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PILOT PROJECT PROPOSAL
FOR
PROJECT XL FACILITIES
UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

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Submitted by:
PACIFIC MARINE AND SUPPLY COMPANY

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**PROJECT XL APPLICATION
ON BEHALF OF PACIFIC MARINE**

I. INTRODUCTION

A. Hawaii's Unique Waste Problems And The 1995 Defense Appropriation Act

Hawaii faces unique solid and hazardous waste management problems due to its geographical location, its geological setting, and its longstanding function as a strategic base of military operations. These factors led Congress to appropriate \$3,500,000 under the 1995 Defense Appropriation Act for the Department of Defense's ("DOD's") Pacific Command to conduct an innovative technology demonstration project using "the Terra-Vit hazardous waste treatment technology".

A condition of the appropriation was that the project be completed at an EPA permitted facility in the State of Hawaii. Pacific Marine is the only permitted RCRA management facility in Hawaii. Pacific Marine teamed with Battelle laboratories -- who has the patent to the Terra-Vit technology -- and together they are working with the Pacific Command to implement this vitrification demonstration project.

B. The Terra-Vit Technology

Waste vitrification is the process that transforms wastes into a solid, chemically durable, inorganic silicate glass. The Terra-Vit process functions as a recycling operation; it takes all kinds of materials, both solid and hazardous, and recycles them into useful glass products including roofing materials, railroad ties, asphalt, concrete aggregate, seawalls, glass tiles, glass wool insulation and even jewelry components. The process generates glass by fusing and immobilizing the inorganic materials found in waste into a durable glass matrix while destroying the organic and combustible materials in the feed. The Terra-Vit process produces immeasurable environmental gains by transforming society's waste into an income generating and commercially useful glass product that exhibits an exceptionally high degree of compressive strength and is chemically durable and inert.

C. Need for XL Agreement

The demonstration project requires an innovative regulatory approach, such as that provided under Project XL, because of the numerous, inflexible regulatory hurdles otherwise presented by the Subtitle C RCRA regulatory requirements. Under RCRA Subtitle C, Pacific Marine has two options, neither of which is optimal, and both of which present impediments to an expeditious and successful Terra-Vit demonstration project.

* One option available to Pacific Marine is to apply for a full Subtitle C RCRA permit for the vitrification unit. The Subtitle C permitting process is, however, often protracted and thus would make it difficult for Pacific Marine to complete the demonstration project in the allotted time frames. The regulatory difficulties inherent in the RCRA permitting process are compounded by the application of the land ban regulations. These regulations could prohibit or significantly impede the productive use of the glass generated by the Terra-Vit process.

* Alternatively, Pacific Marine could assert that the vitrification process is a recycling operation and is thus exempt from RCRA Subtitle C permitting requirements. Similarly, it could assert that the glass end-product is a recyclable material which is also exempt from RCRA substantive management requirements. Although the recycling exemption is self-executing and does not require the Agency's imprimatur, to avoid potential enforcement and citizens' suits, it is advisable to obtain a recycling endorsement from the Office of Solid Waste. Yet, the narrow test prescribed by the Agency's "sham recycling" guidance will make it difficult for Pacific Marine to obtain such a determination.

It is possible that regulatory amendments enacted in the future, such as the Hazardous Waste Identification Rule ("HWIR") and the Re-Definition of Solid Waste, will one day make Pacific Marine's proposal possible, but neither the Pacific Command nor the citizens of Hawaii can await these eventualities. Hawaii's waste problems are immediate and cannot be forestalled while the RCRA regulatory program evolves, especially with the understanding that, in the end, this project may still remain infeasible. Testing is scheduled to begin in June of 1996 beginning with clean soils, proceeding to spiked soils, and culminating with a demonstration of its applicability to all types of hazardous and non-hazardous wastes generated by the military.

D. Summary of XL Proposal

Pacific Marine proposes that it be permitted to complete the scheduled demonstration project outside of the RCRA Subtitle C permitting process. We also propose that the glass end-product of the recycling process be deemed non-hazardous and thus exempted from the land ban testing and related requirements to enable the glass material to be freely sold and used as a commercially viable product.

