ALASKA LEGISLATURE COMMITTEE FILES 1991-1992 8672
7664 SENATE RESOURCES

- Does some formal coordination mechanism need to be established to improve intergovernmental relations in the water resources arena as has been recommended in some of the documents reviewed here?

Historical Perspective

President Theodore Roosevelt was the first to recognize the need to address the need for intergovernmental coordination to deal with water problems. He was particularly concerned about the relationship of federal and state water policies for managing river basins in a unitary manner for multiple purposes. However, his proposed solution, the Inland Waterways Commission (1907), was opposed by Congress and was refused appropriations in 1909. During the subsequent 80 years, numerous attempts were made by the federal executive and legislative branches to conceptualize and institutionalize further ways of addressing water-related coordination problems. From the executive branch these included the National Resources Committee 1935-1939; the National Resources Planning Board 1939-1943; the Federal Interagency River Basin Committee 1943-1954; and the Interagency Committee on Water Resources 1954-1959.[4]

Then, in 1959, the U.S. Senate established the Select Committee on Water Resources, which did not sponsor legislation but paved the way for passage of the Water Resources Planning Act (WRPA) of 1965. This Act established the WRC and authorized five RBCs to be formed. One of the major responsibilities assigned to the Water Resources Council (WRC) and the River Basin Commissions (RBCs) was intergovernmental coordination of federal water policies. While the WRC planning approach appeared to be logically compelling and addressed many of the concerns voiced by Congress and Presidents since 1907, it also suffered from substantial conceptual and institutional weaknesses that attracted substantial criticism.

Few of the WRPA detractors quarreled with the basic intent of the Act; however, it is now generally accepted that the assumptions used to frame the legislation and the institutional structure chosen to accomplish its objectives were seriously flawed. Specifically, the drafters of the WRPA assumed that an entire generation of multipurpose federal water development projects were needed and desired by the American public. Further, unified and comprehensive river basin plans were presumed to be the primary mechanism for federal-state water policy coordination. These weaknesses in the WRPA authorizing legislation and its subsequent interpretation created a number of operational problems that, for all intents and purposes, sealed its fate when the Reagan Administration took office.

Recent Perspectives on National Water Policy Coordination

The reports and papers reviewed here have made a substantial contribution to evolution of thinking that has emerged in recent years regarding national water policy coordination. Aspects of these documents that have a direct bearing on the questions posed above are summarized below.

Water Resources Planning and Management in the U.S. Federal System (1988)

This report and its companion conference were sponsored by the Engineering Foundation and the University Council on Water Resources. Both continued an examination of water resource planning and management that had been initiated by the American Water Resources Association (AWRA) in 1980 on Unified River Basin Management (URBM). The editors chose as their guiding principle the concept that—"Because the complexity of modern life intensifies the need in a Federal Government for the fullest cooperation and coordination of activities between the levels of government...it is essential...to give continuing attention to intergovernmental problems."[5] One of the report's primary purposes was to contribute to the nation's "institutional memory" by having the conferees discuss a wide range of water resources issues, many relating to the WRC and RBCs experience. These issues were distilled into a list of ten key topics (e.g., roles of federal, state, and local governments; institutions in the federal system) for which recommendations and options were prepared for consideration by national water policy leaders.

The report was critical of lack of attention that the President and Congress had given to developing federal/state cooperative programs; reconciling national and state water policies; providing a national clearinghouse for water; and designing a coordinated federal water research and development program. The major theme that emerged from the report's recommendations was that the nation's leadership needed to revisit the WRPA experience; to review its programs and processes with an eye to modernizing and strengthening them; and to reconsider the establishment of a "national-state assisted institution." Such an institution would support the formation and coordination of an enhanced set of water and related natural and environmental resources issues.

Redefining National Water Policy: New Roles and Directions (1989)

This report grew out of a 1987 AWRA minisymposium which aimed at building on the contributions made by the AWRA work on the URBM and the work of the Engineering Foundation Conference. The report analyzed the existing national water policy environment and the shift that was occurring in state-federal relations. Particular attention was given to case examples of recent state policy and institutional initiatives and innovations. The main objective was to identify "constructive next steps" in shaping national water policy. In sum, the report favored strategic and decentralized water policy processes. Lessons learned from such experiences were to be incorporated into the nation's intergovernmental workings as

they unfolded. No support was given for "resuscitation of the historic federally-dominated national water policy approach" (Born, 1989, p. 4). National "water policy deadlocks" were viewed as constructive and conducive to developing new "sources of intellectual and political leadership" (Born, 1989, p.4). The report encouraged the rethinking of respective government roles and particularly those federal roles that could complement and support the increased capacity of state and local management and planning activity in water policy.

Federal Water Policy: Toward an Agenda for Action (1988)

This discussion paper sought to provide the then-incoming Bush Administration with a timely and useful review of federal water policy and to influence them in developing a "more coherent federal water policy" (Foster and Rogers, 1988, p. i). The report focused on the analysis of a select group of policy imperatives (i.e., science, technology, economic, financial, social/political, and institutional) as a way of alleviating much of the existing confusion in water policy. From such an analysis, appropriate reforms in laws and institutions could be fashioned.

The report supported the development of federal policy in close consultation with the states. State-federal relations were viewed as potentially subject to policy reform. The rise in state competencies and responsibilities at the same time that federal programs were declining pushed a larger policy issue into the fore—the fundamental role of the states in water resources within the U.S. federal system of governance. Regarding the emergence of a unified vision of national purpose, the problem was determined to be, in the final analysis, a function of perception. "There are as many versions of federal water policy as there are proponents" (Foster and Rogers, 1988, pg.90).

The paper concluded with recommendations for the new administration. The first proposal was the establishment of a President's Water Council to coordinate and assess water resources nationally. This Council would be supported by regional councils that would be voluntary, largely autonomous, and self-defined. From Foster and Rogers perspective, the Council was offered in lieu of consolidation and reorganization at the federal level which were deemed less plausible under the current political climate: "We have no doubt as to the merits of a central, federal, water resources agency....The absence of such an entity at present has led to the intolerable situation of no agency within the executive branch currently responsible for taking a comprehensive view of federal water programs and...formulating policy recommendations" (Foster and Rogers, 1988, pp. 90-91).

White Paper on Federal Water Policy Coordination (1989)

This paper was developed by the Western Governors Association (WGA) under the leadership of Governor George Sinner of North Dakota. Governor Sinner convened a working group to discuss the possibilities of improving coordination and overcoming what he perceived to be "water-decision gridlock." The work group concluded that the way in which federal water policy was then developed and implemented was inconsistent with the realities of water allocation at the state level. Further, the federal government needed to resolve conflicts inherent in federal policy and exercise its regulatory authority more consistently with the notion of state primacy in water. The paper identified and concisely discussed, six problems in water policy coordination among federal agencies:

- Lack of global thinking about water
- Redundancy of functions
- Protracted Disputes
- Turf Battles
- Absence of articulation of policy
- Lack of finality of water decisions

The WGA White Paper also discussed, the preemptive, cross-cutting, and intrusive nature of water-related regulations and the adverse impact they have had on states' ability to make water allocations and development decisions. It concluded that poor coordination and the water-decision gridlock reduced governmental efficiency and threatened the balance between the states and federal government in water policy. It recommended that the President create a White House-evel group comprised of cabinet-level secretaries and heads of independent agencies to resolve and to avoid conflicts among and between levels of government that deal with water.

Toward National Water Policy Coordination: The Challenge of Improving Intergovernmental Relations (1990)

The Interstate Conference on Water Policy (ICWP) developed this concept paper to propose a President's Council on Water and to encourage further public debate on its merits. The paper formed the basis of a two-day seminar convened by ICWP on Capitol Hill. Representatives of the Administration, various federal agencies, and members of Congress and their staffs met with regional, state, substate regional, and local water policy leaders to discuss the significance of the coordination issue and to react to the concept of a water council.

The concept paper provided an executive summary of concerns, issues, and insights from nonfederal water resources managers' perspectives and challenged the national water policy leadership to respond.

Feedback from the participants working in small groups at the Washington DC seminar gave overwhelming support to the conclusion advanced in the ICWP Concept Paper: "The need existed for a national forum to coordinate intergovernmental and interagency actions and provide more efficient and equitable water policy to the nation." The key phrase that emerged from the small group discussions was "reality check"—meaning that current and proposed water resource programs and policies

needed to be reviewed so that they would reflect the reality of managing water resources in a fragmented system based on intergovernmental and interagency dependency.

Discussion

The United States is in the midst of a "sea change" in national water policy that appears destined to have a profound and lasting effect on associated intergovernmental and interagency relations. In effect, "the states are now the driving force in water resources innovation with the federal government floundering to define its mission and role" (Born, 1989, p. 6). The pivotal intergovernmental question that was not addressed, much less answered, during the 1980s remains: "How do we build a balanced federal-state model [in national water policy] rather than simply letting the pendulum swing in due course?"[6] It is this painful, haphazard, and seemingly unattended process of realigning respective state and federal roles that appears to be at the heart of much of the dilemma.

The reports reviewed here attest to the growing community of interests that have perceived these issues as real. The issue has been most salient among state water managers in general and especially those from the western states, along with their governors, where water allocation has been historically and increasingly problematic.

An attendant issue to the redefinition of respective governmental roles is challenging a myth that has prevailed through much of the twentieth Century in water resources management. The conservation movement of the early 1900s placed almost unlimited faith in federal technical experts and applied science vis-a-vis power politics to answer the major water resource questions of the nation.[7] An as yet unarticulated metaphor must emerge and replace the image of "scientific management"[8] qua "elitist technocratic decision-making" (Born, 1989, p. 6) with one that is more responsive to enlightened public values and choices, while supporting a more decentralized state-federal stewardship of the nation's waters.

Unfortunately, as Harrison stated emphatically almost 10 years ago, the prevailing institutional value structure in national water policy is largely resistant to sharing power.[9] Federal agencies have enjoyed considerable freedom in defining the public interest in their own mission-oriented terms.[10] One current example of this problem has involved authority of the Federal Energy Regulatory Commission (FERC) under the Public Utility Regulatory Policies Act of 1978 (PURPA) that placed federal hydroelectric power licensing squarely in conflict with states' control over water allocation.[11]

Another example concerned the Water Resources Development Act (WRDA) of 1986, which changed cost sharing on federal water projects and ostensibly created a new partnership between the Corps of Engineers and local project sponsors. A recent "Report Card" on the new partnership by the National Association of Flood and Stormwater Management Agencies (NAFSMA) contained few compliments and numerous complaints of federal bureaucratic inertia, internal turf problems, lack of sensitivity to local needs, unwillingness to change established ways of doing business, and unnecessary and lengthy levels of review.[12]

The repeated calls for some sort of water council in the Office of the President, are a recognition that a leadership vacuum exists at the national level. Frustration is mounting over what has been termed the "water-decision gridlock" or "water policy deadlock." These entail issues of institutional control or policy between agencies and among governments that have no final administrative mediator or arbiter to appeal to for resolution of disputes. Nationally, water management responsibilities are becoming increasingly decentralized, but no parallel structure has been created which provides subfederal levels of government with adequate representation in order to exert an equitable share of influence over national policymaking. Questions facing the states right now that could benefit from such a structure include how to avoid preemptive federal legislation in groundwater, the definition of the President's policy on "no net loss of wetlands," and how that should be implemented? Although reconstituting the WRC and the RBCs in some form or fashion seems appealing, no one has really figured out how to make it work.

Prospects for the Future

Harrison's 1981 study for the National Academy of Public Administration called for a national water policy reform process. It would engage federal, state, and local interests in a collaborative examination of institutional and procedural issues.[13] Furthermore, Harrison correctly assessed previous national water policy reviews by Congress and Presidents over the past 30 years as having "missed opportunities" to perform critical analyses of how the existing policy structure operates.[14] Harrison's perspective was strikingly similar to the notion of a "reality check" which surfaced during the small group discussions at the 1990 ICWP seminar in Washington, DC.

The most encouraging sign of reform was the recent introduction of the Western Water Policy Review Act of 1989 (WWPRA) (S.1996) by U.S. Senator Mark Hatfield of Oregon. In addition to reviewing the water resource problems, the proposed commission would analyze the need to reorganize or consolidate federal programs, review the effectiveness of existing institutional arrangements, and review the respective federal and state roles and responsibilities in water resources. The WWPRA provision calling for gubernatorial representatives to work closely with the commission needed to be bolstered to ensure sufficient consideration of states perspectives. Also, Senator Hatfield, during his introductory remarks before the U.S. Senate, specifically left the door open for expanding his bill to "embrace a national perspective."[15]

In conclusion, intergovernmental relations in national water policy suffer from a lack of leadership and reform. Major initiatives from the President, Congress and the states failed to materialize during the 1980s. In the current decade, it is incumbent upon practitioners and scholars concerned with the nation's water-related institutions and their problem-solving capacity to devote themselves to

identifying and analyzing existing institutional and policy conflicts and inventing innovative ways to resolve them (see Gray, 1989).[16] "The big challenge is sorting out the respective roles/capabilities/comparative advantages of the different levels of government in developing viable coordinating/conflicting-resolving mechanisms."[17]

* * *

Stephen S. Light is Policy Director for the South Florida Water Management District. He has worked the past seven years in the District's executive office as a senior policy advisor. Before that, he worked three years as a visiting scholar at the Institute for Water Resources. He received his doctorate in natural resources from the University of Michigan, Ann Arbor.

John R. Wodraska has served for six years as Executive Director for the South Florida Water Management District where he has been a career employee for 18 years. He received his master's degree in geography from Columbia University, New York City.

Notes

1. Lawrence Mosher, "After Eight Years of Non-Policy, Change is Afoot; Growing Droughts and Pollution Are Fueling New Federal Moves," *The Water Reporter* (March 1989), p. 17.
2. *Ibid.* p. 18.
3. Richard D. Lamm, "The Uncompetitive Society," (Denver, CO: University of Denver, The Center for Public Policy and Contemporary Issues, 1989), p. 1.
4. See Warren Viessman, Jr., "Coordination of Federal Water Resources Policies and Programs," (Washington: Environment and Natural Resources Policy Division, Congressional Research Service, 1978), p.69.
5. From the Declaration of Purpose in Section 2 of the statute that established the U.S. Advisory Commission on Intergovernmental Relations in 1959.
6. Bruce Babbit, "Shifting Roles in Resource Management," speech at 1988 Woodland Conference (Woodlands, TX: 14 November1988), 5 pp.
7. See discussion of "Conservation and the Grass Roots," in Samuel P. Hays, *Conservation and the Gospel of Efficiency* (Cambridge, MA: Harvard University Press, 1958), pp. 271-276.
8. *Ibid.*, p. 29.
9. David C. Harrison, "Do We Need a National Water Policy Process? Preliminary Criteria for Designing a Constituency-Based Water Policy Structure" (Washington: National Academy of Public Administration, 1981), p. 66.
10. *Ibid.*, p.6
11. See Western Governors Association *White Paper* for further discussion of this issue.
12. Handout titled "New Partnership: The Report Card" at joint meeting with the U.S. Corps of Engineers and National Association of Flood and Stormwater Management Agencies (Scottsdale, AZ: November 1989).
13. *Ibid.*, Harrison, p. 2
14. *Idem.*
15. Floor Statement, the U.S. Senate by Senator Mark O. Hatfield titled "Introduction of the Western Water Policy Review Act of 1989," 21 November 1989.
16. Barbara Gray, *Collaborating: Finding Common Ground in Multiparty-Problems* (San Francisco, CA: Jossey-Bass Publishers, Inc., 1989), p. 282.
17. Stephen M. Born, Professor, Urban and Regional Planning and Environmental Studies (Madison, WI: personal communications, 5 May 1990).

OIL & GAS JOURNAL AUG 13 1990
p.47

Table 7

*Results of calculations for pressure build-up data**

Δs	s_2	Q_2, b/d	ΔQ, b/d
0	8.55	118.5	0.0
1	7.55	126.4	7.9
2	6.55	135.5	16.9
3	5.55	145.9	27.3
4	4.55	158.0	39.5
5	3.55	172.4	53.9
6	2.55	189.6	71.1
7	1.55	210.7	92.1
8	0.55	237.0	118.5
9	−0.45	270.8	152.3
10	−1.45	315.9	197.4
11	−2.45	379.1	260.5

* Area = 160 acres

The slope of the line is a dimensionless constant given by the right-hand side of Equation 36. Using the drawdown data for the example problem, the value of the slope is calculated to be 0.061.

It is important to note that in applying Equation 36 there appears to be no limiting value for the well treatment size. Obviously, this would not be a valid conclusion when treatment costs are included in the analysis.

A more useful expression in an economic analysis may be developed by first rearranging Equation 24 leading to Equation 37. Again, taking the derivative with respect to Δs and performing the necessary algebraic steps leads to Equation 38. Integrating Equation 38 yields Equation 40 which plots as a straight line on log-log scales having a slope of −1. If the y-intercept is assumed to be where a − Δs = 1, then the constant b is represented by the value of Q_2 at this point

Fig. 9 illustrates this plot for the drawdown case for the example problem given above. Values of a and b for the example problem are computed to be 16.4 (dimensionless) and 1,934 b/d, respectively. These calculations are illustrated in the example calculations box.

Still another useful variation of Equation 40 is given by Equation 42. In this expression it may be observed that as Δs increases, the producing rate Q_2 approaches infinity. Again, it is clear that there must be some limiting value of Δs which controls the size of the treatment. That is ($0 \leq \Delta s < a$).

The value of a for the example problem is 16.4. Thus, the design of the treatment size for this well should be for Δs to be something less than 16.4. As mentioned above, the optimum well treatment design is governed by economics.

