EXHIBIT E
SECTION 404(B)(1) EVALUATION

c. General Description of Dredged or Fill Material

Current maintenance of the Columbia and Lower Willamette Rivers navigation channel requires dredging an average quantity of 5.5 mcy of sediments annually. About 4 mcy of this amount are dredged with a pipeline or hopper dredge and disposed in flowlane locations in or adjacent to the navigation channel. All of the material dredged from the Columbia River is coarse to medium-grained sand while most sediments dredged from the Willamette River is medium to fine-grained sand. All sediments evaluated under the current channel maintenance program have been determined to be suitable for unconfined in-water disposal. Dredged material disposed in-water (flowlane) would be reduced from an estimated 46 to 21 mcy over the next 20 years for the 43-foot deepening alternative. Estimated quantities proposed for wetland fills range from 0.5 to 1.0 mcy.

As described in Section 5.1.7 of the report, since the 1930s, the Corps has collected sediment data on the Columbia and Willamette Rivers. A comprehensive Sediment Quality Evaluation was prepared for the study. See Appendix B to the FEIS. All material dredged will be tested and assessed under joint EPA and Corps dredged material evaluation guidelines prior to flowlane or upland disposal. The likelihood of contamination by contaminants is low in the federal navigation channel based upon all of the past testing and evaluation discussed in the EIS. The Sediment Quality Evaluation and compliance with EPA/Corps Guidelines prior to dredging meet the evaluation and testing requirements of 40 CFR Part 230 Subpart G.

d. Description of the Proposed Discharge Sites

Flowlane sites are in or adjacent to the Columbia River at depths generally from 45 to 65 feet. However, there would be exceptions to the general depth criteria for the proposed channel deepening. The actual disposal sites cannot be designated. They vary from year to year depending on the condition of the channel. Flowlane disposal could occur at depths of 35 to 65 feet between CRMs 64 and 68 and CRMs 90 and 101. Flowlane disposal could occur in areas over 65 feet deep in five specific areas: downstream of CRM 5; CRMs 29 to 35; CRMs 54 to 56.3 on the Oregon side of the channel; and CRMs 72.2 to 73.2 on the Washington side of the channel. The substrate at these locations is coarse to medium-grained sand. The wetland sites total a maximum of 20.4 acres. Both sites are located in Washington (15 acres at Mt. Solo (W-62.0) and 5.4 acres at Puget Island (W-44.0). For the past several (up to 30) years, these sites have been drained and used for a variety of agricultural purposes.

III. Alternatives

The EIS describes the alternatives to the proposed project in detail. In addition to alternatives to the overall project, specific alternatives were evaluated for flowlane disposal areas and upland disposal sites. Descriptions of the alternatives to the proposed project are contained in Chapter 4 of the EIS. As discussed in the EIS, none of the alternatives to the proposed action adequately meet the purpose and need defined by Congress. As required by the 404(b)(1) Guidelines, a detailed evaluation of upland and flowlane disposal alternatives

was performed in conjunction with preparation of the EIS. All practicable alternatives to the disposal sites proposed to be used were studied. As discussed in the EIS and below, practicable alternatives to the proposed flowlane disposal areas and the two affected wetland sites do not exist.

a. In-Water (Flowlane) Disposal

In-water disposal avoids impacts to special aquatic sites, like shoreline areas, mudflats, wetlands and vegetated shallows. As proposed, in-water disposal will not affect any special aquatic sites since disposal will occur primarily at depths of 35 to 65 feet and no shallow water areas will be affected. The areas used for in-water disposal inherently change yearly depending on natural changes in the river that necessitate dredging. As noted in the EIS, the greatest use of in-water disposal will be in areas where there are few upland disposal site options. The alternatives evaluated focused not on specific alternative in-water disposal sites, but rather on ways to avoid special aquatic site impacts and to minimize the amount of dredging that will be required in the future. By minimizing the amount of dredging required, the in-water disposal impacts are reduced.

b. Upland Disposal Sites

The process used for screening upland disposal sites is described in detail in Section 4.4.3.4 of the EIS. Over 157 sites were reviewed. Environmental and engineering criteria were applied to screen the sites. One of the criteria applied was avoidance of wetlands to the extent practicable. As a result of the screening and comments on the draft EIS, the total area of wetland fill has been reduced from 38 acres in the least cost plan evaluated in the draft EIS to only 20.4 acres in the recommended plan. The two remaining areas of wetland fill, 15 acres at Mt. Solo and 5.4 acres at Puget Island, are in river areas where no other practicable means exists for disposing of dredged material. Other upland or in-water sites are not available in the vicinity. The project sponsors will acquire the two wetland fill sites, along with other upland disposal sites. Following site acquisition and before any filling occurs, the wetlands on the sites will be delineated. The sponsors will obtain any required permits before any wetland fill occurs at either site. The two sites requiring some wetland fill currently serve no useful wetland functions such as wildlife habitat or flood storage. The sites have been drained and used for agricultural purposes for the past several years.

