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FPSC-COMMISSION OF FALL

# 2004 Hurricane Fuels Plan

May 27, 2004



# 2004 Hurricane Fuels Plan

### Goal:

Develop and implement a plan to manage fuel for the FPL Generation Fleet that supports reliable operation during tropical weather events that affect fuel supply.



2004 Hurricane Fuels Plan

Energy Marketing & Trading

### **Outline**

- 1. Probabilities and Event Risk
- 2. Impacts of Events to FPL Fuel Supply
- 3. Hurricane Fuels Plan
- 4. Conclusions and Recommendations

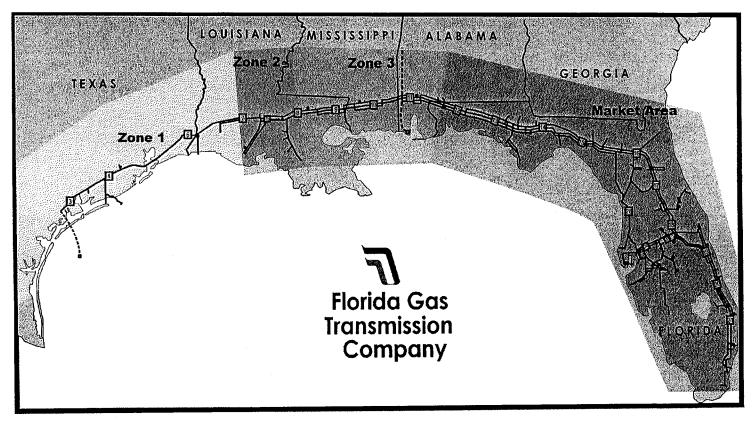


### **Historical Analysis of Tropical Events**

- EMT examined US Hurricanes and Tropical Storms for the period from 1899-2003.
- Analysis focused on storms affecting natural gas production areas that feed the Florida Gas Transmission (FGT) and Gulfstream Natural Gas System (Gulfstream) pipelines.
  - Texas, Louisiana, Alabama, and Mississippi coastlines
- Monthly data was used to estimate annual strike probabilities.
- For intra-month event study, EMT reviewed the National Hurricane Center's (NHC) Hurricane Track charts and summaries for the period from 1991-2003.

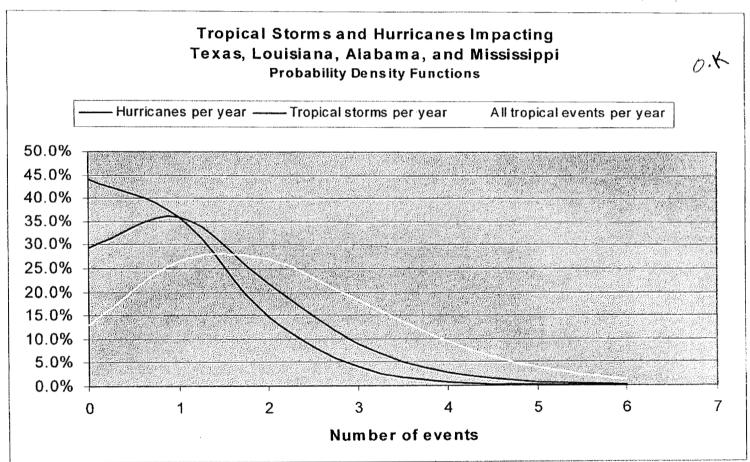


### **Geography**



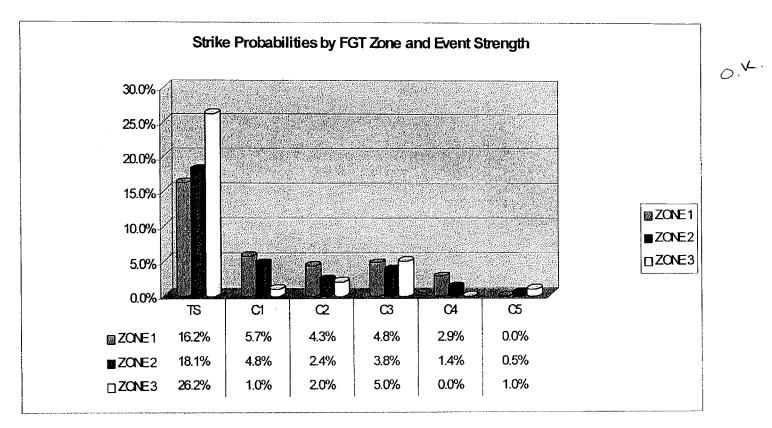


### **Annual Strike Probabilities**





### **Conditional Strike Probabilities by Zone and Strength**





### **Summary of Probability Results**

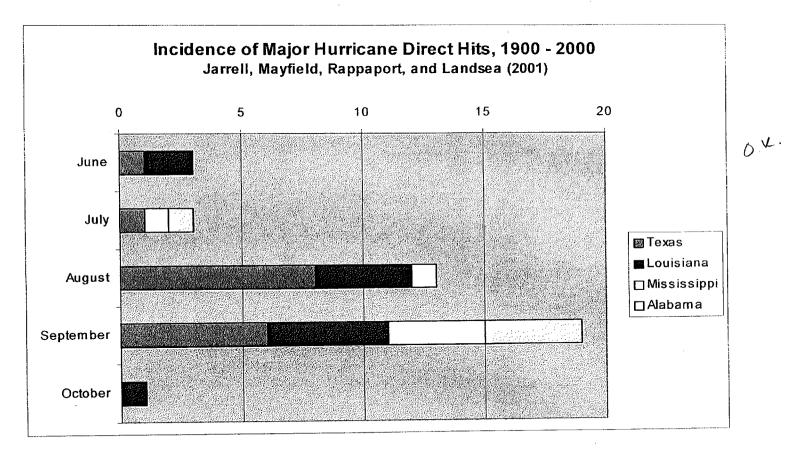
 Based on historical weather, the most likely outcome for a given year is two tropical events. Expect this approximately 27% of the time.

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- Expect 4 or fewer events approximately 95% of the time.
- The most likely event (given one does occur) is a tropical storm impacting FGT Zone 3 – Mississippi / Alabama coastline.
- The probability of our worst-case event (given one does occur), a hurricane of category 3 or higher impacting Zone 3, is approximately 6%.



### **Summary of Probability Results**





### **Summary of Probability Results**

 Based on historical analysis, the probability of one major hurricane (Category 3 or higher) impacting Zone 2 or Zone 3 in a given year is approximately 23%.

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- The probability of two or more Category 3 or higher storms impacting Zone 2 or Zone 3 is approximately 5.3%.
- The period from July 1<sup>st</sup> to October 31<sup>st</sup> is 122 days. If we assume independence, then the probability of two events in a ten-day window is approximately 1.9%. This corresponds to a 1 in 52 year event.



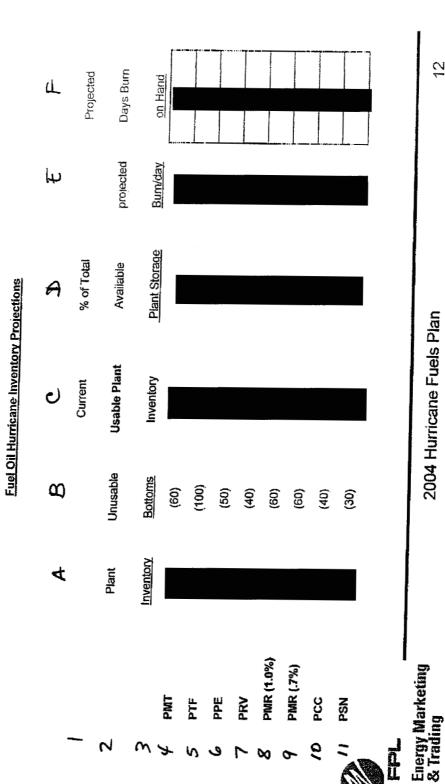


### **Hurricane Season Preparation**

- 2 By July 1st, EMT will be prepared for the hurricane season.
- 3 Bay Gas Storage
  - Fuel Oil inventories will be at their summer high levels.
  - EMT has evaluated additional gas and light oil storage options for 2004.
  - EMT has evaluated purchase power opportunities for 2004.



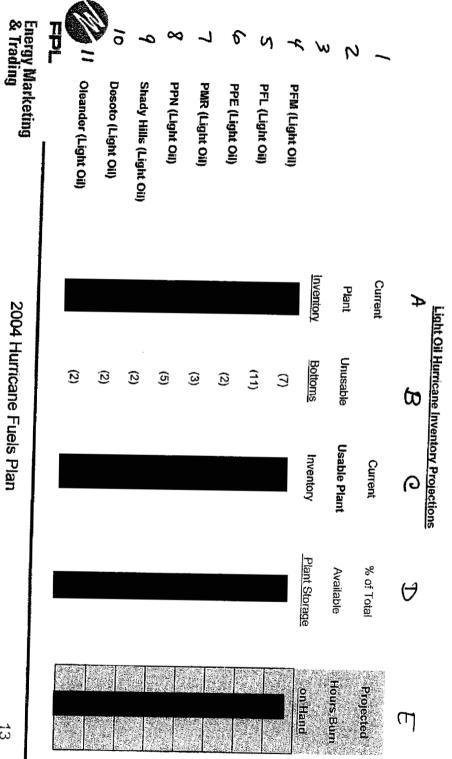
# Hurricane Season Preparation



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# Hurricane Season Preparation



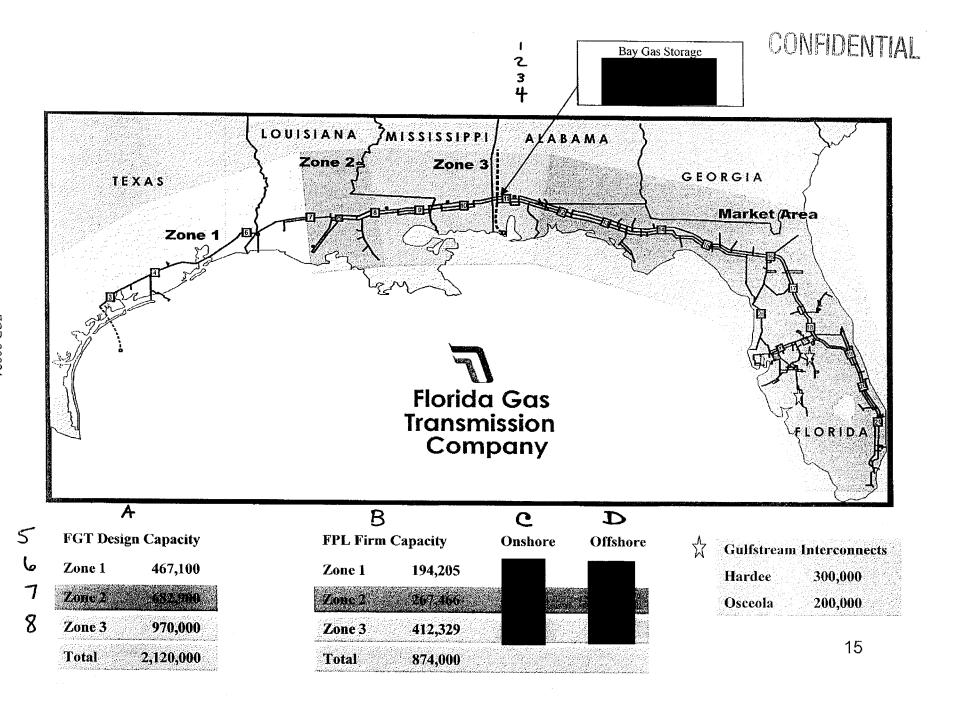
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### **Natural Gas Supply**

- Availability of natural gas on the FGT and Gulfstream pipelines during tropical events is the critical factor in formulating the Hurricane Fuels Plan.
- Producing platforms and rigs are generally evacuated when wind speeds reach 40 mph.
  - Deepwater rigs and platforms that can be operated remotely can continue operating in some instances.
- EMT Gas Personnel did an extensive analysis of natural gas supply to determine availability during different types of tropical events.





### Natural Gas Supply Rolected Fether Cara

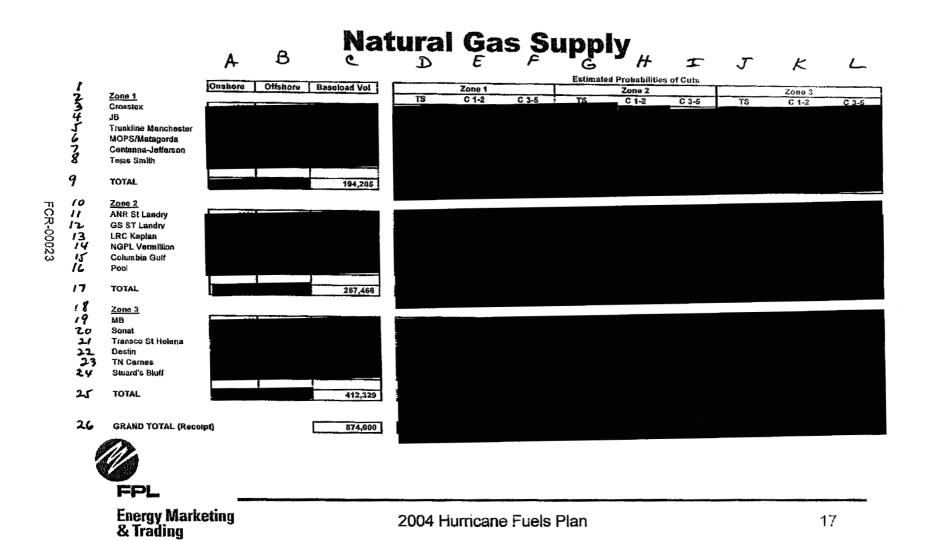
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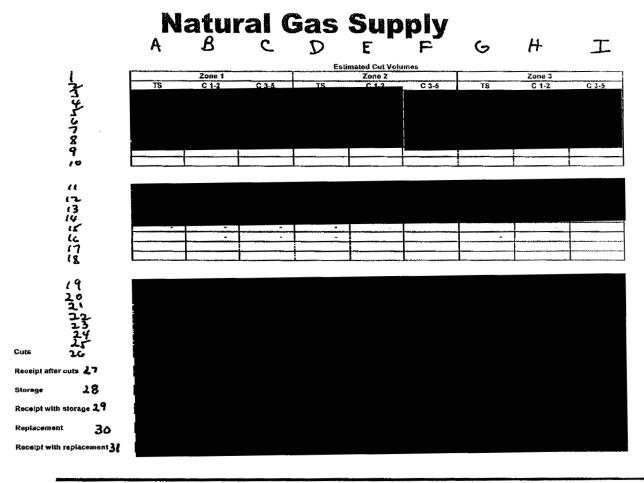
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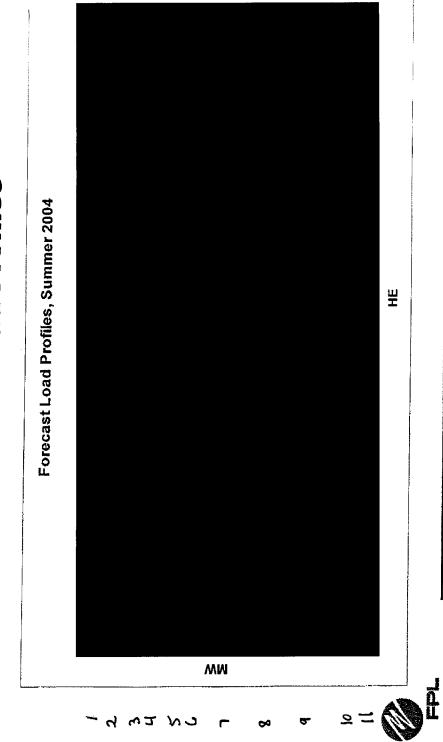
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### Forecast Load Profiles

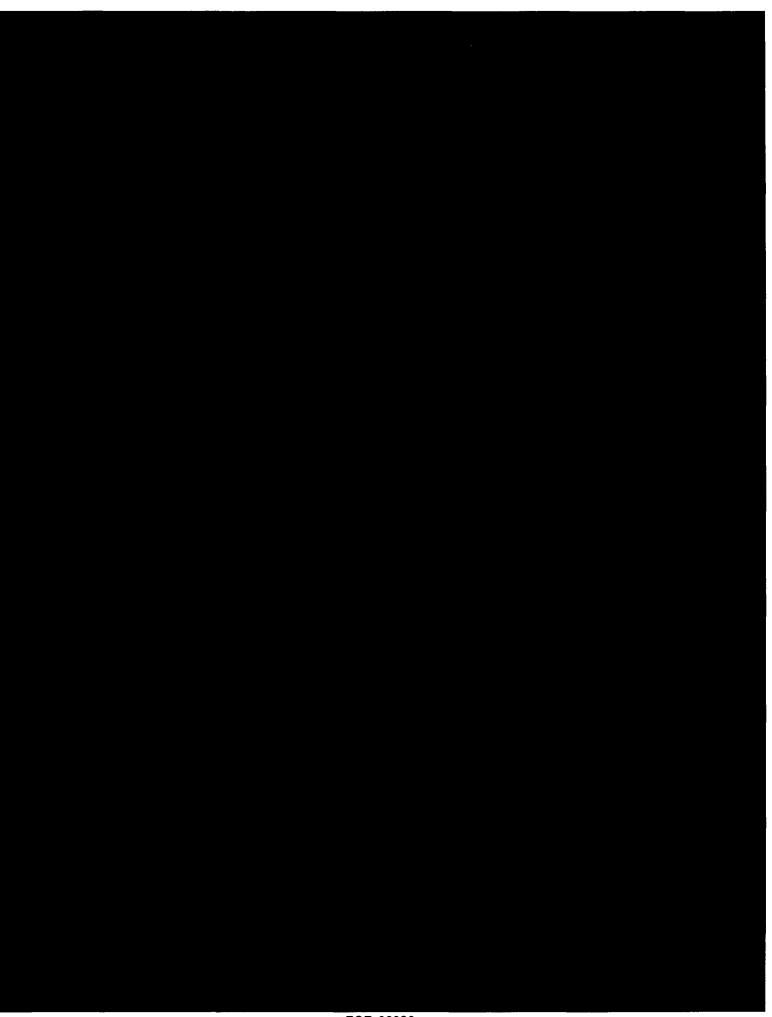


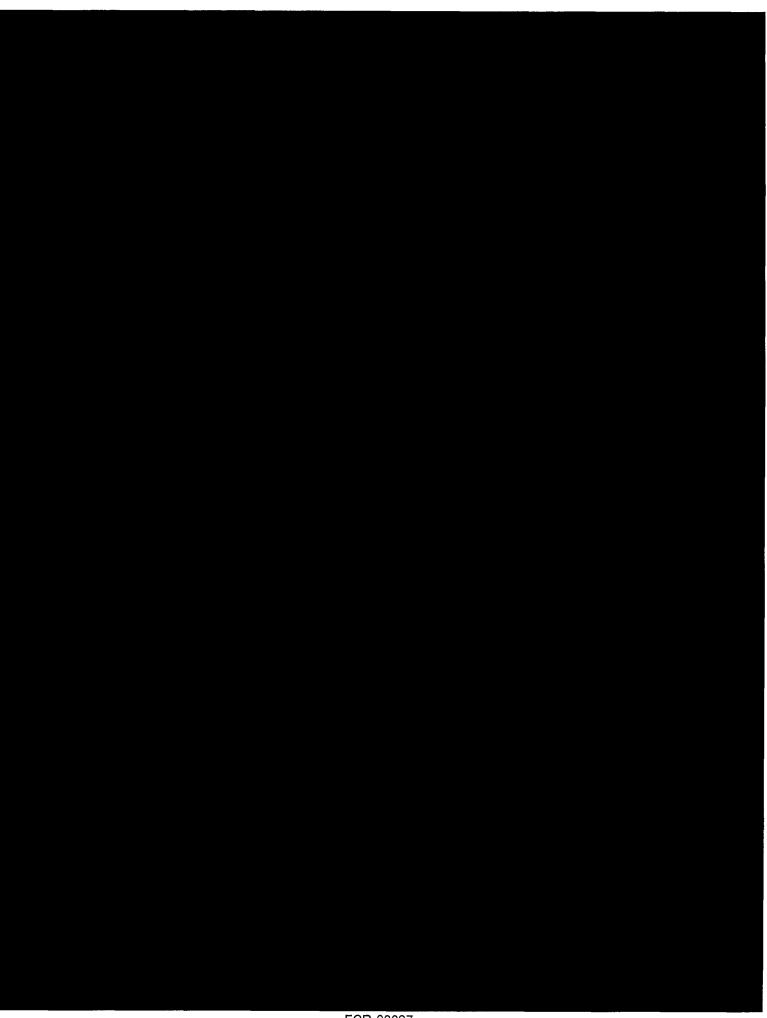
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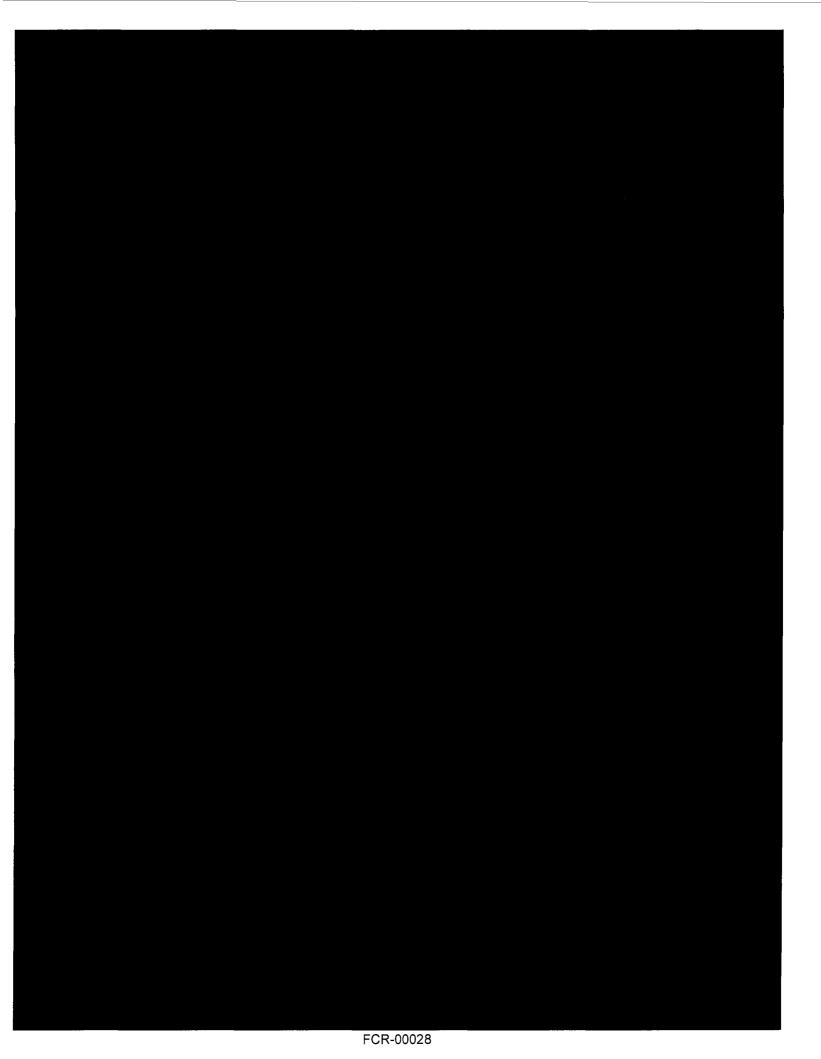
2004 Hurricane Fuels Plan

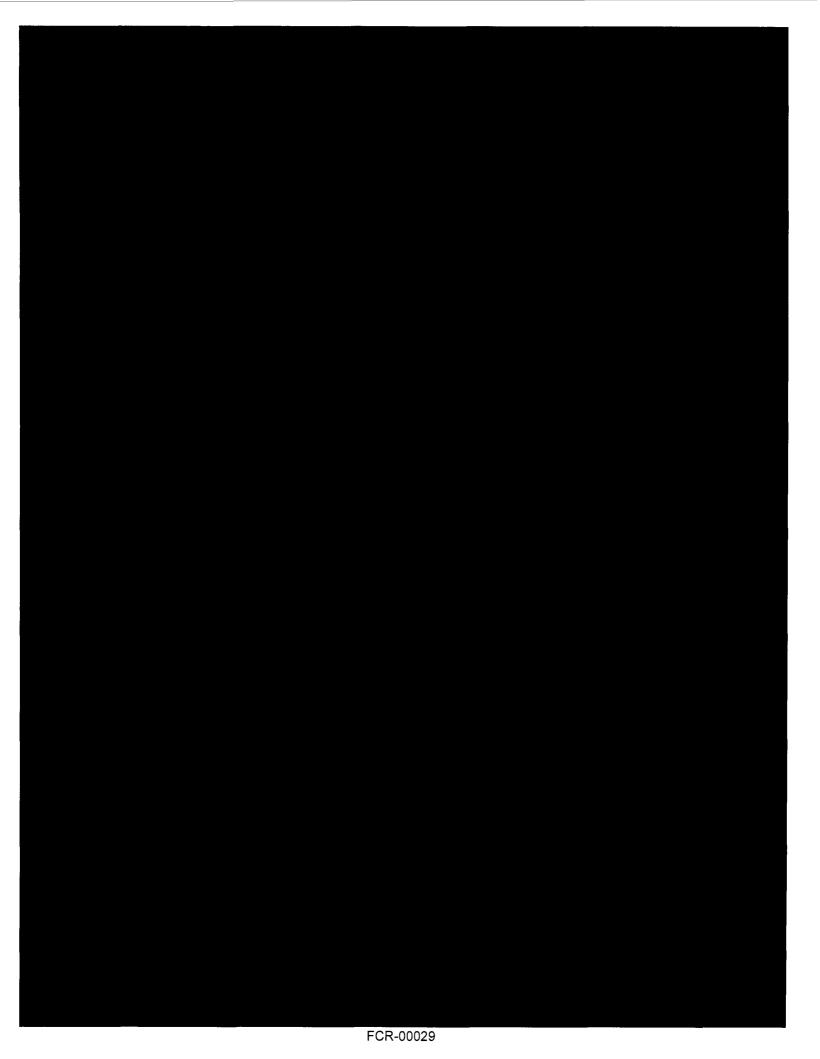
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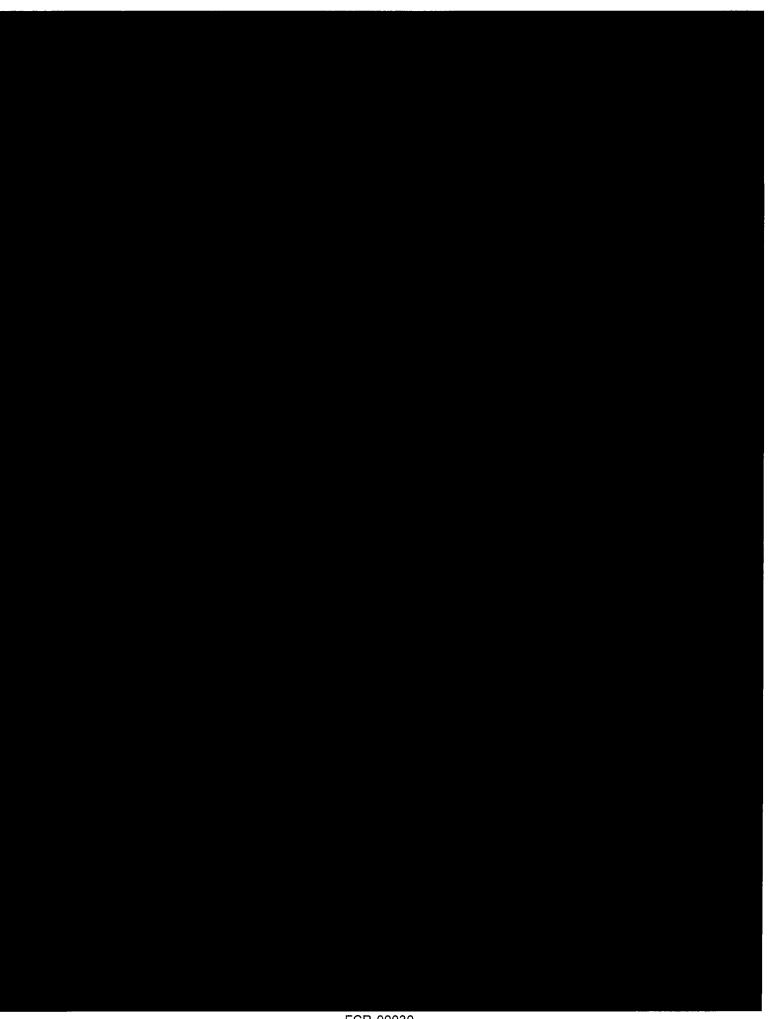
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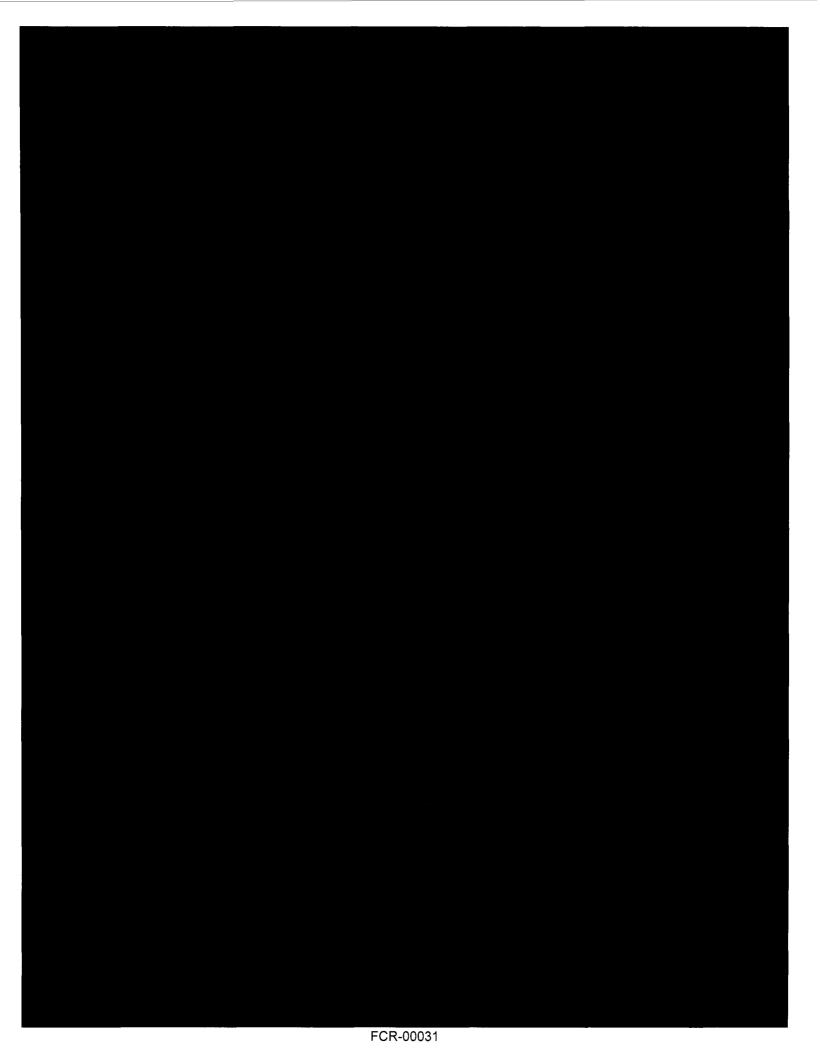


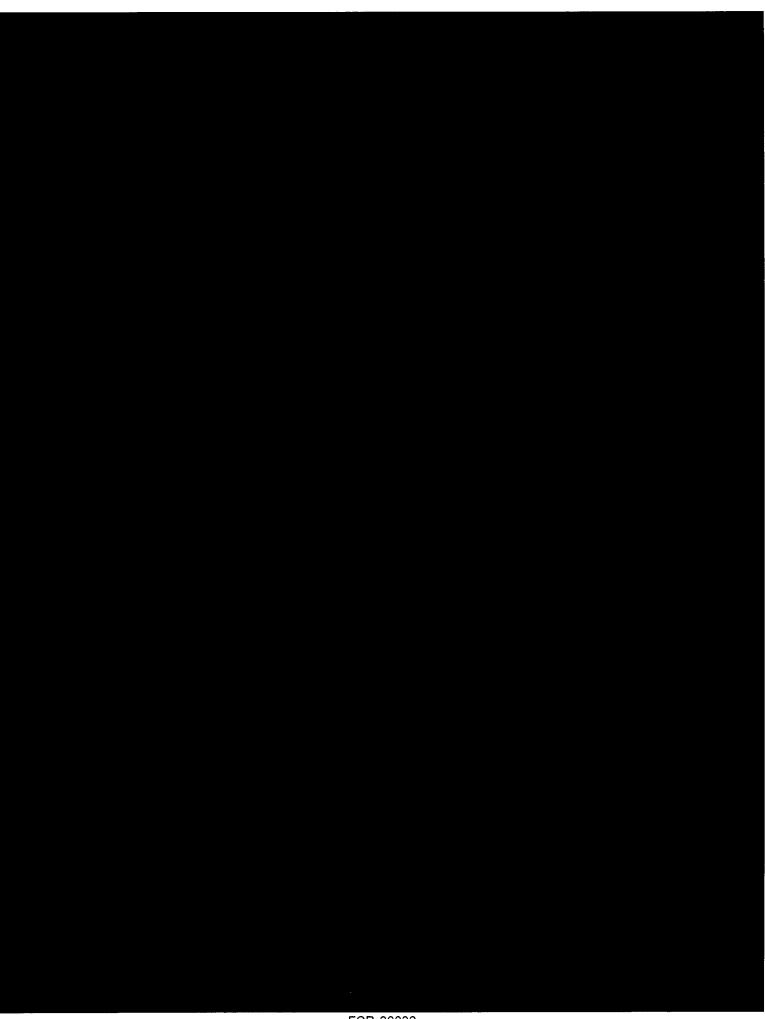


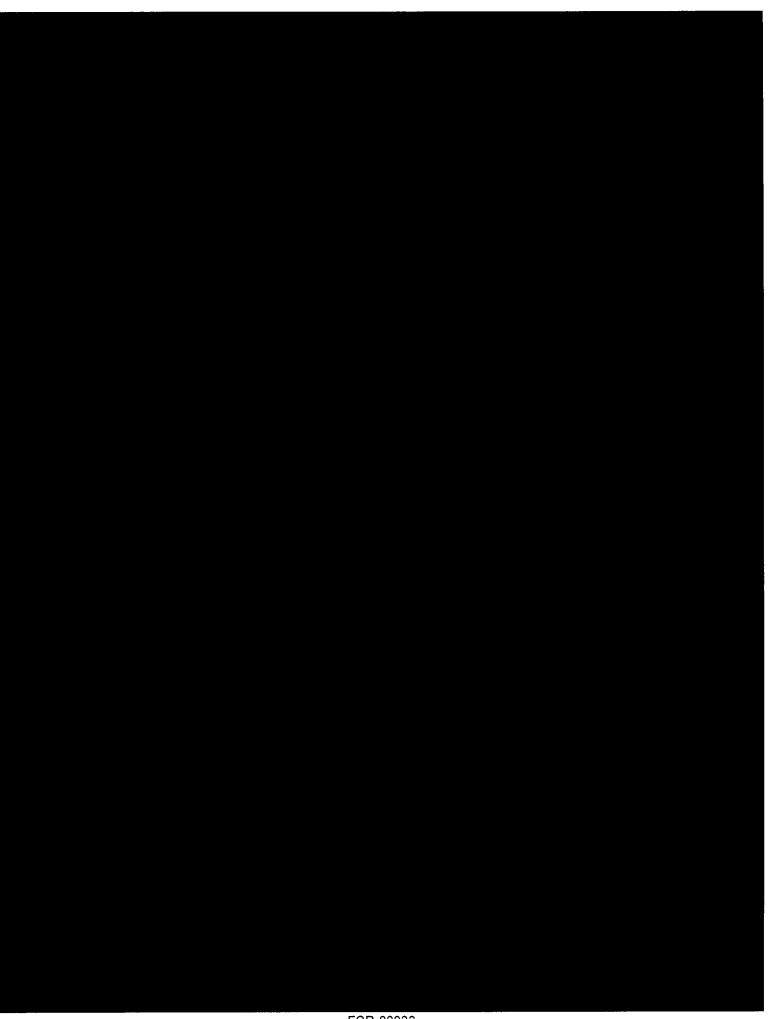


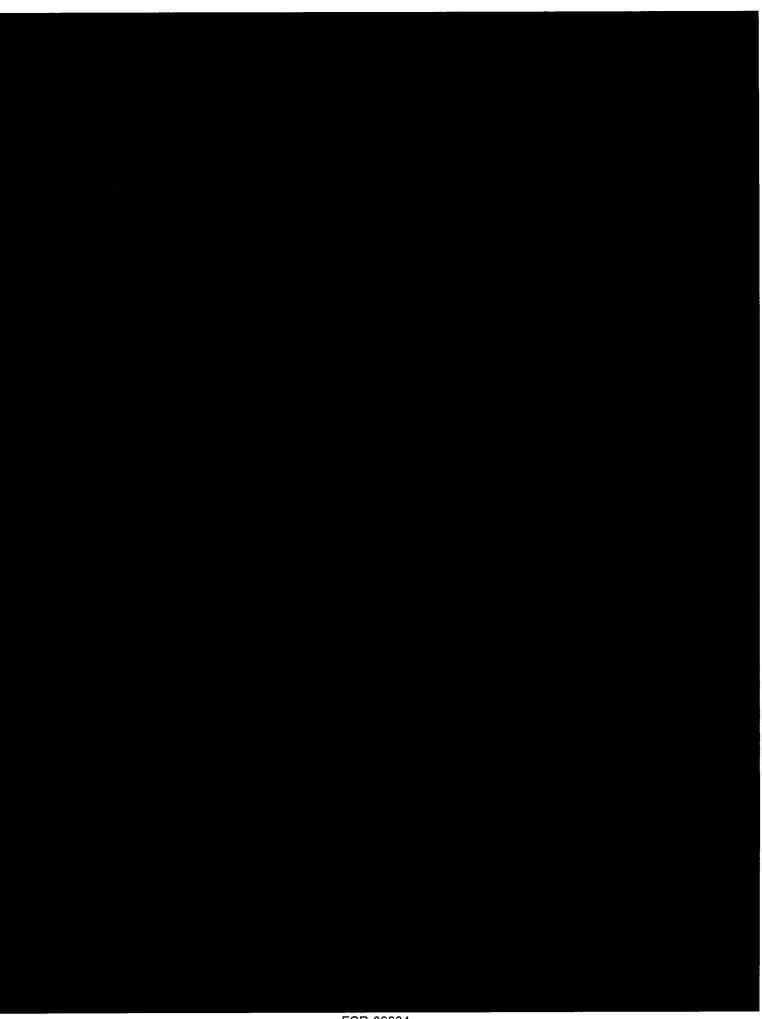


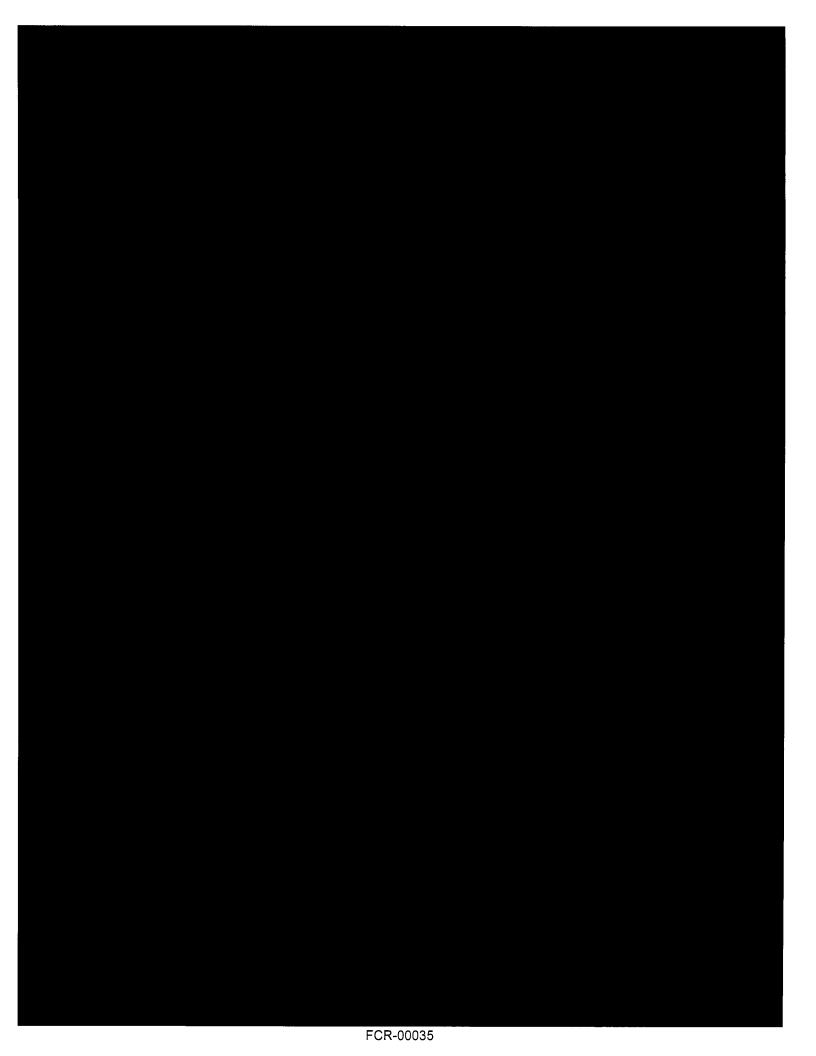












### **Conclusions**





• The hypothetical dispatch plan does not include assumptions regarding unit availability/reliability on liquid operation or forced outage events, security concerns and ending inventory levels.



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### **Conclusions (cont'd)**

- An additional volume of mmBtu/day (mmBtu/day schedule) would allow for the unavailability of approximately 3-4 simple cycle CT's on liquid fuel.
  - This additional volume would also allow the flexibility to move liquid operation throughout the simple cycle CT fleet on a daily basis to better manage liquid inventory.
  - The additional gas volumes will allow for higher capacity factors on FPL's most efficient combined-cycle units, potentially lowering overall fuel costs.
  - Greater flexibility in managing heavy oil inventory.
  - South Florida concerns FPL must have gas available to dispatch, if necessary, 12 gas-only peaking units at the Gas Turbine Power Park.
  - Oil inventories at the end of a ten-day event will be adequate to continue reliably meeting load and to build inventories back to preevent levels, assuming normal weather.
  - In order to compensate for these realistic concerns, additional natural gas availability during hurricane season should be obtained.

