ENCLOSED FACILITY ECONOMIC FEASIBILITY ANALYSIS
NURSERY PRODUCTS HAWES COMPOSTING FACILITY
SAN BERNARDINO COUNTY, CALIFORNIA

Prepared for:

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LIST OF ACRONYMS

BLM	Bureau of Land Management
BofA	Bank of America
CEQA	California Environmental Quality Act
CH_4	Methane
CIWMB	California Integrated Waste Management District
CO_2	Carbon Dioxide
County	County of San Bernardino
Court	Superior Court of the State of California, County of San Bernardino, Barstow District
DSCR	Debt service coverage ratio
Draft EIR	Draft Environmental Impact Report
EIR	Environmental Impact Report
GHG	Greenhouse Gas
IERCF	Inland Empire Regional Composting Facility
IEUA	Inland Empire Utility Agency
Kv	Kilovolt
LV	Las Virgenes Composting Facility
LVMWD	Las Virgenes Municipal Water District
MDAQMD	Mojave Desert Air Quality Management District
N_2O	Nitrous Oxide
Petitioners	The Center for Biological Diversity and HelpHinkley.Org
pH	Measure of acidity or alkalinity
Project	Nursery Products Hawes Composting Facility Project
SCE	Southern California Edison
SWP	State Water Project
tpy	tons per year
VOC	Volatile Organic Compounds

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1. INTRODUCTION

PURPOSE OF REPORT

This report provides an economic analysis of an enclosed facility as potential mitigation for the one unmitigated significant impact of volatile organic compounds (VOC) emissions and as an alternative for the Nursery Products Hawes Composting Facility (Project). The enclosed facility was fully evaluated in the Draft Environmental Impact Report (Draft EIR), however this analysis supplements the economic and technological analysis therein. In addition, this analysis summarizes the Greenhouse Gas (GHG) emissions associated with an enclosed compost facility. The purpose of this report is to provide additional analysis regarding the economic feasibility of the enclosed facility alternative to the Project as part of the Supplemental Environmental Impact Report and in fulfillment of California Environmental Quality Act (CEQA).

Nursery Products LLC applied for a conditional use permit for the Project in December 2005. The Draft EIR was circulated for a 45-day public review period, beginning in September 2006 through November 13, 2006. A Final EIR was issued November 21, 2006, certified by the San Bernardino County Planning Commission on November 30, 2006, and affirmed by the Board of Supervisors on February 27, 2007. A lawsuit alleging violation of CEQA was subsequently filed against the County of San Bernardino (County) by the Center for Biological Diversity and HelpHinkley.Org (Petitioners). The Petitioners alleged violations of the CEQA process including the adequacy of the analysis of an enclosed facility. On February 8, 2008, the case was heard in Barstow Superior Court (Court). On April 11, 2008 the Court issued its Statement of Decision. The Court reviewed the analysis of air quality impacts and found the analysis adequate. The Court also found that the County's administrative record was not sufficient to support the conclusion that an enclosed facility was infeasible and questioned the economic analysis and availability of infrastructure. This analysis is in fulfillment of the Court's direction for additional economic analysis of the feasibility of the enclosed facility alternative and infrastructure availability. This analysis evaluates the best available cost information for the two enclosed facilities located in the greater Southern California area: Rancho Las Virgenes Composting Facility in Calabasas and Inland Empire Regional Composting Authority located in Rancho Cucamonga. These are the only two enclosed biosolids composting facilities that provide relevant information for further economic analysis.

PROJECT DESCRIPTION

The proposed Nursery Products Hawes Composting Facility Project is an open air biosolids and green material composting facility. The facility would be located on 80 acres of a 160-acre parcel located within the unincorporated part of the County of San Bernardino, California. The facility would receive a daily average of 1,100 tons (400,000 tons per year (tpy)) of biosolids and green material to produce agricultural compost.

The Project site is located west of the City of Barstow, approximately 8 miles west of Hinkley, and approximately 12.3 miles east of Kramer Junction. The site is approximately one mile south of State Route 58 and one mile west of Helendale Road. The Project would be located on land owned by Nursery Products, LLC, near the decommissioned Hawes Airport.

The primary goal of the Project is to provide cost-efficient local biosolid and green material composting capacity for the County of San Bernardino and the Inland Empire that complies with the applicable Federal requirements for biosolids composting and otherwise complies with applicable state and local regulations. A more detailed Project description is set forth at Section 2 of the Draft EIR.

THE COMPOSTING PROCESS

In order to understand the economic feasibility analysis of an enclosed facility, a brief introduction into the composting process that will be used by Nursery Products is needed. The windrow composting process involves the bulk mixture of primary feedstock materials, biosolids and greenwaste, with bulking agents and amendments (sawdust, sand, gypsum, or other similar material). The mixture is placed in long rows called windrows, which are typically several hundred feet long, with an initial width of up to 30 feet and initial height of up to 12 feet. Composting of the feedstock materials will occur over a period of approximately 60 days, during which time the volume of the materials in the windrows will decrease substantially as decomposition of the source materials proceeds and moisture and other off-gases are released. The material within the windrows needs to be mechanically turned periodically in order to provide adequate moisture, temperature and oxygen content within the windrows. On average the material within a windrow will be turned once a day.

VOC EMISSIONS ASSOCIATED WITH COMPOSTING

The enclosed facility was evaluated in the Draft EIR as an alternative to the Nursery Products Hawes Composting Facility and as potential mitigation for the one significant impact that could not otherwise be mitigated to less than significant: VOC emissions. CEQA requires that evaluation of mitigation and alternatives to the proposed Project be focused on reducing significant impacts. The only significant impact identified in the Draft EIR that the enclosed facility may be able to mitigate is air quality impacts of VOC emissions associated with the open air composting operation. These emissions were deemed significant because they exceed the threshold developed by the Mojave Desert Air Quality Management District.

The following briefly describes VOC emissions associated with the composting process. Additional emissions from composting activities are discussed in detail in Section 4.3 of the Draft EIR. For emissions purposes, it is assumed that the active phase of the composting cycle takes approximately 22 days, with the resulting product being cured for at least 30 additional days before use. As stated above, total residency time for feedstock is approximately 60 days. The active composting phase of the process is the time period where organic material decomposes at its fastest rate and emissions are generated at a high rate. The compost may be considered cured or stable by the oxygen uptake rate, a low degree of reheating in curing piles, the organic content of the compost, and the presence of nitrates and the absence of ammonia and starch.

VOCs are produced during the anaerobic (in the absence of oxygen) decomposition of organic material. Decomposition occurs during the composting process. Windrow composting produces VOC emissions when areas within the core of the windrow become anaerobic as the decomposition process depletes the available oxygen at these locations. The anaerobic condition will continue until the windrow is turned allowing air to oxygenate the area. Turning the windrows can decrease the temperature within the core of the windrow. If windrows are turned too often the temperature within the core of the windrow can drop too low and detrimentally affect the composting process. Therefore, a balance needs to be achieved whereby the windrow is turned often enough to oxygenate the core of the windrow, but not so often that the temperature within the windrow core drops too low. If this balance is achieved the emissions of VOCs are reduced to the lowest extent possible, but cannot be completely eliminated.

GREENHOUSE GAS EMISSIONS ASSOCIATED WITH COMPOSTING

Parts of the Earth's atmosphere act as an insulating blanket of just the right thickness, trapping sufficient solar energy to keep the global average temperature in a suitable range. The 'blanket' is a collection of atmospheric gases called 'greenhouse gases' (GHGs) based on the idea that the gases 'trap' heat like the glass walls of a greenhouse. These gases, mainly carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), and chlorofluorocarbons (CFCs) all act as effective global insulators, reflecting back to earth visible light and infrared radiation. Human activities such as producing electricity and driving internal combustion

vehicles have contributed to the elevated concentration of these gases in the atmosphere. This in turn is causing the Earth's temperature to rise.

Methane emissions are commonly associated with composting operations. However, emissions from decomposition of the feedstock material the proposed Project would use are currently occurring at composting facilities and land applications in Arizona and Kern County, California. These methane emissions from decomposition will continue to occur as long as the waste material is generated and are therefore part of the baseline emissions (existing conditions) which will continue regardless of whether or not the proposed Project is implemented.

Exhaust emissions from the use of haul trucks to deliver feedstock to composting operations and off-road equipment such as front end loaders, windrow turners and tractors at composting operations are the other primary source of GHG emissions associated with composting. GHG emissions within the exhaust include carbon dioxide, methane and nitrous oxide. The GHG emissions from these aspects of the proposed Project were the main focus of the GHG analysis.

AIR DISTRICT REGULATIONS

The Mojave Desert Air Quality Management District (MDAQMD) has jurisdiction in the Project area and, on October 27, 2008, adopted Rule 1133 to regulate emissions of VOC and ammonia from numerous co-composting facilities. The rule covers the Project and requires the use of the best management practices (BMPs) listed in Rule 1133. The MDAQMD found that these BMPs have been proven to significantly reduce VOCs and ammonia emissions from composting activities. The following summarizes the BMPs for composting operations as required by MDAQMD Rule 1133:

- Scrape or sweep, at least once a day, all areas where compostable material is mixed, screened, or stored such that no compostable material greater than one inch (1") in height is visible in the areas scraped or swept immediately after scraping or sweeping, except for compostable material in process piles or storage piles;
- Establish initial carbon to nitrogen ratio of not less than 20:1 in active piles;
- Maintain moisture content between 40 percent to 70 percent in active and curing piles;
- Maintain pH below 8.0 in active and curing piles;
- Adequately mix incoming feedstock so that moisture and nutrients are maintained in proper proportions in all parts of the composting piles;
- Maintain daily records of materials receipt, discharge, and operational activities sufficient to verify the above.

The proposed project will be subject to Rule 1133. The MDAQMD has the authority to enforce the rule, which the MDAQMD determined was appropriate for co-composting facilities.

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2. SCOPE OF ANALYSIS

The Draft and Final EIR for the Project published in the fall of 2006 evaluated several alternatives. The Draft EIR analyzed the No Project Alternative (Section 3.3.1, pages 3-5 through 3-6 of the Draft EIR), the Reduced Capacity Alternative (Section 3.3.2, page 3-6 of the Draft EIR), and Alternative Site Locations (Fort Cady and Fremont Peak are locations; Section 3.3.3, page 3-6 of the Draft EIR). The Court reviewed the Draft and Final EIR and found these alternative analyses adequate. Therefore, this analysis does not consider them further.

The Court directed the County to supplement the analysis in the administrative record regarding the economic feasibility of an enclosed facility and associated electric power lines and other infrastructure required for an enclosed facility, stating that the analysis was inadequate and that "Each public agency shall mitigate or avoid the significant effects on the environment of projects that it carries out or approves whenever it is feasible to do so" (Court 2008). Enclosing a compost facility allows a capture and treatment system that would lower emissions of VOCs. The Court directed the County to further analyze the economic feasibility of an enclosed composting facility and further defined feasible as "capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, social, and technological factors" (Court 2008). In addition, the Court determined that more information was needed to constitute substantial evidence regarding the economic infeasibility of enclosing the Nursery Products facility. Therefore, this analysis implements the Court direction by analyzing the cost of building and operating an enclosed facility at the Hawes site, re-evaluating the potential benefit of reducing VOC emissions, with a focus of whether or not the enclosed facility reduces impacts found significant in the Draft EIR to less than significant levels, and addressing the impacts of adding the additional infrastructure necessary to enclose the facility.

This economic and technologic feasibility analysis focuses on two variations of the enclosed facility alternative and compares them to the proposed Project, which is an open air facility with a photovoltaic solar system to supply electrical needs as proposed and described in the Project description of the Draft EIR for the Project. These variations are:

- Conventional Power Variation: An enclosed facility with negative draft air system to biofilter, and conventional electric hookup, and
- Solar Power Variation: An enclosed facility with negative draft air system to biofilter that is powered by a photovoltaic solar system.

The analysis was accomplished by evaluating the costs of a hypothetical enclosed facility at the Hawes site with exemplary costs obtained from the two operational enclosed facilities in the vicinity. The exemplary costs were scaled up to a facility the size of the proposed project. Typically an enclosed facility is housed in a metal shell warehouse style building large enough to accommodate the entire operations including the feedstock loading area, windrows, the negative air system, and product loading areas. Approximately 18 employees are needed to run the facility. Because the entire enclosed facility is under negative draft, pulling all of the air within the building through a bio-filter, powerful fans are required. This negative air system consumes up to 127 megawatt hours of power per day. For the Hawes Facility, the electric power needed for the enclosed facility requires upgrades to the electric grid in the Project area. In particular, a 13.8 kilovolt (kv) electric power line will need to be extended approximately 6 miles, from the existing Coolwater-Kramer Junction power line near Lockhart, to accommodate the facility along with a set of power transformers at the site.

An enclosed facility with negative draft air system to biofilters, was chosen for analysis because it may provide emissions control capable of reducing VOC emission impacts, and therefore, potentially offer environmental benefits when compared to the proposed Project. However, because the enclosed facility requires significantly more electricity than the proposed Project, emissions from the consumption of electricity may actually exceed the emissions captured by the biofilter using the negative draft air system. Therefore, a photovoltaic solar powered enclosed facility was also evaluated.

The photovoltaic solar powered enclosed facility has all the same characteristics of the enclosed facility described above except that the power would be generated onsite. A much larger photovoltaic power system than what is needed for the proposed Project is required. In effect, the photovoltaic solar powered enclosed facility will require a solar generating station with a solar field of up to 216 acres, a control room, set of transformers, and significant improvements to the existing electrical grid. In addition to the 18 employees required to run the enclosed composting facility, this alternative variation will require approximately 4 employees during the daytime and 3 employees during the evening and nighttime shifts (10 employees total) to run the photovoltaic solar powered generating station. Evening and nighttime employees are needed to provide facility shutdown, startup, and maintenance when the equipment is offline. The improvements to the electrical system include approximately 6 miles of 13.8 kv power line, which is identical to the conventionally powered enclosed facility. The power lines and transformers are needed to both accommodate power generation when the solar generating station is online and provide power to the enclosed composting facility when solar power is not available.

