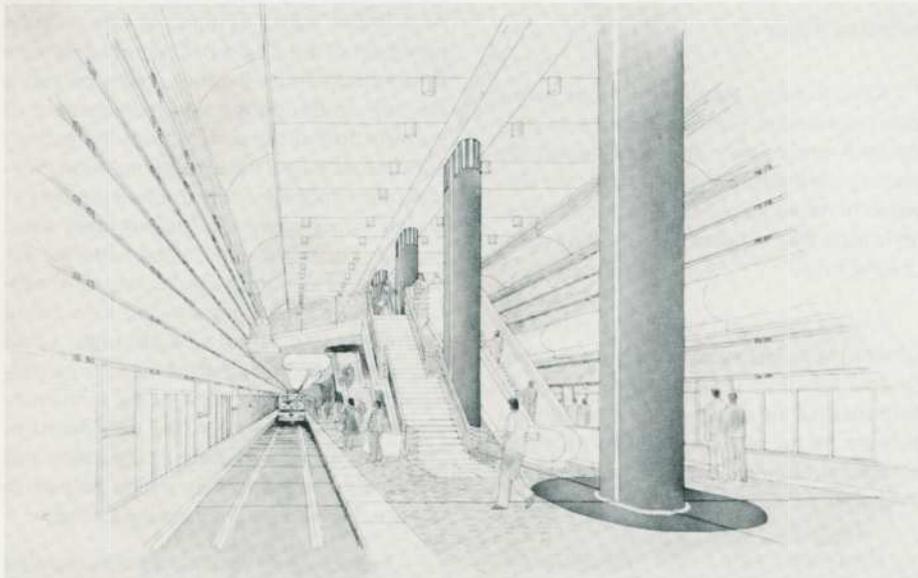


TUDOR QUARTERLY

SPRING 1984

LA METRO RAIL

Wilshire/Normandie Station



Tudor Engineering Company, in a joint venture with William L. Pereira Associates, is performing the final design of approximately three miles of subway tunnel and two stations for the Southern California Rapid Transit District (SCRTD). The estimated construction cost for this project is \$133 million.

The project is divided into three major design segments: Tunnel, Wilshire/Western Station and Wilshire/Normandie Station. The Tunnel is nearing the 60 percent completion submittal. Preliminary architectural work for both stations is complete and the designs were presented to the SCRTD Board in March. The designs were well received by the Board.

The Wilshire/Western Station is located near the Pellisier Building, which is on the National Register of Historic Buildings, and the McKinley Building, another historically significant building. The Wilshire/Normandie Station is near several large office buildings and a major hotel. Both stations have interior designs that match the style and character of the areas they will serve.

The stations are designed to be completely automated. An extensive system of closed circuit television and other communication devices will be used for passenger assistance and security.

Under the direction of Keith Bull, Project Manager, the design is proceeding as planned. The final design submittal is scheduled for May 1985 with project completion due October 1985. A firm date for the start of construction has not been determined.

The San Francisco Office is performing the civil/structural design of the Wilshire/Western Station and the Tunnel. Bob Ganse, Deputy Project Manager, is leading the civil design. Don Croft is overseeing the structural effort, and Don Moore is in charge of the utilities design.

1984 STOCKHOLDERS MEETING

The 1984 Tudor Engineering Company stockholders' meeting was held on May 5 at the Claremont Hotel in Oakland with thirty-seven stockholders in attendance. During the course of the meeting, reports covering financial matters and business operations were presented. The stockholders voted on the slate for Board of Directors and re-elected the previous members to continue in their respective roles. The Board includes Louis W. Riggs, Robert N. Janopaul, Paul E. Potter, Keith D. Bull and Douglas J. Mansfield.

The reports to the stockholders indicated that 1983 was a good year for Tudor Engineering Company. The Company enjoyed a growth in revenue and earned a profit. The Company was also able to make a significant contribution to both the Employees' Retirement Plan and the Employee Stock Plan. The outlook for 1984 is a challenging one for Tudor, with new projects and new opportunities for growth.

The Board of Directors announced the designation of Robert N. Janopaul as Chief Executive Officer, effective May 5, 1984. Louis W. Riggs and Robert N. Janopaul will continue in the primary roles assumed in January 1983 as Chairman of the Board and President, respectively.



A break in the action at the 1984 Stockholders meeting

LAKE SISKIYOU PROJECT

Construction finally is underway for the Lake Siskiyou Power Project following eight years' effort in project planning and development. Box Canyon Associates, a private partnership consisting of Axel Johnson Corporation and Mercer Companies, Inc., has reached an agreement with the Siskiyou Power Authority for the partnership to finance, construct, operate and maintain the 5-megawatt power plant for 25 years. Tudor Engineering Company has provided engineering services to the Siskiyou Power Authority since the inception of the project and has now been retained by Box Canyon Associates to continue providing engineering services during the final design and construction phase. The current schedule calls for an on-line date of February 15, 1985.

The Lake Siskiyou Power Project is being built at the foot of the existing Box Canyon Dam on the Sacramento River in Northern California. The Project involves the construction and installation of a power plant, consisting of twin turbine-generator units with a total rated capacity of 5 MW, together with the extension of the existing low-level outlet and spillway, the installation of a switchyard, a short transmission line and appurtenant facilities. Specific major construction activities include the installation of a multiple-port intake structure in the reservoir, rock scaling along the face of downstream abutments, spillway modification to serve as powerhouse roof, a water diversion scheme during construction, and difficult construction access.

Western States Construction Company of Loveland, Colorado, was awarded a contract for general construction and Axel Johnson Engineering Corporation will supply and install hydroelectric generating equipment.

Power generated from the Project will be purchased by Pacific Power and Light Company. All regulatory approvals have been secured, including Federal Energy Regulatory Commission Exemption, U.S. Army Corps of Engineers Section 404 Permit, California Division of Safety of Dams Approval, Water Rights Permit, and California Department of Fish and Game Agreement.

Many Tudor engineers have participated in the project work since its inception in 1976. Among them are David Willer, Roberto Iniguez, Gordon Little and Richard Everett. Oral Conyers is Manager of Field Services and Brian McDermott is Resident Engineer. The Project Engineer is Hans Albring and Project Manager is S.T. Su. Walter Anton is the Principal-in-Charge.

INTERURBAN BRIDGE



Interurban Bridge

King County, Washington, has given Tudor Engineering Company notice to proceed with preliminary and final design for replacing the Interurban Bridge over the Duwamish River, south of Seattle. The new four-lane bridge will supplant the existing 290-foot long truss.

Project Manager Don Hoel and Project Engineer Harry Jasper have begun the type, size and location (TS&L) study. A major determinant of the design is the requirement that there be no piers in the river channel. One solution being considered is using inclined piers or struts for the substructure.

The project team is also evaluating several concrete superstructure alternatives, all of which would have 3 spans (50, 155, and 55 feet long, respectively, from North to South). These alternatives include:

- Post tensioned box girder
- Composite precast-prestressed I girder with precast-prestressed, inclined struts.
- Cast-in-place, with precast-prestressed concrete I girder drop-in post-tensioned center span.

Another issue to be resolved in this phase is the provision of construction detours. The existing bridge is the major northern access for Metro's South Bus Operations Base. Darrel Chambers has been studying potential routings.

Tudor staff will present their findings and recommendations to the County Engineering Department and the Design Commission. They will also participate in neighborhood public meetings on the project. Once an alternative is approved, Tudor will proceed with final design.

Louis Riggs HONORED

At the May 3, 1984 Annual Membership Meeting of the University of California, Berkeley Engineering Alumni Society (EAS), Louis Riggs received the Distinguished Engineering Alumnus Award, the highest honor bestowed by EAS. This award is granted to outstanding Berkeley engineering graduates for "distinguished achievement in technical and professional matters, distinguished service to the engineering profession and the community at large, and other acts of distinction which tend to enhance the reputation of the University and hence its alumni." In presenting the award to Louis, Society President Wendell Freeman cited Louis' important contribution to the development of the Bay Area Rapid Transit System. As one of three members of the Board of Control of Parsons Brinckerhoff-Tudor-Bechtel, Louis played a key role in the design and management of construction of the system from the earliest conceptual stages through completion. Several other important construction projects in which Louis played a leading role were named. Louis was also recognized for his active participation in the Society of American Military Engineers and the Consulting Engineers Association of California. Louis has served as President of both organizations. His efforts on behalf of the University include several years on the EAS Board of Directors, including a term as President, and his fund raising activities which helped to finance the Bechtel Engineering Center.

In accepting the award, Louis thanked his dedicated colleagues at Tudor and his wife Patricia, whom he credited with sharing his success.

T.Y. Lin, a pioneer in prestressed concrete design, and Charles Dalziel, an electrical safety authority who developed the ground fault interrupter, were also honored as Distinguished Engineering Alumni.

Tudor's Stan Froid and Mike Goldberg were recognized for their contributions to EAS. Stan for serving on the Board of Directors for the past 10 years, including a term as President, and Mike for serving as Director and Secretary of the Society for the past two terms.



Wendell Freeman, Alumni President, presenting award to Louis Riggs

MIDDLE BAR/RAILROAD FLAT

On January 18, 1983, East Bay Municipal Utility District (EBMUD) signed an agreement with Tudor Engineering Company for engineering services for the proposed Middle Bar and Railroad Flat Hydroelectric Projects. Both projects involve building new dams with power plants on the Mokelumne River in the Sierra foothills of California.

Tudor's involvement in this project is divided into six phases: (1) review of originally proposed projects and identification of alternatives; (2) data compilation; (3) screening studies to select the three best alternatives for each project; (4) feasibility studies to determine the preferred alternative; (5) preparation of the FERC License Application; and (6) assisting EBMUD in document review. Work on the project started in January, 1983, and will continue until the FERC Application submittal which is scheduled for May 1, 1985.

The Middle Bar Project is located near the Middle Bar area of the main stem of the Mokelumne River at the upstream end of Pardee Reservoir, an existing EBMUD facility. A hydroelectric power plant up to 80 MW in size would be installed at the base of a newly constructed dam, with proposed dam heights up to 420 feet.

The Railroad Flat Project is located 17 miles upstream from the Middle Bar Project on the South Fork Mokelumne River near the historic mining town of Railroad Flat. The three preferred alternatives for Railroad Flat Dam range in height from 334 feet to 449 feet and would store up to 166,000 acre-feet of water. The power plant, up to 80 MW in size, would be located along the Middle Bar Reservoir and connected to the Railroad Flat Reservoir by a seven-mile tunnel. Water from the Middle Fork Mokelumne River would be diverted to the Railroad Flat Reservoir by a small diversion dam and a 3,200-foot long tunnel.

It has been a number of years since dams of these sizes have been constructed in California. Tudor is exploring the feasibility of building Roller Compacted Concrete (RCC) dams at both sites. RCC is a recent development in concrete construction methods and is particularly applicable to massive hydraulic structures. Concrete of no-slump consistency is transported, placed, and compacted using the same construction equipment used for earth and rockfill dams. Tudor is also considering more traditional dam types, such as concrete arch and concrete gravity dams.

The operating characteristics of the reservoirs present many interesting possibilities. The Railroad Flat Reservoir provides additional benefits to the Middle Bar Reservoir as a dependable and regulated supply of water. Tudor is investigating the feasibility of operating the Railroad Flat and Middle Bar Reservoirs as a pumped storage project. There is a 1,500-foot drop in elevation between Railroad Flat and Middle Bar Reservoirs.

Ron Wright, on loan from the Seattle office, coordinated the planning activities through the project update and data gathering phases. Lemma Wendim-Agegnehu and Dave Church covered the hydrology and water rights aspects of the projects. During the summer of 1983, Joe Bergquist, on loan from the Denver office, and Dorene Thornton interviewed the property owners affected by the projects. Cliff Bjorgum, also on loan from Denver, Steve Van Til, Karen Chew, and Craig Giordano formed the cost estimating team and calculated estimates for the many alternatives developed by Hans Pokorny. Don Scapuzzi coordinated the surveying and Bob Toothman performed economic analyses. Gordon Marsh is Project Manager and Walter Anton is Principal-in-Charge.



CORPS OF ENGINEERS HYDROPOWER STUDIES

Tudor's Denver office has recently completed a contract with the Corps of Engineers, Louisville District, Kentucky. The open-ended contract involved reconnaissance level studies for six Federal dams in Ohio, Indiana and Kentucky. Three projects — Buckhorn Dam, Clarence J. Brown Dam, and Caesar Creek Dam — are major multi-purpose reservoirs. Several project alternatives were examined for each site. These include utilizing the existing outlet works conduit as a tailrace tunnel for an upstream powerhouse, or as a pressurized penstock for a downstream powerhouse. Another alternative evaluated a new tunnel through an existing abutment of the dam. Power plant capacities varied from 500 kW to 10,000 kW producing average annual energies from 500,000 kWh to 17,000,000 kWh. Buckhorn Dam and Caesar Creek Dam projects appear feasible while the Clarence J. Brown Dam project is only marginally attractive.

Three other projects involved adding hydropower plants at existing lock and dam installations on the Kentucky and Ohio Rivers. These projects varied from a 2 MW installation at Kentucky River Lock and Dam 4 (where the hydraulic head was only 8 feet) to a 187 MW installation at Cannelton Locks and Dam on the Ohio River where the hydraulic head was about 25 feet. The third project, Kentucky River Lock and Dam 2, had an installed capacity of 30 MW at a head of 29 feet. Average annual energy production varied from 12,400,000 kWh at Lock and Dam 4 to 530,000,000 kWh at Cannelton Locks and Dam.

Originally, studies at the Cannelton Locks and Dam Project were to evaluate power generation in addition to the S.C. Johnson Hydropower Project proposed by the City of Vanceburg, Tennessee. During the study period, the FERC cancelled Vanceburg's hydropower license because of lack of sufficient progress, pending appeal. This resulted in expanding the study scope to evaluate the site as a single Federal project disregarding the Vanceburg Project.

The studies concluded that the Lock and Dam 2 and Cannelton Locks and Dam projects appear very attractive while a project at Lock and Dam 4 is marginal.

Tudor's efforts on these reconnaissance level studies received many compliments from the Corps of Engineers Louisville District staff members.

DENVER PROJECTS UPDATE

The Denver office has completed the first phase of the Low-Head Hydropower Study for the Sabine River in Texas. The initial phase consisted of a basin-wide site identification effort. As a result, four sites were selected for reconnaissance-level evaluation. All are in the middle reaches of the Sabine River, in the general area of Longview, Texas. The reconnaissance study of the four sites is to be completed in August 1984. Nelson Jacobs and Jerry Cross made a field trip to the four sites during March.

