADR NO. 24590-LAB-ADR-M-03-013 REV: 4

EMS SCREENING REQUIRED? [X] YES [ ] NO EMS INITIAL IF YES DEK

SCREENING IS REQUIRED FOR DRAWING TYPES IDENTIFIED IN 24590-WTP-GPP-SREG-002

PROJECT No.	24590
SITE	HANFORD
AREA	200E
BUILDING No.	60

BECHTEL

RIVER PROTECTION PROJECT
WASTE TREATMENT PLANT
2435 STEVENS CENTER PLACE
RICHLAND, WA 99354

CONTRACT No: DE-AC27-01RV14136

P&ID - LAB
RADIOACTIVE LIQUID WASTE DISPOSAL SYSTEM
C3 RAD LAB COLLECTION

SCALE: NONE

24590-LAB-M6-RLD-00006002

REV 0

"E" SIZE - 44x34

COMPUTER GENERATED - MANUAL DESIGN CHANGES NOT PERMITTED

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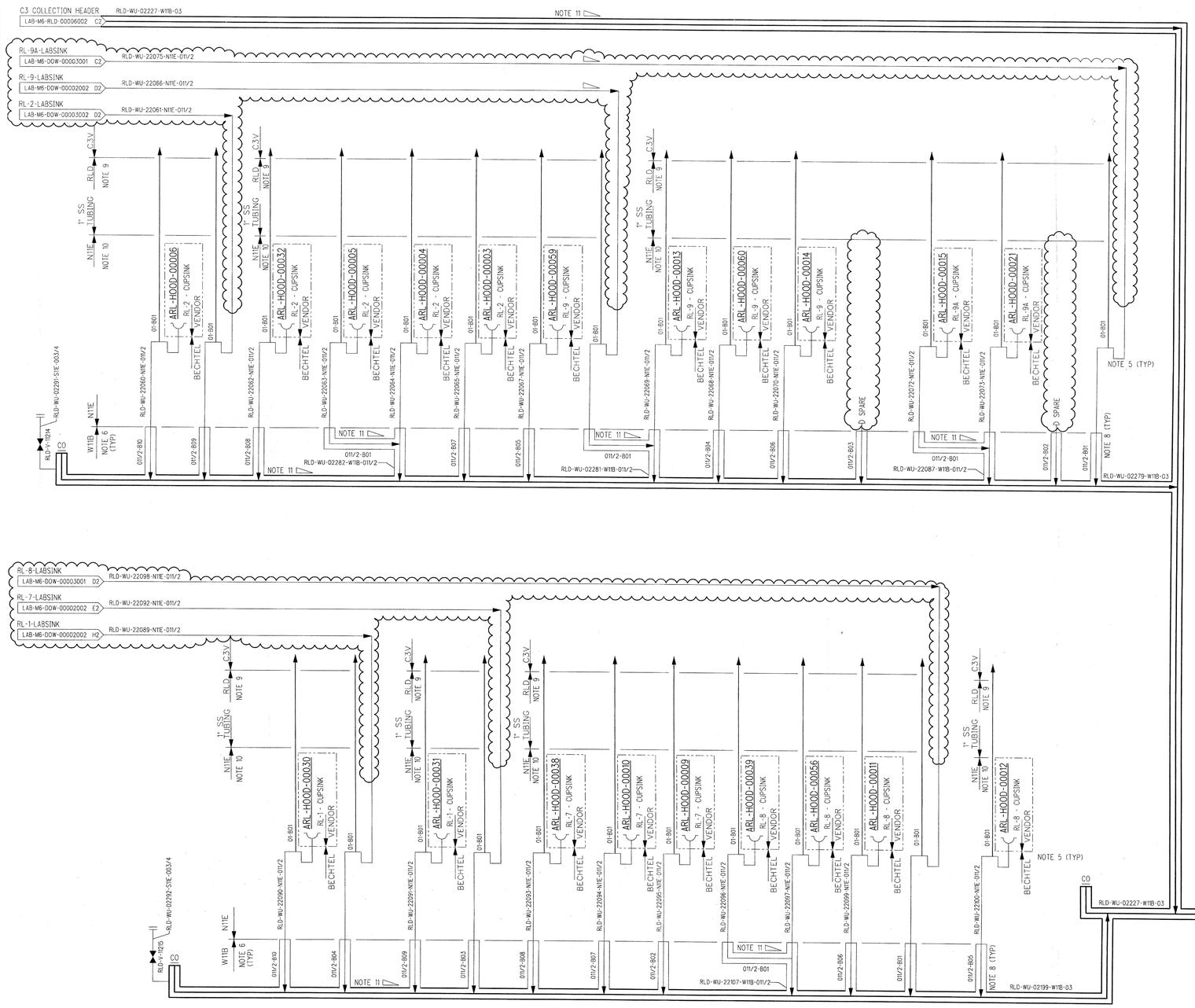
FORM E_SDN.DGN 02/2009



NOTES:

1. SEE DRAWINGS 24590-WTP-M6-50-00001 THROUGH 24590-WTP-M6-50-00008 FOR GENERAL NOTES, SYMBOLS AND LEGEND, AND GENERAL SLOPE REQUIREMENTS.
2. CONTENTS OF THIS DOCUMENT ARE DANGEROUS WASTE PERMIT AFFECTING
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8. COAT EXPOSED CARBON STEEL JACKET PER SPECIFICATION 24590-WTP-3PS-AFPS-T0001, APPENDIX D, COATING SCHEDULE ITEM 3.90, SYSTEM CODE D.
9. TUBING IS CONNECTED TO C3V DUCTWORK. SEE NOTE 3 ON 24590-LAB-M8-C3V-00002 FOR 1 1/2" NPT TAP PROVIDED BY HVAC SUBCONTRACTOR.
10. FOR CONNECTION OF TUBING TO DRAIN LINE, SEE DETAIL 1 ON DRAWING 24590-LAB-MX-RLD-00002.
11. SLOPE C3 COLLECTION HEADERS 1/8 INCH PER FOOT AS PRACTICAL WITH A MINIMUM OF 1/16 INCH PER FOOT (1:192 SLOPE).
12. THIS DRAWING IS CONVERTED FROM A SINGLE SHEET TO MULTI-SHEET DRAWINGS AND, IN PART, SUPERSEDES 24590-LAB-M6-RLD-00006 REV 3. THIS DRAWING INCLUDES INFORMATION FROM 24590-LAB-M6N-M80T-00001, 24590-LAB-M6N-RLD-00049, -00054, AND -00059.

HOLD/OPEN ITEMS:

NONE

REFERENCES:

1. 24590-LAB-3YD-RLD-00001, SYSTEM DESCRIPTION FOR THE ANALYTICAL LABORATORY RADIOACTIVE LIQUID WASTE DISPOSAL SYSTEM.

Please note that source, special nuclear, and byproduct materials, as defined in the Atomic Energy Act of 1954 (AEA) are regulated by the U.S. Nuclear Regulatory Commission (NRC) and not by DOE acting pursuant to its AEA authority. DOE asserts that pursuant to AEA, it has sole and exclusive responsibility and authority to regulate source, special nuclear, and byproduct materials at DOE-owned nuclear facilities. Information contained herein on radionuclides is provided for process description purposes only.

DRAWING INDEX

DWG NO	TITLE
24590-LAB-M6-RLD-00006001	RLD C3 RAD LAB COLLECTION
24590-LAB-M6-RLD-00006002	RLD C3 RAD LAB COLLECTION
24590-LAB-M6-RLD-00006003	RLD C3 RAD LAB COLLECTION

REVISION HISTORY

REV	DESCRIPTION	ORG	CHKD	RVWD	APVD	DATE
0	ISSUED FOR CONSTRUCTION, SEE NOTE 12					7/22/10

CM
QUALITY DESIGNATOR

ISSUED BY RPP-WTP PDC
ISSUE STAMP

PROJECT No.	24590
SITE	HANFORD
AREA	200E
BUILDING No.	60

	BY	DATE
ORIGINATOR		6/22/10
CHECKER		6/22/10
APPROVER		7/22/10
REVIEWER		6/30/10
		6/30/10

CONTENT APPLICABLE TO ALARA? [X] YES [ ] NO
ADR NO. 24590-LAB-ADR-M-03-013 REV: 4
EMS SCREENING REQUIRED? [X] YES [ ] NO EMS INITIAL IF YES DEK

BECHTEL
RIVER PROTECTION PROJECT
WASTE TREATMENT PLANT
2435 STEVENS CENTER PLACE
RICHLAND, WA 99354

CONTRACT No: DE-AC27-01RV14136

P&ID - LAB
RADIOACTIVE LIQUID WASTE DISPOSAL SYSTEM
C3 RAD LAB COLLECTION

SCALE: NONE
24590-LAB-M6-RLD-00006001
REV 0

SCREENING IS REQUIRED FOR DRAWING TYPES IDENTIFIED IN 24590-WTP-GPP-SREG-002

E SIZE - 44x34
COMPUTER GENERATED - MANUAL DESIGN CHANGES NOT PERMITTED

R1125479

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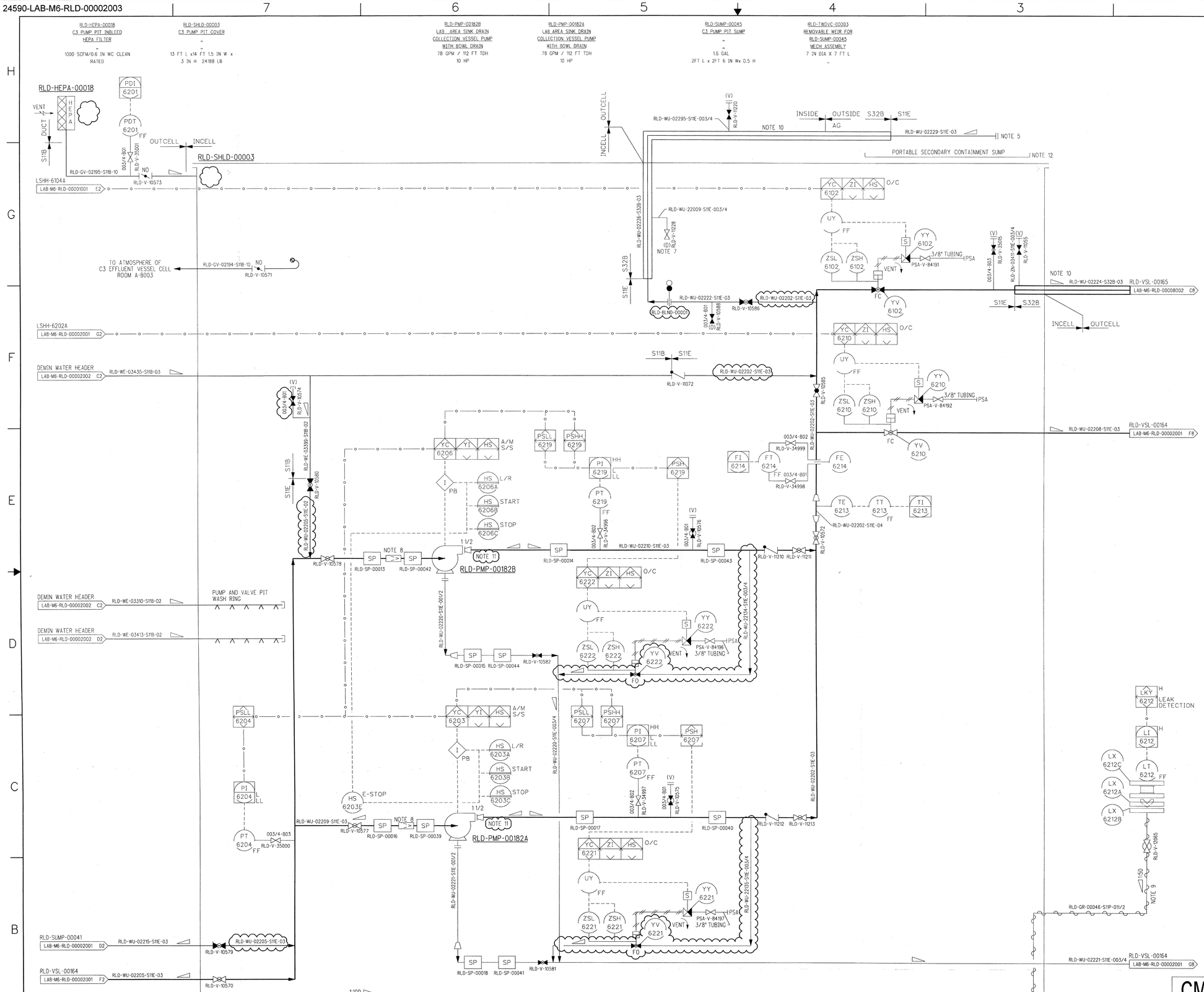
PLOTTED BY: mdritter

FORM E_SDN.DGN 02/2009



NOTES:

1. SEE DRAWINGS 24590-WTP-M6-50-00001 THROUGH 24590-WTP-M6-50-00008 FOR GENERAL NOTES, SYMBOLS AND LEGEND, AND GENERAL SLOPE REQUIREMENTS.
2. CONTENTS OF THIS DOCUMENT ARE DANGEROUS WASTE PERMIT AFFECTING.
3. THE PRESSURE BOUNDARY FOR ALL COMPONENTS ON THIS DRAWING IS QUALITY LEVEL CM AND SEISMIC CATEGORY SC-IV, UNLESS OTHERWISE NOTED.
4. ALL LINES SHOWN ON THIS DRAWING SHALL BE SELF DRAINING, UNLESS OTHERWISE NOTED.
5. TRANSFER LINE FOR TANKER TRUCK CONNECTION IS PROVIDED FOR USE DURING COLD COMMISSIONING.
6. FOR REMOTELY OPERATED REMOVABLE WEIR DESIGN (RLD-TWDVC-00003), SEE DRAWING 24590-LAB-MX-RLD-00006.
7. ENCASEMENT PIPE GRAVITY DRAINS TO RLD-SUMP-00045 FOR INTERSTITIAL LEAK COLLECTION AND MONITORING. DRAIN VALVE IS TO REMAIN IN OPEN POSITION.
8. PROVIDE REMOVABLE PIPING SPOOL FOR START-UP STRAINER.
9. SUMP RADAR WAVE GUIDE LINE DESIGNED PER 24590-WTP-J8-50-00002.
10. TRANSFER PIPING SHALL BE DOUBLE-WALL UNLESS PROVIDED WITH ANOTHER FORM OF SECONDARY CONTAINMENT AND LEAK DETECTION. EXTERIOR SURFACE MATERIALS OF DOUBLE-WALL PIPE ENDCAPS AND CONTAINMENT PIPING EXPOSED TO PUMP AND VALVE PIT ATMOSPHERES SHALL BE THE SAME AS THE PIT LINER MATERIAL. DOUBLE-WALL PORTIONS SHALL HAVE A MINIMUM SLOPE OF 1:192.
11. DISCHARGE PIPE AT CONNECTION TO PUMP MUST HAVE A MINIMUM THREE FOOT (5 FOOT PREFERRED) VERTICAL RISE BETWEEN FLANGE AND PIPE INVERT BEFORE FIRST HORIZONTAL RUN WHICH SLOPES AWAY FROM PUMP TO PROVIDE FOR RETENTION OF PRIMING LIQUID. IF INTERFERENCES PREVENT USE OF A SINGLE VERTICAL PIPE RUN, USE OF 45 DEGREE ELBOWS WITH OR WITHOUT INTERVENING STRAIGHT PIPE ARE PERMITTED WITHIN THIS PIPE SECTION.
12. PROVIDE EMERGENCY MANUAL PUMP SHUTOFF, SWITCH (HS-6203E) IN AREA.
13. THIS DRAWING IS CONVERTED FROM A SINGLE SHEET TO MULTI-SHEET DRAWINGS AND, IN PART, SUPERSEDES 24590-LAB-M6-RLD-00002, REV 2. THIS DRAWING INCLUDES INFORMATION FROM 24590-LAB-M6N-RLD-00054, -00066, -00070, -00072, 24590-LAB-M6PR-RLD-00003, 24590-WTP-SDDR-PL-06-00018, 24590-LAB-M6N-60-00001, AND 24590-LAB-M6N-M8OT-00001.

