FY 2004 ANNUAL REPORT

Natural Energy Laboratory of Hawaii Authority

An attached agency of the
Department of Business, Economic Development & Tourism
STATE OF HAWAII

MESSAGE FROM THE CHAIRMAN

Richard Henderson

Thirty years since its inception in 1974, the Natural Energy Laboratory of Hawaii Authority (NELHA) today provides an inspiring model for economic development, stimulating innovative business development to help diversify the Hawaii economy through tangible accomplishments.

Construction of the much-anticipated Hawaii Gateway Energy Center (HGEC) at NELHA in FY2004 heralded a new era for renewable and distributed energy for the state of Hawaii. Plans for this unique federally-funded, energy-efficient facility include research and development of leading edge renewable energy technologies and distributed energy resource applications to provide a national model for energy use.

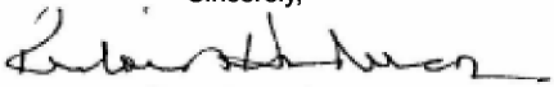
At the heart of this agency's economic success, NELHA tenants took new exports to market and garnered recognition and awards for their accomplishments. The economic setting that NELHA offers continues to foster growth and attract new tenants, demonstrated by the signing of several new long term subleases.

During FY04, a new industry sector at NELHA was initiated by newcomer Koyo USA Corporation who signed a sublease and quickly surpassed its own projections. Bottled water made from desalinated deep seawater has become a huge growth sector, promising to boost NELHA revenues significantly. Five other tenants in this industry sector also have plans for commercialization within the next few years.

NELHA aquaculture tenants made great strides forward, contributing 70% of the entire State of Hawaii production of aquacultured products. This industry sector has matured over the last 25 years as a mainstay at NELHA, and remains the primary user of NELHA's unique seawater resources. Their individual tenant growth remains steady and has put NELHA on the map as a source of high quality, healthy, fresh seafood products.

Behind the scenes, NELHA moved closer to meeting the Legislature's challenge of self-sufficiency. To this end, despite some difficult and often controversial decisions made last year to reduce operating expenses, NELHA continued to strengthen its foundations and provide reliable support services to its tenants. The multi-faceted dynamics at NELHA continue to create "out of the box" opportunities and economic growth and diversity in West Hawaii, and the Board of Directors looks ahead to many more years of positive input from this unique government agency.

Sincerely,



Richard Henderson
Chairman of the Board

NELHA MISSION STATEMENT:

To develop and diversify the Hawaii economy by providing resources and facilities for energy and ocean-related research, education, and commercial activities in an environmentally sound and culturally sensitive manner.

TABLE OF CONTENTS

PREVIOUS PAGE: New 55-inch diameter distribution system pipeline snakes along path that will carry deep seawater from 3,000 feet to tenant properties in NEL HA's Hawaii Ocean Science and Technology Park.

NEXT PAGE: Construction underway on the Hawaiii Gateway Energy Center (lower left); tenant commercial developments for Enzamin, Koyo USA Corporation., Moana Technologies LLC, and Big Island Abalone Corporation.


NELHA GROWTH

A view from the parking lot of the main building of the new Hawaii Gateway Energy Center at NELHA. Its photovoltaic panels mounted on distinctive "space frames"are owned and managed by the Hawaii Electric Light Company, Inc. and provide power to the grid.

PROGRESS

THE NATURAL ENERGY LABORATORY OF HAWAII AUTHORITY (NELHA) is a state agency which administers an 870-acre ocean science and technology park in Kailua-Kona on the Island of Hawaii. It is focused on bringing economic development and diversification to West Hawaii. To accomplish this, NELHA has created an attractive venue for research, education, and commercial development relating to ocean sciences and technology. Among NELHA's many assets are a unique dual-temperature seawater supply system, pristine natural resources, and ample leaseable land. Together, these assets set NELHA apart from all other technology parks and have created a prime setting for innovation and new industry development.

The NELHA story now spans 30 years. The visionary state leaders who created NELH in 1974 to support research and development in renewable energy and ocean-related science and technology laid the groundwork which would give Hawaii an unprecedented opportunity to capture the future. Over the next three decades, NELHA built on those foundations and evolved into a vital economic development asset for the state. Much has been accomplished, yet much remains to be done in the years ahead to ensure NELHA's continued success.

ECONOMIC HIGHLIGHTS

During FY04, 38 tenants were active with projects in various stages of research, demonstration, or commercialization. These included commercial, education, and research projects in areas such as alternate energy, aquaculture, marine biotechnology, water bottling, cold water agriculture, and others. Collectively, activities at the ocean science and technology park provided jobs for 238 people, with 19 positions at NELHA itself and the balance at tenant companies. Of these positions, 193 were privately funded. Over $15 million in capital investments were made by tenants in new construction, of which about $9 million was in permanent improvements.

NELHA aquaculture tenants made great strides for-ward, with a total of 125 acres of land in commercial production during FY04. Their gross sales totaled $19.5 million, or 70% of the entire State of Hawaii production of aquacultured products and 99% of that of Hawaii Island. Recent Department of Agriculture statistics show that aquaculture is the state's fastest growing agriculture sector, having increased 9.8% over the previous year to $27.65 million. Aquaculture as an industry sector has matured over the last 25 years as a mainstay at NELHA, and remains the primary user of NELHA's unique seawater resources. Individual tenant growth re-mains steady and has put NELHA on the map as a source of high quality, healthy, fresh seafood products.

Kona Bay Resources, Inc. CEO Brian Goldstein accepts 2004 Exporter of the Year Award from Governor Linda Lingle.

A new industry sector was launched during FY04 with the commercialization of Koyo USA Corporation, bottling desalinated water made from deep seawater for the Japanese market. By the end of FY04, other deep seawater bottling companies had followed suit. Enzamin USA had begun construction of their new commercial facilities, and Hawaii Deep Marine, Inc. was preparing to do the same. Three other tenant companies were also making plans for new facilities to commercialize production of bottled water and other deep seawater-derived products, primarily to an Asian market, but with plans to develop other international markets as well. To support this new industry sector, NELHA, with the assistance of DBEDT marketing expertise, launched a new trademarked logo and royalty program to highlight the uniqueness of the product on its label.

NELHA tenants' substantial export activities were recognized by the Governor's Exporter of the Year awards program, with Big Island Abalone Corporation accepting an award in the fall of 2003 and Kona Bay Marine Resources, Inc. earning the same title in the Fall of 2004. In addition, Koyo USA Corporation, first tenant to launch a business in a new industry sector at NELHA and exceed all projections, was also recognized as the Governor's Exporter of Manufactured Products for 2004.

SELF-SUFFICIENCY. Now that NELHA has matured as an economic development agency, the Hawaii State Legislature is phasing out state general funding support for annual operations to NELHA. To accelerate the process during FY04, NELHA reduced outside support services necessitated by temporary staff vacancies, reduced its vehicle and mobile equipment fleet, increased attention to streamlining and making creative use of existing resources, and sought new ways to increase the revenue stream. By examining expense structures and increasing efficiency of operations, NELHA was able to reduce operating expenses for FY04 dramatically. The NELHA Board also established a new rate structure, new fees for services, new minimum rents, and approved a royalty policy for water bottling companies, among other revenue-generating measures, to significantly enhance NELHA's revenue stream. By the end of FY04, NELHA's operating budget had also been dramatically decreased in response to state administration directives to greatly reduce General Fund expenditures (Figures 1 and 2, page 31).

NEW DIRECTIONS. Meanwhile, NELHA continued to look ahead, reexamining its role as a business incubator, and positioning for a renewed focus on renewable energy development. Using federal funds secured through the supportive efforts of Senator Daniel K. Inouye over the last several years, NELHA commenced construction of the long-awaited Hawaii Gateway Energy Center (HGEC) at NELHA facility in December 2003. By the end of FY04, contractor Bolton Construction Company was in the last stages of construction, with NELHA planning dedication ceremonies for the main building and first laboratory module for Fall 2004. The HGEC will host leading edge renewable and distributed energy projects, inviting partnerships with public and private sector groups active in the renewable energy industry.

HISTORICAL PERSPECTIVES

- NELHA began as "NELH" in 1974 when the Hawaii State Legislature created the Natural Energy Laboratory of Hawaii (NELH) on 322 acres of land at Keahole Point. NELH was mandated to provide a support facility for research on the ocean thermal energy conversion (OTEC) process and its related technologies.

- In 1979, a barge dubbed "Mini-OTEC," anchored offshore of Keahole Point, demonstrated the world's first production of net electrical power via closed-cycle OTEC.

- In 1980, after necessary environmental impact and other surveys were completed and master permits obtained, the NELH facilities and first pipeline to draw deep seawater from 2000 feet and surface seawater from 45 feet depths were constructed at Keahole Point.

- In 1981, shore-based OTEC research began with a project testing biofouling and corrosion countermeasures for the closed cycle OTEC process.

In 1979 the Mini-OTEC project at Keahole Point made world history as the first net power-producing plant to use the OTEC process, invented by French engineer Jacques D'Arsonval nearly 100 years before.

- By 1984 it was apparent that the seawater being pumped up for OTEC research had many other profitable uses. New legislation legalizing commercialization on state property allowed NELH tenants to commercialize.

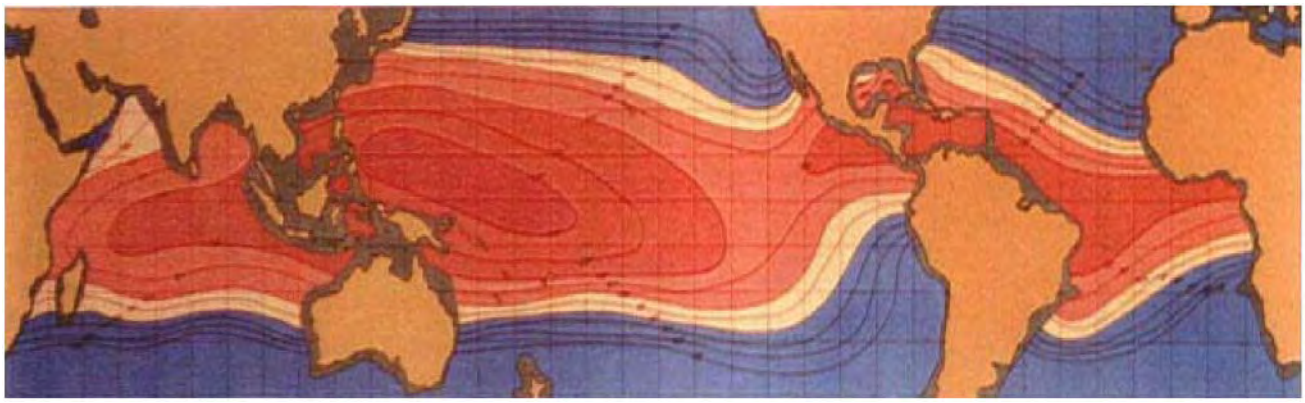
- In 1985, the Legislature created the Hawaii Ocean Science and Technology (HOST) Park on 548 acres at Keahole to accommodate NELH's growing businesses.

- In 1990, HOST Park and NELH were melded into one agency, the NELH Authority (NELHA), attached to the Department of Business, Economic Development & Tourism of the Hawaii State Government.

- In 1998-99, the Legislature expanded the activities allowed at NELHA to include other business activities that could enhance economic development and generate additional revenues to support the growing park.

- In 2003, the design and planning of the NELHA Gateway facilities was completed for distributed energy resources and renewable energy research and development.

- In 2004, the Hawaii Gateway Energy Center at NELHA neared completion, as did NELHA's new 55-inch pipeline seawater delivery system, with the world's largest and deepest (3,000 ft deep) seawater intake.



Regions of Earth where the delta T between surface and deep seawater would allow OTEC and other deep seawater applications to be economical, indicated by the red, orange, and yellow coloration.

OUTSTANDING RESOURCES

- THE LAND on which NELHA's Keahole facilities are situated consists of 870 acres with a steep offshore bathymetry for easy access to the ocean depths and what may become Hawaii's most valuable natural re-source: deep ocean water.

- COLD DEEP SEAWATER (DSW) is delivered onshore for tenant use from a chilly 6°C (43°F) resource at 2,000 feet depths. When the new 55-inch diameter pipeline system is completed, deep seawater will also be drawn from an even colder resource of 4°C (39°F) at 3,000 foot depth.

- WARM SURFACE SEAWATER (SSW) from a source rated Class AA pristine by the Hawaii Department of Health is at comfortably warm temperatures within the narrow range of 24.5° to 27.5°C (76° to 82°F) year 'round.

- PURITY OF NELHA'S SEAWATER SUPPLY makes it ideal as a growth medium for marine plants and animals.

- POTENTIAL ENERGY from a natural temperature differential ("delta T") of about 20°C between the cold and warm seawaters is available for use year 'round.

- ANNUAL INCOMING SOLAR ENERGY at NELHA is the highest of any location in the coastal United States.

- LOW RAINFALL, less than 15 inches per year, means more clear, sunny days to naturally maximize both marine and terrestrial plant photosynthesis and growth with no added expense of artificial lighting or heating, and virtually eliminates concern for unwanted dilution of critical salinities in open pond aquaculture.

- A WINTERLESS CLIMATE makes NELHA ideal for year 'round cultivation of a variety of organisms dependent on plant-based food resources, makes possible optimization of growout time for plant and animal species.

- PROXIMITY TO KONA INTERNATIONAL AIRPORT at Keahole puts NELHA at the center of the two largest markets in the world, Asia and North America. Direct flights from Kona to the East and West create opportunities to get fresh products to market fast.

- RELIABLE SUPPORT from NELHA and cooperative affiliated agency staff help nurture business development.

• HAWAII ENTERPRISE ZONE benefits apply to qualifying businesses located at NELHA's Keahole facilities, providing significant savings to them.

• A FRIENDLY COMMUNITY where the "Aloha Spirit" is alive and well, and a stable political climate provide the setting for all ventures at NELHA.

A simple heat exchanger is at the heart of deep seawater-based cooling in the Research Compound.

RESOURCE APPLICATIONS

NELHA's abundance of natural resources has provided fertile ground for the development of useful applications such as new ways to cool and heat, new ways to produce and save energy, new products to enhance the quality of life. The following section describes some of the applications for which cold seawater and other NELHA resources may be used, but this list is by no means complete. There are many other possible uses, some still waiting to be discovered.

• LOW COST COOLING using cold deep seawater to replace traditional coolants makes economic sense. One of the most cost-effective small-scale applications is for AIR CONDITIONING to replace traditional energy-hungry technologies. NELHA saves up to $4,000/month by using deep seawater to cool its 3 main buildings. Ideally, a heat exchanger such as flat plate titanium models designed for long-term use would provide years of virtually maintenance-free service. Such models are currently in use at a growing number of tenant as well as NELHA facilities at Keahole. INDUSTRIAL COOLING APPLICATIONS that use deep seawater to chill storage space can provide significant cost savings to traditional refrigerator or freezer technologies. Studies show that deep seawater air conditioning combined with industrial cooling has tremendous implications for improving economics and decreasing environmental impact of large scale coastal developments in tropical climates.