The analysis of the conventional power enclosed facility with negative air systems to biofilter provides a cost analysis of building and operating the enclosed facility, improving the electrical grid, and calculates indirect emissions of GHGs and VOCs resulting from electric consumption. The cost analysis of providing photovoltaic power as part of the enclosed facility, which will not result in any GHG or VOC emissions from electricity production, includes a cost analysis of building and operating both the enclosed facility and the solar generating station and improving the electrical grid, but conservatively does not include the GHG or VOC emissions from electricity production even though backup power will be periodically needed and used. The cost and total net emissions (both direct and indirect) for the Project as proposed and the two variations of the negative draft to biofilter alternative were evaluated. Because the emissions associated with backup power in the solar powered variation are excluded from the calculation, the calculations present the most conservative (i.e. lowest emission) results.

3. ANALYSIS

The alternative analysis supplements the Draft EIR economic and technological feasibility analysis of the enclosed facility with biofilter and evaluates the additional variation, the enclosed solar powered facility. These alternative variations are compared to the proposed Project to both evaluate the potential emissions reductions and the relative financial feasibility. Since this analysis is done within the context of CEQA, the evaluation also includes determination of whether or not each of the enclosed facility alternatives reduces significant impacts as compared with the proposed Project.

PROPOSED PROJECT

The proposed Project would provide open air windrow composting. The proposed Project as evaluated in the Draft EIR included mitigation measures for the control of emissions from composting operations. Detailed facility cost and photovoltaic cost estimates for the proposed Project are provided in Appendix A and summarized in Table 1. Equipment operations and maintenance costs are based upon the off-road mobile equipment list provided in Appendix A. Labor costs assume 8 full time employees. Miscellaneous maintenance includes maintaining the perimeter fence and grounds. The capital costs are annualized over 15 years as the minimum economic life of the Project.

Table 1
Costs Associated with the Proposed Project

Cost Categories	Costs (2008 U.S. dollars)
Capital Costs	
Facility Costs	$6,190,607.00
Photovoltaic Solar and Back-up Generator	$155,859.50
Total Capital Costs	$6,346,466.50
Operations and Maintenance Costs (Annualized)	
Solar and Back-up Generator	$20,000.00
Equipment Operations (fuel and maintenance)	$300,100.00
Labor	$776,084.80
Additional Operational Costs	$0.00
Total O&M	$1,096,184.80
Annualized Capital & O&M Costs	
Total O&M	$1,096,184.80
Annualized Capital Costs	$570,808.18
Total: Annualized Capital & O&M Costs	**$1,666,992.98**
Detailed cost estimate is provided in Appendix A.	

Emission reductions associated with the enclosed alternative variations will be evaluated based upon how much the alternative reduces emissions as compared to the proposed Project emissions shown in Table 2. Vehicle transport of waste materials to the site is identical for the Project and the enclosed facility. Therefore, to focus on differences in emissions between the Project and the enclosed facility and to be consistent with the analysis in the Draft EIR, this analysis only compares onsite emissions associated with the Project and the enclosed facility alternative variations. The evaluation also includes a comparison of significant impacts associated with emissions generated by the proposed Project, versus whether or not the enclosed alternative variations reduce emissions to less than significant levels.

Table 2
Proposed Project Emissions Summary

Emission Type	Emissions (tpy)	MDAQMD Significance Thresholds	Significant Impact?
VOC Emissions	357.70	25	Significant[1]
GHG Emissions	624.73[2]	>30% BAU[3]	Not Significant[4]

[1] This is the significance determination that was made in the Draft EIR
[2] GHG emission totals exclude truck transport emissions which are identical for the Project and each of the enclosed facility alternatives.
[3] BAU = business as usual, which is defined as standard building and operating practices.
[4] This is the significance determination that was made in the GHG emissions analysis for the Project.

ENCLOSED ALTERNATIVE

In the enclosed composting facility alternative all of the composting processes are done within a building that houses the feedstock loading area, windrows, negative air system, biofilters collecting the emissions, and product loading areas. Biofilters may be housed outdoors as is indicated by the Inland Empire Regional Composting Facility (IERCF) procedures.

The analysis of the enclosed facility alternative used information obtained on the existing enclosed facilities in Rancho Cucamonga and Las Virgenes, California. These two facilities are the only operating enclosed facilities in the western United States at this time that are similar to the operations of the proposed Project. However, both the Rancho Cucamonga and Las Virgenes facilities are of a smaller capacity than the proposed Project, and therefore, costs were scaled to fit the size of the proposed facility.

Analysis Assumptions and Limitations:

The following are the assumptions and limitations that were used in determining the potential costs for the proposed enclosed facility alternative. A range of costs for the enclosed facility alternative were determined based on the costs of both the Los Virgenes and Inland Empire Regional Composting Facility data as provided.

Inland Empire Regional Composting Facility

The IERCF is the largest fully enclosed composting facility in the United States. The IERCF is a combined venture between the Inland Empire Utility Agency and the Los Angeles County Sanitation District, each having responsibility for half of the construction and annual operational costs. At capacity the facility is able to process up to 200,000 tons of organic matter into compost every year. The facility uses a 3:1 ratio or 150,000 tons of biosolids and 50,000 tons of woodchips to produce 240,000 cubic yards (90,000 tons) of compost annually.

The IERCF has been in testing mode for approximately 2 years. Tests included trouble shooting mechanical systems, testing different ratios of biosolids to woodchips, improving energy efficiency of the

process, and testing the emission control systems. This testing required the facility to operate at various loads below full capacity. In December 2008, the facility reached full capacity and is expected to remain at full capacity from that time forward. Because the IERCF has been in testing mode, its operational costs and history may not fully reflect how it will operate into the future. However, this is the best data available at the time of this analysis.

At present the selling price for compost is $2.00 per ton. However, IERCF is currently negotiating with a national wholesaler for a substantially higher price. As the higher price per ton is undisclosed, the analysis uses the current retail price of $18.27 per ton as an upper limit for the feasibility analysis (WasteAge 2000).

The IERCF employs twenty people, ten as operators of the facility, five in administrative roles, and five in maintenance roles. In January 2009, the facility added solar generation capable of 1 MW per hour of electricity for the building, approximately half of the electrical requirements. The IERCF had an original capital cost of approximately $89 million (based in 2007 dollars). A compost storage facility was added to allow the facility to operate at full capacity year round and stockpile product during the offseason. The storage facility increased capital costs to $94 million. No capital outlay was incurred by the IERCF for the installation of the solar power panels as a Purchase Pay Agreement was arranged which permits the vendor to install, operate, and maintain the equipment for the duration of the agreement. Further, the agreement provides for the purchase of all generated power at a fixed price, plus an annual escalation factor. The IERCF has a current operating budget of 6,000,000 which is split evenly between the joint venture partners.

Because the operational record for IERCF represents the period of time when the facility was in test mode and did not operate at full capacity, using the IERCF operational data may underestimate electricity use and other factors that would show lower operational costs. However, given that the IERCF is one of only two enclosed composting facilities in the United States, and the IERCF more closely represents the Project in capacity and biosolids delivery via trucks, this information constitutes the best information available on this type of enclosed facility at this time. Appendix B details the economic analysis of the IERCF facility.

Las Virgenes Composting Facility

The only other enclosed facility in the United Sates is the Las Virgenes Composting Facility. The Rancho Las Virgenes Composting Facility was constructed in 1994 and has the capacity to process up to 10,670 tons of organic matter annually into compost. The general feed stock mix is fifty percent biosolids from the Tapia wastewater reclamation facility and fifty percent wood chips.

Composting at the Las Virgenes facility begins with biosolids being transferred into the facility through 4-miles of underground piping from Tapia. Therefore, the biosolids will need to be dewatered onsite. The process of pumping liquid biosolids and then eventually extracting up to 75% of the water causes an increase in electrical demand that was not considered in this analysis because it is considered a wastewater treatment process and not part of the composting operations. The wastewater removed from this process is pumped back to the Tapia reclamation facility.

The Las Virgenes Facility is a completely automated in-vessel composting system where a material handling system transports the dewatered biosolids, recycled compost, and finely shredded wood to a mixer. Process odor is controlled by drawing air through the composting material and through a 17,000 square foot biofilter. In addition to controlling odor, the air is used to control heat and provide oxygen for the digestive microbes. Once this process is completed, the compost is allowed to cure for an additional fifteen days to finish the process before distribution.

The Las Virgenes facility had an original capital cost of $45,000,000 in 1994. The facility employs seven people in the daily operations, with an average labor cost of $1,191,000 annually. These costs do not include administrative labor costs. Annual costs for the operation division, maintenance, additional operational activities, and administrative expenses are $1,191,314; $445,776; $501,525; and $1,752,772

respectively. Operation division expenses include labor, electricity, telephone, natural gas, water, supplies, fuel, polymer, amendment, outside services, odor control, permits and fees, consulting services, and annual capital outlay. Maintenance expenses include labor, supplies, outside services, building maintenance, and capital outlay. Additional operational expenses include SCADA (automation control) services, technical services, compost outreach, other lab services, Tapia lab expenses, and allocated lab expenses. Administrative expenses include allocated G&A expenses, allocated support services, and allocated operations services.

The process used at the Las Virgenes facility differs from the Project in several respects. First the Las Virgenes facility combines portions of the wastewater treatment process into the composting facility, including the large electrical demand associated with pumping and dewatering biosolids. Also, the Las Virgenes facility includes an anaerobic digester for the production of methane that does not represent the type of process that the Project will use. For these reasons the Las Virgenes facility shows much higher electrical consumption and operational costs than IERCF. Finally, the Las Virgenes facility is much smaller than the capacities of the IERCF or the Project. The larger size of IERCF and the Project may provide an economy of scale that the Las Virgenes facility cannot accomplish. The operational data of the Las Virgenes facility provides the upper limit of operational costs in this analysis. Appendix C details the economic analysis of the Las Virgenes facility.

Solar Power Requirements

Since the cost of solar power for the IERCF is not available, another method of estimating costs was developed. In order to estimate costs, the Nellis Air Force Base Solar Power System (Nellis) project was reviewed and scaled to the size of the enclosed alternative's energy needs. The Nellis project is a 14.2 MW photovoltaic power plant constructed on 140 acres and generates 30,100,000 kW annually. The capital outlay for the Nellis project was $103,839,550 in 2008 dollars. Using the estimated required annual kWhr usage for the enclosed solar facility variation based on both the Las Virgenes and IERCF facilities, estimated costs for the installation of solar power range from $67,156,475 to $160,366,466 and will require between 90 and 216 acres of land.

Comparison of IERCF and Las Virgenes (LV) Facilities to the proposed Project

The IERCF and LV Facilities are both owned and operated as part of public utilities. Therefore, the cost of the construction and operations are supplemented by outside organizations. In addition, these entities have instituted the composting operations as a means of biosolids disposal and not specifically as a profit center. The IERCF is controlled by the Inland Empire Regional Composting Authority, a joint venture by the Inland Empire Utility Agency and the Los Angeles Sanitation District.

The proposed Project on the other hand would be a private entity without the benefit of joint venture or public utility funding. The purpose of the facility is to manage the composting of biosolids and green waste in a manner that is not only beneficial to the environment and will be cost effective. Due to the distances between the Project site and residential communities, odors from the proposed Project would be diluted to a level that would be less than significant (Draft EIR Section 4.3.3).

The Las Virgenes facility has incorporated a biosolids dewatering process and methane production through the use of an anaerobic digester into its operations. This exaggerates the operational costs beyond the IERCF and the proposed Project. Although proposed construction and operation costs for an enclosed facility are provided in ranges based on both the Las Virgenes and IERCF facilities, it is anticipated that the costs will be closer to those incurred by the IERCF as the construction and operational technology as well as the operating processes are more closely associated to those that would be employed by the enclosed alternative of the proposed Project.

Conventional Power Variation

The costs associated with an enclosed facility using a conventional power source are shown in Table 3. As shown in Table 1, the total annualized costs of the proposed Project are slightly more than $1.6 million. Total annualized costs for the conventional power variation of the enclosed facility alternative range from $21.3 million to $172.8 million. This alternative variation requires an initial capital investment of between $162.5 million and $1,246.6 million and will compost approximately 400,000 tpy. Labor costs assume 18 full time employees are needed to operate the conventional power facility. Miscellaneous maintenance includes painting the building and trim as well as maintaining the grounds. The capital costs are annualized over 15 years as the minimum economic life of the Project. Appendix D details the economic analysis of the enclosed facility alternative.

Table 3
Costs Associated with the Conventional Power Enclosed Facility Alternative

Cost Categories	Based on LV[1] (2008 U.S. dollars)	Based on IEUA[2] (2008 U.S. dollars)
Capital Costs		
Facility Costs	$1,225,585,754.45	$136,781,948.99
Electric Utility Upgrades	$21,000,000.00	$21,000,000.00
Enclosed Storage Facility	-	$4,738,000.00
Total Capital Costs	$1,246,585,754.45	$162,519,948.99
Operations and Maintenance Costs (Annualized)		
Electricity	$6,043,111.53	$2,530,666.67
Equipment Operations (fuel and maintenance)	$8,355,688.85	$400,133.33
Labor	$3,063,378.86	$1,746,190.80
Additional Operational Costs	$42,768,191.19	$2,048,400.00
Total O&M	$60,230,370.42	$6,725,390.80
Annualized Capital & O&M Costs		
Total O&M	$60,230,370.42	$6,725,390.80
Annualized Capital Costs	$112,119,294.46	$14,617,223.04
Total: Annualized Capital & O&M Costs	**$172,349,664.88**	**$21,342,613.84**

1 Costs for the Enclosed Facility Alternative are based on the known costs for the Las Virgenes facility and scaled based on the percent difference between the biosolids intake of the Nursery Products facility and the Las Virgenes Facility.

