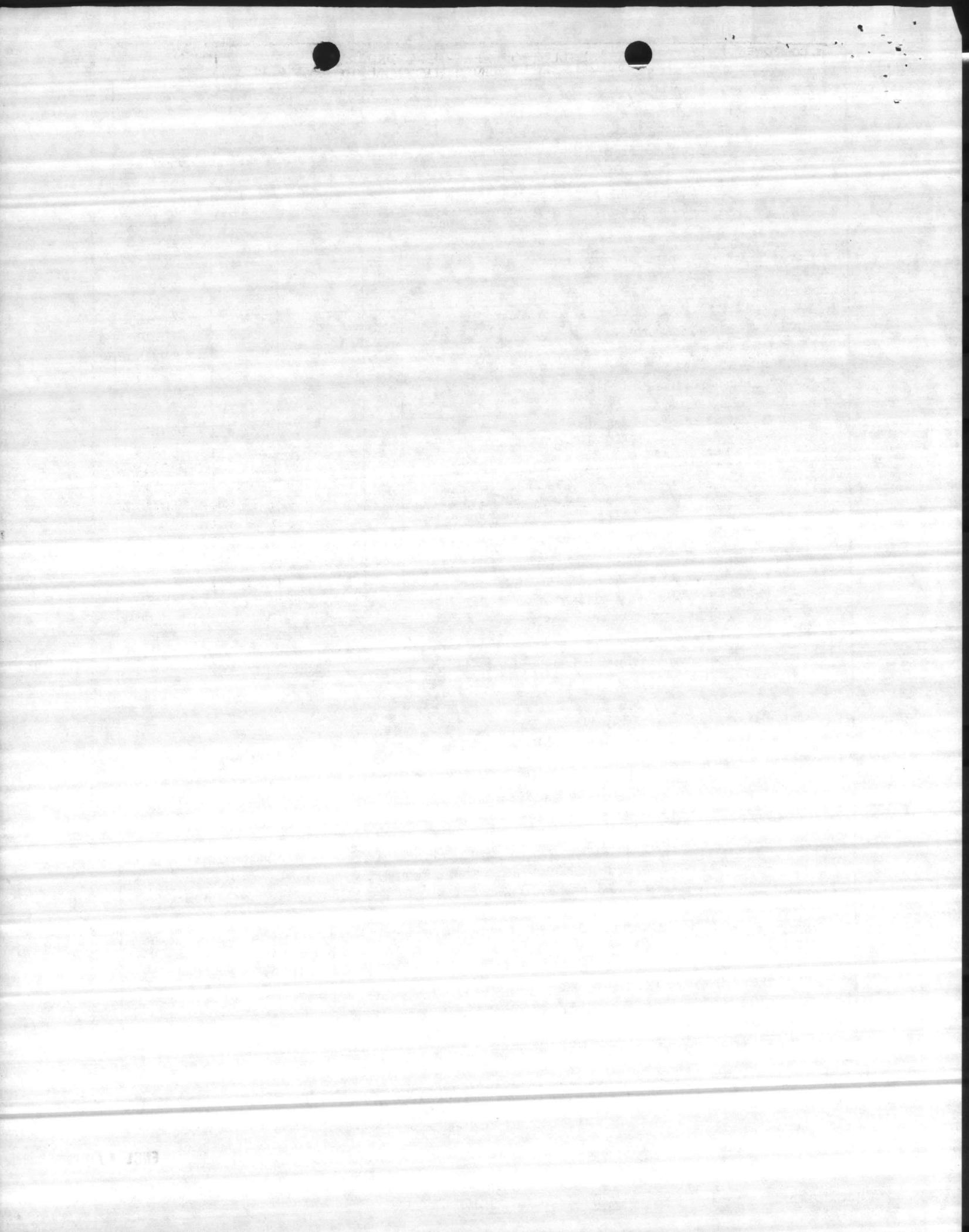


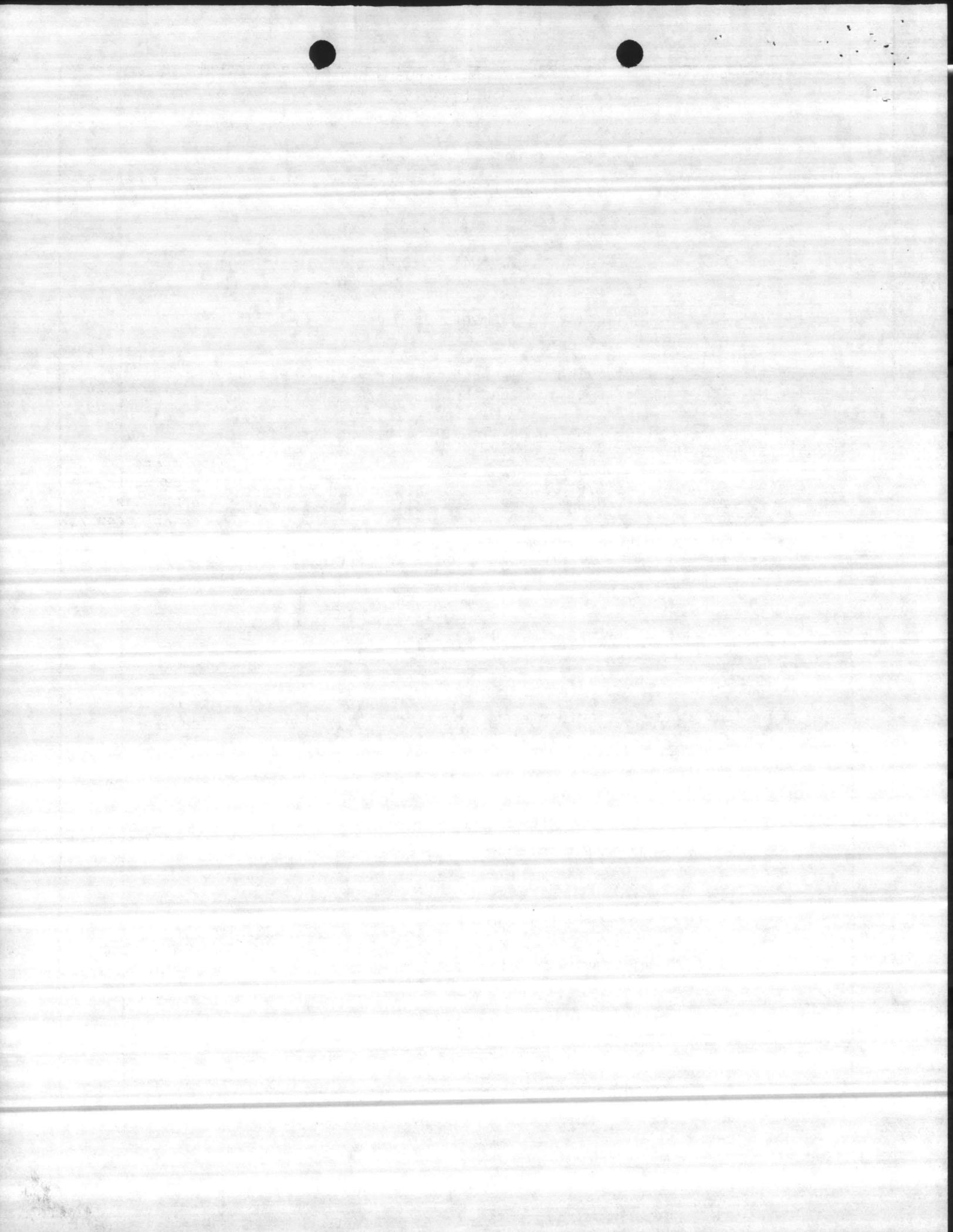
1. COMPONENT NAVY		POLLUTION ABATEMENT PROGRAM FY 1982 MILITARY CONSTRUCTION PROJECT DATA			2. DATE 24 Aug 84	
3. INSTALLATION AND LOCATION MARINE CORPS BASE CAMP LEJEUNE, NORTH CAROLINA 28542				4. PROJECT TITLE REFUSE BURNING SUPPLEMENTAL STEAM PLANT		
5. PROGRAM ELEMENT		6. CATEGORY CODE 821-09	7. PROJECT NUMBER P-822		8. PROJECT COST (\$000) 42,000	
ESCALATED TO APRIL 1988				9. COST ESTIMATES		
ITEM				U/M	QUANTITY	COST (\$000)
FACILITY				LS	-	35,876
CONTINGENCY				LS	-	3,588
TOTAL CONTRACT COST				LS	-	39,464
SUPERVISION, INSPECTION, AND OVERHEAD (10%)				LS	-	2,171
TOTAL REQUEST				LS	-	41,635
TOTAL REQUEST (ROUNDED)				LS	-	42,000
EQUIPMENT PROVIDED FROM OTHER APPROPRIATIONS				LS	-	124
10. DESCRIPTION OF PROPOSED CONSTRUCTION						
Provide a one story Refuse Burning Supplemental Steam Plant, of Brick Veneer over masonry block, structural steel framing, reinforced concrete slab and pile foundation. Includes site improvements, access roads and pavements, and utilities.						
11. REQUIREMENTS						
<u>PROJECT:</u> This Steam Plant will provide corrective measures for relieving the existing and potential Pollution Abatement problems associated with landfill operations. It will prolong the life of existing landfills and improve management techniques and controls. It provides a Refuse Burning Supplemental Steam Plant for Camp Geiger and MCAS(H) New River.						
<u>REQUIREMENT:</u> Utilization of solid waste from Marine Corps Base, Camp Lejeune, N.C., and MCAS Cherry Point will eliminate costly expansion of facility landfills and/or procurement of new sites. This Plant will reduce oil requirements for steam generation at Camp Geiger, and Marine Corps Air Station (H), New River.						
<u>CURRENT SITUATION:</u> Current landfill operations at Marine Corps Base, Camp Lejeune, N.C., and MCAS Cherry Point will require extensive improvements to contain estimated increases in solid waste disposal. Existing landfills used by the local military bases and surrounding municipalities are rapidly being filled to capacity. Attempts at obtaining other approved landfills have met with opposition from the public. Sites available either cannot meet environmental requirements or are infeasible due to cost and distances from prospective users. Existing landfills have been monitored and some						
EGJ						