The license application for the Abiquiu Dam Power Project was submitted to FERC during April 1984. A survey of bald eagles in the Abiquiu area was requested by the Fish and Wildlife Service. The study was prepared by Carl Smith, former Tudor Environmental Specialist, his first job as a private environmental consultant. The FERC letter of acceptance for the El Vado Dam Power Project license application was also received during April. Nelson Jacobs and Sal Todaro visited the El Vado site in April, accompanied by Art Martin of FERC's Fort Worth office, and Bureau of Reclamation personnel, for FERC's pre-licensing inspection. Tudor's client for both projects is the Incorporated County of Los Alamos, New Mexico. Tom Rawlings recently completed a preliminary evaluation of a third project, the potential for adding a power plant at Heron Dam, New Mexico, for the same client.

On March 15, Dave Willer and John Williams, with Beling Consultants and City personnel of Peru, Illinois, attended a FERC site visit at Starved Rock Lock and Dam on the Illinois River. Representatives from the Corps of Engineers, Rock Island District, were also present. Tudor assisted Beling Consultants, Moline, Illinois, with the feasibility study and FERC license application. This project, which will have an installed capacity of 7.6 megawatts and produce nearly 50,000 megawatt-hours per year, should be licensed in late 1984.

CAPITOLA HYDROELECTRIC PROJECT

Construction activities on Capitola are increasing as Axel Johnson, equipment supplier and installation contractor, moves on site with their twin generating units. Owned by the French Broad Electric Membership Corporation of Marshall, North Carolina, the project is a fine example of Tudor's commitment to making extreme low head hydropower generation a practical and feasible reality. With only 14 feet of head, 3 of which are created by constructing hydraulically

KIRKWOOD POWERHOUSE ADDITION

Following a highly competitive selection process involving major hydroelectric engineering firms from around the nation, Tudor Engineering Company was selected by the City and County of San Francisco to design a third hydroelectric generating unit at the City's Robert C. Kirkwood Powerhouse. Future services include limited engineering during the construction phase of these additional facilities.

The City's Kirkwood Powerhouse is located on the Tuolumne River in the central Sierra Nevada, twelve miles downstream of Hetch Hetchy Reservoir. Although the size and type of generating equipment is yet to be determined, the additional unit is tentatively sized as a 33.75 MW impulse turbine, identical to the two existing units. The additional average annual energy production is estimated to be 49.5 million kWh. The third unit would use a portion of the water presently discharged through the Kirkwood Powerhouse bypass valve with an operating head of 1245 feet. This unit will be installed within an expansion of the existing reinforced concrete structure or within an adjacent but separate structure. The turbine and generator procurement contract is expected to be bid in late 1984, and the general construction contract is planned for an early 1985 bidding period. The estimated construction cost is approximately \$20 million. Several MBE/WBE subconsultants will assist Tudor with design activities along with other subcontractors including Kennedy/Jenks Engineers.

The City's Project Manager will be Leo T. Bauer of the Utilities Engineering Bureau, San Francisco Public Utilities Commission. Hugh Brown will be Tudor's Project Manager; Jack Biederman is Deputy Project Manager; Kurt Scholz is Project Engineer; and Walter Anton is Principal-in-Charge.

controlled flashboard gates atop the 500 foot long Capitola Dam, a surprising 18 million kWh of electricity can be generated annually. Almost the entire flow of the French Broad River will pass through the Capitola powerhouse containing the tubular turbines.

Tom O'Neill in Atlanta was Project Manager during the final design phase; Hugh Brown's hydro design group completed Construction Documents in 1983. With

WORD PROCESSING PHASE II

The Word Processing Center has come a long way since the days of two IBM magnetic card typewriters in Dave Willer's office. With the current multi-terminal CRT system, information is immediately available to the operator and editing is done on the screen rather than from hard copy. The laser printer produces up to 6,000 letter-perfect words per minute, and software allows Telecommunications, Records Processing, Advanced Stored Keystroke Programming, Stat Math, Spelling Checks, and more. What this means is increased productivity and improved performance. Word processing is one successful venture toward office automation at Tudor.

Yet this is only the beginning. The next phase goes beyond word processing to integration between automated office systems. Phase II will begin soon with installation of an NBI 2000 Personal Computer (PC) which will interface with existing word processing equipment to give benefits of many additional software options. The 2000 PC will be equipped with dBase II and Multi-Plan software. dBase II is a relational database management system which collects, organizes, retrieves and manipulates information. It also contains a powerful programming language which enables the creation of customized applications. Multiplan is a rapid electronic spreadsheet which handles planning, modeling, and forecasting questions involving "what if" scenarios.

When added to current equipment, the PC will create exciting new ways for office automation to serve Tudor. In fact, the possibilities are so open, the input of project managers, engineers and clerical staff is needed. Please think about how word processing can support your jobs now and in the future, then discuss your ideas with us. To make the task easier, refer to the recently released Word Processing Guide. It will show you how different word and data processing equipment interface, and will explain the scope of word processing services available at Tudor.

Tom's move to Seattle, Andy Yeung handled the design and coordination activities during construction with the assistance of Tom MacLennan and Candy King of San Francisco, and Ulrich Lemcke at PB/T, Atlanta. Financed by a loan from the Rural Electrification Administration, the Capitola Project is well on its way to a power-on-line date at the end of the year, with total Project costs well within the REA loan commitment.

LABYRINTH WEIR STUDIES

After successful completion and operation of the labyrinth weir for the Garland Canal Power Project in Wyoming last year, the Denver office has found at least two other possible applications for this unusual hydraulic structure.

In plan view, a labyrinth weir looks like a series of "V"'s placed side-by-side. The weir's principal advantage is that it can pass more than four times the amount of flow as a conventional weir while maintaining the same water level upstream. The result is that the crest of the labyrinth weir can be placed at a higher elevation than that of a straight weir, and will provide more head for hydropower generation. This can be a great help for low-head projects, which by their very nature are sensitive to small changes in net power head.

An example of a project with these characteristics is the Hellsgate Hydroelectric Project for which the Denver office is currently preparing a feasibility report. The project is located on the Colorado River about five miles below Glenwood Springs, Colorado. Highway and railroad structures limit the reservoir pool and the net head on the power plant making the site a good candidate for a labyrinth weir. After a prefeasibility evaluation, the labyrinth weir was chosen over the alternative, a fully gated dam, because of lower cost and less stringent foundation requirements. However, anticipated severe sedimentation problems prompted the decision to model the structure during the feasibility study.

As a result, in April, Sal Todaro and Jeff Stevens participated with Al Stevens, a Tudor consultant, in the hydraulic and sedimentation tests of a model of the Hellsgate weir at the Colorado State University laboratories. The results indicated that the structure will pass large cobbles over its crest and generally will function satisfactorily under a heavy sediment load without reducing discharge capabilities. This eliminates the need to provide sluice gates to remove sediment accumulating behind the weir and significantly reduces capital expenditures as well as operation and maintenance costs.

The Denver office is also considering the labyrinth weir as an alternative diversion structure for low dams for the Sabine River Authority's Low-Head Hydropower Study. Jerry Cross is evaluating labyrinth weirs for the study, as well as fully gated structures and rubber inflatable dams.



Garland Folded Weir



GARLAND CANAL

Beginning with a 1978 study on Potential Hydropower by Tudor's Riverton office, the Garland Project has come through numerous obstacles and is now a fully operational plant. Irrigation water flows in the Garland Canal of the Shoshone Irrigation District now pass through the Garland powerhouse, situated near the town of Powell in northwestern Wyoming, and produce nearly 10 million kWh of electricity annually. Final design was accomplished in 1982 through joint efforts of the Denver and San Francisco offices, led by engineers Sal Todaro and Andy Yeung. The District mobilized its own forces and constructed the project; the power came on-line in September 1983.

John Williams, Project Manager, participated in the inauguration party at the Project site at the end of May.



Garland Power Plant

FRIANT PROJECT



Friant-Kern

This project officially entered the Construction Phase on October 18, 1983, when the Friant Power Authority issued Notices to Proceed with the fabrication of turbines and generators and general civil construction to Hitachi America, Ltd. and R.G. Fisher Constructors, respectively.

During the past eight months significant progress has been made, both in the fabrication of equipment and in the general construction activities. Hitachi has completed the hydraulic model tests and has delivered to the site various components for embedment at the Friant-Kern, Madera and River Outlet powerhouses. R.G. Fisher completed the first critical construction window period on schedule. All planned activities and some additional concrete construction were completed from December 1, 1983, through January 31, 1984. The Friant-Kern irrigation releases were purposely interrupted by the Bureau of Reclamation to allow scheduled construction of the Friant-Kern powerhouse to proceed. Other activities such as excavation and concrete work at all three power plants continue as planned.

Tudor Engineering Company, the Owner's Engineer on the project, is providing design services during construction and field engineering services to ensure that the project is constructed according to the plans and specifications and that changes which are required in the field meet Tudor's approval. Tudor's involvement includes overseeing and inspecting the fabrication of major mechanical and electrical equipment components which are being manufactured in Japan. In order to provide these services Tudor has assigned to the project a selected group of professionals who perform the everyday activities. It is impossible to name everybody associated with the project; however, the individuals who have certain key responsibilities are Dave Willer, Principal-in-Charge; Roberto Iniguez, Project Manager; James Gormly, Deputy Project Manager; Oral Conyers, Manager, Field Services; Craig Vernon, Resident Manager; William Gray, Assistant Resident Engineer; Kurt Scholz, Project Engineer; Greg Reichert and Candy King, Civil Engineers; Gary Durham and Geoff McCavitt, Mechanical Engineers; and William Untiedt, Electrical Engineer.

NEW LAHONTAN POWER

Tudor Engineering Company has received notice to proceed with the development phase of the New Lahontan Power Project. The client is the Truckee-Carson Irrigation District. Previous work on the project has included a FERC license and feasibility study. New work orders signed in April 1984 cover final design, project development (previous sales negotiations, USBR coordination, financial advice, etc.) and engineering services during construction. Construction is slated to begin in November 1984 and will take about one year to complete.

The project includes a 5 MW powerhouse at the existing outlet works of Lahontan Dam, which was constructed between 1910 and 1915 by the USBR. An existing and still functioning 2 MW power plant at the site was completed in 1911. This new installation will generate about 19 million kWh per year using the normal irrigation releases which occur from mid-April to mid-November.

The project FERC license and feasibility work was completed under the direction of Project Manager, Gordon Little, with help from Bob Toothman, Steve Van Til, and various design group individuals. The final design effort will include the participation of Walter Anton, Principal-in-Charge; Gordon Little, Project Manager; and Kurt Scholz, Project Engineer.

PALO VERDE

Palo Verde Dam located on the Colorado River near Blythe, California, is the future site of one of the lowest head hydro developments in the United States.

In the summer of 1981, Tudor was retained to conduct feasibility studies for a powerhouse at this site. The resulting project consists of a powerhouse containing two 3 MW Kaplan turbines with a rated head of 9.5 feet. The rated discharge for each unit is 4,250 cfs. Because of very low head at the site, the turbines will be oversized, resulting in a powerhouse weighing 20,000 tons overall. The propellers, 18 feet in diameter, will rotate at 60 rpm; the generator shaft speed will be increased to 450 rpm using a speed increasing gearbox. Each generator will be housed in a bulb under water. Energy output will average about 40 million kWh per year, about the same as the Jones Fork Project.

An interesting aspect of Palo Verde project is that large flows in the Colorado will raise the tailwater to a level where energy generation becomes negligible, forc-

BUCKEYE

The Buckeye Power Project, which went on-line in June of 1983, represented several firsts for Tudor Engineering Company. It was Tudor's first micro-hydro project and first project for a private developer, Western Energy Associates of Orinda, California. This project presented the challenge of providing personalized attention on a minimum engineering budget without sacrificing quality or plant integrity.

The Buckeye plant was constructed at the terminus of an existing water discharge conduit. A new bifurcation was installed upstream of an energy dissipating valve, and the power plant was constructed in parallel with the existing system. The plant was designed around an Ossberger cross-flow turbine rated at 375 kW. The turbine and associated equipment was furnished under a procurement contract with F.W.E. Staphenhorst, Inc.

Tudor's engineering responsibilities included turbine selection, bifurcation and penstock design, and powerhouse design. The project team consisted of Gary Durham, Project and mechanical engineer; Paul Kneitz, civil engineer; and Tom MacLennan, electrical engineer, with Walter Anton as the Principal-in-Charge.

Buckeye Power Plant



ing the plant to shut down. As a result of the tailwater characteristics, this plant would have above average energy productions in years with below average discharge. The opposite is true for most hydroelectric plants.

A license application for the project was submitted to FERC in June 1983 and accepted in January 1984. Issuance of the FERC License is anticipated near the end of 1984 and design work on the project could start in early 1985. Construction cost of the project is \$14.5 million in 1982 dollars. Dick Everett is Project Manager and Bob Toothman is Project Engineer.

DAM SAFETY

Since September 1983 Tudor's Denver office has been a subcontractor to F.M. Fox and Associates of Lakewood, Colorado, in safety of dams evaluation work for the U.S. Bureau of Reclamation. With an increasing work load and severe manpower ceilings the Bureau is retaining outside contractors for more safety of dams work, particularly for Federal dams belonging to other agencies. Fox's contract with the Bureau is one under which work is assigned periodically on a work order basis. Fox is handling all the geotechnical and geological work while Tudor is assisting in evaluation of hydrology and hydraulic structures, including dam-break analysis. Nelson Jacobs is Project Manager and Sal Todaro is Project Engineer, assisted by Jeff Stevens.

The initial work order under the contract involved evaluation of two National Park Service dams in Marin County, California — Kehoe Dam and Home Ranch Dam. Sal and Fox's Project Manager, Steve Vick, visited both dams in October 1983. The studies showed inadequate spillway capacities for both dams, and both dams showed potential problems of liquefaction, a major concern in light of their proximity to the San Andreas fault. The required reports were completed to the Bureau's satisfaction in January 1984.

A second work order included evaluation of three Bureau of Indian Affairs' dams in South Dakota. The three dams are Ponca Dam in south-central, Crow Creek in central, and Standing Rock in north central parts of the state. Sal Todaro, Jeff Stevens, and Fox personnel visited the three dams in April 1984. Dodging spring snowstorms, the field trip was completed in four days. Ponca and Crow Creek both have structurally damaged spillways; in fact the team found shelter from the storm under the spillway at Crow Creek where the Pierre shale foundation has been eroded away. The spillways for all three were determined to have inadequate capacity; Standing Rock is of particular concern because of the proximity of the town of Bullhead, South Dakota, three miles downstream.

Sal and Jeff returned from the trip well versed in Indian folklore. For instance, Bullhead is named for the Indian police lieutenant who killed Sitting Bull. They also learned that the rock formation near Standing Rock Dam was named for an Indian woman and baby who, according to legend, were turned to a rock pillar. Supposedly her husband was warned that if he left his wife and child they would turn into rock; obviously, he didn't heed the warning! Work is proceeding on the reports for these three dams, with expectations of more Bureau assignments.