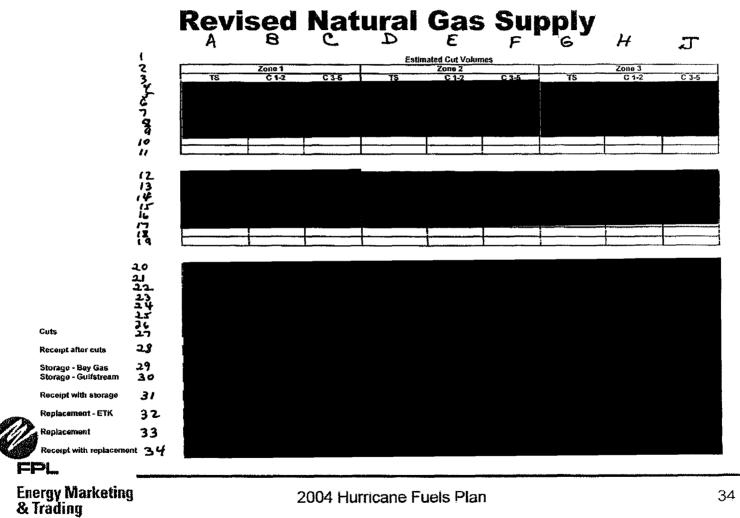


### Recommendations

73456	In order to provide greater natural gas supply reliability to cover a potential shortfall for the upcoming hurricane season and diversify our existing natural gas storage position, EMT plans to put in place two supplemental summer 2004 deals that will provide the needed incremental supply during times of supply disruptions.
78910	To diversify our existing Bay Gas position which provides of withdrawal capability, EMT will put in place a Gulfstream storage position and a baseload gas supply deal for
11	The Gulfstream storage will provide delivery diversification.
13 14	assistance in daily system balancing. The deal, which is a baseload supply deal which contains contract language modifications to provide a firmer deliverability, will provide a reliable source of onshore gas during offshore supply disruptions

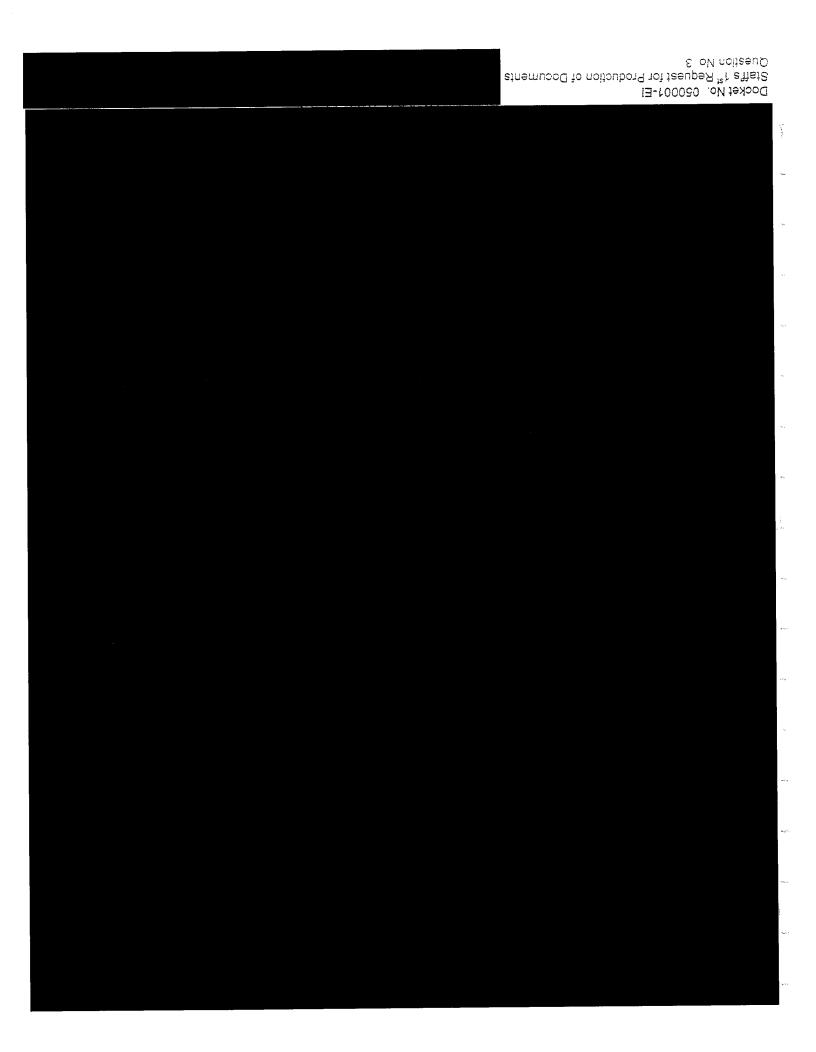


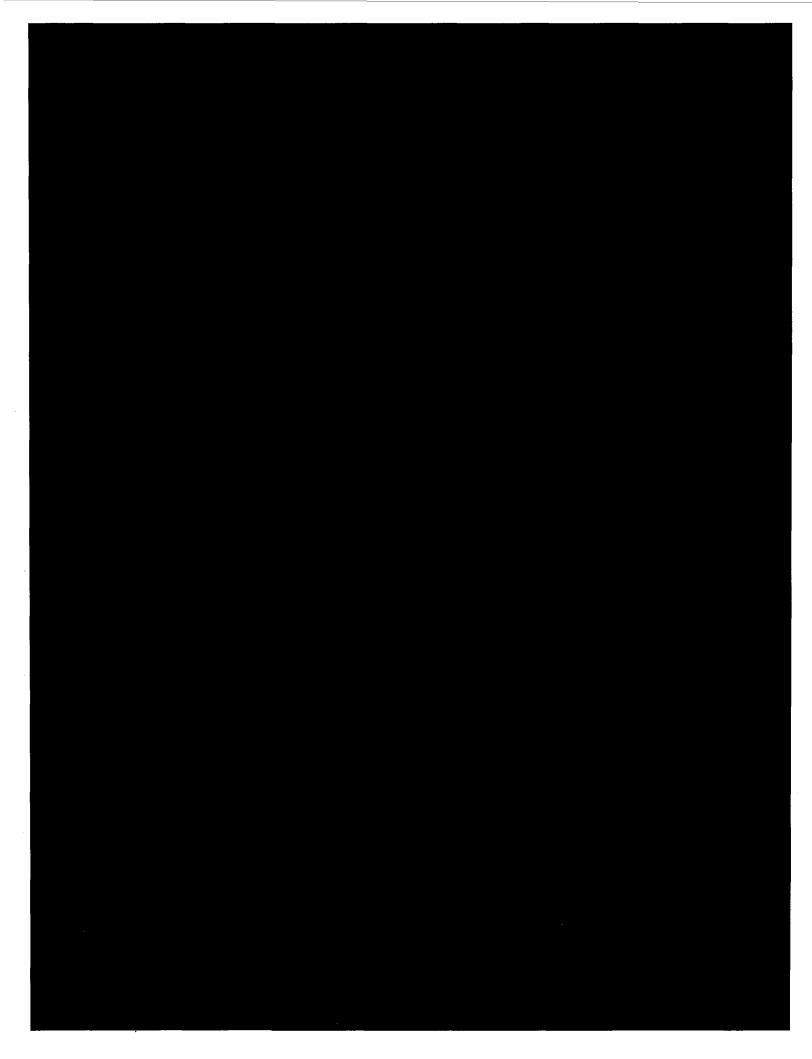
### **Recommendations** Request for Approval for 2004 Hurricane Plan 2 3 Summary of the supplemental deals as follows: Gulfstream ( Park ) Storage 5 Maximum Park Quantity: FCR-00039 Term: Rate: **Total Cost:** 10 11 Quantity/Price: 12 13 14 Term: Total Cost: 15 16 17 Energy Marketing & Trading 33 2004 Hurricane Fuels Plan

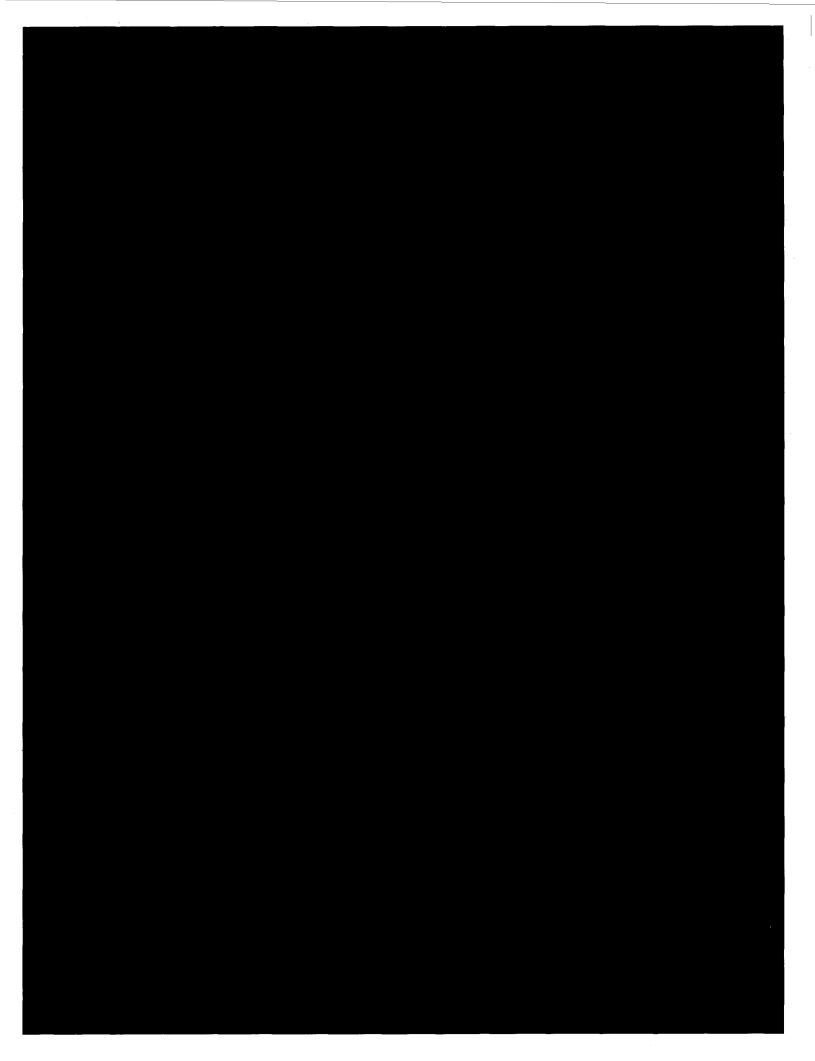


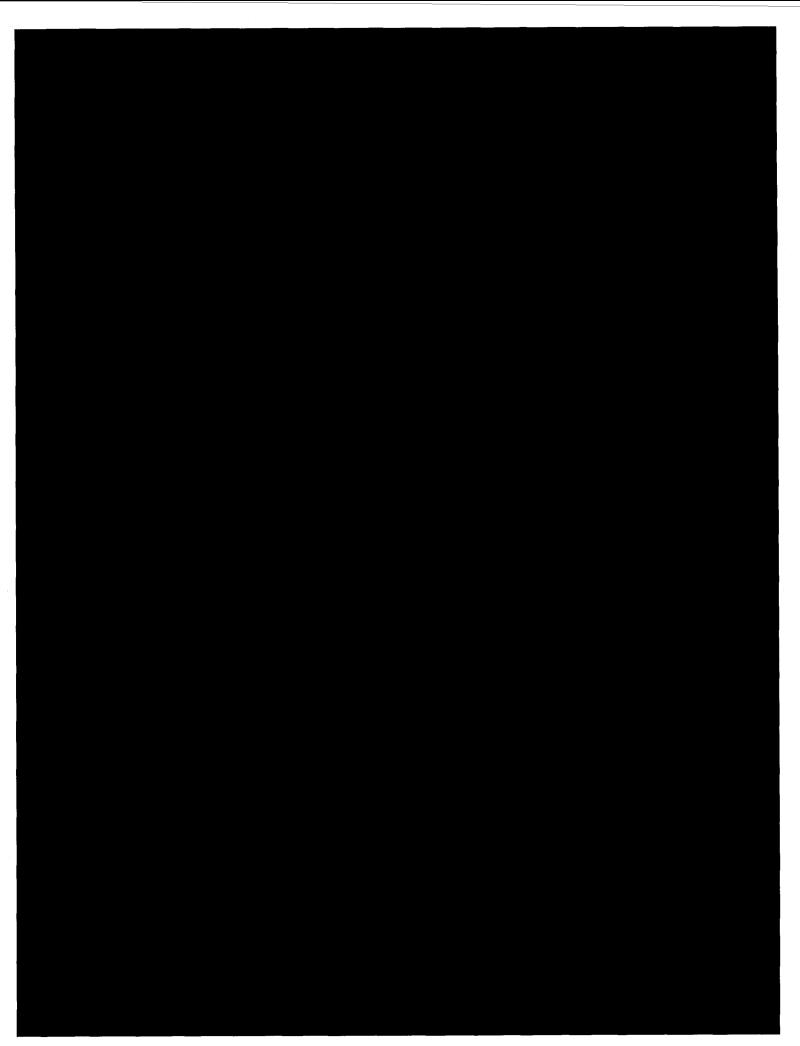
2004 Hurricane Fuels Plan

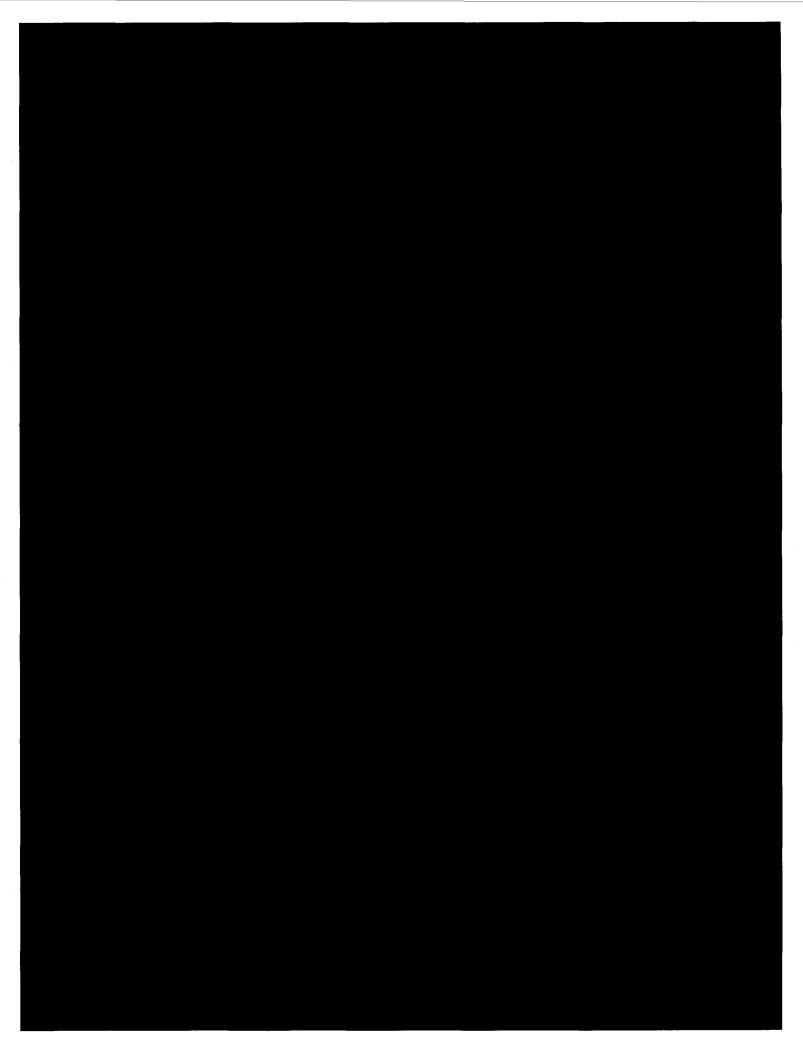
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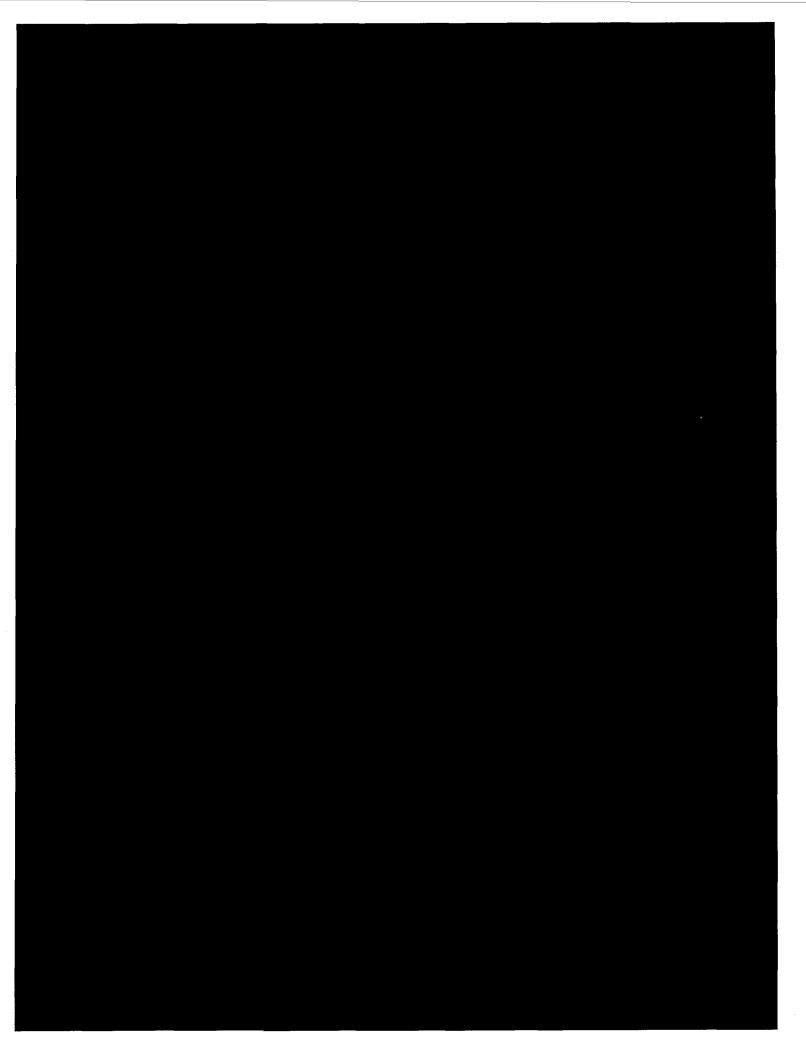