2 Costs for the Enclosed Facility Alternative are based on the known and assumed Inland Empire Utility Agency (IEUA) facility and scaled based on the percent difference between the biosolids production of the Nursery Products facility and the IEUA facility.

Detailed cost estimates are provided in Appendix D

Table 4 summarizes the emissions associated with the conventional power facility variation. Note that while emissions of VOCs decrease with enclosure, GHG emissions increase. The primary source of GHG emissions in the conventional power enclosed facility variation is from electric power generation associated with the power consumption of the facility. The result is that GHG emissions would constitute a new significant impact that does not occur with the proposed Project.

Table 4
Enclosed Facility Alternative Onsite Emissions Summary

Emission Type	Emissions[1]		MDAQMD Significance Thresholds	Significant Impact?
	LV	IEUA		
Pre-Process VOC Emissions (tpy)	357.7	357.7		
VOC Capture Efficiency[2]	95%	95%		
VOC Destruction Efficiency[2]	85%	85%		
Net VOC Emissions from Process (tpy)	69.42	69.42		
VOC Emissions from Electrical Use (tpy)	0.78	0.78		
Total VOC Emissions (tpy)	70.2	70.2	25 tpy	Significant Impact[3]
VOC Reductions (tpy)	287.5	287.5		
Pre-Process GHG Emissions (tpy)	624.73[4]	624.73[4]		
GHG Capture Efficiency	60%	60%		
GHG Destruction Efficiency	48%	48%		
Net GHG Emissions from Process (tpy)	444.81	444.81		
GHG Emissions from Electrical Use (tpy)	20,453.56	8,565.31		
Total GHG Emissions (tpy)	20,898.37	9,010.12	>30% BAU[5]	Significant Impact[6]
GHG Reductions (tpy)	Increase	Increase		

[1] Emissions determined based on power estimations from Las Virgenes (LV) and Inland Empire Regional Composting Facility (IEUA) facilities to show the possible range of emissions based on the range of estimated electrical use.

[2] VOC and Ammonia capture and destruction efficiency rates of the biofilters quantified in the Staff Report Proposed Adoption of Rule 1133 (MDAQMD 2008) were used in the analysis.

[3] This is the significance determination that was made in the Draft EIR.

[4] GHG emission totals exclude truck transport emissions which are identical for the Project and each of the enclosed facility alternatives.

[5] BAU = business as usual, which is defined as standard building and operating practices.

[6] This significance determination that was made based upon the substantial increase in GHG emissions as compared with both BAU and the proposed Project. (Appendix D)

Solar Power Variation

Given the large increase in GHG emissions when considering the electricity generation needed for an enclosed facility, a variation that uses photovoltaic solar energy for electricity generation was added to the analysis. Labor costs assume 28 full time employees are needed to operate the solar power facility. Miscellaneous maintenance includes painting the building and trim and maintaining the grounds, as well as upkeep and maintenance for the associated solar generation facility. The total cost of constructing and

operating the facility with photovoltaic solar will be increased from the conventional power variation by between $5 million and $11 million per year when annualized over 15 years (Table 5). However, the initial capital needed to build the solar-powered enclosed facility increased to between $229.7 million and $1,411.7 million (an increase of over 141% compared to the conventional enclosed facility shown in Table 3, and over 3,618% over the proposed Project). To apply this alternative variation to the proposed Project site will require approximately 6 miles of 13.8kv power lines and transformers. This is due to the fact that the facility will need power regardless of whether or not solar power is available and onsite backup generators cannot supply enough electricity to run the facility. Therefore, this alternative will need to connect to the electric grid and will at times require full or near full electric loads supplied by Southern California Edison. This alternative does have the advantage of supplying power back to the electric grid during times when the facility is at lower electric demands but has full solar generation available, which is taken into account in the operations and maintenance costs. Table 5 summarizes the costs of this alternative. Appendix D details the economic analysis of the enclosed facility alternative.

Table 5
Costs Associated with the Solar Powered Enclosed Facility Alternative

Cost Categories	Based on LV[1] (2008 U.S. dollars)	Based on IEUA[2] (2008 U.S. dollars)
Capital Costs		
Facility Costs	$1,225,585,754.45	$136,781,948.99
Photovoltaic Solar and Back-up Generator[3]	$160,366,466.23	$67,156,475.38
Electric Utility Upgrades	$21,000,000.00	$21,000,000.00
Enclosed Storage Facility	-	$4,738,000.00
Total Capital Costs	$1,406,952,220.68	$229,676,424.37
Operations and Maintenance Costs (Annualized)		
Solar and Back-up Generator	$500,000.00	$500,000.00
Equipment Operations (fuel and maintenance)	$8,355,688.85	$400,133.33
Labor	$4,765,256.00	$2,716,296.80
Additional Operational Costs	$42,768,191.19	$2,048,400.00
Total O&M	$56,389,136.04	$5,664,830.13
Annualized Capital & O&M Costs		
Total O&M	$56,389,136.04	$5,664,830.13
Annualized Capital Costs	$126,542,830.90	$20,657,350.34
Total: Annualized Capital & O&M Costs	**$182,931,966.93**	**$26,322,180.47**

[1] Costs for the Enclosed Facility Alternative are based on the known costs for the Las Virgenes facility and scaled based on the percent difference between the biosolids intake of the Nursery Products facility and the Las Virgenes Facility.

[2] Costs for the Enclosed Facility Alternative are based on the known and assumed IEUA facility and scaled based on the percent difference between the biosolids production of the Nursery Products facility and the IEUA facility.

[3] Costs for solar generation do not include the cost of land needed to accommodate the solar field.

Detailed cost estimates are provided in Appendix D

Table 6 summarizes the emissions reductions that are afforded by providing photovoltaic power to the enclosed facility alternative. While the emissions of both VOCs and GHGs decrease in the solar enclosed alternative, the CEQA significance determination for VOCs has not changed from that of the proposed Project. VOC emissions remain significant for both the proposed Project and the solar powered enclosed facility alternative.

Table 6
Solar Powered Enclosed Facility Alternative Onsite Emissions Summary

Emission Type	Emissions[1]		MDAQMD Significance Thresholds	Significant Impact?
	LV	IEUA		
Pre-Process VOC Emissions (tpy)	357.7	357.7		
VOC Capture Efficiency[2]	95%	95%		
VOC Destruction Efficiency[2]	85%	85%		
Net VOC Emissions from Process (tpy)	69.42	69.42		
VOC Emissions from Electrical Use (tpy)	0.78	0.78		
Total VOC Emissions (tpy)	70.2	70.2	25 tpy	Significant Impact[3]
VOC Reductions (tpy)	287.5	287.5		
Pre-Process GHG Emissions (tpy)	624.73[4]	624.73[4]		
GHG Capture Efficiency	60%	60%		
GHG Destruction Efficiency	48%	48%		
Net GHG Emissions from Process (tpy)	444.81	444.81		
GHG Emissions from Electrical Use (tpy)	--	--		
Total GHG Emissions (tpy)	444.18	444.81	>30% BAU[5]	Not Significant[6]
GHG Reductions (tpy)	211.58	211.58		

[1] Emissions determined based on power estimations from Las Virgenes (LV) and Inland Empire Regional Composting Facility (IEUA) facilities to show the possible range of emissions based on the range of estimated electrical use.

[2] VOC and Ammonia capture and destruction efficiency rates of the biofilters quantified in the Staff Report Proposed Adoption of Rule 1133 (MDAQMD 2008) were used in the analysis.

[3] This is the significance determination that was made in the Draft EIR.

[4] GHG emission totals exclude truck transport emissions which are identical for the Project and each of the enclosed facility alternatives.

[5] BAU = business as usual, which is defined as standard building and operating practices.

[6] This significance determination that was made based upon the substantial increase in GHG emissions as compared with both BAU and the proposed Project. (Appendix D)

Available Funding

The only enclosed facilities currently in operation (the IERCF and Las Virgenes facilities) are owned and operated by publicly funded agencies that provide regional wastewater treatment and subsidize the enclosed composting facilities. Because the Hawes facility will be privately owned, the construction and operational costs will not be subsidized by public agencies or ratepayers. In order to assess the

availability of funding, several lenders were approached with respect to securing loans for the capital investment required to construct both of the alternative variations. Inquiries were answered by three of the approached lenders: Citibank, Bank of America, and Desert Community Bank.

According to Citibank, securing a loan of the magnitude required to finance either of the enclosed facility variations will require a debt service coverage ratio (DSCR) of at least 1.15. A debt service coverage ratio is the amount of cash flow available to meet annual interest and principal payments on a debt. A DSCR of less than one indicates a negative cash flow, for example a DSCR of 0.80 means that there is only enough of a net operating income to cover 80% of the annual debt payments. The calculations of annual debt used in this report was determined for the proposed Project and both enclosed facility alternatives based on the annualized capital and O&M costs and does not include the interest of the loan. The interest was not included in the analysis because it is a variable dependent upon the lending institution's assessment of the calculated risk of the applicant and the perceived value of a project. However, for this evaluation, not including interest is considered a conservative analysis since inclusion of interest in the annualized debt will increase the amount of debt and decrease the DSCR.

Net operating income was determined by the revenue generated from accepting biosolids and the revenue generated from the sale of compost. Revenue from biosolids was generated using both the current market price of $15/ton and at 100% over current market price ($30/ton). Revenue from the sale of compost assumes that 120,000 tons of compost is sold annually at prices varying between the Las Virgenes, IERCF, and current retail prices of $0.00, $2.00, and $18.27 per ton respectively (LV 2009, IEUA 2009, WasteAge 2000). Based on the variation in selling price of compost, net operating income ranges from $3,000,000 to $5,192,400 annually for current market price of biosolids and $6,240,000 to $8,192,400 annually with an increase of 100% over current market price of biosolids.

Based on the calculated annualized expenditures and the current market price of biosolids, the DSCR for the proposed Project, would fall between 3.37 and 5.83. The DSCR for the conventional power variation would be between 0.02 and 0.24 and the DSCR for the solar power variation would be between 0.02 and 0.20. Therefore, the most conservative DSCR for the proposed Project (3.37) is above the 1.15 threshold and meets the Citibank criteria for a loan. However, the most optimistic DSCR for the enclosed facility using conventional power (0.24) and the solar variation of the enclosed facility (0.20) do not meet the criteria for securing a loan. The DSCR for both enclosed facility variations indicates that expenses would significantly exceed revenue. Even if the market rate were to increase by 100%, the DSCR for the conventional power and solar enclosed facility variations could at best be increased to 0.38 and 0.31, respectively. The DSCR for these variations shows that the alternative variations would only be able to cover 38% and 31% of their annual debt payments respectively. Citibank requires that prospective borrowers be able to net at least 115% of their annual debt payments, therefore both of these alternative variations would be rejected by Citibank for approval.

According to Bank of America (BofA), securing a loan will require the prospective borrower to have assets that are worth at least as much as the loan amount requested. In addition, BofA requires a DSCR of 1.0 at a minimum. As shown above, both of alternative variations show a negative cash flow and as BofA requires that prospective borrowers show a net operating income of at least equal to their annual debt payment, BofA would not approve a loan for either of these variations, regardless of the value of company assets.

The Desert Community Bank only handles financing for up to approximately $20 million and therefore would not have the ability to finance either of the enclosed variations of the Project. However, after disclosing the expected DSCR for the Project variations, the representative stated that no lending institution or private investor would support the Project.

A general consensus by all lending institutions was that given the amount of capital to be financed, the loan would need to be syndicated. This means that several different lenders would provide various portions of the loan, thereby requiring the backing of several separate lenders. With a debt service ratio showing negative cash flow, there is little possibility of convincing one lender, let alone several, to back this undertaking.

The California Integrated Waste Management Board (CIWMB) was also contacted to inquire about the availability of federal grant money or loans for the Project. The CIWMB responded to the request on March 25th 2009 indicating that there were no available grants for composting facilities (CIWMB 2009), and the DSCR would not be adequate to warrant loan consideration.

Infrastructure

The enclosed facility is typically housed in a metal shell warehouse style building large enough to accommodate the entire operations including the feedstock loading area, windrows, the negative air system, and product loading areas. Because the entire enclosed facility is under negative draft, pulling all of the air within the building through a biofilter, powerful fans are required, which consume significant quantities of electrical power. Based upon the operations at the LV and Inland Empire Utility Agency (IEUA) enclosed composting facilities, it is estimated that the energy needed to accommodate an operational capacity of 400,000 tpy within an enclosed facility would require between 53 and 127 megawatts per day of power (an average of 2 to 5 megawatts per hour). To accommodate this level of power consumption, electric utility upgrades would need to be made to the electric distribution system near the site.

Under existing conditions the nearest power source is a 4 kilovolts (kv) electric transmissions line that runs parallel to and within the right-of-way of State Highway 58 approximately 0.2 miles from the Project site. However, this electric utility line does not have the capacity to carry the load of an enclosed composting facility with an operational capacity capable of composting 400,000 tpy of biosolids and greenwaste.

The minimum line capacity needed to accommodate the enclosed facility is calculated at 13.8 kv. Therefore, a minimum line size of 13.8kv would be needed to connect an adequate power source to the proposed Project site. The nearest power source of that size is the Southern California Edison (SCE) Coolwater-Kramer Junction 500kv Transmission Line approximately 6 miles north of the proposed Project site where the power line intersects with Harper Lake Road near the unincorporated community of Lockhart and the Harper Lake Thermal Solar Facility.

