3.3 Water Resources (Surface Water and Groundwater Quantity and Quality)

3.3.1 Affected Environment

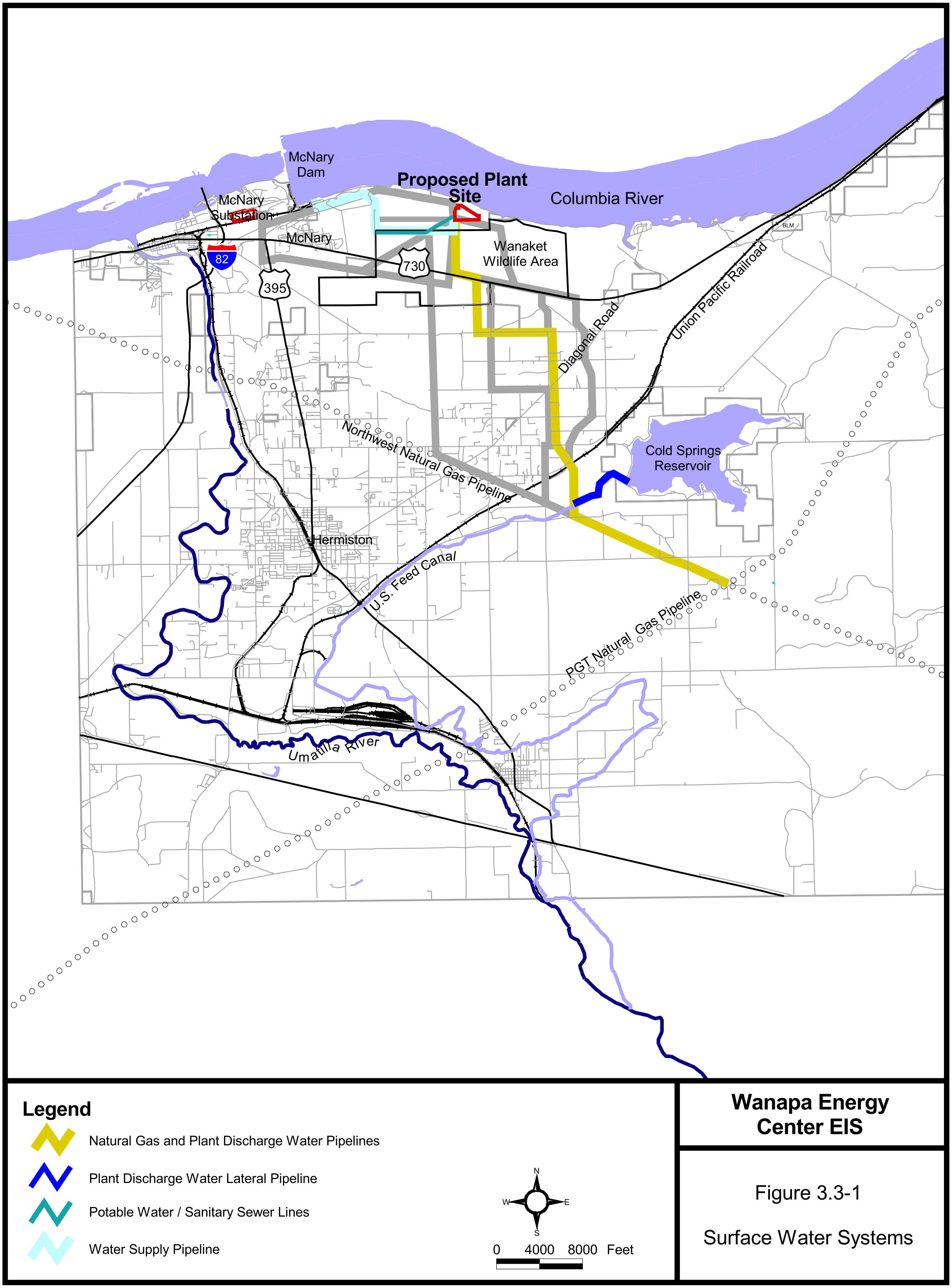
3.3.1.1 Surface Water

Regional Hydrology

The proposed generating plant site lies directly adjacent to the south bank of the Columbia River, the region's dominant surface water feature. The project site is located on a bluff overlooking the Columbia River approximately 2 miles east of McNary Dam, which is operated by the USACE for hydroelectric power. The Umatilla River is located approximately 4 miles west of the plant site and flows into the Columbia River at the City of Umatilla. The plant site is located within a small closed subbasin that includes the Wanaket Wildlife Management Area immediately south and east. The subbasin is adjacent to the Columbia-Umatilla plateau hydrologic subbasin of the Umatilla River, which is to the south and west. **Figure 3.3-1** illustrates the surface hydrologic system that includes the Columbia and Umatilla rivers.

The Columbia River discharges an average of approximately 191,000 cfs at McNary Dam which is located 2 miles to the west of the proposed plant site. Flow in the Columbia River and discharge at the dam vary seasonally and year-to-year. High flows usually occur from April to June and range from 350,000 cfs to 600,000 cfs. Low flows occur from August to November and range from 65,000 cfs to 85,000 cfs.