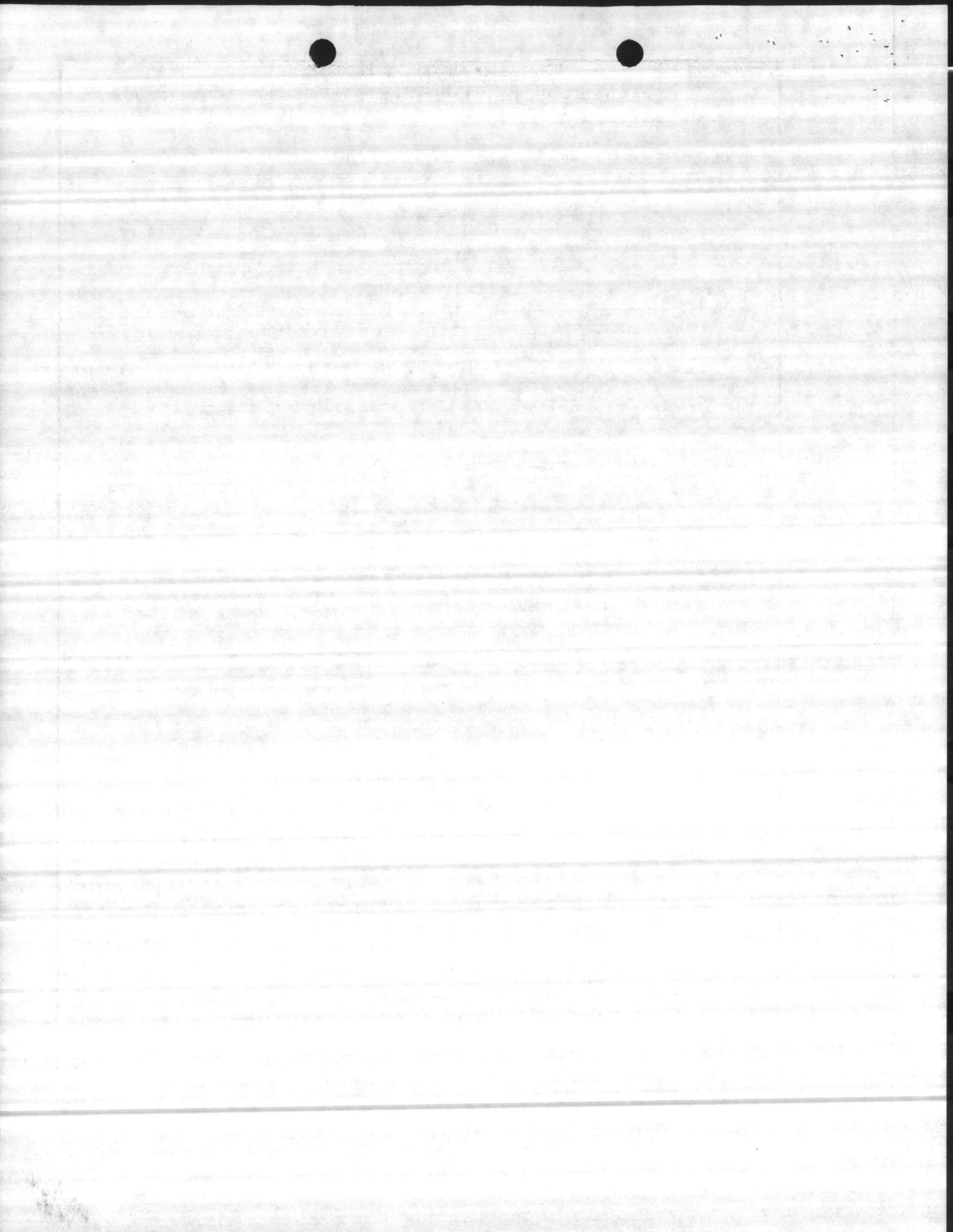
1. COMPONENT NAVY	POLLUTION ABATEMENT PROGRAM FY 19 88 MILITARY CONSTRUCTION PROJECT DATA	2. DATE 24 Aug 84
3. INSTALLATION AND LOCATION MARINE CORPS BASE CAMP LEJEUNE, NORTH CAROLINA 28542		
4. PROJECT TITLE REFUSE BURNING SUPPLEMENTAL STEAM PLANT	5. PROJECT NUMBER P-822	
<p>11. Continued</p> <p>were found to have pollutants. Constant corrections are being made. This project will enhance the environment by eliminating further need for disposal of solid waste in landfills. It further will enable landfill operators to tighten controls in the proper usage of existing landfills. Steam is generated using costly fossil fuel with the present value cost for 25 years operation of \$86.5 million dollars.</p> <p><u>IMPACT IF NOT PROVIDED:</u> A feasibility study titled "Solid Waste and Wood Burning and Co-Generation Options" dated 19 October 1982 projected that the current landfill at MCAS Cherry Point would be exhausted by the year 1992. It assumed that U.S. Forest land (Croatan Forest) would be utilized beginning that year. The "Solid Waste Management Master Plans" for MCAS Cherry Point and MCB Camp Lejeune dated 1977, revealed the present existing landfill at Camp Lejeune has an additional suitable adjacent area of approximately 20 acres that can be utilized until the year 2000. However, impermeable liners are necessary to prevent leachate from further contaminating ground water. A system of wells are monitoring ground water quality at present and corrective measures are being taken. Stricter control measures will have to be implemented to prevent additional contamination. This project will make it possible for the current landfills at both activities to dispose of inert and oversize waste for the life of the project, based on 25 years.</p>		

