APPENDIX D

MODELED CONSTRAINTS FOR IDAHO POWER COMPANY'S PROPOSED OPERATION AND OPERATIONAL ALTERNATIVES

To support the evaluation of resource effects of alternative operating regimes, Idaho Power used a simulation computer model for hydropower systems, called CHEOPS.[146] CHEOPS evaluates physical and operational changes at multiple-development hydroelectric projects. It is designed to emphasize long-term simulations of project operations, and it emphasizes maintaining correct mass balances in reported flows and meeting all project-related operating constraints. This appendix presents the constraints used in the CHEOPS modeling of project operations for the Applicant's Proposed Operation (Section 2.2.2) and for the several alternative operating scenarios described in DEIS Section 2.3.2.

Following are the operating scenarios evaluated:

- Applicant's Proposed Operation
- Alternative Operating Scenarios
  - Scenario 1(a). Stabilized Hells Canyon Release, with instantaneous outflow from Hells Canyon dam equaling the average inflow to the Hells Canyon reservoir during the previous 24 hours.
  - Scenario 1(b). Stabilized Hells Canyon Release, with maximum ramping rate of 2 inches per hour (year-round).
  - Scenario 1(c). Stabilized Hells Canyon Release, with maximum ramping rate of 6 inches per hour (year-round).
  - Scenario 1(d). Stabilized Hells Canyon Release, with maximum ramping rate of 2 inches per hour (March 1 through May 31).
  - Scenario 1(e). Stabilized Hells Canyon Release, with maximum ramping rate of 6 inches per hour (March 1 through May 31).
  - Scenario 1(f). Stabilized Hells Canyon Release, with maximum ramping rate of 2 inches per hour March 1 through May 31 and 6 inches per hour for the rest of the year, plus a maximum total daily fluctuation of 2.0 feet year-round.
  - Scenario 2. Flow Augmentation with Stabilized Release.
  - Scenario 3. Navigation Target Flow.
  - Scenario 7. Stabilized Hells Canyon Release, with a seasonal maximum ramping rate of 4 inches per hour March 15 through June 15 and 1 foot per hour the remainder of the year. Ramp rate compliance was modeled at Johnson Bar.
  - Scenario 8. A 237-kaf release of flow augmentation water from Brownlee reservoir by refilling to elevation 2,077 feet msl by June 20, beginning augmentation on June 21, with target reservoir elevations set to 2,066 feet msl on July 15 and 2,059 feet msl on July 31, with no refill to occur before August 31.
  - Scenario 9. A combination of Scenarios 7 and 8.

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[146] The content of the appendix is based on Idaho Power's Responses to FERC Additional Information Request OP-1(a) Operational Scenarios, Power Economics, February 2005 (scenarios 1, 2 and 3) and Idaho Power's March 30, 2007 response to FERC's February 23, 2007, Additional Information Request (scenarios 7, 8, and 9).

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Table 1. Constraints for modeled proposed operations and Scenarios 1a and 1b for the Brownlee development.

	Constraints		
Brownlee Development	**Modeled Proposed Operations**	**Scenario 1a**	**Scenario 1b**
Maximum reservoir elevation	2,077 feet msl	2,077 feet msl	2,077 feet msl
Minimum reservoir elevation	1,976 feet msl	1,976 feet msl	1,976 feet msl
Flood-control Requirements			
Brownlee reservoir official target elevations specified for February 28, March 31, April 15, and April 30	Corps flood-control rule curve requirements[a]	Corps flood-control rule curve requirements[a]	Corps flood-control rule curve requirements[a]
Daily Reservoir-level Fluctuation[b]			
January 1 through May 20	3 feet	3 feet	3 feet
May 21 through June 21 for resident fish spawning	1 foot	1 foot	1 foot
June 22 through December 31	3 feet	3 feet	3 feet
Reservoir Target Elevation			
June 7	2,069 feet msl or higher[c]	2,069 feet msl or higher[c]	2,069 feet msl or higher[c]
June 8 through July 5	2,075 feet msl[d]	2,075 feet msl[d]	2,075 feet msl[d]
August 31[e]			
High water year	2,059 feet msl	2,059 feet msl	2,059 feet msl
Medium water year	2,069 feet msl	2,069 feet msl	2,069 feet msl
Low water year	2,072 feet msl	2,072 feet msl	2,072 feet msl
October 21[f]	2,040 feet msl or higher	2,040 feet msl or higher	2,040 feet msl or higher
December 11 through 31[g]	2,075 feet msl	2,075 feet msl	2,075 feet msl