Cold Springs Reservoir is located approximately six miles southeast of the proposed plant site and six miles northeast of Hermiston, Oregon, off State Road 207. This reservoir is operated by the Hermiston Irrigation District (HID) and is part of the Reclamation's Umatilla Reclamation Project. The original Umatilla Reclamation Project was initiated by the Reclamation in 1905 to supply full or supplemental irrigation water to approximately 34,000 acres of agricultural land in north central Oregon. The East Division of the Umatilla Reclamation Project is the HID and consists of Cold Springs Dam and Reservoir (constructed in 1908), Feed Canal Diversion Dam and Canal and Maxwell Diversion Dam and Canal. The Feed Canal Diversion Dam is located on the Umatilla River, approximately 1.5 miles southeast of Echo, Oregon. The dam raises the water level in the riverbed to provide diversion into the 25-mile-long Feed Canal (maximum operational capability of 220 cfs per second). The Feed Canal conveys river water to the Cold Springs Reservoir.



Wanapa Energy Center EIS

Figure 3.3-1

Surface Water Systems

11/11/04

Diversion continues throughout the winter and spring months until June when diversion and flow in the canal are ended. Water is released from the reservoir for irrigation use throughout the summer and early autumn months. The reservoir has a total active capacity of 44,600 acre-feet, a normal storage capacity of 38,000 acre-feet for irrigation, 1,530 acres of water surface, and 12 miles of shoreline. During the summer and fall months, water is discharged for irrigation use and flows through canals to agricultural areas. Irrigation drain water is collected in drain canals and ultimately returns to the Umatilla River near Hermiston.

Activities were initiated in the mid-1980s under the Umatilla Basin Project to restore instream flows in the Umatilla River for anadromous fish but maintain irrigation water for continued use. These activities included channel modifications, construction of fish ladders, fish traps and fish screens and construction of water exchange facilities to deliver irrigation replacement water from the Columbia River. The Columbia River Pumping Plant was built on the Columbia River just downstream of the Sand Station Recreation Area and the Columbia-Cold Springs Canal was constructed to convey water from Lake Wallula, which is created by McNary Dam, to Cold Springs Reservoir.

Local Hydrology

The proposed power plant site is currently undeveloped and has no defined natural drainage channels or subbasin outlets. The site is located on a bluff overlooking the Columbia River with an approximate height of 160 feet above normal river level. The area is considered semi-arid, receiving 8 to 10 inches of rainfall annually with most precipitation occurring between October and April. The site is relatively flat with thin but permeable soils – normal precipitation would percolate into the ground or evaporate. Excessive volumes of run-off would probably enter the Wanaket Wildlife Management Area and accumulate in wetland ponds.

Surface Water Quality

Oregon DEQ's 2002 303(d) list identifies Oregon waterbodies that are impaired and not meeting state water quality standards. The section of the Columbia River above McNary Dam is on the 2002 303(d) list for exceeding temperature standards in the summer – it is not listed for any other parameter. Cold Springs Reservoir does not appear on the Oregon DEQ's 2002 303(d) list. Several sections of the Umatilla River appear on the 2002 303(d) list. The impairment parameters listed are dissolved oxygen, iron, and manganese.

Samples from the Columbia River were collected at the Port of Umatilla's intake in January and February 2002 and June 2003 and analyzed for critical parameters. **Table 3.3-1** presents this data and applicable Oregon water quality standards. Samples of Cold Springs Reservoir were collected in August 2003 ***and May 2004*** *and* analyzed. Data associated with water quality standards are presented in **Table 3.3-2**. It is assumed that water in Cold Springs Reservoir is a combination of Columbia River water, Umatilla River water, and surface run-off.

Surface Water Management

Flows in all major rivers, reservoirs and other drainages are extensively managed. Most surface water in the Umatilla Basin is appropriated for agricultural use. The Columbia River is utilized for a variety of beneficial uses including hydropower, irrigation, recreation, water supply, navigation and fish and wildlife use. Oregon and Washington have a moratorium currently in place on granting new water rights, except under certain conditions.

The Port of Umatilla diverts water from the Columbia River into the regional water supply system under an existing municipal water use permit from the State of Oregon (Permit No. 49497, 1979). This permit is currently under an extension application, which would extend the permit date. The Port of Umatilla's raw water system serves the City of Hermiston and industrial users in northwestern Umatilla County. Committed uses (prior to this proposed project) represent a total of 23.4 cfs from a total water right of 155 cfs. The Port's intake system is located at the Port of Umatilla Dock (RM 293 in the Columbia River), upstream of the boat launch ramp above McNary Dam. The intake was built in 1995 and consists of four intake bays, three of which currently house pumps and discharge piping. Intake bays are screened (0.125 mesh) and are designed for 0.4 cfs approach velocities. Actual withdrawal rates vary, depending on seasonal and operational water demand.

3.3.1.2 Groundwater

The proposed project area is underlain by Columbia River basalt with a confined "deep" aquifer. Groundwater flow is indicated to be generally from south to north, toward the Columbia River. Other areas of central Oregon, to the west and south, have been designated "critical groundwater areas" due to extensive withdrawals and subsequent impacts to groundwater availability and quality. Many aquifers have been extensively used for irrigation which, due to slow recharge, has

Table 3.3-1
Water Quality Sampling Results for the Columbia River
(Winter and Spring) and Comparisons with Water Quality Standards