HOLD/OPEN ITEMS:

NONE

REFERENCES:

1. 24590-LAB-3YD-RLD-00001, SYSTEM DESCRIPTION FOR THE ANALYTICAL LABORATORY RADIOACTIVE LIQUID WASTE DISPOSAL SYSTEM.

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REV	DESCRIPTION	ORG	CHKD	RVWD	APVD	DATE
0	ISSUED FOR CONSTRUCTION, SEE NOTE 13					7/22/10

CM — QUALITY DESIGNATOR

REVISION HISTORY

ISSUED BY ITPP-WTP PDC

ISSUE STAMP

PROJECT No.	24590	
SITE	HANFORD	
AREA	200E	
BUILDING No.	60	
	BY	DATE
ORIGINATOR		6/24/10
CHECKER		6/24/10
APPROVER		7/22/10
REVIEWER		6/30/10
		6/30/10

CONTENT APPLICABLE TO ALARA? [X] YES [ ] NO
ADR NO. 24590-LAB-ADR-M-03-013 REV: 4
EMS SCREENING REQUIRED? [X] YES [ ] NO EMS INITIAL IF YES: PEK

RIVER PROTECTION PROJECT
WASTE TREATMENT PLANT
2435 STEVENS CENTER PLACE
RICHLAND, WA 99354

CONTRACT No: DE-AC27-01RV14136

P&ID - LAB
RADIOACTIVE LIQUID WASTE DISPOSAL SYSTEM
C3 COLLECTION & TRANSFER
RLD-PMP-00182A/B

SCALE: NONE

24590-LAB-M6-RLD-00002003

REV 0

SCREENING IS REQUIRED FOR DRAWING TYPES IDENTIFIED IN 24590-WTP-GPP-SREG-002

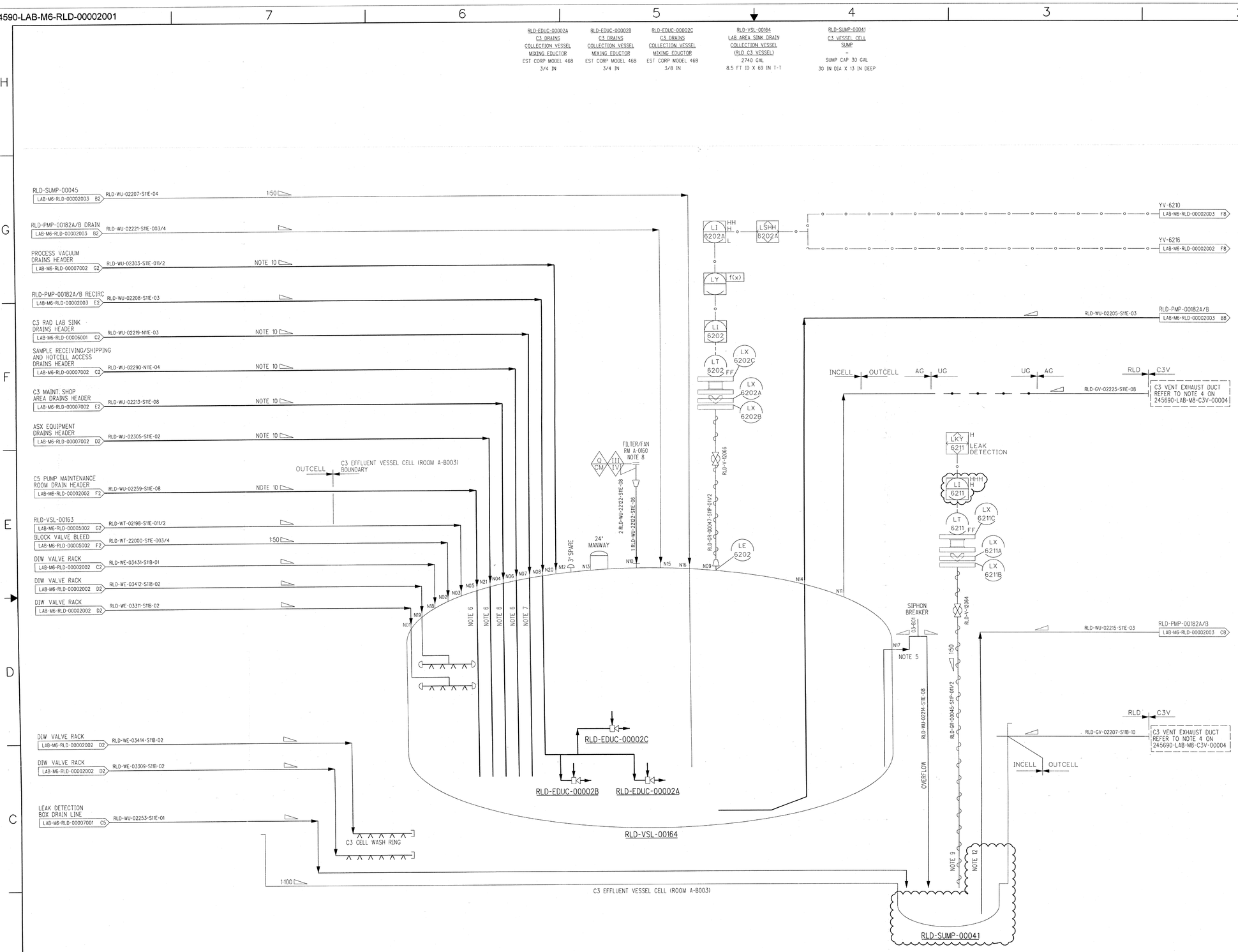
E-SIZE - 44x34
COMPUTER GENERATED - MANUAL DESIGN CHANGES NOT PERMITTED

R1125347Z

6/24/2010 10:41:21 AM

PLOTTED BY: gpickes C:\Work\gpickes\tmp04238\LAB\M6\RLD\00002003.dgn

FORM E_SDN.DGN 02/2009



NOTES:

1. SEE DRAWINGS 24590-WTP-M6-50-00001 THROUGH 24590-WTP-M6-50-00008 FOR GENERAL NOTES, SYMBOLS AND LEGEND AND GENERAL SLOPE REQUIREMENTS.
2. CONTENTS OF THIS DOCUMENT ARE DANGEROUS WASTE PERMIT AFFECTING.
3. THE PRESSURE BOUNDARY FOR ALL COMPONENTS ON THIS DRAWING IS QUALITY LEVEL CM AND SEISMIC CATEGORY SC-IV, UNLESS OTHERWISE NOTED.
4. ALL LINES SHOWN ON THIS DRAWING SHALL BE SELF DRAINING, UNLESS OTHERWISE NOTED.
5. THE MAXIMUM ELEVATION DIFFERENCE BETWEEN THE INSIDE BOTTOM OF THE VESSEL AND THE INSIDE BOTTOM OF OVERFLOW LINE (AT ITS HIGHEST POINT) SHALL BE 7.19 FT TO YIELD MAXIMUM OPERATING VOLUME (MOV) OF 2740 GAL.
6. THE DIP TUBE ON NOZZLES N04, N05, N06, AND N21 EACH HAVE FOUR WEEP HOLES LOCATED ABOVE THE OVERFLOW LEVEL. THE DIAMETER OF THE FOUR HOLES ARE 0.5 INCH (N21), 1 INCH (N06), AND 2 INCHES (N04 AND N05). THE WEEP HOLES PROVIDE IN-LEAKAGE FOR THE C3V VENT SYSTEM, SEE DRAWING 24590-LAB-MV-RLD-00001.
7. THE DIP TUBE FOR N07 HAS TWO ROWS OF 0.5 INCH DIAMETER HOLES OVER THE ENTIRE LENGTH OF PIPE, SEE DRAWING 24590-CM-POA-MVA0-00010-01-00008.
8. PROVISION FOR FUTURE USE. FLOOR SHIELD PLUG TO BE PROVIDED BY CS&A. SEE DETAIL 24590-LAB-MX-RLD-00005.
9. SUMP RADAR WAVE GUIDE LINE DESIGNED PER 24590-WTP-J8-50-00004.
10. SLOPE C3 COLLECTION HEADERS 1/8 INCH PER FOOT AS PRACTICAL WITH A MINIMUM OF 1/16 INCH PER FOOT (1:192 SLOPE).
11. THIS DRAWING IS CONVERTED FROM A SINGLE SHEET TO MULTI-SHEET DRAWINGS AND, IN PART, SUPERSEDES 24590-LAB-M6-RLD-00002 REV 2. THIS DRAWING INCLUDES INFORMATION FROM 24590-LAB-M6N-60-00001, 24590-LAB-M6N-M80T-00001, 24590-LAB-M6N-RLD-00052, -00054, -00058, AND -00066.
12. EXTEND END OF PIPE TO 1/2 INCH ABOVE THE BOTTOM CENTER OF THE SUMP.
13. REVISION 1: INCORPORATED 24590-LAB-M6N-RLD-00075 AND ADDED NOTE 12.

HOLD/OPEN ITEMS:

NONE

REFERENCES:

1. 24590-LAB-3YD-RLD-00001, SYSTEM DESCRIPTION FOR THE ANALYTICAL LABORATORY RADIOACTIVE LIQUID WASTE DISPOSAL SYSTEM.

Please note that source, special nuclear, and byproduct materials, as defined in the Atomic Energy Act of 1954 (AEA) are regulated at the U. S. Department of Energy (DOE) facilities exclusively by DOE under the AEA. DOE's Office of Environmental Management, pursuant to AEA, is the sole and exclusive regulator and authority to regulate source, special nuclear, and byproduct materials at DOE-owned nuclear facilities. Information contained herein on radionuclides is provided for process description purposes only.

DRAWING INDEX

DWG NO	TITLE
24590-LAB-M6-RLD-00002001	RLD DISPOSAL SYSTEM RLD-VSL-00164
24590-LAB-M6-RLD-00002002	RLD DISPOSAL SYSTEM C3 COLLECTION & TRANSFER
24590-LAB-M6-RLD-00002003	RLD DISPOSAL SYSTEM RLD-PMP-00182A/B

Q
QUALITY DESIGNATOR

REVISION HISTORY

REV	DESCRIPTION	ORG	CHKD	RVWD	APVD	DATE
1	REVISED PER NOTE 13	PH	JB	MS/NS	MS/NS	6.13.11
0	ISSUED FOR CONSTRUCTION, SEE NOTE 11	RJG	SMT	SS/SK	RS/JS	07/22/2010

ISSUED BY RPP-WTP PDC
INIT DATE
ISSUE STAMP

PROJECT No.	24590	
SITE	HANFORD	
AREA	200E	
BUILDING No.	60	
	BY	DATE
ORIGINATOR	GIBBS, ROBERT	06/22/2010
CHECKER	THAKKAR, SURENDRA	06/22/2010
APPROVER	STEVENS, ROBERT	07/22/2010
REVIEWER	KRETZSCHMAR, STUART	06/30/2010

CONTENT APPLICABLE TO ALARA? [X] YES [ ] NO
ADR NO. 24590-LAB-ADR-M-03-013 REV: 4
EMAS SCREENING REQUIRED? [X] YES [ ] NO EMAS INITIAL IF YES ____

BECHTEL

RIVER PROTECTION PROJECT
WASTE TREATMENT PLANT
2435 STEVENS CENTER PLACE
RICHLAND, WA 99354

CONTRACT No: DE-AC27-01RV14136

P&ID - LAB
RADIOACTIVE LIQUID WASTE DISPOSAL SYSTEM
C3 COLLECTION & TRANSFER
RLD-VSL-00164

SCALE: NONE
24590-LAB-M6-RLD-00002001
REV 1

R11378831

6/10/2011 7:10:39 AM

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PLOTTED BY: gpodocs

FORM E_SDN.DGN 02/2009

SCREENING IS REQUIRED FOR DRAWING TYPES IDENTIFIED IN 24590-WTP-GPP-SREG-002

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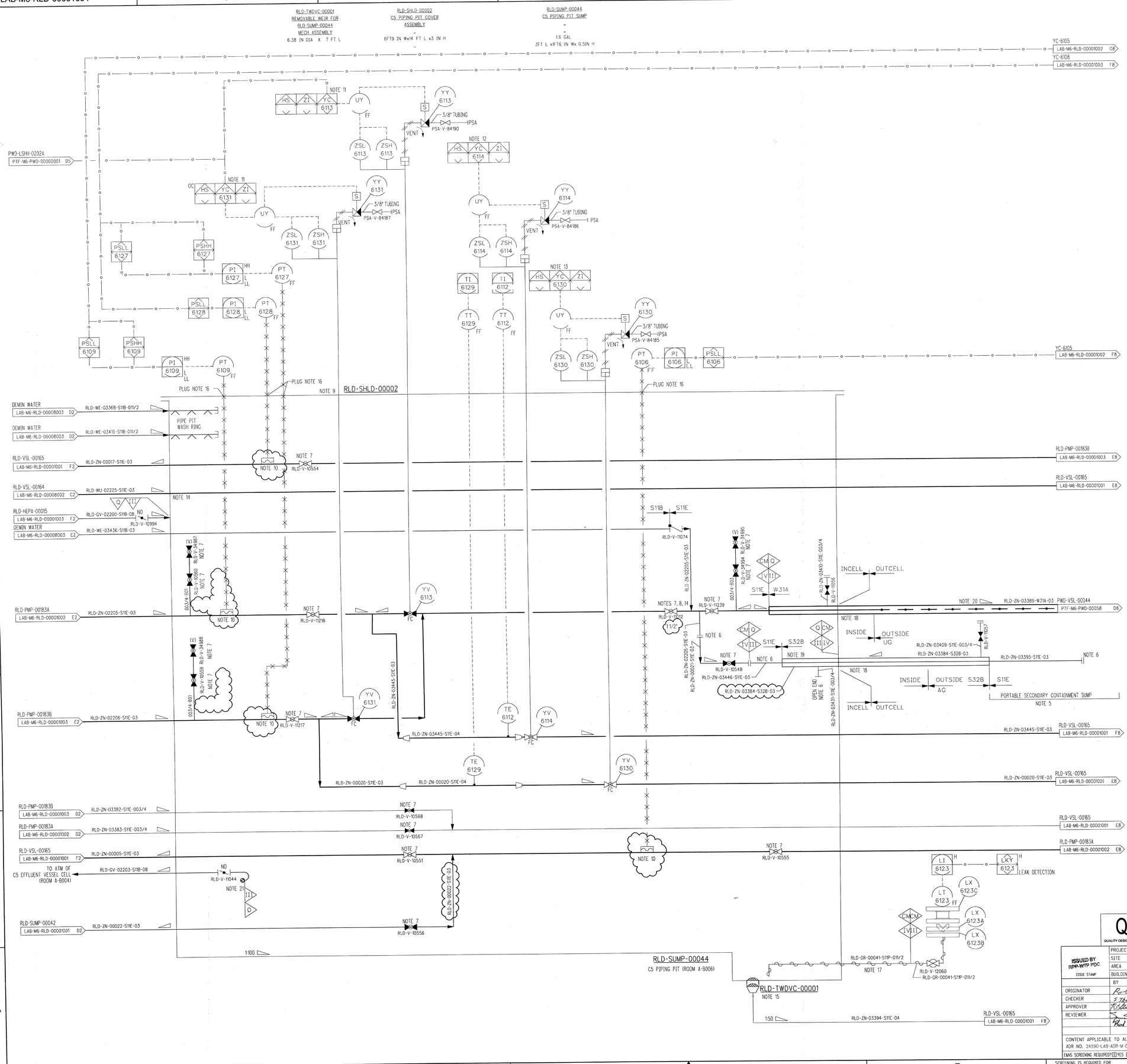

