TO: R.A. Conrad
FROM: R.D. Hillman, S.V. Corkran, and G.G. Bacon(FED)

DATE: May 22, 1987
SUBJECT: Heavy Ends Disposition White Paper

Attached are the results of the study made to examine the proposed options for the disposition of the heavy ends material produced at the VCM Plant as a by-product in the manufacture of EDC and VCM. Several options were examined with the majority of the time spent examining options which involved sending the heavy ends to PPG, as is currently done, sending the heavy ends to BFG in La Porte, and the use of the VCM Plant incinerators to burn the heavy ends.

The results of this study indicate that the most desirable solution to the heavy ends disposition problem would involve continuing to send about one-half of the material to PPG and to negotiate a contract with B.F. Goodrich in La Porte in which BFG would agree to take the remaining material for use as feedstock for their CATOXID Unit. This solution (with an NPV of $92-98M relative to the current practice), would be more economical than both the current practice of sending the heavy ends to PPG or permitting and revising the VCM Plant incinerators to burn the heavy ends (with an NPV of -$171-380M relative to the current practice).

This option would provide Vista with two disposition options while not having a possible affect on the stream factors of the VCM Plant or its incinerators. There would be no increase in the risk of possibly increased regulation or enforcement measures applied to the incinerators which could result if the number of incinerator bypasses and stack excedances, which could be increased by burning heavy ends, increases sufficiently to draw action by regulatory actions.

A decision must be made to determine which of the options discussed in the attached document should be made as soon as is practicable due to the existing deadlines which would apply to the permitting process of the incinerators. A complete permit application should be submitted by August 8, 1987 to ensure that the complete permitting process can be completed by November 8, 1988. Even now the timing is such that it would be difficult to complete the time consuming and expensive permitting process in time to meet the existing deadline which was imposed by Congress. If the permitting process is not completed (permit in hand) by the November 8, 1988 deadline, the entire permitting process will have to be repeated.

CWH 000008308

Please review the attached document and initiate the appropriate steps which are required to have the disposition

OPTION	DESCRIPTION	NET PRESENT VALUE * ($M)	MAJOR ADVANTAGES	MAJOR DISADVANTAGES
1	SEND HEAVY ENDS TO PPG	0	1. NO CAPITAL COSTS 2. NO INCINERATOR MODIFICATIONS 3. NO STREAM FACTOR EFFECTS	1. RISK OF LOSS OF OPTION 2. ANNUAL COST OF $320M/YR 3. VISTA DEP. ON OUTSIDE DISPOSITION
2	SEND HEAVY ENDS TO BFG	195-220	1. SMALL CAPITAL COST ($50M) 2. GUARANTEED DISP. OPTION 3. NO STREAM FACTOR EFFECTS	1. ANNUAL COST OF $240-250M/YR 2. VISTA DEP. ON OUTSIDE DISPOSITION 3. LOSS OF PPG VOLUME
3	SEND H.E. TO PPG & BFG	93-98	1. PROVIDES TWO DISPOSITION OPTIONS 2. SMALL CAPITAL COSTS ($50) 3. NO STREAM FACTOR EFFECTS	1. ANNUAL COST OF $290M/YR 2. VISTA DEP. ON OUTSIDE DISPOSITION 3. LOSS OF PPG VOLUME
4	RCRA PERMIT INCINERATORS	-171-380	1. IN-PLANT DISPOSITION OF H.E. 2. SOME RECOVERY OF CHLORINE VALUE	1. INITIAL COST OF >$500M 2. PERMITTING COST AND TIMING 3. INCREASED ENVIRONMENTAL RISKS
5	NEW HAZ. WASTE INCIN.	-5000-10000	1. IN-PLANT DISPOSITION OF H.E. 2. SOME RAW MATERIAL RECOVERY 3. CAN HANDLE OTHER WASTE	1. HIGH COST - $5-10MM 2. INCREASED ENVIRONMENTAL RISKS 3. NO INTERIM DISPOSITION PROVIDED
6	COMMERCIAL INCINERATION	-7000-9000	1. NO STREAM FACTOR EFFECTS 2. GUARRANTEED DISPOSTION OPTION 3. NO CAPITAL COSTS	1. HIGH COST - $7-9MM/YEAR 2. VISTA TIED INTO AGREEMENT 3. NO INTERIM DISPOSITION OPTION
7	GEORGIA GULF PROCESS	UNKNOWN	1. POSSIBLY PROFITABLE OPTION 2. POSSIBLY IN-PLANT DISPOSITION 3. ELIMINATES HAZ. WASTE DESIGNATION	1. FEW DETAILS AVAILABLE CURRENTLY 2. NO INTERIM DISPOSITION OPTION

* RELATIVE TO THE CURRENT BASE CASE OF SENDING HEAVY ENDS TO PPG - NPV= $-1.2MM

upon sixty-day notification by PPG of refusal of heavy ends due to changes in either environmental regulations or solvent market conditions.

2. Vista would still be dependent upon another company for the disposition of heavy ends.
3. Cost - Vista pays about $383,000 per year for sending heavy ends to PPG.
4. Heavy ends sent to PPG must be treated as hazardous waste and each shipment must be manifested and is subject to all hazardous waste shipping regulations.

Option 2 - B. F. GOODRICH CATOXID PROCESS

B. F. Goodrich has developed a CATOXID Process which uses a fluidized catalytic bed reactor to oxidize chlorinated hydrocarbon feed streams to HCl, water, and nitrogen oxides which are then fed to their Oxychlorination reactors to be used in the production of EDC. They have a CATOXID Unit in operation at their La Porte, Texas facility and have presented Vista with a terms proposal in which they would agree to accept up to 12 million pounds of heavy ends per year for a charge of $25 per ton. This would provide for the disposition of the current 11.4 million pounds produced annually at the VCM Plant.

Since the heavy ends material would then be classified as a feedstock, and not as a hazardous waste, the environmental regulations applying to the shipping and handling would be less stringent allowing for the shipment of heavy ends under a bill of lading instead of having to manifest it as is currently done on shipments to PPG. Approval has been received from the Louisiana Department of Environmental Quality and the Texas Water Commission for this interpretation of applicable regulations.

Two truckloads of heavy ends were sent to the La Porte facility for sampling and testing for compatibility with their other feedstocks and the CATOXID Process. They reported no difficulties in unloading and blending of the heavy ends material.

The estimated cost of sending the heavy ends to BFG would be $25 per ton for processing and $11.40 per ton plus about $20,000 per year for transportation costs for a total annual expense of about $227,000 per year to send 11.4 million pounds of heavy ends to BFG. An additional cost of about $50,000 would be required for secondary containment and piping revisions which would allow for railcar loading at the VCM Plant.