Acknowledgment

Special thanks are due Paul E. Hodges, associate professor of economics, University ofTexas of the Permian Basin.

References

1. Vogt, T. C., and Anderson, M.L., "Optimizing the Profitability of Matrix Acidizing Treatments," JPT, September 1984.
2. Hawkins, Murray F., Jr. "A Note on the Skin Effect," Trans. AIME 1956, p. 207.
3. McGuire, W. J., and Sikora, V. J., "The Effect of Vertical Fractures on Well Productivity," Trans. AIME, 1960, p. 219.
4. "Production Stimulation for the Permian Basin," Halliburton Services Manual.
5. Van Everdingen, A. F., and Hurst, W., "The Application of the Laplace Transformation to Flow Problems in Reservoirs," Trans. AIME, 1949, p. 186.
6. Van Everdingen, A. F., "The Skin Effect and Its Influence on the Productive Capacity of a Well," Trans. AIME, 1953, p. 198.
7. Hurst, William, "Establishment of the Skin Effect and Its Impediment to Fluid Flow Into a Well Bore," Petroleum Engineering, October 1953.
8. Matthews, C. S., "Analysis of Pressure Buildup and Flow Test Data," JPT September 1961.
9. Matthews, C. S., Brons, F., and Hazebroek, P., "A Method for Determination of Average Pressure in a Bounded Reservoir," Trans. AIME, 1954, p. 201.
10. Matthews, C. S., and Russell, D. G., "Pressure Buildup and Flow Tests in Wells," Monograph Series Vol. 1, SPE, 1967.
11. Horner, D. R., "Pressure Buildup in Wells," Proc. Third World Pet. Cong. E. J. Brill, Leiden, 1951.

VANCOUVER ISLAND PIPELINE—
Conclusion

Marine-crossing sections require extensive surveying

Henry M. Yamauchi
Westcoast Energy Inc.
Vancouver, B.C.

Design of the marine-crossing sections of the Vancouver Island, B.C., natural-gas pipeline incorporated measures to preserve or mitigate any damage to the sensitive waters through which it would pass.

This final of two articles on the project (Part 1, July 30, p. 86) discusses the marine crossing construction: the steps in its design and the options for its construction.

Construction on the pipeline system, under discussion for more than 30 years, began earlier this summer (OGJ, June 25, p. 32). It is designed to operate at 14,895 kPa (1,027 psi) over its 590-km (366-mile) length. It crosses a variety of terrain conditions in areas ranging from sparsely to densely populated.

The elevation varies from −425 m in Georgia Strait, an arm of the Pacific Ocean, to higher than 1,150 m on land. The subsea portion of the route represents 15% of the length of the project.

Survey

Prior to design of the marine pipelines, a detailed investigation was conducted of sea conditions to determine tidal currents, currents produced by surface winds, and wave-induced water motion. Marine geophysical and geotechnical surveys were conducted to define seabed conditions along the route.

A variety of instruments were utilized to collect data, including (Fig. 1) tethered subsurface current buoys, navigation systems, fathometers, sub-bottom profilers, side-scan sonar, and sediment-sampling equipment.

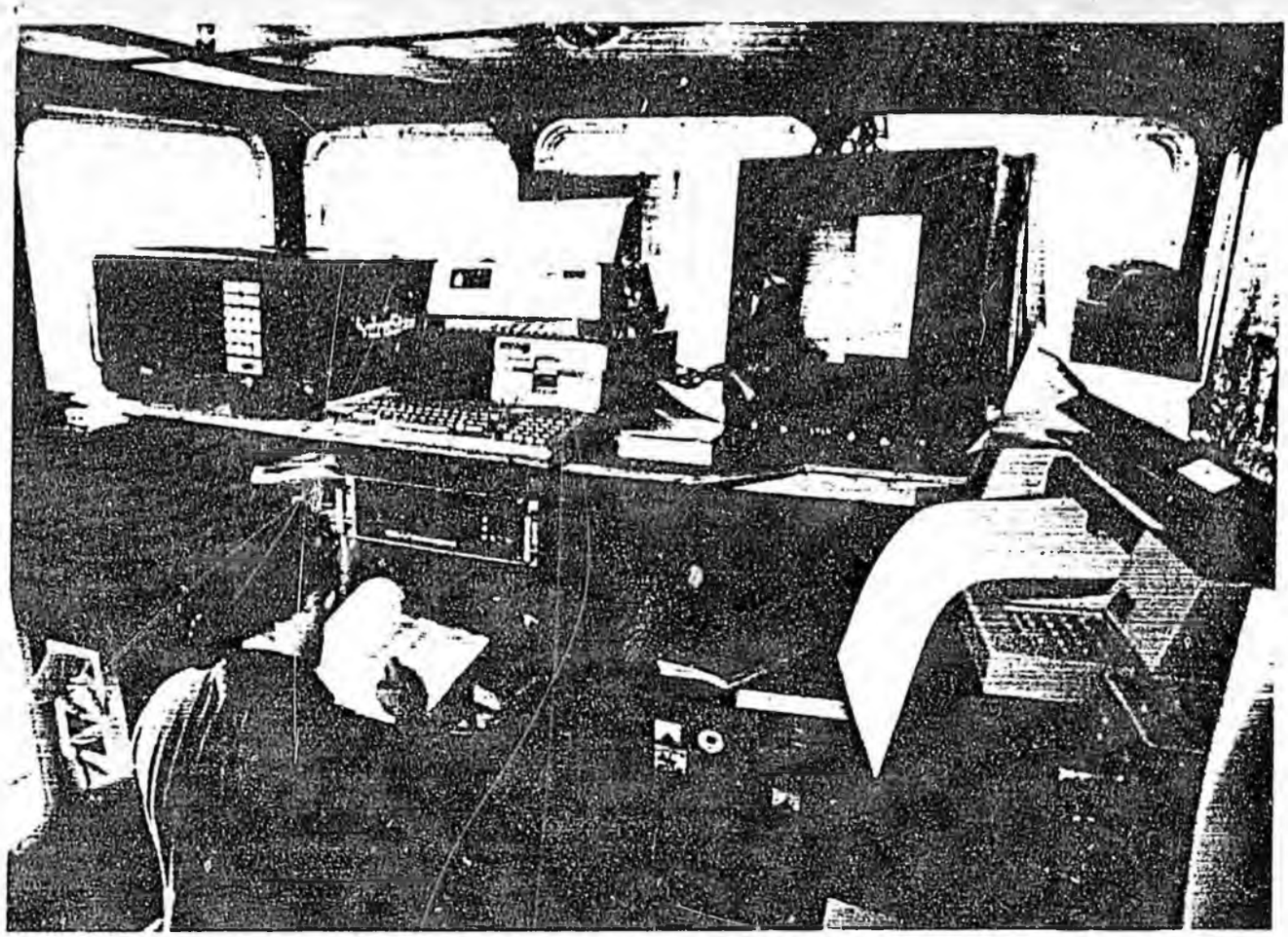
The result of these surveys and data-gathering programs is a detailed analysis of the water depth, subsea sediment layering, and the known position of all geological features and man-made objects near the selected pipeline route.

It is critical that all data collected be referenced to a known geographic location. Therefore, an accurate navigation system with repeatable results was required.

Typically, for marine surveys conducted close to shore (within 30-40 km), a series of microwave navigation stations are deployed at prominent positions on shore. The geographic location of these units is determined with conventional land-surveying techniques.

Onboard the survey vessel, a computer system continually calculates the location of the ship by transmitting a pulse-coded microwave signal to each of the shore-based slave units which in turn respond and pulse a signal back to the ship-board computer.

The time of travel to the different slave stations allows the position of the ship to be determined mathematically within 2-3 m. The computer provides steering and track data to the helmsman and



SUPPORT VESSEL equipment consisted of a Hydrostar acoustic positioning system, navigation system, Atlas Deso 20 recorder, and track plotter (Fig. 1).

fixes to the recording systems for the other instrumentation.

The system also incorporates data logging, an ongoing plot of location and track relative to the planned track, and provides a warning of proximity to unusual conditions in the area (such as moorings) which could affect the various items of towed equipment which at times were up to many hundreds of meters behind the survey vessel.

With accurate position information at all times and simultaneous recording of these data on all of the records from the different instruments, it is possible to correlate the data from the different acoustic instruments and to locate where the data came from.

Fathometers, profiles

The fathometer is used to gather accurate measurements of the depth of water below the survey vessel and hence to determine bottom topography. The instrument uses high-frequency sound projected in a narrow cone to give as much detail as possible of the relief conditions of the ocean floor in areas where the maximum depths are in the order of 400 m.

Depth is determined by the time for a sound pulse to be reflected back from the bottom. The instrument is run constantly during survey operations to produce a strip-chart profile of the seabed.

Tides in the Georgia Strait (Fig. 2) result in water depth changes up to 5 m. To correct for this, the data are referenced to a tide gauge which records the change of elevation of the water surface over the day.

To delineate subsea sediment layering, three separate sub-bottom profiling systems were used.

These units all function on the same principle: A sound source produces an acoustic pulse at the surface of the water, which is reflected from the sea bottom and from various layers of differing density or materials below the bottom. The reflected pulse is detected at the surface with a string of hydrophones towed behind the survey vessel and recorded on a large plotter.

The end result is an acoustic record that shows the various layers of sediment (sand, silt, gravels, so forth) up to a 100 m or more beneath the seafloor.

The final record looks similar to a slice of birthday cake revealing the layers of cake and icing.

Depending on the instrument used, the frequency output/selection varied between 50 hz and 20 khz, providing different resolutions and penetration depths of the bottom. The high-frequency signals provide the best resolution (in the order of 0.8-1.2 m vertical), but the greatest penetration is provided by the lower frequency signals, necessitating the use of different instruments to acquire the different types of data required.

Sonar; sediment sampling

The image from the side-scan sonar (the sonograph) resembles an oblique aerial photograph of the seabed created with a narrow-beam, high-frequency sound source (335 khz). The system uses a torpedo-shaped device ("fish") which is "flown" close to the seabed, following the contours of the bottom.

The sound is emitted as a fan-shaped beam on a horizontal plane from the fish. Any object lying on or protruding from the seafloor reflects part of the sound back to the instrument. The signal is transmitted via the tow cable to the surface where the computer processor and display devices are mounted.

The record is corrected for ship speed and acoustic distortion by the computer, and the sonograph is displayed on a high-resolution CRT. Computer enhancement combined with the use of color to show the strength of the reflected signal (blue for weak return, red for a very

strong return) provides approximately two to three times the resolution of a conventional side-scan wet or dry paper recorder.

The signal is also digitally recorded on tape and simultaneously presented on a thermal recorder for the highest possible paper hardcopy reproduction.

The sonograph records consist of a swath of seabed information showing the geologic and topographic features or any man-made objects on the seafloor. Abrupt vertical features show up particularly well because of the shadow which they cast.

In this survey, the instrument was operated on a 150-m scale range (each side of the tow fish) to produce high-definition records with exceptional resolution characteristics.

For example, near the north end of Texada Island, a 40-mm diameter abandoned telegraph cable was defined at the outer perimeter of the record with the 150-m range. It was possible to follow the cable for several hundred meters and to measure its height off the bottom where it bridged between high spots.

The sonograph records were laid out finally to produce a mosaic-like image for the operator and geophysicists to define all potential areas of hazard and seabed geologic conditions.

Marine sampling was carried out at locations selected to provide confirmation of the various deposits present and to provide samples for laboratory index testing and detailed logging. The locations of the samples were specified with coordinates from the survey system and were cross checked with water depth.

Some of the locations were targets less than 50 m across selected to obtain specific geological data. In general, the targets were successfully hit with the sampler through water up to 425 m deep.

The samples were taken with a gravity drop corer and a Shipbeck grab sampler. The gravity corer consisted of a core barrel with tail fins, additional weights, and a cutting shoe.

Fig. 2

Vancouver Island pipeline northern routes

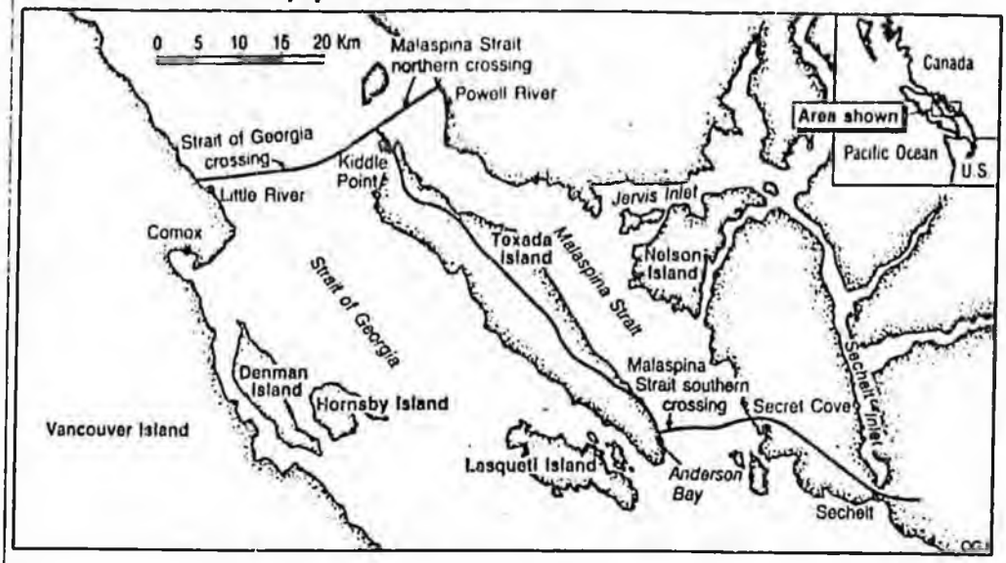
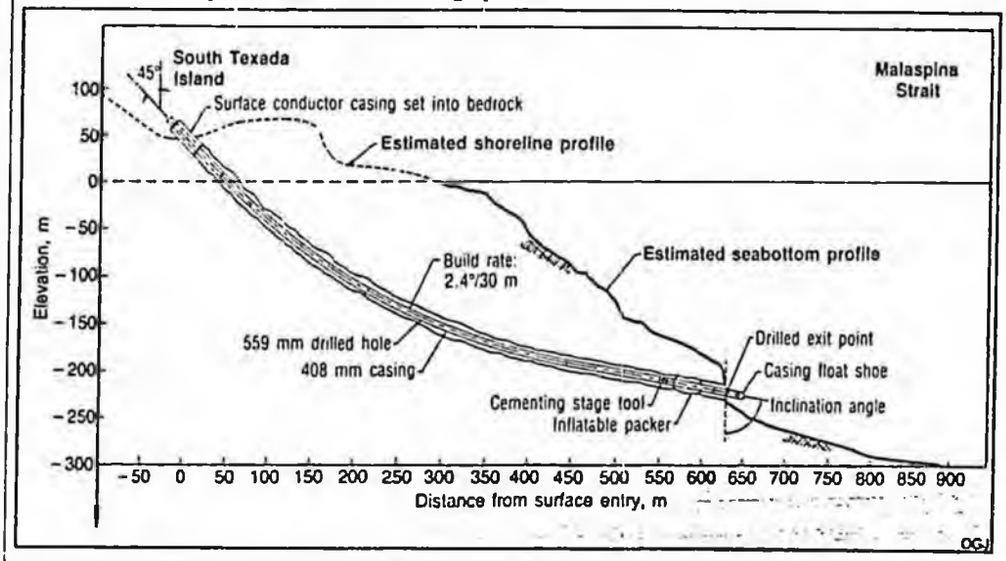


Fig. 3

Anderson Bay drilled crossing profile



The corer was dropped into the bottom from a selected height above the bottom and penetrated the softer sediments, retrieving a cylindrical sample in a PVC tube. The grab sampler consisted of a spring-loaded bucket which rotated to scoop up a sample of the bottom when it was triggered by contact with the bottom.

Testing of the samples included detailed logging, grain-sized analyses, and various index tests.

Because many of the samples were very soft, extruding them from the sampler tube tended to damage them and destroy the internal structure. This internal structure was formed by the geologic mode of deposition and was critical to the proper interpretation of the geologic environment.

To obtain the maximum amount of information, all of the samples were X-rayed before opening which provided valuable information. In addition, information on the grain-size distribution in the samples was obtained, and the X rays allowed some samples to be logged and kept unopened for future testing.

It was found that some subtle information, important to the geological interpretation, could only be seen on the X ray.

Shore approaches

The shore approaches of Secret Cove, Kiddie Point, Little River, and Powell River will be excavated with conventional equipment, including backhoes and clams on barges. The approaches at Secret Cove on the mainland and Kiddie Point on the north end of Texada Island will require drilling and use of explosives.

The shore approach at Anderson Bay on the south end of Texada Island is more challenging because it is steep and irregular.

It extends approximately 420 m offshore to a water depth of about 250 m. The average slope is approximately 45° with several vertical or near-vertical rock cliffs and intermediate ledges.

This shore approach will be drilled from land to sea with the slant-hole drilling technique (Fig. 3).

After the drill rig is set up and positioned, a pilot hole will be drilled, followed by reaming to 508-610 mm. The enlarged hole will then be cased by the drill rig with 406.4 mm casing. Since the crossings are twinned, a second hole about 30 m away will be also drilled.

Installation

Various installation methods are available for construction of the marine pipelines.

The three main construction methods are conventional laybarge, dynamically positioned reel ship, and bottom-tow.

Laybarge

The conventional laybarge method has been used extensively for the installation of offshore pipelines worldwide. Numerous pipelines of various diameters have been successfully laid and are operating in water depths and environmental conditions exceeding those in the project area.