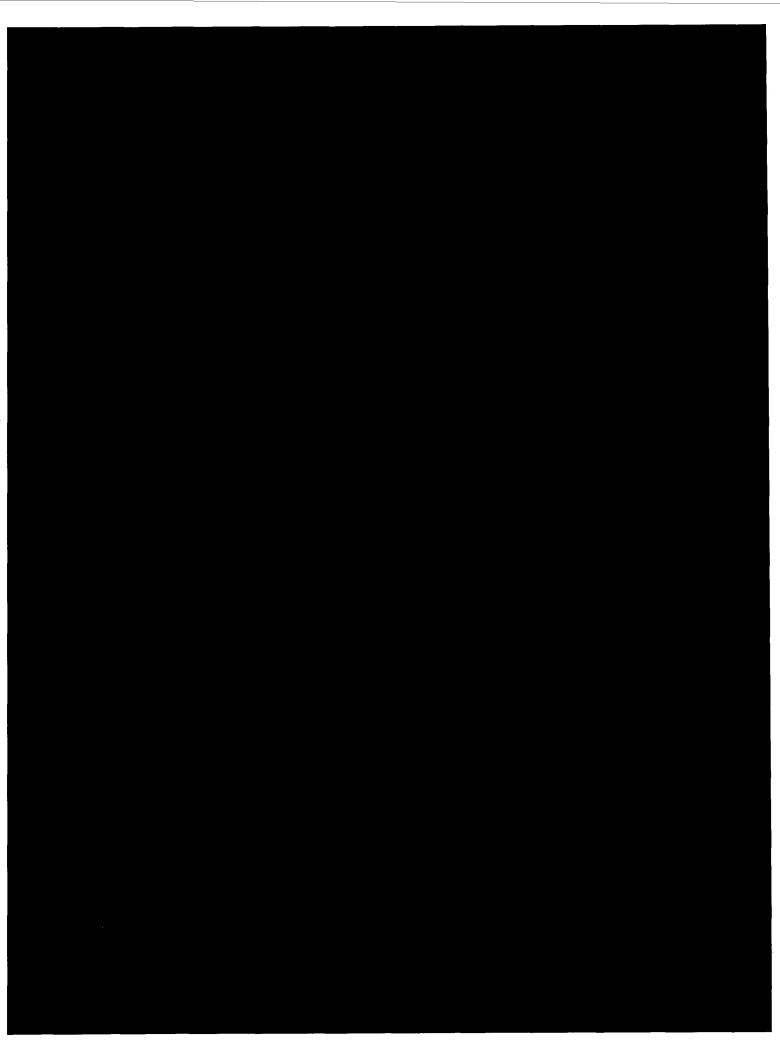


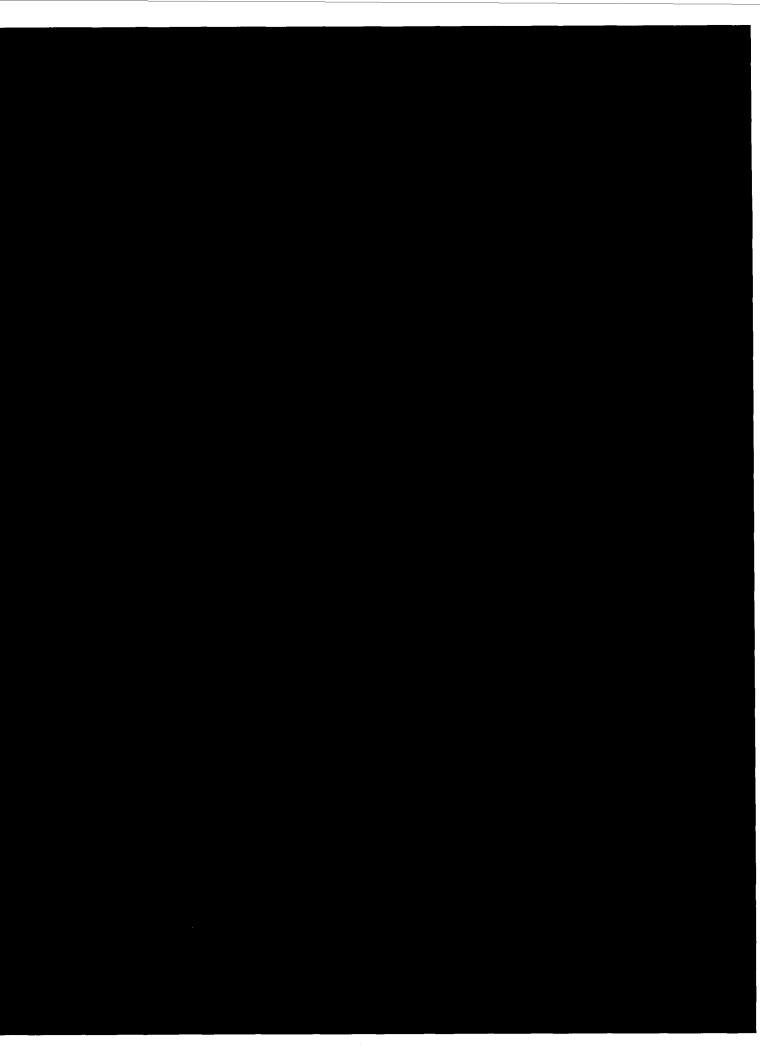


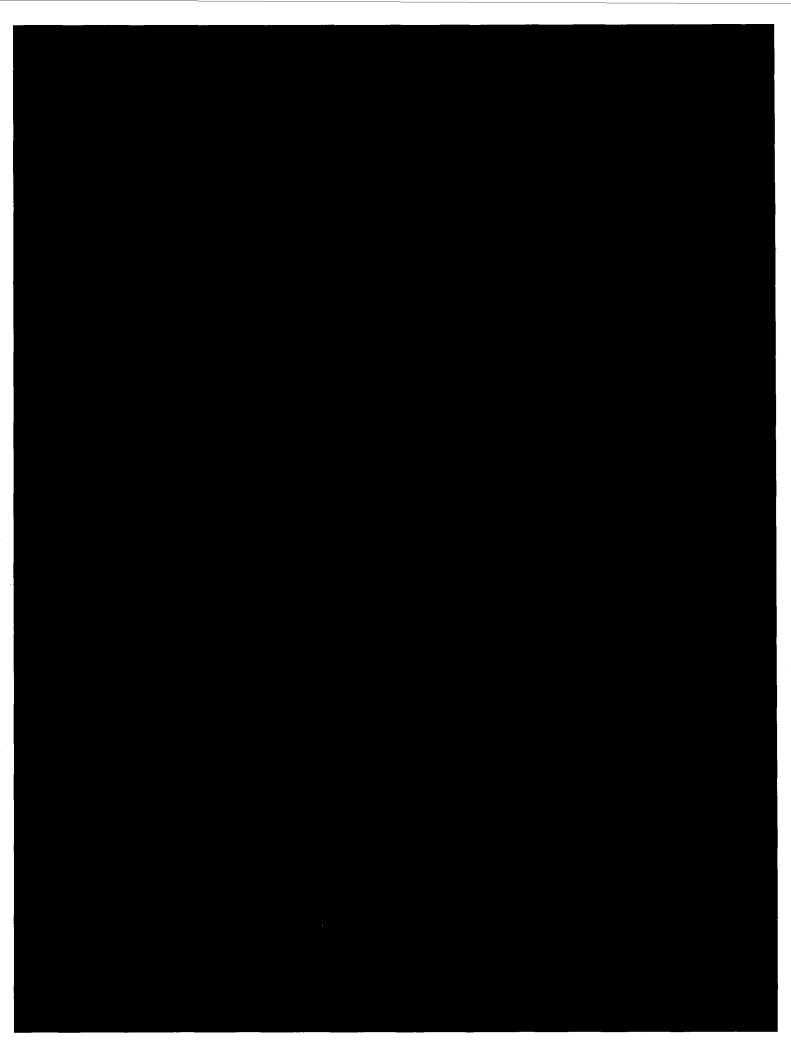


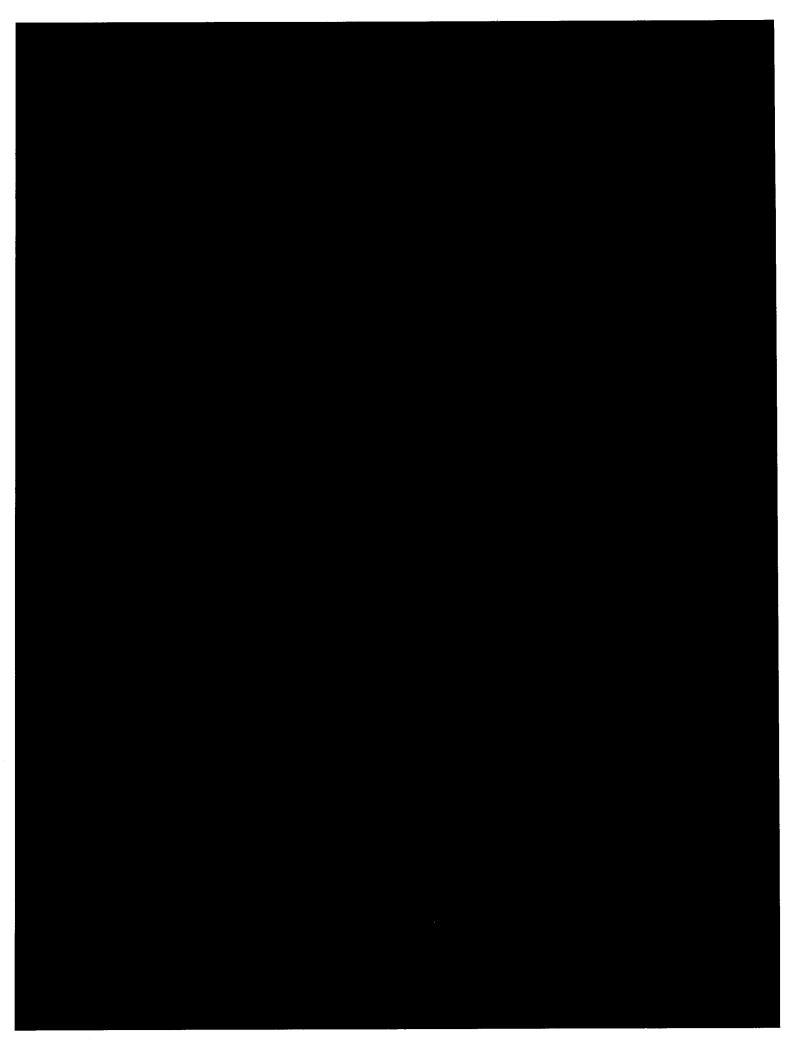


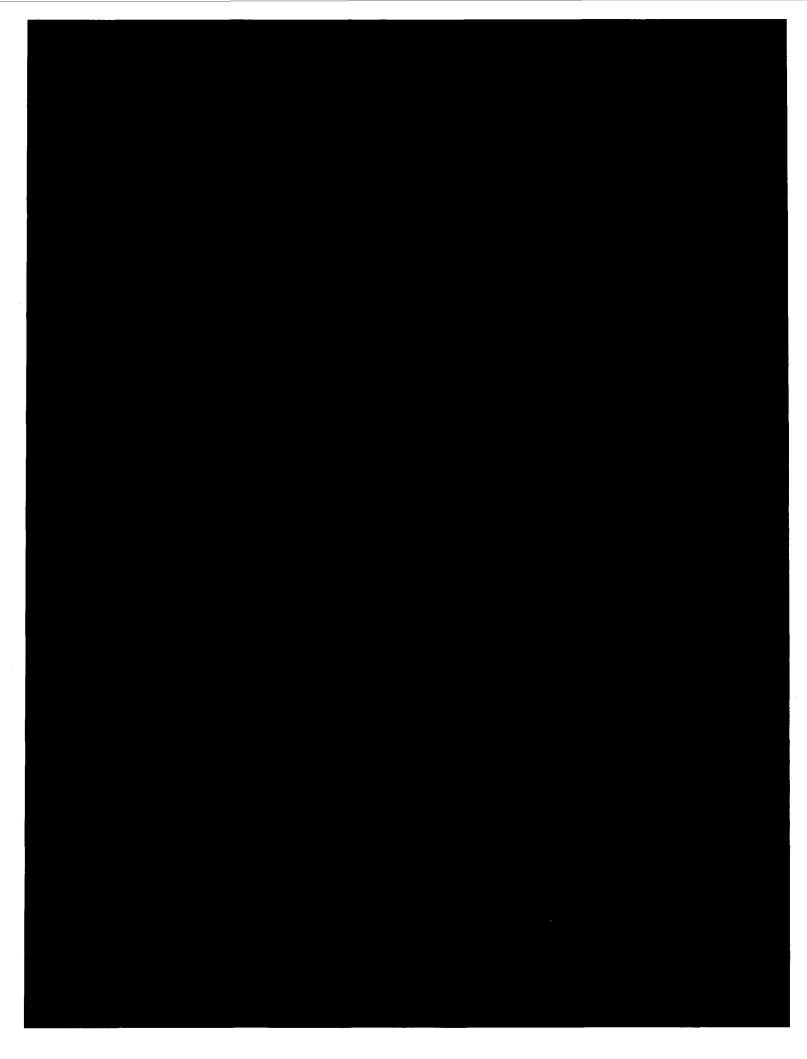


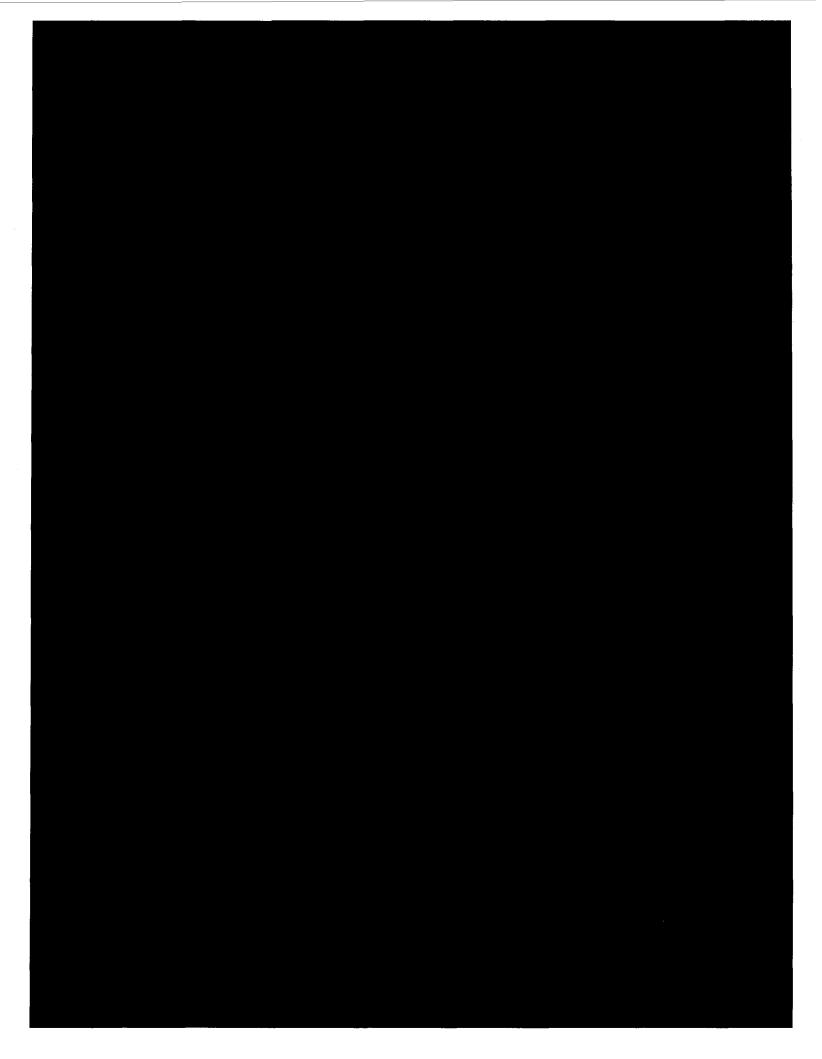


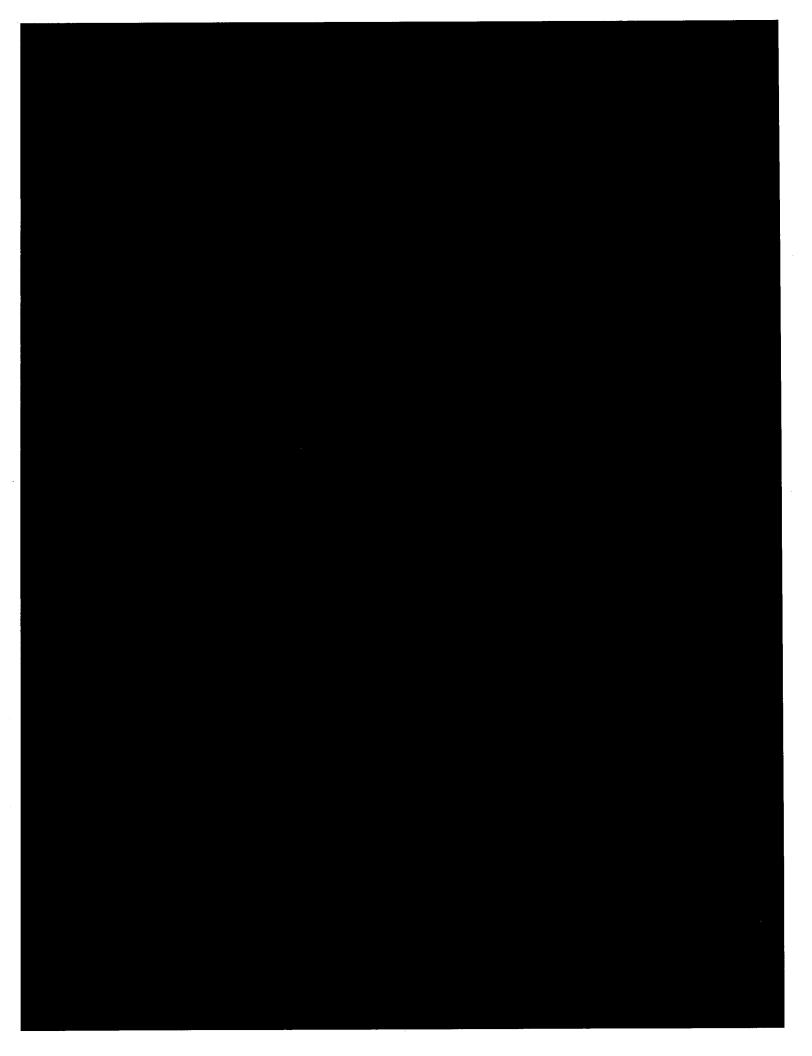


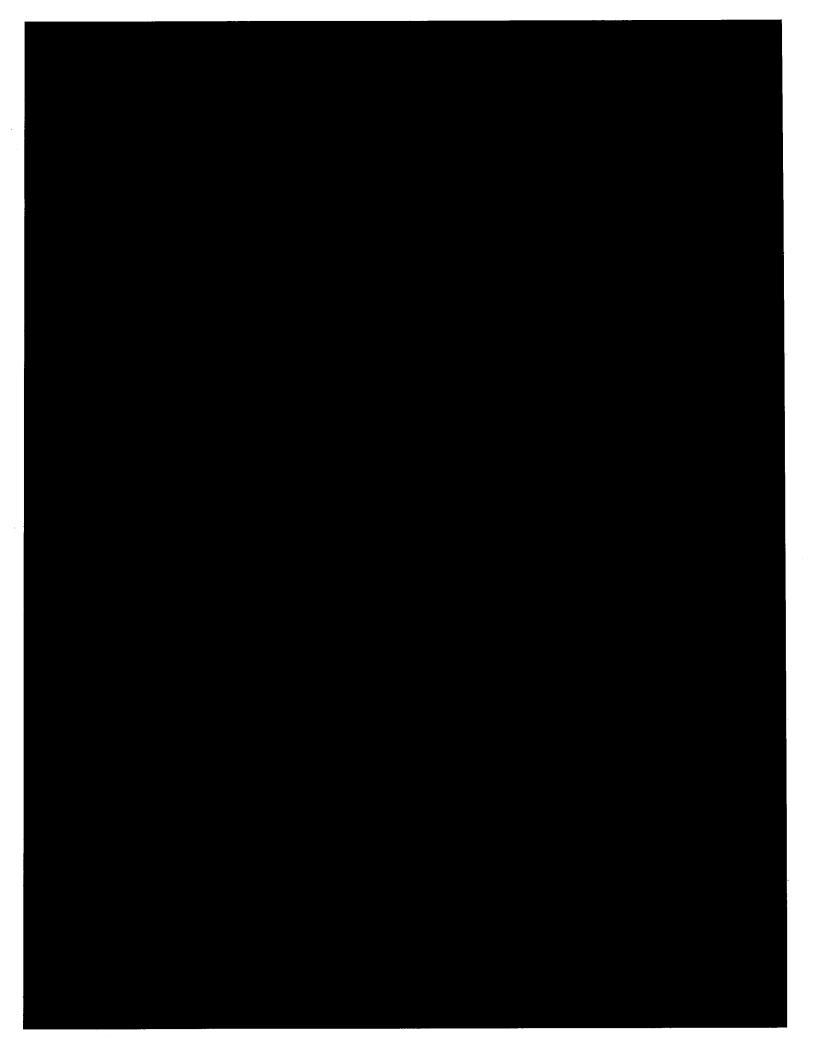


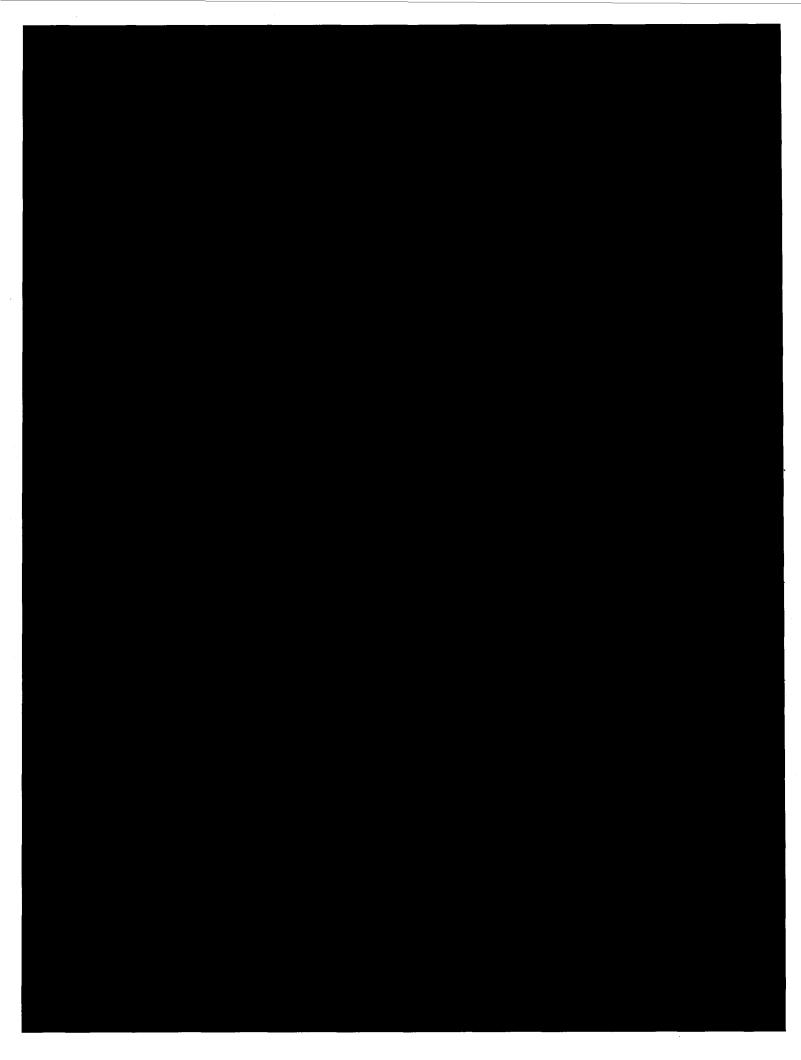


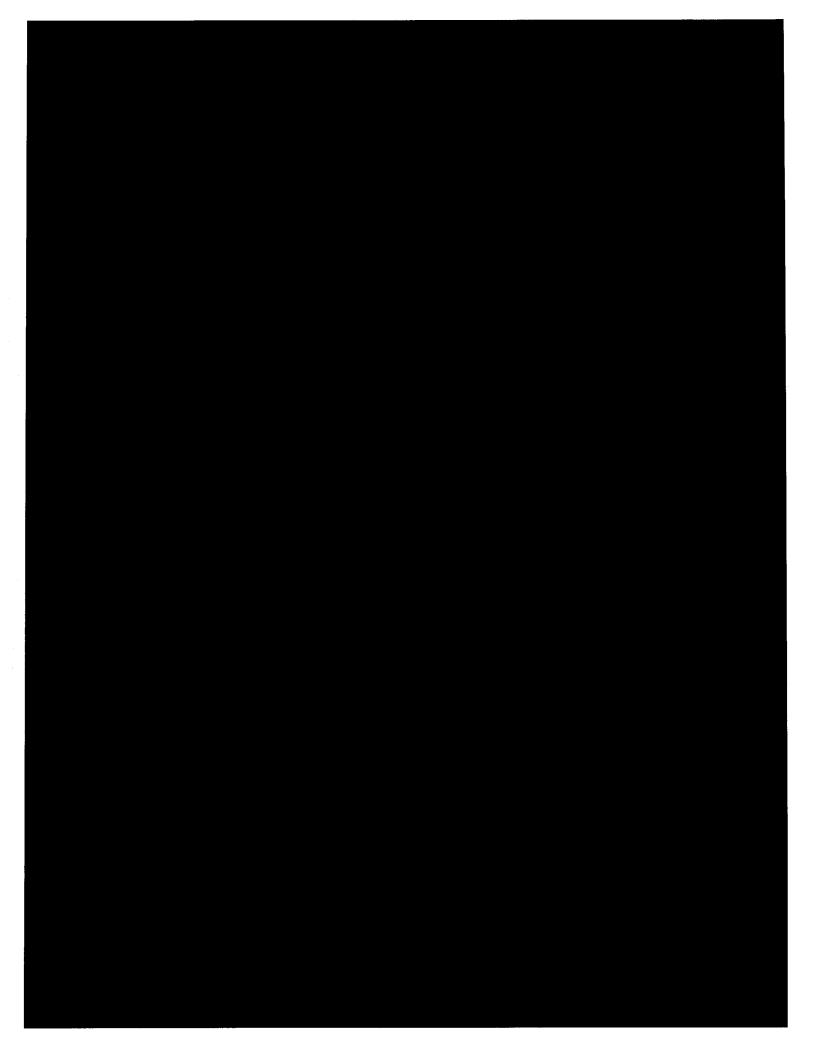


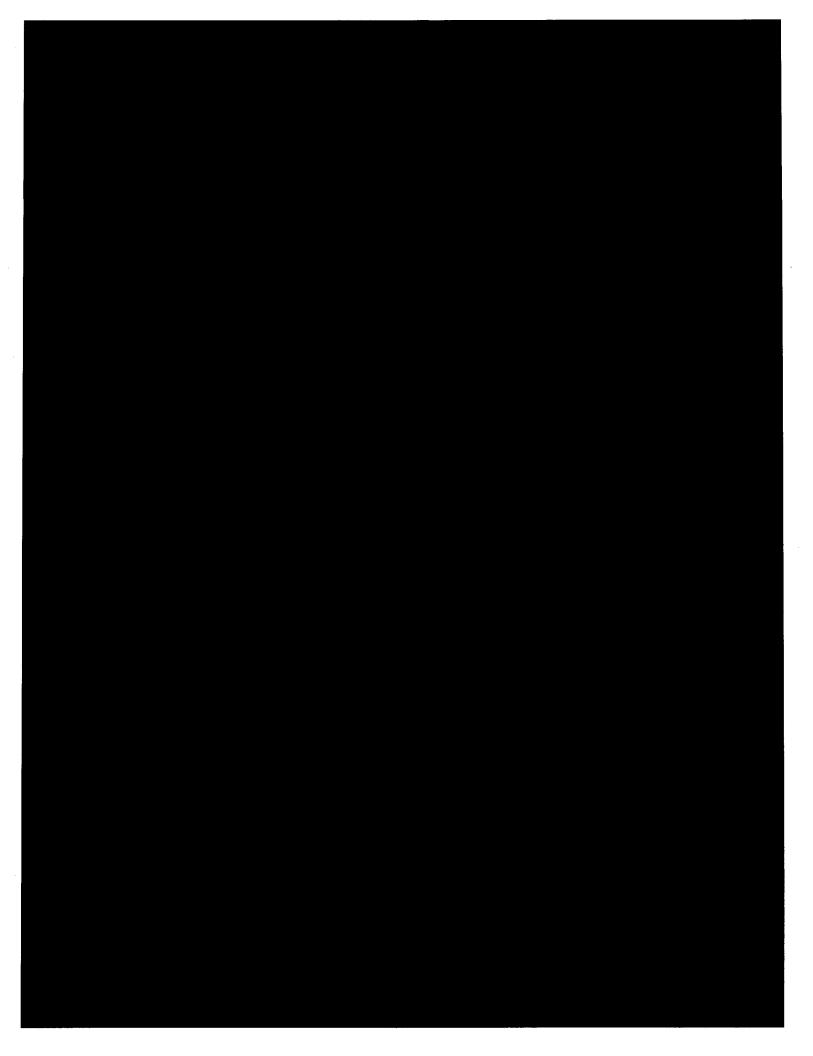


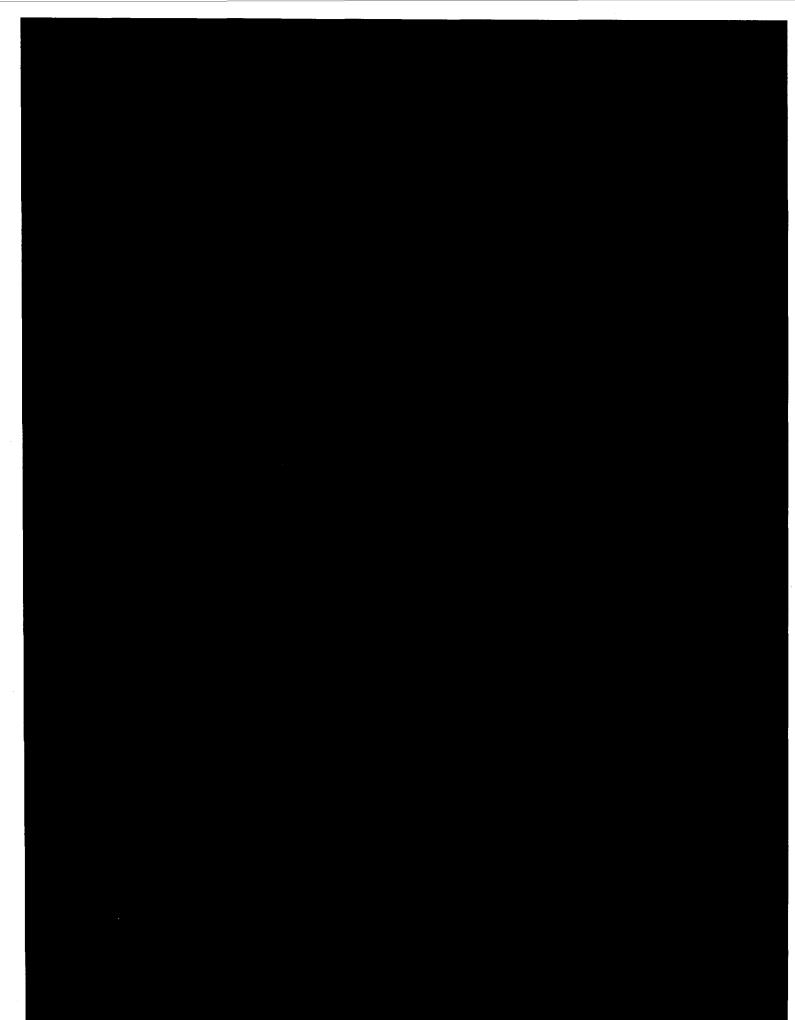


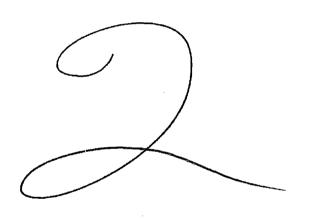




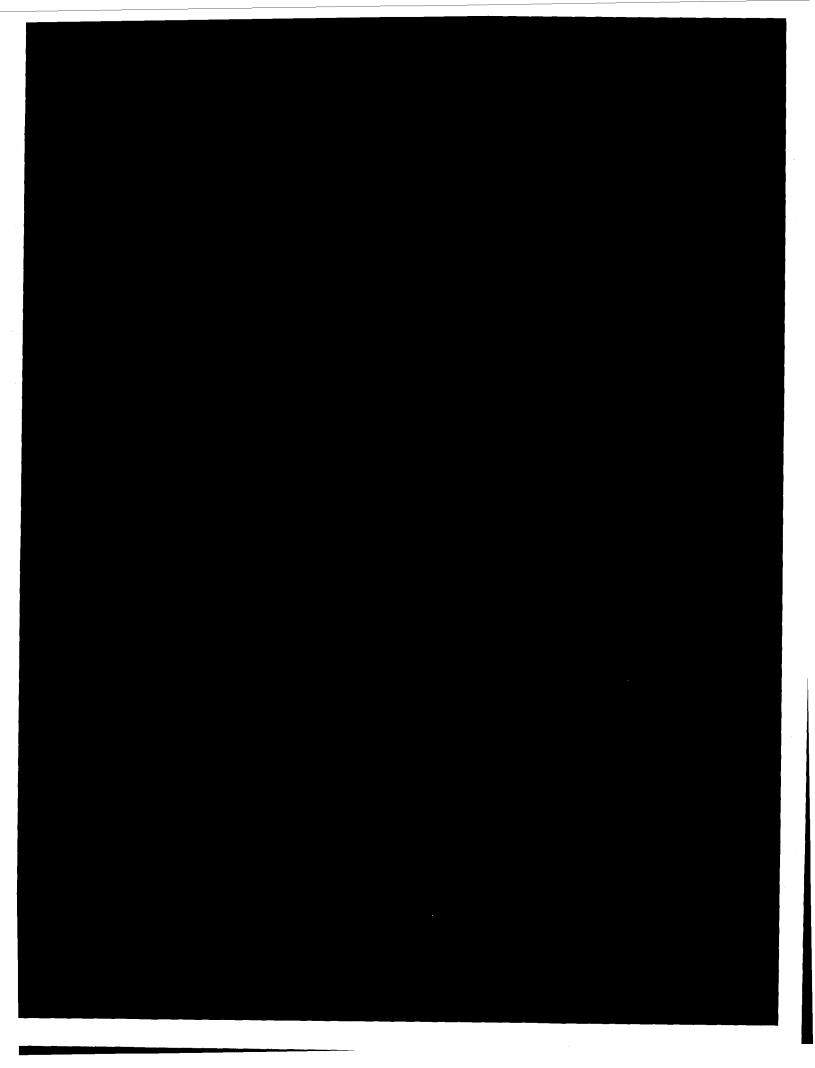


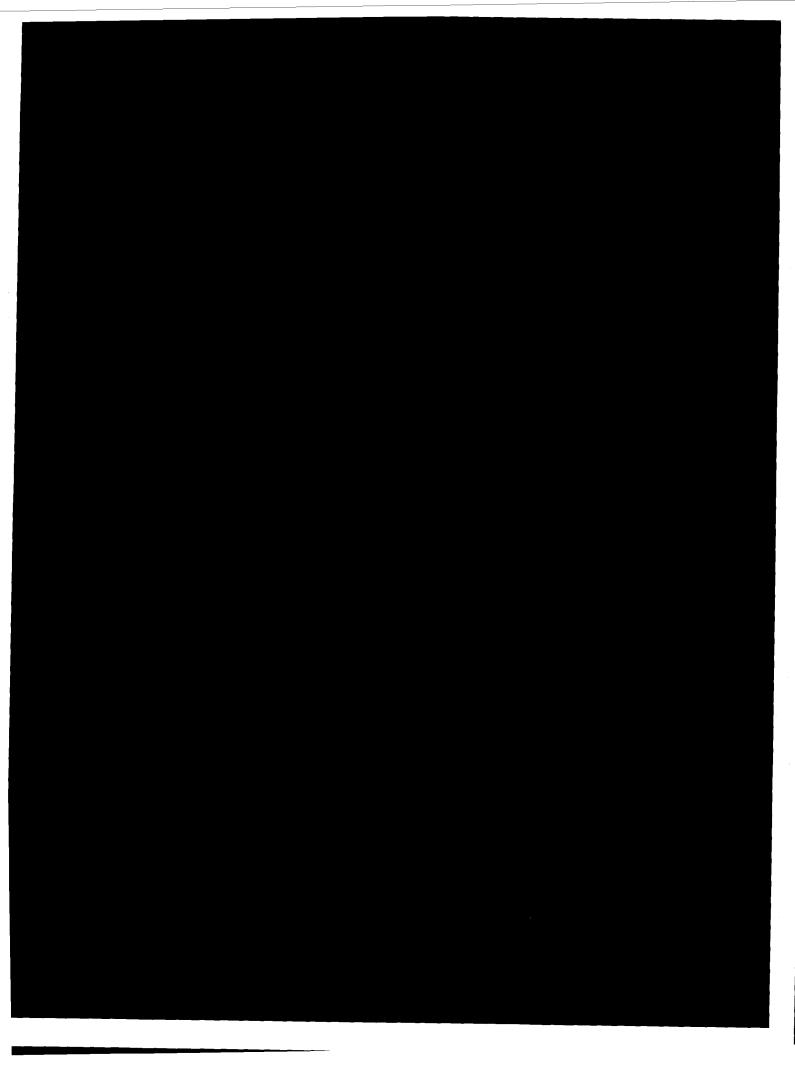


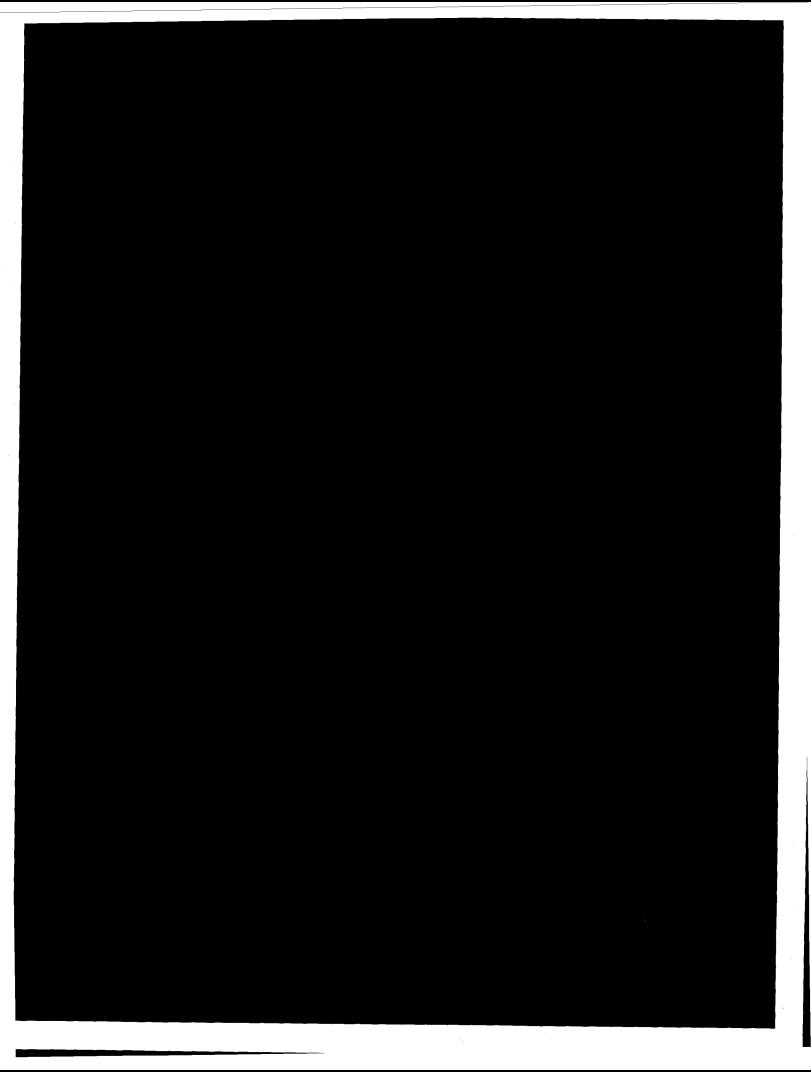


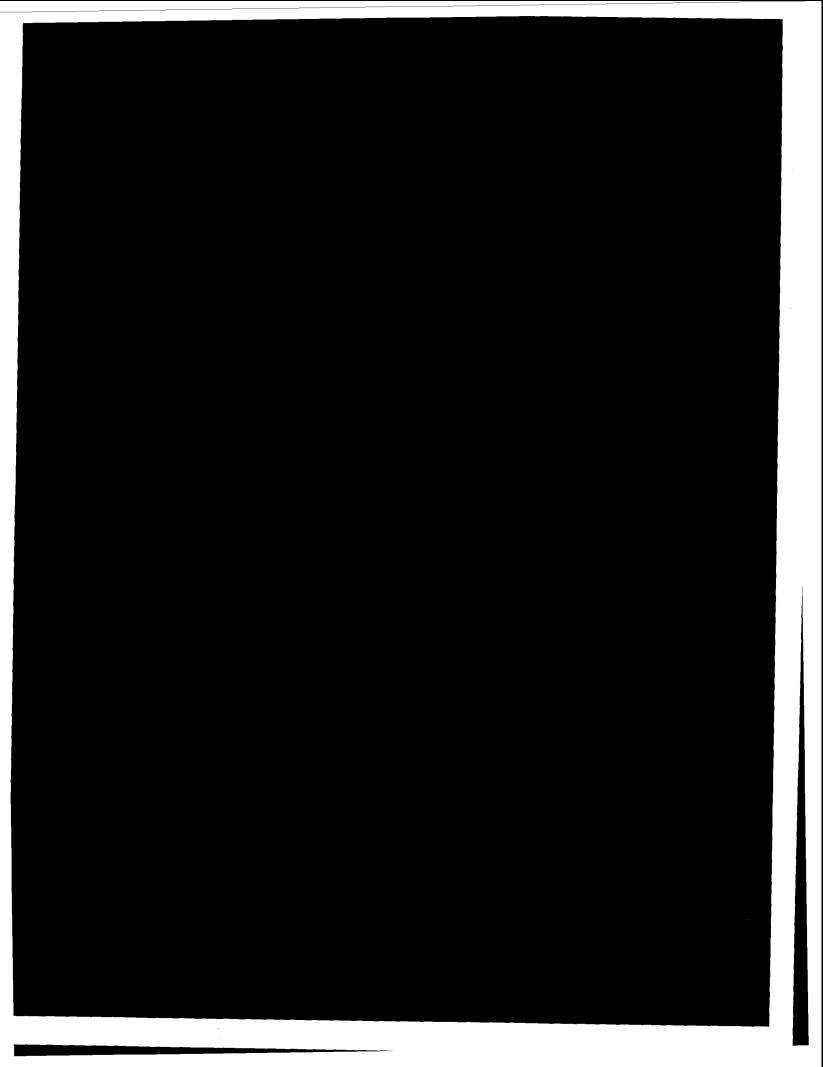


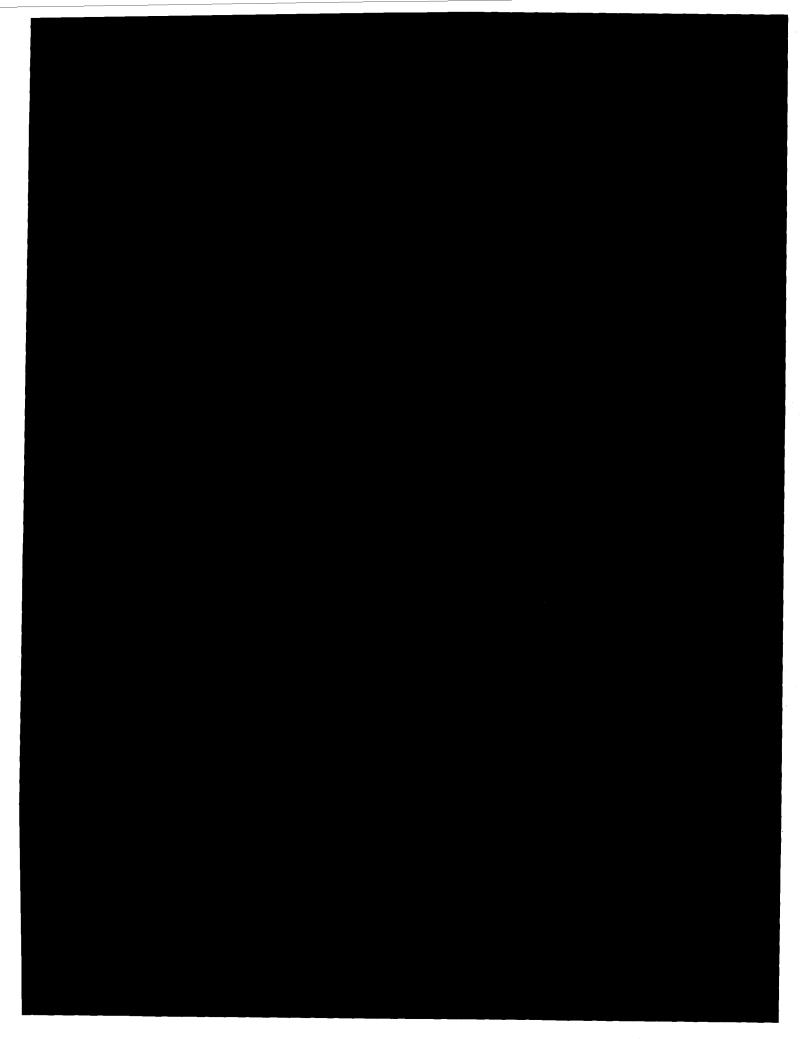
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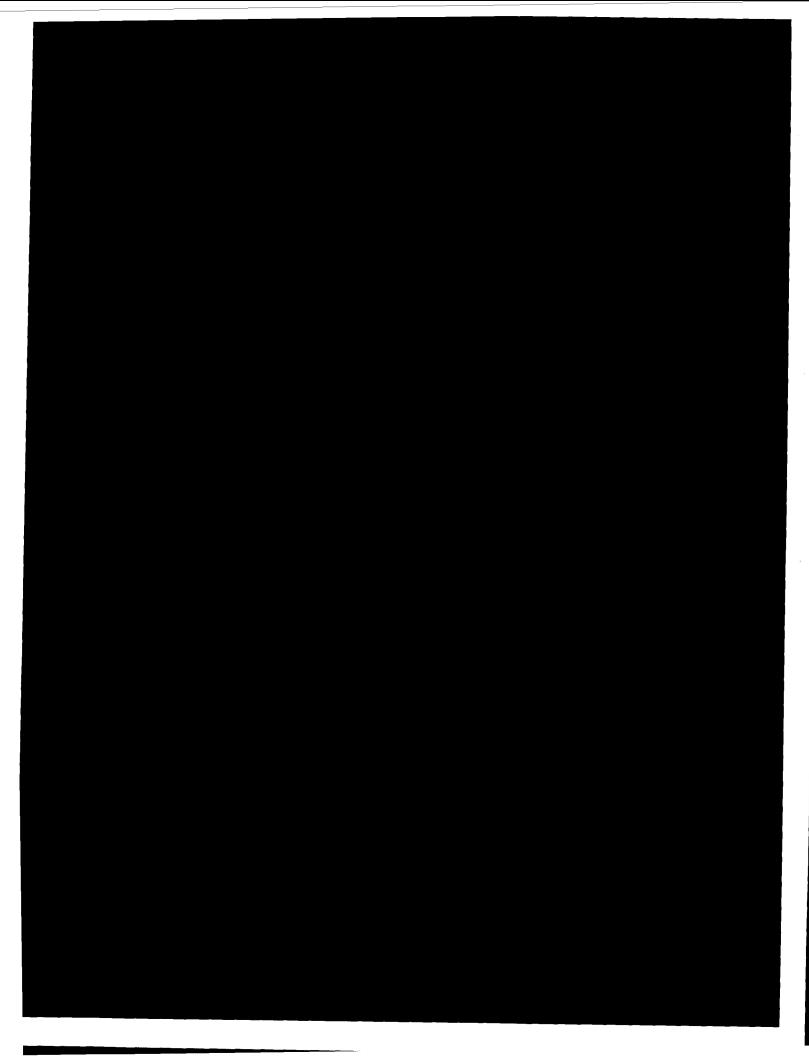