• A WIDE RANGE OF TEMPERATURE REGIMES are easily created using NELHA's natural seawater temperature differential—to maintain suitable environments for a wide variety of marine plants and animals as well as terrestrial flora and fauna, and many other applications, some still waiting to be discovered.

• ALTERNATIVE ENERGY PRODUCTION technologies use hydrogen, solar, oceanic and other renewable energy resources. NELHA's ability to provided tenants with a constant supply of chilly deep seawater creates a natural temperature differential with many potential energy possibilities. The same intense sun that warms the surface waters around Keahole Point also provides a ready source of natural energy that can be converted into usable form through the use of photovoltaics, photobioprocessors, and other solar energy-dependent technologies. NELHA's Keahole Point location and low rainfall combine to make the site ideal for research and development of all solar technologies.

• DISTRIBUTED ENERGY RESOURCES (DER) are a variety of modular power-generating technologies combined with energy management and storage systems to increase energy delivery efficiencies. DER technologies are playing an increasingly important role in the nation's energy portfolio. They are aimed at more efficient use of energy and can be used to meet base load power, peaking power, backup power, remote power, power quality, as well as cooling and heating needs.

• AQUACU LTU RE & MARINE BIOTECHNOLOGY can take advantage of the abundant resources at N ELHA to create optimum growing conditions for a wide range of marine organisms. With its unique complement of logistical and natural resources, NELHA has become recognized as a premier location for aquaculture development. NELHA's abundant supplies of cold, clean, nutrient-rich deep seawater and warm surface seawater combine with the ideal weather conditions to provide optimum growing environments. Since the aquaculture industry is the fastest growing sector of the U.S. federal agriculture program, aquaculture is an attractive area for business development in Hawaii.

• MARINE BIOTECHNOLOGY optimizes large-scale production of microalgae (microscopic plants) and other organisms with vast pharmaceutical and nutraceutical market potential. Microalgae grow extremely fast in the ideal conditions at NELHA. Over 30,000 different species have been identified worldwide, yet only a few have been commercially developed to date. Some of these are being cultured both in commercial production facilities and as experimental research ventures by businesses at NELHA. Researchers point out that microalgae are the fastest growing plants on earth, able to double their weight daily in laboratory cultures, and exceeding the average growth of trees by a factor of 100. They can yield a vast array of high-value pharmaceutical and nutraceutical products, with applications to carbon dioxide mitigation, AIDS research, pharmaceuticals, drug discovery, food supplements, and even alternative energy. Products from microalgae include food supplements, pigments used in molecular medical tagging and cosmetic products, natural fertilizers, organic mosquitocides, cancer-inhibiting drugs, and many others.

NELHA tenant products for export.
ABOVE: microalgae products;
RIGHT: Deep seawater products.

- COLDWATER AGRICULTURE chills the soil using cold deep seawater to improve on nature, dramatically increasing yields for land-based crops. This is a new area of development in which cold deep seawater is used to cool soil temperatures to create unique microclimates in a subtropical coastal setting. Test crops at NELHA's Keahole facility have demonstrated immense potential in the manipulation of growing conditions to increase and improve yield and shorten growing times for both temperate and tropical plants.

- A WIDE RANGE OF RESEARCH&DEVELOPMENT PROJECTS THAT FOSTER INNOVATION using the unique complement of resources at NELHA is creating the industries of tomorrow…today.

- DEEP SEAWATER-DERIVED PRODUCTS have recently been making a splash on the Asian international market. Intense interest in the mystique of deep seawater and any associated products, originally generated by activities in Japan, has spread to Hawaii. Asian countries have great interest in NELHA's unique pristine deep seawater resource and any products derived from it. These include desalinated drinking water packaged as bottled water or made into various types of beverages, mineral water, and mineral salts and associated products. All are key to a new industry sector at NELHA based solely on the deep seawater itself.

NELHA TENANTS

NELHA's tenants are the keys to its success. Their many accomplishments over the years have built a reputation of excellence both in scientific and technical innovation and economic development.

During the reporting period, seven new tenants joined the NELHA community, bringing the total to 38 for FY04, including several short term research projects. Of these, 19 were commercial tenants, nine were engaged in pre-commercial research, six were involved in basic research, and three were providing educational or community services. Of the 38 tenants, 30 were from the private sector. Six represented the new water bottling sector, and 22 either research or commercial aspects of marine biotechnology, including 17 in the aquaculture sector. At the end of FY04, two more new projects were preparing to join the NELHA community as tenants.

Percentage rent revenues collected by NELHA rose significantly from the previous fiscal year. Note that tenants report by calendar year, so fiscal year figures only reflect what was collected during the reporting period. Several new tenants were in transition or preparing to transition into full commercial production for the coming year.

During FY04, NELHA tenants had land use agreements (subleases, facility use agreements, facility rental agreements, and options) for 316 acres or 44% of its leaseable lands (717 acres). Of the total 870 acres under NELHA's jurisdiction, 53% was occupied by tenants, reserved for future expansion, or occupied by NELHA infrastructure.

The following section, arranged in alphabetical order, provides a brief description of each tenant's activities at NELHA.

BIG ISLAND ABALONE CORPORATION

The Big Island Abalone Corporation (BIAC) capitalizes on global demand for fresh abalone products and its expertise and experience in abalone culture and production. The NELHA Board first approved BIAC's proposal in FY97, allowing the company to commence pre-commercial research phase activities in early FY98. BIAC is commercializing the onshore culture of abalone, focusing on production of high-value Japanese northern abalone for the Asian market on the first ten-acre increment of its planned 60-acre aquafarm.

During FY 04, BIAC continued to optimize commercial production on its10-acre state-of-the-art abalone aquafarm in the HOST Park, now the largest single abalone production facility in the world outside of China. With a design

capacity of 100 tons/year, BIAC's aquafarm has performed exceedingly well, growing inventory rapidly. The company keeps over 1 million *Ezo awabi* abalone in stock and ships this highly prized species to seafood markets in Japan. Proprietary production methods have made the BIAC nursery one of the highest yielding in the world. BIAC ships both *Ezo* and red abalone to local, Asian and domestic US markets.

The company operates a sales office in Nara, Japan, to actively sell live abalone in Japan. Main markets have been in Tokyo and Osaka, with sales growing rapidly. In 2002, sales totaled 22 tons of live abalone, about 26% of total US exports. In FY03, sales reached 37 tons, and in FY04, 70 tons, of which 95% was exported, making up 40% of total US exports. At this rate, BIAC will soon be the largest single exporter of live abalone to Japan among other countries such as Australia, South Africa, USA, China, and Iceland within the next couple of years. BIAC will continue marketing efforts in Japan, the prime market for this valuable and delicious product. Big Island Abalone Corporation has been recognized for its growth by being selected as the Governor's New Exporter of the Year for 2002 and as the Governor's overall Exporter of the Year for 2003.

High-value fresh abalone are being sent daily to international markets by NELHA tenant Big Island Abalone Corporation.

BLACK PEARLS, INC.

Black Pearls, Inc. (BPI) has developed specialized hatchery technologies for black-lip pearl oysters, *Pin ctada margaritifera,* as well as for valuable finfish species. During FY04, BPI expanded into 1.25 acres adjoining its present site at NELHA for the finfish division of its operations. BPI's finfish division, Kona Blue Water Farms, has been developing culture techniques for a number of valuable finfish species, including: ulua (also known as Giant trevally *or Caranx ignobilis),* opakapaka (rosy snapper, *Pristipomoides filamentosus),* flame angelfish *(Centropyge loriculus),* deep water grouper (hapu'upu'u, *Epinephelus quernus),* another rare native grouper, the giant or king grouper, *E. lanceolatus,* Kona Kampachi™ (amberjack), omilu (bluefin trevally), uku (green snapper), and a number of aquarium-fish species. BPI's NELHA site will also provide hatchery support for a new offshore cage culture fish farm planned for a Kona coast location well outside of NELHA's ocean use corridor.

COAST SEAFOOD

During FY04, this long-standing tenant decided to terminate their tenancy after commercially operating for over six years at NELHA. The company is headquartered in the state of Washington, and had operated a nursery for clams and oysters to supplement company production by taking advantage of Hawaii's winterless climate. By August 2003, the company had vacated the site and a new interest for subsequent tenancy had been identified.

COMMON HERITAGE CORPORATION

Common Heritage Corporation entered into a 30-year sublease with NELHA for 5.461 acres in April 2004. The company planned to develop the site to demonstrate integrated deep ocean water systems which can be used to provide food, water, and cooling to support sustainable human habitats in tropical coastal communities with access to cold water.

Grapevines can be grown using deep seawater "cold-ag" methods which allow manipulation of growing seasons to maximize crop yields ten-fold over traditional methods.

CYANOTECH CORPORATION

Cyanotech Corporation has specialized in developing and commercializing natural microalgae-based products at NELHA since 1984 and has 90 acres of land in commercial production. The well-established company, with annual revenues in excess of $15 million, produces a variety of high-value products for the nutritional supplement and immunological diagnostics markets, in addition to microalgae-based products for the aquaculture feed/pigments and food coloring markets. Products include BioAstin® natural astaxanthin, a powerful antioxidant with expanding applications as a human nutraceutical; Natu Rose® natural astaxanthin for the aquaculture and animal feed industries; Spirulina Pacifica®, a nutrient-rich dietary supplement; and phycobiliproteins, which are fluorescent pigments used in the immunological diagnostics market. Cyanotech also operates a Japanese business unit, Cyanotech Japan YK, with an office in Tokyo. Cyanotech currently markets its products in the United States and thirty other countries through a combination of retail, wholesale and private label channels. Cyanotech was the first microalgae company in the world to receive third party organic certification as an ISO 9002 Registered Quality System.

DEEP SEAWATER INTERNATIONAL, INC.

Approved in the Fall of 2003, Deep SeaWater International, Inc. (DSWI) entered into a 30-year sublease with NELHA for 20 acres of unimproved commercial property in the HOST Park in June 2004. The company also was approved for a one year Conditional Option on 20 acres of land and a one year Conditional Right of First Refusal on 40 additional acres. DSWI plans to build a bottling plant to process and manufacture deep seawater-based products including bottled desalinated water and anticipated starting construction on the first phase of development by the close of FY04.

ENZAMIN USA, INC.

Enzamin USA, Inc. is a company with origins in Japan where it has a well-established product line based on *Bacillus natto,* a bacterial strain derived from fermented soybeans, or *Natto,* a food item reputed to have many health benefits and popularized in Japan since the 17th century. In September 2000, the company received NELHA approval to commence pre-commercial research at NELHA to develop health drinks, health foods, dietary supplements and skin care products utilizing water and minerals derived from DSW, and quickly began test marketing a variety of products. In October 2003, Enzamin began construction of the first building on its three-acre commercial site in HOST Park. The company has been transitioning from pre-commercial research status to full commercial status and plans to move out of its research site in the NELHA Research Compound in FY05 once the commercial facilities are complete.

FRIENDS OF NELHA

The Friends of NELHA (FON) is a non-profit organization whose sole mission is to support the education/ outreach and public relations needs of NELHA. Its members are community volunteers who serve as specially trained NELHA docent “Ambassadors,” making weekly presentations about NELHA to interested visitors. The West Hawaii Sea Grant Extension Agent from the University of Hawaii at Manoa, whose office is also located at NELHA and who provides weekly outreach presentations for NELHA, supervises the docent training program. During the reporting period, FON volunteers provided an additional 66 presentations to the general public and 26 more for private groups. Presentations by FON and SGES combined reached a total of 2,800 persons during FY04, including offsite presentations at the Rotary Club, the Waimea County Fair, the AAUW (American Association of University Women) Girls Engaging in Math and Science program, four local schools, and the Hawaii Manufacturing Association’s New Waves at NELHA event. FON volunteers logged a total of 1,724 hours of time to support NELHA outreach during FY04.

HAWAIIAN ISLANDS HUMPBACK WHALE NATIONAL MARINE SANCTUARY

NOAA (National Oceanic and Atmospheric Administration), an agency of the federal government, oversees the Hawaiian Islands Humpback Whale National Marine Sanctuary (HIHWNMS), established in 1997 to protect the endangered humpback whale. The sanctuary is comprised of five separate areas abutting six of the major islands of the State of Hawai‘i. The five areas of the sanctuary cover relatively shallow offshore areas built up

from the sea floor by the development of the Hawaiian Islands chain, and NELHA sits at its southernmost boundary. The HIHWNMS became a tenant at NELHA in April 2004, to further its functions on the Big Island to protect humpback whales and their habitat within the sanctuary; to educate and interpret for the public the relationship of humpback whales and the Hawaiian Islands marine environment; to manage human uses of the sanctuary consistent with the Hawaiian Islands National Marine Sanctuary Act and the National Marine Sanctuary Act; and to identify marine resources and ecosystems of national significance for possible inclusion in the sanctuary. A blessing of the new office space was planned for July 2004 with Congressman Ed Case as guest speaker.

HAWAII DEEP MARINE, INC.

Hawaii Deep Marine, Inc. continued its R&D and test marketing activities during FY 04, and also commenced the transition to full commercial status. In April 2004, HDMI entered into a 30-year sublease with NELHA for 4.5 acres of commercial property. This marked the beginning of the company's transition from pre-commercial research to full commercial status. HDMI had been the first company with an interest in developing deep seawater-based products to become a NELHA tenant in 1999 and pioneered the test-marketing of a number of products including desalinated water, nigari, sea salt, salt spray for food use, and others since then. A new owner was introduced to NELHA in December 2003 and construction plans for the commercial site were commenced soon thereafter.

HAWAII DEEP OCEAN WATER LLC

Hawaii Deep Ocean Water (HDOW) LLC has been conducting pre-commercial research and development since 2000 using NELHA deep seawater resources. The company has rented a small research site at NELHA. A strong parent company based in Gifu Prefecture, Japan, for over 20 years provides support and a well-developed production, marketing, and sales system in which the new products are being test-marketed. The company planned to embark on its commercial production phase at NELHA during FY05, with the intention of building a bottling plant facility on NELHA properties.

HIGH HEALTH AQUACULTURE, INC.

High Health Aquaculture (HHA) supplies certified Specific Pathogen-Free (SPF) broodstock to the world's shrimp hatcheries. "The world's leading shrimp breeder and supplier of SPF Broodstock", High Health's shrimp breeding technology is based on many years of practical shrimp growing experience combined with state-of-the-art breeding, genetics and marine biotechnology. HHA has operated a biosecure shrimp breeding facility at NELHA since 1995 and has made significant contributions to improving the shrimp production industry worldwide. All SPF stock is certified by the Hawaii State Department of Agriculture to validate the company's motto: "Healthy shrimp are profitable shrimp."

