Non-Treaty Storage Agreement

Technical Report: Appendices A - L

Bonneville
POWER ADMINISTRATION

March 1990

APPENDIX J

BIOLOGICAL ASSESSMENT

APPENDIX J

Draft Biological Assessment

Background

Bonneville Power Administration (BPA) and British Columbia Hydro and Power Authority (BC Hydro) are negotiating and propose to enter into a Non-Treaty Storage Agreement (NTSA). The existing NTSA, which has been in effect since 1984, is a model for the proposed NTSA. The proposed NTSA would expand the amount of existing non-Treaty storage space available to BPA and BC Hydro from the current 2.0 million acre feet (MAF) to about 4.5 MAF; and would extend the agreement from 1993, when the existing agreement ends, to the year 2003.

The proposed NTSA will enhance generation of more marketable energy; increase the operating flexibility of the Columbia River Power System within existing guidelines; and help ensure an adequate, efficient, and economical power supply in the Pacific Northwest.

Because there will not be any construction or any particular required operation of resources, there will not be any direct environmental effects. By enabling changes in the operation of the Pacific Northwest power system, it is possible that additional non-Treaty storage could have indirect environmental effects. However, any changes in operation at existing Pacific Northwest hydroelectric and thermal generating facilities will be small and within existing operating limits and permit requirements.

Section 7 of the Endangered Species Act of 1973 (as amended) requires federal agencies to ensure that their actions do not jeopardize endangered or threatened species or their critical habitats. In compliance with Section 7, BPA requested from the U.S. Fish and Wildlife Service (USFWS) a list of endangered and threatened species that may be present in the areas of the generating facilities which could be affected by the proposed Non-Treaty Storage Agreement. This information was provided by the USFWS Field Offices in Idaho, Oregon, Montana/Wyoming, and Washington and is presented in Tables 1 and 2 along with the location and expected impacts. Table 1 includes listed and proposed endangered and threatened species; Table 2 includes candidate species.

Discussion

The proposed NTSA could affect the operation of hydroelectric and thermal generating facilities in the Pacific Northwest. This section identifies the impacts that could potentially occur from changes in operation at the various hydroelectric projects, coal plants, and combustion turbines. There will be no increase in human activity or noise levels which would disturb endangered and threatened species or degradation of habitat at any of the facilities as a result of the proposed NTSA. Facilities for which the USFWS indicated there were no endangered and threatened species were not included in this Assessment.

Hydroelectric Projects. There are two basic types of hydroelectric projects in the Pacific Northwest: run-of-river and storage. Run-of-river projects have little storage capability and cannot shape flows on a long-term basis, i.e. for more than a week. Run-of-river projects are typically operated throughout their operating range on a daily or weekly basis. Run-of-river projects included in this assessment are Chief Joseph, Wells, Rocky Reach, Rock Island, Wanapum, Priest Rapids, McNary, John Day, The Dalles, and Bonneville. Because the proposed NTSA will not affect operation of run-of-river projects, there will be no impacts on endangered or threatened species from these projects.

Hydroelectric storage reservoirs operate on an annual drawdown/refill cycle to maintain a balance among multiple uses (such as flood control, navigation, power generation, irrigation, recreation, and fisheries). Reservoirs are also operated on a daily and hourly basis to meet short-term requirements. The storage dams addressed in this assessment are Libby, Grand Coulee, and Hungry Horse. (Albeni Falls, the other Federal storage reservoir in the Columbia Basin, has a fixed operating schedule. The proposed NTSA will not cause any changes in operation; therefore there will be no effect on any endangered or threatened species.)

Changes in operation at storage projects which could impact resident fish populations can also impact endangered and threatened species that use those fish as a primary food source. Lowered elevations reduce the productive shallow areas near the shoreline, which could result in reduced habitat (particularly spawning habitat) for resident fish and their food organisms. Reservoir fluctuations can also change water temperature or expose nests, killing the eggs.

Reservoir water level fluctuations can also affect wildlife and vegetation, both directly and indirectly, through the timing, duration, and amount of releases from the reservoir. The most likely potential effect on wildlife is through impacts on wildlife habitat. Any effect on its prey or browse species or foraging areas will have a corresponding effect on an endangered or threatened wildlife species. This effect would be particularly important if vegetation was damaged at critical times of the year, such as when it was needed for winter food or for shelter or nesting. Erosion of islands also affects wildlife by decreasing habitat available for nesting birds and deer fawning. It may also decrease the amount of shoreline available for reptiles laying eggs. Land bridges may be formed during low water periods, allowing predators easy access to habitat that would otherwise be isolated - a particular concern during nesting and fawning. Changes in hydro operations could also affect endangered and threatened plant species along shorelines, on islands, and in the drawdown zone.