NOTES:

1. SEE DRAWINGS 24590-WTP-M6-50-00001 THROUGH 24590-WTP-M6-50-00008 FOR GENERAL NOTES, SYMBOLS AND LEGEND, AND GENERAL SLOPE REQUIREMENTS.
2. CONTENTS OF THIS DOCUMENT ARE DANGEROUS WASTE PERMIT AFFECTING.
3. THE PRESSURE BOUNDARY FOR ALL COMPONENTS ON THIS DRAWING IS QUALITY LEVEL CM AND SEISMIC CATEGORY SC-IV, UNLESS OTHERWISE NOTED. COLLARS OR SLEEVES FOR PIPING ENTERING THE CELL OR PIT CONFINEMENT BOUNDARY SHALL BE QUALITY LEVEL Q AND SEISMIC CATEGORY SC-III. THE PIT SHIELD PLATES SHALL BE QUALITY LEVEL Q AND SEISMIC CATEGORY SC-III.
4. ALL LINES SHOWN ON THIS DRAWING SHALL BE FREE DRAINING, UNLESS OTHERWISE NOTED.
5. PROVIDE EMERGENCY MANUAL PUMP SHUTOFF SWITCH (HS-6105E) IN AREA.
6. TRANSFER LINE FOR TANKER TRUCK CONNECTION IS PROVIDED FOR USE DURING COLD COMMISSIONING. AFTER COLD COMMISSIONING, THE PIPE SPOOL IS REMOVED AND WELDED CAPS ARE PLACED ON THE END OF THE CONNECTING PIPES AND THE DRAIN LINE FOR THE COAXIAL PIPE.
7. PLUG VALVE TO HAVE SQUARE NUT OPERATOR FOR REMOVABLE TEE HANDLE OPERATION. TEE HANDLE TO BE STORED NEARBY.
8. VALVE SHALL BE SUITABLE FOR THROTTLING SERVICE.
9. ALL PRESSURE INSTRUMENTS, ACTUATOR VALVES, AND REMOVABLE WEIR PENETRATE PIT FROM TOP THROUGH THE SHIELD.
10. THE LOWER HOUSING OF THE PRESSURE TRANSMITTER SEAL IS IN-LINE, SADDLE WELDED TO THE PIPE. AFTER WELDING THE LOWER SECTION TO THE PIPE, THE UPPER SECTION (WHICH HAS THE DIAPHRAGM WELDED TO IT) IS THEN BOLTED TO THE LOWER SECTION.
11. YV-6113 AND YV-6131 CAN NOT BE OPENED SIMULTANEOUSLY. ON PTF-PWD-VSL-00044 LVL HI HI YV-6113 AND YV-6131 ARE OVERRIDE CLOSED. WHEN PUMP RLD-PMP-00183B IS NOT RUNNING YV-6131 CLOSES. WHEN PUMP RLD-PMP-00183A IS NOT RUNNING YV-6113 CLOSES.
12. WHEN PUMP RLD-PMP-00183A IS NOT RUNNING YV-6114 CLOSES.
13. WHEN PUMP RLD-PMP-00183B IS NOT RUNNING YV-6130 CLOSES.
14. A BYPASS SPOOL MAY BE INSTALLED WITHIN THE VALVE PIT IN THE FUTURE, IF NECESSARY, TO ALLOW EFFLUENT FROM RLD-VSL-00164 TO BYPASS RLD-VSL-00165 AND BE TRANSFERRED DIRECTLY TO THE PT FACILITY. THIS SPOOL WOULD PROVIDE ALARA PROTECTION SHOULD SOLIDS BECOME TRAPPED IN THE ELBOWS OF THE PUMP DISCHARGE LINES FOR RLD-PMP-00182A/B AND RLD-PMP-00183A/B. THE SPOOL WOULD CONNECT LINES RLD-WU-02225-S11E-03 AND RLD-ZN-02205-S11E-03. THE SPOOL WOULD TIE-IN TO RLD-ZN-02205-S11E-03 BETWEEN RLD-V-11012 AND RLD-WE-03436-S11B-03. SPECTACLE BLINDS WOULD BE INCLUDED ON THE SPOOL AND ON RLD-WU-02225-S11E-03 DOWNSTREAM OF THE SPOOL CONNECTION.
15. FOR REMOTELY OPERATED REMOVABLE WEIR DESIGN (RLD-TWDVC-00001), SEE DRAWING 24590-LAB-MX-RLD-00006.
16. CSA TO DESIGN SHIELDING PLUG FOR PRESSURE TRANSMITTER CAPILLARY LINE PENETRATION IN SHIELD.
17. SUMP RADAR WAVE GUIDE LINE DESIGNED PER 24590-WTP-J8-50-00004.
18. TRANSFER PIPING SHOWN SHALL BE DOUBLE-WALLED UNLESS PROVIDED WITH ANOTHER FORM OF SECONDARY CONTAINMENT AND LEAK DETECTION. EXTERIOR SURFACE MATERIALS OF DOUBLE-WALL PIPE ENDCAPS AND CONTAINMENTS PIPING EXPOSED TO PUMP AND VALVE PIT ATMOSPHERES SHALL BE THE SAME AS THE PIT LINER MATERIAL. DOUBLE WALLED PORTION SHALL HAVE A MINIMUM SLOPE OF 1:192.
19. DOUBLE-WALL PIPE DRAINS TO PIPE PIT FOR INTERSTITIAL LEAKAGE COLLECTION AND MONITORING.
20. REFER TO INTERFACING DRAWING FOR MINIMUM SLOPE REQUIREMENTS.
21. MESH SCREEN CAP ON VENT INTAKE IS QUALITY LEVEL CM.
22. THIS DRAWING IS CONVERTED FROM A SINGLE SHEET TO MULTI-SHEET DRAWINGS AND, IN PART, SUPERSEDES 24590-LAB-M6-RLD-00001 REV 2. THIS DRAWING INCLUDES INFORMATION FROM 24590-LAB-M6N-60-00001, 24590-LAB-M6N-M80T-00001, 24590-LAB-M6N-RLD-000054, -00056, -00065, -00071, 24590-LAB-M6PR-RLD-00001, -00002, AND 24590-WTP-SDDR-PL-06-00018.

HOLD/OPEN ITEMS:

NONE

REFERENCES:

1. 24590-LAB-3YD-RLD-00001, SYSTEM DESCRIPTION FOR THE ANALYTICAL LABORATORY RADIOACTIVE LIQUID WASTE DISPOSAL SYSTEM.

Please note that source, special nuclear, and byproduct materials, as defined in the Atomic Energy Act of 1954 (AEA) are regulated by the U.S. Department of Energy (DOE) facilities exclusively by DOE acting under the AEA. Radioactive waste is DOE waste pursuant to AEA. It has sole and exclusive regulatory and authority to regulate source, special nuclear, and byproduct materials at DOE-owned nuclear facilities. Information contained herein on radionuclides is provided for process description purposes only.

REV	DESCRIPTION	ORG	CHKD	RVWD	APVD	DATE
0	ISSUED FOR CONSTRUCTION, SEE NOTE 22	RJB	ST	DSK	LPK RJB	7/22/10

Q — QUALITY DESIGNATOR

REVISION HISTORY

ISSUED BY (RPP-WTP PDC) — ISSUE STAMP

PROJECT No.	24590	
SITE	HANFORD	
AREA	200E	
BUILDING No.	60	

	BY	DATE
ORIGINATOR	R. J. Baker	6/22/10
CHECKER	S. Thakker	6/22/10
APPROVER	R. J. Baker / J. P. Mark	7/22/10
REVIEWER		6/28/10
		6/30/10

CONTENT APPLICABLE TO ALARA? [X] YES [ ] NO
ADR NO. 24590-LAB-ADR-M-03-013 REV: 4
EMS SCREENING REQUIRED? [X] YES [ ] NO EMS INITIAL IF YES DSK

BECHTEL

RIVER PROTECTION PROJECT
WASTE TREATMENT PLANT
2435 STEVENS CENTER PLACE
RICHLAND, WA 99354

CONTRACT No: DE-AC27-01RV14136

P&ID - LAB
RADIOACTIVE LIQUID WASTE DISPOSAL SYSTEM C5 COLLECTION AND TRANSFER VALVE PIT

SCALE: NONE

24590-LAB-M6-RLD-00001004

REV 0

SCREENING IS REQUIRED FOR DRAWING TYPES IDENTIFIED IN 24590-WTP-GPP-SREQ-002

"E" SIZE - 44x34
COMPUTER GENERATED - MANUAL DESIGN CHANGES NOT PERMITTED

6/22/2010 1:30:18 PM

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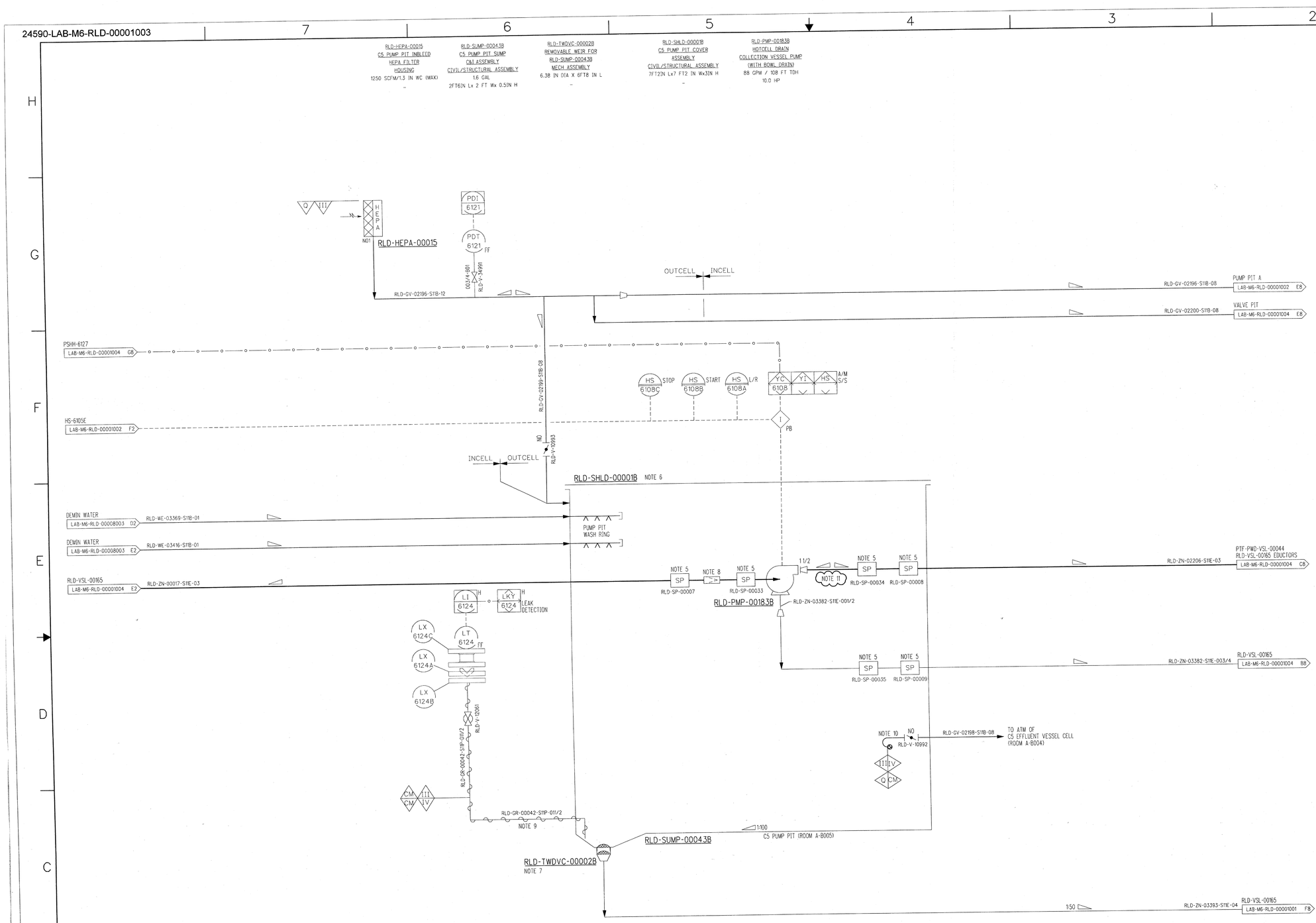
PLOTTED BY: mdritter

FORM E_SDN.DGN 02/2009



NOTES:

1. SEE DRAWINGS 24590-WTP-M6-50-00001 THROUGH 24590-WTP-M6-50-00008 FOR GENERAL NOTES, SYMBOLS AND LEGEND, AND GENERAL SLOPE REQUIREMENTS.
2. CONTENTS OF THIS DOCUMENT ARE DANGEROUS WASTE PERMIT AFFECTING.
3. THE PRESSURE BOUNDARY FOR ALL COMPONENTS ON THIS DRAWING IS QUALITY LEVEL CM AND SEISMIC CATEGORY SC-IV, UNLESS OTHERWISE NOTED. COLLARS OR SLEEVES FOR PIPING ENTERING THE CELL OR PIT CONFINEMENT BOUNDARY SHALL BE QUALITY LEVEL Q AND SEISMIC CATEGORY SC-III. THE PIT SHIELD PLATES SHALL BE QUALITY LEVEL Q AND SEISMIC CATEGORY SC-III.
4. ALL LINES SHOWN ON THIS DRAWING SHALL BE FREE DRAINING, UNLESS OTHERWISE NOTED.
5. PROVIDE GRAYLOCK TYPE CONNECTORS OR EQUAL FOR PUMP SUCTION, DISCHARGE, AND DRAIN LINES.
6. ALL PRESSURE INSTRUMENTS, ACTUATOR VALVES, AND REMOVABLE WEIR PENETRATE PIT FROM TOP THROUGH THE SHIELD.
7. FOR REMOTELY OPERATED REMOVABLE WEIR DESIGN (RLD-TWDVC-00002B), SEE DRAWING 24590-LAB-MX-RLD-00006.
8. PROVIDE REMOVABLE PIPING SPOOL FOR START-UP STRAINER.
9. SUMP RADAR WAVE GUIDE LINE DESIGNED PER 24590-WTP-J8-50-00004.
10. MESH SCREEN CAP ON VENT INTAKE IS QUALITY LEVEL CM.
11. DISCHARGE PIPE AT CONNECTION TO PUMP MUST HAVE A MINIMUM THREE FOOT (5 FOOT PREFERRED) VERTICAL RISE BETWEEN FLANGE AND PIPE INVERT BEFORE FIRST HORIZONTAL RUN WHICH SLOPES AWAY FROM PUMP TO PROVIDE FOR RETENTION OF PRIMING LIQUID. IF INTERFERENCES PREVENT USE OF A SINGLE VERTICAL PIPE RUN, USE OF 45 DEGREE ELBOWS WITH OR WITHOUT INTERVENING STRAIGHT PIPE ARE PERMITTED WITHIN THIS PIPE SECTION.
12. THIS DRAWING IS CONVERTED FROM A SINGLE SHEET TO MULTI-SHEET DRAWINGS AND, IN PART, SUPERSEDES 24590-LAB-M6-RLD-00001 REV 2. THIS DRAWING INCLUDES INFORMATION FROM 24590-LAB-M6N-60-00001, 24590-LAB-M6N-M80T-00001, 24590-LAB-M6N-RLD-00054, -00065, -00071, AND 24590-WTP-SDDR-PL-06-00018.

HOLD/OPEN ITEMS:

NONE

REFERENCES:

1. 24590-LAB-3YD-RLD-00001, SYSTEM DESCRIPTION FOR THE ANALYTICAL LABORATORY RADIOACTIVE LIQUID WASTE DISPOSAL SYSTEM.

Please note that source, special nuclear, and byproduct materials, as defined in the Atomic Energy Act of 1954, are not subject to the U.S. Department of Energy (DOE) facilities, exclusively by DOE acting pursuant to its AEA authority. DOE asserts that pursuant to AEA, it has sole and exclusive responsibility and authority to regulate source, special nuclear, and byproduct materials at DOE-owned nuclear facilities. Information contained herein on radionuclides is provided for process description purposes only.

REV	DESCRIPTION	ORG	CHKD	RVWD	APVD	DATE
0	ISSUED FOR CONSTRUCTION, SEE NOTE 12	RJB	SDL	SDS	RPD	7/22/10

REVISION HISTORY

Q
QUALITY DESIGNATOR

ISSUED BY (RPP-WTP PDC)

PROJECT No.	24590	
SITE	HANFORD	
AREA	200E	
BUILDING No.	60	
ISSUE STAMP		

	BY	DATE
ORIGINATOR	Robert Bailey	6/24/10
CHECKER	S Meekker	6/24/10
APPROVER	R C Stevens	7/22/10
REVIEWER		6/30/10
		6/30/10

CONTENT APPLICABLE TO ALARA? [X] YES [ ] NO
ADR NO. 24590-LAB-ADR-M-03-013 REV: 4
EMS SCREENING REQUIRED? [X] YES [ ] NO EMS INITIAL IF YES DEK

BECHTEL

RIVER PROTECTION PROJECT
WASTE TREATMENT PLANT
2435 STEVENS CENTER PLACE
RICHLAND, WA 99354

CONTRACT No: DE-AC27-01RV14136

P&ID - LAB
RADIOACTIVE LIQUID WASTE DISPOSAL SYSTEM
C5 COLLECTION AND TRANSFER
RLD-PMP-00183B

SCALE: NONE

24590-LAB-M6-RLD-00001003

REV 0

SCREENING IS REQUIRED FOR DRAWING TYPES IDENTIFIED IN 24590-WTP-GPP-SREQ-002

'E' SIZE - 44x34
COMPUTER GENERATED - MANUAL DESIGN CHANGES NOT PERMITTED

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FORM E_SDN.DGN 02/2009

Drawings and Documents

Operating Unit Group 10 – Appendix 11.4
Laboratory Building
General Arrangement Drawings

The documents listed in the following table are incorporated by reference into this permit and are subject to the requirements set forth in Part I Standard Conditions, Part II General Facility Conditions, and Part III Operating Unit Group 10 Conditions. Upon request, copies of the documents can be viewed at the Nuclear Waste Program Resource Center located at 3100 Port of Benton Blvd., Richland, WA. Appointments for viewing can be scheduled by calling (509) 372-7950.

Drawing/Document	***Description***
24590-LAB-P1-60-P0007, Rev 2	General Arrangement Plan at El. -19'-2" and Sections E-E, F-F, G-G
24590-LAB-P1-60-P0008, Rev 2	General Arrangement Plan at El. 0'-0"
24590-LAB-P1-60-P0010, Rev 1	General Arrangement Sections A-A, B-B, C-C, D-D
RESERVED	RESERVED

Source documents (which do not include a "P" in the last set of numbers, e.g. "-P0001," or "-TP001") should be used in conjunction with any document change notices issued against them.

We are currently transitioning from permit documents (which include a "P" in the last set of numbers) to source documents. At the end of the transition period, permit submittals will contain source documents and will be incorporated into the permit as described in Ecology Publication #07-05-006 (http://www.ecy.wa.gov/biblio/0705006.html).

Drawings and Documents

Operating Unit Group 10 – Appendix 11.5
Laboratory Building
Civil, Structural, and Architectural Criteria and Typical Design Details

The documents listed in the following table are incorporated by reference into this permit and are subject to the requirements set forth in Part I Standard Conditions, Part II General Facility Conditions, and Part III Operating Unit Group 10 Conditions. Upon request, copies of the documents can be viewed at the Nuclear Waste Program Resource Center located at 3100 Port of Benton Blvd., Richland, WA. Appointments for viewing can be scheduled by calling (509) 372-7950.

Drawing/Document	***Description***
24590-LAB-PER-M-02-002, Rev 2	Sump Data for LAB Facility
RESERVED	RESERVED

Source documents (which do not include a "P" in the last set of numbers, e.g. "-P0001," or "-TP001") should be used in conjunction with any document change notices issued against them.

We are currently transitioning from permit documents (which include a "P" in the last set of numbers) to source documents. At the end of the transition period, permit submittals will contain source documents and will be incorporated into the permit as described in Ecology Publication #07-05-006 (http://www.ecy.wa.gov/biblio/0705006.html).

Drawings and Documents

Operating Unit Group 10 – Appendix 11.6
Laboratory Building
Mechanical Drawings

The documents listed in the following table are incorporated by reference into this permit and are subject to the requirements set forth in Part I Standard Conditions, Part II General Facility Conditions, and Part III Operating Unit Group 10 Conditions. Upon request, copies of the documents can be viewed at the Nuclear Waste Program Resource Center located at 3100 Port of Benton Blvd., Richland, WA. Appointments for viewing can be scheduled by calling (509) 372-7950.

Drawing/Document	***Description***
24590-LAB-MVD-RLD-P0164, Rev 1	Mechanical Data Sheet for RLD-VSL-00164
24590-LAB-MVD-RLD-P0165, Rev 1	Mechanical Data Sheet for RLD-VSL-00165
24590-LAB-MV-RLD-P0001, Rev 0	Equipment Assembly Drawing for RLD-VSL-00164
24590-LAB-MV-RLD-P0003, Rev 0	Equipment Assembly Drawing for RLD-VSL-00165; Hot Cell Drain Collection Vessel
RESERVED	RESERVED

Source documents (which do not include a "P" in the last set of numbers, e.g. "-P0001," or "-TP001") should be used in conjunction with any document change notices issued against them.

We are currently transitioning from permit documents (which include a "P" in the last set of numbers) to source documents. At the end of the transition period, permit submittals will contain source documents and will be incorporated into the permit as described in Ecology Publication #07-05-006 (http://www.ecy.wa.gov/biblio/0705006.html).

Drawings and Documents

Operating Unit Group 10 – Appendix 11.8
Laboratory Building
Engineering Calculations

The documents listed in the following table are incorporated by reference into this permit and are subject to the requirements set forth in Part I Standard Conditions, Part II General Facility Conditions, and Part III Operating Unit Group 10 Conditions. Upon request, copies of the documents can be viewed at the Nuclear Waste Program Resource Center located at 3100 Port of Benton Blvd., Richland, WA. Appointments for viewing can be scheduled by calling (509) 372-7950.

Drawing/Document	***Description***
24590-LAB-PER-M-02-001, Rev 2	Dangerous Waste Permit (DWP) Liner Heights in the LAB Facility
RESERVED	RESERVED

Source documents (which do not include a "P" in the last set of numbers, e.g. "-P0001," or "-TP001") should be used in conjunction with any document change notices issued against them.

We are currently transitioning from permit documents (which include a "P" in the last set of numbers) to source documents. At the end of the transition period, permit submittals will contain source documents and will be incorporated into the permit as described in Ecology Publication #07-05-006 (http://www.ecy.wa.gov/biblio/0705006.html).

ISSUED BY
RPP-WTP PDC

R11247279

Dangerous Waste Permit (DWP) Liner Heights in the LAB Facility

Document title: **Dangerous Waste Permit (DWP) Liner Heights in the LAB Facility**

Document number: 24590-LAB-PER-M-02-001, Rev 2

Contract deliverable number: DE-AC27-01RV14136

Department: LAB Mechanical Systems

Author(s): P.E. Stanley P. E. Stanley

Checked by: A. Moretta Angelo A. Moretta

Issue status: Approved

Reviewed By: D. Robertson David C Robertson

Approved by: S. Kretzschmar

Approver's position: Deputy Engineering Group Supervisor

Approver's signature: _____ *Signature* 12/9/10 *Date*

River Protection Project
Waste Treatment Plant
2435 Stevens Center Place
Richland, WA 99354
United States of America
Tel: 509 371 2000

History Sheet

Rev	Reason for revision	Revised by
2	Updated to incorporate Ecology and ORP comments on revision 1 and reflect confirmed calculation 24590-LAB-M6C-RLD-00016. Changed title from "Flooding Volume for LAB Facility" to "Dangerous Waste Permit (DWP) Liner Heights in the LAB Facility".	P.E. Stanley
1	Update to reflect confirmed calculation 24590-LAB-M6C-RLD-00016. Changed title from "Flooding Volume for LAB Facility" to "Dangerous Waste Permit (DWP) Liner Heights in the LAB Facility".	P.E. Stanley
0	Issued for Permitting Use	P. Martinelli

Notice

Please note that source, special nuclear, and byproduct materials, as defined in the Atomic Energy Act of 1954 (AEA) are regulated at the U. S. Department of Energy (DOE) facilities exclusively by DOE acting pursuant to its AEA authority. DOE asserts that pursuant to AEA, it has sole and exclusive responsibility and authority to regulate source, special nuclear, and byproduct materials at DOE-owned nuclear facilities. Information contained herein on radionuclides is provided for process description purposes only.

Contents

History Sheet ii

Acronyms iv

1 Introduction 1

2 Applicable Documents 1

3 Description 1

3.1 C3 vessel Secondary Containment for LAB Facility 2

3.2 C5 Vessel Secondary Containment for LAB Facility 2

Appendices

Appendix A Calculation of Liner Height for RLD-VSL-00164 Cell ..... A-i

Appendix B Calculation of Liner Height for RLD-VSL-00165 Cell ..... B-i

Acronyms

AEA	Atomic Energy Act of 1954
C3	Originally an identification of radiological contamination level potential (in the context of this report it identifies or describes subsystems or components associated with the RLD-VSL-00164 tank system)
C5	Originally an identification of radiological contamination level potential (in the context of this report it identifies or describes subsystems or components associated with the RLD-VSL-00165 tank system)
CCN	Correspondence Control Number
DOE	US Department of Energy
DWP	Dangerous Waste Permit
LAB	Analytical Laboratory Facility
LDB	Leak Detection Box
NPS	Nominal Pipe Size
PDC	WTP Project Archives & Document Control
PIN	Plant Item Number
UBC	Uniform Building Code
WAC	Washington Administrative Code
WTP	Hanford Tank Waste Treatment and Immobilization Plant

1 Introduction

The Washington Administrative Code, WAC 173-303, requires that secondary containment be designed and operated to contain 100% of the capacity of the largest tank within its boundary for tank systems that contain dangerous waste. This report discusses the assessment of the liner heights and the flooding volumes that are required to be contained for the River Protection Project - Waste Treatment Plant (WTP) analytical laboratory (LAB). The LAB has two dangerous waste vessels: the laboratory area sink drain collection vessel (RLD-VSL-00164) and the hotcell drain collection vessel (RLD-VSL-00165). The Floor Drain Collection Vessel (RLD-VSL-00163) collects, contains, and transfers non-contaminated liquid effluent. Although the floor drain collection vessel is identified as part of the RLD system, it is not designed or permitted to manage mixed or dangerous wastes.

2 Applicable Documents

WAC 173-303. *Dangerous Waste Regulations.* Washington Administrative Code.

Publication #95-420, Guidance for Assessing Dangerous Waste Secondary Containment Systems, Washington Department of Ecology, September 1995.

UBC, 1997, Uniform Building Code™

3 Description

There are two dangerous waste vessels in the LAB. The first vessel, RLD-VSL-00164, laboratory area sink drain collection vessel, will hereafter be referred to as the C3 vessel (RLD-VSL-00164). The second vessel, RLD-VSL-00165, hotcell drain collection vessel, will hereafter be referred to as the C5 vessel (RLD-VSL-00165).