Analytes	Units	Average of Detected Analytes Winter 2001-2002	Average of Detected Analytes Spring 2003	Average of Detected Analytes Winter and Spring	Lowest Applicable Aquatic Life Water Quality Standard
Total Recoverable Aluminum - Al	ug/L	131	300	215	
Dissolved Aluminum - Al	ug/L	NA	9.3	9.3	
Total Recoverable Antimony - Sb	ug/L	0.144	0.143	0.143	
Dissolved Antimony - Sb	ug/L	NA	0.136	0.136	1,600 [1]
Total Recoverable Arsenic - As	ug/L	1.09	0.95	1.02	
Dissolved Arsenic - As	ug/L	NA	0.78	0.78	
Total Recoverable Barium - Ba	ug/L	27.3	20.0	23.7	
Dissolved Barium - Ba	ug/L	NA	17.5	17.5	
Total Recoverable Beryllium - Be	ug/L	0.007	0.023	0.015	
Dissolved Beryllium - Be	ug/L	NA	<0.020	<0.020	5.3 [1]
Total Recoverable Boron - B	ug/L	13.60	6.18	9.89	
Dissolved Boron - B	ug/L	NA	5.9	5.9	
Total Recoverable Cadmium - Cd	ug/L	0.014	0.019	0.017	
Dissolved Cadmium - Cd	ug/L	NA	0.008	0.008	1.1 [1]
Total Recoverable Chromium - Cr	ug/L	0.26	0.19	0.23	
Dissolved Chromium - Cr	ug/L	NA	<0.07	<0.07	
Total Recoverable Cobalt - Co	ug/L	0.10	0.17	0.14	
Dissolved Cobalt - Co	ug/L	NA	<0.05	<0.05	
Total Recoverable Copper - Cu	ug/L	1.28	1.60	1.44	
Dissolved Copper - Cu	ug/L	NA	1.04	1.04	12 [1]
Total Recoverable Iron - Fe	ug/L	162	276	219	
Dissolved Iron - Fe	ug/L	NA	8.1	8.1	1,000 [1]

Table 3.3-1 (Continued)

Analytes	Units	Average of Detected Analytes Winter 2001-2002	Average of Detected Analytes Spring 2003	Average of Detected Analytes Winter and Spring	Lowest Applicable Aquatic Life Water Quality Standard
Total Recoverable Lead - Pb	ug/L	0.174	0.663	0.419	
Dissolved Lead - Pb	ug/L	NA	0.141	0.141	3.2 [1]
Total Recoverable Lithium - Li	ug/L	3.92	2.08	3.00	
Dissolved Lithium - Li	ug/L	NA	1.79	1.79	
Total Recoverable Manganese - Mn	ug/L	7.34	15.73	11.54	
Dissolved Manganese - Mn	ug/L	NA	0.93	0.93	
Total Recoverable Mercury - Hg	ug/L	0.0023	0.0019	0.0021	
Dissolved Mercury - Hg	ug/L	NA	0.00056	0.00056	0.012 [1]
Total Recoverable Molybdenum - Mo	ug/L	0.97	0.63	0.80	
Dissolved Molybdenum - Mo	ug/L	NA	0.64	0.64	
Total Recoverable Nickel - Ni	ug/L	0.22	0.11	0.16	
Dissolved Nickel - Ni	ug/L	NA	<0.04	<0.04	160 [1]
Total Recoverable Selenium - Se	ug/L	0.146	<0.30	0.146	
Dissolved Selenium - Se	ug/L	NA	<0.30	<0.30	5 [1]
Total Recoverable Silver - Ag	ug/L	0.002	<0.015	0.002	
Dissolved Silver - Ag	ug/L	NA	<0.015	<0.015	0.12 [1]
Total Recoverable Strontium - Sr	ug/L	107	65.0	86.0	
Dissolved Strontium - Sr	ug/L	NA	65.7	65.7	
Total Recoverable Thallium - Th	ug/L	0.026	<0.020	0.026	
Dissolved Thallium - Th	ug/L	NA	<0.020	<0.020	40 [1]
Total Recoverable Tin - Sn	ug/L	0.03	<0.10	0.03	
Dissolved Tin - Sn	ug/L	NA	<0.10	<0.10	
Total Recoverable Titanium - Ti	ug/L	7.08	19.8	13.46	
Dissolved Titanium - Ti	ug/L	NA	12.0	12.0	

Table 3.3-1 (Continued)

Analytes	Units	Average of Detected Analytes Winter 2001-2002	Average of Detected Analytes Spring 2003	Average of Detected Analytes Winter and Spring	Lowest Applicable Aquatic Life Water Quality Standard
Total Recoverable Tungsten - W	ug/L	0.07	0.04	0.06	
Dissolved Tungsten - W	ug/L	NA	0.039	0.039	
Total Recoverable Vanadium - V	ug/L	1.77	1.60	1.69	
Dissolved Vanadium - V	ug/L	NA	1.10	1.10	
Total Recoverable Zinc - Zn	ug/L	1.77	3.65	2.71	
Dissolved Zinc - Zn	ug/L	NA	1.21	1.21	110 [1]
Alkalinity as $CaCO_3$, Total	mg/L	75	45	60	20 [2]
Ammonia as Nitrogen	mg/L	0.05	0.07	0.06	
Bicarbonate as $CaCO_3$	mg/L	75	45	60	
Biochemical Oxygen Demand (BOD)	mg/L	<4	<4	<4	
Calcium	mg/L	22.4	13	17.7	
Carbonate as $CaCO_3$	mg/L	<2	<2	<2	
Chemical Oxygen Demand (COD)	mg/L	<5	9	9	
Chloride	mg/L	3.8	1.6	2.7	230 [1]
Conductivity	umhos/cm	194	103	149	
Fecal Coliform	MPN/100 ml	9	6	8	
Fluoride	mg/L	<0.2	<0.2	<0.2	
Magnesium	mg/L	6.63	4	5.07	
Nitrate as Nitrogen	mg/L	0.4	<0.1	0	
Nitrite as Nitrogen	mg/L	<0.1	<0.1	<0.1	
Nitrogen, Total Kjeldahl (TKN)	mg/L	0.2	0.1	0.2	
Nitrogen, Total Organic	mg/L	0.15	0.1	0.13	
Oil and Grease	mg/L	<5.0	<5.0	<5.0	
Orthophosphate as Phosphorus	mg/L	0.03	0.01	0.02	