UP CLOSE AND PERSONAL



Mary Bickerdike

Mary Bickerdike was born and raised in Pleasant Hill, California. In 1976 she moved to Seattle, Washington, to obtain a degree in Fisheries at the University of Washington. She worked for a year to become a full-fledged resident of Washington, then never returned to school. Mary recalls her "first apartment" experience in Seattle: "It was really nice . . . the fact that the landlord owned two Doberman pinschers and always answered the door with them never gave me any clues to the contrary, until one day as I was walking home at 4:00 PM I was grabbed right outside my apartment door. After six months and another incident, I moved to the suburbs, where the problem is to try to keep a tape deck in your car! Kirkland has been my home for seven years, and I enjoy the community very much."

Mary's work experience began at Aetna Life Insurance. During a leave of absence from Aetna she traveled to the Pribiloff Islands, north of the Aleutian chain. She recalls a wonderful summer working as a Government Observer for the fur seal harvest: "We're talking about 500 natives and 1.7 million seals. What an education! The natives consumed the entire July supply of beer on July 4th and we had to suffer the rest of the month until the 'Aleut Provider' anchored in August."

After returning to Seattle, Mary joined Tudor and has worked as secretary/receptionist/word processor for four years. Mary and husband, Ron Lee, celebrated their first wedding anniversary February 12 with a return trip to their honeymoon spot in Hawaii. Ron owns an air freight business. . . "I'm the Vice President/Secretary, so let me advertise while I can! We do get some freebies from the airlines once in awhile so I travel with Ron as often as Tudor allows."

Mary's and Ron's fall activities include football. They are avid fans with season tickets for the Seahawks and the University of Washington Huskies. They have flown down to Los Angeles for a football weekend: just to watch the Huskies against UCLA on Saturday and the Seahawks versus the Raiders on Sunday. They were also able to enjoy a cruise to the Carribean Islands. Other favorite travel spots have been Florida, Hong Kong, Taipei and Tokyo (for Ron) and numerous trips to the San Francisco Bay Area (for Mary).

Dale Bowers

When Dale Bowers isn't moving mountains for the Denver office drafting department, she's climbing them. Last summer she hiked her second "fourteener"—Mt. Democrat. She has made one trip biking over Vail Pass (from Vail to the top of the pass and back), climbing to an elevation of 10,000 feet. This past September she visited the North Cascades National Park in Washington for a week of hiking and photo-taking. "I learned then that the height of a mountain isn't everything," Dale quips, "the North Cascades are some of the most rugged mountains I've ever seen!"

Born in Denver, Colorado, Dale moved at the tender age of two to be raised and to seek her fortune in the Syracuse area of New York State. She attended Pratt Institute for Interior Design in Brooklyn for two years, then returned to Denver in 1972. Her drafting career was launched in Lewiston, Idaho, a year later when she was hired by James W. Grow and Associates. She progressed from drafting to calculations, layout of small subdivisions, legal descriptions, writing and research, and minor field work. When Tudor Engineering Company acquired James Grow & Associates in 1976, Dale remained.

In 1981 Dale traveled to New Delhi, India, on a mission for her church. She spent three months throughout India, taking slides to show the various areas of church work such as relief and development, communication, and Christian education. She returned just as Tudor was closing the Lewiston office and accepted a transfer to Denver where she has spent the last two years learning about low-head hydroelectric installations.

Outside the office Dale is active with a Christian singles group, singing, teaching and studying as well as outdoor activities such as cross-country skiing. When time permits, Dale enjoys stained glass, various crafts, biking and playing the violin.

Dale's spirit of adventure also calls her skyward. She looks forward to training for non-power flight, after being on the verge of a power rating. Just in case she lands in unknown territory, she will take classes in Advanced First Aid and Emergency Medical Training including a class on Wilderness Survival. . . a good test of endurance and self sufficiency!

"I enjoyed living in the Pacific Northwest," reflects Dale, "but I'm content making vacation trips from sunny Colorado. I'd love to do a bicycle tour through the San Juans and Vancouver Island!" There are, indeed, several Tudorites who would gladly join her on such an adventure.



SCHOLARSHIP AWARD

Each year Tudor Engineering Company joins with other firms and organizations in sponsoring Scholarship Awards for outstanding high school seniors seeking higher education to become "engineers of tomorrow." This year at the Engineers Week Banquet, held at the new Oakland Convention Center, the Tudor award went to Stewart Kune of Carlmont High School in Belmont.

Stewart's scholarship award was presented by Robert N. Janopaul, President of Tudor Engineering Company. In a recent letter Stewart indicated that he will enroll in the School of Engineering at UCLA, and will be studying Electrical engineering with specific specialization in Communications and Telecommunications. In addition to Stewart's academic achievements, he is currently Senior Class President, is a member of Carlmont's varsity cross-country and track teams, and also finds time for his church youth group activities.

Stewart Kune is a most deserving recipient of the Tudor Scholarship Award and has the dedication to pursue an engineering degree and ultimately to contribute to the engineering profession.

Stewart Kune and Robert Janopaul



PING PONG TOURNAMENTS

This year's San Francisco ping pong tournaments began with singles playing a double elimination format. Twenty-eight contenders began play the first of February with winners progressing up one ladder and losers meeting for a second elimination round. Joe Lawrence and Mark Nothaft met in the championship game at the end of March with Nothaft winning the final two matches, three of five games.

Top tournament players included Wu-Chieh Chen, Paul Potter, Rainer Rungaldier, Gate Gelana and most improved player, Dave Silveira, and runner-up, Jon Kaneshiro.

Following the singles tournament, the top eight players were invited to play in single elimination doubles matches — three games of five. The team of Rainer Rungaldier and Gate Gelana defeated Wu-Chieh Chen and Dave Silveira to win the doubles tournament.

Plans are afoot to continue the tournaments every few months. Players will have the opportunity to challenge other players at higher levels and to increase their playing skills. A pizza party was held at Pizzeria Uno on Lombard Street on March 30 with 13 players and guests, Jim Spofford and Tim Burgess of Boise, in attendance.

NEW FACES . . .

Tudor welcomes new employees:

. . . for san francisco



Bob Cermak
Structural Engineer



Margaret Nolan
Accounting



Pat Vennari
Structural Engineer

. . . for seattle



Eusebio (Jun) Quiray
Structural Engineer

CONGRATULATIONS

Cliff Bjorgum has taken leave of absence to complete his Masters Degree program at Colorado State University.

Dan and Isma Boyle, proud parents of Adam, born in San Francisco, April 26, 1984.

Gary Durham and Geoff McCavitt received their Mechanical Engineer registrations from the State of California.

Grant Larsen and Paula Dierkop received Honor Awards at the Construction Specifications Institute 28th Annual Convention in Dallas, Texas, June 16. The awards deemed best entries by category are: Electrical Engineering, Lake Mendocino Power Project, Grant Larsen; and Procurement, Lake Siskiyou Power Project, Paula Dierkop.

THE TUDOR QUARTERLY is published by Tudor Engineering Company for the information and enjoyment of its employees, their families, and friends.

CONTRIBUTING AUTHORS: Walter Anton, Joseph D'Amico, Roslyn Ball, Gary Durham, Dick Everett, Michael Goldberg, Roberto Iniguez, Nelson Jacobs, Gordon Little, Mark Nothaft, Ed Peters, Jim Schroeder, S.T. Su, and Andy Yeung.

EDITING AND PRODUCTION STAFF: Barbara Cooper, Frank Chiappella, Paula Dierkop, Jim Flannery, Alfred Korbmacher, Grant Larsen and Charlotte Wheeler.

TUDOR QUARTERLY

SUMMER 1984

MIAMI MASS TRANSIT



The prestressed concrete box girders carrying the Miami Metrorail train and, below, the partially completed guideway structures for the Downtown People Mover.

METRORAIL

The South Line of the Miami Metrorail System opened for revenue service on May 20, 1984. Paul Potter, Principal in Charge of Tudor's design work on the system, which began in 1977, attended the Grand Opening ceremony. The North Line is scheduled to open later this year, completing construction of the 22-mile initial phase of the system.

Metrorail is a heavy rail system similar to BART and MARTA. However, whereas BART and MARTA include aerial, at-grade and subway sections, the Metrorail track is almost entirely aerial. Tudor's work included design of the prestressed concrete standard guideway superstructures for spans of 80 to 130 feet. Tudor also provided the systemwide structural geometry and alignment program.

DOWNTOWN PEOPLE MOVER

Meanwhile, construction work continues on the Miami Downtown People Mover. The People Mover consists of four miles of guideways, eight stations, and a maintenance facility. All of the guideways including switches, as well as the stations and maintenance tracks, are elevated. The People Mover and the Metrorail system will interface at Government Center Station. The People Mover will serve as a shuttle carrying Metrorail commuters and other visitors to within a few blocks of their downtown destinations. The driverless rubber-tired vehicles, manufactured by Westinghouse, will be almost identical to the interterminal shuttles at the Seattle and Atlanta airports.

Design of the guideway structures was performed by a Parsons Brinckerhoff/Tudor joint venture. Tudor designed the guideway superstructures while Parsons Brinckerhoff designed the alignment and substructures. The joint venture is currently performing construction services on the project. In performing these services, Project Engineer Mike Goldberg has spent considerable time in Miami, which has allowed him to observe all stages of the project. Paul Potter and Project Manager Rainer Rungaldier also have had several opportunities to enjoy the Florida sunshine while working on the project. The system is expected to open for non-revenue testing early next year, with revenue service commencing in 1986.

MUNI

HARRISON ST. FACILITY

In September Tudor Engineering Company signed a contract with the Utilities Engineering Bureau of the San Francisco Public Utilities Commission to provide services for the design of a storage, maintenance and repair facility for the new articulated bus fleet.

The project will involve reconstruction of a large (6-acre) steel-frame, metal-clad structure purchased from U.S. Steel by the San Francisco Municipal Railway in 1983. Industrial layout will be significant since this will be a new fleet requiring maintenance different from existing Muni facilities. The building will also contain bus storage and operations activities.

Tudor Engineering Company is the manager of the project estimated to cost \$12 million and will provide structural and civil design. Mike Harrington is the Principal-in-Charge with Lou Salaber acting as Project Manager. The design team will include the following subconsultants: Keller & Gannon for architectural and mechanical engineering with Jefferson Associates and Raymond Brooks Engineering in support; Ken Heilig, industrial layout and equipment selection with Fleet Maintenance as reviewers; Elcon Inc., electrical engineering; Marlene Lee, lighting; Geo/Resource, geotechnical and seismic analyses; John Warren Associates, surveying and civil engineering; Architectural Models, Inc., model; and J.A. Boyd Associates, project monitoring.

The schedule consists of a 3½-month conceptual design period beginning in October, followed by a 9-month final design stage. It is expected that the project will be advertised and construction will commence within 16 months of the initial design notice-to-proceed. Approximately 17 months have been set aside for construction since Muni is looking forward to transfer of the facility to their staff by Summer of 1987.

KIRKWOOD

The tight schedule for the Kirkwood project presents a major management challenge since the Tudor team includes six subcontractors whose work must be fully coordinated to ensure the overall integration needed in a power project of this magnitude. The subcontractors, each considered outstanding in their field, include three minority-owned firms and one woman-owned firm.

A visit to the site was conducted on July 11, 1984, to collect data and provide familiarity with existing conditions. Shown, from left to right:

Alvin Joe, Geo/Resource Consultants
William Skinner, Kennedy/Jenks Engineers
Fred Chen, Geo/Resource Consultants
Kurt Scholz, Tudor's Project Engineer
William Untiedt, Tudor's Electrical Engineer
Gary Durham, Tudor's Mechanical Engineer
Jack Biederman, Tudor's Deputy Project Manager
Leo Bauer, Project Manager, San Francisco Utility Engineering Bureau
Sylvia Kwan, Kwan-Henmi Associates
Don Todd, Don Todd Associates
Paul Giorsetto, Kennedy/Jenks Engineers.

Also on the site visit but missing from the picture were:

Katherine Fitz and
Norbert Nieberd, Fitz Consultants, Inc.



SEATTLE MONORAIL REHABILITATION

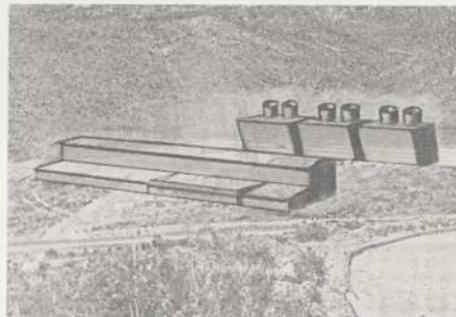
The City of Seattle has selected Raymond Kaiser Engineers and Tudor Engineering Company to design an UMTA-funded rehabilitation of Seattle's approximately 1 mile-long downtown monorail. The monorail was designed and built by ALWEG, a Swedish-German consortium, for the 1962 World's Fair. It runs on twin aerial guideways from the retail shopping district to the convention and recreation facilities at Seattle Center, the former fair site. A one-way trip takes 90 seconds and costs 50 cents; this fare is sufficient to make the system totally self-supporting — a rare occurrence among public transit systems. The City wishes to renovate and update the system equipment and guideway and to relocate the retail district station to accommodate development.

Kaiser is the prime consultant and will be responsible for systemwide engineering, including improvements to traction power supply, trains, and other equipment. Tudor will be responsible for facilities design, the major element of which is the new Westlake Station.

The existing retail district station occupies a corner of the Westlake Mall which is being converted to a major multi-use commercial development. The development will include a new station inside the building. Tudor will design the realignment of the guideway, the station structure, and the structural support of a switch. This last element is necessary to permit the two existing guideways to serve a single-track station. Tudor will also design the rehabilitation of the entire guideway, a post-tensioned concrete box girder structure which has developed significant upward camber and has defective joint plates.

Bela Vadasz is in charge of Tudor's activities and will supervise all facilities design. Dick Rudolph will handle structural design, and Roger Brassfield will be responsible for civil design. The team includes several specialty subconsultants for acoustical design, monorail technology, geotechnical engineering and illumination. An especially noteworthy subconsultant is Mr. Eberhardt Lemcke, former Chief Engineer for ALWEG, who managed the design and installation of the monorail. Mr. Lemcke emigrated from Germany to America to work on this project, bringing his family, including his son Ulrich, who is now a Tudor employee.

COSO GEOTHERMAL



Coso Geothermal Power Plant No. 1

China Lake Joint Venture, a co-venture between California Energy Company Inc. and Caithness Geothermal 1980 Ltd., engaged Guy F. Atkinson Construction Co. as general constructor and Mitsubishi Heavy Industries, Ltd. as process engineers and equipment supplier for a proposed six-unit, 75-MW geothermal power plant near Coso in the China Lake U.S. Naval Ordnance Test Station.