The C3 vessel (RLD-VSL-00164) collects, by gravity flow, effluents and other inflows from the radiological laboratory fumehood sinks, radiological laboratory sinks, maintenance area floor drains, pump maintenance room drains, hotcell maintenance access area floor drains, personnel decontamination showers and sinks, process vacuum system equipment drains, and a maintenance area sink. These sources of influent are all located at grade level. In addition, the C3 vessel (RLD-VSL-00164) receives liquid transfers from RLD-VSL-00163, floor drain collection vessel (C2 vessel), and sump drain flows from the C3 pump pit (A-B002). RLD-VSL-00164 is located at elevation (-)18'-7". The vessel is located in a stainless steel lined, rectangular cell and is the only vessel in that cell. The cell is designated room A-B003, C3 effluent vessel cell.

The C5 vessel (RLD-VSL-00165) collects, by gravity flow, effluents and other inflows from laboratory hotcell floor drains, hotcell cupsinks, hotcell transfer drawer drains, hotcell transfer glovebox drains, autosampling system drains, and a maintenance decontamination glovebox drain. In addition, the vessel receives effluent transfers from the previously described C3 vessel (RLD-VSL-00164), liquid transfers from RLD-VSL-00163, floor drain collection vessel (C2 vessel), and sump drain flows from the C5 pump pits (A-B005 and A-B007) and C5 piping pit (A-B006). RLD-VSL-00165 is located at elevation (-)19'-

2". It is housed in a stainless steel lined, rectangular cell and is the only vessel in that cell. The cell is designated room A-B004, C5 effluent vessel cell.

3.1 C3 vessel Secondary Containment for LAB Facility

Flooding could occur in the cell if there is a failure of the vessel or a release of fire water that causes the vessel to overflow via its overflow nozzle. The greater flooding volume of the two scenarios determines the required height of the stainless steel liner for the C3 effluent vessel cell.

The WTP design criteria for flooding due to a vessel failure is defined as either 110% of the maximum operating volume of the largest vessel in the cell or the total volume of the largest vessel, whichever is greater. The total volume is defined as the internal volume of the vessel, including the shell and both heads. In this case, there is only one vessel in the cell and its total volume of 3200 gal (427.8 ft^3) is the greater volume. This is the volume that is used for calculating the cell stainless steel liner height.

Two cases are evaluated based on the different code requirements. Both cases are evaluated and the greater liner height is used.
Scenario A: "Tank" or vessel is ruptured (WAC) plus In-Cell Fire Water Volume (If equipped)
Scenario B: "Tank" or vessel full plus remote Fire Water Volume (UBC)(fire water input from higher elevation floor drains to a filled vessel).

For Scenario A, the flooding height is calculated by the summation of the total volume of the C3 vessel plus 20 minutes of fire water flow into the vessel cell minus the volume of the sloped floor divided by the net cell floor area. The C3 vessel cell has a floor area of ≈354 ft^2. The fire water flow into the C3 vessel cell was estimated based on a sprinkler spray density of 0.17 gal/min-ft^2 (gallons per minute per square foot), a minimum design area for a period of 20 minutes, plus a 1.1 margin. Therefore, the total amount of fire water from sprinklers inside the cell is 1325 gal (177 ft^3). In addition, an allotment was made for displacement due to piping, vessel supports, and other commodities that may be found in the cell. The top of the stainless steel liner above the poured concrete floor required for a postulated vessel failure is 1.70 ft.

Scenario B examines the collection of fire water discharges when the vessel is full and intact and firewater from floor drains in the largest upper elevation area overflow the vessel resulting in the flooding of the C3 effluent vessel cell. The largest firewater volume that can drain into RLD-VSL-00164 comes from the C3 Maintenance Shop that has a floor area of ≈2300 ft^2. Scenario B also uses a sprinkler spray density of 0.17 gal/min-ft^2 (gallons per minute per square foot), into the C3 Maintenance shop for a period of 20 minutes, plus a 1.1 margin. Therefore, the total amount of fire water that is collected in the vessel and presumed to overflow into the cell is 8602 gal (1150 ft^3).

The required height for Scenario B is equal to the fire water flooding volume minus the volume of the sloped floor area divided by the cross-sectional area of the cell compartment minus the vessel area. The top of the stainless steel liner above the poured concrete floor required for flooding due to a postulated fire water discharge is 3.8 ft.

The installed liner height is 4.96 ft, therefore the liner is sufficient for both scenarios. A derivation of the liner height calculation is provided in Appendix A.

3.2 C5 Vessel Secondary Containment for LAB Facility

The C5 vessel (RLD-VSL-00165) is the only vessel in the respective cell. Flooding could occur in the cell if there is a failure of the vessel or a release of fire water that causes the vessel to overflow via its

overflow nozzle. The worst of the two scenarios determines the required height of the stainless steel liner for the C5 effluent vessel cell.

The WTP design criteria for flooding due to a vessel failure is defined as either 110% of the maximum operating volume of the largest vessel in the cell or the total volume of the largest vessel, whichever is greater. The total volume is defined as the internal volume of the vessel, including the shell and both heads. In this case, there is only one vessel in the cell and its total volume of 9100 gal (1216.5 ft^3) is the greater volume. This is the volume that is used for calculating the cell stainless steel liner height.

Two cases are evaluated based on the different code requirements. Both cases are evaluated and the greater liner height is used.

Scenario A: "Tank" or vessel is ruptured (WAC) plus In-Cell Fire Water Volume (If equipped)
Scenario B: "Tank" or vessel full plus remote Fire Water Volume (UBC)(fire water input from higher elevation floor drains to a filled vessel).

For Scenario A, the flood height is calculated by the summation of the total volume of the C5 vessel minus the volume of the sloped floor divided by the net cell floor area. There are no in-cell fire sprinklers in the C5 vessel cell, so sprinkler flow was not considered in Scenario A. In addition, an allotment was made for displacement due to piping, vessel supports, and other commodities that may be found in the cell. The top of the stainless steel liner above the poured concrete floor required for a postulated vessel failure is 1.90 ft.

For Scenario B the required liner height is equal to the hot cell fire water flooding volume minus the volume of the sloped floor area divided by the cross-sectional area of the cell compartment minus the vessel area. In addition, an allotment was made for displacement due to piping, vessel supports, and other commodities that may be found in the cell. The largest firewater volume that can drain into RLD-VSL-00165 is from the Hotcells that has a floor area of ≈2300 ft^2. The flooding due to fire water entering the drain collection system through floor drains and overflowing the C5 vessel (RLD-VSL-00165) was estimated based on a sprinkler spray density of 0.17 gal/min-ft^2 (gallons per minute per square foot), a minimum design area for a period of 20 minutes, plus a 1.1 margin. Therefore, the total amount of fire water that is collected in the vessel and presumed to overflow into the cell is 8602 gal (1150 ft^3). The top of the stainless steel liner above the poured concrete floor required for flooding due to a postulated fire water discharge is 2.7 ft.

The installed liner height is 4.0 ft, therefore the liner is sufficient for both scenarios. A derivation of the liner height calculation is provided in Appendix B.

Appendix A

Calculation of Liner Height for RLD-VSL-00164 Cell

Calculation of Liner Height for RLD-VSL-00164 Cell

A.1 Objective

The purpose of this calculation is to size the height of the liner in the C3 effluent vessel cell (A-B003) at the (-)18'-7" elevation of the WTP analytical laboratory (for the C3 vessel, RLD-VSL-00164). The general arrangement of the cell is illustrated in drawing 24590-LAB-P1-60-00007.

A.2 Inputs

The following input parameters and physical characteristics are used as input to this calculation.

- Vessel characteristics: 8'-6" (102.0 in.) diameter x 8'-79/16" (103.6 in.) height (flanged and dished heads, top and bottom)
- Vessel volume: total volume = 3200 gal (427.8 ft^3), maximum operating volume = 2740 gal (366.3 ft^3)
- Cell dimensions: 27'-3" (long, north/south) x 13'-0" (wide, east/west) x 10'-0" (high)
- duration of a fire water discharge is 20 minutes
- Fire sprinkler design criteria: The minimum spray density for laboratory process areasand mechanical rooms is 0.17 gal/min-ft^2 times 1.1 over the minimum design area of 3000 ft^2 (See Design Guide WTP-GPG-M-033, Sect. 3, page 10 of 15)
- Fire protection water: Per Uniform Building Code (UBC), Sec. 307.2.3.3, "Secondary containment for indoor storage areas shall be designed to contain a spill from the largest vessel, plus the design flow volume of fire-protection water calculated to discharge from the fire-extinguishing system over the minimum required system design area or area of the room or area in which the storage is located, whichever is smaller, for a period of 20 minutes. Based on these UBC criteria the C3 Maintenance Shop (≈2300 ft^2) was selected to evaluate fire protection water drain flow into RLD-VSL-00164 (Scenario B).
- Liner sizing criterion: The liner must be designed to contain either 110% of the maximum operating volume of the largest vessel in the cell or the total volume of the largest vessel, whichever is greater; and handle the volume of fire water from the fire protection system over the minimum design area for a period of 20 minutes (with the vessel full)

The characterization of the fire and fire sprinkler system is based on the design guide 24590-WTP-GPG-M-019. The design criterion for the liner is based on a review of Washington Administrative Code requirements and referenced standards. The vessel volumes are conservative values.

A.3 Background

This calculation is being performed to support dangerous waste permit modifications for the analytical laboratory (LAB) facility.

A.4 Applicable Codes and Standards

WAC 173-303. *Dangerous Waste Regulations.* Washington Administrative Code.

Publication #95-420, Guidance for Assessing Dangerous Waste Secondary Containment Systems, Washington Department of Ecology, September 1995.
United Building Code, 1997

A.5 Methodology

This is a manual calculation that uses well-known and recognized handbook formulas. The general approach is to calculate the total volume of liquid that potentially enters the cell and divide that value by the net available floor area to obtain the flooding height in the cell.

Liquid can enter the cell if there is a failure of the vessel in the corresponding cell or a release of fire water that causes the vessel to overflow. For the vessel rupture cases, the total volume of the vessel in the corresponding cell is discharged to the cell. In contrast, for the fire water cases, liquid enters the drain collection system through floor drains located at various grade-level rooms throughout the analytical laboratory building and the collected liquid causes the vessel to overflow into the corresponding cell. The intact vessel is taken to be full at the start of the fire water discharge.

A.6 Assumptions

The following assumptions are used in the calculation.

A.6.1 For the scenario of a vessel spill, credit is taken for any fluid volume that remains in the vessel as the fluid level will equalize between vessel and cell. This assumption does not require verification.

A.6.2 The volume displaced by the piping, vessel supports, and other obstructions in the cell is assumed to equal 5% of the volume displaced by the vessel. By inspection, the few pipes or other commodities located in the vessel cells are open and do not significantly contribute to volume reduction. This assumption is deemed to be conservative and does not require verification.

A.6.3 For the scenario of a full vessel, the area of the vessel is subtracted from the gross area of the cell floor. This assumption is conservative and does not require verification.

A.7 Calculations

A.7.1 C3 Vessel (RLD-VSL-00164) Rupture Plus In-Cell Firewater Release (Scenario A)

A.7.1.1 Vessel Characteristics

Vessel dimensions: 8'-6" (8.50 ft) diameter x 8'-7 9/16" (8.63 ft) height (flanged-and-dished heads, top and bottom).

Total Volume = 3,200 gal (427.8 ft^3) 110% MOV = 1.1 * 2,740 gal = 3,014 gal

Therefore, the vessel capacity used in liner height calculation is 3,200 gal (427.8 ft^3).

A.7.1.2 Cell Characteristics

Cell Dimensions: [27'-3" (long)] x [13'-0" (wide)]

Based on Assumption A.6.2, the net cell floor area is given by the following:

Net Cell Floor Area (A_f) = Gross Area – 5% of Vessel Area for unknowns (e.g., piping, vessel supports, etc.)

Vessel outside diameter: 8.50 ft (internal diameter) + 2*(0.375"/12 in/ft) (shell thickness) = 8.5625 ft.

A_f= [27.25 ft*13.00 ft] – [0.05 *(1/4)* π*(8.5625 ft)^2]

A_f= 354.25 ft^2 – 2.88 ft^2 = 351.4 ft^2

A.7.1.3 Fire Water Flood Characteristics:

$$V_{ol} = (T)(0.17)(A_{fw})(1.1)$$

Where:
T = 20 minutes
A_{fw} = 354.25 ft^2
Therefore, fire water flooding volume is equal to: V_{ol} = 20 min * (0.17 gal/min-ft^2) * (354.25 ft^2)*(1.1) = 1324.9 gal (177.1 ft^3)

A.7.1.4 Sloped Floor Volume

The cell floor is sloped 2 inches (0.17 ft) to direct potential leaks to the secondary containment sump. Credit is taken for the volume of the sloped floor from the base of the liners to the top of the sump by subtracting the calculated volume from the vessel and fire water flood volumes.
The volume of the sloped floor section is calculated using:

$$V_s = (h_s/3)(A_f + \sqrt{A_f A_1} + A_1) = (0.17/3)(354.25 + \sqrt{(354.24)(10.03)} + 10.03) = 24.02\,ft^3$$

Where A_1 = 3.167' x 3.167' = 10.03 ft^2 (area of floor at top of sump)

A.7.1.5 Required Liner Height (H)

Flood Height = (Vessel Volume + Fire Water Flood Volume - Sloped Floor Volume) / Net Cell Floor Area =

(427.8 + 177.1 - 24.02) ft^3 / 351.4 ft^2 =

(580.88) ft^3 / 351.4 ft^2 = 1.653 ft $\cong 1.70\,ft$

The required liner height, H = 1.70 ft (Scenario A)

A.7.2 C3 Vessel (RLD-VSL-00164) Full Plus Remote Firewater Release volume (Scenario B)

A.7.2.1 Flood Height

Flood Height = Remote Floodwater Volume / (Cell Floor Area -Vessel Area)

A.7.2.2 Cell Characteristics, A-B003

Cell Dimensions: [27'-3" (long)] x [13'-0" (wide)]

Based on Assumption A.6.3, the net cell floor area minus the vessel area is given by the following:

Net Cell Floor Area (A_f) = Gross Area – Vessel Area

Vessel outside diameter: 8.50 ft (internal diameter) + 2*(0.375"/12 in/ft) (shell thickness) = 8.5625 ft.