Table 3.3-1 (Continued)

Analytes	Units	Average of Detected Analytes Winter 2001-2002	Average of Detected Analytes Spring 2003	Average of Detected Analytes Winter and Spring	Lowest Applicable Aquatic Life Water Quality Standard
Orthophosphate as Phosphorus, Filtered	mg/L	0.02	0.01	0.01	
pH	pH units	7.95	7.8	7.86	7 - 8.5 [3]
Phenolics, Total	mg/L	<0.01	<0.01	<0.1	2.56 [1]
Phosphorus, Total	mg/L	0.03	0.04	0.04	
Phosphorus, Total Dissolved	mg/L	0.04	0.02	0.03	
Potassium	mg/L	<2.0	<2.0	<2.0	
Silica, Reactive Dissolved	mg/L	3.95	8.9	6.42	
Silicon, Filtered	mg/L	11.8	7.72	9.7	
Silicon, Total	mg/L	6.26	15.74	11.00	
Sodium	mg/L	8.51	4.14	6.33	
Sulfate	mg/L	15.8	7.6	11.7	
Total Dissolved Solids (TDS)	mg/L	101	72	87	
Total Organic Carbon	mg/L	1.1	2.3	1.7	
Total Suspended Solids (TSS)	mg/L	9	8.5	8.8	
Turbidity	NTU	2.3	6.4	4.4	

[1]Protection of Aquatic Life - Fresh Chronic Criteria.
[2]Standard is for minimum alkalinity.
[3]ORS 468 - Umatilla Basin - 340-041-0645 2 (d) (A).

NA = data not available/analysis not conducted.

Table 3.3-2
Comparison of Cold Springs Reservoir Water Quality with Estimated Effluent Quality

Analyte	Units	Reservoir (average)	Estimated Effluent	Lowest Applicable Aquatic Life Water Quality Standard
Dissolved Antimony – Sb	µg/l	0.075	0.700	1,600
Dissolved Beryllium – Be	µg/l	0.023	0.042	5.3
Dissolved Cadmium – Cd	µg/l	0.009	0.074	1.1
Dissolved Copper – Cu	µg/l	0.91	5.80	12
Dissolved Iron – Fe	µg/l	24.6	685	1,000
Dissolved Lead – Pb	µg/l	0.019	0.800	3.2
Dissolved Mercury – Hg	µg/l	0.00082	0.00160	0.012
Dissolved Nickel - Ni	µg/l	0.07	1.50	160
Dissolved Selenium – Se	µg/l	0.41	0.70	5
Dissolved Silver – Ag	µg/l	0.016	0.011	0.12
Dissolved Thallium - Th	µg/l	0.088	0.074	40
Dissolved Zinc - Zn	µg/l	0.26	8.9	110
Alkalinity	mg/l	67	188	20[1]
Chloride	mg/l	8.3	20.0	230
pH	S.U.	8.45	7.5-8.5	7 – 8.5
Phenolics	mg/l	0.02	0.053	2.56
Total Dissolved Solids	mg/l	117	1,586	N/A

[1]Minimum concentration.

resulted in rapidly dropping water levels for the last forty years. The project site is not located in one of the state's critical groundwater areas. Groundwater may be initially encountered at 75 to 100 feet below ground surface.

3.3.2 Environmental Consequences and Mitigation

3.3.2.1 Surface Water

Water Diversion from the Columbia River

Water for the proposed project would be supplied by the Port of Umatilla's regional water supply system. Under an existing water right, the Port of Umatilla pumps water from the Columbia River to various municipal, industrial and agricultural users. A pump would be added to the existing intake structure and a pipeline would be constructed to ***transport*** water to the proposed project.

As shown in Table 2.3-3, maximum water demand at the proposed project would be ***17.7*** *cfs*.[1] Average annual***ized daily*** water demand would be ***12.4*** cfs.

Flow in the Columbia River is usually in the range of 65,000 to 85,000 cfs during the low flow period in the fall. The ***annual average volume of*** water diverted for this project would represent approximately 0.***02*** percent of river flow during low flow periods. The percentage diverted would be considerably lower in high flow periods. Because the Columbia River is extensively dammed, peak flows are reduced and low flows are increased which means river flow does not fluctuate as much. The lowest flow recorded in recent years was 48,000 cfs in 1977. Even if this extremely low flow period occurred again, the maximum rate of water diverted for this project would represent ***0.04*** percent of overall river flow.

Several species of fish in the Columbia River are listed under the ESA. Fish populations are at less than one-third of historic numbers. The Tribes' treaty reserved right to fish is negatively impacted, eroding the Tribes' culture, impacting the health of Tribal members, and violating their treaty rights. The proposed project is designed to avoid an overall negative impact on fish that results from adding to new cumulative depletions of Columbia River in-stream flows. The project achieves this goal by using only existing water rights.

[1] ***This maximum flow would occur only when ambient temperature reaches 107°F.***

The small change in river flow due to the proposed project would not reduce beneficial uses of the river or water quality. Beneficial uses include hydropower generation, navigation, municipal and industrial supply, agricultural use and protection of fish and wildlife. There would be no effect on downstream water users and no measurable reduction in water levels. River water quality also would not be affected by this amount of withdrawal.