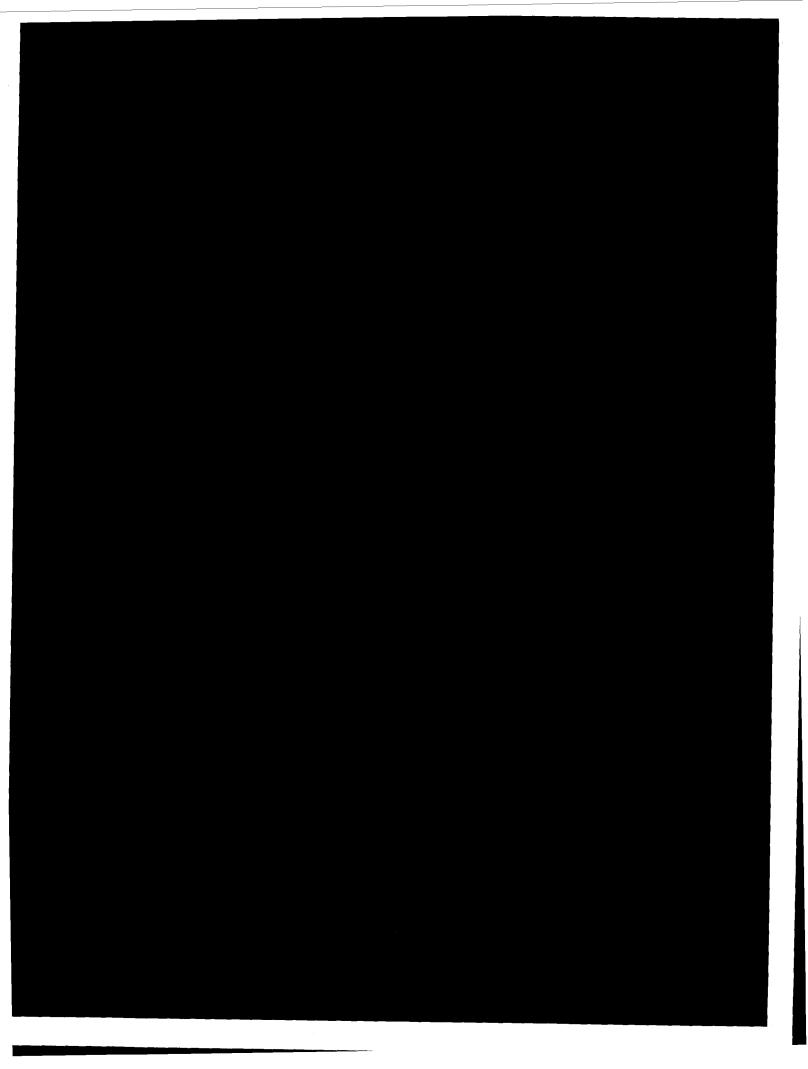


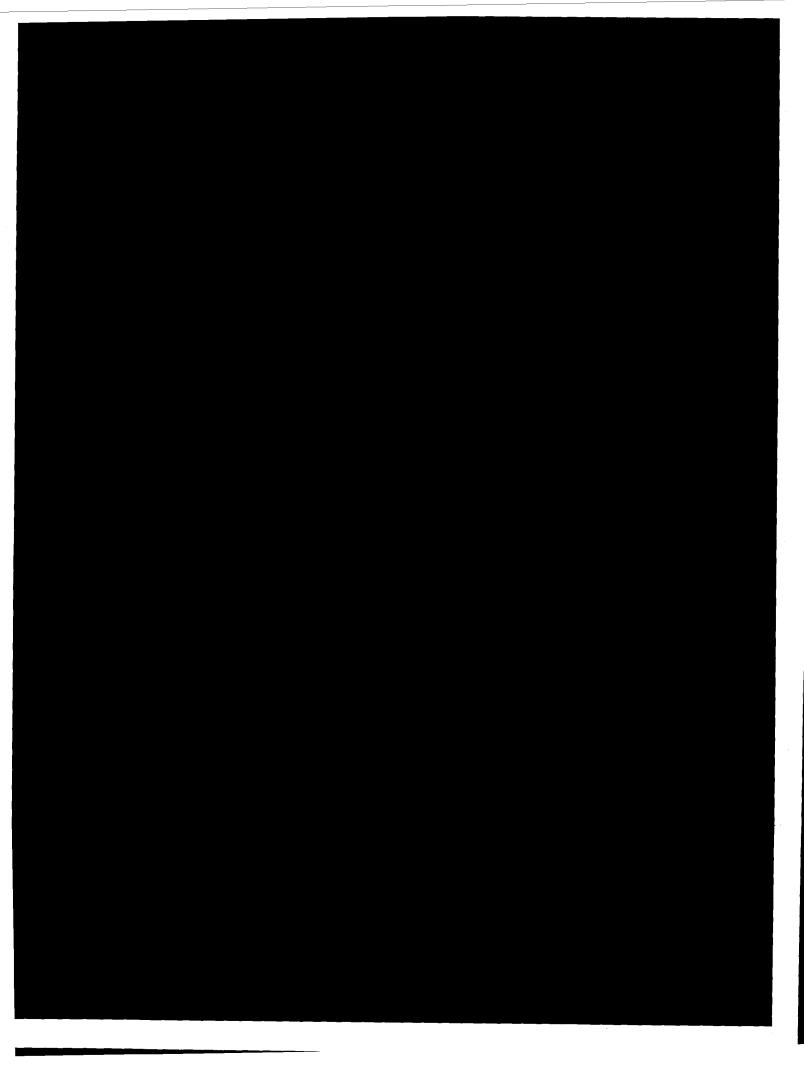


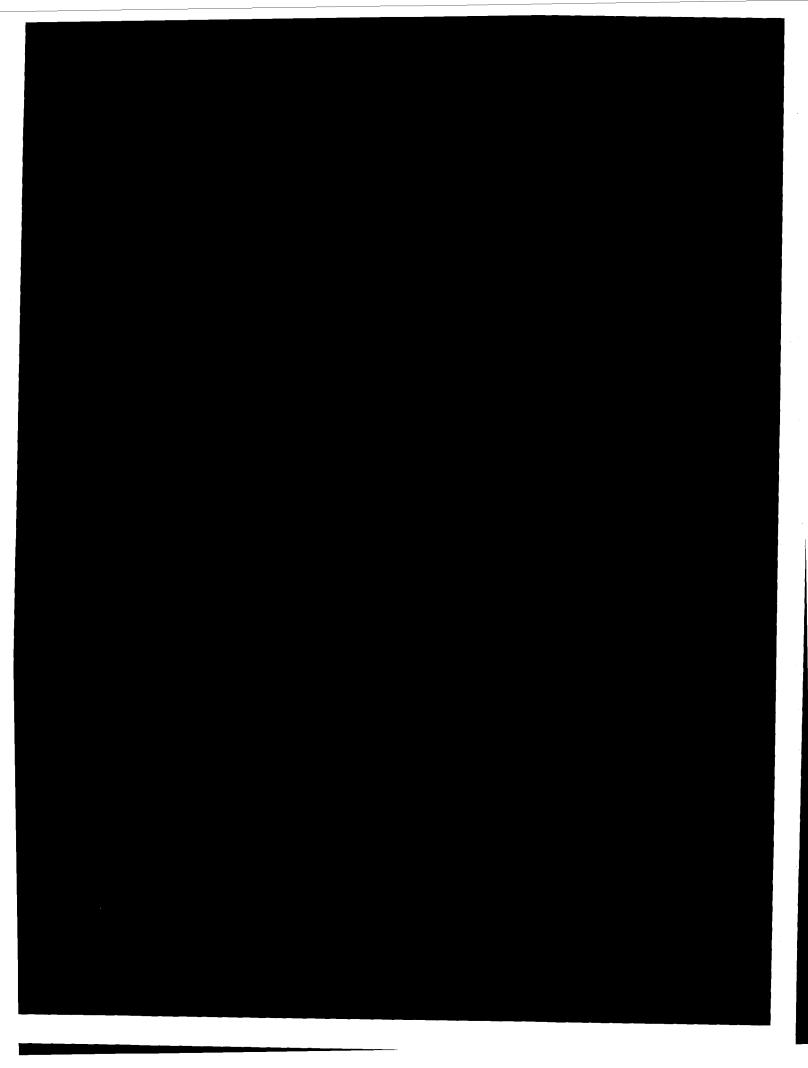


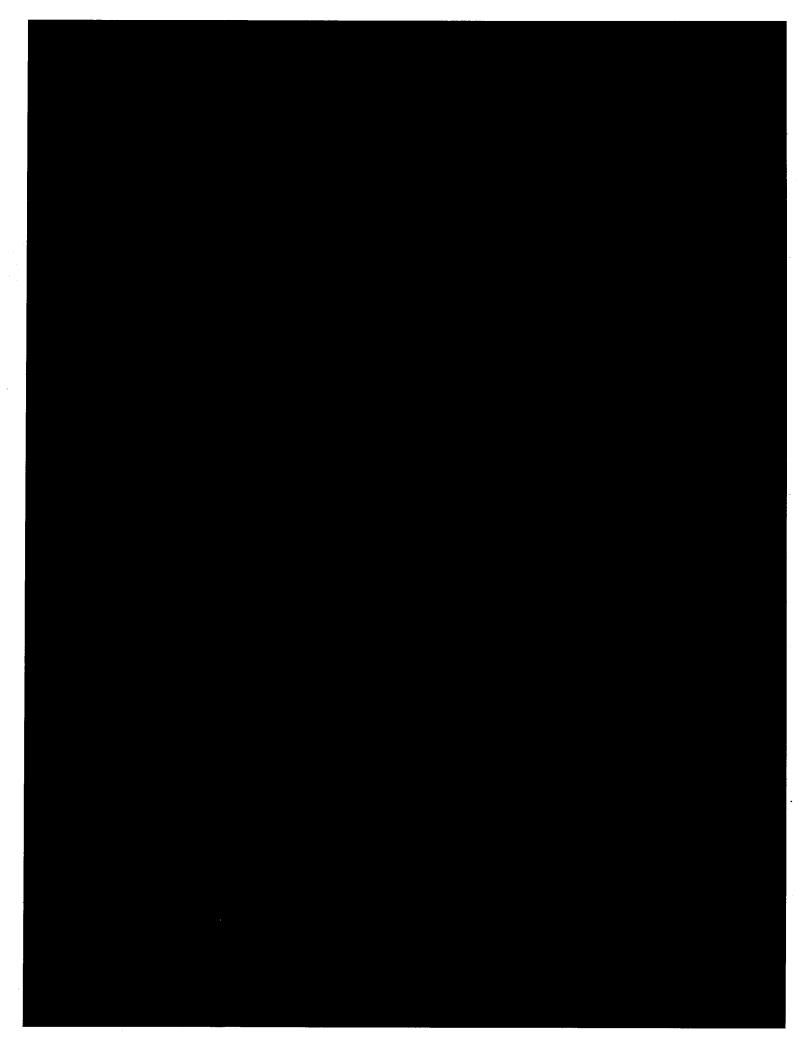




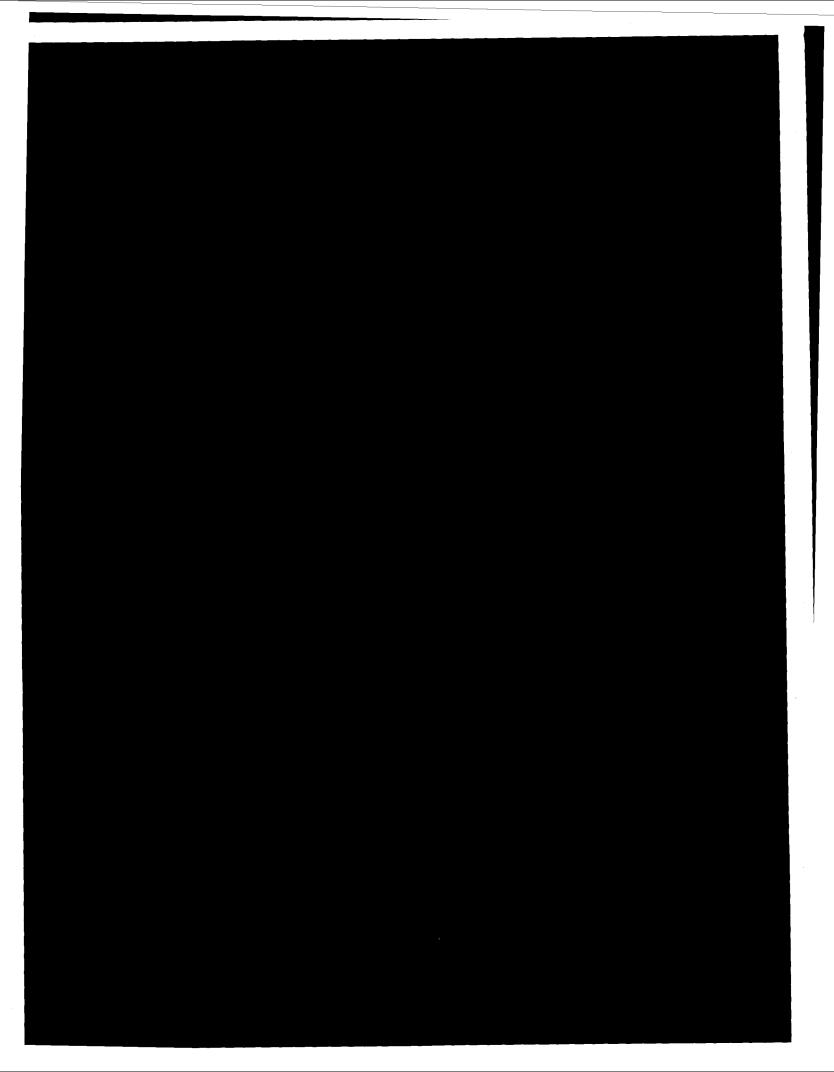


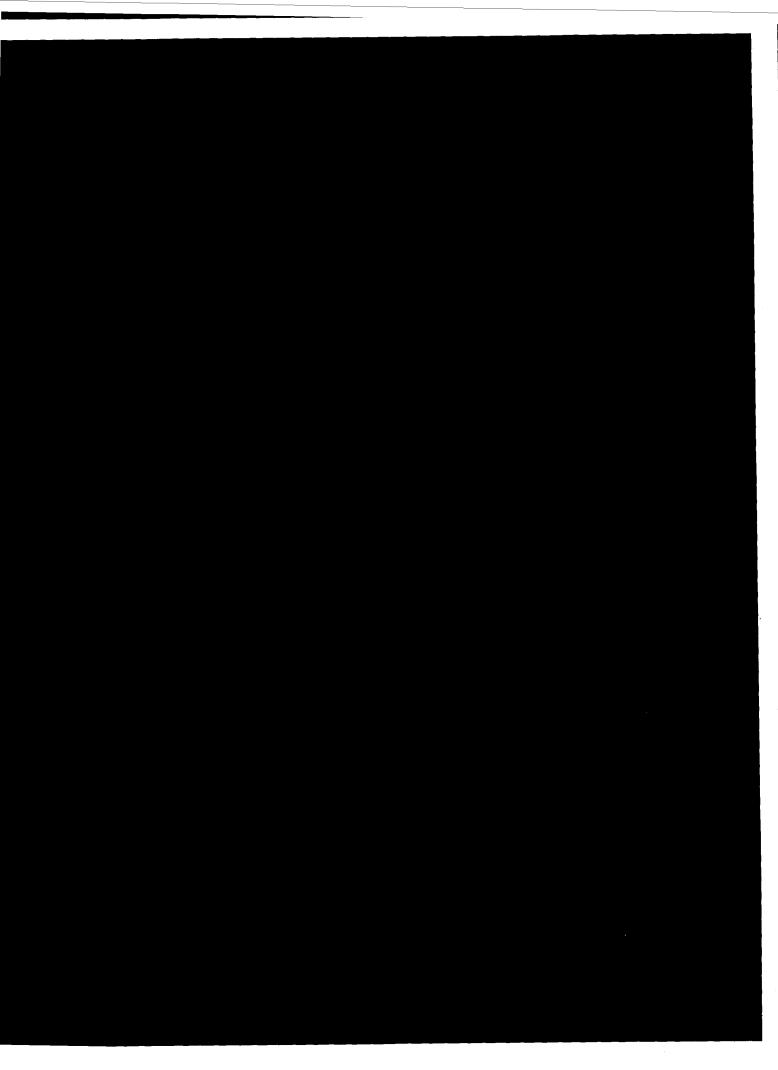


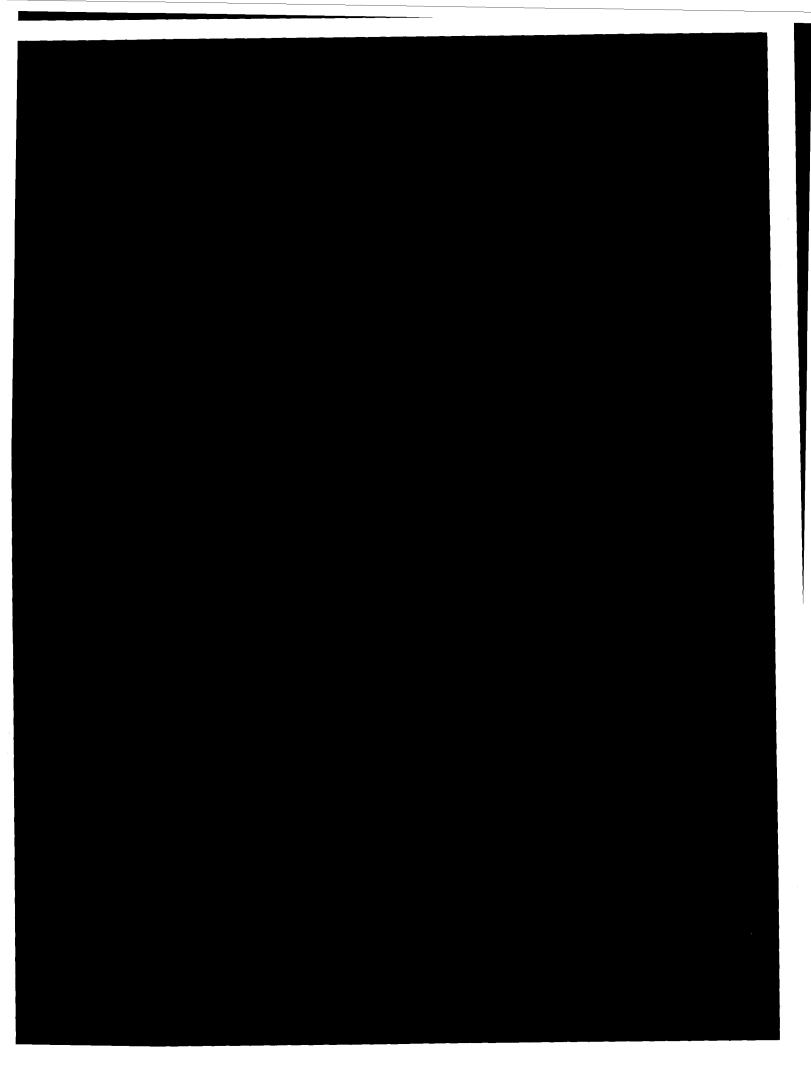


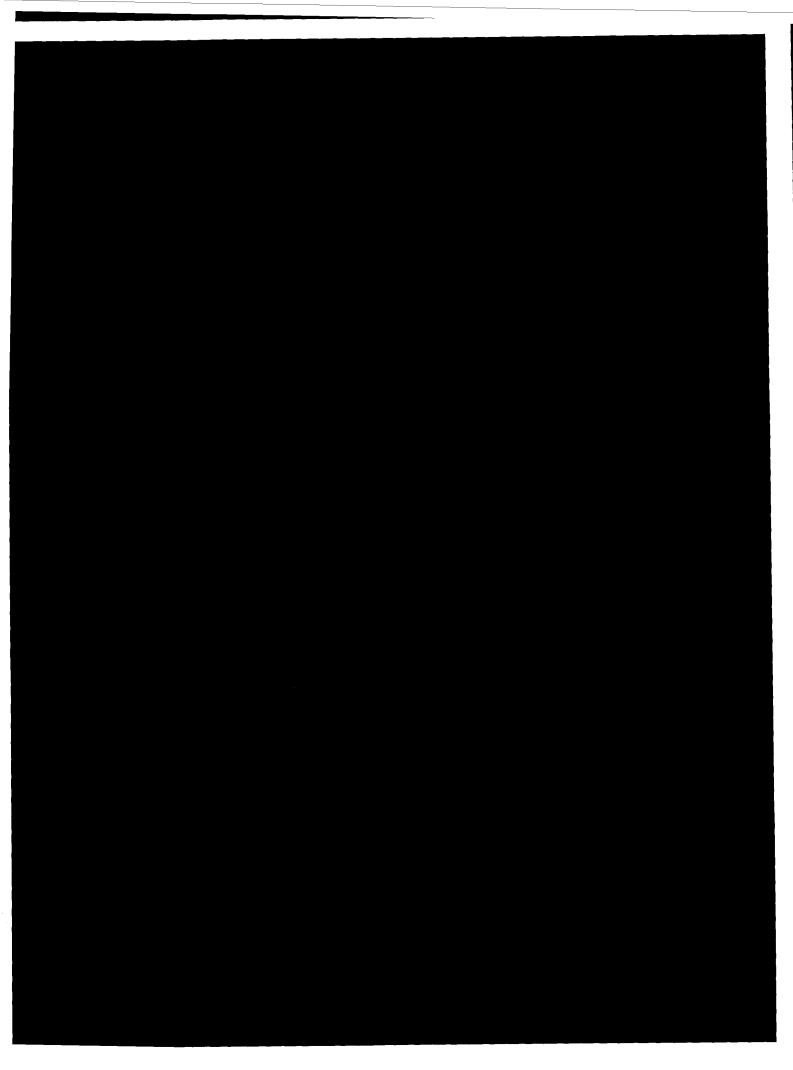


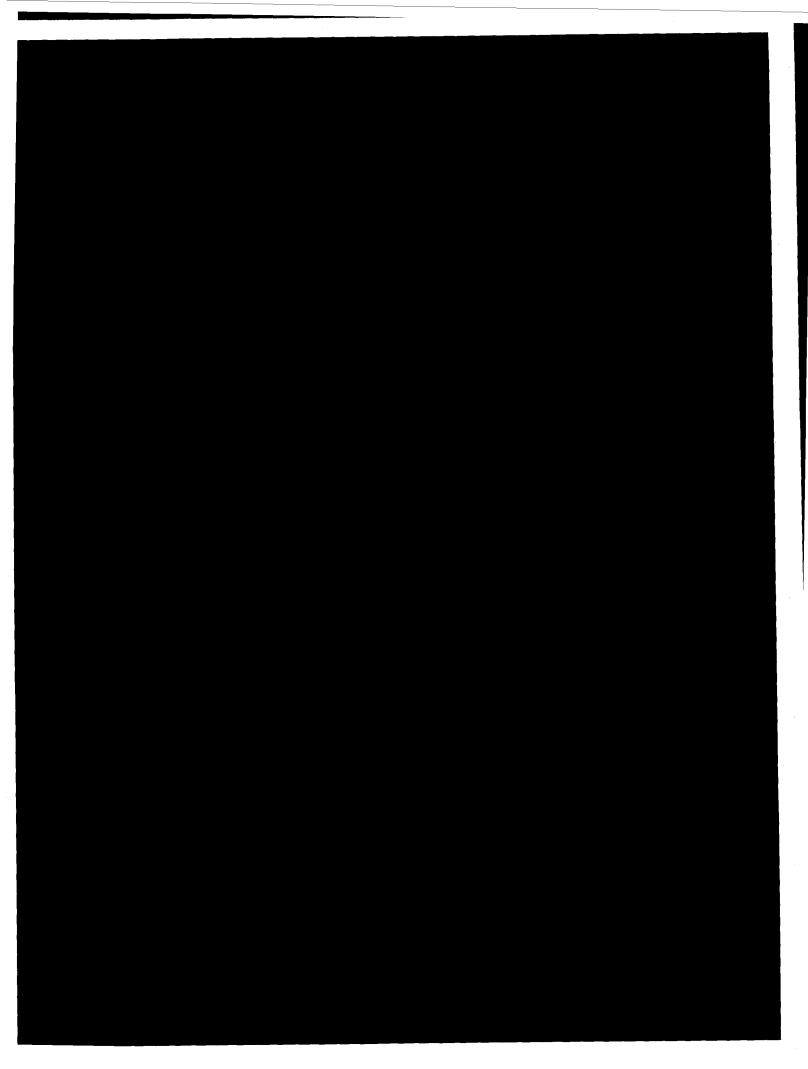


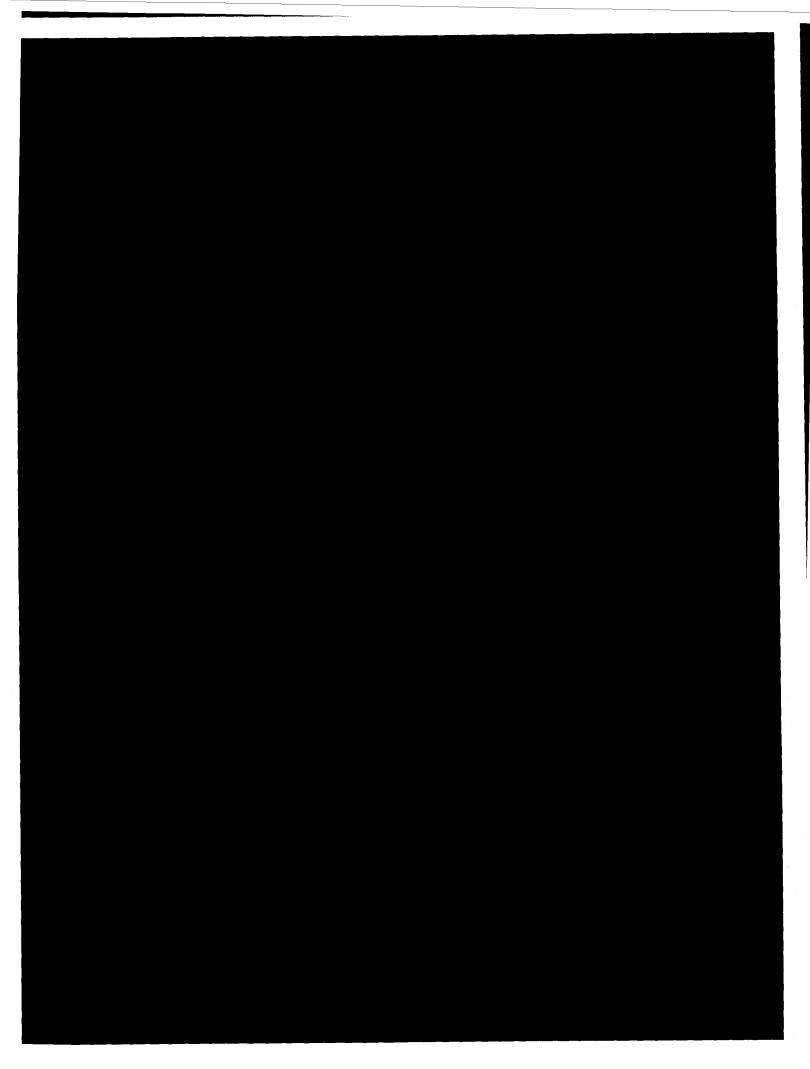


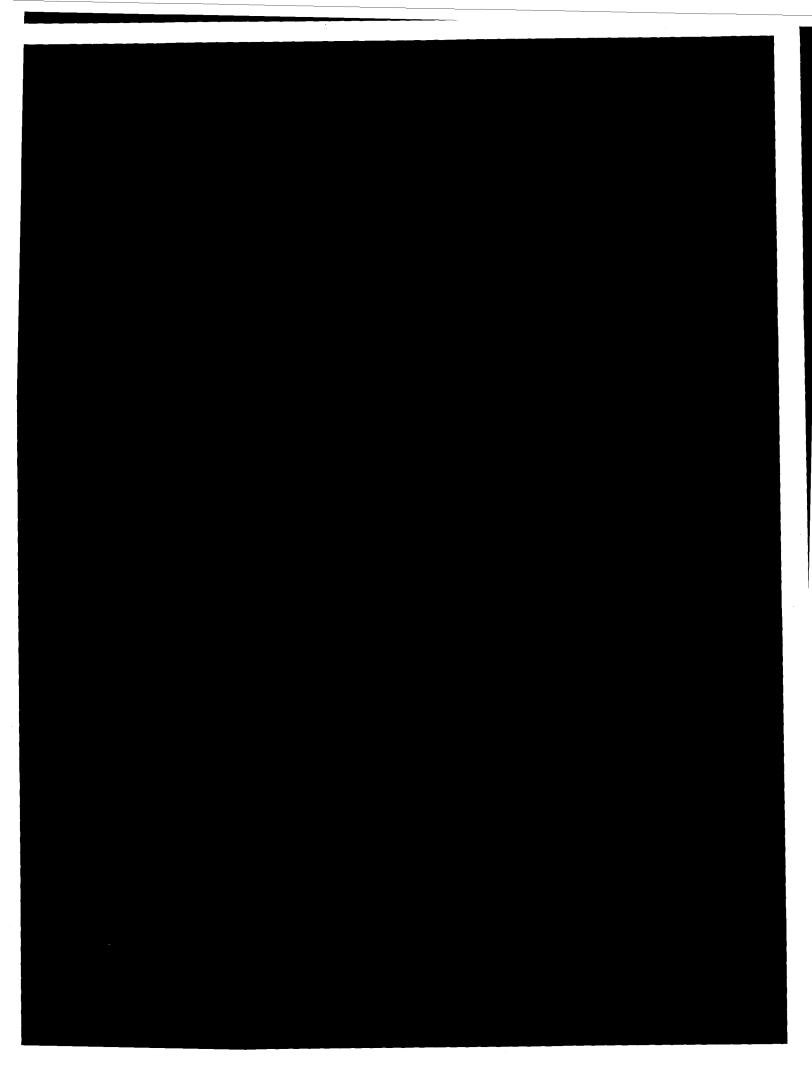


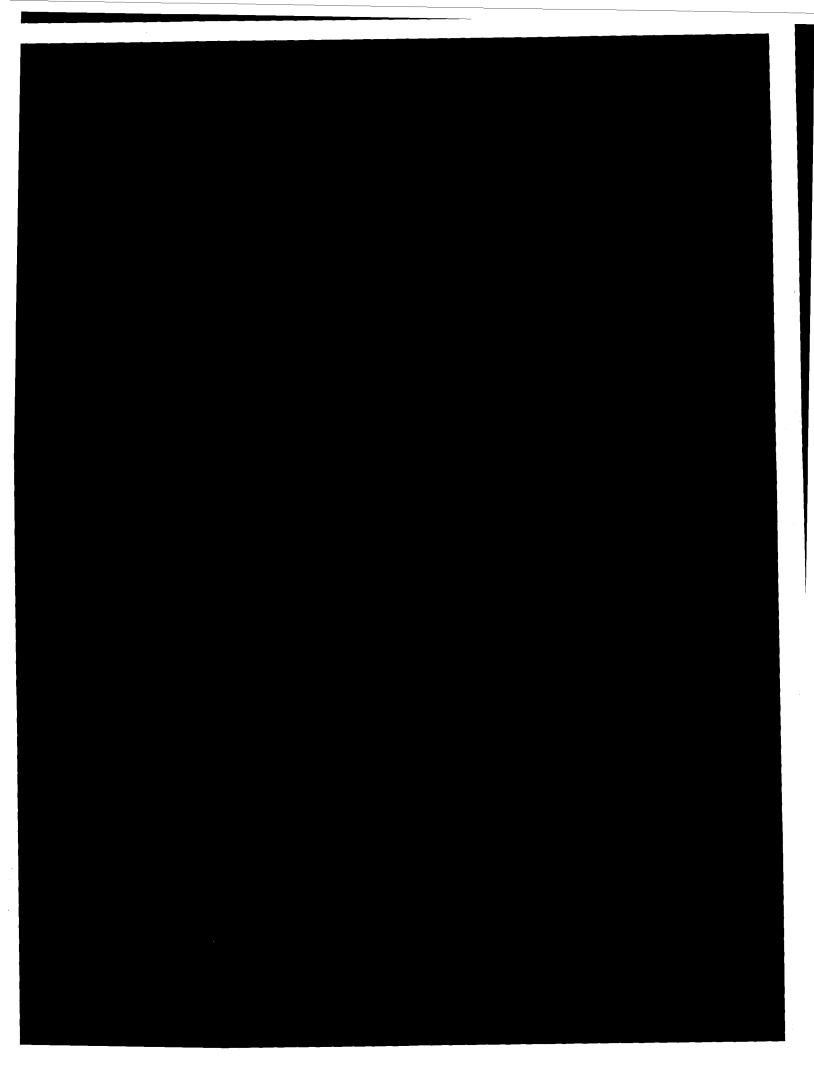


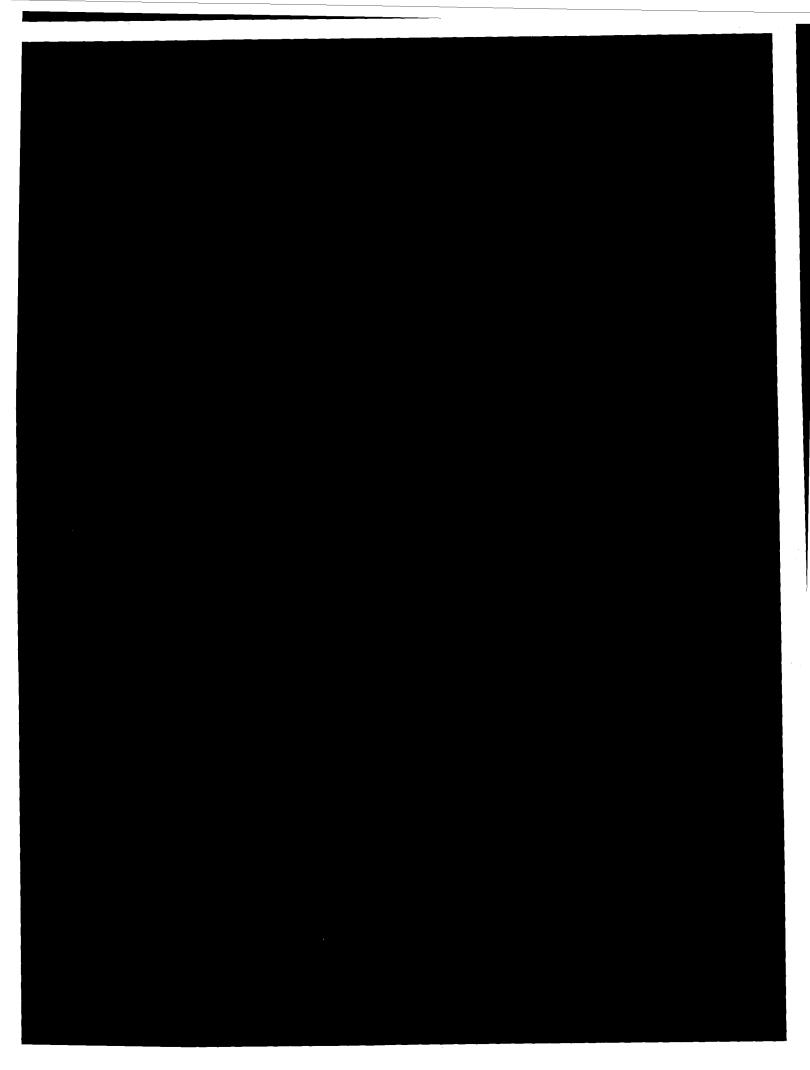


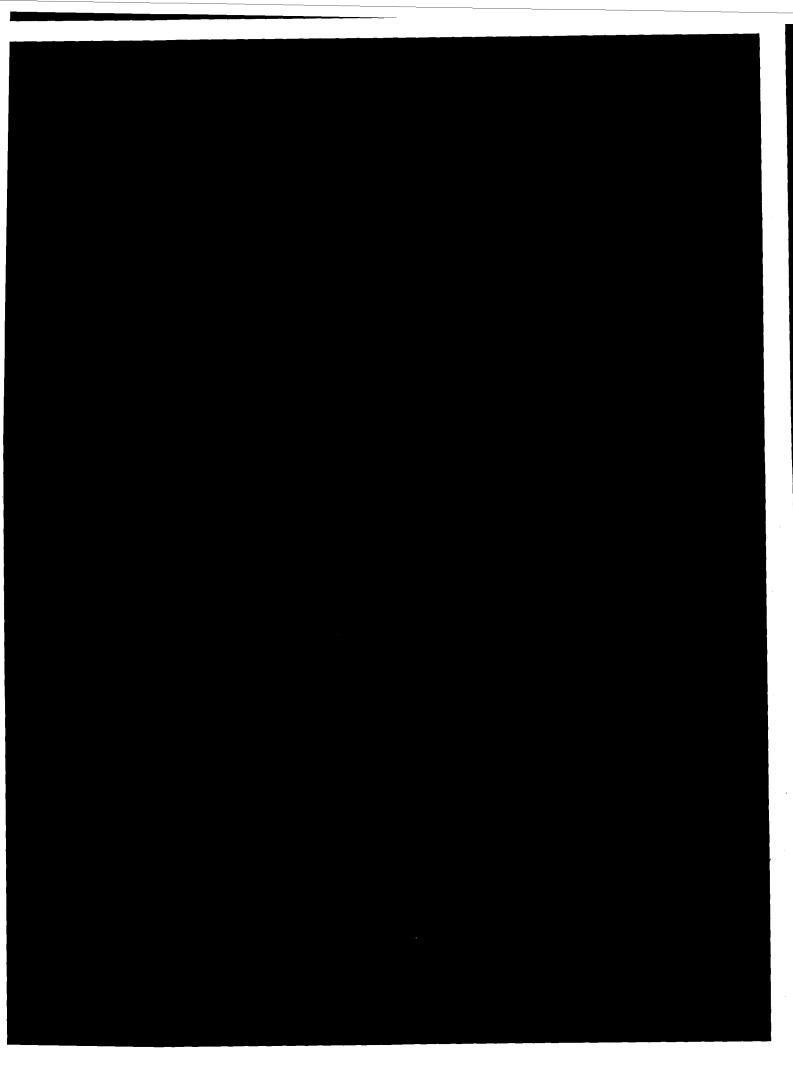


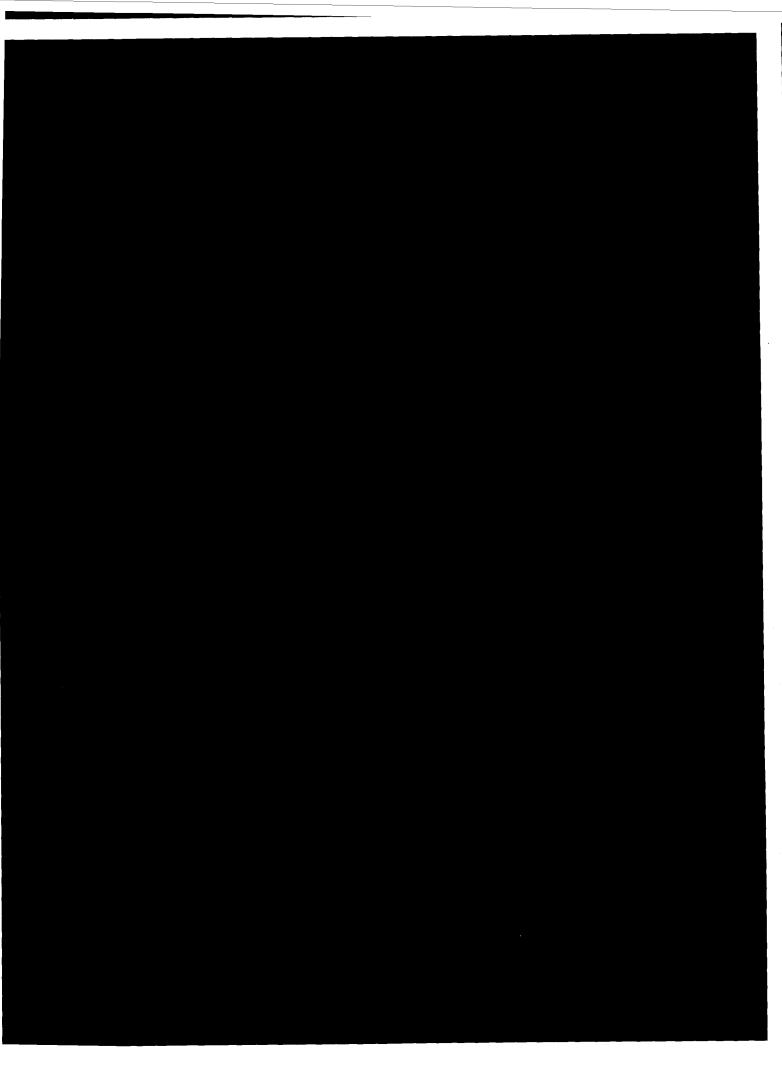


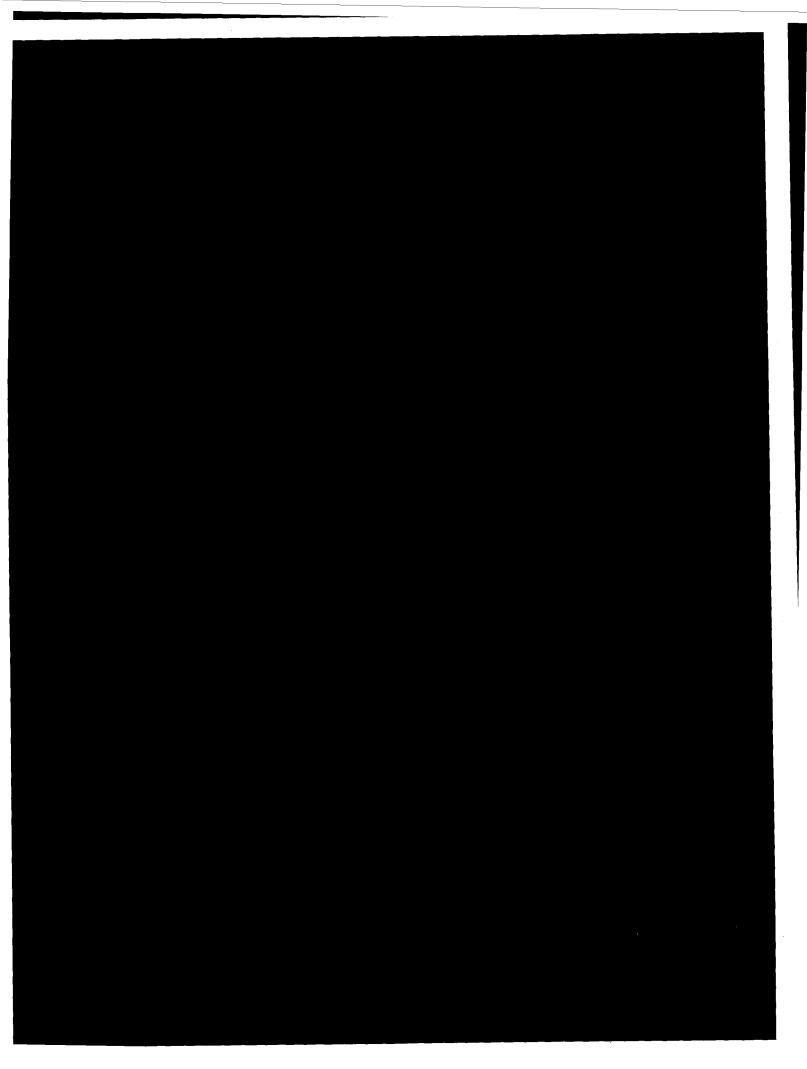


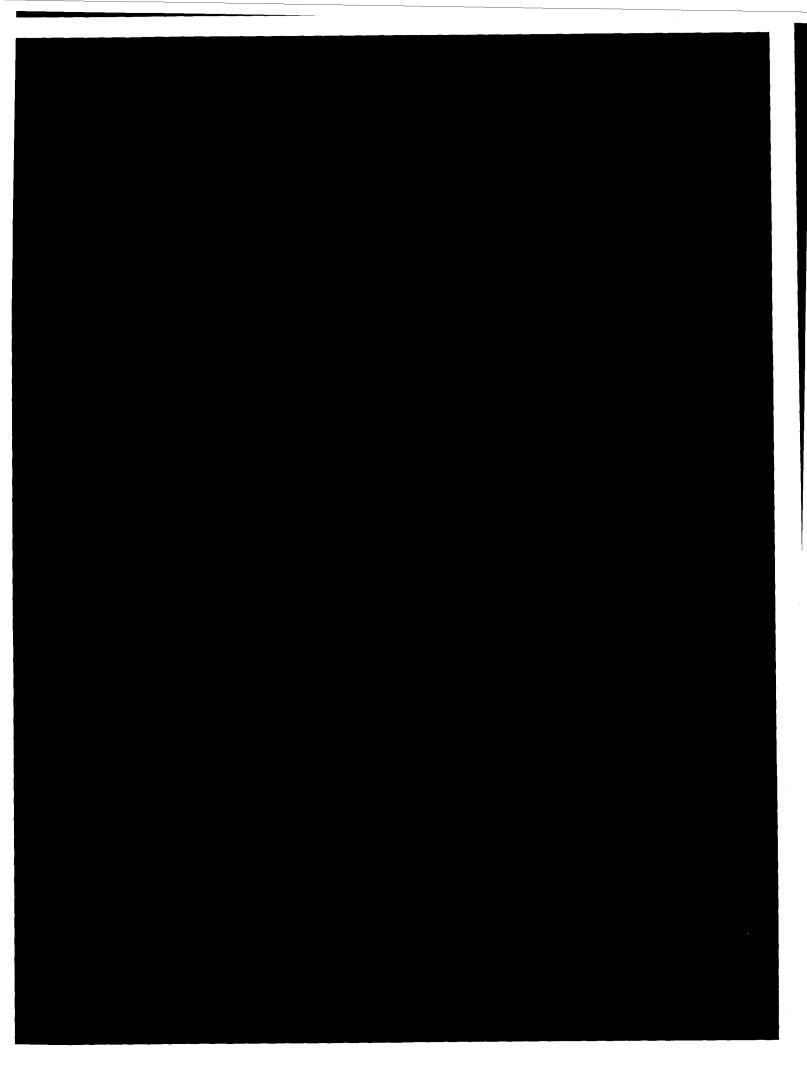


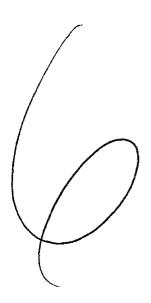


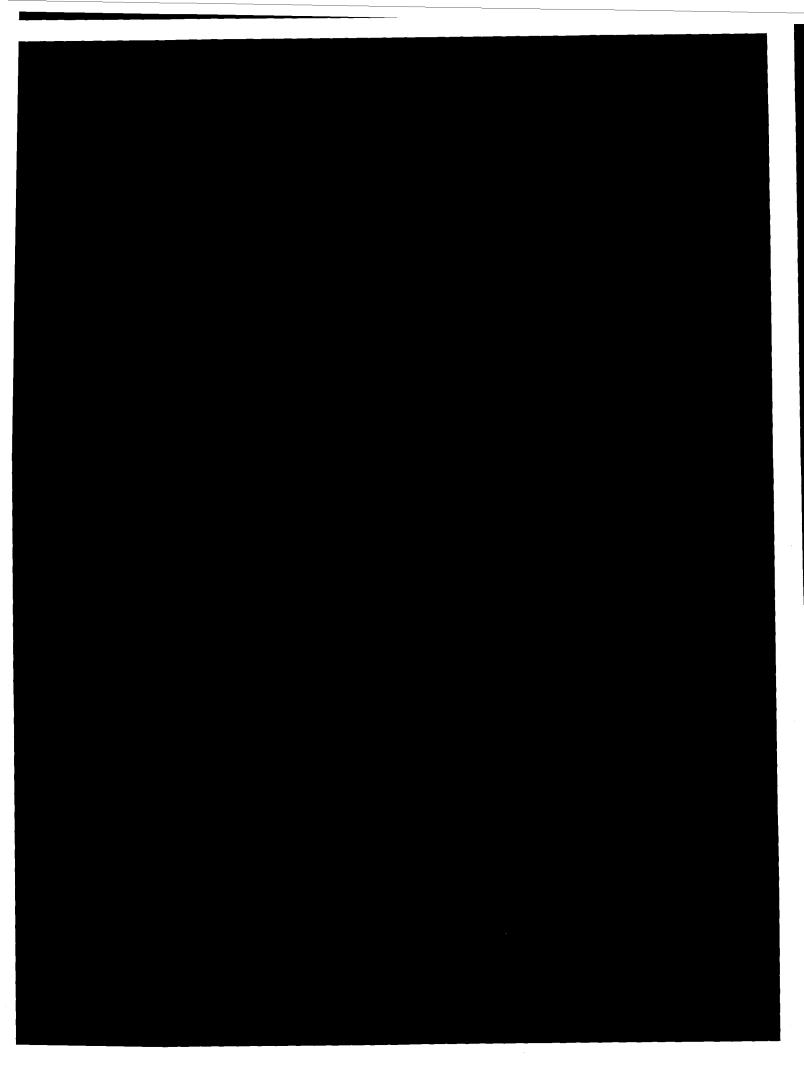


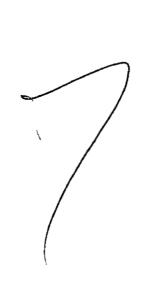