A_f= [27.25 ft*13.00 ft] – [(1/4)* π*(8.5625 ft)^2]

A_f= 354.25 ft^2 – 57.58 ft^2 = 296.67 ft^2

A.7.2.3 Fire Water Flood Characteristics

The largest firewater volume that can drain into RLD-VSL-00164 is from the C3 Maintenance Shop

The floor area of the C3 Maintenance Shop is calculated below:

A_{ms} = 58.6875' x 39' = 2289 ft^2 ≈ 2300 ft^2

Remote Floodwater Volume from the largest area with fire sprinkler service draining to vessel (C3 Maintenance Area) =

$$V_{ol} = (T)(0.17)(A_{fw})(1.1)$$

Where:
T = 20 minutes
$A_{fw} = A_{ms}$ = 2300 ft^2
Therefore, fire water flooding volume is equal to: V_{ol} = 20 min * (0.17 gal/min-ft^2) * (2300 ft^2)*(1.1) = 8602 gal (1150 ft^3)

A.7.2.4 Sloped Floor Volume

The cell floor is sloped 2 inches (0.17 ft) to direct potential leaks to the secondary containment sump. Credit is taken for the volume of the sloped floor from the base of the liners to the top of the sump by subtracting the calculated volume from the vessel and fire water flood volumes.
The volume of the sloped floor section is calculated using:

$$V_s = (h_s/3)(A_f + \sqrt{A_f A_1} + A_1) = (0.17/3)(354.25 + \sqrt{(354.24)(10.03)} + 10.03) = 24.02\,ft^3$$

Where A_1 = 3.167' x 3.167' = 10.03 ft^2 (area of floor at top of sump)

A.7.2.5 Required Liner Height

Flood Height = (Fire Water Flood Volume - Sloped Floor Volume)/Net Cell Floor Area = (1150 - 24.02) ft^3 / 296.67 ft^2 = 3.8 ft

The required liner height, H = 3.8 ft (Scenario B)

A.8 Results and conclusions

The required liner height is 1.70 ft. for Scenario A.
The required liner height is 3.80 ft. for Scenario B.
Installed liner height of 4.96 ft (4'-11.5") as measured from the highest point on the concrete floor exceeds the minimum liner height requirement and therefore it is adequate.

A.9 References

A.9.1 24590-LAB-P1-60-00007, Rev. 002, ANALYTICAL LABORATORY GENERAL ARRANGEMENT PLAN AT EL (-) 19 FT - 2IN SECTIONS E-E, F-F & G-G.

A.9.2 24590-WTP-GPG-M-033, Rev. 004, Fire Water Floor Drain System.

A.9.3 24590-QL-SRA-MTF5-00001-44-00007, Rev. 00B, Drawings - Analytical Laboratory C3 Cell Details - Dwg. No. 206.

A.10 Attachments

None

Appendix B

Calculation of Liner Height for RLD-VSL-00165 Cell

Appendix B
Calculation of Liner Height for RLD-VSL-00165 Cell

B.1 Objective

The purpose of this calculation is to size the height of the liner in the C5 effluent vessel cell (A-B004) at the (-)19'-2" elevation of the WTP analytical laboratory (for the C5 vessel, RLD-VSL-00165). The general arrangement of the cell is illustrated in drawing 24590-LAB-P1-60-00007.

B.2 Inputs

The following input parameters and physical characteristics are used as input to this calculation.

- Vessel characteristics: 16'-0" (192.0 in.) diameter x 8'-2" (98 in.) height (flanged and dished heads, top and bottom)
- Vessel volume: total volume = 9100 gal (1216.5 ft^3), maximum operating volume = 6615 gal (884.3 ft^3)
- Cell dimensions: 29'-0" (long, north/south) x 21'-0" (wide, east/west) x 11'-2" (high)
- Duration of a fire water discharge is 20 minutes
- Fire sprinkler design criteria: The minimum spray density for laboratory process area, including hotcell support rooms, laboratory suites and corridors, and mechanical rooms is 0.17 gal/min-ft^2 times 1.1 over the minimum design area of 3000 ft^2 (See Design Guide WTP-GPG-M-033, Sect. 3, page 10 of 15)Fire protection water: Per Uniform Building Code (UBC), Sec. 307.2.3.3, "Secondary containment for indoor storage areas shall be designed to contain a spill from the largest vessel, plus the design flow volume of fire-protection water calculated to discharge from the fire-extinguishing system over the minimum required system design area or area of the room or area in which the storage is located, whichever is smaller, for a period of 20 minutes. Based on these UBC criteria the Hotcell area (≈2300 ft^2) was selected to evaluate fire protection water drain flow into RLD-VSL-00165 (Scenario B).

- Liner sizing criterion: The liner must be designed to contain either 110% of the maximum operating volume of the largest vessel in the cell or the total volume of the largest vessel, whichever is greater; and handle the volume of fire water from the fire protection system over the minimum design area for a period of 20 minutes (with the vessel full)

The characterization of the fire and fire sprinkler system is based on the design guide 24590-WTP-GPG-M-019. The design criterion for the liner is based on a review of Washington Administrative Code requirements and referenced standards. The vessel volumes are conservative values.

B.3 Background

This calculation is being performed to support dangerous waste permit modifications for the analytical laboratory (LAB) facility.

B.4 Applicable Codes and Standards

WAC 173-303. *Dangerous Waste Regulations.* Washington Administrative Code.

Publication #95-420, Guidance for Assessing Dangerous Waste Secondary Containment Systems, Washington Department of Ecology, September 1995.
United Building Code, 1997

B.5 Methodology

This is a manual calculation that uses well-known and recognized handbook formulas. The general approach is to calculate the total volume of liquid that potentially enters the cell and divide that value by the net available floor area to obtain the flooding height in the cell.

Liquid can enter the cell if there is a failure of the vessel in the corresponding cell or a release of fire water that causes the vessel to overflow. For the vessel rupture cases, the total volume of the vessel in the corresponding cell is discharged to the cell. In contrast, for the fire water cases, liquid enters the drain collection system through floor drains located at various grade-level rooms throughout the analytical laboratory building and the collected liquid causes the vessel to overflow into the corresponding cell. The intact vessel is taken to be full at the start of the fire water discharge.

B.6 Assumptions

The following assumptions are used in the calculation.

B.6.1 For the scenario of a vessel spill, credit is taken for any fluid volume that remains in the vessel as the fluid level will equalize between vessel and cell. This assumption is conservative and does not require verification.

B.6.2 The volume displaced by the piping, vessel supports, and other obstructions in the cell is assumed to equal 5% of the volume displaced by the vessel. By inspection, the few pipes or other commodities located in the vessel cells are open and do not significantly contribute to volume reduction. This assumption is deemed to be conservative and does not require verification.

B.6.3 For the scenario of a full vessel, the area of the vessel is subtracted from the gross area of the cell floor. This assumption is conservative and does not require verification.

B.7 Calculations

B.7.1 C5 Vessel (RLD-VSL-00165) Rupture (Scenario A)

B.7.1.1 Vessel Characteristics

Vessel Dimensions: 16 ft Dia. x 8.17 ft H (Flanged-and-Dished-Heads Top and Bottom)

Total Volume = 9,100 gal (1,216.5 ft^3) 110% MOV = 1.1 * 6,615 gal = 7,277 gal

Therefore, the vessel capacity used to calculate the liner height is equal to 9,100 gal (1,216.5 ft^3).

B.7.1.2 Cell characteristics

Cell Dimensions: [29'-0" (long)] x [21'-0" (wide)]

Based on Assumption B.6.2, the net cell floor area is given by the following:
Net Cell Floor Area (A_f) = Gross Area – 5% of Vessel Area for unknowns (e.g., piping, vessel supports, etc.)

Vessel outside diameter : 16.0 ft (internal diameter) + 2*(0.688"/12) (shell thickness) = 16.115 ft

A_f = [29.00 ft*21.00 ft] – [0.05 *(1/4)*π*(16.115 ft)^2]

A_f= 609.00 ft^2 – 10.2 ft^2 = 598.8 ft^2

B.7.1.3 Fire Water Flood Characteristics:

There are No Sprinklers in C5 Cell.

B.7.1.4 Sloped Floor Volume

The cell floor is sloped 4 inches (0.33 ft) to direct potential leaks to the secondary containment sump. Credit is taken for the volume of the sloped floor from the base of the liners to the top of the sump by subtracting the calculated volume from the vessel and fire water flood volumes.
The volume of the sloped floor section is calculated by:

$$V_s = (h_s/3)(A_f + \sqrt{A_f A_1} + A_1) = (0.33/3)(609 + \sqrt{(609)(11.11)} + 11.11) = 77.26 ft^3$$

Where A_1 = (1'-8" + 1'-8") x (1'-8" + 1'-8") = 3.33' x 3.33' = 11.11 ft^2 (area of floor at top of sump)

B.7.1.5 Required Liner Height (H)

Flood Height = (Ruptured Vessel Volume - Sloped Floor Volume) / Net Cell Floor Area =

(1216.5 - 77.26) ft^3 / 598.8 ft^2 =

(1139.24)ft^3 / 598.8 ft^2 = 1.90 ft

The required liner height, H = 1.90 ft (Scenario A)

B.7.2 C5 Vessel (RLD-VSL-00165) Full Plus Remote Firewater Release Volume (Scenario B)

B.7.2.1 Flood Height

Flood Height = Remote Floodwater Volume / (Cell Floor Area -Vessel Area)

B.7.2.2 Cell Characteristics, A-B004

Cell Dimensions: [29'-0" (long)] x [21'-0" (wide)]

Based on Assumption B.6.3, the net cell floor area is given by the following:

Net Cell Floor Area (A_f) = Gross Area – Vessel Area

Vessel outside diameter : 16.0 ft (internal diameter) + 2*(0.688"/12) (shell thickness) = 16.115 ft

A_f = [29.00 ft*21.00 ft] – [1/4*π*(16.115 ft)^2]

A_f= 609.0 ft^2 – 203.96 ft^2 = 405.0 ft^2

B.7.2.3 Fire Water Flood Characteristics

The largest fire water volume that can drain into RLD-VSL-00165 is from the Hot Cell Area (HC-1 through HC-14) [A0141B].

The floor area of the Hot Cells is calculated below:

A_{HC} = 20' x 115' = 2300 ft^2

$$V_{ol} = (T)(0.17)(A_{fw})(1.1)$$

Where:
T = 20 minutes
A_{fw} = A_{HC} = 20' x 115' = 2300 ft^2

Therefore, fire water flooding volume is equal to: V_{ol} = 20 min * (0.17 gal/min-ft^2) * (2300 ft^2)*(1.1) = 8602 gal (1149.8 ft^3)

B.7.2.4 Sloped Floor Volume

The cell floor is sloped 4 inches (0.33 ft) to direct potential leaks to the secondary containment sump. Credit is taken for the volume of the sloped floor from the base of the liners to the top of the sump by subtracting the calculated volume from the vessel and fire water flood volumes.
The volume of the sloped floor section is calculated by:

$$V_s = (h_s/3)(A_f + \sqrt{A_f A_1} + A_1) = (0.33/3)(609 + \sqrt{(609)(11.11)} + 11.11) = 77.26 ft^3$$

Where A_1 = (1'-8" + 1'-8") x (1'-8" + 1'-8") = 3.33' x 3.33' = 11.11 ft^2 (area of floor at top of sump)

B.7.2.5 Required Liner Height

Flood Height = (Fire Water Flood Volume - Sloped Floor Volume)/Net Cell Floor Area =

(1149.8 - 77.26) ft^3 / 405.0 ft^2 =
(1072.54)ft^3 / 405.0 ft^2 = 2.65 ft $\cong 2.70 ft$

The required liner height, H = 2.70 ft (Scenario B)

B.8 Results and Conclusions

The required liner height is 1.90 ft. for Scenario A.
The required liner height is 2.70 ft. for Scenario B.
Installed liner height of 4.0 ft as measured from the highest point on the concrete floor exceeds the minimum requirement and therefore it is adequate.

B.9 References

B.9.1 24590-LAB-P1-60-00007, Rev. 002, ANALYTICAL LABORATORY GENERAL ARRANGEMENT PLAN AT EL (-) 19 FT - 2IN SECTIONS E-E, F-F & G-G.

B.9.2 24590-WTP-GPG-M-033, Rev. 004, Fire Water Floor Drain System.

B.9.3 24590-QL-SRA-MTF5-00001-44-00004, Rev. 00C, Drawing - Analytical Laboratory C5 Cell Details - 203.

B.10 Attachments

None

Drawings and Documents

Operating Unit Group 10 – Appendix 11.9
Laboratory Building
Material Selection Documentation

The documents listed in the following table are incorporated by reference into this permit and are subject to the requirements set forth in Part I Standard Conditions, Part II General Facility Conditions, and Part III Operating Unit Group 10 Conditions. Upon request, copies of the documents can be viewed at the Nuclear Waste Program Resource Center located at 3100 Port of Benton Blvd., Richland, WA. Appointments for viewing can be scheduled by calling (509) 372-7950.

Drawing/Document Number	***Description***
24590-LAB-N1D-RLD-P0002, Rev 1	Material Selection Data Sheet for RLD-VSL-00164
24590-LAB-N1D-RLD-P0003, Rev 1	Material Selection Data Sheet for RLD-VSL-00165
RESERVED	RESERVED

Source documents (which do not include a "P" in the last set of numbers, e.g. "-P0001," or "-TP001") should be used in conjunction with any document change notices issued against them.

We are currently transitioning from permit documents (which include a "P" in the last set of numbers) to source documents. At the end of the transition period, permit submittals will contain source documents and will be incorporated into the permit as described in Ecology Publication #07-05-006 (http://www.ecy.wa.gov/biblio/0705006.html).

Drawings and Documents

Operating Unit Group 10 – Appendix 11.10
Laboratory Building
Critical Systems Equipment/Instrument List

The documents listed in the following table are incorporated by reference into this permit and are subject to the requirements set forth in Part I Standard Conditions, Part II General Facility Conditions, and Part III Operating Unit Group 10 Conditions. Upon request, copies of the documents can be viewed at the Nuclear Waste Program Resource Center located at 3100 Port of Benton Blvd., Richland, WA. Appointments for viewing can be scheduled by calling (509) 372-7950.

Drawing/Document	***Description***
	Analytical Laboratory Below Grade Room & Equipment Room List
RESERVED	RESERVED

Source documents (which do not include a "P" in the last set of numbers, e.g. "-P0001," or "-TP001") should be used in conjunction with any document change notices issued against them.

We are currently transitioning from permit documents (which include a "P" in the last set of numbers) to source documents. At the end of the transition period, permit submittals will contain source documents and will be incorporated into the permit as described in Ecology Publication #07-05-006 (http://www.ecy.wa.gov/biblio/0705006.html).

Drawings and Documents

Operating Unit Group 10 – Appendix 11.11
Laboratory Building
IQRPE Reports

The documents listed in the following table are incorporated by reference into this permit and are subject to the requirements set forth in Part I Standard Conditions, Part II General Facility Conditions, and Part III Operating Unit Group 10 Conditions. Upon request, copies of the documents can be viewed at the Nuclear Waste Program Resource Center located at 3100 Port of Benton Blvd., Richland, WA. Appointments for viewing can be scheduled by calling (509) 372-7950.