System operating and planning requirements are unchanged as a result of the proposed NTSA. Therefore changes in hydroelectric facility operations which could affect vegetation and wildlife are not expected to occur. A review of potential reservoir elevation changes indicates that fluctuations in reservoir elevations are minimal and within normal operating ranges. Therefore, there will be no impacts to any endangered or threatened species.

Combustion Turbines. The primary concerns associated with combustion turbines are air quality degradation from increased emissions and oil spills. The only combustion turbine expected to be affected by the proposed NTSA is the Beaver facility. The change is slight, especially when compared to the plant capacity. A field study conducted by Portland General Electric (the facility owner) showed that the ambient air concentrations of nitrogen oxides and sulfur dioxides from the Beaver combustion turbine facility were far below the air quality regulatory standards. Therefore, the slight projected generation change at the Beaver facility will not cause a degradation in air quality. The combustion turbine will continue to operate within regulatory guidelines and environmental permit requirements, so there is little likelihood of an oil spill. No impacts to endangered and threatened species or their habitat are expected.

Coal-Fired Plants. For existing coal-fired plants, impacts can occur from air pollution, increased water withdrawals for cooling, or increased return-water temperature. Water quality impacts are well-regulated and, therefore, are not likely to be affected. The proposed NTSA is projected to result in only small differences (universally less than 8 per cent and typically much less) in annual coal plant generation for any one plant in any one year when compared to the annual generating capability of the plant. A method for projecting changes in ambient air quality from changes in annual average generation was developed for BPA's Intertie Development and Use Environmental Impact Statement (IDU EIS).

The analysis in the IDU EIS showed, in all cases, very small or negligible effects on air quality in the areas affected by the coal-fired power plants supplying the Pacific Northwest. These air quality changes were determined to be insignificant. For all plants except Boardman, larger differences in generation were projected in the analysis for the IDU EIS than for the proposed NTSA. Therefore, the air quality impacts of the proposed NTSA with respect to coal-fired plants other than Boardman are very small or negligible. For Boardman, the largest difference in annual average ambient air quality that is projected from the proposed NTSA is negligible when compared with Prevention of Significant Deterioration criteria or ambient air quality standards. Air quality impacts of the Corette plant were not quantitatively analyzed. However, the change in generation is very small (at most 1 aMW) and considering the small effects shown by the air quality analysis of the other plants, are not significant.

The impact of the proposed NTSA on both ground and surface waters is very small. A water consumption analysis shows the maximum change in surface or ground water use by any plant relative to a very conservatively estimated minimum annual flow in the source river or aquifer recharge to be less than approximately 3 percent. Water withdrawals for cooling at the Jim Bridger coal plant are of particular concern due to the downstream presence in the Green and Colorado Rivers of the Colorado squawfish and the humpback chub, both listed species. Potential changes in water withdrawals are so slight as to be considered unmeasurable (less than 1 percent). In addition, operations at all the coal plants are governed by environmental and other permits and regulations. Any changes in operation due to the proposed NTSA will be consistent with these existing requirements.

Projected air quality changes are so small that any effects on vegetation or wildlife are very unlikely. The projected changes in water usage were so slight as to be considered unmeasurable and insignificant. Therefore, there will be no impacts on any endangered or threatened species or their habitat.

Conclusion

It is not expected that any of the listed, proposed, or candidate species will be impacted by the proposed Non-Treaty Storage Agreement. There is no new construction. or any particular required operation of resources. There will not be any increase in human activity or noise levels at any of the facilities; there will not be any habitat degradation. The proposed NTSA will not affect the operation of run-of-river projects. Changes in hydroelectric storage reservoir operations are small, and within normal operating ranges. Combustion turbines will continue to operate within regulatory guidelines and environmental permit requirements, with insignificant changes in air quality and little likelihood of oil spills. Existing coal-fired plants will continue to operate within design limits. Changes in air quality are expected to be negligible. The projected changes in water usage are so slight as to be considered unmeasurable and insignificant. Therefore, based on this Biological Assessment, BPA concludes the proposed Non-Treaty Storage Agreement is not likely to adversely affect any Federally-listed endangered or threatened species.

TABLE J-1

Listed and Proposed Endangered and Threatened Species that may occur in areas affected by the NTSA.