HHA broodstock--big and healthy--produced from a biosecure culture facility at NELHA.

INDO-PACIFIC SEAFARMS, INC.

Indo-Pacific Sea Farms' mission is to develop and commercialize innovative technologies for sustainable production of reef-dwelling organisms. IPSF cultures photosynthetic molluscs and cnidarians as well as other marine species for the aquarium industry. The pristine seawater supply at NELHA provides an ideal environment for these organisms. Cultivation requirements for the plant-animal symbionts are similar to those of free-living microalgae and include ample tropical sunlight, warm surface seawater and a carefully controlled concentration of deep seawater to control temperature and supplement essential inorganic nutrients. IPSF products are currently in high demand in the aquarium industry.

KONA BAY MARINE RESOURCES, INC.

Kona Bay Marine Resources, Inc. is a marine biotechnology company using advanced technology in the production of SPF (Specific Pathogen-Free) and SPR (Specific Pathogen Resistant) shrimp broodstock and disease-free bivalve seed. Kona Bay supplies the global aquaculture industry with high quality, certified pathogen-free seafood products, which are produced in a land-based, proprietary, state-of-the-art, bio-secure facility. The Company markets SPF and SPR shrimp broodstock in Asia, US Mainland and Hawaii and certified disease-free clam seed in the US mainland, Europe and Mexico. In the last year, Kona Bay has become the leading exporter of SPF and SPR shrimp broodstock in Hawaii, earning the Governor's Exporter of the Year Award for 2004. Kona Bay has developed a global brand and reputation, and is recognized throughout Asia as the leading provider of SPF and SPR shrimp broodstock. Recently, the Company completed an expansion that increased production by 50%. In 2005, Kona Bay expects to further expand its production to double its capacity.

KONA COLD LOBSTERS LTD.

Kona Cold Lobsters Ltd. (KCL) utilizes the deep cold seawater supplied by NELHA to create a habitat for live Maine lobsters and live Dungeness crabs. KCL imports live lobsters and crabs from the natural fisheries and rejuvenates them in cold seawater holding pens for distribution throughout the Hawaiian Islands and select Asian destinations. KCL is therefore able to provide the freshest, most stable supply of live Maine lobster in the Pacific basin. Currently KCL services over 50 customers on five Hawaiian Islands, including supermarkets, restaurants, and resorts, meeting their specific size and quantity requirements on a daily basis. KCL also has the expertise and experience to culture Maine lobsters in a multidisciplinary system that includes broodstock, husbandry, nutrition, pathology and habitat design, and has successfully bred and raised lobsters from egg to sexual maturity for over 20 years.

Koyo's new bottled water made from 100% deep seawater, bearing NEL HA's trademarked logo.

KOYO USA CORPORATION

Koyo USA Corporation is a new Hawaii-based company with financial backers from Gifu Prefecture, Japan. During FY03, the company became the first deep seawater bottling company to commercialize in the state of Hawaii, and built the first phase of a commercial production facility on eight acres for production of deep seawater-based beverages and other products for export to the Asian market. A well-organized and highly motivated staff initiated and implemented on-site development in record time, starting with NELHA proposal approval in January 2003, followed by on-site development and building construction completion by June 2003. Initial products are being marketed to the mother company's existing broad-based distribution network in Japan. By the end of FY04, Koyo had added 22 acres for expansion to its original sublease, and plans for new production facilities were already in the works. Koyo began producing its first bottles with the NELHA Logo/Trademark on the KOYO label in June 2004. To celebrate the company's early success, in conjunction with the grand opening on February 16, 2004, of the new 75,000 square foot production facility at NELHA, a conference on Oahu was planned for several hundred employees and guests from Hawaii. Production capabilities would reach 200,000 bottles per day for export to Japan, and Koyo USA would eventually earn the Governor's Award for Exporter of Manufactured Products for 2004.

M ERA PHARMACEUTICALS (formerly AQUASEARCH, INC.)

Mera Pharmaceuticals has been a tenant at NELHA since 1995, under its former name Aquasearch Inc. Specializing in marine biotechnology, it has been a global leader in the development of proprietary, cost-effective, photobioreactor technology for commercial scale production of pure cultures of microalgal species, and in re-search and development of high-valued products derived from microalgae. Mera has capitalized on its new 3-acre Hawaii Research, Development and Production (HRDP) Facility, constructed during FY99, allowing its staff

scientists to conduct R&D on new microalgae products on the lab bench and then ramping up from laboratory-scale culture flasks to fully computerized mass production, all in the same location. The cornerstone of the microalgae-based business and key to this versatility is the company's proprietary and economical photobioreactor technology, the Aquasearch Growth Module (AGM) which the company says creates ten-fold increases from previous production capacities.

The Aquasearch Growth Module is a commercial-scale closed photobioreactor used to culture microalgae.

MOANA TECHNOLOGIES LLC

Moana Technologies, Inc. has been a NELHA tenant since 2001, specializing in shrimp brood stock genetics using traditional breeding techniques. The company came to NELHA with a strong technical team and solid financial backing. The company also operates a facility on Oahu which serves as a quarantine site to screen all genetic stock prior to introduction at the company's NELHA Keahole sites. During FY 04, the company continued with proprietary breeding operations and research at NELHA using certified disease-free shrimp stock. These animals are routinely transferred to the NELHA research site from Moana's Oahu quarantine facilities following strict biosecurity protocols. At NELHA, animal grow out cycles are closely monitored and access to the site is limited only to company personnel with biosecurity clearance.

OCEANIC INSTITUTE

Oceanic Institute (OI) entered into a long term sublease in FY04 for a four-acre parcel in the HOST Park section of the NELHA properties. OI is a well-established private research organization headquartered at Makapuu, Oahu, that "applies new technologies in marine science, biology, and chemistry to remove obstacles to the culture of significant commercial and depleted species." OI has a federal grant to develop the facility with matching funds from the state, administered through NELHA. The site is being planned to provide a venue for a finfish outreach, training and demonstration project, and also provide location for a temporary public outreach and education facility for NELHA using the state portion of the funding.

OCEAN RIDER, INC.

Ocean Rider, Inc. has been a tenant at NELHA since 1998. Citing the pristine quality of the seawater supply as the primary reason for choosing this location, the company has established a commercial culture facility using proprietary culture systems for the care and feeding of seahorses. The company targets the live ornamental fish industry outside of Hawaii. During FY 04, the company enjoyed its first full year of production at its new commercial site in the NELHA Small Business Compound. Sales of seahorses have continued to increase, and satisfied customers worldwide continue to report gratitude for the high quality services and products from this innovative company. To protect Hawaii's pristine natural resources, Ocean Rider does not sell its prized exotic seahorses locally, but only to out-of-state locations around the world.

ONO TAKE, INC.

Ono Take, Inc. has been using deep seawater to create temperature-controlled environments for the cultivation of mycomedicinal mushrooms. The company specializes in production of *shiitake (Lintinula edodes), reishi (Ganoderma lucidum)* and *maitake (Grifola frondosa)* mushrooms, long regarded by Asians and Western medicine alike for its support and enhancement of human immunological function. During FY 04, Ono Take, Inc. decided to end its tenancy at NELHA and made plans to close its operations.

POSEIDON FISH COMPANY

Poseidon Fish Company established its presence at a one-acre site in the NELHA Farm Compound during FY04. The new company intended to develop an finfish culture operation at the site.

ROYAL HAWAIIAN SEA FARMS, INC.

Royal Hawaiian Sea Farms, Inc. (RHSF) has been in business at Keahole since 1987 and commercially produces *limu,* or edible sea vegetables. Sales of these popular nutritious delicacies have consistently reached over two tons per week. A pickled *ogo (Gracilaria)* product is being processed under the "Waimanalo Ko-Ko" brand. In addition to *limu,* RHSF also produces salt water tilapia *(Tilapia)* and milkfish *(Chanos).* Intensive applied research is being conducted to investigate the potential of commercially producing edible sea cucumbers *(Stichopus),* the Hawaiian limpet, *opihi (Cellana),* and warm water abalone *(Haliotis).*

SAVERS HOLDINGS LTD

Savers Holdings Ltd. became a commercial tenant at NELHA during FY04, signing a 30-year sublease in May 2004 for six acres of commercial property in the HOST Park. Savers commenced plans for construction shortly thereafter. The company will develop deep seawater-based bottled water products for the Korean market.

TAYLOR SHELLFISH

Taylor Shellfish–Kona is a subsidiary of Taylor United, a family-owned company reputed to be the largest commercial shellfish producer in the U.S. Headquartered in Quilcene, Washington, since the late 1960s, Taylor achieves maximum marketing flexibility by operating a range of nursery and grow out locations for several varieties of shellfish. One of these sites is a nursery at NELHA where both Manila clams *(Venerupis japonica)* and Pacific oyster *(Crossostrea gigas)* "spat" enjoy a "Hawaiian grow out vacation" during their early months of growth. The company's shellfish "seed" or "spat" start life in a hatchery in the Pacific Northwest. When only about 250 microns in size, soon after settlement from the swimming, or planktonic stage, they are brought to the Kona facility. After about three months of growth on screens and sand-filled raceways, they reach about 5-6 mm, and most are returned to Washington state for 1-4 years of grow out to market size in Taylor's facilities. The NELHA nursery annually produces 100-120 million oyster seed and 200-300 million clam seed. Some of these are also sold to other oyster and clam farms around the world, including destinations as far away as South Africa. The Kona nursery makes good economic sense to Taylor since the unique N ELHA dual seawater supply enables the company to maintain the precise temperature regimes required by the delicate early stages of growth for very low cost, and Hawaii's winterless climate allows year-round productivity instead of only seasonal production. During FY04, Taylor Shellfish–Kona continued to work on developing an expansion of its facilities to meet growing market demand for its high quality products.

TURQUOISE TECHNOLOGIES, INC.

Turquoise Technologies, Inc. operates an antenna on the administration building rooftop in NELHA's Research Compound to provide wireless Internet access to NELHA's tenants and clients in the Keahole area. This brings high speed Internet service to NELHA's properties without the need for costly underground cabling infrastructure.

UNIVERSITY OF HAWAII AT MANOA—HAWAII INSTITUTE OF MARINE BIOLOGY

Dr. Mark Huntley of the Hawaii Institute of Marine Biology brought his research proposal for the study of oceanic 'jellies' (gelatinous zooplankton) to NELHA during FY03, and entered into a one year Facilities Use Agreement for research space at the beginning of FY04. The project planned to conduct studies on the life history, physiology, growth and population dynamics of tropical marine zooplankton. This work was anticipated to contribute significantly to scientific predictive capacities in tropical planktonic ecosystems.

UNLIMITED AQUACULTURE CORPORATION

Unlimited Aquaculture Corporation is a Canadian-based company developing Hawaii's first coldwater halibut and black cod ("butterfish" or sablefish) aquaculture farm to service markets throughout the Pacific Basin with fresh product. The company prepared to sign a Facilities Rental Agreement for a one-acre lot in the NELHA Farm Compound for the first phase of its production facilities, with long range plans for further expansion.

UNIVERSITY OF HAWAII—INFRASOUND LABORATORY OF HAWAII

The Infrasound Laboratory of Hawaii (ISLA) is a project of the University of Hawaii at Manoa's Hawaii Institute of Geophysics specializing in atmospheric infrasound monitoring. A unique project that collects and analyzes data from infrasonic signals (pressure disturbances whose frequencies are below the hearing range of the human ear) in the atmosphere, ISLA became a NELHA tenant in March 2000. Initially supported through U.S. Department of Defense funds, ISLA is part of an international network dedicated to monitoring compliance with the Comprehensive Nuclear Test Ban Treaty (CTBT). The CTBT seeks to eliminate the proliferation and use of nuclear weapons and to ensure complete global disarmament under strict international control. ISLA operates and maintains IS59, or KONA, a 4-element infrasound array located on the forested slopes of Mt. Hualalai, as well as two other arrays outside of Hawaii. The Kona array has exceptionally low ambient noise levels and acoustic detection thresholds and can detect low-frequency atmospheric sound waves generated by natural and man-made sources such as explosions, volcanic eruptions, meteorite impacts, and severe weather and thus may provide advance warning of potential threats to Hawaii. ISLA can analyze various aspects of infra-sonic wave propagation, source characterization, and event location. At the beginning of FY04, *West Ha waii Today* featured ISLA in an early July edition regarding its contribution of infrasound data relating to the investigation of the U.S. space shuttle disaster. Ongoing research concentrates on infrasonic tracking of storms systems, modeling sound wave propagation over thousands of kilometers, characterizing the ambient infrasonic field in the Pacific, optimizing wind-noise-reducing systems, and ray-tracing of wave paths from atmospheric meteor entries.

UNIVERSITY OF HAWAII—SEA GRANT EXTENSION SERVICE

The University of Hawaii Sea Grant Extension Service program promotes responsible stewardship for the area's marine and coastal ecosystems using a multi-level, multi-generational education/outreach approach including the general public, schools, resorts, and collaboration with several agencies and NGOs. The West Hawaii Extension Agent, Sara Peck, with a part-time assistant, maintains an office as a tenant at NELHA, and provides outreach services to NELHA. During FY04, major accomplishments for this Kona Sea Grant office included:

- Continuation of ReefWatchers, a five-year old volunteer marine resource monitoring program providing long term fish and invertebrate count data for Division of Aquatic Resources and University use.
- Continuation of ReefTalk, a free public education/information program providing eleven talks for the past eleven years in West Hawaii.
- Continuation of the West Hawaii Fisheries Council (WHFC) and outreach components in Milolii and Kohala for the fifth year. WHFC is a community-based marine resource management effort, tasked with specific marine resource conservation goals by Act 306, 1998.
- Continuation of the four-year old ReefTeach program for not only West Hawaii Explorations Academy students, but also the Kona Girl Scouts and a cadre of adults. The goal of this program is to inform swimmers and snorkelers at Kahalu'u Beach Park about the importance of coral reefs, and suggest how people can be low impact reef visitors.
- Served as liaison and coordinator of outreach services for NELHA with the Friends of NELHA, a not-forprofit corporation formed to support the education /outreach and public relations needs of NELHA, which continued to provide presentations to schools and the general public. (Please see the "Friends of NELHA" section for additional information.)
- Continued to provide resource support for the West Hawaii Explorations Academy to ensure that the Aloha Kai, Wana Survey, and Snorkel Survey projects remain available and active for student benefit.

Sea Grant West Hawaii generates approximately $150,000 annually in federal, state, and private funding to maintain its current programmatic level. Funding and program partners include: Harold K.L. Castle Foundation, Hawaii Community Foundation, The Nature Conservancy, Pa'aPono Foundation, Community Conservation Network, DBEDT/CZM, Division of Aquatic Resources, NOAA, National Fish and Wildlife Foundation, National

Marine Fisheries Service, The Kamehameha Investment Corporation (Bishop Holdings), The Kona Reefers Dive Club, the Kona Underwater Photography Society, the Hawaii Island Recreation SCUBA Association, the National Park Service, and many others.