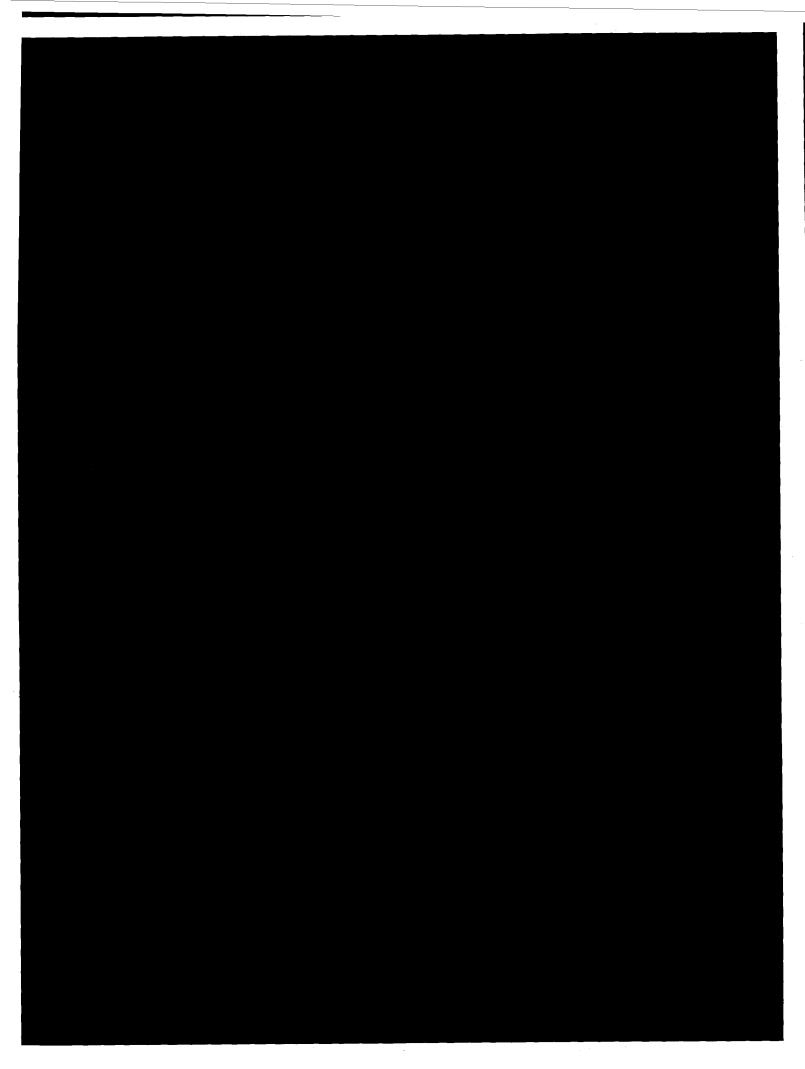


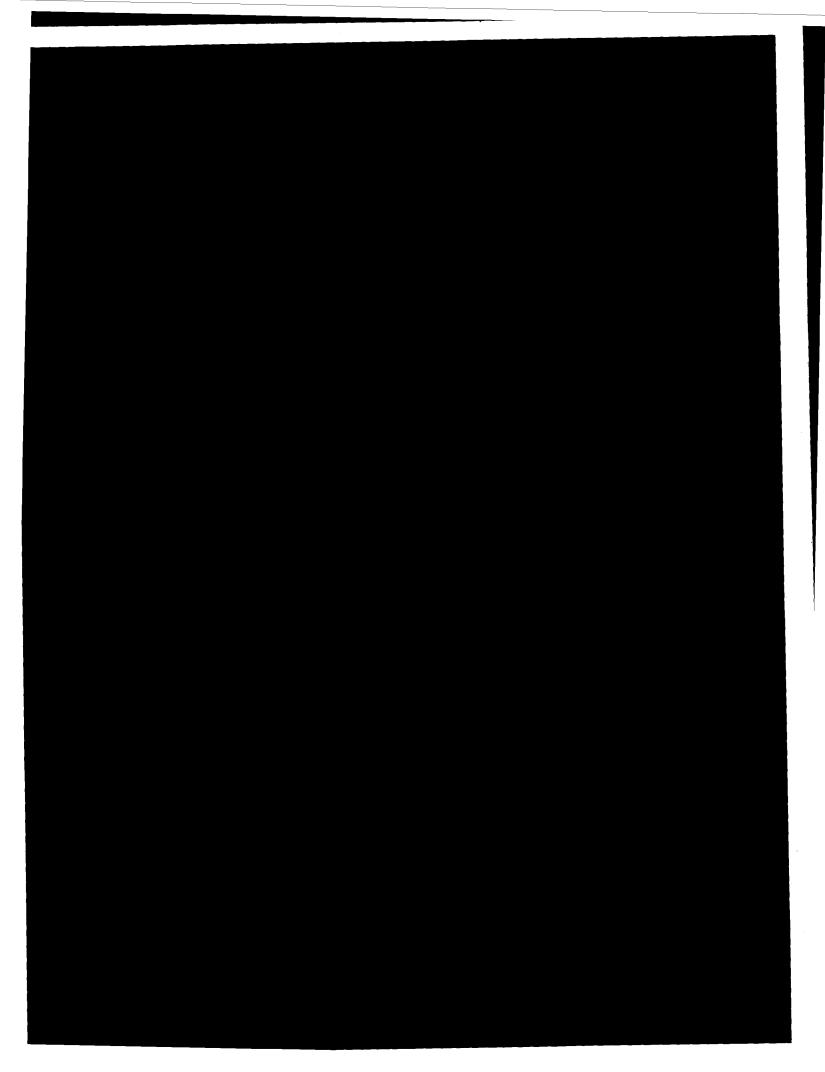


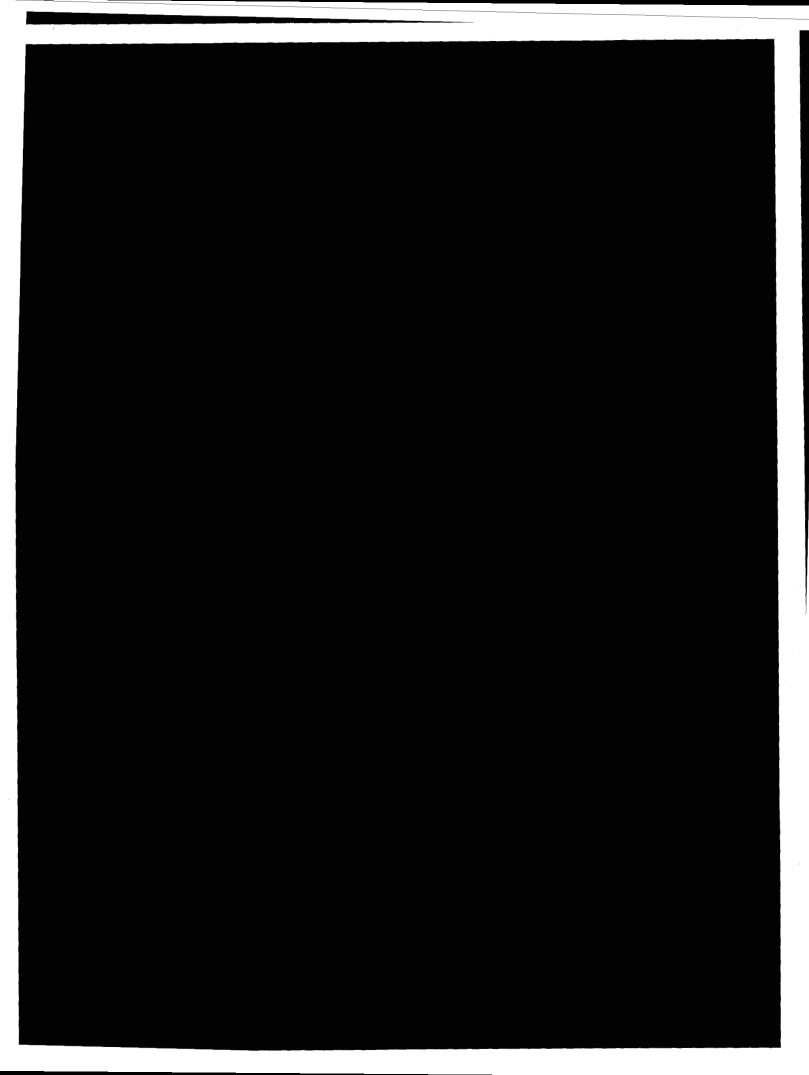


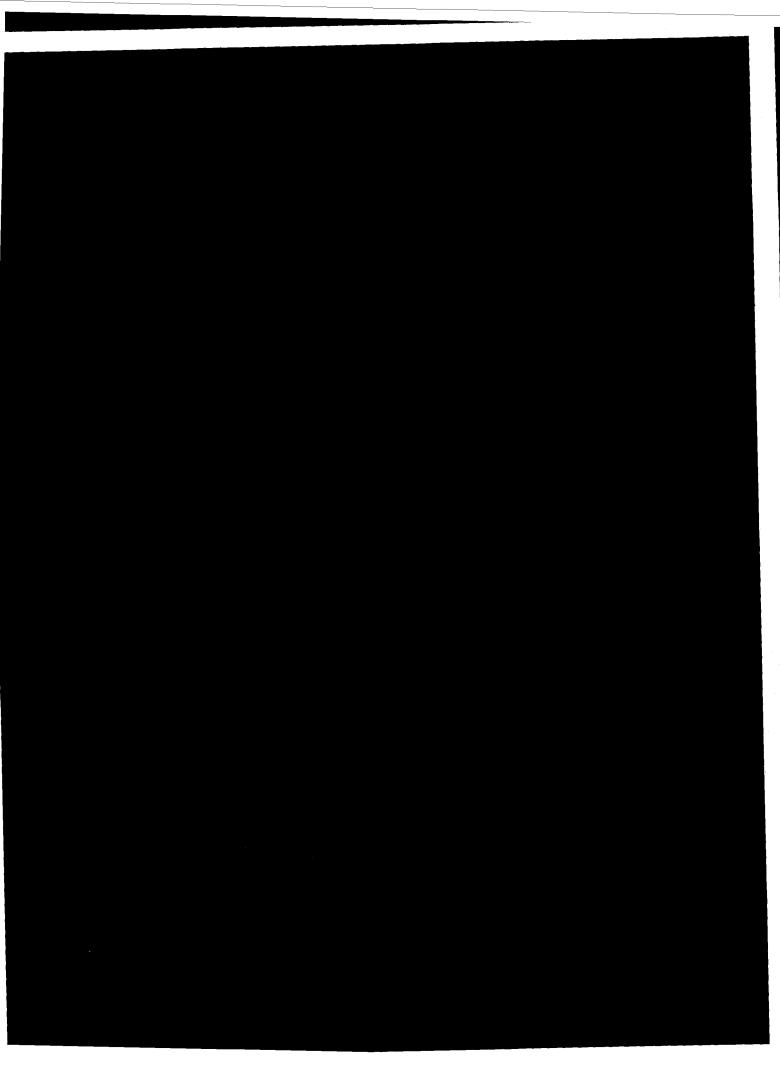


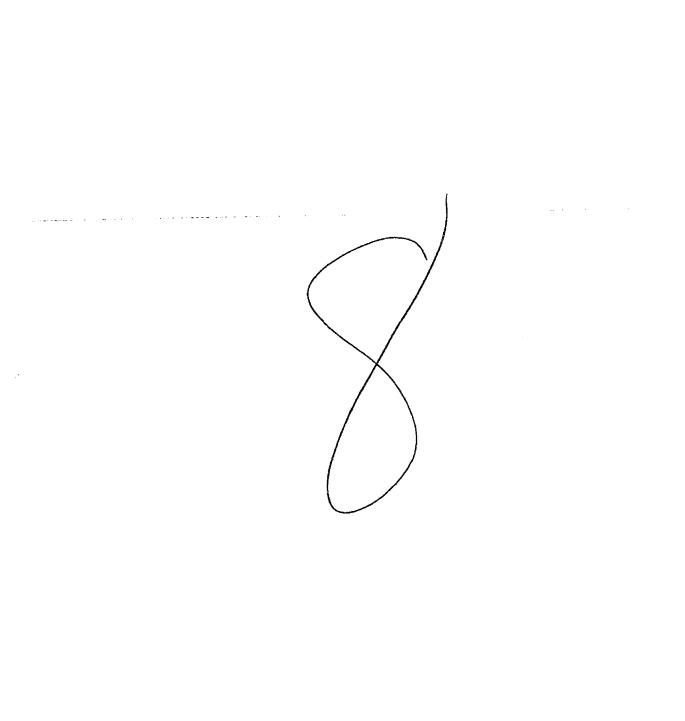


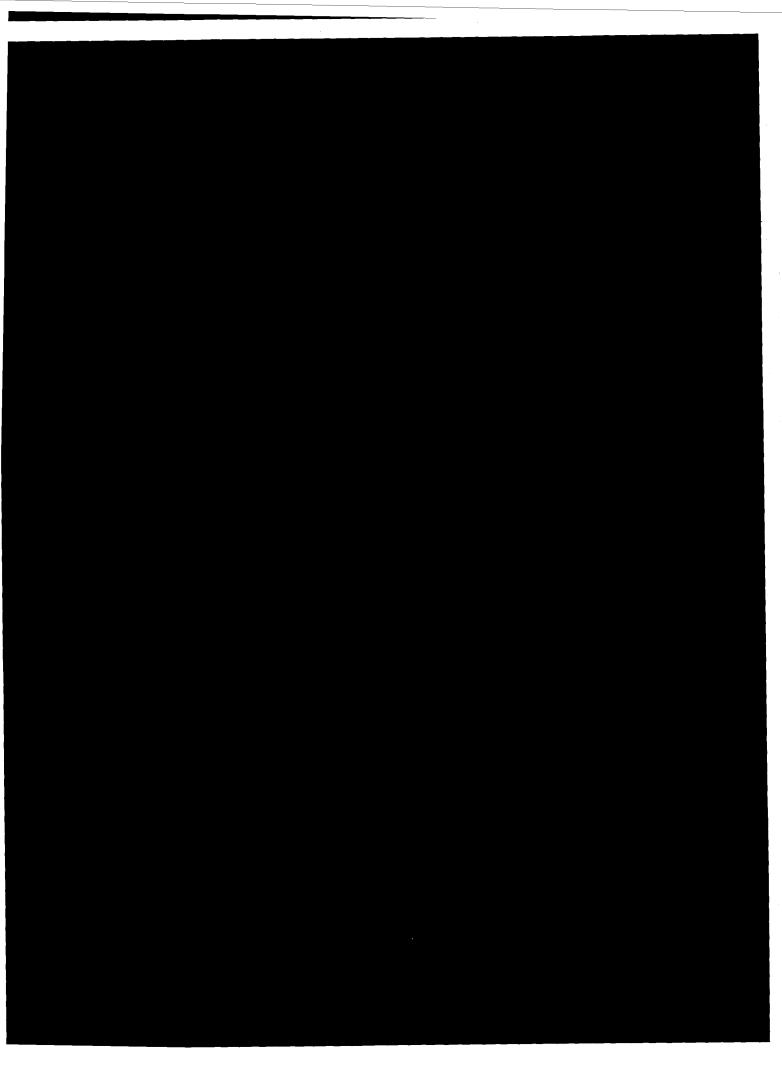


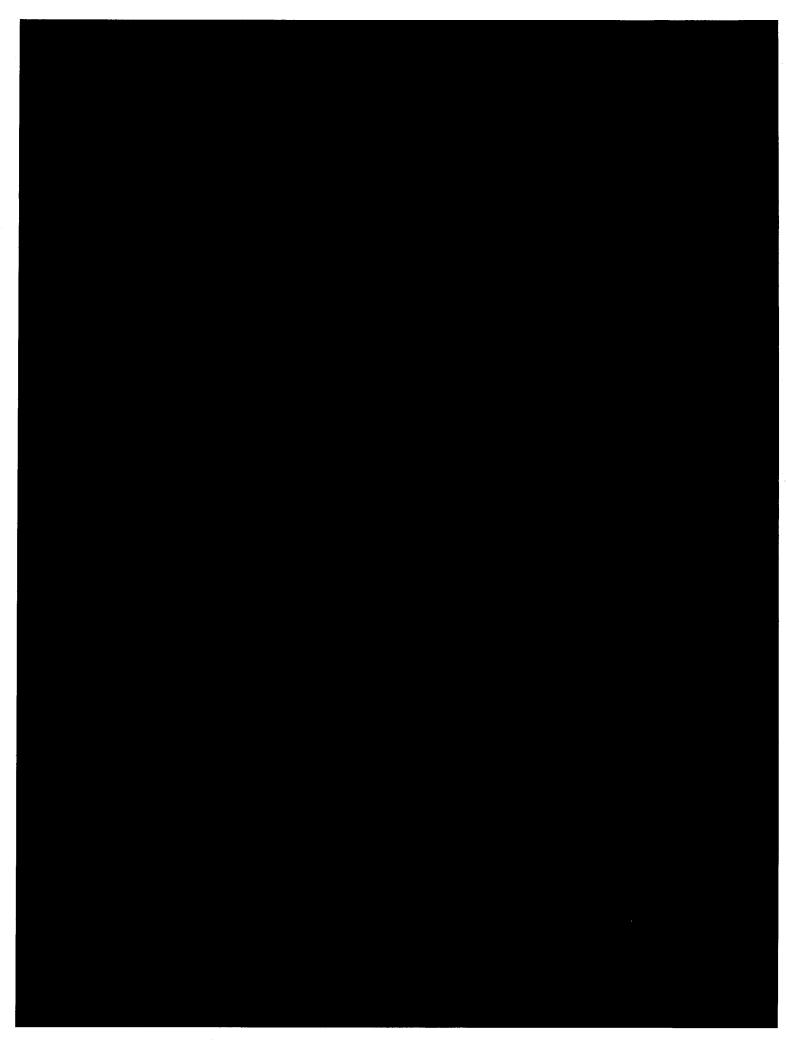


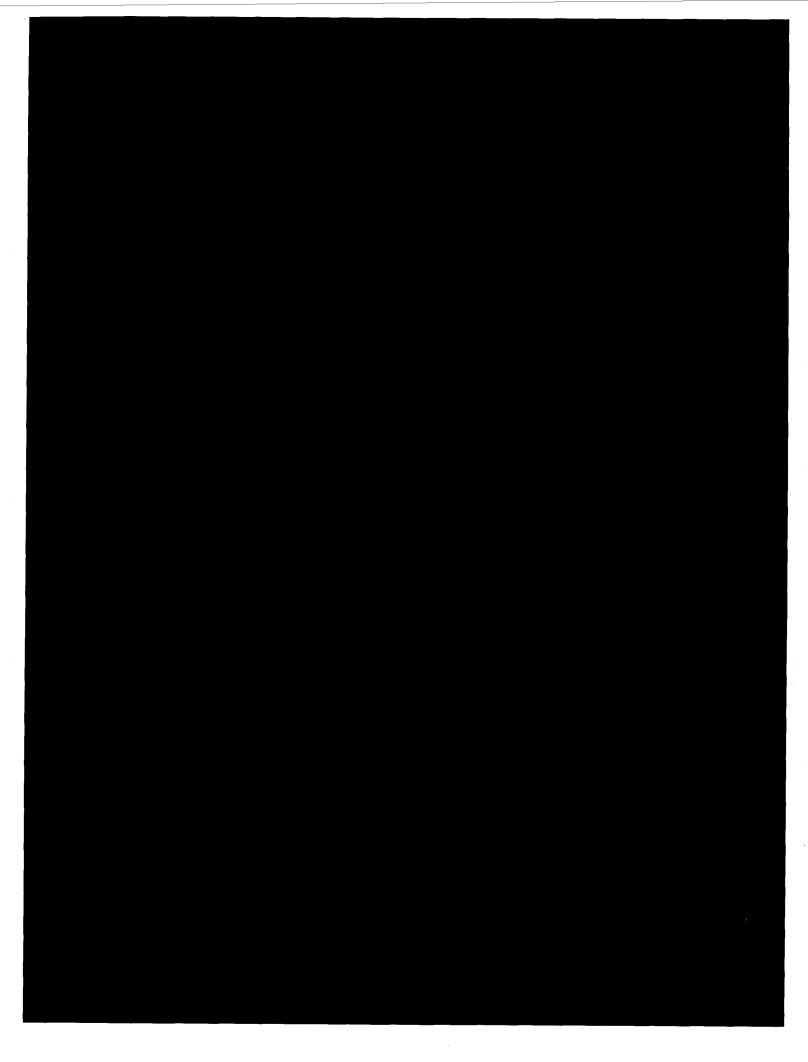


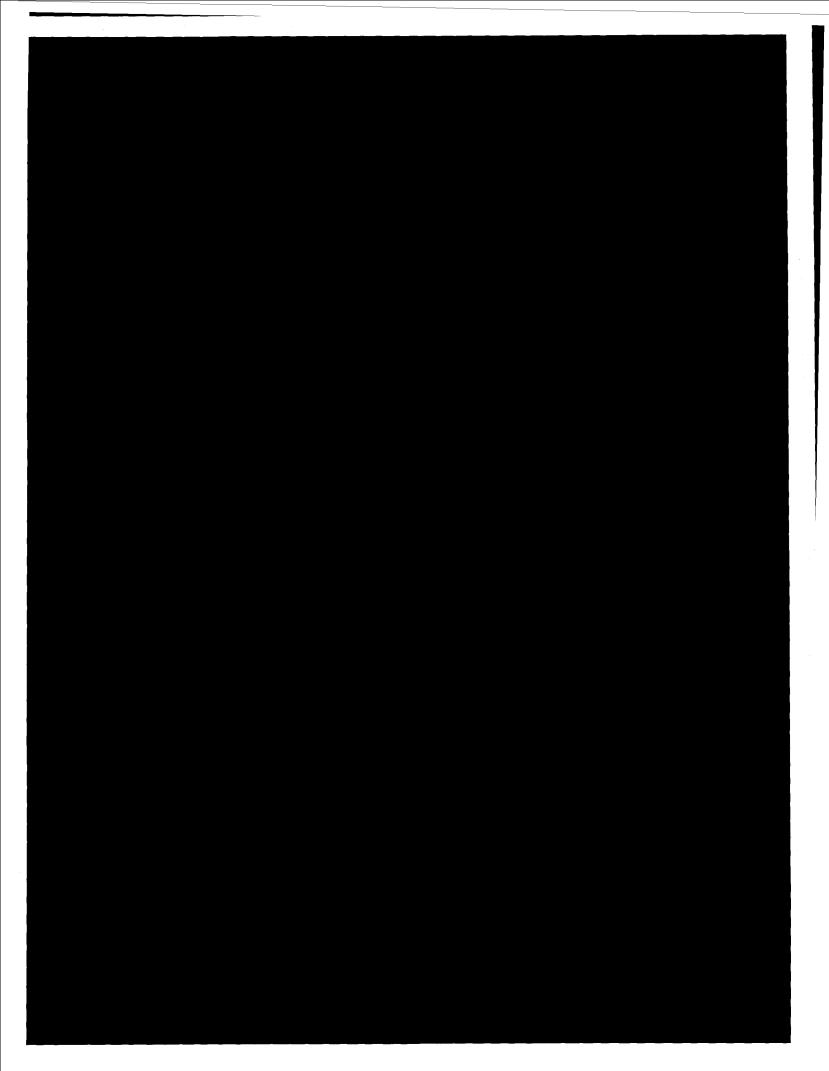


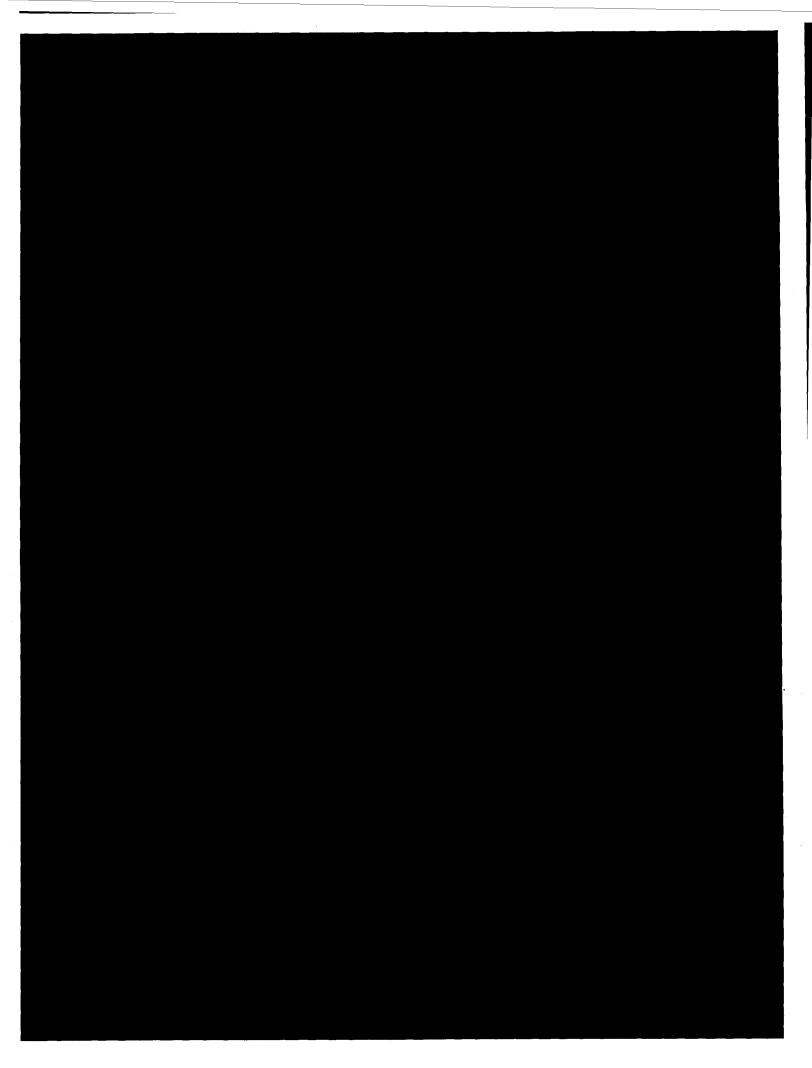


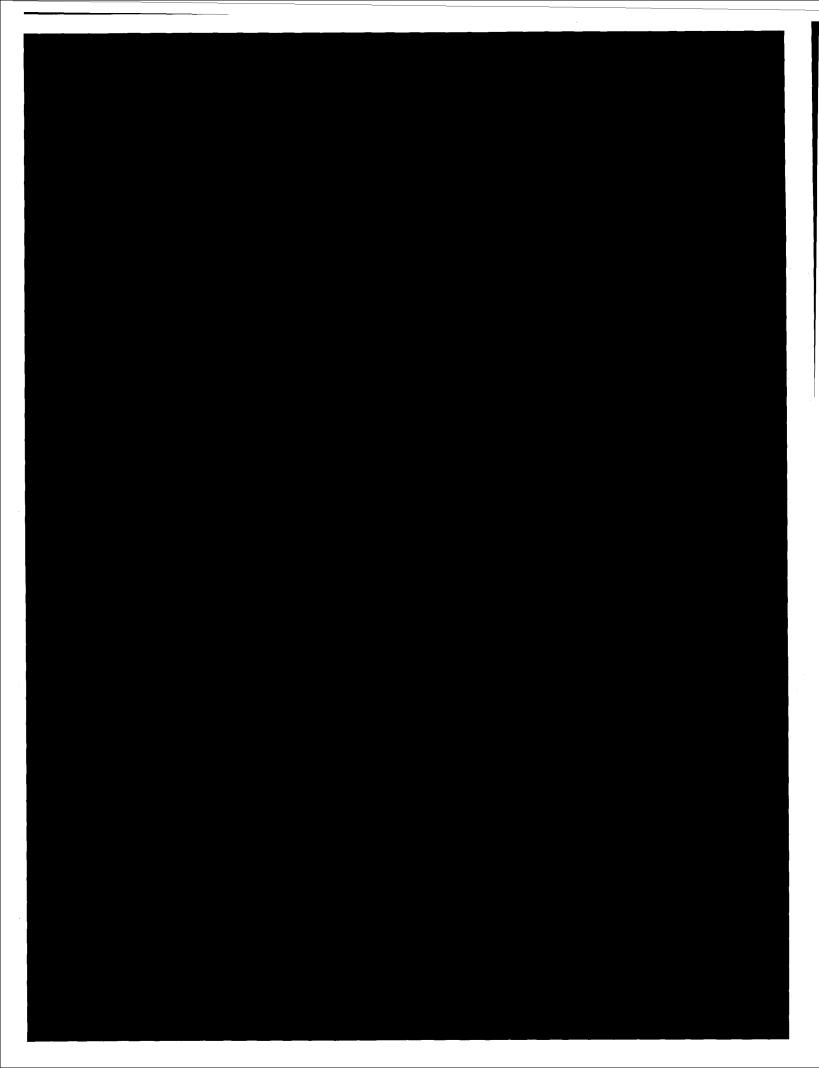


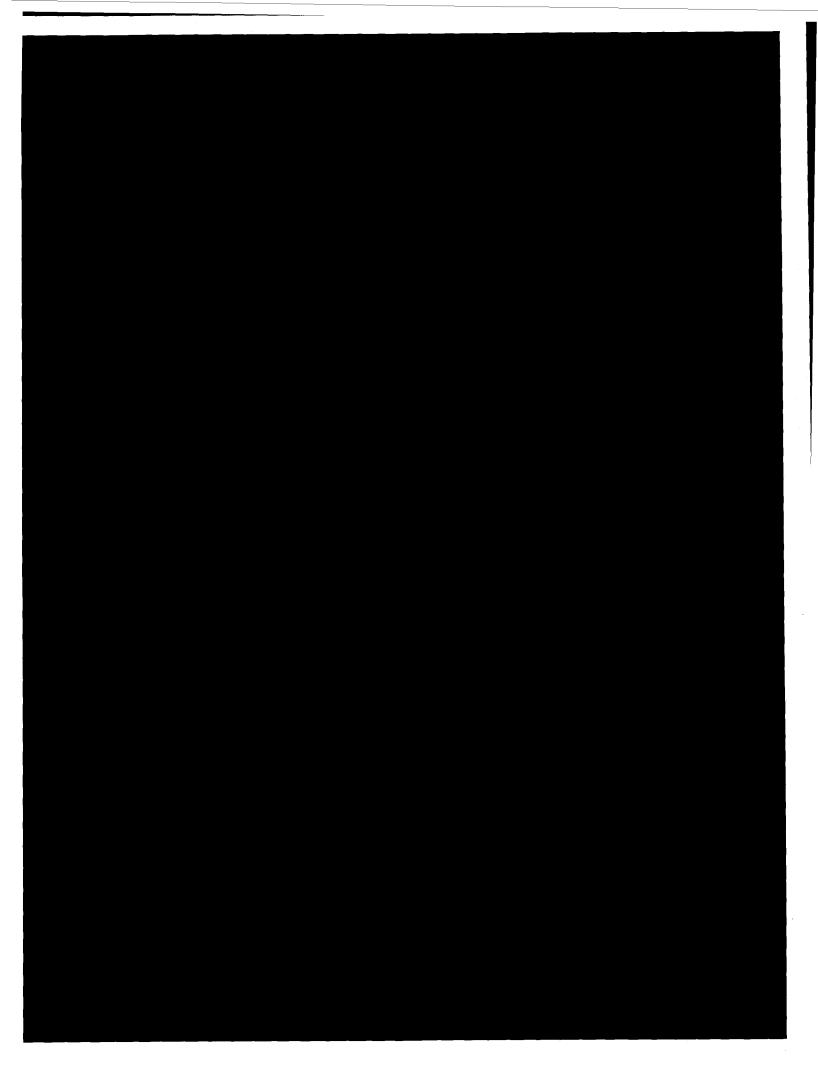


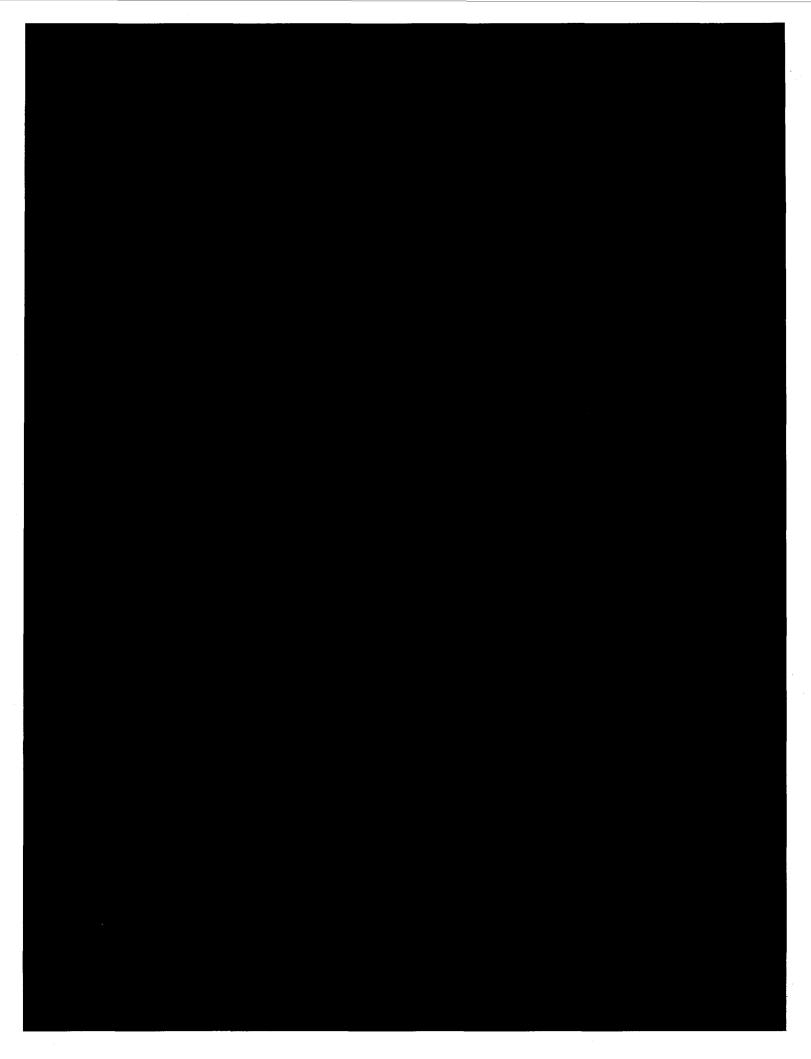


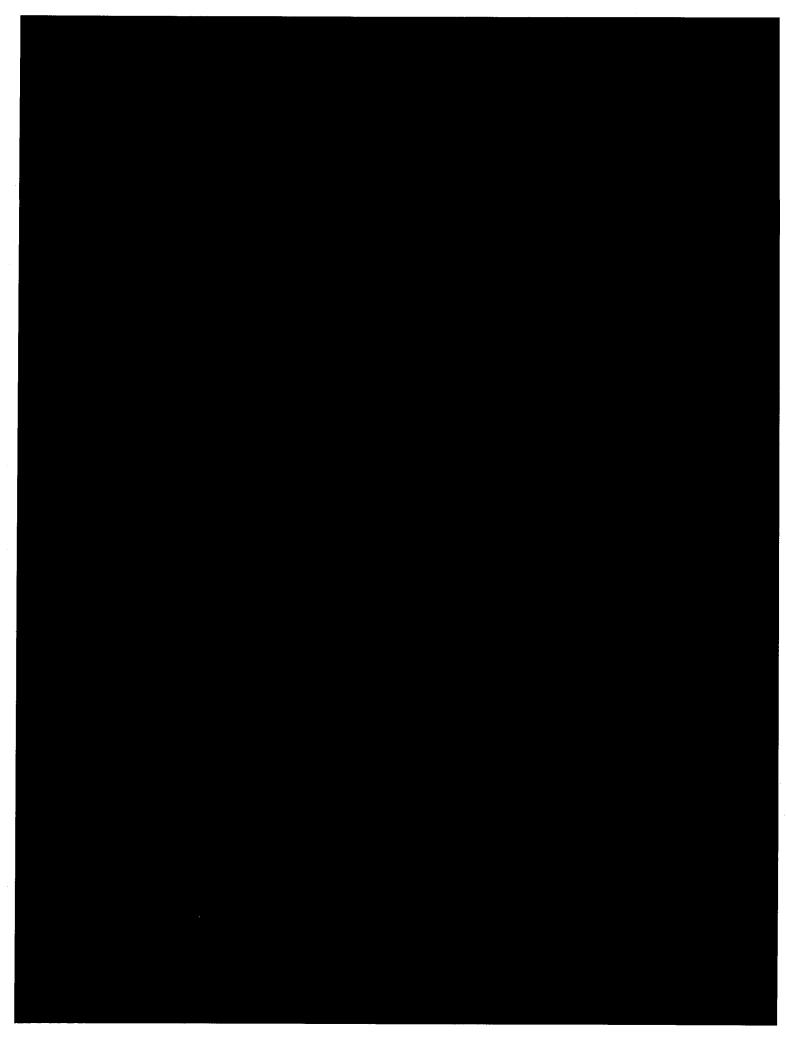


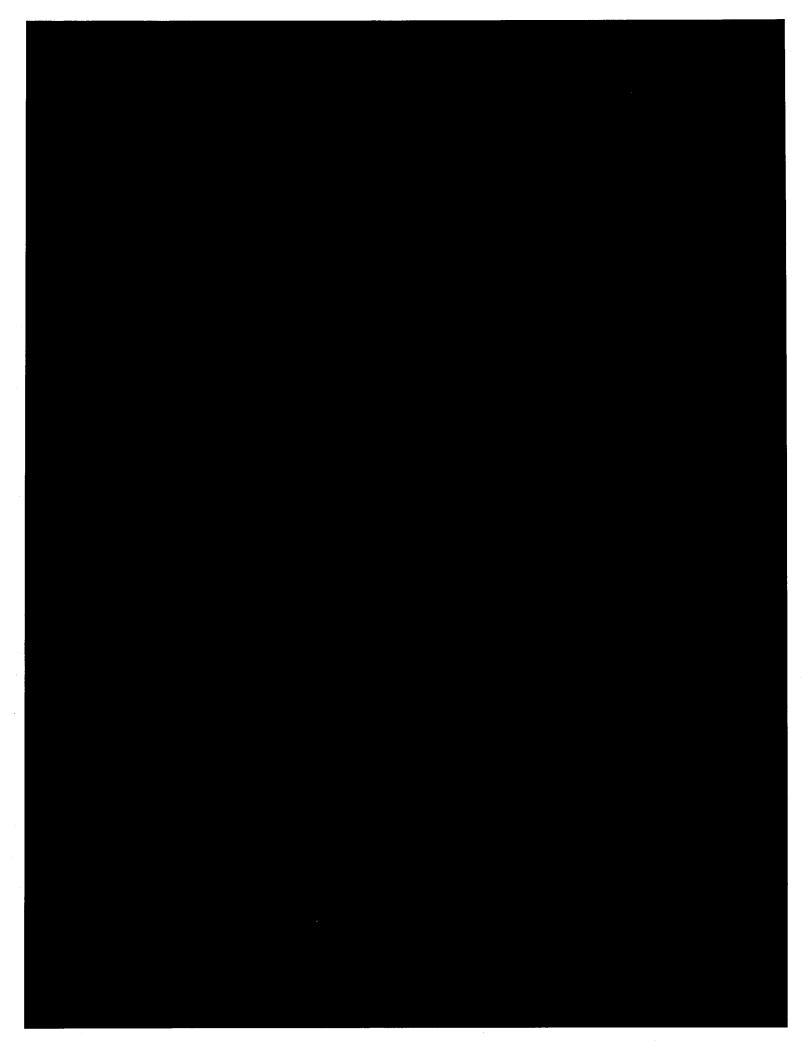


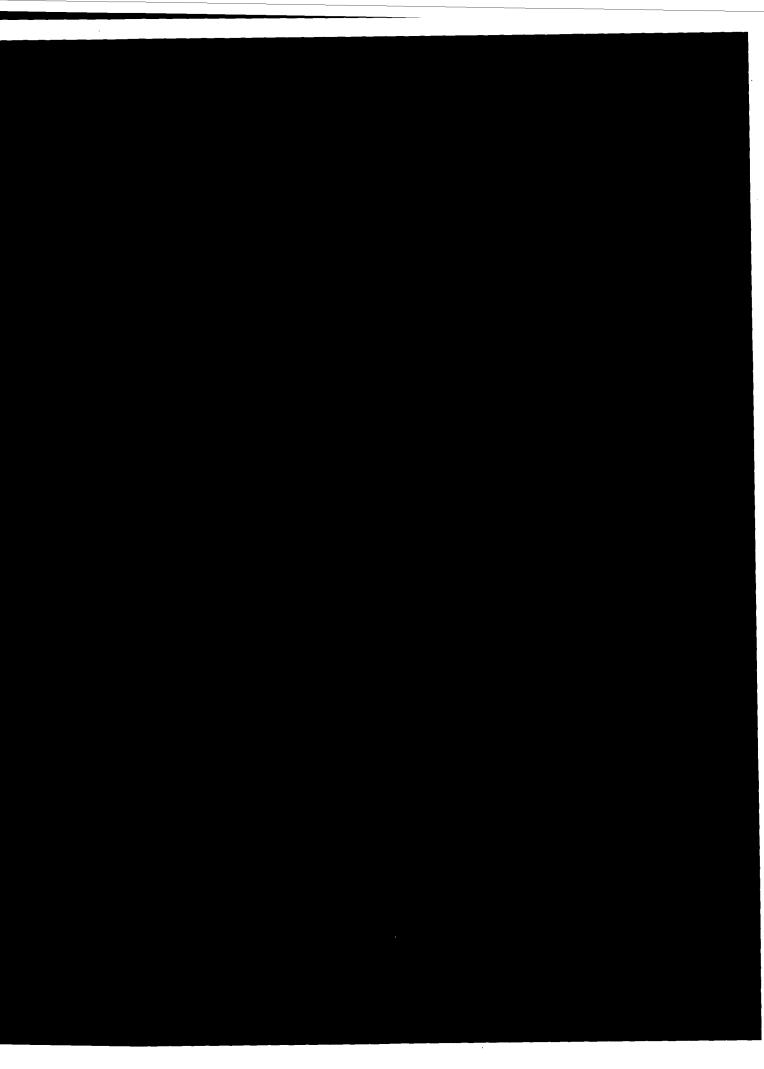




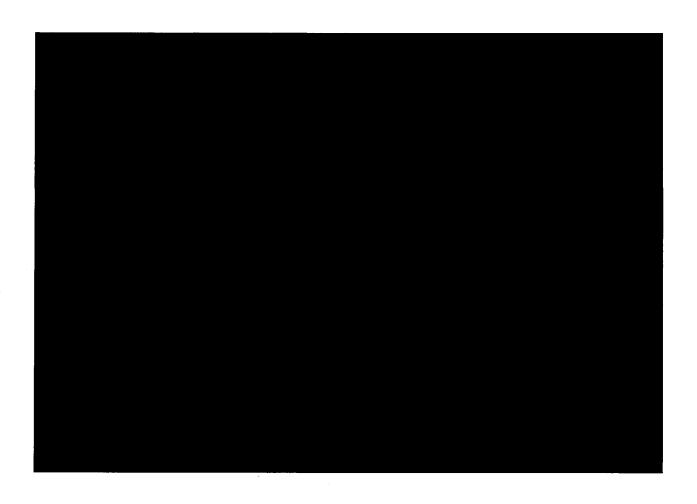


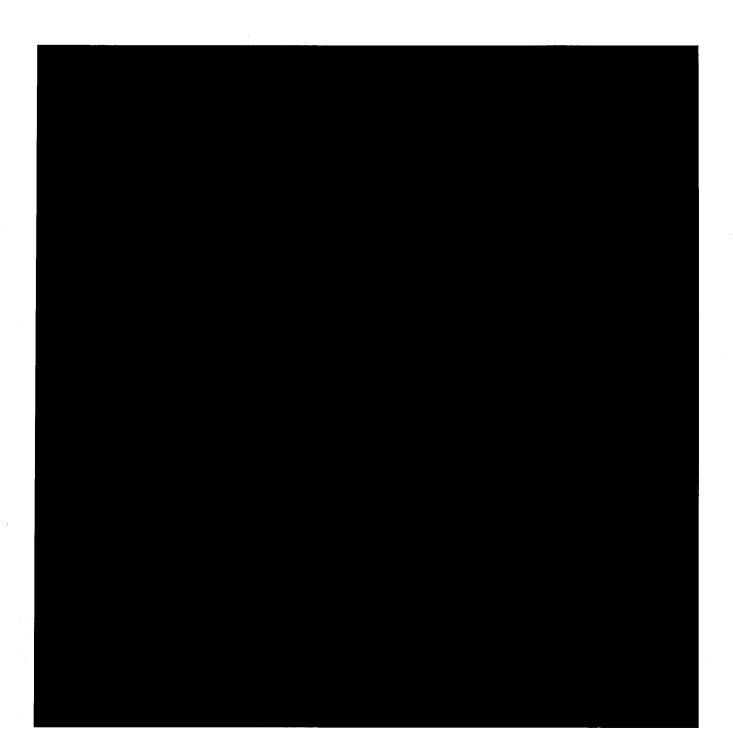






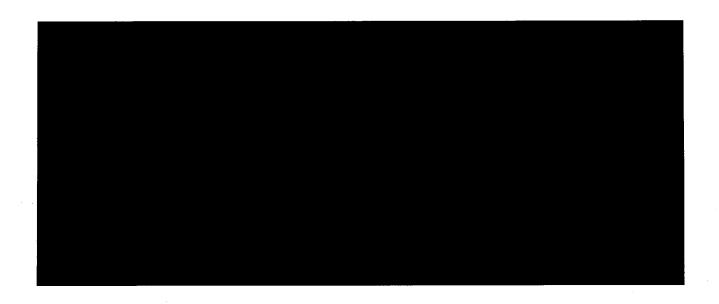


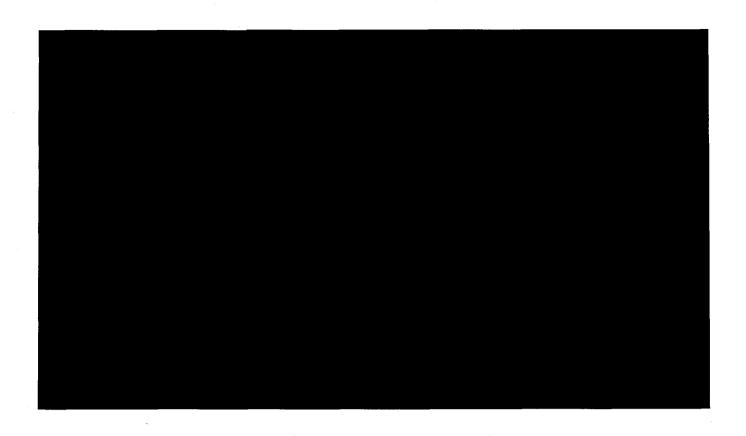