When approached on the possibility of Vista purchasing the CATOXID Technology for use at the VCM Plant, BFG indicated that the current technology was not compatible with the oxygen-based fixed bed Oxychlorination Unit at the VCM Plant. BFG also indicated that they had no immediate plans of developing the required technology. The approximate cost of the La Porte CATOXID Unit, about $10 million, indicates that even a smaller unit, such as would be required at the VCM Plant, could not be justified at this time.

ADVANTAGES

1. Few capital modifications ($50,000) required.
2. Possible long-term solution to heavy ends disposition problem.
3. Eliminates the need to RCRA permit the VCM Plant incinerators to burn heavy ends.
4. Eliminates the need for secondary containment at heavy ends feed tank and pumps (about $55,000) as would be required for burning heavy ends.
5. Eliminates the need for revisions to the VCM Plant incinerators, a savings of about $80,000.
6. Provides for a lower disposition cost than either PPG or incineration.
7. No potential effect on the stream factor for either the VCM Plant or the VCM Plant incinerators.
8. Heavy ends would not be classified as hazardous waste and would be subject to less stringent shipping regulations, with only a bill of lading required instead of a manifest.
9. Vista would have a signed contract with BFG with a guaranteed method of heavy ends disposition for a minimum of three years with less chance of being affected by future environmental regulations or solvent market conditions which would cause PPG to shut down the solvent process in which they utilize some of the heavy ends material.

DISADVANTAGES

1. Vista would still be dependent upon another company for disposition of the heavy ends and would not recover any of the chlorine value in the heavy ends.
2. Increased expense and risk involved in shipping the heavy ends to La Porte, Texas although this would be minimized by the use of railcars instead of trucks.
3. Cost - Vista would still have to pay about $227,000 annually for the disposition of the heavy ends.
4. Risk of having PPG arrange for another company to supply heavy ends material to fill the gap left by the heavy ends sent by Vista to BFG, thus eliminating a disposition option for that fraction of Vista heavy ends.

OPTION 3 - ARRANGE TO DIVIDE THE HEAVY ENDS BETWEEN PPG AND BFG

This option would involve negotiations with both PPG and BFG to reach an agreement with the two companies in which the shipments of heavy ends would be split between them. Provisions should be made which would allow the amount sent to each of them to be varied to meet current conditions. The most economical split would be to maximize the amount of heavy ends being sent to BFG while maintaining a share of PPG's demand. The PPG share should be maintained in order to prevent PPG from arranging for another company to fill the gap left by having Vista send heavy ends to BFG.

OPTION 4 - RCRA Permit the VCM Plant Incinerators to Burn Heavy Ends

Currently Vista has interim status to burn heavy ends in the VCM Plant incinerators. Unless a complete permit application, including a trial burn plan is submitted by August 8, 1987 this interim status will be lost. The complete permitting process must be completed by November 8, 1988 or the entire process must be repeated. The permitting process required for hazardous waster incinerators is very time consuming and is expensive.

5/18/87
1100 hrs

HEAVY ENDS DISPOSITION OPTIONS

SUMMARY

A study was made to examine several proposed options to provide for the disposition of the heavy ends material produced at the VCM Plant as a by-product in the manufacture of EDC and VCM. The objective was to determine whether the VCM Plant incinerators should be permitted to burn the heavy ends which would be classified as a hazardous waste material. This decision is required at this time since currently the VCM Plant has interim status for burning hazardous waste in the incinerators but in order to retain approval to do so a complete RCRA Part 2 permit application, along with a test burn plan should be submitted by August 8, 1987. This is the expected latest date that aould allow sufficient time to complete the permitting process by the November 8, 1988 deadline set by Congress in the RCRA Amendments of XXXX. If this deadline is not met, then Vista would lose the option of burning heavy ends in the VCM Plant incinerators until a complete reapplication can be submitted.

The following options were examined :

Option 1 - Continue to send the heavy ends to PPG without a signed contract, possibly negotiating for a lower cost and a signed contract in the future.

Option 2 - Obtain a contract with B. F. Goodrich to have them process the heavy ends material in their La Porte CATOXID Unit to recover the chlorine as HCl which is fed to their Oxychlorination Unit to produce EDC while generating high pressure steam.

Option 3 - Obtain a contractual agreement with B. F. Goodrich and approval from PPG which would allow Vista to send heavy ends to both plants with about an even split between the two. This would provide two disposition options thereby making Vista less dependent on one industry for the outlet of heavy ends, would allow for price negotiations with PPG, and would likely result in cost savings.

Option 4 - Permit the VCM Plant incinerators to burn heavy ends and perform the required revisions to allow for this operation.

Option 5 - Permit and construct a new hazardous waste incinerator to burn heavy ends at the VCM Plant.

Option 6 - Commercial incineration of all heavy ends by participation in a take-or-pay arrangement with a company such as Chemical Waste Management or Gulf Coast Waste Disposal Authority.

Option 7 - Negotiate an arrangement with Georgia Gulf in developing a process similar to the CATOXID Process of B. F. Goodrich, possibly building such a process unit at or near the VCM PLant.

The results of this study indicate that the best option would be Option 3: Continue to send heavy ends material to PPG while negotiating a contract with B. F. Goodrich and then to split the shipments of heavy ends material

between the two companies. This would provide two disposition options and would allow for future price negotiations. It should also provide for an annual savings of about relative to the current cost of sending all of the material to PPG. This option would also provide a two to three year period in which other options, such as the Georgia Gulf process, could be examined or developed.

HEAVY ENDS DISPOSITION OPTIONS

OPTION 1 - CONTINUE TO SEND HEAVY ENDS TO PPG

Currently Vista sends all of its heavy ends to PPG where some of the material is recovered in one of their solvent processes and the remaining material is incinerated. There is no signed contract and future environmental regulations or changes in the solvent market could result in PPG refusing to accept the Heavy Ends upon a sixty-day notification. Currently this would leave Vista with no other disposition option except for commercial incineration which has an estimated $4-7 million annual cost.

Currently Vista pays about $383,500 annually to send about 11.4 million pounds of Heavy Ends to PPG. This material is shipped by truck and each shipment must be shipped under a hazardous waste manifest and can be refused for various reasons, (such as difficulty unloading due high solids content). Each of these refusals necessitates state and federal notification in which the reason for refusal is given along with what was done to correct the problem.

ADVANTAGES

1. No need for permitting or modifications to the VCM Plant incinerators.
2. No potential affect on the stream factor of the VCM Plant or the incinerators.
3. No capital modifications required.