Pacific Marine is amenable to entering into a Final Agreement which places any appropriate air emissions limitations on the melter and any necessary discharge limits on the water quencher. The company is willing to ensure that the hazardous and solid wastes are appropriately handled and stored on site and that the data generated through the various phases of the demonstration project are valid, and made available to EPA, the Hawaii Department

of Health and interested members of the public.

Because the Terra-Vit process is unique, Pacific Marine invites EPA and the Hawaii Department of Health to work cooperatively with the company to develop adequate data to satisfy any and all concerns regarding vitrification as a technology as well as Pacific Marine's specific plans to recycle and render the glass end-product commercially available.

Members of Hawaii's Congressional delegation recognize the urgency of the situation and wholeheartedly endorse this XL application. Similarly, the State of Hawaii Department of Health expects to receive RCRA delegated status next Spring and is extremely supportive of an XL approach for this project as demonstrated by a letter of support from Bruce Anderson, its Director, which will supplement this proposal. Hawaii, moreover, is willing to commit the time, resources, and hard work required to implement this project on the XL tract. The City of Honolulu is also enthusiastic about this project and has expressed its willingness to work with Pacific Marine, local environmental groups, and other Hawaii citizens to satisfy any local concerns that may arise during the pendency of the project.

In short, it is hard to imagine better circumstances warranting selection for XL status than those presented here. Hawaii and DOD are urgently in need of an innovative solution to the South Pacific's waste problems. The Terra-Vit demonstration project promises to satisfy that need while actually enhancing the environment while saving substantial costs.

II. HAWAII'S HAZARDOUS WASTE PROBLEMS

Hawaii's hazardous wastes are generated largely by the military. At bases in Hawaii and throughout the South Pacific, military operations have led to significant environmental contamination at a variety of sites as a result of leaking underground fuel storage tanks, soil contamination resulting from weapons training and pesticide application, routine base maintenance and repair activities, and the storage and disposal of hazardous materials. The magnitude of the problem led DOD to earmark more than \$1.3 billion towards remediation projects for Hawaii and the Pacific Command.

In addition to DOD's wastes, Hawaii must treat and dispose of large volumes of wastes generated by private sector commercial entities which could benefit greatly from innovative technological advancements in the area of hazardous waste handling and recycling. Because Hawaii lacks appropriate treatment facilities, this waste is shipped to the mainland at great expense. In addition, Hawaii experiences great difficulties managing medical wastes, which are generated at a rate of more than 171 tons annually, in a safe, environmentally protective and cost effective manner.

Hawaii's enormous hazardous waste problems are exacerbated by a lack of a hazardous waste landfill, a hazardous waste incinerator, or any other type of hazardous waste treatment or disposal facility. Hawaii does not have the open spaces necessary for opening new disposal sites and its geologic setting renders land disposal difficult, if not ultimately dangerous with respect to ground and surface waters. Acquisition of incineration capacity is not advisable because transferring pollutants from one medium to another does not present an environmentally protective solution.

These factors together force DOD and similarly situated commercial entities to ship their wastes to the continental United States for treatment and disposal at a cost in excess of \$30 million annually, or an added cost of between \$150.00 - \$200.00 per drum of hazardous waste. Shipping, of course, lends itself to additional environmental risks, including spills, accidents, and even groundings, which could prove to be devastating to the environment. In short, Hawaii and DOD are in desperate need of an innovative approach to waste handling as uniquely provided by the Terra-Vit process.

III. THE APPLICANT

Pacific Marine, a Kamaaina company founded in 1944, is a privately owned and diversified Hawaiian corporation with operations in the maritime, industrial, environmental and tourism sectors. One of its wholly owned subsidiaries is Unitek Environmental Services, an environmental services company that owns and operates a full service environmental laboratory, and an interim status facility that stores and prepares hazardous wastes for trans-shipment to the mainland. Unitek enjoys a well earned reputation for full compliance with all environmental regulations.