1940
1941

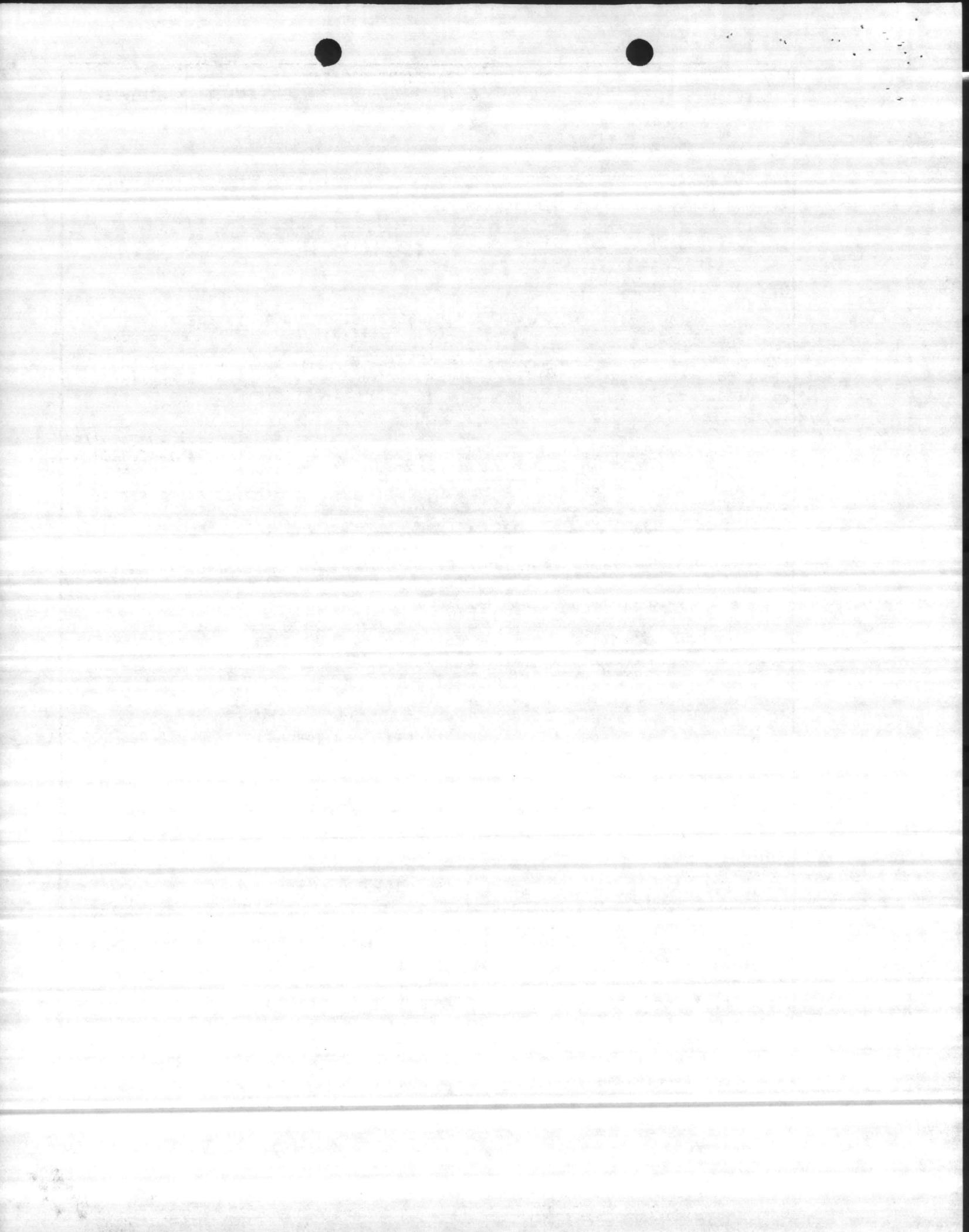
1. COMPONENT NAVY	POLLUTION ABATEMENT PROGRAM FY 19 84 MILITARY CONSTRUCTION PROJECT DATA	2. DATE 24 Aug 84
3. INSTALLATION AND LOCATION MARINE CORPS BASE, CAMP LEJEUNE, NORTH CAROLINA 28542		
4. PROJECT TITLE REFUSE BURNING SUPPLEMENTAL STEAM PLANT	5. PROJECT NUMBER P-822	
<p style="text-align: center;"><u>SPECIAL CONSIDERATIONS</u></p> <ol style="list-style-type: none"> 1. <u>Pollution Abatement Requirement:</u> Will be identified by the environment impact review and incorporated into the design of this facility. 2. <u>Flood Hazard Evaluation:</u> Requirements of Executive Order No. 11296 (Flood Hazards) are not applicable. 3. <u>Environmental Impact:</u> The project Environmental Impact Assessment will be written and processed through the local EIA Review Board. 4. <u>Fallout Shelter Construction:</u> Fallout shelter protection is not incorporated in this project. 5. <u>Design for Accessibility of Physically Handicapped Personnel:</u> Provisions for physically handicapped personnel are not incorporated in this project. 6. <u>Use of Air Conditioning:</u> Ceiling "U" factors will be made to conform with DOD 4270.1-M. 7. <u>Preservation of Historical Sites and Structures:</u> This project does not directly or indirectly affect a district, site, building, structure, object, or setting which is listed in the National Register or otherwise possesses a significant quality of American history. 8. <u>"New Start" Criteria for Commercial or Industrial Activities Program (OMB Circular A-76):</u> Not applicable. 		



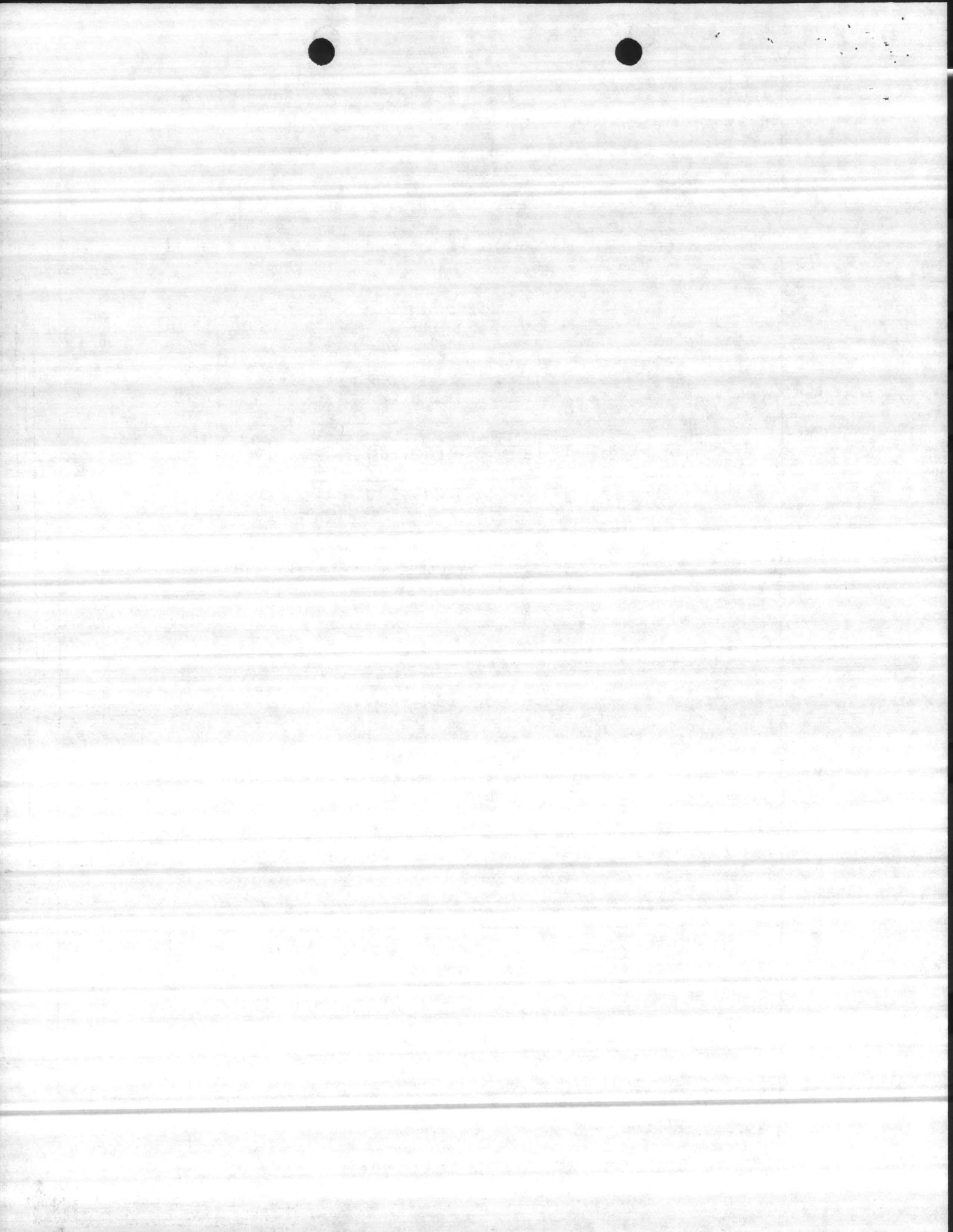
1. COMPONENT NAVY	POLLUTION ABATEMENT PROGRAM FY 19 <u>88</u> MILITARY CONSTRUCTION PROJECT DATA	2. DATE 24 Aug 84
3. INSTALLATION AND LOCATION MARINE CORPS BASE, CAMP LEJEUNE, NORTH CAROLINA 28542		
4. PROJECT TITLE REFUSE BURNING SUPPLEMENTAL STEAM PLANT	5. PROJECT NUMBER P-822	
<p style="text-align: center;"><u>FACILITY STUDY</u></p> <p>1. <u>Project</u>: This Steam Plant will provide corrective measures for relieving the existing and potential Pollution Abatement problem associated with landfill operations. It prolongs the life of existing landfills and will improve management techniques and controls. It further provides a positive means to reduce the cost of steam production for Marine Corps Base, Camp Lejeune, North Carolina (Camp Geiger) and MCAS (H) New River. Also, this project will generate electricity which will defer energy consumption and be a positive impact on energy reduction efforts.</p> <p>2. <u>Current and Planned Future Workload with regard to this project</u>: This project will generate steam and electricity for schools, administrative facilities at Camp Geiger and MCAS (H) New River. The facilities and their demand for energy are expected to continue as a necessary requirement throughout the life of the project.</p> <p>3. <u>Description of Proposed Construction</u>:</p> <p style="padding-left: 40px;">a. <u>Type of Construction</u>: This project will provide a permanent facility with a 25 year life span.</p> <p style="padding-left: 40px;">b. <u>Replacement</u>: Boiler Plant G-650 may be shut down pending actual Refuse Burning Supplemental Steam Plant efficiency and generating capabilities.</p> <p style="padding-left: 40px;">c. <u>Description of work to be done</u>:</p> <p style="padding-left: 80px;">(1) <u>Primary Facility</u>: Provide a permanent solid refuse burning supplemental steam plant.</p> <p style="padding-left: 80px;">(2) <u>Energy Conservation</u>: This project will save 414,777 MBTU's of energy per year.</p> <p style="padding-left: 80px;">(3) <u>Collateral Equipment</u>: Requirements will be determined during preliminary design procedures.</p> <p style="padding-left: 80px;">(4) <u>Supporting Facilities</u>: This project will provide a Refuse Burning Supplemental Steam Plant that will relieve steam generating requirements for G-650 and AS-4151 steam plant during the summer months.</p> <p>4. <u>Cost Estimate</u>: Costs as shown on enclosure (3) were derived from the Solid Waste and Wood Waste Burning and Co-Generation Study as accomplished by J. E. Sistine Company for year 1986. Enclosure (4); Cost Summary Design Analysis (FY-87) is escalated to 1988 as shown on DD Form 1391.</p>		