DISADVANTAGES

1. Risk of having to resort to commercial incineration or other option

The timing is such that it would be difficult to have the required work completed in time to meet the existing deadlines.

Some studies and test burns have been completed to determine whether the heavy ends could be successfully burned in the VCM Plant incinerators. Previous test burns were only partially successful but John Zink representatives feel that it is possible. The major problem which would be encountered would be the need to remove essentially all of the sodium present in the heavy ends. Past studies indicate that the newly-installed static mixers in conjunction with a mesh coalecsence system should lower the sodium concentration in the heavy ends to an acceptable 10-20 ppm.

The presence of sodium in the feed to the incinerators can cause excessive fouling of the waste heat boiler tubes and severe damage to the refractory lining, requiring frequent cleaning of the tubes and possibly annual replacement of the refractory lining.Both of these would result in greater downtime for the liquid-burning incinerator which would increase the risk of having incinerator bypasses since the downtime required to replace the refractory is estimated to be three to four weeks during which time the VCM Plant would have no back-up incinerator should there be a problem with the on-line incinerator. Recent tightening of the regulations and enforcement practices pertaining to the number of incinerator bypasses and stack exceedances cause this added risk to be highly undesirable and possible costly in the future.

ADVANTAGES

1. This option would provide for in-plant disposition of heavy ends with no dependency upon other companies.
2. Some possible revenues from increased steam and muriatic acid production, although these revenues would be nearly negligible since the extra steam has little current value and the market for muriatic acid is nearly non-existent, especially for the low-grade acid which would be produced.
3. Savings of costs for sending Heavy Ends to PPG or BFG ($227,000 - 383,000/year).
4. Lower capital expenditure when compared to building a new hazardous waste incinerator dedicated to Heavy Ends.

DISADVANTAGES

1. Higher risk of incinerator bypasses and the resulting possible increased enforcement measures by environmental agencies. This increased risk is due to:
   a) higher feed rates to the incinerator resulting in a lower tolerance for possible upsets in the vent flows and
   b) more downtime required for more frequent maintenance including a possibly annual 3-4 week downtime required for refractory replacement ($90,000)
2. Increased maintenance cost - about $187,000 per year
3. RCRA permitting costs ($130,000) and timing requirements
4. Modifications required for sodium removal ($70,000)
5. Additional incinerator instrumentation required by RCRA regulations. (carbon monoxide monitoring system and fuel shut-off controls, costing

about $80,000).
6. Need for secondary containment around the heavy ends feed storage tank and feed pumps (about $55,000).
7. Risk of reducing the stream factor for both the incinerators and the VCM Plant
8. Possible capital modifications which may be required to achieve the required 99.99% destruction efficiency (not likely to be needed)
9. The VCM Plant would become a hazardous waste disposal site and subject to any applicable regulations
10. Engineering/envirionmental manpower requirements

OPTION 5 - CONSTRUCT AND PERMIT A NEW INCINERATOR TO BURN HEAVY ENDS

A quick examination of the option of constructing and permitting a new hazardous waste incinerator to burn heavy ends and possibly other Vista-generated wastes indicated that this option would not be desirable at this time. If built at the VCM Plant it would cause the VCM Plant to be classified as a hazardous waste disposal site and subject to all applicable regulations. The estimated cost ($5-10 million plus an undetermined operating cost) is not justifiable at this time.

ADVANTAGES

1. Could provide capacity to process much of Vista's hazardous waste materials.
2. Would be more capable of meeting the required destruction efficiencies for all types of waste produced by Vista.
3. Would eliminate the risk of decreasing the stream factor of the VCM Plant or its incinerators

DISADVANTAGES

1. 3-5 years would be required before start-up of the new incinerator.
2. The VCM Plant would become a hazardous waste disposal site and subject to any applicable regulations and enforcement measures.
3. Estimated cost - $5-10 million plus an undetermined operation cost.

OPTION 6 - COMMERCIAL INCINERATION OF ALL HEAVY ENDS

This option would involve Vista participating in a take-or-pay arrangement with other companies in which the expense of constructing, permitting, and operating a commercial incinerator would be shared by the companies which would send material to be incinerated. Usually the companies subscribing to the incineration services must agree to supply a certain fraction of the feed material to the incinerator or to pay the required minimum fee for processing that amount whether they send it or not.

Currently both Gulf Coast Waste Disposal Authority and Chemical Waste Management are proposing such arrangements. In the case of the Chemical Waste Management proposal the subscribers would be required to supply eighty percent of the capacity of the incinerator for a period of three to four years depending on the required payback period. After the payback period, each

subscriber would have an annual right of first refusal to renew its original capacity commitment or to reduce its commitment if so desired. A similar arrangement should be available from Gulf Coast Waste Management Authority.

ADVANTAGES

1. Secure, long-term solution to heavy ends disposition problem
2. No need to permit and revise the VCM Plant incinerators
3. No demand on Vista engineering manpower required
4. No possible affect on the stream factor of the VCM Plant

DISADVANTAGES

1. Cost - estimated to be $7-9 million annually
2. No provisions for interim disposal of heavy ends while the incinerator is constructed (possibly in 1990)
3. Increased risk of transporting hazardous waste further distances
4. Increased onsite and offsite storage capacity may be required.
5. No raw material or energy recovery by Vista
6. Vista would have to commit to a take-or-pay arrangement with the constructing the incineration facility with no payback or payout possible.

OPTION 6 - NEGOTIATE AN ARRANGEMENT WITH GEORGIA GULF

Georgia Gulf has been working on developing a process similar to the CATOXID Process of B. F. Goodrich which could be of value to Vista for processing heavy ends. They has been some tentative contact with them and the initial impression is that they would possibly work with Vista in the development of this process. They currently don't have this process in operation and are probably several years away from doing so.

ADVANTAGES

1. Possible long-term solution to heavy ends disposition problem
2. Future bargaining tool for negotiating pricing and terms with both PPG and BFG
3. Might be feasible to build a CATOXID-like unit at or near the VCM Plant as either a joint venture with Georgia Gulf or by licensing the technology from Georgia Gulf and constructing the unit ourselves.
4. Possible revenues from the recovery of the chlorine and energy value of the heavy ends.

DISADVANTAGES

1. This option is still several years away from possible operation.
2. No firm commitment or proposal from Georgia Gulf is expected at this time.
3. May not be economically feasible due to the possibly high capital expenditure required for the development and construction of this process.