IV. THE TERRA-VIT PROJECT

A. The Technology

Terra-Vit is a melter technology patented by Battelle that transforms a wide range of hazardous waste streams into chemically durable, useful and recyclable industrial glass products. A diagram of the technology is attached as Exhibit 1. Waste vitrification is a relatively new technology that makes glass from waste by destroying organic molecules and incorporating and isolating hazardous materials and radioactive elements. Due to the intense heat of the vitrification process, all combustible materials are totally consumed and any remaining heavy metals become chemically bonded to the glass which prevents any leaching.

The Terra-Vit process requires low capital and operating costs. The melter consists of a pit located inside a container

for molten waste. The melter is covered by a roof of high-temperature materials. Its refractory sidewalls are sloped gradually to the center and can be made of low cost clays, rock or waste refractory from the glass and steel industries. Electrodes are inserted through holes in the roof to supply most of the energy needed to transform wastes into molten glass. Wastes are gravity fed through a feed port near the center of the molten pool. The homogenous, molten glass product is poured through a discharge section at the periphery of the tank into glass conditioning systems used to make reusable products.

The innovative method of construction associated with the Terra-Vit patent ensures high cost savings; the costs of running this technology are reduced from \$5,000 per ton in traditional glass melters to less than \$100 per ton with the Terra-Vit process. In addition, the Terra-Vit design enables use of alternative energy sources to further reduce operating costs. Such alternative energy sources include municipal solid wastes and medical wastes and may to a lesser extent include waste wood, tires, low cost coal or natural gas. Energy is, moreover, expected to be recovered from the process and may be used to pre-heat incoming waste, or to generate electricity through a small gas turbine.

In short, the technology can be easily, quickly and inexpensively constructed and transported. It adapts easily to different locations including relatively primitive conditions and thus may be used as a mobile form of waste treatment. The Terra-Vit process minimizes waste handling and transport before processing and is amenable to all kinds of solid, hazardous and even radioactive wastes.

B. The Demonstration Project

The general purpose of the demonstration project is to validate the technical efficiency of the Terra-Vit technology to remediate sludges and soils contaminated with heavy metals, PCBs, dioxins, solvents and other forms of organic chemicals, as well as asbestos and combustible wastes, by converting these waste streams into mechanically and chemically stable, high value glass products.

Pacific Marine expects that the demonstration project will yield results validating the technology thus rendering it universally available as a substitute for more traditional hazardous waste management techniques. In turn, the company hopes that as a result of a successful demonstration project, EPA will issue a determination that the technology itself qualifies as exempt under the Agency's recycling regulations, that the glass end-product produced from the technology fully satisfies the substantive land-ban treatment tests, and that it therefore may be freely sold and productively used as a commercial substitute.

Because contaminated media is fairly ubiquitous in Hawaii, the project test sequence is geared at the outset to verify the ability of the Terra-Vit process to recycle soils contaminated with heavy metals. After the completion of the demonstration project, other priority wastestreams identified by stakeholders including PCBs, selected drummed wastes, sludges and sediments, chlorinated solvents, incinerator ash, and wastes containing a substantial fraction of combustibles such as municipal and medical solid wastes will be tested.

V. REGULATORY OBSTACLES

A. Recycling Standards and Prohibitions

* The Definition of Solid Waste exempts certain recyclable materials entirely from Subtitle C regulation. 40 C.F.R. ¶261.2(e). A limited exemption from Subtitle C requirements is provided for specified hazardous wastes that are considered recyclable materials. 40 C.F.R. ¶261.6(a)(1). Pursuant to 40 C.F.R. 261.6(a)(2), however, these hazardous recyclable materials are still required to meet the requirements found in Parts 266, 270 and 124.

If these recyclable materials are used in a manner constituting disposal as provided under 40 C.F.R. 266.20, they are also required to comply with the land ban prohibitions and requirements found under Part 268. If triggered in this case because the recyclable materials will be used to construct products that are placed on the ground, the land ban regulations may present serious obstacles, if not prove prohibitive to the sale and reuse of the glass materials produced by the Terra-Vit technology. 40 C.F.R. ¶261.6(a)(2)(i).

