ORDER NUMBER: 512
DATED: SEPTEMBER 13, 1976

BEFORE THE WASHINGTON STATE

ENERGY FACILITY SITE EVALUATION COUNCIL

In the matter of Application No. 74-1 of PUGET SOUND POWER & LIGHT COMPANY, a Washington Corporation.	APPLICATION NO. 74-1 (Skagit) FINDINGS OF FACT, CONCLUSIONS OF LAW AND ORDER

This matter came on regularly for hearing pursuant to due and proper notice to all interested parties on May 22, 1975, at Sedro Woolley, Washington, before members of the Washington State Thermal Power Plant Site Evaluation Council and Legal Examiner C. Robert Wallis. The initial hearing phase in this matter, commencing May 22, 1975, was concluded July 11, 1975; hearings were held on 25 days during the stated period. Motions to reopen the hearing were presented by intervenors and Applicant and were granted, in part, by Council order dated March 3, 1976. Pursuant to said order, reopened hearing sessions were held on March 18 and April 14, 15, 19, 20 and 21, 1976.

Council members who participated in this proceeding, and the agencies they represent, are the following:

THOMAS STACER Acting Chairman	Utilities and Transportation Commission

BRUCE REEVES	Department of Natural Resources
DAVID GUIER	Department of Emergency Services
JOHN CLARK	Park and Recreation Commission
GERALD PELTON	Interagency Commission for Outdoor Recreation
SAM REED	Department of Social and Health Services
GEORGE HANSEN	Department of Ecology
LAWRENCE BRADLEY	Department of Commerce and Economic Development
VIRGIL CUNNINGHAM	Department of Agriculture
RALPH LARSON	Department of Game
FRED CLAGGETT	Office of Planning & Community Affairs
J. E. LASATER	Department of Fisheries
CLAUDE LAKEWOLD	Office of Program Planning & Fiscal Management
HOWARD MILLER	Commissioner, Skagit County

In addition, Russell Albert, Department of Highways, attended sessions of the reopened hearing as a non-participating observer.

The parties were represented as follows:

APPLICANT: PUGET SOUND POWER & LIGHT COMPANY
By F. Theodore Thomsen
Douglas P. Bieghle
Douglas S. Little
William F. Baron and
James Lisbaaken
Attorneys at Law
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Seattle, Washington 98104

INTERVENORS: SKAGITONIANS CONCERNED ABOUT NUCLEAR PLANTS (SCANP)
HELEN DAY and RONALD CARSTENS
By Roger M. Leed
Attorney at Law
540 Central Building
Seattle, Washington 98104

SKAGIT ENVIRONMENTAL COUNCIL
By Alfred G. Rode
Attorney at Law
202 Fairhaven Avenue
Burlington, Washington

MEMBER AGENCIES:

DEPARTMENT OF SOCIAL AND HEALTH SERVICES
By James Humphrey
Assistant Attorney General
Temple of Justice
Olympia, Washington 98504

DEPARTMENT OF FISHERIES
and DEPARTMENT OF GAME
By James T. Johnson
Assistant Attorney General
Temple of Justice
Olympia, Washington 98504

COUNSEL FOR THE ENVIRONMENT
By Malachy Murphy
Deputy Attorney General
Temple of Justice
Olympia, Washington 98504

Darrel Peeples, Assistant Attorney General, Counsel for the Council, also participated in the initial session of the hearing, and his successor, Thomas Carr, Assistant Attorney General, participated in the reopened session of the hearing.

In addition, testimony in the nature of public testimony was presented by members of the Whatcom County Energy Council, assisted by Richard Baum, Attorney at Law, 203 West Holly, Bellingham, Washington.

The following witnesses, called by Applicant, presented testimony:

Warren J. Ferguson	George Y. Lou	James W. MacIsaac
Bronislaw S. Schicker	Edwin Rabin	Merlyn J. Adair
Frederick C. Mikels	Lauren R. Donaldson	Bruce A. Bolt
Howard R. Summers	Ivan L. Stark, Jr.	Howard A. Coombs
Wilfred J. Finnegan	David Myhra	Gerald A. Miller
Kermit H. Larson	Richard Swartzell	John H. King
Johnathan P. Houghton	Kent P. Anderson	James K. Leslie
David A. Munsell	David H. Knight	Thomas W. Crosby
Timothy A. Reichard	Gordon W. Jacobsen	Ralph H. Talmage

The following witnesses, called by intervenors SCANP, Carstens and Day, presented testimony:

Franklin I. Badgley
Robert Norton
Eric S. Cheney
John Ellingson
L. Douglas DeNike
David C. Brubaker
Dave Milne
Gardner M. Brown
Edwin C. Heilman

The testimony of Russell F. Orrell was presented by the Departments of Game and Fisheries, and the testimony of Stewart Smith, Norman H. Rasmussen, Robert S. Crosson and Robert H. Klug was presented by Counsel for the Environment.

Ninety-seven witnesses, appearing as members of the public, presented testimony during the course of the hearing. The testimony of Scott Clark was presented by the Federal Energy Administration.

Thirty-three volumes of testimony, containing 5,933 pages, constitute the transcript in this matter, and 166 documents were received in evidence.

The members of the Council voting on this matter, having heard or read the evidence and having personally considered the entire record in this matter, the Council now makes and enters the following Findings of Fact and Conclusions of Law.

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FINDINGS OF FACT

A. History of Proceedings.

1. Puget Sound Power and Light Company (Applicant), a Washington corporation, on March 28, 1974, caused to be filed with the Washington State Thermal Power Plant Site Evaluation Council, now named the Washington State Energy Facility Site Evaluation Council (the Council), an application for certification, pursuant to RCW chapter 80.50, of a proposed site (the Site) located in Skagit County, Washington (the County), for a proposed thermal power plant, the Skagit Nuclear Power Project Units 1 and 2 (the Project). This application, denominated Application No. 74-1, as revised by Revisions 1 through 7 filed thereto by Applicant with the Council, is referred to herein as the "Certification Application" (Officially Noticed Document No. 4). As specified therein, the Certification Application appropriates by reference certain portions of the environmental report (ER) and the preliminary safety analysis report (PSAR) submitted by Applicant to the United States Nuclear Regulatory Commission (NRC) for the Project (Officially Noticed Documents Nos. 5 and 6).

2. Pursuant to RCW 80.50.090(1) and (2), public hearing was held at Sedro Woolley, Washington, on May 13, 1974, and by order entered May 27, 1974, the Council determined that the

site is consistent with and in compliance with Skagit County and regional land use plans and zoning ordinances. In conjunction with rezoning of the site for Project use, agreement (the Rezone Contract) was entered into by and between Applicant and Skagit County on March 26, 1974. The parties to the Rezone Contract intend that said contract provide significant assurance that the Project will be compatible with surrounding areas and will produce minimal adverse effects on the environment and affected communities. Therefore, the Council endorses and supports the intent of the Rezone Contract.

3. By orders entered August 14, 1974, pursuant to WAC 463-08-025(b), the Council admitted as intervenors to this proceeding (a) the Skagit Environmental Council; (b) Skagitonians Concerned About Nuclear Plants (SCANP); and (c) Ronald Carstens and Helen Day.

4. To achieve timely investigation and review of the sufficiency of the Certification Application, the Council by order entered May 27, 1974, appointed a prehearing examiner to conduct a series of prehearing conferences. The various guideline sections of the Certification Application were divided into four categories, and a schedule was established for the submission of reports on each category by Mathematical Sciences

Northwest, Inc., the independent consultant retained by the Council for this proceeding, and for the submission of comments and questions by the state agencies represented on the Council, Counsel for the Environment, and the Intervenors. By means of this procedure, an investigation and review of the sufficiency of the Certification Application was accomplished by the Council and all parties to this proceeding, and prehearing conference orders were subsequently issued by the Council to record results of the process. During this phase of the proceeding, Applicant submitted substantial additional and revised information in response to comments and questions there raised, and by means of seven revisions to the Certification Application filed by Applicant with the Council, said information was incorporated into the Certification Application. Considering the foregoing, and in view of the entire record in this proceeding, the Council finds that the Certification Application as presently constituted is in compliance with the Council's topical guidelines, WAC chapter 463-12. Pursuant to chapters 80.50 and 34.04 of the Revised Code of Washington and to pertinent sections of the Washington Administrative Code, public hearing on the Certification Application was convened at 10:00 a.m. on May 22, 1975, in the Sedro Woolley High School Little Theater, Sedro Woolley, Washington, before members of the Council and Legal Examiner C. Robert Wallis. This hearing was conducted as a contested case under chapter 34.04 of the Revised Code of Washington.

6. The initial session of the public hearing herein continued for a total of 25 days: in Sedro Woolley, Washington, on May 22 and 23, 1975, and in Olympia, Washington, on May 27, 28 and 29; June 3, 4, 5, 10, 11, 12, 13, 17, 18, 19, 24, 25 and 26; and July 1, 2, 3, 8, 9, 10 and 11, 1975. The transcript of the initial hearing session constitutes 26 volumes and totals 5,069 pages. This transcript stands corrected as provided in the Examiner's Proposed Order Granting Motion to Correct Transcript, In Part (certification portion), dated May 3, 1976, and affirmed and adopted as the order of the Council on May 24, 1976. The exhibits admitted in evidence during the initial session of this hearing are listed in Appendix A, attached hereto, and by this reference made a part hereof. Documents officially noticed during this session of the hearing are listed in Appendix B, attached hereto and by this reference made a part hereof. During this session of the hearing, Applicant presented 24 witnesses; Intervenors SCANP, Carstens and Day presented 9 witnesses; Counsel for the Environment presented 4 witnesses; the Department of Fisheries presented 1 witness; and 97 members of the public presented testimony.

7. Motions to reopen the evidentiary hearing in this matter were filed on November 1, 1975, by Intervenors SCANP, Carstens and Day, and on February 6, 1976, by Applicant. By order dated March 3, 1976, the Council granted Applicant's motion and granted, in part, Intervenor's motion and ordered that the

public hearing be reopened for the purposes and in the manner set forth in said order. Pursuant thereto, a reopened session of the public hearing was convened at 10:00 a.m. on March 18, 1976, in Olympia, Washington, before Legal Examiner C. Robert Wallis and was thereafter continued before the Council and the Examiner for hearing sessions on April 14, 15, 19, 20 and 21, 1976. Transcript of this reopened session constitutes seven volumes totaling 864 pages. Exhibits admitted in evidence during the reopened session are listed in Appendix AA, attached hereto and by this reference made a part hereof. During the reopened hearing session, pursuant to the Council's order of March 3, 1976, Applicant presented eight witnesses and Intervenors SCANP, Carstens and Day presented one witness.

8. Review of the transcript, Volumes 26 through 31, inclusive, indicates that corrections thereto are appropriate and necessary. Corrections which should be made to said transcript are set out in Appendix C, attached hereto and by this reference made a part hereof.

8A. In a companion proceeding, the Council has previously approved issuance to Applicant of a National Pollutant Discharge Elimination System (NPDES) Permit and a Section 401 Certification for the Project. This proceeding is referred to herein as the "NPDES proceeding" (Officially Noticed Document No. 3).

B. General Matters.

9. The Site consists of the plant site plus certain associated areas. The associated areas are those on which related and supporting facilities and associated transmission lines for the Project will be located. Legal descriptions of the plant site and the associated areas are as set forth in the recommended Site Certification Agreement for the Project which is attached hereto as Appendix D, and by this reference made a part hereof. Said agreement is referred to herein as the "Certification Agreement".

10. The plant site, consisting of approximately 1,500 acres, is located on the north side of the Skagit River Valley in Skagit County, Washington, approximately five miles east northeast of Sedro Woolley, Washington, approximately one mile north of the Skagit River, and elevated approximately 300 feet above the river flood plain. The Skagit River is a major recreational resource of the State of Washington, heavily exploited by fishermen, boaters and sightseers. It is a major attraction for visitors to the State. The Skagit River Valley is a productive and important agricultural area as well as being scenic. Specific features and characteristics of the plant site and associated areas and their environs are set forth in the Certification Application.

11. The Project consists of two nuclear-fueled electrical generating units (Units 1 and 2), together with the facilities required for construction or operation of these units or otherwise associated with them. Each of the nuclear generating units will have a nominal net electric power output of 1,288 MWe, and each will include a boiling water reactor heat source, a turbine generator, a natural draft cooling tower and other facilities required for the generation and transmission of electric power. Unit 1 is scheduled to commence commercial operation in mid-1983; Unit 2 in 1986. Other facilities forming a part of the Project include the Ranney collector wells, the discharge facilities, the temporary barge off-loading facility, plant access roads, a railroad access line, associated transmission lines, intake and discharge pipelines, sanitary sewer pipelines, a transmission substation, a fish rearing facility, a visitors' information center and other related and supporting facilities. Specific features and characteristics of the facilities comprising the Project are set forth in the Certification Application.

12. Puget Sound Power and Light Company, Applicant, is a regulated investor-owned electric utility operating within the State of Washington, having principal offices in Bellevue, Washington. It serves approximately 409,000 customers in an area of approximately 3,200 square miles, principally in the Puget Sound region of Western Washington, and including a portion of Kittitas County in the central portion of Washington State.

13. Applicant is originator and sponsor of the Project. Applicant will retain an ownership interest in the Project of 40 percent. Portland General Electric Company, Pacific Power and Light Company, and the Washington Water Power Company have agreed to share ownership of the Project with Applicant on a joint-ownership basis as tenants in common, with the undivided ownership share of each participant being as follows for both units.

Participant	Ownership Percentage
Applicant	40%
Portland General Electric Company	30
Pacific Power and Light Company	20
Washington Water Power Company	10
TOTAL	100%

Each owner will pay its ownership percentage of the cost of construction of the Project and will bear its ownership percentage of all obligations and liabilities associated with the Project. Each owner of a percentage in the Project will own and control a like percentage of the electrical output of the Project. Obligations placed upon Puget in the NPDES Permit and the Certification Agreement herein, are borne equally, jointly and severally by all Project participants, with Puget, as sponsor, bearing primary responsibility for compliance as among the participants.

14. Pacific Power and Light Company is a regulated investor-owned electric utility serving customers in six western states, including Washington, and having principal offices in Portland, Oregon. Portland General Electric Company is a regulated investor-owned electric utility serving customers in Oregon and having principal offices in Portland, Oregon. Washington Water Power Company is a regulated investor-owned electric utility serving customers in Washington and Idaho and having principal offices in Spokane, Washington.

15. Agreements of the Project participants are set forth in Exhibits 80.1a and 80.2a. Pursuant to said agreements, Applicant has become a participant, and will own a 20 percent interest, in a proposed Pebble Springs Nuclear Plant, sponsored by Portland General Electric Company, consisting of two 1,260 MWe nuclear generating units to be located near Arlington, Oregon.

C. Geology and Seismology.

16. The proposed plant site is situated on a glaciated bedrock bench in the foothills of the north Cascade Mountains. The bedrock consists of metamorphic rocks of the Shuksan plate in the northeastern part of the plant site overlain by sedimentary rocks of the Chuckanut formation in the southwestern part. The Shuksan thrust plate has been inactive for at least 60,000,000 years. The reactors and other category one structures will be founded on sedimentary bedrock. Cooling towers will be founded upon the metamorphic rock.

17. Accurate geologic interpretation, particularly tectonic and seismic analysis, are difficult to make in Western Washington for two primary reasons. First, because of the area's historically recent settlement, seismic observations which are capable of meaningful interpretation by present-day geologists and seismologists, go back for a relatively short time. It is only since the middle third of the 19th Century, when Caucasian settlement began in earnest, that any kind of written records are available in a quantity or in a form as to permit more than the purest speculation. This time span forces reliance upon presently extant objective data for analysis of pre-"settlement" events. Second, objective data from which accurate interpretation of prehistoric events may be made tends to be thoroughly disguised because of subjection of a substantial portion of Western Washington to repeated glaciation. This glaciation had two effects: first, advancing glaciers tended to gouge away surface features and their weight may have tended to depress portions of the earth's crust; in addition, glacial till, which is the name of debris scoured away by the glaciers, was deposited by retreating glaciers in levels to hundreds or perhaps exceeding a thousand feet in depth in certain areas within the Puget Sound region. First the scouring, then the masking by the deposited till, have completely disguised surface evidence of topographic features which, if visible, could provide significant clues as to underlying geology and tectonic phenomena.

18. The Council recognizes that many volumes of testimony and numerous documentary exhibits have been entered

into this record upon the subjects of geology, seismology and volcanism. The Council believes that the information thus introduced provides persuasive evidence substantiating the conclusions which we reach. We believe that the experts who testified on behalf of the parties are learned, well-qualified and sincere. At the same time, we recognize that at virtually any moment an earthquake, a volcanic eruption, or a newly discovered technique may, or perhaps only the passage of centuries will, provide the information necessary to prove the existence or nonexistence, the capability or noncapability, or the activity or nonactivity of the real and the postulated faults which were discussed on this record. This Council must make its decision upon the basis of the record before it, which we believe to reflect the present state of knowledge on area geology and seismisity, and view and weigh that evidence as reasonable men would view and weigh it in order to base our findings and conclusions concerning site suitability. The Council undertakes this task in full recognition of the magnitude of its decision, both in terms of the dollars proposed to be invested and in terms of the potential adverse effects if such a project were to be situated upon an unsuitable site.

19. The Council does not believe it possible, on the basis of the evidence presented, to conclude that northern and southern areas of the State may be differentiated and positively indentified as falling within independent tectonic

regions. It is recognized that there are some identifiable features apparently unique to the so-called northern and southern areas. Too many unknown factors, however, exist to permit a conclusion that the regions are, seismically, relatively independent: uncertainties as to the precise nature of subcrustal tectonic features, the nature and origins of the apparent vast depression upon which Seattle apparently is situated, and the inability of present geologic science to provide unequivocal reasons for causes of the severe, deep earthquakes which have been observed near Seattle and Olympia in recent years, lead us to adopt the view expressed by witness Rasmussen, that the western portion of Washington State is not seismically divisible.

20. Applicant has conducted an extensive geologic survey to determine geologic conditions of the plant site region. Its investigative work included geological mapping, extensive on-site drilling and trenching programs, a review of available literature on the geology and seismology of northwestern Washington, evaluation of remote sensing data, geophysical surveys, evaluation of several sets of marine seismic data, and studies of the December 14, 1974, earthquake and related aftershocks occurring in the site vicinity. Witnesses presented by Applicant, Intervenors and Counsel for the Environment presented the results of individual exploration and research as well as learned analysis of others' research. Information is presented and analyzed in this record which is adequate for the Council to determine

the suitability of the plant site from the points of view of geology, seismology, volcanism and engineering geology.

21. No active or capable faults have been identified within five miles of the plant site. Witness Cheney, observing Day Creek and Gilligan Creek lineations, postulated the existence of faults thereon. Lineations, or lineaments, are, as the names suggest, topographic features showing alignment. While such features may indicate the existence of faults, presence or absence of a lineation is only one indicator, not conclusive in and of itself, of the existence of a fault. No other evidence is shown of record which would corroborate the existence of a fault or faults in conjunction with these lineations. If faulting were present along the lineations, other evidence might reasonably be expected to exist. Despite geologic mapping of the areas as conducted by Applicant, no such additional evidence is shown to exist. Consequently, information in this record precludes the conclusion that the asserted faulting exists.

22. Intervenor's witness, Dr. Cheney, postulated the existence of a fault zone running northwesterly from Lake Chaplain to Bellingham Bay and thence upon the Strait of Georgia to the Campbell River region. Taken on balance, the considerable evidence presented concerning this postulated fault leads us to the finding that its existence remains, at this time, speculative. Because of the magnitude of this postulated fault,

and its proximity to the plant site, we feel it appropriate to review herein the evidence leading to our conclusion that the postulated fault remains speculative and that the threat of hazard posed to the plant site by the possibility of its existence remains small.

(a) During the initial hearing session in this matter, Dr. Cheney postulated a fault passing within five to ten miles of the plant site based upon observation of a lineament trending northwesterly and extension of a fault thought to pass through the Straits of Georgia. The Council believes that the lineament might also be attributable to glacial action or other cause as well as to existence of a fault. We note that apparent differences exist between testimony given and exhibits introduced at the initial session and material presented at the reopened session. We believe, however, that these differences could and did result from studied review of data over time and are indicative of an open scientific mind rather than uncertainty or vacillation.

(b) The Council recognizes that existence of the postulated Lake Chaplain to Bellingham Bay fault has not been observed by other geologists. We do not, however, attribute substantial weight to the absence of affirmative data; conversely, we recognize difficulties which are inherent in attempts to prove a negative or the absence of a postulated phenonomen.

(c) The witness' personal field work was confined to a relatively small area at the southeastern end of the postulated fault zone. He did not observe fault gouge or fault plane fracture and found no shearing trending to the northwest, but did find some northeasterly trending shearing with mineralization, indicating rehealing of fracturing. The witness' personal field work in the limited area explored therefore does not provide substantial evidence of existence of the postulated Bellingham Bay-Lake Chaplain fault.

(d) Geologic mapping by Timothy P. Lovseth, showing northwesterly trending faulting on the eastern side of Walker Valley, is less than one mile long. Field trips made by Lovseth and Applicant's geologists could not confirm the northwesterly trending fault contact. Lovseth's mapped northwesterly faulting does not appear to represent significant active faulting and does not constitute substantial evidence of the postulated Bellingham Bay-Lake Chaplain fault zone.

(e) A serpentinite zone identified by Lovseth west of Table Mountain, relied upon by Dr. Cheney as evidence of the postulated fault zone, may be a portion of the Shuksan thrust fault and does not alone constitute persuasive evidence of the postulated Bellingham Bay-Lake Chaplain fault zone.

(f) The Council finds it significant that of four asserted instances of offset along the trace of the witness'

postulated fault zone, the sense of relative motion along the asserted offsets alternates between right- and left-lateral. It is not reasonable to assume that the offset pattern results from motion along the postulated fault zone alone, and no persuasive alternative explanation appears of record. In addition, questions are present concerning the existence of two of the four claimed offsets. It appears unreasonable to correlate the Boulder Creek fault with the "Saturana Fault" inasmuch as they have opposite senses of motion and considerably different ages of last movement. The alleged Devil's Mountain fault offset is not shown by Lovseth, who has mapped the fault, and the postulated right lateral offset on the eastern end of the Devil's Mountain fault would be opposite to the relative motion which the witness hypothesizes at the western end of the same fault.

(g) Seismic reflection data reviewed by Applicant intersects the postulated fault yet fails to show the existence of major northwesterly trending faulting as postulated by the witness.

23. Dr. Cheney postulates the existence of a northeasterly trending "Hamilton Fault" beneath the Skagit Valley, passing some three miles from the plant site. The Council believes that the existence of this postulated fault remains speculative. The continuity of structure and stratigraphy across the Skagit Valley appears to preclude significant faulting

along the valley. Asserted offsets hypothesized as evidence of the postulated fault appear to have contradictory senses of motion. Gravity surveys of the Skagit Valley reveal an apparent ancient river channel or possible block fault buried beneath the alluvium constituting the present valley floor. It appears to be sinuous, and not fault controlled. Seismic reflection surveys in the waters off Fidalgo Island give no indication of faulting; a fault postulated along the access of the Skagit Valley would project, if long enough, into that area. Rocks of the Chuckanut formation may be observed both at the plant site and on the opposite side of the Skagit River Valley; outcrops of the formation on opposite sides of the river are not in alignment. Nonalignment is to be expected in such widely-separated outcrops of Chuckanut formation rocks inasmuch as the formation is typically deformed and bent where observed in Western Washington, reflecting refolding and crustal warping experienced by the region after its deposit. The Council concludes that the outcrops constitute portions of the same distorted but unfaulted structure.

24. The limited historical earthquake records available for analysis indicate that the largest and most damaging earthquakes in the Pacific Northwest have not occurred in the area surrounding the plant site. The tectonic flux map prepared by Rasmussen and others shows the plant site area as an area of minimal historical earthquake energy release. Based

upon this limited historical record, the plant site appears to be located in an area of lower observed seismisity than observed in many other areas of Western Washington.

25. A series of small earthquakes occurred on and after December 15, 1974, with epicenters in the Skagit Valley, approximately five miles southeast of the plant site. Analysis of aftershock data and velocity surveys reveals no evidence of surface faulting or continuance or capable fault, but rather that a shallow crustal adjustment of relief of local stress occurred, which leads us to the conclusion that this is a localized pocket of low-level seismisity. The small earthquakes in the Skagit Valley since December 15, 1974, appear to have no significant bearing upon the suitability of the plant site. The question which was raised in the draft environmental impact statement as to the significance of these small earthquakes appears to have been resolved.

26. Witnesses Crosson, Rasmussen and Smith testified that due to the absence of information about the seismisity of western Washington, they would assume it possible that an earthquake similar to the Olympia earthquake of April 13, 1949, could occur anywhere within western Washington, including near the plant site. The 1949 Olympia earthquake was an intensity VIII (on soil), magnitude 7.1 event. Witnesses Adair, Coombs, and Dobrin testified that the geologic and seismologic conditions of the area surrounding the plant site differ substantiantially

from those of the southern Puget Sound region and that the northern area has a lower seismic risk. The boundary between these two regions was identified as falling roughly along a west-northwesterly trending line through Marysville, about 20 miles southeast to the plant site. The Council rejects the "dual seismic region" theory postulated by Applicant's witnesses as being without the foundation of persuasive objective data. Earthquake recurrence curves calculated by witness Rasmussen appear to the Council to demonstrate some similarity between the two purported regions. The Council does not accept Applicant's relocation of the epicenter of an 1872 earthquake from southern British Columbia to central Washington, inasmuch as the data upon which this relocation was made is highly subjective in nature; much of it was compiled decades after the event; and other contributing factors such as water saturation could contribute to observed geologic phenomena such as sliding. The Council believes that in view of the gravity of the decision which it must make it must treat this event as though it may have occurred at either of the asserted epicenters.

27. Four factors bear upon the risk of damage from a given seismic event to a given structure. First is its magnitude, or the amount of energy released, commonly measured on what is known as the Richter scale. The second factor is depth of the hypocenter; the greater the depth, the more muffled its surface effect or crustal movement is likely to be. Third, as

distance from the earth's surface immediately over the earthquake's hypocenter increases, felt effect of the earth movement is likely to decrease. Finally, the nature of the material on which a structure is built has a significant effect upon the ground movement or intensity, structural damage being measured on what is known as a modified Mercali scale. Unconsolidated material, such as glacial till or alluvial deposits, tend to behave in an earthquake much as a liquid would behave and to quiver or resonate. This phenomenon tends to amplify the intensity or surface effect of a given crustal movement. Movement of the unconsolidated material may in many instances crush or twist foundations and cause structural damage. Structures built on bedrock, however, are not subjected to the intensification posed by unconsolidated materials.

28. The Council takes the view that information concerning geology, seismology and volcanism as it relates to operations at the plant site do not have exclusive relevance to radioactive safety and nuclear emissions. The question which the Council faces concerning seismisity and volcanism goes far beyond whether the plant can shut down safely or withstand events without radiological releases. Rather, the Council recognizes that Applicant seeks to build and operate a substantial facility at the plant site. Sums approaching or perhaps exceeding $2 billion may ultimately be spent on construction of the plant. The Council has an obligation to the People of the State of Washington to examine the proposed site with utmost care and to determine whether,

if the site is authorized, seismic or volcanic events might cause interruption of the generation of electrical power, disruption of service to consumers, substantial repair or maintenance expenses which may be borne by users of electricity, or other effects adverse to the health, safety, or welfare of the people of the State.

29. In evaluating the proposed plant site, the Council will assume that seismic risk within Western Washington is constant. We note that the United States geological survey expects future seismic risks in the Pacific Northwest to arise from the recurrence of deep subcrustal earthquakes such as those which have occurred in mid and southern Puget Sound, and we note that little is known concerning the existence or precise nature of sub-surface features in the plant site vicinity capable of causing such events.

30. Plant reactors and other safety-related structures will be founded on sedimentary bedrock of the Chuckanut formation. This foundation rock contains steeply dipping and narrow coal seams and sheared zones which will, if necessary be treated by dental excavation and backfilling with concrete.

31. The plant reactors and other safety related structures will be designed to withstand an earthquake of intensity VIII on the modified Mercali scale, which exceeds both the maximum

intensity VI historically experienced in the area of the plant site and the maximum intensity VII experienced on rock or dense soils in western Washington and equals the maximum intensity experienced historically anywhere on any foundation in western Washington.

32. The relatively flat slope of hillsides above and below the plant site, the steep dip of the bedding, foliation in the bedrock and the lateral support of alluvial fill in the valley preclude any jeopardy to structures on the plant site due to landslides above, upon or below the plant site.

33. A volcanic eruption of Mount Baker during the Project's life must be viewed as a distinct but relatively remote possibility. The Council finds from relevant evidence that possible hazards to the plant site from this activity might result (1) from the potential fall of ash and other volcanic materials upon the site and as such falls may affect the Skagit River; and (2) from a lava flow or a mud slide of large amounts of water-saturated materials high on the mountain. The Council finds that because of prevailing easterly wind patterns, relatively little airborne material is expected to reach the site; that plant structures will be built to withstand damage from any potential airborne volcanic material which might fall upon the site; that standby service water cooling tower basins will be covered and protected from any fall of volcanic material; that ash, other material, or mud is unlikely to affect operation of the Project's

water intake and outflow; that the chief danger to Project components from a mudslide or lava flow would be its potential, farther up on the mountainside, to cause waters to overflow dams; that there is a distinct but very remote possibility that mudslide-caused flooding may affect the Project water intake or outflow; and that the standby service water cooling system is a covered category I system located on the plant site, not subject to the hazards outlined above, and that the system will contain water sufficient to provide 30 days of cooling in the event of any disruption of the normal cooling water makeup system, allowing ample time for repair of any affected system or for shutdown.

34. With regard to geology, engineering geology, seismology and volcanism, we find that the proposed plant site is a suitable site for the nuclear power Project proposed.

D. Effects of Construction - Environmental.

35. Graded areas required on the plant site during construction will be clearcut, except for a 50-foot perimeter strip which will be thinned of older trees. A curtain of trees will be preserved at the southwest corner of the site for aesthetic purposes. Slash and stripped material from the logging and clearing operations will be kept in construction disposal areas; runoff and erosion from the disposal areas will be controlled. Applicant should be required to formulate, subject to County approval, a fire protection plan for use during the construction period.

36. During site preparation work, 5,200 feet of Black Creek will be permanently rerouted into a new channel, four temporary sediment retention ponds will be built; and external surface runoff will be diverted from graded areas. These efforts will substantially control erosion during construction. The diversion of Black Creek will result in the displacement and loss of some Cutthroat trout.

37. A new access road to the plant site from State Route 20 will be constructed to facilitate access and egress of construction personnel, heavy equipment and materials. A superspan elliptical culvert will be installed at the access road crossing of Wiseman Creek, resulting in rechannelization of approximately 310 feet of the creek bed. Use of the culvert is preferable to a conventional bridge at this location because a bridge would cost approximately twice as much as the proposed culvert, would require rechannelization of 150 to 200 feet of creek bed, and could have greater aesthetic impact than the proposed culvert. Installation of the culvert has been designed and will be timed to minimize impact upon the creek and the organisms in its ecosystem. Protective measures include riprapping to prevent erosion and siltation, steepening of the embankment to permit a quicker return to the old creek channel; introduction of bends into the new channel to create additional pools; covering of the bottom of the new creek channel with gravel and stones suitable for fish spawning and selection of a large span elliptical

structure to facilitate entry of light into the culvert. The re-channelization of Wiseman Creek is expected to alter the use of the creek by anadromous salmonids over a length greater than the actual alteration. Any resulting percentage loss in population is difficult to quantify. While little, if any, food will be produced within the culvert, food will be carried into the structure by the flow of the creek.

38. An access rail line will be constructed to connect the plant site with Burlington Northern railroad tracks at a point seven miles northwest of the site. Approximately 50 acres of land presently used for logging and agricultural operations will be disturbed. The route was chosen to minimize impact upon surrounding land and to minimize visibility from State Route No. 20. Several creeks and depressions will be crossed through the use of culverts, which will be installed during low water flow conditions.