This method involves welding together individual sections of steel pipe on the barge, inspecting each weld joint by radiography to ensure joint integrity, and applying corrosion-coating material to the weld-joint area.

The barge is either winched forward on its anchors or dynamically moved forward. The welded section is lowered down a ramp onto the stinger, which eases the bend of the pipe as it leaves the barge. The pipe forms an "S" curve configuration between the barge and the seabed.

The stresses in the suspended pipe between the stinger and the seabed are controlled by application of tension to the pipe aboard the laybarge. Deepwater pipe laying requires a combination of increased barge tensioner capacity and increased pipe-departure angles.

A laybarge has an array of anchor lines which are continuously relocated by anchor-handling tugs as the vessel moves forward. The forward anchors provide sufficient horizontal force to accommodate pipe tension, move-up loads, and environmental forces acting on the vessel. The breast anchors resist the broadside loads resulting from beam seas, winds, and current.

The laybarge method is the most commonly used of pipeline construction methods throughout the world and numerous contractors are capable of doing the work. However, there are generally no offshore pipelaying contractors on the West Coast of North America, particularly in the Pacific Northwest area.

The cost of mobilizing equipment and personnel from other parts of the world is considered a major economic factor. A laybarge is, however, expected to be operating off the California coast this winter.

Reel barge

The reelbarge method of installation utilizes a large reel mounted in a horizontal or vertical position on a barge or ship.

Before assembly of the corrosion-coated pipe on the reel, it is welded into long strings on land. The individual strings are in turn welded together to form a long pipeline segment as it is wound onto the reel. Depending on the size of the reel and the diameter of the pipe, large quantities of pipe can be wound onto the reel.

This installation method allows all of the welding, inspection, and corrosion coating of the weld joints to be completed onshore. Once the reel vessel is loaded, it moves to the offshore site and commences to lay pipeline in one rapid continuous operation.

Vessel positioning is done by dynamic means, rather than an anchor system, allowing a much greater rate of advance than for a laybarge.

The reel method of installation has been used successfully worldwide for numerous small-to-medium diameter pipelines. Pipe diameters up to 323.9 mm (12.75 in.) may be laid using the method.

The main advantage is that the pipe is welded onshore, where the work is not affected by adverse climatic considerations. Since all of the pipe is loaded onto the installation vessel at one time, the offshore lay operation may be completed relatively quickly.

While this installation method appears to be very sound, the required construction equipment has limited availability. Very few offshore pipelaying contractors have pipe-reel capability. Mobilization costs to bring a reel vessel to the Vancouver area will likely be high.

Nevertheless, preliminary economic comparisons run earlier this summer indicated the reel-barge method as the most likely method of installation for the marine-crossing sections of the pipeline.

Bottom tow/pull

Installing offshore pipelines by the bottom-tow method has been done in locations where conventional pipelaying equipment is not readily available, or not technically suitable. For this method of installation, the pipe is welded into convenient sections onshore and pulled into the required offshore location by the use of a moored barge or tow vessel.

If this method is selected, pipe make-up sites at Secret Cove, Little River, and Kiddie Point would be prepared by installing pipe-support sleepers, launchways, and hold-back winches.

While the factory-applied, anti-corrosion and abrasion-resistant coated pipe is being aligned and welded into strings of approximately 300 m in length, the pipeline trenches and directionally drilled holes with casings will be prepared at respective shore-crossing sites.

Welds will be radiographed, and each string of pipe section will be hydrostatically tested prior to being placed in a storage area for use in the tow.

During installation, the first section of pipe section is towed by the towing vessel, followed by successive strings of pipe which are welded together as the pipe string is slowly towed. As each string is successively welded, the weld joint is radiographed and the anti-corrosion coating applied.

When the full pipe string is assembled, towing is continued to get the pipe to the beach in the landfall area. At this time the tow cable is transferred to an onshore winch which continues to pull until the lead pipe and trailing end are positioned in the specified target areas.

After tow completion, divers inspect and correct seabed spans, and backfill process for the shore crossings and approaches.

The bottom-tow method enables a greater use of local equipment and labor.

Tow-abrasion test

The bottom-tow method, which consists of towing the pipe string on the bottom, requires a barrier or abrasion-resistant coating to protect the anti-corrosion coating during towing over rocky areas of the seabed.

To select the best abrasion coating, a tow test was conducted to evaluate 10 different coatings from four generic abrasion-resistant materials: solid-filled epoxies, urethanes, concrete, and polymer cement. The test employed 24 joints of coated pipe welded into two strings, each measuring approximately 220 m in length.

Two separate tows were conducted, the first for a distance of 15 km out and back. The sea bottom material in this case was mostly soft sediment, sand to cobbles, and some boulders.

The second was over a distance of 24 km, out and return. In this case the strings were pulled over the rocky sea bottom near the north end of Texada Island.

The tow test confirmed original coating assumptions Selection of the abrasion coating is currently being made, based on an overall evaluation including technical performances during application, tow, and cost. The cost includes coating materials, application, and other installation impacts due to coating weight, field joint material, and application schedule. •

P.O. Box 942849
Sacramento, CA 94249-0001
Phone (916) 445-1670
ATSS 8-485-1670

Maria Luisa Ochoa
Senior Assistant

1255 South Atlantic Blvd
Los Angeles, CA 90022
Phone (213) 265-2772
ATSS 8-645-2267

Marina Mojica-Aviles
Administrative Assistant

Assembly
California Legislature

LUCILLE ROYBAL-ALLARD
ASSEMBLYWOMAN, FIFTY-SIXTH DISTRICT

Committees:

Chair, Ways & Means
Subcommittee No. 1
on Health and Human Services
Rules
Ways and Means
Health
Utilities and Commerce
Select Committee on Sexual Assault
Victims Assistance, Chair

March 7, 1991

Maria Lucia Ochoa
916 445 1670
Patty

Honorable Walter J. Hickel
Governor
State of Alaska
P.O. Box A
Juneau, Alaska 99811-0101

Dear Governor Hickel:

Enclosed for your information is the pre-print text of my California State Assembly Concurrent Resolution No. 31, which would urge California Governor Pete Wilson to direct the immediate start of an initial feasibility study for the construction of an Alaska-California under ocean water pipeline. I will forward a copy of the printed version of the measure as soon as it becomes available.

As indicated in the resolution, the study would include a proposed plan of implementation with estimated costs, and a specific action plan with a time frame for the operational completion of an Alaska-California water pipeline.

The people of the State of California sincerely appreciate your innovative ideas on this issue and your willingness to share Alaska's tremendous surplus of fresh water through the development of an Alaska-California water pipeline. Your progressive approach to solving our state's critical water shortage will make a significant contribution to the future development of our nation into the 21st Century and beyond.

I look forward to working with you, the Alaska State Legislature, and the people of the great State of Alaska on this important and valuable joint enterprise.

Sincerely,

Lucille Roybal-Allard

LUCILLE ROYBAL-ALLARD
Assemblywoman 56th District

mining, including ...
proposal to reopen the Alaska-Ju-

California official skeptical of water pipeli

By MATT KOHLMAN
THE ASSOCIATED PRESS

A California water expert has given Gov. Walter J. Hickel high marks for creativity but expressed doubt about the value of building his proposed water pipeline from Alaska to parched California.

"I have to give him credit for at least being a visionary," Maurice Roos, chief of the hydrology branch of the California Water Resources Department, said Monday. "But I think if you look at the practicality of it, there's probably less expensive ways to get water supplied to our state."

Roos was one of about 100 people attending the Western Snow Conference in Juneau, a gathering of scientists and water managers from Western states.

Hickel promoted the pipeline during a welcome address.

The governor suggests building two 20-foot-diameter plastic pipes that could be laid on the outer continental shelf between the two states. Southeast Alaska water would be captured and pumped through the pipeline.

Hickel said he is delighted with the renewed attention the idea has received because of the California drought. Los Angeles County recently hired an engineering firm to conduct a cost study on the idea.

"They're seriously taking a look at it and I think that makes sense," Hickel said. "What the world needs are large-scale projects. All wars are big projects. What does a war cost?"

But Roos is wondering what the pipeline would cost.

"He didn't say what the price was

and that's ce
Roos said. "
tremely stor
ing somethi
out to be rat
Roos sai
just one of r
nia officials
the state's w

By JAMES H. RUBIN

The assembl... PHOTO BY MONICA RIVERA
... Penix's daughters

pipeline plan

and that's certainly a major factor," Roos said. "The North Pacific is extremely stormy and the job of building something like that would turn out to be rather difficult."

Roos said the ocean pipeline is just one of many ideas that California officials have considered to ease the state's water shortage.

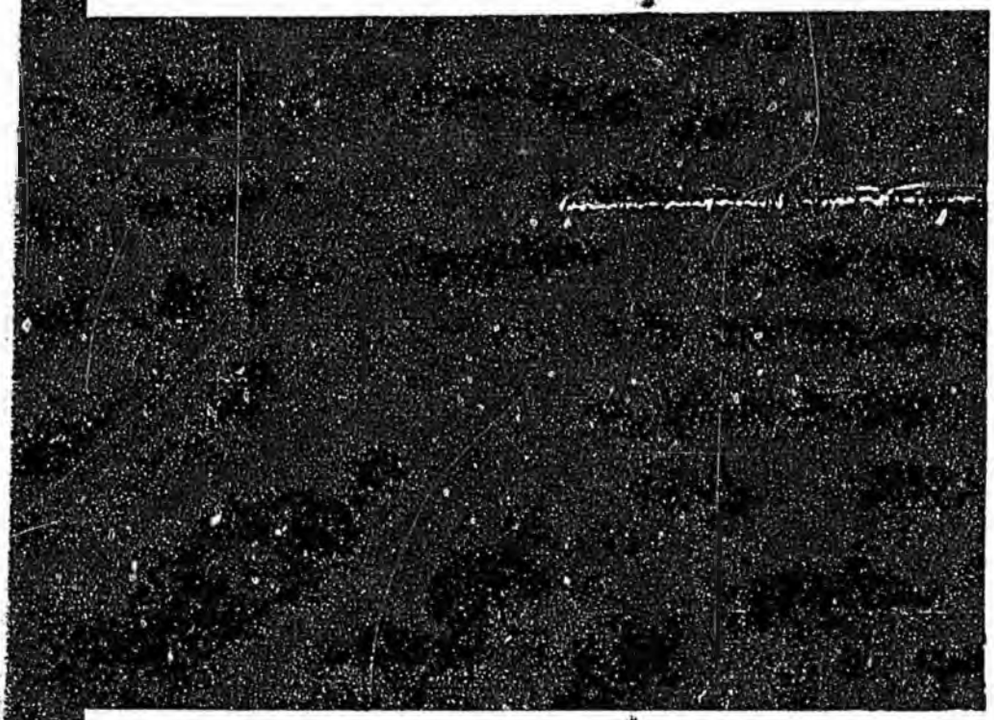
been plagued by probl
continuing to rely o
... shot, ...
lets has kil
Anyone
call Dinnef

W

Arctic water flows through fiberglass pipe

Vancouver, Canada—Mining zinc and lead on Little Cornwallis Island in the Arctic Circle, 60 nautical miles from the magnetic North Pole, is a laborious operation.

Mining drinking and processing water for that operation was almost as difficult, because the water had to be pumped from below the ice of Frustration Lake and hauled by tank truck to the mine. Now, however, water is transported through an overland piping system.



Fiberglass piping system supplies drinking and processing water to Arctic zinc/lead mine. Water is pumped from below ice of lake five miles distant. Mechanical joining of pipe lengths eliminated heat-welding required by metal and other plastic pipelines, which puts stress on pipe when welding at low temperatures.

Since winter temperatures frequently register −40F (−70F with a wind-chill factor), and many pipe lengths had to be laid in darkness, speed was crucial to Tower Arctic, Montreal, which installed the pipeline and dock.

Therefore, fiberglass pipe was used because the material does not require heat-welding to join the lengths, as is the case with metal and other plastic pipelines, which put stress on the pipe when welding at low temperatures.

The 40-ft lengths of pipe, supplied by Ciba-Geigy Pipe Systems, Hawthorne, NY, were joined mechanically to make the seal. Called "Pronto-Lock" II, the system involves a free-spinning sleeve that threads into the female pipe end, locking the joint in place and forcing the male end to make a leak-free seal.

Insulated with three-inch-thick polyurethane, the pipe was installed on 4 × 4 sleepers placed along a right-of-way running from the mine to the lake.

After the pipe was strung, a ¼-inch-dia rope was inserted and pulled through each length so that a heat-tracing wire could be drawn through the pipe. The joined pipe then was fastened to the sleepers, and the joints covered with insulating material. □

Methanol-fueled bus brings clean transit

San Francisco, CA—*"Methanol 1"* is the first factory-produced, methanol-fueled transit bus in the country. Part of the California Energy Commission's (CEC) statewide effort to develop new energy sources, it will be operated by the Golden Gate Bridge District (GGBD) on a closely monitored test program over the next year.

'Methanol 1', first methanol-fueled transit bus in country (right) begins service. According to manufacturer, methanol is cleaner burning, more fuel efficient, and gives better performance than diesel fuel.

Combined Wave and Current Forces on Large-Diameter Submarine Pipelines

José M. Andrés[1]

This paper deals with the analysis of combined wave and current forces acting on an 8.3-ft-diameter, 70-ft-long submarine pipeline mounted on a steep slope at Keahole Point on the island of Hawaii, Hawaii. Force transfer coefficients have been obtained for a large number of wave and current conditions. In the absence of strong currents, mean values of wave force coefficients calculated by a frequency-domain method have proven to predict extremely well the distribution of peak wave forces. In cases where current effects are relevant, a wave-by-wave analysis of the loads indicates that, for the range of Reynolds numbers and Keulegan Carpenter parameter covered in this study, the inertia coefficient decreases as the value of the ratio of current to maximum wave velocity increases. The same result is also found by a mean-square method in which overall force coefficients are computed for the whole record length.

Introduction

DURING the past decade, considerable attention has been paid to submarine pipeline design for ocean outfalls, oil transport, seawater intakes for desalination, and the development of Ocean Thermal Energy Conversion (OTEC) plants and structures to meet future energy needs. Despite the fact that a number of advances have been made in this field during the past few years, many engineering problems remain to be solved. The evaluation of realistic hydrodynamic loading is one of them. Engineering decisions regarding different design strategies cannot be made without reliable estimates of the magnitude and frequency of occurrence of the environmental forces.

The hydrodynamic analysis of submarine pipelines with several feet in diameter and located in relative deep waters represents a difficult task since the loads do not fall completely in the inertia or in the drag-dominated regime, especially when they are subjected to the action of large waves and strong currents. Under moderate wave and weak current conditions, inertial forces would tend to dominate, but for strong currents or large waves or both, the drag force cannot be completely neglected and will considerably modify the hydrodynamic characteristics of the fluid past the cylinder. In the later case, the ratio of particle orbital path length to cylinder diameter may become so large that flow separation will occur. An additional difficulty in the analysis of the hydrodynamic forces acting on submarine pipelines located in some coastal areas, and in particular for OTEC pipes, is created by the steep sloping bottoms in which the pipes are mounted. Also, the designer must keep in mind that as pipe diameter increases, diffraction effects will become important, and therefore, the assumption of small bodies in Morison's equation ceases to be valid for the inertial forces.

Summary of past work

Although a strong research effort has been directed to study the hydrodynamic forces acting on pipes placed near a plane boundary, much of it has been restricted to laboratory scale studies with uniform oscillatory flow or with regular waves. Small tank tests involve Reynolds numbers of the order of 10^3 to 10^4 which are usually one to two orders of magnitude too small to be compared with full-scale submarine pipes. Systematic test results have shown that the Reynolds number has a dramatic effect on the force coefficients in the region where the transition from the laminar to the turbulent boundary layer occurs. Therefore, values of Reynolds number larger than 10^5 must be used in laboratory tests if realistic results are to be expected for design conditions of large-diameter pipes. In addition, parameters which modify wave forces, such as scale and intensity of turbulence in the approaching flow and the random characteristics of the ocean environment, cannot be properly reproduced in the laboratory.

Few measurements of hydrodynamic forces on submerged pipelines in the ocean are available in the literature [1–4],[2] and these results have been restricted to pipelines located on flat bottoms and in the absence of strong ocean currents. Consequently, it can be concluded that in spite of the existing studies of fluid forces on submarine pipelines, there is no information from prototype measurements on combined wave and current forces on pipes mounted on steep sloping bottoms.

Study objective

The present study deals with the analysis of combined wave and current forces acting on an 8.3-ft-diameter, 70-ft-long fiber-reinforced pipe mounted 6 ft above a steep bottom slope (37 deg) at Keahole Point on the island of Hawaii, Hawaii (Fig. 1). The program was implemented by the National Oceanic and Atmospheric Administration (NOAA) and was directed to gather experimental data that could help the design of future bottom-mounted OTEC pipes, but the results obtained would be useful also in the general design of submerged pipelines.

In this paper, hydrodynamic force transfer functions of waves and currents acting on submarine pipelines mounted on steep bottoms are derived from the experimental data and presented as a function of relevant dimensionless parameters. Time-domain analysis techniques are used to calculate instantaneous force drag and inertia coefficients that better

[1]Makai Ocean Engineering, Inc., Honolulu, Hawaii

Presented at the February 17, 1987 meeting of the Hawaii Section of THE SOCIETY OF NAVAL ARCHITECTS AND MARINE ENGINEERS.

[2]Numbers in brackets designate References at end of paper.