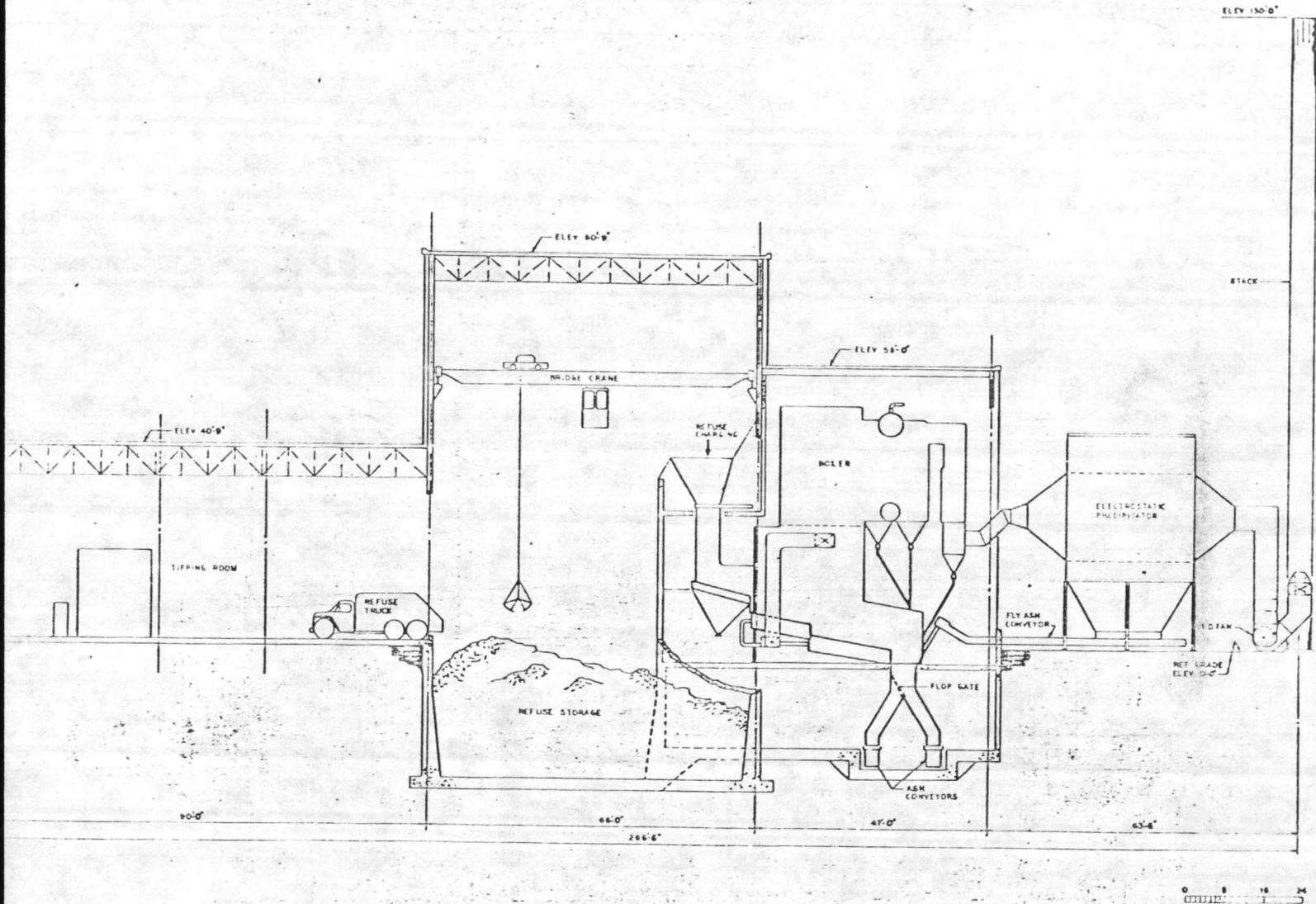
1. COMPONENT NAVY	POLLUTION ABATEMENT PROGRAM FY 19 88 MILITARY CONSTRUCTION PROJECT DATA	2. DATE 24 Aug 84
3. INSTALLATION AND LOCATION MARINE CORPS BASE, CAMP LEJEUNE, NORTH CAROLINA 28542		
4. PROJECT TITLE REFUSE BURNING SUPPLEMENTAL STEAM PLANT	5. PROJECT NUMBER P-822	
<p>5. <u>Justification for Project and Scope of Project:</u></p> <p>a. <u>Justification for Project:</u></p> <p>(1) <u>Project:</u> Corrects potential Pollution Abatement Problems, prolongs the life of existing landfills and eliminates the immediate need for procuring new sites. Provides a Refuse Burning Supplemental Steam Plant for Camp Geiger and MCAS (H) New River capable of burning solid waste and producing 30,200 lb/hr steam and 725KW of electricity during the initial year.</p> <p>(2) <u>Requirement:</u> Utilization of solid waste from Marine Corps Base, Camp Lejeune, NC, and MCAS Cherry Point will eliminate costly expansion of facility landfills and/or procurement of new sites. This Steam Plant will reduce energy requirements for steam generation for Marine Corps Base, Camp Lejeune, NC and Marine Corps Air Station (H) New River.</p> <p>(3) <u>Current Situation:</u> Current landfill operations at Marine Corps Base, Camp Lejeune, NC and MCAS Cherry Point will require extensive improvements to contain estimated increases in solid waste disposal. Existing landfills used by the local military bases and surrounding municipalities are rapidly being filled to capacity. Attempts at obtaining other approved landfills have met with opposition from the public. Sites available either cannot meet environmental requirements or are infeasible due to cost and distances from prospective users. Existing landfills have been monitored and some were found to have pollutants. Constant corrections are being made. This project will enhance the environment by eliminating further needs for disposal of solid waste in landfills. It further will enable landfill operators to tighten controls in the proper usage of existing landfills. Steam is generated using costly fossil fuel with the present value cost for 25 years operation of \$86.5 million dollars.</p> <p>(4) <u>Impact if not Provided:</u> A feasibility study titled "Solid Waste and Wood Burning and Co-Generation Options" dated 19 October 1982 projected that the current landfill at MCAS Cherry Point would be exhausted by the year 1992. It assumed that U. S. Forest land (Croatan Forest) would be utilized beginning that year. The "Solid Waste Management Master Plans" for MCAS Cherry Point and MCB Camp Lejeune dated 1977, revealed the present existing landfill at Camp Lejeune has an additional suitable adjacent area of approximate 20 acres that can be utilized to at least the year 2000. However, impermeable liners are necessary to prevent leachate from further contaminating ground water. A system of wells are monitoring ground water quality at present and corrective measures are being taken. Stricter control measures will have to be implemented to prevent additional contamination. This project will make it possible for the current landfills at</p>		