[a] For modeling purposes, reservoir target elevations are calculated in the model using the Corps' 1998 modified rule curve procedure and are based on observed inflows (not monthly forecasts). Flood-control requirements are not modeled past the last April 30 target date.

[b] Dates specified are for modeling purposes only and may vary under actual operations.

[c] The elevation of 2,069 feet msl or higher was set as a target in the model for June 7 for resident fish spawning requirements.

[d] A full reservoir during this period helps Idaho Power meet peak summer load demands. The dates specified are for modeling purposes only and would vary as a function of Idaho Power's system needs and water conditions.

[e] This target was only specified in the model for this date as a means of modeling power needs of the system by drafting Brownlee reservoir. The specified target was also a function of water year type.

[f] Reservoir elevation for modeling purposes was calculated as a function of the specified fall Chinook flow for water year type for Hells Canyon Development discharge (see table 6). This calculation resulted in reservoir elevations typically 2,040 feet msl or higher, except under extreme high-water conditions for the model runs.

[g] In the late fall, the reservoir is operated to accommodate the fall Chinook program, and in early December, Idaho Power attempts to have a full reservoir, typically around 2,075 feet msl, to help meet peak winter load conditions. December 11 was specified for modeling purposes only and is a function of inflow and system or load needs during this period.

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Table 2. Constraints for Scenarios 1c, 1d, and 1e for the Brownlee development.

	Constraints		
Brownlee Development	**Scenario 1c**	**Scenario 1d**	**Scenario 1e**
Maximum reservoir elevation	2,077 feet msl	2,077 feet msl	2,077 feet msl
Minimum reservoir elevation	1,976 feet msl	1,976 feet msl	1,976 feet msl
Flood-control Requirements			
Brownlee reservoir official target elevations specified for February 28, March 31, April 15, and April 30	Corps flood-control rule curve requirements[a]	Corps flood-control rule curve requirements[a]	Corps flood-control rule curve requirements[a]
Daily Reservoir-level Fluctuation[b]			
January 1 through May 20	3 feet	3 feet	3 feet
May 21 through June 21 for resident fish spawning	1 foot	1 foot	1 foot
June 22 through December 31	3 feet	3 feet	3 feet
Reservoir Target Elevation			
June 7	2,069 feet msl or higher[c]	2,069 feet msl or higher[c]	2,069 feet msl or higher[c]
June 8 through July 5	2,075 feet msl[d]	2,075 feet msl[d]	2,075 feet msl[d]
August 31[e]			
High water year	2,059 feet msl	2,059 feet msl	2,059 feet msl
Medium water year	2,069 feet msl	2,069 feet msl	2,069 feet msl
Low water year	2,072 feet msl	2,072 feet msl	2,072 feet msl
October 21[f]	2,040 feet msl or higher	2,040 feet msl or higher	2,040 feet msl or higher
December 11 through 31[g]	2,075 feet msl	2,075 feet msl	2,075 feet msl

[a] For modeling purposes, reservoir target elevations are calculated in the model using the Corps' 1998 modified rule curve procedure and are based on observed inflows (not monthly forecasts). Flood-control requirements are not modeled past the last April 30 target date.

[b] Dates specified are for modeling purposes only and may vary under actual operations.

[c] The elevation of 2,069 feet msl or higher was set as a target in the model for June 7 for resident fish spawning requirements.