The UH Sea Grant program continues to provide NELHA with a public information/presentation program. The Sea Grant office allocates approximately 25% of staff time toward building the Friends of NELHA organization, providing training for volunteers, scheduling public presentations, fielding inquiries, marketing and giving the presentations. Extension Agent Peck taught one Professional Development DOE class and gave 20 public and private presentations for NELHA during FY04. The total value of services provided by Sea Grant to NELHA for staff time, materials and equipment use was $13,500 for this reporting period.

UWAJIMA FISHERIES, INC.

Uwajima Fisheries, Inc. (UFI) operates a facility at NELHA for growing *hirame,* a flounder highly prized by the Japanese for *sashimi* and *sushi.* Uwajima Fisheries markets their 1.5 to 2 pound *hirame* through a Honolulu distributor who supplies the Oahu *sushi* market. UFI manages the maturation and spawning of its broodstock for year-'round production of eggs. UFI also utilizes the NELHA surface and cold deep seawater for the semi-intensive polyculture of marine shrimp, milkfish and the edible seaweed, *Gracilaria spp.,* also known locally as *ogo, and* the popular finfish species Pacific threadfin *(moi)* for local markets.

U.S. COAST GUARD

Since December 2000, the U.S. Coast Guard has been operating a radio direction finding (DF) antenna on the NELHA Laboratory Building at Keahole Point to aid mariners in distress. NELHA is a perfect site due to its unobstructed views, low RF noise, and accessible power and phone lines. The Coast Guard DF antenna is only 35 inches high and weighs approximately 14 pounds. The federal agency has plans to upgrade systems in the year 2005 and, although a site a NELHA may not be necessary at that time, in the interim it is a vital component to ensure mariner safety. NELHA provides electrical service and access for maintenance to the Coast Guard at no cost as a public service.

VERIZON WIRELESS

Verizon operates two roof-mounted antennas installed atop the NELHA administration building. During FY03, NELHA negotiated a new rental rate for a proposed antenna pole and small area adjacent to the Research Compound. Verizon planned to install three antennas of its own and reserved the right to sub-sublet space on the pole to other users on the condition that NELHA participate in rental negotiations with any secondary users. The antennas installed at NELHA allow Verizon to provide commercial wireless telephone service for Keahole and the surrounding areas of Kailua-Kona.

VULCAN POWER

Vulcan Power Company became a tenant at NELHA in early FY04, renting administrative space to accomplish the research and development phase of a thermal/wind power project development.

WEST HAWAII EXPLORATIONS ACADEMY—PUBLIC CHARTER SCHOOL

The West Hawaii Explorations Academy (WHEA)—Public Charter School, the first charter high school in the State of Hawaii, has been a tenant at NELHA since May 2000. An outgrowth of an education program based at Konawaena High School, WHEA-PCS is an independent school in which its student body, consisting of mostly juniors and seniors, spend a full academic year at NELHA working on projects related to the resources available at Keahole Point. WHEA student projects have included educational presentations to thousands of elementary, middle and high school students each year; a solar car prototype; design and construction of an electric car which placed first in the annual HELCO-sponsored Electron Marathon championship race; hydroponic and cold-water agriculture; and numerous aquaculture projects.

NEXT PAGE: Final stage of installing the surface seawater discharge manifold in December 2003 at the 55-inch pipeline pump station.

ESSENTIAL SUPPORT SERVICES

BOARD OF DIRECTORS

The NELHA Board Vision Statement: "Growing sustainable industries for the 21st century" summarizes the Board's intent that NELHA's many activities all support its legislative mandate to promote economic development and diversity.

The NELHA Board of Directors is responsible for establishing policies pertaining to NELHA operations and growth, maintaining NELHA property and facilities, reviewing and approving proposals from prospective and existing tenants, and planning and coordinating the development of the NELHA site. NELHA staff provides support with technical assistance and by developing staff recommendations to assist the Board in its decision-making. The eleven Board members come from the public and private sector, serving as volunteers and representing a broad range of interests to support NELHA policy development, planning, and operations.

Throughout FY04, the Board worked closely with the NELHA Executive Director (E.D.) and staff to monitor budgetary matters and analyze long term needs to support self-sufficiency. In October 2003, an investigative committee was appointed to work with the E.D. and staff to review and assist with rate determinations. In April 2004, following advice from this Rent Structure Committee, the Board authorized the E.D. to issue an RFP to engage a planning firm in Hawaii to work with the committee to develop an updated master plan for NELHA.

The many tenant activities at NELHA could not take place without the essential support services provided by all divisions of the NELHA staff. This section includes just a few highlights from FY04.

ADMINISTRATION

BUDGET CHALLENGES. The budget was the focus of FY04 challenges. FY04 began with a spending moratorium issued by the Governor through July 2003, and a 20% budget cut was also imposed. In response, the Executive Director and Fiscal Officer were able to reduce internal budget by $700,000, including $640,938 ($119,502 from general funds, and $521,436 from special funds). Contracted services such as cleaning and security were severely reduced, and even eliminated for a time. The Board worked closely with NELHA staff each month throughout this critical year to monitor revenues and expenditures. In addition, a new directive from the Governor's Office in July 2003 stated that ceded lands revenue payments to OHA would become a direct transfer out of revenues—not be treated as an expense as in previous years.

Director Liu, Koyo USA President Takano, Governor Lingle, and Lt. Gov. Aiona toast the new logo with Koyo "MaHaLo" water made from NEL HA's 100% deep seawater.

TENANT SUPPORT. During FY04, NELHA staff provided support in areas that would facilitate tenant business activities.

A Trademark Licensing Agreement was drafted with the assistance of the Attorney General's Office, and a logo signifying 100% deep sea water content for use on tenant products was submitted for federal trademark registration. In April 2004, Governor Lingle hosted a ceremonial signing and media event on Oahu for the 100% Hawaii Deep Seawater NELHA trademark with Lieutenant Governor James Aiona, Director Ted Liu, and President Yasuki Takano of Koyo USA Corporation, the first NELHA tenant to use the trademarked logo in product labeling. NELHA also organized a Deep Seawater Bottling Industry Meeting in May 2004 to bring representatives from the state agencies who are involved with regulatory or permitting processes for this new industry and allow them to meet directly with NELHA tenants.

NELHA continued to work with the Hawaii Foreign Trade Zone to complete applications for FTZ designation for certain tenant sites. FTZ waived all application costs for those tenants who have expressed a desire for the designation, and provided staff support to coordinate the lengthy application process. By February 2004, FTZ representatives visited NELHA tenants to better assess their needs.

During FY04, the Executive Director met with Young Brothers and the Hawaii District Harbor Manager to discuss the expected increase in container shipping over the next twelve months. In March 2004, the Hawaii District Harbor Manager and DLNR Small Boat Harbor Representative toured NELHA and met with deep seawater bottling tenants to learn more about the process and potential opportunities to be expected with shipping of this valuable export product.

The NELHA ED and Administrative Projects Manager met with Mayor Harry Kim regarding future projections for NELHA growth. The Mayor expressed strong support of NELHA in the pursuit of its core mission relating to energy and ocean science and technology. He acknowledged and values the respect that NELHA enjoys in the international arena and the generally positive relationship it has had with the local community over the years. The Mayor noted it is vital that NELHA maintains this positive relationship as it enters into a period of unprecedented growth in commercial activities that are finally placing it on the path to financial independence. While he welcomed the positive news from NELHA, he also cautioned the Board, staff, and tenants to give thought to the context in which all future growth will be occurring, as West Hawaii is moving through a very challenging period of growth. Of particular concern is NELHA's potential impact on highway traffic, and quality of life issues for the general community.

NELHA/AIRPORT CONNECTOR ROAD. In June 2004, NELHA received good news from Congressman Ed Case that $500,000 in federal funding had been designated to NELHA for planning and design of a connector road between NELHA and the Airport. This important project will connect two existing roads, one at the Kona International Airport and the other at NELHA, to enhance the infrastructure of both agencies. The new road will provide easier access to air cargo services for NELHA tenants, and ease traffic flow on the main highway fronting the NELHA properties.

LEGISLATURE: During FY04, NELHA resubmitted a request to amend its statutes relating to confidentiality of NELHA tenant information by including a new section that would allow greater protection of proprietary tenant data from public disclosure. An appropriation was obtained for capital improvement funds to renovate the main pump station cover, with $750,000 for construction and $90,000 for planning and design.

In the Fall of 2003, 16 members of the House Finance Committee and the Senate Ways and Means Committees attended a site visit and informational briefing at NELHA. Board Chairperson Richard Henderson also attended.

Work on the new deep seawater pump intake plumbing at the 55-inch diameter pipeline pump station in December 2003.

One of the 200 HP Gould split case centrifugal pumps awaiting installation in the surface seawater supply section of the new 55-inch pipeline pump station.

Principal interest during the briefing were the NELHA fiscal actions following the last legislative session and the resulting effects. The members were briefed extensively on new tenants, new projects, and relationships with the County, State, and Federal agencies. During the briefing the members were able to walk out to the deep seawater pumping station which is in need of repair and view the damage. As a result, they expressed strong support of the financial needs to effect repair. Following the briefing, the members also visited several tenant operations.

PUBLIC RELATIONS. NELHA is an integral part of the West Hawaii community and regularly supports community-based activities, or hosts visitors on site at the NELHA properties at Keahole. During FY04, NELHA hosted numerous visitors including University of Hawaii officials and State Representatives from Oahu, Maui, and Hawaii; a delegation of private and governmental officials from Niigata Prefecture, Japan; a delegation of five visitors from Taiwan representing Kuo Toong International Company; Undersecretary Grant Aldonas—U.S. Department of Commerce/International Trade Administration, Congressman Ed Case from Hawaii's Second Congressional District, State Representative Cindy Evans, State Representative Mark Jernigan, Mr. Pete Hendricks representing Mayor Kim; Dr. Ja-Kyong Chun of the Korea Legislation Research Institute concerning future Deep Sea Water regulations in Korea; the Japanese Chamber of Commerce; the Consul General of Japan, Masatoshi Muto; the Crown Prince and Princess of Japan; Senator Kalani English; government officials and potential investors from southern China, Taiwan, Norway, and North America; officials from the Taiwan Government interested in creating a NELHA-like deep ocean water facility in Taiwan; and Congressman Neil Abercrombie from Hawaii's First Congressional District.

Strong Angel II was set up next to the new HGEC Laboratory module, inviting the public to witness the international communications capabilities and relief efforts that can be mobilized using a variety of innovative approaches and technologies.

NELHA was the venue for a number of events during FY04. NELHA staff, Friends of NELHA, and NELHA tenants also participated in hosting the New Waves at NELHA event as part of the Hawaii Big Island Festival, organized by the Hawaii Food Manufacturers Association, in November 2003, showcasing the finest culinary talent in the United States and Hawaii, and Big Island products. Two races were allowed to use the NELHA access road for a portion of their route: the marathon section of the internationally broadcast Ironman Triathlon World Championship on October 18, 2003, and the Kona Marathon on Sunday, June 20, 2004. The Big Island Festival event "New Waves at NELHA" used the new Gateway facility as a venue for a luncheon in November 2003. Plans were also made to host Strong Angel II, a project of the Office of the Secretary of Defense and DARPA, at NELHA during the summer months. Strong Angel II is a sustainable and self-sufficient information management system for austere environments, that follows a successful Strong Angel I held In June 2000 on the Big Island. The event changed the face of how the military does business in addressing humanitarian relief efforts.

NELHA also assisted in the sponsoring the West Hawaii Marine Bio Conference in July 2003, an effort to bring the marine industries in West Hawaii together to determine work force needs.

NELHA and its tenants were the subjects of media interest, including a number of film/video projects. A Korean film crew from Documentary Korea Co., Ltd. spent two days at NELHA filming tenants and the facility for a future educational show on Korean National TV (August 2003); a Japanese based business magazine, Diamond Weekly" visited NELHA and covered the new Deep Seawater Bottling companies as well as Cyanotech (September 2003); and a production crew from the Seoul Broadcasting Corporation for portions of a 60-minute documentary to have been broadcast on December 2, 2003 (October 2003).

OFFSITE MARKETING ACTIVITIES. The NELHA Administrative and Projects Coordinator participated in the the 1st Hawaiian Bank's annual "Outlook on the Economy" in October 2003, and the Energy/Ocean Conference in June 2004 in Palm Beach, Florida; the Executive Director participated in the DBEDT Sponsored Bio2004 Conference in San Francisco June 6-10, 2004.

OPERATIONS

The Operations Department manages the operation and maintenance of all of NELHA's facilities and equipment. Its staff of eight is dedicated to maintaining an efficient and safe working environment, reliable services, and premium quality resources, central to the uniqueness and success of NELHA as an economic development agency. The most critical responsibility of this department is the operation and maintenance of a unique seawater delivery system to keep NELHA's primary resource, pristine seawater, flowing 'round the clock, 24/7, exclusively for NELHA tenant use. Each and every member of this department is committed to providing tenants with an uninterrupted seawater supply to support their diverse operations. Operations staff include skilled planners, mechanics, electricians, and maintenance specialists who combine their talents and initiative to find economical solutions to repair and maintenance challenges, saving many tax dollars in the overall operations of the facility.

SEAWATER DISTRI BUTION CONNECTIONS. To support tenant seawater supplies, a new 28" seawater distribution pipeline was installed to supply warm, surface seawater for the NELHA Farm Compound where four aquaculture tenants are located. Also during FY04, deep seawater distribution system connections were made for Koyo USA, Enzamin USA Inc. and the Gateway Energy Center. In addition, permanent seawater, freshwater, electric and telephone utilities were installed for Ocean Rider and Black Pearls, Inc. in the Small Business Compound.

OUTDOOR WET LAB. During FY04 the NELHA outdoor wet lab was totally refurbished, re-plumbed and fitted with new wet and dry bench tops. Researchers from Woods Hole and Scripps Oceanographic institutions were able to conduct their research on schedule and were pleased with the new improvements.

POWER OUTAGE. On June 11, 2004, an electrical short in an underground 12,470 volt cable tripped the main circuit breaker for the NELHA Research Compound, triggering automatic startup of NELHA's 1-megawatt emer-

In one of the final stages of installation in December 2003, three forklifts and a crane prepare to synchronize lifting of the entire surface seawater discharge manifold plumbing into a trench at NELHA's new 55-inch pipeline pump station in HOST Park.

gency generator. Power was immediately restored to the Research Compound and its tenants. Due to the size of the cable and the connectors that needed to be special ordered to repair it, the generator was called on to operate continuously for several days. On June 16th, the radiator on the emergency generator developed a serious leak and shut itself off automatically. NELHA staffers were able to restore power within two hours using a large capacity electric generator obtained from a contractor working at NELHA. The 12.47 kV cable was repaired and power was re-established to the Research Compound the following day. The NELHA staff per-formed over and above the call of duty during this emergency. Seawater flow was not interrupted for more than two hours during the entire exercise. Cause of the initial power failure was determined to be termites eating through the insulation of the 12.47 kV transmission line. Cause of failure of the one megawatt generator backup system was the aging metal fan guard breaking apart and being blown through the system's radiator. Repair costs were estimated between $16,000 and $20,000.