Although there are other geothermal plants in California, this project will open a new geothermal field at an active steam vent known as Devil's Kitchen. It is near one of the most active seismic regions in the United States. Moderate and severe earthquakes are expected during the life of the plant and may cause strong seismic shaking which must be considered in the design.

The construction schedule is based on a fast-track program and Guy F. Atkinson retained Tudor Engineering Company as designers for the foundations of the six 12,500-kW steam turbine-generators, for the 120-meter-long by 19-meter-wide powerhouse containing all ancillary mechanical and electrical equipment, for the condensers and hot well pumps, pipeway supports, and pipe and cable trenches. The electrical design connected with the foundations comprises the grounding grid with connecting risers covering an area of 120 meters by 40 meters.

Floors in the power plant are designed to carry the completely assembled turbine-generator units, weighing 100 tons each, while they are being moved into position during installation.

The assignment was performed on schedule and within budget, including design and drawings prepared in metric scale. Principal-in-Charge was Walt Anton and Project Engineer was Kurt Scholz. Electrical engineer Bill Untiedt, civil-structural engineers Tony Lea and John Lopez, civil designers Karl Huttner and Mel Bulseco, and drafters Andy Nguyen, Josephine Lee, Susan Lee and Hernando Orozco helped in the successful completion of this assignment.

SANTA CRUZ BUS DEPOT

The Santa Cruz Metropolitan Transit District's Intermodal Transfer Facility, located in downtown Santa Cruz adjacent to the Greyhound bus depot, was dedicated June 8, 1984. Tudor Engineering Company performed structural design of this \$1.2 million facility as subcontractor to Thompson and Wright, Architects. The structure is primarily wood frame, utilizing glued laminated timber beams and joists and plywood sheathed shear walls supplemented with steel frame bracing. The glu-lam beams and steel frames are exposed as architectural features in this attractive and unusual structure.

Across from the site are timber frame pedestrian shelters and a group of concession kiosks. The Pacific Avenue Mall was extended under this contract to tie to this facility, with civil engineering work performed by John Warren & Associates.

Tudor personnel active in this project included Don Croft as Project Engineer, Dick Rudolph as design engineer, and Charlie Tsang as designer-drafter.



Interior view of the main waiting area showing exposed glu-lam beams and steel bracing frame lighted by curved glass skylights.

IDAHO FLOOD STUDY

Negotiations with the Federal Emergency Management Agency (FEMA) were completed in early August for approximately \$275,000 of new work for the Boise office for Flood Insurance Studies in Idaho City, Boise and Custer Counties in Idaho. Work is scheduled to begin in late August with over 29 miles of rivers and streams to be surveyed this year.

The major rivers included in the study are the Middle and South Forks of the Payette River in Boise County and the Salmon River in Custer County. The Salmon River has attained some national exposure lately with the recent rafting trip of Vice President Bush and a few years ago with President Carter's

trip. Even though the 8.7-mile area to be studied is not as inaccessible and primitive as the popular rafting areas, the study should prove to be both challenging and rewarding. One interesting facet of the work in Custer County is that the hydrology has been upset by the November 1983 earthquake in the area. One stream to be studied by approximate methods has reportedly seen a two-fold increase in flows since the earthquake. Jim Spofford will be involved with the project hydrology and research into the earthquake-hydrology situation.

Project Manager, Paul Kunz, will be assisted by Tim Burgess, Don Payne, and Gary Ames with surveying and office support.

TUDOR SERVICES IN CHILE

Tudor Engineering Company's services to the Dirección de Vialidad in Santiago, Chile, were successfully completed on June 30, 1984, after 12 years and two months of continuous services which started in May, 1972.

The original contract called for one engineer from Tudor to spend 30 months in Chile providing technical and administrative assistance to the client supervising the construction of a 30-kilometer section of the Santiago-San Antonio freeway, financed with funds from the World Bank. Raul Martinez, because of his highway construction experience, was hired to go to Chile and Roberto Iniguez was designated Project Manager in San Francisco.

Because of the political and economic situation in Chile during 1972 through 1974, the freeway construction did not progress as originally anticipated and the Client extended the contract until July, 1978, when the freeway was finally completed. During these six years Raul developed a reputation as a practical and competent highway construction engineer. The Client, anticipating new loans from the World Bank for future highway work, did not want to terminate Tudor's contract and risk the possibility of not having Raul available when needed. Through 1980 Raul's services involved the review of all designs prepared by local consultants for submittal to the World Bank.

These designs were the basis for the new World Bank loan, which was awarded in June, 1980, to partially cover the cost of repaving 1500 kilometers of highways along the Panamerican Highway. Tudor's contract was again extended, and Raul provided technical and administrative services during the repaving process, which is scheduled to be completed at the end of 1987. Because of the Client's desire to reduce the cost of consulting services, Tudor's contract was not extended again.

Raul's personal life in Chile has been a rewarding 12 years. Raul's youngest daughter, Fernanda, was born in Santiago in 1974 and Raul's other daughters, Patricia and Juliana, as well as his wife Imelda, consider themselves Chilean. This situation prompted Raul to make what he calls "a hard decision"; he has elected to remain in Chile for a few more years. Raul will be a consultant to the Dirección de Vialidad until the completion of the repaving work.

Tudor takes this opportunity to express its appreciation to Raul for his outstanding participation on this work and to wish him and his family the best during their stay in Chile.

WESTERN

This July, Tudor was awarded a one-year contract by the Western Area Power Administration (Western) to provide support services to Western's Power Marketing Division at their Headquarters Office in Golden, Colorado. Tudor's Denver office will be assisted by Stone & Webster Management Consultants, Inc. of Denver as a subcontractor to Tudor. Work under the contract will involve special studies and services dealing primarily with economic and financial analysis procedures and system rate and repayment studies. It is, however, an open-ended arrangement in which Western can request service in any area. Tudor will provide economic and financial expertise while Stone & Webster will supply power system analysis capability. The contract is for an estimated \$530,000, with options to renew the contract for two successive years.

Under the initial work order, Western requested a temporary replacement for the Conservation and Renewable Energy Program Officer in their Billings, Montana, office. Cliff Bjorgum spent about six weeks in Billings doing an admirable job of filling the position before returning to Colorado State University to finish his masters program.

Other work orders now being negotiated include developing guidelines for Western's use in developing power values, for economic and financial analysis for various applications throughout their organization, and to verify results from their rate and repayment studies computer program.

Nelson Jacobs is Project Manager for the contract. Considerable effort will be provided by others in Tudor's Denver office, including Ed Barbour and Tom Rawlings.

ABIQUIU POWER

Tudor Engineering Company has been retained by the County of Los Alamos in New Mexico to provide engineering services for the final design of the Abiquiu Dam Power Project. The Tudor Denver office prepared the feasibility report, preliminary engineering, and FERC license application for this project.

The project consists of a new powerhouse and the installation of a new steel liner inside the existing outlet works tunnel at Abiquiu Dam. The dam and reservoir, located on the Rio Chama, are owned and operated by the U.S. Army Corps of Engineers. The new power plant will have an installed capacity of approximately 11 megawatts and will be capable of generating an average of 34 million kilowatt hours of energy yearly. The equipment procurement and the main construction contracts are scheduled to be awarded in the winter and summer of 1985 respectively.

Tudor's San Francisco office initiated final design activities in August. The client's Project Coordinator is James Harder, Manager of the Los Alamos County Utilities Department. Tudor's Principal-in-Charge is Walt Anton. Nelson Jacobs from Tudor's Denver office will continue as Project Manager. Roberto Iniguez, Deputy Project Manager, will be in charge of the design effort in the San Francisco office, and Paul Kneitz will be the Project Engineer.

SULPHUR CREEK

Tudor's Denver office will be working as a subconsultant to Woodward-Clyde Consultants under a contract recently signed with the Wyoming Water Development Commission. The Sulphur Creek Project requires final design of a water supply project for the town of Evanston, Wyoming, including enlargement of an existing reservoir, a transbasin diversion canal, ten miles of pipeline, and a small hydroelectric facility.

Tudor will be responsible for the conceptual design, and ultimately for the final design of the 250 kilowatt hydroelectric plant and the power penstock. The facility will operate primarily during the winter months when the municipal demands are low. The excess flows in the 27-inch diameter raw water supply line will be diverted to the hydroelectric plant through a 300-foot drop.

LAWRENCE BERKELEY CAM

Tudor, in joint venture with Keller & Gannon, has been selected as the design engineers for the Center for Advanced Materials (CAM) at the Lawrence Berkeley Laboratory.

The project consists of an 82,000-square-foot, four-story laboratory and office building, and reconstruction of and an addition to Building 6, which currently houses an existing 184-inch cyclotron. This building will house an Advanced Light Source (ALS) which is a new electron synchrotron accelerator. The project's purpose is to provide basic research on the synthesis, characterization, and behavior of advanced materials.

Responsibilities and subcontractors include: Tudor, Civil and Structural Design; Keller & Gannon, Project Management, Mechanical and Electrical Design; Reid & Tarics, Architecture; Harding & Lawson, Geotechnical; Mel Lee Associates, Landscape Architecture.

TOM O'NEILL SEATTLE OFFICE MANAGER

At the June 1, 1984, Board of Directors meeting, Tom O'Neill was named Manager of Tudor's Seattle office beginning July 1. Tom replaces Gerry Gibney, who carried the responsibility for the office management for the preceding ten months.

Tom first joined Tudor in the PB/T Atlanta joint venture office in 1973. In January, 1978, Tom transferred to Tudor's San Francisco office, where he was primarily involved in hydro development projects. In February, 1982, Tom returned to Atlanta to lead Tudor's efforts to develop hydroelectric projects in the Southeast. The Capitola Project was a direct result of this effort. After the cancellation of the Houston Transit Project, Tom was transferred from Atlanta to Seattle. Tom, Sandra, and baby daughter Ames arrived in Seattle in October, 1983, with Tom facing yet another new assignment in a new location — this time in the Pacific Northwest.

Best wishes and congratulations to Tom as he assumes leadership of the Seattle office.

TUDOR SUMMER EVENTS



Steve Gold, Mike Goldberg, Bob Janopaul and Gerry Gibney enjoying the warm weather and cool drinks.

Steaks, salmon and corn-on-the-cob under the watchful eyes of Don Scapuzzi, Bob Myrdal and Steve Alters.

Bob and Sue Myrdal serving the deliciously prepared salmon.

Gerry Gibney, Bob Iniguez and Ivan Mlaker working up an appetite at the volleyball net.

SAN FRANCISCO, ROBERTS PARK

Once again Roberts Park in the Oakland Hills was the site of the San Francisco office picnic. Warm, sunny weather along with plenty of cool soda and beer combined to make an enjoyable "day away from the office."

The menu consisted of barbecued steak and salmon (Bob Myrdal's specialty), corn-on-the-cob, and a variety of delicious home-made salads and desserts.

Special guests Kay and Joe Carson and Agnes and Les Helgesson enjoyed the afternoon with old friends discussing Tudor events past and present.

A non-stop volleyball game kept most of the athletes busy while the afternoon saw some baseball and swimming.

This year's picnic committee consisted of Steve Alters, Roslyn Ball, Gerry and Carol Gibney, Bambi and Mehrdad Goosheh; Bob, Sue and Mary Myrdal, Don and Patricia Scapuzzi, David Silveira, and Steve Van Til.

Joe Carson, Diane Alexander, Eric Canson, Gwen Alexander and John Kennedy patiently waiting for the cooks to finish.

Enjoying lunch are Louis Riggs, Agnes and Les Helgesson, Gordon and Irma Marsh and Debby McDermott.

Digging in at the salad table are Synthia Lee, Bob Janopaul, Linda Rivera, Kay Carson, David Silveira and Les and Agnes Helgesson.

Future generations at Tudor were represented by Jerome Chen (with Dad, Wu-Chieh), Davis Toothman (with Mom, Brooke) and a pensive Trever Alters.





TUDOR SUMMER EVENTS



Tudorites welcome torchbearer Wilson Binger at opening ceremonies.

*"Did we eat it all?"
Pete and Leila Paterson, Roger and Jill Mason, and Wilson Binger (behind Jill).*

*"Just letting dinner settle."
Lisa Nepple, Phyllis Rudolph, Dick Rudolph and Dave Alden.*

*"A good time had by these three."
Wilson Binger, Darrel Chambers, and Jim Schroeder.*

Tom O'Neill, Wilson Binger, Jane Curtis, and Dick Rudolph in the potato sacks.

*"Hold your peanut like this."
Darin Johnson, Jack Bjork, Roger Mason and Ron Wright.*

*"Oh, Nooooooooooooooooooooo!"
Dick Rudolph, Darrel Chambers, Martha Nagula, Harry Jasper, Peter Jasper, Roger Mason, Darin Johnson, and Jane Curtis.*

*"Baby Talk"
Ames and Sandra O'Neill with Emily and Polly Rae.*



SEATTLE, ST. EDWARDS STATE PARK

Seattle's picnic and summer games were held August 18, at St. Edwards State Park in Kirkland.

Wilson Binger, long distance runner and medalist, was torchbearer for the opening ceremonies. Wilson ran out of the shrubs through the phalanx of cheering Tudorites to light the three ceremonial barbecues with his Olympic-brand propane torch. Turning to the crowd in Rafer Johnson pose, he yelled "Let the games begin!"

Roger Mason then led the "enlightened amateurs" through a series of challenges: Wheelbarrow race, gunny sack race, 3-legged race, blind run and water balloon toss, to mention a few.

Participants chowed down on a hearty training table of barbecued salmon and potluck, then worked it off with some aggressive volleyball and softball.

The marathon garbage pickup preceded the closing ceremony chants of, "Hey, great picnic!" The agony of victory and the thrill of defeat over for another year.

DENVER, STERNE PARK

The Denver office summer picnic was held at Sterne Park in Littleton on July 21. The group enjoyed a typically beautiful Colorado Saturday afternoon just relaxing. John Williams was the chef-in-charge of burning hamburgers and hotdogs, while others brought side dishes and desserts ranging from baked beans to strawberry cheesecake. Everyone joined in the fun and games, which included volleyball, badminton and smashball.



Hail, hail, the gang's all here! Ed Barbour's making sure John gets things right.

Lucy Stevens and Janet Williams relax while waiting for lunch.

Pam Stimpson, first in line to sample John Williams' culinary abilities.

Jeff Stevens and Lynn Cross battle it out on the volleyball court while Dale Bowers, and Pam Stimpson look on.

Relaxing after a strenuous game of badminton are champions John Williams and Ed Barbour.

A little relaxation after lunch for Janet Williams, Jeff and Lucy Stevens, Dale Bowers, Nelson Jacobs and Jerry Cross.

Who's this? Huck Finn and Tom Sawyer! No, Christopher and Jeremy Cross.

