**Reservation of Rights:** *All draft Provider of Choice (POC) contract language presented by BPA for discussion is subject to ongoing review and revision. Prior to finalizing the POC contract templates, BPA will publish complete contract templates for public review and comment. BPA acknowledges that failure to offer edits or comments on this document does not preclude a stakeholder from offering edits or comments during the formal public review.*

**Summary of Changes:**

* Changed Exhibit M to Exhibit L; changed Exhibit N to Exhibit M
* Delivery Request renamed to Slice Output Energy Request
* Slice Computer Application (SCA) renamed to Provider of Choice Slice Application (POCSA)
* Slice Implementation Group renamed to Slice Operations Forum
* SCA Implementation Date renamed to POCSA Deployment Date

1. Updated product description to hourly schedule submitted on a day-ahead timeframe. Removed references to Exhibit O Interim Slice Procedures

3.2 Added provision for Hard Operating Constraints that cannot be modelled in POCSA

3.2.1 Specified time for BPA to update Simulator Parameters to align with WRAP timeline

3.2.1, 9.1 Added unilateral right for BPA to change deadline for BPA Simulator Input to align with WRAP or a successor RA program timelines

3.3.6 Added provisions for shielding of Simulated Operating Scenario constraint violations

3.3.8 Added customer obligation to create preliminary Simulated Operating Scenario

3.5.4.2 Added provision for SOF process to modify Simulator Test Performance criteria

3.6.1, 9.2 Added unilateral right for BPA to change H/k computation in Exhibit after approval by SOF and 30-day notice to customers.

4.2.4 removed within day adjustments to BOS Flex to conform with day ahead scheduling

4.4 deleted due to mandatory CGS displacement participation

4.5 (4) deleted due to mandatory CGS displacement participation

5. DUI – added provisions from 5.9.5 Customer Unable to Utilize DUI in Body of Regional Dialogue

8. BPA to provide a single test version of the POCSA for Provider of Choice day-ahead Slice Product with reduced uptime compared to production version of POCSA

**Related** **Definitions** (See also section 2 of this exhibit)**:**

2.«#» “Absolute Operating Constraint” means an Operating Constraint that cannot be exceeded under any condition.

2.«#» “Actual BOS Generation” means the actual generation produced by the BOS Complex, as adjusted for actual Designated System Obligations and CHWM Modeled Augmentation.

2.«#» “Balance of System” or “BOS” means the Tier 1 System Resources other than the six Simulator Projects net of Designated System Obligations. Customers receive a share of the BOS complex in three different ways: via BOS Base Energy, BOS Deviation Return, and BOS Flexibility.

2.«#» “BOS Base” means the forecast generation amounts available from the BOS Complex, as adjusted by BPA for forecast Designated System Obligations and CHWM Modeled Augmentation.

2.«#» “BOS Complex” or “Balance of System Complex” means the Tier 1 System Resources, except those resources that comprise the Coulee-Chief Complex and Lower Columbia Complex.

2.«#» “BOS Deviation Account” means the account BPA maintains that quantifies the cumulative amount, expressed in megawatt days, by which «Customer Name»’s hourly BOS Base schedules deviate from the amount determined by multiplying «Customer Name»’s Slice Percentage by the hourly Actual BOS Generation.

2.«#» “BOS Deviation Return” means the energy amounts associated with the reduction of «Customer Name»’s BOS Deviation Account balance.

2.«#» “BOS Flex” means the amount by which the BOS Base can reasonably be reshaped within a given calendar day by utilizing the flexibility available from the Lower Snake Complex.

2.«#» “BOS Module” means the POCSA module that is used to determine «Customer Name»’s Slice Output Energy and Delivery Limits available from the BOS Complex.

2.«#» “Coulee-Chief Complex” means the two hydroelectric projects located in the middle reach of the Columbia River, consisting of Grand Coulee and Chief Joseph.

2.«#» "CHWM Modeled Augmentation" means a PRDM construct of a flat annual block of power used to establish the simulated Slice capability and equitably allocate costs between Slice and Non- Slice Cost Pools.

2.«# “CHWM System” means the annual Tier 1 Firm System Output reduced for annual Designated System Obligations Plus annual CHWM Modeled Augmentation as determined in each 7(i) process.

2.«#» “Customer Inputs” means the discharge, elevation, or generation requests at each of the Simulator Projects that «Customer Name» submits as inputs to the Simulator pursuant to section 3.3 of Exhibit L.

2.«#» “Default User Interface” or “DUI” means the basic user interface that is developed by BPA and made available to «Customer Name» for access to the POCSA.

2.«#» “Delivery Limits” means the limits that govern the availability of Slice Output and the scheduling of Slice Output Energy by «Customer Name» as determined by BPA, and implemented through the POCSA.

2.«#» “Designated System Obligations” means the set of obligations specified in Table 3-2 of the PRDM, which: (1) are directly assigned to, or from, the generation output or capability of the Tier 1 System Resources, or (2) are incurred because of contracts, operational obligations, memorandums of agreement, treaties, statutes, regulations, court orders, or executive orders, as individual or in combination that create a firm obligation for the Tier 1 System Resources. Designated System Obligations also includes the portion of BPA’s ancillary and control area service obligations that are provided from the Tier 1 System Resources.

2.«#» “Elective Spill” means Spill other than Bypass Spill or Fish Spill that occurs at a hydroelectric project and is within such project’s available turbine capacity such that the Spill may otherwise be utilized to produce energy.

2.«#» “Federal Operating Decision” means a decision made by the U.S. Army Corps of Engineers, the Bureau of Reclamation, BPA, or the United States Entity of the Columbia River Treaty, in accordance with the authority of each such entity, and as needed to meet Designated System Obligations not already reflected in the Simulator or BOS Module, that establishes the permissible range of operations for any project or projects that comprise the FCRPS.

2.«#» “Fish Spill” means Spill that occurs at a hydroelectric project in order to maintain compliance with established fish passage criteria, such as those criteria set forth in biological opinions.