REMOTE CAMERA INSTALLATIONS. A remotely operated camera system was installed to monitor security at the highway entrance to NELHA. A similar camera system was installed at the Gateway Energy Center to monitor construction progress at the facility.

HIGH SURF. During the winter months, high surf caused closure of beach parks, including NELHA's Wawaioli Beach Park, by Hawaii County Civil Defense to protect the curious public. Waves were reported as high as the top of the Coast Guard's Keahole Point lighthouse, and wave wash over the NELHA access road fronting the beach park necessitated periodic road clearing by NELHA operations staff.

COMMUNITY SERVICE. The NELHA Operations Staff assisted the community in removing several abandoned and burned vehicles off the beach area of O'oma. The staff moved the vehicles to an accessible area on NELHA property where a private contractor could tow the vehicles away.

ENGINEERING

The Engineering Department provides engineering support for all infrastructure development and land use at NELHA, as well as IT support for NELHA staff. Tenants are also provided with consultation and support services on an as-needed, as-available basis.

Both the Operations Manager and Engineering Projects Coordinator manage state capital improvement projects for essential NELHA infrastructure development.

NELHA INFRASTRUCTURE IMPROVEMENTS

During FY04, a number of capital improvement projects went forward to improve existing infrastructure.

SEAWATER SUPPLY SYSTEM. During FY04, contractor Bolton Inc. began construction of the 55-inch On-shore Distribution System which will provide delivery connections from the pump station to tenants along the NELHA Access Road in HOST Park. Work began by September 2003. In an attempt to economize on pipe supplies, high density polyethylene pipe material from previous seawater lines was tested for re-use in the new distribution system but failed fusion tests, necessitating purchase of additional new supply pipe, and resulting in five months of time delays. The associated pump house construction was also delayed, due to County requirements for handicapped access and parking at the pump house for potential handicapped workers or visitors. At the close of FY04 in June 2004, the 55-inch Distribution System Project was well underway and on schedule for completion in the following year with the following components completed:

1) 12” deep and surface seawater pipelines were installed to the 100 ft. elevation.
2) 12” deep seawater pipeline extended to the Gateway Energy Center.
3) Warm and cold seawater pump manifolds were installed.
4) 40” distribution pipeline completed and connected to Big Island Abalone Corp.
5) Four 200 hp / 7,000 gpm pumps were installed at the pump station.
6) Underground utilities were installed for the pump station, emergency generator and fuel tank and the HELCO transformer.

A composite material pump impeller was specially manufactured and installed as an experiment in one of the 60-horsepower Interim Surface Seawater system pumps. Although coated with a special epoxy, the cast iron impellers that were originally supplied with the pumps were discovered to be corroding at an unacceptable rate. The composite impeller is manufactured primarily out of graphite and should prove to be far superior in longevity and performance. If this experiment proves to be successful, several other cast iron pumps will be retrofitted with composite material impellers and wear rings.

NELHA PUMP COVER REPLACEMENT PROJECT. NELHA requested $90K funding for planning and design, and $750K for construction of a replacement of the cover of the main pump station that supplies seawater to the entire NELHA property. The long term effects of weather and water on the approximately 15-year old reinforced concrete weakened the cover structure, so replacement measures were planned to commence as soon as funds became available.

NELHA POTABLE WATER LINE EXTENSION PROJECT. The potable water line extension project was put out for bid in March 2004, and a contractor selected by May, with construction slated for FY05. The improvements will bring the 30-year old NELHA freshwater distribution system up to Department of Water Supply standards.

SCIENTIFIC/TECHNICAL

ANALYTICAL LABORATORY SERVICES. The NELHA water quality laboratory has the important role of monitoring incoming seawater as well as the onshore and offshore environment to prevent impacts from onshore developments and to maintain their pristine condition. Underway since 1989, the NELHA Comprehensive Environmental Monitoring Program (CEMP) is currently maintained by a staff of two chemists and one microbiologist. They generate over 7,000 data points each year from over 3,500 samples derived from 99 sample sites. The CEMP monitors groundwater, nearshore and offshore waters, anchialine ponds, and onshore disposal trenches as well as incoming surface and deep seawater. The three laboratory staff also conduct analyses for outside groups such as the Department of Health and NELHA tenants. The position of Scientific/Technical Manager, vacated in FY03, was left unfilled and subsequently permanently eliminated by the Legislature during FY04. General supervisory duties of the three technical personnel remaining in this department were assigned to the Operations Manager. In an effort to further economize laboratory functions, Operations Department personnel assumed the responsibility of collecting CEMP offshore water samples from the NELHA Boston Whaler vessel, a task previously contracted out to a private dive company at an annual cost of $4,400. Due to the State's budgetary belt-tightening during FY04, NELHA considered the possibility of privatizing these analytical laboratory services by issuing a request for proposals in April 2004. By the end of the fiscal year, the matter was being deliberated by the NELHA Board.

LEASING AND TENANT RELATIONS

NELHA holds a master lease from the Department of Land and Natural Resources (DLNR) for the 870 acres of state lands it administers in West Hawaii, which allows NELHA to sublet its lands. NELHA Leasing and Tenant Relations handles all lease-related tasks, working cooperatively with the Hilo Land Division office of DLNR and the Department of the Attorney General in Honolulu. This NELHA department also assists the Executive Director in recruiting new tenants and processing new tenant applications, working cooperatively with NELHA management staff in operations, fiscal and engineering to bring new tenants aboard and help them get established. NELHA annual reports, recruitment materials, and other publications describing tenant progress and economic impacts are also produced.

During FY04, seven tenants entered into new lease agreements for 62 acres during FY04. Vulcan Power Company (one-year FUA—office space); Common Heritage Corporation (30-year sublease—5.461 acres, one-year FUA—office space); Hawaii Deep Marine, Inc. (30 year sublease—4.5 acres); Koyo USA Corp. (sublease amendment to add 22 acres to the original 8 subleased acres); Deep SeaWater International, Inc. (30-year sublease—20 acres); Savers Holdings Ltd. (six month FUA office space and 30-year sublease—6 acres); Oceanic Institute (30-year sublease—4 acres). New companies ready to sign new leases with NELHA at the end of FY04 included aquaculture companies Pacific Ocean Ventures and Unlimited Aquaculture LLC.

FISCAL

The Fiscal Department is responsible for managing NELHA's financial resources, working closely with the State of Hawaii Department of Budget and Finance, the Department of Accounting and General Services, and the Department of Economic Development & Tourism to which NELHA is administratively attached. This department handles tracking and accounting for General, Special, and State Capital Improvement Project funds, purchasing, accounts payable and accounts receivable, inventory of fixed and movable assets, petty cash disbursements, and budgeting.

NEXT PAGE: Newest tenant product by Koyo USA Corporation: desalinated deep seawater with NELHA trademarked logo.

NELHA FINANCIAL OVERVIEW

STATEMENT OF OPERATIONS*

FY 04 (July 1, 2003 to June 30, 2004)

CATEGORY	REVENUES	EXPENDITURES
General Funds		
State Funds	$597,510.00	
Subtotal	*$597,510.00*	
GF Salaries		$456,893.00
GF Kona Operations		$103,508.00
Subtotal		*$560,401.00*
Special Funds		
Land Use Fees	$670,663.00	
Royalties	$24,000.00	
Reimbursables	$919,944.00	
Interest Received	$41,979.00	
Percentage Rents	$81,624.00	
Subtotal	*$1, 738,210.00*	
Total Revenue	**$2,335,720.00**	
SF Salaries		$444,430.00
SF Kona Operations		$913,764.00
Subtotal		*$1,358,194.00*
Total Expenditures		**$1,918,595.00**

FINANCIAL POSITION

Special Fund Balance on July 1, 2002	$1,357,787.75
State General Fund Appropriations	$597,510.00
Special Fund Revenues	$1,738,210.00
Subtotal	*$3,693,507.75*
General Fund Expenditures	$560,401.00
Special Fund Expenditures/journal entries	$1,358,194.00
Unrequired G/F Returned to St Treasury/DBEDT	$37,109.00
Subtotal	*$1,955, 704.00*
Transfers to OHA-Ceded land	$150,520.00
Special fund transfer from previous years	($25,739.00)
Ending Special Fund Balance at FY End	**$1,561,544.75**

***Does not include CEROS operations, salaries, or CEROS grants;*
does not include NELHA state or federal CIP funds or federal program funds.

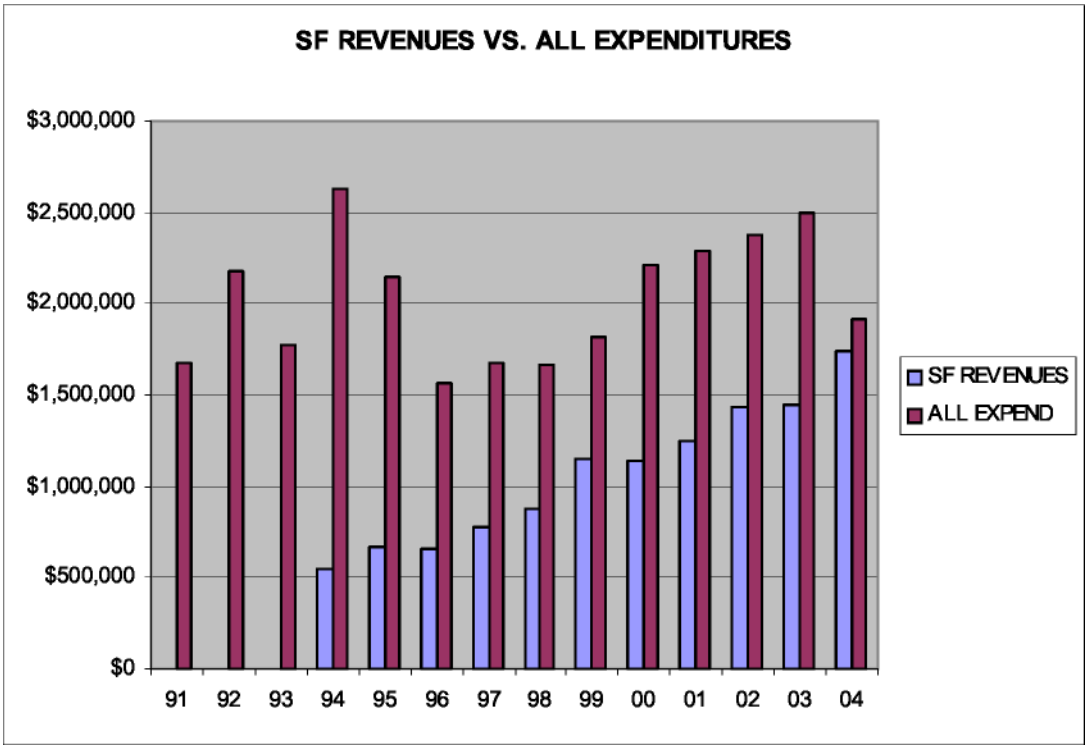


FIGURE 1. NELHA SPECIAL FUND REVENUES VS. ALL EXPENDITURES, FY1991-2004

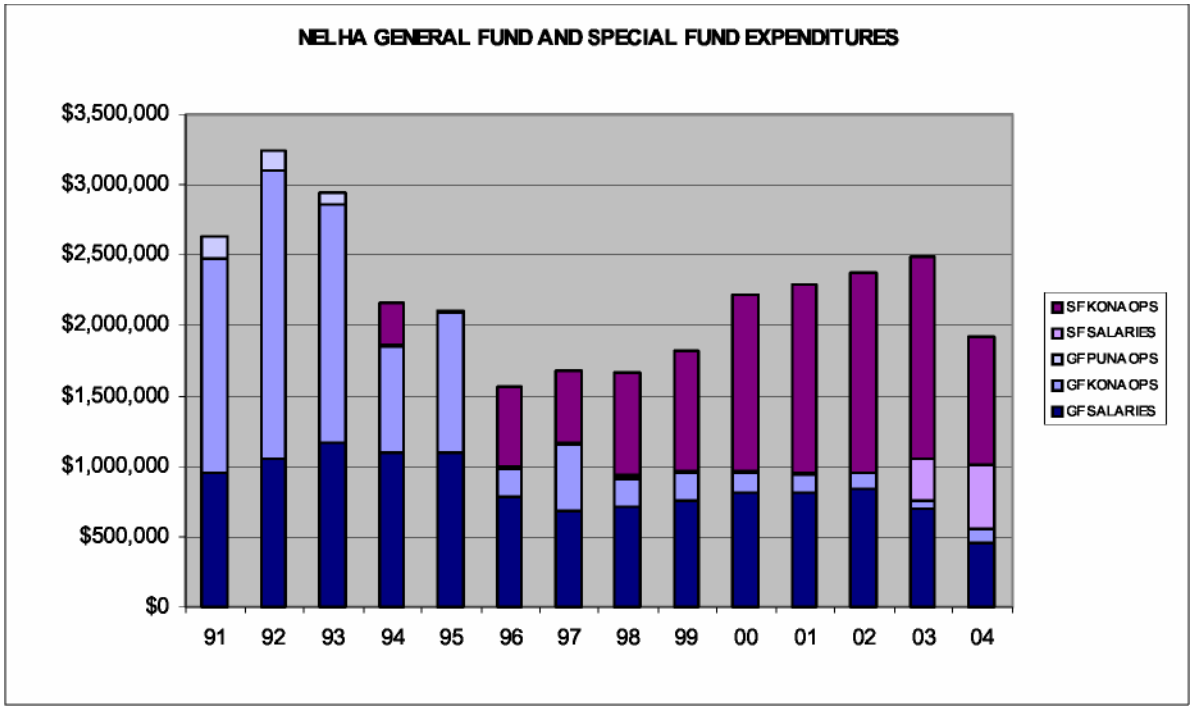


FIGURE 2. NELHA GENERAL AND SPECIAL FUND EXPENDITURES. NELHA's operational dependence on General Funds (GF) has been progressively decreased since FY94 as Special Fund support has increased. In FY95, due to a legislative oversight, NELHA was not granted authority to expend its Special Funds, resulting in a larger proportion of GF support for that one year. NELHA's long term goal is to be supported solely by Special Fund revenues of land and percent-age rents from its tenants.