* Under the applicable land ban regulations, it is expected that the glass end-product of the vitrification process will easily satisfy the appropriate treatment standards in Part 268 Subpart D. The total concentration limitations found at 40 C.F.R. ¶268.41 may, however, present an obstacle to beneficial reuse of the glass product. The presence of heavy metals and non-combustible waste within the glass may also create additional regulatory impediments to the beneficial reuse of the glass end-product. Finally, the fact that the Terra-Vit technology employs a batch-type process may render the requisite testing costs associated with the land ban regulations prohibitive.

* In light of these obstacles, Pacific Marine could petition to "delist" the glass end-product. However, the delisting process is lengthy and presently unfunded and thus unavailable; more importantly, the inherently variable nature of the batch-type process is likely to make the delisting process impracticable.

* It is doubtful that the treatability study samples exemption under 40 C.F.R. ¶ 261.4(e) could be applied to relieve Pacific Marine of the management requirements under Parts 261-263 because of the quantity restrictions imposed under ¶ 261.4(e)(2).

B. RCRA Permitting Obstacles

* If the Terra-Vit process is not determined to be an exempt process under the recycling rules, then a Part B RCRA permit would be required to conduct the demonstration project under 40 C.F.R. Parts 264 and 270. The process normally takes many years to complete and is therefore not amenable to the time-sensitive needs of this project.

* Alternatively, Pacific Marine could apply for a Research, Development and Demonstration ("RD & D") permit under 40 C.F.R. ¶ 270.65(d). While the RD & D permit is intended to encourage the use and development of innovative and experimental hazardous waste treatment technologies under more compressed time frames, the permit may only be issued for a period of 1 year, and may not be renewed more than 3 times. 40 C.F.R. ¶270.65 (d). The renewal limitation may prove problematic given the scope and projected timing of the demonstration project.

VI. THE PROJECT SATISFIES THE XL CRITERIA

Pacific Marine's Terra-Vit demonstration project satisfies the criteria for selection in the XL program. Authorizing the Terra-Vit demonstration project to proceed **without** (1) obtaining a full RCRA Part B permit; (2) **without** being subjected to the land ban testing requirements for each individual batch; and **without** (3) submitting a delisting petition for the glass end-product will lead to greater environmental benefits, reduced hazardous waste management costs and substantial cost savings and will foster technological innovation and pollution prevention. The project enjoys widespread stakeholder support, is transferable as well as technically and administratively feasible and will be well documented and open to public scrutiny.

A. Environmental Results

The Terra-Vit project will result in a number of important net environmental gains that will fully offset the regulatory flexibility requested through this proposal.

First, the project will eliminate the varied risks including shipping accidents associated with hazardous waste transport to the mainland from Hawaii and the South Pacific.

Second, the Terra-Vit process will eliminate the risks associated with landfilling, incineration and other forms of conventional treatment and disposal of hazardous and solid waste. All

combustible material is totally consumed through the use of intense heat in the vitrification process. Any remaining heavy metals are totally encapsulated. Indeed, the process has been demonstrated to produce a glass by-product the consistency of sand which has consistently passed all leaching test standards.

In contrast, landfilling often results in leaching and thus in potential ground and surface water contamination. Incineration merely transfers the hazardous pollutants from one medium to another. While the Terra-Vit process will result in a minor release of off-gases of the less toxic, simple hydrocarbons chains variety, including carbon dioxide, carbon monoxide and water, the recycling process will build in appropriate air emissions control units, and Pacific Marine contemplates that the final XL Agreement will incorporate appropriate and enforceable air emission limitations as necessary.

Third, the process recycles hazardous and other wastes into a reusable glass product that is completely inert, insoluble and thus environmentally safe. The process therefore dramatically reduces the volume of wastes requiring disposal or further management. The Terra-Vit technology results in a mass recycling effort and in so doing fosters principles of sustainable development.

Fourth, the Terra-Vit process will substantially reduce the costs of hazardous waste management in Hawaii. Indeed, it will virtually eliminate shipping and related manifesting costs. Moreover, vitrification is expected to be less costly than some of the more traditional hazardous waste management avenues. That cost differential will result in more and more wastes being vitrified and thus safely managed.