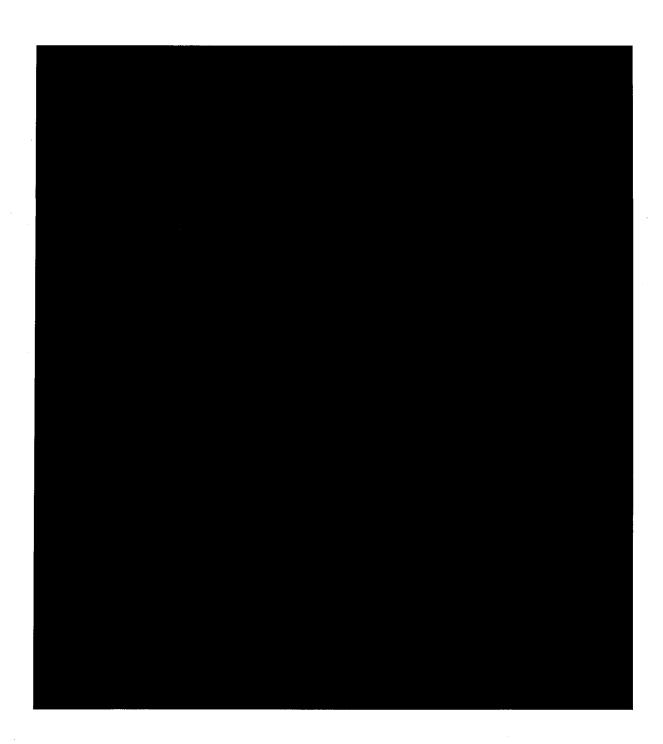


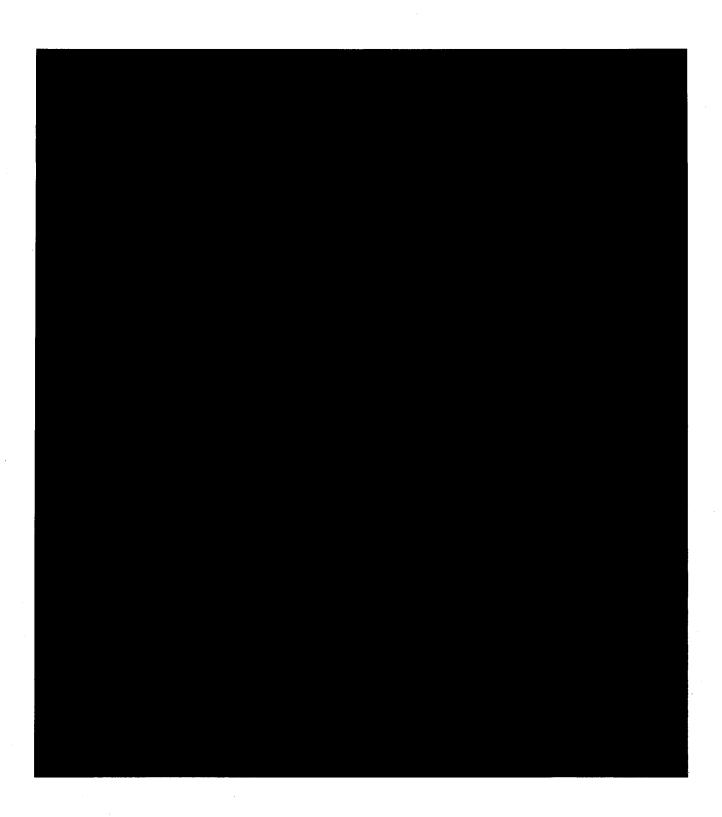


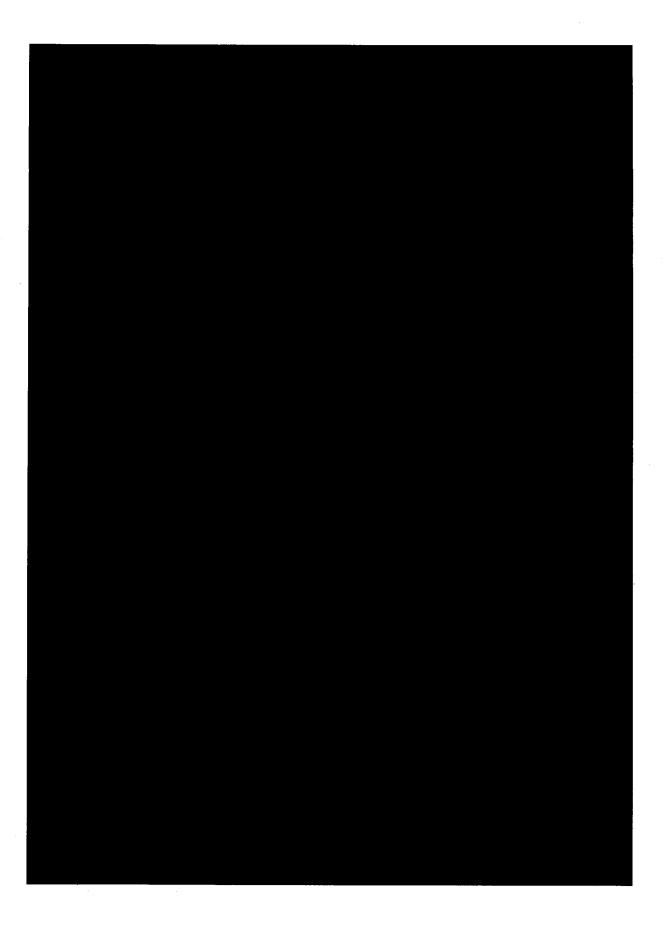


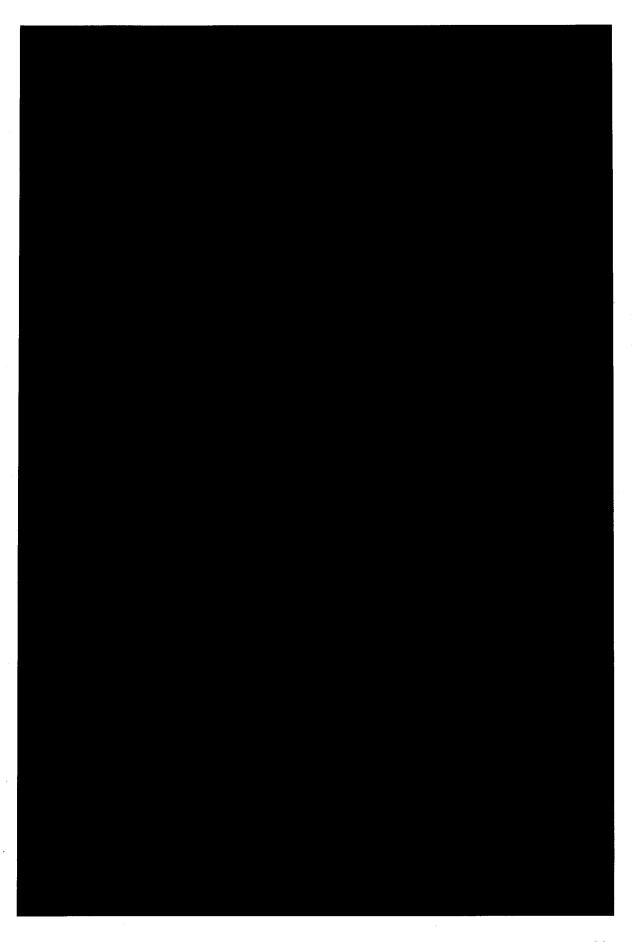


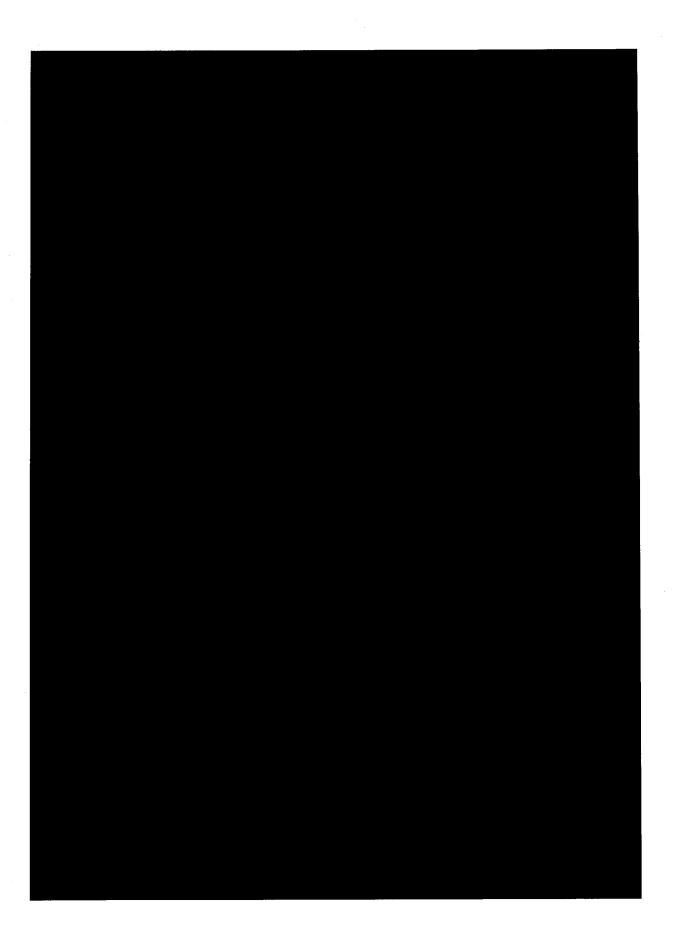


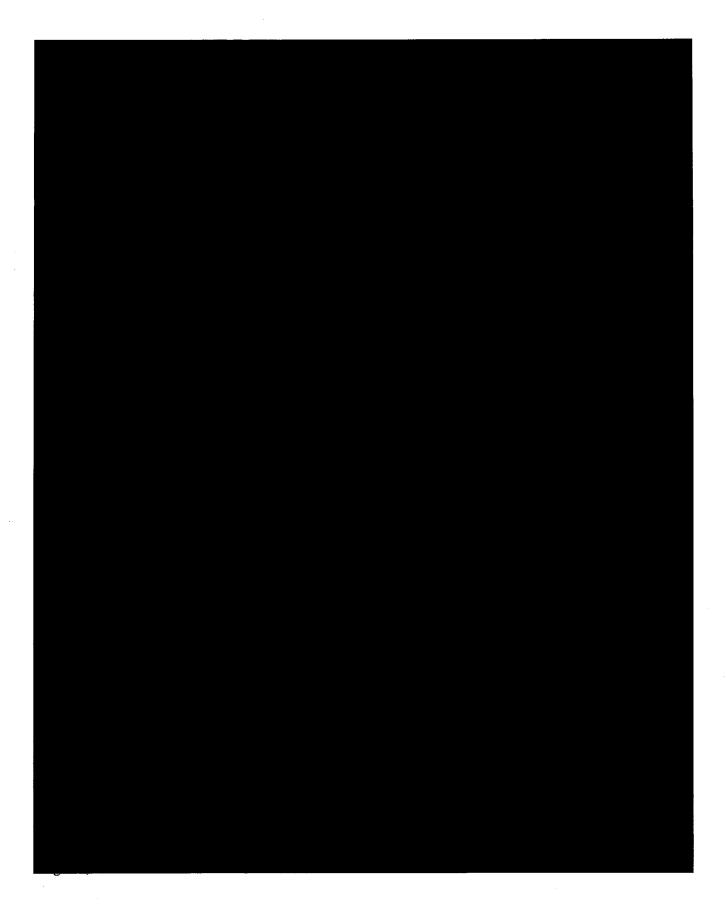


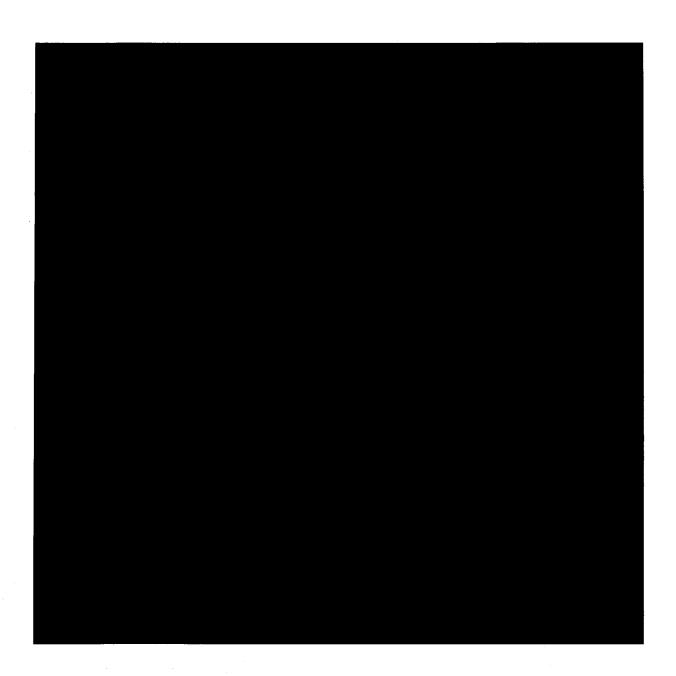




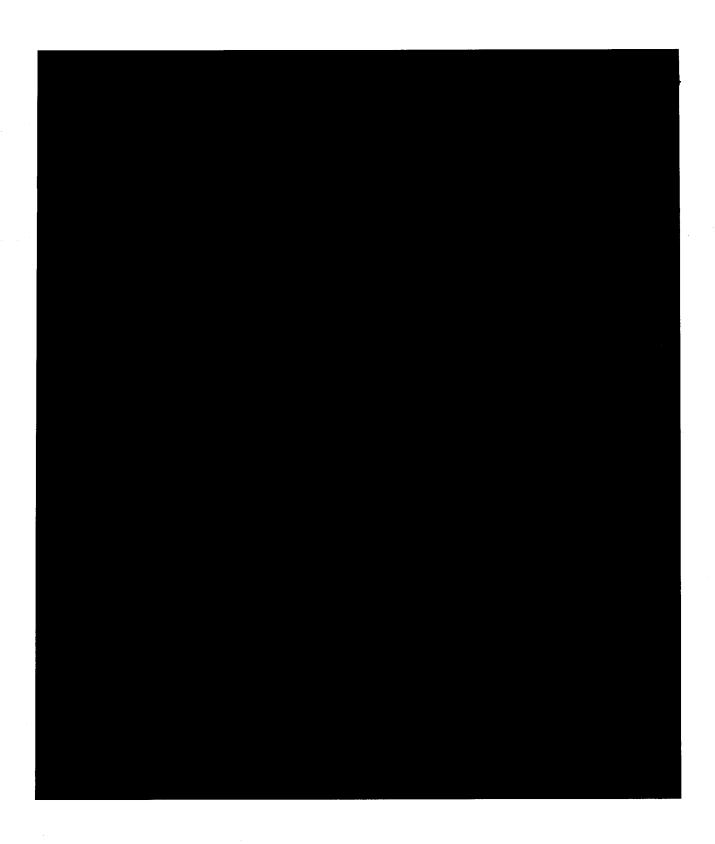


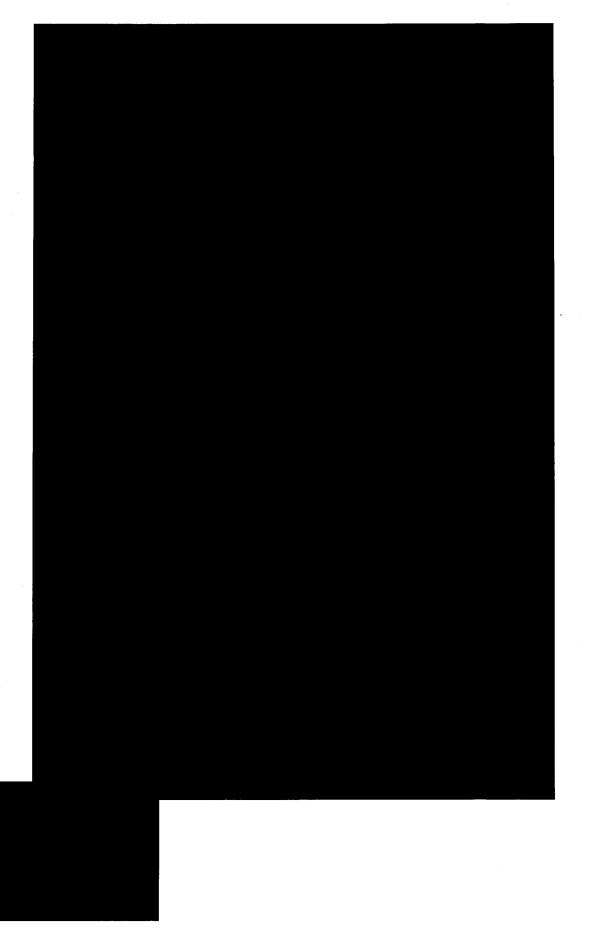


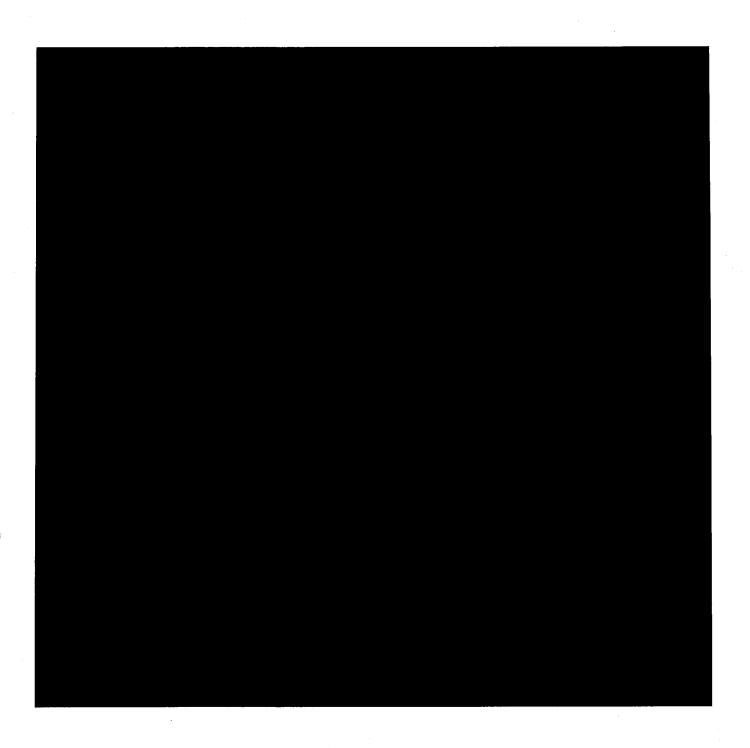




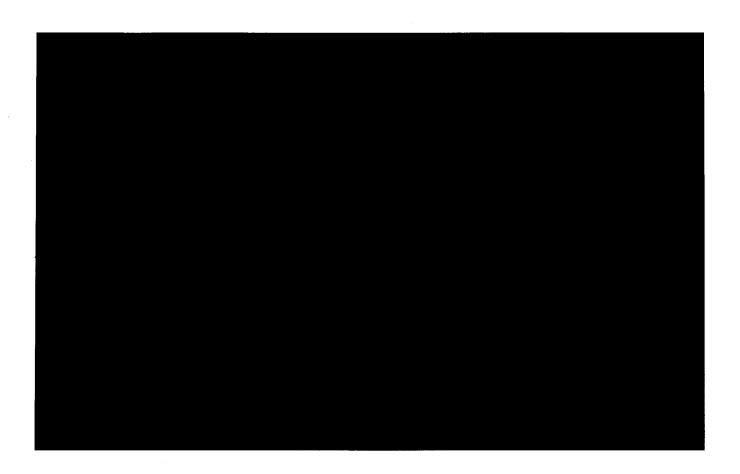


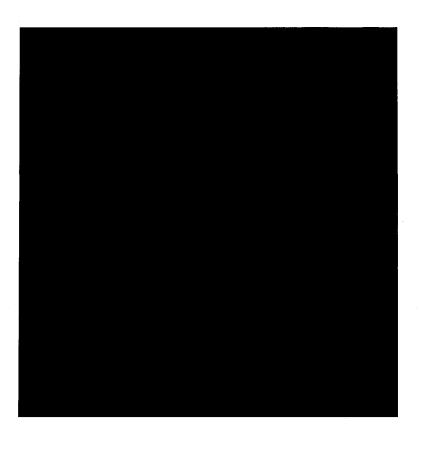


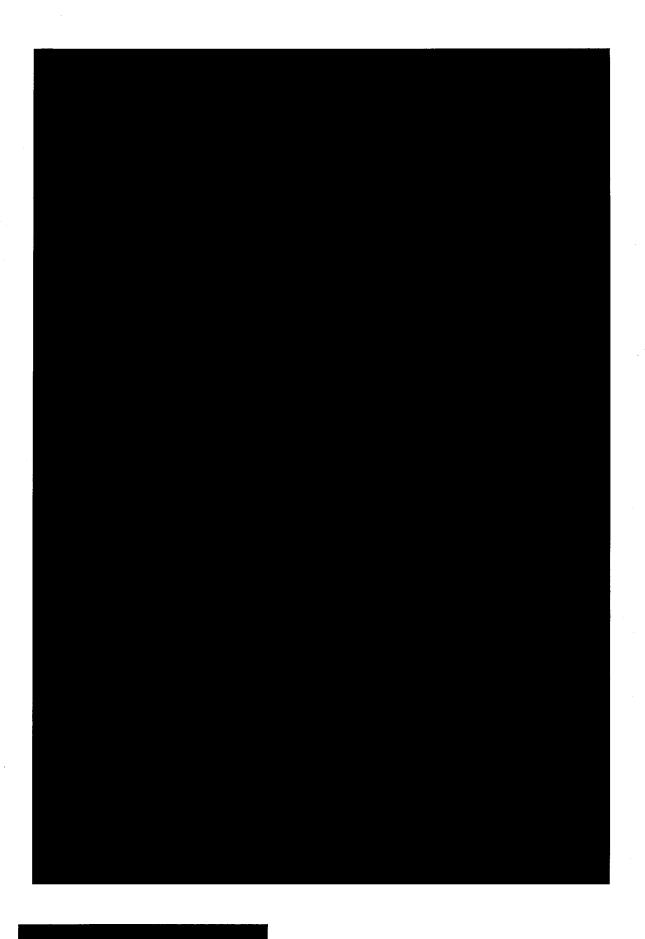






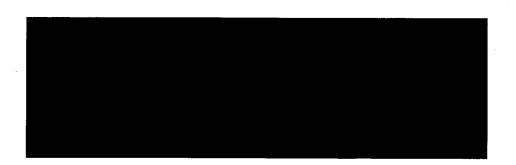


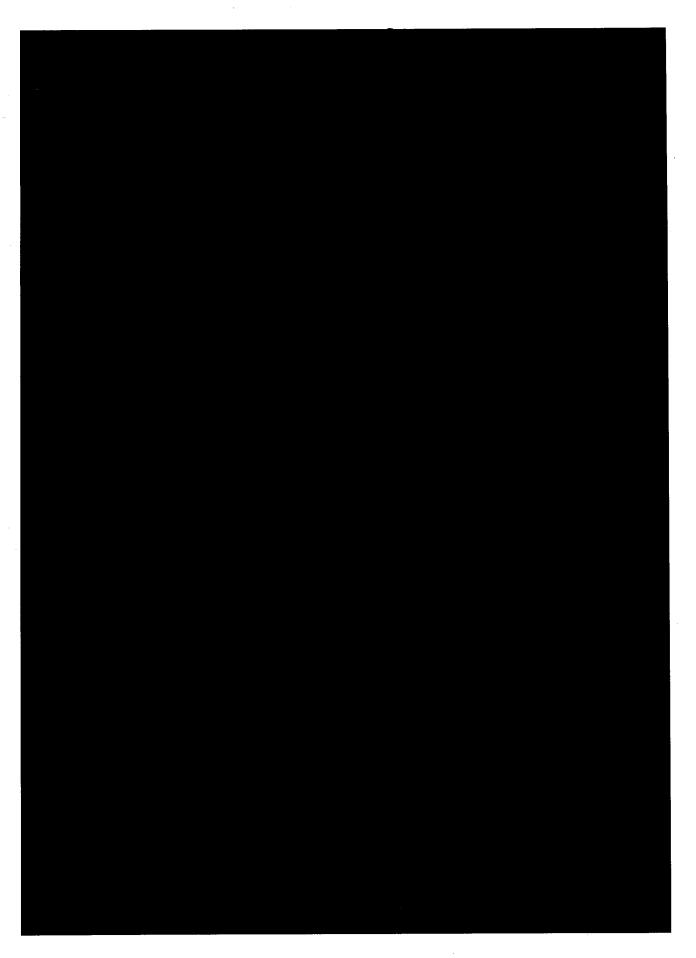


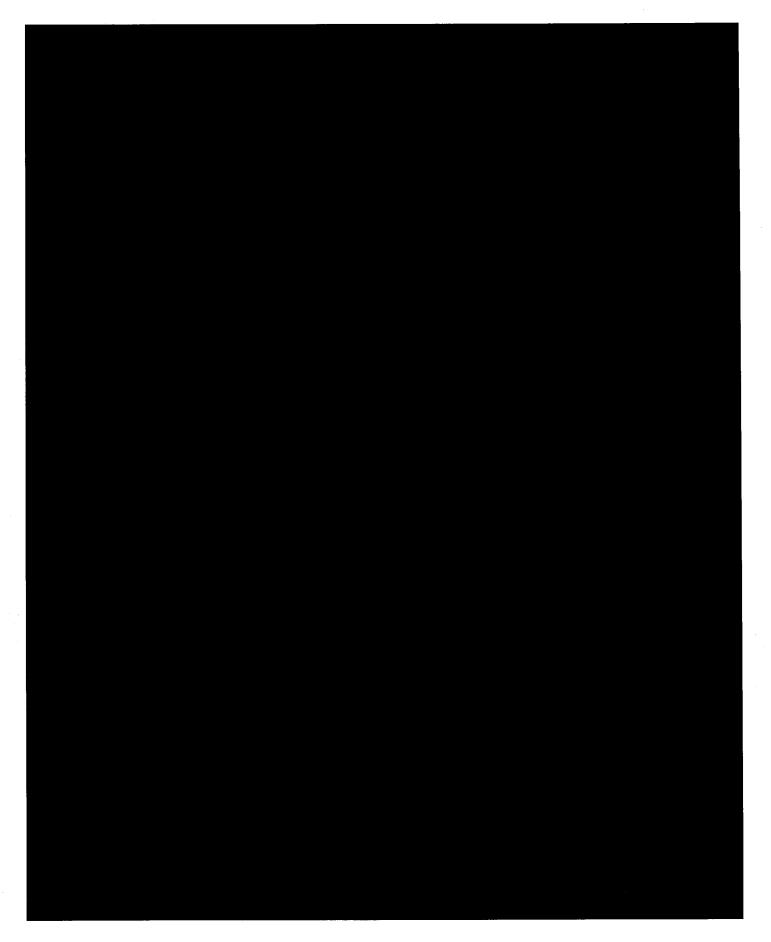


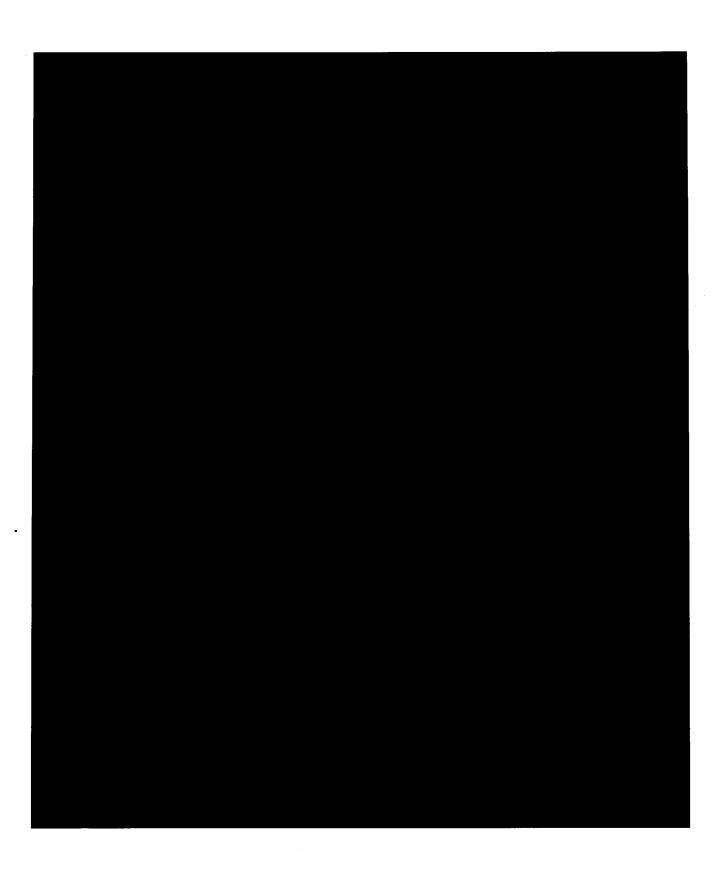




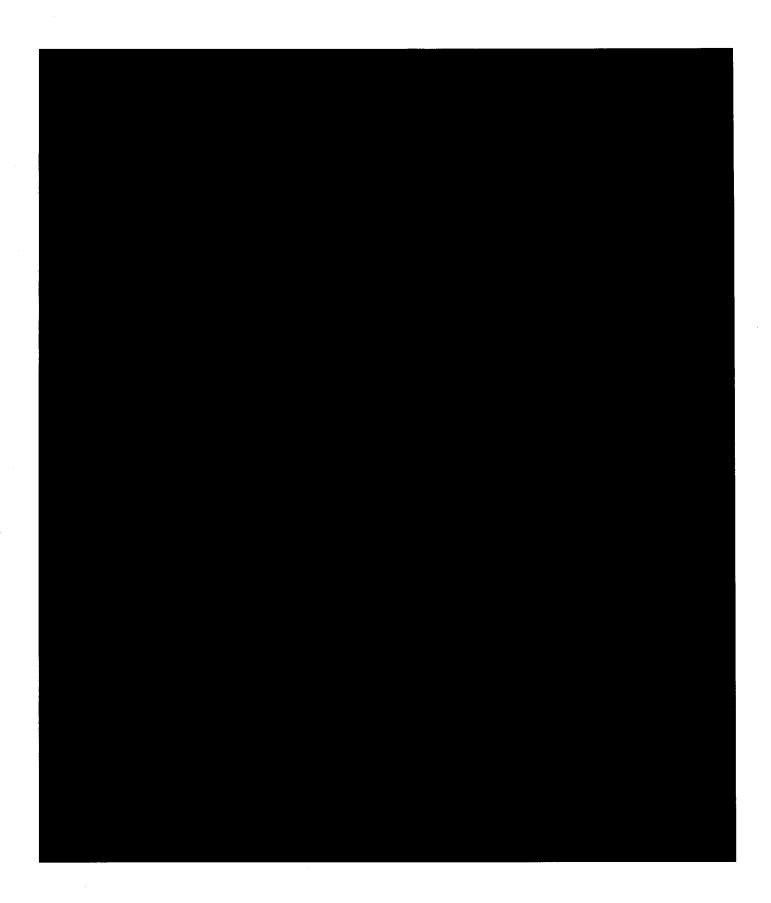


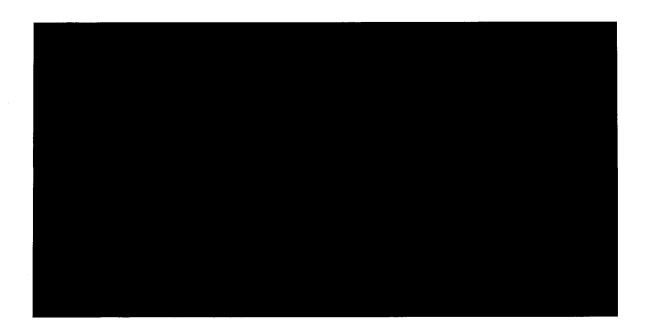


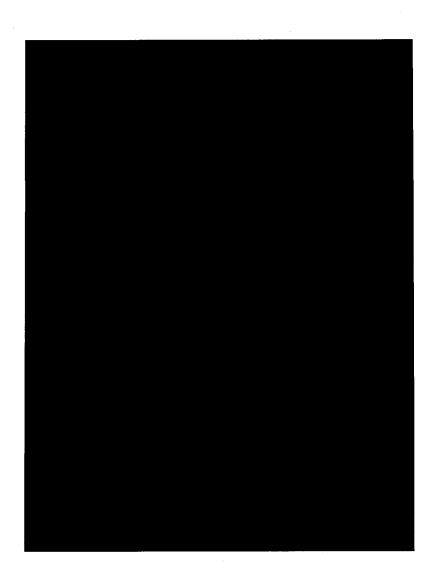