39. Installation of Ranney collector wells will not disturb the Skagit River. Sand and gravel removed during installation will be used for access roads or will otherwise be suitably disposed. In order to stabilize the riverbank along the proposed Ranney collector site, existing riprap will be repaired and extended.

40. A 35,000 foot pipeline for makeup water and a 37,000 foot pipeline for the discharge will be constructed by

normal trenching methods. At points where stream beds are crossed, pipelines will be placed beneath the streams during temporary rerouting of the streams. Stream crossings will be constructed during low water flow conditions. A sewer line connecting the plant sewage system with the Sedro Woolley municipal sewerage system will also be constructed.

41. The Project discharge diffuser will be located on the bed of the Skagit River near Sedro Woolley, at a point where the river channel is relatively stable. The timing and final method of diffuser installation have not yet been determined. Provision is made in the Certification Agreement herein that timing and procedures for installation subject to Council approval will result from consultation with the Department of Fisheries and the Department of Game.

42. Reactor pressure vessels will be transported up the Skagit River by barge and off-loaded at a temporary barge off-loading facility to be constructed on the north bank of the river near Sedro Woolley. A temporary cofferdam, projecting approximately 15 to 20 feet into the river, will be installed during construction of this facility. After the reactor vessels are off-loaded at this facility, they will be transported via county roads and the new access road to the plant site. Following delivery of the second reactor vessel, the facility will be left for public use or the disturbed shoreline area will be

restored. Such further provision may be made as is appropriate under the circumstances subject to consultations among Applicant, Skagit County and the Council.

43. Transmission lines to be constructed in connection with the Project are described in Section 110(1) of the Certification Application as supplemented by the record herein. Construction of the new 500 kV lines will require removal of all large trees, but smaller trees, brush and ground cover will remain. There appears to be no need for new access roads in view of existence of a number of logging roads in the vicinity. Construction methods utilized and final design of structures built in connection with the transmission lines will be based upon criteria, methods and practices suggested in state and federal publications relating to transmission line construction and should be subject to review and approval by the Council.

44. The plant site and other construction areas contain no terrestrial biota habitats that are unique to the site region nor do they constitute unique habitats to any rare or threatened species. The primary impact of construction on terrestrial biota will be loss of habitat. Project structures and pavement will permanently replace approximately 150 acres of habitat. Animals in these areas will either emigrate to similar surrounding habitats or die from predation. Construction activities will temporarily affect, in a similar manner, an additional 350 acres by converting areas which vary from forests to clearcut habitats into recently cutover, open-type habitats or barren lands. Except

for those areas which will be maintained as lawns or as rights of way, the affected acreage will be landscaped, restored or will undergo secondary ecological succession during plant operation, resulting in restoration of habitat and species characteristic of the area prior to construction. In addition to habitat modification and loss, construction activities will result in modification of animal movements and behavior patterns, interfere with animal communication, increase physiological stress on animals and cause destruction of some individual animals.

45. Each winter for a number of years, significant numbers of bald eagles have congregated in the Skagit River Valley, which constitutes a uniquely important habitat for the species. In the reaches upstream from Rockport, a bald eagle sanctuary is to be located. Witnesses Ellingson and Reichard presented testimony concerning potential Project construction effect upon the eagles' behavior. We find that the species in question has a degree of tolerance for the activities of man which is well documented; such that in view of the distance of the proposed sanctuary from the site, the topography of the Skagit Valley and the observed behavior of the eagles along the Skagit River, the Council finds that the Project construction will not adversely affect the bald eagles along the Skagit River nor interfere with the sanctuary.

46. Construction of transmission lines, access railroad, and the intake, discharge and sewer pipelines, will affect

the aquatic environments of the creeks crossed by the various rights of way. The major effect of pipeline construction on the creeks will be minor to moderate siltation for a relatively short time during and after construction of each crossing. In addition, pipeline crossings will result in a temporary loss of stream bank vegetation at the point of crossing. The access railroad will require little clearing of stream bank vegetation. Its right of way preparation will also result in a minor degree of siltation at each point of crossing for a relatively short time during and after construction. The pipeline and access railroad construction will have almost negligible long-term biological impact on the creeks that are crossed.

47. Because construction and operation of the transmission lines will require that larger trees within the rights of way be removed, at points where the rights of way intersect creeks, a small reduction in cover may result in a slight temperature increase in the creek. Any logging activity necessary for construction of the transmission lines will result in some siltation of relatively short duration. Control measures will be used to prevent significant impact.

48. The only impact on aquatic biota of construction of the Ranney collector intake system will be from the riprapping necessary to stabilize river bank in the area. Installation of riprap could cause local siltation immediately downstream

of the affected area, of short duration and of minimal impact on the aquatic biota of the river.

49. Installation of the diffuser in the Skagit River will result in some local disruption of benthic invertebrates and may cause local siltation. The area of stream bed which will be disturbed is small in proportion to the river size. Siltation will be of relatively short duration, but could cause temporary reduction of feeding efficiency for fish downstream of the area. The result would be a slight decrease in growth of aquatic biota over a limited area.

50. Potentially adverse effects upon the aquatic environment of siltation resulting from point source discharges associated with the plant site construction activity were examined extensively during the NPDES proceeding. Witnesses Houghton and Brubaker presented further testimony at the instant hearing on the subject of siltation as it relates to both point source and nonpoint source discharges. The Council's consideration of the effects of siltation is thus based upon the evidence presented at both the NPDES hearing and the instant hearing. In view of the levels and duration of the siltation that will result from the various construction in and along the Skagit River and the affected creeks, and taking into account the limitations, monitoring requirements and other restrictive provisions of the NPDES Permit and the Certification Agreement, the Council finds that long range adverse effects resulting from siltation will be

minor and could not result in permanent damage to the aquatic environment.

51. In view of all the evidence presented during this and the NPDES hearing concerning the nature and effects of Project construction, both on and off the plant site, and the limitations and requirements within the NPDES Permit and the Certification Agreement, the Council finds that the Project in its entirety has been designed and construction has been planned in a manner which will produce minimal adverse effects on the environment, the ecology of the land and its wildlife, and the ecology of the waters and their aquatic life.

E. Effects of Construction - Socioeconomic.

52. Provisions of the Rezone Contract between Skagit County and the Applicant as incorporated into the Certification Agreement provide significant assurance that construction of the Project will produce minimal unmitigated adverse effects on that community. Articles 5.2 and 5.3 of the Rezone Contract, which provide for construction impact payments by Applicant to school districts and law enforcement agencies in Skagit County, should serve to mitigate any adverse impacts on school districts and law enforcement agencies which might otherwise occur during construction. The Council notes that this agreement is effective only as to the County and local jurisdictions therein. It

is further noted that adverse impacts may be felt by surrounding communities outside the boundaries of Skagit County. The Council believes that the Certification Agreement herein should contain provisions for impact payments to local jurisdictions which demonstrate to the Council that they are adversely affected by plant construction in Skagit County. This and following provisions are consistent with Puget's stated record position that it will willingly bear responsibility for significant adverse project effects.

53. Construction of the Project may bring about an increase in crime, school enrollments, transient housing, auto-oriented businesses such as taverns and drive-ins, and moderate social change. It is possible that as many as 35 percent of the construction work force and their families will become new residents of Skagit County. Project construction may have additional socioeconomic effects in that it may tend to drive up wages in Skagit County and may tend to erode the agricultural work force which is needed by valley farmers. While real estate taxes may increase, creating difficulties for those on fixed incomes, they may also decrease, in view of the substantial addition to the County's tax base. Rents may also increase, with a similar effect, and price levels generally may show inflationary tendencies due to the construction. We believe that, taken in its entirety, the record herein, including the Certification Application, the Draft and Final EIS, the transcript of

hearing testimony and the documentary evidence, allow us to judge the possible parameters of socioeconomic effect of the Project. Applicant's chief witness on socioeconomic effects to be anticipated from the Project presented evidence which consisted largely of data based upon interviews with individuals who were selected on a non-scientific basis, which elicited subjective reports and impressions, rather than objective data, and which were based upon interchanges of information, rather than elicitation of the subject's own views without interviewer input. Precise definition of socioeconomic effects is rendered difficult because of a shortage of "hard" or objective data or statistical review of objective data. In many instances, testimony and evidence were nonspecific, imprecise, and subjective. We recognize that to a great extent this represents the state of present knowledge. Based upon the evidence in this record, the Council finds that construction of the project may have adverse socio-economic effects upon areas outside Skagit County or upon resources and facilities not protected by provisions of the Rezone Contract. Consequently, tax revenue and Rezone Contract provisions may not be sufficient in all cases to alleviate such adverse impacts. We believe that provision should be made for an analysis of socio-economic effects of project construction on a regular basis by Puget in conjunction with the State and County agencies. In the event that monitoring shows substantial unmitigated adverse project caused effects, the Certification Agreement should provide for a means by which the Council may require the institution of mitigative plans or other such action as the Council may deem to be necessary. The

Certification Agreement should also make appropriate provision for research, recognition and mitigation of such impacts.

54. The population of Skagit County is 53,000. The County does not have a large supply of skilled labor. The major occupations are farming and forestry. The Project work force is expected to peak at approximately 3,100 workers in 1979 or 1980. Applicant estimates that approximately 10 percent of the work force will relocate into the County, whereas the Skagit County Planning Department estimates that the influx may range as high as 35 percent. In any case, there is at present minimal excess housing capacity in the County. Because arrival of the construction work force will occur gradually, over a period of time, and because it has been anticipated, private business interests can be expected to supply some new housing, existing public resources and facilities in the area may be burdened. We note that the Skagit County Planning Department, in commenting on the NRC final environmental statement for the Project, expressed the opinion that adequate measures can be taken to mitigate any adverse impacts arising from construction worker influx. Specific provisions in the Certification Agreement should be made to facilitate such mitigation.

55. There are no major population concentrations within the Skagit Valley nor is there any major industrial development. The Valley contains only one principal east-west highway, which is two lanes wide, with narrow shoulders,

bearing heavy summer tourist traffic. Two witnesses, MacIsaac and Klug, presented information to the Council concerning expected traffic congestion from Project construction. The initial presentation of both individuals was based on data which was shown to be partially invalid. In our deliberations concerning expected traffic congestion, we have relied upon the substituted and valid data.

(a) Even without construction of the Project, the existing road network will be overloaded by 1979. Traffic associated with the Project construction, if unregulated, will have a marked impact on traffic congestion in the vicinity of the plant site particularly during periods and seasons of peak traffic flow. Portions of the road system between Interstate Highway No. 5 and the plant site, especially in and around the City of Sedro Woolley, will experience at times marked overload conditions particularly during summer months, when heavy tourist traffic is experienced. Factors such as potential development of the former Northern State Hospital facility and possible construction of a new Ross Dam may exacerbate this overloaded condition. Road construction by the State Highway Department to relieve current congestion is anticipated, but will not be accomplished in time to serve Project construction congestion. Adjustments in peak hour travel behavior by road system users, natural traffic diversions to streets parallel to those approaching and exceeding overload conditions and some traffic engineering

improvements of a relatively minor nature can be expected to reduce the serious nature of the overload. In addition to causing recurrent delays and expense to motorists, these problems will make it difficult to evacuate the area within a reasonable time if an accident, seismic or volcanic event, other natural disaster or man-caused crisis requiring valley evacuation should occur during years of peak construction activity.

(b) Among the improvements presently anticipated by Applicant are left turn channelization at the intersection of Bacus Road and State Route No. 20 and at the intersection of the new access road and State Route No. 20. Possible improvements to the road system in and around Sedro Woolley range from left turn channelization at various intersections to expansion of the existing SR-20 roadway to four lanes between the east and west junctions of SR-20 and SR-9. Applicant has consulted with state and local officials to discuss and evaluate further the magnitude of the impact and the range of potential solutions. Applicant has assured the Council, and the Certification Agreement herein should require, that Applicant will continue to work with these officials to develop plans and methods designed to reduce the expected overloads.

(c) The Council recognizes that Project construction will be only one, although a substantial one, contributor to the expected overload conditions, and that portions of the state

highway and county road system in the vicinity of the plant site will be overloaded by 1979 simply by normal growth of traffic expected in the area even without Project construction. It is appropriate that the Certification Agreement herein requires Applicant to work with the State Highway Department and the County to minimize anticipated traffic congestion during the construction period.

(d) Because the incremental burden of Applicant's construction traffic is expected to be substantial, the Council believes it appropriate that Applicant fund the design and construction and widening and other improvements to SR20 in accordance with state and local requirements, institute such employee work regulations as might effectively reduce commuter traffic during the period June 1 to September 15 of each year during which construction work force totals 500 or more persons, including but not limited to alternate routing where available; mandatory car pooling; restriction or elimination of on-site or near-site parking within Applicant's control; institution of a staging area or areas at one or more points adjacent to Interstate Highway No. 5; provision of mandatory bus service from identified staging areas; staggering of work shift hours; or such other means as may be appropriate or effective under the circumstances. The total traffic during summer months attributable to Project construction should ideally not exceed the peak levels of a work force of 500 persons, and project related traffic during other periods should be minimized to the greatest extent possible.

56. There are no known significant historical or archaeological sites within the construction area, and Puget has retained the services of a competent archaeologist to perform the functions specified in Council Guideline WAS 463-12-150(7).

F. Effects of Operation - Environmental.

57. Potential adverse environmental and socioeconomic effects of operation of the Project are described in the Certification Application, in the draft and final environmental impact statements issued by the Council and in the record of this hearing. The Council has carefully considered all of these effects and its findings as to those having substantial potential significance are summarized herein.

58. The two natural draft cooling towers will release large quantities of heat and water vapor to the environment. As the warm, moist air condenses, cloud-like plumes will form. Due to bouyancy and momentum, the plumes will ordinarily rise far above the towers. The cooling towers will also release drift -- droplets composed of water and small but significant amounts of other chemicals -- which will either evaporate or drift in the air and precipitate upon the ground.

59. Applicant's quantitative descriptions of the plumes and drift deposition were derived from a computer model using inputs of the on-site meteorological data and the design

parameters of the towers. Precise descriptions are unknown. The Council finds that the data and methodology used by Applicant have given sufficient description of cooling tower releases for preliminary findings herein, but we concur with witness Badgley that data should be collected over longer periods of time -- a minimum of three years. In addition, we note that the final design of the cooling towers is not apparent on the face of this record and that relatively minor variations in tower configuration may have substantial effect upon the characteristics of both plume and drift configuration. Consequently, the Council believes that the Certification Agreement herein should require Applicant to (1) utilize baseline data collected over longer periods of time; (2) present its proposed final design for cooling tower construction for analysis of stated operational parameters, (3) advise the Council whether its analysis and review of any new data, in light of its final cooling tower design, significantly affects the evidence of record; and (4) allow the Council, on request, to review the collected data and designs and the analysis of Applicant and to review the implimentation of any modifications or mitigative measures which the Council deems necessary.

(a) The length of visible plumes will vary depending upon meteorological conditions and plant heat load. The maximum predicted length, occurring less than one percent of the time during winter months, is 12,500 feet. The average predicted summer and winter lengths are 980 and 4,300 feet, respectively. The Council believes, subject to receipt of data

herein to monitor the icing resulting from project operation and which might affect vehicular traffic and if such icing occurs to work with the Council, the Washington State Highway Department and the County.

(d) The drift will contain dissolved salts present in the cooling tower. The salts will be deposited upon the surrounding terrain, substantially in accordance with calculations of amounts and locations shown in the record herein. On an annual basis, maximum salt deposition from the drift is less than normal deposition from rainfall. Salt will not concentrate in the soil due to the relatively small annual amount of deposition, and due to leaching accomplished by rainwaters.

(e) There are many farms in the Skagit Valley, including some within five miles of the plant site, on which are raised strawberries and raspberries, crops particularly sensitive to airborne salt deposition. Concentration of salts in the drift will be greater than that of rainwater, and, if sufficiently high, may cause "salt burn" on salt-sensitive foliage. Based upon observations at other operating plant sites, upon the concentrations expected to be present here, and upon the incidence of natural rainfall, spotting is not expected to occur. To the extent that it does occur, it will be substantially limited to foliage within the plant site, is not expected to endanger the survival of trees or plants, and is not expected to affect animals.

(f) In conclusion, the Council believes that the cooling tower operation, subject to revised data and design plans to be supplied by Applicant, will not pose significant unmitigable adverse environmental impact.

60. Bald eagles presently tolerate substantial human activity within the Skagit Valley and are believed to migrate at high altitudes. The Council finds that the size of the completed Project and the cooling tower plumes will not drive bald eagles away permanently or disrupt their migration or migratory patterns.

61. Baseline data collected by Applicant demonstrates that the predominant migratory path of water fowl in the plant site area is at a lower elevation than that of bald eagles and follows the Skagit River and the flood plain. Data from another nuclear plant site, located directly in the middle of a migration path, indicates that the impact of large, tall structures on migrating birds is not substantial. We therefore conclude that the Project, during construction as well as operation, will not have a serious impact on bird populations using the Pacific flyway. Continued monitoring of bird kills should be required in the Certification Agreement.

62. Aesthetic impact is difficult to assess in light of the largely subjective nature of such a determination. Project structures will be visible from many points in the Skagit River Valley and beyond, and the Council finds that they will

be regarded as an unwarranted intrusion by some people and as an acceptable and even pleasing addition by others. Geographical placement of the Project, the screening effect of Bacus Hill, the buffer zone required under terms of the Rezone Contract, minimization of the number of minor structures and utilization of simplified shapes and finishes will minimize the aesthetic impact inherent in a project of this sort.

63. Cooling water requirements for operation of the Project will be met through use of a Ranney collector system consisting of four separate collectors or wells to be installed near the banks of the Skagit River. The top of the caisson for each collector will stand two feet above the 100-year flood and will emit a noise similar to the normal noise of a large electric motor. Operating noise should be subject to all applicable restrictions. General appearance of the collectors and pump houses will be designed to blend with the surroundings. Shrubbery will be used to hide fencing around the collectors. The Ranney system has a lengthy history of successful operation, and successful application of the system at the proposed site is expected.

64. The velocity of water moving vertically through the river bed into the aquifer of the Ranney collector system is computed to be approximately .001 feet per second, Particularly in view of normal river velocity, fish fry are not expected to be attracted by or drawn into the Ranney collector system. The Certification Agreement should provide for monitoring and for appropriate action in the event that any damage does occur to fish in the river as a result of intake operations.

65. The potential effects of Project discharge upon the aquatic environment of the Skagit River were discussed extensively during the NPDES proceeeding. During the course of this proceeding, witnesses Houghton, Brubaker and Orrell supplemented, and to some extent repeated, testimony in the earlier proceeding. The Council notes that it has issued an NPDES permit for the Project containing numerous conditions relating to the effect of plant construction and operation upon the Skagit River, which permit is incorporated into the Certification Agreement herein. Weighing all of the evidence, and in view of the NPDES permit and its provision, the Council finds that the Project has been designed and will be operated in a manner that will produce minimal unmitigable adverse effects upon the environment and on the ecology of the Skagit River and its aquatic life.

66. Radiological releases associated with the Project have been described and analyzed in the NRC final environmental impact statement and, to some extent, during the course of the NPDES proceeding in this matter. Reviewing all the available information, we find that the Project will have no measurable radiological impact on man, or biota other than man, and that its calculated radiological impact will be extremely small compared to the radiological impact of natural background radiation and to other radiation introduced into the environment.

67. In view of all of the evidence concerning the nature and effect of the Project operation and in view of the conditions within the Certification Agreement, the Council finds

that the location and operation of the Project will produce minimal unmitigable adverse effects on the environment, the ecology of the land and its wildlife, or the ecology of the waters affected and their aquatic life.

G. Effects of Operation - Socioeconomic.

68. Operation of the Project will require approximately 150 full-time employees. The population increase resulting from Project operation, therefore, is modest and will not have an adverse effect. Property values may increase disproportionately in the area surrounding the Project during its operation. If this occurs, and if real property taxes increase commensurately despite the tax base added to the County by Project construction, there may be an adverse impact on individuals with fixed incomes. The Council finds that existence and operation of the Project as such, particularly in view of present zoning requirements within Skagit County, will not cause or serve as a catalyst toward industrialization. Any trend toward industrialization or lack of such trend will be governed by factors governing industrialization generally and by the attitudes toward industrialization held by people of the area. It is recognized that construction and operation of the Project may affect those attitudes.

H. Need for Power.

69. "Energy" is defined as that number of kilowatt-hours consumed in a given time period. "Kilowatt hour" is an

energy term representing 1,000 watts of power used for a period of one hour. "Demand" in the electrical, as opposed to the economic sense, is the rate of energy used, expressed in watts, kilowatts or megawatts, at any given point in time.

70. Since 1960, Applicant has experienced annual energy load growth averaging approximately 8 percent per year, as shown on Exhibit 45, Table 100(4)-2 and Exhibit 80.3a. This average load growth in Applicant's service area has exceeded the northwest average of 6.8 percent and the national average of approximately 7 percent.

71. Since 1958-59, the West Group of the Northwest Power Pool has experienced an average load growth rate of approximately 6.8 percent. Exhibit 45, Table 100(4)-10, as updated by Exhibit 80.9Aa, shows the forecasted peak and energy loads and resources for the West Group for the period 1975-76 through 1986-87. The demand for electricity in the service areas of West Group participants is projected by the Pacific Northwest Utilities Conference Committee (PNUCC) to grow at a rate of approximately 5 percent per year through June, 1986.

72. Anticipated loads and resources of participants Washington Water Power Company, Portland General Electric Company and Pacific Power and Light Company are included within the West Group forecast and are shown separately in Exhibits 80.10a through 80.12a. Applicant annually prepares a long-range energy and peak

load forecast. Its 1974 and 1975 forecasts through 1986-87 and 1995-96 are shown on Exhibit 45, Tables 100(4)-3 and -4 and on Exhibits 80.4a and 80.5a.

(a) Previously, Applicant's energy forecasting was accomplished largely by extrapolation of historical trends and adjustment of short term portions of the forecast up or down based upon anticipated major customer or load growth variations. The difference in actual experience from these projections generally prove to be relatively minor and resulting from short-term weather or economic influences.

(b) Applicant's forecasting efforts are now directed towards attempting to appraise a number of influences on energy use in addition to the factors previously considered. In the fall of 1974, Applicant utilized three independent methods to reach its final long-term forecast for the 1975-1986 period. These included (1) a subjective forecast based upon general knowledge and expectations of factors affecting customer and load growth; (2) trend extrapolation techniques, adjusted for expected developments resulting in substantial low growth such as the Trident support facility, Alaska pipeline-related activities and Weyerhaeuser construction and development proposals at Federal Way, Washington; and (3) separate analysis of each component class of customer use -- residential, commercial and industrial -- in the light of identified relevant factors, including trends of population and customer growth, appliance saturation, changing customer use patterns, and electrical use

applications such as pollution control and waste disposal facilities, appliance efficiencies, insulation standards, conversion from other fuels and electric transportation developments. Applicant's 1974 system load was approximately 53 percent residential, 22 percent commercial and 25 percent industrial and other. The three separate forecasts based on these methods were then combined with reliance placed primarily upon the latter two techniques identified above. The resulting forecast is shown on Exhibit 44.

73. Increasing costs of oil and natural gas and uncertainties as to their future availability are causing shifts from these fuels to electricity. The proportion of Applicant's residential customers using electricity for space heating rose from 28 percent in 1970 to 34 percent in 1974. Approximately 70 percent of all new space heating installations in Applicant's service area are electric, and the expected continuation of this trend indicates that by 1980 approximately 40 percent of Applicant's residential customers will utilize electric space heating. Conversions of existing home heating plants, while presently few in number, may further increase Applicant's residential space heating load.

74. Changes in Applicant's rate structure and potential changes which may result from further study, are designed

to develop rates encouraging more efficient use of energy. The primary effect of this restructuring is to mitigate demand on peak.

75. Effects of recent conservation have been substantial. Conservation results primarily from sacrifice, such as enduring lowered interior temperatures and by eliminating apparent waste. Both of these factors are self-limiting, i.e., points are reached at which thermostats will not be further lowered and at which virtually all apparent energy waste is eliminated. Therefore, conservation accomplished in 1974 by existing customers cannot necessarily be duplicated in the future. Conservation will have some continuing effects, however. Building design, insulation standards and energy system designs, particularly in new construction, will tend to improve energy efficiencies. These factors have been recognized in Applicant's growth rate estimates. We note that, after adjustment for ambient temperature, actual loads differ from predicted loads by only 1 percent in 1974 and 1.3 percent in 1975. Specific information of the nature and detail described above in Findings 72-75 concerning Applicant's forecasts of expected load growth demand was not presented for other Project participants.

76. Forecasts were also prepared by Applicant's consultant, National Economics Research Associates, Inc., (NERA)

under the direction of its consultant, Dr. Kent P. Anderson, for both Applicant and the West Group of the Northwest Power Pool. This study indicates that consumption of electricity in Applicant's service territory will grow at a rate ranging from 5.1 to 7.1 percent per year for the period 1974 through 1980, and between 4.5 and 6.6 percent for the period 1974-1986. These estimates are presented in terms of a range in order to reflect uncertainties in economic and demographic factors as well as future levels of electricity prices and the prices and availabilities of competing fuels.

77. Applicant's forecasts and those of its consultant are consistent and are appropriate considering uncertainties inherent in the forecasting of electrical consumption.

78. The consultant's forecasts for the West Group of the Northwest Power Pool are consistent with those of the group itself.

79. Dr. Anderson also prepared forecasts for the states of Washington and Oregon, including sales for residential, commercial and industrial sectors only, but excluding sales to public authorities, sales to railroads and railways, interdepartmental sales and street and highway lighting sales. This forecast includes a factor in addition to those described in Finding No. 76, that of future trending in non-price-related growth in use of electricity per unit of output in the industrial sector.

80. Planned new thermal resources for the West Group of the Northwest Power Pool are shown on Exhibits 45 and 80.9Aa. The resulting surplus or deficiency of total net resources over total area load is also shown. Despite the planned addition of new generating resources, the region is expected to be energy-deficient in all years through 1986-87.

81. Additional large thermal resources cannot be constructed in time to meet regional needs before 1982. Consequently, the region cannot be assured of meeting its total load under adverse hydro conditions until the mid-1980's assuming that the planned new thermal resources currently in the process of licensing or under construction are, in fact, constructed and operated as scheduled.

82. Virtually all of the firm energy capability of the Columbia River is or will be utilized. Depending on reservoir water inventories additional low-cost peaking power will continue to be obtained from hydro resources, primarily from the addition of generating units at existing hydro projects, and to a smaller extent from development of new hydro projects. Operating economics are such that it is planned, and is appropriate, to utilize thermal generation for base or energy requirements and to utilize hydro resources for peaking capacity. Thermal power plants are proposed in order to supply growing firm energy requirements.

83. Applicant's generating resources are as follows:

(a) In 1975, Applicant owned generating facilities with a total net plant capability of 592,550 kilowatts. These facilities are described on Exhibit 45. In addition, it owns a 50 percent interest (330 megawatts) in Colstrip Units 1 and 2, a coal-fired plant under construction at Colstrip, Montana. Unit No. 1 commenced operation in November, 1975, and Unit No. 2 is scheduled for start up in mid-1976. Applicant will also own a 25 percent interest (350 mw) in the proposed Colstrip Units 3 and 4 (700 mw each).

(b) In 1975, Applicant purchased approximately 1,700 mw of firm capacity from hydroelectric projects located on the Columbia River through long-term contracts with various public utility districts owning the projects. This arrangement accounts for approximately 60 percent of Applicant's total firm resources. The source and amounts of contract hydro is shown on Exhibits 45 and 80.5a. Underlying contracts contain withdrawal provisions whereby the districts, upon giving proper notice under the contracts, can increase their respective withdrawal of plant output; this ultimately reduces Applicant's firm capacity from these purchases to 1,060 mw, a decrease of 640 mw. This figure, shown on Exhibit 45, Table 100(4)-4, line 5, is based on forecasted withdrawals by the various public utility districts and does not reflect maximum withdrawals.

84. Applicant is party to the Pacific Northwest Coordination Agreement, under which all parties are obligated to share forced outage reserves calculated pursuant to a probability formula. These reserves are carried on peak resources only. The sum of the peak reserves, shown on Exhibits 45 and 80.5a, is an estimate of the forced outage reserves which Applicant will be required to carry under that agreement. These reserves for 1984-85 amount to over 300 mw; this is less than the figure which would be required under prudent utility management if Applicant were not a party to the coordination agreement. Applicant carries no energy reserves, but the Northwest Power Pool in its planning through the PNUCC does include energy reserves for the purpose of meeting unexpected load growth in the amount of one-half of one year's load growth on utility type-loads.

85. Commencing in the fall of 1973, Pacific Northwest power users participated in an extensive program for conservation of electricity because of adverse hydro conditions. While this program was underway, a national energy conservation program went into effect which continued during 1974. Applicant's energy loads increased in 1974 by 2.8 percent over 1973 (3.1 percent on a temperature corrected basis). In 1975 its energy loads were 7.4 percent over 1974 loads. It is recognized that acute energy availability problems and conservation programs did not extend over this entire period -- during the first four months of 1975 Applicant's temperature-corrected energy loads were 5.3 percent over 1974 loads for the same months.

86. Through the mid-1980's demand on Applicant's system is estimated to increase by approximately 6 percent per year. Its ability to meet this expected growth depends upon timely completion of several resources. Its margin of net firm resources over total load is small through the late 1970's, and deficits begin to appear in 1979 and continue into the 1980's. Included in net firm resources are Applicant's share of Colstrip Units 3 and 4, Washington Public Power Supply System Plant No. 3, and Skagit Units 1 and 2. The loss or delay of any one of these large generating units could increase the indicated deficit in firm power resources, impairing Applicant's ability to carry out its statutory responsibility to provide its customers with an adequate and reliable power supply.

87. Surpluses and deficiencies of Washington Water Power, Portland General Electric, and Pacific Power and Light, with and without the Project, are shown on Exhibits 80.10a through 80.12a. The following is asserted, based upon forecasts of demand and supply:

(a) Washington Water Power, without its shares of Skagit Units 1 and 2, would be deficient with respect to peak and average energy from 1983-84 through 1994-95 and could not meet its firm load in Washington State during that period.

(b) Pacific Power and Light Company, even including its share of Skagit Units 1 and 2, will be deficient in energy

and peak from 1983-84 through 1994-95 and, without the Project, could not meet its expected firm energy load.

(c) The situation for Portland General Electric is similar to that of Pacific Power and Light.

88. A sharp reduction in forecast load would allow Applicant to postpone construction of a generating unit. It would not, however, eliminate the need for the Project, but would merely affect the time by which it is needed. An upward revision in forecasted loads during the 1976-86 period would present more difficult problems for Applicant to deal with. The lengthy regulatory process, as well as physical limitations on construction, would seriously limit or preclude its ability to add additional base-load energy resources or to accelerate the completion dates of planned resources.

89. By terms of the Pacific Northwest coordination agreement, each of its parties, including the Project participants, is obligated during each operating year to have available to it sufficient firm peak and energy resources to meet its firm peak and energy load forecasted for the year. A party entering an operating year with firm resources less than firm load would be in breach of the coordination agreement and would conceivably be jeopardizing operations of the regional interconnected system. Consequently, the utility's sole alternative appears to be curtailment of firm load to the extent necessary to balance its loads and its resources.

(a) If future electricity demand is overestimated, the result is a need to carry excess capacity for a period of time. Capital carrying costs, however, would be mitigated by several factors. First, because the growth of electricity demand will not be zero, the period of time in which excess capacity is observed would be limited. Second, during the time in which excess capacity existed, sale of surplus power on a temporary basis to utilities in neighboring regions is possible, although the line capacity and demand may be limiting factors. Third, replacement of some thermal generating units which have high operating costs with new generating units having lower operating costs might be accomplished, producing savings in overall thermal generation costs. Fourth, because of the probability of advance detection of a potential situation of excess capacity, construction programs could be extended, reducing incremental capital costs during the period. Finally, if plant construction cost escalation occurred at a rate in excess of the cost of capital financing, it would be less expensive to pre-build capacity in spite of the need to carry it as excess capacity over a period of time.