[d] A full reservoir during this period helps Idaho Power meet peak summer load demands. The dates specified are for modeling purposes only and would vary as a function of Idaho Power's system needs and water conditions.

[e] This target was only specified in the model for this date as a means of modeling power needs of the system by drafting Brownlee reservoir. The specified target was also a function of water year type.

[f] Reservoir elevation for modeling purposes was calculated as a function of the specified fall Chinook flow for water year type for Hells Canyon Development discharge (see table 6). This calculation resulted in reservoir elevations typically 2,040 feet msl or higher, except under extreme high-water conditions for the model runs.

[g] In the late fall, the reservoir is operated to accommodate the fall Chinook program, and in early December, Idaho Power attempts to have a full reservoir, typically around 2,075 feet msl, to help meet peak winter load conditions. December 11 was specified for modeling purposes only and is a function of inflow and system or load needs during this period.

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Table 3. Constraints for Scenarios 1f, 2, and 3 for the Brownlee development.

	Constraints		
Brownlee Development	**Scenario 1f**	**Scenario 2**	**Scenario 3**
Maximum reservoir elevation	2,077 feet msl	2,077 feet msl	2,077 feet msl
Minimum reservoir elevation	1,976 feet msl	1,976 feet msl	1,976 feet msl
Flood-control Requirements			
Brownlee reservoir official target elevations specified for February 28, March 31, April 15, and April 30	Corps flood-control rule curve requirements[a]	Corps flood-control rule curve requirements[a]	Corps flood-control rule curve requirements[a]
Daily Reservoir-level Fluctuation[b]			
January 1 through May 20	3 feet	3 feet	3 feet
May 21 through June 21 for resident fish spawning	1 foot	1 foot	1 foot
June 22 through December 31	3 feet	3 feet	3 feet
Reservoir Target Elevation			
June 7	2,069 feet msl or higher[c]	2,069 feet msl or higher[c]	2,069 feet msl or higher[c]
June 8 through July 5	2,075 feet msl[d]	NA	2,075 feet msl[d]
June 8 through June 20	NA	2,075 feet msl	NA
July 5	NA	2,069 feet msl	NA
July 31 through August 31	NA	2,049 feet msl	NA
August 31[e]			
High water year	2,059 feet msl	2,049 feet msl	2,059 feet msl
Medium water year	2,069 feet msl	2,049 feet msl	2,069 feet msl
Low water year	2,072 feet msl	2,049 feet msl	2,072 feet msl
October 21[f]	2,040 feet msl or higher	2,040 feet msl or higher	2,040 feet msl or higher
December 11 through 31[g]	2,075 feet msl	2,075 feet msl	2,075 feet msl

Note: NA – Not applicable

[a] For modeling purposes, reservoir target elevations are calculated in the model using the Corps' 1998 modified rule curve procedure and are based on observed inflows (not monthly forecasts). Flood-control requirements are not modeled past the last April 30 target date.

[b] Dates specified are for modeling purposes only and may vary under actual operations.

[c] The elevation of 2,069 feet msl or higher was set as a target in the model for June 7 for resident fish spawning requirements.

[d] A full reservoir during this period helps Idaho Power meet peak summer load demands. The dates specified are for modeling purposes only and would vary as a function of Idaho Power's system needs and water conditions.

[e] This target was only specified in the model for this date as a means of modeling power needs of the system by drafting Brownlee reservoir. The specified target was also a function of water year type.

[f] Reservoir elevation for modeling purposes was calculated as a function of the specified fall Chinook flow for water year type for Hells Canyon Development discharge (see table 6). This calculation resulted in reservoir elevations typically 2,040 feet msl or higher, except under extreme high-water conditions for the model runs.

[g] In the late fall, the reservoir is operated to accommodate the fall Chinook program, and in early December,

Idaho Power attempts to have a full reservoir, typically around 2,075 feet msl, to help meet peak winter load conditions. December 11 was specified for modeling purposes only and is a function of inflow and system or load needs during this period.