Jerry and Lynn Cross and family.



SAND CASTLE

Early Sunday morning, June 10, 1984, representatives from 13 architectural and engineering firms gathered at Aquatic Park, Fisherman's Wharf, San Francisco, to compete in the first annual Learning through Education in the Arts Program (LEAP) Sand Castle Contest. LEAP is a non-profit organization which promotes and encourages children to pursue and participate in arts. Representing Tudor Engineering Company were team captain and organizer, Karen Chew, Lou and Mary Jo Krug, Jon Kaneshiro, Celia Patelio, Noha Nakib (Bechtel), and Andre Ebou Shakra (architecture student). Many Tudorites watched and offered moral support. The Tudor team built a rather impressive medieval style castle (6' x 5' x 3') which did not win any prize against the very talented competition; but wait 'til next year!



The Tudor Sand Castle Building Team: Karen Chew, Lou Krug, Jon Kaneshiro, and friends Noha Nakib and Andre Ebou Shakra.

TUDOR SOFTBALL

IT WAS A DARK AND STORMY NIGHT

Things did not go well for our heroes this year, sports fans. Even with able assistance from the other offices (Dave Alden and Jack Bjork from Seattle; Tim Burgess, Sabin Landaluce and Jim Spofford from Boise; Cliff Bjorgum from Denver; and Greg Colzani, John Kennedy and Tom Scotese from the Stanford SLC Field Office) we couldn't match the performance of years past. Our hitters couldn't hit, the base running shouldn't be talked about, and the fielding brought tears to our eyes. So, the team decided to just relax, quaff a few root beers, and enjoy themselves. (At this time, dear reader, the first and only practice had just been finished.)

The season saw Tudor win six and lose seven softball games, but also saw the team enjoy themselves every outing, and especially at the Pizza Parlor or at Mark Nothhaft's home for Bolivian barbecue after the games.

WAIT 'TIL NEXT YEAR!



Sabin Landaluce one-hands a pop-up under the watchful eye of Steve Van Til, David Silveira and Tom Scotese.

NEW FACES . . .

Tudor welcomes new employees:

. . . for san francisco

Helen Mayotte
Secretary



Ivan Mlaker
Civil Engineer



. . . for seattle

Diane Blankenship
Drafter



Lisa Nepple
Secretary/Receptionist



CONGRATULATIONS

Candace King and husband Edward Sykes of San Francisco, proud parents of baby boy Jeffrey Allen, born June 19, 1984.

Mary Bickerdike and husband Ron Lee of Seattle on the arrival of their son Garret, August 14, 1984.

Holly Hoel, part-time office help in the Seattle office this summer, participated in the Miss Teen of Washington Scholarship and Recognition Pageant. Holly is the daughter of Seattle engineer Don Hoel and his wife Judy.

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CONTRIBUTING AUTHORS: Roslyn Ball, Don Croft, Karen Chew, Rosemary George, Michael Goldberg, Roberto Iniguez, Nelson Jacobs, Ed Peters, Lou Salaber, Don Scapuzzi, Kurt Scholz and Bela Vadasz.

EDITING AND PRODUCTION STAFF: Barbara Cooper, Frank Chiappella, Paula Dierkop, Jim Flannery, Alfred Korbmacher, Grant Larsen and Charlotte Wheeler.

TUDOR QUARTERLY

FALL 1984

CADD FOR TUDOR



Manuel Silveira at the keyboard of the CADD workstation.

In November the San Francisco office of Tudor Engineering Company purchased an Intergraph computer-aided design/drafting (CADD) system which is based on a Digital Equipment Corporation VAX-11/750 32-bit minicomputer. One major requirement in the selection of a CADD system was that all engineering and accounting programs had to operate on the same system as the graphics. This approach provides for implementation of future plans to interface engineering programs with graphics data.

The initial configuration of the system includes the central processing unit, a nine-track magnetic tape drive, 460 MB of disk storage, three alphanumeric terminals, a 600 line-per-minute system printer, two color dual-screen CADD workstations, and an electrostatic plotter. The VAX computer is powerful enough to allow for expansion requirements over the next few years. The system was delivered on December 12 and is scheduled for full operation by the end of the year.

Tudor's computer applications can be categorized in three general areas: 1) Interactive computer graphics, 2) Engineering applications, and 3) Accounting and Project Management. The first steps in implementing CADD will be two-dimensional drawing production and the creation of intelligent drawings which provide the user information for scientific calculations, cost estimates, and materials and equipment lists. Eventually, the three-dimension modeling capabilities will be used from conceptualization through the construction phase of a project.

In January, the accounting and project management system will be converted to a new, interactive Computer-based Financial Management System (CFMS). Basically, it will provide the same information as the existing TECDATA system; however, since it is interactive, the data can be updated daily and reports can be generated quickly.

Computer applications are impacting nearly every facet of the engineering design and construction process. Staying current with advanced technology in business management and engineering is vital to the company's future. The new CADD system provides the tools — Tudor personnel provide the energy.

STAGECOACH DAM

Tudor will be working with Woodward-Clyde Consultants (WCC) in the final design of the 140-foot high, roller-compacted-concrete Stagecoach Dam. The project is located on the Yampa River near Steamboat Springs, Colorado.

Tudor, as subcontractor to WCC, will be responsible for design of the outlet works and emergency spillway. Design is scheduled to commence in January 1985.

The spillway will have a unique stair-stepped design which will reduce the requirement for energy dissipation at the base of the dam. The outlet works will have a multi-level intake tower and will be designed for future addition of a hydroelectric power plant.

Tudor is currently preparing a feasibility study for the hydroelectric facility as part of the same contract.

Sal Todaro of Tudor's Denver office will be the Project Engineer for Tudor's portion of the Stagecoach Dam Project.

FERRY TERMINAL

Demolition of the existing center fender at the Seattle Ferry Terminal has begun. This project for the Washington State Department of Transportation includes installation of a new precast concrete moving dolphin, 80' x 48' x 12', which will be towed to the site and anchored. Dick Rudolph is project manager and Harry Jasper is project engineer.



Center fender replacement.

SLAC Experimental Hall

Final design work has been completed and the contract has been awarded for construction of the Collider Experimental Hall (CEH).

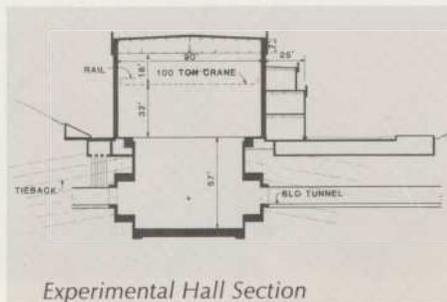
Bids were opened at the Stanford Linear Accelerator Center (SLAC) on September 7 1984 and the contract was awarded to Dickman Builders, Mountain View, California, with a low bid of \$8,585,000. Thirteen contractors, with bids ranging from \$8,585,000 to \$10,480,000, participated. All bids were within -7 percent to +11 percent of the Engineer's Estimate.

Construction services for the CEH are being provided by Tudor, a continuation of the first phase of construction services in progress for the SLAC Linear Collider North and South Arc Tunnel Contract.

The CEH is the second phase of construction of this high-energy physics project. Positrons and electrons will be ejected from the existing two-mile linear accelerator at velocities approaching the speed of light, guided by magnets along separate paths of the North and South Arc Tunnels, until the particles collide in an underground chamber. The experimental hall will house detectors which will "watch" the particles collide and help physicists solve the mysteries of matter.

The CEH consists of a three-story utility building attached to a main building which covers the pit housing the detectors. Some interesting design aspects of the CEH include the concrete floor slab which is designed to support a 3,300-ton detector, pit walls supported by over 500 permanent tiebacks, the rim and strut beams framing the pit which also support heavy shielding blocks for radiation protection, and the 50- and 100-ton capacity overhead bridge cranes which will service the detectors.

The Principal-in-Charge of the CEH is Mike Harrington. The Project Manager and Project Engineer are Heinz Mueller and Walter Zien, respectively. The Resident Engineer is Clyde Earnest. Other firms involved are Keller and Gannon, Architectural/Electrical/Mechanical; Jacobs Associates, Cost Estimating; and Earth Sciences Associates, Geotechnical.



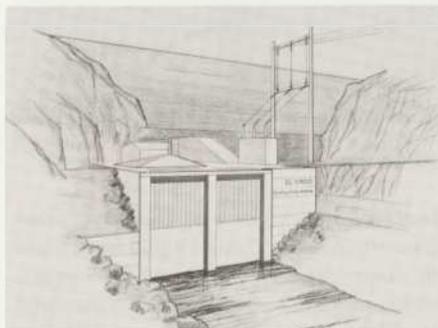
EL VADO Power Project

Progress on the El Vado Dam Power Project continues on schedule. The second phase of the implementation process was just completed when bids were received on the electromechanical equipment with an installed capacity of 8 megawatts which will generate an average 24 million kilowatt-hours of energy per year.

The bid opening for the procurement of turbine, generator, turbine shutoff valve, governor, and auxiliary electrical equipment was held in Los Alamos, New Mexico, on November 27 1984 at County of Los Alamos offices.

A total of six bids were received from U.S. and foreign firms. Bids ranged from Voith Hydro Inc.'s low bid of \$2,335,232 to a high of \$3,232,592. Tudor is currently analyzing and evaluating the bids and will recommend award soon.

El Vado Power Plant



WSB-2 FINAL DESIGN

The City of Seattle Engineering Department has given notice to proceed with final design of the low-level, movable West Seattle Bridge to the WSB-2 design team. The team consists of Andersen-Bjornstad-Kane-Jacobs, Parsons Brinckerhoff and Tudor Engineering Company. Two complete final bridge designs will be prepared for bidding; one of segmental concrete, and one of steel. Both designs will be double-leaf, swing bridges using a unique hydraulic lift and turning mechanism. The concrete design would be the longest of this type ever constructed. Construction costs are expected to be \$50 million. Tudor is responsible for all civil design and will participate in the structural design. Bela Vadasz is managing Tudor's effort, assisted by Einer Handeland, Darrel Chambers, DeWitt Jensen, and others.

WAPA

Work orders continue to develop in some unusual and unexpected directions under the Support Services contract with the Western Area Power Administration (WAPA) in Golden, Colorado.

Tudor has been requested to perform studies of solar and wind energy development to supply station service energy needs at some Federal facilities in WAPA's Sacramento Area Office power system. These are primarily WAPA substation office and warehouse facilities, but can include other Federal agency facilities. The Denver office has solicited help from the San Francisco office for this work and Bob Toothman has been assigned. Under the same work order, Tom Rawlings will be looking at some potential small hydro developments for the Sacramento Area Office.

Another approved work order with the Sacramento Area Office involves review of WAPA's contract with Pacific Gas and Electric Company. This review will be done by Tudor's subcontractor, Stone and Webster Management Consultants.

Ed Barbour continues to work with the Stone and Webster staff to develop written guidelines for use in all WAPA offices — one for development of power values and another for conduct of economic and financial analyses.

Bruce Braaten is still working in WAPA's Billings office as their Conservation and Renewable Energy Program Officer. The term of his assignment is indefinite as WAPA is still subject to manpower limitations and a hiring freeze.

Other completed work orders include collection of data and analyses by Stone and Webster related to a possible power pool arrangement within the Western Systems Coordinating Council, and collection of data by Tudor and Stone and Webster for analysis of the potential for generating additional revenues from WAPA's power operation and marketing of the Colorado River Storage Project. The additional revenues would be used to assist development of authorized Federal water resource projects in the Upper Colorado River Basin.

Dick Everett of the San Francisco office has been involved in discussions with WAPA concerning possible work under the contract that would involve hydrologic and power systems modelling.

Nelson Jacobs is Project Manager for the WAPA Support Services contract.

IN MEMORY OF DONALD J. CROFT

At an Awards luncheon on November 29 1984, a Certificate of Merit in memory of Donald J. Croft was presented to Irene Croft, sons Bill and Greg, and daughter-in-law Carol. Don, a nineteen-year employee of Tudor, died of cardiac arrest on September 23 1984.

The award was presented to the Croft family by Robert Janopaul, President of Tudor, who read the following inscription from the Certificate of Merit:

"This Certificate of Merit is given in memory of Donald J. Croft and in appreciation for his nineteen years of service with Tudor Engineering Company. He graduated from the University of California at Berkeley in 1945 and for the next twenty years was employed as a Structural Engineer by several different Bay Area firms. Don joined Tudor in 1965 during its expansion for development of the San Francisco Bay Area Rapid Transit System. His contributions to the development of this system were substantial. He was responsible for the structural design of ten stations, and the system's maintenance and repair buildings. Don also was responsible for a significant number of structures associated with the Caracas Metro and the Metropolitan Atlanta Rapid Transit System.

Donald J. Croft



"His most noteworthy project in Atlanta was the \$45 million Five Points Station, a four-level underground structure which is the key station for the entire system. In addition, Don was responsible for the structural design of many complex structures and industrial facilities including: the Social Security Administration Building in Richmond, California; the parking and maintenance facility for Chevron Research Corporation, also located in Richmond; the Performing Arts Garage, San Francisco; the San Francisco General Mail Facility for the U.S. Postal Service; and several projects for the U.S. Army Corps of Engineers and the Naval Facilities Engineering Command. Don's last assignment for Tudor was the structural design of station and ventilation facilities on a three-mile segment of the Los Angeles Metro Rail Project.

"The Board of Directors at its meeting on November 29, 1984, unanimously voted to award this Certificate of Merit. With this presentation the Directors, individually and collectively, express sincere appreciation for the outstanding contributions made by Don during his many years of loyal and faithful service with Tudor Engineering Company."

The Certificate was signed by all the members of the Board of Directors and attested to by the Assistant Secretary, Robert W. Myrdal. In addition to the Certificate, a check was presented to the family as a contribution to the Save the Redwoods League to assist in purchasing a grove of trees which will be dedicated as a living memorial to Donald J. Croft.

MARTA—Five Points Station



TEXAS HYDRO

Tudor's Denver office has been working closely with Espey, Huston and Associates of Dallas, Texas, on three hydropower projects in Texas. Two of the projects, for the Sabine River Authority of Texas, include an update of the River Basin Master Plan and a Low-Head Hydropower Study of the entire Sabine River Basin.

The Low-Head Study, completed in November 1984, inventoried thirty-one sites; six sites were selected to proceed to the reconnaissance level. Four of these sites require that new dams be constructed within the existing river channel to maintain a reservoir at the river bank-full condition. This resulted in dam heights in the range of 20-40 feet, and power plant capacities ranging from 1000 kW to 3000 kW. The remaining two projects examined in this reconnaissance phase were at existing dams which would utilize reservoir spills for generation. Each of these projects has a potential installed capacity of 2000 kW, and would utilize a siphon penstock to deliver hydropower flows to the turbines.