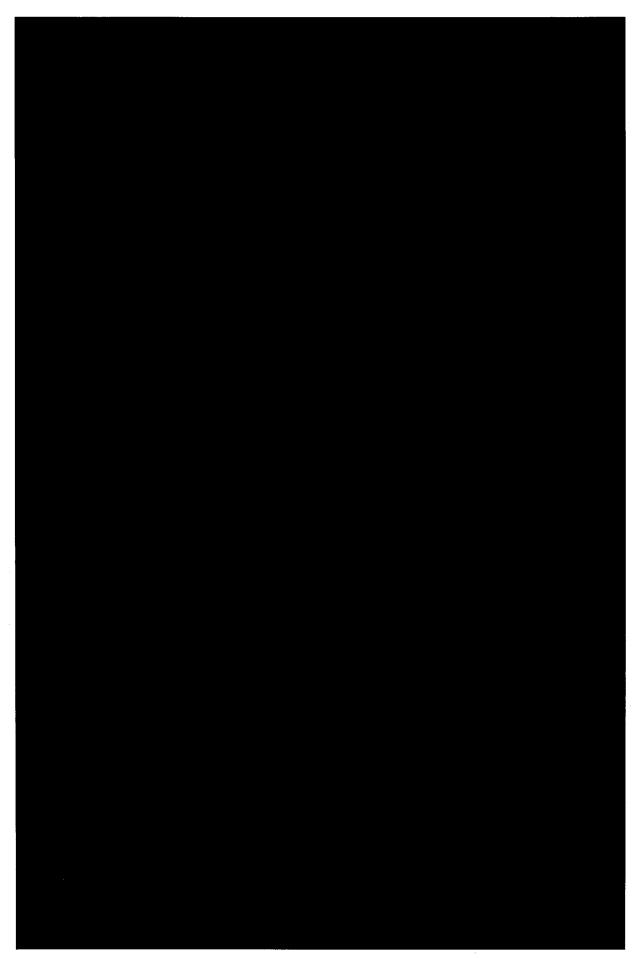


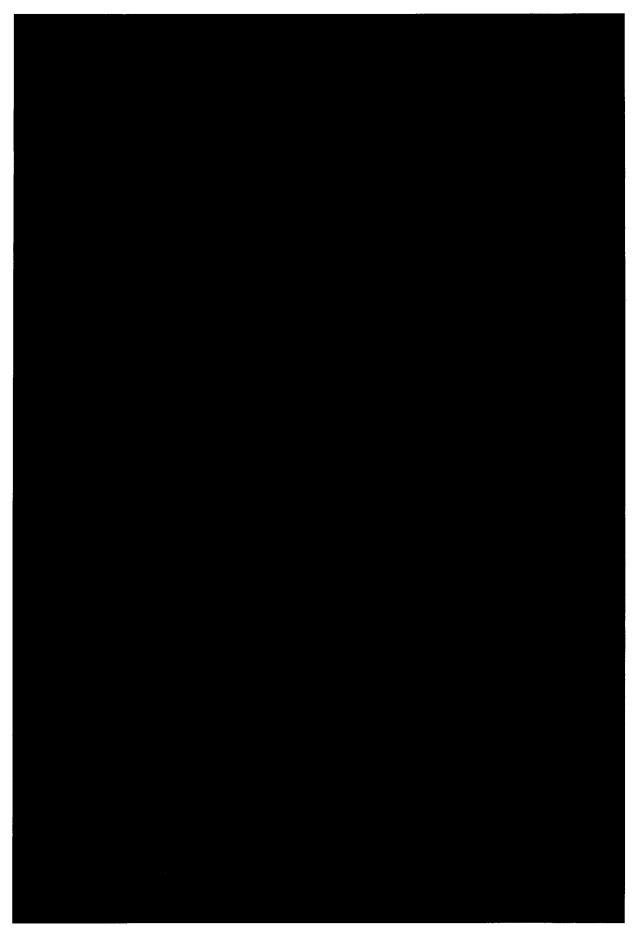




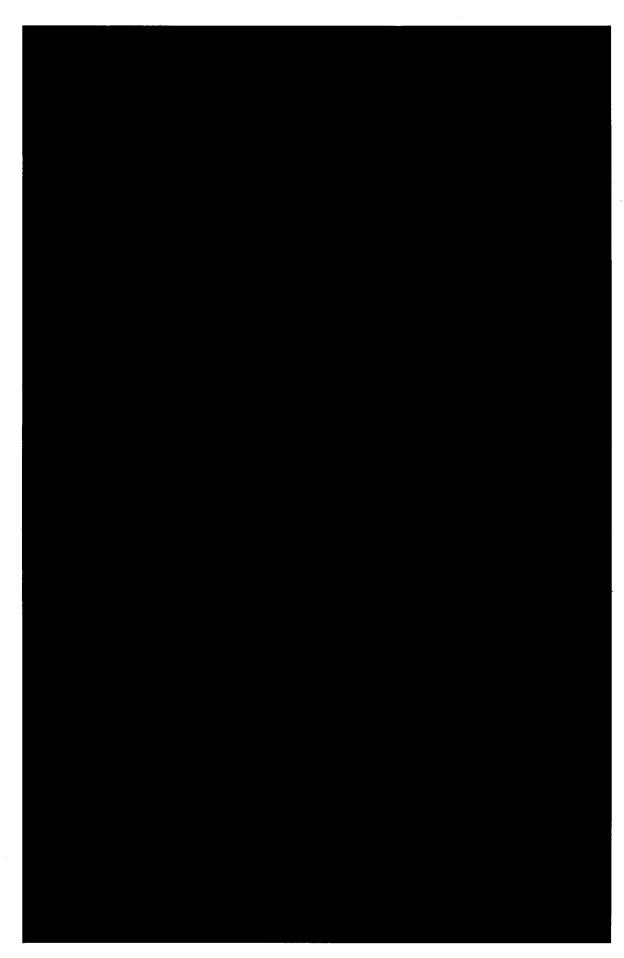


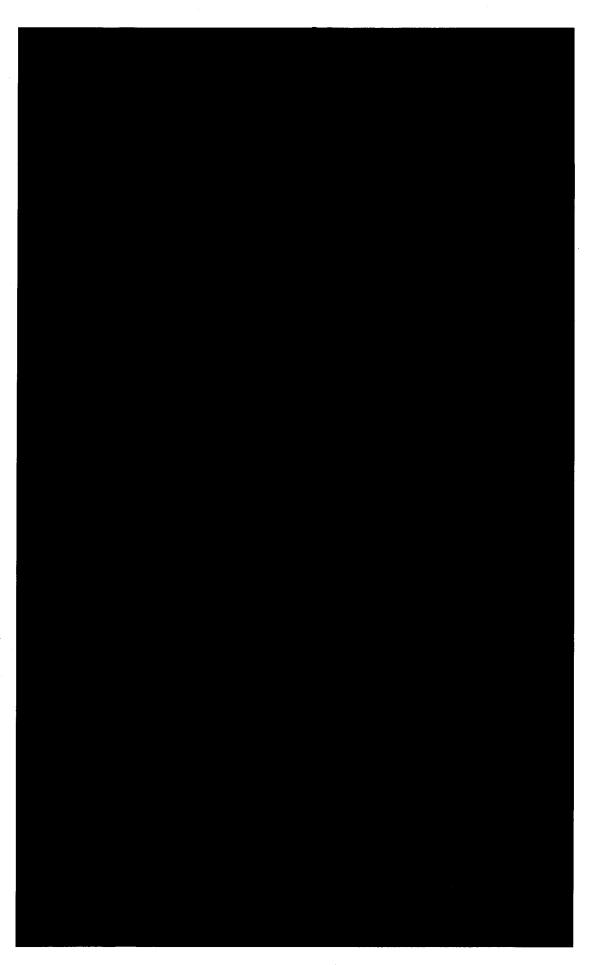








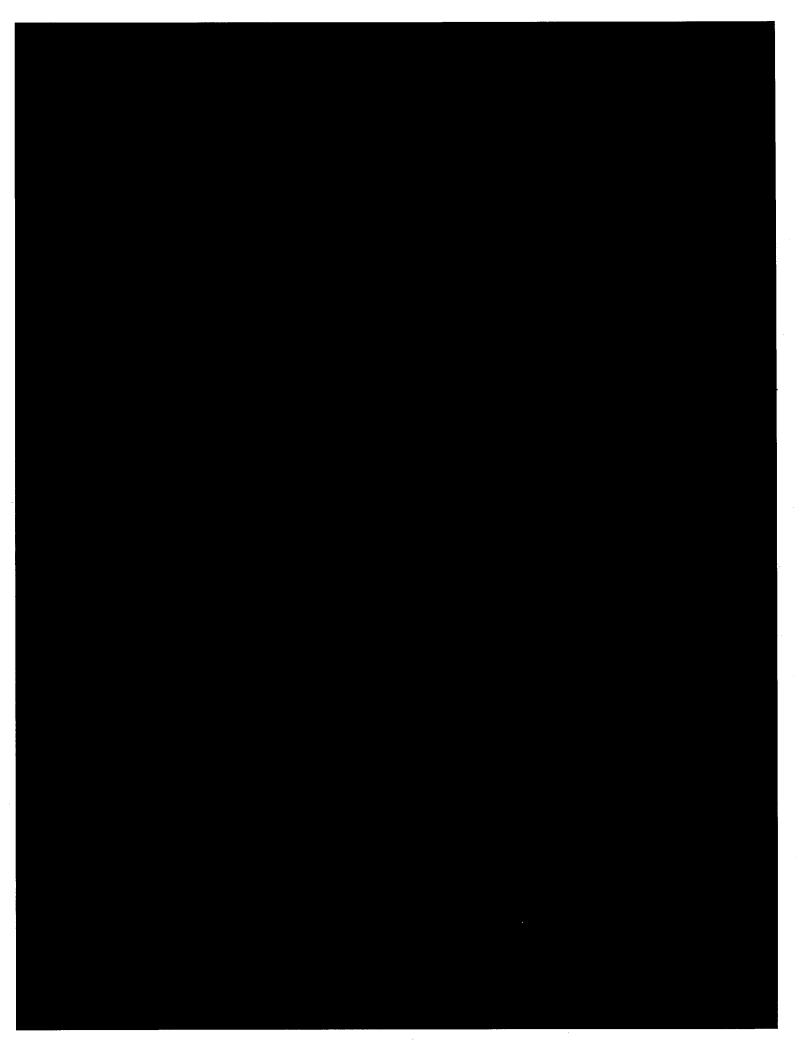


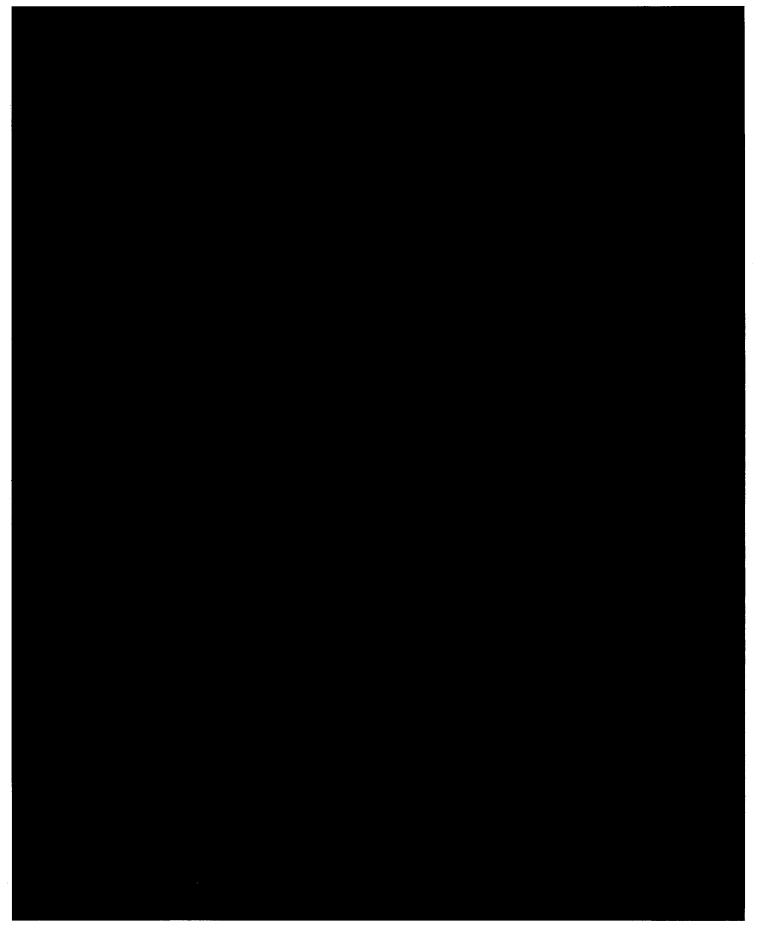


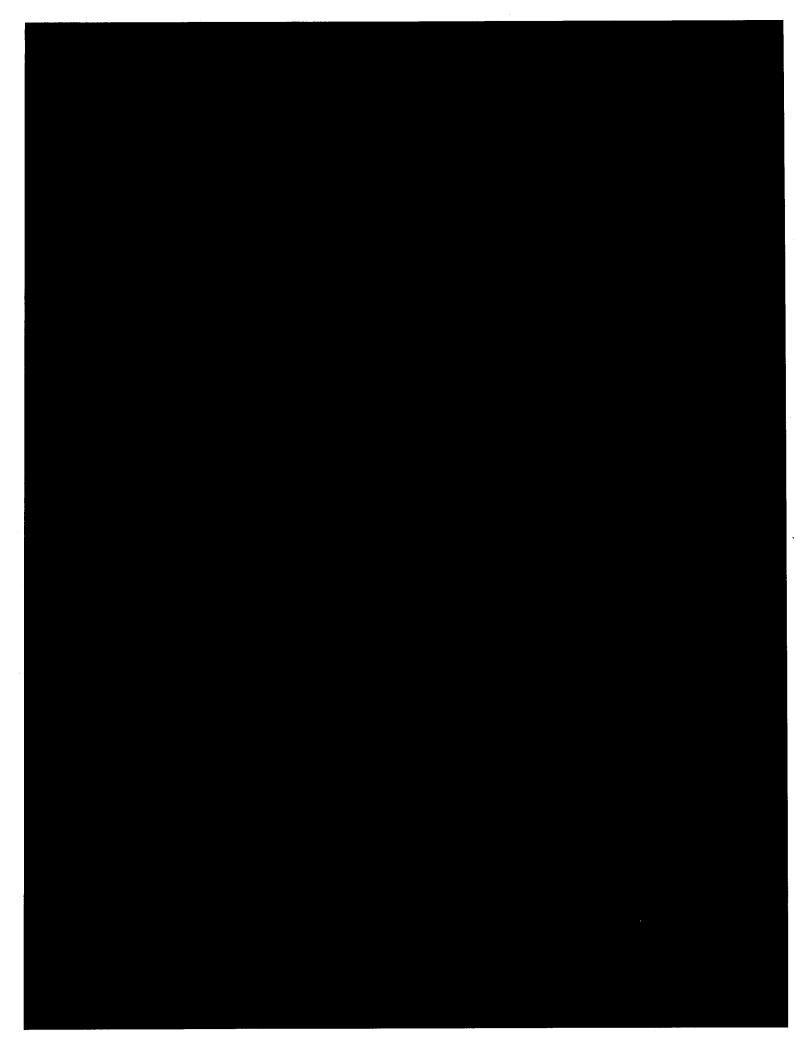


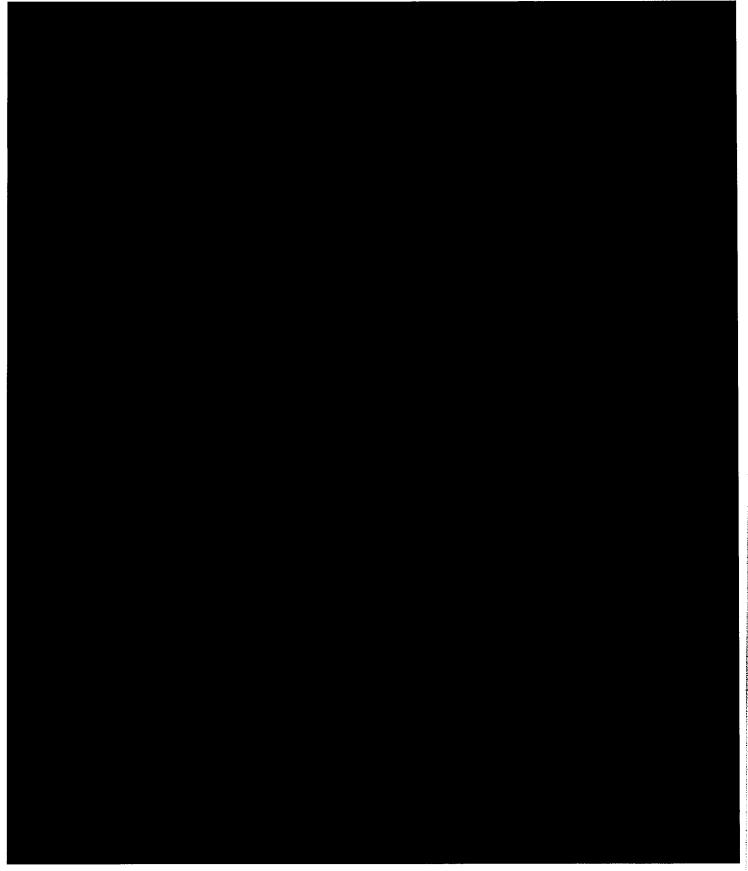


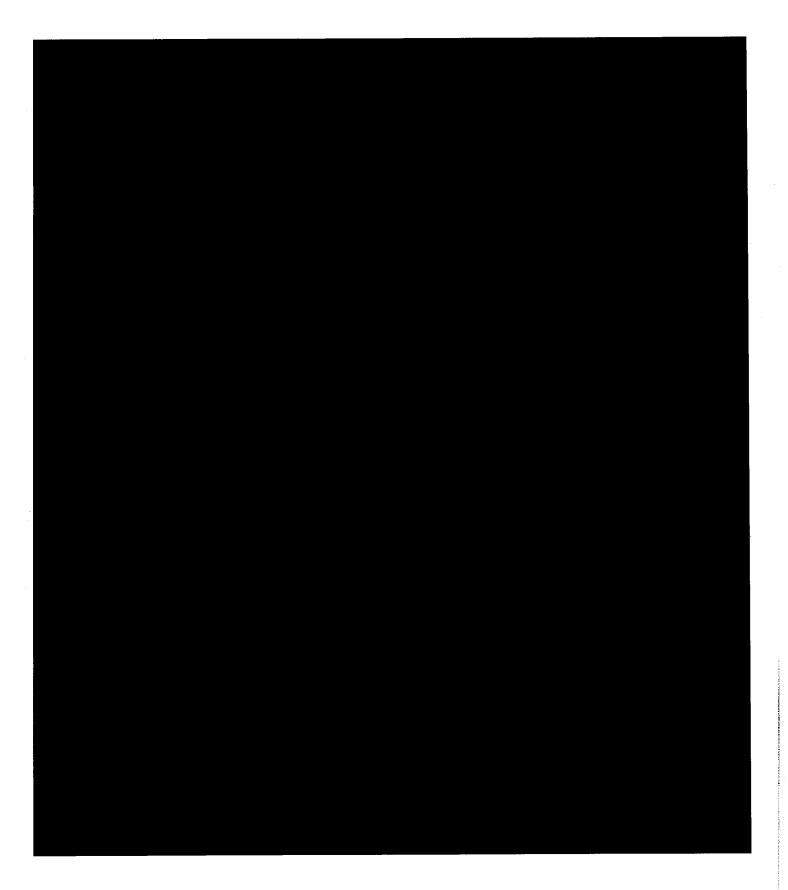


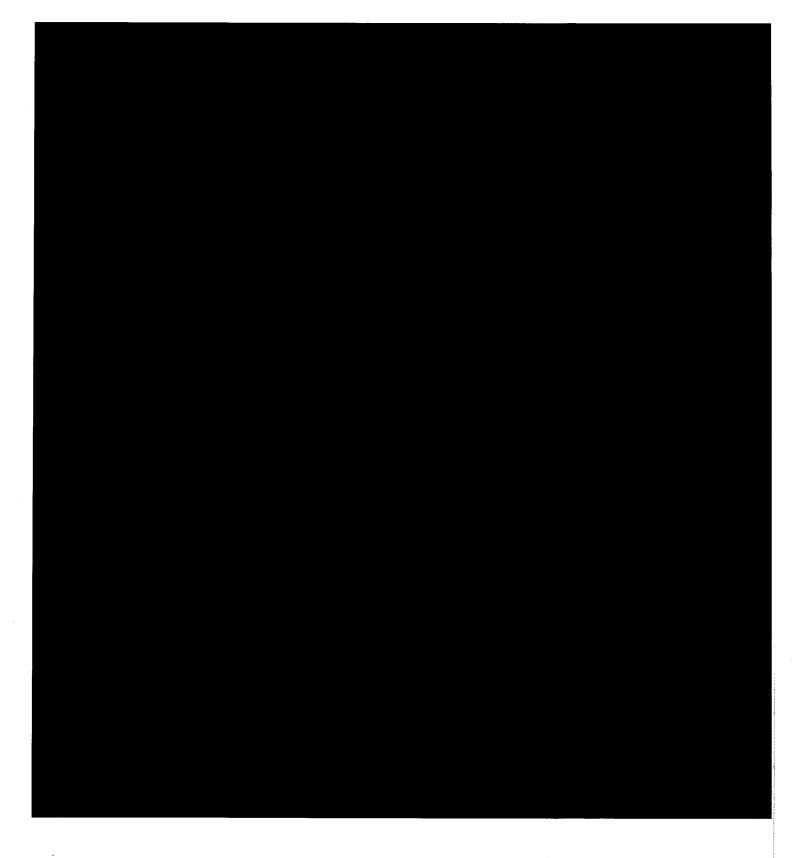


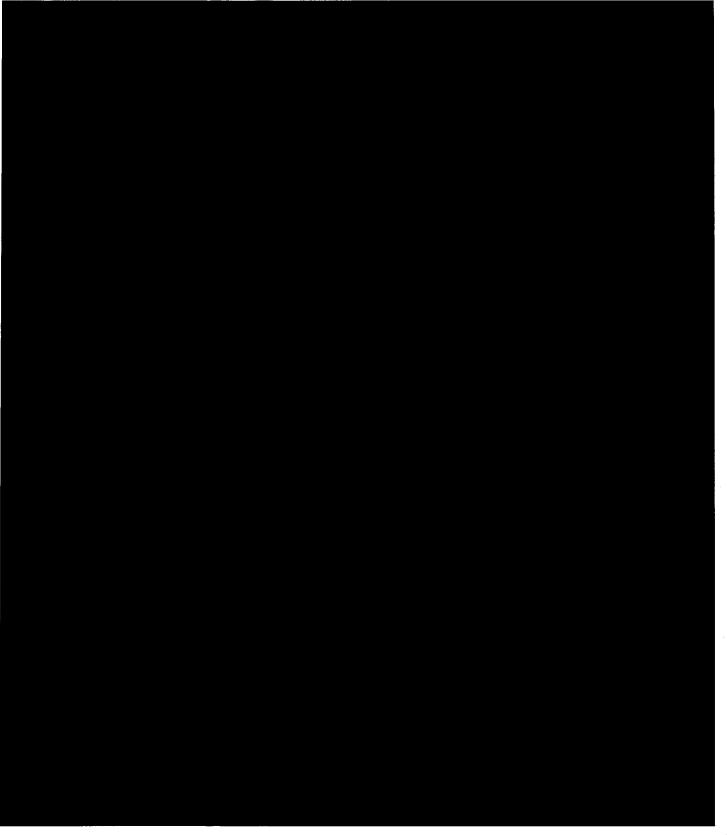


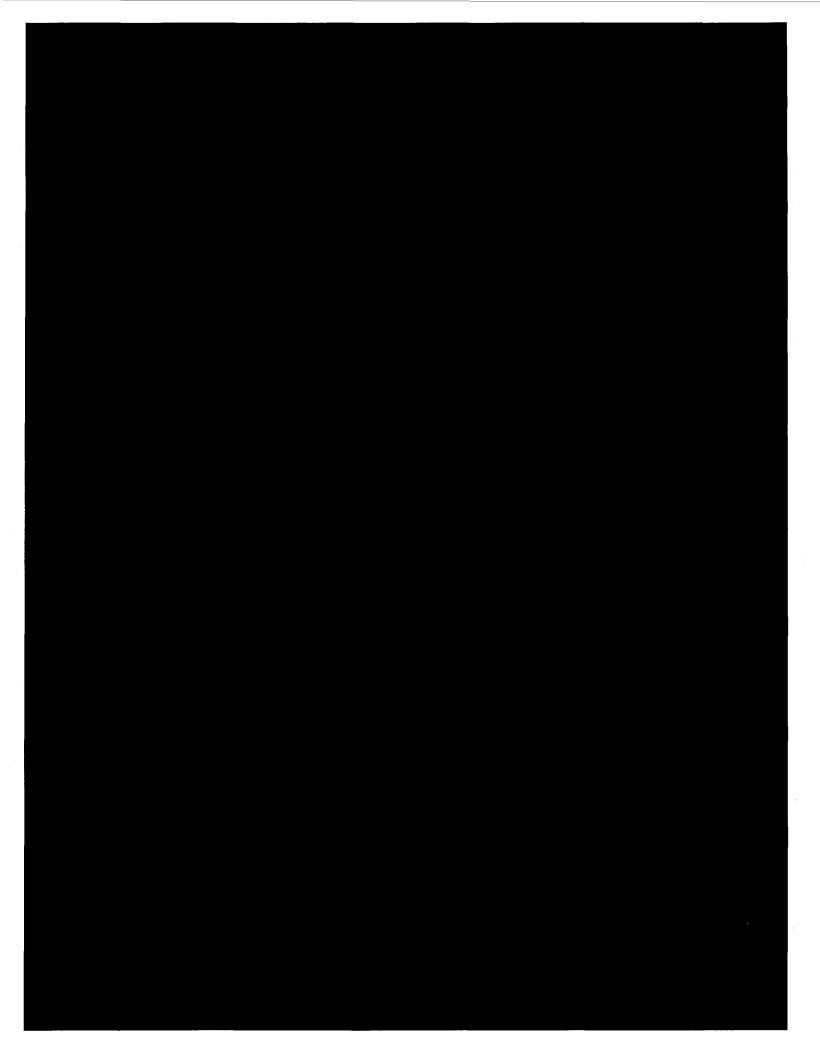


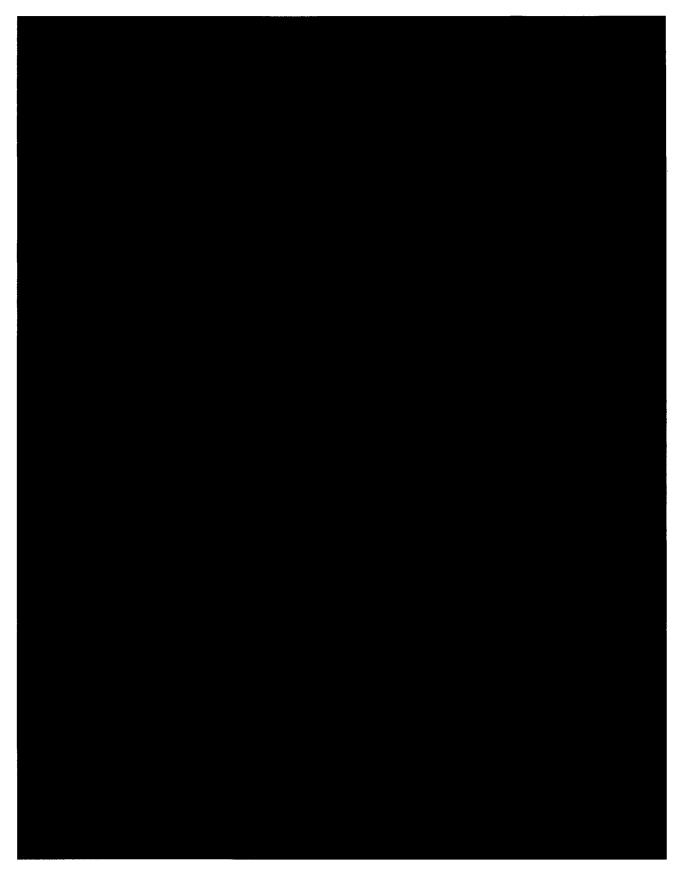




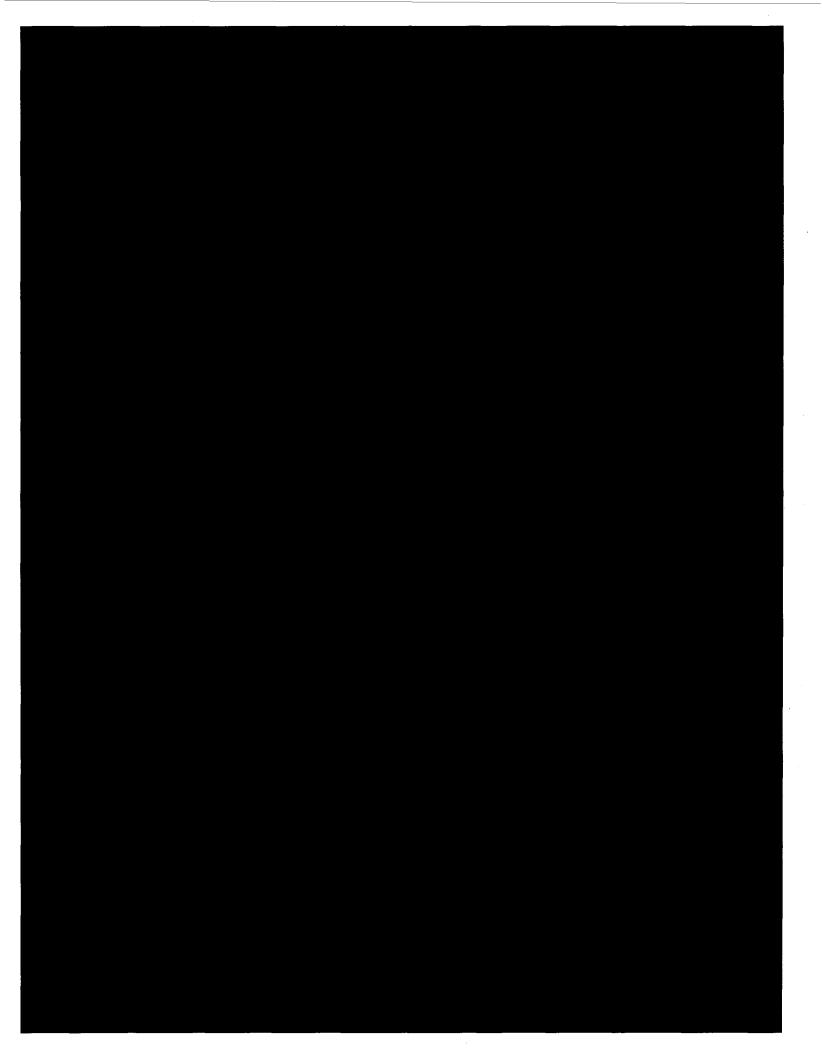


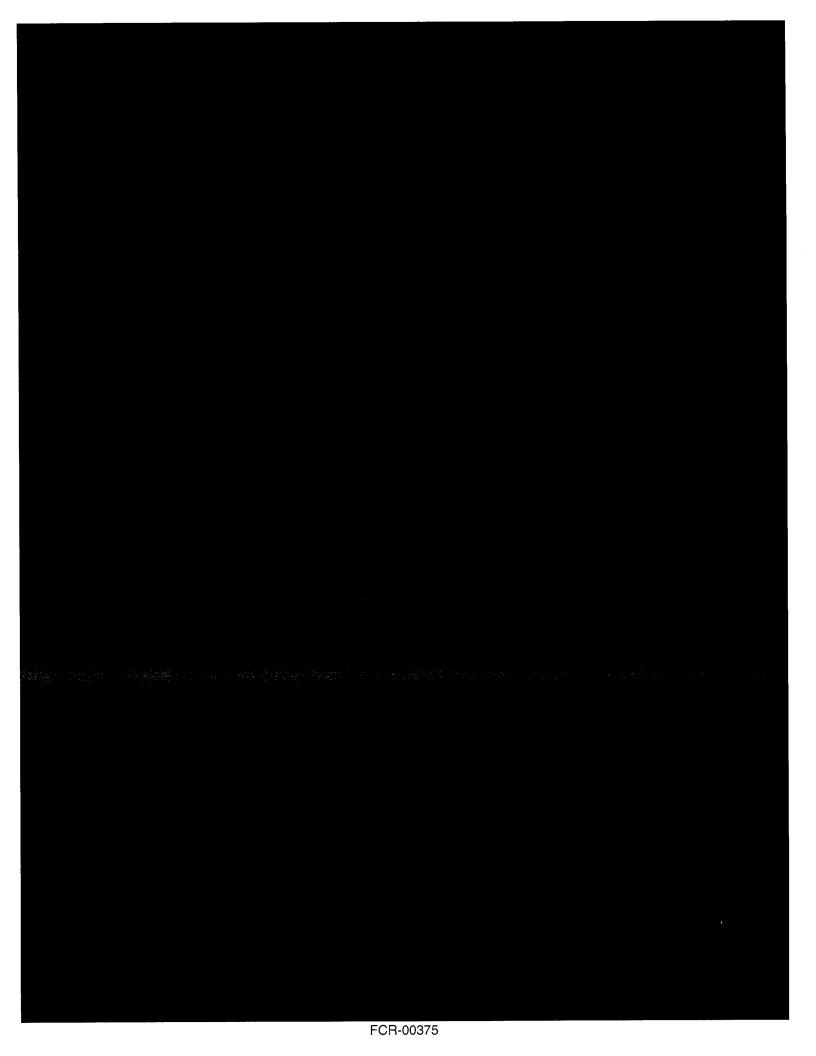


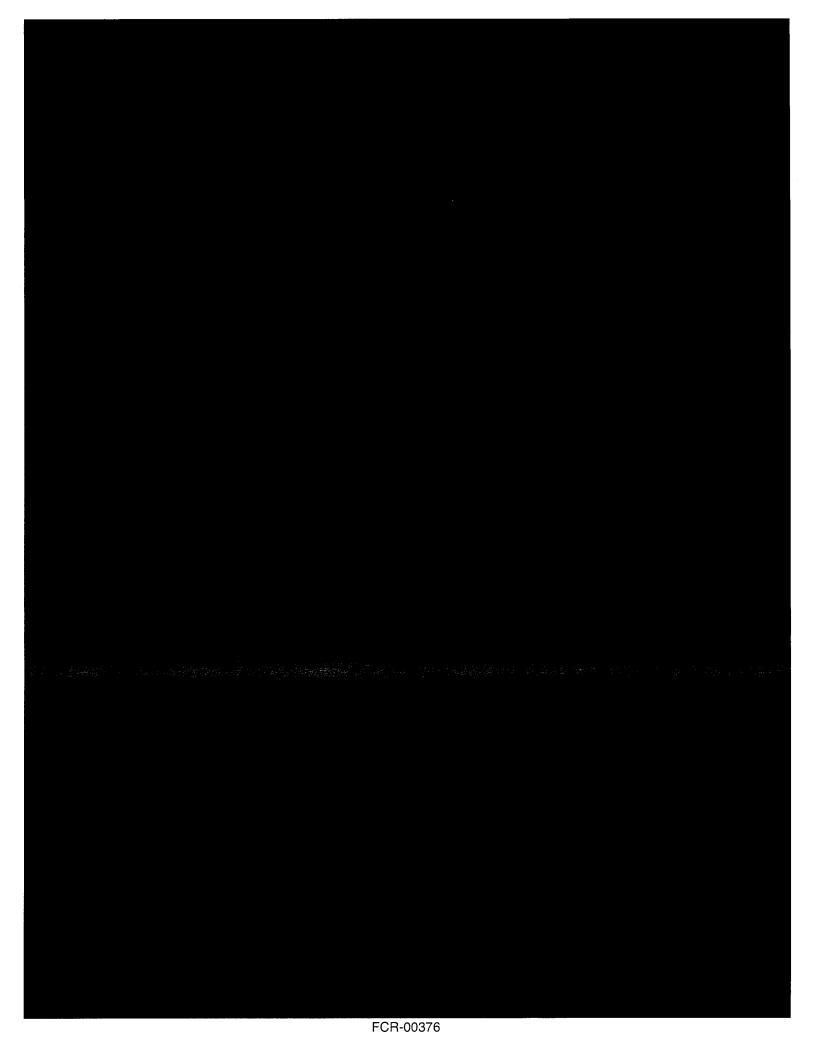


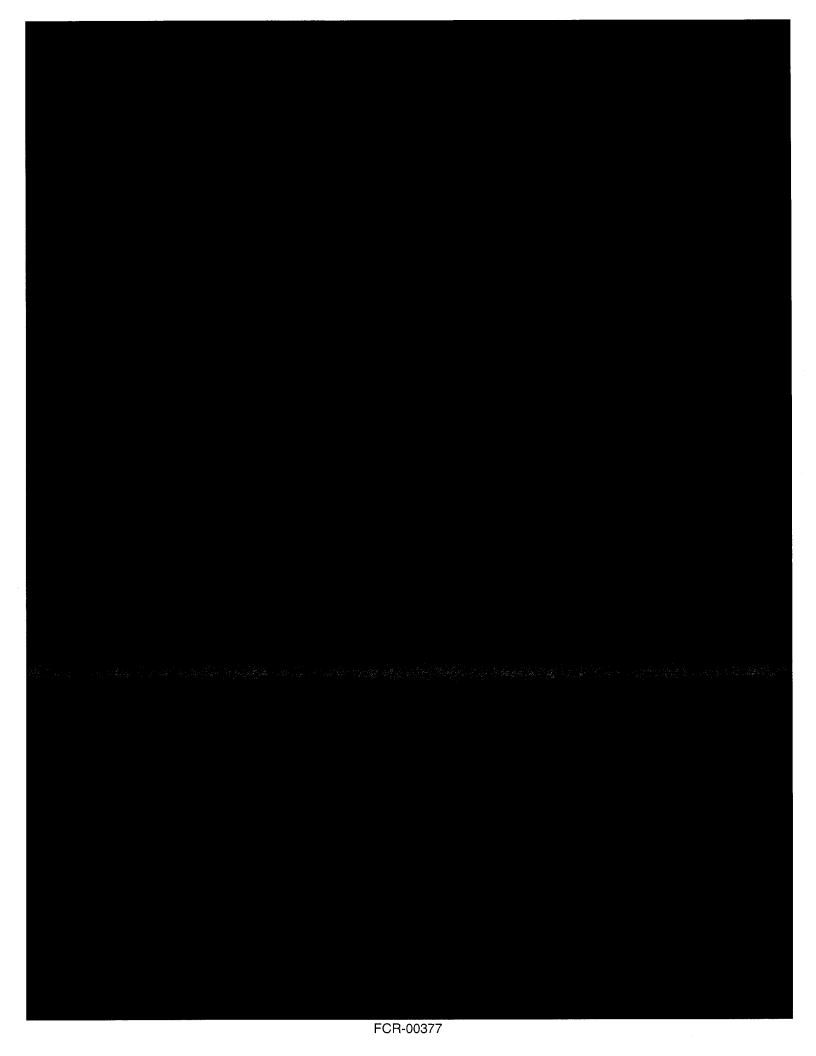


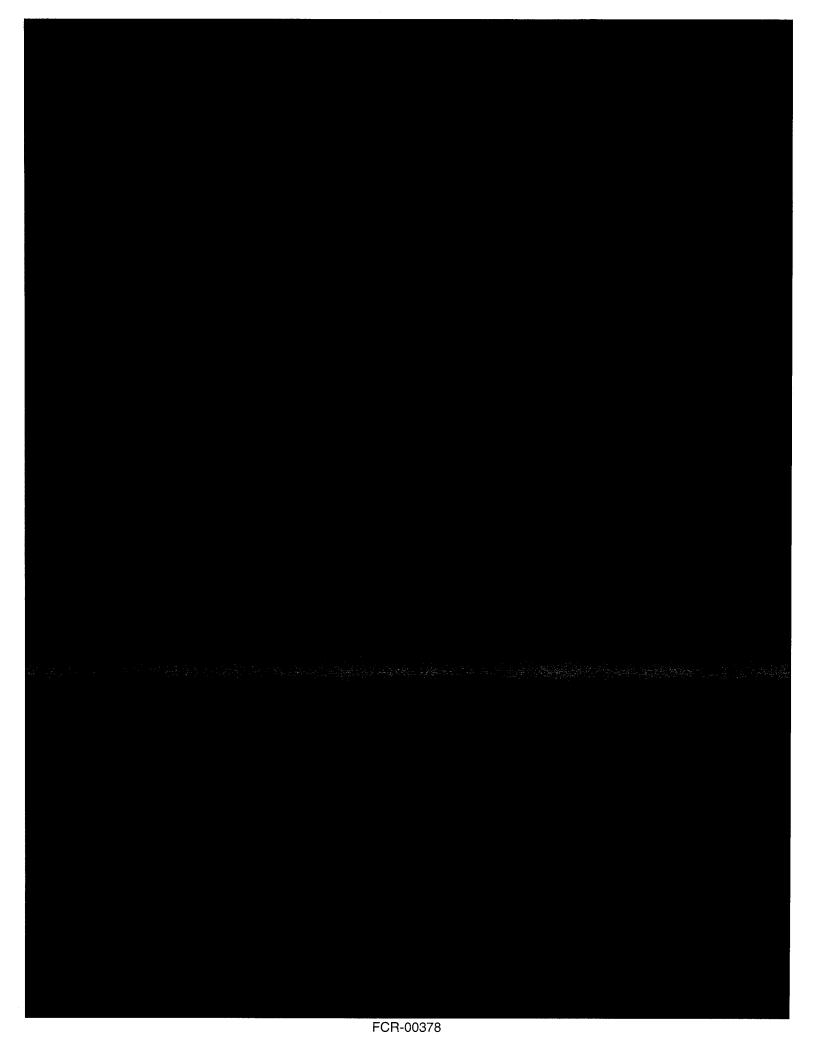


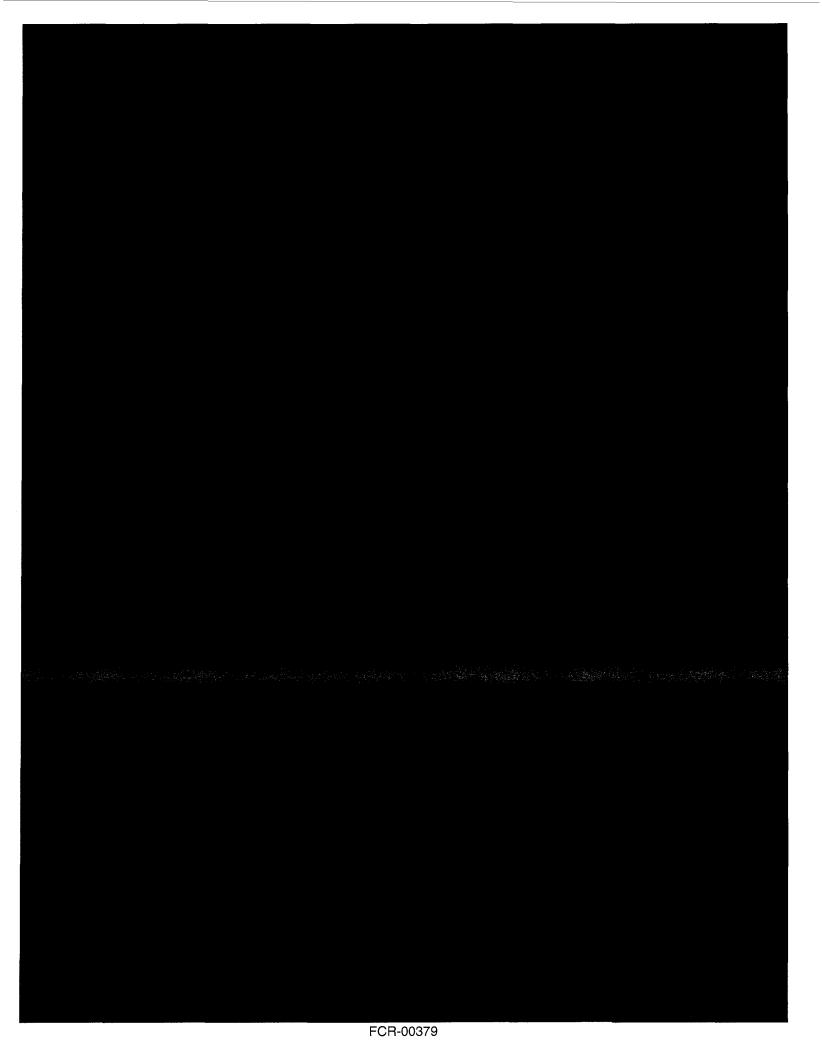


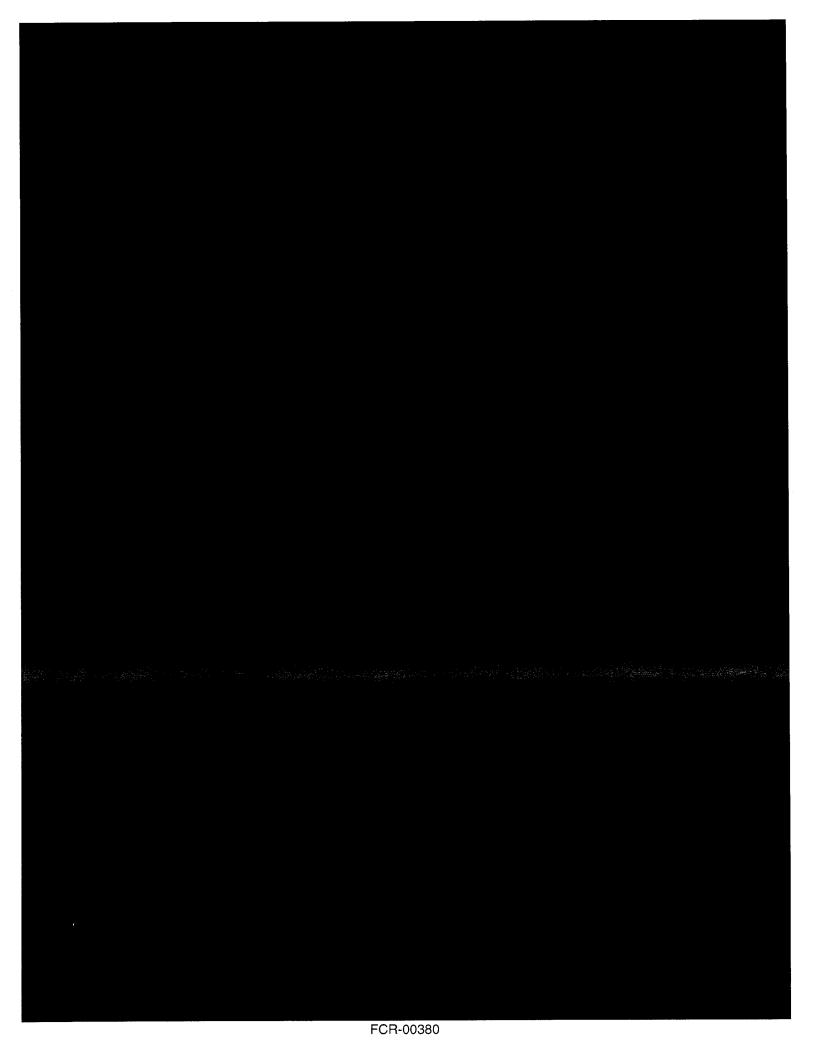


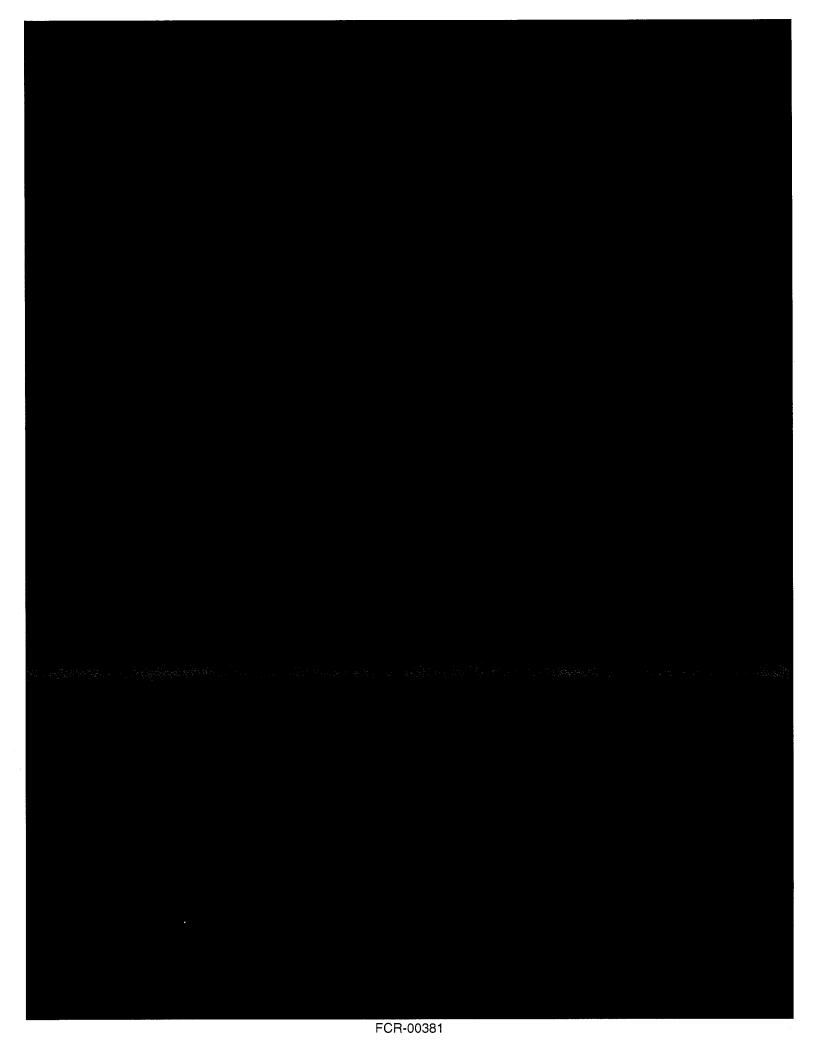