2.«#» “Hard Operating Constraint” means an Operating Constraint that may not be exceeded without express consent from project operators, owners, or other federal agencies responsible for establishing such Operating Constraints.

2.«#» “Hydraulic Link Adjustment” means the adjustment to «Customer Name»’s simulated McNary inflow that is equal to the difference between «Customer Name»’s Calibrated Simulator Discharge for Chief Joseph and the measured Chief Joseph discharge, pursuant to section 3.7 of Exhibit L.

2.«#» “Incremental Side Flows” means the portion of a hydroelectric project’s natural inflow that enters the river on which the project is located between that project and the next-upstream project.

2.«#» “Lower Columbia Complex” or “LCOL Complex” means the four hydroelectric projects located on the lower reach of the Columbia River, consisting of McNary, John Day, The Dalles, and Bonneville.

2.«#» “Operating Constraints” means the operating limits, project operating requirements, and non-power constraints that are the result of implementing Federal Operating Decisions or Prudent Operating Decisions.

2.«#» “Provider of Choice Slice Application” or “POCSA” means BPA’s proprietary computer hardware, software and related processes, developed, updated, and maintained by BPA and consisting of: (1) the Simulator; (2) the BOS Module; (3) the Default User Interface; and (4) other related processes, including but not limited to communications, scheduling, electronic tagging and accounting for Slice Output Energy, all as described in Exhibit L.

2.«#» “Prudent Operating Decisions” means a decision made by Power Services operations staff, in their exercise of reasonable judgment, that modifies the operating range applied to any project or projects that comprise the FCRPS for the purpose of meeting any BPA obligation, including but not limited to Federal Operating Decisions, except actions taken by Power Services solely to sell surplus power to loads BPA is not contractually obligated to serve under section 5 of the Northwest Power Act. Prudent Operating Decisions are applied for a finite period of time and in a manner that proportionally affects the amount of power from such project or projects that is available to BPA, to «Customer Name» under this Agreement, and to other Slice Customers under their respective Slice/Block Power Sales Agreements.

2.«#» “Scheduling Hour XX” means the 60‑minute period ending at XX:00. For example, Scheduling Hour 04 means the 60‑minute period ending at 4:00 a.m.

2.«#» “Simulator” or “Slice Water Routing Simulator” means the POCSA module used to determine «Customer Name»’s Slice Output and Delivery Limits available from the Simulator Projects.

2.«#» “Simulated Operating Scenario” means the simulated operation of the Simulator Projects, including the discharge amounts, generation amounts, and forebay elevations, as determined by the Simulator.

2.«#» “Simulated Output Energy Schedule(s)” means the amount of energy that is calculated by the Simulator as «Customer Name»’s simulated generation amount associated with each Simulator Project.

2.«#» “Simulator Parameters” means the operating parameters applicable to the Simulator Projects and which BPA develops as inputs to the Simulator to reflect Operating Constraints, pursuant to section 3.2 of Exhibit L.

2.«#» “Simulator Projects” means any of the hydroelectric projects represented in the Simulator, including those projects that comprise the Coulee-Chief Complex and the Lower Columbia Complex.

2.«#» “Slice Operating Day” means the current day that BPA makes Slice Output Energy available.

2.«#» “Slice Output” means the quantities of energy, peaking energy, storage, and ramping capabilities available from the Tier 1 System Resources, as adjusted for Designated System Obligations and established pursuant to the POCSA, that «Customer Name» is entitled to purchase under the Slice Product, as determined by applying «Customer Name»’s Slice Percentage to such quantities.

2.«#» “Slice Output Energy” means the energy made available to «Customer Name» under the Slice Product.

2. «#» “Slice Output Energy Request” or “SOER” means the amount of Slice Output Energy «Customer Name» requests that BPA makes available for any given hour as established per section 7 of Exhibit L.

2.«#» “Slice Product” means BPA’s power product under which Slice Output as defined herein is sold to «Customer Name» pursuant to the terms and conditions set forth in section 5 of this Agreement.

2.«#» “Slice Scheduling Day” means the calendar day before the Slice Operating Day.

2.«#» “Soft Operating Constraint” means an Operating Constraint, other than a Hard or Absolute Operating Constraint, that is to be achieved on a day-ahead planning basis, but may be exceeded after coordinating with project operators, owners, or other federal agencies responsible for establishing such Operating Constraints.

2.«#» “Spill” means water that passes a hydroelectric project without producing energy, including Bypass Spill, Elective Spill, Fish Spill, and Forced Spill.

2.«#» “Storage Content” means the amount of water stored in a project’s reservoir, expressed in thousands of second-foot-days (ksfd). The Storage Content is typically calculated based on a conversion of such reservoir’s measured forebay elevation, expressed in feet, to ksfd through the use of an established elevation-to-content conversion table.

2.«#» “Tier 1 System Resources” means the resources listed in Table 3-1 of the PRDM, as updated for any new resources, including market purchases, that BPA determines are needed to meet its CHWM obligation

**Exhibit L**

**PROVIDER OF CHOICE SLICE APPLICATION**

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*Drafter’s Note: When the Signatures clause is included at the end of the revision, list it in the Table of Contents.*

**10. Signatures**

**1. PROVIDER OF CHOICE SLICE APPLICATION – GENERAL DESCRIPTION**

The Provider of Choice Slice Application (POCSA) is a proprietary BPA computer application developed and maintained by BPA in consultation with «Customer Name» and other Slice Operations Forum (SOF) members. The POCSA consists of the Slice Water Routing Simulator, the Balance of System Module, the Default User Interface, and other related processes used for scheduling, tagging, and accounting of Slice Output and communication of information, all as described below.

The POCSA calculates the Slice Output Energy amount that BPA makes available to «Customer Name» in each Scheduling Hour. The total amount of Slice Output Energy in each Scheduling Hour is comprised of the results of the Simulator and the BOS Module, as set forth in section 7 of this exhibit. «Customer Name» shall use the POCSA on a day-ahead timeframe to submit Customer Inputs and BOS Flex Requests to BPA for each Scheduling Hour in the next Slice Operating Day, pursuant to section 4.1 of Exhibit F.