Tudor's involvement in the Master Plan Update has been the preparation of a preliminary layout and cost estimate for a major dam and reservoir and the associated hydroelectric plant. Tudor developed the area-capacity curves and sized the spillway using the USBR flood routing computer program. The dam would be about 2 miles long with a maximum height of about 40 feet and would impound approximately 700,000 acre-feet of water. The spillway would contain eleven 40-foot wide by 35-foot high radial gates, providing for a maximum discharge of about 400,000 cfs.

A power plant, located adjacent to the spillway, would contain two 2,500 kW turbines and would generate about 30,000,000 kWh per year. The Master Plan Update will be completed sometime before the first of the year.

Tudor and Espey-Huston are also working together for the Trinity River Authority on the CRWS Treatment Plant Hydroelectric Project. This project would utilize the 110 mgd wastewater treatment plant effluent and the 40 feet of available head to produce 500 kW of hydroelectric power. Due to the consistent flow of the plant effluent, the project would produce about 4,000,000 kWh of energy per year. The feasibility report was completed in October 1984; it is expected that a license application to FERC will be initiated around the first of the year.



So long 149 New Montgomery.

Paula Dierkop smiles as Grant Larsen discovers his desktop.

Rainer Rungaldier relaxing and waiting for the rest of Tudor to get organized.

Stephen Wong looks on as Frank Chiappella wonders what he did with the keys.

Don Guild tells movers to come back next week.

George Schneider works on his fourth map file; only 60 more to go.

Manuel Silveira wonders what goes next.

A toast to 149 by David Silveira, Gate Gelana, Manuel Silveira, Mark Nothaft, Frank and Connie Chiappella, Beverly Hanapole, and Don Scapuzzi.

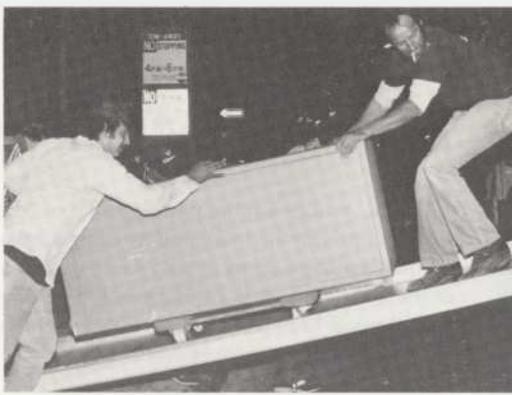


TUDOR ON THE MOVE

After 15 years at 149 New Montgomery more than the address of Tudor's corporate offices in San Francisco has changed. The spacious new quarters reflect Tudor's growth as a leading consulting engineering firm in transportation, hydrogeneration, and other major engineering fields.

The move began months earlier with search for adequate space — room to accommodate the increasingly automated office systems and room for additional personnel. In April, Tudor signed a 10-year lease for space at the WTR Properties-owned building. The next step was to design the office to provide efficient work areas. Architect Nielsen Weber, Keller & Gannon, was selected to layout the administrative and design spaces. Jessica Hall, interior designer, worked with Tudor personnel to select colors and materials for wall, flooring, and window treatments for reception, office, and conference areas.

By September the moving date had been selected. During construction work by Contractor Gene Woo, personnel were encouraged to visit and become familiar with the new site. By October Tudor employees were actively involved with the move we selected, and on Monday, October 22, personnel began packing non-essential items and generally preparing for the move. Numbers and tags were assigned and other prep-



tions for the move were undertaken while work on project deadlines continued.

The move was under the leadership of Robert Myrdal. Frank Chiappella, Joseph D'Amico, Gate Gelana, Beverly Hanapole, Mark Nothaft, Don Scapuzzi, and David and Daniel Silveira were recruited to stay at 149 New Montgomery on Friday, October 28, to work with and direct the movers, CITRANS.

When employees reported to work on Monday, October 31, it was not to 149 New Montgomery but rather to the new office at 301 Mission Street. Feelings of discovery, excitement, and anticipation — all of these were present.

The office interiors feature a muted palette of plum and rose quartz carpeting; amethyst and ash rose wall covering; warm white and gray walls and woodwork, and accents of medium blue, rose, gray and beige upholstered furniture. Lavatories, kitchens, and storage areas have natural wood cabinets, gray-beige vinyl flooring and tan laminated counters. In the open-floor areas, dividers are covered with warm gray fabric.

After several weeks in the spacious new quarters, employees are settled in and are personalizing their work areas while carpentry and finishing work continues in some areas.

Last item out 1:45 a.m., Saturday 10-27-84 — the office safe.

Bob Myrdal looks on as more and more furniture arrives.

Tony Lea, the original Mr. Clean.

Gordon Marsh tells Beverly Hanapole and Joseph D'Amico about his ASAP word processing job.

Mike Goldberg and Eva Spatenka examine his new office.

Diane Alexander ready for work with her cleaning gloves.

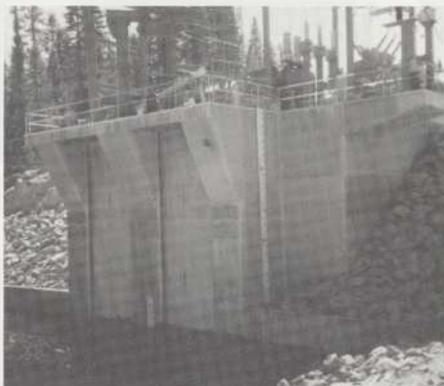
Open for business at 301 Mission 8:00 a.m., Monday 10-28-84.

Hello 301 Mission.



LOS ALAMOS COUNTY

JONES FORK



Jones Fork Power Plant

Construction is nearing completion on the Jones Fork Hydroelectric Project. First power production is expected after the first of the year. The project is currently within budget and slightly ahead of schedule.

Tudor continues to provide onsite contract administration services for the owner, Sacramento Municipal Utility District, as well as design services. The project, in the Sierra Nevada 60 miles east of Sacramento, is presently experiencing another white winter.

Tudor personnel assigned to the project as part of the resident staff are Fred Estep, Resident Engineer; Jeff Ghilardi, Assistant Resident Engineer; Gene Buffum, Electrical Engineer; and Sue Sanders, Secretary-Receptionist.

The construction contractor is 98 percent complete with his work, and the owner has begun startup, testing and checkout of the installation.

ALAMEDA NAS

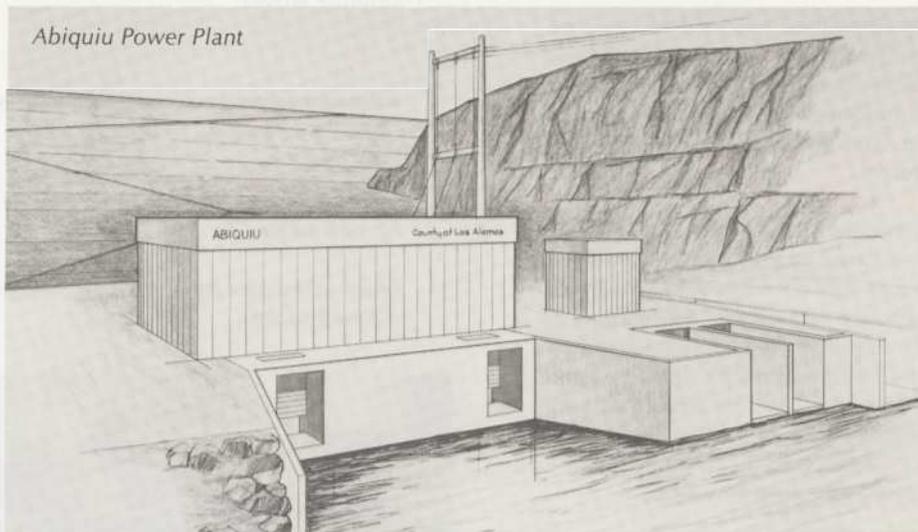
Bids were opened in August for the construction of the Corrosion Control Facility at Alameda NAS, a replacement facility for paint stripping of aircraft assigned to the station. The low bidder was Tutor-Saliba of Los Angeles with a bid of \$12,900,000. Actual construction started in late September with an estimated date of completion to be in the early summer of 1986.

The project consists of a 55,000 square foot steel-framed, pile-supported hangar, a large concrete apron and support facilities including an industrial waste treatment plant, filter houses for a glass-bead blasting

On November 6th the populace of Los Alamos County approved, by a 2 to 1 margin, the sale of bonds for the independent integrated power system, to jointly serve the electric power demands of the County of Los Alamos and the Los Alamos National Laboratory. The approval of the \$110 million bond issue will allow the County to finalize the purchase of a share in both the San Juan and Laramie River coal-fired, thermal plants and to proceed with El Vado Dam and Abiquiu Dam Power Projects.

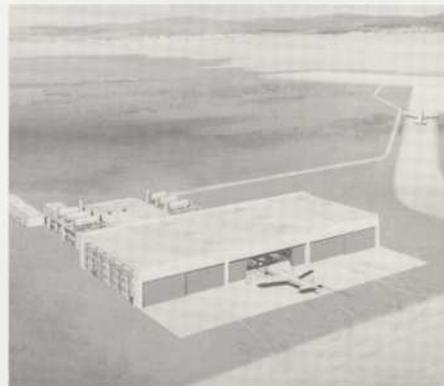
As the San Francisco office proceeds with the final design of the El Vado and Abiquiu projects, the Denver office continues to work with the County to obtain Federal Energy Regulatory Commission (FERC) licenses. The El Vado project consists of an unusual ownership situation wherein the Middle Rio Grande Conservancy District owns the dam, while the Bureau of Reclamation not only has some ownership interests but also has responsibility for operation and maintenance of the dam. This situation and the necessary agreements for the County to construct and operate a hydroelectric plant have caused confusion and inordinate delays in licensing the project by FERC. An agreement in principle has been reached with the District for the County to construct the project; it is anticipated that the project will be licensed soon.

The Abiquiu project license application has been accepted for filing by FERC and is now in the official 60-day agency review. The Denver office is working with the Interstate Stream Commission and New Mexico State Engineer to develop a scheme for care of the river during construction of the project. It will involve a bypass arrangement at the dam and out-of-sequence storage and release of flows during construction. Operation of the dams and reservoirs on the Rio Chama and Rio Grande are subject to the terms of the Rio Grande Compact between the States of Colorado, New Mexico and Texas and the Country of Mexico.



bay, exhaust systems for two stripping bays, a fire protection water pumphouse, a boiler room for heating air, a substation, two pump stations, extensive utility extensions, and miscellaneous paving and grading.

Tudor Engineering, under project manager Lou Salaber, is responsible for construction contract support services including office and field consultation and shop drawing review. Tudor has brought Joe Culpepper down from Sly Creek Power Project to act as Resident Inspector and site representative for the Navy's Resident Officer-in-Charge of Construction (ROICC).



Naval Aircraft Corrosion Control Facility

UP CLOSE AND PERSONAL

Roger Brassfield

When Roger Brassfield says "cheese," he means Tillamook. A native of Oregon and the middle of three brothers, Roger was born in Salem and grew up in Tillamook County. His father, a retired dairy farmer, sold milk to the Tillamook factory nearby. Roger graduated from Oregon State in 1961 with a B.S. degree in Forestry. For eight months he worked as a forester in Montana for the Northern Pacific Railroad, but when the opportunity arose to join a consulting firm survey crew, he left forestry and hasn't returned.

Roger joined Tudor in 1964, assigned to the BART project on the Contra Costa line. In 1970 he was transferred to the Honolulu office for the Mauna Kea Observatory Access Road on the big island of Hawaii. He lived in Honolulu and traveled between the islands for "38 months and 12 days." He sported a great tan and bright aloha shirts in the native spirit, and not once in that time did he have the urge to travel to the Mainland. He has since returned to visit Hawaii but not to live, because, he quips, "Everything is limited except the sun."

From late 1973 to early 1975, Roger was assigned to the Atlanta MARTA Project as Project Engineer on the preliminary design of a section of the West Line. Between travels to Atlanta and Caracas, Roger moved to Seattle, which he considers his home. He spent two years as a site engineer for the Metro in Caracas with Tudorites Heinz Mueller, Miguel Cornejo and Dick Rudolph. His struggle with Spanish was moderately successful — "I'm not a linguist but I learned enough to survive."

In 1982 Roger spent 27 days in Peru, 10 days in Lima and the remainder in the countryside as a subconsultant to Dames & Moore on a transportation study. He has fond memories of this trip, in which he was sent into the wilds with a questionable driver to inspect parts of the road system, and marveled at such spectacles as the Amazon headwaters, Lake Titicaca, and Machu Picchu. Not only was Roger's survival Spanish well tested, but also his photography skills; he shot 14 rolls of film.

Roger's assignments in Seattle include assisting in the design review for the Vancouver, B.C., Transit Project (ALRT), the West Seattle Bridge, and the Metro Transit. He recently completed a temporary assignment in San Francisco, on the Middle Bar/Railroad Flat Hydro Project.

Roger's leisure hours are usually spent contemplating, hiking on faraway mountains, and dreaming of Molokai and Bali Hai.



Heinz Mueller

Born in Cologne, in the wineland of West Germany, Heinz Mueller as a young lad would sit beside the Rhine River and dream of becoming an engineer. His engineer father urged Heinz to become a businessman, and his mother hoped he would become a priest. But Heinz loved trains and envisioned himself engineering powerful locomotives. Somewhere along the road to adulthood his childhood dream was transformed from engineering trains to engineering structures. He attended an old Jesuit school in Cologne and obtained a good background in ancient Greek and Latin (very important for a future engineer)! He played the church organ every morning during mass until he was disqualified by the clergy for playing jazz. Heinz graduated from the Civil Engineering Academy in Cologne with a Masters degree in Civil-Structural Engineering in 1961 and he worked as a structural engineer for a consulting firm in Cologne.

Heinz came to the United States in 1964 with a German Professional Society called "Karl-Duisberg-Gesellschaft," for a two year work-study program. After taking several business and technical courses at Antioch College, he began working with Tudor Engineering Company as a part of this program in the summer of 1964.

Heinz met his wife, Bergit, at the French residence club, Baker Acres, where both lived at the time. They were married in 1965 in San Francisco and their first daughter, Andrea, was born a year later. When the two-year work study program ended, they returned to Germany where Heinz worked as a project engineer for a Darmstadt consulting engineering firm. When they became homesick for the United States, they returned and Heinz returned to Tudor. Heinz and Bergit's second daughter, Michelle, was born in Berkeley in 1968.

In 1970 the Muellers lived in Lima, Peru, where Heinz worked on the design of fishing ports along the coasts of Peru. In 1977 Tudor sent Heinz and his family to Caracas, Venezuela. During his two and one-half year assignment Heinz was part of a team of PBTB advisers for the Metro de Caracas, building the first phase of the Caracas Metro system.