To _____

From _____

Calculation Sheet

VISTA

Economic Basis

Revenues

1. Disposal Fee Savings – Heavy ends disposal fee costs are based on the yearly average (for the last seventeen months) production rate of 11.355 mm lbs./yr of heavy ends with an average concentration of EDC plus 1,1,2-Trichloroethane. This revenue is held constant for two years and then escalated annually, at 3.5 % for the remaining period in order to be consistent with other revenues and costs.

2. Disposal Transportation Savings – Transportation costs were obtained from an estimated $ 150 / load for a 21-ton trailer load of heavy ends delivered to PPG. This is the current estimated actual cost to Vista when Vista Transportation services are utilized. This cost was escalated at an annual 3.5 % to allow for inflation.

3. Muriatic Acid Sales – The revenue from possible sales of muriatic acid are obtained from the current price paid by Texas United for the muriatic being produced currently. The base incineration case included the assumption that 50% of the excess acid produced is purchased by Texas United at the current price of $ 0.003501 / lb for 18 wt % muriatic acid.

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Calculation Sheet

VISTA

Costs

1. BFG Disposal Fee – The charge by B.F. Goodrich for processing heavy ends in their CATOX-D Unit was obtained from their terms proposal. This value, $ 25/ton was held constant and then escalated at an annual 3.5% annual rate for consistency. It was assumed for the base case that this price, with the escalation is held constant.

2. Transportation Charges – The transportation charges were estimated from the negotiated railcar costs for the entire 11.353 mm lb/yr for $ 11.40/ton plus an additional $ 20,000/yr for leasing fees and maintenance of the railcars. For the case of sending only 50% of the heavy ends to BFG the cost was assumed to still be $ 11.40/ton with only $ 10,000/yr for leasing and maintenance. A 3.5% annual escalation rate was used to allow for inflation.

3. Acid Neutralization – It was assumed that 85% of the chlorine (.33 lb Cl/lb HE) was recovered as HCl with the remaining 15% being neutralized by caustic in the caustic scrubber (75%) and the limestone pits (25%). It was also assumed that 50% of the recovered Cl (as HCl) was neutralized by limestone in the limestone pits. The cost of the caustic ($ 0.057/lb) and the limestone ($ $ 0.0063) were obtained from the March 1987 IPA costs. Per 4/28/83 memo by SJR it was assumed that 1.5 lbs of limestone / lb HCl or .1746 lb caustic / lb HCl were required for neutralization.

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Calculation Sheet

VISTA

4. Electricity Costs - The electricity costs were obtained from the 237.3 MWHr/yr requirement (per Budget estimate by STR 4/28/83) with the cost's escalation provided by PED.

5. Incinerator Permitting Costs - The estimated cost for permitting the VCM Plant incinerators was obtained from estimates by Scott Environmental to M. R. Cheeseman ($100M for trial burn and data gathering and $30M for actual permitting process). These were split evenly over 1987 and 1988.

6. Refractory Replacement - This cost was estimated for annual refractory replacement for one of the incinerators (per IA Cole memo dated 1/31/84) and an estimated cost of $90M escalated at 4.8% annually.

☆ 7. Maintenance - The annual increased maintenance cost was estimated to be 30% higher for the incinerator (currently (- $627M/yr) plus 5% of the capital expenditures. This was escalated at 4.8%, annually.

☆ 8. Sodium Removal - The cost for revisions required for sodium removal ($250M) were based on a preliminary design by J.G. Cole (5/22/84) for a mesh coalescer system. This system should lower the Na level to the target 20 ppm in the heavy ends.

9. Feed System Revisions - The cost for the revisions required for burning heavy ends ($ 50 M) was based on the escalated cost of a design (J.G. Cole, 7/27/8[illegible]; S.J. Reynolds, 6/6/84) to provide a circulation loop to reduce solids buildup in the Heavy Ends

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From _____ Calculation Sheet

VISTA

Storage Tank, Trucks. It was assumed that the existing feed pumps and controls with a few revisions would be sufficient for burning heavy ends.

10. Additional Incinerator Instrumentation — this cost ($80M) was obtained from a 3QTR 1979 budget estimate. This would provide a continuous carbon monoxide monitoring system as well as feed cut-off controls.

11. Secondary Containment for Feed System — The cost for providing secondary containment around the heavy ends feed tank and pumps was estimated at $55M in a preliminary VCM Plant estimate.

2. Notes

It was assumed that no particulate scrubber ($100M) would be required and that no revisions ($100M) would be required for the feed pump and feed control system at the incinerator. Due to the present condition of this equipment and the tyler tha design feed rate requirements, it is likely that this extra $100M will be required. This was not included in the base case. It may also be necessary to revise the firebox to eliminate fugitive emissions.

Other

CWH 000008320

1) After Tax startup costs —

2) Insurance & taxes — 2% of construction cost for the first year of operation, escalated at 6.5% per year.

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To N.E. File

From RDH

Calculation Sheet

VISTA

Final N.E. Economics

Basis: 11.355 mm #/year Heavy Ends:
w/ 33.15 wt% EDC + 1,1,2-Trichloroethane

Option 1 - Contract with BFG to process N.E.'s in the CATOXFD Unit @ La Porte, TX

(1) Processing Fee $25/ton ($141,938/yr)
(2) Transportation Charges
(a) Trucking by Vista Transportation

$400./load or $19.048/ton (based on 21 tons/load) with a 2(2+3)hr trip @ $40/hr (2hr load, unload & a 6hr round trip req.), estimated actual Vista costs obtained from John Zailhoff, SVT on 5/18/87

Most Likely Case

$$\frac{5677.5 \text{ ton}}{\text{year}} \left| \frac{\$19.048}{\text{ton}} \right. = \$108,145/\text{yr}$$

($250,083 total)

(b). Railcar (per CRM on 5/11/87)

For loads over 130,000 lb the rate would be $11.40/ton + $20,000/yr maintenance and leasing costs
For loads over 190,000 lb the rate would be $9.40/ton + $20,000/yr for maintenance and leasing costs

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To NE Econ.

From

Calculation Sheet

VISTA

Best Case

(5677.5 ton/yr)($9.40/ton) + $ 20,000 = $ 53,389 /yr
($195,327/yr total)

Most Likely Case

(5677.5 ton/yr)($ 11.40/ton) + $20,000 = $ 84,724 /yr

($226,662/yr total)

Option 2 - Send NE's to PPG

(1) Processing fee - for an average (last 17 months) EDC + 1,1,2-Trichloroethan composition of 33.15%

$/ton = $125 - $2.25 (wt% EDC + 1,1,2) = $50.41 /ton

Yearly Fee = (5677.5 ton/yr)($50.41/ton)
= $ 286,203 /yr

(2) Transportation - by Vista Transportation

$ 150 /load (21 ton/load) from John Zulhoff, SDT on 5/18/87
= $ 7.143 /ton

$/year = (5677.5 ton/yr)($ 7.143/ton) = $ 40,554 /yr

Total Cost = $ 286,203 /yr + $ 40,554 = 326,757 /yr

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To HE Econ.