(b) If future electricity demand is underestimated, costs appear to be more severe. Because it is not generally feasible to accelerate additions to capacity, the possibility of brownouts would be enhanced. Costs to the regional economy in the form of lost production time, spoilage, injuries, damage

to capital equipment, and personal inconveniences might be of significant proportions. Longer term costs might include economic suppression and aggravated unemployment.

(c) Because potential excess generating capacity which might result from overestimating future demand would be temporary and have less negative impact upon the citizens of the State than allowing the capacity deficiency to occur, prudence and the public interest require that uncertainties as to demand forecasts and the scheduling of new generating resources be resolved on the conservative side at the potential risk of temporary excess capacity.

90. Weighing all of the evidence, the Council finds that the demand forecasts presented by Applicant are reasonable, that projections of future capacity are reasonable, that the additional electric power to be generated by the Project will be required to meet the future needs of the Pacific Northwest region, and that it is prudent and in the public interest to plan the Project for completion as presently scheduled in order to assure the citizens of the State of Washington an adequate supply of electrical energy.

I. Alternatives.

91. The Council has considered alternatives to the Project, including alternatives not requiring construction of

new generating capacity, alternative generating sources, alternative sites, and alternative plant designs. None of the alternatives, based upon the evidence presented, is found to be preferable to the proposed Project.

92. In view of our findings as to the need for additional electric power in the Pacific Northwest region, and taking note of the policy of Washington State as declared by its legislature to provide "abundant" low-cost electrical energy to its citizens, we find that the alternative of not providing the additional electric power to be generated by the Project would be unreasonable and contrary to the public interest.

93. Purchasing power from other sources is not a viable alternative because there appears to be no firm baseload power available for purchase from any source either within or without the region.

94. All potential available alternative generating sources have been considered, including experimental sources, baseload hydroelectric power, pumped-storage hydroelectric power, combustion turbine generators and fossil-fueled steam generating plants. Weighing all of the relevant evidence, the Council finds that a coal-fired thermal plant offers the best alternative to those listed above.

(a) The nearest available economic source of coal in the quantity required to fuel a coal-fired plant comparable

in output to the Project is in eastern Montana. Montana coal could be shipped to a coal-fired plant in Western Washington or, alternatively, could be burned in a mine-mouth plant in Montana. The former would require long-distance transportation of coal, while the latter would require additional long transmission lines.

(b) Applicant presented an economic comparison between the Project and a comparable coal-fired plant at the site. The total estimated cost for the Project in September, 1974 dollars is approximately $1,698,000,000. Based upon this estimate and an annual capacity factor of 75 percent, the estimated cost of power from the Project would be approximately 20.6 mills per kilowatt hour. Comparable cost for a coal-fired plant at the site using Montana coal would be approximately 25 mills per kilowatt hour. Even if a capacity factor of 60 percent were used, Applicant's economic comparison would still favor the nuclear project. Additional comparisons between coal-fired and nuclear plants, both economic and environmental and including comparisons with a mine-mouth plant located in Montana, are contained in the record herein.

95. We have also considered the impact of a possible increase in the seismic design basis for the Project on the cost comparison of a coal-fired versus a nuclear power plant at the site. The critical systems' seismic design basis, including the safe shutdown earthquake (SSE), will be determined by the Nuclear

Regulatory Commission (NRC). For purposes of cost comparison of a coal-fired versus a nuclear plant at the site, we consider a .35g SSE to be an appropriate estimate of the maximum seismic design basis for a nuclear project at the site. The cost impact of changing the SSE to .35g would be a 2.5 percent increase in the estimated capital cost of the Project -- or about 43 million dollars in September 1974 dollars -- a 2 percent increase in the total estimated annual cost of Project operations -- from $349 million to $356 million in September, 1974 dollars. Estimated cost of the power from the Project would be increased from approximately 20.6 mills per kilowatt hour to approximately 21 mills per kwh. We find that these cost estimates are appropriate. These cost increases do not change our finding that an economic comparison favors a nuclear power plant over a coal-fired project at the site.

96. Weighing all of the relevant evidence, the Council finds that the Project is the preferable alternative and the one most likely to provide the citizens of Washington State with abundant, reasonable cost power during the period under consideration.

97. In our evaluation of alternative sites, we believe that it is not necessary for us to conclude that the proposed site is the only acceptable site or the best site of all available alternatives within Washington state. We believe it our function

to determine whether this is an appropriate site for the proposed Project in view of the risks, the costs and the benefits inherent in its construction as compared with suitable alternatives. We believe that sites in western Washington are more appropriate than sites east of the Cascade mountains for at least two reasons. First, in the western Washington area electrical loads substantially exceed generating resources, with the result that the western Washington area is dependent on cross-mountain transmission lines for much of its electrical power. These lines are particularly exposed to natural and manmade disasters. Thus, the location of new generating resources in western Washington is important to improve system reliability and assure the citizens of western Washington of a reliable supply of electric power. Additionally, location of generating resources near the western Washington load center areas will significantly reduce transmission line losses and thereby avoid the economic and environmental cost of the additional generation that would be required to make up for such losses, were the new generation to be located east of the Cascades. All factors considered, it is desirable and in the public interest to locate additional generation west of the Cascade Mountains.

98. Prior to selection of the proposed site, Applicant and three other utilities commissioned a study of potential thermal power plant sites in central and western Washington.

discussed in its Environmental Impact Statement and finds that the design alternative selected by Applicant for the Project, the Ranney collector system for the water intake, represents satisfactory selection among viable alternatives and reflect the state of the art of technology available for minimizing adverse environmental impacts.

J. Compliance with SEPA.

102. Pursuant to the Washington State Environmental Policy Act of 1971, (SEPA); and RCW 43.21(C) and the Council's regulation implementing that Act, WAC 463.08.024, the Council in May, 1975, issued its draft Environmental Impact Statement on the Project for the purposes of this proceeding and the parallel NPDES proceeding. The Council adopted this draft statement finding it to be an adequate draft environmental impact statement. Public notice was given of the availability of said draft statement and it was distributed and made available; and comments were solicited and received, all in full compliance with SEPA and the Council's regulation.

103. Subsequently, also in May, 1975, the Nuclear Regulatory Commission (NRC) issued its Final Environmental Statement on the Project (NUREG-75/055; referred to herein as "NRC FES") pursuant to the National Environmental Policy Act of 1969 (42 U.S.C. 4321).

104. The Council recognizes that enactment of chapter 206 of the Laws of Washington, 1975, first extraordinary session, which amended SEPA (RCW 43.21C.150) effective June 16, 1975, eliminated the Council's obligation to prepare its own environmental impact statement and authorized it to use the NRC FES instead. Notwithstanding this change in law, the Council, in the interest of a complete evaluation and review of the potential environmental impacts of the Project, and in full compliance with all of the policies and procedures of SEPA, both in this proceeding and in the companion NPDES proceeding, determined to prepare its own final environmental impact statement on the Project, which it would then consider along with the NRC FES.

105. Accordingly, the Council, taking into account all comments received on its draft environmental impact statement, prepared its own final environmental impact statement on the Project, approved by the Council on November 24, 1975, and which the Council finds to be an adequate final environmental impact statement. Public notice was given of the availability of said final statement and it was distributed and made available in full compliance with SEPA and the Council's regulation.

106. Prior to reaching its decision in this proceeding, the Council has carefully reviewed and considered the record in both this proceeding and in the NPDES proceeding, as well as its own final environmental impact statement and the NRC FES, and all

withdrawal will be considered cause to amend the authorization. The Council also finds that Applicant should be authorized to withdraw up to 2 cubic feet per second from wells on or adjacent to the plant site for uses associated with construction of the Project. All water withdrawal authorizations are subject to the condition that if such utilization is shown to result in damage to neighboring users with preexisting registered water rights, either in terms of quantity or quality of water available, that compensation for such damage be the responsibility of Applicant.

110. Applicant will construct and proposes to operate a fish rearing facility in conjunction with the Project. This facility is described in Appendix P to the Certification Application and was further described on the record in this matter. The facility has consistently been termed a component of the Project and is integrated into the project's water use and discharge system as defined, described and presented by Applicant. We believe that Applicant has expressed a commitment to construct the facility and that Applicant should be required to do so. During the course of the proceedings in this matter, the Council at open meeting determined that it did not wish to assert regulatory jurisdiction over actual operation of the fish rearing facility. Consequently, the Council approves and endorses the construction of a fish rearing facility by the Applicant and the operation of that facility by the appropriate State agency in the event that operation by the Applicant is not permitted.

111. The Certification Agreement includes criteria specific to the site and transmission line routing, and embodies compliance with the siting guidelines (WAC 463-12). The environmental monitoring program that forms a part of the Certification Agreement, complies with the monitoring guidelines set forth in WAC 463-12-150.

112. The Certification Agreement will insure, through available and reasonable methods, that the location and overall operation of the Project will produce minimal adverse effects on the environment, ecology of the land and its wildlife, and the ecology of state waters and their aquatic life. In reaching its recommendation to the Governor, the Council has balanced the increasing demands for thermal power plant location and operation in conjunction with the broad interests of the public on the basis of the three premises set forth in RCW 80.50.010.

113. The Governor of the State of Washington will act within the purpose of the statutes contained in RCW 80.50 by approving certification of the proposed site, provided that such certification is conditioned upon the application of each and every limitation stated in this order, the Site Certification Agreement appended hereto and Council's NPDES order and permit herein.

CONCLUSIONS OF LAW

Having considered the whole record in this proceeding, the Council has made the foregoing findings of fact and now makes the following conclusions of law.

1. The Council has jurisdiction over the subject matter of this application and the parties thereto.

2. Corrections to the transcript should be made in accordance with Appendix C, attached hereto and by this reference made a part hereof.

3. The proposed site is consistent with and in compliance with Skagit County and regional land use plans and zoning ordinances.

4. The Certification Application is in compliance with the Council's topical guidelines as set forth in WAC 463-12.

5. The Council is authorized to and should submit the following recommendation and order to the Governor of the State of Washington. Certification should be contingent upon execution by the Governor and the Applicant of the Site Certification Agreement for Skagit Nuclear Power Project Units 1 and 2, attached hereto as appendix D and by this reference made a part hereof.

RECOMMENDATION AND ORDER

Having considered the entire record in this proceeding, including the above findings of fact and conclusions of law, the Council hereby reports to the Governor of the State of Washington that the Certification Application for the Skagit Nuclear Power Project Units 1 and 2 is in compliance with the Council's topical guidelines, and recommends to the Governor that he approve the Certification Application and certify the site for construction and operation of the Project contingent upon execution by the Governor and Applicant of the "Site Certification Agreement for Skagit Nuclear Power Project Units 1 and 2" attached hereto as Appendix D and by this reference made a part hereof.

WHEREFORE, IT IS HEREBY ORDERED That transcript corrections shall be, and the same are hereby, deemed made in accordance with Appendix C, attached hereto and by this reference made a part hereof; and

IT IS FURTHER ORDERED That the foregoing report and recommendation, together with the foregoing findings of fact and

conclusions of law, shall be, and the same are hereby, forwarded forthwith to the Governor of the State of Washington for his consideration and his action.

DATED at Olympia, Washington, and effective this 13th day of September 1976.

WASHINGTON STATE ENERGY FACILITY
SITE EVALUATION COUNCIL

By Thomas C. Stacer
Thomas C. Stacer
Acting Chairman

TPPSEC
Application No. 74-1 (Skagit)

Site Certification Hearing

EXHIBITS

Number	Description	Identified	Admitted
1 through 11	Documents re zoning admitted at initial hearing on May 13, 1974		
12	Drawings Entitled "525 KV Transmission Line & Access Railroad Corridor" (5 drawings)	3:45	3:58
13A	General Area Maps (3 maps)	3:35	3:58
13B	USGS Maps--Scale 1:250,000 (2 maps)	3:35	3:58
13C	USGS Maps--15 and 7.5 Minute Series (30 maps)	3:35	3:58
14A	Aerial Survey of Plant Site and Surrounding Areas Showing Plant Site and Industrial Zone Boundaries	3:35	3:58
14B	Washington State Department of Natural Resources Photo Maps of Townships (81 photomaps)	3:35	3:58
15	Site and Project Description (Slides 4.1 through 4.11)	3:30	3:58
16	Consultants Retained, Work Performed and Amounts Paid by Puget for Services, Reports and Documents Relating to the Skagit Site (attached to pre-filed testimony of Warren J. Ferguson)	3:54	3:58
17.1	Tables 1, 2 and 3 and Appendix A (attached to pre-filed testimony of Kent Anderson dated March 15, 1975)	15:113	16:4

Number	Description	Identified	Admitted
19.13	DNR Information Circular 53 "Compilation of Earthquake Hypocenter in Western Washington" by Robert S. Crosson, 1974	23:154	23:161
19.14	Rasmussen Slides Nos. 1 through 12, excluding 8	23:156	23:157
20.1	Puget Sound Power & Light Company, The City of Seattle, Department of Lighting, The City of Tacoma, Department of Public Utilities, Light Division, Public Utility District No. 1 of Snohomish County, Thermal Power Plant Siting Study, Bechtel, September 1970	17:164	17:164
20.2	Letter from Bechtel Corporation, dated January 20, 1972, to Mr. E. L. Bush, Puget Sound Power & Light Company	17:164	17:164
21	Resumes of Applicant's Witnesses:		
21.1	Ferguson, Warren J.	3:17	3:58
21.7	Adair, Merlyn J.	20:7	20:7
21.8	Coombs, Howard A.	22:71	22:72
21.9	Bolt, Bruce A.	21:58	21:59
21.10	Larson, Kermit H.	5:40	5:40
21.11	Houghton, Jonathan P.	5:69	5:69
21.12	Reichard, Timothy A.	5:145	5:145
21.13	Lou, George Y.	6:7	6:7
21.16	Starke, Ivan L., Jr.	9:48	9:51
21.17	Myhra, David	9:140	9:142
21.17A	Myhra, David	9:140	9:142
21.18	Donaldson, Lauren R.	7:183	7:190
21.19	Munsell, David A.	5:128	5:128
21.20	Mikels, Frederick C.	4:110	4:192
21.21	Summers, Howard R.	4:163	4:192

Number	Description	Identified	Admitted
40	Review of Socio-Economic Impacts of the Calvert Cliffs Nuclear Power Plant on Calvert County, Maryland and Comparison with Kent County, Maryland	11:144	11:145
41	Review of the Geology and Seismology Section (2.5) of the Preliminary Safety Analysis Report of the Skagit Nuclear Power Project, by Prof. Eric S. Cheney, June 6, 1975	11:163	11:163
42	TPPSEC Fig. L-2, Site Vicinity 0 to 50 Miles, as marked by Cheney	11:184	11:185
43	Evaluating the Biosphere, by Barry Commoner, pages 50 through 60, from Man's Impact on Environment edited by Thomas R. Detwyler, Department of Geography, University of Michigan, published by McGraw-Hill Book Company, New York, 1971	14:91	14:91
44	Twelve-year Forecast, Annual Billed KWH	15:44	15:110
45	Tables 100(4)-2 through 100(4)-10	16:9	16:236
46	Washington Water Power Company and Pacific Power & Light Co., 1975 "Blue Book" Critical Period Loads and Resources, July 1975--June 1995	16:9	16:236
47	NRC Impact Statement (p. 9-7)	16:187	16:188
48	Operating Costs (Mills per Kilowatt Hour)	17:11	17:17
49	Appraisal of Nuclear Power Plant Reliability, Power Engineering, May 1975	17:73	17:75
50	Letter dated April 2, 1975, from General Electric (Allison) to Puget (Finnegan)	17:74	17:75
51	Question 1, Qualification on Nuclear Power--L. Douglas DeNike Ph.D.--April, 1975	17:92	17:107

Number	Description	Identified	Admitted
66	References of David C. Brubaker	25:192	25:194
67	SCANP-TPPSEC Interrogatories	25:192	25:194
68	SCANP-NRC Interrogatories	25:192	25:194
69	Puget-NRC Interrogatories	25:192	25:194
70	Energy Transportation Alternative Coal Slurry Pipeline Study	25:201	25:201
71	Three U.S. Forest Service Documents re Skagit River and Wild and Scenic Rivers Act:	25:205	25:205
71A	Draft Environmental Statement dated June 16, 1975 and accompanying letter dated June 26, 1975		
71B	The Skagit Wild and Scenic River Study Report		
71C	The Skagit, A Proposal 1975		

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Reopened Session--April 1976

EXHIBITS

Number Offered By	Description	Id.	Ad.
GEOLOGY, SEISMOLOGY AND VOLCANISM			
Direct Evidence - Intervenor			
72.1 Int.	"Skagit Valley Earthquake Sequence 1974-75" by Stewart W. Smith, Geophysics Program, University of Washington, Seattle, Washington, 98195, approximately 30 p., including figures; cover letter attached thereto addressed from Douglas S. Little to Roger M. Leed and dated November 10, 1975.		*
72.2 Int.	"The Devils Mountain Fault Zone, Northwestern Washington" by Timothy Peter Lovseth, Masters Thesis, University of Washington, 1975, 29 p.		*
72.3 Int.	"Origin and Age of Postglacial Deposits and Assessment of Potential Hazards from Future Eruptions of Mount Baker, Washington" by Jack H. Hyde and Dwight R. Crandell, United States Geological Survey Open-file report 75-286, 1975, 22 p. (Exhibit 20, in LWA proceeding.)		*
72.4 Int.	"Increased Heat Emission from Mt. Baker, Washington" by Stephen D. Malone and David Frank, EOS magazine, October, 1975, pp. 679-685.		*

Footnote
*All exhibits marked herein with an asterisk were admitted by the Examiner's Memorandum Ruling dated March 25, 1976. All others were admitted at the reopened hearing; see the transcript at the volume and page cited herein.

Number Offered By	Description	Id.	Ad.
73.3 App.	Prefiled testimony of Merlyn J. Adair for the resumed LWA hearing, December 1, 1975, and Attachment A.		*
73.3a App.	Prefiled testimony of Merlyn J. Adair for the resumed LWA hearing, December 1, 1975 with revisions on April 9, 1976, and Attachment A.	26A:73	26A:74
73.4 App.	Prefiled testimony of Milton B. Dobrin for the resumed LWA hearing, December 1, 1975, 9 p.		* 26A:75
73.5 App.	"Sketch of Dr. Cheney's Alleged Fault Zone as Described by Mr. Adair."	30:82	30:87
73.6 App.	"A Map bearing the Legend at the Lower Right-Hand Corner, Geology by Timothy Lovseth, 1974."	30:136 --	31:3 --
Direct Evidence - Counsel for the Environment			
74.1 C/E	"High Resolution Seismic Profiles Adjacent to Whidbey and Fidalgo Islands, Washington by Messrs. Snavely, Gower, Yount, Pearl, Tagg and Lee", USGS Open File 76-187, February 18, 1976.	28:7	28:12
74.2	(none; 28:4, 12)		
74.3 C/E	"All Profiles Obtained or Processed During the Marine Seismic Reflection Survey; A Map identifying High Resolution Profile Locations and Shop Plans, and a Report dated April 2, 1976, Evaluating the Seismic Survey Data by Dr. Milton B. Dobrin."	28:8	28:12
Rebuttal Evidence - Intervenor			
75.1	(none; 26:53)		
Rebuttal Evidence - Applicant			
76.1 App.	Testimony of John Ivey on July 21, 1975 at the LWA hearing, transcript pages 1320 and 1326-1332, with LWA Exhibit 26 attached. Offered to rebut Exhibits 72.8, 72.9 and 72.10.		*

Number Offered By	Description	Id.	Ad.
79.2 C/E	Skagit County Planning Department Report "Investigation of the Minkler Lake Slide, December 1, 1975", March 1, 1976.		*

PROJECT OWNERSHIP; COMPLETION SCHEDULE; NEED FOR POWER

80.1 App.	Supplemental testimony of David H. Knight, March 3, 1976.		*
80.2 App.	Agreement dated January 23, 1976.		*
80.3 App.	Table 100(4)-2 (Revised)		*
80.4 App.	Table 100(4)-3 (Revised)		*
80.5 App.	Table 100(4)-4 (Revised)		*
80.6 App.	Table 100(4)-5 (Revised)		*
80.7 App.	Table 100(4)-6 (Revised)		*
80.8 App.	Table 100(4)-7 (Revised)		*
80.9 App.	Table 100(4)-10 (Revised)		*
80.10 App.	The Washington Water Power Company		*
80.11 App.	Pacific Power & Light Company		*
80.12 App.	Portland General Electric Company		*
80.13 App.	Comparison of 1975 and 1974 System Loads		*
80.14 App.	Comparison of 1975 and 1974 Total KWH Billed to Customers		*

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Site Certification Hearing

DOCUMENTS OFFICIALLY NOTICED

Number	Description	Identified	Noticed
1.	The record of all prehearing conferences held in this proceeding	25:202-204	25:204-205
2.	The record of the initial hearing held by the Council in this proceeding on May 13, 1974	25:202-204	25:204-205
3.	The record of the NPDES Permit and 401 Certification hearing held by the Council commencing April 29, 1975 concerning the Skagit Nuclear Power Project	25:202-204	25:204-205
4.	Applicant's Application No. 74-1 for Site Certification for the Skagit Nuclear Power Project, as revised through Revision 7 thereto, dated May 2, 1975	25:202-204	25:204-205
5.	The Skagit Nuclear Power Project Environmental Report (ER) submitted by the Applicant to the Nuclear Regulatory Commission (Docket Nos. STN 50-522 and STN 50-523) as amended and supplemented through Amendment No. 2 and Supplement No. 2 thereto; specifically those portions of the ER listed on the tabulation attached hereto	25:202-204	25:204-205
6.	Chapter 2 of the Skagit Nuclear Power Project Preliminary Safety Analysis Report (PSAR) submitted by the Applicant to the Nuclear Regulatory Commission (Docket Nos. STN 50-522 and STN 50-523) as amended through Amendment No. 5 thereto; specifically those portions of the PSAR listed on the tabulation attached hereto	25:202-204	25:204-205

APPLICATION NO. 74-1
(SKAGIT)

LIST OF NRC DOCUMENT SECTIONS
INCORPORATED IN TPPSEC APPLICATION

Skagit Nuclear Power Project Environmental Report (ER) Sections referenced are as submitted to the Nuclear Regulatory Commission (NRC) Docket Nos. STN 50-522 and STN 50-523, as amended and supplemented through Amendment No. 2 and Supplement No. 2 thereto.

Skagit Nuclear Power Project Preliminary Safety Analysis Report (PSAR). Sections referenced are as submitted to the Nuclear Regulatory Commission (NRC), Docket Nos. STN 50-522 and STN 50-523, as amended through Amendment No. 5 thereto.

Section 100(4) Applicant Description

ER Section 9.2.1 - Siting Criteria

ER Section 9.2.2 - Selection of Candidate Site Plant Alternatives

ER Section 9.2.3 - Selection of Candidate Site

Section 115(3) Background Radiation Levels

ER Section 2.8 - Background Radiological Characteristics

Appendix B Background Radiation Levels

ER Section 2.8 - Background Radiological Characteristics

Section 115(4) Radwaste System

ER Section 3.5 - Radwaste System

ER Section 5.2 - Radiological Impact on Biota Other Than Man

ER Section 5.3 - Radiological Impact on Man

Section 120(4) Geologic Survey

PSAR Section 2.5 - Geology and Seismology

Appendix C Geology

PSAR Section 2.4.13 Groundwater

PSAR Section 2.5 Geology and Seismology

Appendix 2C	Report on Field Explorations and Laboratory Testing for the Soil and Foundation Investigation Shannon & Wilson, Inc.
Appendix 2D	Seismic Survey - July 25, 1972 Geophysical Survey - December 18, 1972 August 1, 1974; August 21, 1974 Harding-Lawson Associates
Appendix 2E	Procedure for Laboratory Test Program on Rock Cores
Appendix 2F	Soil Tests Results Summary
Appendix 2G	Consultants Dr. Howard A. Coombs Dr. Bruce A. Bolt Dr. Perry Byerly
Appendix 2H	Validity Test For Vertical Temperature Gradient Data
Appendix 2I	Consultant's Letters Concerning December 15, 1974 Skagit Valley Earthquakes
Appendix 2J	Investigation of the December 14, 1872 Earthquake in the Pacific Northwest by Bechtel, Inc. June 1975

Section 135(1) Terresterial Biota Description

ER Section 2.7.2 - Vegetation

ER Section 2.7.3 - Soils

ER Section 2.7.4 - Terresterial Fauna

Section 135(2) Aquatic Biota Description

ER Section 2.7.5 - Aquatic Ecosystems

Section 135(3) Project Effects on Terresterial Biota

ER Section 5.6 - Effects of Operation and Maintenance of the Transmission System

Section 140(1) Aesthetic Impact

ER Section 3.1 - External Appearance

APPENDIX C

CORRECTIONS TO TRANSCRIPT

SITE CERTIFICATION

Volume 26

Page	Line	Correction
35	19	Not having recently
36	9	as to 73.1
	11	73.1?
41	19	ask counsel to
46	4	that for admission?

Volume 26A

64	16	EFSEC, go
66	13	aerosol study in
71	4	overruled, in that
91	11	as to the propriety of
94	3	or sponsorship,

Volume 27

21	7	Its public
32	8	no flexibility to accept delays
34	18	If counsel
63	21	Colstrip 3 and 4, many
64	8	For Skagit No. 1, that
72	22	words, reduce some

Volume 29 (cont.)

Page	Line	Correction
133	1	thrown side.
160	4	fault offsets glacial materials at
164	10	found and we visited the area with
176	24	the fault plane
197	1	by Barr, Sandra
197	4	talked to Sandra Barr?
199	12	plane solution
199	18	fault plane solutions
201	5	not associated with a
206	18	agrees with it.

Volume 30

5	12	the 1846 zone.
7	7	plant site,
36	4	the Humboldt plant
37	20	record was .31g, or else .27g.
47	20	to one-half of
51	10	criteria must be one-half of the
58	6	north 50° west.
64	21	April 6th, counsel.
72	1	counsel to be
73	14	with counsel
77	19	discussion of counsel
87	1	added by the counsel for intervenor

Volume 31 (cont.)

Page	Line	Correction
80	14	strike and dip of
98	4	high-angle fault downdropped
109	13	EXAMINER WALLIS: Does
110	25	possible post-hearing
112	12	parties --
112	14	-- since

Appendix D

SITE CERTIFICATION AGREEMENT

FOR

SKAGIT NUCLEAR POWER PROJECT UNITS 1 AND 2

BETWEEN

THE STATE OF WASHINGTON

AND

PUGET SOUND POWER & LIGHT COMPANY

SITE CERTIFICATION AGREEMENT

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Attachments:

SITE CERTIFICATION AGREEMENT
FOR
SKAGIT NUCLEAR POWER PROJECT UNITS 1 AND 2
BETWEEN
THE STATE OF WASHINGTON
AND
PUGET SOUND POWER & LIGHT COMPANY

This Certification Agreement was made and entered into pursuant to Chapter 80.50 of the Revised Code of Washington by and between the State of Washington, acting by and through the Governor of the State of Washington, and Puget Sound Power & Light Company ("Puget"), a Washington Corporation.

ARTICLE I. SITE CERTIFICATION

A. Definitions.

The following terms where used in this Certification Agreement shall have the meanings set forth below:

1. "Site" means the plant site described in Article I.B.1 hereof plus the associated areas described in Article 1.B.2 hereof.

2. "Project" means the Skagit Nuclear Power Project Units 1 and 2 described in Article I.C. hereof.

3. "Council" means the Washington State Energy Facility Site Evaluation Council, formerly Thermal Power Plant Site Evaluation Council, created by Chapter 80.50 RCW or such other agency of the State of Washington as may hereafter succeed to the powers of said Council for the purposes of this Certification Agreement.

4. "Application" means the site certification application submitted by Puget to the Council for the Project, namely TPPSEC Application No. 74-1 dated March 28, 1974, as revised through Revision 7 thereto dated May 2, 1975.

5. "County" means Skagit County. Its authorized representative for purposes of this Agreement is the Skagit County Planning Department.

6. "Puget" means Puget Sound Power & Light Company, a Washington corporation, sponsor of the Project. Where necessary or appropriate, it means as well Puget's successor or successors in interest, if any, and all other participants in the Project, and their successor or successors in interest, if any.

B. Site Description.

The Site on which the Project is to be constructed and operated is located in Skagit County, Washington.

1. Plant Site. The plant site consists of the following described property in Skagit County, Washington:

All of Section 11, Township 35 North, Range 5 East, W.M., Except the north 1/2 of the Northwest 1/4, and Except that portion of the Southwest 1/4 of the Southwest 1/4 lying southerly of State Highway SR 20; and

All of Section 12, Township 35 North, Range 5 East, W.M.; and

That portion of Section 13, Township 35 North, Range 5 East, W.M. lying north of State Highway SR 20, Except the east 1034.91 feet thereof, and Except the west 620 feet of the Southwest 1/4 of the Northwest 1/4 of said Section 13; and

The following portions of Section 14, Township 35 North, Range 5 East, W.M.:

That portion of the East 1/2 of the Northwest 1/4 and the West 1/2 of the Northeast 1/4 lying north of Minkler Road; and that portion of the Northeast 1/4 of the Northeast 1/4 lying northerly of State Highway SR 20; and also that portion of the hereinafter described tract lying within the Northeast 1/4 of the Northeast 1/4:

Beginning at a point on the north line of the former right-of-way of the Puget Sound and Baker River Railroad which is 1010.2 feet east of the North-South centerline of said Section 14, running thence easterly along said north line a distance of 330 feet; thence N 9¼40'E. 153.2 feet; thence N 72¼26' W. 350 feet; thence south to the point of beginning; less any portion thereof in public highway.

2. Associated Areas. The associated areas are those on which related and supporting facilities and associated transmission lines will be located.

(a) The water for the Project will be supplied by Ranney collectors located on the following described property in Skagit County, Washington:

That portion of Section 15, Township 35 North, Range 6 East, W.M., described as follows:

The South 1/2 of the Northeast 1/4 lying south of the Great Northern Railroad Right-of-Way and lying north and west of the Skagit River; Also, that portion of the North 1/2 of the Southeast 1/4 lying west of the Skagit River.

(b) the railroad access line, the associated transmission lines, the discharge facility, the intake and discharge pipeline rights-of-way, and the temporary barge off-loading facility will be located essentially as indicated in the Application, provided that Puget may adapt the locations of these facilities to the terrain where conditions indicate that such change or variance is reasonable or necessary. Puget agrees to submit to the Council and obtain approval of any change in the locations of these facilities. If the Council does not approve of such submittal, it agrees to respond to Puget with any comments on the submittal, within thirty (30) days, after receipt of the submittal. When the precise locations of these facilities have been determined, Puget will file with the Council legal descriptions of the areas involved.

C. Project Description.

The Project consists of two nuclear generating units, together with other facilities required for construction or operation of the nuclear generating units, or otherwise associated with those units. Those facilities include the Ranney collector wells, the discharge facility, the temporary barge off-loading facility, plant access roads, the railroad access line, the associated transmission lines, the intake and discharge pipelines, the sanitary sewer pipeline, the transmission

substation, the fish rearing facility, the visitors' information center, improvements to the public road system, and other related and supporting facilities. Each of the nuclear generating units, having a nominal net electric power output of 1288 MWe, includes a boiling water reactor heat source, a turbine-generator, a natural draft cooling tower, and other facilities required for the generation and transmission of electric power.

D. Site Certification.

1. The Project described in Article I.C. hereof is authorized to be located, constructed and operated on the Site described in Article I.B. hereof.

2. This Certification Agreement certifies to the extent authorized by state law, that within and on the Site Puget may construct and operate the Project subject to the terms and conditions of this Certification Agreement.