2. DEFINITIONS

The following definitions apply only to this Exhibit L.

2.1 “Algorithm Tuning Parameters” means factors, coefficients, or variables that are embedded within Simulator algorithms or formulas and are adjusted by Power Services as needed to appropriately implement provisions of this Agreement.

2.2 “Bypass Spill” means Spill that occurs at a hydroelectric project associated with lock operations, leakage and fish bypass systems.

2.3 “Forced Spill” means Spill other than Bypass Spill, Elective Spill, or Fish Spill that occurs at a hydroelectric project and is unavoidable in order to operate the project within applicable Operating Constraints.

2.4 “Incremental Side Flows” means the portion of a hydroelectric project’s natural inflow that enters the river on which the project is located between that project and the next-upstream project.

2.5 “Logic Control Parameters” means flags or toggles that are embedded within the POCSA logic and are set by Power Services as needed to appropriately implement provisions of this Agreement.

2.6 “Simulator Initialization Time” means the date and time that represents the beginning of the first one-hour period of the Simulator Modeling Period.

2.7 “Simulator Modeling Period” means the variable time period represented by the Simulator output, including between 216 and 241 one-hour time periods, as described in section 3.1.2 of this exhibit.

**3. SLICE WATER ROUTING SIMULATOR**

3.1 **General Description**

The Simulator is designed to determine «Customer Name»’s potential range of available Simulated Output Energy Schedules and Delivery Limits associated with the Simulator Projects. «Customer Name» shall utilize the Simulator to simulate the routing of available stream flow through the Simulator Projects in compliance with established Simulator Parameters. Power Services is responsible for establishing and managing Simulator Parameters within the Simulator, pursuant to section 3.2 of this exhibit, and «Customer Name» is responsible for establishing and managing Customer Inputs within the Simulator, pursuant to section 3.3 of this exhibit.

3.1.1 «Customer Name» shall have access to the Simulator for the purpose of running various Simulated Operating Scenarios.

3.1.2 The Simulator produces Simulated Operating Scenarios in one-hour time periods for no less than 216 hours and no more than 241 hours depending upon the Simulator Initialization Time.

The one-hour time periods used in the Simulated Operating Scenarios shall begin with the first hour of the day following the most recent operating day that «Customer Name» submitted Customer Inputs pursuant to section 4.1 of Exhibit F.

3.1.3 The Simulator incorporates approximate hydraulic time lags between Simulator Projects.

3.1.4 The Simulator reflects the application of all Operating Constraints in effect for each Simulator Project, including compliance with Operating Constraints in effect at downstream projects.

3.1.5 The Simulator calculates simulated inflows to Grand Coulee based upon forecast (or measured when available) discharges from upstream projects plus forecast Incremental Side Flows between those projects and Grand Coulee, as adjusted for forecast Banks Lake irrigation pumping flows.

3.1.6 The Simulator calculates the simulated Grand Coulee discharge, generation, and forebay elevation based on «Customer Name»’s Customer Inputs. Such computed discharge is used to establish «Customer Name»’s simulated Chief Joseph inflow, given appropriate time lags, and as adjusted for forecast Chief Joseph Incremental Side Flows.

3.1.7 The Simulator calculates simulated inflows to McNary based upon forecast (or measured when available) discharges from Priest Rapids and Ice Harbor after considering approximate hydraulic time lags between those projects and McNary, as adjusted for forecast McNary Incremental Side Flows. The Simulator also incorporates «Customer Name»’s Hydraulic Link Adjustment, pursuant to section 3.7 of this exhibit, into «Customer Name»’s simulated McNary inflow.

3.1.8 The Simulator calculates the simulated McNary discharge, generation, and forebay elevation based on «Customer Name»’s Customer Inputs. Such calculated discharge is used to establish «Customer Name»’s simulated John Day inflow, given appropriate time lags, and as adjusted for forecast John Day Incremental Side Flows.

3.1.9 The Simulator calculates the simulated discharge, generation and forebay elevations for John Day, The Dalles and Bonneville, as well as simulated inflows into The Dalles and Bonneville for «Customer Name», in the manner described in section 3.1.8 above.

3.1.10 The Simulator does not accept aggregated Customer Inputs for the Lower Columbia Complex or the Coulee-Chief Complex. «Customer Name» may develop aggregated Customer Inputs for use in its in-house processes but must translate such aggregated Customer Inputs into individual Customer Inputs for each Simulator Project to enable the POCSA to validate «Customer Name»’s simulated operation of individual Simulator Projects against Operating Constraints.

3.2 **Simulator Parameters**

BPA shall monitor and update the Simulator Parameters, as specified in this section 3.2, applicable to each Simulator Project to reflect: (1) Operating Constraints in effect or to take effect at the actual Tier 1 System Resource, and (2) forecast system conditions used by BPA in the operation of the Tier 1 System Resources, for the entire Simulator Modeling Period. BPA shall designate each Operating Constraint established as a Simulator Parameter as either an Absolute Operating Constraint, a Hard Operating Constraint, or a Soft Operating Constraint. BPA shall notify Slice Customers of any Absolute Operating Constraint or Hard Operating Constraint that cannot be modelled in the POCSA. The simulated operating capability available from the Simulator Projects as affected by the Simulator Parameters shall reasonably represent the actual operating capability available from the Tier 1 System Resources that comprise the Simulator Projects as affected by the associated Operating Constraints. To the maximum extent practicable, BPA shall monitor the operating conditions that affect the Simulator Projects and shall revise the Simulator Parameters as necessary to reflect changes.

3.2.1 BPA shall update the Simulator Parameters applicable to each Scheduling Hour in the Simulator Modeling Period no later than three hours prior to the Customer Inputs submission deadline in section 4.1 of Exhibit F on each calendar day. BPA shall have the right to revise Simulator Parameters applicable to each Scheduling Hour up to 75 minutes prior to the Customer Inputs submission deadline in section 4.1 of Exhibit F.