From

Calculation Sheet

VISTA

Option 3 - Permit VCM Incinerators & Revise to Burn NE's.

Basis: 11.355 mm (NE) lb/yr, 33 wt% Cl,

Assumptions:

(1) 85% recovery of Cl to produce 18 wt% muriatic acid
(2) Texas United purchases 50% of extra acid at a price of $ 0.003501 / lb with remainder neutralized
(3) 1.5 lb of limestone required to neutralize 1.0 lb of HCl
(4) 75% of unrecovered HCl (15% of total prod.) is neutralized by caustic in C-902 (caustic scrubber) and the other 25% is neutralized by limestone (per 4/28/83 memo by SJR). Excess 50% neutralized by limestone,
(5) 65% boiler efficiency
(6) Incremental electricity usage of 237.3 M KWH/yr (per 4/28/83 memo by SJR) @ $0.04094 KWHr
(7) 30% increase in maintenance cost at incinerator (per estimate by Vulcan Chemical personnel)

a) Muriatic Acid sales Revenues

$\frac{11.355 \cdot 10^6 \text{ lb NE}}{\text{yr}}$	$\frac{.33 \text{ lb Cl}}{\text{lb NE}}$	$\frac{.85 \text{ lb Cl rec}}{\text{lb Cl}}$	$\frac{36.5 \text{ lb HCl}}{35.5 \text{ lb Cl}}$	$\frac{\text{lb acid}}{.1815 \text{ lb HCl}}$

= 18.2 mm lb Acid (3.275 mm lb HCl)

Texas United Revenues = $(18.2 \cdot 10^6 \frac{\text{lb}}{\text{yr}})(\$ 0.003501/\text{lb})(.5) = \$ 31,859$
(If all is purchased => $ 63,718 /yr)

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To NE Econ.

From

Calculation Sheet

VISTA

b) Acid Neutralization Costs

Limestone

i) Unrecovered HCl $\Rightarrow$ $(.15)(3.8527\cdot10^6 \frac{lb\ HCl}{yr})(\frac{1.5\ lb\ L.S.}{lb\ HCl})(\frac{\$0.0093}{lb\ L.S.})(.25)$
$= \$2015.5/yr$

ii) Excess HCl $\Rightarrow$ $(.5)(3.275\cdot10^6 \frac{lb\ HCl}{yr})(\frac{1.5\ lb\ L.S.}{lb\ HCl})(\frac{\$0.0093}{lb\ L.S.})$
$= \$22,843/yr$

Total extra Limestone $\Rightarrow$ $\$24,859/yr$ (50%)
($\$47,702/yr$ for 100% neutr)

Caustic

i) Unrecovered HCl $\Rightarrow$ $(3.8527\cdot10^6 \frac{lb\ HCl}{yr})(.15)(.75)(.1746 \frac{lb\ NaOH}{lb\ HCl})(\frac{\$0.057}{lb})$
$= \$4314/yr$

Total Neutralization Costs = $\$29,173/yr$ (50%)
$\$52,016/yr$ (100% neut)

c) Steam Generation - No expected revenues
Basis: Neat H2O from 366°F to 405°F, form 250# steam

$$\frac{11.355\cdot10^6\ lb}{yr} \mid \frac{7800\ BTU}{lb} \mid .65 \mid \frac{lb\ stm}{(39+820)\ BTU} = 67.0\ \frac{mm\ lb}{yr}$$

d) Electricity Costs

$$\frac{237\ 300\ KWHr}{yr} \mid \frac{\$0.04094}{KWHr} = \$9715/yr$$

e) Maintenance

CWH 000008324

$(\$600,000/yr)(0.30) = \$180,000/yr$

Made By RDH
Date 5/13/87
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V3-20G-S

To NE Econ.

From

Calculation Sheet

VISTA

f) Permitting Costs

Approximately $100,000 for trial burn including burn plan and $ 30,000 for permitting procedure, Assume split between 1987 & 1988 (per MRC)

g) Sodium Removal

5%

a) Mesh Coalescence — $250,000 yr 1 + $12,500 maint
b) Water Wash - $700,000 capital + $50,000/yr op/maint.
c) Additive Treatment - $50,000 + $35,000/yr op/maint

h) Feed System Revisions - 50,000 capital + $2500 maint

i) Secondary Containment for T-902, P-902's — $55,000 per GGB

j) Additional Incinerator Instrumentation (CO monitoring system, shut-off controls) — $80,000 per budget estimate + $4060/yr maint.

k) Annual refractory replacement - per JA Cole memo dated 1/31/84 a Na level of 20-40 ppm would require refractory replacement ~ 1/yr

— $80-90,000/yr capital/incinerator per JRH
osc @ 4.8%

Total Maintenance = 180 + 12.5 + 2.5 + 4.0 = $199 M/yr osc @ 4.8%

Total Capital = 250 + 50 + 55 + 80 = 435 M

CWH 000008325

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V3-20G-S

To NE Ercon.

From

Calculation Sheet

VISTA

Assumptions

1) Constant PPG + BFG fees for 3 years with a 4% escalation after year 3
2) Constant transportation charges for 3 years with a 3.5% escalation after year 3
3) The following electricity charges (per C. A. Dutra)

year	88	89	90	91	92	93	94	95	96	97
¢/KWHr	4.1	4.6	4.9	5.1	5.4	5.6	5.7	5.8	5.9	6.0

4) 4.8% escalation of maintenance costs
5) 3.5% escalation of muriatic acid revenues
6) 3.5% escalation of neutralization expenses
7) 3.5% escalation on operating costs
8) 4% " " refractory replacement

CWH 000008326

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V3-20G-S

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From _____

Calculation Sheet

VISTA

NE Incineration Economics -

Basis: 10.5 mm lb/yr NE's
33 wt% Cl

1. Muriatic Acid sales to Texas United.
Assume 85% recovery of Cl to produce 18 wt% Acid

$$\frac{10.5 \cdot 10^6 \text{ lb NE}}{\text{yr}} \left| \frac{.33 \text{ lb Cl}}{\text{lb NE}} \right| \frac{36.5 \text{ lb HCl}}{35.5 \text{ lb Cl}} \left| \frac{.85 \text{ lb Cl}_{\text{rec}}}{\text{lb Cl fed}} \right| \frac{\text{lb Acid}}{.18 \text{ lb HCl}} = 16.82 \text{ mm lb } 18\% \text{ Acid}$$