ARTICLE II. GENERAL CONDITIONS

A. Legal Relationship.

1. The issuance of this Certification Agreement is in lieu of any permit, certificate or similar document required by any department, agency, division, bureau, commission or board of this state. (RCW 80.50.120(3))

2. Puget agrees to enter into a lease with the State Department of Natural Resources for use of certain public state land needed for the Project.

3. This Certification Agreement ratifies and incorporates by reference the National Pollutant Discharge Elimination System (NPDES) Permit issued January 26, 1976 as amended April 12, 1976, and as hereafter amended pursuant to law, by the State of Washington, acting by and through the Council, to Puget with respect to the various discharges associated with construction and operation of the Project. All activities therein regulated must be accomplished in strict accordance with the terms thereof.

4. This Certification Agreement shall bind Puget, its fellow participants and the State and any of its departments, agencies, divisions, bureaus, commissions and boards subject to all the terms and conditions set forth herein.

5. This Certification Agreement is subject to federal laws and regulations applicable to the Project and to the terms and conditions of any permits and licenses which may be issued to Puget by pertinent federal agencies.

6. This Certification Agreement acknowledges the Rezone Contract and its provisions entered into by and between the County and Puget in conjunction with the rezone of the

Site for the Project, and recognizes that its provisions result in benefit to the People of the State of Washington including specifically those residents within the County.

7. This Certification Agreement together with those commitments made by Puget expressed in the Application and during the course of the NPDES and Certification hearings herein constitute the whole and complete agreement between the parties and supersede any other negotiations, representations or agreements, either written or oral.

B. Enforcement of Compliance.

1. This Certification Agreement is subject to all the penalties and remedies available at law, or in equity, to any person.

2. This Certification Agreement may be revoked, suspended or modified pursuant to the provisions of Chapter 34.04 RCW for failure to comply with the terms and conditions herein, and for violations of Chapter 80.50 RCW, regulations issued thereunder, and any order of the Council.

3. Where approval or agreement of the Council is required by this Certification Agreement the Council may, but is not required to, conduct a hearing pursuant to Chapter 34.04 RCW.

C. Notices and Filings.

1. Filing of any document or notice with the Council shall be deemed to have been duly made when delivered to the Council at the offices of the Council in Olympia, Washington. Notices to be served upon Puget shall be deemed to have been duly made when delivered to the office of the Secretary of Puget.

D. Right of Inspection.

1. Subject to applicable health and safety regulations, Puget shall provide access to the Project and all of its environs to designated representatives of the Council in the performance of their official duties.

ARTICLE III. CONSTRUCTION OF THE PROJECT

A. Construction Schedule.

1. Puget agrees to submit quarterly a Summary Construction Progress Report to the Council.

2. Puget will (a) give the Council immediate notice of any significant change in the construction schedules on file with the Council, and (b) give the Council thirty days' prior

written notice of the commencement of any work on the banks or in the bed of the Skagit River or tributary streams.

B. Access Roads and Railroads.

1. All permanent primary access roads, temporary roads and railroads constructed by Puget or its contractors for servicing the Project's central facilities will be constructed to meet or exceed appropriate Washington State and Skagit County Standards for such roads and railroads. SR-20 widening, channelization and construction of turnouts, where the plant access roads intersect SR-20, or other work undertaken upon state roads, will meet Washington State Highway Department standards.

2. Puget agrees to submit, on request, specific location plans,, drawings, and construction specifications for roads and railroads to the Council for its review and study. If the Council has objections, it agrees to respond with comments indicating reasons for its objections within thirty (30) days of receipt of such documents unless the parties, by mutual agreement, extend the time for response. In such cases, the Council may require changes, additions or deletions as are appropriate before site preparation or construction may begin.

C. Aesthetics and Landscaping.

1. Puget agrees to construct the Project in a manner which is aesthetically compatible with the adjacent area.

2. Puget agrees to maintain the Project lands within the permanent fenced perimeter in a natural or landscaped condition compatible with the surroundings and Project security requirements.

3. Puget agrees to restore temporary construction areas not required for permanent facilities. These areas will be graded to conform with the finished grading plan, the topsoil will be replaced, and the areas will be developed and maintained in a natural or landscaped condition compatible with the surroundings and Project security requirements.

D. Surface Runoff and Erosion Control.

1. During all construction work, Puget agrees to require its contractors to employ all means necessary to meet all standards set in this Agreement and all other reasonable means in order to avoid soil erosion. Puget agrees to set forth such requirements in its bidding documents, plans and contracts, which will be developed through consultation with the Council.

2. Surface runoff and erosion control will be provided by, but not limited to, the following:

(a) Building temporary sediment retention ponds.

(b) Diverting surface runoff away from graded areas, construction laydown areas and shop areas; diverting Black Creek; construction of diversion ditches.

(c) Providing, during the entire construction period, dust control for the construction roads, temporary parking lots, spoil areas and disposal areas, as required, by wetting or other acceptable methods.

(d) Soil stabilization by means such as seeding, mulching, blanketing and riprapping.

3. Following installation of the intake and discharge pipelines, Puget shall have the corridors of these pipelines graded to blend in with the surrounding areas. The topsoil will be replaced, and the corridors will be maintained in a natural condition compatible with the surroundings.

4. Puget will include in specifications for general landscaping any necessary provisions for replacing topsoil and grading disturbed areas in such a way as to accomplish the return of natural vegetation and maintenance of a natural condition compatible with the surroundings.

5. Should any unforeseen surface water runoff problems arise during construction of the Project, Puget agrees to comply with the pertinent industry standards for such control and agrees to take whatever actions are necessary to avoid or to correct runoff which detrimentally affects water quality. Applicant shall promptly notify the Council of the occurrence or likely occurrence of any previously unforeseen surface water problem and of the actions taken or to be taken to correct or avoid said problems. Nothing herein excuses Puget from compliance with the NPDES Permit issued for the Project.

E. Transmission Lines.

1. The transmission lines to be constructed for the Project are those described in Section 110(1) of the Application.

2. All transmission lines will be constructed to comply with the February 1970 "Environmental Criteria for Electrical Transmission Systems," published by the U. S. Department of the Interior and the U. S. Department of Agriculture.

3. Puget agrees to submit, on request, specific location plans, drawings and construction specifications for transmission lines, structures and facilities to the Council for its review and study. If the Council has objections, it agrees to respond with comments indicating reasons for its objections within thirty (30) days of receipt of such documents unless the parties, by mutual agreement, extend the time for response. In such cases the Council may require changes, deletions or additions as may be appropriate before site preparation or construction may begin.

F. Water Intake System.

1. Puget shall be permitted to construct, operate and maintain a water intake system as described in the Application and the hearing herein adjacent to the shoreline of the Skagit River as required for construction and operation of the Project subject to the terms and conditions of this Certification Agreement. River bank stabilization by means of riprapping is an element of the required system and includes the maintenance thereof.

2. Puget agrees to submit, on request, specific location plans, drawings, and construction specifications for installation of the intake system to the Council for its review and study. If the Council has objections, it agrees to respond

with comments indicating reasons for its objections within thirty (30) days of receipt of such documents unless the parties, by mutual agreement, extend the time for response. In such cases the Council may require changes, deletions or additions before site preparation or construction may begin.

3. The permanent water intake facility power supply lines near the river shall be underground.

4. Puget shall schedule the placement of the rip-rapping on the bank of the Skagit River during the period after May 31 and before September 16. Any work at other times directly on the banks or in the bed of the Skagit River shall require specific prior approval of the Council.

5. The construction of the water intake system is subject to the following terms and conditions:

(a) In any well system utilized for potable, construction or operations water, no portion of any well or lateral should be nearer than twenty (20) feet to the Skagit River. All laterals should be buried at least twenty (20) feet deeper than the deepest portion of the adjacent stream bed. These distances should be adhered to unless a showing is made that other distances are more appropriate.

(b) Puget agrees that any material which is placed upon the bank for bank protection shall be clean and of sufficient size to prevent it from being washed away, and that any bank activities must be coordinated with the Council or its designated representatives.

6. The Council may require appropriate modifications to the intake system or take any other appropriate steps if monitoring establishes that the intake system causes fish losses.

7. Should Puget's withdrawal of water in connection with plant construction or operations produce any adverse effect on ground water users in the area of the plant, Puget must make full compensation to the adversely affected users and must take all appropriate measures to eliminate or reduce adverse effects.

8. The Council agrees to provide a suitable waiver of the turbidity criteria of the water quality standards of the State of Washington, if demonstrated by Puget to be necessary, reasonable and appropriate, during construction of the intake system.

G. Discharge System.

1. Puget shall be permitted to construct, operate

and maintain a discharge system as described in the Application and in the hearing herein on the shoreline of, and in the bed of, the Skagit River as required for construction and operation of the Project subject to the terms and conditions of this Certification Agreement.

2. Puget agrees as a condition precedent to any discharge system site preparation or construction to submit, on request, specific location and design plans, drawings, bid documents and construction specifications to the Council for timely review, study and comment. If the Council has objections, it agrees to respond with comments indicating reasons for such activity within thirty (30) days of receipt of such proposals, unless the parties by mutual agreement extend the time for response. In such cases the Council may require changes, deletions or additions as may be appropriate.

3. Puget shall, after consultation with the State Department of Fisheries and the Department of Game, plan and schedule the construction of the discharge structure on the bank or in the bed of the Skagit River during the period after May 31 and before September 16. Any work at other times directly on the banks or in the bed of the Skagit River shall require specific approval of the Council.

4. The Council agrees to provide a suitable waiver of the turbidity criteria of the water quality standards of the State of Washington, if demonstrated by Puget to be necessary, reasonable and appropriate, during construction of the discharge system.

5. Puget will continuously, efficiently and assiduously maintain and operate the cooling tower and all other waste recovery and pollution abatement facilities under its control throughout the duration of Project operation.

H. Temporary Barge Off-Loading Facility.

1. Puget shall be permitted to construct and maintain a temporary barge off-loading facility on the shoreline of the Skagit River as required for delivery of the reactor pressure vessels during construction of the Project subject to the terms and conditions of this Certification Agreement.

2. Puget agrees as a condition precedent to any barge off-loading facility site preparation or construction to submit, on request, specific location and design plans, drawings, bid documents and construction specifications for installation of the barge off loading facility to the Council for timely review, study and comment. If the Council has objections, it agrees to respond

with comments indicating reasons for its objections within thirty (30) days of receipt of such proposals, unless the parties by mutual agreement extend the time for response.

3. During construction of any such temporary barge slip, applicant must: (a) establish and maintain grading and sloping on the bed and bank of the Skagit River and tributary creek construction area so as not to create fish traps; (b) construct the barge slip in the dry during periods of lower river flow; (c) submit procedural plans to the Council, subject to Council approval, within thirty (30) days, concerning all proposed underwater excavation attendant on the construction of such facilities; (d) after the temporary barge facilities have served their intended purpose, to revert the disturbed area to its prior state or to devote it to public water oriented recreational use, as determined in consultation with the Council and the County; and (e) do no dredging of the Skagit River or its tributaries except for the entrance to the barge slip.

4. Puget shall schedule the construction and restoration of the barge off-loading facility, insofar as this involves work directly on the bank, in the bed of, or in any way affecting the Skagit River or its tributaries, during the period after May 31 and before September 16. Any work at other times directly on the banks, in the bed of, or in any way affecting the Skagit River or its tributaries shall require specific approval of the Council.

5. The Council agrees to provide a suitable waiver of the turbidity criteria of the water quality standards of the State of Washington, if demonstrated by Puget to be necessary, reasonable and appropriate, during construction and restoration of the barge off-loading facility.

I. Construction Clean-Up

1. Puget agrees upon completion of construction to dispose of all temporary structures not required for future use and to dispose of used timber, brush, refuse or inflammable material resulting from the clearing of lands or from the construction of the Project in a manner acceptable to the Council.

J. As-Built Drawings.

Puget agrees to maintain on file as-built drawings for the following listed Project components and for any other components which the Council may in the future identify:

(a) water intake system;

(b) water discharge system, including construction runoff control systems;

(c) sanitary waste disposal system;

(d) cooling towers and circulating water system;

(e) makeup water pretreatment and demineralization system;

(f) radwaste system;

(g) all associated electrical transmission and service lines and substations;

(h) off gas stack and associated systems;

(i) temporary barge off-loading facility;

(j) environmental monitoring installations; and

(k) permanent access roads and railroads.

K. Archaeological Site Protection.

1. Puget agrees to retain the services of a qualified professional archaeologist to (a) inspect the construction site in the course of the construction excavation of the Project, including associated transmission line corridors; (b) determine whether archeological or historical sites are being invaded or disturbed; and (c) preserve and provide for interpretation of

any historical or archaeological artifacts which may be discovered in the course of excavation or construction. In the event that archeological resources are discovered during the course of construction, Puget agrees to suspend construction activities in the area of discovery until such time as the archeologist can evaluate the significance of the resources. Puget, in consultation with the qualified professional archeologist, shall determine mitigative measures and assure the protection of the non-renewable resource and shall notify the Council to arrange for preservation of the artifacts for the interpretation of the resource discovered during the course of construction.

L. Surface Mining.

1. If the construction activities of Puget fall within the scope of the Surface Mining Reclamation Act (RCW 78.44), Puget agrees to comply with the policies and requirements of the Act and to submit a Reclamation Plan to the Council for its review, study and comment. If the Council has objections, it agrees to respond with comments indicating reasons for its objections within thirty (30) days of receipt of such documents unless the parties, by mutal agreement extend the time for response.

M. Geologic and Seismic Considerations.

1. In order to prevent disruptive and costly power

outages, and lengthy, costly and disruptive repairs, having an adverse effect upon the People of the State of Washington, Puget shall design and construct plant reactors and other safety related Project structures and operating systems to withstand an intensity VIII earthquake as felt at the site. This provision is not intended to supersede United States Government regulation of radiological hazards. Any other plant structures will be designed and constructed in accordance with the uniform Building Code as adopted by the State of Washington.

2. Puget shall continuously evaluate geologic and seismic information developed prior to or during construction and take appropriate steps in the design and construction of the Project to accommodate the geologic and seismic conditions disclosed. Any such geologic or seismic information, and a description of any steps taken in the designing and construction of the Project to accommodate the geologic and seismic conditions disclosed, shall be submitted by Puget to the Council in the same form and at the same time as Puget submits said information and description to the Nuclear Regulatory Commission.

N. Construction Traffic.

1. Puget agrees to make planned improvements to portions of the public road system by providing left turn channelization at the intersection of Bacus Road and SR-20 and at the

intersection of the new site access road and SR-20. Puget will work with the State and County to develop plans and methods to prevent traffic overloads on the existing public roadway network to the site. These shall include consideration of alternate routing where available, staggering of shifts to reduce traffic at the peak hours, busing of personnel to the site or construction of additional lanes and channelization as may be required to provide adequate movement of traffic on the highways affected. The plans as adopted and implemented must provide such measures as the Council deems necessary, reasonable and appropriate. Particular attention shall be given to the period June 1 to September 15, inclusive.

2. Puget agrees to submit, at least six months prior to employment of an onsite construction force of 500 persons, specific traffic reduction plans, to the Council for timely review, study and comment. If the Council has objections, it agrees to respond with comments indicating reasons for its objections within thirty (30) days of receipt of such proposals, unless the parties by mutual agreement extend the time for response.

3. Traffic control to provide for pedestrian cross of SR-20 in Sedro Woolley shall be installed by Puget as required by the increase in construction traffic, subject to approval of the Washington State Department of Highways.

O. Transport of Reactor Pressure Vessels.

1. Plans for transportation of the reactor pressure vessels from the barge off-loading facility to the Site shall be submitted to the County for approval prior to implementation of said plans. No transportation of reactor pressure vessels may be accomplished upon or across roads of the County without specific prior County approval.

P. Construction Noise and Air Pollution.

1. Noise due to construction or construction traffic and air pollution from dust or smoke shall be subject to all applicable State or County standards.

ARTICLE IV. OPERATION OF THE PROJECT

A. Water Withdrawal

1. The State of Washington hereby authorizes Puget (a) to withdraw up to 120 cubic feet per second of water continuously from Ranney collector wells at the location described in Article I.B.2.a. of this Certification Agreement for uses associated with the construction or operation of the Project, and (b) to withdraw up to 2 cubic feet per second of water from wells on or adjacent to the plant site described in Article I.B.1. of this Certification

Agreement for uses associated with the construction of the Project. Withdrawal may at no time violate any term of this Agreement. The Council shall give appropriate notice of the authorizations granted herein to the Department of Ecology and the Skagit County Auditor so that such withdrawals may be recorded in the records of water appropriations. For the purpose of those records, and for all purposes, the authorization granted herein shall be in lieu of any water right certificates, and their priority shall date from March 28, 1974, the date on which the application for such withdrawal was filed with the Council, however, if there is subsequent evidence of significant damage to the eco-system caused by water withdrawal, that shall be cause to amend this authorization downward from the said 120 cubic feet per second.

2. Operation of intake system pump motors shall be subject to all applicable noise pollution standards of State or County agencies.

B. Water Discharge.

1. All discharges by Puget to the waters of the United States shall be subject to the terms and conditions of this Agreement, including the National Pollutant Discharge Elimination System permit, which is attached hereto as Attachment I and which is by this reference incorporated herein, or as said permit may be modified or reissued from time to time pursuant to all applicable laws, rules and regulations.

C. Discharge Into Air.

1. Puget agrees to construct and operate the Project in such a manner that discharges resulting from the operation of the diesel generators and fire pump diesel will comply with the applicable air pollution regulations promulgated by the Washington Northwest Air Pollution Authority.

2. Puget agrees to expand meteorological monitoring at the site to utilize at least three years' data from presently operating stations in final design plans and effect analyses, and to undertake such further meteorological monitoring as the Council shall deem necessary.

3. Puget agrees to incorporate all known, available and reasonable technology in the design and operation of the cooling towers to minimize fogging and icing effects on the surrounding areas.

4. Puget shall monitor the effects of drift and visible plume upon traffic traversing State Route No. 20. In the event that fogging or icing is observed which affects traffic, Puget shall report these phenomena to the Council and work closely with the State Department of Highways to establish signs, traffic regulations or other measures sufficient to minimize or eliminate traffic hazards. Final plans are subject to Council approval prior to implementation.

5. Puget further agrees, on request, to submit specific location plans, drawings and construction specifications for installation of the cooling tower systems to the Council for its review, study and comment. If the Council has objections, it agrees to respond with comments indicating reasons for its objections within thirty (30) days of receipt of such documents unless the parties, by mutual agreement, extend the time for response. In such cases, the Council may require changes, deletions or additions as may be appropriate.

6. Levels of radioactive discharges to the atmosphere shall be as low as practicable and shall not exceed the applicable federal requirements or standards.

D. Ecosystem Replacement.

1. Puget will provide replacement and/or compensation as found necessary by the Council for any wildlife, fish or other aquatic life or ecosystem damage or loss caused by construction or operation of the proposed project.

2. Restoration of vegetation shall be accomplished in conformity with Paragraph III.C.3. herein.

E. Additional Protective Measures.

1. Puget shall provide such additional measures for

protection of wildlife, fish and other aquatic life and the ecology of area environs as are found to be reasonable and necessary by the Council.

ARTICLE V. PUBLIC AND ENVIRONMENT PROTECTION

A. Emergency Plan.

1. Puget will develop an Emergency Response Plan in accordance with all applicable laws and regulations. In preparing that plan Puget shall in addition:

(a) Coordinate such development with local, state and federal agencies directly involved in implementing such plan.

(b) Include detailed provisions in the Emergency Response Plan for the health and safety of people, emergency treatment, special training programs and prevention of property damage.

(c) Comply with relevant obligations which are applicable and as set forth in the Washington State Department of Emergency Services' Radiological Emergency Response Plan or successor document.

(d) Semiannually provide the Council and the Skagit County Director of Emergency Services with current lists of responsible individuals, communication channels and procedures.

B. Security Plan.

1. Puget will submit a comprehensive physical Security Plan for the protection of the Project against acts of industrial sabotage in accordance with the requirements of the United States Nuclear Regulatory Commission (NRC) as a part of the NRC operating licensing process.

C. Monitoring Program.

1. Puget agrees to initiate and maintain Environmental Monitoring Programs as described herein and in Attachment II to this Agreement. The programs shall be developed and implemented in close consultation with the Council and upon Council approval. Reasonable modifications may be made, upon approval of the Council, when these are necessary to achieve the purposes of the program. Aquatic, terrestrial ecology, water quality and meteorological surveillance shall begin prior to land clearing or other site alteration. Other programs shall begin no later than two years before fuel loading.

2. Puget agrees to provide the Council full access

to information and data recorded in Puget's Monitoring Program for the purpose of assuring Puget's continued compliance with the terms and conditions of this Certification Agreement.

3. Puget agrees to submit to the Council on a quarterly basis copies of quarterly reports and data from the monitoring programs. Where additional reports or notifications are required to be filed by terms of the Nuclear Regulatory Commission's construction permit, operating license or other regulation, two copies of such reports or notifications shall be submitted to the Council at the time as when submitted to the Nuclear Regulatory Commission.

4. The radiological monitoring program shall be designed and maintained to provide for detection of all possible radioactivity releases from the project and to provide for a reliable assessment and record of their distribution and retention in the environment within the area described in Attachment II to this Certification Agreement.

5. Puget may retain or employ a qualified consultant or firm of consultants to carry out all or any portion of the environmental monitoring studies required to effect the Monitoring Program set forth in Attachment II hereof, but this shall not relieve Puget of any of its obligations under this Certification Agreement.

6. In carrying out Monitoring Program, Puget shall establish to the Council's satisfaction and approval sampling locations on and off the Project Site sufficient to provide a representative sampling of environmental effects in the surrounding area.

7. Should any element of Puget's Monitoring Program be terminated pursuant to this Agreement, Puget agrees to report such termination to the Council and to re-activate so much of any such program as the Council determines to be appropriate and necessary.

8. Requirements of the Monitoring Program may be changed upon a showing that the degree of off-site monitoring is not commensurate with the actual or intended results of such efforts. Such changes shall be effected as found necessary by the Council and Puget. Such changes shall be governed by the procedures in this paragraph and shall not be subject to the modification procedures specified in Section VI.J. hereof.

9. At the time of start-up of the first unit, a report shall be made that summarizes pre-operational monitoring data and establishes baseline reference values for all parameters. The report shall be submitted to the Council within ninety (90) days after start-up of the first unit. Reports shall be submitted semiannually thereafter summarizing operational data, anomalies therein and comparisons made with previously established baseline data.

ARTICLE VI. MISCELLANEOUS PROVISIONS

A. Project Visitation and Recreation.

1. Puget agrees to provide visitor information facilities substantially as described in the Application.

2. If the Council finds that the Project has caused significant damage or loss of recreational opportunities and that such damage or loss exceeds any recreational benefits resulting from the Project, Puget will take such appropriate replacement or mitigating measures as are determined to be necessary by the Council.

3. Puget agrees to implement means to assure that members of the public will be able to use Project-related land and water areas safely over which Puget exercise control and to which public access has been granted.

B. Fish Rearing Facility.

1. Puget agrees to construct and maintain, in conjunction with the Project, a fish rearing facility substantially as described in the Certification Application and the record herein.

2. Regulatory jurisdiction over operation of the fish rearing facility is vested, in the State Department of Fisheries

and/or the State Department of Game. The facility shall be operated for the benefit of the general public and shall not be operated for commercial purposes. The objective shall be to benefit as many members of the general public as is practicable, consistent with the nature of the facility.

3. Puget agrees to work diligently with the State Department of Fisheries and the State Department of Game to secure approvals authorizing the operation of the facility under the jurisdiction and management of the appropriate department or departments.

C. Social and Economic Impacts.

1. Puget agrees to monitor primary and secondary socio-economic impacts of the project during construction in close cooperation with Skagit County and other affected counties, subdivisions, districts or agencies, including but not limited to, Council member agencies and to make information available, on a regular basis, to the Council relating to the project in the socio-economic planning effort.

2. Specific data to be reported and a schedule for reporting socio-economic effects of construction shall be determined following discussions among Puget, Skagit County and the

Council no later than six months after the effective date of this Certification Agreement, subject to further modification as necessary.

3. Puget agrees that where socio-economic monitoring shows substantial adverse effects that are project construction connected, it will honor any substantiated claims that a substantial unmitigated burden has been or will be encountered that is a clearly demonstrated inability of the County, subdivision, district or agency to provide services of a quality at least equal to those presently provided. The provision recognizes Puget's commitment stated during the hearings herein to make whole any damage caused by Project connected construction or operation.

4. If needed, Puget agrees to make available for temporary housing any suitable land which it owns in the vicinity of the site, which is otherwise unused.

D. Facilities Review.

1. Puget shall submit to the County for approval all plans for the design of all buildings and structures associated with the Project, excepting those designated as Nuclear Power Plant Safety Related Structures, as well as the design of all approach roads, landscaping, fencing and parking areas associated with such buildings. The County shall review these plans and approve designs in accordance with the building code requirements in effect at the time of submittal.

E. Fire Protection Plans.

1. Puget shall submit to the County for approval all fire protection plans to be in force during construction and operation of the Project. The County shall review the fire protection plans and coordinate with the appropriate agencies prior to approval and adoption of such plans.

F. Solid Waste Disposal Plans.

1. Puget shall submit to the County for approval all construction and operation solid waste disposal plans for the Project. The County shall review the solid waste disposal plans and coordinate with the appropriate agencies prior to the adoption of such plans.

G. Non-Nuclear Effects Insurance.

1. Puget shall provide to the County evidence of adequate insurance, consistent with industry practices, against legal liability for injury to persons or damage to property of any kind whatsoever occurring on or off the site and resulting from non-nuclear hazards.

H. Changes in Project Managing Ownership.

1. No change in Project managing ownership or responsibilities may be effected without prior approval by the Council.

I. Site Retirement.

1. Within five (5) years after execution of this Agreement Puget shall submit to the Council a description of methods and procedures for site retirement or restoration which may be implemented after the useful life of the plant is completed. Puget agrees that it is responsible for final disposal of the plant structures on completion of such useful life.

J. Modification of Agreement.

1. This Certification Agreement may be amended by initiation of either the Council or Puget. Such amendatory activity shall be accomplished pursuant to Council rules and procedures then in effect in a like manner as the development of this original Certification Agreement, including, but not limited to, obtaining approval of the Governor. Any such amendments to this Certification Agreement shall be made in writing.

2. In certain circumstances where a dangerous degree of impact on the environment exists or is imminent, the Council

may impose specific conditions or requirements upon Puget in addition to the terms and conditions of this Certification Agreement as a consequence of any said emergency situation. The Administrative Procedures Act in RCW 34.04.170(2) contains authority for the Council to find that the public health, safety or welfare imperatively requires such emergency action.

K. Certification Compliance Costs

1. Puget agrees to pay those reasonable costs, which are determined to be necessary during plant construction and operation, to assure compliance with conditions of the Site Certification Agreement. Such costs shall be paid in amounts and at such times as are prescribed to the Council.

L. Severability.

1. Should any provision of this Agreement be declared by the courts to be unconstitutional or to have been preempted by any applicable state or federal law, regulation or requirement, the other provisions of this Agreement shall remain in

full force and effect, and any superseding state or federal law, regulation or requirement shall govern.

ATTACHMENTS hereto which are by this reference included in this Agreement and made a part hereof:

I. NPDES Permit

II. Environmental Monitoring Program

DATED at Olympia, Washington, and effective this _____ day of _____ 19____.

FOR THE STATE OF WASHINGTON

_____
DANIEL J. EVANS, Governor

FOR PUGET SOUND POWER & LIGHT

_____
JOHN ELLIS, President

Approved as to form
this _____ day of _____ 19___.

_____
THOMAS CARR
Assistant Attorney General

ATTACHMENT I
NPDES ORDER AND PERMIT

APPLICATION NO. 74-1
ORDER NO. 7
ADOPTED 1/26/76
AMENDED 4/12/76

BEFORE THE WASHINGTON STATE

THERMAL POWER PLANT SITE EVALUATION COUNCIL

In the matter of Application No. 74-1 of PUGET SOUND POWER & LIGHT COMPANY For a National Pollutant Discharge Elimination System Permit and Certificate of Compliance under Title 33, U. S. Code.	)	FINDINGS OF FACT, CONCLUSIONS OF LAW, AND ORDER

This matter came on regularly for hearing pursuant to due and proper notice to all interested parties on April 29 and 30, and May 1, 2, 6, 7, 8 and 9, 1975, at Sedro Woolley, Washington, before members of the Washington State Thermal Power Plant Site Evaluation Council and Legal Examiner C. Robert Wallis.

Council members who participated in this proceeding, and the agencies they represent, are the following:

THOMAS STACER Acting Chairman	Utilities and Transportation Commission
BRUCE REEVES	Department of Natural Resources
DAVID GUIER	Department of Emergency Services
JOHN CLARK	Parks and Recreation Commission
ROBERT MOONEY	Department of Social and Health Services
GEORGE HANSEN	Department of Ecology
LAWRENCE BRADLEY	Department of Commerce and Economic Development
VIRGIL CUNNINGHAM	Department of Agriculture
JOHN DOUGLAS	Department of Game
J. E. LASATER	Department of Fisheries
HOWARD MILLER	Commissioner, Skagit County

The parties were represented as follows:

APPLICANT: PUGET SOUND POWER & LIGHT COMPANY
By F. Theodore Thomsen
and William F. Baron
Attorneys at Law
Perkins, Coie, Stone, Olsen & Williams
1900 Washington Building
Seattle, Washington 98104

INTERVENORS: SKAGITONIANS CONCERNED ABOUT NUCLEAR PLANTS
RONALD CARSTENS and HELEN DAY
By Roger M. Leed
540 Central Building
Seattle, Washington 98104

SKAGIT ENVIRONMENTAL COUNCIL
By Alfred G. Rode
Attorney at Law
202 Fairhaven Avenue
Burlington, Washington

COUNSEL FOR THE ENVIRONMENT
By Wayne Williams
Assistant Attorney General
Temple of Justice
Olympia, Washington 98504

The Council's attorney, Darrel Peeples, Assistant Attorney General, Temple of Justice, Olympia, Washington 98504, also participated in the hearing.

Testimony from the following witnesses was presented by the applicant:

Robert V. Myers
Frederick M. Berthrong
Thomas Edwin Oaks
Warren J. Ferguson
Wilfred J. Finnegan
Bronislaw S. Schicker
Harry L. Blohm
Herman H. Druebert, P.E.
Jonathan P. Houghton
Ranjit K. Chakravorti
Barry A. Scott
Crispin Sager Kraft
Robert Yale
Richard Tosetti
Allyn Seymour

The following witnesses, being called by intervenors SCANP, Carstens and Day, presented testimony:

Robert J. Sylvester
David Brubaker

The following witnesses, appearing as members of the public, presented testimony during the course of the hearing:

Sophie Neble
Clair Heilman
Ron Carstens
George S. Mahaffy
Gregory McKee
Jeffrey Margolis
Helen Day
Jock Heverling
Keron Ericson
Will Davis
Richard Dildine
Gary Worline
Donald Bergstedt
Larry McKinnon
Zell A. Young
Jean Lisherness

The members of the Council voting on this matter having heard or read the evidence and having personally considered the entire record in this matter, the Council now makes and enters the following findings of fact.

FINDINGS OF FACT

1. On April 4, 1974, Puget Sound Power & Light Company (Applicant) filed with the Council an application for a National Pollutant Discharge Elimination System (NPDES) permit authorizing Applicant to discharge pollutants expected to result from the construction and operation of its proposed Skagit Nuclear Power Project (Project). Applicant also requested the Council to issue a certification in accordance with Section 401 (33 USC 1341) of the Federal Water Pollution Control Act (FWPCA; 33 USC 1251) with respect to discharges expected to result from the construction and operation of the Project.

2. Applicant on February 28, 1975, filed with the Council an amendment to its NPDES permit application. The term "NPDES Application" as used herein refers to the April 4, 1974, document as amended on February 28, 1975. The NPDES Application, as amended, constitutes Officially Noticed Document No. 1.

