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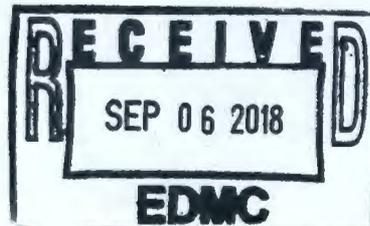
OFFICE OF RIVER PROTECTION

P.O. Box 450, MSIN H6-60
Richland, Washington 99352

AUG 31 2018

18-ECD-0058

Ms. Alexandra K. Smith, Program Manager
Nuclear Waste Program
Washington State
Department of Ecology
3100 Port of Benton Blvd.
Richland, Washington 99354



Ms. Smith:

SUBMITTAL OF HANFORD FACILITY RESOURCE CONSERVATION AND RECOVERY ACT PERMIT MODIFICATION NOTIFICATION FORM 24590-LAW-PCN-ENV-18-002, MECHANICAL DATA SHEETS

- References:
1. WA7890008967, "Dangerous Waste Portion of the Hanford Facility Resource Conservation and Recovery Act Permit for the Treatment, Storage, and Disposal of Dangerous Waste, Part III, Operating Unit 10, 'Waste Treatment and Immobilization Plant.'"
 2. BNI letter from B.P. Reilly to B.T. Vance, ORP, "Submittal of Hanford Facility Resource Conservation and Recovery Act Permit Modification Notification Form 24590-LAW-PCN-ENV-18-002," CCN: 307908, dated August 2, 2018.

This letter transmits Hanford Facility Resource Conservation and Recovery Act Permit Modification Notification Form 24590-LAW-PCN-ENV-18-002, attached, for the Washington State Department of Ecology review and approval. The form describes Class 1 modifications to Reference 1.

The permit modification provides revised Mechanical Data Sheets (24590-LAW-MVD-LCP-00004, Rev. 3; 24590-LAW-MVD-LCP-00005, Rev. 3; 24590-LAW-MVD-LFP-00007, Rev. 4; and 24590-LAW-MVD-LFP-00008, Rev. 4) for incorporation in to Appendix 9.6 of Reference 1.

Washington State Department of Ecology comments resulting from review of this modification notification form and the associated information have been dispositioned.

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Ms. Alexandra K. Smith
18-ECD-0058

-2-

AUG 31 2018

If you have any questions, please contact me, or your staff may contact Gae M. Neath,
Environmental Compliance Division, (509) 376-7828.



Robert G. Hastings, Assistant Manager
Technical and Regulatory Support

ECD:GMN

Attachment

cc w/attach:

D.E. Casey, BNI
R.J. Landon, BNI
B.P. Reilly, BNI
D.M. Yasek, BNI
D.C. Robertson, BNI
J. Cantu, Ecology (7 hard copies & CD)
A.S. Carlson, Ecology
T.Z. Gao, Ecology
M.E. Jones, Ecology
J.K. Perry, MSA
A.C. McKarns, RL
J. Atwood, YN

Administrative Record (WTP H-0-8)

BNI Correspondence
Environmental Portal

cc w/o attach:

M. Johnson, CTUIR
S.L. Dahl, Ecology
D. McDonald, Ecology
J. Bell, NPT (Acting)
G.P. Bohnee, NPT
K. Niles, Oregon Energy
P.M. Pak, RL (Acting)
R. Longoria, YN (Acting)

Attachment
18-ECD-0058
(25 Pages Excluding Cover Sheet)

Hanford Facility RCRA Permit Modification Notification
Form 24590-LAW-PCN-ENV-18-002

Quarter Ending Sept 30, 2018

24590-LAW-PCN-ENV-18-002

Hanford Facility RCRA Permit Modification Notification Form
Part III, Operating Unit 10
Waste Treatment and Immobilization Plant

Index

Page 2 of 5: Hanford Facility RCRA Permit, Part III, Operating Unit 10, Waste Treatment and Immobilization Plant

Replace the Mechanical Data Sheets for the following Low-Activity Waste (LAW) Concentrate Receipt Process system (LCP) equipment in Appendix 9.6 of the Dangerous Waste Permit (DWP)

- LAW Concentrate Receipt Process System LCP-VSL-00001
- LAW Concentrate Receipt Process System LCP-VSL-00002
- LAW Melter Feed Process System LFP-VSL-00002
- LAW Melter Feed Process System LFP-VSL-00004

Submitted by Co-Operator:

Reviewed by ORP Program Office:

Roger J. Landon 7/31/18
Roger J. Landon Date

Thomas W. Fletcher 8/28/18
Thomas W. Fletcher Date

Quarter Ending Sept 30, 2018

24590-LAW-PCN-ENV-18-002

Hanford Facility RCRA Permit Modification Notification Form

Unit:

Waste Treatment and Immobilization Plant

Permit Part:

Part III, Operating Unit 10**Description of Modification:**

The purpose of this Class 1 prime modification is to replace the following Mechanical Data Sheets in Appendix 9.6 of the DWP:

| Appendix 9.6 | | | |
|--------------|--------------------------------|-------|--------------------------------|
| Replace: | 24590-LAW-MVD-LCP-P0004, Rev 1 | With: | 24590-LAW-MVD-LCP-00004, Rev 3 |
| Replace: | 24590-LAW-MVD-LCP-P0005, Rev 1 | With: | 24590-LAW-MVD-LCP-00005, Rev 3 |
| Replace: | 24590-LAW-MVD-LFP-P0007, Rev 1 | With: | 24590-LAW-MVD-LFP-00007, Rev 4 |
| Replace: | 24590-LAW-MVD-LFP-P0008, Rev 1 | With: | 24590-LAW-MVD-LFP-00008, Rev 4 |

This modification requests Ecology approval and incorporation into the permit the specific changes to the Mechanical Data Sheets.

Changes to the Mechanical Data Sheet (24590-LAW-MVD-LCP-00004, Rev 3) for the LAW Concentrate Receipt Vessel are summarized below:

- Revised P&IDs referenced, to the following:
 - 24590-LAW-M6-LCP-00001002; 24590-LAW-M6-LCP-00001003.
- Added process data documentation:
 - 24590-WTP-DB-PET-17-001, Process Inputs Basis of Design (PIBOD) for LAW and EMF
 - 24590-LAW-M4C-V11T-00001, Calculation of Process Stream Priorities for the LAW Facility
- Added LAW concentrate receipt process pulsejet mixer/agitators tag numbers (LCP-AGT-00001)
- Added LAW concentrate receipt process reference data for RFD/Pump tag numbers to LCP-PMP-00001A, LCP-PMP-00001B and Spray nozzle tag numbers to LCP-NOZ-00001, LCP-NOZ-00002
- Revised design data quality level and seismic category from CM to Q (Reference CCN 302153) for P&ID 24590-LAW-M6-LCP-00001002.
- Revised design specific gravity, maximum operating volume and total volume to reflect current values
- Added vendor provided specifications for actual vessel design weights for Empty, Operating, and Testing. Referenced in General Arrangement drawings
- Revised internal and external pressures for vessel operations per 24590-WTP-MVC-50-00009, LAW, BOF, LAB Cyclic Datasheet Inputs.
- Added temperature references for Vessel Operating and Vessel Design per:
 - 24590-LAW-MVC-LCP-00002, LAW Concentrate Receipt Process System (LCP) Data
 - 24590-CM-POA-MVA0-00002-03-86, Drawing – General Notes and Nameplate Details
- Added seismic base moment vendor provided calculations (24590-CM-POA-MVA0-00002-02-02 and 24590-LAW-MVC-LCP-00009)
- Added corrosion allowances (24590-CM-POA-MVA0-00002-03-53) and hydrostatic test pressure data (24590-CM-POA-MVA0-00002-03-86)
- Values updated on Equipment Cyclic Data Sheets per reference 24590-WTP-DB-PET-17-001, Process Inputs Basis of Design (PIBOD) For LAW and EMF.
- Added notes

Changes to the Mechanical Data Sheet (24590-LAW-MVD-LCP-00005, Rev 3) for the LAW Concentrate Receipt Vessel are summarized below:

- Revised the P&IDs referenced, to 24590-LAW-M6-LCP-00002003; 24590-LAW-M6-LCP-00002004
- Added process data documentation
 - 24590-WTP-DB-PET-17-001, Process Inputs Basis of Design (PIBOD) for LAW and EMF
 - 24590-LAW-M4C-V11T-00001, Calculation of Process Stream Properties for the LAW Facility
- Added LAW concentrate receipt process pulsejet mixer/agitators tag numbers (LCP-AGT-00002)