IV. Factual Determinations (40 CFR § 230.11)

a. Physical Substrate Determinations

The substrate of all flowlane disposal sites is primarily sand. The disposal of dredged material would alter the depth and/or gradient of the sites raising the bottom elevation by as much as 20 feet. The physical characteristics of bottom sediments would not change significantly as the dredged material is essentially the same composition as material found at the discharge site. The substrate of both wetland sites is primarily silty clay loam. Placement of dredged material at the sites would change the physical composition to primarily sand.

b. Water Circulation, Fluctuation and Salinity Determinations

The disposal would affect minor changes in hydrologic features such as circulation patterns, downstream flows, or normal water level fluctuations. Water quality characteristics such as salinity, water chemistry, clarity, color, odor, taste, dissolved gas levels, temperature, or nutrients would not be affected to any measurable degree. As discussed in Sections 6.2.3.2 and 6.2.3.3 and Appendix F, channel deepening and related disposal could cause a minor concentration of flow in the main channel. The hydraulic analysis of water surface elevations and salinity concentrations support the expectations of minor changes. Since the water surface profiles and thus the energy gradients are essentially unchanged, the flow in side channels and shallows would also be unchanged. The results of salinity intrusion modeling show insignificant changes in salinity concentrations outside the main channel. This result indicates that there would be very little hydraulic change away from the main channel. Based on the results of sediment analysis (see subpart d. below), and that dredged material would originate from nearby in-water locations, physical or chemical characteristics of the receiving water would not be adversely affected.

c. Suspended Particulate/Turbidity Determination

Short-term minor increase in turbidity would occur in the immediate disposal vicinity of in-water sites. This condition would temporarily inhibit light penetration through the water column and thereby affect aquatic organisms. Since the dredged material is primarily sand, the expected short-term increase in turbidity levels would not violate state water quality standards. See further discussion in Sections 4 and 6 of the EIS.

d. Contaminant Determinations

The primarily sandy dredged material would not contain unacceptable quantities, concentrations, or forms of contaminants deemed critical to the proposed placement sites. Sediments in the Columbia River are classified as clean river sand with sieve analysis gradients of fine to coarse sand. This material has been determined to be acceptable for unconfined in-water disposal by the EPA and the states of Oregon and Washington. Sediments in the mainstem Columbia River typically are composed of sand with less than one to five percent in the silt to clay size classification and less than one percent volatile solids. The two dominant shoal forms are large sand waves and cutline shoals. Sand waves are present throughout the river channel and cause shoals across the channel. Cutline shoals are much larger and run parallel to the channel and develop at the same location year after year. The material present in the mainstem Columbia River meets exclusionary criteria as defined under the MPRSA and CWA and, therefore, would not be subject to further testing.

In June 1997, surface grab samples were collected from the Columbia channel and surface and core samples were collected from the Willamette channel. Eighty-nine stations were sampled from the Columbia channel (CRMs 3.0 to 106.2) for physical analysis, and 23 were further analyzed for chemical contaminants. Sixty-eight samples were analyzed from 43 stations in the Willamette River (WRMs 0.1 to 11.5) for physical analysis, and 45 (including replicate samples) were further analyzed for chemical contaminants.

The following chemical tests were performed: nine inorganic total metals, polynuclear aromatic hydrocarbons (PAHs), total organic carbon (TOC), total volatile solids (TVS), acid volatile sulfide (AVS), pesticides and polychlorobiphenyls (PCBs), pore water tributyltin (TBT), and P450 reporter gene system (RGS), a dioxin/furan screen.

A summary of the physical and chemical test results for Columbia River sediment is presented below. Additional information regarding the sediment testing and results can be found in Appendix B, *Columbia and Willamette River Sediment Quality Evaluation.*

Physical analysis, total organic carbon, and total volatile solids. Approximately 95 percent of the material recovered was classified as poorly graded sand with a mean grain size of 0.56 mm and an average TVS of 0.62 percent. Of the 90 samples submitted for physical analysis, only 4 (CRMs 12.4, 83.3, 99.2, 100.2) exceeded 20 percent fines and had greater than five percent TVS.

Metals. Twenty-three sediment samples were analyzed for 9 metals: arsenic, cadmium, chromium, copper, lead, mercury, nickel, silver, and zinc. Of the samples tested, three samples (CRMs 12.4, 83.3, 100.2) showed the highest levels of metals. However, all three samples were well below the established screening levels.

Pesticides and polychlorobiphenyls. Pesticides were found in 4 of the 23 samples tested (CRMs 12.4, 83.3, 99.2, 100.2). The laboratory considered these values as estimate concentrations because the value was less than the method reporting limit, but greater than the method detection limit. PCBs were found only in one sample (CRM 100.2). None of the pesticide or PCB levels exceeded established screening levels.