0025-3316/89/2601-0023$00.47/0

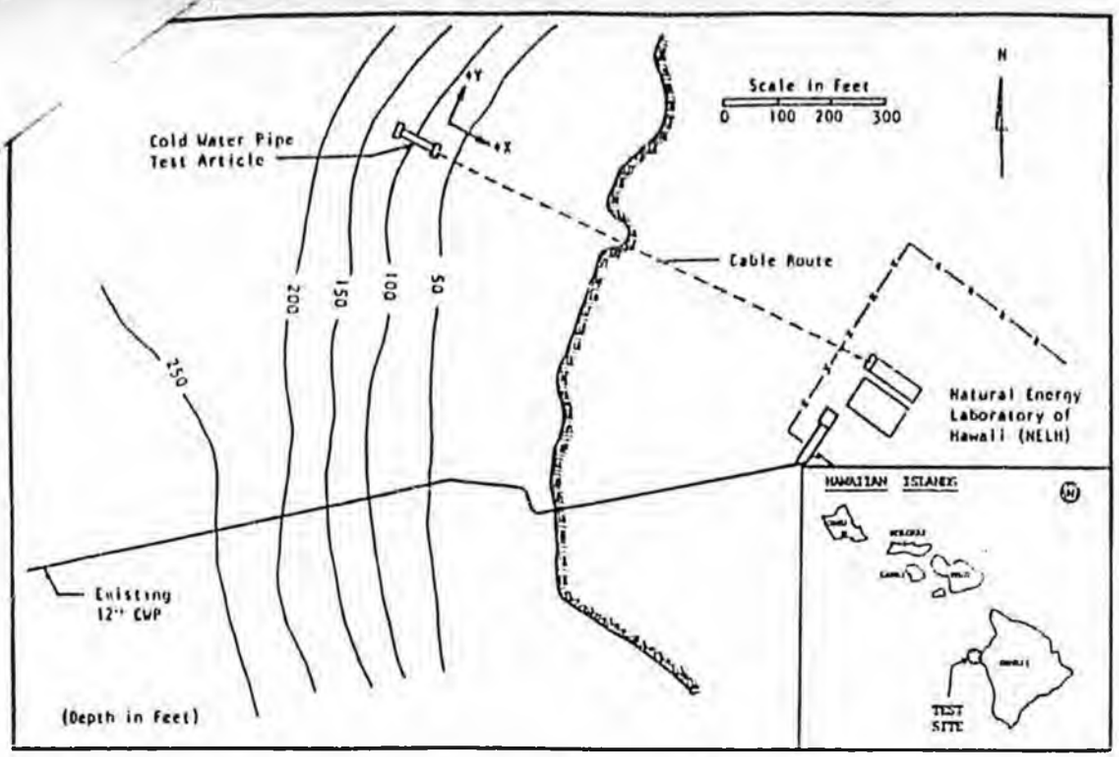


Fig. 1 Site plan for the OTEC cold water pipe at-sea Phase III test program

predict maximum forces acting on the pipe as well as average coefficients that better approximate the measured force over the whole wave cycle. In the absence of strong currents, a frequency-domain analysis of the horizontal loads on the pipe is used to estimate mean values of force coefficients in order to predict the distribution of peak wave forces. These results will be useful to calculate fatigue damage on sections of the pipeline as well as extreme loads expected during its lifetime.

Ocean experiment

The experimental setup of the OTEC at-sea-test, including the depth of the relevant instruments, is schematically diagrammed in Fig. 2. The longitudinal axis of the pipe is oriented very nearly perpendicular to the slope contours, and the ocean bottom in the vicinity of the pipe is covered with small pieces of loose coral rubble. The pipe surface was initially smooth when it was deployed in late April 1984. By the end of the experiment in April 1985, the pipe was covered with only a thin layer of marine growth.

Instrumentation consisted of six systems that provided time histories of data for 1024 seconds, with a sampling rate of one second each. Data sets were identified by the date and time of their acquisition. For example, JN02841225 was a data set taken on June 2, 1984, and the 1024-sec record started at 12:25.

Current data at the pipe were obtained from two current meters. An acoustic current meter was mounted normal to the slope about 80 ft southwest of the pipe, and located about 3.3 ft below the centerline of the pipe and 8 ft above the bottom. The other current meter was an electromagnetic current meter mounted 3.4 ft directly above the pipe. Each current meter provided orthogonal velocity components. Pressure data at the pipe were obtained from two pressure sensors mounted close to the location of the two current meters. Surface wave height data were provided by a Waverider buoy which most of the time was moored at the lower foundation of the pipe to provide sea surface data directly over the pipe. The main part of the force measurement system was an 8-ft-long floating ring section located in the center of the pipe. Horizontal forces acting on the ring were

Nomenclature

A = fluid acceleration
C_D, C_I = drag and inertia coefficients, respectively
C_L = lift coefficient
D = pipe diameter
d = depth of submergence
e = distance from lowest part of cylinder to bottom
F = fluid-induced force
F_D, F_I = drag and inertia forces, respectively
F_L = lift force
F_{IZ} = inertia force in Z-direction
Hs = significant wave height
KC(*) = Keulegan Carpenter parameter
L = length of pipe section
Re(*) = Reynolds number
R_{ff} = covariance function for wave force
S_{vv}, S_{aa}, S_{ff} = spectrum of wave velocity, acceleration, and force, respectively
t = time
V = magnitude of total velocity (wave + current)
Vc = magnitude of current velocity
$|Vc/Vw|(*)$ = ratio of current to maximum wave velocity
Vw = magnitude of maximum wave velocity (crest)
ω = wave frequency
ν = kinematic viscosity of fluid
ρ = density of fluid
σ = standard deviation of velocity record

NEWS RELEASE

STATE OF ALASKA
OFFICE OF THE GOVERNOR
P.O. BOX A
JUNEAU, ALASKA 99811
WALTER J. HICKEL
GOVERNOR

FOR INFORMATION CONTACT
ERIC REHMANN
PRESS SECRETARY
JOHN MANLY
DEPUTY PRESS SECRETARY
(907) 465-3500
FAX (907) 586-3028

FOR RELEASE April 11, 1991
No. 91-71

L.A. COUNTY OKS STUDY ON FRESHWATER PIPELINE

JUNEAU--Governor Walter J. Hickel today released a letter he received from the Los Angeles County Board of Supervisors unanimously supporting an engineering study of the Alaska-to-California freshwater pipeline.

The letter says the Board of Supervisors at an April 7 meeting approved contracting with an engineering firm to provide an analysis of the engineering and costs required to build the pipeline.

"I am delighted the Board of Supervisors has the vision to pursue the pipeline. States should work together to help bring solutions to problems facing people. Projects like this build great countries," Hickel said.

Kenneth Hahn, an L.A. County Supervisor, also requested that three of his county officials meet with Governor Hickel in the next few weeks to discuss this project further. They include the chief administrative officer, director of public works, and assistant general manager of the area's water district.

####

KENNETH HAHN
SUPERVISOR, SECOND DISTRICT

County of Los Angeles
Board of Supervisors
Los Angeles, California 90012

866 HALL OF ADMINISTRATION
974-2222
FAX (213) 680-3253

MEMBERS OF THE BOARD
GLORIA MOLINA
KENNETH HAHN
EDMUND D. EDELMAN
DEANE DANA
MICHAEL D. ANTONOVICH

April 8, 1991

The Honorable Walter J. Hickel
Governor, State of Alaska
P. O. Box A
Juneau, AK 99811-0101

Dear Governor Hickel:

Yesterday, the Board of Supervisors unanimously approved my motion calling for the procurement of an outside engineering firm to provide Los Angeles County with engineering and cost analysis data on an Alaska-to-California fresh water pipeline.

In addition, I have requested our Chief Administrative Officer Richard Dixon, the Los Angeles County Director of Public Works Tom Tidemanson (who also serves as the County Engineer), and Metropolitan Water District Assistant General Manager Duane L. Georgeson to visit you sometime during the next few weeks to further discuss this project. I would also like to send Dr. Craig Black, Director of the Museum of Natural History, and a marine biologist to review the potential ecological impact of such a project.

I am very optimistic about this proposal and I look forward to meeting you in person in the near future.

Sincerely yours,

Kenneth Hahn

KENNETH HAHN
Supervisor, Second District

KH:jar

ALASKA WATER RESOURCES BOARD

Resolution 91-5

ANWR Water Data Collection

WHEREAS: The State of Alaska desires to receive a major bonus, royalty and tax interest off of future ANWR Oil and Gas leasing and development; and,

WHEREAS: Much of the exploration, field development and production activities are dependent on an adequate supply of fresh water; and,

WHEREAS: Fresh water supplies have not been adequately identified or quantified in the Central Plain of ANWR; and,

WHEREAS: The State of Alaska owns title or a claim of title to all navigable rivers in the Central Plain that will be obvious sources for the industrial water needs; and

WHEREAS: Long term water data collection will be necessary to make rational management decisions with respect to water quantities available for withdrawal for industry needs.

NOW THEREFORE BE IT RESOLVED:

That the Alaska Water Resources Board, for the third time, strongly recommends that the administration pursue and the Legislature fund a water data collection program to begin the lengthy but crucial water data collection process necessary to support the rapid and orderly development of the oil reserves in the ANWR Coastal Plain.

Adopted this 20th day of March, 1991
Alaska Water Resources Board

Peg Tileston

Peg Tileston, Chairwoman
Alaska Water Resources Board

ALASKA WATER RESOURCES BOARD

Resolution 91-6

Wetlands Position

WHEREAS: The topography and climate of Alaska is significantly different than the rest of the nation; and

WHEREAS: Congress and the Bush Administration are proposing to adopt wetlands policies which fail to recognize Alaska's differences; and

WHEREAS: The proposed wetlands policies would have both immediate and long-term impacts on Alaska's environment, economy and industrial and public works projects; and

WHEREAS: It would be in the private and public sector's best interests in Alaska to advocate Alaska's unique characteristics in the on-going national debate involving wetlands policy development.

NOW THEREFORE BE IT RESOLVED:

That the Alaska Water Resources Board recommends that the Office of the Governor or the appropriate state agency designated by the Governor, develop an aggressive campaign to influence the national wetlands policy with regards to its treatment or regulation of arctic and subarctic conditions of Alaska wetlands.

Adopted this 20th day of March, 1991
Alaska Water Resources Board

Peg Tileston

Peg Tileston, Chairwoman
Alaska Water Resources Board

ALASKA WATER RESOURCES BOARD

Resolution 91-7

USGS Matching Funds for Stream Gaging

WHEREAS: The United States Geological Survey (USGS) conducts a $300,000 annual matching grants program available to the State of Alaska for stream gaging; and

WHEREAS: The State of Alaska failed to take full advantage of this program in 1990; and

WHEREAS: Stream gaging is necessary for knowledgeable fish and game management, orderly development, navigation and commerce planning; and

WHEREAS: The State of Alaska can double its much needed data collection activities by funding up to $300,000 in matching funds to the USGS grants.

NOW THEREFORE BE IT RESOLVED:

That the Alaska Water Resources Board recommends that the State of Alaska should fund a budget increment of $300,000 per year to participate in the USGS matching fund program for stream gaging stations.

Adopted this 20th day of March, 1991
Alaska Water Resources Board

Peg Tileston

Peg Tileston, Chairwoman
Alaska Water Resources Board

ALASKA WATER RESOURCES BOARD

Resolution 91-8

Feasibility of Exporting Alaska Water as Commercial Commodity

WHEREAS: Water is one of the most valuable Alaska resources that is used by Alaska citizens, fish, waterfowl, wildlife, trees and vegetation; and

WHEREAS: Alaska has abundant rivers and lakes fed by precipitation and glacier discharges; and

WHEREAS: The state of California is currently facing severe water shortage due to increasing population and consecutive drought years; and

WHEREAS: The State of California is considering Alaska as a new source of water supply; and

WHEREAS: There is urgent need to identify and quantify water potentially available for export in Alaska; and

WHEREAS: There is a serious deficiency of information on the impacts of massive extraction of water from the Alaskan watershed.

NOW THEREFORE BE IT RESOLVED:

That the Alaska Water Resources Board recommends that a non-state funded analysis of the impact of exporting water on Alaska population, fishery, land and water resources be conducted.

AND FURTHER RESOLVE:

That the state fund water data collection and management as per resolutions 91-12 and 91-15 from the Alaska Water Resources Board.

Adopted this 20th day of March, 1991
Alaska Water Resources Board

Peg Tileston

Peg Tileston, Chairwoman
Alaska Water Resources Board

ALASKA WATER RESOURCES BOARD

Resolution 91-9

As-builts for Rural Water Utilities

WHEREAS: The State of Alaska coordinates and facilitates the maintenance of many of the rural water utilities in Alaska; and

WHEREAS: The Federal, State and Local agencies fund and administrate the design and construction of these facilities; and

WHEREAS: The design concept and component equipment are of different manufacture and specifications; and

WHEREAS: To preclude total system failure or unsafe drinking water due to unidentified component failure.

NOW THEREFORE BE IT RESOLVED:

That the Alaska Water Resources Board recommends that as-builts of utility systems with design concept, parts books and maintenance manuals should be on site and in the regional service centers with a management system to keep the documentation current.

Adopted this 20th day of March, 1991
Alaska Water Resources Board

Peg Tileston

Peg Tileston, Chairwoman
Alaska Water Resources Board

ALASKA WATER RESOURCES BOARD

Resolution 91-10

Oil and Hazardous Substance Release Response Fund

WHEREAS: Immediate response to major oil spills offers the best chance to mitigate damage to the environment; and

WHEREAS: Having sufficient funds in reserve and readily available and specifically allocated for use in responding to a major oil spill; and

WHEREAS: An Oil and Hazardous Substance Release Response Fund has been created for this purpose,

NOW THEREFORE BE IT RESOLVED:

That the Alaska Water Resources Board recommends that the Oil and Hazardous Substance Release Response Fund be initially funded at $25,000,000 in FY 92 and that the Oil and Hazardous Substance Release Response Fund be kept intact and in reserve solely for use on major oil and hazardous substance spills, to be administered by the Department of Environmental Conservation.

Adopted this 20th day of March, 1991
Alaska Water Resources Board

Peg Tileston

Peg Tileston, Chairwoman
Alaska Water Resources Board

ALASKA WATER RESOURCES BOARD

Resolution 91-11

Hazardous Waste Disposal Siting

WHEREAS: The siting of hazardous waste disposal facilities is a complex and controversial process; and

WHEREAS: The State should determine what types and quantities of hazardous waste such a site would handle and the type of disposal required; and

WHEREAS: The State should compare the cost of disposing of hazardous waste in-state with that of shipping it out-of-state; and

WHEREAS: Hazardous waste disposal facilities have contributed to ground water pollution.

NOW THEREFORE BE IT RESOLVED:

That the Alaska Water Resources Board urges the Department of Environmental Conservation to determine the feasibility of developing a hazardous waste disposal facility in-state for wastes generated in Alaska and provide for a public education and participation procedure.

BE IT FURTHER RESOLVED:

That the Department of Environmental Conservation develop a plan to assure protection of Alaska's ground water resources.

Adopted this 20th day of March, 1991
Alaska Water Resources Board

Peg Tileston

Peg Tileston, Chairwoman
Alaska Water Resources Board

ALASKA WATER RESOURCES BOARD

Resolution 91-12

Statewide Stream Gaging Network

WHEREAS: Stream flow obtained from stream gage data is required to properly manage the state's water resources for such uses as water rights allocation, instream flow reservations, resource development projects, and design of roads, railroads and pipelines; and

WHEREAS: Stream gage data is extremely limited in the state and almost totally lacking in northwest Alaska; and

WHEREAS: At least ten years of continuous data collection at each gage is required to establish good hydrologic data for a stream; and

WHEREAS: Data from index gage sites can be correlated and extrapolated to other similar stream basins regionally; and

WHEREAS: The Division of Geological and Geophysical Surveys (DGGS) is the state agency designated to coordinate and collect basic hydrologic data; and

WHEREAS: The U.S. Geological Survey (USGS) is the primary federal agency designated to coordinate and collect hydrologic data; and

WHEREAS: The DGGS/USGS Cooperative Matching program to fund stream gages and collect flow data has been decreasing annually resulting in decreasing numbers of stream gages.

NOW THEREFORE BE IT RESOLVED:

That the Alaska Water Resources Board recommends the DGGS coordinate with all state agencies needing stream flow data, with interested private organizations, and with the USGS to cooperatively design a statewide stream gage data collection network.

BE IT FURTHER RESOLVED:

That the DGGS and USGS cooperatively prepare a map of the proposed stream gaging network and a report summarizing a list of proposed gage sites prioritized by need, cost for the establishment and maintenance of the gages, rational for choosing the gage locations, and proposed multi-year budget for the gage network.

BE IT FURTHER RESOLVED:

That the DGGS and USGS present the maps and report to the Water Resources Board at its next meeting.

Adopted this 20th day of March, 1991
Alaska Water Resources Board

Peg Tileston

Peg Tileston, Chairwoman
Alaska Water Resources Board

ALASKA WATER RESOURCES BOARD

Resolution 91-13

Multi-Agency Task Force: Village Safe Water

WHEREAS: The Alaska Water Resources Board passed a resolution in 1989 (89-10) recommending the creation of a Multi-Agency Task Force to increase communication and cooperation of agencies delivering or servicing village water programs; and

WHEREAS: The state agencies requested to participate in this Task Force have failed to respond to this request; and

WHEREAS: The new administration has the opportunity to encourage the establishment of this Multi-Agency Task Force.