Table 4. Constraints for Scenarios 7, 8, and 9 for the Brownlee development.

	Constraints		
Brownlee Development	**Scenario 7**	**Scenario 8**	**Scenario 9**
Maximum reservoir elevation	2,077 feet msl	2,077 feet msl	2,077 feet msl
Minimum reservoir elevation	1,976 feet msl	1,976 feet msl	1,976 feet msl
Flood-control Requirements			
Brownlee reservoir official target elevations specified for February 28, March 31, April 15, and April 30	Corps flood-control rule curve requirements[a]	Corps flood-control rule curve requirements[a]	Corps flood-control rule curve requirements[a]
Daily Reservoir-level Fluctuation[b]			
January 1 through May 20	3 feet	3 feet	3 feet
May 21 through June 21 for resident fish spawning	1 foot	1 foot	1 foot
June 22 through December 31	3 feet	3 feet	3 feet
Reservoir Target Elevation			
June 7	2,069 feet msl or higher[c]	2,069 feet msl or higher[c]	2,069 feet msl or higher[c]
June 21	2,075 feet msl[d]	2,077 feet msl[d]	2,077 feet msl[d]
July 15	2,075 feet msl[d]	2,066 feet msl[e]	2,066 feet msl[e]
July 31	2,075 feet msl[d]	2,059 feet msl[e]	2,059 feet msl[e]
August 31[f]			
High water year	2,059 feet msl	2,059 feet msl	2,059 feet msl
Medium water year	2,069 feet msl	2,059 feet msl	2,059 feet msl
Low water year	2,072 feet msl	2,059 feet msl	2,059 feet msl
October 21[g]	2,040 feet msl or higher	2,040 feet msl or higher	2,040 feet msl or higher
December 11 through 31[h]	2,075 feet msl	2,075 feet msl	2,075 feet msl

[a] For modeling purposes, reservoir target elevations are calculated in the model using the Corps' 1998 modified rule curve procedure and are based on observed inflows (not monthly forecasts). Flood-control requirements are not modeled past the last April 30 target date.

[b] Dates specified are for modeling purposes only and may vary under actual operations.

[c] The elevation of 2,069 feet msl or higher was set as a target in the model for June 7 for resident fish spawning requirements.

[d] A full reservoir during this period helps Idaho Power meet peak summer load demands. The dates specified are for modeling purposes only and would vary as a function of Idaho Power's system needs and water conditions.

[e] Brownlee flow augmentation contribution of 237,000 acre-feet.

[f] This target was only specified in the model for this date as a means of modeling power needs of the system by drafting Brownlee reservoir. The specified target was also a function of water year type except for Scenarios 8 and 9.

[g] Reservoir elevation for modeling purposes was calculated as a function of the specified fall Chinook flow for water year type for Hells Canyon Development discharge. This calculation resulted in reservoir elevations typically 2,040 feet msl or higher, except under extreme high-water conditions for the model runs.

[h] In the late fall, the reservoir is operated to accommodate the fall Chinook program, and in early December, Idaho Power attempts to have a full reservoir, typically around 2,075 feet msl, to help meet peak winter load

conditions. December 11 was specified for modeling purposes only and is a function of inflow and system or load needs during this period.

Table 5. Constraints for modeled proposed operations and alternative scenarios for the Oxbow development.

	Constraints	
Oxbow Development	**Modeled Proposed Operations**	**Scenarios 1a, 1b, 1c, 1d, 1e, 1f, 2, 3, 7, 8, and 9**
Maximum reservoir elevation	1,805 feet msl	1,805 feet msl
Minimum reservoir elevation	1,800 feet msl	1,800 feet msl
Daily reservoir-level fluctuation (January 1 through December 31)[a]	5 feet	5 feet
Bypass flow (January 1 through December 31)	100 cfs	100 cfs

[a] The typical operating limit for modeling purposes was 5 feet.