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24590-LAW-PCN-ENV-18-002

- Added LAW concentrate receipt process reference data for RFD/Pump tag numbers to LCP-PMP-00002A, LCP-PMP-00002B and Spray nozzle tag numbers to LCP-NOZ-00003, LCP-NOZ-00004
- Revised design data quality level and seismic category from CM to Q (Reference CCN 302153) for P&ID 24590-LAW-M6-LCP-00002003
- Revised design specific gravity, Maximum operating volume and total volume to reflect current values
- Added vendor provided specifications for vessel design data capacities for Empty, Operating, and Testing. Referenced General Arrangement drawings:
 - 24590-CM-POA-MVA0-00002-03-64
 - 25490-CM-POA-MVA0-00002-03-87
- Revised internal and external pressures for vessel operations
- Revised temperatures for vessel operation and design per 24590-LAW-MVC-LCP-00002 and 24590-CM-POA-MVA0-00002-03-87
- Revised the minimum design metal temperature with included data sheet 24590-LAW-U0D-W16T-00001, LAW Room Environment Datasheet
- Added seismic base moment vendor provided calculations per references:
 - 24590-CM-POA-MVA0-00002-02-02
 - 24590-LAW-MVC-LCP-00009
- Added corrosion allowance (24590-CM-POA-MVA0-00002-03-64) and hydrostatic pressure data (24590-CM-POA-MVA0-00002-03-87)
- Values updated on Equipment Cyclic Data Sheets per reference 24590-WTP-DB-PET-17-001, Process Inputs Basis of Design (PIBOD) For LAW and EMF.
- Added notes

Changes to the Mechanical Data Sheet (24590-LAW-MVD-LFP-00007, Rev 4) for the LAW Melter Feed Process System are summarized below:

- Revised the P&IDs referenced, to the following:
 - 24590-LAW-M6-LFP-00001003, 24590-LAW-M6-LFP-00001004
 - 24590-LAW-M6-LFP-00002002, 24590-LAW-M6-LFP-00002003
 - 24590-LAW-M6-LFP-00002004, 24590-LAW-M6-LFP-00002005
 - 24590-LAW-M6-LFP-00002006, 24590-LAW-M6-LFP-00002007
- Added process data reference documentation:
 - 24590-WTP-DB-PET-17-001
 - 24590-LAW-M4C-V11T-00001
- Revised design data quality level and seismic category from CM to Q (Reference CCN 302153) for P&ID 24590-LAW-M6-LFP-00001003
- Revised design specific gravity, maximum operating volume and total volume to reflect current values per reference:
 - 24590-CM-POA-MVA0-00002-03-04, General Arrangement Drawing – Melter 1 Vessel Feed
- Added vendor provided specifications for vessel design data capacities for Empty, Operating, and Testing. Referenced General Arrangement drawings.
- Revised the inside diameter and length/height to include the reference document:
 - 24590-CM-POA-MVA0-00002-03-04, General Arrangement Drawing – Melter 1 Vessel Feed
- Revised internal and external pressures for vessel operations
- Revised temperatures for vessel operation and design per reference:
 - 24590-LAW-MVC-LFP-00001, LAW Melter Feed Process System (LFP) Data
 - 24590-CM-POA-MVA0-00002-03-04, General Arrangement Drawing – Melter 1 Vessel Feed
- Revised the Minimum design metal temperature with included data sheet per reference:
 - 24590-LAW-U0D-W16T-00001, LAW Room Environment Datasheet
- Added seismic base moment vendor provided calculations per references:
 - 24590-CM-POA-MVA0-00002-02-01
 - 24590-LAW-MVC-LFP-00012
- Added corrosion allowance reference documentation (24590-CM-POA-MVA0-00002-03-04) and Hydrostatic Test Pressure reference documentation (24590-CM-POA-MVA0-00002-03-84)
- Added equipment cyclic data sheet. Included reference document 24590-WTP-MVC-50-00009, LAW, BOF, and LAB Vessel Cyclic Datasheet Inputs.

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24590-LAW-PCN-ENV-18-002

- Added notes

Changes to the Mechanical Data Sheet (24590-LAW-MVD-LFP-00008, Rev 4) for the LAW Melter Feed Process System are summarized below:

- Revised the P&IDs referenced, to the following:
 - 24590-LAW-M6-LFP-00003003, 24590-LAW-M6-LFP-00003004
 - 24590-LAW-M6-LFP-00004002, 24590-LAW-M6-LFP-00004003
 - 24590-LAW-M6-LFP-00004004, 24590-LAW-M6-LFP-00004005
 - 24590-LAW-M6-LFP-00004006, 24590-LAW-M6-LFP-00004007
- Added process data reference documentation:
 - 24590-WTP-DB-PET-17-001
 - 24590-LAW-M4C-V11T-00001
- Revised design data quality level and seismic category from CM to Q (Reference CCN 302153) for P&ID 24590-LAW-M6-LFP-00003003.
- Revised design specific gravity, Maximum operating volume and total volume to reflect current values per reference:
 - 24590-CM-POA-MVA0-00002-03-42, General Arrangement Drawing – Melter 2 Feed Vessel
- Added vendor provided specifications for vessel design data capacities for Empty, Operating, and Testing. Referenced General Arrangement drawings.
- Revised the inside diameter and length/height to include the reference document:
 - 24590-CM-POA-MVA0-00002-03-42, General Arrangement Drawing – Melter 2 Feed Vessel
- Revised internal and external pressures for vessel operations
- Revised temperature data for vessel operation and design to include the references:
 - 24590-LAW-MVC-LFP-00001, Law Melter Feed Process System (LFP) Data
 - 24590-CM-POA-MVA0-00002-03-85, Drawing – General Notes and Nameplate Details
- Revised the Minimum design metal temperature with included data sheet per reference:
 - 24590-LAW-U0D-W16T-00001, Engineering Specification for Structural Design Loads for Seismic Qualification Criteria for Pressure Vessels
- Added seismic base moment vendor provided calculations per references:
 - 24590-CM-POA-MVA0-00002-02-01, Calculations – Compress Pressure Vessel Design Calculations
 - 245960-LAW-MVC-LFP-00012, Supplemental Calculation for LAW-MV-LFP-VSL-00002 & 00004 Vessels
- Added corrosion allowance reference documentation (24590-CM-POA-MVA0-00002-03-42) and Hydrostatic Test Pressure reference documentation (24590-CM-POA-MVA0-00002-03-85)
- Added equipment cyclic data sheet. Included reference document 24590-WTP-MVC-50-00009, LAW, BOF, and LAB Vessel Cyclic Datasheet Inputs
- Added notes

This PCN updates information in Appendix 9.6 to reflect current design. These DWP components may be re-evaluated to confirm design adequacy. If the re-evaluation results in future design changes, the changes will be reviewed by Ecology in subsequent permit modifications.

The following outstanding change documents have been submitted to Ecology pursuant to Permit Condition III.10.C.9.h and are maintained in the WTP Operating Record: None

In accordance with Permit Condition III.10.C.2.e, this permit modification sent to Ecology may include page changes to the Permit, attachments, and permit application supporting documentation.

In accordance with WAC-173-303-830(4)(d)(i), this modification notification is requested to be reviewed and approved as a Class 1 modification. WAC 173-303-830(4)(d)(i)(A) states, "Class 1 modifications apply to minor changes that keep the permit current with routine changes to the facility or its operation. These changes do not substantially alter the permit conditions or reduce the capacity of the facility to protect human health or the environment. In the case of Class 1 modifications, the director may require prior approval."

Quarter Ending Sept 30, 2018

24590-LAW-PCN-ENV-18-002

| | | | | |
|--|----------------|----------------------------|----------------|----------------|
| WAC 173-303-830 Modification Class: | Class 1 | Class 1¹ | Class 2 | Class 3 |
| Please mark the Modification Class: | | X | | |

Enter relevant WAC 173-303-830, Appendix I Modification citation number:
 Enter wording of WAC 173-303-830, Appendix I Modification citation:

| | |
|---|--|
| <p>Modification Approved/Concur: <input type="checkbox"/> Yes <input type="checkbox"/> Denied (state reason below)</p> <p><u>Reason for denial:</u></p> | <p>Reviewed by Ecology:</p> |
| | <p>_____ S. Dahl</p> <p>_____ Date</p> |

| | | |
|---|--------------------------------------|---|
|  | MECHANICAL DATA SHEET: VESSEL | PLANT ITEM No. 24590-LAW-MV-LCP-VSL-00001 |
|---|--------------------------------------|---|

| | | | |
|---------------|---------------------------------------|----------------|---|
| Project: | RPP-WTP | P&ID: | 24590-LAW-M6-LCP-00001002, 24590-LAW-M6-LCP-00001003 |
| Project No: | 24590 | Process Data: | Ref. 3, Ref. 4 |
| Project Site: | Hanford | Vessel Drawing | 24590-LAW-MV-LCP-00001 |
| Description: | LAW Concentrate Receipt Vessel | | |

Reference Data

| | |
|---|---------------------------------------|
| Charge Vessels (Tag Numbers) | Not Applicable |
| Pulsejet Mixers / Agitators (Tag Numbers) | LCP-AGT-00001 |
| RFDs/Pumps (Tag Numbers) | LCP-PMP-00001A, LCP-PMP-00001B |
| Spray Nozzles (Tag Numbers) | LCP-NOZ-00001, LCP-NOZ-00002 |