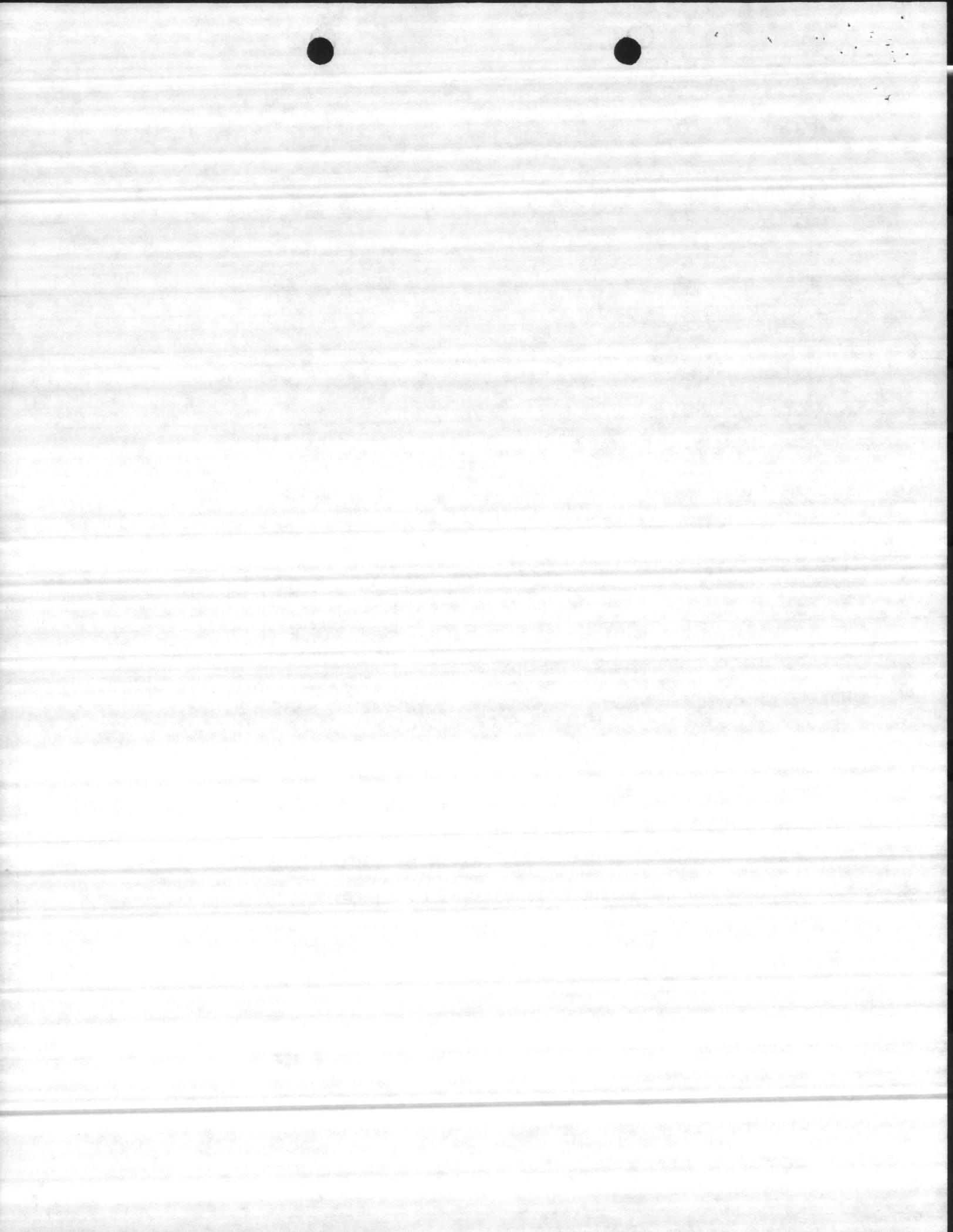


1. COMPONENT NAVY	POLLUTION ABATEMENT PROGRAM FY 19 88 MILITARY CONSTRUCTION PROJECT DATA	2. DATE 24 Aug 84
3. INSTALLATION AND LOCATION MARINE CORPS BASE, CAMP LEJEUNE, NORTH CAROLINA 28542		
4. PROJECT TITLE REFUSE BURNING SUPPLEMENTAL STEAM PLANT	5. PROJECT NUMBER P-822	
<p>both activities to dispose of inert and oversize waste for the life of the project, based on 25 years.</p> <p>b. <u>Justification for Scope of Project:</u> This project will correct and alleviate pollution abatement problems associated with landfill operations, improve management of existing facilities, and have a significant impact in energy requirements for steam generation at Camp Geiger and MCAS (H) New River. It will greatly enhance this Command's ongoing attempt at energy conservation and pollution abatement controls.</p> <p>6. <u>Equipment Provided from Other Appropriations:</u> \$124,419 will be required for purchase of a truck and disposal containers in support of this facility.</p> <p>7. <u>Common Support Facilities:</u> This project will supplement steam generating requirements of steam plant G-650 and AS-4151.</p> <p>8. <u>Effect on Other Resources:</u> An increase in manpower to facilitate operation of this plant will be required and consists of the following:</p> <ul style="list-style-type: none"> 4 Crane Operators WG-8 4 Boiler Operators WG-7 4 Boiler Mechanics WG-10 3 Supervisors WS-7 <p>9. <u>Siting of the Project:</u> See Enclosure (1)</p> <p>10. <u>Other Graphic Presentations, including Photographs:</u> See Enclosure (2).</p> <p>11. <u>Economic Analysis:</u> An ECIP economic analysis has been made with support documentation. See Enclosure (3).</p> <p>12. <u>Environmental Impact:</u> An Environmental Impact Assessment will be written and processed through the local Environmental Impact Assessment Review Board.</p> <p>13. <u>Quantitative Data:</u> Not applicable.</p> <p>14. <u>Additional Information:</u> A cost summary design analysis (FY-87) dated 29 March 1983, prepared by NAVFACENCOM, Atlantic Division, Norfolk, VA is attached as Enclosure (4).</p>		