LISTED SPECIES:	FACILITIES: H = Hydro facilities T = Thermal facilities	EXPECTED IMPACTS:
	MAMMALS	
Black-footed ferret (*Mustela nigripes*)	H -- None	None
	T -- Colstrip 1-4, Corette, and Jim Bridger 1-4	None
Columbian white tailed deer (*Odocoileus virginianus leucurus*)	H -- None	None
	T -- Beaver	
Gray wolf (*Canis lupus*)	H -- Libby and Hungry Horse	None
	T -- None	None
Grizzly bear (*Ursus arctos horribilis*)	H -- Libby and Hungry Horse	None
	T -- None	None
	BIRDS	
Bald eagle (*Haliaeetus leucocephalus*)	H -- Libby, Hungry Horse, Bonneville, The Dalles, John Day, McNary, Priest Rapids, Wanapum, Rock Island, Rocky Reach, Wells, Chief Joseph, Grand Coulee, and Albeni Falls	None
	T -- Boardman, Centralia, Colstrip 1-4, Corette, and Jim Bridger 1-4 coal plants; Beaver Bethel, South Whidbey, Fredrickson 1-2, Fredonia 1-2, Northeast 1-2, and Whitehorn combustion turbines	None
Peregrine falcon (*Falcon peregrinus*)	H -- Libby, Hungry Horse, Bonneville, The Dalles, John Day, McNary, Priest Rapids, Wanapum, Rock Island, Rocky Reach, Wells, Chief Joseph, Grand Coulee	None
	T -- Boardman, Colstrip 1-4 Corette, and Jim Bridger 1-4 coal plants; South Whidbey and Whitehorn 1-3 combustion turbines	None

TABLE J-1 (Continued)

LISTED SPECIES: (Cont.)	FACILITIES: H = Hydro facilities T = Thermal facilities	EXPECTED IMPACTS:
	FISHES	
Colorado squawfish (Ptychocheilus lucius)	H -- None T -- Jim Bridger 1-4	None None
Humpback chub (Gila cypha)	H -- None T -- Jim Bridger 1-4	None None
	PLANTS	
Bradshaw's lomatium (Lomatium bradshawii)	H -- None T -- Bethel	None None

PROPOSED SPECIES:	FACILITIES: H = Hydro facilities T = Thermal facilities	EXPECTED IMPACTS:
None		

TABLE J-2

Candidate Endangered and Threatened Species that may occur in areas affected by the NTSA.

CANDIDATE SPECIES:	FACILITIES: H = Hydro facilities T = Thermal facilities	EXPECTED IMPACTS:
	MAMMALS	
White-footed vole (*Arborimus albipes*)	H -- None T -- Beaver	None None
	BIRDS	
Ferruginous hawk (*Buteo regalis*)	H -- McNary T -- None	None None
Long-billed curlew (*Numenius americanus*)	H -- McNary T -- None	None None
	AMPHIBIANS AND REPTILES	
Northwestern pond turtle (*Clemmys marmorata marmorata*)	H -- None T -- Bethel	None None
	FISHES	
Oregon chub (*Oregonichthys (=Hybopsis) crameri*)	H -- None T -- Bethel	None None
	INVERTEBRATES	
Columbia River tiger beetle (*Cicindela columbica*)*/	H -- Lower Columbia River T -- None	None None
Giant Columbia River limpet (*Fisherola nuttalli*)	H -- Hanford Reach T -- None	None None
Great Columbia River spire snail (*Lithoglyphus columbianus*)	H -- Hanford Reach T -- None	None None

TABLE J-2 (Continued)

CANDIDATE SPECIES: (Cont.)	FACILITIES: H = Hydro facilities T = Thermal facilities	EXPECTED IMPACTS:
	PLANTS	
Columbia cress (Rorippa columbiae)	H -- Lower Columbia River T -- None	None None
Columbia milk vetch (Astragalus columbianus)	H -- Priest Rapids T -- None	None None
Douglas' onion (Allium douglasii var. constrictum)	H -- Grand Coulee T -- None	None None
Hoover's desert-parsley (Lomatium tuberosum)	H -- Wanapum, Priest Rapids T -- None	None
Howellia (Howellia aquatilis)	H -- Lower Columbia River T -- None	None None
Pauper milk-vetch (Astragalus misellus var. pauper)	H -- Rock Island T -- None	None
Smooth desert-parsley (Lomatium laevigatum)	H -- John Day T -- None	None None
Sticky phacelia (Phacelia lenta)	H -- Rock Island T -- None	None
Thompson's clover (Trifolium thompsonii)	H -- Rocky Reach T -- None	None None
White-top aster (Aster curtis)	H -- None T -- Frederickson 1-2	None None

*/ Possibly extinct.