Design Data

| | | | | | |
|--------------------------|-----------------------------|-------------------|--|-------------------------|-------------------------|
| Quality Level | Q (Ref. 6) | Fabrication Specs | 24590-WTP-3PS-MV00-T0001 (PVDF) | | |
| Seismic Category | SC-III (Ref. 6) | Design Code | ASME VIII Div 1 | | |
| Service/Contents | LAW Concentrate Feed | Code Stamp | Yes | | |
| Design Specific Gravity | 1.46 (Ref. 7) | NB Registration | Yes | | |
| Maximum Operating Volume | gal 15,284 (Ref. 8) | Weights (lbs) | Empty | Operating | Test |
| Total Volume | gal 18,130 (Ref. 9) | Estimated | 49,200 | 235,700 | 199,900 |
| | | Actual * | 37,458 (Ref. 11) | 227,624 (Ref. 9) | 190,411 (Ref. 9) |

| | | | | | | |
|-----------------------------|------|---------------------|----------------------|--------------------|--|---|
| Inside Diameter | inch | 168 (Ref. 9) | | | Wind Design | Not Required |
| Length/Height (TL-TL) | inch | 153 (Ref. 9) | | | Snow Design | Not Required |
| | | Vessel Operating | Vessel Design | Coil/Jacket Design | Seismic Design | |
| | | | | | 24590-WTP-3PS-MV00-T0002 24590-WTP-3PS-FB01-T0001 | |
| Internal Pressure (Ref. 12) | psig | 0.0 | 15 | None | Seismic Base Moment * | Ref. 15 & 16 |
| External Pressure (Ref. 12) | psig | 5.6 | FV | None | Postweld Heat Treat | Not Required |
| Temperature | °F | 123 (Ref. 7) | 150 (Ref. 11) | None | Corrosion Allowance | Inch Top HD & Nozzles 0.04 BTM HD, Shell, & Shell Nozzles 0.125 (Ref. 9) |
| Min. Design Metal Temp. | °F | 40 (Ref. 17) | | | Hydrostatic Test Pressure * | psig 19.5 (Ref. 11) |

Materials of Construction (Ref. 18)

| Component | Material | Minimum Thickness / Size | Containment |
|-------------------------------|---|--------------------------|----------------------------|
| Top Head | SA-240 316 (Note 1) | See Drawing | Auxiliary |
| Shell | SA-240 316 (Note 1) | See Drawing | Primary |
| Bottom Head | SA-240 316 (Note 1) | See Drawing | Primary |
| Support | SA-240 304 (Note 1) | See Drawing | N/A |
| Jacket/Coils/Half-Pipe Jacket | NA | N/A | N/A |
| Internals | SA-240 316/SA-312 TP316 (Note 1) | See Drawing | Thermowells Primary |
| Pipe | SA-312 TP316 Seamless (Note 1) | See Drawing | Note 2 |
| Forgings/ Bar stock | SA-182 F316 (Note 1) | See Drawing | N/A |
| Gaskets (O Ring) | EPDM | N/A | N/A |
| Bolting | SA-193 Gr. B8M / SA-194 Gr. 8M | N/A | N/A |

Miscellaneous Data

| | | | |
|-----------------------------|-----------------------|---------------------|-------------------------------|
| Orientation | Vertical | Support Type | Skirt |
| Insulation Function | Not Applicable | Insulation Material | Not Applicable |
| Insulation Thickness (inch) | Not Applicable | Internal Finish | Welds descaled as laid |
| | | External Finish | Welds descaled as laid |



MECHANICAL DATA SHEET: VESSEL

PLANT ITEM No.

24590-LAW-MV-LCP-VSL-00001

Remarks

** To be determined by the vendor.*

Note 1: Material shall have Carbon Content of 0.030% Max. Non-welded specialty items are excluded from this requirement.

Note 2: Nozzle necks below normal operating level are Primary, others Auxiliary. See PVDF and vessel drawing for NDE.

Note 3: Additional NDE requirements should be as per 6.4 of the PVDF.

Note 4: Contents of this document are dangerous waste permit affecting.

Note 5: This data sheet is a lead document that contains input information for Design Basis Event calculations.

Modification to the geometry of the vessel (i.e., diameter or length/height) requires an AB review by the E&NS discipline. Changes to the text of this note require AB review by the E&NS discipline as well. If the changes being made do not alter the geometry of the vessel or the text of this note, AB review is not required.

Note 6: Beta/gamma dose exposure rate is 1.2E+01 Rad/hr (Ref. 19).

Note 7: NDE requirements per note 3 are associated with a CM pressure vessel design in accordance with the quality classification at the time of procurement. LCP-VSL-00001 has been reclassified as Safety Significant per CCN 302153 (Ref. 6).



MECHANICAL DATA SHEET: VESSEL

PLANT ITEM No.
24590-LAW-MV-LCP-VSL-00001

Equipment Cyclic Data Sheet

| | |
|------------------------------|-----------------------------------|
| Component Plant Item Number: | 24590-LAW-MV-LCP-VSL-00001 |
| Component Description | Parent Vessel |

The information below is provisional and envelopes operational duty for fatigue assessment. It is not to be used as operational data.

| | |
|---|---|
| Materials of Construction | SA-240 316 |
| Design Life | 40 years |
| Component Function and Life Cycle Description | Equipment Shut Down for maintenance occurs annually. |

Cyclic Data (Ref. 12)

| Load Type | Min | Max | Number of Cycles | Comment |
|------------------------------|-----------------------|------------------------|----------------------|---|
| Design Pressure psig | FV | 15 | 10 Δ | |
| Operating Pressure psig | -5.6 Δ | 0.0 Δ | 100 | Maximum of 100 start/stop cycles per 40 years of design life |
| Operating Temperature °F | 59 | 150 Δ | 100 | |
| Contents Specific Gravity | 1.0 | 1.46 Δ | 5500 Δ | |
| Contents Level inch | 34.00 Δ | 171.00 Δ | 5500 Δ | |

Localized Features

| | | |
|----------|--|--|
| Nozzles | Within 50° F of vessel temperature. | As above. |
| Supports | Same as vessel | Number of cycles same as vessel |
| | | |
| | | |

Notes

- Cycle Increase: The Seller must increase the numbers of operational cycles given above by 10% to account for commissioning duty unless otherwise noted.**

Approval

| Rev | Description | System Engr | Vessel Engr | Checked | Reviewed | Approved | Date |
|-----|---|-------------------------------------|-------------|--|--|---|----------------|
| 0 | Issue for Purchase | P. Hoigado | S.L.Lee | M.Sanvictores/ E.Isern/C.Slater | N/A | M. Hoffmann | 3/20/03 |
| 1 | Revise the External Pressure | P. Hoigado | S.L.Lee | M.Sanvictores/ C.Slater | E.Isern | M. Hoffmann | 12/15/03 |
| 2 | Revise as Noted & Re-Issued for Purchase | P. Hoigado | S.L.Lee | M.Sanvictores/ C.Slater | E.Isern | M. Hoffmann | 12/15/04 |
| 3 | <ul style="list-style-type: none"> - Revised Quality Level from CM to Q - Updated Values and References - Added Attachment 1 - Incorporated 24590-LAW-M6N-M80T-00008 & 24590-LAW-MVN-LCP-00006. - Incorporated 24590-WTP-EIE-ENG-17-0018 - Changes do not reduce margin for Q SSC; margin is addressed in associated calculations in Attachment 1 | <i>[Signature]</i> A.Wand | N/A | <i>[Signature]</i> C.Stredwick | <i>[Signature]</i> W.Donigan | <i>[Signature]</i> C. Roberts <i>[Signature]</i> J. Shoemaker <i>[Signature]</i> C. Roberts | 2/16/18 |



MECHANICAL DATA SHEET ATTACHMENT 1:
24590-LAW-MVD-LCP-00004, Rev. 3 References
(for internal use only)