Drawing/Document	***Description***
CCN 200253 / IA-3001891-001	IQRPE Structural Integrity Assessment Report for LAB RLD Ancillary Equipment
24590-CM-HC4-HXYG-00138-01-16, Rev 00B	IQRPE Review of the Analytical Laboratory Facility Below Grade Level Secondary Containment
24590-CM-HC4-HXYG-00138-01-00020, Rev 00A	IQRPE Integrity Assessment Report for RLD-VSL-00164 and RLD-VSL-00165
RESERVED	RESERVED

Source documents (which do not include a "P" in the last set of numbers, e.g. "-P0001," or "-TP001") should be used in conjunction with any document change notices issued against them.

We are currently transitioning from permit documents (which include a "P" in the last set of numbers) to source documents. At the end of the transition period, permit submittals will contain source documents and will be incorporated into the permit as described in Ecology Publication #07-05-006 (http://www.ecy.wa.gov/biblio/0705006.html).

Drawings and Documents

Operating Unit Group 10 – Appendix 11.13
Laboratory Building
Instrument Control Logic and Narrative Descriptions

The documents listed in the following table are incorporated by reference into this permit and are subject to the requirements set forth in Part I Standard Conditions, Part II General Facility Conditions, and Part III Operating Unit Group 10 Conditions. Upon request, copies of the documents can be viewed at the Nuclear Waste Program Resource Center located at 3100 Port of Benton Blvd., Richland, WA. Appointments for viewing can be scheduled by calling (509) 372-7950.

Drawing/Document Number	***Description***
24590-LAB-PER-J-03-001, Rev 1	System Logic Description for Analytical Laboratory – Radioactive Liquid Waste Disposal System
RESERVED	RESERVED

Source documents (which do not include a "P" in the last set of numbers, e.g. "-P0001," or "-TP001") should be used in conjunction with any document change notices issued against them.

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RPP-WTP PDC

System Logic Description for Analytical Laboratory - Radioactive Liquid Waste Disposal (RLD) System

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Approver's signature: _____ Signature 12/7/10 Date

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This bound document contains a total of 17 sheets

Notice

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History Sheet

Rev	Reason for revision	Revised by
0	Issued for Permitting Use	A. Pfeif
1	Revised to include changes to permitted instruments	N. A. Gergely

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Acronyms

AEA	Atomic Energy Act
DOE	US Department of Energy
DWP	Dangerous Waste Permit
LAB	analytical laboratory
LAH	level alarm high
LAHH	level alarm high high
LAL	level alarm low
LI	level indicator
LSH	level switch high
LT	level transmitter
P&ID	piping and instrumentation diagram
RLD	radioactive liquid waste disposal
WTP	Hanford Tank Waste Treatment and Immobilization Plant

Glossary

acquire	Acquire is a command under batch control that reserves a group of equipment for a particular batch control operation.
batch	Batch is the material that is being produced or that has been produced by a single execution of a batch process.
batch control	Batch control refers to control activities and control functions that provide an ordered set of processing activities to complete a batch process.
batch process	A batch process is a process that leads to the production of finite quantities of material by subjecting quantities of input materials to an ordered set of processing activities over a finite period of time using one or more pieces of equipment.
control system	Refers to electronic processors that perform regulatory and logical control functions necessary for normal plant operation
exception handling	Exception handling refers to those functions that deal with plant or process contingencies and other events that occur outside the normal or desired behavior of batch control.
level alarm high (LAH)	A vessel high-level setpoint used to stop a transfer-in batch operation to a vessel under normal plant operation.
level alarm high high (LAHH)	Refers to a notification in the control system that is activated when the applicable variable reaches a point that is significantly higher than that expected during normal operation
level alarm low (LAL)	A vessel low-level set point used to stop a transfer-out batch operation from a vessel under normal plant operations.
release	Release is a command under batch control that opens up a group of equipment for any batch control to acquire.

1 Introduction

This document describes the instrument control logic for Dangerous Waste Permit (DWP) tank and ancillary equipment in the radioactive liquid waste disposal (RLD) system within the analytical laboratory (LAB) associated with dangerous waste management.

2 Applicable Documents

24590-WTP-M6-50-00001	*P&ID Symbols and Legend Sheet 1 of 8*
24590-WTP-M6-50-00002	*P&ID Symbols and Legend Sheet 2 of 8*
24590-WTP-M6-50-00003	*P&ID Symbols and Legend Sheet 3 of 8*
24590-WTP-M6-50-00004	*P&ID Symbols and Legend Sheet 4 of 8*
24590-WTP-M6-50-00005	*P&ID Symbols and Legend Sheet 5 of 8*
24590-WTP-M6-50-00006	*P&ID Symbols and Legend Sheet 6 of 8*
24590-WTP-M6-50-00007	*P&ID Symbols and Legend Sheet 7 of 8*
24590-WTP-M6-50-00008	*P&ID Symbols and Legend Sheet 8 of 8*
24590-LAB-M6-RLD-00001001	*P&ID - LAB Radioactive Liquid Waste Disposal System C5 Collection and Transfer RLD-VSL-00165*
24590-LAB-M6-RLD-00001002	*P&ID - LAB Radioactive Liquid Waste Disposal System C5 Collection and Transfer RLD-PMP-00183A*
24590-LAB-M6-RLD-00001003	*P&ID - LAB Radioactive Liquid Waste Disposal System C5 Collection and Transfer RLD-PMP-00183B*
24590-LAB-M6-RLD-00001004	*P&ID - LAB Radioactive Liquid Waste Disposal System C5 Collection and Transfer Valve Pit*
24590-LAB-M6-RLD-00002001	*P&ID - LAB Radioactive Liquid Waste Disposal System C3 Collection & Transfer RLD-VSL-00164*
24590-LAB-M6-RLD-00002003	*P&ID - LAB Radioactive Liquid Waste Disposal System C3 Collection & Transfer RLD-PMP-00182A/B*
24590-LAB-M6-RLD-00006001	*P&ID - LAB Radioactive Liquid Waste Disposal System C3 RAD LAB Collection*
24590-LAB-M6-RLD-00006002	*P&ID - LAB Radioactive Liquid Waste Disposal System C3 RAD LAB Collection*
24590-LAB-M6-RLD-00006003	*P&ID - LAB Radioactive Liquid Waste Disposal System C3 RAD LAB Collection*

24590-LAB-M6-RLD-00007001	*P&ID - LAB Radioactive Liquid Waste Disposal System C3 Leak Detection Boxes*
24590-LAB-M6-RLD-00007002	*P&ID - LAB Radioactive Liquid Waste Disposal System C3 Collection Drain Header*
24590-LAB-M6-RLD-00008001	*P&ID - LAB Radioactive Liquid Waste Disposal System - C5 Leak Detection Boxes*
24590-LAB-M6-RLD-00008002	*P&ID - LAB Radioactive Liquid Waste Disposal System C5 Drain Collection Headers*
24590-LAB-3YD-RLD-00001	*System Description for the Analytical Laboratory Radioactive Liquid Waste Disposal System (RLD)*

3 Description

The DWP tank and ancillary equipment associated with dangerous waste management within the RLD system are the following:

• RLD-VSL-00165	Hotcell drain collection vessel (C5 vessel)
• RLD-VSL-00164	Lab area sink drain collection vessel (C3 vessel)
• RLD-PMP-00183A	Hotcell drain collection vessel pump (C5 vessel)
• RLD-PMP-00183B	Hotcell drain collection vessel pump (C5 vessel)
• RLD-PMP-00182A	Lab area sink drain collection vessel pump (C3 vessel)
• RLD-PMP-00182B	Lab area sink drain collection vessel pump (C3 vessel)
• RLD-SUMP-00042	C5 vessel cell sump
• RLD-SUMP-00041	C3 vessel cell pump
• RLD-SUMP-00043A	C5 pump pit sump
• RLD-SUMP-00043B	C5 pump pit sump
• RLD-SUMP-00044	C5 piping pit sump
• RLD-SUMP-00045	C3 pump pit sump
• RLD-LDB-00002	Hotcell collection leak detection box
• RLD-LDB-00004	C3 transfer leak detection box
• RLD-LDB-00005	RAD Lab sink collection header leak detection box
• RLD-LDB-00006	PVA drain header leak detection box
• RLD-LDB-00007	C3 maintenance drain header leak detection box
• RLD-LDB-00008	Sample receive/send drain header leak detection box
• RLD-LDB-00009	Glovebox header leak detection box
• RLD-LDB-00011	ASX equipment drain collection header leak detection box

3.1 Hotcell Drain Collection Vessel

The hotcell drain collection vessel (RLD-VSL-00165) receives effluent from hotcell glovebox drains, hotcell cupsinks, hotcell transfer drawers, the master-slave manipulator decontamination glovebox, hotcell sample drop station, and the hotcell drain collection vessel pump pits and valve pit sumps. Effluents from the lab area sink drain collection vessel (RLD-VSL-00164) and the floor drain collection vessel (RLD-VSL-00163) can also be transferred to the hotcell drain collection vessel

(RLD-VSL-00165). The Floor Drain Collection Vessel (RLD-VSL-00163) collects, contains, and transfers non-contaminated liquid effluent. Although the floor drain collection vessel is identified as part of the RLD system, it is not designed or permitted to manage mixed or dangerous wastes. For waste management reliability, batch controlled transfers into RLD-VSL-00165 are limited by the control system to one transfer in or out at a time by the batch control mechanism of acquiring and releasing. Once acquired, no other batch control operation will be able to coordinate activities with the hotcell drain collection vessel (RLD-VSL-00165) until it is released.

When the vessel is available to receive effluent, the operator will initiate the transfer-in sequence. Once the sequence is initiated, the control system will verify that instruments, utilities, and equipment associated with the transfer are within operational parameters. If any of the monitored parameters are not within the specified limits during the transfer, the control system will switch to exception handling logic that will return the equipment associated with the transfer to a safe state. During normal operation, the batch transfer sequence is stopped by the control system when any of the following conditions are met:

- The level in the hotcell drain collection vessel (RLD-VSL-00165) reaches its level alarm high (LAH)
- The level of the sending equipment reaches its level alarm low (LAL).

When the LAH of the hotcell drain collection vessel (RLD-VSL-00165) is reached, the control system will notify an operator through the plant control system interface that the hotcell drain collection vessel (RLD-VSL-00165) is ready to transfer its contents. The operator will then initiate the transfer-out sequence within the control system. Once initiated, the control system verifies that instruments, utilities, and equipment associated with the transfer are within operational parameters and remain as such throughout the transfer. If any of the monitored parameters are not within the specified limits during the transfer, the control system will switch to exception handling logic that will return the equipment associated with the transfer to a safe state. During normal operation, the batch transfer sequence will end when any of the following conditions are met:

- The level in the hotcell drain collection vessel (RLD-VSL-00165) reaches its LAL
- The level of the receiving equipment reaches its LAH (during routine operations, pretreatment plant wash vessel, PWD-VSL-00044 or the pretreatment ultimate overflow vessel, PWD-VSL-00033, which receives transfer line flushes).

When the level is above the normal operating range due to an abnormality, interlocks and alarms within the control system help prevent an overflow condition. Figure 1 shows the interlocks and alarms for the level instrument associated with the hotcell drain collection vessel (RLD-VSL-00165). At the high high-alarm setpoint, an alarm (LAHH) is generated and all dedicated controlled feeds are isolated. Isolation occurs by stopping the motive force, closing valves, or a combination of both.

3.2 Radiological Laboratory Area Sink Drain Collection Vessel

The radiological laboratory (referred to in this document as the lab) area sink drain collection vessel (RLD-VSL-00164) receives effluent from the lab sinks, the lab fume hood sinks, decontamination showers and sinks, autosampling system equipment drains, the receiving and shipping area, process vacuum equipment, other floor drains throughout the LAB, and the C3 pump pit sump (RLD-SUMP-00045). Effluents from the floor drain collection vessel (RLD-VSL-00163) can also be transferred to the lab area sink drain collection vessel (RLD-VSL-00164). For waste management

reliability, batch controlled transfers into RLD-VSL-00164 are limited by the control system to one transfer in or out at a time by the batch control mechanism of acquiring and releasing. Once acquired, no other batch control operation will be able to coordinate activities with the lab area sink drain collection vessel (RLD-VSL-00164) until it is released.

When the vessel is available to receive effluent, the operator will initiate the transfer-in sequence. Once the sequence is initiated, the control system will verify that instruments, utilities, and equipment associated with the transfer are within operational parameters. If any of the monitored parameters are not within the specified limits during the transfer, the control system will switch to exception handling logic that will return the equipment associated with the transfer to a safe state. During normal operation, the batch transfer sequence is stopped by the control system when any of the following conditions are met:

- The level in the lab area sink drain collection vessel (RLD-VSL-00164) reaches its LAH
- The level of the sending equipment reaches its LAL.

When the LAH of the lab area sink drain collection vessel (RLD-VSL-00164) is reached, the control system will notify an operator through the plant control system interface that the lab area sink drain collection vessel is ready to transfer its contents. The operator will then initiate the transfer-out sequence within the control system. Once initiated, the control system verifies that instruments, utilities, and equipment associated with the transfer are within operational parameters and remain as such throughout the transfer. If any of the monitored parameters are not within the specified limits during the transfer, the control system will switch to exception handling logic that will return the equipment associated with the transfer to a safe state. During normal operation, the batch transfer sequence will end when any of the following conditions are met:

- The level in the lab area sink drain collection vessel (RLD-VSL-00164) reaches its LAL
- The level of the receiving equipment reaches its LAH.

When the level is above the normal operating range due to an abnormality, interlocks along with alarms within the control system help prevent an overflow condition. Figure 1 shows the interlocks and alarms for the level instrument associated with the lab area sink drain collection vessel (RLD-VSL-00164). At the high high-alarm setpoint, an alarm (LAHH) is generated and all dedicated controlled feeds are isolated. Isolation occurs by stopping the motive force, closing valves, or a combination of both.

3.3 Cell and Equipment Sumps

The LAB has two different types of sumps: pump or piping pit (equipment) and vessel cell sumps. All of the sumps are maintained dry. A general description of radar level detection in sumps can be found in 24590-WTP-PER-J-02-002, *Leak Detection in Secondary Containment Systems*, section 3.2.1.

Upon detection of a high liquid level in a cell sump, the control system alarms at which point the operator must take the necessary action to diagnose the source of the leakage and empty the cell sump. Figure 2 shows the alarms for the level instrument associated with the C5 vessel cell sump (RLD-SUMP-00042), which also serves as a typical method of operation for the C3 vessel cell sump (RLD-SUMP-00041).

The pump or piping pit sumps are self-emptying and automatically drain back to their respective vessel. Upon detection of a high liquid level in a pit sump, the control system alarms at which point the operator

removes the weir from the sump and diagnoses the source of the leakage. Figure 2 shows the alarms for the level instrument associated with one of the C5 pump pit sumps (RLD-SUMP-00043A), which serves as a typical method of operation for all pit sumps in the LAB.