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Table 6. Constraints for modeled proposed operations and Scenarios 1a and 1b for the Hells Canyon development.

	Constraints		
Hells Canyon Development	**Modeled Proposed Operations**	**Scenario 1a[a]**	**Scenario 1b**
Maximum reservoir elevation	1,688 feet msl	1,688 feet msl	1,688 feet msl
Minimum reservoir elevation	1,683 feet msl[b]	1,668 feet msl[c]	1,668 feet msl[c]
Daily reservoir-level fluctuation limit (January 1 through December 31)	5 feet	None	None
Ramp-rate Restriction[b]			
Ramp rate	1 foot per hour	None	2 inches per hour
Compliance ramp-rate curve[d]	Johnson Bar	Hells Canyon	Hells Canyon
Daily Limit Between Minimum and Maximum Flows			
December 12 through May 31	None	No load following	None
June 1 through September 30	10,000 cfs[e]	No load following	10,000 cfs[e]
October 1 through October 20	None	No load following	None
October 21 through December 11[f]	No load following	No load following	No load following
Minimum Instantaneous Flows			
December 12 through May 31[g]			
Low	8,500 cfs	8,500 cfs	8,500 cfs
Medium	10,500 cfs	10,500 cfs	10,500 cfs
High	12,000 cfs	12,000 cfs	12,000 cfs
June 1 through October 20			
Low	6,500 cfs[h]	6,500 cfs[h]	6,500 cfs[h]
Medium	6,500 cfs[h]	6,500 cfs[h]	6,500 cfs[h]
High	6,500 cfs[h]	6,500 cfs[h]	6,500 cfs[h]
October 21 through December 11[f]			
Low	9,000 cfs	9,000 cfs	9,000 cfs
Medium	11,500 cfs	11,500 cfs	11,500 cfs
High	13,000 cfs	13,000 cfs	13,000 cfs

[a] The model passed daily average flow below Hells Canyon dam in this scenario with no load following. Flood control and the fall Chinook program are also modeled in this scenario.

[b] The typical operating limit for modeling purposes was 5 feet.

[c] An extreme minimum was defined for modeling purposes such that the model was not constrained under these scenario constraints.

[d] Compliance was modeled at either the Johnson Bar gage, located approximately 17.6 miles downstream of Hells Canyon dam or at the Hells Canyon gage, located 0.6 mile downstream of Hells Canyon Dam.

[e] A limit of 10,000 cfs was modeled during this time frame to represent typical operations.

[f] For modeling purposes only, flows under the fall Chinook program began October 21 and ended December 11.

[g] Releases under the fall Chinook program are reduced in the model and assume that the most critical shallow redd is still protected under load-following conditions downstream of the Hells Canyon Complex. The

December 12 date was specified for modeling purposes only, since the actual date that fall Chinook spawning is completed can vary.

[h] Minimum flow modeled was 6,500 cfs or project inflow during this period to avoid drafting Brownlee reservoir.

Table 7. Constraints for Scenarios 1c, 1d, and 1e for the Hells Canyon development.

	Constraints		
Hells Canyon Development	**Scenario 1c**	**Scenario 1d**	**Scenario 1e**
Maximum reservoir elevation	1,688 feet msl	1,688 feet msl	1,688 feet msl
Minimum reservoir elevation	1,668 feet msl[a]	1,668 feet msl[a]	1,668 feet msl[a]
Daily reservoir-level fluctuation limit (January 1 through December 31)	None	None	None
Ramp-rate Restriction[b]			
Ramp rate	6 inches per hour	1 foot per hour (except 2 inches per hour from March 1–May 31)	1 foot per hour (except 6 inches per hour from March 1–May 31)
Compliance ramp-rate curve[c]	Hells Canyon	Hells Canyon	Hells Canyon
Daily Limit Between Minimum and Maximum Flows			
December 12 through May 31	None	None	None
June 1 through September 30	10,000 cfs[d]	10,000 cfs[d]	10,000 cfs[d]
October 1 through October 20	None	None	None
October 21 through December 11[e]	No load following	No load following	No load following
Minimum Instantaneous Flows			
December 12 through May 31[f]			
Low	8,500 cfs	8,500 cfs	8,500 cfs
Medium	10,500 cfs	10,500 cfs	10,500 cfs
High	12,000 cfs	12,000 cfs	12,000 cfs
June 1 through October 20			
Low	6,500 cfs[g]	6,500 cfs[g]	6,500 cfs[g]
Medium	6,500 cfs[g]	6,500 cfs[g]	6,500 cfs[g]
High	6,500 cfs[g]	6,500 cfs[g]	6,500 cfs[g]
October 21 through December 11[e]			
Low	9,000 cfs	9,000 cfs	9,000 cfs
Medium	11,500 cfs	11,500 cfs	11,500 cfs
High	13,000 cfs	13,000 cfs	13,000 cfs