PLANT ITEM No.
24590-LAW-MV-LCP-VSL-00001

| Ref. | Document Number | Rev. | Document Title; Additional Information |
|------|-------------------------------|------|---|
| 1 | 24590-LAW-M6-LCP-00001002 | 0 | P&ID - LAW LAW CONCENTRATE RECEIPT PROCESS SYSTEM CONCENTRATE RECEIPT VESSEL LCP-VSL-00001 |
| 2 | 24590-LAW-M6-LCP-00001003 | 0 | P&ID - LAW LAW CONCENTRATE RECEIPT PROCESS SYSTEM CONCENTRATE RECEIPT VESSEL LCP-VSL-00001 |
| 3 | 24590-WTP-DB-PET-17-001 | 0 | PROCESS INPUTS BASIS OF DESIGN (PIBOD) FOR LAW AND EMF; p. A-2, Table A-1, Stream LCP01 |
| 4 | 24590-LAW-M4C-V11T-00001 | 1 | CALCULATION OF PROCESS STEAM PROPERTIES FOR THE LAW FACILITY |
| 5 | 24590-LAW-MV-LCP-00001 | 2 | EQUIPMENT ASSEMBLY CONCENTRATE RECEIPT VESSEL LCP-VSL- 00001 |
| 6 | CCN 302153 | N/A | BECHTEL NATIONAL, INC. EARLY LIMITED PROCUREMENT AND UPGRADING OF EXISTING STRUCTURES, SYSTEMS, AND COMPONENTS IN SUPPORT OF DIRECT FEED LOW-ACTIVITY WASTE |
| 7 | 24590-LAW-MVC-LCP-00002 | 2 | LAW CONCENTRATE RECEIPT PROCESS SYSTEM (LCP) DATA |
| 8 | 24590-LAW-M6C-LCP-00001 | 2 | LAW CONCENTRATE RECEIPT VESSELS LCP-VSL-00001/00002 SIZING |
| 9 | 24590-CM-POA-MVA0-00002-03-53 | D | DRAWING - GENERAL ARRANGEMENT - CONCENTRATE RECEIPT VESSEL |
| 10 | 24590-WTP-3PS-MV00-T0001 | 5 | ENGINEERING SPECIFICATION FOR PRESSURE VESSEL DESIGN AND FABRICATION |
| 11 | 24590-CM-POA-MVA0-00002-03-86 | B | DRAWING - GENERAL NOTES AND NAMEPLATE DETAILS |
| 12 | 24590-WTP-MVC-50-00009 | 0 | LAW, BOF, AND LAB VESSEL CYCLIC DATASHEET INPUTS |
| 13 | 24590-WTP-3PS-MV00-T0002 | 3 | ENGINEERING SPECIFICATION FOR SEISMIC QUALIFICATION CRITERIA FOR PRESSURE VESSELS |
| 14 | 24590-WTP-3PS-FB01-T0001 | 6 | ENGINEERING SPECIFICATION FOR STRUCTURAL DESIGN LOADS FOR SEISMIC CATEGORY III & IV EQUIPMENT AND TANKS |
| 15 | 24590-CM-POA-MVA0-00002-02-02 | E | CALCULATIONS - COMPRESS PRESSURE VESSEL DESIGN CALCULATIONS |



MECHANICAL DATA SHEET ATTACHMENT 1:
24590-LAW-MVD-LCP-00004, Rev. 3 References
(for internal use only)

PLANT ITEM No.
24590-LAW-MV-LCP-VSL-00001

| Ref. | Document Number | Rev. | Document Title; Additional Information |
|------|--------------------------|------|---|
| 16 | 24590-LAW-MVC-LCP-00009 | 0 | SUPPLEMENTAL CALCULATION FOR LAW-MV-LCP-VSL-00001 & 00002 VESSELS |
| 17 | 24590-LAW-U0D-W16T-00001 | 4 | LAW ROOM ENVIRONMENT DATASHEET; p. vii, Section 1.4C |
| 18 | 24590-LAW-N1D-LCP-00001 | 4 | LCP-VSL-00001 & LCP-VSL-00002 - CONCENTRATE RECEIPT VESSEL - CORROSION EVALUATION |
| 19 | 24590-WTP-Z0C-W13T-00010 | H | CONTACT DOSE RATES TO EQUIPMENT FROM BETA AND GAMMA EMITTERS; Table 8-1 |

| | | |
|---|--------------------------------------|---|
|  | MECHANICAL DATA SHEET: VESSEL | PLANT ITEM No. 24590-LAW-MV-LCP-VSL-00002 |
| | | |

| | | | |
|---------------|---------------------------------------|----------------|---|
| Project: | RPP-WTP | P&ID: | 24590-LAW-M6-LCP-00002003; 24590-LAW-M6-LCP-00002004 |
| Project No: | 24590 | Process Data: | Ref. 3, Ref. 4 |
| Project Site: | Hanford | Vessel Drawing | 24590-LAW-MV-LCP-00002 |
| Description: | LAW Concentrate Receipt Vessel | | |

Reference Data

| | |
|---|---------------------------------------|
| Charge Vessels (Tag Numbers) | Not Applicable |
| Pulsejet Mixers / Agitators (Tag Numbers) | LCP-AGT-00002 |
| RFDs/Pumps (Tag Numbers) | LCP-PMP-00002A, LCP-PMP-00002B |
| Spray Nozzles (Tag Numbers) | LCP-NOZ-00003, LCP-NOZ-00004 |

Design Data

| | | | | | |
|--------------------------|-----------------------------|-------------------|--|-------------------------|-------------------------|
| Quality Level | Q (Ref. 6) | Fabrication Specs | 24590-WTP-3PS-MV00-T0001 (PVDF) | | |
| Seismic Category | SC-III (Ref. 6) | Design Code | ASME VIII Div 1 | | |
| Service/Contents | LAW Concentrate Feed | Code Stamp | Yes | | |
| Design Specific Gravity | 1.46 (Ref. 7) | NB Registration | Yes | | |
| Maximum Operating Volume | gal 15,284 (Ref. 8) | Weights (lbs) | Empty | Operating | Test |
| Total Volume | gal 18,130 (Ref. 9) | Estimated | 49,200 | 235,700 | 199,900 |
| | | Actual * | 37,458 (Ref. 11) | 227,624 (Ref. 9) | 190,411 (Ref. 9) |

| | | | | | |
|-----------------------------|------|---------------------|----------------------|---------------------|--|
| Inside Diameter | inch | 168 (Ref. 9) | Wind Design | Not Required | |
| Length/Height (TL-TL) | inch | 153 (Ref. 9) | Snow Design | Not Required | |
| | | Vessel Operating | Vessel Design | Coil/Jacket Design | Seismic Design |
| | | 0.0 | 15 | None | 24590-WTP-3PS-MV00-T0002 24590-WTP-3PS-FB01-T0001 |
| Internal Pressure (Ref. 12) | psig | 0.0 | 15 | None | Seismic Base Moment * ft ³ b Ref. 15 & 16 |
| External Pressure (Ref. 12) | psig | 5.6 | FV | None | Postweld Heat Treat Not Required |
| Temperature | °F | 123 (Ref. 7) | 150 (Ref. 11) | None | Corrosion Allowance Inch Top HD & Nozzles 0.04 BTM HD, Shell, & Shell Nozzles 0.125 (Ref. 9) |
| Min. Design Metal Temp. | °F | 40 (Ref. 17) | | | Hydrostatic Test Pressure * psig 19.5 (Ref. 11) |

Materials of Construction (Ref. 18)

| Component | Material | Minimum Thickness / Size | Containment |
|-------------------------------|---|--------------------------|----------------------------|
| Top Head | SA-240 316 (Note 1) | See Drawing | Auxiliary |
| Shell | SA-240 316 (Note 1) | See Drawing | Primary |
| Bottom Head | SA-240 316 (Note 1) | See Drawing | Primary |
| Support | SA-240 304 (Note 1) | See Drawing | N/A |
| Jacket/Coils/Half-Pipe Jacket | NA | N/A | N/A |
| Internals | SA-240 316/SA-312 TP316 (Note 1) | See Drawing | Thermowells Primary |
| Pipe | SA-312 TP316 Seamless (Note 1) | See Drawing | Note 2 |
| Forgings/ Bar stock | SA-182 F316 (Note 1) | See Drawing | N/A |
| Gaskets (O Ring) | EPDM | N/A | N/A |
| Bolting | SA-193 Gr. B8M / SA-194 Gr. 8M | N/A | N/A |

Miscellaneous Data

| | | | |
|-----------------------------|-----------------------|---------------------|-------------------------------|
| Orientation | Vertical | Support Type | Skirt |
| Insulation Function | Not Applicable | Insulation Material | Not Applicable |
| Insulation Thickness (inch) | Not Applicable | Internal Finish | Welds descaled as laid |
| | | External Finish | Welds descaled as laid |



MECHANICAL DATA SHEET: VESSEL

PLANT ITEM No.

24590-LAW-MV-LCP-VSL-00002

Remarks

** To be determined by the vendor.*

Note 1: Material shall have Carbon Content of 0.030% Max. Non-welded specialty Items are excluded from this requirement.

Note 2: Nozzle necks below normal operating level are Primary, others Auxillary. See PVDF and vessel drawing for NDE.

Note 3: Additional NDE requirements should be as per 6.4 of the PVDF.

Note 4: Contents of this document are dangerous waste permit affecting.

Note 5: Beta/gamma dose exposure rate is 1.2E+01 Rad/hr (Ref. 19).

Note 6: NDE requirements per note 3 were associated with a CM pressure vessel design in accordance with the quality classification at the time of procurement. LCP-VSL-00002 has been reclassified as Safety Significant per CCN 302153 (Ref. 6).