3. Presently pending before the Council is Puget Sound Power & Light Company's application for certification of the Project site pursuant to RCW 80.50. This application, filed with the Council on March 28, 1974, and assigned Application No. 74-1 by the Council, has since been revised by Revisions 1 through 7 filed with the Council. Applicant's Site Certification Application No. 74-1, as revised through Revision 7 dated May 2, 1975, is referred to herein as "Certification Application" (Officially Noticed Document No. 3).

4. The Project will consist of a nuclear-fueled electrical generating facility designed to accommodate two nuclear generating units each with a nominal electric power output of 1,288 MWE. Applicant proposes to construct the Project on a site (the Plant Site) of approximately 1,500 acres located at the north side of the Skagit River Valley in Skagit County, Washington, near the town of Lyman. The Project, the Plant Site, and the site environs are described in the Certification Application.

5. At its regular meeting of March 10, 1975, the Council made a tentative determination to issue an NPDES permit for the Project and in furtherance of this determination, adopted a proposed Draft NPDES Permit dated March 10, 1975, (Officially Noticed Document No. 2). This document is referred to herein as the "Draft NPDES Permit." At its March 10, 1975, meeting, the Council set April 29, 1975, as the date for commencement of the public hearings on the NPDES Application and the Section 401 Certification for the Project, pursuant to the official calendar for the Project previously agreed upon by the parties and adopted by the Council at its meeting of January 27, 1975.

6. The Council then prepared, under date of March 17, 1975, a fact sheet with respect to Puget's NPDES Application and, under date of March 21, 1975, a Notice of the public hearing set for April 29, 1975, which Notice also gave notice of the NPDES Application and the Application for Section 401 Certification. The fact sheet and Notice were then issued, mailed, circulated, published, and posted more than 30 days prior to April 29, 1975, the date set for public hearing on these matters, in full compliance with all applicable laws and regulations. The said notice invited all interested persons to submit written comments on these matters to the Council within 30 days following the date of publication of the notice. No such comments were received by the Council.

7. Pursuant to the notice described in Finding of Fact No. 6, next above, public hearing on these matters was convened at 10:00 o'clock A.M. on April 29, 1975, in the Sedro Woolley High School Little Theater, Sedro Woolley, Washington, before the Council members as set out above and Legal Examiner C. Robert Wallis.

8. The public hearing continued for a total of eight days during the two weeks subsequent to its opening. The transcript in this matter consists of 1,698 pages as follows: Pages 1-933; 933-1

to 933-75; and 934-1,624. The transcript in this matter stands corrected as provided in Examiner's Proposed Order Granting Motion to Correct Transcript, In Part, dated November 12, 1975, which was affirmed and adopted by the Council's Order dated December 8, 1975. Thirty-eight exhibits were admitted into evidence during the hearing and are identified in Appendix A, attached hereto and by this reference made a part hereof. In addition, provision was made during the course of the hearing for the admission of late-filed Exhibits 23, 24, 25 and 26, which have been received and made a part of the record herein. Official notice was taken during the hearing to numerous documents, which are identified in Appendix B, attached hereto and by this reference made a part hereof. During the course of this hearing, the applicant presented 14 witnesses; intervenors SCANP, Carstens and Day presented 2 witnesses; and 17 members of the public presented testimony.

9. An Examiner's Proposed Order herein issued on December 11, 1975; applicant and intervenors filed timely exceptions thereto; applicant filed a timely reply to intervenors' exceptions.

10. The Draft NPDES Permit identifies five outfall points through which pollutants will be discharged into Washington State waterways. These points are located as follows:

(a) Outfall Point 001
Latitude 48°29'19"N, Longitude 122°11'56"W

(b) Outfall Point 002
Latitude 48°32'5"N, Longitude 122°7'50"W

(c) Outfall Point 003
Latitude 48°32'5"N, Longitude 122°6'35"W

(d) Outfall Point 004
Latitude 48°32'5"N, Longitude 122°6'28"W

(e) Outfall Point 005
Latitude 48°32'6"N, Longitude 122°6'21"W

11. Discharge Outfall Point 001 is the only point from which pollutants occasioned by the operation of the proposed Project will be discharged directly into the Skagit River. Outfall Points 002 through 005 are points at which pollutants contained in construction runoff will be discharged into tributaries of the Skagit River.

12. The 7-day, 10-year low flow (that 7-day lowest flow which can statistically be expected to occur only once in a 10-year period) for the Skagit River in the vicinity of Project Discharge Point 001 is 4,740 cubic feet per second (cfs). The minimum instantaneous, 100-year low flow at this location is 2,330 cfs. The Council finds that the 7-day, 10-year low flow provides an appropriately conservative basis for use in evaluating project discharge impacts.

13. The Skagit River is one of great ecological importance as a spawning ground, rearing ground and fishing area for many species of salmonoid fish. It is also an important economic and recreational resource.

14. The significant fish populations of the Skagit River for commercial or recreational purposes are Chinook, Coho, Sockeye, Pink and Chum salmon and Steelhead and Searun Cutthroat trout.

15. The stability and survival of the Skagit's anadromous or salmonoid fish population are dependent upon adequate spawning and rearing areas, and adequate food supply for young fish, and satisfactory water quality.

16. The effluent discharges for which applicant seeks a permit from the Council in this proceeding consist of the following:

(a) Sanitary sewage discharge;

(b) Construction runoff discharges; and

(c) Project discharge.

These will be treated herein in the order listed.

SANITARY SEWAGE DISCHARGE

17. Applicant has applied for a permit authorizing it to discharge sanitary sewage generated during the construction and operation of the Project into the municipal sewage system of the City of Sedro Woolley, Washington, by means of a sanitary sewage pipeline to be constructed from the Project to the municipal system (NPDES Application Attachment 2). This discharge is referred to herein as the "Sanitary Sewage Discharge."

18. The estimated sanitary sewage loads from the Project which will comprise the Sanitary Sewage Discharge are shown in the NPDES Application on Table 1 of Attachment 2. The maximum load will occur in the fourth year of construction and will constitute approximately 500 population equivalents. During normal Project operation, the maximum load will be approximately 167 population equivalents.

19. The Sedro Woolley sewage treatment plant has a capacity of 11,000 population equivalents and is presently serving a population of 5,000. The excess capacity of this plant is sufficient to accommodate the maximum flow proposed to be discharged from the Project, in light of both present demand and expected future demand growth. The city is willing to receive sewage from the Project, and the Sedro Woolley City Council found at a meeting of April 28, 1975, that the conditions specified in the Draft NPDES Permit would be acceptable to the city.

20. The Sanitary Sewage Discharge will contain only sanitary sewage generated by humans. This discharge will comply with Federal pretreatment standards (40 CFR 128; Officially Noticed Document No. 7).

21. The Sanitary Sewage Discharge will be to a municipal sewage system. This discharge will not violate Washington State Water Quality Standards (WAC Chapter 173-201, Officially Noticed Document No. 6; referred to herein as "Water Quality Standards").

CONSTRUCTION RUNOFF DISCHARGES

22. Applicant has applied for a permit authorizing it to discharge collected storm runoff drainage generated during the construction of the project into two creeks on the Plant Site at Discharge Points 002, 003, 004 and 005 (NPDES Application, Section II). These discharges are referred to herein as "Construction Runoff Discharges."

23. Construction Runoff Discharges will originate from rainfall runoff from graded and spoil areas. Spoil areas are sites where earth, gravel, rock and other such substances removed from the Project site by grading and excavation will be stored during Project construction.

24. Applicant's plans for erosion control during site preparation and Project construction were presented during the course of the hearing and are described in Certification Application Section 120(1). The basic method for control of erosion during construction will be the collection of storm water runoff from graded and spoil areas into sediment retention ponds, where the runoff will be detained and sediment will settle out prior to discharge of the water. The ponds have been designed and are capable of operation so as to assure that the concentration of total suspended solids in the water discharge will not exceed the Federal standards of 50 mg/l (milligrams per liter) specified in Federal standards of performance for new sources (40 CFR 423.15 and 423.45, referred to herein as "Federal Standards of Performance"; see Officially Noticed Document No. 4). Construction Runoff Discharges will therefore consist of rainfall containing eroded particulate matter in concentrations not exceeding 50 mg/l.

25. Four ponds have been proposed by applicant for sediment retention purposes. Discharge points from these ponds are identified as Discharge Points 002, 003, 004 and 005 in the NPDES Application, in Draft NPDES Permit, in the testimony, and on Exhibit 3. The sediment retention barriers (dams) associated with these four discharge points are diagrammed on Exhibit 4.

26. The maximum 24-hour, 10-year rainfall (that maximum rainfall which can statistically be expected to occur only once in a 10-year period) at the project site is 3.5 inchess. A significant portion of any rainfall will percolate into the ground, rest on or

become absorbed by vegetation, or otherwise fail to constitute runoff. Applicant has calculated, by state-of-the-art methods, runoff water volumes which can be expected to be contained by the sediment retention barriers. The sediment retention ponds as shown in Exhibit 3 are designed to contain runoff in excess of the 24-hour, 10-year storm in addition to retained sediment. The ponds are designed to pass safely the 100-year storm without overtopping.

27. Questions were raised during the hearing concerning the validity of Applicant's use of coastal, rather than Cascade foothills, rainfall figures. Applicant should be required, within the extent of its capabilities, to verify the accuracy of its choice of figures and should, in the event its figures are unduly conservative, be required to amend its plans for retention barriers, in accordance with the following condition, which should be made a part of any permit to be issued herein:

> Prior to construction, Permittee shall advise the Council of the design redundancy in the settling capacity of the storm runoff settling ponds with regard to the maximum 24-hour, 10-year rainfall expectancy (3.5 inches). The Council reserves the right to require increased pond capacity or to require such other action as it deems necessary.

28. Black Creek is a tributary of Wiseman Creek. The stream will be diverted so that it joins Wiseman Creek at a point in excess of 1,000 feet north, or upstream, from the present confluence. The permanent diversion channel will be approximately 3,000 feet long. Discharge Point 002 is located on the present Black Creek, in an area from which water flow will be diverted, near the creek's present confluence with Wiseman Creek. Construction Runoff Discharge from Point 002 will thus be into Wiseman Creek, as diagrammed on Exhibit 3. Wiseman Creek is classified as Class A water under the Water Quality Standards. Construction Runoff Discharges from Points 003, 004 and 005 will be into Tank Creek as shown on Exhibit 3. Tank Creek is classified as Class AA water under the Water Quality Standards. Both creeks have populations of resident fish in the plant site area, and both are used by anadromous fish in their lower reaches, below intervening natural barriers.

29. Because the Construction Runoff Discharges will consist of rainfall runoff from graded and spoil areas, the pH, coliform, dissolved oxygen, total dissolved gas and temperature parameters of construction area runoff is expected to be consistent with natural conditions and the discharges are not expected to contain either toxic or radioactive substances. Applicant should be required to prohibit, and to develop procedures for preventing, the unauthorized or accidental spillage of substances in areas where they may be washed, carried or drained into the retention ponds. Discharges under the Permit herein should be

conditioned upon formulation of preventive plans, surveillance and procedures and corrective measures to effect this end, in accordance with the following condition which should be made a part of the Permit herein authorized:

> No dumping, spilling or deposit of oil, grease, chemicals, cement truck washings or other substances in areas within which such substances may be drained, washed or carried into discharges from the Plant Site will be allowed, except as specifically authorized in this Permit. Permittee must present to the Council plans outlining preventive surveillance and corrective measures designed to provide an effective barrier to introduction of foreign substances to Construction Runoff Discharge. No discharges may be made from Discharge Points 002, 003, 004 or 005 unless and until such plans have been accepted and approved by the Council.

30. Testimony during the hearing indicated that the temperature in the settling ponds at Discharge Points Serial Nos. 002, 003, 004 and 005 would not exceed 70° Fahrenheit. To insure that this capability is maintained, the following conditions should be inserted into the Permit to be granted herein:

> No discharges from settling ponds at Discharge Outfall Point Serial Nos. 002, 003, 004 or 005 shall be made if the temperature of the discharge exceeds 70° Fahrenheit; provided that the Council may temporarily waive this limitation if the Council determines that such waiver is appropriate and prudent, considering the total effect upon the ecosystem.

Construction Runoff Discharges, as thus conditioned, will not violate Water Quality Standards relating to coliform bacteria, dissolved oxygen, total dissolved gas, temperature or pH values.

31. Both Wiseman and Tank Creeks frequently experience concentrations of total suspended solids in excess of 50 mg/l from natural runoff, with levels as high as 237 mg/l in Wiseman Creek and 189 mg/l in Tank Creek measured during Applicant's water quality monitoring program.

32. The sediment retention ponds have been designed and are capable of operation so that the Construction Runoff Discharges will meet the standard of 50 mg/l total suspended solids specified in the Federal Standards of Performance. Testimony adduced at the hearing indicated that Applicant does not at present have prepared an operating manual outlining procedures to be adopted to insure compliance with terms and conditions of any discharge permit. In order for the Council to evaluate Applicant's procedures undertaken

to comply with Permit conditions, Applicant shall be required to prepare such a manual and receive Council approval thereof prior to making of any discharge from Discharge Points 002, 003, 004 or 005 in accordance with the following condition which shall be made a part of the Permit to be issued herein:

> The Permittee shall prepare and present to the Council prior to the discharge of any effluent, an operational manual describing the proper operation of the settling ponds at Discharge Point Serial Nos. 002, 003, 004 and 005, including but not limited to methods of discharge operation, monitoring release and pumping of residue. No discharge shall be made until the operational manuals have been reviewed and accepted by the Council. The Council reserves the right to require amendments to the operational manual at any time.

33. Maximum levels of total suspended solids associated with the Construction Runoff Discharges will be less than levels of total suspended solids occurring naturally in Wiseman and Tank Creeks with some frequency. The discharge from Point 002 will not cause Wiseman Creek to fail to meet or exceed the requirements for all or substantially all of the uses appropriate to Class A water that are consistent with the natural conditions that occur in this creek. The discharges from Points 003, 004 and 005 will not cause Tank Creek to fail to exceed, markedly and uniformly, the requirements for all or substantially all uses appropriate to Class AA water that are consistent with the natural conditions that occur in this creek.

34. Suspended solids can be considered a potentially deleterious material. Conflicting testimony was presented relating to the question of whether levels of total suspended solids associated with the Construction Runoff Discharges would be damaging to the aquatic environment. Intervenor's witness, Dr. Brubaker, described the adverse effects of total suspended solids and of sedimentation potentially associated with suspended solids. Applicant's witness, Dr. Houghton, quantified the levels at which adverse effects can be expected from total suspended solids, while still suspended. Those levels exceed substantially the levels associated with Construction Runoff Discharges. The Council finds, that, given the characteristics of Wiseman and Tank Creeks relating to flow, gradient, natural levels of suspended solids, natural flushing of sediment, and aquatic life, the levels of total suspended solids associated with Construction Runoff Discharges is expected to have a minimal impact upon the aquatic life.

35. While levels of total suspended solids can be estimated in advance, turbidity levels cannot, since there is no direct correlation between the two parameters. Turbidity must be measured empirically; it cannot be calculated. In view of this, compliance

with Water Quality Standards relating to turbidity cannot be demonstrated in advance. Applicant by means of empirical observations will have the ability to ascertain turbidity increases caused by Construction Runoff Discharges in Jackson Turbidity Units (JTU) and to operate the sediment retention ponds so that Construction Runoff Discharges comply with Condition G-4 of the Draft NPDES Permit, prohibiting the Permittee from discharging effluents causing violations of the Water Quality Standards.

36. The utilization of mixing zones in Tank and Wiseman Creeks is not appropriate. All pertinent water quality standards must therefore be met at the point of discharge. Ecologically effective discharge management, however, may call for discharge at times when turbidity limitations cannot be met. The Council does not believe that the record herein sufficiently states a case for waiver of this requirement; at the time when Applicant presents its Construction Runoff Discharge operational manual it may seek limited waiver of turbidity requirements. The Council will then consider whether limited, temporary waiver of such requirements is appropriate and prudent, considering total effect upon the ecosystem.

37. Taking into consideration the characteristics of Wiseman and Tank Creeks, and the fish populations and aquatic biota that are present in or could be expected to make use of or pass through the reaches of these creeks in the vicinity of discharge outfalls, and in view of the anticipated effect of these discharges on fish and biota, the Council finds that the discharges as conditioned herein will not interfere with biological communities or populations of important species to a degree which is damaging to the ecosystem, and which will not diminish other beneficial uses disproportionately.

38. Concerns were voiced during the hearing about the possibility that operation of Construction Runoff Discharge Outfalls might cause accelerated siltation of lower reaches of Tank and Wiseman Creeks. Applicant stated on the record its willingness to bear responsibility for any damage resulting from its operations. Consequently, the following condition, consistent with Applicant's position, should be added to Condition G-23 of the Draft NPDES Permit:

> In the event that operation of Discharge Outfall Points 002, 003, 004 or 005 are shown to have caused damage to downstream property owners through siltation of Tank or Wiseman Creeks, Permittee shall negotiate in good faith with any affected property owner or owners to effect a resolution acceptable to all parties thereto.

39. No permit authority was sought for any discharges which might result from construction of barge slip or railroad or highway access routes in conjunction with site preparation, except insofar as resulting discharges might be contained in settling ponds and discharged through Discharge Points 002, 003, 004 or 005. Except for discharges through the above-mentioned Discharge Points, no such discharges are authorized by the Permit to be issued herein.

40. Weighing the evidence presented, including consideration of relevant information contained in Water Quality Criteria 1972 (Exhibit 26; Officially Noticed Document No. 5), the Council finds that the Construction Runoff Discharges as conditioned herein will not violate the Water Quality Standards relating to toxic, radioactive, or deleterious material concentrations or the Water Quality Standards relating to aesthetic values.

DISCHARGE FROM PROJECT OPERATIONS

41. Applicant has applied for a permit authorizing it to discharge into the Skagit River at Discharge Point 001 (NPDES Application, Section II), during project operations, three effluent streams, together with dilution water: cooling tower blowdown, low volume wastes, and fish rearing facility effluent. Said discharge is referred to herein as the "Project Discharge".

42. In addition, a temporary effluent stream associated with Project Discharge will consist of water utilized in the flushing and hydrostatic testing of systems as construction of each unit is completed. Prior to its discharge, the water so utilized will be retained in a settling basin for elimination of debris and for monitoring prior to release. The water when discharged will be essentially pure. The Draft NPDES Permit schedule addressing metal cleaning wastes should be titled "Hydrostatic Testing and Flushing Wastes" in order to correspond more closely with system operations. Because of the nature of the discharged wastes, limits for total suspended solids should be reduced to 10 mg/l.

43. Issuance of this permit should be conditioned upon preparation of and presentation to the Council of such written procedures and Council approval thereof prior to conduct of any hydrostatic testing and flushing operations, in accordance with the following condition:

> Prior to the conduct of hydrostatic testing and flushing operations, Permittee shall prepare and present to the Council written procedures to be followed in the handling thereof. These procedures shall be subject to Council acceptance, modification, or rejection. No such operations shall be conducted except pursuant to procedures approved by the Council.

44. Average values for water flow within the project are shown schematically on the diagram entitled "Schematic of Water Flow," which appears in the NPDES Application following Section I.

45. The Project will draw approximately 106 cubic feet per second of water for use in plant operations. Of the total Project intake, some 20 cfs will be utilized for dilution of blowdown and, as needed, utilized in the Applicant's proposed fish facilities. Blowdown from cooling tower operation will constitute approximately 7 cfs; total Project discharge, blowdown plus dilution, will

total 27 cfs. These figures are based upon operation of both Project units; the values may be halved to show one unit operations.

46. The water will be drawn into the Project by means of pumping from Ranney wells sunk near the river. Most of the water thus drawn will originate from the Skagit River; the remaining minority will be ground water.

47. Composition of plant intake water is expected to be essentially similar to the composition of Skagit River Water. Because ground water may constitute a portion of the Project intake, and because that water may be of slightly different composition from Skagit River water, the following condition should be made a part of any permit to be issued herein:

> Following installation of Ranney wells, and prior to Plant operations, at the earliest time when well intake water composition can be expected to be equivalent to intake during plant operations, Permittee shall conduct base line water quality studies equivalent to those heretofore conducted on Skagit River water. Results of such study or studies shall be made available immediately to the Council. If intake water differs in quality or composition from Skagit River water as described in conjunction with the Application, effects of such difference upon discharge shall be described. If such a difference appears, the Council may require that a new application be filed, require that water treatment or other regulatory steps be taken, or take such other steps as it may deem necessary to insure that discharge quality will be maintained within the parameters established within this Permit.

48. Skagit River temperature and flow vary markedly on a seasonal basis. Exhibit 5.3 presents United States Geological Survey data on a natural temperature and flow variations in the Skagit River near the proposed diffuser location.

49. The Skagit River, at the point of discharge, is classified as Class A water under the Water Quality Standards. Exhibit 5.1A presents a summary of Skagit River water quality information. Questions concerning a few of the data presented on Exhibit 5.1A were raised, discussed and resolved by witness Houghton. Skagit River water quality information presented in the column entitled "Skagit River Analysis" on Certification Application Table 125(10) 05 as supplemented by the information in the column entitled "River Water" on Exhibit 5.2 are the maximum values expected to be observed in the Skagit River.

50. The highest temperature of the Project Discharge is calculated to be 70° Fahrenheit under summertime conditions and 50° Fahrenheit under wintertime conditions. The maximum temperature

difference (Delta T) between the discharge and the Skagit River will be 6° Fahrenheit under summer operating conditions and 16° Fahrenheit under winter operating conditions.

51. Certification Application Figure 125(7)-1 presents the results of a hydrographic study of the bottom of the Skagit River in the vicinity of the proposed diffuser location.

(a) The Project Discharge pipeline to Discharge Point 001 is proposed to terminate in a diffuser on the bed of the Skagit River as shown on Exhibit 6. It will be located midway between monuments N-4 and N-3 shown on Certification Application Figure 125(6)-1 and is proposed to consist of a 30-inch diameter pipe, 65 feet long, partially buried, with 44, 4-inch diameter ports, spaced on 1-1/2 - foot centers, designed to angle the discharge at 60° above the river bottom.

(b) The results of calculations of diffuser performance presented through Exhibits 7, 8, 9 and 10 as described in testimony represent the best available technology for making such predictions. The calculations are a conservative prediction of the mixing that will actually occur through diffuser operation.

(c) Questions were raised at the hearing concerning prior unsuccessful attempts to locate pipelines in the river bed at this point. Applicant offered on the record to investigate the circumstances of the events alluded to and to review its proposed diffuser design in light of the results of that investigation. The Council should condition the grant of permit and certification herein applied for upon satisfactory demonstration by the Applicant that its design plans remain viable and feasible in light of its investigation, in accordance with the following condition:

> The Permittee shall prepare and present to the Council, prior to the discharge of any effluent at Discharge Point 001, first, the results of its investigation concerning pipelines laid in the bed of the Skagit River near the proposed diffuser site and which may have been damaged or destroyed by the action of the river or objects carried therein, and second, a review of Applicant's diffuser design in light of the results of the aforementioned investigation in such detail as will permit the Council to evaluate the diffuser design in view of potential river hazards, and third, a summary of any engineering or design changes in such detail as may enable the Council to review their effectiveness. No discharge shall be made at Discharge Point Serial No. 001 until the above information has been received and approved by the Council. The Council reserves the right to require amendments to the design plan before, during or after any discharge period.

(d) Prior to operation of the proposed diffuser, Applicant should be required to present a detailed operational plan for its response to conditions resulting in physicial impairment or loss of the diffuser. The plan should include provision for monitoring the diffuser so that Applicant will be immediately and effectively advised of any such impairment or loss, in accordance with the following condition, which should be made a part of any permit to be issued herein:

> The Permittee shall prepare and present to the Council, prior to the discharge of any effluent at Discharge Point Serial No. 001, information showing the establishment and maintenance of a monitoring system which will enable it to determine whether the diffuser is in place and operating properly. No discharge shall be made until the information concerning the plan has been reviewed and accepted by the Council. The Council reserves the right to require amendments to the monitoring system before, during or after any discharge. If the diffuser is lost or damaged for whatever reason or cause in any manner adversely affecting the mixing of the effluent the Permittee shall immediately notify the Council and discharge, except from the fish rearing facility, shall cease at the earliest physically and technically possible moment, and shall not again begin until the Permittee has satisfied the Council that the diffuser has been replaced or repaired in such manner as will insure efficient mixing of the effluent; provided that the Council may temporarily waive the requirement that the discharge cease if the Council determines that protection of the overall public interest and welfare will be served and damage to the environment will be minimal.

(e) As conditioned above, the diffuser design selected is an effective and satisfactory method to mix the Project Discharge with waters of the Skagit River as quickly as possible.

52. The testimony of witness Houghton and data presented in Sections 135(2) and 135(4) of the Certification Application describe the aquatic biota present in the Skagit River in the vicinity of Discharge Point 001.

53. Applicant has presented sufficient information on the physical characteristics of the Skagit River, including river hydrology, water levels, temperature, flow and the topography of the bed and the banks of the river, and on the aquatic biota of the river, to allow a thorough consideration and adequate evaluation of potential effects of Project Discharge on the environment.

54. The cooling tower blowdown effluent stream arises because of the need to blowdown the recirculated cooling water system. Materials, including heavy metals, naturally present in the Skagit River will be concentrated by the operation of the cooling towers to some 12 times the values of their presence in river water. Because the blowdown of 3.5 cfs per unit will be diluted by a stream of 10 cfs per unit, the ratio of concentration of a naturally present constituent in the Project Discharge to its concentration in Skagit River water is approximately 3.85:1. Sulphyric acid will be added to the recirculated cooling water system for control of scaling and pH values. Sodium hypochlorite will be added to prevent biological growth in the system. No discharge of materials added for corrosion inhibition should be permitted, per the following condition, which should be added to the permit to be issued herein:

> No discharge of materials added for corrosion inhibition, including but not limited to zinc, chromium, and phosphorous, is permitted.

55. Testimony at the hearing indicated that Applicant could and would meet a condition that no supplemental biocides except as described herein shall ever be used or discharged in connection with Discharge Point Serial No. 001. The following condition should be inserted within the Permit.

> No supplemental biocide, other than sodium hypochlorite solution as described in the Application, will ever be used or discharged in connection with or from Discharge Point Serial No. 001.

56. The addition of the sodium hypochlorite to the recirculating cooling water will be accomplished in such a manner that the concentration of free available chlorine will reach a level of 0.5 mg/l (maximum) and 0.2 mg/l (average) at the condenser exit. Because there will be no further addition of chlorine or chlorine compounds between the condenser exit and the cooling tower basins, and because any chlorine added will decay chemically prior to discharge, Federal Standards of Performance of free available chlorine will not be exceeded. The chlorination schedule proposed by Applicant assures compliance with the Federal Standard of Performance prohibiting the discharge of free available chlorine or total residual chlorine from any one unit for more than two hours in any one day or from more than one unit at any one time.

57. Applicant's proposed method of and schedule for chlorination will result in a maximum concentration of total residual chlorine of 0.09 mg/l in the Project Discharge at the diffuser site. This calculation is based upon a concentration of ammonia in the raw water makeup to the cooling tower of 0.31 mg/l, its highest recorded level in Skagit River water. Using a less extreme value of ammonia in the raw water makeup, or 0.1

mg/l, the resulting concentration of total residual chlorine in the Project Discharge at the diffuser is calculated to be 0.03 mg/l, which level is shown on Exhibit 5.2. Monitoring should be continuous during discharge according to the following condition:

> Continuous recording of total residual chlorine at a location downstream of the junction of all streams that make up the Project Discharge, during periods of active chlorination and thereafter until total residual chlorine reaches an undetectable level, is required.

58. Testimony of Applicant's witness, Dr. Chakravorti, established that an appropriate parameter for effluent limitations concerning chlorine would be that of total residual chlorine, which term includes free available chlorine. The witness further testified that at no time would the total residual chlorine level (including free available chlorine) exceed .09 mg/l at the point of discharge. The Permit to be issued herein should establish that limitation according to the following condition:

> The maximum concentration of total residual chlorine at the outfall shall not exceed 0.09 mg/l at any time.

59. The low-volume waste stream consists of effluent from the raw water pretreatment system, comprising clarifier blowdown, filter backwash water demineralizer regeneration waste water, and plant facility floor drainage. Solid wastes therein shall not be added to Project Discharge.

60. Updating of flow figures based on Applicant's submissions requires modifications of low volume waste figures shown in the Draft NPDES Permit. These changes shall be reflected in the Permit to be issued herein at Page 4 of Appendix C, attached hereto and by this reference made a part hereof.

61. Contributions of the fish facility effluent to the Project Discharge are quantified on Exhibit 15. Maximum fish facility utilization, expressed in fish population by weight, will be 70,170 pounds, rather than the 50,000 pounds assumed in the formulation of Schedule B of the Draft NPDES Permit. Consequently, using the factors shown on Exhibit 16 to calculate total suspended solids in the effluent based on pounds of fish present, total suspended solids identified in the Draft NPDES Permit should be amended to read as follows: Daily average, 1,544 pounds per day; daily maximum 2,035 pounds per day.

62. Limitations relating to fish rearing facility effluent, set forth in Schedule B of the Draft of NPDES Permit, are based on current State and Federal agency practice relating

to such discharges with the exception of the limitation on biochemical oxygen demand (BOD). In accordance with the recommendation of the Washington State Department of Ecology, the limitation on BOD should be deleted. The Council notes that no effluent imitations or standards have been promulgated by the U. S. Environmental Protection Agency for fish rearing facilities. Modifications should be made in Schedule B as follows:

The term "cleaning effluent" should be deleted and the lines thereunder relating to suspended and settleable solids combined with other lines within the schedule relating to such parameters. Settleable solids should be monitored weekly; grab samples will provide sufficient and adequate indication of effluent composition. Specific provision should be made to allow discharge of dilution water not contaminated with plant effluent. Raceway and pond sludge should be treated as solid wastes and disposition thereof should be made under Permit provisions for solid wastes. Temperature of water discharged into the fish facility should not exceed the lowest temperature of recirculated cooling water prior to addition of makeup water.

The limitations and conditions remaining on Schedule B after deletion of the BOD limitation, and the above modifications, are appropriate and are those necessary to comply with the Water Quality Standards and to carry out the provisions of the Federal Water Pollution Control Act.

63. Certification Application Table 125(10)-5 as supplemented by Exhibit 5.2, lists the maximum concentrations of various constituents which will be present in the Project Discharge.

64. The only potential source of coliform bacteria in the Project Discharge will be from intake water. Considering all of the factors involved, including the degree of dilution achieved by the diffuser at the edge of the mixing zone, the discharge will not violate the Water Quality Standards regarding coliform bacteria levels, subject to final determination of intake water composition per Finding of Fact No. 47 and the condition therein.

65. Considering the lowest levels of dissolved oxygen in the Skagit River and in the Project Discharge, and considering the degree of dilution achieved by the diffuser at the edge of the mixing zone, the discharge will not violate the Water Quality Standard for dissolved oxygen.

66. The concentration of dissolved gas in the Project Discharge will not exceed 110 percent of saturation. The Water Quality Standard for total dissolved gas will not be violated.

67. Considering the maximum temperatures of the Project Discharge and of the Skagit River in summer months, the maximum temperature of the Project Discharge and the minimum temperature

of the Skagit River in winter months, and considering the degree of dilution calculated to be achieved by the diffuser at the edge of the mixing zone, the Water Quality Standard for temperature will not be violated.

68. The pH value of each constituent stream of the Project Discharge is required by terms of the Draft NPDES Permit to be in the range of 6.5 to 8.5. Considering the pH values in the Project Discharge, this discharge will not violate Water Quality Standards or the Federal Standards of Performance relating to pH. Applicant should be required to monitor pH according to the following condition, which should be inserted into the Permit to be issued herein:

> Permittee shall include an alarm system for pH control to provide an indication of any variance from established limits.

69. Considering the methods and facilities to be used in the Project for control of effluent streams, the design of the Project is adequate to assure compliance with Federal Standards of Performance relating to pH, low volume waste sources, metal cleaning wastes, and heat. Provisions of the NPDES Permit include these standards and Applicant is required to comply therewith.