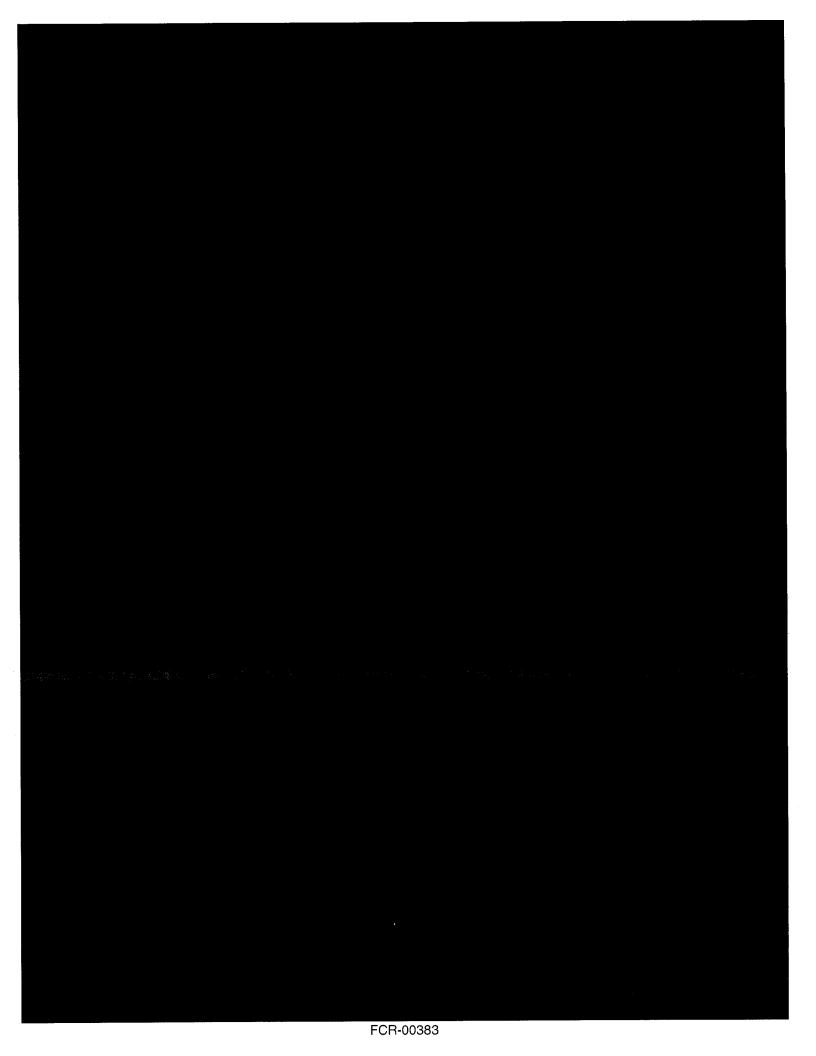


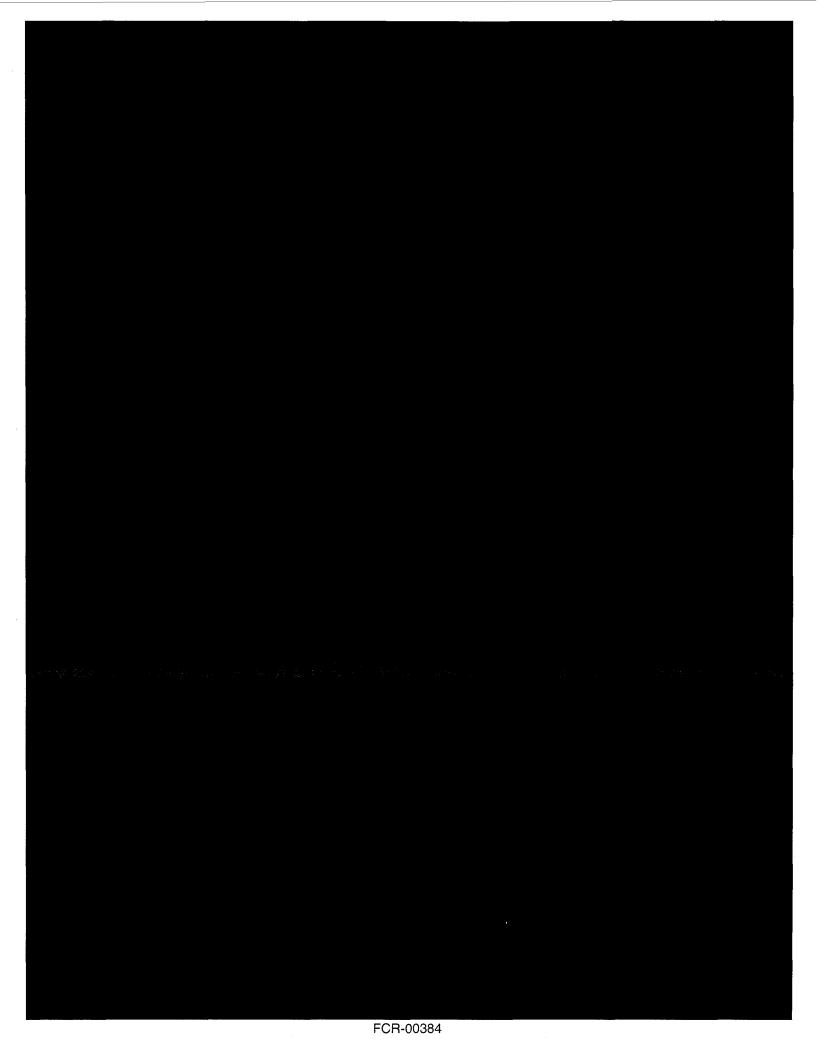


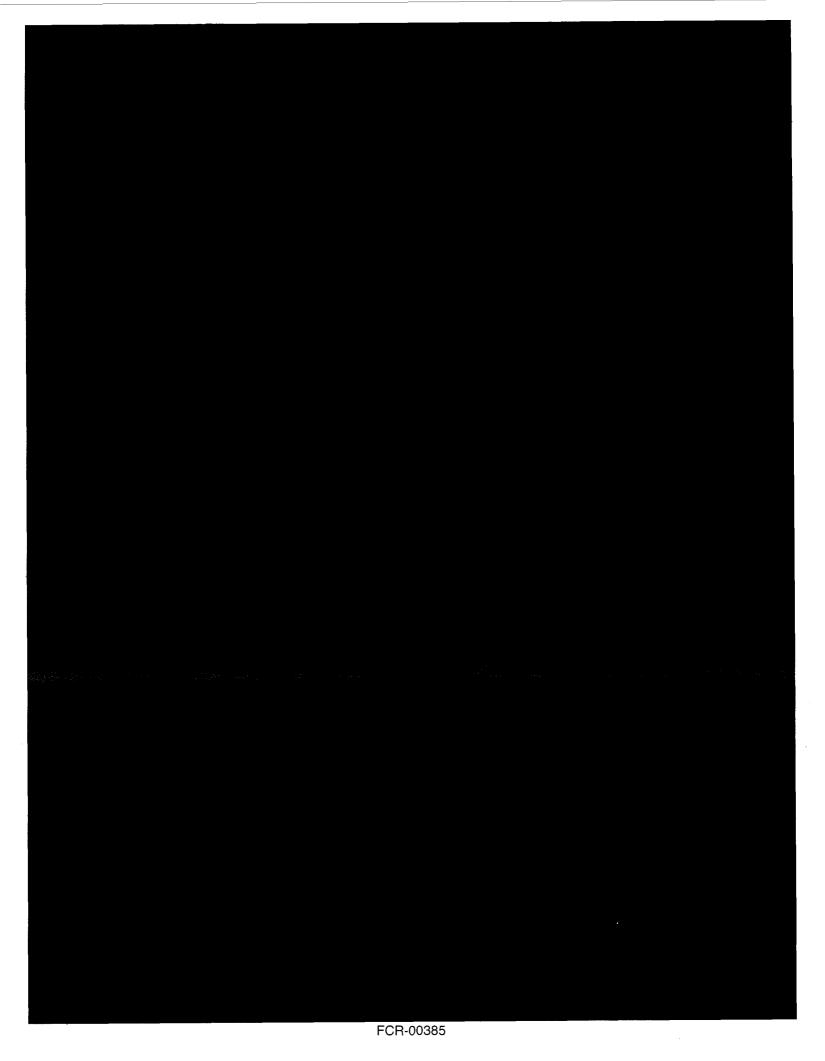








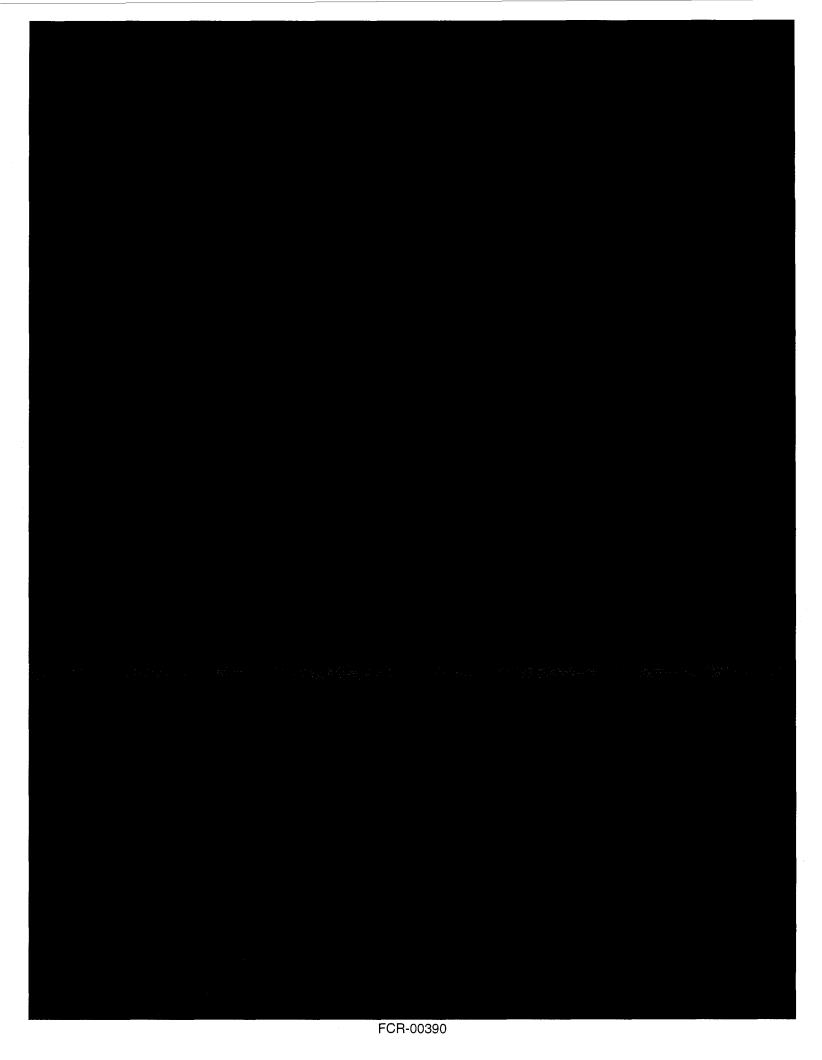




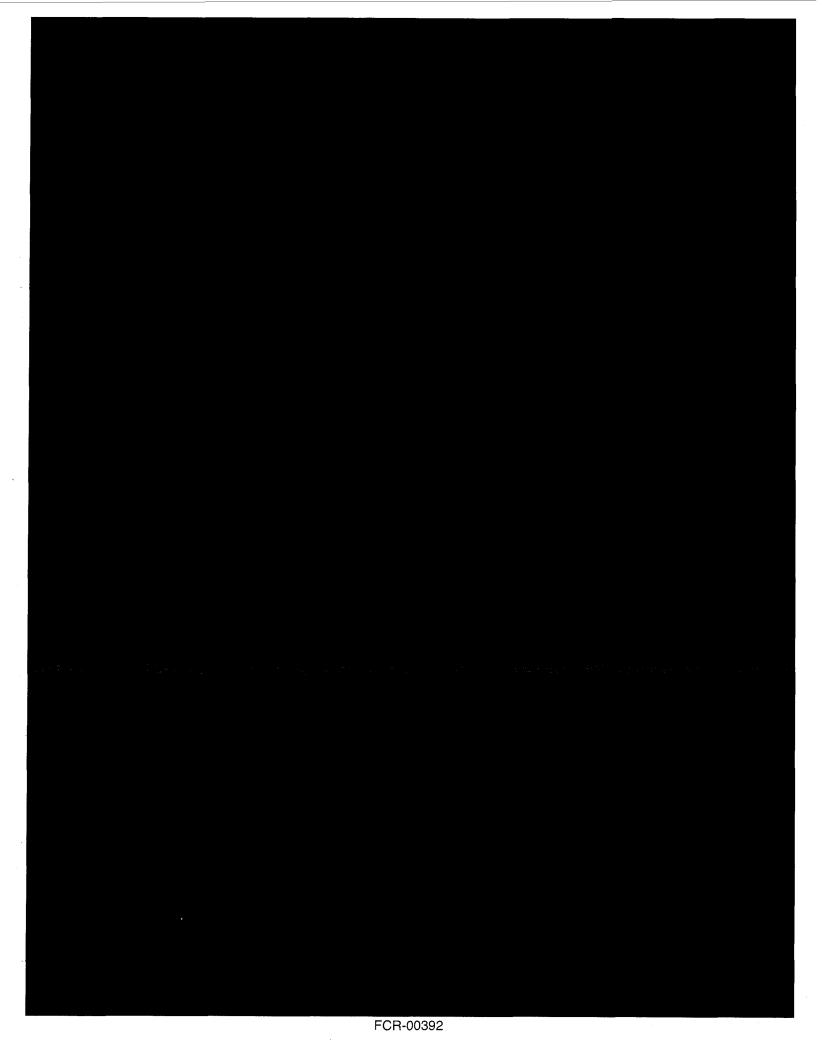


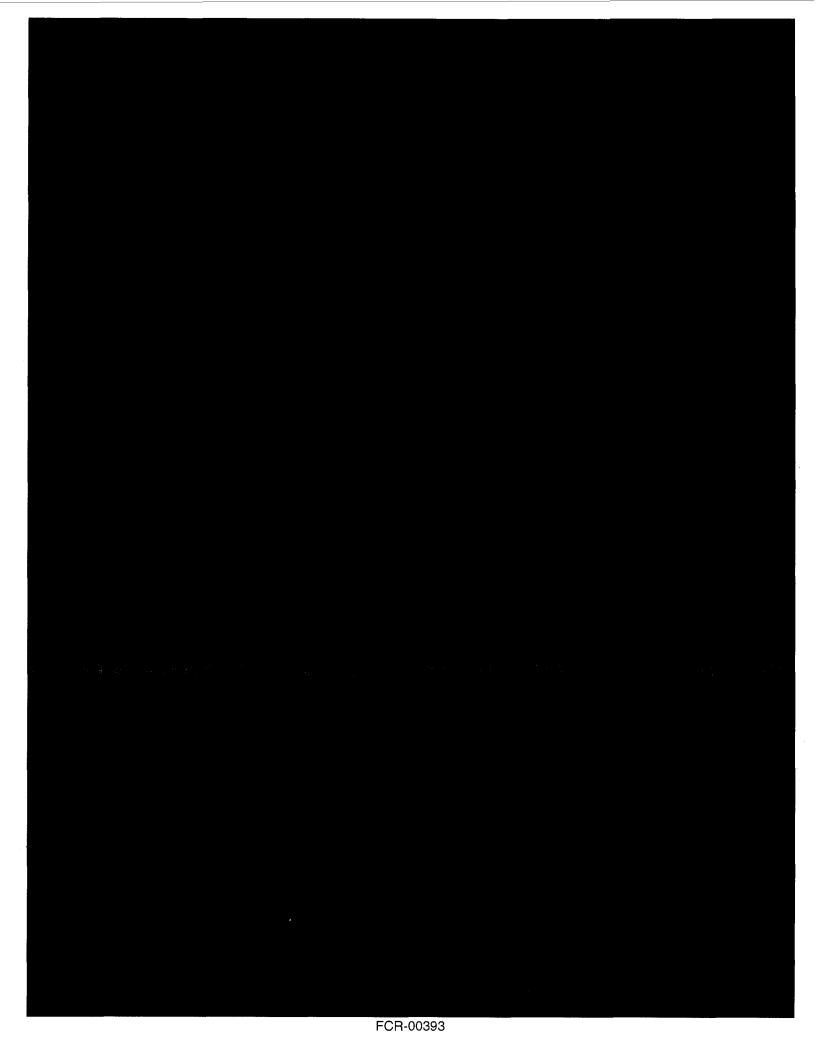


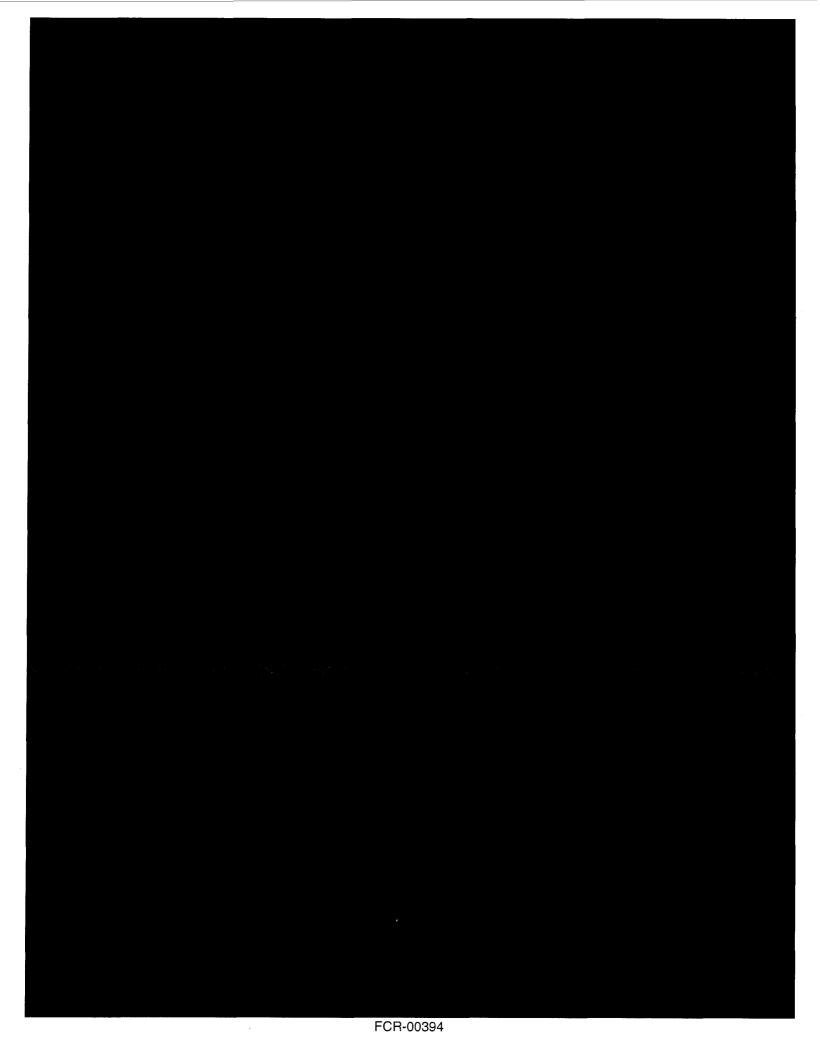


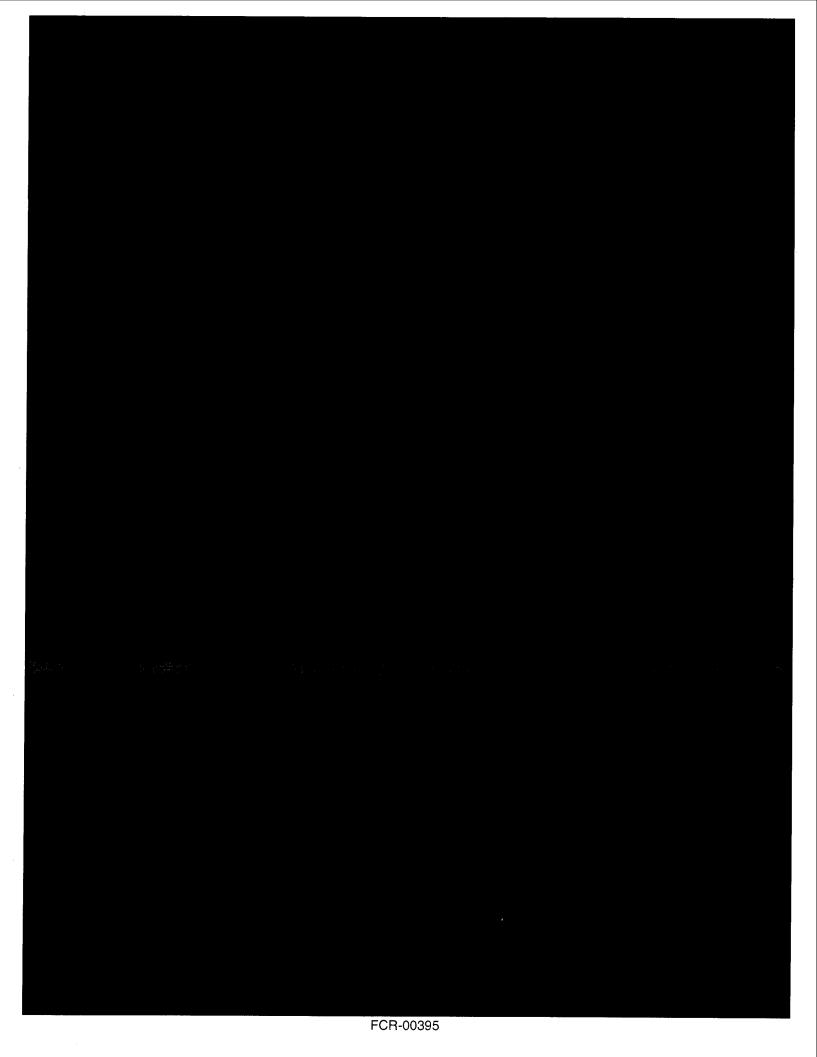


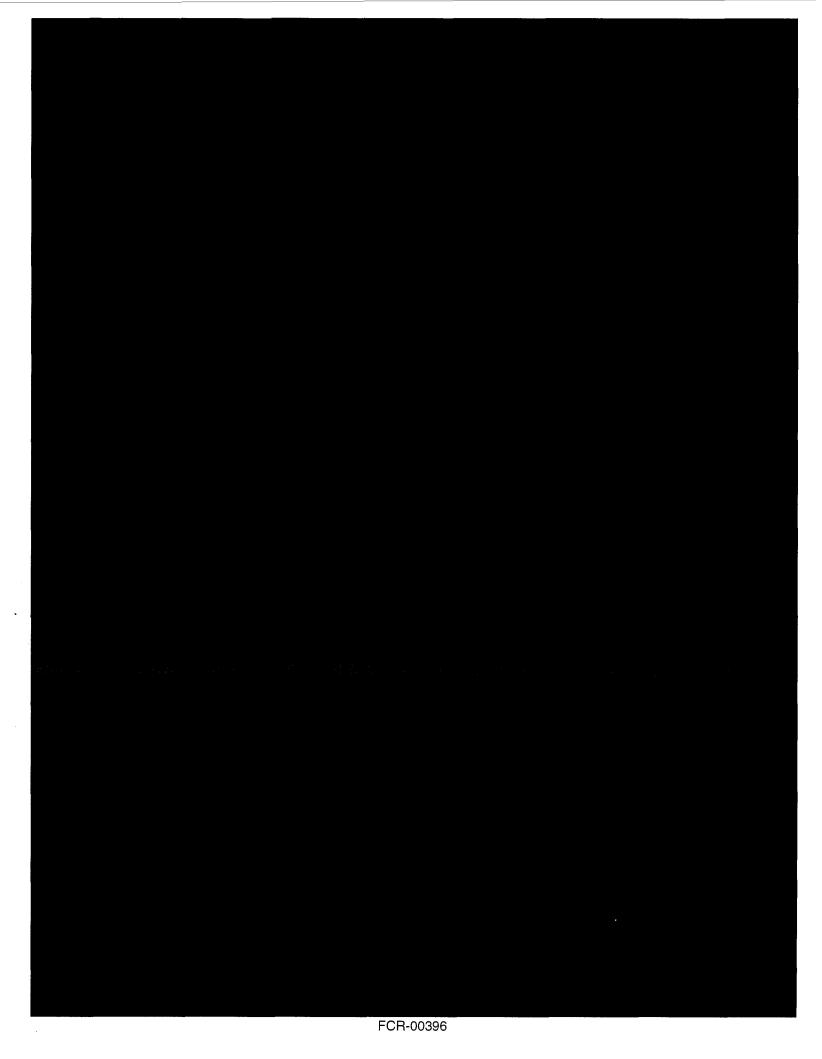


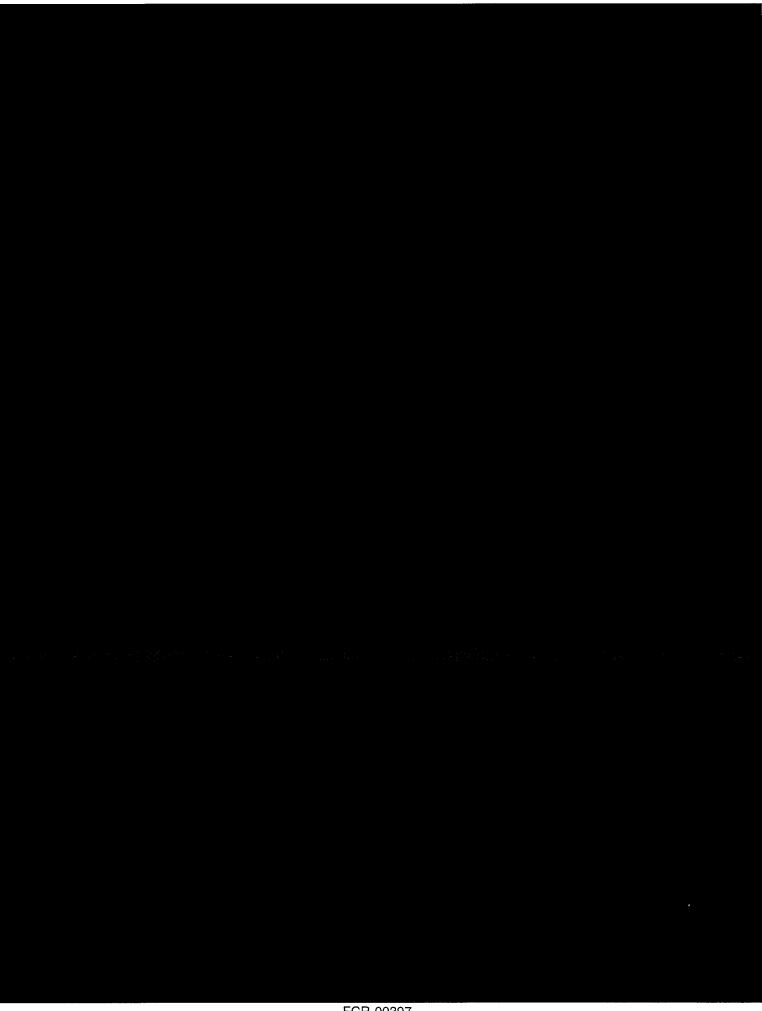




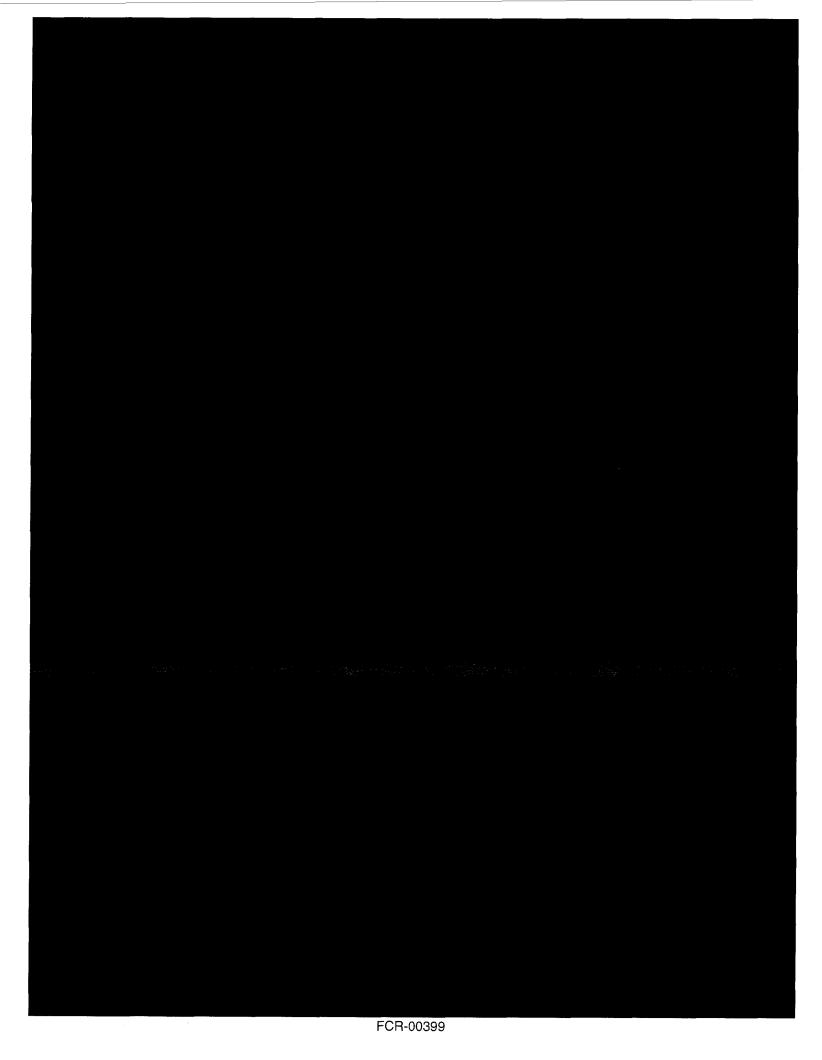




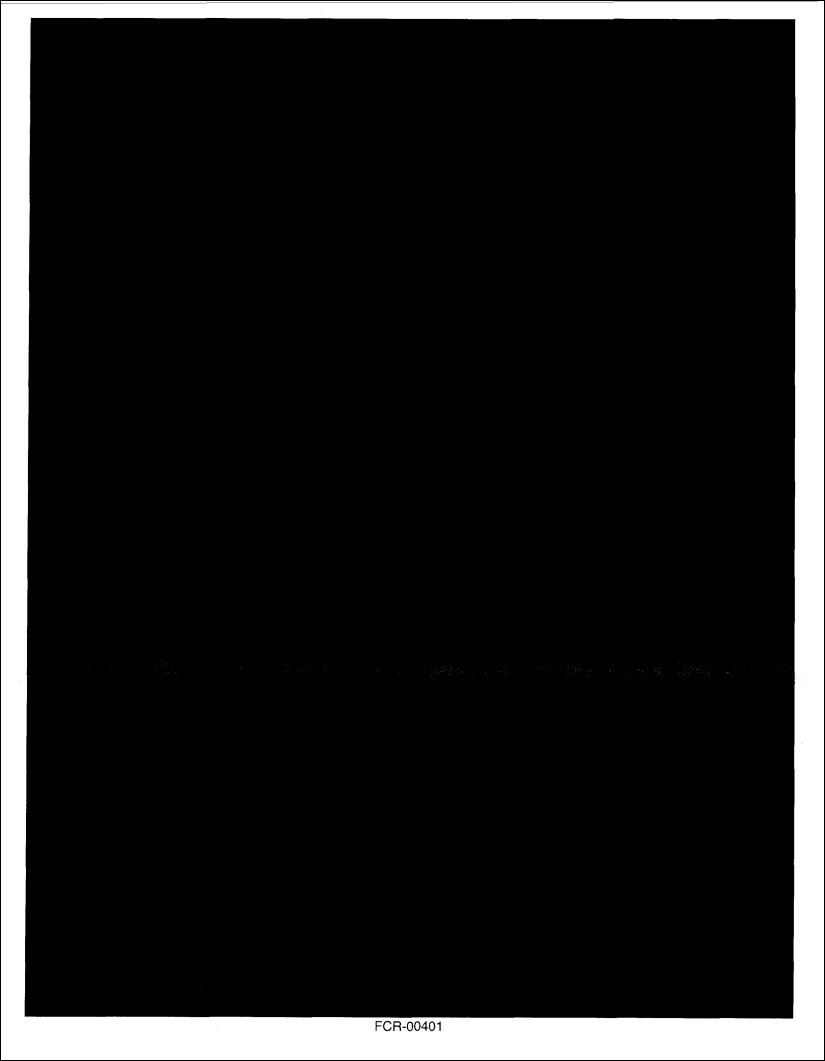


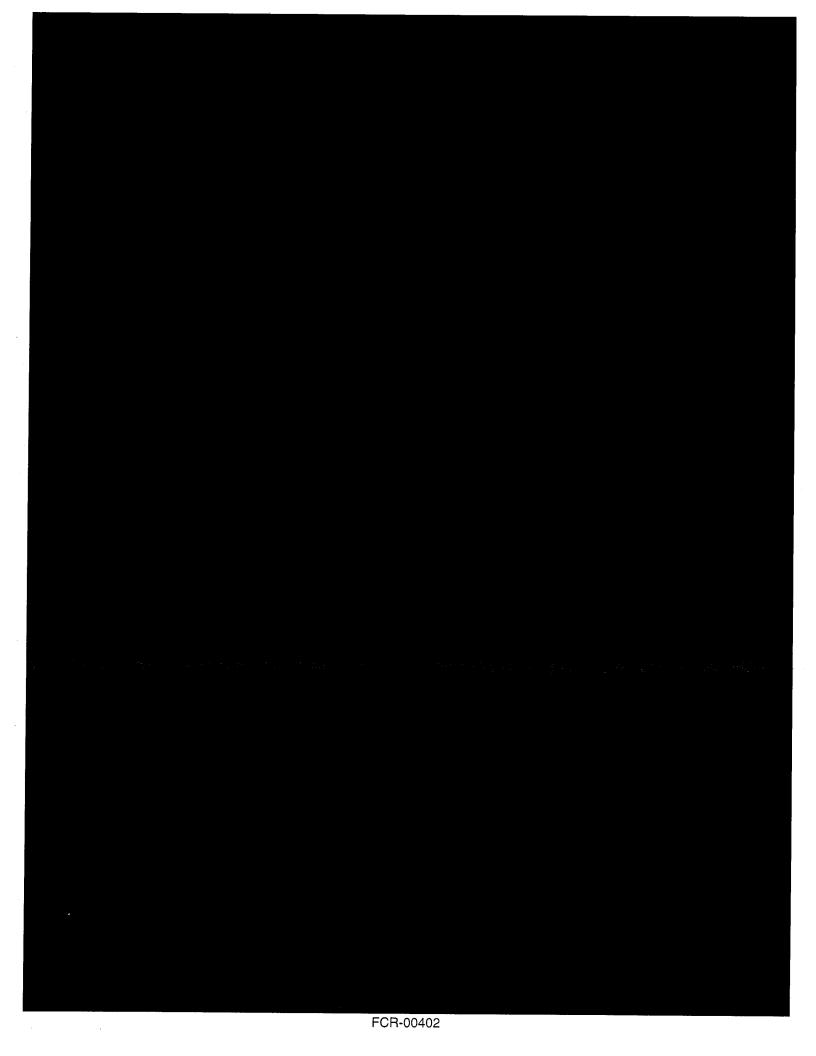


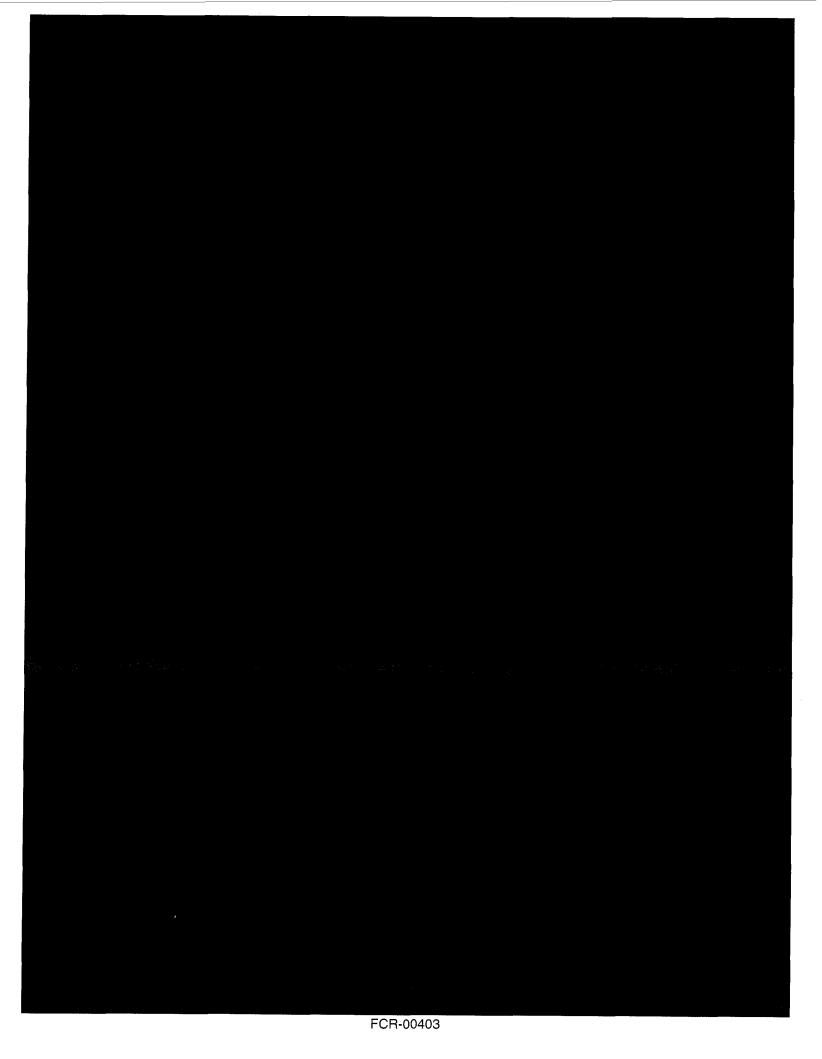


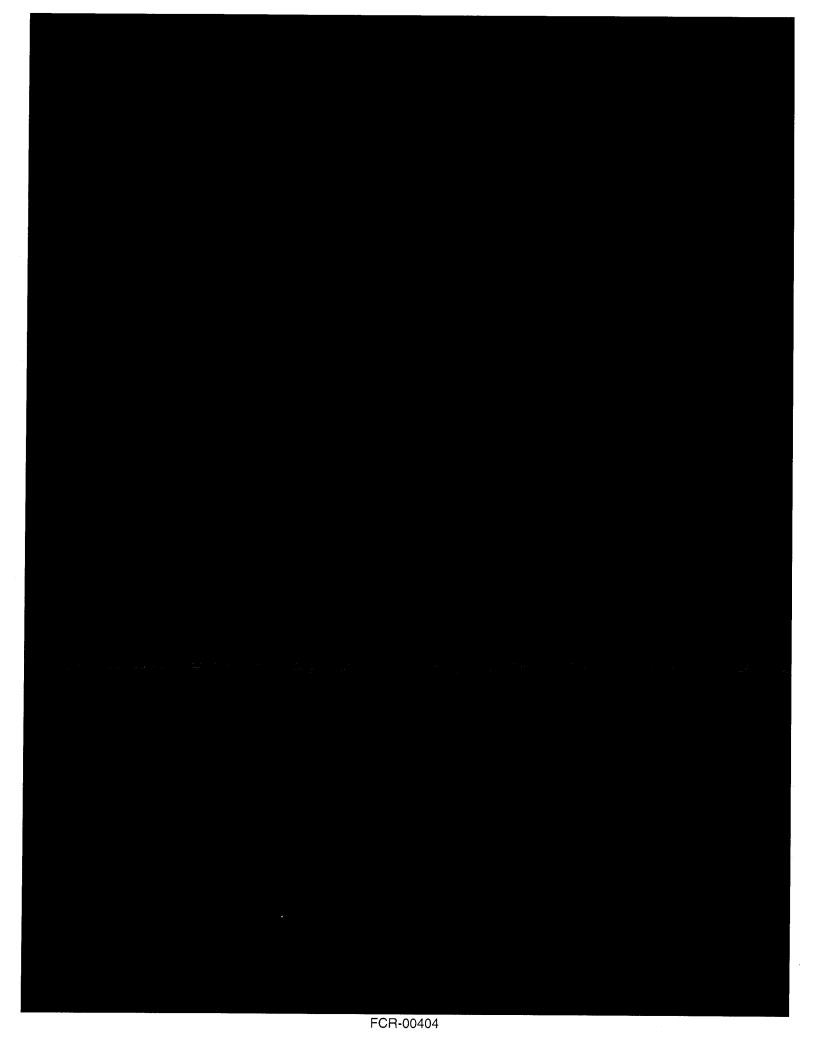




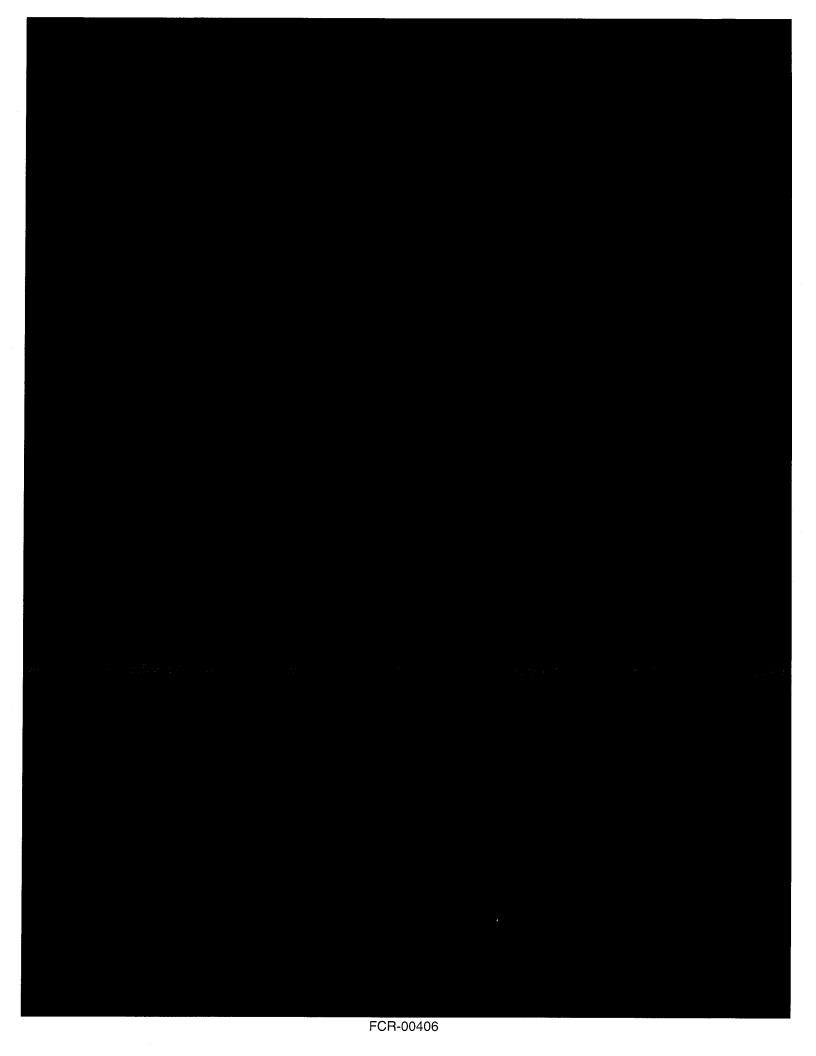


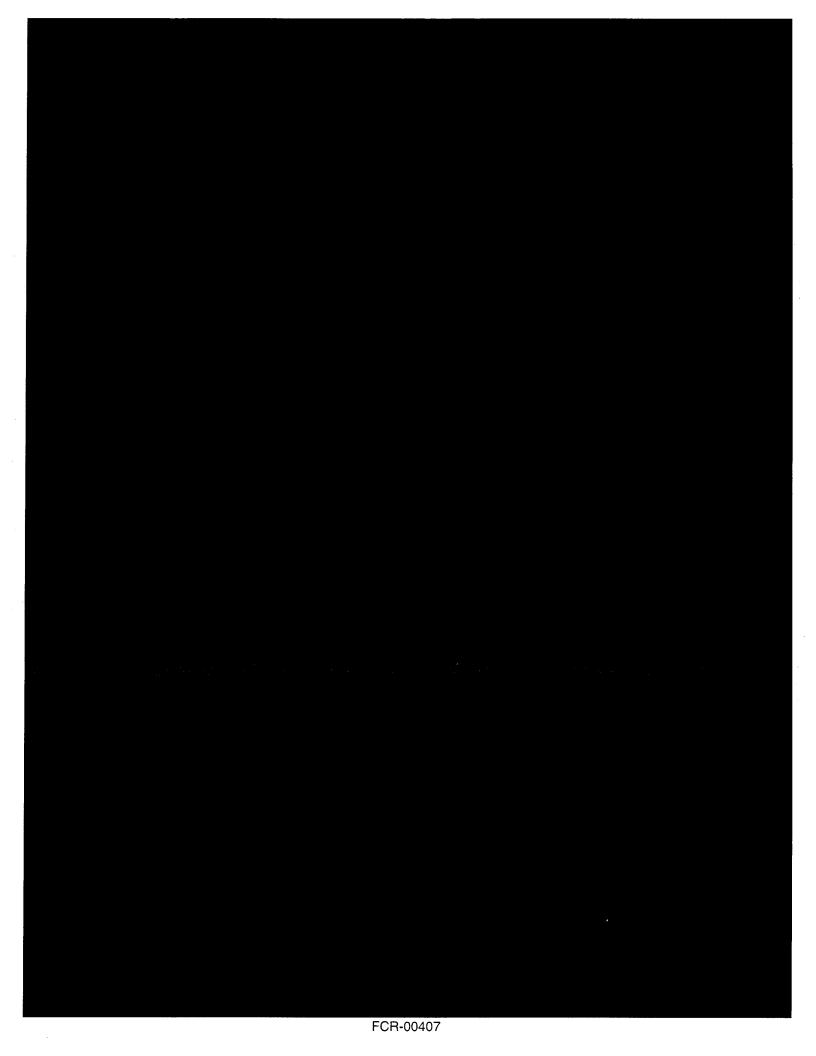


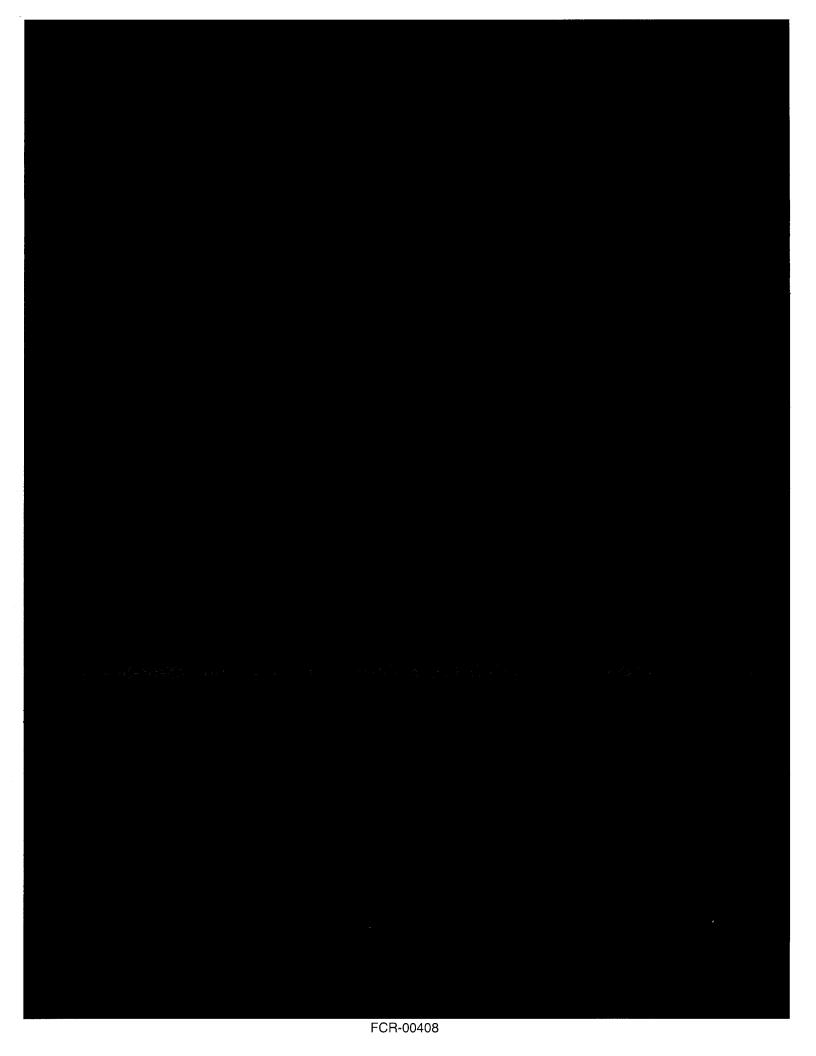












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