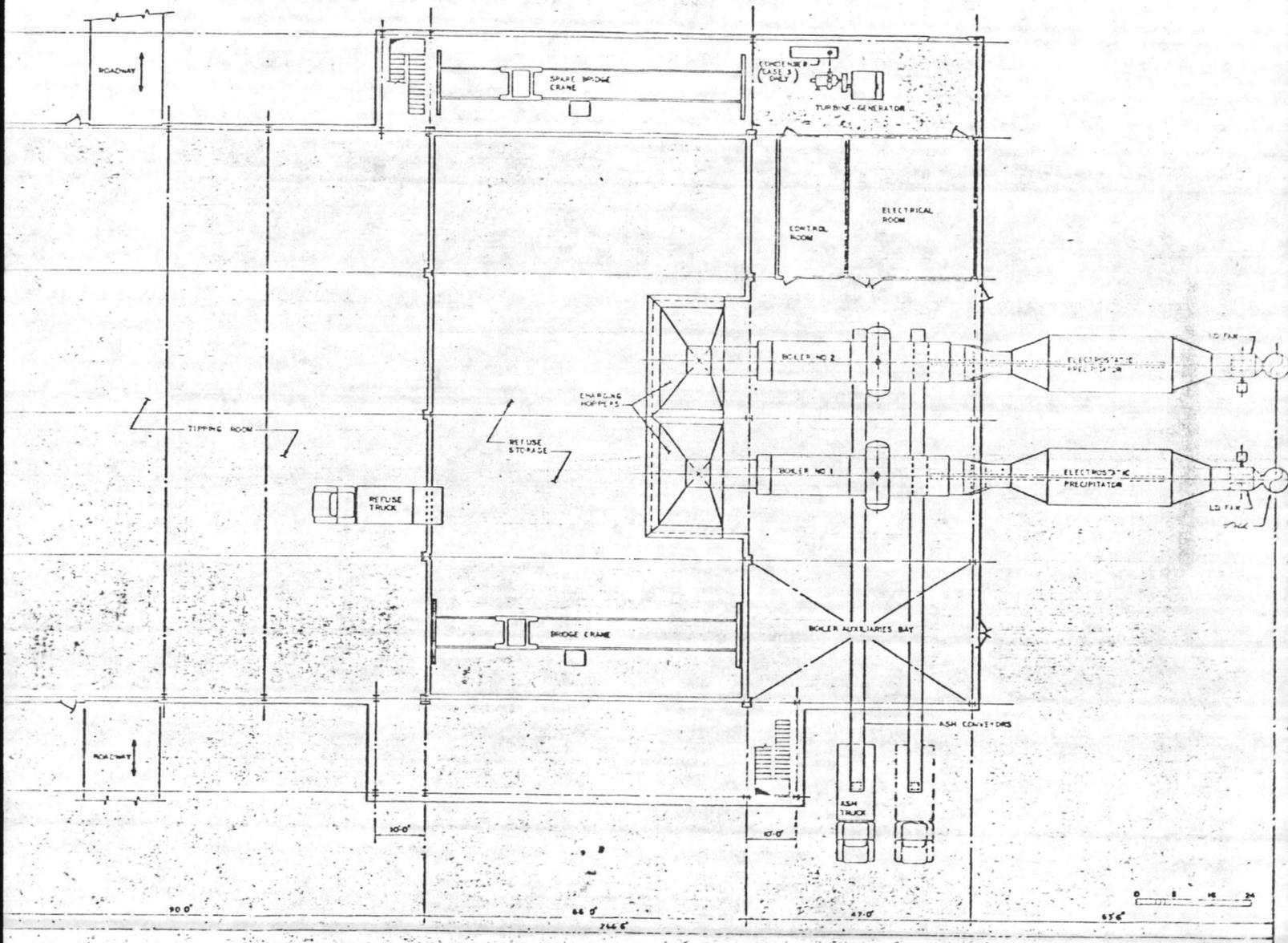


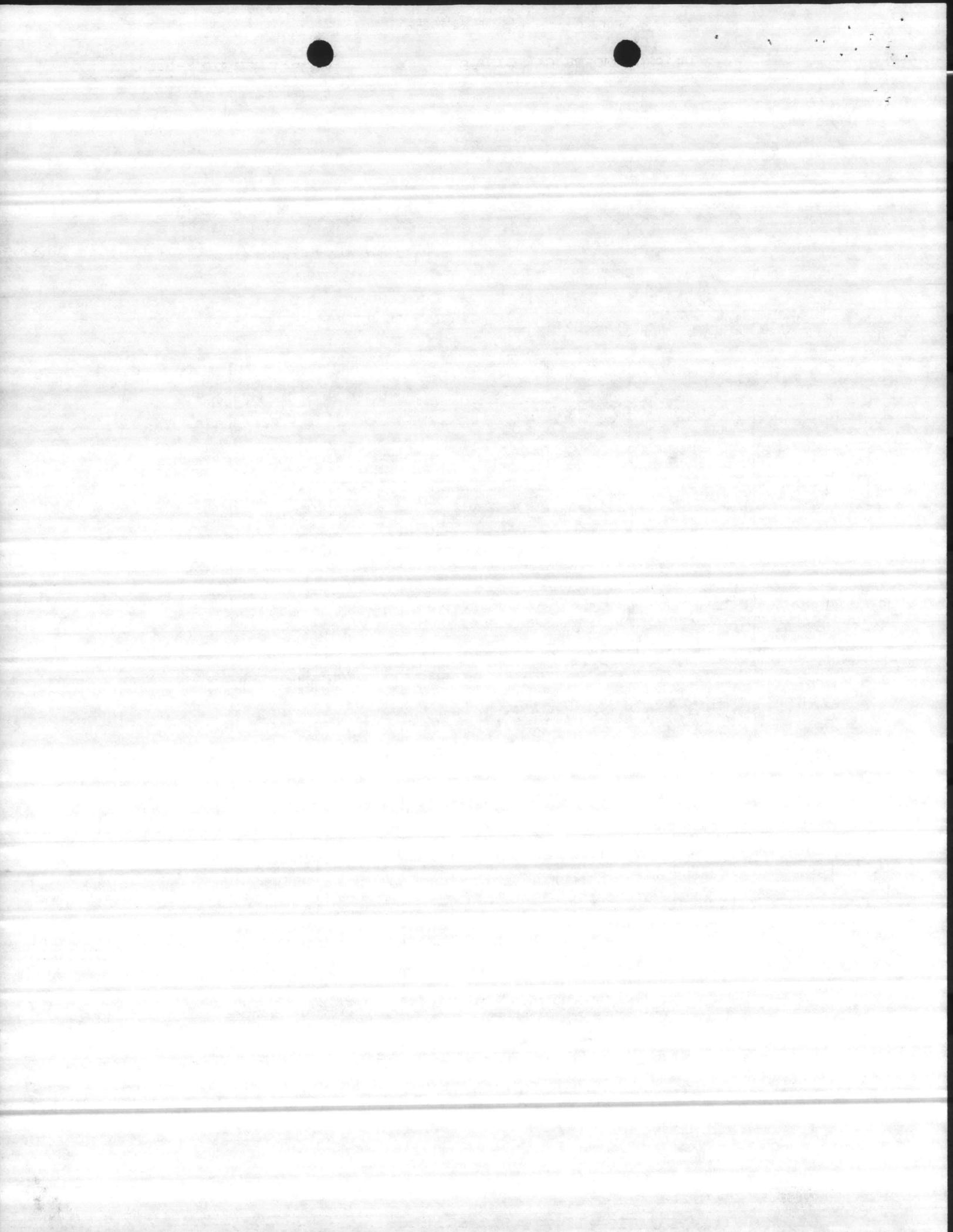
P-822 REFUSE BURNING SUPPLEMENTAL STEAM PLANT





P-822 REFUSE BURNING SUPPLEMENTAL STEAM PLANT





LOCATION: MCB, CAMP LEJEUNE, NORTH CAROLINA

PROJECT NUMBER P-822

PROJECT TITLE P-822 REFUSE BURNING SUPPLEMENTAL STEAM PLANT

FISCAL YEAR 1988

DISCRETE PORTION NAME CO- GENERATION OF STEAM AND ELECTRICITY

ANALYSIS DATE _____ ECONOMIC LIFE 25 YEARS PREPARED BY V. MARSHBURN

1. INVESTMENT

A. CONSTRUCTION COST	\$ 21,824,415
B. SIOB	\$ 1,200,342
C. DESIGN COST	\$ 1,223,906
D. ENERGY CREDIT CALC (1A+1B+1C)X.9	\$ 21,823,796
E. SALVAGE VALUE OF EXISTING EQUIPMENT	-\$
F. TOTAL INVESTMENT (1D-1E)	\$21,823,796

2. ENERGY SAVINGS (+) / COST (-)

ANALYSIS DATE ANNUAL SAVINGS, UNIT COST & DISCOUNTED SAVINGS

FUEL	COST \$/MBTU(1)	SAVINGS MBTU/YR(2)	ANNUAL \$ SAVINGS(3)	DISCOUNT FACTOR(4)	DISCOUNTED SAVINGS(5)
A. ELEC	\$ 5.45	33,192	\$ 180,896	18.049	\$ 3,264,991
B. DIST	\$ 11.48	381,586	\$ 4,380,607	20.05	\$ 87,831,170
C. RESID	\$		\$		\$
D. NG	\$		\$		\$
E. COAL	\$		\$		\$
F. TOTAL		414,778	\$ 4,561,503		\$91,096,161

3. NON ENERGY SAVINGS(+) / COST(-)

A. ANNUAL RECURRING (+/-)	\$ - 411,543
(1) DISCOUNT FACTOR (TABLE A)	9.524
(2) DISCOUNTED SAVING/COST (3A X 3A1)	\$ -3,919,535

B. NON RECURRING SAVINGS(+) / COST(-)

ITEM	SAVINGS(+) COST (-)(1)	YEAR OF OCCURRENCE(2)	DISCOUNT FACTOR(3)	DISCOUNTED SAVINGS(+) COST(-)(4)
a.	\$ 65,658	5	.652	\$ 42,809
b.	\$ 65,658	10	.405	\$ 26,591
c.	\$ 65,658	15	.251	\$ 16,480
d.	\$ 65,658	20	.156	\$ 10,242
e. TOTAL	\$ 262,632			\$ -96,122