MECHANICAL DATA SHEET: VESSEL

PLANT ITEM No.
24590-LAW-MV-LCP-VSL-00002

Equipment Cyclic Data Sheet

| | |
|------------------------------|----------------------------|
| Component Plant Item Number: | 24590-LAW-MV-LCP-VSL-00002 |
| Component Description | Parent Vessel |

The information below is provisional and envelopes operational duty for fatigue assessment. It is not to be used as operational data.

| | |
|---|--|
| Materials of Construction | SA-240 316 |
| Design Life | 40 years |
| Component Function and Life Cycle Description | Equipment Shut Down for maintenance occurs annually. |

Cyclic Data (Ref. 12)

| Load Type | Min | Max | Number of Cycles | Comment |
|---------------------------|----------------|-----------------|------------------|--|
| Design Pressure psig | FV | 15 | 10 Δ | |
| Operating Pressure psig | -5.6 Δ | 0.0 Δ | 100 | Maximum of 100 start/stop cycles per 40 years of design life |
| Operating Temperature °F | 59 | 150 Δ | 100 | |
| Contents Specific Gravity | 1.0 | 1.46 Δ | 5500 Δ | |
| Contents Level inch | 34.00 Δ | 171.00 Δ | 5500 Δ | |

| Localized Features | |
|--------------------|--|
| Nozzles | Within 50' F of vessel temperature. As above. |
| Supports | Same as vessel Number of cycles same as vessel |

Notes

- **Cycle Increase:** The Seller must increase the numbers of operational cycles given above by 10% to account for commissioning duty unless otherwise noted.

Approval

| Rev | Description | System Engr | Vessel Engr | Checked | Reviewed | Approved | Date |
|-----|--|-------------|-------------|-----------------------------------|-----------|---------------|----------|
| 0 | Issue for Purchase | P. Holgado | S.L.Lee | M.Sanvictores/ E.Isem/C.Slater | N/A | M. Hoffmann | 3/20/03 |
| 1 | Revise the External Pressure | P. Holgado | S.L.Lee | M.Sanvictores/ C.Slater | E.Isem | M. Hoffmann | 12/15/03 |
| 2 | Revise as Noted & Re-Issued for Purchase | P. Holgado | S.L.Lee | M.Sanvictores/ C.Slater | E.Isem | M. Hoffmann | 4/30/04 |
| 3 | <ul style="list-style-type: none"> - Revised Quality Level from CM to Q - Updated Values and References - Added Attachment 1 - Incorporated 24590-LAW-M6N-M80T-00008 - Incorporated 24590-WTP-EIE-ENG-17-0018 - Changes do not reduce margin for Q SSC; margin is addressed in associated calculations in Attachment 1 | A.Wand | N/A | Chad Stredwick C.Stredwick | W.Donigan | Chami Roberts | 2/16/18 |



MECHANICAL DATA SHEET ATTACHMENT 1:
24590-LAW-MVD-LCP-00005, Rev. 3 References
(for internal use only)

PLANT ITEM No.
24590-LAW-MV-LCP-VSL-00002

| Ref. | Document Number | Rev. | Document Title; Additional Information |
|------|-------------------------------|------|---|
| 1 | 24590-LAW-M6-LCP-00002003 | 0 | P&ID - LAW LAW CONCENTRATE RECEIPT PROCESS SYSTEM CONCENTRATE RECEIPT VESSEL LCP-VSL-00002 |
| 2 | 24590-LAW-M6-LCP-00002004 | 0 | P&ID - LAW LAW CONCENTRATE RECEIPT PROCESS SYSTEM CONCENTRATE RECEIPT VESSEL LCP-VSL-00002 |
| 3 | 24590-WTP-DB-PET-17-001 | 0 | PROCESS INPUTS BASIS OF DESIGN (PIBOD) FOR LAW AND EMF; p. A-2, Table A-1, Stream LCP01 |
| 4 | 24590-LAW-M4C-V11T-00001 | 1 | CALCULATION OF PROCESS STEAM PROPERTIES FOR THE LAW FACILITY |
| 5 | 24590-LAW-MV-LCP-00002 | 2 | EQUIPMENT ASSEMBLY CONCENTRATE RECEIPT VESSEL LCP-VSL- 00002 |
| 6 | CCN 302153 | N/A | BECHTEL NATIONAL, INC. EARLY LIMITED PROCUREMENT AND UPGRADING OF EXISTING STRUCTURES, SYSTEMS, AND COMPONENTS IN SUPPORT OF DIRECT FEED LOW-ACTIVITY WASTE |
| 7 | 24590-LAW-MVC-LCP-00002 | 2 | LAW CONCENTRATE RECEIPT PROCESS SYSTEM (LCP) DATA |
| 8 | 24590-LAW-M6C-LCP-00001 | 2 | LAW CONCENTRATE RECEIPT VESSELS LCP-VSL-00001/00002 SIZING |
| 9 | 24590-CM-POA-MVA0-00002-03-64 | D | DRAWING - GENERAL ARRANGEMENT - CONCENTRATE RECEIPT VESSEL |
| 10 | 24590-WTP-3PS-MV00-T0001 | 5 | ENGINEERING SPECIFICATION FOR PRESSURE VESSEL DESIGN AND FABRICATION |
| 11 | 24590-CM-POA-MVA0-00002-03-87 | B | DRAWING - GENERAL NOTES AND NAMEPLATE DETAILS |
| 12 | 24590-WTP-MVC-50-00009 | 0 | LAW, BOF, AND LAB VESSEL CYCLIC DATASHEET INPUTS |
| 13 | 24590-WTP-3PS-MV00-T0002 | 3 | ENGINEERING SPECIFICATION FOR SEISMIC QUALIFICATION CRITERIA FOR PRESSURE VESSELS |
| 14 | 24590-WTP-3PS-FB01-T0001 | 6 | ENGINEERING SPECIFICATION FOR STRUCTURAL DESIGN LOADS FOR SEISMIC CATEGORY III & IV EQUIPMENT AND TANKS |
| 15 | 24590-CM-POA-MVA0-00002-02-02 | E | CALCULATIONS - COMPRESS PRESSURE VESSEL DESIGN CALCULATIONS |



MECHANICAL DATA SHEET ATTACHMENT 1:
24590-LAW-MVD-LCP-00005, Rev. 3 References
(for internal use only)

PLANT ITEM No.
24590-LAW-MV-LCP-VSL-00002

| Ref. | Document Number | Rev. | Document Title; Additional Information |
|------|--------------------------|------|---|
| 16 | 24590-LAW-MVC-LCP-00009 | 0 | SUPPLEMENTAL CALCULATION FOR LAW-MV-LCP-VSL-00001 & 00002 VESSELS |
| 17 | 24590-LAW-U0D-W16T-00001 | 4 | LAW ROOM ENVIRONMENT DATASHEET; p. vii, Section 1.4C |
| 18 | 24590-LAW-N1D-LCP-00001 | 4 | LCP-VSL-00001 & LCP-VSL-00002 - CONCENTRATE RECEIPT VESSEL - CORROSION EVALUATION |
| 19 | 24590-WTP-Z0C-W13T-00010 | H | CONTACT DOSE RATES TO EQUIPMENT FROM BETA AND GAMMA EMITTERS; Table 8-1 |



MECHANICAL DATA SHEET: VESSEL

PLANT ITEM No. △
24590-LAW-MV-LFP-VSL-00002

| | | | |
|---------------|-----------------------------|----------------|--|
| Project: | RPP-WTP | P&ID: | 24590-LAW-M6-LFP-00001003, 24590-LAW-M6-LFP-00001004 24590-LAW-M6-LFP-00002002, 24590-LAW-M6-LFP-00002003 24590-LAW-M6-LFP-00002004, 24590-LAW-M6-LFP-00002005 24590-LAW-M6-LFP-00002006, 24590-LAW-M6-LFP-00002007 |
| Project No: | 24590 | Process Data: | Ref. 9, Ref. 10 |
| Project Site: | Hanford | Vessel Drawing | 24590-LAW-MV-LFP-00001 |
| Description: | Melter 1 Feed Vessel | | |

Reference Data

| | |
|---|--|
| Charge Vessels (Tag Numbers) | Not Applicable |
| Pulsejet Mixers / Agitators (Tag Numbers) | LFP-AGT-00002 |
| RFDs/Pumps (Tag Numbers) | LFP-PMP-00007, LFP-PMP-00008, LFP-PMP-00009, LFP-PMP-00010, LFP-PMP-00011, LFP-PMP-00012, LFP-PMP-00002 |
| Spray Nozzles | LFP-NOZ-00003, LFP-NOZ-00004, LFP-NOZ-00005 |