Polynuclear aromatic hydrocarbons. Low levels of PAHs were found in most of the 23 samples submitted for chemical analysis. Three samples (CRMs 12.4, 83.3, 100.2) showed the largest individual amounts of both high and low density PAHs detected. All levels detected, as well as totals of low and high density PAHs, were well below the established screening levels, however.

P450 reporter gene system. P450 is the designation for a group of enzymes that play a key role in activating or deactivating many toxic chemicals including PAHs, PCBs, dioxins and furans. The sample at CRM 11.0 contained low levels of PAHs above background; CRM 12.4 contained somewhat higher levels of PAHs and low levels of chlorinated hydrocarbons. The sample at CRM 83.3 contained the highest PAH level and significant amounts of chlorinated hydrocarbons (PCBs or dioxins/furans). Because PCBs were not detected, it is likely that the chlorinated hydrocarbons detected were dioxins or furans.

e. Aquatic Ecosystem and Organism Determinations

Flowlane disposal would continue to occur within the areas previously impacted. The organisms that have adapted to the ongoing maintenance practices would continue to be

affected to the same degree. The two wetland sites have been significantly degraded by farming practices for the past 30 years.

Vegetation at the sites consists primarily of pasture grasses with scattered remnants of sedge. These wetland sites have been drained, cut off from their original river connections and/or intensively utilized for crop or pasture production. Filling these two wetland sites will have no effect on flow and circulation patterns because they have been cutoff and converted. Proposed mitigation would restore wetland functions of high value over a much larger (4 to 5 times) area. No threatened or endangered species would likely be placed in jeopardy by the proposed action. Dredging and disposal actions would be scheduled so that salmon migrations would not be disrupted. Further discussions of aquatic impacts are included in the EIS and Biological Assessments prepared for this action.

f. Proposed Disposal Site Determinations

The mixing zone would be limited to the smallest practicable area. For flowlane disposal, the river current would carry sediment downstream but since the material would be mostly sand, the extent and duration of mixing would be minor. No mud flats and vegetated shallows would be affected by flowlane disposal. The placement of the sandy material would be in compliance with Environmental Protection Agency and State water quality standards. The material would not introduce toxic substances into surrounding water or violate the primary drinking water standard of the Safe Drinking Water Act (42 USC 300 et seq.). See above discussion of contaminant determinations. There are no municipal or private water supply intakes in the vicinity of the flowlane disposal areas. Impacts to recreational and commercial fisheries will occur. These impacts are addressed in Section 6.8.1 and 6.8.6 of the EIS. Disposal sites have been selected in order to minimize mounding and shoaling in order to reduce impacts to the fisheries. The overall amount of flowlane disposal will actually be reduced, compared to historic practices. Habitat impacts are addressed in the EIS and the Biological Assessments. Impacts to aesthetics are described in Section 6.8.5 of the EIS. The proposed action reduces shoreline disposal sites and increases the use of upland sites, thus reducing aesthetic impacts to aquatic sites.

g. Determination of Cumulative Effects on the Aquatic Ecosystem

The proposed action is not expected to have any significant adverse cumulative effects on the aquatic ecosystem. The wetlands proposed for dredged material disposal do not contribute much value to the aquatic ecosystem in their current state. Proposed creation of new wetlands through mitigation would add cumulative resource value to the lower Columbia River ecosystem.

h. Determination of Secondary Effects on the Aquatic Ecosystem

The proposed action would maintain commercial navigation on the Columbia River resulting in continuing impacts to the aquatic ecosystem.

IV. Findings of Compliance (40 C.F.R. § 230.12)

a. No significant adaptations of the guidelines were made regarding this evaluation.

b. Alternatives. Alternatives to the proposed action were considered, including the no-action alternative. Upland disposal of all Columbia River dredged material is not feasible from a physical or economic standpoint and would affect more wetlands if it were. All alternative disposal actions have been evaluated for engineering and environmental suitability using an array of screening criteria. Avoidance of wetlands, significant riparian habitat and habitat important to threatened and endangered species are among the screening criteria considered in the analysis. Any remaining wetlands or riparian areas affected by disposal were considered unavoidable in achieving a practicable disposal plan. Alternatives that may further reduce wetland fills will continue to be evaluated in conjunction with permitting the two remaining upland disposal sites that impact wetlands. A mitigation plan for agricultural, wetland and riparian habitat loss has been developed in cooperation with Federal and State resource agencies.

c. Water Quality Standards (40 C.F.R. § 230.10(b)(1). The proposed action complies with applicable state water quality standards. Sediment has been collected and tested for physical and chemical properties from the mainstem Columbia and Willamette Rivers for this study (see Appendix B, *Columbia and Willamette River Sediment Quality Evaluation*). The Corps and the EPA share the regulatory responsibility for the testing, evaluation and disposal of dredged material under the CWA and the MPRSA. All material dredged by the Corps or under Corps' regulatory permits would be evaluated under CWA or MPRSA[1] guidelines. Except under specific circumstances, testing and assessment of dredged material as a hazardous waste pursuant to the Resource Conservation and Recovery Act (RCRA) is not considered technically appropriate. Under 40 CFR §261.4(g), dredged material from Corps civil works projects is not considered a hazardous waste. National policy reflects consistency with international agreements for the evaluation and management of dredged material, per the London Convention, as amended in 1998.