3.2.2 The Simulator Parameters shall include:

1. Hourly regulated inflows (Grand Coulee and McNary only);
2. Hourly Incremental Side Flows;
3. Initial forebay elevations;
4. Water to energy conversion factors (H/ks);
5. Content to elevation conversion tables;
6. Project turbine capacities;
7. Spill limitations and requirements, including Bypass Spill quantities;
8. Generation limitations and requirements;
9. Discharge limitations and requirements as needed to meet both discharge and tailwater elevation requirements;
10. Forebay limitations and requirements;
11. System wide requirements that affect the Simulator Projects (e.g. Vernita Bar, chum spawning, or Operating Reserves);
12. Algorithm Tuning Parameters;
13. Logic Control Parameters that affect the Simulator Projects (e.g. CGS Displacement election, PSB enforcement flag, etc.); and
14. Simulator Parameters as implemented pursuant to section 5.12 of the body of this Agreement and included in the specification manual described in section 3.5.1 of this exhibit.

3.3 **Customer Inputs and Use of the Simulator**

«Customer Name» shall be responsible for accessing the Simulator and submitting at least one Customer Input for each of the Simulator Projects for each one-hour time period for the entire Simulator Modeling Period. «Customer Name» is required to submit Customer Inputs to the Simulator separately from all other Slice Customers’ Customer Inputs.

3.3.1 Customer Inputs shall include:

1. Generation requests;
2. Elevation requests;
3. Discharge requests; and,
4. Customer Inputs as implemented pursuant to section 5.12 of the body of this Agreement and included in the specification manual described in section 3.5.1 of this exhibit.

3.3.2 Customer Inputs shall be stated in terms of whole project capability rather than «Customer Name»’s Slice Percentage of project capability.

3.3.3 The Simulator shall apply a fixed prioritization of Customer Inputs among generation, elevation, and discharge requests.

3.3.4 The Simulator shall process «Customer Name»’s Customer Inputs to determine a Simulated Operating Scenario. The simulated generation values resulting from each Simulated Operating Scenario shall represent «Customer Name»’s potential Simulated Output Energy Schedules. Simulated Output Energy Schedules are not considered schedules for power delivery.

3.3.5 For each Simulated Operating Scenario the POCSA will provide «Customer Name» with a report stating for each Simulator Project: (1) the resulting simulated generation, discharge and elevation values, (2) which, if any, Absolute or Hard Operating Constraints limited the Simulated Operating Scenario, and (3) which, if any, Absolute or Hard Operating Constraints were violated.

3.3.6 If «Customer Name» submits Customer Inputs for a Simulated Operating Scenario that would otherwise result in violations of one or more Absolute or Hard Operating Constraints, the Simulator shall, to the extent possible, establish a Simulated Operating Scenario that conforms to the Absolute or Hard Operating Constraints. In such event, «Customer Name» shall elect to either cancel the submission of its Customer Inputs or accept the results of the Simulated Operating Scenario. «Customer Name» shall contact the Power Services duty scheduler on shift no earlier than three hours prior to the Customer Inputs submission deadline in section 4.1 of Exhibit F and no later than thirty minutes prior to the Customer Inputs submission deadline to request shielding from Simulated Operating Scenario constraint violations for the next Slice Operating Day. Shielding eliminates the energy reduction at the Simulator Project where the constraint violation occurred. The Power Services duty scheduler on shift or other position designated by BPA shall have the sole discretion to approve or deny shielding requests. Shielding requests will not be approved by BPA after the fact. «Customer Name» shall resubmit a final feasible Simulated Operating Scenario for such shielding to take place.

3.3.7 «Customer Name» shall have the right to modify and submit its Customer Inputs for each Scheduling Hour included in the next Slice Operating Day prior to the Customer Inputs submission deadline in section 4.1 of Exhibit F.

The Simulator shall process the last submitted Customer Inputs after the Customer Inputs submission deadline to calculate «Customer Name»’s final Simulated Operating Scenario and associated final Simulated Output Energy Schedules. The final Simulated Operating Scenario and final Simulated Output Energy Schedules are inputs to the calculation of «Customer Name»’s Slice Output Energy Request (SOER), pursuant to section 7 of this exhibit, applicable to each Scheduling Hour in the next operating day.

3.3.8 For the Customer Inputs listed in section 3.3.1 of this exhibit, «Customer Name» shall produce and submit to BPA at least one preliminary and one final Simulated Operating Scenario that demonstrates all Simulator Projects are in compliance with all applicable Operating Constraints for the duration of the Simulator Modeling Period. «Customer Name» shall produce and submit a preliminary Simulated Operating Scenario to BPA no earlier than 17 hours prior to the Customer Inputs submission deadline in section 4.1 of Exhibit F and no later than four hours prior to the Customer Inputs submission deadline. «Customer Name» shall produce and submit the final Simulated Operating Scenario to BPA no later than the Customer Input submission deadline in section 4.1 of Exhibit F. If «Customer Name» does not submit a final Simulated Operating Scenario to BPA that complies with the requirements of this section 3.3. then «Customer Name»’s preliminary Simulated Operating Scenario shall become its final Simulated Operating Scenario for the applicable time period. BPA may suspend this requirement during periods when BPA determines «Customer Name» is not able to comply due to conflicting Operating Constraints.

3.4 **Simulator Output**

Based on the Simulator Parameters and Customer Inputs in effect, the Simulator produces the following results for each one-hour timeperiod for the entire Simulator Modeling Period:

3.4.1 «Customer Name»’s potential Simulated Output Energy Schedules (simulated generation), simulated discharge, and simulated forebay elevation associated with each Simulator Project.

3.4.2 A list of Customer Inputs that resulted in violation of Operating Constraints within the Simulated Operating Scenario, pursuant to section 3.3.6 of this exhibit, or that were not achieved by the Simulator, for each Simulator Project.