Moreover, the savings expected to be achieved by relaxation of the RCRA regulations will be reinvested in the project itself, including all appropriate controls deemed necessary for its safe operation. The reinvestment will enable the project to be expanded and diversified to effectively process heterogeneous wastes.

Fifth, the Terra-Vit process will result in energy conservation and increased energy production by utilizing waste materials as fuel to maintain melter operating temperature, pre-heat incoming waste or generate electricity through a small gas turbine.

More specifically, the H-power plant in Honolulu -- a trash to energy conversion power plant -- generates bottom and fly ash which is currently being landfilled. Pacific Marine believes that the ash would serve as an excellent feed stock for the vitrification unit. The ability of the Terra-Vit process to successfully utilize the waste ash from this facility would reduce the volume of materials currently being disposed of at the local landfills while simultaneously serving as an alternative energy source for the unit itself.

Sixth, the Terra-Vit process will result in little to no secondary wastes. Both phases of the demonstration project will utilize appropriate air pollution control units to ensure that the recycling process does not transfer pollutants from one medium to another.

Finally, Pacific Marine is committed to exploring avenues to work with the Pacific Command to establish a pollution prevention/waste minimization plan that could be implemented at military bases in the South Pacific. The goal of this effort would be to establish practices that prevent the generation of pollution at the front-end, so that the amount of wastes requiring the vitrification services provided by Pacific Marine would be reduced.

B. Cost Savings And Paperwork Reduction

Relaxation of the RCRA regulations in acknowledgment of the recycling benefits and numerous environmental gains discussed above will also result in substantial costs savings to Pacific Marine, as well as future proponents of vitrification. More specifically, if accepted, the XL proposal is expected to result in substantial cost savings by eliminating requirements in the following areas:

- * RCRA Part B or RD&D permitting requirements under 40 C.F.R. Part 270 and substantive management standards under Parts 261-263;

- * RCRA land ban testing and related requirements under 40 C.F.R. Part 266;

- * RCRA delisting petition process;

- * The relaxation of the substantive RCRA obligations also will result in dramatic reduction in paperwork;

- * The cost savings generated by the regulatory relaxation will be reinvested to enhance the development of the Terra-Vit technology.

C. Stakeholder Support

Pacific Marine's XL project enjoys the strong support of Senator Innoyue of Hawaii, the Department of Defense's Pacific Command, the State of Hawaii Department of Health and the City of Honolulu. As this project proceeds, Pacific Marine expects to obtain the continuing support of all of Hawaii's Congressional Delegation, local environmental groups and the citizens of Hawaii. When such letters of support are received, they will be forwarded to the EPA for consideration with this application.

D. Innovation/Multi-Media Pollution Prevention

Pacific Marine's goal is to achieve widespread use of the innovative Terra-Vit technology throughout the military, Hawaii and ultimately the continental United States. Use of this technology may be fostered in tandem with a broad-based pollution prevention program voluntarily initiated by the military. In addition, the process itself dramatically reduces the volume of wastes required for disposal or subsequent management.

Vitrification destroys hazardous organics with a destruction efficiency greater than 99.99%. It chemically binds heavy metals and radioactive elements into chemically durable and leach resistant solids.

Vitrification can also be used to replace solid fuel fired boilers and can thus generate industrial energy without producing waste ash.

E. Transferability

The Terra-Vit technology itself as well as the information generated through the demonstration project will be transferable to facilities -- especially those located in Hawaii -- who are in need of an alternative form of hazardous waste management that is both safer and less expensive. The melter is designed to be transportable and the materials used to construct the melter are relatively primitive and affordable. These factors will enable the technology to become generally available and amenable to all kinds of wastes.

Because the technology will be proven to be the safest and most cost efficient and environmentally responsible mode of waste management, Pacific Marine contemplates that its use will become widespread, especially if EPA issues a general determination that the process qualifies as a recycling process and that the glass end-product meets the land-ban requirements and thus can be commercially sold and generally reused. Granting this project XL status will relax the regulatory obstacles and thus ensure that these goals become realized.