Connecting the proposed Project site with sufficient electrical power to accommodate an enclosed facility will require construction of a substation at or near the Coolwater-Kramer Junction Transmission line to connect a 13.8kv line, construction of 6 miles of 13.8kv power lines to extend power to the proposed Project site, and the installation of onsite transformer banks to connect the proposed Project to the existing power grid.

Right of way would be needed for the substation and 13.8kv electric line connecting the site to the Coolwater-Kramer Junction 500kv Transmission Line. There are existing electric utility rights-of-way along Harper Lake Road between the Coolwater-Kramer Junction 500kv Transmission Line and the proposed Project site that could accommodate the 13.8kv electric line. There is no existing electric transmission line between Helendale Road and the Project site, a distance of approximately one (1) mile.

Approval to construct the substation and 13.8kv electric transmission line would require CEQA evaluation. In personal correspondence with SCE staff no one would speculate what level of CEQA evaluation would be required, but presumably it could proceed through a mitigated negative declaration.

According to SCE, this level of infrastructure would take approximately three years to complete the authorization process and construct the substation and power line necessary to accommodate the increased load requirements of an enclosed facility if the expansion of infrastructure was fully funded, and subsequent to the certification of the CEQA evaluation. Because the power line would serve only the Project, the Project would be required to pay the entire cost of the installation. This would add approximately $21,000,000 to the capital expenditure of each of the alternative variations.

The analysis also reviewed an enclosed facility powered by photovoltaic solar power for its electrical consumption. The solar powered enclosed facility will require the same electrical infrastructure as described above. This is due to the fact that the facility will need power regardless of whether or not solar power is available and onsite backup generators cannot supply enough electricity to run the facility. Therefore, this alternative will need to connect to the electric grid and will at times require full or near full electric loads supplied by SCE.

In addition, solar power will require up to 216 acres near the composting facility to accommodate the solar field of the photovoltaic solar generation facility required to supply the power needs of the enclosed facility. Privately owned parcels near enough to the site that could be purchased are not of sufficient size and groups of parcels are not situated in such a way so that they could be grouped together to accommodate the required solar field. Private parcels of sufficient size are at a greater distance to the site and would require right-of-way easements and additional cost of providing transmission lines to connect the Project site to the solar generating station. Another possibility is to petition the Federal Bureau of Land Management (BLM) for up to a 216 acre easement or land swap to encompass the solar generating station and transmission line right of way to connect the solar generating station to the Project site. However, it is speculative to conclude that this possibility would be approved by BLM. In order for BLM to approve such an agreement would require analysis through the National Environmental Policy Act. The speculative nature of being able to acquire BLM land to accommodate the solar generating station makes this option infeasible since there needs to be some reasonable anticipation that this option could be accomplished.

SUMMARY OF ANALYSIS

The Draft EIR calculated that the proposed Project will generate 357 tpy of VOC emissions. Additional analysis in this SEIR found that the Project would generate 624.73 tpy of GHG emissions associated with onsite activities. In comparing these emissions to the CEQA significance thresholds, the Draft EIR found that only the VOC emissions were a significant air quality impact. The Draft EIR found that all other emissions were less than significant.

The Draft EIR found that the conventional powered enclosed facility alternative variation decreased VOC emissions by approximately 80% (to 70.20 tpy), but VOC emissions remained a significant and unmitigable impact. The VOC emissions are still above the CEQA significance thresholds (25 tpy) and remain a significant impact with this alternative variation. GHG emissions associated with onsite activities and power consumption increased significantly with the conventional power enclosed facility variation (to between 9,010.12 and 20,898.37 tpy) and constitutes a new significant adverse impact making this alternative less environmentally favorable than the proposed Project.

The solar powered enclosed facility variation results in lower emissions overall (70.20 tpy of VOC and 444.81 tpy of GHG), but the level of significance remains identical to the proposed Project (i.e. VOC emissions remain significant, while GHG emissions are less than significant). This alternative variation has both the highest capital costs (between $229.6 million and $1,406 million), and the highest annualized costs (between $20.6 million and $126.5 million). In addition, this alternative may require up to 216 acres nearby the composting facility to accommodate the solar field of the photovoltaic solar generation facility required to supply the power needs of the enclosed facility

With the increased costs associated with construction and operation of the either alternative variation, the necessary funding to facilitate the start-up of the proposed Project is increased. According to the available funding sources, there are no grants available to subsidize, or lenders willing to back the construction of either variation of an enclosed composting facility.

In addition, either enclosed facility variation would require construction of approximately 6 miles of 13.8 kv power lines and transformer banks onsite. The construction of the power lines and transformer banks would need to be coordinated through Southern California Edison, which will significantly increase the length of time and costs required to build the facility.

ECONOMIC FEASIBILITY OF THE ENCLOSED FACILITY ALTERNATIVE

The analysis of the enclosed facility alternative used information obtained on the existing enclosed facilities operated by the Inland Empire Utilities Agency in Rancho Cucamonga and the Las Virgenes Municipal Water District (LVMWD) located in Las Virgenes, California.

The IEUA facility cost $98,830,880 to construct in 2007; operates at approximately $6,000,000 per year (IEUA 2007); and has a capacity of 200,000 tons of biosolids and amendments per year. Approximately 75 percent (150,000 tpy) of the composted material is biosolids. Processing biosolids into compost at the IEUA facility costs approximately $132 per ton of biosolids received when operating at capacity.

The capital cost for the construction of the LV enclosed composting facility was $45 million in 1994. The LV facility has an annual operating budget of $4,248,753 per year (LVMWD, 2009). The LV facility composts one load of biosolids per day (6 days/week) or 10,670 tons of biosolids per year. Processing biosolids into compost at the LVMWD facility costs approximately $949 per ton of biosolids received.

The proposed Project will have an operational capacity of 400,000 tons of material per year. As shown, a conventionally powered enclosed facility of this size with a conventional power source would require between $162.5 million and $1,246.6 million to build and between $ 6.7 million and $60.2 million to operate (based on the IEUA and LV facilities). Processing biosolids into compost for a conventionally powered enclosed facility at the Project site is estimated to cost between $107 and $862 per ton of biosolids received. Similarly, the solar powered variation would require between $229.7 million and $1,407.0 million to build and $5.7 million to $56.4 million to operate (based on the IEUA and LV facilities and estimated solar costs). Processing biosolids into compost with this variation would cost between $132 and $915 per ton of biosolids received.

The average fee charged to wastewater treatment plants to dispose of biosolids at privately owned open air windrow facilities in Kern County and Arizona is approximately $15 per ton. The currently operating enclosed facilities are subsidized by public agencies to process the biosolids and do not profit from composting. In order to be profitable, these publicly owned facilities would need to increase their average fee by between 878% and 6,329%.

Similarly, an enclosed facility of the capacity of the proposed Project would require the average disposal fee to be increased by between 711% and 5,745% for the conventional and 877% and 6,098% for the solar variation. The disposal fees for biosolids composting are not anticipated to increase sufficiently for an enclosed facility to be profitable. As discussed previously, there are no grants available to subsidize the construction or operational costs and no lenders would provide the required financial backing to support the construction and operation of a privately owned enclosed facility. The enclosed facility alternative would operate at an annual loss, rendering this alternative economically infeasible.

CONCLUSION

The costs of the enclosed facility alternative and solar powered enclosed facility alternative are significantly higher than the costs associated with the proposed Project. The solar powered enclosed facility will require up to 216 acres adjacent to the composting facility to accommodate the solar field. This acreage of land is not available adjacent to the site. Although the VOC emissions from both enclosed facility variations are reduced, they are not reduced below the significance threshold therefore the CEQA significance determination with respect to VOCs remains identical to the proposed Project. In addition, with the conventional power variation, a new significant impact is encountered with the increased generation of GHG emissions. Both enclosed facility variations are rejected because they do not reduce the significant impact (VOC emissions) associated with the proposed Project to less than significant levels, but significantly increase the cost of implementing the Project. As proposed, the Project fulfills the County's responsibility to "mitigate or avoid the significant effects on the environment of projects that it carries out or approves whenever it is feasible to do so", as this alternative cannot mitigate to less than significant or avoid the VOC emissions. Therefore, the enclosed facility alternative is considered environmentally and economically infeasible because it is incapable of being accomplished in a successful manner taking into account economic and environmental factors.

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APPENDIX A – ECONOMIC ANALYSIS PROPOSED PROJECT

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Nursery Products Proposed Project (Open Air Facility)

	2008
Cost of Construction[1]	
Facility	$6,190,607.00
Photovoltaic Solar & Back-up Generator	$155,859.50
Electric Upgrades	-
Enclosed Storage Facility	-
Total	$6,346,466.50
Annualized Costs[2]	
#Years	15.00
% interest	0.04
Capital Recovery Factor	0.09
Total Annualized costs[2]	**$570,808.18**
Annual Operating Budget for 2008	-
Operational Costs	
Electricity[3]	
Upgrade to Grid Required?	No
kWhrs Annually	0.00
MWhrs Annually	0.00
Cost/ kWhr	$0.00
Annual Electrical Costs	**$0.00**
Maintenance	
Equipment Fuel[4]	*
Automated System Maintenance	*
Photovoltaic Solar & Back-up Generator[1]	$20,000.00
Other Maintenance Costs	*
Annual Maintenance Costs	**$320,100.00**
Labor[5]	
Maintenance Labor	$0.00
Operational Labor	$664,642.88
Administrative Labor	$111,441.92
# of employees[1]	8
Labor cost/employee	$97,010.60
Total Labor Costs	**$776,084.80**
Additional Facility Costs[6]	
Additional Operational Costs	**-**
Specialty Expenses	**-**
Administrative Expenses	-
Total Additional Operational Costs	**$0.00**
Total Operational Costs	**$1,096,184.80**
Total Annualized Costs + O&M	**$1,666,992.98**

	2008
Raw Materials	
Wet tons of biosolids/year[1]	
Facility at Capacity	200,000
Tons of Green waste/year[1]	
Facility at Capacity	200,000
Operational Statistics	
Compost production per year (tons)	
Facility at Capacity[7]	120,000
Price to public per ton[8] (2008)	$2.00
Price to public per ton[9] (Retail)	$18.27
Facility at Capacity	
Cost per ton of biosolids[10]	$8.33
Current Market Price[1]	$15.00
% of current market price[11]	55.57
Revenue Potential	
From Biosolids[12]	$3,000,000.00
From compost sales (give away)[13]	$0.00
From compost sales (2008)[14]	$240,000.00
From compost sales (Retail)[15]	$2,192,400.00
Debt Service Coverage Ratio (Give Away)	
NOI[16]	$3,000,000.00
TDS[17]	$1,666,992.98
DSCR[18]	1.80
Debt Service Coverage Ratio (2008)	
NOI	$3,240,000
TDS	$1,666,993
DSCR	1.94
Debt Service Coverage Ratio (Retail)	
NOI	$5,192,400
TDS	$1,666,993
DSCR	3.11

Footnotes to Table Nursery Products Proposed Project (Open Air Facility)

[1] Information on facility construction costs, employees, biosolid and greenwaste amounts, and market price of biosolids obtained through Nursery Products.

[2] Annualized cost is determined by multiplying the Total cost of construction in 2008 dollars by the capital recovery factor. The capital recovery factor is determined by the following equation based on a project term of 15 years and an interest rate of 4%.

CRF = 1 / [(1/r) - (1 / r * (1 - r)^{n})]; where r = rate (0.04) and n = years (15).

[3] Electricity will be provided to the site via Solar panel with a backup generator. Therefore no electricity will be purchased from the power grid.

[4] Maintenance costs for Nursery Products facility extrapolated from Inland Empire Utility Agency (IEUA) costs. Costs determined by multiplying the IEUA cost by the percentage increase in biosolids intake for the nursery products facility (i.e. 1.333 %). Maintenance costs also extrapolated from IEUA because, unlike Las Virgenes, their operations do not include processing and dewatering biosolids.

[5] Labor costs for Nursery Products extrapolated from the IEUA facilities.

Total labor was determined as the cost per employee for IEUA times the number of employees.

Maintenance, operational and administrative labor was determined as a percentage of the total labor based on the IEUA Facility.

Percentage per category			
	LV	***IEUA***	***Average***
Maintenance Labor (Included in Operational)	0.41	0.00	0.20
Operational Labor	0.59	0.86	0.72
Administrative Labor	0.00	0.14	0.07

[6] Additional costs are assumed to include costs of conveyors and other building related costs which are not part of the proposed facility.

[7] Production compost volume was determined using the same % of compost from the IEUA facility at capacity (Compost volume is 60% of the biosolids input volume).

[8] Price per ton (2008) is arbitrarily chosen as the maximum between the Las Virgines and IEUA facilities.

[9] Price per ton of compost (Retail) was assumed to be $9.87 per cubic yard (WasteAge 2000) which, extrapolated from IEUA compost production, is equal to $18.27 per ton.

[10] Cost/ton of biosolids = Sum of annualized capital costs and yearly O&M Costs divided by number of tons produced.

[11] % over Current Market Price = Cost per ton Divided by current market price.

[12] Revenue From Biosolids is determined by Market Price times Cost Per Ton of Biosolids.

[13] Revenue From compost sales (Give Away). As Las Virgines gives away their compost, a comparative strategy is shown for a conservative income potential for the Nursery Products facility.

[14] Revenue from Compost Sales (2008) is equal to the tons of compost produced multiplied by the going price per ton of IEUA for 2008 ($2.00 / ton).