The proposed power plant would be designed with a number of components and systems incorporating water re-use and reduced water consumption. The plant would incorporate a recirculating cooling system that includes cooling towers with high-efficiency drift eliminators. The cooling system would be operated at the highest level of cycles possible without jeopardizing system components ***(and within the limits for*** PM_{10} ***established by USEPA in the air quality permit)***, which reduces the volume of raw water required as makeup. All wastewater streams generated within the facility would be routed to the cooling system as makeup to reduce the volume of raw water required.

Recommended Mitigation Measures: No measures beyond those included in the proposed project are recommended.

Wastewater *Generation*

The proposed facility would generate wastewater that is primarily comprised of cooling tower blowdown. The plant also would generate small quantities of process wastewater, sanitary sewage and storm water. Process wastewater would include boiler blowdown, filter backwash, residual streams from water treatment processes and washwater. Process wastewater would be piped to the cooling system as makeup, which ***would*** reduce the quantity of raw water required. ***The only significant potential contamination that may be present in the small volumes of process wastewater is oil and grease – process wastewater would be treated for oil and grease prior to being added to the cooling system as make-up. Wastewater produced during periodic cleaning of the HRSGs would be collected and disposed of by a licensed contractor.***

Cooling system blowdown consists primarily of raw water that has been subjected to a heat load and undergone evaporation of most of the water to the atmosphere. When the water is evaporated off, the dissolved solids that were present are left behind. Thus, the concentration of dissolved ions increases proportionately with the number of "cycles" at which the system operates. The higher the number of cycles means the lower the volume of blowdown and the lower the rate of makeup addition that is required. If a system is operated at six cycles, then the concentration of dissolved solids in the blowdown will be multiplied approximately six times that of the raw water concentration. The efficiency of the cooling system and its associated cost of operation are determined by the number of cycles.

Columbia River water is considered good quality makeup – typically, total dissolved solids concentrations are approximately 100 milligrams per liter (mg/l). The cooling system would be designed to operate at six cycles – as a result, ***each*** dissolved ion concentration in the blowdown would be approximately six times the concentration in the raw water. Temperatures of the ***plant*** discharge ***water*** would be controlled within the range of 70 to 75°F***, based on 93°F ambient dry bulb temperature***.

Very small quantities of water treatment chemicals would be added to the cooling system for corrosion protection, deposit control, pH control and prevention of microbiological growth. These chemicals ***would*** include sulfuric acid, sodium hypochlorite (bleach solution), and mixtures of inorganic phosphates, organic phosphates and polymers. All of these chemicals are regarded as non-toxic in the quantities to be used. Feed rates are usually in the range of 1 to 20 parts per million (ppm) and concentrations in the final blowdown are considerably lower due to chemical reactions, evaporation, and absorption onto suspended solids and system surfaces.

Plant Discharge to Cold Springs Reservoir

As shown in Table 2.3-4, plant discharge rates ***for two blocks*** would average ***1.6*** million gallons per day (MGD) or ***2.4*** cfs with a maximum flow rate of ***2.2*** MGD or ***3.4*** cfs. Plant discharge water would be ***pumped at a rate of approximately 2.3 cfs from the plant's retention pond*** to Cold Springs Reservoir via a 9-mile pipeline – it would discharge into ***the drop structure at*** the end of the Feed Canal immediately upstream of the reservoir ***or into a diffuser that would extend out into the main "dead pool" area of the reservoir***. During the months of November through June, water from the Umatilla River also would be flowing in the canal and would mix with plant ***discharge water***. The maximum flow rate of ***3.4*** cfs would represent 1.7 percent of the maximum flow capacity of the Feed Canal. During the remainder of the year, plant ***discharge water*** would be the only flow in the canal. During the summer months, water level in the reservoir is drawn down for agricultural use – as the water level approaches very low volume, water quality in the reservoir decreases due to wind effect on shallow areas, sediment interaction, biological growth and higher turbidity. Even at the reservoir's lowest or "dead pool" level of approximately ***1,000*** acre-feet, the average inflow of plant discharge water would represent an incremental addition of ***0.5*** percent of the total reservoir volume on a daily basis. Under normal operating circumstances, the volume of plant discharge ***water*** would have minimal effect on reservoir water quality and would supplement the volume of stored water for irrigation use.

The Cold Springs Reservoir was sampled in August 2003 ***and May 2004*** to collect information on existing water quality in the reservoir and enable an initial evaluation of the potential impact of the plant's discharge. At the time of ***the August*** sampling, the level of the reservoir had been drawn down very low due to summer withdrawals for irrigation. Columbia River water was being added to the reservoir at the time of sampling to supplement available water. It is expected that water quality in the reservoir would be poorest during the late summer and early autumn months when the level is at its lowest. Six locations were sampled on the reservoir ***in August 2003 and an additional two locations were sampled in May 2004.*** **T**he results of these samples were averaged and compared with the estimated ***plant discharge water*** quality. Of particular interest were the parameters that have water quality standards associated with aquatic life beneficial use (see **Table 3.3-2**).

In evaluating metals concentrations, it was found that in most locations, most metals concentrations were slightly to somewhat higher in the ***plant discharge water*** than in the reservoir. For several metals such as iron, mercury and silver, concentrations in the ***plant discharge water*** are estimated to be lower than existing concentrations in the reservoir. No metals concentrations in either the reservoir or the ***plant discharge water*** approach any applicable water quality standard. Recoverable metals concentrations were compared to the water quality standards which are expressed as dissolved metals concentrations; this represents a more conservative and protective analysis since dissolved concentrations are almost always less than recoverable concentrations. Because the reservoir appears to exceed the water quality standard for pH at ***certain*** time***s*** of ***the*** year, the addition of the ***plant discharge water*** should help reduce the pH and bring the reservoir pH closer to the standard.