3.4.3 A list of Operating Constraints that were violated within «Customer Name»’s simulated operation for each Simulator Project.

3.4.4 An explanation for each occurrence listed pursuant to sections 3.4.2 and 3.4.3 of this exhibit.

3.4.5 «Customer Name»’s Hydraulic Link Adjustment amounts as established pursuant to section 3.7 of this exhibit.

3.5 **Simulator Documentation, Performance Test, and Accuracy**

3.5.1 **Simulator Documentation**

BPA, with «Customer Name»’s input, shall develop an updated Slice Water Routing Simulator (SWRS) manual with specifications describing the Simulator computations, processes and algorithms.. The SWRS manual shall include, but shall not be limited to, the following:

1. A documented list of data points, including the source systems of record, such as BPA’s internal modeling tools or stream flow forecasting databases, that are accessed and used to determine Simulator Parameters;
2. Full documentation, excluding computer code, of the processes by which the Simulator calculates and produces output values;
3. Full documentation, excluding computer code, of the Simulator functions available to «Customer Name», including access and controls of the Simulator; and
4. Full documentation of the data output/display processes and communication protocols associated with «Customer Name»’s computer systems.

3.5.2 **Simulator Performance Test**

BPA shall conduct the Simulator Performance Test specified in this section 3.5.2 of this exhibit, and as required pursuant to section 5.9.4 of the body of this Agreement and section 3.5.3.2 of this exhibit.

3.5.2.1 **Storage Content Test**

Using actual stream flows (including calculated Incremental Side Flows), operating constraints, initial monthly Simulator Project forebay elevations, and Simulator Project discharges for the months of January through September 2025 as input parameters, BPA shall produce Simulated Operating Scenarios for each month of that period. BPA shall calculate the hourly Storage Content difference for each Simulator Project as the difference between the simulated Storage Content and the actual Storage Content for each such Simulator Project for each hour of the test period. For each month of the test period, a Simulator Project will have passed the Storage Content test if: (1) the hourly Storage Content difference is greater than the Storage Content value contained in column A of the table below on no more than 4 percent of the hours in the month; and, (2) no hourly Storage Content difference during the month is greater than the lesser of (i) the Storage Content value contained in column B of the table below or (ii) one-half of the applicable monthly available Storage Content. If a Simulator Project fails either of these tests for a month, then such Simulator Project will have failed the Storage Content test for such month.

|  |  |  |
| --- | --- | --- |
| **Simulator Project** | **Column A** | **Column B** |
| Grand Coulee | 5 ksfd | 15 ksfd |
| Chief Joseph | 5 ksfd | 11.5 ksfd |
| McNary | 5 ksfd | 15 ksfd |
| John Day | 5 ksfd | 15 ksfd |
| The Dalles | 5 ksfd | 12.5 ksfd |
| Bonneville | 5 ksfd | 15 ksfd |

The overall Storage Content test will be deemed to have failed if one or more of the following occurs:

(1) Grand Coulee fails the test in one or more of the nine months;

(2) More than 25 percent of the 54 monthly tests fail;

(3) Four or more Simulator Projects fail the test in any single month; or

(4) Any of the Simulator Projects fail the test in all 9 months.

3.5.2.2 **Energy Test**

Using actual stream flows (including calculated Incremental Side Flows), operating constraints, initial monthly Simulator Project forebay elevations, Simulator Project discharge values, and Simulator Project H/ks (for the months of January through September 2025) as input parameters, BPA shall produce Simulated Operating Scenarios for each month of that period. BPA shall calculate the daily and monthly differences between the simulated generation and actual generation for each Simulator Project. For each month of the test period, a Simulator Project will have passed the energy test if: (1) for each day of the month the daily generation difference is no greater than 5 percent of the associated Simulator Project’s actual daily generation; and, (2) the monthly generation difference is no greater than 3 percent of the associated Simulator Project’s actual monthly generation. The overall energy test will be deemed to have failed if one or more of the following occurs:

(1) Grand Coulee fails the test in one or more of the 9 months;

(2) More than 25 percent of the 54 monthly tests fail;

(3) Four or more Simulator Projects fail the monthly test in any single month; or

(4) Any of the Simulator Projects fail the test in all 9 months.

3.5.2.3 **Peaking Test**

BPA shall produce a separate Simulated Operating Scenario as specified below, for the hottest consecutive 3‑day period and the coldest consecutive 3‑day period that occurred during the period January through September 2025

The 3‑day test periods shall be determined by BPA based on the weighted-average temperatures for three major load centers: Portland, Seattle, and Spokane. The weighted-average temperatures for these load centers will be determined as follows:

(1) Each city’s daily maximum and daily minimum temperature will be averaged;

(2) The resulting day-average temperature from each city will be weighted by applying load center percentage weightings, which will be determined by BPA and will sum to 100 percent for the three cities; and

(3) The resulting weighted day-average temperatures for each city will then be combined to determine each day’s weighted-average load center temperature.

The daily weighted-average load center temperatures will be averaged for each consecutive 3‑day period for the January 2025 through September 2025 period. The lowest such average will establish the coldest 3‑day period, and the highest such average will establish the hottest 3‑day period.

The Simulated Operating Scenarios will be developed using actual stream flows (including calculated Incremental Side Flows), operating constraints, and initial Simulator Project forebay elevations from the 3‑day test periods as input parameters. Each Simulator Project’s hourly generation request will be set equal to such Simulator Project’s actual generation value from the representative test periods. BPA will compare each of the Simulator Project’s simulated hourly generation values to such Simulator Project’s actual hourly generation values for each of the 6 peak hours on any of the test days. The 6 peak hours shall be established as the 6 hours with the largest combined actual Simulator Project generation each day. The peaking test will be deemed to have failed if either of the following occurs:

(1) The Simulator Projects’ combined simulated generation value deviates from the Simulator Projects’ combined actual generation value by more than 200 aMW over the 6 peak hours on any of the test days; or

(2) The Simulator Projects’ combined simulated generation value deviates from the Simulator Projects’ combined actual generation value by more than 400 MW on any of the 6 peak hours on any of the test days.