Footnotes to Table Nursery Products Proposed Project (Open Air Facility) Continued
[15] Revenue from compost sales (retail) is equal to the tons of compost produced multiplied by the going retail price per ton of $18.27 (average retail rate of $9.87/cubic yard converted to cost per ton ($9.87/cubic yard x 1 cubic yard/27 cubic feet x 1 cubic foot/40 pounds x 2000 pounds/ton = $18.27).
[16] NOI: the Net operating income is determined by summing the product of tons of biosolids per year and the market rate with the product of compost per year by market rate.
[17] TDS: Total debt service is the sum of the annualized capital cost and the annual operating and maintenance costs.
[18] DSCR: Debt service coverage ratio is the amount of annual debt that can be covered by Project revenue and is determined by dividing the NOI by the TDS. A DSCR of one means that the Project will be able to cover all annual debts but will not make any profit. A DSCR greater than 1 shows a profit margin where a DSCR less than one shows a net annual loss.
- Not applicable for this facility * Individual costs were not known.

The Following onsite equipment was used in the analysis

Nursery Products - Composting Facility			
Combustion Sources - Operational Equipment			
Equipment Type	**Fuel Type**	**Horsepower[2]**	**Hours/Day Per Unit**
Rubber Tire Loaders # 1	D	165	8 hrs/day
Rubber Tire Loaders # 2	D	165	8 hrs/day
Rubber Tire Loaders # 3	D	165	8 hrs/day
Rubber Tire Loaders # 4	D	165	4 hrs/day
Misc Screen	D	190	7 hrs/day
Large Grinder	D	1000	8 hrs/day
			0.3 hrs/day
Water Truck[1]	D	425	3 hrs/day
Site Truck	D	425	.5 hrs/day
Windrow Turner	D	550	2 hrs/day

[1] Includes water truck, and one on-site truck. Water truck assumes dust control of road from site to Hy 58.
[2] As assumed by manufacturer specs for similar equipment.

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APPENDIX B – ECONOMIC ANALYSIS INLAND EMPIRE REGIONAL COMPOSTING FACILITY

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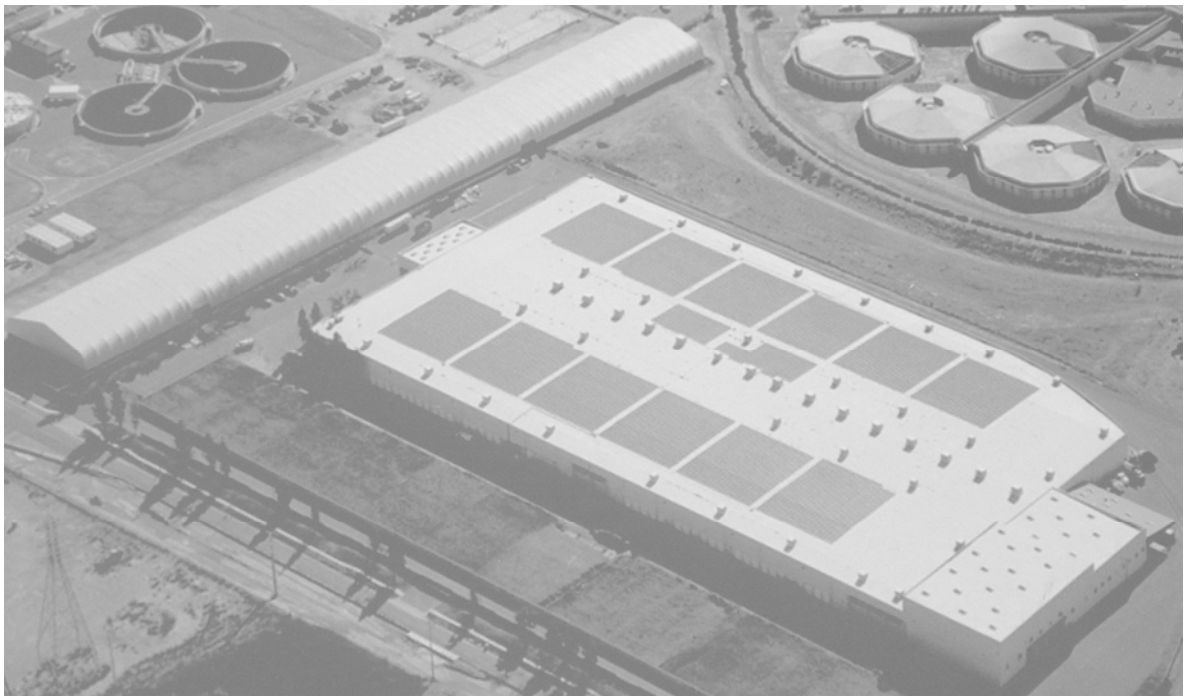
INLAND EMPIRE UTILITY AGENCY REGIONAL COMPOSTING FACILITY
FACILITY SUMMARY AND ECONOMIC BREAKDOWN



Summary Prepared by:

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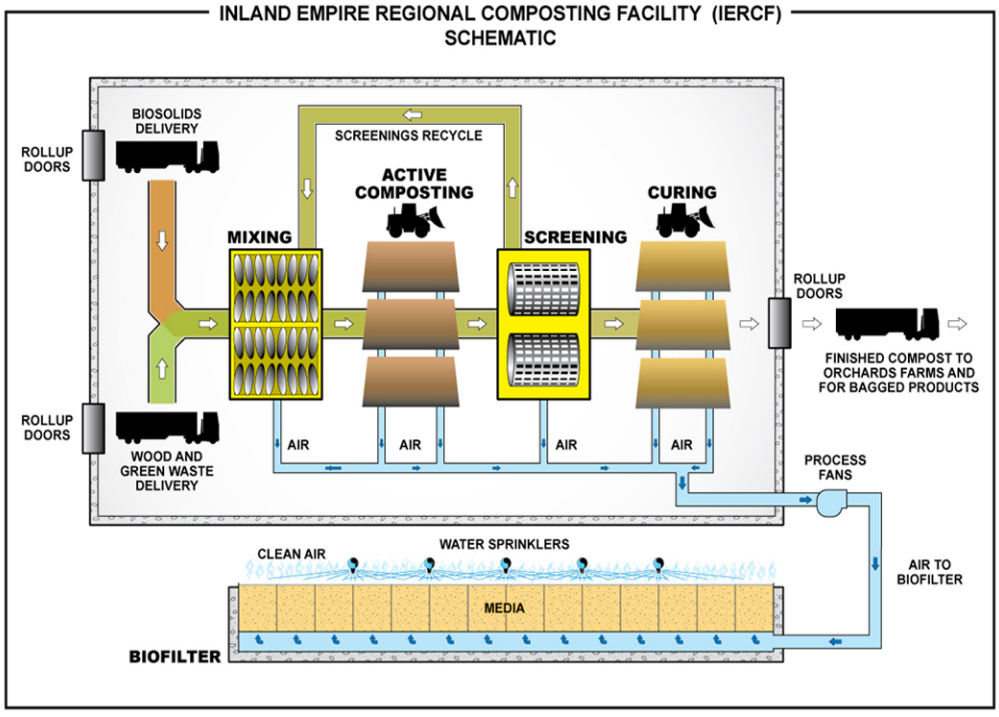
June 2009

The Inland Empire Regional Composting Facility (IERCF) is the largest fully enclosed composting facility in the United States. The IERCF began testing operational capabilities in April 2007 and continued testing until December 2008 for operational and quality control purposes. In December 2008 the 410,000 square foot facility began operating at full capacity and will continue to operate at this level in the foreseeable future. At capacity the facility is able to process up to 200,000 tons of organic matter into compost every year. Testing revealed a 3 to 1 ratio of biosolids to amendments was the best ratio for quality product. At this ratio 150,000 wet tons of biosolids and 50,000 tons of woodchips are combined to produce 240,000 cubic yards (90,000 tons) of compost. The biosolids are obtained from the Inland Empire Utilities Agency and the Los Angeles County Sanitation District, and the woodchips are predominantly obtained from local equestrian centers. Due to quality control of the product, only woodchips are used as amendments. Green waste such as grass clippings, leaves, etc. are not accepted. Because the demand for compost fluctuates throughout the year, the IERCF has constructed a three acre covered storage area. At present the selling price is $2.00 per ton (IERCF 2009). However, IERCF claims that it is currently negotiating with a national wholesaler for a substantially higher price. Currently, the IERCF is not revealing the higher negotiated price of their compost.

An Aerated Static Pile (ASP) Composting process is being used at the facility. The ASP method uses fans to draw air through loosely piled feedstock mixtures at a rate of up to 800,000 cubic feet per minute before releasing it through biofilters. The biofilter consists of 50,000 cubic yards of a special blend of wood chips that eliminate odors and other volatile organic compounds before releasing the air to the atmosphere. This process will satisfy SCAQMD regulations and will nearly eliminate odors completely. The entire composting process, from feed stock delivery to compost distribution takes approximately sixty days, with approximately twenty-one days of active composting, and up to thirty-eight days of curing. Before the compost goes to curing it is screened and the larger material that remains from the screening is recycled and used in the composting of another batch of biosolids. The schematic below shows the basic operational process of the facility, without showing the storage facility.



(Source: IEUA 2009)

The IERCF employs twenty people, ten as operators of the facility, five in administrative roles, and five in maintenance roles. In January 2009, the facility added 6,000 solar panels to the facility which will provide up to 1 megawatt (MW) per hour of electricity for the building. This is approximately half of the electrical requirements of the facility which operates at 2 MW per hour during peak and one MW per hour during non operating hours. The IERCF had an original capital cost of approximately $89 million without the storage facility. The storage facility increased capital costs to $94 million dollars. No capital outlay was incurred by the IERCF for the installation of the solar power panels as a Purchase Pay Agreement was arranged which permits the vendor to install, operate, and maintain the equipment for the duration of the agreements. Further, the agreement provides for the purchase of all generated power by the Agency and IERCA at a fixed price, plus an annual escalation factor. The IERCF has a current operating budget of $6,000,000 which is split evenly between the joint venture partners. The publically available operating budget was not broken down to the extent that the Las Virgenes facility was, therefore costs are shown for the different categories (Electrical, maintenance, labor and additional operational costs) based on known labor and electrical usage then dividing the remaining budget between maintenance and additional operational costs based on the percentage of the Las Virgenes budget associated with each category, as shown on the attached table.

Inland Empire Regional Composting Facility

	2007[1]	2008
Cost of Construction[1]		
Facility (original plus storage)	$94,092,888.00	
Photovoltaic Solar & Back-up Generator	-	
Electric Upgrades	-	
Enclosed Storage Facility[2]	4,738,000.00	
Total	$98,830,888.00	
% inflation[3]		3.80
Cost in 2008$s[4]		$102,586,461.74
Solar Installation[5]		$50,367,356.54
Total Costs		$152,953,818.28
Annualized Costs[6]		
#Years		15.00
% interest		0.04
Capital Recovery Factor		0.09
Total Annualized costs[6]		**$13,756,834.72**
Annual Operating Budget for 2008		$6,000,000.00
Operational Costs		
Electricity[7]		
Upgrade to Grid Required?		No
kWhrs Annually		14,600,000.00
MWhrs Annually		14,600.00
MWhrs /day		40.00
Cost/ kWhr		$0.13
Total Annual Electrical Costs		**$1,898,000.00**
Maintenance[8]		
Equipment Fuel		*
Automated System Maintenance		*
Photovoltaic Solar & Back-up Generator		-
Other Maintenance Costs		*
Total Annual Maintenance Costs		**$300,100.00**
Labor[9]		
Maintenance Labor (Included in Operational)		
Operational Labor		$1,940,212.00
Administrative Labor		$325,319.00
# of employees		20
Labor cost/employee		$97,010.60
Total Labor Costs		**$2,265,531.00**
Additional Facility Costs[8]		
Additional Operational Costs		*
Specialty Expenses		*
Administrative Expensive		*
Total Additional Operational Costs		**$1,536,300.00**
Total Operational Costs		**$5,999,931.00**
Total Annualized Costs + O&M		**$19,756,765.72**

	2007[1]	2008
Raw Materials		
Wet tons of biosolids/year		
Facility at Capacity[10]		150,000
Current Operations (2008)[11]		84,110
Tons of Green waste/year[10]		
Facility at Capacity		50,000
Current Operations (2008)		28,037
Operational Statistics		
Compost production per year (tons)		
Facility at Capacity[10]		90,000
Current Operations (2008)[12]		50,466
Price to public per ton[13] (2008)		$2.00
Price to public per ton[14] (Retail Market)		$18.27
Facility at Capacity		
Cost per ton of biosolids[15]		$131.71
Current Market Price		$15.00
% of current market price[16]		878.08
Current (2008 Operations)		
Cost per ton of biosolids[15]		$234.89
Current Market Price		$15.00
% of current market price[16]		1,565.95

Footnotes to Table Inland Empire Regional Composting Facility

[1] Inland Empire Utility Agency Composting Facility construction year financial information obtained from the IEUA operating and capital program budget FY 2007/2008.

[2] Cost for the enclosed storage facility was determined from the Construction Management Bi-Annual Project Summary Report from January 2008 (IERCF 2008).

[3] % inflation between year of construction and 2008 determined from the Consumer Price Index.

[4] Total cost in 2008 dollars is the facility construction cost in the year constructed added to the facility cost times the rate of inflation.

[5] Cost for Photovoltaic Solar and Back-up Generator determined based on the annual kWhrs used for the project as compared to the Nellis project:

	Nellis[1]	IEUA	Nursery Products High	Nursery Products Low
kWh/year	30,100,000	14,600,000	46,485,473	19,466,667
Ratio (Proposed to	1	0.49	1.54	0.65
Cost 2008$	$103,839,550	$50,367,357	$160,366,466	$67,156,475
# Acres	140.00	10.00	216.21	90.54
Photovoltaic plant	14.20	1.01	21.93	9.18

[1] Nellis AFB Solar project: http://www.nellis.af.mil/shared/media/document/afd-080117-043.pdf

[6] Annualized Cost is determined by multiplying the Total cost in 2008 dollars by the capital recovery factor. The capital recovery factor is determined by the following equation based on a project term of 15 years and an interest rate of 4%.