(VS6-4172W)

APPENDIX K

THERMAL RESOURCE OPERATION

APPENDIX K

Part 1

List of Thermal Generating Resources in the PNW

APPENDIX K

Part 1

List of Thermal Generating Resources in the PNW

THERMAL GENERATING RESOURCES IN THE PACIFIC NORTHWEST
ADDRESSED IN THE SAM ANALYSIS

Plant	Location	Net Capability (MW)
Nuclear		
Trojan	Rainier, OR	1,080
WPPSS No. 2	Hanford, WA	1,100
Coal		
Colstrip No. 1	Colstrip, MT	330
No. 2	Colstrip, MT	330
No. 3	Colstrip, MT	700
No. 4	Colstrip, MT	700
Corette	Billings, MT	172.8 1/
Jim Bridger No. 1	Rock Springs, WY	500
No. 2	Rock Springs, WY	500
No. 3	Rock Springs, WY	500
No. 4	Rock Springs, WY	500
Centralia No. 1	Centralia, WA	640
No. 2	Centralia, WA	640
Boardman	Boardman, OR	530
Valmy No. 1 & 2	Valmy NV	522
		Base Load Capacity
Combustion Turbines		
Beaver	Clatskanie, OR	534 2/
Bethel	Salem, OR	58
Frederickson 1 & 2	Spanaway, WA	81
Fredonia 1 & 2	Carnation, WA	114
Whitehorn 1, 2, & 3	Ferndale, WA	145

1/ Capacity.
2/ Maximum capacity in combined cycle mode.

Sources: Western Systems Coordinating Council, "Summary of Estimated Loads and Resources" issued April 1986.
Pacific Northwes Utilities Conference Committee, "Thermal Resources Data Base", 1987 update.
BPA, "Electric Power Plants in the Pacific Northwest and Adjacent Areas", July 1, 1986.

(VS6-3422W)

APPENDIX K

Part 2

Annual Coal Generation by Plant - Base Case Analyses

COMPARISON OF ANNUAL COAL GENERATION BY PLANT
BASE CASE
(AVG ANNUAL MW)

YEAR	CASE	VALMY	COLSTP	CORETTE	BRDMAN	CENTR	BRIDGER	GENCOAL	TOTAL
1989	No Action	20.5	966.5	18.9	28.6	306.9	959.1	0.0	2300.5
Change Resulting from Proposal									
	Opportunity	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Firm	7.1	1.4	-0.2	11.4	44.7	-14.0	0.0	50.4
1990	No Action	25.4	966.4	20.9	37.9	445.7	1017.7	0.0	2514.0
Change Resulting from Proposal									
	Opportunity	-6.3	2.7	0.4	-10.9	-21.7	1.6	0.0	-34.2
	Firm	8.6	3.2	0.1	8.0	2.2	-19.3	0.0	2.8
1991	No Action	30.5	975.4	22.3	53.7	626.8	1043.4	0.0	2752.1
Change Resulting from Proposal									
	Opportunity	-3.7	5.4	0.7	-5.9	-1.9	34.5	0.0	29.1
	Firm	9.7	5.4	0.3	16.2	5.6	-0.4	0.0	36.8
1992	No Action	31.1	995.0	23.2	59.7	637.6	1058.9	0.0	2805.5
Change Resulting from Proposal									
	Opportunity	-5.2	12.2	0.3	-9.5	3.2	15.0	0.0	16.0
	Firm	9.1	1.1	0.1	22.1	10.5	-1.3	0.0	41.6
1993	No Action	42.7	1035.2	24.1	79.1	755.0	1176.0	0.0	3112.1
Change Resulting from Proposal									
	Opportunity	-5.1	9.7	0.3	-14.4	5.9	8.8	0.0	5.2
	Firm	13.1	-3.1	0.0	29.9	7.1	2.1	0.0	49.1
1994	No Action	87.7	1038.9	25.9	145.8	827.0	1238.8	0.0	3364.1
Change Resulting from Proposal									
	Opportunity	-11.2	18.0	0.6	-40.0	20.2	24.5	0.0	12.1
	Firm	0.2	6.1	0.3	-3.9	6.1	13.5	0.0	22.3
1995	No Action	117.5	1044.1	25.9	148.0	842.3	1194.1	0.0	3371.9
Change Resulting from Proposal									
	Opportunity	1.5	12.6	0.6	-21.2	42.9	30.2	0.0	66.6
	Firm	3.9	5.0	0.4	2.8	31.0	21.7	0.0	64.8
1996	No Action	127.7	1015.5	25.5	171.8	802.5	1178.3	0.0	3321.3
Change Resulting from Proposal									
	Opportunity	4.3	21.1	0.8	-10.2	35.9	33.6	0.0	85.5
	Firm	5.4	9.9	0.5	-3.4	30.4	22.8	0.0	65.6
1997	No Action	122.0	1093.6	31.4	197.4	835.8	1212.9	0.0	3493.1
Change Resulting from Proposal									
	Opportunity	6.1	16.9	1.0	4.8	42.8	37.3	0.0	108.9
	Firm	7.4	10.4	0.6	1.4	29.4	22.4	0.0	71.6
1998	No Action	132.5	1057.1	32.7	221.7	822.5	1172.2	0.0	3438.7
Change Resulting from Proposal									
	Opportunity	5.8	16.3	0.7	8.3	25.1	22.1	0.0	78.3
	Firm	5.2	9.5	0.4	9.8	18.9	17.4	0.0	61.2