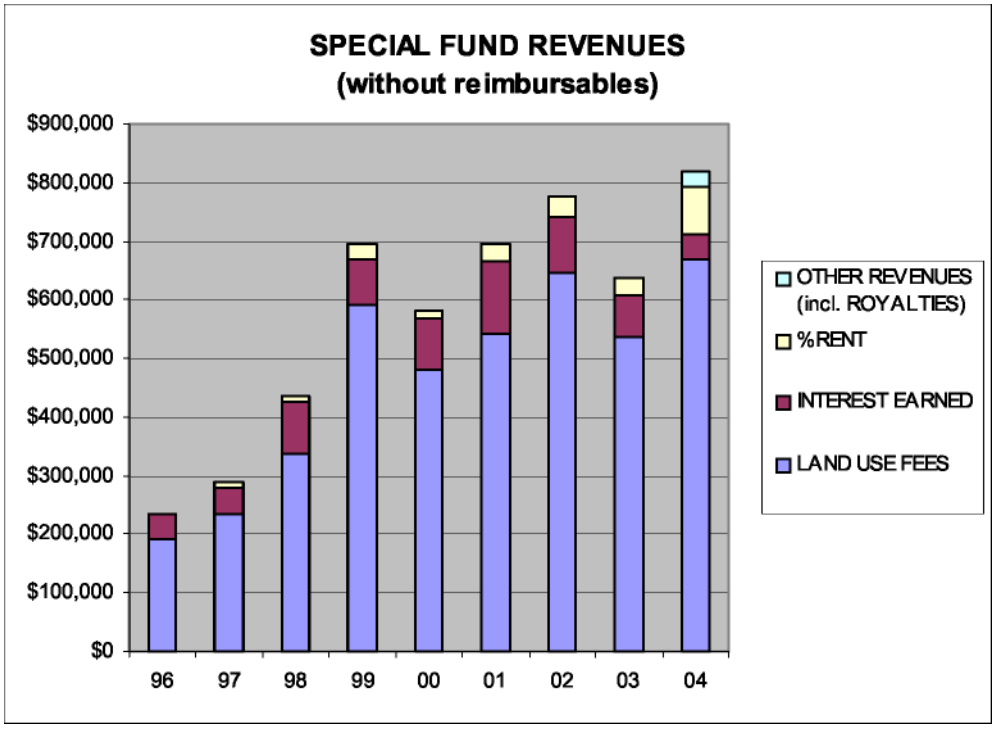


FIGURE 3. NELHA SPECIAL FUND REVENUES (without reimbursables), FY1996-2004

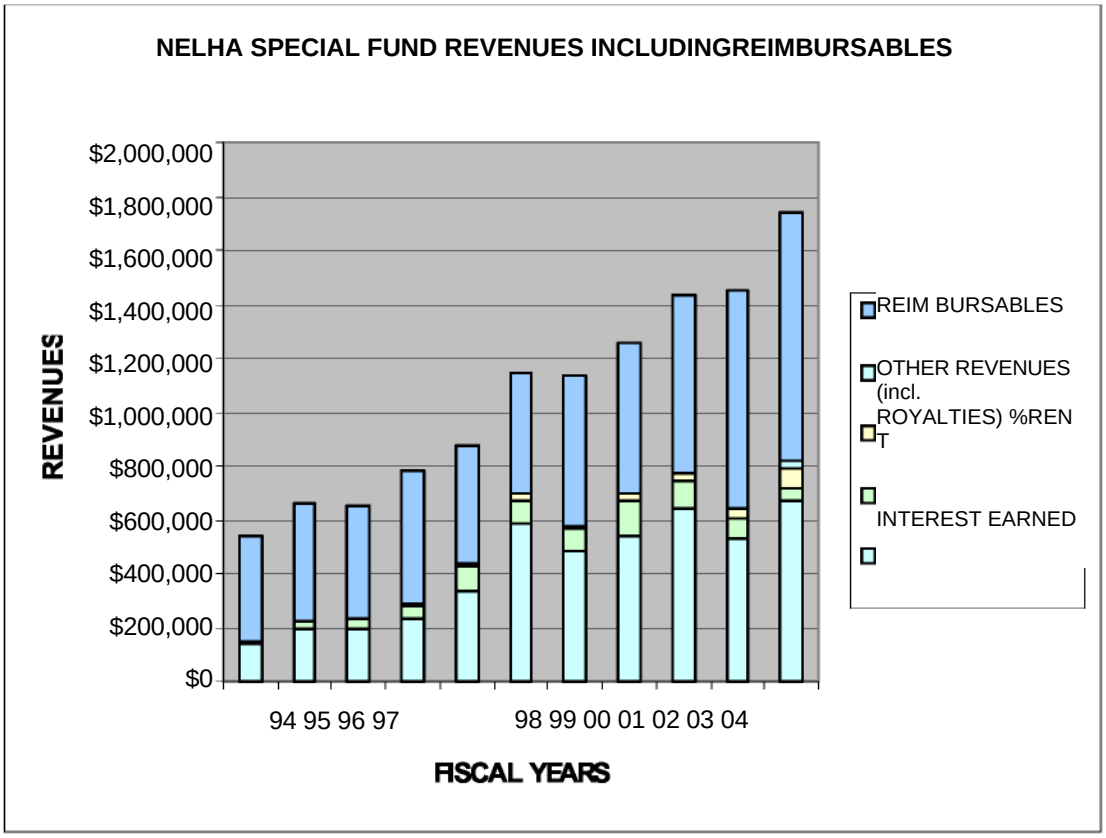


FIGURE 4. NELHA SPECIAL FUND REVENUES INCLUDING REIMBURSABLES, FY1994-2004

HAWAII GATEWAY ENERGY CENTER AT NELHA

THIS PAGE: Artist's conception of future plans for development of campus-like setting for the Hawaii Gateway Energy Center at NELHA

NEW FOCUS ON ENERGY

The Hawaii Gateway Energy Center (HGEC) at NELHA is located at the entrance to NELHA's Kona properties at Keahole. Through the support of Senator Daniel K. Inouye, federal funding administered through the U.S. Department of Energy was secured over the last several years: $3.945M for planning, design, and construction, and program funds of $450K (federal FY02) for Energy Efficiency and Renewable Energy Activities, and $412,562 (federal FY03) for Development and Deployment of Distributed Energy Systems, subcontracted to the National Renewable Energy Laboratory (NREL) in Colorado. In June 2004, NELHA was awaiting confirmation of $500,000 in additional program funds, anticipated for release in August 2004.

During FY04, construction activities at NELHA on the HGEC facilities were begun by contractor Bolton, Inc. Ferraro-Choi Associates (FCA) won the bid to design the $3.5 million environmentally friendly facility. The HGEC facility complex includes a 3,600 square foot Visitor Center with two buildings, one with office space and the other a multi-purpose space to be used for public presentations and rotating exhibits to support renewable energy education and outreach. Another 2,000 square foot building is the first of 11 planned laboratory modules intended to support projects involving research and development of leading edge renewable energy technologies.

The HGEC facility was designed to meet criteria for a Platinum rating in the LEED (Leadership in Energy and Environmental Design) Green Building rating system. The LEED Green Building Rating System is a voluntary, consensus-based national standard for developing high-performance, sustainable buildings. LEED Certification distinguishes building projects that have demonstrated a commitment to sustainability by meeting the highest performance standards. It emphasizes state-of-the-art strategies for site development, water savings, energy efficiency, materials selection and indoor environmental quality. LEED recognizes achievements and promotes expertise in green building through a comprehensive system offering project certification, professional accreditation, training and practical resources. LEED was created to: define a "green building" by establishing a common standard of measurement; promote integrated, whole–building design practices; recognize environmental leadership in the building industry; stimulate green competition; raise consumer awareness of green building benefits; transform the building market.

FCA planned to submit an application for Platinum LEED status through certification from the U.S. Green Building Council during FY05. There are fewer than ten Platinum LEED-certified projects worldwide. Additional information about LEED certification is available at www.usgbc.org. Sustainable design strategies incorporated into the design of the new Gateway facility include: distributed energy facility design; zero-net energy facility; photovoltaic energy production; deep seawater used for space cooling, condensation Irrigation, fresh water production, and in-slab radiant cooling; daylighting design; shading design for glazing; envelope insulated against heat gain; energy efficient building orientation and configuration, solar chimney for induced ventilation, septic system on-site, greywater use on-site, 100% outside air ventilation, native landscaping, porous paving systems, use of re-cycled materials and locally-produced construction materials.

Traditional air-conditioning was replaced by an integrated design system where the building envelope functions as a thermal chimney, relying on the physics of natural convection to move deep seawater-cooled air from the plenum beneath the building through floor vents and up and out through thermal chimneys in the copper-sheathed roof. Air movement is 'fueled' by the temperature differential ('delta T') between plenum and sunlight-heated roof. As a result, the sunnier it is outside, the cooler it is inside. This induced ventilation system provides 12 to 15 complete air changes per hour for the interior space, twice as efficient as the industry standard of 6 air changes per hour.

In addition, freshwater condensate from the deep seawater heat exchangers that cool and dehumidify the air is collected in a cistern and used to water the plants around the building and to flush the toilets in the restrooms. As a result of all these energy-saving features, the main buildings of the HGEC facility consume only 2.5 kwh/s.f./year, whereas even the most energy-efficient conventional buildings can consume 15 kwh/s.f./year and still comply with the Model Energy Code.

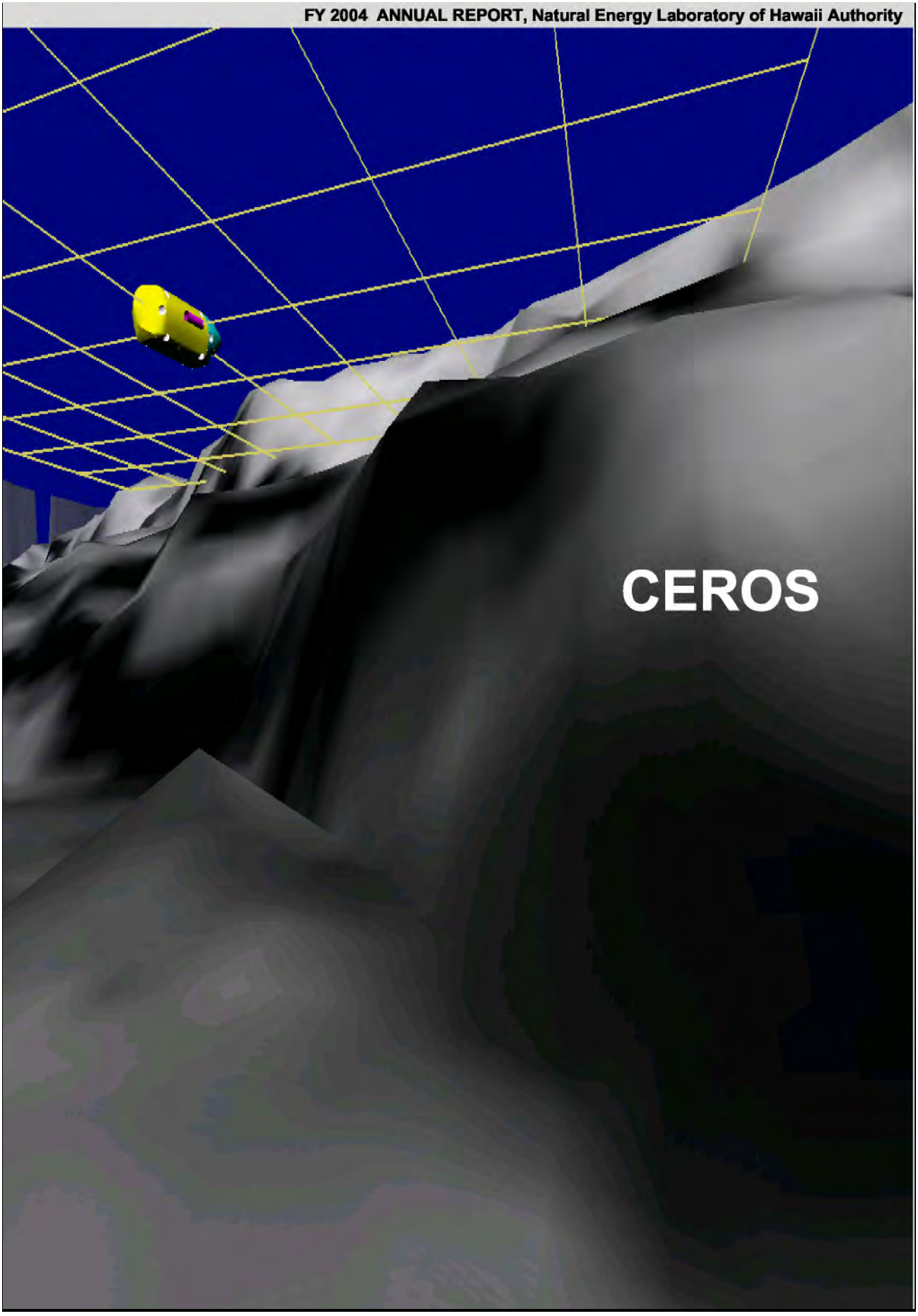
LEFT: Construction underway at HGEC facilities.
ABOVE: The first of 21 laboratory modules.
BELOW: The main buildings of the HGEC.

The Hawaii Gateway Energy Center (HGEC) at NELHA is distinguished from afar by the "space frames" that support photovoltaic panels. Passive solar design allows energy-efficient temperature control of these two main buildings, driven by deep seawater cooling.

Photovoltaic arrays on the buildings are provided through a partnership between NELHA and the local utility, Hawaii Electric Light Company, and produce more energy than is used by the facility. The PV arrays on the main building complex produce an average of 20 kW, more than double the energy needed to operate the facility at normal load, and those on the laboratory module produce 20 kW as well. All electricity produced is fed into the HELCO grid.

By the end of FY04, construction was nearly complete and facility dedication ceremonies were being planned. The facilities of the Hawaii Gateway Energy Center at NELHA will generate more energy than they use, provide a model for use of environmentally friendly materials and designs, and provide a platform to demonstrate energy-efficient and renewable energy technologies. The facility will host leading edge renewable and distributed energy research projects, incubate renewable energy commercial startups, as well as provide renewable energy education and outreach for visitors and residents alike.

Contractors on this exemplary project funded through the U.S. Department of Energy included: Architect: Ferraro Choi and Associates; Mechanical/Electrical: Lincolne Scott, Inc.; Structural: Libbey Heywood, Inc.; Civil: R.M. Towill Corporation; Landscaping: LP & D; Commissioning: Engineering Economics, Inc.; LEED Management: ENSAR Group.


CEROS

The National Defense Center of Excellence for Research in Ocean Sciences (CEROS)

NEW OCEAN TECHNOLOGIES FOR HAWAII

CEROS is a unique technology development program between the State of Hawaii and the federal Defense Advanced Research Projects Agency (DARPA). CEROS demonstrates that the State can be responsive to the needs of the Department of Defense for state-of-the-art ocean technology. Complete information about CEROS is on the website, www.ceros.org.