70. Because maximum levels of total suspended solids within the Project Discharge will under most conditions be less than the levels of total suspended solids occurring naturally in the Skagit River, and because the Project Discharge will be released into the river from a diffuser located on the bed of the river, the Project Discharge will not violate Water Quality Standards relating to aesthetic values, either within or without the mixing zone described in the Draft NPDES Permit.

71. The Project has been designed so that no liquid radioactive waste will be contributed to Project Discharge and discharged into the Skagit River. A portion of the gaseous radioactive waste emitted by the Project, however, will pass through the cooling towers, and a portion of such material will enter the cooling tower blowdown and subsequently constitute a constituent of liquid Project Discharge into the Skagit River. This phenomenon was described by Applicant's witness, Mr. Tosetti.

72. Estimates of the magnitude of this phenomenon were presented. Exhibit 18 shows calculated increases in various radioactive concentrations. Exhibit 19 shows calculated resulting radioactive dose associated with the phenomenon.

73. The amount of radioactive material which can be expected to be entrained by the cooling towers is calculated and expected to be negligible. The release of such entrained radioactive material to the Skagit River will not adversely affect the populations of aquatic and terrestial species. Any permit to be issued herein should be conditioned as follows:

When plant operation commences the Permittee shall make and report to the Council an analysis to determine the levels of entrained radioactive material being released into the Skagit River.

74. To reflect the fact that no liquid radioactive waste will be added to Project Discharge into the Skagit River, the following sentence should be added at the end of General Condition No. G-2 of the Draft NPDES Permit:

No liquid radioactive waste shall be added to Project Discharge.

This further condition assures that no waste will be discharged into the Project Discharge from the Project's liquid radioactive waste treatment system.

75. Radioactive wastes which might be added to Project Discharge through cooling tower operation were identified and quantified by Applicant's witness Tosetti, who stated that they would not exceed specified levels. Those levels should be incorporated into the Permit to be issued herein as a condition to its issuance, as specified below:

The radiological waste materials contained in the discharge from discharge point Serial Number 001, which are attributable to plant operation, shall never exceed the following calculated levels:

Isotope	Annual Average Release From Plant (Ci/yr)	Annual Average Release From Cooling Tower (Ci/yr)	Annual Average Concentration At Cooling Tower Discharge (μCi/cc)	Annual Average Concentration Project Discharge (μCi/cc)	Annual Average Concentration After Mixing (μCi/cc)
Mn-54	1.8E-6	1.71E-7	3.30E-14	7.4E-15	1.2E-17
Mn-56	2.3E-3	5.9E-6	1.13E-12	2.5E-13	4.1E-16
Fe-59	3.6E-6	3.29E-7	6.32E-14	1.4E-14	2.3E-17
Co-58	2.3E-4	2.13E-5	4.10E-12	9.2E-13	1.5E-15
Co-60	2.3E-5	2.19E-6	4.22E-13	9.5E-14	1.5E-16
Sr-89	1.0E-4	9.18E-6	1.77E-12	4.0E-13	6.3E-16
Sr-90	7.8E-6	7.41E-7	1.42E-13	3.2E-14	5.1E-17
Mo-99	7.8E-4	3.26E-5	6.30E-12	1.4E-12	2.3E-15
Ru-103	6.8E-7	6.17E-8	1.19E-14	2.7E-15	4.3E-18
Ru-106	8.7E-8	8.27E-9	1.59E-15	3.6E-16	5.7E-19
Cs-134	5.5E-6	5.23E-7	1.01E-13	2.3E-14	3.6E-17
Cs-136	3.6E-6	3.01E-7	5.80E-14	1.3E-14	2.1E-17
Cs-137	8.2E-6	7.79E-7	1.50E-13	3.4E-14	5.4E-17
Ba-140	3.1E-4	2.57E-5	4.94E-12	1.1E-12	1.8E-15
I-131	2.3E-2	1.78E-3	3.42E-10	7.7E-11	1.2E-13
I-133	8.4E-2	1.53E-3	2.94E-10	6.6E-11	1.1E-13
H-3	4.84	4.60E-1	8.86E-8	2.0E-08	3.2E-11

76. In view of the extremely minute incremental doses associated with cooling tower operation in comparison to the guideline doses established by the Nuclear Regulatory Commission as a result of the "as low as practicable" hearings (Option of the Nuclear Regulatory Commission, Docket No. RM-50-2, April 30, 1975; Officially Noticed Document No. 11), the concentrations of radioactive materials as conditioned in Finding of Fact Nos. 73, 74 and 75 and the Permit to be issued herein, are the lowest practicable concentrations attainable and will not violate Water Quality Standards relating to radioactive concentrations.

77. The Council received conflicting testimony regarding the effect on the Skagit River aquatic environment of materials present in the Project Discharge which may be potentially toxic or deleterious. Intervenor's witness, Dr. Brubaker, testified that the chlorine, zinc and temperature components of the Discharge were capable of causing acute biological shock to aquatic organisms. In contrast, applicant's witness, Dr. Houghton, testified that such a condition was extremely unlikely.

78. This difference of opinion appears largely attributable to different assumptions of the witnesses concerning the probable time to which the aquatic biota would be exposed to given concentrations of the Project Discharge. Dr. Brubaker assumed a relatively lengthy exposure; Dr. Houghton assumed a much shorter exposure period. Length of the period of exposure is an important factor in evaluating the effect of a constituent or of constituents on biota.

79. The Council finds that the period of exposure of biota to undiluted or slightly diluted Project Discharge will ordinarily be on the order of seconds or minutes, and not on the order of hours or days. Downstream migrant fish may be subjected to minutes of exposure to the Project Discharge, during which time the Discharge is being diluted from full strength to 5 percent solution with Skagit River water. The diffuser and its discharge will not be a substantial barrier to fish moving upstream. The Council finds that relatively small numbers of fish, in comparison with river population, may be expected to become attracted to the mixing zone because its temperature will be higher than the ambient river temperature. Because of the velocities and the physical and chemical characteristics of the discharge, river flow velocities during periods when the water is coldest and temperature attraction might be greatest, and the relatively small proportion of the river occupied by the mixing zone, the Council finds that the period of exposure for this small number of fish will be far shorter than the hours or days assumed in Dr. Brubaker's testimony. The Council finds that the analysis presented by Dr. Houghton corresponds much more closely to conditions which will be actually experienced than does the analysis presented by Dr. Brubaker.

80. The precise nature of outfall attraction, if any, appears unknown. So that effects of operation of the discharge

may be fully known and properly evaluated, the following condition should be incorporated into any permit to be issued herein:

> During any period of discharge at outfall point 001, the Council may in its discretion require Permittee to conduct surveys to assess the nature and extent of attraction, if any, which the discharge plume may pose to aquatic organisms. Such surveys shall be conducted by state-of-the-art methods; precise method and timing of the surveys shall be proposed by the Permittee subject to Council approval. If the results of such surveys demonstrate that a significant hazard is posed to the aquatic biota, the Council may take such action as it deems necessary, including but not limited to requiring suspension of discharge until harmful conditions are eliminated.

81. Washington State Water Quality Criteria and Standards contained in WAC Chapter 173-201 do not permit the discharge of effluents in concentrations sufficient to cause acute biological shock either outside the mixing zone or inside. Condition G-4 of the Draft NPDES Permit to be issued herein should be modified to prohibit the discharge of effluent in concentrations sufficient to cause acute biological shock inside the mixing zone.

82. Applicant has not conducted standard 96-hour LC50 tests utilizing discharged effluent, receiving waters, and the most sensitive important species of aquatic life. The following provision should be entered into any permit to be issued herein as a condition to its grant:

> Upon full operation, and yearly thereafter, Applicant shall conduct tests indicating effects of Project Discharge upon the most sensitive significant aquatic species. The specific tests to be conducted shall be proposed by the applicant subject to approval of the Council. If these tests indicate that damage to the aquatic biota is a potential effect of discharge operation, the Council may require such modifications of discharge operation as will, in the Council's judgment, effectively protect the ecosystem, and may suspend or cancel portions of this Permit until discharges are shown to be in full compliance with all terms and conditions herein.

83. As conditioned as described above in Finding of Fact No. 82. the constituents of the Project Discharge, either singly or in combination, will not adversely stress the aquatic biota to any significant degree. In view of the conditions expressed above, and weighing the evidence presented, the Council finds that a condition of acute biological shock, as that term is defined in the Water Quality Standards, will not exist either

within or without the mixing zone specified in the Draft NPDES Permit for the Project Discharge.

84. Considering the evidence relating to the nature of the Project Discharge and its effects on the aquatic biota, including consideration of the relevant information contained in Water Quality Criteria 1972 (Exhibit 26; Officially Noticed Document No. 5), and the evidence on the suitability of the water of the Skagit River downstream of the point of discharge for use as a supply of drinking water, and considering the conditions referenced in the above Findings of Fact, Water Quality Standards for toxic and deleterious material will not be violated.

85. The mixing zone relating to the Project Discharge is described in the Draft NPDES Permit. Considering the characteristics of the Skagit River at the point of discharge and the fish populations and biota present in or which could be expected to make use of or pass through the reach of the river in the vicinity of the mixing zone, and considering the anticipated effect of the Project Discharge on fish and biota with the condition as described in Finding of Fact No. 80, above, the Council finds that the mixing zone is limited to a size which will not interfere with biological communities or populations of important species to a degree which is damaging to the ecosystem and which will not diminish other beneficial uses disproportionately.

86. Considering the quality and characteristics of the Skagit River and the constituents of the Project Discharge and their concentrations and potential effects, and conditions to be placed upon discharge releases, and weighing all the evidence, the Council finds that the Project Discharge will not cause the Skagit River to fail to meet or exceed the requirements for all or substantially all of the uses appropriate to Class A water.

87. Condition G-7 in the Draft NPDES Permit requires the Applicant to notify the Council and, under some circumstances, seek a new and revised NPDES Permit, whenever Applicant anticipates a facility expansion, production increase, or process modification affecting its effluent discharges. The Council believes that potentially, other circumstances may be anticipated which may affect Project Discharges, and that the requirement of notification to the Council and, if necessary application for new NPDES Permit, should be required under any such circumstances. Condition G-7 in the Draft NPDES Permit should be modified to read as follows:

> a. Whenever a facility expansion, production increase, process modification or other action, event or occurrence is anticipated which will result in a new or increased discharge, or which will cause any of the conditions of the Permit to be exceeded a new NPDES Application must be submitted, together with the necessary reports and engineering plans for the proposed changes. No such change shall be

made until plans have been approved and a new permit or permit modification has been issued.

b. Permittee shall notify the Council of any anticipated action event or occurrence which shall affect or modify the nature, character, composition, or constituents of effluent discharges prior to the action, event or occurrence even though, to the best of Applicant's knowledge or belief, such action, event or occurrence shall not result in violation of effluent limitations specified in this Permit. The Council may in its discretion waive notification of recurring or insignificant changes.

88. Data resulting from monitoring activities and results may have considerable value for the establishment of patterns, and it appears to the Council that the Draft Permit requirement in Condition G-15 that Permittee shall retain records of monitoring activities and results for a minimum three-year period may be insufficient for the establishment of such patterns. Consequently, the Council should modify Condition G-15 of the Draft NPDES Permit to require Permittee to retain all records of monitoring activities and results for a minimum five-year period.

89. It appears to the Council that Condition G-9 of the Draft NPDES Permit constitutes a substantial redundency of terms stated within Condition G-12. Condition G-9 of the Draft NPDES Permit shall be stricken, and non-redundant terms included in G-12, as follows:

If, for any reason the Permittee does not comply with or will not be able to comply with, any daily maximum effluent limitations specified in this permit, the Permittee shall:

(a) Immediately take action to stop, contain, and clean up the unauthorized discharge and correct the problem.

(b) Provide the Council with the following information, in writing, within 48 hours of becoming aware of such condition:

(1) A description of the discharge and cause of noncompliance; and

(2) The period of noncompliance, including dates and times; or if not corrected, the anticipated time the noncompliance is expected to continue and steps being taken to reduce, eliminate and prevent recurrence of the noncomplying discharge.

Compliance with these requirements does not relieve the Permittee from responsibility to maintain continuous compliance with the conditions of this permit or the resulting liability for failure to comply.

COMPLIANCE WITH STATE ENVIRONMENTAL POLICY ACT

90. In May, 1975, pursuant to the Washington State Environmental Policy Act of 1971 [referred to herein as SEPA; RCW Chapter 43.21C] and pursuant to the Council's regulation implementing that act (WAC 463-08-024), the Council issued its Draft Environmental Impact Statement on the Project, for the purposes both of this proceeding and the Site Certification proceeding. Public notice was given of the availability of said Draft Statement, and the Draft Statement was distributed and made available, and comments were solicited and received, all in full compliance with SEPA and with the Council's regulation.

91. Thereafter, also during May, 1975, the Nuclear Regulatory Commission (NRC) issued its Final Environmental Statement regarding Applicant's Proposed Project (NUREG-75/05-5, referred to herein as "NRC FES") pursuant to the National Environmental Policy Act of 1969 (42 USC 43.21).

92. The Council recognizes that Chapter 206, Laws of Washington, 1975 First Extraordinary Session, amended SEPA (RCW 43.21C.150) effective June 16, 1975, eliminated the Council's obligation to prepare its own Environmental Impact Statement and authorized the Council to use the NRC FES instead. Notwithstanding this change in law, the Council, in the interests of a complete evaluation and review of potential environmental impacts of the Project and full compliance with all of the policies and procedures of SEPA, both in this proceeding and in the companion Site Certification proceeding, made the decision to prepare its own final Environmental Impact Statement on the Project, which it would consider along with the NRC FES.

93. Accordingly, the Council, taking into account all comments received on its Draft Environmental Impact Statement, prepared its own final Environmental Impact Statement on the Project, which Statement was approved by the Council on November 24, 1975. Public notice was given of the availability of this final Environmental Impact Statement, and the Statement was distributed and made available in full compliance with SEPA and the Council's regulations.

94. Prior to reaching its decision in this proceeding, the Council has carefully reviewed and considered its final Environmental Impact Statement concerning this Project, as well as the NRC FES, and all of the information set forth therein. In addition, the Council has carefully considered and weighed all of the factors

specified in SEPA in the light of the policies of that Act and those set forth in RCW Chapter 90.48, RCW Chapter 80.50, and the Federal Water Pollution Control Act.

95. The Council recognizes that, by virtue of RCW 90.48.262(2), the NPDES Permit issued in this proceeding will not become effective until the Council has arrived at a decision concerning its recommendations to the Governor of the State of Washington in the Site Certification proceeding, and then only if the Governor approves the Application for Site Certification and executes a Certification Agreement pursuant to RCW 80.50. Thus, the Council considers these two proceedings integrally related for the purposes of SEPA.

ADDITIONAL FINDINGS

96. The Draft NPDES Permit as modified by the changes noted in the above Findings is hereinafter referred to as the "Permit" and a copy is attached hereto as Appendix C.

97. The discharges authorized by the Permit which will result from the construction and operation of the Project will not violate the applicable Water Quality Standards of the State of Washington. These Standards have been approved by the United States Environmental Protection Agency pursuant to the FWPCA.

98. The discharges authorized by the Permit resulting from the construction and operation of the Project will comply with the applicable provisions of Sections 301, 302, 306 and 307 of the FWPCA.

99. The Permit applies and ensures compliance with all applicable effluent limitations under Sections 301 and 302 of the FWPCA, all applicable standards of performance for new sources under Section 306 of FWPCA, and all applicable effluent standards, effluent prohibitions and pretreatment standards under Section 307 of FWPCA, all limitations necessary to meet and implement the Water Quality Standards of the State of Washington, and, with respect to the fish rearing facility, all conditions which the Council has determined to be necessary to carry out the provisions of FWPCA.

100. The provisions, limitations and conditions of the Permit will assure protection of public water supplies, agricultural and industrial uses, and the protection and propagation of a balanced population of shellfish, fish and wildlife, and allow recreation activities in and on the water of the rivers, creeks and waters that will receive or be affected by the discharges from the Project.

101. The Permit, issued for a period of five years from the date of issuance, is sufficient, adequate and appropriate for the Project and for the regulation of discharges authorized by the Permit. It will establish limitations and conditions upon those discharges in full compliance with the procedures, requirements and policies of the FWPCA, including but not limited to

Section 402 thereof, and the requirements and policies of RCW Chapter 90.48 and RCW Chapter 80.50, and of all applicable regulations issued pursuant to said laws.

From the foregoing Findings of Fact, the Council makes and enters the following Conclusions of Law:

CONCLUSIONS OF LAW

1. The Washington State Thermal Power Plant Site Evaluation Council has jurisdiction over the subject matter of this application and the parties to this proceeding.

2. The Council's draft Environmental Impact Statement referred to in Finding of Fact No. 90 was an adequate draft environmental impact statement and the Council's final Environmental Impact Statement referred to in Finding of Fact No. 93 is an adequate final environmental impact statement.

3. The discharges authorized by the Permit which will result from the construction and operation of the Project will not violate the applicable Water Quality Standards of the State of Washington. These Standards have been approved by the United States Environmental Protection Agency pursuant to the FWPCA.

4. The discharges authorized by the Permit resulting from the construction and operation of the Project will comply with the applicable provisions of Sections 301, 302, 306 and 307 of the FWPCA.

5. The Permit applies and ensures compliance with all applicable effluent limitations under Sections 301 and 302 of the FWPCA, all applicable standards of performance for new sources under Section 306 of FWPCA, and all applicable effluent standards, effluent prohibitions and pretreatment standards under Section 307 of FWPCA, all limitations necessary to meet and implement the Water Quality Standards of the State of Washington, and, with respect to the fish rearing facility, all conditions which the Council has determined to be necessary to carry out the provisions of FWPCA.

6. The conditions and terms of the Draft NPDES Permit as modified in accordance with the Findings of Fact herein are reasonable and necessary conditions and terms for the maintenance of current State and Federal standards applicable by law, rule or regulation of effluent discharges and for maintenance of the ecological environment of the State of Washington.

7. The Council is authorized to, and may properly issue to the applicant, an NPDES Permit for the Project in the form of the Permit attached hereto as Appendix C, for a period of five years from the date of its issuance.

8. The Permit identified in Conclusion of Law No. 7, above, and the discharges authorized by said Permit, will be in

compliance with all applicable Federal and State laws, rules and regulations.

9. The Council is authorized to and may properly issue to the Applicant a Certificate in accordance with Section 401 (33 USC 1341) of the Federal Water Pollution Control Act (FWPCA; 33 USC 1251) stating that any discharge from the construction or operation of the Skagit Nuclear Power Project will be undertaken in compliance with the Permit issued herein, will comply with the applicable provisions of Sections 301, 302, 306 and 307 of the FWPCA and will not violate the applicable Water Quality Standards of the State of Washington as approved by the United States Environmental Protection Agency pursuant to the FWPCA.

From the foregoing Findings of Fact and Conclusions of Law, the Council makes and issues the following Order:

O R D E R

WHEREFORE, IT IS HEREBY ORDERED, That the application of Puget Sound Power & Light Company for an NPDES Permit authorizing the discharge of pollutants from the construction and operation of the Skagit Nuclear Power Project shall be, and the same is hereby, granted, SUBJECT TO the conditions and limitations set forth in the Permit attached hereto as Appendix C and by this reference made a part hereof.

IT IS FURTHER ORDERED That said Permit be issued forthwith for a term of five (5) years from the date of its issuance.

IT IS FURTHER ORDERED That a Certificate be issued forthwith to the Applicant in accordance with Section 401 (33 USC 1341) of the Federal Pollution Control Act (FWPCA; 33 USC 1251) stating that any discharge from the construction or operation of the Skagit Nuclear Power Project undertaken in compliance with the Permit issued herein will comply with the applicable provisions of Sections 301, 302, 306 and 307 of the FWPCA and will not violate the applicable Water Quality Standards of the State of Washington as approved by the United States Environmental Protection Agency pursuant to the FWPCA, and that the conditions and limitations of the NPDES Permit issued pursuant to this Order assure such compliance and nonviolation.

ENTERED this 26th day of January 1976.

WASHINGTON STATE THERMAL POWER PLANT
SITE EVALUATION COUNCIL

By Thomas C. Stacer
THOMAS C. STACER
Acting Chairman

Approved for Entry:

DARREL PEEPLES
Assistant Attorney General

TPPSEC

Application No. 74-1 (Skagit)

NPDES Permit and Section 401 Certification Hearing

EXHIBITS

Number	Description	Identified	Admitted
1.1	Resume of Fredrick M. Berthrong	1:25	1:57
1.2	Resume of Jonathan P. Houghton	1:26	3:549
1.3	Resume of Allyn H. Seymour	1:26	8:1592
1.4	Resume of Bronislaw S. Shicker	2:412	2:412
1.5	Resume of Herbert H. Druebert	3:541	3:542
1.6	Resume of Ranjit K. Chakravorti	5:919	5:920
1.7	Resume of Barry A. Scott	6:1045	6:1066
1.8	Resume of Richard J. Tosetti	7:1304	7:1306
2	Map entitled Plant Site Creeks	1:26	1:83
2A	Aerial Infrared Photograph of Plant Site Area, taken June 1974	1:26	4:753
2B	Black and White Photograph of the Skagit River Proposed Diffuser Site	1:27	3:683
2C	Oblique Aerial Photograph of Pipeline and Transmission Crossings taken April 28, 1975	3:681	3:683
2D	Oblique Aerial Photograph of River Channel, taken April 28, 1975	3:681	3:683
3	Map entitled Storm Runoff Discharge Points 002 to 005	1:27	1:83
4	Diagram entitled Sediment Retention Barrier Details	1:28	1:93
5.1	Skagit River Water Quality Information	1:28	4:750
5.1A	Skagit River Water Quality Information (revised)	4:735	4:750

Number	Description	Identified	Admitted
5.2	Supplemental Water Quality Parameters	1:28	4:750
5.3	Natural Temperature and Flow Variations in the Skagit River Near the Proposed Diffuser Location	1:28	4:750
5.4	Timing of Salmon and Searun Trout, Fresh Water Life Phases in Skagit Basin	1:29	4:750
5.5	Summary of Dames & Moore Water Quality Data	7:1275	7:1277
6	Skagit River Cross-section at Diffuser	1:29	6:1066
7	Average Dilution, 10-year, 7-day Low River Flow, 4740 cfs	1:29	6:1066
8	Summer Conditions, 10-year, 7-day Low River Flow, 4740 cfs	1:29	6:1066
9	Winter Conditions, 10-year, 7-day Low River Flow, 4740 cfs	1:30	6:1066
10	Dilution of Project Discharge in Skagit River	1:30	6:1066
11	Map entitled Bechtel, Location of Water Well Springs, TPPSEC Fig. L-7	1:288	1:302
12	Large Scale photograph introduced by Helen Day	1:289	1:302
13	Mr. Blohm's drawing of Diversion Channel Cross-section	2:471	2:477
14	Dr. Houghton's sketch for illustrative purposes of Upper Tank Creek	3:598	3:659
15	Fish Facility Contribution to the Project Discharge	5:854	5:877
16	Memorandum, Mr. Roy Nakatani, a two-page document	5:855	5:877
17	Model for Radioactive Gaseous Effluent Pathway to Project Discharge	7:1304	7:1323

Number	Description	Identified	Admitted
18	Incremental Increase in Radioactivity Due to Project Offgas to Cooling Tower to Skagit River Pathway	7:1304	7:1342
19	Incremental Dosage to Man Due to Project Offgas to Cooling Tower to Skagit River Pathway	7:1304	7:1339
20	Guidelines for the Establishment of Dilution Zones	6:1173	7:1221
21	Industrial General Conditions	6:1173	7:1221
22	Municipal General Conditions	6:1173	7:1221
23	Excerpts from "Fisheries Handbook of Engineering Requirements and Biological Criteria" by Milo C. Bell, Fisheries-Engineering Research Program, Corps of Engineers, North Pacific Division, Portland, Oregon, February, 1973	Late-filed exhibit 7:1435	7:1435
24	Letter dated May 30, 1975 from Attorneys for Applicant to Wayne L. Williams, Counsel for the Environment, and attached table entitled "Supplemental Total Coliform Data from the Skagit River"	Late-filed exhibit 8:1563-64, 1567	
25	Pages 77-83 from Battelle publication "Pacific Northwest Laboratory Annual Report for 1973 to the USAEC Division of Biomedical and Environmental Research," January, 1974	Late-filed exhibit by SCANP	
26	Additional pages from "Water Quality Criteria 1972"	Late-filed exhibit by SCANP	

TPPSEC

Application No. 74-1 (Skagit)

NPDES Permit and Section 401 Certification Hearing

DOCUMENTS OFFICIALLY NOTICED

Number	Description	Identified	Noticed
1.	Applicant's NPDES Application dated April 4, 1974, as amended February 28, 1975	1:32-33	1:36
2.	The Draft NPDES Permit for the Skagit Project, as adopted by the Council at its meeting March 10, 1975	1:32-33	1:36
3.	Applicant's Application No. 74-1 for Site Certification for the Skagit Nuclear Power Project, as revised through Revision 7 Thereto, dated May 2, 1975	1:32-33	1:36
4.	39 Federal Register 36186-36207, October 8, 1974 (40 CFR 423, Steam Electric Power Generating Point Source Category) and 40 Federal Register 7095-7096, February 19, 1975 (correction to 40 CFR 423)	1:32-33	1:36
5.	The following pages from Water Quality Criteria 1972, A Report of the Committee on Water Quality Criteria, Environmental Studies Board, National Academy of Sciences, National Academy of Engineering, Washington, D. C., 1972: 126-129, 178, 180-182, 189	1:32-33	1:36
6.	Water Quality Standards for Waters of the State of Washington, WAC 173-201	1:32-33	1:36
7.	40 CFR 128, Pretreatment Standards (38 Federal Register 30982, November 8, 1973).	1:32-33	1:36

Number		Description	Identified	Noticed
8.		Letters from Department of Ecology (Sylvester) to Thomsen dated April 2, and April 23, 1975	1:32-33	1:36
9.		Publication entitled "Guidelines for Erosion and Sediment Control Planning and Implementation" issued by the U.S. Environmental Protection Agency, EPA R2-72-015, August 1972	1:119-20	1:123
10.	A.	Agenda and Minutes for the Following meetings of the Council:		
		(1) January 27, 1975--agenda item 5 (2) February 18, 1975--agenda item 6 (3) February 24, 1975--agenda item 5 (4) March 10, 1975--agenda item 5		
	B.	The Following letters from Attorneys for Applicant:		
		(1) February 25, 1975 to Alfred G. Rode and Roger M. Leed (2) February 28, 1975 to the Council (3) March 5, 1975 to the Council (4) March 15, 1975 to Roger M. Leed		
11.		Opinion of the Nuclear Regulatory Commission, Docket No. RM-50-2, April 30, 1975	6:936-37	6:937
12.		Publication entitled "Development Document for Effluent Limitations Guidelines and New Source Performance Standards for the Steam Electric Power Generating Point Source Category" issued by the U.S. Environmental Protection Agency, EPA 440/1-74 029-a, October 1974	6:936-37	6:937
13.		NPDES Permit for WPPSS Nos. 1 and 4 (Hanford): (a) as approved April 28, 1975, and (b) as amended July 14, 1975	6:1174-76	6:1175
14.		Draft NPDES Permit for WPPSS Nos. 3 and 5 (Satsop), as adopted (tentative determination) February 24, 1975	6:1174-76	6:1175

APPENDIX C

Permit No. WA-002502-0
Issuance Date:
Expiration Date:

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM WASTE DISCHARGE PERMIT

State of Washington
Thermal Power Plant Site Evaluation Council
Olympia, Washington 98504

In Compliance With the Provisions of
Chapter 155, Laws of 1973, (RCW 90.48) as amended

and

The Federal Water Pollution Control Act Amendments of 1972,
Public Law 92-500

Puget Sound Power & Light Company
Puget Power Building
Bellevue, Washington 98009

Plant Location:	Sections 11, 12, 13 & 14 T. 35N, R5E, W.M. West of Lyman Skagit County, Washington	Receiving Water: See Page 2 Discharge Location: See Page 2
Industry Type:	Nuclear Steam Electric Generating Plant (Skagit Units 1 & 2)	Waterway Segment No.: See Page 2

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is authorized to discharge in accordance with the special and general conditions which follow:

APPROVED: January 26, 1976

AMENDED: April 12, 1976

Thomas C. Pierce
Acting Chairman
Thermal Power Plant Site
Evaluation Council

OUTFALL IDENTIFICATION

Outfall	Receiving Water	Discharge Location	Water Segment No.
001	Skagit River	Lat. 48°29'19"N Lo. 122°11'56"W	02-03-06
002	Wiseman Creek	Lat. 48°32' 5"N Lo. 122° 7'50"W	02-03-06
003	Tank Creek	Lat. 48°32' 5"N Lo. 122° 6'35"W	02-03-06
004	Tank Creek	Lat. 48°32' 5"N Lo. 122° 6'28"W	02-03-06
005	Tank Creek	Lat. 48°32' 6"N Lo. 122° 6'21"W	02-03-06

SPECIAL CONDITIONS

S.1 EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS FOR OUTFALL DISCHARGE SERIAL NUMBER 001.

During the period beginning with the issuance of this permit and lasting until the expiration date of this permit, the permittee is authorized to discharge effluents from Outfall Discharge Serial Number 001 subject to the following limitations and monitoring requirements:

A. LOW VOLUME WASTE SOURCES PORTION OF DISCHARGE SERIAL NUMBER 001 (1)

PARAMETER	EFFLUENT LIMITATIONS		MONITORING REQUIREMENTS (2)	
	Daily Maximum	Daily Average	Minimum Frequency	Sample Type
Total Suspended Solids (lb/day) (3)	95.5	9.0	3 times per week	Grab
pH	Between 6.5 and 8.5 at all times		3 times per week	Grab
Oil and Grease (4) (lb/day)	19.1	4.5	Weekly	Grab
Flow (GPD)	0.114×10^6	0.036×10^6	Continuous	Instantaneous

Note (1) When only one generating unit is in operation, the effluent limitations on flow and the effluent loading limitations for total suspended solids, and Oil and Grease shall be half of the limitations specified above.

Note (2) Permittee shall monitor the effluent prior to confluence with other inplant streams.

Note (3) The maximum concentration of total suspended solids shall not exceed 100 mg/l at any time.

Note (4) The maximum concentration of oil and grease shall not exceed 20 mg/l at any time.

B. RECIRCULATED COOLING WATER BLOWDOWN PORTION OF DISCHARGE SERIAL NUMBER 001 PER UNIT

PARAMETER	EFFLUENT LIMITATIONS		MONITORING REQUIREMENTS (1)	
	Daily Maximum	Daily Average	Minimum Frequency	Sample Type
Temperature	Note (2)		Continuous	Instantaneous
Free Available Chlorine (lb/day)	Note (3) 0.79	0.32	Continuous (4)	Instantaneous
pH	Between 6.5 and 8.5 at all times		Continuous (5)	Instantaneous
Flow (GPD)	2.27×10^6	2.27×10^6	Continuous	Instantaneous

Limits Applicable to Total Residual Chlorine: The maximum concentration of total residual chlorine at the outfall shall not exceed 0.09 mg/l at any time. Continuous recording of total residual chlorine at a location downstream of the junction of all streams that make up the Project Discharge, during periods of active chlorination and thereafter until total residual chlorine reaches an undetectable level, is required. The Council may waive the requirement that Permittee monitor total residual chlorine upon a showing by Permittee that such total residual chlorine levels are substantially correlated with the levels of free available chlorine monitored at the exits from the cooling tower basins.

Note (1) Permittee shall monitor the effluent prior to confluence with other inplant streams.

Note (2) The temperature of the recirculated cooling water blowdown shall not exceed, at any time, the lowest temperature of the recirculated cooling water prior to the addition of the makeup water.