3.5.2.4 **Ramp Down Test**

Using actual stream flows (including calculated Incremental Side Flows), operating constraints, initial Simulator Project forebay elevations, and Simulator Project generation values from the dates specified below as input parameters, BPA shall develop a separate Simulated Operating Scenario for each specified date. BPA shall calculate the difference between the simulated Grand Coulee generation change and the actual Grand Coulee generation change for each two consecutive hours between Scheduling Hour 20 and Scheduling Hour 02 for each study day. The ramp down test will be deemed to have failed if one or more of the following occurs:

(1) The difference between the simulated and actual Grand Coulee generation change is greater than 300 MW on any two consecutive hours between Scheduling Hour 20 and Scheduling Hour 02, on any ramp down test date;

(2) The average difference between the simulated and actual Grand Coulee generation change is greater than 100 MW for each two consecutive hours between Scheduling Hour 20 and Scheduling Hour 02 on any ramp down test date.

(3) BPA shall determine the ramp down test dates and provide such dates to «Customer Name» no later than October 31, 2027.

3.5.2.5 **Changes to Simulator Performance Test Criteria**

If the Simulator Performance Test fails, and after BPA discusses the results of the test with «Customer Name», and the Parties agree the test criteria is unreasonable, inappropriate, or unattainable, then the Parties may mutually agree to either deem the Simulator Performance Test as having passed, or alter the test criteria prior to conducting subsequent Simulator Performance Tests.

3.5.3 **Simulator Accuracy**

«Customer Name» and BPA acknowledge that model errors are inevitable. No cumulative accounting of model error impacts shall be required or established.

3.5.3.1 To minimize such errors BPA shall ensure Simulator Parameters established for the Simulator reasonably reflect the expected values for forecasted inflows and Operating Constraints and that the Simulator reasonably represents the operational attributes of the Simulator Projects. BPA shall develop a process to account and correct for differences between forecasted and measured inflows and H/k values reflected in the Simulator in an effort to minimize cumulative deviations. «Customer Name» shall accept such inputs and corrections, and shall ensure that Customer Inputs established for the Simulator reasonably reflect «Customer Name»’s intended use of hourly scheduling flexibility within the established Delivery Limits.

3.5.3.2 As an ongoing check of the Simulator’s accuracy, BPA shall run a retrospective Simulator Performance Test, as described in section 3.5.2 of this exhibit, after major changes to the Simulator have occurred, at BPA discretion. The Simulator accuracy criteria for each Simulator Performance Test shall be set equal to actual Simulator accuracy associated with the preceding Simulator Performance Test results, unless the Parties agree otherwise through the SOF process. The test criteria for each Simulator Performance Test may be modified as agreed by the Parties through the SOF process pursuant to section 5 in the body of this Agreement. BPA shall provide the results of each such test to «Customer Name» within a reasonable timeframe.

3.5.3.3 If any Simulator Performance Test results are not within the accuracy criteria established pursuant to section 3.5.3.2 of this exhibit, BPA, in consultation with «Customer Name» and other members of the SOF, shall make a plan to promptly implement modifications necessary to bring the Simulator output in compliance with such accuracy criteria pursuant to section 5.12 of this Agreement.

3.5.4 **Documentation of** **Simulator Updates, Upgrades, or Replacements and Required Actions**

At least 30 days prior to BPA implementing any major updates, upgrades, or replacements to the Simulator, the Simulator specifications manual described in section 3.5.1 of this exhibit shall be revised by BPA, with «Customer Name»’s input, and distributed to «Customer Name»’s SOF representative. Within such 30 day period «Customer Name» shall test its systems and provide sufficient training to its staff to allow it to prudently manage the changes resulting from the updates, upgrades, or replacements.

3.6 **Forecasted H/k, Corrected H/k, Bypass Spill, and Fish Spill**

3.6.1 The POCSA shall automatically calculate forecasted H/k values for each Simulator Project for use as H/k Simulator Parameters. Forecasted H/k values shall be calculated using observed turbine discharge and gross generation amounts associated with the most recent contiguous periods that include hours ending 2300 through 0600 and hours ending 0700 through 2200, separately. The forecast H/k values shall be applied to all hours of each future, like, contiguous period within the Simulator Modeling Period. Such applied forecasted H/k values shall be adjusted for each Scheduling Hour based upon the ratio of «Customer Name»’s hourly simulated head associated with the prior Scheduling Hour and the observed head associated with the applicable observed contiguous period.

3.6.2 The POCSA shall automatically calculate observed hourly H/k values for each Simulator Project for use in deviation accounting. Observed hourly H/k values shall be based on observed turbine discharge and gross generation amounts for each hour and shall be adjusted based upon the ratio of «Customer Name»’s simulated head and the observed head for each hour. Observed hourly H/k values shall be applied to «Customer Name»’s final simulated turbine discharge values associated with the same hour to determine corrected SOES amounts and H/k correction return amounts («Customer Name»’s Slice Percentage of the corrected SOES minus «Customer Name»’s Slice Percentage of the final SOES). The sum of «Customer Name»’s H/k correction return amounts for each hour shall be applied to «Customer Name»’s SOER for the Scheduling Hour that occurs 168 hours after the applicable observed hour.

3.6.3 The POCSA shall automatically apply forecasted Bypass Spill amounts to «Customer Name»’s simulations for the entire Simulation Modeling Period. The POCSA shall calculate hourly observed Bypass Spill amounts as soon as practicable following each hour. Such hourly observed Bypass Spill amounts shall replace the forecasted Bypass Spill amounts for the Scheduling Hour that occurs 24 hours after the applicable observed hour.

3.7 **Calculation and Application of the Hydraulic Link Adjustment**

3.7.1 «Customer Name»’s Hydraulic Link Adjustment values shall be determined for each hour of this Agreement, beginning October 1, 2028.