(3.028 mm lb HCl)

Assume All/half bought by Texas United @ $0.003501/lb

All $(16.82 \cdot 10^6)(1.0)(\$0.003501) = \$58,887./\text{yr}$

50% $(16.82 \cdot 10^6)(0.5)(\$0.003501) = \$29,443/\text{yr}$

2. Acid Neutralization - Assume 75% of neutralization is by C-902 (caustic soln) and other 25% is by limestone (SJR 4-28-83 memo)
Assume 15% of NCl is neutralized.
(caustic scrubber (75%) + 25% in limestone beds

$$\left(\frac{3.028 \cdot 10^6}{.85}\right)(.15) = 534,353 \text{ lb NCl neutralized}$$

Limestone: $(534,353 \frac{\text{lb NCl}}{\text{yr}})(.25)(\frac{1.5 \text{ lb LS}}{\text{lb NCl}}) = \boxed{200.4 \text{ mlb/yr}}$

Caustic $(534353)(.75)(0.1746 \frac{\text{lb NaOH}}{\text{lb NCl}}) = \boxed{69.97 \text{ mlb/yr}}$

$(200,400 \text{ lb/yr})(\frac{\$0.0093}{\text{lb}}) = \$1864./\text{yr}$

$(69,970 \text{ lb/yr})(\$0.057/\text{lb}) = \$4000/\text{yr}$

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From _____ **Calculation Sheet**

VISTA

2. (cont') If some or all of NCl must be neutralized with limestone

(100% neutr) $(3.028 \cdot 10^6 \frac{lb\,NCl}{yr})\left(\frac{1.5025\ lb\ L.S.}{lb\ NCl}\right) =$ 4.55 mm lb/yr L.S.

(50% neutr) $(3,028 \cdot 10^6)(.5)(1.5025) =$ 2.275 mm lb/yr

(25%) $(3,028 \cdot 10^6)(.25)(1.5025) =$ 1.137 mm lb/yr

Costs	
100%	$ 42,300
50%	$ 21,148
25%	$ 10,574

3. Steam Generation

Basis: heat water from 366°F to 405°F, form 250# Stm

[65% Boiler eff.

$$\frac{10.5\ mm\ lb\ NE}{yr} \Big| \frac{7800\ BTU}{lb\ NE} \Big| \frac{.65}{} \Big| \frac{lb\ Stm}{(394+820)\ BTU} = 61.97\ mm\ lb/yr$$

4. Electricity Costs = Per Budget Estimate SJR - 4/28/87 requires incremental 237.3 m KWH/yr

$$\frac{237,300\ KWHr}{yr} \Big| \frac{\$0.04094}{KWH} = \boxed{\$\ 9715\ /yr}$$

5. Maintenance

Assume 25% increase in costs, 7% esc

($ 600,000 /yr)(0.25)

CWH 000008328

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From _____ **Calculation Sheet**

VISTA

M$/yr

(1) Muriatic Acid Sales Revenues (3.5% escalation)

	88	89	90	91	92	93	94	95	96	97
All	58.9	61.0	63.1	65.3	67.6	70	72.4	75	77.6	80.3
50%	29.4	30.4	31.5	32.64	33.7	34.9	36.1	37.4	38.7	40.1

(2) Acid Neutralization Costs (Limestone + Caustic) 3.5% esc

	88	89	90	91	92	93	94	95	96	97
Min	5.86	6.07	6.28	6.50	6.69	6.93	7.17	7.42	7.68	7.95
half	27.0	28	29	30	31	32	33.2	34.4	35.6	36.8
All	42.3	43.8	45.3	46.9	48.5	50.2	52.0	53.8	55.7	57.7

(3) Electricity Costs (KA Data)

	88	89	90	91	92	93	94	95	96	97
	9.73	10.9	11.6	12.1	12.8	13.3	13.5	13.8	14.0	14.2
cost/kWhr	4.1	4.6	4.9	5.1	5.4	5.6	5.7	5.8	5.9	6.0

(4) Maintenance 7% esc.

88	89	90	91	92	93	94	95	96	97
188	201	215	230	246	264	282	302	323	346

(4) Permitting Costs - $130 M split between 87-88

(5). Sodium removal -
- (a) Mesh Coalescence - $250 M
- (b) Water Wash - $ 700 m + $ 50m/yr Op/maint,
- (c) Additive Treatment $ 50 + $35/yr op/maint,

(6) Feed system - $ 150 m + $ 10 M/yr Op/maint

(7) Additional Incin. Instrumentation - $ 80 M

(8) T-902 / A-902's Secondary Containment - $ 55M

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V3-20G-S

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From _____

Calculation Sheet

VISTA

Economic Basis (June 13, 83 Pricing write-up).

- 25% Maintenance costs increase escalate @ >9%/yr

389,000 lb Steam / 878850 lb NCl = 0.443 lb steam / lb NCl
136 000 lb Caustic / 878850 lb NCl = 0.155 lb caustic / lb NCl

Possibly burning VE's will eliminate need for standby incinerator gas pilot light. = 57.2 mm SCF Nat. Gas/yr (7000 SCFH)

(57.2 x 10^6 SCF) ($0.001655/sc) = $94,690/yr
(Savings)

Electricity Incremental electrical of 237.3 KWH/yr required for incin. air blower acid pumps

(237.3 KWH/yr) ($0.041/KWH) = $9729 '87

Steam Recovery 2.65/1000 lbs, 13.5% eff

164.4 170 176.1 182.3 188.64 195.2 202.1 209 216.5 224

CWH 000008330

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Calculation Sheet

VISTA

HE Incineration Revenues

1. Tars Disposal – 10.5 mm lb HE/yr ~$360,000
2. Muriatic Acid Sales: – $\frac{11.77}{2} = 5.89$ mm lb 18% Acid /yr $29,400/yr (sell 50%)
3. Steam recovery – 620 mm lb/yr produced
   – recovered ⇒ (possibly none)

Costs

		30% increase	100 route
1.	Limestone & Caustic	$48,700	⇒ $98,906
2.	Electricity	900 KWH/yr	⇒ $1883
3.	Maintenance	25% increase	
4.	Refractory Replacement	– $90,000 /yr	
5.	Instrumentation	– 80,000 1st yr	
6.	Na Removal		
7.	Feed System Revisions		

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Calculation Sheet

VISTA

NE Incineration Economics

Costs

1. Permitting Incinerator — $ 130 M in 1987
2. Na Removal – (Mash Coalescer) – $ 250 M in '87
3. Instrumentation at Incinerator — $ 80 M '87
4. Feed System Revisions — $ 150 M + $ 10 M/yr Op.
5. Secondary Containment — $ 100 M '87
6. Refractory replacement — $ 90 M/yr each yr '99 on
7. Acid Neutralization — Min $ 5.186 M/yr
   50% $ 27.0 M/yr
   100% $ 42.3 M/yr
8. Electricity $ 9.72 M/yr
9. Extra Maintenance
10. Particulate Scrubber 100 M + $ 70/yr Op.