Note (3) For compliance, free available chlorine will be measured at and will be characteristic of the discharge of the unit being chlorinated. Neither free available chlorine nor total residual chlorine may be discharged from any unit for more than two hours in any one day and not from more than one unit at any one time.

Note (4) Continuous recording of free available chlorine during periods of active chlorination and thereafter until free available chlorine reaches an undetectable level is required.

Note (5) Permittee shall include an alarm system for the pH control to provide an indication of any variance from the established units.

C. HYDROSTATIC TESTING AND FLUSHING WASTES PORTION OF DISCHARGE SERIAL NUMBER 001 PER UNIT

PARAMETER	EFFLUENT LIMITATIONS(1)		MONITORING REQUIREMENTS(2)	
	Daily Maximum	Daily Average	Minimum Frequency	Sample Type
Total Suspended Solids (mg/l)	10	10	3 times per day when discharging	Grab
pH	Between 6.5 and 8.5 at all times		3 times per day when discharging	Grab
Flow (GPD)	0.1×10^6		Each discharge	N/A

Note (1) No water contaminated with chemical cleaning agents shall be discharged.

Note (2) Permittee shall monitor the effluent prior to confluence with other inplant streams.

D. FISH FACILITY PORTION OF DISCHARGE SERIAL NUMBER 001

PARAMETER	EFFLUENT LIMITATIONS			MONITORING REQUIREMENTS(1)	
Total Discharge	Daily Maximum	Instantaneous Maximum	Daily Average	Minimum Frequency	Sample Type
Total Suspended Solids (lb/day)	2035	N/A	1544	Weekly	6-hr. composite
Total Suspended Solids (mg/l)	N/A	15	N/A	Weekly	Grab
pH	Between 6.5 and 8.5 at all times			Daily	Grab
Flow (GPD)(2)	6.5×10^6	---	6.5×10^6	Continuous	Instantaneous
Settleable Solids(3) (ml/l)	N/A	0.2	0.1	Weekly	Grab
Temperature	See Note (4)			Continuous	Instantaneous

Note (1) Permittee shall monitor the effluent prior to confluence with other inplant streams.

Note (2) Value shown does not include blowdown flow. 6.48 MGD of uncontaminated dilution water may also be discharged.

Note (3) Bottom sludges from raceways and ponds shall be treated as solid wastes and disposed of as required in condition G-7.

Note (4) Recirculated cooling water discharged to the fish facility shall not exceed at any time the lowest temperature of the recirculated cooling water prior to addition of the makeup water.

S.2 EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS FOR OUTFALL DISCHARGE SERIAL NUMBERS 002, 003, 004 and 005

During the period beginning with the issuance of this Permit and lasting until the expiration date of this permit, the permittee is authorized to discharge effluents from Outfall Discharge Serial Numbers 002, 003, 004 and 005 subject to the following limitations and monitoring requirements:

A. COLLECTED STORM RUN-OFF DRAINAGE OF DISCHARGE SERIAL NUMBERS 002, 003, 004 and 005

PARAMETER	EFFLUENT LIMITATIONS(1)	MONITORING REQUIREMENTS	
		Minimum Frequency	Sample Type
Total Suspended Solids	50 mg/l maximum	Once per day when there is discharge from the storm collector basins	Grab
pH	Between 6.5 and 8.5 at all times	Once per day when there is discharge from the storm collector basins	Grab

Note (1) These limits may be exceeded during periods when runoff volumes exceed those generated by a "10-year, 24-hour rainfall event" as defined in 40CFR 423.41(d). This has been determined to be 3.5" per 24 hours.

S.3 BOUNDARIES OF MIXING ZONES FOR OUTFALL DISCHARGE SERIAL NUMBER 001

Outfall 001

a. The boundaries in the vertical plane shall be one foot below the receiving water surface and one foot above the riverbed;

b. The upstream and downstream boundaries shall be 10 feet and 100 feet, respectively, from the center line of the diffuser; and

c. The laterial boundaries shall be 50 feet, respectively, from the center of the diffuser.

S.4 SPECIAL CONDITIONS APPLICABLE TO DISCHARGE OF SANITARY SEWAGE INTO MUNICIPAL SEWERAGE SYSTEM OF THE CITY OF SEDRO WOOLLEY, WASHINGTON

a. Permit. Permittee is authorized to discharge sanitary sewage generated during the construction and operation of the Project to the municipal sewerage system of the City of Sedro Woolley, Washington.

b. Discharge Location. The point(s) of discharge into the municipal sewerage system shall be at such location(s) as may be approved by the City of Sedro Woolley.

c. Maximum Flow. The maximum flow of the discharge authorized herein shall be 50,000 gpd or such greater flow as may be authorized by the City of Sedro Woolley.

d. Prohibited Wastes. The discharge authorized herein shall not include any "incompatible pollutant" as defined in 40 CFR 128.122 nor any waste prohibited by 40 CFR 128.131.

e. Pretreatment Requirements. None, except as may be required to comply with 40 CFR 128.131.

f. Limitations and Monitoring Requirements.

1. Flow
Limitations: 0.05 mgd daily average
0.05 mgd daily maximum
(Subject to paragraph C, Maximum Flow, above).

Monitoring Requirements:
Minimum frequency - continuous
Sample type - instantaneous

2. Other Constituents
Limitation: Raw untreated sanitary sewage constituent concentrations (BOD, suspended solids, pH and fecal coliform) shall be within the ranges normally experienced for such wastes.

Monitoring Requirements:
Minimum frequency - monthly
Sample type - 6 hour composite

One copy of each monitoring report required under Condition G-27, to the extent it covers the discharge authorized herein, shall also be submitted to the City of Sedro Woolley.

g. Plans and Specifications. All plans and specifications for the construction of the sewerage system extension or other facilities proposed for conveying the discharge authorized herein to the municipal sewerage system of the City of Sedro Woolley, and the proposed method of future operation and maintenance of said facilities, shall be submitted to and approved by the City of Sedro Woolley and the Council before construction thereof may begin.

GENERAL CONDITIONS

G1. No discharge of polychlorinated biphenol compounds, such as transformer fluid is permitted. No discharge of materials added for corrosion inhibition including, but not limited to, zinc, chromium, and phosphorous is permitted.

G2. All discharges and activities authorized herein shall be consistent with the terms and conditions of this Permit. Permittee is authorized to discharge those pollutants which are: (1) contained in the raw water supply, (2) entrained from the atmosphere, or (3) quantitatively and qualitatively identified in the Permit application; except as modified or limited by the special or general conditions of this Permit. However, the effluent concentrations in Permittee's waste water shall be determined on a gross basis and the effluent limitations in this Permit mean gross concentrations and not net addition of pollutants. The discharge of any pollutant more frequently than or at a level in excess of that authorized by this Permit shall constitute a violation of the terms and conditions of this Permit. No liquid radioactive waste shall be added to Project Discharge.

G3. The radiological waste materials contained in the discharge from discharge point Serial Number 001, which are attributable to plant operation, shall never exceed the following calculated levels:

Isotope	Annual Average Release From Plant (Ci/yr)	Annual Average Release From Cooling Tower (Ci/yr)	Annual Average Concentration At Cooling Tower Discharge (μCi/cc)	Annual Average Concentration Project Discharge (μCi/cc)	Annual Average Concentration After Mixing (μCi/cc)
Mn-54	1.8E-6	1.71E-7	3.30E-14	7.4E-15	1.2E-17
Mn-56	2.3E-3	5.9E-6	1.13E-12	2.5E-13	4.1E-16
Fe-59	3.6E-6	3.29E-7	6.32E-14	1.4E-14	2.3E-17
Co-58	2.3E-4	2.13E-5	4.10E-12	9.2E-13	1.5E-15
Co-60	2.3E-5	2.19E-6	4.22E-13	9.5E-14	1.5E-16
Sr-89	1.0E-4	9.18E-6	1.77E-12	4.0E-13	6.3E-16
Sr-90	7.8E-6	7.41E-7	1.42E-13	3.2E-14	5.1E-17
Mo-99	7.8E-4	3.26E-5	6.30E-12	1.4E-12	2.3E-15
Ru-103	6.8E-7	6.17E-8	1.19E-14	2.7E-15	4.3E-18
Ru-106	8.7E-8	8.27E-9	1.59E-15	3.6E-16	5.7E-19
Cs-134	5.5E-6	5.23E-7	1.01E-13	2.3E-14	3.6E-17
Cs-136	3.6E-6	3.01E-7	5.80E-14	1.3E-14	2.1E-17
Cs-137	8.2E-6	7.79E-7	1.50E-13	3.4E-14	5.4E-17
Ba-140	3.1E-4	2.57E-5	4.94E-12	1.1E-12	1.8E-15
I-131	2.3E-2	1.78E-3	3.42E-10	7.7E-11	1.2E-13
I-133	8.4E-2	1.53E-3	2.94E-10	6.6E-11	1.1E-13
H-3	4.84	4.60E-1	8.86E-8	2.0E-08	3.2E-11

G4. Permittee shall notify the Council no later than 120 days before the date of anticipated first discharge under this Permit.

G5. Permittee shall not discharge any effluent which shall cause a violation of any applicable State of Washington Water Quality Criteria or standards contained in WAC 173-201, as they exist now or hereafter are amended, outside the boundaries of the applicable mixing zone described in Condition S.3 or inside said zone if in concentrations sufficient to cause biological shock.

G6. The Permittee shall provide an adequate operating staff which is qualified and shall carry out the operation, maintenance, and testing activities required to insure compliance with the conditions of this Permit.

G7. Permittee shall handle and dispose of all solid waste material from any waste retention basins or any other source in such a manner as to prevent their pollution of any ground or surface water body. Further, Permittee shall not permit laechate from such solid waste material to cause adverse effect on ground or surface water quality.

G8. a. Whenever a facility expansion, production increase, process modification or other action, event or occurrence is anticipated which will result in a new or increased discharge, or which will cause any of the conditions of the Permit to be exceeded, a new NPDES Application must be submitted, together with the necessary reports and engineering plans for the proposed changes. No such change shall be made until plans have been approved and a new permit or permit modification has been issued.

b. Permittee shall notify the Council of any anticipated action, event or occurrence which shall affect or modify the nature, character, composition, or constituents of effluent discharges prior to the occurrence of such action, event or occurrence even though, to the best of the Applicant's knowledge or belief, such action, event or occurrence shall not result in violation of effluent limitations specified in this Permit. The Council may in its descretion waive notification of recurring or insignificant changes.

G9. If a toxic effluent standard or prohibition (including any schedule of compliance specified in such effluent standard or prohibition) is established under Section 307(a) of the Federal Act for a toxic pollutant which is present in the Permittee's discharge and such standards or prohibition is more

stringent than any limitation upon such pollutant in this Permit, this Permit shall be revised or modified in accordance with the toxic effluent standard or prohibition and the Permittee shall be so notified.

G10. If, for any reason, the Permittee does not comply with or will not be able to comply with, any daily maximum effluent limitations specified in this Permit, the Permittee shall:

a. Immediately take action to stop, contain, and clean up the unauthorized discharge and correct the problem.

b. Provide the Council with the following information, in writing, within 48 hours of becoming aware of such condition:

(1) A description of the discharge and cause of noncompliance; and

(2) The period of noncompliance, including dates and times; or if not corrected, the anticipated time the noncompliance is expected to continue and steps being taken to reduce, eliminate and prevent recurrence of the noncomplying discharge.

Compliance with these requirements does not relieve the Permittee from responsibility to maintain continuous compliance with the conditions of this Permit or the resulting liability for failure to comply.

G11. The Permittee shall at all times maintain in good working order and efficiently operate all treatment or control facilities or systems installed or used by the Permittee to achieve compliance with the terms and conditions of this Permit.

G12. The diversion from or bypass of any discharge from facilities utilized by the Permittee to maintain compliance with the terms and conditions of this Permit is prohibited, except (a) where unavoidable to prevent loss of life or severe property damage, or (b) where excessive storm drainage or runoff would damage any facilities necessary for compliance with the terms and conditions of this Permit. The Permittee shall promptly notify the Council in writing of each such diversion or bypass in accordance with the procedure specified in Condition G10.

G13. Permittee shall install an alternative electric power source capable of operating any electrically powered pollution control facilities; or, alternatively, Permittee shall certify

to the Council that the terms and conditions of this Permit will be met in case of a loss of primary power to the pollution control equipment by controlling production.

G14. Prior to construction, Permittee shall advise the Council of the design redundancy in the settling capacity of the storm runoff settling ponds with regard to the maximum 24-hour, 10-year rainfall expectancy (3.5 inches). The Council reserves the right to require increased pond capacity or to require such other action as it deems necessary.

G15. No dumping, spilling or deposit of oil, grease, chemicals, cement truck washings or other substances in areas within which such substances may be drained, washed or carried into discharges from the Plant Site will be allowed, except as specifically authorized in this Permit. Permittee must present to the Council plans outlining preventive, surveillance and corrective measures designed to provide an effective barrier to introduction of foreign substances to Construction Runoff Discharge. No discharges may be made from Discharge Points 002, 003, 004, or 005 unless and until such plans have been accepted and approved by the Council.

G16. The Permittee shall prepare and present to the Council prior to the discharge of any effluent, an operational manual describing the proper operation of the settling ponds at Discharge Point Serial Nos. 002, 003, 004 and 005, including but not limited to methods of discharge operation, monitoring release and pumping of residue. No discharge shall be made until the operational manuals have been reviewed and accepted by the Council. The Council reserves the right to require amendments to the operational manual at any time.

G17. No discharges from settling ponds at Discharge Outfall Point Serial Nos. 002, 003, 004, or 005 shall be made if the temperature of the discharge exceeds 70° Fahrenheit; provided that the Council may temporarily waive this limitation if the Council determines that such waiver is appropriate and prudent, considering the total effect upon the ecosystem.

G18. In the event that operation of Discharge Outfall Points 002, 003, 004 or 005 are shown to have caused damage to downstream property owners through siltation of Tank or Wiseman Creeks, Permittee shall negotiate in good faith with any affected property owner or owners to effect a resolution acceptable to all parties thereto.

G19. When plant operation commences, the Permittee shall make and report to the Council an analysis to determine the levels of entrained radioactive material being released into the Skagit River.

G20. Following installation of Ranney wells, and prior to Plant operations, at the earliest time when well intake water composition can be expected to be equivalent to intake during plant operations, Permittee shall conduct base line water quality studies equivalent to those heretofore conducted on Skagit River water. Results of such study or studies shall be made available immediately to the Council. If intake water differs in quality or composition from Skagit River water as described in conjunction with the Application, effects of such difference upon discharge shall be described. If such a difference appears, the Council may require that a new application be filed, require that water treatment or other regulatory steps be taken, or take such other steps as it may deem necessary to insure that discharge quality will be maintained within the parameters established within this Permit.

G21. The Permittee shall prepare and present to the Council prior to the discharge of any effluent at Discharge Point 001, first, the results of its investigation concerning pipelines laid in the bed of the Skagit River near the proposed diffuser site and which may have been damaged or destroyed by the action of the river or objects carried therein, and second, a review of Applicant's diffuser design in light of the results of the aforementioned investigation in such detail as will permit the Council to evaluate the diffuser design in view of potential river hazards, and third, a summary of any engineering or design changes in such detail as may enable the Council to review their effectiveness. No discharge shall be made at Discharge Point Serial No. 001 until the above information has been received and approved by the Council. The Council reserves the right to require amendments to the design plan before, during or after any discharge period.

G22. The Permittee shall prepare and present to the Council, prior to the discharge of any effluent at Discharge Point Serial No. 001, information showing the establishment and maintenance of a monitoring system which will enable it to determine whether the diffuser is in place and operating properly. No discharge shall be made until the information concerning the plan has been reviewed and accepted by the Council. The Council reserves the right to require amendments to the monitoring system before, during or after any discharge. If the diffuser is lost or damaged for whatever reason or cause in any manner adversely affecting the mixing of the effluent the Permittee shall immediately notify the Council and discharge, except from the fish rearing facility,

shall cease at the earliest physically and technically possible moment, and shall not again begin until the Permittee has satisfied the Council that the diffuser has been replaced or repaired in such manner as will insure efficient mixing of the effluent; provided that the Council may temporarily waive the requirement that the discharge cease if the Council determines that protection of the overall public interest and welfare will be served and damage to the environment will be minimal.

G23. Upon full operation, and yearly thereafter the Permittee shall conduct tests indicating effects of discharge upon the most sensitive significant aquatic species. The specific tests to be conducted shall be proposed by the Applicant subject to approval of the Council. If these tests indicate that damage to the aquatic biota is a potential effect of discharge operation, the Council may require such modifications of discharge operations as will in the Council's judgment, effectively protect the ecosystem, and may suspend or cancel portions of this Permit until discharges are shown to be in full compliance with all terms and conditions herein.

G24. Prior to the conduct of hydrostatic testing and flushing operations, Permittee shall prepare and present to the Council written procedures to be followed in the handling thereof. These procedures shall be subject to Council acceptance, modification, or rejection. No such operations shall be conducted except pursuant to procedures approved by the Council.

G25. No supplemental biocide, other than sodium hypochlorite solution as described in the Application, will ever be used or discharged in connection with or from Discharge Point Serial No. 001.

G26. During any period of discharge at outfall point 001, the Council may in its discretion require Permittee to conduct surveys to assess the nature and extent of attraction, if any, which the discharge plume may pose to aquatic organisms. Such surveys shall be conducted by state-of-the-art methods; precise method and timing of the surveys shall be proposed by the Permittee subject to Council approval. If the results of such surveys demonstrate that a significant hazard is posed to the aquatic biota, the Council may take such action as it deems necessary, including but not limited to requiring suspension of discharge until harmful conditions are eliminated.

Monitoring

G27. Permittee shall comply with the Monitoring Program requirements set forth herein:

Monitoring results for the previous quarter shall be summarized on a monthly basis and reported on a Discharge Monitoring Report Form (EPA 3320-1), postmarked no later than the 28th day of the month following the end of the quarter. The first report is due the 28th day of the first month following the end of the quarter in which the first discharge under this Permit occurs. Duplicate signed copies of these, and all other reports required herein shall be submitted to EPA and the Council at the following addresses:

U.S. EPA Region X
1200 Sixth Avenue
Seattle, WA 98101
Attention:
Permits Branch M/S 521

TPPSEC
Attention:
Executive Secretary
820 East 5th Avenue
Olympia, WA 98504

G28. The Permittee shall retain for a minimum of five years all records of monitoring activities and results, including all reports of recordings from continuous monitoring instrumentations, record of analysis performed and calibration and maintenance of instrumentation. This period of rentention shall be extended during the course of any unresolved litigation regarding the discharge of pollutants by the Permittee or when requested by the Council.

G29. All samples and measurements made under this program shall be representative of the volume and nature of the monitored discharge.

G30. The Permittee shall record each measurement or sample taken pursuant to the requirements of this Permit for the following information: (1) the date, place and time of sampling; (2) the dates the analyses were performed; (3) who performed the analyses; (4) the analytical techniques or methods used; and (5) the results of the analyses.

Other Provisions

G31. As used in this permit, the following terms are as defined herein:

a. The "daily maximum" discharge means the total discharge by weight during any calendar day.

b. The "daily average" discharge means the total discharge by weight during a calendar month divided by the number of days in the month that the respective discharges occur. Where less than daily sampling is required by the Permit, the daily average discharge shall be determined by the summation of the measured daily discharges by weight divided by the number of days during the calendar month when the measurements were made.

c. "Composite sample" is a sample consisting of a minimum of six grab samples collected at regular intervals over a normal operating day and combined proportional to flow, or a sample continuously collected proportional to flow over a normal operating day.

d. "Grab sample" is an individual sample collected in a period of less than 15 minutes.

G32. All sampling and analytical methods used to meet the monitoring requirements specified in this Permit shall conform to regulations published pursuant to Section 304(g) of the Federal Act, or if there is no applicable procedure, shall conform to the latest edition of the following references:

a. American Public Health Association, Standard Methods for the Examination of Water and Wastewaters.

b. American Society for Testing and Materials, A.S.T.M. Standards, part 23, Water, Atmospheric Analysis.

c. Environmental Protection Agency, Water Quality Office Analytical Control Laboratory, Methods for Chemicals Analysis of Water and Wastes.

Alternative methods may be utilized if approval pursuant to 40 CRF 136 or as amended is received by Permittee. The Council shall be notified of each such alternative method approved for use.

G33. Except for data determined confidential under Section 308 of the Federal Act, all reports prepared in accordance with the terms of this Permit shall be available for public inspection

at the offices of the Council and the Regional Administrator. As required by the Federal Act, effluent data shall not be considered confidential. Knowingly making a false statement on any such report may result in the imposition of criminal penalties as provided in Section 309 of the Federal Act.

G34. After notice and opportunity for a hearing this Permit may be modified, suspended or revoked in whole or in part during its term for cause, including but not limited to the following:

a. Violation of any terms or conditions of this Permit;

b. Obtaining this Permit by misrepresentation or failure to disclose fully all relevant facts;

c. A change in any condition that requires either a temporary or permanent reduction or elimination of the authorized discharge; and

d. If any provision of this permit is declared invalid by the courts.

G35. The Permittee shall, at all reasonable times, allow authorized representatives of the Council upon the presentation of credentials:

a. To enter upon the Permittee's premises for the purpose of inspecting and investigating conditions relating to the pollution of, or possible pollution of any of the waters of the State, or for the purpose of investigating compliance with any of the terms of this Permit;

b. To have acess to and copy any records required to be kept under the terms and conditions of this Permit;

c. To inspect any monitoring equipment or monitoring method required by this Permit; or

d. To sample any discharge of pollutants.

G36. Nothing in this Permit shall be construed as excusing the Permittee from compliance with any applicable Federal, State or local statutes, ordinances or regulations.

G37. Nothing in this Permit shall be construed to preclude the institution of any legal action or relieve the Permittee from any responsibilities, liabilities or penalties to which the Permittee is or may be subject.

G38. Should any provision of this Permit be declared by the courts to be unconstitutional or invalid, by reason of federal preemption or otherwise, such decision shall not affect the validity of the other provisions of this Permit, which shall remain in full force and effect.

ATTACHMENT II

PUGET SOUND POWER & LIGHT COMPANY
SKAGIT NUCLEAR POWER PROJECT
SITE CERTIFICATION AGREEMENT

ENVIRONMENTAL MONITORING PROGRAM

INDEX

I. INTRODUCTION

This attachment to the Site Certification Agreement provides a synopsis of the environmental monitoring program for the Skagit Nuclear Power Project. The program is divided into three separate but closely intertied phases:

A. Baseline monitoring
B. Construction monitoring
C. Pre-operational/Operational monitoring

Emphasis is placed on the Pre-operational/Operational stage. Reporting schedules and program change techniques are also described. Monitoring required under terms of the NPDES Permit are in addition to those specified herein.

II. REPORTS

Periodic program status and results reports will be submitted to the Council. Reports will be submitted on or before the last day of March, June, September and December during periods of site preparation and construction, and on the last day of March and September of each year thereafter.

Specific data to be reported and schedule for reporting socio-economic effects of construction as described and required in Certification Agreement Section VI.C. shall be determined, following discussions among Puget, Skagit County and the Council, no later than one year from the effective date of the Certification Agreement.

III. MONITORING PROGRAM DESCRIPTION

A. Baseline

The baseline environmental monitoring program, that has been and is being utilized, is described in the following sections of Application 74-1:

115(3)	Background Radiation Levels
125(8)	Baseline Water Quality
130(2)	Air Quality & Meteorological Conditions
135(1)	Terrestrial Biota Description
135(2)	Aquatic Biota Description
145(1)	Archeological Sites
150(3)	Radiation Monitoring
150(4)	Water Quality Monitoring
150(5)	Air Quality Monitoring
150(6)	Biota Quality Monitoring

Its purpose has been to provide a base upon which to assess the effects of Project construction and operation. Thus, Project-induced variations or changes can be determined and corrective action taken if necessary. The program will continue with sampling locations and frequencies being adjusted appropriately as determined by the adequacy of the data and the "normalcy" of the environment. The program is designed to provide an orderly transition to the construction monitoring phase.

B. Construction

The construction environmental monitoring program will essentially be a continuation of the studies conducted during the baseline phase. However, the level of activity will be increased in those areas where impact due to construction is likely to occur. Archeological, aquatic, terrestrial, water quality, and air quality monitoring will be carried out during construction as indicated in Application 74-1 sections

120(1)	Excavation & Erosion
145(1)	Archeological Sites
150(4)	Water Quality Monitoring
150(5)	Air Quality Monitoring
150(6)	Biota Quality Monitoring
150(7)	Construction Archeology

The addition of temporary stations and adjustment of sampling frequencies will be such as to ensure timely assessment of Project induced variations with the implementation of corrective measures if necessary. Sampling will be reduced as construction activities that significantly affect the environment are decreased or terminated, however, sampling will not be discontinued until it can be shown that a station is no longer affected by construction activities.

C. Pre-Operational/Operational

The pre-operational/operational phase of the program will, in many respects, be similar to that conducted during preceding phases. However, the studies will concentrate on the areas where an impact may be possible due to the operation of the Project. Initiation will take place approximately one year prior to initial fuel loading for Unit 1 and in some instances as early as two years. The areas to be covered are:

1. Water Quality/Hydrology
2. Meteorology
3. Radiation Monitoring
4. Terrestrial Biotic Monitoring
5. Aquatic Biotic Monitoring

The monitoring program shall be governed by the following gradient concept to avoid nondiscovery of excessive variance in values of the parameters monitored. The frequency of data collection and reporting shall be increased when:

a. Limits exist for monitored parameter, and the last value approaches a limiting value by more than 50% of the difference between the limiting value and the preceding value; or

b. No limits exist for monitored parameter and the difference between the last value and the preceding value exceeds 150% of the difference between the preceding value and the next preceding value when both differences are in the same direction or 200% if in a contrary direction.

The scope of the Environmental Monitoring Program will be modified as the need arises. Such modifications will be based upon evaluations or determinations pertaining to existing studies, program features, or resulting data. Program changes, together with the justification rationale will be submitted to the Council as part of the applicant's periodic reports. Proposed deletions of sampling stations, sample parameters, etc. will be submitted to the Council for approval. If the Council does not approve any such submittal, it agrees to respond with any comments within forty-five (45) days of receipt of the submittal.

Initial operation, as used in this attachment, is defined as the date of initial commercial operation for a unit.

A discussion of each program subsection follows.

1.0 WATER QUALITY/HYDROLOGY

The pre-operational program will begin at the start of the hydrologic year preceding Unit 1 initial fuel loading. Locations to be sampled are shown on Figure C-1.1 and the frequencies of analysis of each parameter are listed in Table C-1.1. Subject to the consent of the owners of such wells and to the feasibility of obtaining such measurements in such wells, water quality, water level, and water yield in the five domestic wells closest to the Ranney Collectors will be monitored quarterly beginning one calendar year prior to collector operation.

The program will be continued for one hydrologic year following Unit 1 initial operation. After this year, the frequency of sample collection at locations, other than those at and below the diffuser (SL 4 and 6), will be reduced (biweekly sampling to monthly; monthly sampling to quarterly, etc.) until at least one hydrologic year preceding Unit 2 initial fuel loading. The full program will then be reinstated and continued for one hydrologic year after Unit 2 initial operation. Based on data generated during these years monitoring at locations other than the Project discharge may be discontinued.

Sampling stations in the Project discharge pipeline (SL 4a) and in the major axis of the discharge plume (SL 4) will be established as part of the operational sampling program. Effluents in the discharge streams making up the Project discharge and the combined discharge will be sampled frequently during the first few months of operation until a satisfactory balance of

chemical additions is established. The sampling frequency for the combined discharge then will be reduced to that shown on Table C-1.1 for a period of a year. Each sample taken for analysis will consist of a 24-hour composite to ensure a representative sample. It is expected that during the first year of operation sufficient data will be gathered to characterize the effluent so that the sampling frequency may be reduced thereafter. Analysis will be for parameters:

a. the pre-operational program has shown to exist in the intake water,
b. expected to be part of the discharge, and
c. required by applicable local, state, and federal regulations.

Parameters may be added or deleted from this list (Table C-1.1) based on results from the studies or modifications in local, state, or federal regulations.

A detailed study to define the extent and nature of the effluent plume will be performed seasonally during the first year of operation for both Unit 1 and Units 1 and 2 simultaneously. The sampling scheme will be a three-dimensional grid blanketing the region of the plume, with control locations sampled directly upstream from the Project discharge.

The temperature, pH, dissolved oxygen, alkalinity and like parameters and flow rate of the Project discharge will be monitored continuously before it enters the Skagit River. Monitoring of chlorine in the Project discharge shall be as

specified in the NPDES Permit for the Project, as said Permit may be modified or reissued from time to time. The exact location of sample point 4a has not been established. However, it will be in the pipeline at a location downstream of the junction of all streams that make up the Project discharge.

TABLE C.1-1

AQUATIC MONITORING FREQUENCY BY SAMPLING LOCATION AND PARAMETER(1)

Parameter	Domestic Wells (5)	Ranney Collector (SL 1a)	Pipeline In River (SL 4)	Pipeline In Pipe (SL 4a)	Shake Mill (SL 6)	Lower Tank Cr. (SL 9a)	Lower Wiseman Cr. (SL 10)	Sorenson Cr. (SL 12)
Physical and Chemical								
Flow	-	C	-	C	-	BW	BW	-
Temperature	Q	BW	BW	C	BW	BW	BW	-
Total Hardness (EDTA)	Q	BW	BW	BW	BW	M	M	-
Alkalinity Total (Methyl orange)	Q	BW	BW	BW	BW	M	M	-
Turbidity	-	BW	BW	D	BW	BW	BW	-
pH	Q	BW	BW	C	BW	BW	BW	-
Dissolved Oxygen	-	BW	BW	D	BW	M	M	-
Color	-	M	M	-	M	M	M	-
Conductivity	Q	BW	BW	D	BW	BW	BW	-
Suspended Solids	-	BW	BW	D	BW	BW	BW	-
Total Dissolved Solids	Q	M	M	M	M	Q	Q	-
Biochemical Oxygen Demand	-	Q	Q	W	Q	Q	Q	-

(1) C=continuous; D=daily; W=weekly; BW=every 2 weeks; M=monthly; Q=quarterly; (-) not done; X=done as per text; 5/yr=done in Jan., Apr., Jun., Aug. Oct; 2/yr=done in Apr. and Aug.