The guidelines and specifications for dredged material evaluations and disposal site management were developed jointly by the EPA and the Corps. The evaluation guidelines have evolved over the past 20 years to reflect the results of long-term environmental effects of dredging research and the improvements in the technology. Both the MPRSA Testing Manual (the 'Green Book,' 1991) and the CWA Inland Testing Manual (ITM, 1995) adopt a tiered approach to the testing and management of dredged material. Regional manuals or framework documents are being developed to implement the national approach. The tiered testing framework allows for consistent design of project specific testing programs and the subsequent evaluation of test results meet statutory compliance for dredging and disposal of clean and contaminated sediments. These guidance documents establish the Regional Management Team, which is expected to result in more efficient completion of required evaluations, reduced costs, and data availability to the Corps and resource agencies.

[1] *Federal Register*, Vol 53, No. 80, April 26, 1988, pp. 14903, 14910, 14913

Corps' projects containing fine-grained sediments dredged on a regular schedule are tested regularly (approximately every 5 to 10 years). The testing must provide current sediment quality information to allow dredging to proceed. New projects, projects dredged less often or sediments that meet exclusionary criteria are sampled and tested as needed. See above discussion of contaminant determinations.

d. Toxic Effluent Standards (40 C.F.R. § 230.10(b)(2). The disposal of dredged material would not violate toxic effluent standards of Section 307 of the Clean Water Act. EPA has designed 65 substances and compounds as toxic pollutants under section 307, *see* 40 C.F.R. § 401.15, but it has adopted effluent standards under this subsection only for manufacturers and formulators of aldrin, dieldrin, DDT, DDD, DDE, endrin, toxaphene, benzidene, and polychlorinated biphenyls (PCBs). *See* 40 C.F.R. part 129. Although sediment sampling discussed in the environmental impact statement for the project found aldrin, DDT, DDE, DDD, and PCBs, which could be released into the water column by dredging and disposal, EPA's toxic pollutant effluence standards do not apply to such activities. None of the pesticide or PCB levels exceeded established screening levels.

e. Endangered Species (40 C.F.R. § 230.10(b)(3). The proposed action has been evaluated under the Endangered Species Act through formal consultation with the U.S. Fish and Wildlife Service and the National Marine Fisheries Service. Biological Assessments prepared by the Corps conclude that the proposed action may affect listed species or critical habitat. Biological Opinions are being prepared by the USFWS and the NMFS. The project will not proceed unless the biological opinions find no jeopardy or provide reasonable and prudent alternatives.

f. Marine Sanctuaries (40 C.F.R. § 230.10(b)(4). No marine sanctuary designated under Title III of the Marine Protection, Research, and Sanctuaries Act of 1972 will be affected by the proposed action.

g. No Significant Degradation (40 C.F.R. § 230.10(c).

(1) As discussed in the EIS, the proposed action, including mitigation, would not result in significant adverse effects on human health or welfare, including municipal water supplies, plankton, fish, shellfish, or wildlife.

(2) Significant adverse effects on life stages of aquatic life and other wildlife dependent on the aquatic ecosystem, on ecosystem diversity, productivity, or stability, or on recreational, esthetic, or economic values would not occur.

(3) No significant adverse effects on aquatic ecosystem diversity, productivity and stability are expected due to avoidance and mitigation of impacts.

(4) No significant adverse effects of the discharges are expected on recreational, aesthetic and economic values, again due to avoidance and mitigation of impacts.

h. Minimization of Impacts (40 CFR § 230.10(d)). Appropriate steps to minimize potential adverse impacts would be specified in the dredging contracts and/or dredging orders. With the inclusion of appropriate and practical conditions to minimize pollution or adverse effects to the aquatic ecosystem, the proposed discharge is specified as complying with the requirements of Section 404(b)(1) guidelines.

On the basis of the factual determinations and findings made above, I conclude that the proposed disposal sites for discharge of dredged materials under the Integrated Feasibility Report for Channel Improvements in the Columbia and Lower Willamette River Federal Navigation Channel comply with the Guidelines at 40 C.F.R. Part 230.

Date:_____

RANDALL J. BUTLER
Colonel, EN
Commanding