Revenues

1. Heavy Ends Disposal Costs — $ 360 M/yr (incl. transp).
2. Possible Muriatic Acid Sales — 0 — $ 58.9 M/yr max
   $ 29.4 M/yr (50%)

CWH 000008332

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V3-20G-S

VISTA CHEMICAL COMPANY
CALCULATION OF PROJECT ECONOMICS (M$)

CWH 000008333

VERSION 12-86

PERMIT INCIN - 50% ACID SALES NO ESC

20-May-87

Project Year	-3	-2	-1	1	2	3	4	5	6	7	8	9	10
Revenues													
PPG DISPOSAL FEE SAVINGS				286.20	286.20	286.20	286.20	286.20	286.20	286.20	286.20	286.20	286.20
MURIATIC ACID SALES (50%)				31.86	31.86	31.86	31.86	31.86	31.86	31.86	31.86	31.86	31.86
PPG TRANSPORTATION CHARGES				40.55	40.55	40.55	41.97	43.44	44.96	46.53	48.16	49.85	51.59
Total Revenues				358.61	358.61	358.61	360.03	361.50	363.02	364.59	366.22	367.91	369.65
Costs													
ACID NEUTRALIZATION COSTS (50%)				29.17	30.19	31.25	32.34	33.48	34.65	35.86	37.12	38.42	39.76
ELECTRICITY				9.73	10.90	11.60	12.10	12.80	13.30	13.50	13.80	14.00	14.20
PERMITTING INCINERATOR				65.00	65.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
REFRACTORY REPLACEMENT (ONCE/YEAR)				90.00	93.60	97.34	101.20	105.29	109.50	113.88	118.43	123.17	128.10
Maintenance				199.00	208.55	218.56	229.05	240.05	251.57	263.65	276.30	289.56	303.46
Insurance and Taxes				8.70	9.00	9.32	9.65	9.98	10.33	10.69	11.07	11.46	11.86
Depreciation-Construction Capital				87.00	139.20	82.65	65.25	60.90	0.00	0.00	0.00	0.00	0.00
Total Costs				488.60	556.45	450.72	449.59	462.50	419.35	437.58	456.72	476.61	497.38
Taxable Income				-129.99	-197.84	-92.11	-89.56	-101.00	-56.33	-72.99	-90.50	-108.70	-127.73
Income Tax				-48.10	-73.20	-34.08	-33.14	-37.37	-20.84	-27.01	-33.48	-40.22	-47.26
After Tax Income				-81.89	-124.64	-58.03	-56.42	-63.63	-35.49	-45.98	-57.01	-68.48	-80.47
Operating Cash Flow				5.11	14.56	24.62	8.83	-2.73	-35.49	-45.98	-57.01	-68.48	-80.47
Investment													
Construction Capital	0.00	0.00	435.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
After Tax Startup	0.00	0.00	13.70	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Investment	0.00	0.00	448.70	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Net Cash Flow	0.00	0.00	-448.70	5.11	14.56	24.62	8.83	-2.73	-35.49	-45.98	-57.01	-68.48	-80.47

Internal Rate of Return,% =	ERR	NPV of operating cash flow =	-59.84
Discounted Payback Period,yrs =	NA	NPV of investment,working capital =	397.08
Cost of Capital,% =	13%	NPV of net cash flow =	-456.92

VISTA CHEMICAL COMPANY
CALCULATION OF PROJECT ECONOMICS (M$)

CWH 000008334

VERSION 12-86

BFG ONLY 10-YEAR WITH TRUCKS (No esc)

20-May-87

Project Year	-3	-2	-1	1	2	3	4	5	6	7	8	9	10
Revenues													
PPG DISPOSAL FEE SAVINGS				286.20	286.20	286.20	286.20	286.20	286.20	286.20	286.20	286.20	286.20
PPG TRANSPORTATION SAVINGS				40.55	40.55	40.55	41.97	43.44	44.96	46.53	48.16	49.85	51.59
Total Revenues				326.75	326.75	326.75	328.17	329.64	331.16	332.73	334.36	336.05	337.79
Costs													
BFG PROCESSING FEE				141.94	141.94	141.94	141.94	141.94	141.94	141.94	141.94	141.94	141.94
BFG TRUCK TRANSPORTATION CHARGES				108.15	108.15	108.15	111.93	115.85	119.90	124.10	128.44	132.94	137.59
Depreciation-Construction Capital				0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Costs				250.09	250.09	250.09	253.87	257.79	261.84	266.04	270.38	274.88	279.53
Taxable Income				76.66	76.66	76.66	74.30	71.85	69.32	66.69	63.98	61.17	58.26
Income Tax				28.36	28.36	28.36	27.49	26.58	25.65	24.68	23.67	22.63	21.56
After Tax Income				48.30	48.30	48.30	46.81	45.27	43.67	42.01	40.31	38.54	36.70
Operating Cash Flow				48.30	48.30	48.30	46.81	45.27	43.67	42.01	40.31	38.54	36.70
Investment													
Construction Capital	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
After Tax Startup	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Investment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Net Cash Flow	-0.00	0.00	-0.00	48.30	48.30	48.30	46.81	45.27	43.67	42.01	40.31	38.54	36.70

Internal Rate of Return,% =	-197	NPV of operating cash flow =	169.76
Discounted Payback Period,yrs =	3.0	NPV of investment,working capital =	0.00
Cost of Capital,% =	13%	NPV of net cash flow =	169.76

VISTA CHEMICAL COMPANY

CALCULATION PROJECT ECONOMICS (M$)

CWH 000008335

DN 12-86

BFG/PPG 50/50 10 YR SPLIT W/TRUCKS (NO ESC)