[a] An extreme minimum was defined for modeling purposes such that the model was not constrained under these scenario constraints.

[b] The typical operating limit for modeling purposes was 5 feet.

[c] Compliance was modeled at either the Johnson Bar gage, located approximately 17.6 miles downstream of Hells Canyon dam or at the Hells Canyon gage, located 0.6 mile downstream of Hells Canyon Dam.

[d] A limit of 10,000 cfs was modeled during this time frame to represent typical operations.

[e] For modeling purposes only, flows under the fall Chinook program began October 21 and ended December 11.

[f] Releases under the fall Chinook program are reduced in the model and assume that the most critical shallow redd is still protected under load-following conditions downstream of the Hells Canyon Complex. The December 12 date was specified for modeling purposes only, since the actual date that fall Chinook spawning is

completed can vary.

[g] Minimum flow modeled was 6,500 cfs or project inflow during this period to avoid drafting Brownlee reservoir.

Table 8. Constraints for Scenarios 1f, 2, and 3 for the Hells Canyon development.

	Constraints		
Hells Canyon Development	**Scenario 1f**	**Scenario 2**	**Scenario 3**
Maximum reservoir elevation	1,688 feet msl	1,688 feet msl	1,688 feet msl
Minimum reservoir elevation	1,668 feet msl[a]	1,683 feet msl[b] (except 1,668 feet msl from March 1–May 31)[a]	1,683 feet msl[b]
Daily reservoir-level fluctuation limit (January 1 through December 31)	None	5 feet (except none from March 1–May 31)	5 feet
Ramp-rate Restriction[b]			
Ramp rate	6 inches per hour	1 foot per hour	1 foot per hour
	2 inches per hour (March 1–May 31)	2 inches per hour (March 1–May 31)	
Compliance ramp-rate curve[c]	Hells Canyon	Hells Canyon	Johnson Bar
Daily Limit Between Minimum and Maximum Flows			
December 12 through May 31	2 feet on gage	None	None
June 1 through September 30	2 feet on gage	10,000 cfs[d]	10,000 cfs[d]
October 1 through October 20	2 feet on gage	None	None
October 21 through December 11[e]	No load following	No load following	No load following
Minimum Instantaneous Flows			
December 12 through May 31[f]			
Low	8,500 cfs	8,500 cfs	8,500 cfs
Medium	10,500 cfs	10,500 cfs	10,500 cfs
High	12,000 cfs	12,000 cfs	12,000 cfs
June 1 through October 20			
Low	6,500 cfs[g]	6,500 cfs[g]	8,500 cfs[h]
Medium	6,500 cfs[g]	6,500 cfs[g]	8,500 cfs[h]
High	6,500 cfs[g]	6,500 cfs[g]	8,500 cfs[h]
October 21 through December 11[e]			
Low	9,000 cfs	9,000 cfs	9,000 cfs[i]
Medium	11,500 cfs	11,500 cfs	11,500 cfs
High	13,000 cfs	13,000 cfs	13,000 cfs

[a] An extreme minimum was defined for modeling purposes such that the model was not constrained under these scenario constraints.