CRF = $1 / [(1/r) - (1 / r * (1 - r)^n)]$; where r = rate (0.04) and n = years (15).

Footnotes to Table Inland Empire Regional Composting Facility Continued
[7] Annual Electrical usage and cost was determined based on the electrical usage rates provided by J. Anderson of IERCA: 2 MW/hr used during peak hours and 1 MWhr used during off peak hours. Peak was determined as the 16 hours operational day where off-peak was determined as the hours when the facility was not open, but air is still being circulated and pumped to the biofilters. This results in a daily use of 40 MW hrs. Cost was estimated based on the $0.13/kWhr as determined by Las Virgines facility statistics.
[8] Maintenance costs and additional facility costs were determined based on the Las Virgines (LV) facility as costs were not broken down to this level of detail in the IEUA budget. Costs were extrapolated as a percentage of total budget minus known costs (i.e. LA maintenance costs are 16.34% of [Total LV budget - LV electricity costs - LV labor costs]; Therefore IERCF Maintenance costs are 16.34% of [IERCF Total Budget - IERCF Electricity Costs - IERCF Labor]).
[9] Labor costs were obtained from the IEUA operating and capital program budget FY 2008/2009.
[10] Capacity quantities of feedstock and compost production per year were determined from personal conversation with IERCA. At capacity a 3:1 ratio of biosolids to wood chips is used to process 240,000 cubic yards (90,000 tons) of compost.
[11] Dry tons taken from the EPA biosolids totals for 2008 spreadsheet. Wet tons = dry tons divided by % solids Wet tons = 16,822 dry tons / 20 % solids Wet tons = 84,110
[12] Current production compost volume was determined using the same % of compost from the IEUA facility at capacity (Compost is 60% of the biosolids input volume).
[13] Price per ton of compost to consumers was determined from Personal Communication with IERCA.
[14] Price per ton of compost to consumers on a retail level was determined at $9.87 per cubic yard (WasteAge 2000) which, based on IEUA compost production, is equal to $18.27 per tone.
[15] Cost/ton of biosolids = Sum of annualized capital costs and yearly O&M Costs divided by number of tons produced.
[16] % over Current Market Price = Cost per ton Divided by current market price.
- Not applicable for this facility. * Individual costs were not known.

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APPENDIX C – ECONOMIC ANALYSIS LAS VIRGENES COMPOSTING FACILITY

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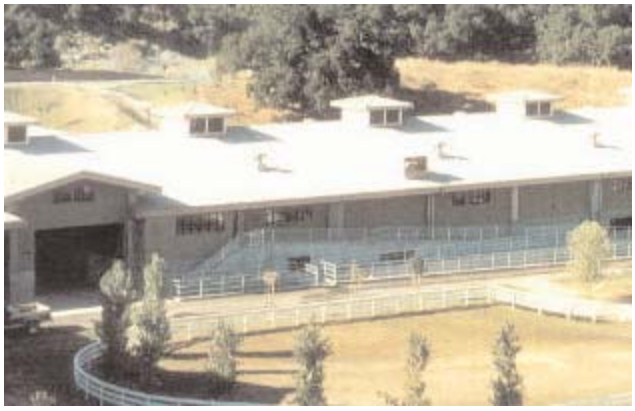

RANCHO LAS VIRGENES COMPOSTING FACILITY
FACILITY SUMMARY AND ECONOMIC BREAKDOWN

Summary Prepared by:

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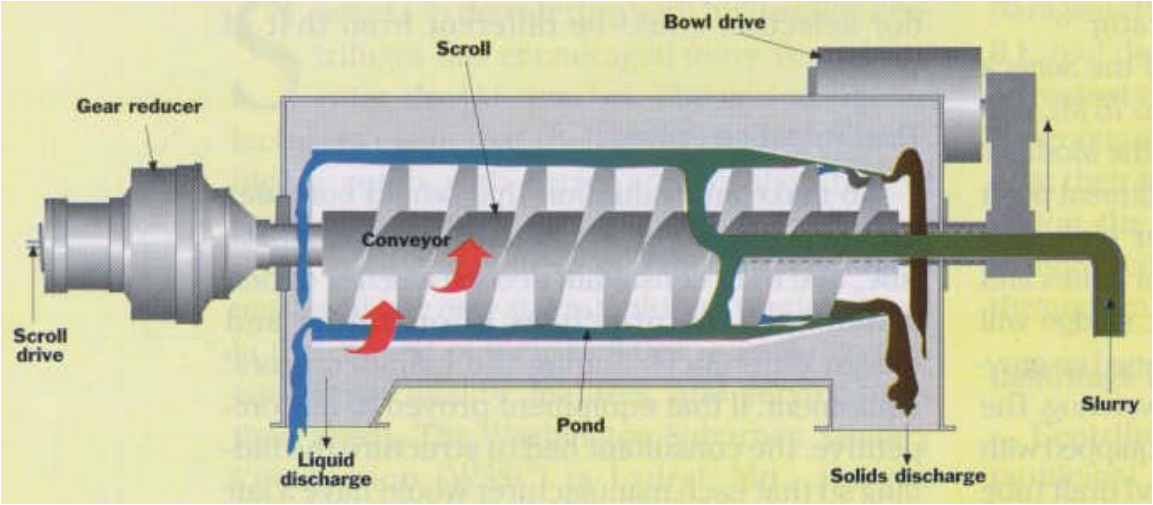
June 2009

The Rancho Las Virgenes Composting Facility is a 9-buliding complex constructed in 1994 for the purpose of maintaining beneficial reuse alternatives for biosolids. The facility has the capacity to process up to 10,670 tons of biosolids annually into compost. The general feed stock mix is fifty percent biosolids from the Tapia waste water reclamation facility and fifty percent wood chips.

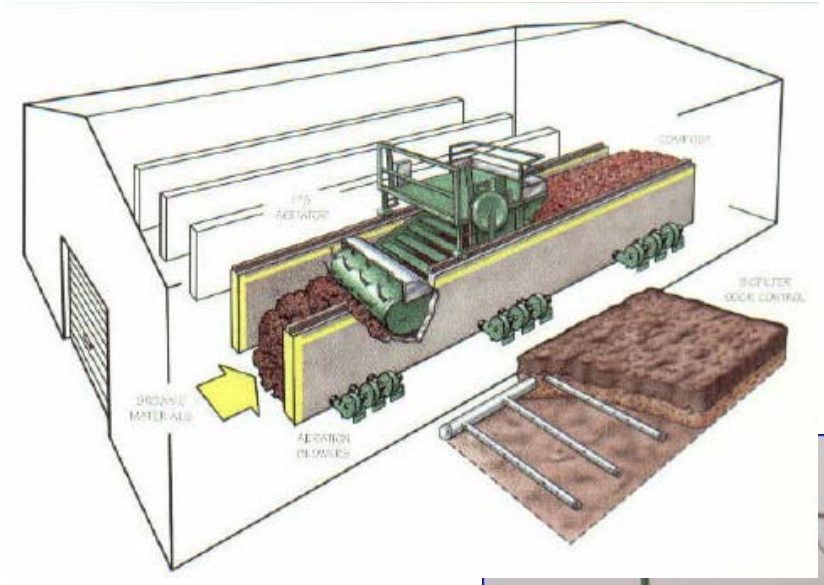
Composting at the Las Virgenes facility begins with biosolids being transferred as a liquid sludge into the facility through 4-miles of underground piping from Tapia. The transport of biosolids is accomplished with pumps and will need to be dewatered on-site as opposed to having de-watered biosolids trucked in. The process of pumping liquid biosolids and then dewatering causes an increase in electrical demand that was not considered in this analysis.

Once pumped onsite, the biosolids are placed in anaerobic digesters. This process, which takes between twenty and thirty days, initiates the natural process. Following the first month, up to 75% of the water is removed using a centrifuge thickening and dewatering process. This process uses the force from the rapid rotation of a cylindrical vessel to separate biosolids from waste water. The waste water removed from this process is pumped back to the Tapia reclamation facility to be run through further waste water treatment processing. The following figure represents the centrifuge thickening and dewatering process, which prepares the biosolids for composting.



The Las Virgenes Facility is a completely automated system where a material handling system transports the dewatered biosolids, recycled compost, and finely shredded wood to a mixer. Las Virgenes uses in-vessel composting process where the mixture is mechanically turned and moved along eight bays. Odor is controlled during the process by drawing air through the composting material and through a 17,000 square foot biofilter. In addition to controlling odor, the air is used to control heat and provide oxygen for the digestive microbes.

Once this process is completed, the compost is allowed to cure for an additional fifteen days to finish the process before distribution. The following figures show the typical in-vessel composting process.



Under current operations the Las Virgenes facility obtains all of its electricity from SCE. If the previously built co-gen facility were operational it would reduce the current electricity costs of $330,000 to $27,000 annually. (LV 2009a).

The Las Virgenes facility had an original capital cost of $45,000,000 in 1994 The facility employs seven people in the daily operations, with an average labor cost of $1,191,000 annually. These costs do not include administrative labor costs. Including labor, maintenance, additional operational, and administrative expenses are $1,191,314; $445,776; $501,525; and $1,752,772 respectively. Operation division expenses include labor, electricity, telephone, natural gas, water, supplies, fuel, polymer, amendment, outside services, odor control, permits and fees, consulting services, and annual capital outlay. Maintenance expenses include labor, supplies, outside services, building maintenance, and capital outlay. Additional operational expenses include SCADA (automation control) services, technical services, compost outreach, other lab services, Tapia lab expenses, and allocated lab expenses. Administrative expenses include allocated G&A expenses, allocated support services, and allocated operations services.

Las Virgenes Composting Facility

	1994[1]	2008
Cost of Construction[1]		
Facility	$45,000,000.00	
Photovoltaic Solar & Back-up Generator	-	
Electric Upgrades	-	
Enclosed Storage Facility	-	
Total	$45,000,000.00	
% inflation[2]		45.30
Total cost in 2008$s[3]		$65,385,000.00
Annualized Costs[4]		
#Years		15.00
% interest		0.04
Capital Recovery Factor		0.09
Total Annualized costs[4]		**$5,880,798.85**
Annual Operating Budget for 2008		$4,248,753.00
Operational Costs[5]		
Electricity		
Upgrade to Grid Required?		No
kWhrs Annually		2,480,000.00
MWhrs Annually		2,480.00
MWhrs /day		6.79
Cost/ kWhr		$0.13
Annual Electrical Costs		**$330,000.00**
Maintenance		
Equipment Fuel		$5,000.00
Automated System Maintenance		$25,776.00
Photovoltaic Solar & Back-up Generator		-
Other Maintenance Costs		$415,000.00
Annual Maintenance Costs		**$445,776.00**
Labor		
Maintenance Labor		$487,064.00
Operational Labor		$704,250.00
Administration Labor		-
# of employees		7
Labor cost/employee		$170,187.71
Total Labor Costs		**$1,191,314.00**
Additional Facility Costs		
Additional Operational Costs		$501,525.00
Specialty Expenses		$27,386.00
Administrative Expenses		$1,752,772.00
Total Additional Operational Costs		**$2,281,683.00**
Total Operational Costs		**$4,248,773.00**
Total Annualized Costs + O&M		**$10,129,571.85**

	1994[1]	2008
Raw Materials		
Wet tons of biosolids/year		
Current Operations (2008)[7]		10,670
Tons of Green waste/year[8]		
Current Operations (2008)		10,670
Operational Statistics		
Compost production per year (tons)		
Current Operations (2008)[9]		6,402
Price to public per ton[1]		$0
Current (2008 Operations)		
Cost per ton of biosolids[10]		$949.35
Current Market Price		$15.00
% of current market price[11]		6,329.00

Footnotes to Table Las Virgenes Composting Facility

[1] Information obtained through personal communication with Las Virgines Staff and Facility website (http://www.lvmwd.com/index.aspx?page=73).

[2] % inflation between year of construction and 2008 determined from the Consumer Price Index (US Inflation Calculator 2009).

[3] Total cost in 2008 dollars is the facility construction cost in the year constructed added to the facility cost times the rate of inflation.

[4] Annualized Cost is determined by multiplying the Total cost in 2008 dollars by the capital recovery factor. The capital recovery factor is determined by the following equation based on a project term of 15 years and an interest rate of 4%.

CRF = 1 / [(1/r) - (1 / r * (1 - r)^n)]; where r = rate (0.04) and n = years (15).

[5] Operational costs for Las Virgines facility taken from the *Las Virgines Municipal Water District Adopted Budget Fiscal Year 2008-2009.*

[6] Wet tons = dry tons divided by % solids
Wet tons = 2,134 dry tons / 20% solids
Wet tons = 10,670
Dry tons taken from the EPA biosolids totals for 2008 spreadsheet. Provided by EPA.

[7] Tons of green waste are equal to tons of biosolids.

[8] Capacity composting yards determined from LV website. http://www.lvmwd.com/index.aspx?page=73

[9] Production compost volume was determined using the same % of compost from the IEUA facility at capacity (Compost volume is 60% of the biosolids input volume).

[10] Cost/ton of biosolids = Sum of annualized capital costs and yearly O&M Costs divided by number of tons produced.