1999	No Action	137.0	1102.1	32.4	241.2	847.5	1123.5	0.0	3483.7
Change Resulting from Proposal									
	Opportunity	7.8	13.4	0.5	10.1	24.1	17.1	0.0	73.0
	Firm	6.8	12.7	0.4	10.6	16.8	15.6	0.0	62.9
2000	No Action	138.7	1071.1	32.7	271.1	824.8	1135.0	0.0	3473.4
Change Resulting from Proposal									
	Opportunity	7.0	10.2	0.6	10.6	21.6	26.8	0.0	76.8
	Firm	6.0	8.6	0.6	11.1	20.4	23.4	0.0	70.1
2001	No Action	143.5	1112.8	32.0	290.5	871.7	1183.8	0.0	3634.3
Change Resulting from Proposal									
	Opportunity	7.8	10.7	0.5	7.8	18.0	20.4	0.0	65.2
	Firm	6.2	10.7	0.4	10.3	11.9	17.0	0.0	56.5
2002	No Action	146.0	1080.6	31.4	300.8	866.3	1152.9	0.0	3578.0
Change Resulting from Proposal									
	Opportunity	6.1	9.7	0.4	7.9	3.1	16.8	0.0	44.0
	Firm	4.3	8.4	0.3	10.2	5.7	14.3	0.0	43.2
2003	No Action	142.1	1100.1	32.1	275.3	871.0	1099.6	0.0	3520.2
Change Resulting from Proposal									
	Opportunity	7.4	11.4	0.6	15.5	26.0	21.7	0.0	82.6
	Firm	4.2	9.8	0.6	14.0	20.7	18.4	0.0	67.7
2004	No Action	149.7	1102.5	31.6	281.1	834.9	1129.6	0.0	3529.4
Change Resulting from Proposal									
	Opportunity	7.0	12.3	0.8	16.1	23.4	21.7	0.0	81.3
	Firm	5.5	9.5	0.6	14.2	17.2	18.6	0.0	65.6
2005	No Action	153.4	1101.5	32.3	289.5	846.5	1094.0	0.0	3517.2
Change Resulting from Proposal									
	Opportunity	6.2	13.0	0.8	12.1	17.0	20.1	0.0	69.2
	Firm	3.4	8.4	0.6	11.3	14.7	16.7	0.0	55.1
2006	No Action	155.0	1102.9	32.3	294.4	853.0	1057.7	224.9	3720.2
Change Resulting from Proposal									
	Opportunity	5.4	11.3	0.5	12.1	17.2	17.7	6.5	70.7
	Firm	4.0	11.3	0.5	10.0	12.9	21.3	4.5	64.5
2007	No Action	148.5	1123.9	33.0	318.2	869.4	1144.5	334.8	3972.3
Change Resulting from Proposal									
	Opportunity	6.0	12.3	0.5	11.7	9.2	15.7	10.6	66.0
	Firm	4.7	11.7	0.4	9.9	10.1	12.6	7.8	57.2
2008	No Action	154.1	1127.2	32.9	314.2	867.2	1129.3	524.2	4149.1
Change Resulting from Proposal									
	Opportunity	4.4	8.8	0.4	10.8	15.0	15.5	12.9	67.8
	Firm	4.2	12.9	0.5	10.8	11.9	15.0	10.4	65.7
AVERAGE	No Action	110.3	1060.6	28.7	201.0	772.7	1125.1	54.2	3352.6
Average Change Resulting from Proposal									
	Opportunity	2.6	11.4	0.6	0.8	16.4	20.1	1.5	53.2
	Firm	5.9	7.6	0.4	10.3	16.4	11.9	1.1	53.7