[b] The typical operating limit for modeling purposes was 5 feet.

[c] Compliance was modeled at either the Johnson Bar gage, located approximately 17.6 miles downstream of Hells Canyon dam or at the Hells Canyon gage, located 0.6 mile downstream of Hells Canyon dam.

[d] A limit of 10,000 cfs was modeled during this time frame to represent typical operations.

[e] For modeling purposes only, flows under the fall Chinook program began October 21 and ended December 11.

[f] Releases under the fall Chinook program are reduced in the model and assume that the most critical shallow redd is still protected under load-following conditions downstream of the Hells Canyon Complex. The

December 12 date was specified for modeling purposes only, since the actual date that fall Chinook spawning is completed can vary.

[g] Minimum flow modeled was 6,500 cfs or project inflow during this period to avoid drafting Brownlee reservoir.

[h] The minimum instantaneous flow modeled was 8,500 cfs unless inflows to Brownlee reservoir dropped below 8,500 cfs. When this occurred, the modeled minimum instantaneous flow below the Hells Canyon development was calculated as the 3-day moving average of Brownlee reservoir inflow.

[i] The constant flows below the Hells Canyon development were not modified during the fall Chinook program to achieve 11,500 cfs downstream of the mouth of the Salmon River.

Table 9. Constraints for Scenarios 7, 8, and 9 for the Hells Canyon development.

	Constraints		
Hells Canyon Development	**Scenario 7**	**Scenario 8**	**Scenario 9**
Maximum reservoir elevation	1,688 feet msl	1,688 feet msl	1,688 feet msl
Minimum reservoir elevation	1,683 feet msl[a]	1,683 feet msl[a]	1,683 feet msl[a]
Daily reservoir-level fluctuation limit (January 1 through December 31)	5 feet	5 feet	5 feet
Ramp-rate Restriction[a]			
Ramp rate	4 inches per hour (March 15–June 15)	1 foot per hour	4 inches per year (March 15–June 15)
Compliance ramp-rate curve[b]	Johnson Bar	Johnson Bar	Johnson Bar
Daily Limit Between Minimum and Maximum Flows			
December 12 through May 31	None	None	None
June 1 through September 30	10,000 cfs[c]	10,000 cfs[c]	10,000 cfs[c]
October 1 through October 20	None	None	None
October 21 through December 11[d]	No load following	No load following	No load following
Minimum Instantaneous Flows			
December 12 through May 31[e]			
Low	8,500 cfs	8,500 cfs	8,500 cfs
Medium	10,500 cfs	10,500 cfs	10,500 cfs
High	12,000 cfs	12,000 cfs	12,000 cfs
June 1 through October 20			
Low	6,500 cfs[f]	6,500 cfs[f]	6,500 cfs[f]
Medium	6,500 cfs[f]	6,500 cfs[f]	6,500 cfs[f]
High	6,500 cfs[f]	6,500 cfs[f]	6,500 cfs[f]
October 21 through December 11[d]			
Low	9,000 cfs	9,000 cfs	9,000 cfs[i]
Medium	11,500 cfs	11,500 cfs	11,500 cfs
High	13,000 cfs	13,000 cfs	13,000 cfs

[a] The typical operating limit for modeling purposes was 5 feet.

[b] Compliance was modeled at either the Johnson Bar gage, located approximately 17.6 miles downstream of Hells Canyon dam.

[c] A limit of 10,000 cfs was modeled during this time frame to represent typical operations.

[d] For modeling purposes only, flows under the fall Chinook program began October 21 and ended December 11.

[e] Releases under the fall Chinook program are reduced in the model and assume that the most critical shallow redd is still protected under load-following conditions downstream of the Hells Canyon Complex. The December 12 date was specified for modeling purposes only, since the actual date that fall Chinook spawning is completed can vary.

[f] Minimum flow modeled was 6,500 cfs or project inflow during this period to avoid drafting Brownlee reservoir.

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