C. TOTAL NON ENERGY DISCOUNTED SAVINGS(+) / COST(-) (3A2+3Bd4) \$ -4,015,657

D. PROJECT NON ENERGY QUALIFICATION TEST

(1) 25% MAX NON ENERGY CALC (2F5 X .33) \$ 30,061,733

a. IF 3D1 IS = OR > 3C GO TO ITEM 4

b. IF 3D1 IS < 3C CALC SIR = (2F5+3D1) ÷ 1F =

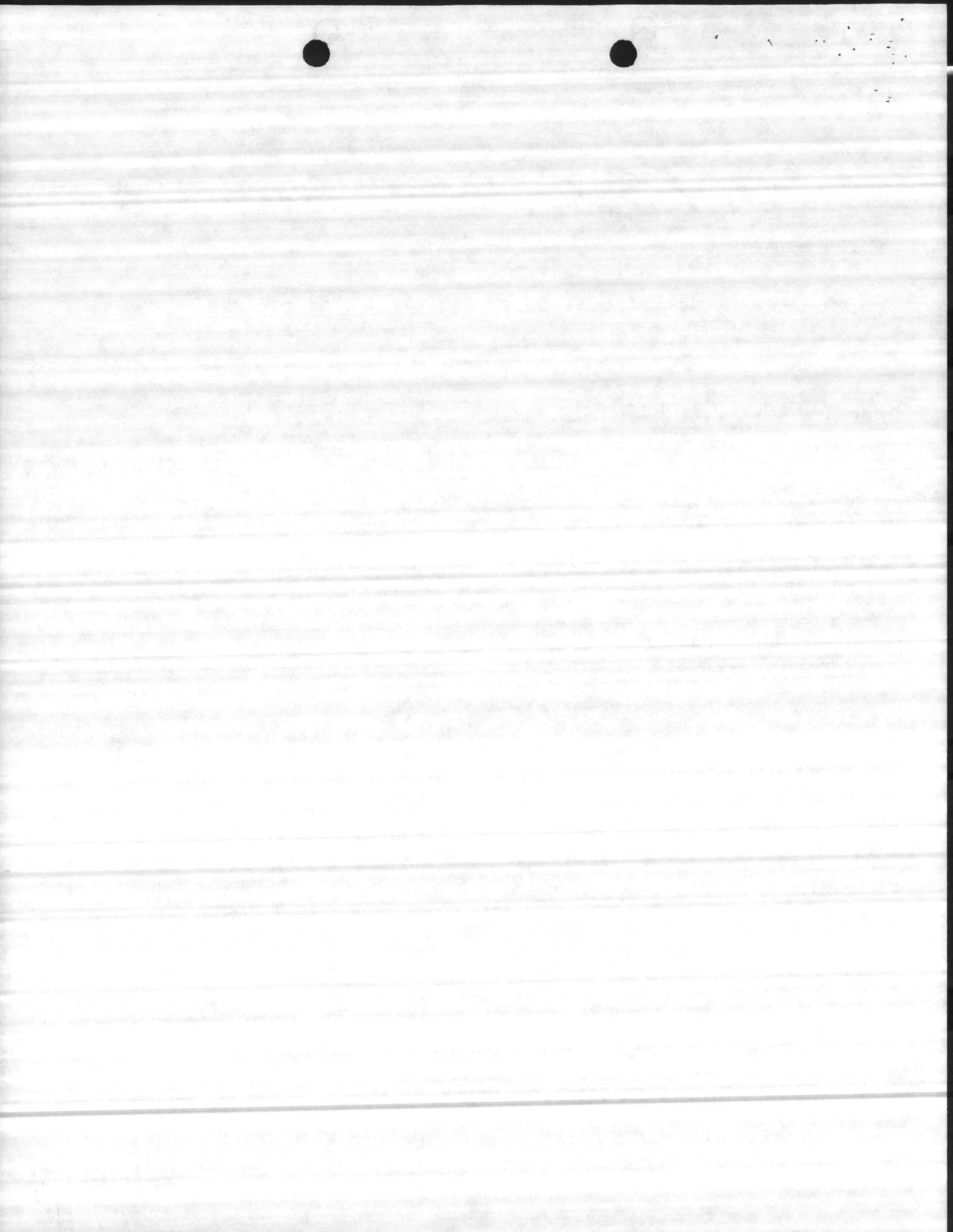
c. IF 3D1b IS = > 1 GO TO ITEM 4

d. IF 3D1b IS < 1 PROJECT DOES NOT QUALIFY

4. FIRST YEAR DOLLAR SAVINGS 2F3+3A+(3B1d ÷ YEARS ECONOMIC LIFE) \$ 631,462

5. TOTAL NET DISCOUNTED SAVINGS (2F5+3C) \$ 87,080,504

6. DISCOUNTED SAVINGS RATIO (IF < 1 PROJECT DOES NOT QUALIFY) (SIR) = (5 ÷ 1F) = 3.99



SUMMARY

LIFE CYCLE COST ANALYSIS

Information utilized in this analysis was obtained from the Solid Waste and Wood Waste Burning and Coal - Generation Study as provided by LANTNAVFAC-ENCOM. The study pertaining to Co-Generation is attached as supporting documentation.

I. INVESTMENT:

Construction Cost	\$21,824,415
SIOH	1,200,342
Design Cost	1,223,906

II. ENERGY SAVINGS

Co-Generation Plant

a. Usage (Page VI-14)
 $(3,402,000 \text{ KWH/year}) \times (.0116 \text{ MBTU/KWH}) = \underline{\$39,463 \text{ MBTU}}$

b. Resources Generated (Page VI-17)
 $\frac{(640 \text{ KW/HR} + 790 \text{ KW/HR})}{2} = 715 \text{ KW/HR Average}$

$(715 \text{ KW/HR} \times (8,760 \text{ HRS})) = 6,263,400 \text{ KWH/Year}$

$(6,263,400 \text{ KWH}) (.0116 \text{ MBTU/KWH}) = + \$72,655 \text{ MBTU}$

Oil-Fired Plants (Status Quo)

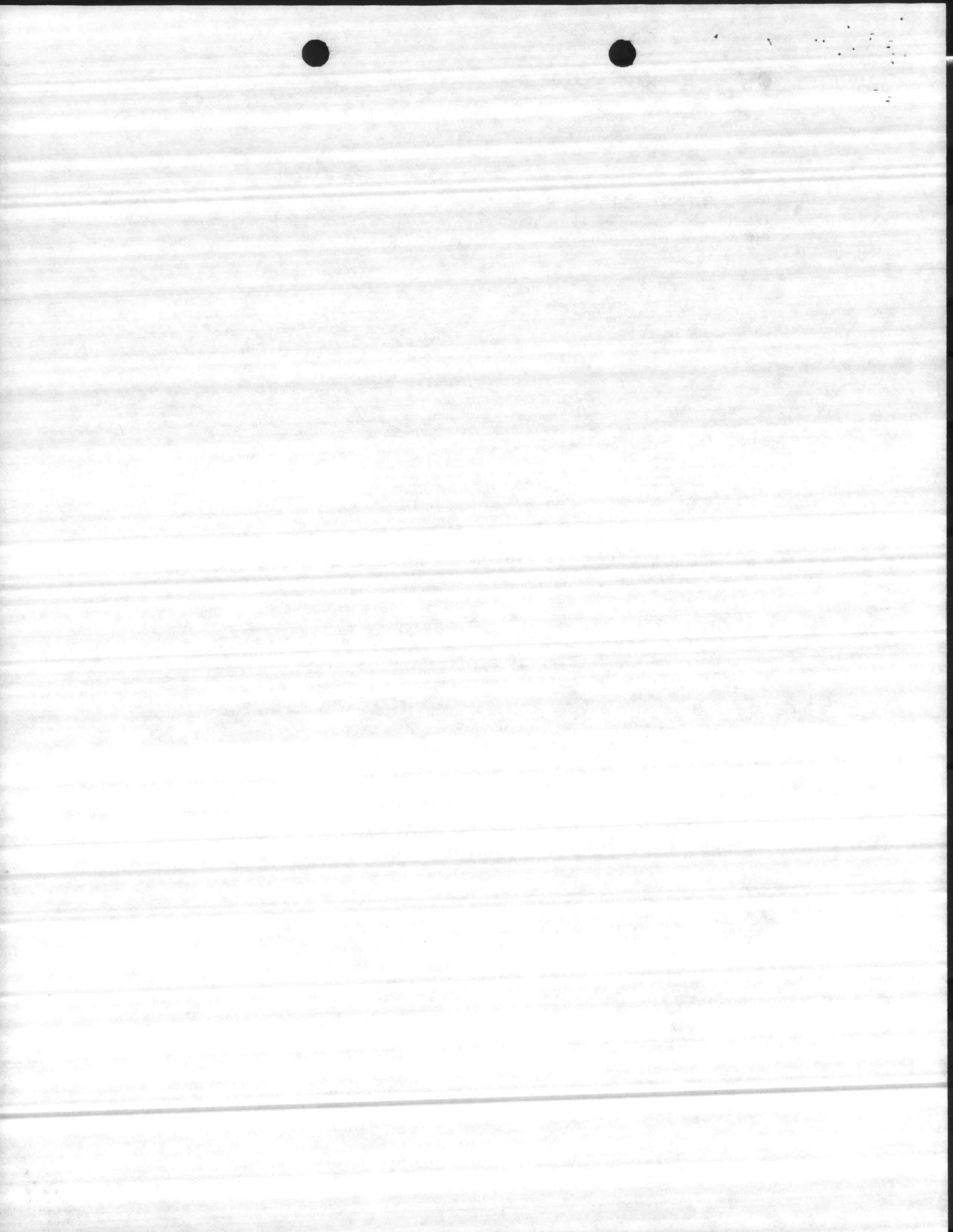
a. Usage (Page VI-25)
 $\frac{(38.99 \text{ MBTU/HR} + 48.13 \text{ MBTU/HR})}{2} = 43.56 \text{ MBTU/HR Average}$

$(43.56 \text{ MBTU/HR}) \times (8,760 \text{ HR/Year}) = 381,586 \text{ MBTU/Year}$