The hotcell drain collection vessel (RLD-VSL-00165) and the lab area sink drain collection vessel (RLD-VSL-00164) have their own set of sumps. The sumps for the hotcell drain collection vessel (RLD-VSL-00165) are the C5 vessel cell sump (RLD-SUMP-00042), the C5 pump pit sumps (RLD-SUMP-00043A and RLD-SUMP-00043B), and the C5 piping pit sump (RLD-SUMP-00044). In the event of a level detection in the C5 vessel cell sump, the operator routes the liquid to the pretreatment plant wash vessel (PWD-VSL-00044). The sumps for the lab area sink drain collection vessel (RLD-VSL-00164) are the C3 vessel cell sump (RLD-SUMP-00041) and the C3 pump pit sump (RLD-SUMP-00045). In the event of a level detection in the C3 vessel cell sump, the operator routes the liquid to the hotcell drain collection vessel (RLD-VSL-00165).

3.4 Leak Detection Boxes

The LAB has leak detection boxes on the headers draining into the hotcell drain collection vessel (RLD-VSL-00165) and the lab area sink drain collection vessel (RLD-VSL-00164). The leak detection boxes are designed to detect a leak in the annular space of the coaxial or double-walled piping. Each box is installed with a drain plug in the closed position to create a detectable level. Upon detection of a level, the control system alarms, at which point the operator lifts the plug to drain the leak detection box. An overflow plug installed in the open position prevents overfill of the leak detection box until it can be drained. The leak detection boxes for the C3 drain collection headers drain to the C3 vessel cell sump (RLD-SUMP-00041). Similarly, the leak detection boxes for the C5 drain collection headers and the C3 transfer line for the lab area sink drain collection vessel (RLD-VSL-00164) drain to the C5 vessel cell sump (RLD-SUMP-00042). Figure 3 shows the alarm for the level instrument associated with one of the C3 transfer leak detection box (RLD-LDB-00004), which serves as a typical method of operation for all leak detection boxes in the LAB.

Table 1 Associated Instruments for LAB Radioactive Liquid Waste Disposal System

P&ID	Monitoring/control parameter	Type of instrument/control device	Instrument/control device tag number
24590-LAB-M6-RLD-00001001	Level Measurement for RLD-VSL-00165	Level Element	LE-6104
		Level Transmitter	LT-6104
		Level Indicator	LI-6104
24590-LAB-M6-RLD-00001001	Level Measurement for RLD-SUMP-00042	Level Transmitter	LT-6115
		Level Indicator	LI-6115
24590-LAB-M6-RLD-00001002	Level Measurement for RLD-SUMP-00043A	Level Transmitter	LT-6116
		Level Indicator	LI-6116
24590-LAB-M6-RLD-00001003	Level Measurement for RLD-SUMP-00043B	Level Transmitter	LT-6124
		Level Indicator	LI-6124
24590-LAB-M6-RLD-00001004	Level Measurement for RLD-SUMP-00044	Level Transmitter	LT-6123
		Level Indicator	LI-6123
24590-LAB-M6-RLD-00002001	Level Measurement for RLD-VSL-00164	Level Element	LE-6202
		Level Transmitter	LT-6202
		Level Indicator	LI-6202
24590-LAB-M6-RLD-00002001	Level Measurement for RLD-SUMP-00041	Level Transmitter	LT-6211
		Level Indicator	LI-6211
24590-LAB-M6-RLD-00002003	Level Measurement for RLD-SUMP-00045	Level Transmitter	LT-6212
		Level Indicator	LI-6212
24590-LAB-M6-RLD-00007001	Level Measurement for RLD-LDB-00005	Level High Switch	LSH-6215
		Level High Alarm	LAH-6215
24590-LAB-M6-RLD-00007001	Level Measurement for RLD-LDB-00006	Level High Switch	LSH-6701
		Level High Alarm	LAH-6701
24590-LAB-M6-RLD-00007001	Level Measurement for RLD-LDB-00007	Level High Switch	LSH-6702
		Level High Alarm	LAH-6702

24590-LAB-M6-RLD-00007001	Level Measurement for RLD-LDB-00008	Level High Switch	LSH-6703
		Level High Alarm	LAH-6703
24590-LAB-M6-RLD-00007001	Level Measurement for RLD-LDB-00011	Level High Switch	LSH-6704
		Level High Alarm	LAH-6704
24590-LAB-M6-RLD-00008001	Level Measurement for RLD-LDB-00002	Level High Switch	LSH-6120
		Level High Alarm	LAH-6120
24590-LAB-M6-RLD-00008001	Level Measurement for RLD-LDB-00004	Level High Switch	LSH-6118
		Level High Alarm	LAH-6118
24590-LAB-M6-RLD-00008001	Level Measurement for RLD-LDB-00009	Level High Switch	LSH-6801
		Level High Alarm	LAH-6801

Figure 1 Typical Drain Collection Vessel Level Detection

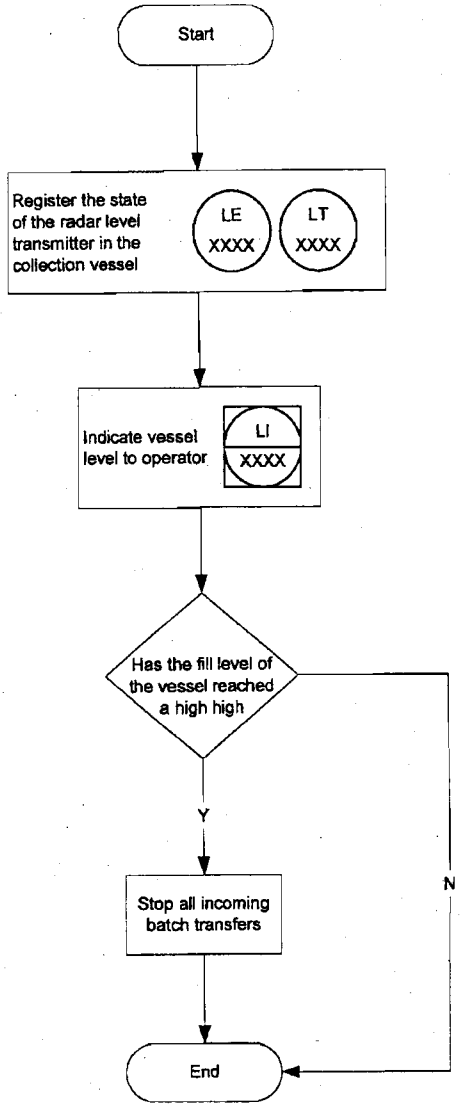


Figure 2 Typical Sump Level Detection

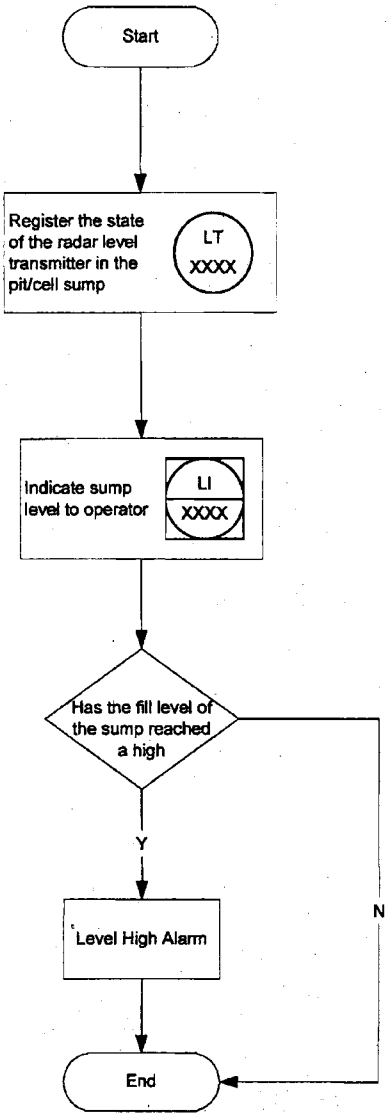
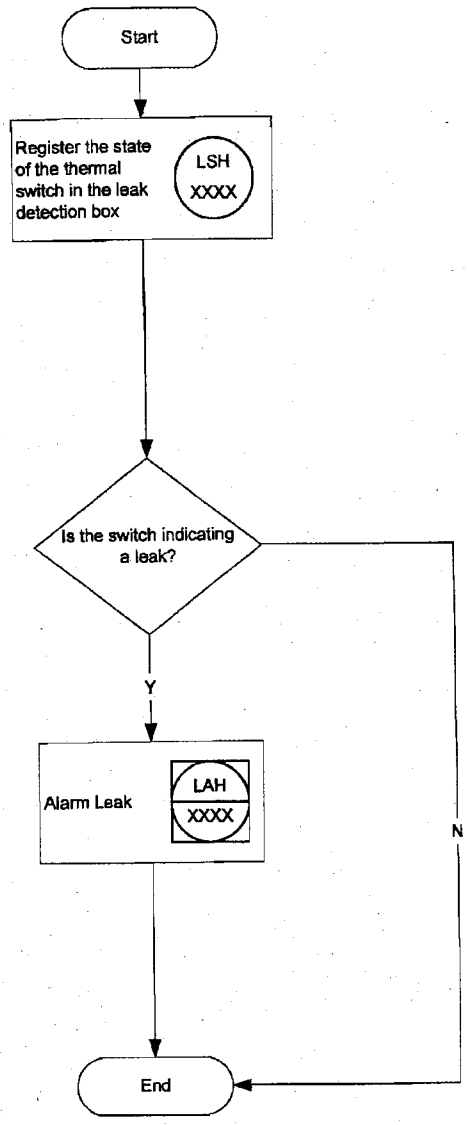


Figure 3 Typical Leak Detection Box Level Detection



Drawings and Documents

Operating Unit Group 10 – Appendix 11.18
Laboratory Building
Operating Documents

The documents listed in the following table are incorporated by reference into this permit and are subject to the requirements set forth in Part I Standard Conditions, Part II General Facility Conditions, and Part III Operating Unit Group 10 Conditions. Upon request, copies of the documents can be viewed at the Nuclear Waste Program Resource Center located at 3100 Port of Benton Blvd., Richland, WA. Appointments for viewing can be scheduled by calling (509) 372-7950.

Drawing/Document Number	***Description***
24590-LAB-PER-M-04-0001, Rev 0	LAB Minimum Leak Rate Detection Capabilities for Leak Detection Boxes, Cell Sumps, and Pit Sumps
24590-LAB-PER-M-04-0002, Rev 0	LAB Waste Removal Capability for the Effluent Vessels Cells
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Operating Unit Group 10 – Appendix 12.0

Where information regarding treatment, management, and disposal of the radioactive source, byproduct material, and/or special nuclear components of mixed waste (as defined by the Atomic Energy Act of 1954, as amended) has been incorporated into this permit, it is not incorporated for the purpose of regulating the radiation hazards of such components under the authority of this permit and chapter 70.105 RCW. In the event of any conflict between Permit Condition III.10.A and any statement relating to the regulation of source, special nuclear, and byproduct material contained in portions of the permit application that are incorporated into this permit, Permit Condition III.10.A will prevail.

Operating Unit Group 10 –Appendix 12.0

Balance of Facilities
Index

Appendix 12.1	Process Flow Diagrams (RESERVED)
Appendix 12.2	Piping and Instrumentation Diagrams
Appendix 12.3	System Description Documentation (RESERVED)
Appendix 12.4	General Arrangement Drawings (RESERVED)
Appendix 12.5	Civil, Structural, and Architectural Criteria and Typical Design Details
Appendix 12.6	Mechanical Drawings (RESERVED)
Appendix 12.7	Specifications (RESERVED)
Appendix 12.8	Engineering Calculations (RESERVED)
Appendix 12.9	Material Selection Documentation (RESERVED)
Appendix 12.10	Critical Systems Equipment/Instrument List (RESERVED)
Appendix 12.11	IQRPE Reports (RESERVED)
Appendix 12.12	Installation Plans (RESERVED)
Appendix 12.13	Instrument Control Logic and Narrative Descriptions (RESERVED)
Appendix 12.14	Descriptions of Instrument Installation and Testing Procedures (RESERVED)
Appendix 12.15	(RESERVED)
Appendix 12.16	(RESERVED)
Appendix 12.17	(RESERVED)
Appendix 12.18	Operating Documents

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Drawings and Documents

Operating Unit Group 10 – Appendix 12.2
Balance of Facilities
Piping and Instrumentation Diagrams

The documents listed in the following table are incorporated by reference into this permit and are subject to the requirements set forth in Part I Standard Conditions, Part II General Facility Conditions, and Part III Operating Unit Group 10 Conditions. Upon request, copies of the documents can be viewed at the Nuclear Waste Program Resource Center located at 3100 Port of Benton Blvd., Richland, WA. Appointments for viewing can be scheduled by calling (509) 372-7950.

Drawing/Document Number	***Description***
24590-PTF-M6-PWD-P0057, Rev 2	Piping & Instrumentation Diagram Plant Wash & Disposal System Underground Transfer Lines
24590-PTF-M6-PWD-P0058, Rev 3	Piping & Instrumentation Diagram Plant Wash & Disposal System Underground Transfer Lines
RESERVED	RESERVED

Source documents (which do not include a "P" in the last set of numbers, e.g. "-P0001," or "-TP001") should be used in conjunction with any document change notices issued against them.

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Drawings and Documents

Operating Unit Group 10 – Appendix 12.5
Pretreatment Building
Civil, Structural, and Architectural Criteria and Typical Design Details

The documents listed in the following table are incorporated by reference into this permit and are subject to the requirements set forth in Part I Standard Conditions, Part II General Facility Conditions, and Part III Operating Unit Group 10 Conditions. Upon request, copies of the documents can be viewed at the Nuclear Waste Program Resource Center located at 3100 Port of Benton Blvd., Richland, WA. Appointments for viewing can be scheduled by calling (509) 372-7950.

Drawing/Document Number	***Description***
24590-PTF-PER-M-02-003, Rev 1	Underground Pipe Protection
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Drawings and Documents

Operating Unit Group 10 – Appendix 12.18
Pretreatment Building
Operating Documents

The documents listed in the following table are incorporated by reference into this permit and are subject to the requirements set forth in Part I Standard Conditions, Part II General Facility Conditions, and Part III Operating Unit Group 10 Conditions. Upon request, copies of the documents can be viewed at the Nuclear Waste Program Resource Center located at 3100 Port of Benton Blvd., Richland, WA. Appointments for viewing can be scheduled by calling (509) 372-7950.

Drawing/Document Number	***Description***
24590-PTF-PER-M-04-0006, Rev 0	Leak Detection for Underground Transfer Lines
RESERVED	RESERVED

Source documents (which do not include a "P" in the last set of numbers, e.g. "-P0001," or "-TP001") should be used in conjunction with any document change notices issued against them.

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