F. Feasibility

The Terra-Vit XL Project is guaranteed to be feasible as a result of Congress' 1995 appropriation of \$3.5 million earmarked expressly for the implementation of this project in Hawaii. It has been successfully used at a smaller capacity facility at the Hanford Department of Energy site in Eastern Washington and is expected to be amenable to all hazardous and solid wastes generated in Hawaii and the South Pacific.

The regulatory relaxation required to make this project a success is administratively feasible and is not expected to require substantial agency resources. The Hawaii Department of Health has agreed to work closely with Region IX and Headquarters officials to accomplish the goals outlined in this application and has agreed to supply the necessary resources towards that end.

G. Monitoring, Reporting and Evaluation

The project will be conducted in phases and will generate volumes of test data correlating the technology's performance on all kinds of wastestreams. Pacific Marine is amenable to making this data available to EPA, the Hawaii Department of Health and the general public under a Final XL Agreement and as previously stated, invites EPA to work with it to ensure that the data adequately demonstrates the safety of the process. The data will measure in clear terms the success of the project and will enable EPA and Hawaiian regulatory officials to determine the ability of the technology to supplant the more conventional means of waste management.

H. Consistency With Environmental Justice Objectives

Pacific Marine's Terra-Vit Project will be consistent with Executive Order 12898. By dramatically reducing the environmental risks associated with conventional hazardous waste management and by generating a useful recycled product through the vitrification process, it will concomitantly protect worker safety and ensure that no one is subjected to unjust or disproportionate environmental impacts. In addition, Pacific Marine will ensure that appropriate environmental health and safety precautions will be taken during the demonstration project to satisfy these goals.

VII. CONCLUSION

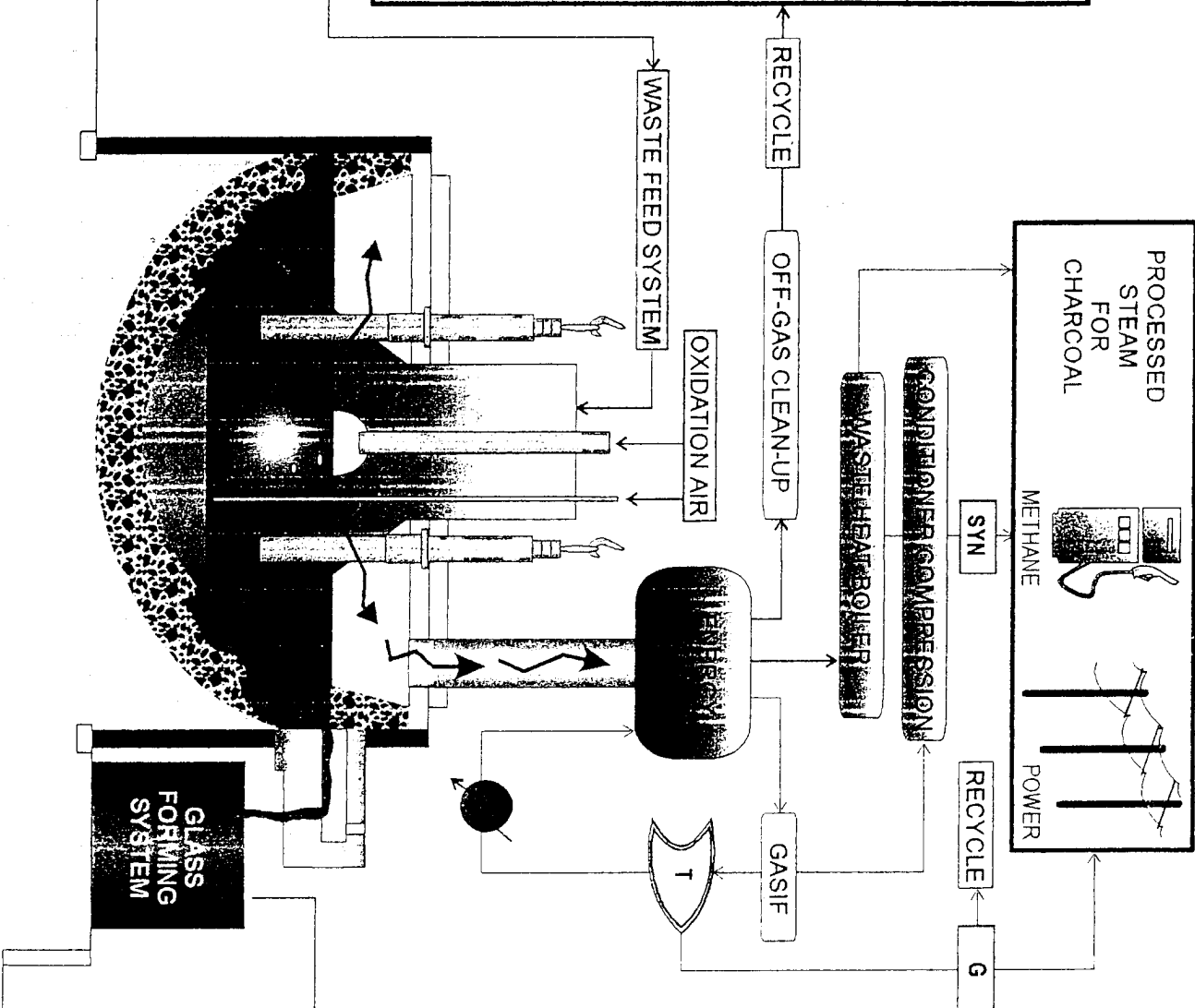
Hawaii's unique waste problems cannot await the emergence of a potentially new regulatory world before beginning to seriously explore and develop alternative, and technologically innovative means of waste handling such as that provided by the Terra-Vit process. The unique convergence of political, economic, strategic and environmental concerns dictate that an innovative regulatory process be used to facilitate Hawaii's Terra-Vit demonstration project. Pacific Marine believes that selection in the Project XL program would provide the requisite degree of flexibility necessary to carry out the objectives of the 1995 Defense Appropriation Act in the time frame demanded by the demonstration project and would result in a "cleaner, cheaper and definitely smarter" method of waste handling in Hawaii, the South Pacific, and eventually throughout the continental United States.