Design Data

| | | | | | |
|--------------------------|--|-------------------|---|---|---|
| Quality Level | Q (Ref. 12) △ | Fabrication Specs | 24590-WTP-3PS-MV00-T0001 | | |
| Seismic Category | SC-III (Ref. 12) △ | Design Code | ASME VIII Div 1 | | |
| Service/Contents | LAW Melter Feed | Code Stamp | Yes | | |
| Design Specific Gravity | 1.90 (Ref. 15) | NB Registration | Yes | | |
| Maximum Operating Volume | gal 7,545 (Ref. 15) Note 9 △ | Weights (lbs) | <u>Empty</u> | <u>Operating</u> | <u>Test</u> |
| Total Volume | gal 9,123 (Ref. 15) | Estimated | 44,500 | 164,600 | 120,800 |
| | | Actual * | △ 27,521 (Ref. 17 & 18) | △ 147,114 (Ref. 15) | △ 103,766 (Ref. 15) |

| | | | | | | | |
|-----------------------------|------|---|--------------------------------|--------------------|-----------------------------|--|--|
| Inside Diameter | inch | 132 (Ref. 15) | | | Wind Design | Not Required | |
| Length/Height (TL-TL) | inch | 126 (Ref. 15) | | | Snow Design | Not Required | |
| | | Vessel Operating | Vessel Design | Coil/Jacket Design | Seismic Design | 24590-WTP-3PS-MV00-T0002 24590-WTP-3PS-FB01-T0001 | |
| Internal Pressure (Ref. 19) | psig | 0.0 △ | 15 | None | Seismic Base Moment * | ft*lb | Ref. 22, Ref. 23 △ |
| External Pressure (Ref. 19) | psig | 5.6 △ | FV | None | Postweld Heat Treat | Not Required | |
| Temperature | °F | 98 (Ref. 13) | 150 (Ref. 17) | None | Corrosion Allowance | Inch | 0.04 Top Head & Nozzles 0.125 Shell, Shell Nozzles, & Btm Head (Ref. 15) △ |
| Min. Design Metal Temp. | °F | 40 (Ref. 24) | | | Hydrostatic Test Pressure * | psig | 19.5 (Ref. 17) △ |

Materials of Construction (Ref. 25)

| Component | Material | Minimum Thickness / Size | Containment |
|-------------------------------|---------------------------------------|--------------------------|----------------------------|
| Top Head | SA-240 316 (Note 2) | See Drawing | Auxiliary |
| Shell | SA-240 316 (Note 2) | See Drawing | Primary |
| Bottom Head | SA-240 316 (Note 2) | See Drawing | Primary |
| Support | SA-240 304 (Note 2) | See Drawing | N/A |
| Jacket/Coils/Half-Pipe Jacket | N/A | N/A | N/A |
| Internals | SA-240 316 (Note 2) | See Drawing | Thermowells Primary |
| Pipe (Seamless) | SA-312 TP316 Seamless (Note 2) | See Drawing | Note 3 |
| Forgings/ Bar stock | SA-182 F316 (Note 2) | See Drawing | N/A |
| Gaskets (O Ring) | EPDM O-Ring | N/A | N/A |
| Bolting | SA-193 B8M / SA-194 8M | N/A | N/A |

Miscellaneous Data

| | | | |
|-----------------------------|-----------------------|---------------------|-------------------------------|
| Orientation | Vertical | Support Type | Skirt |
| Insulation Function | Not Applicable | Insulation Material | Not Applicable |
| Insulation Thickness (inch) | Not Applicable | Internal Finish | Welds descaled as laid |
| | | External Finish | Welds descaled as laid |



MECHANICAL DATA SHEET: VESSEL

PLANT ITEM No.

24590-LAW-MV-LFP-VSL-00002 

Remarks

** To be determined by the vendor.*

Note 1: Deleted.

Note 2: Material shall have Carbon Content of 0.030% Max. Non-welded items are excluded from this requirement.

Note 3: Nozzle necks below normal operating level are Primary, others Auxiliary. See 24590-WTP-3PS-MV00-T0001 for NDE.

Note 4: Additional NDE requirements should be as per 6.4 of 24590-WTP-3PS-MV00-T0001.

Note 5: Contents of this document are dangerous waste permit affecting.

Note 6: This data sheet is a lead document that contains input information for Design Basis Event calculations.

Modification to the geometry of the vessel (i.e., diameter or length/height) requires an AB review by the E&NS discipline. Changes to the text of this note require AB review by the E&NS discipline as well. If the changes being made do not alter the geometry of the vessel or the text of this note, AB review is not required.

Note 7: Beta/gamma dose exposure rate is 1.2E+01 Rad/hr (Ref. 26).

Note 8: NDE requirements per note 4 were associated with a CM pressure vessel design in accordance with the quality classification at the time of procurement. LFP-VSL-00002 has been reclassified as Safety Significant per CCN 302153 (Ref. 12).

Note 9: Vendor submittal (Ref. 15) states a shipping weight of 27,521lbs and an operating weight of 147,114lbs at a specific gravity of 1.90. Subtracting the shipping weight from the operating weight and dividing by the density results in an operating volume of ~7545 gallons. The calculated value for the maximum operating volume in the current vessel sizing calculation (Ref. 14) of 6,278 gallons is not representative of the as built vessel since the calculated height of the overflow nozzle of 9.56 feet used to calculate the volume is ~2 feet lower than the as built overflow nozzle of 11.54 feet. Additionally, Rev. 0 of the vessel sizing calculation (Ref. 14), which was used by the vendor to fabricate the vessel, reports a maximum operating height of 11.41 feet resulting in a volume of 7689 gallons that are representative of the as built vessel. For these reasons and to be representative of the as built vessel, the derived value from the vendor submittal (Ref. 15) of 7545 gallons is used for the maximum operating volume.



MECHANICAL DATA SHEET ATTACHMENT 1:
24590-LAW-MVD-LFP-00007, Rev. 4 References
(for internal use only)

PLANT ITEM No.
24590-LAW-MV-LFP-VSL-00002

| Ref. | Document Number | Rev. | Document Title; Additional Information |
|------|---------------------------|------|---|
| 1 | 24590-LAW-M6-LFP-00001003 | 0 | P&ID - LAW - LAW MELTER FEED PROCESS SYSTEM MELTER 1 FEED VESSEL LFP-VSL-00002 |
| 2 | 24590-LAW-M6-LFP-00001004 | 1 | P&ID - LAW - LAW MELTER FEED PROCESS SYSTEM MELTER 1 FEED VESSEL LFP-VSL-00002 |
| 3 | 24590-LAW-M6-LFP-00002002 | 0 | P&ID - LAW - LAW MELTER FEED PROCESS SYSTEM ADS PUMP CONTROLS LFP-PMP-00010 |
| 4 | 24590-LAW-M6-LFP-00002003 | 0 | P&ID - LAW - LAW MELTER FEED PROCESS SYSTEM ADS PUMP CONTROLS LFP-PMP-00009 |
| 5 | 24590-LAW-M6-LFP-00002004 | 0 | P&ID - LAW - LAW MELTER FEED PROCESS SYSTEM ADS PUMP CONTROLS LFP-PMP-00007 |
| 6 | 24590-LAW-M6-LFP-00002005 | 0 | P&ID - LAW - LAW MELTER FEED PROCESS SYSTEM ADS PUMP CONTROLS LFP-PMP-00008 |
| 7 | 24590-LAW-M6-LFP-00002006 | 0 | P&ID - LAW - LAW MELTER FEED PROCESS SYSTEM ADS PUMP CONTROLS LFP-PMP-00011 |
| 8 | 24590-LAW-M6-LFP-00002007 | 0 | P&ID - LAW - LAW MELTER FEED PROCESS SYSTEM ADS PUMP CONTROLS LFP-PMP-00012 |
| 9 | 24590-WTP-DB-PET-17-001 | 0 | PROCESS INPUTS BASIS OF DESIGN (PIBOD) FOR LAW AND EMF; p. A-4, Table A-3, Stream LFP04 |
| 10 | 24590-LAW-M4C-V11T-00001 | 1 | CALCULATION OF PROCESS STEAM PROPERTIES FOR THE LAW FACILITY |
| 11 | 24590-LAW-MV-LFP-00001 | 1 | EQUIPMENT ASSEMBLY MELTER 1 FEED VESSEL LFP-VSL-00002 |
| 12 | CCN 302153 | N/A | BECHTEL NATIONAL, INC. EARLY LIMITED PROCUREMENT AND UPGRADING OF EXISTING STRUCTURES, SYSTEMS, AND COMPONENTS IN SUPPORT OF DIRECT FEED LOW-ACTIVITY WASTE |
| 13 | 24590-LAW-MVC-LFP-00001 | 1 | LAW MELTER FEED PROCESS SYSTEM (LFP) DATA |
| 14 | 24590-LAW-M6C-LFP-00002 | 2 | LAW MELTER FEED VESSELS LFP-VSL-00002 AND LFP-VSL-00004 SIZING |



MECHANICAL DATA SHEET ATTACHMENT 1:
24590-LAW-MVD-LFP-00007, Rev. 4 References
(for internal use only)