[11] % over Current Market Price = Cost per ton Divided by current market price

- Not applicable for this facility

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APPENDIX D – ECONOMIC ANALYSIS ENCLOSED FACILITY ALTERNATIVE

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Comparisons of Nursery Products Alternatives to Las Virgines & IEUA Facility							
	Las Virgenes	Inland Empire Utility Agency	Nursery Products[1]				
			Proposed Facility	Enclosed Conventional Power		Enclosed Solar	
				Low	High	Low	High
Facility Build							
Original Facility Building Costs[2]	$65,385,000	$102,586,462	$6,346,467	$162,519,949	$1,246,585,754	$229,676,424	$1,406,952,221
Annualized Building Costs	$5,880,799	$13,756,835	$570,808	$14,617,223	$112,119,294	$20,657,350	$126,542,831
Operational							
Electricity	$330,000	$1,898,000	$0	$2,530,667	$6,043,112	$0	$0
Maintenance	$445,776	$300,100	$320,100	$400,133	$8,355,689	$900,133	$8,855,689
Labor	$1,191,314	$2,265,531	$776,085	$1,746,191	$3,063,379	$2,716,297	$4,765,256
# of employees	7	20	8	18	18	28	28
$ Labor/employee	$170,188	$97,011	$97,011	$97,011	$170,188	$97,011	$170,188
Additional Operational Costs	$2,281,683	$1,536,300	$0	$2,048,400	$42,768,191	$2,048,400	$42,768,191
Total Operational Costs	$4,248,773	$5,999,931	$1,096,185	$6,725,391	$60,230,370	$5,664,830	$56,389,136
Total Annualized Costs plus O&M	$10,129,572	$19,756,766	$1,666,993	$21,342,614	$172,349,665	$26,322,180	$182,931,967
Materials & Product							
Biosolids (wet tons/year) - Capacity	-	150,000	200,000	200,000	200,000	200,000	200,000
Biosolids (wet tons/year) - 2008	10,670	84,110	-	-	-	-	-
Green Waste (tons/year) - Capacity	-	50,000	200,000	200,000	200,000	200,000	200,000
Green Waste (tons/year) - 2008	10,670	28,037	-	-	-	-	-
Tons of compost per year - Capacity	-	90,000	120,000	120,000	120,000	120,000	120,000
Tons of compost per year - 2008	6,402	50,466	-	-	-	-	-

[1] Costs for the Enclosed Facility variations were derived from Las Virgenes and Inland Empire Utility Agency information as detailed in Appendix A.

[2] Costs are given in 2008 dollar equivalents.

Economic Feasibility of Facilities							
	Las Virgines	Inland Empire Utility Agency	Nursery Products[1]				
			Proposed Facility	Enclosed Conventional Power		Enclosed Solar	
				Low	High	Low	High
Original Building Facility Costs[2]	$65,385,000	$102,586,462	$6,346,467	$162,519,949	$1,246,585,754	$229,676,424	$1,406,952,221
Annualized Building costs	$5,880,799	$13,756,835	$570,808	$14,617,223	$112,119,294	$20,657,350	$126,542,831
Annual Operating Cost	$4,248,773	$5,999,931	$1,096,185	$6,725,391	$60,230,370	$5,664,830	$56,389,136
Total Annualized Costs & O&M	$10,129,572	$19,756,766	$1,666,993	$21,342,614	$172,349,665	$26,322,180	$182,931,967
2008							
Tons of biosolids/year	10,670	84,110					
Cost per ton of biosolids	$949.35	$234.89					
Current market price per ton of biosolids[3]	$15.00	$15.00					
Profit per ton of biosolids[4]	($934.35)	($219.89)					
Facility Capacity							
Tons of biosolids/year	10,670	150,000	200,000	200,000	200,000	200,000	200,000
Cost per ton of biosolids at capacity	$949.35	$131.71	$8.33	$106.71	$861.75	$131.61	$914.66
Current market price per ton of biosolids[3]	$15.00	$15.00	$15.00	$15.00	$15.00	$15.00	$15.00
Profit per ton of biosolids[4]	($934.35)	($116.71)	$6.67	($91.71)	($846.75)	($116.61)	($899.66)
% over current market price	6,329.00	878.08	55.57	711.42	5,744.99	877.41	6,097.73

[1] Costs for the Enclosed Facility variations were derived from Las Virgenes and Inland Empire Utility Agency information as detailed in Appendix A.

[2] Costs are given in 2008 dollar equivalents.

[3] For the purposes of this evaluation this is calculated excluding transportation and management costs.

[4] Numbers enclosed in ( )'s represent negative numbers.

Bank Funding Probability

Alternative			Net Operating Income (NOI)[1] # Tons/year Biosolids	Disposal Rate/ton Biosolids	Compost (tons/year)	Market Rate (per ton)	NOI	TDS[2] Total Debt Service (no interest)	DSCR[3]	Loan Approval Citi Bank Min. DSCR 1.15	Loan Approval BofA Min. DSCR 1
Compost Give Away		Proposed	200,000	$15.00	120,000	$0.00	$3,000,000	$1,666,993	1.80	Yes	Yes
	Low	Conventional Power	200,000	$15.00	120,000	$0.00	$3,000,000	$21,342,614	0.14	No	No
		Solar Power	200,000	$15.00	120,000	$0.00	$3,000,000	$26,322,180	0.11	No	No
	High	Conventional Power	200,000	$15.00	120,000	$0.00	$3,000,000	$172,349,665	0.02	No	No
		Solar Power	200,000	$15.00	120,000	$0.00	$3,000,000	$182,931,967	0.02	No	No
Compost at 2008 Levels ($2.00 / ton)		Proposed	200,000	$15.00	120,000	$2.00	$3,240,000	$1,666,993	1.94	Yes	Yes
	Low	Conventional Power	200,000	$15.00	120,000	$2.00	$3,240,000	$21,342,614	0.15	No	No
		Solar Power	200,000	$15.00	120,000	$2.00	$3,240,000	$26,322,180	0.12	No	No
	High	Conventional Power	200,000	$15.00	120,000	$2.00	$3,240,000	$172,349,665	0.02	No	No
		Solar Power	200,000	$15.00	120,000	$2.00	$3,240,000	$182,931,967	0.02	No	No
Compost at Retail ($18.27 / ton)		Proposed	200,000	$15.00	120,000	$18.27	$5,192,400	$1,666,993	3.11	Yes	Yes
	Low	Conventional Power	200,000	$15.00	120,000	$18.27	$5,192,400	$21,342,614	0.24	No	No
		Solar Power	200,000	$15.00	120,000	$18.27	$5,192,400	$26,322,180	0.20	No	No
	High	Conventional Power	200,000	$15.00	120,000	$18.27	$5,192,400	$172,349,665	0.03	No	No
		Solar Power	200,000	$15.00	120,000	$18.27	$5,192,400	$182,931,967	0.03	No	No
Compost at 2008 levels ($2.00 / ton) and Biosolids at 50% above Market		Proposed	200,000	$22.50	120,000	$2.00	$4,740,000	$1,666,993	2.84	Yes	Yes
	Low	Conventional Power	200,000	$22.50	120,000	$2.00	$4,740,000	$21,342,614	0.22	No	No
		Solar Power	200,000	$22.50	120,000	$2.00	$4,740,000	$26,322,180	0.18	No	No
	High	Conventional Power	200,000	$22.50	120,000	$2.00	$4,740,000	$172,349,665	0.03	No	No
		Solar Power	200,000	$22.50	120,000	$2.00	$4,740,000	$182,931,967	0.03	No	No
Compost at Retail ($18.27 / ton) and Biosolids at 50% above Market		Proposed	200,000	$22.50	120,000	$18.27	$6,692,400	$1,666,993	4.01	Yes	Yes
	Low	Conventional Power	200,000	$22.50	120,000	$18.27	$6,692,400	$21,342,614	0.31	No	No
		Solar Power	200,000	$22.50	120,000	$18.27	$6,692,400	$26,322,180	0.25	No	No
	High	Conventional Power	200,000	$22.50	120,000	$18.27	$6,692,400	$172,349,665	0.04	No	No
		Solar Power	200,000	$22.50	120,000	$18.27	$6,692,400	$182,931,967	0.04	No	No
Compost at 2008 levels ($2.00 / ton) and Biosolids at 100% above Market		Proposed	200,000	$30.00	120,000	$2.00	$6,240,000	$1,666,993	3.74	Yes	Yes
	Low	Conventional Power	200,000	$30.00	120,000	$2.00	$6,240,000	$21,342,614	0.29	No	No
		Solar Power	200,000	$30.00	120,000	$2.00	$6,240,000	$26,322,180	0.24	No	No
	High	Conventional Power	200,000	$30.00	120,000	$2.00	$6,240,000	$172,349,665	0.04	No	No
		Solar Power	200,000	$30.00	120,000	$2.00	$6,240,000	$182,931,967	0.03	No	No
Compost at Retail ($18.27 / ton) and Biosolids at 100% above Market		Proposed	200,000	$30.00	120,000	$18.27	$8,192,400	$1,666,993	4.91	Yes	Yes
	Low	Conventional Power	200,000	$30.00	120,000	$18.27	$8,192,400	$21,342,614	0.38	No	No
		Solar Power	200,000	$30.00	120,000	$18.27	$8,192,400	$26,322,180	0.31	No	No
	High	Conventional Power	200,000	$30.00	120,000	$18.27	$8,192,400	$172,349,665	0.05	No	No
		Solar Power	200,000	$30.00	120,000	$18.27	$8,192,400	$182,931,967	0.04	No	No

[1] Net operating income is determined by summing the product of tons of biosolids per year and the market rate with the product of compost per year by market rate.

[2] Total debt service is the sum of the annualized capital cost and the annual operating and maintenance costs.

[3] Debt service coverage ratio (DSCR) is determined by dividing the net operating income by total debt services.

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NURSERY PRODUCTS Conventional Power Enclosed Facility Alternative

	Based on LV[1]	Based on IEUA[2]
Cost of Construction		
Facility	$1,225,585,754.45	$136,781,948.99
Photovoltaic Solar & Back-up Generator	-	-
Electric Upgrades[3]	$21,000,000.00	$21,000,000.00
Enclosed Storage Facility[4]	-	$4,738,000.00
Total	$1,246,585,754.45	$162,519,948.99
Annualized Costs[5]		
#Years	15.00	15.00
% interest	0.04	0.04
Capital Recovery Factor	0.09	0.09
Total Annualized costs[5]	**$112,119,294.46**	**$14,617,223.04**
Operational Costs		
Electricity		
Upgrade to Grid Required?	Yes	Yes
kWhrs Annually	46,485,473.29	19,466,666.67
MWhrs Annually	46,485.47	19,466.67
MWhrs /day	127.36	53.33
Cost/ kWhr	$0.13	$0.13
Annual Electrical Costs	**$6,043,111.53**	**$2,530,666.67**
Maintenance		
Equipment Fuel	$93,720.71	*
Automated System Maintenance	$483,149.02	*
Photovoltaic Solar & Back-up Generator	-	-
Other Maintenance Costs	$7,778,819.12	*
Annual Maintenance Costs	**$8,355,688.85**	**$400,133.33**
Labor[6]		
Maintenance Labor	$1,252,450.29	$0.00
Operational Labor	$1,810,928.57	$1,495,446.47
Administrative Expenses	$0.00	$250,744.33
Additional Labor	-	-
# of employees[7]	18	18
Labor cost/employee	$170,187.71	$97,010.60
Total Labor Costs	**$3,063,378.86**	**$1,746,190.80**
Additional Facility Costs		
Additional Operational Costs	$9,400,656.04	*
Specialty Expenses	$513,327.09	*
Administrative Expenses	$32,854,208.06	*
Total Additional Operational Costs	**$42,768,191.19**	**$2,048,400.00**
Total Operational Costs	**$60,230,370.42**	**$6,725,390.80**
Total Annualized Costs + O&M	**$172,349,664.88**	**$21,342,613.84**

NURSERY PRODUCTS Conventional Power Enclosed Facility Alternative (continued)

	Based on LV[1]	Based on IEUA[2]
Raw Materials		
Wet tons of biosolids/year[7]		
Facility at Capacity	200,000	200,000
Tons of Green waste/year[7]		
Facility at Capacity	200,000	200,000
Operational Statistics		
Compost production per year (tons)		
Facility at Capacity[8]	120,000	120,000
Price to public per ton[9] (2008)	$2.00	$2.00
Price to public per ton[10] (Retail)	$18.27	$18.27
Facility at Capacity		
Cost per ton of biosolids[11]	$861.75	$106.71
Current Market Price[7]	$15.00	$15.00
% of current market price[12]	5,744.99	711.42
Revenue Potential		
From Biosolids[13]	3,000,000.00	3,000,000.00
From compost sales (give away)[14]	$0.00	$0.00
From compost sales (2008)[15]	240,000.00	240,000.00
From compost sales (Retail)[16]	2,192,400.00	2,192,400.00
Debt Service Coverage Ratio (Give away)		
NOI[17]	3,000,000.00	3,000,000.00
TDS[18]	172,349,664.88	21,342,613.84
DSCR[19]	0.02	0.14
Debt Service Coverage Ratio (2008)		
NOI	3,240,000.00	3,240,000.00
TDS	172,349,664.88	21,342,613.84
DSCR	0.02	0.15
Debt Service Coverage Ratio (Retail)		
NOI	5,192,400.00	5,192,400.00
TDS	172,349,664.88	21,342,613.84
DSCR	0.03	0.24

Footnotes to Table Nursery Products Conventional Power Enclosed Facility Alternative

Enclosed Facility Alternative

[1] Unless otherwise noted, costs for the Nursery Products Enclosed Facility Alternative are based on Las Virgines (LV) costs. Costs determined by extrapolating the LV cost by the percentage increase in biosolids intake for the Nursery Products facility (i.e. 18.744 times greater than LV).

[2] Unless otherwise noted, costs for the Nursery Products Enclosed Facility Alternative are based on Inland Empire Utility Agency (IEUA) costs. Costs determined by extrapolating the IEUA cost by the percentage increase in biosolids intake for the nursery products facility (i.e. 1.333 times greater than IEUA).

[3] Personal communication with Bustco Corporation (SCE electrical sub contractor)

Footnotes to Table Nursery Products Conventional Power Enclosed Facility Alternative Continued

[4] The Enclosed Alternative Incorporates an enclosed storage facility to enable year round production at full capacity.