NOW THEREFORE BE IT RESOLVED:

That the Alaska Water Resources Board requests the Governor to establish a multi-agency task force consisting of representatives from the Department of Environmental Conservation, Department of Community and Regional Affairs, Department of Transportation and Public Facilities, and the Department of Health and Social Services; and

BE IT FURTHER RESOLVED:

That the Governor request the participation in the multi-agency task force by representatives from Bureau of Indian Affairs, the Public Health Service and Housing and Urban Development; and

BE IT FURTHER RESOLVED:

That the Governor request representation on the multi-agency task force by regional corporations and appropriate non-profit organizations; and

BE IT FURTHER RESOLVED:

That the Governor request the multi-agency task force determine the current and planned activities of each agency which affects, or will affect, water quality and waste disposal in Alaska villages, a method of interagency cooperation, and shared resource allocations, both data and financial, to improve the serious existing problem.

Adopted this 20th day of March, 1991
Alaska Water Resources Board

Peg Tileston, Chairwoman
Alaska Water Resources Board

ALASKA WATER RESOURCES BOARD

Resolution 91-14

Amendment to the Federal Power Act
California vs. FERC in the Supreme Court

WHEREAS: In California vs. FERC, commonly known as the Rock Creek decision, the Supreme Court ruled that the Federal Energy Regulatory Commission (FERC) controls by-pass (instream flow) water below a FERC authorized dam; and

WHEREAS: The water of the state is owned by the people of the state; and

WHEREAS: The state water resources are managed under the appropriation doctrine, "First in time, First in right" and for constitutional priorities for public water supplies and fish and wildlife; and

WHEREAS: The Department of Natural Resources is charged with the management of the state's water for use and distribution; and

WHEREAS: The Supreme Court's decision is counter to the doctrine of state primacy in water management; and

WHEREAS: The Idaho congressional delegation has introduced a Senate Bill which amends Sections 9 and 27 of the Federal Power Act. The Amendment would assure management of by-pass (instream flow) water below a FERC dam by the state.

NOW THEREFORE BE IT RESOLVED:

That the Alaska Water Resources Board urges Alaska's congressional delegation to fully support the Senate Bill introduced by Senator Craig and Senator Symms of Idaho.

Adopted this 20th day of March, 1991
Alaska Water Resources Board

Peg Tileston

Peg Tileston, Chairwoman
Alaska Water Resources Board

ALASKA WATER RESOURCES BOARD

Resolution 91-15

STORET Program

WHEREAS: During the years 1981 to 1984 the Department of Natural Resources, with assistance from a grant from the Environmental Protection Agency, began numbering river miles for stream reaches in the STORET system; and

WHEREAS: When the funds for this project were discontinued work on the STORET system ceased; and

WHEREAS: The STORET program identifies stream reaches on a mile-by-mile basis, making the computer storage and retrieval of the information more readily available; and

WHEREAS: The identification of river miles on streams is important for many reasons; such as instream flow designations, placer mining requirements, river corridor planning, and fish habitat management, to name a few; and

WHEREAS: Not having the STORET system slows the permitting processes and increases costs of managing our surface water resources.

NOW THEREFORE BE IT RESOLVED:

The STORET program be funded and reactivated to complete the identification of river miles on USGS maps, enter this information into DNR's LAS computer system, and integrate this system with DNR's other water management computer systems.

Adopted this 20th day of March, 1991
Alaska Water Resources Board

Peg Tileston

Peg Tileston, Chairwoman
Alaska Water Resources Board

ALASKA WATER RESOURCES BOARD

Resolution 91-16

Western States Water Council

WHEREAS: The Department of Natural Resources (DNR) is one of the state's participants in the Western States Water Council; and

WHEREAS: The DNR sends a representative four times a year to Western States Water Council meetings.

NOW THEREFORE BE IT RESOLVED:

That DNR's representative provide a written report on each meeting and report orally to the Alaska Water Resources Board at its meetings.

Adopted this 20th day of March, 1991
Alaska Water Resources Board

Peg Tileston, Chairwoman
Alaska Water Resources Board

News from
LUCILLE ROYBAL-ALLARD

Member, California Legislature
56th Assembly District

CONTACT:
Maria Luisa Ochoa
[916] 445-1670

FOR IMMEDIATE RELEASE:
Friday, March 8, 1991

CALIFORNIA LEGISLATOR LUCILLE ROYBAL-ALLARD

PROPOSES ALASKA-CALIFORNIA UNDER-OCEAN WATER PIPELINE

AS BEST ANSWER TO CHRONIC CALIFORNIA WATER SHORTAGES

COMMENDS ALASKA GOVERNOR HICKEL FOR LEADERSHIP & COOPERATION

Assemblywoman Lucille Roybal-Allard, [56th Assembly District, Los Angeles] today announced introduction of legislation in the California State Legislature [Assembly Concurrent Resolution 31] to start immediate work on an initial feasibility study for a proposed Alaska-California Under-Ocean Water Pipeline to eliminate California's increasingly critical chronic water shortage emergencies.

"The largest, untapped natural source of fresh water in North America lies in Alaska," Assemblywoman Roybal-Allard declared.

"We must take immediate action to study this possibility," the Los Angeles legislator asserted, "to design and build a financially feasible pay-as-you-go environmentally sound system to bring this huge God-given renewable fresh water resource from Alaska - an area of tremendous surplus where the natural water flow is excess to any future local requirement - to California, where our fast-growing population and steadily expanding industrial and agricultural needs require a dependable and economical supply of good water."

--MORE--MORE--MORE

The California Assemblywoman indicated that the results of the water pipeline study were to be completed no later than August 1, 1991. The resolution directs the State Water Resources Control Board and the Department of Water Resources to conduct the study which would include: the feasibility of the Alaska to California suboceanic fresh water pipeline, a proposed plan of implementation, estimated costs for the project, and a timeframe for the completion of the pipeline.

In a letter commending Alaska Governor Walter Hickel for his outstanding leadership and spirit of interstate cooperation, Assemblywoman Roybal-Allard stated, "We, in California, certainly appreciate your forward-looking initiative in suggesting the development of an Alaska-California water pipeline, and offering to share Alaska's tremendous surplus of fresh water with California. Your progressive attitude will make a significant contribution to the future development of the United States into the 21st Century and beyond. I look forward to working cooperatively with you as Governor, with the Alaska State Legislature, and with the people of Alaska, on this most important and valuable joint enterprise."

###

FISCAL NOTE

STATE OF ALASKA
1991 LEGISLATIVE SESSION

BILL NO. SCR 18

Revision Date: 19-Mar-91
Department Affected: Natural Resources
Title: Endorse Surplus Water to California
BRU: Land & Water
Components: Land & Water
Sponsor: Senator Fischer
Requestor: Senate Resources
COMPONENT SERIAL NO. 431

EXPENDITURES/REVENUES: (Thousands of Dollars)

OPERATING	FY 92	FY 93	FY 94	FY 95	FY 96	FY 97
PERSONAL SERVICES						
TRAVEL						
CONTRACTUAL						
SUPPLIES						
EQUIPMENT						
LAND&STRUCTURES						
GRANTS,CLAIMS						
MISCELLANEOUS						
TOTAL OPERATING	0.0	0.0	0.0	0.0	0.0	0.0
CAPITAL						
REVENUE						

FUNDING: (Thousands of Dollars)

GENERAL FUND						
FEDERAL FUNDS						
OTHER						
TOTAL	0.0	0.0	0.0	0.0	0.0	0.0

POSITIONS:

FULL-TIME						
PART-TIME						
TEMPORARY						

Estimate of Current year impact:

ANALYSIS: (Attach a separate page if necessary)

Prepared by: Gary Gustafson
Phone: 762-2672
Division: Land & Water
Date: 19-Mar-91

Approved by Commissioner: Harold Heinze
Date: 19-Mar-91
Agency: Department of Natural Resources

Distribution (by preparer) : Legislative Finance, legislative Sponsor, Requestor, OMB, & Impacted Agency(ies).

REV 10/90

P.O. Box 942849
Sacramento, CA 94249-0001
Phone (916) 445-1670
ATSS 8-485-1670

Maria Luisa Cotera
Senior Assistant

1255 South Atlantic Blvd
Los Angeles, CA 90022
Phone (213) 265-2772
ATSS 8-645-3267

Marina Mojica-Aviles
Administrative Assistant

Assembly
California Legislature

LUCILLE ROYBAL-ALLARD
ASSEMBLYWOMAN, FIFTY-SIXTH DISTRICT

Committees:

Chair, Ways & Means Subcommittee No. 1 on Health and Human Services
Rules
Ways and Means
Health
Utilities and Commerce
Select Committee on Sexual Assault Victims Assistance, Chair

March 7, 1991

Honorable Walter J. Hickel
Governor
State of Alaska
P.O. Box A
Juneau, Alaska 99811-0101

Dear Governor Hickel:

Enclosed for your information is the pre-print text of my California State Assembly Concurrent Resolution No. 31, which would urge California Governor Pete Wilson to direct the immediate start of an initial feasibility study for the construction of an Alaska-California under ocean water pipeline. I will forward a copy of the printed version of the measure as soon as it becomes available.

As indicated in the resolution, the study would include a proposed plan of implementation with estimated costs, and a specific action plan with a time frame for the operational completion of an Alaska-California water pipeline.

The people of the State of California sincerely appreciate your innovative ideas on this issue and your willingness to share Alaska's tremendous surplus of fresh water through the development of an Alaska-California water pipeline. Your progressive approach to solving our state's critical water shortage will make a significant contribution to the future development of our nation into the 21st Century and beyond.

I look forward to working with you, the Alaska State Legislature, and the people of the great State of Alaska on this important and valuable joint enterprise.

Sincerely,

Lucille Roybal-Allard

LUCILLE ROYBAL-ALLARD
Assemblywoman 56th District

05229

Assembly Concurrent Resolution No. ____

Relative to a freshwater pipeline.

WHEREAS, The shortage of water in the State of California has become an increasingly serious emergency situation for the citizens, businesses, and agricultural interests within the state; and

WEEREAS, Fresh river water from the entire western slope of the North American continent presently is flowing into the Pacific Ocean, thereby wasting a valuable natural source of fresh water; and

WHEREAS, The Governor of the State of Alaska, the Honorable Walter J. Hickel, has publicly announced his interest in sharing that state's immense, renewable surplus of fresh water by making that resource available to western states; and

WHEREAS, It is in the best interests of our growing state population and important industrial and agricultural concerns to divert a portion of that surplus water supply to areas experiencing severe water shortages; and

WHEREAS, Modern technology and engineering capabilities make it economically feasible to construct a fresh water pipeline with a 50 to 75 foot diameter along the coastal waters extending from Alaska to California; and

WHEREAS, In planning, designing, and constructing a North American water pipeline,

consideration should be given to using the demonstrated expertise of federal laboratories and technology transfer programs that are exemplified by the work performed at the National Aeronautics and Space Administration Ames Research Center in Moffitt Field, California; and

WHEREAS, An interstate compact agreement between Alaska and California could be executed to provide for the necessary planning, financing, and construction of large, submerged floating conduit pipes that are either anchored to, or rest on, the Continental Shelf and capable of bringing surplus water to this state; and

WHEREAS, The freshwater pipeline could be constructed to avoid interference with the navigation of commercial and noncommercial vessels and to mitigate the effects of ocean currents; and

WHEREAS, The significant density differences between freshwater to be transported in the pipeline and the surrounding seawater would provide sufficient buoyancy to limit construction support requirements to composite cable anchoring for containment; and

WHEREAS, At selected underwater pumping sites, water flow could be maintained and new water supplies could be added from intake areas drawing upon fresh water from rivers otherwise flowing into the Pacific Ocean; and

WHEREAS, These pumping sites could also direct

freshwater flows to designated onshore areas to meet local water needs; and

WHEREAS, The southward flow in the pipeline would be enhanced in its long journey by the coriolis effect of the earth's rotation, thereby reducing mechanical pumping requirements; and

WHEREAS, A water pipeline route beneath the ocean's surface could effectively eliminate the need to acquire costly rights-of-way, the digging of tunnels, and pumping water over mountain ranges, while at the same time reducing the potential impact of earthquakes and losses of water due to evaporation; and

WHEREAS, The use of prefabricated concrete or reinforced composite pipe section can greatly reduce the costs of the project and ensure long-term reliability, thereby making the construction of the project the most practical and cost effective solution to the state's current and future water needs; now, therefore, be it

Resolved by the Assembly of the State of California, the Senate thereof concurring, That the Governor is hereby requested to direct the State Water Resources Control Board, the Department of Water Resources, or any other appropriate state agency to undertake a study to be completed by August 1, 1991, on the feasibility of an Alaska to California suboceanic

freshwater pipeline, including a proposed plan of implementation with estimated costs and a specific action plan with a designated time frame for the completion of the pipeline; and be it further

Resolved, That the Chief Clerk of the Assembly transmit copies of this resolution to the Governor, the Executive Director of the State Water Resources Control Board, and the Director of Water Resources.

0

LEGISLATIVE COUNSEL'S DIGEST

ACR No.

as introduced, Roybal-Allard.

General Subject: Freshwater pipeline.

This measure would request the Governor to direct the State Water Resources Control Board, the Department of Water Resources, or any other appropriate state agency to undertake a study on the feasibility of a fresh water pipeline, as prescribed, to be completed by August 1, 1991.

Fiscal committee: yes.

102D CONGRESS
1ST SESSION

H. R. 1600

To require the Secretary of the Interior, acting through the Bureau of Reclamation, to conduct an initial feasibility study of an Alaska-California under-ocean, fresh water pipeline.

IN THE HOUSE OF REPRESENTATIVES

MARCH 22, 1991

Mr. ROYBAL introduced the following bill; which was referred to the Committee on Interior and Insular Affairs

---

A BILL

To require the Secretary of the Interior, acting through the Bureau of Reclamation, to conduct an initial feasibility study of an Alaska-California under-ocean, fresh water pipeline.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

SECTION 1. INITIAL FEASIBILITY STUDY OF ALASKA-CALIFORNIA UNDER-OCEAN, FRESH WATER PIPELINE.

The Secretary of the Interior, acting through the Bureau of Reclamation, shall conduct, without delay, an Initial Feasibility Study of an Alaska-California under-ocean,

fresh water pipeline for reclamation purposes. The study shall include a proposed plan of implementation with estimated costs and a specific action plan with a time frame for operational completion of such an Alaska-California water pipeline. Consideration shall be given to shared financial and beneficial participation in the project by California and other water shortage Western and Southwestern States. Consideration shall also be given to all environmental impacts of the project, including fish and wildlife and other oceanic resource aspects. No consideration shall be given in such study to any water transfers from the Columbia River Basin. The completed Alaska-California Fresh Water Pipeline Initial Feasibility Study shall be submitted to the Congress no later than September 30, 1991. There is authorized to be appropriated not more than $100,000 to carry out this Act.

O

102D CONGRESS
1ST SESSION

H. J. RES. 186

Directing the President to conduct an Initial Feasibility Study of an Alaska-California Under-Ocean Fresh Water Pipeline.

IN THE HOUSE OF REPRESENTATIVES

MARCH 12, 1991

Mr. ROYBAL introduced the following joint resolution; which was referred to the Committee on Public Works and Transportation

---

JOINT RESOLUTION

Directing the President to conduct an Initial Feasibility Study of an Alaska-California Under-Ocean Fresh Water Pipeline.

Whereas the shortage of water in the State of California, and in other Western and Southwestern States, has become an increasingly serious emergency for citizens, business and agriculture;

Whereas fresh river water from the entire Western Slope of the North American continent presently flows into the Pacific Ocean, where that valuable natural fresh water resource is wasted;

Whereas the Governor of the State of Alaska, the Honorable Walter J. Hickel, has offered to share that State's huge, renewable surplus of fresh water with shortage States in the "lower 48";

Whereas it would be in the interest of, and service to, our growing population in California and the other Western and Southwestern States, to essential industries, and to vital agriculture to extract a portion of that excess water flow and divert it to areas of severe water shortage;

Whereas modern technology and engineering capability make it economically feasible to construct a water pipeline along coastal waters from Alaska to California;

Whereas in planning, designing and constructing a North American water pipeline, we should utilize the demonstrated expertise of Federal Government laboratories and technology transfer programs, as exemplified by work done at the National Aeronautics and Space Administration Ames Research Center at Moffitt Field, California;

Whereas an interstate compact agreement between Alaska, California, and other water shortage States could be written to provide for planning, financing, and constructing such large, submerged, floating conduit pipes, either tied down or resting on the Continental Shelf, to bring excess fresh water south to where it is urgently needed;

Whereas large concrete or reinforced plastic conduits could be floating and anchored beneath coastal water surfaces at a suitable depth to avoid interference with navigation and fishing, and to reduce strong current effects;

Whereas the significant difference in density between the fresh water and the surrounding seawater provides sufficient buoyancy to such an enclosed aqueduct structure to limit the need for support to primarily that of composite cable anchoring for containment;

Whereas at selected underwater pumping sites water flow could be maintained, new water could be added from in-

takes tapping fresh water from rivers flowing into the Pacific at these sites, and designated portions of fresh water flow could be directed onshore for local use;

Whereas the southward flow in the large conduit should be enhanced in its long journey by the earth's rotation (coriolis effect), thereby reducing mechanical pumping requirements;

Whereas a water pipeline route beneath the ocean's surface could essentially eliminate the need for purchasing costly rights-of-way, digging tunnels, and pumping over mountains, while reducing earthquake hazards and evaporative losses; and

Whereas use of prefabricated concrete or reinforced composite pipe sections can greatly reduce the costs and insure long term reliability, making the under-ocean, fresh water pipeline from Alaska the most practical and cost effective solution to the critical water shortage in California and other Western and Southwestern States: Now, therefore, be it

Resolved by the Senate and House of Representatives of the United States of America in Congress assembled, That the Congress hereby directs the President to conduct, without delay, an Initial Feasibility Study of an Alaska-California under-ocean fresh water pipeline. The study shall include a proposed plan of implementation with estimated costs and a specific action plan with a time frame for operational completion of such an Alaska-California water pipeline. Consideration should be given to shared financial and beneficial participation in the project

by California and other water shortage Western and Southwestern States. The completed Alaska-California Fresh Water Pipeline Initial Feasibility Study shall be submitted to the Congress no later than September 30, 1991.