Organic compounds were not specifically analyzed. However, total phenolic compounds were analyzed at all locations at the reservoir and were estimated for the plant ***discharge water***. Total phenolic compounds can often be an indicator of the presence of other significant organic compounds. The average concentration of phenolics in the reservoir *was* ***0.02*** microgram per liter (µg/l); the estimated concentration in the plant ***discharge water*** is 0.053 µg/l. The applicable water quality standard (chronic criterion) is 2.56 µg/l. The concentrations in the reservoir and ***plant discharge water*** represent very low levels of organic compounds. The plant operation ***would*** not add any organic compounds.

Because participants in the Wanapa Energy Center have requested to deliver water to the Cold Springs Reservoir, a federal irrigation project administered by the Reclamation, the Reclamation must decide whether to accept this water in conjunction with existing uses and rights pertaining to this reservoir. The USFWS administers the Cold Springs Reservoir National Wildlife Refuge, which includes the reservoir surface area and adjacent lands. The ongoing management for waterfowl, fisheries, and threatened and endangered species will be considered in the Reclamation decision.

The discharge to the reservoir would be permitted under the NPDES program, administered by ***Oregon DEQ***. An application would be developed and submitted to ***Oregon DEQ*** with a copy to the ***USEPA Region 10***. ***Oregon DEQ*** would have primary authority for review and approval of the permit since the ***discharge location*** is ***not*** on tribal trust land. The application would include detailed information on plant processes and water treatment, estimated ***plant discharge water*** quality and the water quality status of Cold Springs Reservoir. It would be demonstrated that the addition of the ***plant discharge water*** to the reservoir would not significantly impact water quality in the reservoir. Preliminary evaluation of estimated water quality data indicates that water quality standards can be maintained. **Table 3.3-3** shows estimated concentrations of various parameters in the plant ***discharge water*** after 6 cycles of concentration based on analysis of raw water. No parameters exceed ***any*** state water quality standard ***including standards for aquatic and wildlife uses***. ***Oregon DEQ has not yet determined what standard or limit would apply for TDS and temperature. The TDS concentration of the plant discharge water exceeds the TDS concentrations of the water in Cold Springs Reservoir.*** However, if it is determined that ***plant discharge water*** quality can significantly impact water quality in the reservoir in some other way, the plant ***discharge water*** would be treated adequately before discharge to maintain water quality standards in the reservoir.

The NPDES permit, issued by ***Oregon DEQ***, would include specific requirements for monitoring the plant ***discharge water*** and mass/concentration limits for particular parameters. These limits would be imposed for any parameter that might prevent the attainment of a water quality standard applicable to the reservoir. Results of monitoring would be reported to the Oregon DEQ on a

Table 3.3-3

Estimated Quality of the Plant Discharge *Water* for Six Cycles of Concentration

	Average of Raw Water Sampling Results (Samples Collected 12/21/01, 1/9/02, 1/17/02 from Columbia River)	**Average Concentration[1]**	**Maximum Concentration[1]**
Discharge Temp. °F[2]		***70***	***96***
Plant Makeup, MGD		***8.02***	***11.5***
Plant Discharge, MGD		***1.6***	***2.2***
Plant Discharge, gpm		***1,088***	***1,507***
(total recoverable metals in ug/L)			
Aluminum	131	200.3	207.2
Antimony	0.144	0.7	0.8
Arsenic	1.090	6.9	7.1
Barium	27.3	139.2	143.9
Beryllium	0.007	0.042	0.044
Boron	13.6	75.4	78.0
Cadimum	0.014	0.074	0.076
Chromium	0.26	2.1	2.1
Cobalt	0.1	0.6	0.6
Copper	1.28	5.8	6.0
Iron	162	685.3	708.7
Lead	0.174	0.8	0.8
Lithium	3.92	18.1	18.7
Manganese	7.34	41.1	42.5
Mercury	2.3	1.6	1.6
Molybdenum	0.97	5.2	5.3
Nickel	0.22	1.5	1.6
Selenium	0.146	***0.7***	***0.73***
Silver	0.002	0.011	0.011
Strontium	107	564.1	583.3
Thallium	0.026	0.074	0.076
Tin	0.030	0.053	0.055
Titanium	7.080	41.2	42.6
Tungsten	0.070	0.4	0.4
Vanadium	1.770	10.9	11.2
Zinc	1.770	8.9	9.2

Table 3.3-3 (Continued)

	Average of Raw Water Sampling Results (Samples Collected 12/21/01, 1/9/02, 1/17/02 from Columbia River)	**Average Concentration[1]**	**Maximum Concentration[1]**
Discharge Temp. °F[2]		***70***	***96***
Plant Makeup, MGD		***8.02***	***11.5***
Plant Discharge, MGD		***1.6***	***2.2***
Plant Discharge, gpm		***1,088***	***1,507***
(Units = mg/L unless otherwise noted)			
M. Alkalinity as CaCO3	75	188	191
Ammonia as N	0.05	0.024	0.02
Bicarbonate as CaCO3	75	415	428
Calcium	22.4	119	123
Chemical Oxygen Demand	<5	-	-
Chloride	3.8	20	21
Spec Conductivity (mS/cm)	194	-	-
Fluoride	<0.2	1.1	1.1
Magnesium	6.63	35	36
Nitrate as N	0.4	2.0	2.0
Oil and Grease	<5.0	<1	<1
ortho Phosphate as P	0.03	0.007	0.006
Filtered Phosphate as P	0.02	-	-
pH (pH units)	7.95	7.5 - 8.5	7.5 - 8.5
Phenolics	<0.01	0.053	0.05
Filtered Phosphorus as P	0.03	-	-
Total Phosphorus as P	0.04	0.21	0.22
Potassium	<2.0	11	11
Silicate, reactive, dissolved	11.8	63	65
Sodium	8.51	78	72
Sulfate	15.8	425	401
Total Dissolved Solids	101	1,586	1,589
Total Organic Carbon	1.1	-	-
Total Suspended Solids	9	43	44
Turbidity (NTU)	2.3	-	-