[5] Annualized cost is determined by multiplying the Total cost in 2008$s by the capital recovery factor. The capital recovery factor is determined by the following equation based on a project term of 15 years and an interest rate of 4%.

CRF = 1 / [(1/r) - (1 / r * (1 - r)^{n})]; where r = rate (0.04) and n = years (15).

[6] Labor costs for Enclosed Facility Alternative is based on the labor costs for the LV and IEUA facilities respectively.

Total labor was determined as the cost per employee times the number of employees for each facility respectively.

Maintenance, operational and administrative labor was determined as a percentage of the total labor based on the percentage of total labor of the same category for the Las Virgines and IEUA Facilities respectively.

Percentage per category	***LV***	***Average***
Maintenance Labor	0.41	0.20
Operational Labor	0.59	0.72
Administrative Expenses		0.07

Cost per Employee	
LV	$170,187.71
IEUA	$97,010.60
Average	$133,599.16

[7] Number of employees, tons of biosolids and green waste, and Current Market Price was provided by Nursery Product.

[8] Production compost volume was determined using the same % of compost from the IEUA facility at capacity (Compost volume is 60% of the biosolids input volume).

[9] Price per ton (2008) is the maximum between the Las Virgines and IEUA facilities.

[10] Price per ton of compost (Retail) was determined at $9.87 per cubic yard (WasteAge 2000) which, based on IEUA compost production, is equal to $18.27 per ton.

[11] Cost/ton of biosolids = Sum of annualized capital costs and yearly O&M Costs divided by number of tons produced.

[12] % over Current Market Price = Cost per ton Divided by current market price.

[13] Revenue from biosolids is determined by Market price times cost per ton of biosolids.

[14] Revenue from compost sales (give away). As Las Virgines gives away their compost, a comparative strategy is shown for a conservative income potential for the Nursery Products facility.

[15] Revenue from compost sales (2008) is equal to the tons of compost produced multiplied by the going price per ton of IEUA for 2008 ($2.00 / ton).

[16] Revenue from compost sales (retail) is equal to the tons of compost produced multiplied by the going retail price per ton of $18.27 (average retail rate of $9.87/cubic yard converted to cost per ton ($9.87/cubic yard x 1 cubic yard/27 cubic feet x 1 cubic foot/40 pounds x 2000 pounds/ton = $18.27).

[17] NOI: the Net operating income is determined by summing the product of tons of biosolids per year and the market rate with the product of compost per year by market rate.

[18] TDS: Total debt service is the sum of the annualized capital cost and the annual operating and maintenance costs.

[19] DSCR: Debt service coverage ratio is the amount of annual debt that can be covered by Project revenue and is determined by dividing the NOI by the TDS. A DSCR of one means that the Project will be able to cover all annual debts but will not make any profit. A DSCR greater than 1 shows a profit margin where a DSCR less than one shows a net annual loss.

[-] Not applicable for this facility

[*] Individual costs were not known.

NURSERY PRODUCTS (Solar Power Enclosed Facility) Alternative

	Based on LV[1]	Based on IEUA[2]
Cost of Construction		
Facility	$1,225,585,754.45	$136,781,948.99
Photovoltaic Solar & Back-up Generator[3]	$160,366,466.23	$67,156,475.38
Electric Upgrades[4]	$21,000,000.00	$21,000,000.00
Enclosed storage facility[5]	-	$4,738,000.00
Total	$1,406,952,220.68	$229,676,424.37
Annualized Costs[6]		
#Years	15.00	15.00
% interest	0.04	0.04
Capital Recovery Factor	0.09	0.09
Total Annualized costs[6]	**$126,542,830.90**	**$20,657,350.34**
Operational Costs		
Electricity		
Upgrade to Grid Required?	Yes	Yes
kWhrs Annually	46,485,473.29	19,466,666.67
MWhrs Annually	46,485.47	19,466.67
MWhrs /day	127.36	53.33
Cost/ kWhr	$0.00	$0.00
Annual Electrical Costs	**$0.00**	**$0.00**
Maintenance		
Equipment Fuel	$93,720.71	*
Automated System Maintenance	$483,149.02	*
Photovoltaic Solar & Back-up Generator	$500,000.00	$500,000.00
Other Maintenance Costs	$7,778,819.12	*
Annual Maintenance Costs	**$8,855,688.85**	**$900,133.33**
Labor[7]		
Maintenance Labor	$1,948,256.00	$0.00
Operational Labor	$2,817,000.00	$2,326,250.07
Administrative Expenses	$0.00	$390,046.73
# of employees[8]	28	28
Labor cost/employee	$170,187.71	$97,010.60
Total Labor Costs	**$4,765,256.00**	**$2,716,296.80**
Additional Facility Costs		
Additional Operational Costs	$9,400,656.04	*
Specialty Expenses	$513,327.09	*
Administrative Expenses	$32,854,208.06	*
Total Additional Operational Costs	**$42,768,191.19**	**$2,048,400.00**
Total Operational Costs	**$56,389,136.04**	**$5,664,830.13**
Total Annualized Costs + O&M	**$182,931,966.93**	**$26,322,180.47**

NURSERY PRODUCTS Solar Power Enclosed Facility Alternative (continued)

	Based on LV[1]	Based on IEUA[2]
Raw Materials		
Wet tons of biosolids/year[8]		
Facility at Capacity	200,000	200,000
Tons of Green waste/year[8]		
Facility at Capacity	200,000	200,000
Operational Statistics		
Compost production per year (tons)		
Facility at Capacity[9]	120,000	120,000
Price to public per ton[10]	$2.00	$2.00
Price to public per ton[11] (Retail Market)	$26.32	$18.27
Facility at Capacity		
Cost per ton of biosolids[12]	$914.66	$131.61
Current Market Price[8]	$15.00	$15.00
% of current market price[13]	6,097.73	877.41
Revenue Potential		
From Biosolids[14]	$3,000,000	$3,000,000
From compost sales (give away)[15]	$0	$0
From compost sales (2008)[16]	$240,000	$240,000
From compost sales (Retail)[17]	$3,158,400	$2,192,400
Debt Service Coverage Ratio (2008)		
NOI[18]	3,000,000.00	3,000,000.00
TDS[19]	182,931,966.93	26,322,180.47
DSCR[20]	0.02	0.11
Debt Service Coverage Ratio (2008)		
NOI	3,240,000.00	3,240,000.00
TDS	182,931,966.93	26,322,180.47
DSCR	0.02	0.12
Debt Service Coverage Ratio (Retail)		
NOI	6,158,400.00	5,192,400.00
TDS	182,931,966.93	26,322,180.47
DSCR	0.03	0.20

Footnotes to Table Nursery Products Solar Power Enclosed Facility Alternative

[1] Unless otherwise noted, costs for the Nursery Products Enclosed Facility Alternative are based on Las Virgines (LV) costs. Costs determined by extrapolating the LV cost by the percentage increase in biosolids intake for the Nursery Products facility (i.e. 18.744 times greater than LV).

[2] Unless otherwise noted, costs for the Nursery Products Enclosed Facility Alternative are based on Inland Empire Utility Agency (IEUA) costs. Costs determined by extrapolating the IEUA cost by the percentage increase in biosolids intake for the Nursery Products facility (i.e. 1.333 times greater than IEUA).

Footnotes to Table Nursery Products Solar Power Enclosed Facility Alternative Continued

[3] Cost for Photovoltaic Solar and Back-up Generator determined by:

	Nellis[1]	IEUA	Nursery Products High
kWh/year	30,100,000	14,600,000	46,485,473
Ratio (Proposed	1	0.49	1.54
Cost[2]	$103,839,550	$50,367,357	$160,366,466
# Acres	140.00	10.00	216.21
Photovoltaic plant	14.20	1.01	21.93

[1] Nellis AFB Solar project: http://www.nellis.af.mil/shared/media/document/afd-080117-043.pdf

[2] Costs shown are in 2008 $s. The Nellis Solar project was completed in 2007, and capital costs were adjusted using the 3.8% inflation rate between 2007 and 2008 based on the CPI. IEUA Solar project was completed in 2008.

[4] Personal communication with Bustco (SCE electrical sub contractor)

[5] The proposed project is incorporating an enclosed storage facility to the costs of the enclosed facility to enable a year round production at full capacity. This is based on the operation of the IEUA facility.

[6] Annualized cost is determined by multiplying the Total cost is 2008$s by the capital recovery factor. The capital recovery factor is determined by the following equation based on a project term of 15 years and an interest rate of 4%.

CRF = 1 / [(1/r) - (1 / r * (1 - r)^{n})]; where r = rate (0.04) and n = years (15).

[7] Labor costs for Nursery Products is based on the labor costs for the LV and IEUA facilities.

Total labor was determined as the cost per employee times the number of employees for each facility respectively.

Maintenance, operational and administrative labor was determined as a percentage of the total labor based on the percentage of total labor of the same category for the Las Virgines and IEUA Facilities respectively.

Cost per Employee	
LV	$170,187.71
IEUA	$97,010.60
Average	$133,599.16

Percentage per category	*IEUA*	*Average*
Maintenance Labor	0.00	0.20
Operational Labor	0.86	0.72
Administrative Expenses	0.14	0.07

[8] Number of employees, tons of biosolids and green waste, and Current Market Price was provided by Nursery Products.

[9] Production compost volume was determined using the same % of compost from the IEUA facility at capacity (Compost volume is 60% of the biosolids input volume).

[10] Price per ton (2008) is the maximum between the Las Virgines and IEUA facilities.

[11] Price per ton of compost (Retail) was determined at $9.87 per cubic yard (WasteAge 2000) which, based on IEUA compost production, is equal to $18.27 per ton.

[12] Cost/ton of biosolids = Sum of annualized capital costs and yearly O&M Costs divided by number of tons produced.

[13] % over Current Market Price = Cost per ton Divided by current market price.

[14] Revenue from biosolids is determined by Market price times cost per ton of biosolids.

[15] Revenue from compost sales (give away). As Las Virgines gives away their compost, a comparative strategy is shown for a conservative income potential for the Nursery Products facility.

[16] Revenue from compost sales (2008) is equal to the tons of compost produced multiplied by the going price per ton of IEUA for 2008 ($2.00/ton).

[17] Revenue from compost sales (retail) is equal to the tons of compost produced multiplied by the going retail price per ton of $18.27 (average retail rate of $9.87/cubic yard converted to cost per ton ($9.87/cubic yard x 1 cubic yard/27 cubic feet x 1 cubic foot/40 pounds x 2000 pounds/ton = $18.27).

Footnotes to Table Nursery Products (Solar Power Enclosed Facility) Continued
[18] NOI: the Net operating income is determined by summing the product of tons of biosolids per year and the market rate with the product of compost per year by market rate.
[19] TDS: Total debt service is the sum of the annualized capital cost and the annual operating and maintenance costs.
[20] DSCR: Debt service coverage ratio is the amount of annual debt that can be covered by Project revenue and is determined by dividing the NOI by the TDS. A DSCR of one means that the Project will be able to cover all annual debts but will not make any profit. A DSCR greater than 1 shows a profit margin where a DSCR less than one shows a net annual loss.
- Not applicable for this facility * Individual costs were not known.

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Calculated GHG Emissions from Onsite Activities including Electric Usage for Nursery Products Enclosed Facility Alternative

		Based on Las Virgenes					Based on IEUA				
		Ue_A[1], MWh/yr	EF[1], lbs/MWh	C[1], lbs/ton	E_{ele}[1], tons/yr	CO_2e[2] ton/yr	U_A[1], MWh/yr	E[1], lbs/MWh	C[1], lbs/ton	Y_A[1], tons/yr	CO_2e[2] ton/yr
Electricity Usage	Carbon Dioxide (CO_2)	46,485	878.7100	2,000	20,423.625	20,423.625	19,466.67	878.7100	2,000	8,552.777	8,552.777
	Methane (CH_4)	46,485	0.0067	2000	0.156	3.270	19,466.67	0.0067	2000	0.065	1.369
	Nitrous Oxide (N_2O)	46,485	0.0037	2000	0.086	26.660	19,466.67	0.0037	2000	0.036	11.163
	Total					**20,453.555**					**8,565.310**
GHG from Onsite Activities[3]						444.810					444.810
Total GHG Emissions						***20,898.365***					***9,010.120***
% Increase over Open Air Facility[4]						3,347.112					1,443.074
% increase over Solar Power Facility[5]						4,698.268					2,025.611

1 Calculation for GHG Emissions from electrical use:

$$E_{ele} = (U_{eA} * EF) / C_1$$

Where:

E_{ele} = Annual emissions of CO_2, CH_4, or N_2O from Electricity (tons/year).
U_{eA} = Annual usage of electricity (MWh/year).
EF = Emission factor for electrical usage (lbs/MWh).
(CO_2 = 878.71, CH_4 = 0.0067 , N_2O =0.0037)
C_1 = Conversion factor from lbs to tons (1 ton = 2000 lbs).

2 CO_2e is determined by multiplying the emissions in tons per year from each greenhouse gas by their global warming potential. The global warming potential is the potential of a gas to impact climate change with respect to carbon dioxide. The global warming potential for CO_2 is 1, for CH_4 is 21, and for N_2O is 310.

3 Greenhouse Gas emissions from onsite activities was determined by reducing the emissions from the operation of the project without enclosure (624.37 as determined in the Global Climate Change Analysis) by 60% which is the gas capture efficiency, then by 48% which is the destruction efficiency for enclosing a facility.

4 As determined in the Global Climate Change Analysis, GHG emissions from the open air facility would be 624.37 tons per year of CO_2e.

5 Greenhouse Gas emissions for the solar power facility alternative would be equal to the on-site activities emissions from the Conventional Power Facility.

* None of the calculations for GHG emissions include emissions from transportation.