CEROS is a State program entirely supported by federal funds. The program started in 1993, with $5 million appropriated for CEROS in the supplemental federal appropriation for the Department of Defense. Federal support for CEROS comes to the State through a Cooperative Agreement with DARPA, the principal technology development agency for the Department of Defense (the Internet was a DARPA project, for example). DARPA also provides technical and administrative guidance to assure that the program remains responsive to the needs of the federal defense establishment while helping the technical commercial base develop in Hawaii. DARPA has been an excellent partner in this task.

CEROS is in many ways a special federal/state partnership. CEROS started as a project of the High Technology Development Corporation (HTDC) and became part of the Natural Energy Laboratory of Hawaii Authority (NELHA) in 1996. HTDC and NELHA are among the State's "attached agencies" in the Department of Business, Economic Development & Tourism (DBEDT).

Attached agencies act as quasi-corporate entities within the State structure. The NELHA Board of Directors oversees NELHA operations and grants CEROS its authority to issue State contracts for technical development projects. The best depiction of the CEROS/NELHA relationship is as two separate programs joined by a common Board of Directors. NELHA has proven to be a good and appropriate "home" for CEROS.

From the start, DARPA sought an efficient CEROS organization to turn the federal funds, which are appropriated annually, into funded contracts in as short a period as possible. Thus, CEROS runs annual competitive solicitations for technical projects and handles the entire process from initial announcement (in October) to contract negotiation and commitment (usually in the following June). Since 1993, CEROS has funded 174 technical projects for about $65.75 million.

The CEROS program operates on less than 8% administrative overhead (i.e. 92% of the federal funds go into the Core technical program). The CEROS personnel consists of five individuals: Technical Director, Fiscal Assistant, Research Administrator, Program Manager for Outreach and Administration, and Contracts and Grants Administrator. CEROS maintains a Projects Office at NELHA headquarters in Kailua-Kona on the island of Hawaii and a Contracts Office in Honolulu on Oahu.

CEROS point of contact: William A. Friedl, CEROS Technical Director, billf@ceros.org.

PREVIOUS PAGE: OCEAN IMAGING CONSULTANT, INC. Virtual image of ROVer's eye-view of ocean bottom bat hymetry.

CEROS FUNDED PROJECTS

AERO UNION MARINE SYSTEMS CORPORATION

Marine Air-deployed Rescue Vehicle (FY04) ($310,000) [Subcontractors: Marine Autonomous Systems Engineering, Inc., Honolulu, HI; Plas-Tech, Ltd., Honolulu, HI; Aero Union Corporation, Chico, CA]

APPLIED MARINE SOLUTIONS (formerly WEATHERGUY.COM)

Feedback Planning: Fundamentally Improving Undersea Warfare Acoustic Mission Planning Through Event Reconstruction and Analysis for U. S. Navy Maritime Patrol and Reconnaissance Force (FY03, FY04) ($332,595; $399,000) [Subcontractor: University of Washington – Applied Physics Laboratory, Seattle, WA; University of Hawaii]

AQUACULTURE TECHNOLOGY, INC.

Naturally Occurring Antibodies from Marine Algae *Chaetoceros* (FY94) ($171,485)

Naturally-Occurring Antibacterial and Antifungal Substances from Marine Algae *Chaetoceros, Nitzschia* and *Thalassiosira* (FY95) ($206,960)

Continuous Production of Marine Algae *Chaetoceros spp.* In An Open System (FY97) ($440,000)

BAND, LAVIS & ASSOCIATES, INC.

Application of Techniques and Comparative Effectiveness of Non-Toxic Anti-Fouling Surfaces to Immersed Nettings Used In Naval and Aquaculture Industries (FY97) ($225,483) [Subcontractor: Black Pearls, Inc., Holualoa, HI]

BBN TECHNOLOGIES

Develop HYDROFIST: A Nonexplosive Means for Generating Intense and Focused Underwater Shock Waves (FY99, FY00) ($999,819; $800,000) [Subcontractor: Navatek Ships, Ltd. (a subsidiary of Pacific Marine), Honolulu, HI]

Implement and Demonstrate ASW Targeting and Weapon Control Using Non –Organic Sensors: Netted Combat Control System (Netted CCS) (FY01, FY02) ($1,112,450; $979,901)

A Proposal to Implement and Demonstrate a NetCentric Air-deployed, Portable Range (FY03) $879,000
A Proposal to Advance a Submarine Combat Control System Trainer and Support and Demonstrate Anti-submarine Warfare (ASW) Capabilities with COMSUBPAC, Pearl Harbor (FY04) ($524,948)

Infrasonic Remote Sensing of Breaking Ocean Waves in the Surf and Littoral Zones (FY04) ($349,979) [Subcontractor: University of Hawaii – Infrasound Laboratory]
TREDS Software Interface for Net Centric Portable Range (FY04) ($99,789)

BLACK PEARLS, INC.

Probiotic Bacteria: The Key to Expanded Use of Deep Seawater in Tropical Aquaculture and the Solution to a Growing Industry Problem (FY97) ($121,392)

A Continuous-Culture Closed-System Deep Seawater Photobioreactor for Microalgal Culture for Hatcheries and Pharmaceuticals (FY00) ($173,201)

Developing a Sensitive, Sessile Monitor for Non-Point Source Heavy Metal Pollution for Tropical and Sub-Tropical Indo-Pacific Waters (FY01) ($138,097)
Refining and Broadening the Use of Pearl Oysters as Sensitive Biomonitors for Heavy Metal Contamination (FY03) $119,920

Extending Technology for Probiotic Cultures in Deep Seawater to Enhance Marine finfish Hatchery Efficiencies (FY04) ($157,360) [Subcontractor: Microbial ID]

CELLULAR BIOENGINEERING, INC.

Neural Matrix Chips for Chemical and Biological Weapons Detection (FY04) ($309,326) [Subcontractor: Lawrence Berkeley National Laboratory, Berkeley, CA]

COX ENVIRONMENTAL SYSTEMS

Water Properties Miniature Optical Sensor Project (FY00) ($215,004)

CONCURRENT ANALYTICAL, INC. (formerly DETECTION LIMIT, Inc.)

Development of Fiber-Optic Chemical Sensors (FOCs) For Remote In-Situ Monitoring of pH and Car-bon Dioxide in Seawater (FY93) ($236,700)

Development of a Fiber-Optic Based Autonomous Buoy for *In-Situ* Monitoring of pH, pCO2, Tempera-ture, O2, and Water Quality In Seawater (FY94) ($331,800)

Solution Plus *In-Situ* Ocean Sediment Chemical Analyzer (FY96, FY97) ($320,000; $360,000)

PCB Analyzer for Shallow Ocean Water (FY98) ($380,000)

Automated SERS Immunoassay Detection System: Detection of an Aquaculture Virus and "Dog Nose" Sensor for TNT Detection (FY00) ($439,937)

Improved "Dog Nose" Sensor for Real-Time Ocean TNT Detection and Quantification and Fish Virus Detection (FY02) ($350,000) [Subcontractors: Iowa State University Institute for Physical Research and Technology, Mike Bray Engineering]

Improved Resolution in Fourier Transform Spectroscopy (FY03, FY04) ($352,443; $434,700) [Sub-contractor: Creative Science and Software Solutions, Inc., Fairfax, VA]

Detection System for Weapons of Mass Destruction (FY04) ($51948) [Subcontractor: Iowa State University]

DYNAMICS TECHNOLOGY, INC.

Analysis of synthetic Aperture Sonar Data for Geological Surveys (FY00) ($98,239)

EDWARD K. NODA & ASSOCIATES, INC.

Hurricane Risk Analysis and Modeling of Coastal Flooding For the Hawaiian Islands (FY93) ($213,929)

Modeling of Hurricane-Induced Coastal Flooding for the Hawaiian Islands (FY98) ($182,345)

GATEWAY TECHNOLOGIES INTERNATIONAL, INC.

Radar/Sensor Signal Processing Research of Shallow Water Surveillance Technologies (FY93) ($385,794)

HIRADSIM Workstation Development Project - Continuation of Existing Work Advanced HIRADSIM Small Target - Time Domain - Maritime Radar Mode (FY94) ($250,000)

Personal Emergency Lifesaving System (PELS) (FY98) ($240,920)

GUIDENET, INC.

Using Software Agents to Acquire and Visualize Environmental Information for ASW Surveillance (FY98, FY99) ($305,000; $360,000)

Workflow Paradigm for ASW by Reliable METOC Data and Tasks (FY00) ($397,050)

IBM/LORAL FEDERAL SYSTEMS; KEWALO BASIN MARINE MAMMAL LABORATORY

Acoustic Analysis Tool Kit (FY93) ($432,000)

INNOVATIONS HAWAII

Extended Source Apparent Motion (E-Sam) Lighted Signals for Protection of the Marine Environment (FY93, FY94) ($241,108; $177,180)

LOCKHEED MARTIN ORINCON DEFENSE (formerly ORINCON DEFENSE)

Safety-of-Ship System Phase 2 (FY03) $585,996

Combined Optical Acoustic Tracking System (COATS) (FY03) ($200,000)

Autonomous Passive Acoustic Classification System (APACS) (FY04) ($654,334)

MAKAI OCEAN ENGINEERING, INC.

Cost-Effective GPS-Based Sensor for Measurement of Heave, Pitch, Roll and Heading on Oceano-graphic Platforms with O.3 Degree Resolution (FY93, FY94) ($230,250; $235,000)

Loop Avoidance Control during the Deployment and Retrieval of Submarine Cables (FY96) ($287,000) [Subcontractor: Knapp Engineering, Inc. (new name is Structural Solutions), Aiea, HI]

An Automated Control System For Deployment of Small Diameter Cables and Towed Bodies—a Cable Lay Simulator (FY94) ($325,000)

Design, Construction, and Operation of a Fifty Kilowatt Closed Cycle OTEC Plant and Application Of Results To The Design of a One Megawatt OTEC Plant (FY94) ($649,759)

Internet-Enabled Engineering Tool for Dynamically Analyzing and Planning World-Wide Subsea Cable and Array Installations (FY98) ($379,985)

Improving Flow from Deep Water Pipeline (FY00) ($388,950)

Remote Monitoring and Expert Control of Submarine Cable and Array Installations (FY00) ($345,737)

Computation of Submarine Towed array Shapes and Dynamics Based on Array Sensors, Indirect Cur-rent Sensing and In-situ Drag Coefficient Measurements (FY02) ($479,513)

Real-time, Dynamic Modeling of Multi-Line Towed Array Systems (FY03) ($450,000)

Validation of Towed Array Shapes Using At-sea Data and Smart Beamforming (FY04) ($475,000) [Subcontractor: Lockheed Martin ORINCON Defense, Kailua, HI]

MISSION RESEARCH CORPORATION

Ocean Doppler Lidar (FY95) ($381,000)

NAVATEK, LTD.

The Modification of a Whole Ship Design Synthesis Model to Accept Ship Designs Employing Advanced Lifting Body Technology (FY02) ($356,000) [Subcontractor: Band, Lavis and Associates, Inc., Severna Park, MD]

Analysis of the Potential Benefits of Integrating a Lifting Body Bow to Large Ships (FY03) ($150,000)

NEPTUNE TECHNOLOGIES, INC.

Diver Homing Device (FY95, FY97) ($200,000; $39,300)

A Secure Homing System for ASDS SEAL Teams (FY04) ($310,000)

NEXTWAVE ENGINEERING

Snap-To Amphibious Footwear System (FY01) ($75,700)

NOVASOL (INNOVATIVE TECHNICAL SOLUTIONS, INC.)

Temporally Enhanced Adaptive Multi-Spectral (TEAMS) System for Detection of Underwater Objects (FY01, FY03) ($34,953, $700,000)

OCEAN ENGINEERING CONSULTANTS, INC.

Swath Motion/Structural Software Development (FY94) ($121,000)

Swath Motion/Structural Software Development and Verification (FY95) ($168,000)

Flow Simulation and Visualization for Swath Ships (FY96) ($161,372)

SWATH Ship Software and Verification (FY00) ($164,954)

SWATH Ship Motion Software (FY03) ($172,200)

OCEANIC IMAGING CONSULTANTS, INC.

The DiVRS (ROVer's) Eye Terrain Database Visualization as an Aid to Underwater Navigation (FY98, FY99) ($239,652; $275,482)

Smart Sonar Suite Test and Evaluation (FY04) (450,000) [Subcontractors: Safety Boats Hawaii, Honolulu, HI; Ultra Electronics Ocean Systems, Weymouth, UK]

THE OCEANIC INSTITUTE

Cultured Fish as Biological Indicators of Pollution (FY99) ($216,766) [Subcontractor: Associated Laboratories, Orange, CA]

OCEANIT LABORATORIES, INC.

Low-Cost Prebuckled Cylindrical Pressure Hulls (FY93, FY94)
($342,800; $91,000)

Computational and Physical Modeling of the Hurricane Tower Desalination System (FY97) ($150,000)

Three-Dimensional Cloud Height Indicator for Marine Application (3D-CHIMA) (FY01, FY02) ($400,000; $360,390)

OCEANTEK, INC.

An Ocean Bottom Span Analyzer for Survey Planning and Installations of Submarine Cables and Pipe-lines (FY99, FY03) ($188,000, $94,563)

OCEANTRONICS, INC.

Submarine Electronic Charting System (FY99) ($95,000)

Electronic Charting Display and Information System (ECD IS-N) for the Navy with Special Emphasis on Submarine Navigation – Phase II (FY00) ($98,000)

Submarine Electronics Charting System – Final Phase (FY01) ($200,000)

IFF Modification Kit (FY04) ($160,500) [Subcontractor: AJ Associates, Charlottesville, VA]

ORINCON HAWAII, INC.

Underwater Echolocation for Object Recognition (FY93, FY94, FY95) ($769,732; $652,685; $696,925) [Subcontractor: Hawaii Institute of Marine Biology, Kailua, HI]

Advanced Real-Time Signal Processor (ARTS) and ASW Commanders Workstations (ADM-3) (FY95, FY96) ($862,095; $871,771)

An Upgraded ARTS Processor for Maritime Patrol Aircraft Applications (FY98) ($373,000)

Antisubmarine Warfare Commander's Workstation Upgrades and Advanced Real-Time Signal Processor for CTF-1 2 Applications (FY97) ($500,000)

Submarine-Launched, Two-Way, Fiber Optics-Linked Communications Buoy (FY96) ($160,000) [Sub-contractor: Sippican, Inc., Marion, MA]

An Improved Acoustic Intercept Receiver for Submarine Applications (FY97, FY98) ($450,000; $560,000)

An Integrated System for Detection, Classification, Localization, Tracking and Reporting of Submarine Contact Data (FY97) ($700,000)

Situation Awareness System (SAS) Processor for Submarine Applications, Phase 2 and At-Sea Evaluation (FY98, FY99) ($171,777; $775,864)

Automation and Integration of Environmental Factors into ASW Tracking. (FY99) ($497,415)

Mission Reconfigurable Signal Processing System (FY00) ($749,504)

Passive Assured Access System (FY01) ($749,203)

Theater-Wide Situational Awareness for Decision Wall (FY01) ($150,000)

Safety-of-Ship System (FY02) ($350,000)

Portable and Improved Mission Reconfigurable Signal Processor (PIMRSP) (FY02) ($440,000)

PACIFIC ENVIRONMENTAL TECHNOLOGIES LLC

Development of a Miniaturized Mass Spectrometer-Based Sampling System for In Situ Measurements of Dissolved Gas and/or Solutes in Marine Waters, and for Protein Characterization that leads to Microbial Identification (FY99) ($141,743)

Capillary Electrophoresis-Mass Spectrometry and other Instrumental Enhancements for In Situ Measurement of Dissolved Gas and Solutes in Marine Waters, Atmospheric Gases and Aerosols and Large Organic Compound Identification (FY00) ($171,864)

AQUASENSE: a Low-Power, High-Sensitivity, Portable Mass Spectrometer System for In Situ Measurement of Dissolved Gas and Solutes in Natural Waters, Atmospheric Gases and Aerosols, and Large Organic Compound Identification (FY03) ($153,690)

PACIFIC MARINE & SUPPLY COMPANY, INC.