PLANT ITEM No.
24590-LAW-MV-LFP-VSL-00002

| Ref. | Document Number | Rev. | Document Title; Additional Information |
|------|-------------------------------|------|---|
| 15 | 24590-CM-POA-MVA0-00002-03-04 | F | DRAWING - GENERAL ARRANGEMENT - MELTER 1 FEED VESSEL |
| 16 | 24590-WTP-3PS-MV00-T0001 | 5 | ENGINEERING SPECIFICATION FOR PRESSURE VESSEL DESIGN AND FABRICATION |
| 17 | 24590-CM-POA-MVA0-00002-03-84 | B | DRAWING - GENERAL NOTES AND NAMEPLATE DETAILS |
| 18 | 24590-LAW-VDCN-M-11-00004 | N/A | CORRECTION TO ERECTED WEIGHT OF VESSELS LFP-VSL-00002 AND LFP-VSL-00004 |
| 19 | 24590-WTP-MVC-50-00009 | 0 | LAW, BOF, AND LAB VESSEL CYCLIC DATASHEET INPUTS |
| 20 | 24590-WTP-3PS-MV00-T0002 | 3 | ENGINEERING SPECIFICATION FOR SEISMIC QUALIFICATION CRITERIA FOR PRESSURE VESSELS |
| 21 | 24590-WTP-3PS-FB01-T0001 | 6 | ENGINEERING SPECIFICATION FOR STRUCTURAL DESIGN LOADS FOR SEISMIC CATEGORY III & IV EQUIPMENT AND TANKS |
| 22 | 24590-CM-POA-MVA0-00002-02-01 | E | CALCULATIONS - COMPRESS PRESSURE VESSEL DESIGN CALCULATIONS |
| 23 | 24590-LAW-MVC-LFP-00012 | 0 | SUPPLEMENTAL CALCULATION FOR LAW-MV-LFP-VSL-00002 & 00004 VESSELS |
| 24 | 24590-LAW-U0D-W16T-00001 | 4 | LAW ROOM ENVIRONMENT DATASHEET; p. vii, Section 1.4C |
| 25 | 24590-LAW-N1D-LFP-00006 | 1 | LFP-VSL-00002 & LFP-VSL-00004 MELTER 1 & 2 FEED VESSELS CORROSION EVALUATION |
| 26 | 24590-WTP-Z0C-W13T-00010 | H | CONTACT DOSE RATES TO EQUIPMENT FROM BETA AND GAMMA EMITTERS; Table 8-1 |



MECHANICAL DATA SHEET: VESSEL

PLANT ITEM No. △
24590-LAW-MV-LFP-VSL-00004

| | | | |
|---------------|-----------------------------|-----------------|--|
| Project: | RPP-WTP | P&ID: | 24590-LAW-M6-LFP-00003003, 24590-LAW-M6-LFP-00003004 24590-LAW-M6-LFP-00004002, 24590-LAW-M6-LFP-00004003 24590-LAW-M6-LFP-00004004, 24590-LAW-M6-LFP-00004005 24590-LAW-M6-LFP-00004006, 24590-LAW-M6-LFP-00004007 |
| Project No: | 24590 | Process Data: | Ref. 9, Ref. 10 |
| Project Site: | Hanford | Vessel Drawing: | 24590-LAW-MV-LFP-00002 |
| Description: | Melter 2 Feed Vessel | | |

Reference Data

| | |
|---|--|
| Charge Vessels (Tag Numbers) | Not Applicable |
| Pulsejet Mixers / Agitators (Tag Numbers) | LFP-AGT-00004 |
| RFDs/Pumps (Tag Numbers) | LFP-PMP-00013, LFP-PMP-00014, LFP-PMP-00015, LFP-PMP-00016, LFP-PMP-00017, LFP-PMP-00018, LFP-PMP-00004 |
| Spray Nozzles | LFP-NOZ-00008, LFP-NOZ-00009, LFP-NOZ-00010 |

Design Data

| | | | | | |
|--------------------------|-------------------------|-------------------|--|--------------------------------|--------------------------------|
| Quality Level | Q (Ref. 12) | Fabrication Specs | 24590-WTP-3PS-MV00-T0001 | | |
| Seismic Category | SC-III (Ref. 12) | Design Code | ASME VIII Div 1 | | |
| Service/Contents | LAW Melter Feed | Code Stamp | Yes | | |
| Design Specific Gravity | 1.90 (Ref. 15) | NB Registration | Yes | | |
| Maximum Operating Volume | gal | Weights (lbs) | Empty | Operating | Test |
| Total Volume | gal | Estimated | 44,500 | 164,600 | 120,800 |
| | | Actual * | △ 27,521 (Ref. 17 & 18) | △ 147,114 (Ref. 15) | △ 103,766 (Ref. 15) |

| | | | | | |
|-----------------------------|------|-------------------------|--------------------------|---------------------|---|
| Inside Diameter | inch | 132 (Ref. 15) | Wind Design | Not Required | |
| Length/Height (TL-TL) | inch | 126 (Ref. 15) | Snow Design | Not Required | |
| | | Vessel Operating | Vessel Design | Coil/Jacket-Design | Seismic Design |
| | | 0.0 △ | 15 | None | 24590-WTP-3PS-MV00-T0002 24590-WTP-3PS-FB01-T0001 |
| Internal Pressure (Ref. 19) | psig | 5.6 △ | FV | None | Seismic Base Moment * |
| External Pressure (Ref. 19) | psig | 98 (Ref. 13) | 150 (Ref. 17) | None | ft*lb Ref. 22, Ref. 23 |
| Temperature | °F | | | | Postweld Heat Treat |
| | | | | | Not Required |
| | | | | | Corrosion Allowance |
| | | | | | Inch 0.04 Top Head & Nozzles 0.125 Shell, Shell Nozzles & Btm Head (Ref. 15) |
| Min. Design Metal Temp. | °F | 40 (Ref. 24) | | | Hydrostatic Test Pressure * |
| | | | | | psig 19.5 (Ref. 17) △ |

Materials of Construction (Ref. 25)

| Component | Material | Minimum Thickness / Size | Containment |
|-------------------------------|---------------------------------------|--------------------------|----------------------------|
| Top Head | SA-240 316 (Note 2) | See Drawing | Auxiliary |
| Shell | SA-240 316 (Note 2) | See Drawing | Primary |
| Bottom Head | SA-240 316 (Note 2) | See Drawing | Primary |
| Support | SA-240 304 (Note 2) | See Drawing | N/A |
| Jacket/Coils/Half-Pipe Jacket | N/A | N/A | N/A |
| Internals | SA-240 316 (Note 2) | See Drawing | Thermowells Primary |
| Pipe (Seamless) | SA-312 TP316 Seamless (Note 2) | See Drawing | Note 3 |
| Forgings/ Bar stock | SA-182 F316 (Note 2) | See Drawing | N/A |
| Gaskets (O Ring) | EPDM O-Ring | N/A | N/A |
| Bolting | SA-193 B8M / SA-194 8M | N/A | N/A |

Miscellaneous Data

| | | | |
|-----------------------------|-----------------------|---------------------|-------------------------------|
| Orientation | Vertical | Support Type | Skirt |
| Insulation Function | Not Applicable | Insulation Material | Not Applicable |
| Insulation Thickness (inch) | Not Applicable | Internal Finish | Welds descaled as laid |
| | | External Finish | Welds descaled as laid |



MECHANICAL DATA SHEET: VESSEL

PLANT ITEM No.

24590-LAW-MV-LFP-VSL-00004

Remarks

** To be determined by the vendor.*

Note 1: Deleted.

Note 2: Material shall have Carbon Content of 0.030% Max. Non-welded items are excluded from this requirement.

Note 3: Nozzle necks below normal operating level are Primary, others Auxilliary. See 24590-WTP-3PS-MV00-T0001 for NDE.

Note 4: Additional NDE requirements should be as per 6.4 of 24590-WTP-3PS-MV00-T0001.

Note 5: Contents of this document are dangerous waste permit affecting.

Note 6: Beta/gamma dose exposure rate is 1.2E+01 Rad/hr (Ref. 26).

Note 7: NDE requirements per note 4 are associated with a CM pressure vessel design in accordance with the quality classification at the time of procurement. LFP-VSL-00004 has been reclassified as Safety Significant per CCN 302153 (Ref. 12).

Note 8: Vendor submittal (Ref. 15) states a shipping weight of 27,521lbs and an operating weight of 147,114lbs at a specific gravity of 1.90. Subtracting the shipping weight from the operating weight and dividing by the density results in an operating volume of ~7545 gallons. The calculated value for the maximum operating volume in the current vessel sizing calculation (Ref. 14) of 6,278 gallons is not representative of the as built vessel since the calculated height of the overflow nozzle of 9.56 feet used to calculate the volume is ~2 feet lower than the as built overflow nozzle of 11.54 feet. Additionally, Rev. 0 of the vessel sizing calculation (Ref. 14), which was used by the vendor to fabricate the vessel, reports a maximum operating height of 11.41 feet resulting in a volume of 7689 gallons that are representative of the as built vessel. For these reasons and to be representative of the as built vessel, the derived value from the vendor submittal (Ref. 15) of 7545 gallons is used for the maximum operating volume.