O

STATE OF ALASKA
1991 LEGISLATIVE SESSION

BILL NO. SCR 18

Revision Date: 19-Mar-91
Department Affected: Natural Resources
Title: Endorse Surplus Water to California
BRU: Land & Water
Components: Land & Water
Sponsor: Senator Fischer
Requestor: Senate Resources
COMPONENT SERIAL NO. 431

EXPENDITURES/REVENUES: (Thousands of Dollars)

OPERATING	FY 92	FY 93	FY 94	FY 95	FY 96	FY 97
PERSONAL SERVICES						
TRAVEL						
CONTRACTUAL						
SUPPLIES						
EQUIPMENT						
LAND&STRUCTURES						
GRANTS,CLAIMS						
MISCELLANEOUS						
TOTAL OPERATING	0.0	0.0	0.0	0.0	0.0	0.0
CAPITAL						
REVENUE						

FUNDING: (Thousands of Dollars)

GENERAL FUND						
FEDERAL FUNDS						
OTHER						
TOTAL	0.0	0.0	0.0	0.0	0.0	0.0

POSITIONS:

FULL-TIME						
PART-TIME						
TEMPORARY						

Estimate of Current year impact:

ANALYSIS: (Attach a separate page if necessary)

Prepared by: Gary Gustafson
Phone: 762-2672
Division: Land & Water
Date: 19-Mar-91

Approved by Commissioner: Harold Heinze
Date: 19-Mar-91
Agency: Department of Natural Resources

Distribution (by preparer) : Legislative Finance, legislative Sponsor, Requestor, OMB, & Impacted Agency(ies).

REV 10/90

CALIFORNIA WATERPIPELINE

INTIATED BY REP. EDWARD ROYBAL, D-CALIF., IN THE US CONGRESS, THE FEDERAL RESOLUTION WOULD AUTHORIZE A FEASIBILITY STUDY OF THE 2,000 MILE LONG PIPELINE. IF ADOPTED, THE STUDY WOULD BE COMPLETED BY SEPTEMBER, NOT TO EXCEED $100,000 IN COST.

HIS DAUGHTER, LUCILLE ROYBAL-ALLARD, D-CALIF., HAS INTRODUCED SIMILAR LEGISLATION IN THE CALIF. STATE LEGISLATURE, ASKING GOV. WILSON TO DIRECT THE IMMEDIATE START OF AN INITIAL FEASIBILITY STUDY. THE STUDY WOULD BE ADMINISTERED BY THE CALIF. WATER RESOURCES CONTROL BOARD AND THE CALIF. DEP. OF WATER RESOURCES.

NOBODY KNOWS HOW MUCH THIS IS GOING TO COST, ALTHOUGH IT IS ESTIMATED TO BE IN THE HUNDRED BILLION DOLLAR CLASS.

HICKEL, WHO HAS MET WITH REP. E. ROYBAL, ENVISIONS TWO PIPELINES, EACH 20-FEET IN DIAMETER, RUNNING FROM THE WEST COAST OF ALASKA TO SOUTHERN CALIFORNIA.

****

CALIFORNIA HAS COVETED THE WATER OF THE NW FOR OVER 40 YEARS, AND NW LAWMAKERS ARE FIERCELY PROTECTIVE OF THEIR WATER. IN 1986, FED. AGENCIES WERE PERMANENTLY BARRED FROM STUDYING COLUMBIA RIVER WATER TRANSFERS TO CALIFORNIA. (LONG BEFORE SALMON WAS ACKNOWLEDGED TO BE THREATENED)

THE BILL ALSO INDICATED THAT THE PROJECT WOULD INCLUDE OTHER WATER SHORTAGE WESTERN AND SOUTHWESTERN STATES.

****

ALASKA WATER RESOURCES BOARD SUPPORTS THE IDEA OF A STUDY, NOT FUNDED BY ALASKA, TO ANALYZE THE IMPACTS ON ALASKA'S PEOPLE, FISHERIES AND LAND AND WATER RESOURCES.

****

1. DOES AK. HAVE A HANDLE ON THE PRESENT AND PROJECTED FUTURE NEEDS OF OUR WATER RESOURCES?

2. WHO WILL PAY FOR THIS PROJECT IN LIGHT OF CALIF'S $13 BILLION BUDGET DEFICIT OVER THE NEXT 2 YEARS? --THE PROJECTED SHORTFALL IS THE LARGEST EVER FACED BY ANY STATE.

3. WHERE IS THE WATER TO BE EXTRACTED? SOUTHEAST ALREADY

EXPERIENCES PERIODS OF DROUGHT DURING DRY SPELLS.

4. IN THE STUDY, DO WE FACTOR IN CALIF'S POPULATION GROWTH? NOW AT 30,000,000+

5. ALOT OF ENERGY WILL BE NEEDED TO PUMP WATER SOUTH ON THE OCEAN'S FLOOR, WOULD WE PAY FOR THE CONSTRUCTION OF A MAJOR UTILITY POWER PLANT IN WESTERN ALASKA TO SUPPORT SUCH A FACILITY?

6. CALIFORNIA IS A COASTAL DESERT, WILL OUR WATER PERPETUATE THE LIFESTYLES OF THOSE WHO OPT TO LIVE THERE?

P.O. Box 942849
Sacramento, CA 94249-0001
Phone (916) 445-1670
ATSS 8-485-1670
Maria Luisa Cotera
Senior Assistant

1255 South Atlantic Blvd
Los Angeles, CA 90022
Phone (213) 265-2772
ATSS 8-645-3267
Marina Morris-Aviles
Administrative Assistant

Assembly
California Legislature

LUCILLE ROYBAL-ALLARD
ASSEMBLYWOMAN, FIFTY-SIXTH DISTRICT

Committees:
Chair, Ways & Means Subcommittee No. 1 on Health and Human Services
Rules
Ways and Means
Health
Utilities and Commerce
Select Committee on Sexual Assault Victims Assistance, Chair

March 7, 1991

Honorable Walter J. Hickel
Governor
State of Alaska
P.O. Box A
Juneau, Alaska 99811-0101

Dear Governor Hickel:

Enclosed for your information is the pre-print text of my California State Assembly Concurrent Resolution No. 31, which would urge California Governor Pete Wilson to direct the immediate start of an initial feasibility study for the construction of an Alaska-California under ocean water pipeline. I will forward a copy of the printed version of the measure as soon as it becomes available.

As indicated in the resolution, the study would include a proposed plan of implementation with estimated costs, and a specific action plan with a time frame for the operational completion of an Alaska-California water pipeline.

The people of the State of California sincerely appreciate your innovative ideas on this issue and your willingness to share Alaska's tremendous surplus of fresh water through the development of an Alaska-California water pipeline. Your progressive approach to solving our state's critical water shortage will make a significant contribution to the future development of our nation into the 21st Century and beyond.

I look forward to working with you, the Alaska State Legislature, and the people of the great State of Alaska on this important and valuable joint enterprise.

Sincerely,

Lucille Roybal-Allard

LUCILLE ROYBAL-ALLARD
Assemblywoman 56th District

News from

LUCILLE ROYBAL-ALLARD

Member, California Legislature
56th Assembly District

CONTACT:
Maria Luisa Ochoa
[916] 445-1670

FOR IMMEDIATE RELEASE:
Friday, March 8, 1991

CALIFORNIA LEGISLATOR LUCILLE ROYBAL-ALLARD PROPOSES ALASKA-CALIFORNIA UNDER-OCEAN WATER PIPELINE AS BEST ANSWER TO CHRONIC CALIFORNIA WATER SHORTAGES COMMENDS ALASKA GOVERNOR HICKEL FOR LEADERSHIP & COOPERATION

Assemblywoman Lucille Roybal-Allard, [56th Assembly District, Los Angeles] today announced introduction of legislation in the California State Legislature [Assembly Concurrent Resolution. 31] to start immediate work on an initial feasibility study for a proposed Alaska-California Under-Ocean Water Pipeline to eliminate California's increasingly critical chronic water shortage emergencies.

"The largest, untapped natural source of fresh water in North America lies in Alaska," Assemblywoman Roybal-Allard declared.

"We must take immediate action to study this possibility," the Los Angeles legislator asserted, "to design and build a financially feasible pay-as-you-go environmentally sound system to bring this huge God-given renewable fresh water resource from Alaska - an area of tremendous surplus where the natural water flow is excess to any future local requirement - to California, where our fast-growing population and steadily expanding industrial and agricultural needs require a dependable and economical supply of good water."

—MORE—MORE—MORE

The California Assemblywoman indicated that the results of the water pipeline study were to be completed no later than August 1, 1991. The resolution directs the State Water Resources Control Board and the Department of Water Resources to conduct the study which would include: the feasibility of the Alaska to California suboceanic fresh water pipeline, a proposed plan of implementation, estimated costs for the project, and a timeframe for the completion of the pipeline.

In a letter commending Alaska Governor Walter Hickel for his outstanding leadership and spirit of interstate cooperation, Assemblywoman Roybal-Allard stated, "We, in California, certainly appreciate your forward-looking initiative in suggesting the development of an Alaska-California water pipeline, and offering to share Alaska's tremendous surplus of fresh water with California. Your progressive attitude will make a significant contribution to the future development of the United States into the 21st Century and beyond. I look forward to working cooperatively with you as Governor, with the Alaska State Legislature, and with the people of Alaska, on this most important and valuable joint enterprise."

###

WHEREAS, The shortage of water in the State of California has become an increasingly serious emergency situation for the citizens, businesses, and agricultural interests within the state; and

WHEREAS, Fresh river water from the entire western slope of the North American continent presently is flowing into the Pacific Ocean, thereby wasting a valuable natural source of fresh water; and

WHEREAS, The Governor of the State of Alaska, the Honorable Walter J. Hickel, has publicly announced his interest in sharing that state's immense, renewable surplus of fresh water by making that resource available to western states; and

WHEREAS, It is in the best interests of our growing state population and important industrial and agricultural concerns to divert a portion of that surplus water supply to areas experiencing severe water shortages; and

WHEREAS, Modern technology and engineering capabilities make it economically feasible to construct a fresh water pipeline with a 50 to 75 foot diameter along the coastal waters extending from Alaska to California; and

WHEREAS, In planning, designing, and constructing a North American water pipeline,

consideration should be given to using the demonstrated expertise of federal laboratories and technology transfer programs that are exemplified by the work performed at the National Aeronautics and Space Administration Ames Research Center in Moffitt Field, California; and

WHEREAS, An interstate compact agreement between Alaska and California could be executed to provide for the necessary planning, financing, and construction of large, submerged floating conduit pipes that are either anchored to, or rest on, the Continental Shelf and capable of bringing surplus water to this state; and

WHEREAS, The freshwater pipeline could be constructed to avoid interference with the navigation of commercial and noncommercial vessels and to mitigate the effects of ocean currents; and

WHEREAS, The significant density differences between freshwater to be transported in the pipeline and the surrounding seawater would provide sufficient buoyancy to limit construction support requirements to composite cable anchoring for containment; and

WHEREAS, At selected underwater pumping sites, water flow could be maintained and new water supplies could be added from intake areas drawing upon fresh water from rivers otherwise flowing into the Pacific Ocean; and

WHEREAS, These pumping sites could also direct

freshwater flows to designated onshore areas to meet local water needs; and

WHEREAS, The southward flow in the pipeline would be enhanced in its long journey by the coriolis effect of the earth's rotation, thereby reducing mechanical pumping requirements; and

WHEREAS, A water pipeline route beneath the ocean's surface could effectively eliminate the need to acquire costly rights-of-way, the digging of tunnels, and pumping water over mountain ranges, while at the same time reducing the potential impact of earthquakes and losses of water due to evaporation; and

WHEREAS, The use of prefabricated concrete or reinforced composite pipe section can greatly reduce the costs of the project and ensure long-term reliability, thereby making the construction of the project the most practical and cost effective solution to the state's current and future water needs; now, therefore, be it

Resolved by the Assembly of the State of California, the Senate thereof concurring, That the Governor is hereby requested to direct the State Water Resources Control Board, the Department of Water Resources, or any other appropriate state agency to undertake a study to be completed by August 1, 1991, on the feasibility of an Alaska to California suboceanic

freshwater pipeline, including a proposed plan of implementation with estimated costs and a specific action plan with a designated time frame for the completion of the pipeline; and be it further

Resolved, That the Chief Clerk of the Assembly transmit copies of this resolution to the Governor, the Executive Director of the State Water Resources Control Board, and the Director of Water Resources.

0

102D CONGRESS
1ST SESSION

H. R. 1600

To require the Secretary of the Interior, acting through the Bureau of Reclamation, to conduct an initial feasibility study of an Alaska-California under-ocean, fresh water pipeline.

IN THE HOUSE OF REPRESENTATIVES

MARCH 22, 1991

Mr. ROYBAL introduced the following bill; which was referred to the Committee on Interior and Insular Affairs

---

A BILL

To require the Secretary of the Interior, acting through the Bureau of Reclamation, to conduct an initial feasibility study of an Alaska-California under-ocean, fresh water pipeline.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

SECTION 1. INITIAL FEASIBILITY STUDY OF ALASKA-CALIFORNIA UNDER-OCEAN, FRESH WATER PIPELINE.

The Secretary of the Interior, acting through the Bureau of Reclamation, shall conduct, without delay, an Initial Feasibility Study of an Alaska-California under-ocean,

fresh water pipeline for reclamation purposes. The study shall include a proposed plan of implementation with estimated costs and a specific action plan with a time frame for operational completion of such an Alaska-California water pipeline. Consideration shall be given to shared financial and beneficial participation in the project by California and other water shortage Western and Southwestern States. Consideration shall also be given to all environmental impacts of the project, including fish and wildlife and other oceanic resource aspects. No consideration shall be given in such study to any water transfers from the Columbia River Basin. The completed Alaska-California Fresh Water Pipeline Initial Feasibility Study shall be submitted to the Congress no later than September 30, 1991. There is authorized to be appropriated not more than $100,000 to carry out this Act.

O

102D CONGRESS
1ST SESSION

H. J. RES. 186

Directing the President to conduct an Initial Feasibility Study of an Alaska-California Under-Ocean Fresh Water Pipeline.

IN THE HOUSE OF REPRESENTATIVES

MARCH 12, 1991

Mr. ROYBAL introduced the following joint resolution; which was referred to the Committee on Public Works and Transportation

---

JOINT RESOLUTION

Directing the President to conduct an Initial Feasibility Study of an Alaska-California Under-Ocean Fresh Water Pipeline.

Whereas the shortage of water in the State of California, and in other Western and Southwestern States, has become an increasingly serious emergency for citizens, business and agriculture;

Whereas fresh river water from the entire Western Slope of the North American continent presently flows into the Pacific Ocean, where that valuable natural fresh water resource is wasted;

Whereas the Governor of the State of Alaska, the Honorable Walter J. Hickel, has offered to share that State's huge, renewable surplus of fresh water with shortage States in the "lower 48";

Whereas it would be in the interest of, and service to, our growing population in California and the other Western and Southwestern States, to essential industries, and to vital agriculture to extract a portion of that excess water flow and divert it to areas of severe water shortage;

Whereas modern technology and engineering capability make it economically feasible to construct a water pipeline along coastal waters from Alaska to California;

Whereas in planning, designing and constructing a North American water pipeline, we should utilize the demonstrated expertise of Federal Government laboratories and technology transfer programs, as exemplified by work done at the National Aeronautics and Space Administration Ames Research Center at Moffitt Field, California;

Whereas an interstate compact agreement between Alaska, California, and other water shortage States could be written to provide for planning, financing, and constructing such large, submerged, floating conduit pipes, either tied down or resting on the Continental Shelf, to bring excess fresh water south to where it is urgently needed;

Whereas large concrete or reinforced plastic conduits could be floating and anchored beneath coastal water surfaces at a suitable depth to avoid interference with navigation and fishing, and to reduce strong current effects;

Whereas the significant difference in density between the fresh water and the surrounding seawater provides sufficient buoyancy to such an enclosed aqueduct structure to limit the need for support to primarily that of composite cable anchoring for containment;

Whereas at selected underwater pumping sites water flow could be maintained, new water could be added from in-

lakes tapping fresh water from rivers flowing into the Pacific at these sites, and designated portions of fresh water flow could be directed onshore for local use;

Whereas the southward flow in the large conduit should be enhanced in its long journey by the earth's rotation (coriolis effect), thereby reducing mechanical pumping requirements;

Whereas a water pipeline route beneath the ocean's surface could essentially eliminate the need for purchasing costly rights-of-way, digging tunnels, and pumping over mountains, while reducing earthquake hazards and evaporative losses; and

Whereas use of prefabricated concrete or reinforced composite pipe sections can greatly reduce the costs and insure long term reliability, making the under-ocean, fresh water pipeline from Alaska the most practical and cost effective solution to the critical water shortage in California and other Western and Southwestern States: Now, therefore, be it

Resolved by the Senate and House of Representatives of the United States of America in Congress assembled, That the Congress hereby directs the President to conduct, without delay, an Initial Feasibility Study of an Alaska-California under-ocean fresh water pipeline. The study shall include a proposed plan of implementation with estimated costs and a specific action plan with a time frame for operational completion of such an Alaska-California water pipeline. Consideration should be given to shared financial and beneficial participation in the project

by California and other water shortage Western and Southwestern States. The completed Alaska-California Fresh Water Pipeline Initial Feasibility Study shall be submitted to the Congress no later than September 30, 1991.