Tri-Strut Ship Research and Development (FY94) ($365,400)

Design, Construction and Sea Trials of a 30-Foot Manned Test Model of a Midfoil SWAS (FY95, FY96) ($500,000; $280,000)

CFD Code Validation and Improvement Using Large Scale Tests: Optimization of Design for High Froude Number Underwater Body Operating at Near Surface (Midfoil and Slice) and Subsequent Construction and Testing of Optimized Underwater Body (FY97) ($663,300)

Development, Fabrication, and Demonstration of a Patentable Combination Propeller-Pump Jet Integrated Propulsion Pod with Boundary Layer Suction (FY98, FY99) ($300,000; $1,019,000)

Large-Scale Producibility Demonstration of CEROS-Developed Three-Dimensional Lifting Bodies for

Use in the U.S. Navy's Littoral Support Craft (LSC) Program (FY00) ($980,000)

Flapping Foil Technology for Motion Stabilization of Novel High-Speed Vehicles (FY01) ($250,000)

RAYTHEON SYSTEMS (formerly H UGH ES AIRCRAFT, formerly ALLIANT TECHSYSTEMS)

High-Resolution Bottom-Penetrating Acoustic Sensors and Signal Processing Algorithms for Reduction of False-Alarm Probability in UXO Hunting (FY 94) ($980,766) [Subcontractors: University of Hawaii School of Ocean and Earth Science Technology (SOEST), INTECH, Inc., Sea Engineering, Inc.]

High-Resolution Bottom Penetrating Synthetic Aperture Sonar Using Multi-Vertical Row Array and Subbottom Classifier Sonar (FY95) ($990,083) [Subcontractors: University of Hawaii School of Ocean and Earth Science Technology (SOEST), INTECH, Inc., Sea Engineering, Inc.]

High-Resolution Bottom Penetrating Synthetic Aperture Sonar for Use in Buried UXO Hunting (FY96) ($982,087) [Subcontractors: University of Hawaii School of Ocean and Earth Science Technology (SOEST), INTECH, Inc., Sea Engineering, Inc.]

Integrated Sensor System for Search and Classification of Subbottom Objects (FY97) ($753,008) [Subcontractors: University of Hawaii School of Ocean and Earth Science Technology (SOEST), INTECH, Inc., Sea Engineering, Inc.]

Multi-Spectral, Interferometric Synthetic Aperture Imaging Sonar (FY98) ($550,034) [Subcontractors: University of Hawaii School of Ocean and Earth Science Technology (SOEST), INTECH, Inc., Sea Engineering, Inc.]

Frequency Agile Sequential Transmission Synthetic Aperture Sonar (FastSAS) - Risk Reduction Technology Demonstration for NetTORP (FY99) ($119,976) [Subcontractors: University of Hawaii School of Ocean and Earth Science Technology (SOEST), INTECH, Inc., Sea Engineering, Inc., Honolulu Ship-yard, Inc.]

SCIENCE APPLICATIONS INTERNATIONAL CORPORATION

Effects of Underwater Noise on Marine Mammals Offshore Hawaii (FY93) ($246,324)

Web-Based Processing for State-of-the-Art Large Aperture Multi-Dimensional (SLAM) Array (FY99) ($500,000)

Web Based, Propagation & Noise Effects on Signal Processing (FY00) ($670,000)

Web Based Simulation, Modeling and Signal Processing (FY01) ($399,868)

SCIENCE APPLICATIONS INTERNATIONAL CORPORATION - Ship Technology Division

Development and Demonstration of A 3-D Flapping Foil Motion Control System for Advanced Marine Vehicles (FY03) ($320,000)

Modeling Multi-hull Stability in Insular Littoral Waters (FY04) ($150,000) [Subcontractor: Navatek, Ltd., Honolulu, HI]

Development and Demonstration of Articulated Motion Control Fins for a Prototype Underwater Vehicle (FY04) ($664,000) [Subcontractors: Navatek, Ltd., Honolulu, HI; Massachusetts Institute of Technology, Cambridge, MA]

SCIENCE & TECHNOLOGY INTERNATIONAL, INC. (formerly SETS Technology, Inc.)

Hyperspectral Remote Sensing for Maritime Applications (FY93, FY94) ($691,800; 647,974)

Dual Mode Fluorescence Imaging for Maritime Applications (FY95, FY96) ($794,976; $996,428; $100,000) [Subcontractor: SAIC, Woods Hole, MA]

Grazing Angle Imaging Lidar For Organic Mine Countermeasures (FY96) ($698,227) [Subcontractor: SAIC, San Diego, CA]

Undersea Fanbeam Spectral Imaging (FSI) Risk Reduction Technology Demonstration (FY98) ($398,895)

PAX River DFI Prototype (FY98) ($565,498)

SCIENTIFIC SOLUTIONS, INC.

Implementation of an Ocean Acoustic Laboratory at PMRF (FY01, FY02) ($150,392; $500,000)

Data Assimilation, Productization and Dissemination for the Ocean Acoustic Laboratory at PMRF (FY03) ($210,500)

SEA ENGINEERING, INC.

Development of a Technique to Identify Pollutant Sources and Impacts in Coastal and Oceanic Waters (FY94) ($146,000)

Development of a Broadband FM Sub-Bottom Profiler for Seafloor Imaging and Sediment Classification (FY93, FY94) ($292,000; $223,870) [Subcontractor: Precision Signal, Inc., Boca Raton, FL]

Development of a 3-D, Forward/Aft Sweeping High Resolution Buried Object Imaging System (FY97, FY98) ($388,660; $421,200) [Subcontractor: Precision Signal, Inc., Boca Raton, FL]

On-Site, Preliminary Analysis of Sediment Core Samples (FY97) ($102,650) [Subcontractor: Jet Propulsion Laboratory, California Institute of Technology]

Development of an Ultra-High Resolution Non-Destructive Technique for Stress Detection for Marine Applications (FY98) ($319,154)

Development of an Enhanced Resolution Filter for Improving Sonar Imagery (FY99) ($148,287) [Sub-contractor: MultiSpec Corporation, Cherry Hill, NJ]

SEE/RESCUE CORPORATION

Life/Float the One-Person Survival Craft (FY98) ($70,000)

Enhanced Sea and Land Rescue Visibility System (FY99) ($253,839) [Co-contractor: TerraSystems, Inc., Honolulu, HI]

Compact-Inflatable-Mobile Survival Platform for Military/Special Forces and Commercial Applications (FY00) ($120,000)

Emergency Supplemental Floatation System (ESFS) (FY02) ($45,007) [Subcontractor: Kaysam World-wide, Inc., Totowa, NJ]

Evaluation of LIFE/FLOAT Technology for Special Operations (FY04) ($13,700) [Subcontractor: JPW/ Rescue Technologies]

Emergency Pocket Water Desalinator (EPWD) (FY04) ($50,300) [Subcontractor: BHA Technologies, Inc., Kansas City, MO]

STRUCTURAL SOLUTIONS (KNAPP ENGINEERING, INC.)

Low-Cost Prebuckled Cylindrical Pressure Hulls (FY93, FY94) ($414,450; $571,000) [Project partner: Oceanit Laboratories, Inc. (Honolulu, HI)]

3-D Finite Element Design of Cables (FY 96, FY97) ($145,000; $190,000)

Smart Scuba (FY98, FY99) ($319,000; $312,000)

A Probe for In Situ Characterization of Marine Carbonate Sands and Other Sediments (FY98) ($220,000)

Modeling of Cable Fatigue (FY00) ($190,000)

Experimental Investigation of Cable Fatigue (FY01) ($192,000)

Structural Modeling of Synthetic Fiber Ropes (FY02) ($195,000)

STARs - Computer-Aided Design of Synthetic Fiber Ropes (FY03) ($205,000)

Computer-Aided Design of Complex Umbilical Cables (FY04) ($210,000)

SYNTHETIC TECHNOLOGY CORPORATION

Bioactive Marine Isonitrile Compounds from Hawaiian Sponges as Models for Synthetic Nontoxic Antifoulant and Antibiotic Agents (FY 95) ($155,055)

Bioactive Marine Isonitrile Compounds from Hawaiian Sponges as Models for Synthetic Nontoxic Antifoulant and Antibiotic Agents. Synthetic Analogs, Paint Formulations, and Mechanisms of Action (FY96, FY97) ($326,553; $300,033) [Subcontractor: Pacific Biomedical Research Center of the University of Hawaii]

TERRASYSTEMS, INC. (Acquired by Science & Technology International, Inc. in 2001)

Development of an Underwater Video Camera for Optical Contrast and Range Enhancement Using Spectral Stretching (FY96) ($247,323) [Subcontractor: Sea Engineering, Inc. Waimanalo, HI]

Development of an Underwater Compositional Mapping (UCM) System (FY98) ($351,177) [Subcontractor: Sea Engineering, Inc. Waimanalo, HI]

Enhanced Sea and Land Rescue Visibility System (FY99) ($253,839) [Co-contractor: SeeRescue Corporation, Honolulu, HI]

vSAR: Video Search and Rescue (FY01) ($337,123) [Subcontractor 1: vSAR Corporation, Honolulu, HI; Subcontractor 2: ORINCON Corporation, Kailua, HI]

Reconnaissance of Mines and Obstacles in the Surf Zone (FY01) ($34,999)

THERMAL ENERGY STORAGE, INC.

Development and Testing of a Clathrate Desalination Research Facility (FY96) ($250,000) [Subcontractor: Makai Ocean Engineering, Kailua, HI]

TREX ENTERPRISES

Development of a Sensor for Pesticide Monitoring Based on Porous Silicon Optical Biosensor (FY00) ($537,000)

Porous Silicon Biosensor (FY01) ($499,826)

VARIAN ASSOCIATES

Laser Heterodyne Imaging for Shallow Water Surveillance (FY95, FY97) ($299,674; $395,435) [Sub-contractor 1: (FY95): Oceanit Laboratories, Honolulu, HI; Subcontractor 2: (FY97): Detection Limit Technologies, Inc. Honolulu, HI]

PACIFIC MARINE, INC. Unique hull design of midfoil ship, visible as vessel is suspended from a crane.

SeeRescue CORPORATION. Rescue streamer deployed at sea for high vis

Some views of work on the onshore distribution system for the 55-inch pump station that will service tenants in NEL HA's HOST Park properties:

ABOVE: Towing the surface seawater manifold to an awaiting trench at the new 55-inch pipeline pump station.

RIGHT: Three forklifts and a crane preparing to lift the surface seawater discharge manifold into position.

BELOW: Positioning the surface seawater discharge manifold into the receiving trench.

(Photos taken in December 2003.)

NEXT PAGE: NELHA's newest tenant production facilities of Koyo USA Corporation, are visible from the entrance to NELHA properties.

PERSONNEL

NELHA Board of Directors

Richard Henderson, *Chairman of the Board*
The Realty Investment Company, Ltd.
(At Large-Governor's Appointee; term expires June 30, 2004)

Tom Whittemore, *Vice-Chair*
Parker Ranch Trustee
(At-Large, Governor's Appointee from July 1998; second term expires June 30, 2006)

John Corbin
Director, Aquaculture Development Program
Department of Agriculture
Also Research Advisory Committee Secretary

Donald Thomas, Ph. D.
Center for the Study of Active Volcanoes
University of Hawaii at Hilo
Also Research Advisory Committee Chairman

Maurice Kaya
Energy, Resources, and Technology Division
Department of Business, Economic Development & Tourism
Representing Ted Liu, Director, Department of Business, Economic Development & Tourism

Harry Yada
Land Division,Department of Land and Natural Resources
Representing Peter Young, Chairman, Board of Land and Natural Resources

Richard Rocheleau, Ph. D.
Hawaii Natural Energy Institute, University of Hawaii at Manoa
Representing Evan Dobelle, President, University of Hawaii at Manoa

Raymond Carr
Economic Development Specialist
Research & Development, County of Hawaii
Representing Mayor Harry Kim, County of Hawaii
Also Research Advisory Committee Member

Antonio Saguibo *(until April 2004)*
Robert D. Dewitz *(from May 2004)*
HSI Electric, Inc.
Representing the Hawaii Strategic Development Corporation Board of Directors

Jay Fidell
Bendet, Fidell, Sakai & Lee
Representing the High Technology Development Corporation Board of Dire ctors

Carl L. Simons
Hawaiian Cement
At-Large Governor's appointee (term expires June 30, 2007)

NELHA/CEROS Staff

(from July 1, 2003 through June 30, 2004)

NELHA **Jeff L. Smith,** *Executive Director*

Karen Appleby, *Fiscal Clerk (from November 2003)*

Michael Bloomfield, *Operations Supervisor/Electrical Engineer*

Donald DeSilva, *General Laborer (from July 2003)*

Kimber Deverse, *Chemist III (until July 2003)*

Monica Dunse, *Microbiologist III*

Georgette Espinueva, *Secretary III*

Ernest Galt, *Maintenance Mechanic II (until October 2003)*

Rex Goatcher, *Vehicle/Construction Equipment Mechanic I (until April 2004)*

Karin Haleamau, *Groundskeeper II*

Gisela Hetherington, *Chemist III*

Jacqui Hoover, *Administrative & Projects Manager/Gateway Manager*

Sheryll Kaniho, *Fiscal Officer*

Barbara Lee, *Leasing & Tenant Relations Specialist*

Diane Minchew, *Senior Secretary* **Anthony**

Mitchell, *Maintenance Mechanic I* **Jeff Nichols,**

Engineering Projects Coordinator

Eugene Pierce, *Electrician II*

Rosalind Smith, *Chemist III (from August 2003)*

Jan War, *Operations Manager II*

CEROS **Bill Friedl,** *Technical Director*

Jacquie Brewbaker, *Program Manager for Outreach & Administration*

Corinne Giles, *Fiscal Assistant*

Donna Mau, *Contracts & Grants Administrator (Honolulu office)*

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