MECHANICAL DATA SHEET: VESSEL

PLANT ITEM No.
24590-LAW-MV-LFP-VSL-00004

Equipment Cyclic Data Sheet

| | |
|------------------------------|----------------------------|
| Component Plant Item Number: | 24590-LAW-MV-LFP-VSL-00004 |
| Component Description | Parent Vessel |

The information below is provisional and envelopes operational duty for fatigue assessment. It is not to be used as operational data.

| | |
|---|--|
| Materials of Construction | SA-240 316 |
| Design Life | 40 years |
| Component Function and Life Cycle Description | Equipment Shut Down for maintenance occurs annually. |

Cyclic Data (Ref. 19)

| Load Type | Min | Max | Number of Cycles | Comment |
|------------------------------|-------|--------|------------------|--|
| Design Pressure psig | FV | 15 | 10 | |
| Operating Pressure psig | -5.6 | 0.0 | 100 | Maximum of 100 start/stop cycles per 40 years of design life |
| Operating Temperature °F | 59 | 150 | 100 | |
| Contents Specific Gravity | 1.0 | 1.80 | 21900 | |
| Contents Level inch | 23.00 | 106.00 | 21900 | |

Localized Features

| | | |
|----------|-------------------------------------|---------------------------------|
| Nozzles | Within 50° F of vessel temperature. | As above. |
| Supports | Same as vessel | Number of cycles same as vessel |

Notes

- **Cycle increase:** The Seller must increase the numbers of operational cycles given above by 10% to account for commissioning duty unless otherwise noted.

Approval

| Rev | Description | System Engr | Vessel Engr | Checked | Reviewed | Approved | Date |
|-----|--|-------------|-------------|------------------------------------|---------------|------------------------------|----------|
| 0 | Issue for Purchase | P. Holgado | S.L.Lee | M.Sanvictores/ E.Isorn/C.Slater | N/A | M. Hoffmann | 3/20/03 |
| 1 | Revise the External Pressure | P. Holgado | S.L.Lee | M.Sanvictores/ C.Slater | E.Isorn | M. Hoffmann | 12/15/03 |
| 2 | Revise as noted | P. Holgado | S.L.Lee | M.Sanvictores/ C.Slater | E.Isorn | M. Hoffmann | 3/07/04 |
| 3 | Revise as Noted & Re-issued for Purchase | P. Holgado | S.L.Lee | M.Sanvictores/ C.Slater | E.Isorn | M. Hoffmann | 4/30/04 |
| 4 | <ul style="list-style-type: none"> - Revised Quality Level from CM to Q - Updated Values and References - Added Cyclic Data & Attachment 1 - Incorporated 24590-LAW-M6N-M80T-00008 - Incorporated 24590-WTP-EIE-ENG-17-0018 - Changes do not reduce margin for Q SSC; margin is addressed in associated calculations in Attachment 1 | A.Wand | N/A | Chad Stredwick C.Stredwick | W.Donigan | C.Roberts J.Shoemaker | 2/16/18 |

CER 2/16/18



MECHANICAL DATA SHEET ATTACHMENT 1:
24590-LAW-MVD-LFP-00008, Rev. 4 References
(for internal use only)

PLANT ITEM No.
24590-LAW-MV-LFP-VSL-00004

| Ref. | Document Number | Rev. | Document Title; Additional Information |
|------|---------------------------|------|---|
| 1 | 24590-LAW-M6-LFP-00003003 | 0 | P&ID - LAW - LAW MELTER FEED PROCESS SYSTEM MELTER 2 FEED VESSEL LFP-VSL-00004 |
| 2 | 24590-LAW-M6-LFP-00003004 | 1 | P&ID - LAW LAW MELTER FEED PROCESS SYSTEM MELTER 2 FEED VESSEL LFP-VSL-00004 |
| 3 | 24590-LAW-M6-LFP-00004002 | 0 | P&ID - LAW - LAW MELTER FEED PROCESS SYSTEM ADS PUMP CONTROLS LFP-PMP-00016 |
| 4 | 24590-LAW-M6-LFP-00004003 | 0 | P&ID - LAW - LAW MELTER FEED PROCESS SYSTEM ADS PUMP CONTROLS LFP-PMP-00015 |
| 5 | 24590-LAW-M6-LFP-00004004 | 0 | P&ID - LAW - LAW MELTER FEED PROCESS SYSTEM ADS PUMP CONTROLS LFP-PMP-00013 |
| 6 | 24590-LAW-M6-LFP-00004005 | 0 | P&ID - LAW - LAW MELTER FEED PROCESS SYSTEM ADS PUMP CONTROLS LFP-PMP-00014 |
| 7 | 24590-LAW-M6-LFP-00004006 | 0 | P&ID - LAW - LAW MELTER FEED PROCESS SYSTEM ADS PUMP CONTROLS LFP-PMP-00017 |
| 8 | 24590-LAW-M6-LFP-00002007 | 0 | P&ID - LAW - LAW MELTER FEED PROCESS SYSTEM ADS PUMP CONTROLS LFP-PMP-00012 |
| 9 | 24590-WTP-DB-PET-17-001 | 0 | PROCESS INPUTS BASIS OF DESIGN (PIBOD) FOR LAW AND EMF; p. A-4, Table A-3, Stream LFP04 |
| 10 | 24590-LAW-M4C-V11T-00001 | 1 | CALCULATION OF PROCESS STEAM PROPERTIES FOR THE LAW FACILITY |
| 11 | 24590-LAW-MV-LFP-00002 | 1 | EQUIPMENT ASSEMBLY MELTER 2 FEED VESSEL LFP-VSL-00004 |
| 12 | CCN 302153 | N/A | BECHTEL NATIONAL, INC. EARLY LIMITED PROCUREMENT AND UPGRADING OF EXISTING STRUCTURES, SYSTEMS, AND COMPONENTS IN SUPPORT OF DIRECT FEED LOW-ACTIVITY WASTE |
| 13 | 24590-LAW-MVC-LFP-00001 | 1 | LAW MELTER FEED PROCESS SYSTEM (LFP) DATA |
| 14 | 24590-LAW-M6C-LFP-00002 | 2 | LAW MELTER FEED VESSELS LFP-VSL-00002 AND LFP-VSL-00004 SIZING |



MECHANICAL DATA SHEET ATTACHMENT 1:
24590-LAW-MVD-LFP-00008, Rev. 4 References
(for internal use only)

PLANT ITEM No.
24590-LAW-MV-LFP-VSL-00004

| Ref. | Document Number | Rev. | Document Title; Additional Information |
|------|-------------------------------|------|---|
| 15 | 24590-CM-POA-MVA0-00002-03-42 | E | DRAWING - GENERAL ARRANGEMENT - MELTER 2 FEED VESSEL |
| 16 | 24590-WTP-3PS-MV00-T0001 | 5 | ENGINEERING SPECIFICATION FOR PRESSURE VESSEL DESIGN AND FABRICATION |
| 17 | 24590-CM-POA-MVA0-00002-03-85 | B | DRAWING - GENERAL NOTES AND NAMEPLATE DETAILS |
| 18 | 24590-LAW-VDCN-M-11-00004 | N/A | CORRECTION TO ERECTED WEIGHT OF VESSELS LFP-VSL-00002 AND LFP-VSL-00004 |
| 19 | 24590-WTP-MVC-50-00009 | 0 | LAW, BOF, AND LAB VESSEL CYCLIC DATASHEET INPUTS |
| 20 | 24590-WTP-3PS-MV00-T0002 | 3 | ENGINEERING SPECIFICATION FOR SEISMIC QUALIFICATION CRITERIA FOR PRESSURE VESSELS |
| 21 | 24590-WTP-3PS-FB01-T0001 | 6 | ENGINEERING SPECIFICATION FOR STRUCTURAL DESIGN LOADS FOR SEISMIC CATEGORY III & IV EQUIPMENT AND TANKS |
| 22 | 24590-CM-POA-MVA0-00002-02-01 | E | CALCULATIONS - COMPRESS PRESSURE VESSEL DESIGN CALCULATIONS |
| 23 | 24590-LAW-MVC-LFP-00012 | 0 | SUPPLEMENTAL CALCULATION FOR LAW-MV-LFP-VSL-00002 & 00004 VESSELS |
| 24 | 24590-LAW-U0D-W16T-00001 | 4 | LAW ROOM ENVIRONMENT DATASHEET; p. vii, Section 1.4C |
| 25 | 24590-LAW-N1D-LFP-00006 | 1 | LFP-VSL-00002 & LFP-VSL-00004 MELTER 1 & 2 FEED VESSELS CORROSION EVALUATION |
| 26 | 24590-WTP-Z0C-W13T-00010 | H | CONTACT DOSE RATES TO EQUIPMENT FROM BETA AND GAMMA EMITTERS; Table 8-1 |