O

L.A. takes look at water line

County hires engineers to study proposal

By RALPH THOMAS
THE JUNEAU EMPIRE

Gov. Walter J. Hickel's vision of a double-barreled freshwater pipeline from Southeast Alaska to California is getting some serious attention in parched Los Angeles.

Hickel received a letter this week from a Los Angeles politician who has convinced the county to hire an engineering firm to study the pipeline idea and provide a cost estimate for the 2,000-mile supply line.

The idea has been around for a long time, but started getting renewed attention after Hickel mentioned it in January at a National Press Club luncheon in Washington, D.C.

California has been suffering through a long drought and numerous local governments there have imposed water-use restrictions during the past year.

In a letter to Hickel, Kenneth Hahn, a Los Angeles County supervisor, said the engineering study was approved unanimously by the five-member Board of Supervisors last weekend.

"I am very optimistic about this proposal and I look forward to meeting you in person in the near future," Hahn wrote.

Hahn also said he had asked several county officials – including the public works director and the county's chief administrator – to visit Hickel in the near future.

Victoria Pipkin, a press aide for Hahn, said county officials already have made travel plans to Alaska, but she didn't have any details.

Pipkin said the idea is getting serious consideration in California, noting it has been the topic of at least two front-page stories in the Los Angeles Times. She said she hadn't heard anyone ridicule the proposal, but said there certainly will be doubters.

"Don't you guys have a pipeline up there?" she said. "I'll bet a lot of people said that was impossible, too."

Hickel has suggested a twin set of 20-foot-diameter plastic pipelines that could be laid on the ocean floor from Alaska to California. Under his idea, water would be captured from Alaska rivers and pumped through the pipeline.

NEWS RELEASE

STATE OF ALASKA
OFFICE OF THE GOVERNOR
P.O. BOX A
JUNEAU, ALASKA 99811
WALTER J. HICKEL
GOVERNOR

FOR INFORMATION CONTACT
ERIC REHMANN
PRESS SECRETARY
JOHN MANLY
DEPUTY PRESS SECRETARY
(907) 465-3500
FAX (907) 586-2358

FOR RELEASE April 11, 1991
No. 91-71

L.A. COUNTY OKS STUDY ON FRESHWATER PIPELINE

JUNEAU--Governor Walter J. Hickel today released a letter he received from the Los Angeles County Board of Supervisors unanimously supporting an engineering study of the Alaska-to-California freshwater pipeline.

The letter says the Board of Supervisors at an April 7 meeting approved contracting with an engineering firm to provide an analysis of the engineering and costs required to build the pipeline.

"I am delighted the Board of Supervisors has the vision to pursue the pipeline. States should work together to help bring solutions to problems facing people. Projects like this build great countries," Hickel said.

Kenneth Hahn, an L.A. County Supervisor, also requested that three of his county officials meet with Governor Hickel in the next few weeks to discuss this project further. They include the chief administrative officer, director of public works, and assistant general manager of the area's water district.

####

KENNETH HAHN
SUPERVISOR, SECOND DISTRICT

County of Los Angeles
Board of Supervisors
Los Angeles, California 90012

866 HALL OF ADMINISTRATION
974-2222
FAX (213) 680-3283

MEMBERS OF THE BOARD
GLORIA MOLINA
KENNETH HAHN
EDMUND D. EDELMAN
DEANE DANA
MICHAEL D. ANTONOVICH

April 8, 1991

The Honorable Walter J. Hickel
Governor, State of Alaska
P. O. Box A
Juneau, AK 99811-0101

Dear Governor Hickel:

Yesterday, the Board of Supervisors unanimously approved my motion calling for the procurement of an outside engineering firm to provide Los Angeles County with engineering and cost analysis data on an Alaska-to-California fresh water pipeline.

In addition, I have requested our Chief Administrative Officer Richard Dixon, the Los Angeles County Director of Public Works Tom Tidemanson (who also serves as the County Engineer), and Metropolitan Water District Assistant General Manager Duane L. Georgeson to visit you sometime during the next few weeks to further discuss this project. I would also like to send Dr. Craig Black, Director of the Museum of Natural History, and a marine biologist to review the potential ecological impact of such a project.

I am very optimistic about this proposal and I look forward to meeting you in person in the near future.

Sincerely yours,

Kenneth Hahn

KENNETH HAHN
Supervisor, Second District

KH:jar

ALASKA WATER RESOURCES BOARD

Resolution 91-8

Feasibility of Exporting Alaska Water as Commercial Commodity

WHEREAS: Water is one of the most valuable Alaska resources that is used by Alaska citizens, fish, waterfowl, wildlife, trees and vegetation; and

WHEREAS: Alaska has abundant rivers and lakes fed by precipitation and glacier discharges; and

WHEREAS: The state of California is currently facing severe water shortage due to increasing population and consecutive drought years; and

WHEREAS: The State of California is considering Alaska as a new source of water supply; and

WHEREAS: There is urgent need to identify and quantify water potentially available for export in Alaska; and

WHEREAS: There is a serious deficiency of information on the impacts of massive extraction of water from the Alaskan watershed.

NOW THEREFORE BE IT RESOLVED:

That the Alaska Water Resources Board recommends that a non-state funded analysis of the impact of exporting water on Alaska population, fishery, land and water resources be conducted.

AND FURTHER RESOLVE:

That the state fund water data collection and management as per resolutions 91-12 and 91-15 from the Alaska Water Resources Board.

Adopted this 20th day of March, 1991
Alaska Water Resources Board

Peg Tileston

Peg Tileston, Chairwoman
Alaska Water Resources Board

. . . Resources . . .

Long term issue, looking at state water policy

A presentation by the Water Resources Board sparked a lengthy discussion of the state's water policy in a House Resources Committee meeting last week.

Resources Chair Rep. Cliff Davidson asked the Board and state and federal officials for ideas on establishing a sound water policy for the state of Alaska. One commonly-expressed idea was the need for adequate data on the state's water resources, in an easily-retrieved and usable format. Mary Lu Harle of the Dept. of Natural Resources compared the lack of data to a checking account. "It's hard to write out checks for water if you don't know how much is there," she said.

An analysis of the state's present and projected future needs of our water resources is needed. Gary Gustafson of DNR suggested the need for a policy to establish preferences among water uses, and cooperative planning among various water users.

State water program ?

Bill Long, Chief of the Water Resources Section of DNR cited two main areas of emphasis for his office this year: (1) water resources of the state's land entitlement selections; and (2) groundwater quality and supply for Alaska's communities. Rep. Bill Hudson and Rep. Georgianna Lincoln expressed dismay that the Governor is talking about exporting water to California, while he cannot ensure safe drinking water in many of Alaska's communities. Long admitted that the state is falling behind in collecting water resources data. Rep. Davidson said that he would like to see DNR ask for more money for this effort.

Gathering water data

Phil Carpenter of the USGS recommended a "network evaluation" of the state's water resources. That, he said, would tell us how accurate our data is. It would also tell us where to focus future data collection efforts. The cost of a study would be approximately $400,000, half of which could be paid for with federal funds.

Just because Alaska is a "water-rich" state, Carpenter said, doesn't mean that we don't need a sound water policy. He cited the state of Washington, also a water-rich state, is now facing a dilemma over water rights. The Board presented 12 resolutions to the committee, several dealing with data for water resources.

Concern was expressed by both the board and the committee members that the Dept. of Natural Resources is now using *one-quarter* the amount of federal funds that it was using eight years ago for data collection. One particular area where data collection is needed is in the Arctic National Wildlife Refuge. The Board recommended that DNR take full advantage of all federal matching funds available for data collection.

Board chair Peg Tileston recommended a network of stream gauging, as well as funding for the STORET program, which she called an efficient data storage and retrieval system.

The Board also called for an interagency task force charged with studying the impacts on village water and waste systems of agency projects. Currently, there is no coordinated approach for state agency projects in villages, which can end up placing too-heavy demands on existing systems. The board suggests keeping "as-builts" on the site of utility systems, so that rural maintenance personnel have some reference materials on the systems they are expected to maintain.

Wetlands policy

An aggressive campaign to influence national wetlands policy with regard to its treatment or regulation of Alaska lands is urged by the Board as well.

In response to Gov. Hickel's proposal to export water to California, the Board is recommending a study, *not funded by the state of Alaska,* to analyze the impacts of such a project on Alaska's people, fisheries, and land and water resources.

The Board also called for a $25 million appropriation to the Oil and Hazardous Substance Release Response Fund (the "470 fund"), and that this fund be kept in reserve for use on major oil and other hazardous substance spills. Regarding a hazardous waste disposal site in the state, the board recommended a cost-analysis be done by the Dept. of Environmental Conservation, and that if such a site is created in Alaska, that adequate groundwater protection is assured.

ANWR Resolution

The House Resources last week passed out HJR-21, endorsing ANWR exploration and development and objecting to any decrease in the state revenue share. The resolution was amended to include language re: protection of habitat for the Porcupine caribou herd, as well as other land, water and wildlife resources. HJR-21 now goes to the House Finance.

SCR

32

S' IATE COMMITTEE REPOI
FIRST COMMITTEE OF REFERRAL

DATE: 2/18/92

FURTHER:

Date of 5-Day Notice: 3-5-92
(in accordance with Uniform Rule 23)

DATE TURNED INTO OFFICE: 3-11-92

Resources Committee considered SCR 32

Requesting the Governor to take appropriate steps to make the state eligible for the benefits of the Symms National Recreational Trails Act.

and recommends:

[ ] replace with _____ CS SCR 32 (Res)

[ ] attaches amendment(s)

[T same title
[ ] new title
[ ] technical title change (HB only)

[ ] adopts _____ Letter of Intent

[ ] further referral to the _____

[ ] do pass

[ ] do not pass

[ ] no recommendation

[ ] individual recommendations

NEW FISCAL NOTES: **Dept/Date**

[V] **zero** fiscal notes S. RES SCR & CS

[ ] fiscal notes _____

[ ] **appropriation**--no fiscal note

PREVIOUS FISCAL NOTES: **Dept/Date**

[V] **Governor's bill** with fiscal notes:
zero fiscal notes .

fiscal notes _____

DO PASS

OTHER RECOMMENDATIONS:

Floyd Jones (Do Pass)
Chair/Signature and Recommendation

Alaska State Legislature

SENATE

Official Business

P.O. Box V
State Capitol
Juneau, Alaska 99811

TO: Senator Lloyd Jones, Chairman
Senate Resources Committee

FROM: Senator Sam Cotten

DATE: March 6, 1992

RE: SCR 32- Supporting Participation in the Symms National Recreation Trails Act.

Thank you for bringing SCR 32 before the Senate Resources Committee. I introduced this resolution because I believe Alaska can benefit from participating in the Symms National Recreation Trails Act. It would bring in federal money to fund trails and trailhead acquisition which our current revenue situation would not otherwise allow.

The Symms Act provides a good balance for all types of trail use and emphasizes multiple use. The enclosure from the Blue Ribbon Coalition is also very informative and will likely answer many of your questions about the Symms Act. I appreciate your support.

Alaska State Legislature

SENATE

Official Business

P.O. Box V
State Capitol
Juneau, Alaska 99811

TO: Senator Lloyd Jones, Chairman
Senate Resources Committee

FROM: Senator Sam Cotten

DATE: March 6, 1992

RE: SCR 32- Supporting Participation in the Symms National Recreation Trails Act.

Thank you for bringing SCR 32 before the Senate Resources Committee. I introduced this resolution because I believe Alaska can benefit from participating in the Symms National Recreation Trails Act. It would bring in federal money to fund trails and trailhead acquisition which our current revenue situation would not otherwise allow.

The Symms Act provides a good balance for all types of trail use and emphasizes multiple use. The enclosure from the Blue Ribbon Coalition is also very informative and will likely answer many of your questions about the Symms Act. I appreciate your support.

"Preserving our natural resources FOR the public instead of FROM the public"
P.O. BOX 1427 • IDAHO FALLS, IDAHO 83403-1427 • (208) 522-7339

QUESTIONS AND ANSWERS ON THE SYMMS TRAIL FUND ACT

Now that the Symms Trail Fund Act has passed who will administer the program?

The Secretary of Transportation in consultation with the Secretary of the Interior will administer the program.

When do we get the money and how much?

30 million dollars for the whole country will be available each year starting in 1992 through 1997. It will be divided up this way:

Up to 3% or $900,000 is set aside off the top for administration and the expenses of the advisory board. Some of this money goes to survey the non highway fuel consumption by State. Some will go for research on how to increase compatibility of uses, education, technical assistance, and preparation of a national trails plan.

Half of the remaining $29,100,000 will be available to be divided equally among the 50 States, or $291,000 per State.

The remaining half ($14,550,000) will be available to be distributed to the States proportional to the amount of off-highway gas consumed in each State. Data from State registration programs may be used in this calculation.

State agencies active in working for this legislation have already estimated their share. For example, Idaho will get approximately a total of $500,000, Wisconsin $1,800,000, and Pennsylvania $800,000.

States must apply to the Secretary of Transportation to get the money.

What State agency will administer the money?

The particular State agency in charge of administration will be identified by the governor of that State. Typically, it will be that State agency now in charge of recreation.

The Trails Bill specifies that in three years, each State must meet the following criteria in order to receive additional funds:

1. Establish a recreational trail advisory board with both motorized and non-motorized representatives.

2. The State must dedicate an amount equivalent to its own nonhighway recreational fuel taxes to recreational trails. Several States like Idaho, Montana, Washington, Arizona, and California do already.

3. The State governor has designated the State official/s who will be responsible for administration.

4. The State applies for recreational trail projects authorized by the Trails Fund Act.

Copy to Gov

Symms Trails Fund Act
Questions + Answers

How can the money be used?

The Statement Of Intent in the Trails Fund Act states that the money should be used for trails and trail related projects which have been planned and developed under existing laws, policies, and administrative procedures within each State. The projects should further a specific goal of a trail plan included or referenced in the Statewide Comprehensive Outdoor Recreation Plan (SCORP) required by the Land & Water Conservation Fund Act.

1. Up to 7% can be used for administration.

2. Up to 5% can be used for environmental protection and safety education.

3. Development of urban trails near homes and workplaces.

4. Maintaining existing trails, including snow trail grooming and maintenance.

5. Restoration of areas damaged by trail use and other types of back country terrain use (applies to all users).

6. Development of trail side and trail head facilities that meets the goals set by the National Recreational Trails Advisory Committee (they probably wouldn't approve of fancy toilets built next to gravel pits).

7. Providing handicapped access.

8. Acquiring easements or corridors for trails as identified in a State trails plan.

9. Acquiring property from a willing seller when access cannot be accomplished any other way.

10. Construction of new trails on State, municipal, county, or private lands where a need is shown.

11. Where necessary as required by SCORP, construction of new trails crossing federal land. Such construction must first comply with existing land management plans (and the federal laws governing those plans) and go through the National Environmental Policy Act (NEPA) process.

Are there any uses that are not permitted?

Yes. They are:

1. Condemnation of property.

2. Construction of new trails for motorized use on National Forest or BLM land that the respective agency has recommended for Wilderness designation.

3. Upgrading for motorized use trails that have been predominantly non-motorized and on which motorized use has not occurred or has been prohibited.

Are there any special provisions for existing trails that cross private property?

Yes. Trail Fund Act money can be spent maintaining and improving trails that cross private property. However, the State must obtain written assurances that the owner of the property will cooperate with the State. It also must be accompanied by an easement or legally binding agreement that ensures the public will have access to the funded trail improvements.

Who is represented on the National Recreational Trails Advisory Committee and how are they chosen?

There are 8 members appointed by the Secretary of Transportation from nominations submitted by trail recreational organizations:

1. Hiking
2. Cross-country skiing
3. Off-highway motorcycling
4. Snowmobiling
5. Horseback riding
6. All terrain vehicle riding
7. Bicycling
8. Four wheel driving

Any action, recommendation, or policy must be supported by at least 6 of the above members. There are two additional members appointed by the Secretary from nominations submitted by representative organizations.

1. Hunting & fishing
2. Water trails

There is an "appropriate official of government with a background in science or natural resources management", appointed by the Secretary. State, local government, or Federal officials are eligible. This official serves as the Chair and is non-voting.

How often do they meet? What are their terms?

They are required by law to meet at least twice annually. They can meet more often if necessary.

Three years. In order to stagger the terms, five of the eleven positions serve initially for two years, with subsequent appointments to those positions extending for terms of three years.

What are their duties?

1. Review how the States use their funds to assure it conforms to the purposes of the Trail Fund Act.

2. Establish and review criteria for trail side and trail head facilities that qualify for funding.

3. Recommend changes in Federal policy to the Secretary that will advance the purposes of the Trail Fund Act.

4. Present the Secretary with an annual report of activities.

5. Within four years, present Congress with a report that summarizes the annual reports, describes funded projects, and recommends changes in Federal policy.

To whom can the States grant money?

Private individuals, organizations, city and county governments, and other government agencies as approved by the State.

Any State issuing grants must assure that the recipients comply with the specified conditions for uses specified by the Trail Fund Act.

What are the conditions for uses?

30% of Trail Fund Act funds received annually by a State must be spent for motorized recreation.

30% of Trail Fund Act funds received annually by a State must be spent for non-motorized recreation.