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If reply, please refer to:
File:

November 20, 1995

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Ms. Felicia Marcus
Administrator, EPA Region 9
75 Hawthorne Street
San Francisco, California 94105

Subject: Pacific Marine's Project XL Application

Dear Ms. Marcus: *Felicia*

I am writing to express the Hawaii Department of Health's support and endorsement of Pacific Marine's Project XL proposal.

Under the 1995 Defense Appropriations Act, Congress granted the Pacific Command \$3.5 million to conduct a demonstration project of the Terra Vit technology on waste streams typical of those generated in Hawaii. It seems Congress was aware of the unique problems Hawaii faces given the fact that it does not currently have a means to treat or dispose of hazardous wastes and therefore is required to transship these wastes, at great expense and some risk, to the mainland.

The Terra-Vit technology appears to be a promising means of treating heavy metal contaminated soils and ash. The process produces an inert, glass-like material that can be shaped into pavers and other commercially viable products. This has an advantage over other technologies that simply shift the risk burden to another medium. In addition, it would provide an alternative to exporting wastes from Hawaii to other areas.

Unfortunately, based on my discussions with Pacific Marine, it is my understanding that the existing regulatory framework under RCRA will not accommodate either the demonstration project or Pacific Marine's ability to produce and market the end-product. Therefore, there is a need to permit and regulate this project through a more flexible regime if this technology is ever to be used in Hawaii.

Ms. Felicia Marcus
November 20, 1995
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This Terra Vit technology provides for an innovative approach to managing hazardous materials. To assure that any concerns are openly addressed, we recommend that public information and opportunities for public comment be provided for early in the permitting process. We would be glad to work with you and Pacific Marine in this regard.

This is an opportunity to show that business and government can work together to meet the State's waste management needs. The technology has the potential to provide environmental benefits beyond those that can be achieved under existing federal regulations. For these reasons, I urge you to seriously consider Pacific Marine's proposal.

Very truly yours,



BRUCE S. ANDERSON, Ph.D.
Deputy Director for Environmental Health