3.7.2 «Customer Name»’s Hydraulic Link Adjustment values shall be equal to «Customer Name»’s Chief Joseph simulated discharge for each hour, minus the Chief Joseph measured discharge for the same hour.

3.7.3 «Customer Name»’s Hydraulic Link Adjustment values shall be applied as a component of «Customer Name»’s simulated inflow to McNary after considering appropriate lag times and smoothing functions.

**4.** **BALANCE OF SYSTEM (BOS) MODULE**

The BOS Module calculates: (1) the BOS Base amounts, (2) the BOS Flex amounts, and (3) «Customer Name»’s BOS Deviation Return amounts, all as specified below.

4.1 **BOS Base Amount**

Consistent with the following provisions, the BOS Base amount shall be determined by Power Services and provided to «Customer Name».

4.1.1 The BOS Base amount, for each Scheduling Hour, shall be equal to the sum of: (1) BPA’s latest planned or scheduled generation amounts associated with the BOS Complex projects, (2) the amount of Elective Spill BPA implements on the BOS Complex projects, (3) the amount of CHWM Modeled Augmentation, and (4) the forecast amount of energy associated with Designated System Obligations. Energy associated with CHWM Modeled Augmentation included in the BOS Base amount shall be applied in equal amounts each hour of each Fiscal Year.

4.1.2 «Customer Name»’s hourly BOS Base schedules shall be equal to the hourly BOS Base amounts multiplied by «Customer Name»’s Slice Percentage.

4.1.3 BPA shall have the right to revise BOS Base amounts to reflect changes in items listed in section 4.1.1(1) – (4) affecting each Scheduling Hour up to 75 minutes prior to the Customer Inputs submission deadline in section 4.1 of Exhibit F.

4.2 **BOS Flex Amount**

Consistent with the following provisions, the BOS Flex amount shall be determined by BPA and made available to «Customer Name» on an as-available basis.

4.2.1 The BOS Module will: (1) determine if there is sufficient flexibility to reshape the hourly generation associated with the Lower Snake Complex that is included in the BOS Base amount, and if so, (2) provide as output the resulting amount by which the BOS Base amount can be increased or decreased on any given hour. The BOS Module will specify the BOS Flex amounts that are available for the current calendar day and the subsequent calendar day.

4.2.2 Such BOS Flex amounts shall reflect, in the judgment of BPA, the amount by which the BOS Base amount can reasonably be reshaped using the flexibility available in the Lower Snake Complex, taking into account the Operating Constraints and stream flow conditions.

4.2.3 «Customer Name» shall determine its planned hourly use of the BOS Flex and submit to BPA, positive and negative hourly BOS Flex schedules that sum to zero for each day. A positive hourly BOS Flex schedule shall reflect an increase relative to the BOS Base amount and a negative hourly BOS Flex schedule shall reflect a decrease relative to the BOS Base amount.

4.2.4 «Customer Name» shall update its hourly BOS Flex schedules to comply with revised BOS Flex amounts.

4.2.5 The BOS Flex available to «Customer Name» shall be equal to the BOS Flex amounts determined pursuant to this section 4.2 multiplied by «Customer Name»’s Slice Percentage.

4.2.6 If «Customer Name» determines it has a significant risk of not meeting its firm load service at any time, then «Customer Name» may request that BPA assess the ability to modify the established BOS Flex amounts within applicable Operating Constraints. If BPA, as time permits and in its sole discretion, alters such BOS Flex amounts, then such updated values shall apply to all Slice Customers. «Customer Name» acknowledges that such assessment by BPA may result in an increase, decrease or no change to any of the remaining hourly BOS Flex amounts.

4.2.7 BPA shall have the right to revise BOS Flex amounts to reflect changes in items listed in sections 4.2.1(1) and 4.2.1(2) and section 4.2.6 affecting each Scheduling Hour up to 75 minutes prior to Customer Inputs submission deadline in section 4.1 of Exhibit F.

4.3 **BOS Deviation Return Amounts**

The BOS Module will calculate and establish «Customer Name»’s BOS Deviation Return amounts as established in section 4.2.1 of Exhibit M.

4.4 **Total BOS Amounts**

«Customer Name»’s total BOS amount shall be equal to the sum the following components:

(1) the BOS Base schedule as established pursuant to section 4.1 of this exhibit;

(2) the BOS Flex schedule as established pursuant to section 4.2 of this exhibit; and

(3) the BOS Deviation Return amount described in section 4.3 of this exhibit.

**5.** **DEFAULT USER INTERFACE**

5.1 BPA shall maintain a Default User Interface (DUI) for «Customer Name» to access the POCSA. «Customer Name» may utilize the DUI as its primary interface for the POCSA or may use an alternate interface, provided that such alternate interface shall be reviewed and approved by BPA prior to usage.. Any alternative interface shall be compliant with BPA’s system standards and cyber security requirements as determined by BPA. «Customer Name» shall provide BPA all information, data, and documentation that BPA determines to be necessary for testing and validation of the alternative interface, including but not limited to cyber security requirements. BPA does not guarantee that an alternative interface will be compatible with BPA’s systems and requirements, nor does it guarantee that it will be approved for use by «Customer Name». If «Customer Name»’s primary interface is not the DUI, then «Customer Name» shall maintain back-up functionality through, and staff capability to operate, the DUI in the event «Customer Name»’s alternate interface is unavailable. The DUI shall include the functional capabilities listed below:

(1) Provide «Customer Name» access to the Simulator for submittal of Customer Inputs and to run Simulated Operating Scenarios.

(2) Provide «Customer Name» feedback and reports from the Simulator and BOS Module as set forth in sections 3.4 and 4.2.1 of this exhibit.

(3) Provide «Customer Name» input/output displays related to the Simulator and BOS Module.