States must give preference to project proposals that:

1. Provide for the greatest number of compatible recreational purposes.

2. Provide for innovative corridor sharing that accommodates both motorized and non-motorized use.

States must spend 40% of their Trail Fund Act funds in the above manner.

When and how will applications to the National Advisory Board be solicited?

There will likely be a public announcement from the Secretary of Transportation that applications will be accepted shortly after the first of the year in 1992.

Applications should take the form of a letter from a nominating organization stating the credentials of the organization and the qualifications of the nominee. Copies of this nominating letter should be sent to Senator Symms.

When can the States start applying for the money?

Sometime in the spring of 1992, after the National Advisory Board is in place.

ALASKA STATE SNOWMOBILE ASSOCIATION
ASSA

P.O. BOX 210427 ANCHORAGE, AK 99521-0427

March 4, 1992

Senator Lloyd Jones, Chairman
Senate Resources Committee
Alaska Senate, MS 3100
P.O. Box V
Juneau, Ak 99811

Dear Senator Jones:

First, on the behalf of the Snowmobilers of Alaska, I would like to thank you for bringing Senate Concurrent Resolution No. 32 up for a hearing. The Alaska State Snowmobile Association, ASSA, represents the snowmobilers of Alaska. Twelve active clubs, from Kodiak to Haines, are directly affiliated with the Association with a total of near 3,000 members and 3 more clubs currently being organized. Association individual and club membership includes both the rural and metropolitan areas of Alaska. This family sport spends in excess of $40,000,000 annually in Alaska, with over $25,000,000 spent on more than 5,000 new machines each year.

The Alaska State Snowmobile Association supports the passage of SCR 32. In order to receive the funds from the Symm's Act, the Governor must take action to make Alaska eligible. The Association encourages the Governor to designate the Department of Natural Resources, Parks and Outdoor Recreation Division to administer the funds.

The funds from the Symm's Act will directly benefit both motorized and non-motorized outdoor recreational users. Since it is a rebate of collected highway tax from the sale of fuel used in off-road vehicles, it is being funded by the motorized user groups. A formula, required by the enabling legislation requires that the funds be spent: 30% motorized, 40% multiple use, and 30% non-motorized trails and allows a percentage to be used to fund the management of the state program. In today's fiscally troubled times, Alaska's portion, currently estimated as $340,000 annually, will fund both jobs and recreation with no impact to the State. It's a win-win situation for all.

Again, thank you for your support. If the association can be of any assistance, please do not hesitate to contact me.

Sincerely,

Ronald E. Godden
President

Support Letter
Alaska State Snowmobile Assn

FISCAL NOTE

STATE OF ALASKA
1992 LEGISLATIVE SESSION

BILL NO. SCR 32

Revision Date: March 9, 1992 **Department Affected:**

Title: Requesting governor to take steps to make state eligible for benefits of the Symms National Recreational Trails Act **BRU:**

Component:

Sponsor: Cotten

Requestor: Senate Resources **COMPONENT SERIAL NO.**

EXPENDITURES/REVENUES: (Thousands of Dollars)

OPERATING	FY 93	FY 94	FY 95	FY 96	FY 97	FY 98
PERSONAL SERVICES						
TRAVEL						
CONTRACTUAL						
SUPPLIES						
EQUIPMENT						
LAND & STRUCTURES						
GRANTS, CLAIMS						
MISCELLANEOUS						
TOTAL OPERATING	-0-	-0-	-0-	-0-	-0-	-0-
CAPITAL	-0-	-0-	-0-	-0-	-0-	-0-
REVENUE FUND SOURCE:	-0-	-0-	-0-	-0-	-0-	-0-

FUNDING: (Thousands of Dollars)

GENERAL FUND						
FEDERAL FUNDS						
OTHER FUND SOURCE:						
TOTAL	-0-	-0-	-0-	-0-	-0-	-0-

POSITIONS:

FULL-TIME	-0-	-0-	-0-	-0-	-0-	-0-
PART-TIME	-0-	-0-	-0-	-0-	-0-	-0-
TEMPORARY	-0-	-0-	-0-	-0-	-0-	-0-

Estimate of current year impact:

ANALYSIS: (Attach a separate page if necessary.)

Changes in CSSCR 32 (RES) have no fiscal impact. This fiscal note is appropriate.

3-11-92 Terry Ohmes TCO
date Comte Aide (initial)

Prepared By: Senator Lloyd Jones **Phone:** 465-3743
Division: Senate Resources **Date:** March 9, 1992

Approved by Commissioner:
Agency: Senate Resources **Date:** March 9, 1992

Distribution (by preparer): Leg. Fin., Legislative Sponsor, Requestor, OMB/DBR, Gov. Legis. Ofc., & Impacted Agency(ies).

Rev 10/7/91

Alaska State Legislature

SENATE

Official Business

P.O. Box V
State Capitol
Juneau, Alaska 99811

TO: Senator Lloyd Jones, Chairman
Senate Resources Committee

FROM: Senator Sam Cotten

DATE: March 6, 1992

RE: SCR 32- Supporting Participation in the Symms National Recreation Trails Act.

Thank you for bringing SCR 32 before the Senate Resources Committee. I introduced this resolution because I believe Alaska can benefit from participating in the Symms National Recreation Trails Act. It would bring in federal money to fund trails and trailhead acquisition which our current revenue situation would not otherwise allow.

The Symms Act provides a good balance for all types of trail use and emphasizes multiple use. The enclosure from the Blue Ribbon Coalition is also very informative and will likely answer many of your questions about the Symms Act. I appreciate your support.

SJR

10

FISCAL NOTE

STATE OF ALASKA
1992 LEGISLATIVE SESSION

BILL NO. SJR 10

Revision Date: _____ **Department Affected:** None

Title: Relating to discharge of ballast water. **BRU:** _____

Component: _____

Sponsor: Zharoff

Requestor: _____ **COMPONENT SERIAL NO.** | | | | |

EXPENDITURES/REVENUES: (Thousands of Dollars)

OPERATING	FY 93	FY 94	FY 95	FY 96	FY 97	FY 98
PERSONAL SERVICES						
TRAVEL						
CONTRACTUAL						
SUPPLIES						
EQUIPMENT						
LAND & STRUCTURES						
GRANTS, CLAIMS						
MISCELLANEOUS						
TOTAL OPERATING	0	0	0	0	0	0
CAPITAL						
REVENUE FUND SOURCE:						

FUNDING: (Thousands of Dollars)

GENERAL FUND						
FEDERAL FUNDS						
OTHER FUND SOURCE:						
TOTAL	0	0	0	0	0	0

POSITIONS:

FULL-TIME						
PART-TIME						
TEMPORARY						

Estimate of current year impact: None

ANALYSIS: (Attach a separate page if necessary.)

Resolution requests the U.S. Coast Guard to take action on ballast water issue.
No fiscal impact on the state government.

Prepared By: Terry Otness, Committee Aide **Phone:** 465-3743

Division: Senate Resources Committee **Date:** 4/15/92

Approved by Commissioner: Sen. Lloyd Jones, Chairman

Agency: Alaska State Senate **Date:** 4/15/92

Distribution (by preparer): Leg. Fin., Legislative Sponsor, Requestor, OMB/DBR, Gov. Legis. Ofc., & Impacted Agency(ies).

Rev 10/7/91

SENATE COMMITTEE REPORT
FIRST COMMITTEE OF REFERRAL

DATE: 1/23/91 FURTHER:

Date of 5-Day Notice: 4-9-92
(in accordance with Uniform Rule 23)

DATE TURNED INTO OFFICE: April 6, 1992

Resources Committee considered SJR 10

Discharge of ballast water by vessels entering the waters of Alaska.

and recommended:

[X] **replace with** _____ **CS** SJR 10 (Res [X] **same title** [ ] **new title**

[ ] **attached amendment(s)**

[ ] _____ **letter of intent adopted**

[X] **do pass**

[ ] **do not pass**

[ ] **no recommendation**

[ ] **individual recommendations**

[ ] **further referral to** _____

ATTACHES NEW FISCAL NOTE(S):

Department(s)/Date:	Department(s)/Date:
[ ] fiscal note(s) _____	[X] zero fiscal note(s) Sen Res 4/15/92
[ ] appropriation-no fiscal note	[ ] Governor's bill w/fiscal note

SIGNING DO PASS:

OTHER RECOMMENDATIONS:

Chair Signature and Recommendation

SENATOR FRED F. ZHAROFF
ALASKA STATE LEGISLATURE
P. O. BOX 405, KODIAK, ALASKA 99615 (907) 486-5259
DURING SESSION:
P. O. BOX V, JUNEAU, ALASKA 99811 • (907) 465-3473 • 465-3474
DISTRICT N
ALASKA PENINSULA • ALEUTIAN CHAIN • BRISTOL BAY • KODIAK ISLAND • LAKE CLARK/LAKE ILIAMNA • PRIBILOF ISLANDS • SHUMAGIN ISLANDS

MEMORANDUM

TO: Senator Lloyd Jones
Chairman
Senate Resources Committee

FROM: Senator Fred F. Zharoff

DATE: April 13, 1992

RE: Senate Joint Resolution No. 10 - "Relating to the discharge of ballast water by vessels entering the waters of Alaska."

RESOLUTION SUMMARY: SJR 10 requests the U.S. Coast Guard to adopt regulations that would protect Alaska's ecosystem from the introduction of exotic marine organisms.

A CS has been requested in order to update the Copies section.

PREVIOUS ACTION: Introduced on Jan. 23, 1991. Referred to the Senate Resources Committee. SJR 10 is a reintroduced version of SJR 59, which expired in the House Rules Committee upon adjournment in 1990.

FISCAL IMPACT: No financial expenditures required by the Alaska state government.

RESOLUTION BACKGROUND: SJR 10 is based on a resolution adopted in 1989 by the Pacific Fisheries Legislative Task Force (made up of fisheries-oriented legislators from Alaska, California, Idaho, Oregon and Washington).

The resolution is aimed at a national problem - the introduction of exotic species through the discharge of ballast water. In many locations throughout the United States -- in particular, California and the Great Lakes region -- foreign marine species have overwhelmed native species, creating serious environmental problems and widespread destruction. The most dramatic example of this is the zebra mussel, which -- through its rapid reproductive capability and ability to clog up water intake and discharge systems -- has caused millions of dollars worth of damage in the Great Lakes basin.

To the best of our knowledge, Alaska has been spared this problem. However, the potential threat exists, particularly

in regard to the introduction of exotic marine organisms from northern Asia and Siberia.

ATTACHED BACKUP INFORMATION:

1. Resolution adopted by the Pacific Fisheries Legislative Task Force.
2. Historical overview on ballast water discharge and the invasion of exotic species.
3. Information about exotic species invasions in California.
4. Summary of a paper on Great Lakes exotic organisms.
5. Background information about zebra mussels.
6. Article from The Fishermen's News, April, 1990.

Pacific Fisheries Legislative Task Force
Passed in Eureka, Calif.
Aug. 20, 1989

RESOLUTION
89-10

INTRODUCED ORGANISMS FROM BALLAST WATER

WHEREAS, west coast sport and commercial fisheries are resources of great economic and recreational importance; and

WHEREAS, these resources are threatened by the introduction of aquatic organisms from foreign ports brought in by means of the ballast water of freighters and tankers; and

WHEREAS, in recent years several planktonic and benthic organisms have arrived and become established, at least one of which is suspected to have caused a great decline in the abundance of an important striped bass food organism in California's Sacramento-San Joaquin Estuary; and

WHEREAS, exotic eel grass brought in through ballast water has created problems in Humboldt Bay and estuaries along the Pacific Coast; and

WHEREAS, similar introductions have probably occurred or will occur at other estuarine and coastal ports all along the west coast and they already have occurred in the Great Lakes with consequent harm to Great Lakes fisheries.

NOW, THEREFORE, BE IT RESOLVED that to protect native fisheries and ecosystems of the Pacific Coast States, the Pacific Fisheries Legislative Task Force urges the U.S. Coast Guard to adopt a regulation prohibiting the dumping of ballast water originating in foreign ports in any west coast river, estuary, bay or coastal area. Such ballast water should be dumped at sea and exchanged for open ocean water prior to entry into State waters; and

BE IT FURTHER RESOLVED that this resolution be forwarded to the Commandant of the U.S. Coast Guard, the Secretary of the Treasury, the Secretary of Commerce and the respective Congressional Delegation of the Pacific Fisheries Legislative Task Force states.

BALLAST WATER AND THE INVASION OF EXOTIC SPECIES
A Brief Historical Review: 1868 - 1990

James T. Carlton
Maritime Studies Program, Williams College - Mystic Seaport Museum
Mystic, Connecticut 06355

A Chronological Summary of the Some of the Events and Concerns Relative to Ballast Water:

1868 Grantham (1868) describes the design of double-bottom tank systems for water ballast in iron ships

1880 Lloyd's Register begins in 1880 (but not before) noting types and capacities of water ballast tanks

1896 "Probably most cargo steamers in these days are fitted with some means of carrying water as ballast..." (Walton, 1896)

1900 Fulton and Grant (1900) suggest that the European shore crab Carcinus maenas was introduced to Australia by ballast water

1908 Ostenfeld (1908) suggests that the Asian diatom Odontella (Biddulphia) sinensis may have been introduced to the North Sea in 1903 by ballast water

1933 Peters describes the introduction of the mitten crab Eriochier sinensis, sometime before 1912, from Korea or China to Germany

1968-1978 Extensive literature discussions on the role of ballast water in exchanging marine organisms through the Panama Canal (reviewed by Carlton, 1985, p. 319)

1973 Medcof and Scribner (1975) provide first detailed report of living organisms in ballast water, based upon samples of a ship arriving from Japan to New South Wales, Australia

1973 **"Resolution 18"**: "Research into the Effect of Discharge of Ballast Water Containing Bacteria of Epidemic Diseases" passed by the International Conference on Marine Pollution (including the International Convention for the Prevention of Pollution from Ships)

1976-1977 CSIRO (Australia) biologists sample bulk cargo carriers coming from Japan to Western Australia (see Williams et al., 1988)

1980 Environment Canada commissions ballast water study at Montreal, to sample 55 merchant vessels in the summer and fall; published as Bio-Environmental Services (1981)

1980-1982 Ballast water investigations commence at the Woods Hole Oceanographic Institution, Woods Hole, based upon experimental studies using oceanographic research vessels, and upon bulk bulk cargo traffic arriving at US ports (J. T. Carlton and colleagues)

1985 Publication of review monograph by Carlton (1985)

1986 Ballast water investigations commence in Coos Bay, Oregon, at the University of Oregon Institute of Marine Biology, based upon bulk cargo vessel traffic from Japan to Pacific Northwest (J. T. Carlton and colleagues) [Sea Grant funded, 1987-1988, 1989-1991]

1987 Publication of monograph on introductions of non-indigenous marine organisms by ballast water and other vectors into Australia, by Hutchings, van der Velde, and Keable (1987)

1987 CSIRO (Australia) scientists re-commence sampling of bulk cargo vessels inbound from Japan (Dr. G. Hallegraeff, of CSIRO Division of Fisheries, Hobart)

1987 Revision of Water Quality Agreement between Canada and the United States assigns responsibility (under Annex 6) for studying the ballast water issue and possible solutions to the US and Canadian Coast Guards

1988 Publication of paper on ballast water as a mechanism of introduction of exotic species in Australia by Williams et al. (1988).

1988 (May) Great Lakes Fishery Commission meeting in Toledo, Ohio, considers issue and questions of ballast water release in the Great Lakes

1988 (June) **"Recommendation No. 1"** of the International Council for the Exploration of the Sea's "Working Group on Introductions and Transfers of Marine Organisms" formulated and sent to ICES for consideration at Plenary Session in October 1988

1988 (Sept) Canada and U.S. raise the issue of Great Lakes introductions via ballast water at the London meeting of the Marine Environment Protection Committee of the UN's International Maritime Organization (IMO).

1989 March Congressmen Davis and Hertel introduce a House of Representatives bill "to direct the Secretary of Transportation to report on methods available to control the influx of exotic species into the Great Lakes"

1989 [continued]

May Canadian Coast Guard Voluntary Guidelines on ballast water exchange go into effect in Great Lakes (compliance begins in April)

Aug Mandatory guidelines on ballast water exchange go into effect in Australia; suspended soon thereafter

Aug **"Resolution 89-10"** passed by Pacific Fisheries Legislative Task Force, "Introduced Organisms from Ballast Water", urging US Coast Guard to prohibit non-exchanged ballast water release

Sept American Fisheries Society's Introduced Fishes Section passes Resolution at Annual Meeting (Alaska) on control of ballast water discharges

Oct New York Congressman Nowak introduces House of Representatives Bill 3403 "to require that vessels exchange their ballast water entering the Great Lakes" [legislation pending, February 1990]

Oct Ballast Water Monitoring Workshop, sponsored by the Great Lakes Fishery Commission, at St. Catherines, Ontario

Dec House of Representatives bill 2459 passes, calling for US Coast Guard to produce report on ballast water management strategies by June 1990 (Bill authored by Michigan Congressmen Robert Davis and Dennis Hertel)

1990

Jan Senator F.F.Zharoff submits "Senate Joint Resolution No.59" to State of Alaska legislature "Relating to the discharge of ballast water by vessels entering the waters of Alaska" (and the organisms therein)

Feb Voluntary guidelines on ballast water exchange go into effect in Australia (February 1)

Feb Ballast Water Monitoring Workshop II, sponsored by the Great Lakes Fishery Commisson, at Toronto, Ontario (8-9 February)

Feb Exotic Species and the Shipping Industry Workshop, sponsored by the International Joint Commission and the Great Lakes Fishery Commission, at Toronto, Ontario (28 Feb, 1-2 March)