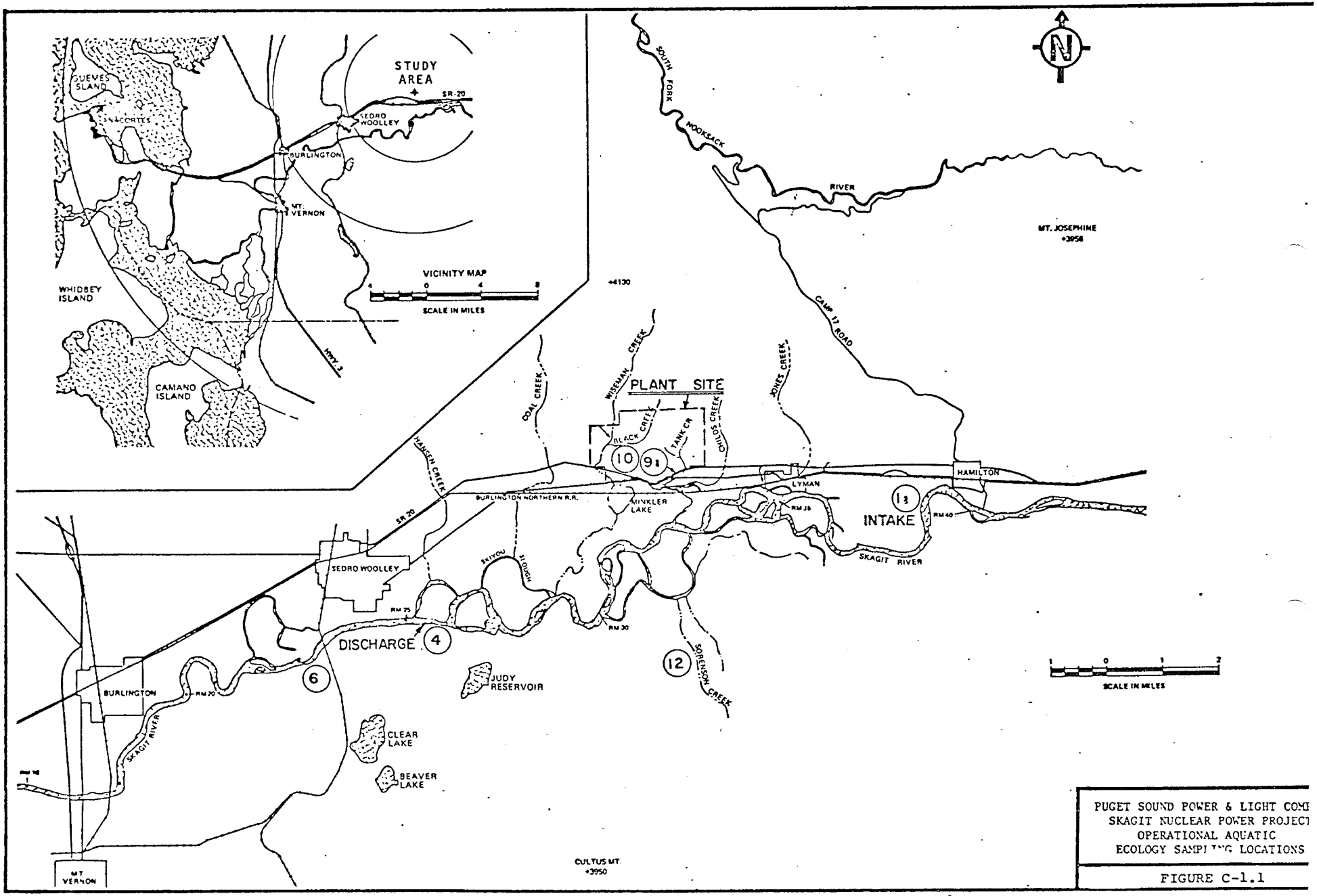
TABLE C.1-1

Parameter	Domestic Wells (5)	Ranney Collector (SL 1a)	Pipeline In River (SL 4)	Pipeline In Pipe (SL 4a)	Shake Mill (SL 6)	Lower Tank Cr. (SL 9a)	Lower Wiseman Cr. (SL 10)	Sorenson Cr. (SL 12)
Chemical Oxygen Demand	-	W	M	W	M	M	M	-
Nitrate	Q	M	M	M	M	M	M	-
Phosphate (total P)	-	M	M	M	M	M	M	-
Sulfate	Q	W	M	W	M	Q	Q	-
Sulfites	-	Q	Q	Q	Q	-	-	-
Borates	-	Q	Q	Q	Q	-	-	-
Chlorine	-	Q	BW	(2)	BW	-	-	-
Chloride	Q	M	BW	-	-	-	-	-
Chlorine Demand (5 min)	-	BW	M	BW	M	Q	Q	-
Chlorine Demand (30 min)	-	M	M	M	M	-	-	-
Phenol	-	Q	Q	Q	Q	-	-	-
Ammonia	-	W	M	W	M	M	M	-
Total Coliform	Q	W	M	W	M	M	M	-
Sodium	Q	M	M	M	M	Q	Q	-
Silica	Q	M	M	M	M	Q	Q	-
Calcium	Q	M	M	M	M	Q	Q	-
Magnesium	Q	M	M	M	M	Q	Q	-
Iron, Total	Q	M	M	M	M	-	-	-
Manganese	-	Q	Q	Q	Q	-	-	-
Copper	-	M	M	M	M	-	-	-

(2) Monitoring of chlorine in the Project discharge shall be as specified in the NPDES Permit for the Project, as said Permit may be modified or reissued from time to time.

TABLE C.1-1

Parameter	Domestic Wells (5)	Ranney Collector (SL 1a)	Pipeline In River (SL 4)	Pipeline In Pipe (SL 4a)	Shake Mill (SL 6)	Lower Tank Cr. (SL 9a)	Lower Wiseman Cr. (SL 10)	Sorenson Cr. (SL 12)
Chromium, Total	-	M	M	M	M	-	-	-
Zinc	-	M	M	M	M	-	-	-
Lead	-	M	M	M	M	-	-	-
Biological								
Invertebrates and algae	-	5/yr	5/yr	-	5/yr	5/yr	5/yr	-
Fish	-	5/yr	5/yr	-	5/yr	5/yr	5/yr	2/yr
Stream Surveys	-	-	-	-	-	X	X	X



PUGET SOUND POWER & LIGHT COMI
SKAGIT NUCLEAR POWER PROJECT
OPERATIONAL AQUATIC
ECOLOGY SAMPLING LOCATIONS

FIGURE C-1.1

2.0 METEOROLOGY

The on-site meteorological program began in May 1973. Wind speed and direction, temperature, and dewpoint are measured by sensors installed on a 60 meter tower. Precipitation is measured on the roof of the associated instrument building. On-site meteorological instrumentation is listed in Table C-2.1.

During the operational period, wind speed, wind direction, and temperature will be displayed in the control room.

Operation of the satellite meteorological station, installed in Burlington in January 1974 to supplement the on-site program, will be continued during the Project operational period.

Time lapse photographs from a location sufficient to allow view of total visible plume will be taken at least hourly during periods when no visible plume is present, and at ten-minute intervals when any visible plume is present.

TABLE C-2.1

METEOROLOGICAL INSTRUMENTATION

Parameter	Level (m)	Instrument	System Accuracy	Calibrated Range
Wind Speed (analog)	10,60	Cup Anemometer	±1 mph	0.6-90 mph
Wind Speed (digital)	10,60	Cup Anemometer	±1% or .15 mph	0.6-90 mph
Wind Direction	10,60	Vane Anemometer	± 55°	0-539
Temperature	10	Thermistor	±0.1°C	-30 to 50°C
Terperature Differential	10-35 10-60	Termistor	±0.1°C	-5 to + 10°C
Dewpoint	10,60	Dewcell	±1.0°C	-30 to 50°C
Wind Direction Variability	10	Sigma Computer	±3°	0-40°
Precipitation	3	Rain Gauge Tipping Bucket	±0.01 in.	0-1"

3.0 RADIATION MONITORING

The pre-operational radiation monitoring program will be implemented two years prior to Unit 1 fuel loading. The program may be modified prior to or during operation of the Project upon review and approval of the Council.

3.1 Program Elements

3.1.1 Airborne radioactivity

Airborne particulates and I-131 will be sampled continuously at three locations near the plant site perimeter calculated to receive maximum ground-level concentrations, at the nearest residence, and at the communities of Lyman, Hamilton, Sedro Woolley and Burlington. Also, one control sample will be obtained at a location to be selected at a distance of 20 miles or more in the sectors indicated as being the least prevalent wind directions.

Direct radiation due to gaseous and particulate releases will be monitored using continuous recording pressurized ion chambers at three locations near the plant site perimeter calculated to receive maximum ground-level dose. In addition, thermoluminescent dosimeters (TLD) will be placed at each of the nine air sampling locations. Two sets of three dosimeters will be placed at each location. One set will be changed monthly and the other set will be changed quarterly.

3.1.2 Waterborne radioactivity

Surface water samples from the Skagit River will be collected at the plant discharge area, upstream from the discharge area at the

Ranney Collector site, and downstream at a distance to permit thorough mixing and dilution. Sampling frequency will be monthly, providing a time-related record of nuclide concentrations.

In addition, surface waters will be collected monthly from Minkler Lake, Wiseman Creek, and the reservoirs providing drinking water to the communities of Lyman, Sedro Woolley, Burlington, and Mt. Vernon. Ground water will be sampled quarterly from several wells used for domestic supply, including use for livestock. Arrangements will be made to obtain weekly composite samples representative of the Anacortes raw water supply.

3.1.3 Aquatic biota and sediments

Samples of bottom sediments, benthos, and aquatic plants will be obtained semiannually at the three Skagit River water sampling locations and from Minkler Lake.

Oysters will be collected annually from one location in Puget Sound.

Fish will be collected semiannually from the Skagit River both above and below the discharge area, and from Minkler Lake. Emphasis will be placed on resident species of fish.

3.1.4 The terrestrial environment

Milk will be collected monthly from four dairy farms in the vicinity of the Project.

Fruits and vegetables grown in the Skagit Valley within ten miles of the plant site will be sampled annually at time of harvest at or near the point of maximum predicated ground-level concentration

of vent releases. Each important crop will be sampled as available. Control samples of each variety will be obtained, if available, from at least 20 miles north-northwest of the plant site as the least prevalent wind direction. Green, leafy vegetables or, alternatively, weeds with similar leaf characteristics, will be sampled monthly in the immediate plant site area.

Meat and poultry or, alternatively, feedstuffs and forage will be sampled semiannually in the two prevailing wind directions and/or from downstream herds using the river for drinking water. One or more samples of venison will be obtained in season as available through local sportsmen.

Surface soil will be collected semiannually at each of the nine air sampling locations.

3.2 Program description

The radiation monitoring program is presented in Table C-3.1. The program therein defined will be in effect at least two years prior to Unit 1 fuel loading and during the first year of operation of Unit 1. Beyond the first year of Unit 1 operation, the program may be modified after approval by the Council to accommodate Unit 2, providing a level of surveillance consistent with the documented operational release rates and measured environmental concentrations.

Radiochemical analyses will be performed using procedures at least equal to, or better than, those contained in the following documents: (1) U. S. Environmental Protection Agency, "Handbook of Radiochemical Analytical Methods," Document EPA-680/4-75-001, February 1975. (2) "Health and Safety Laboratory Procedures Manual,"

U.S. Energy Research and Development Administration, HASL-300, 1972. (3) "Standard Methods for the Examination of Water," American Public Health Association, 13th Edition.

The analytical laboratory will be required to participate in recognized analytical quality control programs. Internal quality control analysis including "spikes" (samples to which known activity is added), "splits" (homogenous sample analyzed as two samples), and "blanks" (samples free of man-made activity) will account for a nominal ten percent of all analytical work. Blind duplicates (field replicates) and/or spikes may be submitted periodically along with regular samples. Arrangements will be made for exchange or sharing of samples with the State of Washington to provide cross check data.

TABLE C-3.1

PRE-OPERATIONAL/OPERATIONAL RADIOLOGICAL MONITORING PROGRAM

Parameter of Sample Type	Approximate Number and Location	Collection Frequency	Analysis and Frequency
Airborne particulates	3--Plant Site perimeter 1--Nearest residence 1--Lyman 1--Hamilton 1--Sedro Woolley 1--Burlington 1--Control	Weekly	Gross beta weekly, Gross alpha monthly, Gamma isotopic monthly composites SR^{89} and SR^{90} quarterly composites
Airborne iodine	Same as airborne particulates	Weekly	I^{131} weekly
Gamma Sensitive Recorders	3--Plant Site perimeter	Continuous	Gamma exposure
TLD Dosimeters	9--Same as airborne particulates and iodine	Monthly and Quarterly	Gamma dose monthly, quarterly
*Surface water	1--Skagit River, near Ranney Collector (SL 1a) 1--Skagit River, Discharge area (SL 4) 1--Skagit River, Shake Mill (SL 6) 1--Minkler Lake (SL 11) 1--Wiseman Creek (SL 10)	Monthly	Gamma isotopic and tritium monthly, SR^{89}, Sr^{90} quarterly composites

*See Figure C-1.1

TABLE C-3.1 (continued)

Parameter of Sample Type	Approximate Number and Location	Collection Frequency	Analysis and Frequency
Ground water	3--Domestic wells 1--Hamilton	Quarterly	Gamma isotopic quarterly Tritium quarterly
Drinking water	1--Anacortes 1--Jones Creek 1--Judy Reservoir	Weekly Monthly	Gross beta on collection Gamma isotopic and tritium monthly, Sr^{89} and Sr^{90} quarterly composite
Aquatic biota and sediments	4--Same as surface water as available	Semiannually	Gamma isotopic and Sr^{89} and Sr^{90} semiannually
Oysters	1--Puget Sound	Annually	Gamma isotopic
Fish	4--Same as surface water	Semiannually	Gamma isotopic on flesh Sr^{89} and Sr^{90} on bones, all semiannually
Milk	1--Nearest dairy 3--Other dairies	Monthly	I^{131}, gamma isotopic and Sr^{89} and Sr90 monthly
Fruits and vegetables	1--Each major crop within 5 miles 1--Control for each crop	At harvest	Gamma isotopic
	1--Leafy vegetables, Plant Site perimeter	Monthly (when available)	I^{131} monthly
Meat, poultry and game	2--Within 5 miles	Semiannually (when available)	Gamma isotopic
Soil	9--Same as airborne particulates	Semiannually	Gamma isotopic and Sr^{89} and Sr^{90}

4.0 TERRESTRIAL BIOTIC MONITORING

4.1 Vegetation Studies

Vegetation studies will be designed to monitor (a) rate of succession of vegetation, (b) changes in plant species distribution, and (c) growth rate, productivity, and nutrient ion use by the forest and wildlife biological indicator species. These monitoring programs will provide data from which to determine changes in these parameters, if any, due to natural phenomena, other non-Project land use, or effects of Project operation. Tentative observation and data collecting points for these studies are shown in Figure C-4.1. Additional study plots will be established as necessary to provide suitable controls and as additional areas of possible impact are identified. Table C-4.1 summarizes the monitoring program and techniques.

False-color infrared aerial photography at scales of 1:6000 and 1:12000 will be flown in late spring or early summer before and after initial operation of each unit, and thereafter biennially for three periods. The same grid will be photographed each flight. This will provide a basis for early discovery of changes in existing plant communities that might not otherwise be apparent from ground investigation as well as a means of mapping these changes. Aerial photography will facilitate location of areas which require more detailed field study.

A portion of the operational monitoring program will be used to quantify the vegetative successional process within the Plant Site environs, and to correlate changes in community structure, composition, and diversity with natural and artificial changes in the environment. In addition, these data will be correlated with

spectral characteristics of infrared aerial photographs. Sampling will be conducted in the spring and summer two years before initial operation of unit one and again in the spring and summer after the first full year of operation for each unit. Sampling will be conducted periodically after both units are operational. Sampling will include both vascular (trees, shrubs, herbs) and nonvascular (mosses and lichens) plant species.

Tree, shrub, and herb productivity around the Plant Site will be monitored before and after initial fuel loading of each unit, using quadrat harvest, litter fall, diameter and height growth measurements techniques. Annual variations will be correlated with seasonal variations in the controlling factors, such as, solar energy, temperature, rainfall, and nutrients. This will determine if any changes in annual productivity are caused by natural events, outside land uses, or Project operation-related factors. The program will be repeated periodically after both units are operational.

The natural deposition of salts from rainwater will be determined before initial operation of the cooling towers from rainwater samples collected on the Plant Site and from locations to the east and west of the Plant Site. Data obtained from these analyses will serve as a baseline against which to measure any impact of cooling tower drift deposition.

Soils and foliage of selected plant species will be analyzed before initial cooling tower operation for the occurrence and amount of nutrient salts to determine the nutrient status of plants and soils. Chemical constituents expected to occur in cooling tower drift will be

emphasized in this analysis. Soil salinity will be determined before and after initial cooling tower operation. Samples will be taken from those areas where cooling tower salt deposition is projected to be significant as well as from control areas, including nearby agricultural areas.

4.2 Faunal Studies

Surveillance programs for monitoring Project operation impacts on terrestrial fauna will be conducted for one year prior to the initial fuel loading of Unit 1 and during the first full year after the operation of Unit 2. The program will be reviewed at the end of the second sampling year and a decision for continuing studies will be made at that time. If during the monitoring period changes within the terrestrial fauna populations become apparent, additional studies to determine the causes and, if required, to formulate appropriate mitigative measures will be considered.

The sampling program will include the biological impact indicators; black-tailed deer, deer mouse, ruffed grouse, bald eagle, and songbird populations (Table C-4.1). These species were and will be studied during the baseline, preconstruction, and construction monitoring periods. Available data will be used to discriminate between natural, non-Project, and Project-induced population variations.

Winter populations of black-tailed deer will be monitored by the pellet group count method at previously established sample points. Deer mice populations will be monitored on two study plots. Drumming counts for monitoring ruffed grouse population changes will be conducted at selected sample points established during the previous

studies (Figure C-4.1).

Populations of wintering bald eagles along the Skagit River from Hamilton to Sedro Woolley will be surveyed by boat in December, February, and March, one year prior to initial fuel loading of Unit 1 and continuing for one year after initial operation of Unit 2. Reproductive success of bald eagles at the Day Creek nest (approximately 1.5 miles southeast of the Plant Site) will be checked during the early summer months.

Transect counts to monitor the population levels and diversity of wintering and breeding nongame birds will be conducted in January and June.

Close cooperation will be maintained with governmental agencies regulating or studying fauna in the Skagit Valley and all available information exchanged with such agencies upon request. Any information received by Puget in this manner will be reported to the Council on the same schedule as reports of Puget's own data.

Estimations of bird mortality due to collisions with Project structures, i.e., cooling towers, reactor and turbine buildings, will be obtained during fall and spring migration seasons. Records of all discovered deaths from this cause shall be kept and maintained.

TABLE C-4.1

TERRESTRIAL ECOLOGY MONITORING PROGRAM FOR UNITS 1 AND 2

Event	Schedule	Methods	Analysis
Aerial Photography	Early spring or late summer before and after the initial fuel loading of each unit and thereafter biennially for 3 periods	False-color infrared photography	Changes in vegetation patterns, vegetation health
Plant community analysis	Spring and summer two years before Unit 1 initial fuel loading and spring and summer after first full year of operation of each unit	Established quadrat sampling techniques	Species distribution, abundance, density, frequency dominance, importance, diversity
Primary production	Before and after the initial fuel loading of each unit	Quadrat harvest techniques, extension growth, litterfall, diameter and height growth	Net primary production with emphasis on wildlife forage and food species
Soil and foliar salts	Soil and foliar nutrients one year before Unit 1 initial fuel loading. Soil salinity before and after initial fuel loading of each unit. Foliage again one full year after initial operation of each unit.	Chemical analytical techniques for nutrient ions; soil conductivity	Nutrient ion presence and quantity in soil and foliage; soil salinity

TABLE C-4.1

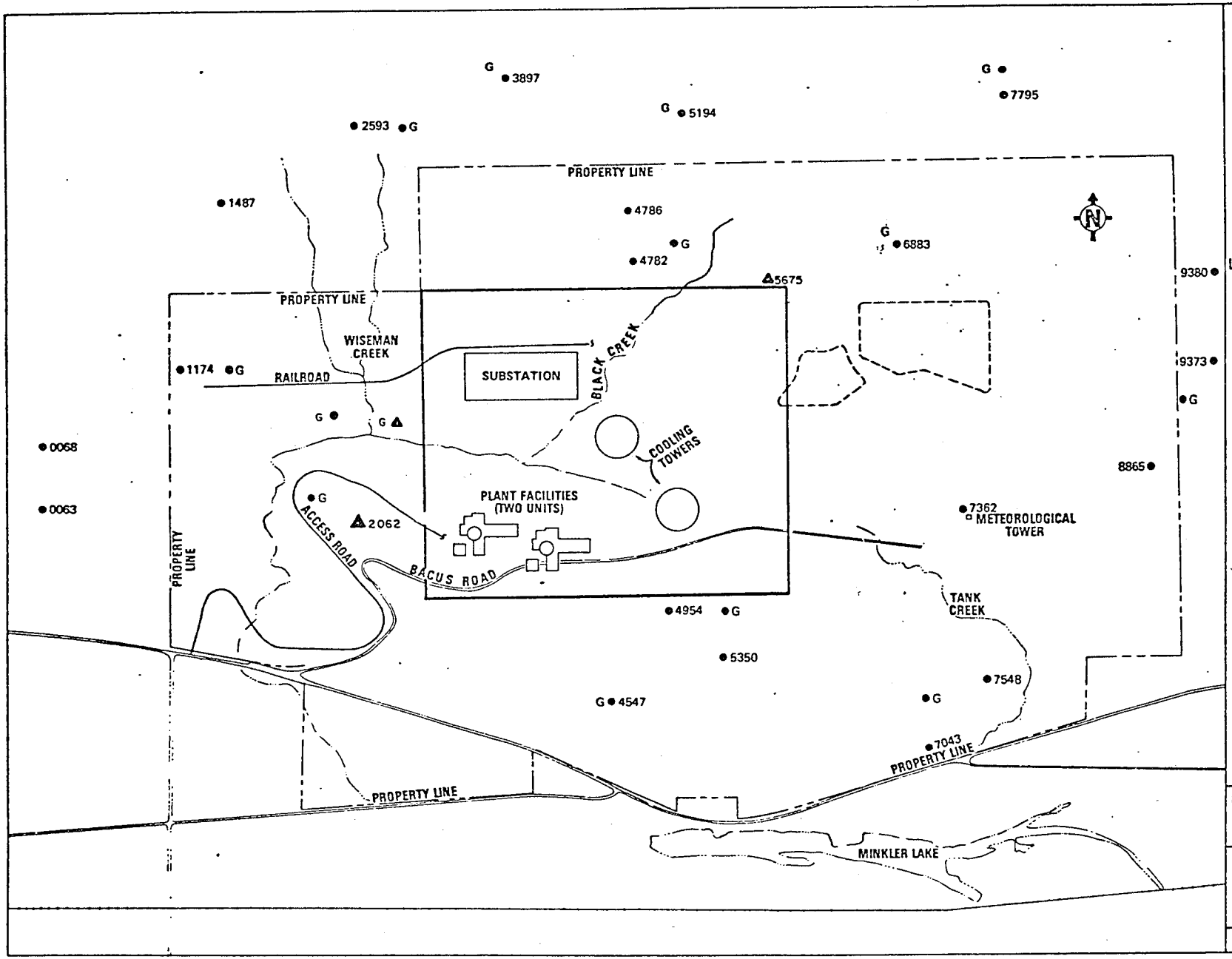
Event	Schedule	Methods	Analysis
Rainwater salt deposition	Before and after initial cooling tower operation	Rain water collection and chemical analysis	Natural salt species content
Black-tailed deer	April, December[(a)]	Pellet group counts	Changes in winter populations and habitat usage
Deer mice	Fall[(a)]	Live-trapping	Fall population changes
Ruffed grouse	Spring[(a)]	Drumming counts	Change in spring populations and habitat usage

(a) All surveys will occur during the year before the initial operation of Unit 1 and the first full year following the initial operation of Unit 2.

TABLE C-4.1

Event	Schedule	Methods	Analysis
Bald eagle	December, February, March, early summer(b)	Skagit River surveys by boat, observation of Day Creek nest	Winter population numbers, reproductive success
Nongame birds	January, June(a)	Transect counts	Changes in population numbers and diversit of wintering and breeding birds
Bird mortality	May, September(a)	Searches for dead birds around base of plant structures	Numbers of dead birds during migration periods

(b) All surveys for the bald eagle will occur one year prior to the initial fuel loading of Unit 1 and continue for one year after initial operation of Unit 2.


G 3897
G 5194
G 7795
2593 G
PROPERTY LINE
1487
4786
G 6883
4782
5675
9380
PROPERTY LINE
WISEMAN CREEK
1174 G
RAILROAD
SUBSTATION
BLACK CREEK
9373
G
G
G
COOLING TOWERS
0068
8865
PLANT FACILITIES (TWO UNITS)
7362 METEOROLOGICAL TOWER
0063
G
2062
ACCESS ROAD
BACUS ROAD
PROPERTY LINE
TANK CREEK
4954 G
5350
7548
G 4547
G
7043
PROPERTY LINE
PROPERTY LINE
MINKLER LAKE
N
LEGEND
NUMBERED POINTS INDI
SAMPLING PLOTS OR
REFERENCE LOCATION
FOR WILDLIFE AND
VEGETATION STUDIES.
INDUSTRIAL ZONE
SPOILS PILES
G GROUSE DRUMMIN
SAMPLE POINT.
SAMPLE AREAS
RELOCATED FROM
INDUSTRIAL ZONE
OR OTHER
CONSTRUCTION
AREAS.
100 0 250 500
SCALE IN FEET
PUGET SOUND POWER & LIGHT CO
SKAGIT NUCLEAR POWER PROJ
OPERATIONAL
TERRESTRIAL ECOLOGY
SAMPLING LOCATIONS
FIGURE C-4.1

5.0 AQUATIC BIOTIC MONITORING

The preoperational and operational programs for monitoring the influence of Project operation on aquatic ecosystems in the lower Skagit Basin will retain many features of the baseline monitoring program. The baseline ecological conditions in these waters established during the baseline and preoperational programs can be compared with postoperation measurements to monitor Project-induced variations.

Additional studies will begin prior to initial Unit 1 fuel loading. These studies will be designed to evaluate effects of operation on aquatic biota in receiving waters within the measurable discharge plume. The effects of the Ranney Collectors on aquatic biota will also be evaluated.

An extensive aquatic biota monitoring program will commence one year before initial operation of Unit 1 to verify baseline conditions determined in the 1973-1975 program. Locations to be sampled and frequency of sampling are given in Table C-5.1. This monitoring program will continue through two years of Unit 1 operation to assess the effects, if any, on aquatic ecosystems in the vicinity of the Plant Site. The third year of this continuing operational monitoring program will also serve as the preoperational baseline for Unit 2. These programs will then be continued at least through the first year of two-unit operation. Based on the data obtained, a decision will be made whether to continue fullscale studies another year or more. The statistical adequacy of the data for demonstrating possible Project-related disturbances and the "normalcy" of the physical environment will be considered in this decision.

Some reduction in the number of sampling locations and sampling frequency may be permissible at the end of the first year; however, sampling at least twice a year (April and August) probably will continue for a minimum of two additional operating years at most of the preoperational sampling locations (Table C-5.1).

Both locations directly in line with Project discharge and appropriate control locations will be sampled five times a year at least though the first Unit 1 shutdown for refueling to detect any adverse impact on aquatic communities that may have adapted to the effluent. This includes the pipeline (SL 4) and Shake Mill (SL 6) locations on the Skagit River (Figure C-1.1).

When Unit I initial operation begins, a long-term data base of various ecological parameters will have been accumulated for these locations. These data will include two full annual cycles and several years of replicated studies at two critical times in the year (April and August). This extensive background information on the areas potentially most vulnerable to Project operation effects should permit detection of subtle as well as obvious ecosystem changes.

In addition, data will have been gathered for several years on the spawing of anadromous salmonids in several small creeks in the vicinity of the Plant Site. The stream surveys for spawning salmonids will continue at least though one spawning cycle to evaluate any changes in spawning behavior.

5.2 Additional Operational Studies - Discharge

The design of the diffuser and the small volume of Project discharge relative to river flow make it unlikely that the effects of the effluent will be measurable at the nearest aquatic biota

sampling locations described above. Therefore, additional studies will focus on localized regions (downstream of mixing zone) where the influence of the discharge may be measurable on shoreline or river bottom areas.

Phytoplankton: Because of the low phytoplankton densities in the Skagit River, it probably will not be possible to demonstrate any measurable effects from their brief residence-time in the plume.

Periphyton: Periphyton growth in areas where measurable influence of the discharge may contact shorelines or the river bottom (surface, midway, bottom) at each of the sampling locations will be measured using glass slides exposed for 4- and 8-week intervals during the first year of operation of each unit. Processing and calculations will be done as in the continuing program. Results will provide a measure of periphyton growth stimulation (if any) from the combined effects of thermal and nutrient enrichment.

Zooplankton: Zooplankton densities in the Skagit River are extremely low and the number captured would be insufficient to reliably monitor the expected negligible influence of the Project effluent. However, zooplankton tows (5-minute) will be conducted above, in, and below the plume as part of the continuing studies.

Aquatic Invertebrates: Some changes probably will occur in species composition or timing of critical life history phases for benthic invertebrates where measurable influence of the discharge contacts the shoreline or river bottom. Potential effects on aquatic invertebrates will be investigated on artificial substrata placed in these areas.

Fish: The effluent's effects on the fish expected to pass through the plume is expected to be slight.

Electrofishing and seining will be conducted upstream and downstream of the discharge (SL 4, and 6) as part of the continuing monitoring program. Attempts also will be made to conduct these operations in the plume itself to check avoidance of, or attraction to, various regions of the plume. The feasibility of such operations, however, is dictated by water depth and velocity.

After the effluent passes through the diffuser, it is reasonable to assume that fish will not be affected by it. However, laboratory bioassays on several important fish and invertebrates will be conducted using several dilutions of various Project effluents. Median tolerance limit (LD 50) for 24-, 48-, and 96-hour exposure will be determined and the incipient lethal level (the concentration that can be tolerated indefinitely by the species in question) will be estimated. These tests will be duplicated at various temperatures (5 to 25^{o}C) to measure the combined effects of chemical and thermal discharge. Samples of Project effluent will be diluted with receiving waters and heated or cooled to achieve the desired water conditions.

If potentially harmful conditions are found to exist at temperatures and concentrations found in the Project discharge water, other studies may be initiated to assess the impact on fish in the river, as the Council may determine.

5.3 Additional Operational Studies - Intake

Studies will be initiated to investigate the behavior of juvenile salmonids near the Ranney Collectors (SL 1a). Although no entrainment or impingment of fish is anticipated, bi-weekly sampling of the Ranney Collector caissons will be conducted during the first spring of one-unit operation and during the first spring of two-unit operation. One additional spring's study shall be added to each test if the initial study fails to coincide with migration of all significant fish species.

TABLE C-5.1

Sheet 1 of 2

AQUATIC MONITORING

Parameters	Sampling Frequency	Sampling Method	Sampling Locations (1)	Analyses
Periphyton	5/yr	Fixed artificial substrata	1a,4,6,9a,10	Algal cells/mm^2-day
Phytoplankton	5/yr	Direct cell count	1a,4,6	Algal cells/ml water
Zooplankton	5/yr	Plankton net two	1a,4,6	Organisms/$meter^3$
Macro-invertebrates	5/yr	Multiple plate	4 (2)	Total organisms/unit area by taxonomic group
	5/yr	Basket substrata	4 (2)	Total organisms by taxonomic group
	5/yr	Stream drift nets	1a,4,6,9a,10	Total biomass and number of organisms/hr by taxonomic group
	5/yr	Natural bottom samples (3)	1a,4,6,9a,10	Total biomass and number of organisms per cm^2 bottom area, by taxonomic group
Copper, Zinc, Chromium	Annual	Tissue Analysis	1a, 6	Muscle, Kidney Liver

(1) See Figure C-1.1

(2) Multiple plate and basket artificial substrata will be placed in areas where the measurable influence of the discharge is most likely to contact the streambed or shoreline as determined by the plume definition study. Controls will be placed outside the plume area.

TABLE C-5.1

Parameters	Sampling Frequency	Sampling Method	Sampling Locations[1]	Analyses
Vertebrates (fish)	5/yr[3]	Beach seine (three sets; 100-ft seine)	1a,4,6	Age, length, weight, total numbers, biomass by species/set
	5/yr[3,4]	Electrofishing	1a,4,6,9a,10	Age, length, weight, total numbers, biomass by species, population estimates (creek locations)
	Biweekly October-February	Coho spawning survey	Tank, Wiseman, Sorenson Cr.	Number, sex, number of redds
	During Unit 1 and 2 operations	Laboratory bioassays	-	24-,48-,96-hr LD 50 of blowdown at several temperatures
	During Unit 1 and 2 operations if bioassays suggest problem may exist	Other tests as required	As required	Survival to plume exposure
	During Unit 1 and 2 operations	Visual inspection of stream bank and Ranney caissons	1a	Impingement or entrainment in intake system

(3) Once satisfactory evidence is gathered that Ranney Collection operation does not affect juvenile fish these studies will be discontinued at SL 1a.

(4) No impacts on Wiseman or Tank Creeks are expected to result from Project operation. Hence, these studies will be conducted 5/yr in the Unit 1 pre-fuel loading year and in the first Unit 2 operational year and 2/yr (April and August) in the interim unless there is an indication of some Project-related impact (e.g.,anomolous water quality readings).