5.2 **Customer Unable to Utilize DUI**

If, as of the POCSA Deployment Date, «Customer Name» is not functionally ready to access and utilize the DUI, then beginning on the POCSA Deployment Date and continuing until 30 calendar days after «Customer Name» provides BPA with written notice that it is functionally ready to utilize the DUI, then BPA shall use the POCSA to determine «Customer Name»’s hourly SOERsin accordance with the following procedures:

5.2.1 **BPA Actions - Customer Inputs**

(1) BPA shall set «Customer Name»’s Customer Inputs (generation requests) for Grand Coulee and Chief Joseph equal to Power Services’ planned Grand Coulee and Chief Joseph’s respective generation.

(2) BPA shall set «Customer Name»’s Customer Inputs (elevation requests) for the LCOL Complex projects such that those projects pass inflow on an hourly basis.

(3) BPA shall set «Customer Name»’s hourly BOS amount equal to «Customer Name»’s Slice Percentage multiplied by the BOS Base amount (no BOS Flex allowed).

(4) BPA shall communicate «Customer Name»’s SOERs to «Customer Name» via a mutually agreed upon delivery method as determined by the Parties.

5.2.2 BPA shall revise «Customer Name»’s Customer Inputs applying the same criteria in section 5.2.1 of this exhibit. BPA shall provide «Customer Name» its revised SOERs, as needed to reflect BPA’s latest estimated generation, inflow and BOS Base values no later than one hour prior to the Customer Input submission deadline in Section 4 of Exhibit F.

5.2.3 **Submission of Electronic Tags**

«Customer Name» shall submit electronic tags to Power Services on day ahead timeframe, pursuant to Exhibit F, which shall indicate energy amounts equal to «Customer Name»’s hourly SOERs established under this section 5.2

(1) If energy amounts indicated on «Customer Name»’s electronic tags are greater than its hourly SOERs, then «Customer Name» shall receive the electronic tag amounts and shall incur additional charges or penalty charges as established in the Wholesale Power Rate Schedules and GRSPs, including the Unauthorized Increase Charge, or its successor, for the energy that is in excess of the Slice Output Energy amount.

(2) If energy amounts indicated on «Customer Name»’s electronic tags are less than its hourly SOERs, then «Customer Name» shall receive the electronic tag amounts and shallforfeit the remaining Slice Output Energy amount.

5.2.4 **Delivery Limit Penalties**

Except as described in section 5.2.3, Delivery Limit penalties established in Exhibit M shall not be assessed for the first 90 days that the circumstances described in this section 5.2 are in effect.

**6. POCSA REPORTS**

6.1 As soon as practicable, but no later than 30 minutes past the end of each Scheduling Hour, the POCSA shall provide «Customer Name» a detailed automated report that specifies: (1) «Customer Name»’s hourly Storage Offset Adjustment (SOA) amounts as defined in section 2.2 of Exhibit M, and as specified in section 4 of Exhibit M, and (2) the after-the-fact Simulator Project data used to calculated hourly SOA amounts. The POCSA shall apply the SOA amounts to each Simulator Project 48 hours after the difference in streamflows occurred.

6.2 The POCSA shall provide «Customer Name» a report that specifies all changes to Simulator Parameters that have been made by BPA between a user specified start date/time and end date/time. The report shall include brief, concise explanatory statements coincidental with significant Simulator Parameter changes.

6.3 The POCSA shall provide «Customer Name» a report that specifies all Prudent Operating Decisions implemented by BPA in the Simulator, between a user-specified start date/time and end date/time. The report shall include the reason for imposing the Prudent Operating Decision and the manner in which BPA incorporated the Prudent Operating Decision into the Simulator Parameters.

**7. SOER FOR EACH SCHEDULING HOUR**

«Customer Name»’s for SOER in each Scheduling Hour shall be equal to the sum of the following components, rounded to a whole number:

(1) the sum of «Customer Name»’s final Simulated Output Energy Schedules established per section 3.3.7 of this exhibit for each of the Simulator Projects multiplied by «Customer Name»’s Slice Percentage;

(2) «Customer Name»’s total BOS amount, established pursuant to section 4.4 of this exhibit;

(3) «Customer Name»’s reduction penalty amount established per section 5.1.4 of Exhibit M, multiplied by -1; and

(4) «Customer Name»’s H/k correction return established per section 3.6.2 of this exhibit.

Any revision to «Customer Name»’s SOER shall conform to the requirements of section 3 of Exhibit F and the scheduling deadline in section 4.1 of Exhibit F.

8. POCSA TEST VERSIONS AND TRIAL PERIODS

8.1 POCSA and provide «Customer Name» with access toPOCSA

8.2 In this test version of the POCSA «Customer Name» shall have the ability to modify Simulator Parameters. The test version of the POCSA availability shall be no less than 90% uptime. The test version of the POCSA shall use production data from the most recent two-year period.

8.3 The selection of specific weeks for such trial periods will be coordinated through the SOF, but shall begin no earlier than April 1, 2027 and shall end no later than 14 days prior to the date when the POCSA is revised with the day-ahead functionality on October 1, 2028. Results and feedback of the trial periods will be reported to the SOF at which time any suggestions for improving the SCA, the Simulator, or the processes necessary to support and maintain the POCSA will be discussed and considered by the Parties.

9. REVISIONS

9.1 BPA may unilaterally revise the deadline for BPA to update Simulator Parameters in section 3.2.1 of this exhibit as necessary to comply with BPA’s obligations as stated in the Western Power Pool Western Resource Adequacy Program tariff, or its successor. BPA shall provide «Customer Name» notice of the revised deadline in section 3.2.1 at least 60 days prior to the effective date of such revision.

9.2 BPA may unilaterally revise Forecasted H/k, Corrected H/k, Bypass Spill, and Fish Spill in section 3.6.1 of this exhibit if such changes are approved by the SOF pursuant to section 5.12 of the body of this Agreement. BPA shall provide «Customer Name» notice of such revision at least 30 days prior to the effective date of such revision.

9.3 All other revisions to this Exhibit L shall be by mutual agreement of the Parties.