[1]Plant water has adjusted quality for Al, Fe, and Hg. FeCl3 and NaOH fed to clarifier. All filter backwash is recycled.
[2]The Discharge temperature is based on the cooling tower blowdown temperature.

monthly basis. Since the plant ***discharge water*** would be strictly monitored for potential impacts under the NPDES permit, no significant adverse effect on surface water quality would occur.

Appendix B presents additional discussion and detail on water use and discharge.

Recommended Mitigation Measures. No measures beyond those included in the proposed project are recommended.

Construction Storm Water Management

Construction of the power plant, pipelines, and transmission lines would require disturbance of soils and could result in transport of sediment during rain events. This potential transport of sediment and water could enter nearby drainages or wetlands and cause an adverse effect on surface water quality. The potential is somewhat limited due to the relative flatness of the terrain and existing vegetation, which could slow or stop sediment movement. However, in construction areas immediately adjacent to surface water drainages or wetlands, there would be increased potential for affecting storm water quality.

Construction activities utilize vehicles, equipment, chemicals and oils in conducting day-to-day project construction. The use of these components can sometimes result in leaks or spills to the ground, which could potentially cause surface water contamination. In addition, a construction site would have chemical toilets in various locations available for use by the construction crews. Although highly unlikely, the chemical toilets can develop leaks, which could potentially result in contamination of surface water, especially during storm events.

The proposed project would ***implement*** several programs to minimize the potential for construction activities to impact surface water quality. Under federal and state regulations, the project would be required to develop and implement a SWPPP for the construction phase. The SWPPP would identify all the possible activities and incidents that could contaminate storm water or surface water and would contain Best Management Practices (BMPs) that would be implemented to prevent contamination. In addition, the proposed project would be required to implement an Erosion Control Plan that would be specifically focused on procedures and practices to prevent transport of sediment. Examples of BMPs and related measures include installation of silt fences, installation of hay bales in storm water channels, installation of a storm water retention pond to collect storm water generated on the plant site, procedures for handling chemicals and oils, emergency response procedures and maintenance of spill response equipment. All construction personnel, including contractors, would be trained on these plans and would be expected to implement all appropriate measures. The construction areas would be inspected on a biweekly basis or after a storm event for implemented prevention and management measures, evidence of leaks or spills and developing erosion areas. These inspections would be documented and identified problems would be addressed immediately.

Recommended Mitigation Measures. No measures beyond those included in the proposed project are recommended.

Pipeline Hydrostatic Test Water

In addition, the proposed project may generate hydrostatic test water in the later phases of the construction schedule. Water is used to fill certain plant pipelines and tanks to confirm their structural integrity and prove that they will not leak. Raw water from the Columbia River would be used for this purpose – the resulting water, after testing, may have very small concentrations of oil and suspended solids. Depending on where and when the hydrostatic testing occurs, the water may be disposed of in the power plant's cooling water system, may be hauled off and disposed of by a licensed contractor or discharged under the plant's NPDES discharge permit. Discharge under the permit would require that the hydrostatic test water meet specific discharge limits.

Recommended Mitigation Measures. No measures beyond those included in the proposed project are recommended.

Operation Storm Water Management

Storm water from the proposed project would be collected in storm drains, storm sewers and surface swales and channels. These structures would drain to a retention pond designed to store water from a 25-year, 24-hour storm event. Accumulated storm water would be pumped to the cooling system for re-use, allowed to evaporate ***in the storm water detention pond or added to the plant discharge holding pond, which is piped to Cold Springs Reservoir, if necessary***. Storm water that is collected in the power block area would be routed to oil/water separators before draining to the ***detention pond***. The oil phase collected in the oil/water separators would be removed by a licensed contractor on a periodic basis. The oil/water separators and retention pond would be inspected on a regular basis for operating condition, oil and solids accumulation and available capacity. Since storm water would either be recycled or evaporated, it would have no effect on surface or groundwater quality. Access roads to the facility would be constructed and maintained according to Umatilla County standards and/or CTUIR standards. Exposure of contaminants to storm water would be negligible.

Under federal regulations, the proposed project also would be required to develop and implement a SWPPP for the operating phase. The SWPPP would identify all the possible activities and incidents that could contaminate storm water or surface water and would contain BMPs that would be implemented to prevent contamination. BMPs would include procedures for handling chemicals and oils, erosion control measures, preventive maintenance programs, structural controls such as rip-rap and berms and non-structural controls such as training and inspections. All plant personnel would be trained annually on these plans and would be expected to implement all appropriate measures.

Recommended Mitigation Measures. No measures beyond those included in the proposed project are recommended.