Since returning to the U.S., Heinz has worked on projects such as the San Francisco Cross Town Tunnel and the Stanford Linear Collider. Presently, he is Project Manager for the design of the Collider Experimental Hall which is part of SLAC's Linear Collider. He was sent on a four-day trip to Manila last March for the Cubi Hangar interview with the Navy. There was no time to see the sights! In his true philosophical style, Heinz quips, "Perhaps I should have been a priest after all; then there would be some light at the end of the tunnel!"

Heinz enjoys working and living abroad, becoming acquainted with other people and cultures. His hobbies include music (practicing Beethoven and Bach on the piano), hiking and tennis. Because of his European roots along the banks of the Rhine, Heinz will always truly enjoy (in any order), wine, women, and song.



NEW FACES . . .

Tudor welcomes new employees:

. . . for san francisco



Avry Dotan
Civil Engineer



Mehrdad Goosheh
Civil Engineer



Beverly Hanapole
Word Processing



Stacy Scott
Word Processing



Jim Spinelli
Accounting



Ron Wiltse
Accounting

. . . for seattle



Peter DeBoldt
Transportation Engineer



Erik Dettloff
Structural Engineer



Cheryl Howell
Drafter



Bill Nelson
Drafter

SALE OF BOISE OFFICE

On November 1, 1984, Tudor's Boise operations were sold to a group of four former Tudor employees. The group, headed by Davis C. Toothman, created a new firm named Toothman-Orton Engineering Company. Dave Toothman, who retired from Tudor in 1980, is chairman of the new company, and Richard Orton is President and Chief Operating Officer. Other principal investors in the firm include Paul Kunz and Donald Payne. Most of the former Tudor employees will remain with the new firm, which is located in the same office that Tudor had occupied for more than 15 years.

The management of Tudor is very supportive of the transfer of this office operation to a locally owned-and-managed engineering firm, similar to the firm that Tudor acquired from Toothman and Associates in 1967.

ASCE CONVENTION —ANNUAL MEETING

The 1984 Annual Convention of the American Society of Civil Engineers was held at the Hilton Hotel in San Francisco during the first week of October. Several Tudor engineers attended selected sessions. One of the field trips was to Tudor's Stanford Linear Collider Project. A number of engineering students were hosted at Tudor offices by Tudor staff, demonstrating how an engineering firm conducts business. The convention attendance met forecasts and was judged a success by the ASCE President, Richard Karn. Walt Anton was the Convention General Chairman and Stan Froid served as Attendance Promotion Chairman.

Later at the ASCE San Francisco Section Annual Meeting the Executive Committee presented Walt Anton with the H.J. Brunner Award. This annual award is presented to recognize outstanding service to the Section.

CONGRATULATIONS

Walter Anton and Diane Kubly were married at Park Boulevard Presbyterian Church in Oakland on September 29; a reception followed at the church. The Antons honeymooned in the Hawaiian Islands.

THE TUDOR QUARTERLY is published by Tudor Engineering Company for the information and enjoyment of its employees, their families, and friends.

CONTRIBUTING AUTHORS: Steve Alters, Walter Anton, Roslyn Ball, Fred Estep, Roberto Iniguez, Nelson Jacobs, Jon Kaneshiro, Ed Peters, and Lou Salaber.

EDITING AND PRODUCTION STAFF: Frank Chiappella, Paula Dierkop, Jim Flannery, Alfred Korbmacher, Grant Larsen, Andy Nguyen, Greg Reichert and Charlotte Wheeler.

TUDOR QUARTERLY

WINTER 1984

SLAC GOES UNDERGROUND



Clyde Earnest (left) of Tudor and Bob Bell (right) of SLAC inspecting first of two mining machines to be delivered at SLAC.

Following completion of the design phase for the North and South Arc Tunnels, Tudor has continued to be involved in design and construction for underground nuclear physics facilities at the Stanford Linear Accelerator Center. The level of excitement was high as the first of two 50-ton mining machines was delivered to the site in February. Excavation at the North Adit portal is just underway, as the Tudor field staff begins monitoring the first tunnel drive, over 2,000 feet in length. Clyde Earnest, Resident Engineer, and Tom Scotese, Office/Field Engineer, have provided engineering construction services since last October. New members of the field office staff include Mary Jo Campbell, John Kennedy, Tim Saunders and Greg Colzani. Heinz Mueller, Jon Kaneshiro, Jim Richardson and Don Rose have provided technical support in San Francisco.

Construction activities at Stanford have progressed well, with the close cooperation among SLAC (owner), Tudor (owner's engineer), Gates & Fox Co. (general contractor), Gradeway Construction (earthwork subcontractor), and good weather. Completed features of the project include the 20- to 40-foot deep and 400-foot long cut and cover excavation, the 110-cubic yard Experimental Hall borrow pit, and 25 drilled and lined shafts. The sight berm should be completed early this spring.

LAKE MENDOCINO PROJECT

The Lake Mendocino Power Project ground breaking on March 1 culminated six years of Tudor's involvement with feasibility studies, DOE loan, permit and license applications, power purchase negotiations, design and bond sale. The project, located at the Corps of Engineers' Coyote Dam, is being built for the City of Ukiah. The City is located two miles from the Dam. The contractor is Underground Construction Company of San Leandro, California.

Many new areas of study and design were pursued during project development to enable the reuse of the existing dam outlet tunnel for power purposes, and to provide oxygenated water at acceptable temperatures for fish water releases into the Russian River.

The existing 12-foot 6-inch diameter tunnel will be lined with an 11-foot 10-inch I.D. steel liner. While the tunnel work continues, up to 400 cfs of water must be pumped over the dam to meet downstream water rights, since there is no other outlet pipe.

A first-of-its-kind design is the plenum structure, which has a 12-foot by 16-foot tainter valve, located at the downstream end of the tunnel. When the tainter valve is closed, the pressurized flow is diverted into the power plant penstocks and power will be generated.

A dissolved oxygen injection system, provided to meet fishery requirements, is a unique installation whereby liquid oxygen is vaporized and emitted through diffusers at the bottom of the reservoir at the intake to the tunnel. This allows the reservoir pressure to force the oxygen into solution, and utilizes the 1,000-foot-long tunnel and the plenum turbulence to facilitate the oxygen absorption into the water.

The Mendocino powerhouse will contain a 2.5 MW generating unit, a 1.0 MW generating unit, and a 54-inch bypass valve with dissipator chamber. For small flood flows a 108-inch valve and dissipation chamber will provide maximum flow of 4300 cfs when generating power (400 cfs through the generating units). When flows exceed 4300 cfs, the plant will be taken off line, the tainter valve opened, and flows will pass through the plenum structure into the existing stilling basin.

To finance the project a power exchange contract was negotiated with WAPA, part of a complex overall City-WAPA power allocation agreement. This contract enabled the City of Ukiah to obtain attractive bond ratings and bond interest rates. These favorable financial results, matched by a low bid price of \$7,334,327, allowed the project to meet all financial requirements.

This project is the result of efforts of a large number of people — their imagination, initiative and persistence. Original work was initiated by Principal-in-Charge, Dave Willer, Dave Alden and Gordon Little. Under the direction of Project Manager, Gordon Marsh, and assisted by Sally Simone, final feasibility and license application work was completed. They were aided on dissolved oxygen studies and reports by Steve Graham; on the plenum structure by Dick Rudolph, Kurt Scholz, and Hugh Brown, (model studies by HRS of Santa Clara); on tunnel liner design and installation and scheduling by Steve Gold and Eldon Floodeen.

Project Engineer, Kurt Scholz, was assisted primarily by staff members Ulrich Lemcke, Dorene Thornton (tainter valve), Karen Chew (powerhouse structural), Hans Pokorny (project layout), Tony Lea (structural engineering), and Steve Van Til (bypass pumping system). Mechanical and electrical engineers were Geoff McCavitt and Tom MacLennan, respectively; specifications were prepared by Paula Dierkop and Grant Larsen. The Principal-in-Charge is Walter Anton.

The Resident Engineer during construction is Bob Beal who will be assisted by Sally Simone during the six months of around-the-clock tunnel liner installation. The project is expected on line in June, 1985.

MUNI—S.F.

Ten years ago, and more, it was thought that the combined capacity of BART and MUNI in downtown San Francisco would make transit vehicles on the surface of Market Street unnecessary. Therefore, the support poles, wires, and switches for the City's many electric trolley coaches were viewed as temporary and were not reconstructed during subway construction.

In fact, the capacity of the electric trolley coach system is very much needed and will be expanded to two lanes of aerial tracks in each direction. Tudor Engineering Company has been involved in the solution to this problem for more than two years. Early efforts examined alternative types of hardware and several geometric schemes. During the summer of 1983, Tudor worked with a Citizens Advisory Committee to minimize the negative aesthetic aspects of the project and to enhance the positive aspects. The selected solution relies on rebuilding the ornate Path-of-Gold poles which already exist on Market Street, and by using eyebolts and rebuilt traffic signal poles to support the overhead wires and switches at intersections where Path-of-Gold poles are not available.

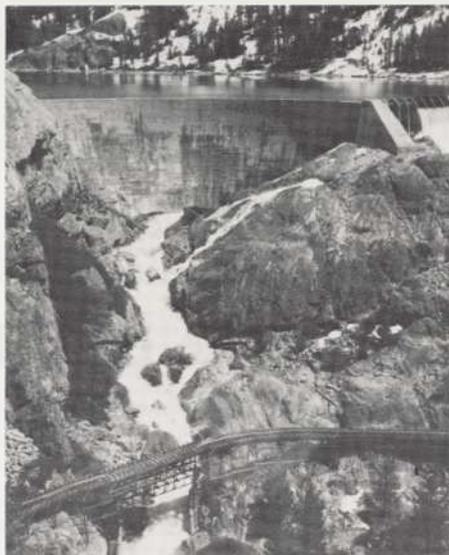
The project is now in final design and construction of this \$15 million project is scheduled to start in July, immediately after the conclusion of the Democratic National Convention.

It is worth noting that while the overhead technology is antique, most of the drawings were produced by Computer Aided Drafting (CAD) techniques. Tudor staff assigned to the project have included Gerry Gibney as Project Manager and Lou Krug as Project Engineer, and Ken Mathis, Walter Zien, Ron Wright, Don Yamagishi, David Silveira, Andy Nguyen and Darryl Tyson.



Path-of-Gold and traffic poles

BOWMAN PROJECT



Bowman Lake's South Dam and Spillway caught during a Spring spill. The remnants of the old Bowman-Spaulding flume — now abandoned and replaced by a tunnel — are seen in the foreground.

The engineering design effort for construction of the Bowman Power Project shifted into high gear in early 1984 as preparation of final construction contract drawings and specifications got underway.

The Bowman Power Project is a development of the Nevada Irrigation District (NID) located at the existing Bowman Lake in Nevada County, California. The project consists of a powerhouse with a 3.6 MW turbine-generator and appurtenant work including improvements to an existing tunnel and a short penstock. Of particular interest is the installation of a 62-inch steel liner inside the existing reservoir outlet tunnel. A wye branch will be installed in the tunnel to provide the connection to the penstock, which will convey water to the powerhouse.

Bids were received and a procurement contract was awarded to Axel-Johnson Engineering Corporation in December to do the engineering and, eventually, to supply the turbine and generator for the project. Jim Gormly administers this contract with the Hydro Group's assistance.

Bob Ganse is Project Manager while Project Engineer, Paul Kneitz, assists and is responsible for the civil design. Dan Boyle and Bill Untiedt are mechanical and electrical engineers, respectively.

The current schedule calls for advertisement for construction bids in April with construction to begin in September 1984, and completion and operation by the end of 1985.

EXPERIMENTAL HALL

On October 31, 1983 U.S. Secretary of Energy, Donald Hodel, dug the first shovelful of dirt for the SLAC Linear Collider Project. This symbolic action indicated the start of construction of one of the world's first linear positron-electron colliders. Phase I of this project consists of the beam housing—an approximately 9,000-foot long tunnel—and its connection to the existing linear accelerator.

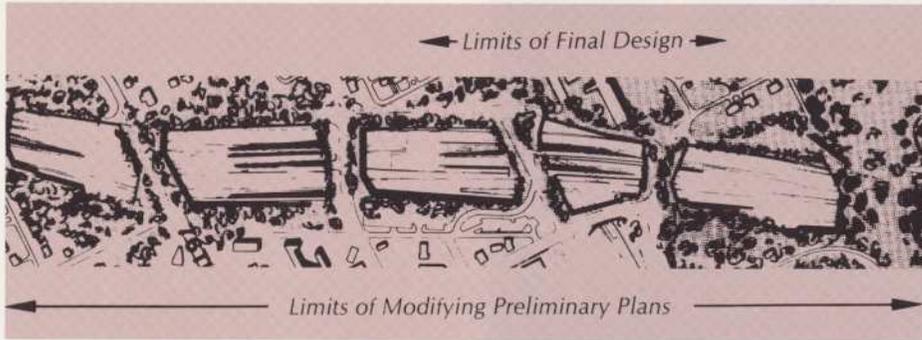
Phase II is the Collider Experimental Hall presently under design and approximately 20 percent complete. Tudor Engineering Company is responsible for the design. Keller and Gannon is the architectural, mechanical and electrical subconsultant. Jacobs Associates, subconsultant to Tudor, provides scheduling and construction cost estimating services, and Earth Science Associates is the geotechnical subconsultant. The Collider Experimental Hall consists of a 300-foot long by 90-foot wide and 65-foot high steel structure with two overhead bridge cranes with 50 and 100 ton capacities. The structure covers an open pit 235 feet long, 65 feet wide and 60 feet deep and will house the nucleus of the facility including the machinery used for the experiments. The machines are called detectors. These detectors are approximately 35-foot cubes and weigh between 1,600 to 3,000 metric tons.

Next to the high bay steel structure a 300-foot long by 25-foot wide three-story steel frame building will be constructed to house computer rooms, counting houses, laboratories, utility and living quarters for round-the-clock scientists and technicians. A 300-foot long by 30-foot-wide utility pad will be provided for electrical and mechanical equipment. A paved storage and turnaround yard will be provided around the building and a 65-foot-wide access road will connect to the existing road system.

A most challenging task is the structural design of the large detector pit. The walls will include a combination of caissons, reinforced concrete walls and permanent corrosion resistant soil tiebacks. The floor of the pit will be a reinforced concrete mat which has to be able to support the heavy detectors and 4 to 5-foot thick removable radiation shielding block walls without appreciable settlement.

The Principal-in-Charge of the project is Mike Harrington. Heinz Mueller is Project Manager. Others assigned to the project are Jon Kaneshiro, Walter Zien, Steve Gold, Joe Lawrence, Alfred Korbmacher and Jim Albert. The design is scheduled to be completed by the end of July and construction contract award is anticipated in early October 1984.