20-May-87

Project Year	-3	-2	-1	1	2	3	4	5	6	7	8	9	10
Revenues													
PPG DISPOSAL FEE SAVINGS				143.10	143.10	143.10	143.10	143.10	143.10	143.10	143.10	143.10	143.60
PPG TRANSPORTATION SAVINGS				20.28	20.28	20.28	20.98	21.72	22.48	23.27	24.08	24.92	25.80
Total Revenues				163.38	163.38	163.38	164.08	164.82	165.58	166.37	167.18	168.02	169.40
Costs													
BFG PROCESSING FEE				70.97	70.97	70.97	70.97	70.97	70.97	70.97	70.97	70.97	70.97
BFG TRANSPORTATION CHARGES				54.07	54.07	54.07	55.96	57.92	59.95	62.05	64.22	66.47	68.79
Depreciation-Construction Capital				0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Costs				125.04	125.04	125.04	126.93	128.89	130.92	133.02	135.19	137.44	139.76
Taxable Income				38.34	38.34	38.34	37.15	35.93	34.66	33.35	31.99	30.58	29.64
Income Tax				14.19	14.19	14.19	13.75	13.29	12.82	12.34	11.84	11.31	10.97
After Tax Income				24.15	24.15	24.15	23.40	22.64	21.84	21.01	20.15	19.27	18.67
Operating Cash Flow				24.15	24.15	24.15	23.40	22.64	21.84	21.01	20.15	19.27	18.67
Investment													
Construction Capital	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
After Tax Startup	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Investment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Net Cash Flow	-0.00	0.00	-0.00	24.15	24.15	24.15	23.40	22.64	21.84	21.01	20.15	19.27	18.67

Internal Rate of Return,% =	-197	NPV of operating cash flow =	84.96
Discounted Payback Period,yrs =	3.0	NPV of investment,working capital =	0.00
Cost of Capital,% =	13%	NPV of net cash flow =	84.96

VISTA CHEMICAL COMPANY

CALCULATIO? PROJECT ECONOMICS (M$) :ON 12-86

CWH 000008336

BFG/PPG 10 YEAR OPTION - NO ESC 20-May-87

Project Year	-3	-2	-1	1	2	3	4	5	6	7	8	9	10
Revenues													
PPG DISPOSAL FEE SAVINGS				143.10	143.10	143.10	143.10	143.10	143.10	143.10	143.10	143.10	143.10
PPG TRANSPORTATION SAVINGS				20.28	20.28	20.28	20.98	21.72	22.48	23.27	24.08	24.92	25.80
Total Revenues				163.38	163.38	163.38	164.08	164.82	165.58	166.37	167.18	168.02	168.90
Costs													
BFG PROCESSING FEE				70.97	70.97	70.97	70.97	70.97	70.97	70.97	70.97	70.97	70.97
BFG RAIL TRANSPORTATION CHARGES				42.36	42.36	42.36	43.84	45.38	46.96	48.60	50.31	52.07	53.89
Maintenance				1.60	1.68	1.76	1.84	1.93	2.02	2.12	2.22	2.33	2.44
Insurance and Taxes				0.80	0.83	0.86	0.89	0.92	0.95	0.98	1.02	1.05	1.09
Depreciation-Construction Capital				8.00	12.80	7.60	6.00	5.60	0.00	0.00	0.00	0.00	0.00
Total Costs				123.73	128.63	123.54	123.54	124.80	120.90	122.67	124.52	126.42	128.39
Taxable Income				39.65	34.75	39.84	40.54	40.02	44.68	43.70	42.66	41.60	40.51
Income Tax				14.67	12.86	14.74	15.00	14.81	16.53	16.17	15.78	15.39	14.99
After Tax Income				24.98	21.89	25.10	25.54	25.21	28.15	27.53	26.88	26.21	25.52
Operating Cash Flow				32.98	34.69	32.70	31.54	30.81	28.15	27.53	26.88	26.21	25.52
Investment													
Construction Capital	0.00	0.00	40.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
After Tax Startup	0.00	0.00	1.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Investment	0.00	0.00	41.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Net Cash Flow	-0.00	0.00	-41.01	32.98	34.69	32.70	31.54	30.81	28.15	27.53	26.88	26.21	25.52

Internal Rate of Return,% =	80	NPV of operating cash flow =	115.50
Discounted Payback Period,yrs =	4.4	NPV of investment,working capital =	28.42
Cost of Capital,% =	13%	NPV of net cash flow =	87.08

VISTA CHEMICAL COMPANY

CALCULATION 'ROJECT ECONOMICS (M$)

CWH 000008337

'N 12-86

BFB OPTION - 10 YR W/RAIL (NO ESC)

20-May-87

Project Year	-3	-2	-1	1	2	3	4	5	6	7	8	9	10
Revenues													
PPG DISPOSAL FEE SAVINGS				286.20	286.20	286.20	296.22	306.58	317.32	328.42	339.92	351.82	364.20
PPG TRANSPORTATION SAVINGS				40.55	40.55	40.55	41.97	43.44	44.96	46.53	48.16	49.85	51.59
Total Revenues				326.75	326.75	326.75	338.19	350.02	362.28	374.95	388.08	401.67	415.79
Costs													
BFB PROCESSING FEE				141.94	141.94	141.94	146.90	152.04	157.38	162.88	168.58	174.48	180.58
BFB TRANSPORTATION CHARGES				84.72	84.72	84.72	87.68	90.76	93.92	97.20	100.62	104.14	107.78
Maintenance				1.60	1.68	1.76	1.84	1.93	2.02	2.12	2.22	2.33	2.44
Insurance and Taxes				0.80	0.83	0.86	0.89	0.92	0.95	0.98	1.02	1.05	1.09
Depreciation-Construction Capital				8.00	12.80	7.60	6.00	5.60	0.00	0.00	0.00	0.00	0.00
Total Costs				237.06	241.96	236.87	243.31	251.25	254.27	263.18	272.44	282.00	291.89
Taxable Income				89.69	84.79	89.88	94.88	98.77	108.01	111.77	115.64	119.67	123.90
Income Tax				33.19	31.37	33.25	35.11	36.55	39.96	41.35	42.79	44.28	45.84
After Tax Income				56.50	53.41	56.62	59.78	62.23	68.04	70.41	72.85	75.39	78.06
Operating Cash Flow				64.50	66.21	64.22	65.78	67.83	68.04	70.41	72.85	75.39	78.06
Investment													
Construction Capital	0.00	0.00	40.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
After Tax Startup	0.00	0.00	1.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Investment	0.00	0.00	41.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Net Cash Flow	-0.00	0.00	-41.01	64.50	66.21	64.22	65.78	67.83	68.04	70.41	72.85	75.39	78.06

Internal Rate of Return,% =	159	NPV of operating cash flow =	255.54
Discounted Payback Period,yrs =	3.7	NPV of investment,working capital =	28.42
Cost of Capital,% =	13%	NPV of net cash flow =	227.11