Sanitary Sewage Management

Because the plant would be designed to operate with a small staff of operating personnel, the volume of sanitary sewage generated on a daily basis would be relatively small, less than 1,000 gallons per day. Sanitary sewage would be pumped to the ***City of*** Umatilla***'s*** water treatment facility. ***The sanitary sewer line from Wanapa Energy Center would be constructed in the water supply pipeline ROW and connect to the City of Umatilla's existing sanitary sewer system south of the Two Rivers Correctional Facility, near Beach Access Road.*** As an alternative, ***sanitary sewage*** may be piped to a septic tank and leach field located on site. This septic system would be designed and installed according to the Umatilla County's engineering standards and regulations. It would be inspected on a regular basis and cleaned out when necessary. Treated sewage from the septic system would slowly percolate into the ground and would not have a significant adverse effect on groundwater or surface water quality.

Recommended Mitigation Measures: No measures beyond those included in the proposed project are recommended.

Potable Water

Potable water for use at the Wanapa Energy Center would be provided by a pipeline constructed in the main water supply pipeline ROW. This potable water pipeline would likely connect to the City of Umatilla's potable water system south of the Two Rivers Correctional Facility, near Beach Access Road.

Recommended Mitigation Measures. No measures beyond those included in the proposed project are recommended.

Chemical Spills

Chemicals and oils would be stored at the proposed facility in aboveground tanks, containers or drums. All storage containers would be located inside buildings and/or in secondary containment. Secondary containment would be designed to hold the entire contents of the container if a spill or leak occurred. If a spill or leak occurred outside secondary containment during transport of the container or filling of a tank, the spill would flow into the storm water collection system and the storm water retention pond. The pond would contain the spill until clean-up could be implemented. The proposed plant also would have spill response equipment on hand to be able to contain and clean up spills immediately. Spills to the ground surface would be cleaned up immediately by trained plant personnel. A chemical or oil spill at the proposed power plant would not adversely affect surface or groundwater quality.

Recommended Mitigation Measures: No measures beyond those included in the proposed project are recommended.

3.3.2.2 Groundwater

No groundwater use or discharges to groundwater are proposed. Therefore, no groundwater quality impacts are predicted.

3.3.3 Proposed Action Impact Summary

Project construction would result in localized disturbance to surface soils at the plant site, pipeline corridors, access road, and transmission line route. By implementing erosion control measures as part of the SWPPP, no water quality impacts would occur in intermittent streams or canals located within or near the project study area. No perennial streams are present in the project study area. As part of gas pipeline construction, Columbia River water would be used for hydrostatic testing. The withdrawal quantity, which is part of an existing water right (Port of Umatilla regional water supply system), would not result in a measurable change in Columbia River flow. If hydrostatic test water is discharged to intermittent drainages or upland areas, water quality would meet NPDES requirements.

The impacts of project operation on water resources involve water withdrawal, water discharge, and management of chemical spills or leaks. Approximately ***12.4*** cfs (average) or ***17.7*** cfs (maximum) of Columbia River water under an existing water right would be used for plant operation. The water withdrawal amount would represent less than 0.***05*** percent of Columbia River flow during the low-flow period. Plant ***discharge*** water (average of ***2.4*** cfs and maximum of ***3.4*** cfs) would be treated ***for oil and grease, pH, and temperature modification*** and piped to the Cold Springs Reservoir. Due to the relatively small discharge quantity, the incremental daily change in reservoir volume, even at its lowest level, would be less than 0.***5*** percent. By meeting NPDES requirements, ***plant*** discharge water would not affect water quality in the reservoir. Storm water and sanitary sewage management would be required during plant operation to ensure that there would be no impacts on surface water near the plant site. The potential effects of a chemical spill at the plant site would be minimized by implementing a spill response plan.

Project construction and operation would not affect groundwater resources, since aquifers are located at least 75 feet below the surface. Groundwater would not be used for water sources or discharge purposes.

3.3.4 Component Alternatives Impact Summary

The relative water resource effects of the component alternatives would be nearly the same as the Proposed Action for both the gas/water discharge pipelines and transmission line alternatives. It is likely that similar volumes of hydrostatic test water would be used for each pipeline alternative regardless of length because the same water can be used again in a different hydrostatic test segment. Table 3.3-4 provides a comparison of the Proposed Action (plant discharge to Cold Springs Reservoir) with the Alternative 1 (plant discharge to the Columbia River).

Table 3.3-4
Summary Comparison of Plant Discharge Water Location Alternatives

	No Action	Proposed Action	Alternative 1
Resource/Impact Issue			
Water Resources	No new water withdrawals or discharges would occur.	Average annual water demand from the Columbia River would be 12.4 cfs, and maximum demand would be 17.7 cfs. Under the lowest flows recorded in the period of record, project withdrawals would represent 0.04 percent of river flow. Power plant discharge water would be discharged to Cold Springs Reservoir in accordance with a NPDES permit obtained from the Oregon Department of Environmental Quality. It is unlikely that a diffuser would be needed to meet water quality discharge standards, but would be installed on the reservoir bed if needed. Plant discharge water would mix with existing stored water in the reservoir and would be distributed for seasonal irrigation. Little or none of this water would be returned to the Columbia River because of uptake by crops, evaporation, and loss to the groundwater system.	Average annual water demand from the Columbia River would be the same as the Proposed Action. Power plant discharge water would be discharged to the Columbia River (Lake Wallula) upstream of McNary Dam in accordance with a NPDES permit obtained from the Oregon Department of Environmental Quality. It is highly likely that a high volume diffuser would be installed on the bed of Lake Wallula to meet temperature and total dissolved solids (TDS) discharge standards for this segment of the Columbia River. Based on the number of times that the water is used in the power plant cooling process, the water discharged directly back to the Columbia would represent about 20 percent of the volume withdrawn.