I-90 ON THE ROAD



On January 18, 1984, the Washington State Department of Transportation signed an agreement with the Seattle office of Tudor Engineering Company for design of the Mercer Island Central Business District section of I-90. The estimated construction cost for this section of I-90 is \$25,000,000. It is part of a 7½ mile long complex urban freeway between 4th Avenue in Seattle and the Factoria Interchange in Bellevue. This is the last uncompleted section of Interstate Highway I-90, which runs from Seattle to Boston through Spokane, Billings, Sioux Falls and Chicago.

Tudor's involvement in this project is divided into three phases: (1) Value Engineering Study; (2) Modification of Preliminary Plans; and (3) Contract Plans, Specifications and Estimate. The Value Engineering Study will involve three major consultants on Mercer Island and will be led by a fourth consultant — a value engineering specialist. This phase began in early February and is scheduled to last for five months. Five high cost areas have been selected to be "Value Engineered." These include: (1) Excavation including the Haul Road; (2) Walls and Structural Shapes; (3) Construction Sequencing and Maintenance of Traffic; (4) Ventilation and Interior of First Hill Tunnel; and (5) First Hill Lid and Retaining Walls and Undercrossings.

DeWitt Jensen is Tudor's representative on the excavation team. The team's major task is to determine how to get 2,500,000 yards of excess material off the Island and, subsequently, where to put it. (2,500,000 yards of material would cover a city block to the height of a 30-story building.)

I-90 will be a depressed freeway across most of Mercer Island with retaining walls up to 30 feet high lining both sides of the freeway. In addition, the structures that carry local traffic across the freeway will travel on landscaped "bridges" up to 113 feet wide. Dick Rudolph is Tudor's engineer on the team studying ways to provide the same functions at a lower price.

The second phase will be to modify the preliminary plans from the east portal of the First Hill Lid to the East Portal of the Luther Burbank Lid. This covers roughly the middle third of the Island. The effort will consist of modifying the preliminary plans to reflect revisions made as part of the Value Engineering Study.

The third phase includes preparing contract drawings, specifications, and cost estimate for a 1,500-foot section of I-90 through the Central Business District (80th Avenue S.E. to Island Crest Way). Design effort includes the 80th Avenue S.E. Undercrossing and the Island Way Undercrossing. Both structures will be post tensioned box girders 113 feet wide and 315 feet and 265 feet long, respectively. The 80th Avenue Structure also includes two ramps which carry traffic from the structure to the freeway. Two tunnels run under the 80th Avenue structure carrying traffic between the freeway and Island Crest Way. The columns for the two 80th Avenue Structure piers are supported by the two tunnels. There is also approximately one mile of retaining walls included in the project. These could be cantilever, slurry, or cylinder pile walls. Also included in the project are the roadway design, drainage, illumination, signing and operational systems.

It is anticipated that a staff of 16 will be involved in the design of this project. Dick Rudolph is Project Engineer for structural design; Don Hoel is Project Manager; and Bob Janopaul is Principal-in-Charge. Tudor's subconsultants on the project include INCA Engineers, Inc., for structural and civil engineering; CTS Consulting Engineers for systems; Converse Consultants for geotechnical; and Jongejan, Gerrard, McNeal for landscaping.

Design is scheduled to be completed by March 31, 1985. WSDOT plans to advertise for construction on October 7, 1985.

JONES FORK UPDATE

Construction of the Jones Fork Hydroelectric Project is progressing through its second winter. With weather conditions far less devastating than last year, the project is presently approximately 80 percent complete. Thanks to a good summer the 8400-foot penstock has been installed.

With turbine and generator equipment supplied by Fuji, the Tudor field staff has become adept in understanding the Japanese erectors, especially by using sign language. All generating equipment has been delivered and site installation is proceeding as weather permits.

Tudor field personnel, Fred Estep and John Wurschmidt, man the field office with visits from San Francisco office personnel as necessary. Gene Buffum is expected to move to the field soon to begin coordination of startup activities. Jim Gormly is the San Francisco office Deputy Project Manager receiving the field problems and coordinating the San Francisco office efforts.

Projections are that by the end of this year the project will be generating power.



Jones Fork Powerhouse, January 1984

DENVER POWER PROJECTS

Tudor is working for the Incorporated County of Los Alamos, New Mexico, in the preparation of a FERC License Application for the Abiquiu Hydroelectric Project. The Abiquiu Project will produce 43 million kWh per year with installed capacity of 11 MW.

Just to the east of the New Mexico projects, Tudor's Denver office is currently conducting a basin-wide study for hydropower in the Sabine River Basin of eastern Texas. The extremely flat terrain is lending itself to some innovative and challenging engineering efforts in order to unearth a feasible project. Tudor has joined with Espey, Huston and Associates of Dallas, Texas, both for the hydropower study and to a lesser degree for the Sabine River Master Plan Update.



1-00 ON THE RO

SAN FRANCISCO CHRISTMAS PARTY

A good time was had by all at the annual San Francisco Office Christmas Party held December 3rd at the Engineers Club. Don Croft ably handled emcee responsibilities for the evening, and Louis Riggs and Bob Janopaul presented a record number of Tudor Service Awards. Proud recipients of 10-year awards included Steve Alters, Gerry Gibney, Karl Huttner, Hernando Orozco, and Ocie Williams. Frank Chiappella, Bob Ganse and Grant Larsen received 20-year awards.

Louis and Bob also had the pleasure of honoring Jim Albert, Rainer Rungaldier, and Bela Vadasz, from Seattle, for 25 years of service with the firm. The final presentation of the evening was made to Oral Conyers who became the fourth person in Tudor history to receive a 30-year Service Award.

Associated consultants Stanley Froid, with his wife Harriette, and Wil Pacheco, with his wife Marge, joined in the festivities and dancing. Les and Agnes Helgesson and Adolph Sandner, Tudor's oldest employee, and his daughter, were also present to entertain some of our "younger" employees with their reminiscing.

Don Croft, Master of Ceremonies, takes the podium to begin the program.

Bob Janopaul, Linda Conyers and Louis Riggs offer warm wishes to Oral Conyers as he receives his 30-year Service Award.

In the lineup are Steve Gold, Linda Choate, Lemma Wendim-Agegnehu and wife Sehin Ketema, Pat and Don Scapuzzi, and Wanda Smith.

Bob Janopaul smiles as Jeanette and Jim Albert take the place of honor as Louis Riggs presents Jim's 25-year Service Award.

Juanita Rungaldier looks on as Louis Riggs congratulates Rainer Rungaldier on his 25 years with Tudor.

Around the hors d'oeuvre table are Roberto Iniguez, Joy Church, Bob Janopaul, Linda and Oral Conyers, Jack Biederman, Dick Everett, and Bob Myrdal.

Barbara Cooper, Louis Riggs and Bob Janopaul lose their composure as Steve Alters gives his standup routine.

A group at the cocktail party are Ken and Debbie Heilig, Roslyn Ball, Wil and Marge Pacheco, Kevin Young and Mary Beane.

TUDOR'S HOLIDAY SEASON

BOISE CHRISTMAS PARTY

The Boise office Christmas Party was held at Crane Creek Country Club. The delicious dinner and live music were enjoyed by all. Out-of-town guests were Linda and Oral Conyers of San Francisco. Mr. Conyers presented Mildred Richards with her 15-year Tudor Service Award. Other guests included Davis and Loreen Toothman and Environmental Engineering Laboratory's Mike and Colette Moore and Sue Howell.



Out-of-town visitors, Linda and Oral Conyers, in conversation with Ted Purcell and Davis Toothman.

Jim and Cindi Spofford, Paul and Rhonda Kunz, guest Sue Howell and friend.

Gary Ames enjoying the party.

Having a good time are Gary Ames, Tim Burgess, and guest Mike Moore.

Dancing partners, Pat and Ted Purcell.

Sabin Landaluce enjoying the warmth of the fire.

Guess who won the centerpiece! Paul Kunz.

Ted Purcell greets newlyweds Jim and Cindi Spofford.

Cliff Bjorgum looks on as John Williams exclaims, "I'll have to wear this coat at the next job interview."

Dawn Jacobs and Irene and Dave Willer enjoying some hors d'oeuvres.

Nelson Jacobs—the Tony Bennett of the Denver office.

Patti and Sal Todaro enjoying a friendly talk with Lynn Cross.

Dale Bowers receives a new digital calculator from Cliff Bjorgum, Master of Ceremonies.

Lynn and Jerry Cross spending a serious moment with Nelson Jacobs.

Tom Rawlings and his date, Claudia Pierce, enjoying each others' company.

Tom Rawlings looks over the shoulders of Pam Stimpson, Janet Williams and Lucy Stevens.



TUDOR'S HOLIDAY SEASON

DENVER CHRISTMAS PARTY

The Denver office held its annual Christmas Party on December 17, 1983, in the Luau Room at Trader Vic's in the Denver Hilton. Nearly 20 employees and guests enjoyed good food and the entertainment, especially from this year's Master of Ceremonies, Cliff Bjorgum. Dave and Irene Willer were special guests from San Francisco and Dave was presented with a miniature display to commemorate Tudor's sales booth at Waterpower '83.

SEATTLE CHRISTMAS PARTY

The Seattle office held its Christmas party December 17th in the Oak Room of the Washington Athletic Club, and included special guests Bob and Beth Janopaul from San Francisco. The evening began with cocktails and canapes. Most of the group sampled a tantalizing assortment of meatballs, shrimp rolls and other elegant hot and cold hors d'oeuvres. Bela Vadasz and Ed Peters spent much time in elaborate philosophical discussion to convince the bartender that brandy is, indeed, a "basic."

Dinner featured prime rib with appropriate side dishes, and spirited conversation was obvious at every table. Gerry Gibney and Wilson Binger tested each others' ability to count in Thai and order dishes in Bangkok restaurants.

Tudor President, Bob Janopaul, began the after dinner program by congratulating the office for recent successful selections on I-90 for WSDOT and King County's Interurban Bridge. He welcomed new drafter Roger Mason, recently of the Boise office, and welcomed back drafter Polly Rae. He then invited Bela and Eva Vadasz to join him for a re-presentation of Bela's 25-year Tudor Service Award originally presented at the San Francisco party on December 3rd. In addition to the traditional year marker, the Vadaszs received an engraved silver tray and matching crystal decanters. Bob also presented 10-year Service Awards to Gerry Gibney, DeWitt Jensen, and Tom O'Neill.

The remainder of the evening was taken up with dancing to the rock and roll beat of Mirage, a four piece band that mixed old and new favorites.

Eva and Bela Vadasz receiving 25-year Service Award from Bob Janopaul.

Phyllis Rudolph, Ron Lee and wife, Mary Bickerdike, and Dick Rudolph socializing before dinner.

Enjoying dinner are the Jensens, O'Neills and Roger Mason.

Gerry Gibney receiving his 10-year Tudor Service Award.

Tom O'Neill making sure his 10-year award was really there.

Dave and Jeri Alden, Ed Peters and Barbara Blount, DeWitt and Carol Jensen, enjoying the music of Mirage.

Dewitt Jensen receiving 10-year award.

Dave and Jeri Alden entertaining Bob Janopaul over hors d'oeuvres.



HAYPRESS CREEK HYDRO

Northwest Power Company has acquired right to develop the Middle and Lower Haypress Creek Hydroelectric Projects from the Southern Pacific Land Company. Tudor has been retained by Northwest to provide engineering services on the two projects.

Middle and Lower Haypress Projects are located adjacent to each other on the Haypress Creek near Sierra City in northern California. Each project is about 5 MW in size and utilizes 600 and 500 feet of head for power generation. Diversion structures will route water to a pipeline and penstock; water will return to the creek after power generation.

Prior to the transfer of development right to Northwest Power, Tudor provided engineering services to the Southern Pacific Land Company in preparing feasibility studies, FERC exemption applications, permit applications and stream gage monitoring activities.

In November 1983, Granite Construction Company agreed to negotiate with Northwest as the prime contractor with Tudor providing engineering services during final design and construction phases. A final agreement is expected to be reached in mid-March with construction scheduled to start in early summer of 1984.

Principal-in-Charge of the Haypress Creek Projects is Walter Anton and S.T. Su is Project Manager.

NEW FACES . . .

Tudor welcomes new employees:

. . . for san francisco



Greg Colzani
Field Inspector



John Kennedy
Field Engineer



Linda Noonis
Drafting Trainee



Tim Saunders
Field Engineer

. . . for Seattle



Philip Agosto
Drafter



Darin Johnson
Civil Engineer



Roger Mason
Drafter



Heidi Ouren
Civil Engineer



Polly Rae
Drafter

EL VADO POWER PROJECT

Tudor Engineering Company has been retained by the County of Los Alamos, New Mexico, to perform the final design for the construction of an 8 MW hydroelectric power plant at El Vado Dam on the Chama River in New Mexico. Future work orders will authorize Tudor to provide engineering services during the construction of the project. The project will utilize existing abandoned outlet works at El Vado Dam. The work involves the rehabilitation of the existing intake structure; the replacement of the existing 78-inch diameter penstock with a 96-inch diameter penstock inside the existing 12-foot diameter tunnel; and the construction of a powerhouse at the lower end of the tunnel.

The El Vado Dam is owned by the Middle Rio Grande Conservancy District and the reservoir is operated by the USBR. Water releases are made throughout the year to satisfy the demands of the water users for such purposes as irrigation, domestic use, and replenishing the water table. These releases will be used to generate power from the project at an average rate of 80 million kWh per year. Project construction is scheduled to start in May 1985 and be completed by August 1986.

The preliminary engineering work on the project was accomplished in Tudor's Denver office under the direction of Project Manager, Nelson Jacobs, and with the participation of Sal Todaro and Tom Rawlings, and electrical and mechanical support from Tudor's San Francisco office. The final design effort will be accomplished in San Francisco with the participation of the following individuals: Walter Anton, Principal-in-Charge; Nelson Jacobs, Project Manager; Roberto Iniguez, Deputy Project Manager; and Hans Albring, Project Engineer.

CONGRATULATIONS

Ed Peters, marketer for Tudor, Seattle, was elected President of the Seattle Chapter of the Society for Marketing Professional Services (SMPS) on February 16, 1984. The Seattle Chapter, with 120 members, is one of the largest in the U.S., and has an average attendance of 130-150 people at monthly luncheon meetings. Ed is former Chapter Secretary and Chairman of the Committee on Selection.

Tim Burgess received his Civil Engineering registration from the State of Idaho.

Jerry and Lynn Cross of Denver on the birth of a son, Simon Peter, February 7 1984.

Nelson and Dawn Jacobs on their 25th wedding anniversary, celebrated on February 14 1984.

Craig and Kim Giordano of San Jose, proud parents of baby girl Rebecca Lynn, February 28 1984.

THE TUDOR QUARTERLY is published by Tudor Engineering Company for the information and enjoyment of its employees, their families and friends.

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