III. ENERGY COSTS

a. Electricity $(.03434\text{¢/KW}) \div (.0116 \text{ MBTU/KW}) = \$2.9603/\text{MBTU}$
 $\$2.96 \times 1.13 \times 1.13 \times 1.13 \times 1.13 \times 1.13 = \$5.45/\text{MBTU}$

b. Fuel Oil (Page VI-25) $\$11.48/\text{MBTU}$



IV. Non-Energy (Annual) Costs (Recurring) Pages VI-18 and VI-26)

<u>Co-Generation</u>		<u>Oil-Fired Boilers (Status Quo)</u>	
Labor	\$437,951	CP Development	\$124,556
Maintenance	241,018	CL Development	458,529
Trash Transfer	345,527	CP Maintenance	18,310
Ash Disposal	<u>17,951</u>	CL Maintenance	<u>29,508</u>
TOTAL	\$1,042,447	TOTAL	\$630,903

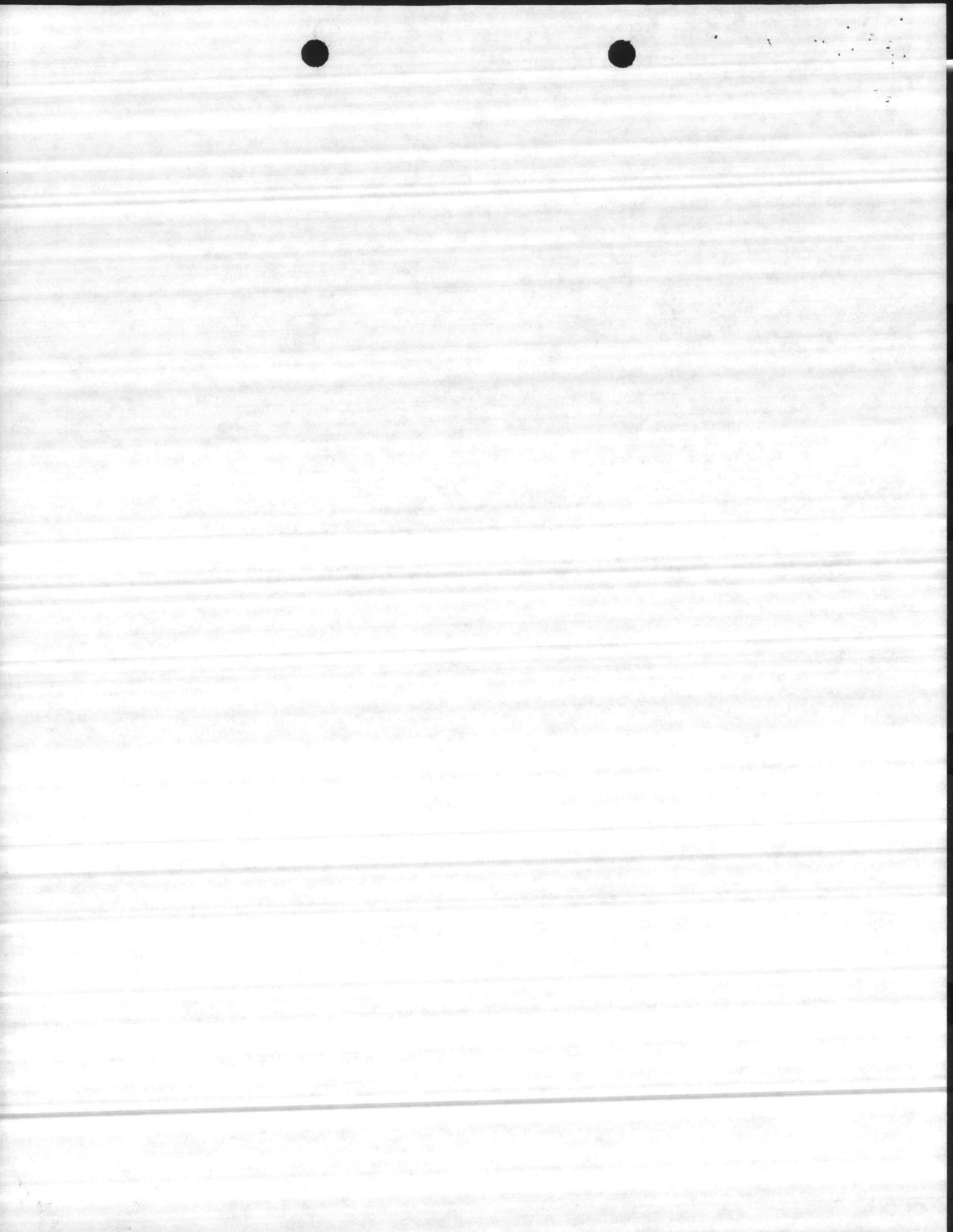
Net Non-Energy Annual Costs:

$$\$1,042,447 - \$630,903 = \$411,543$$

V. Non-Recurring Costs

a. Co-Generation Plant - Plant overhaul (Page VI-13)

\$65,658/Year every 5 years.

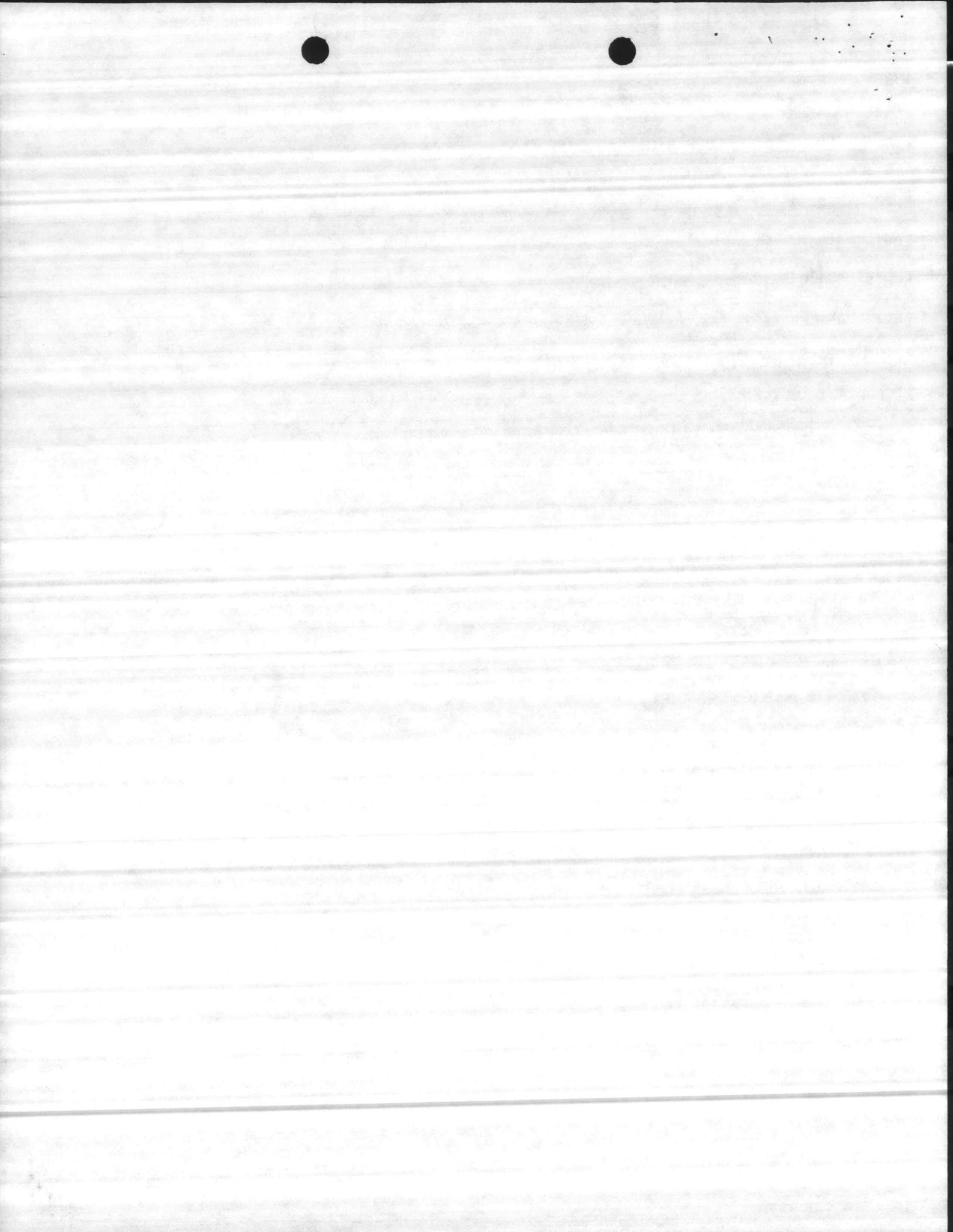


Cost Estimate

DEPARTMENT DIRECT COST SUMMARY

CASE 2 - BACK PRESSURE TURBINE

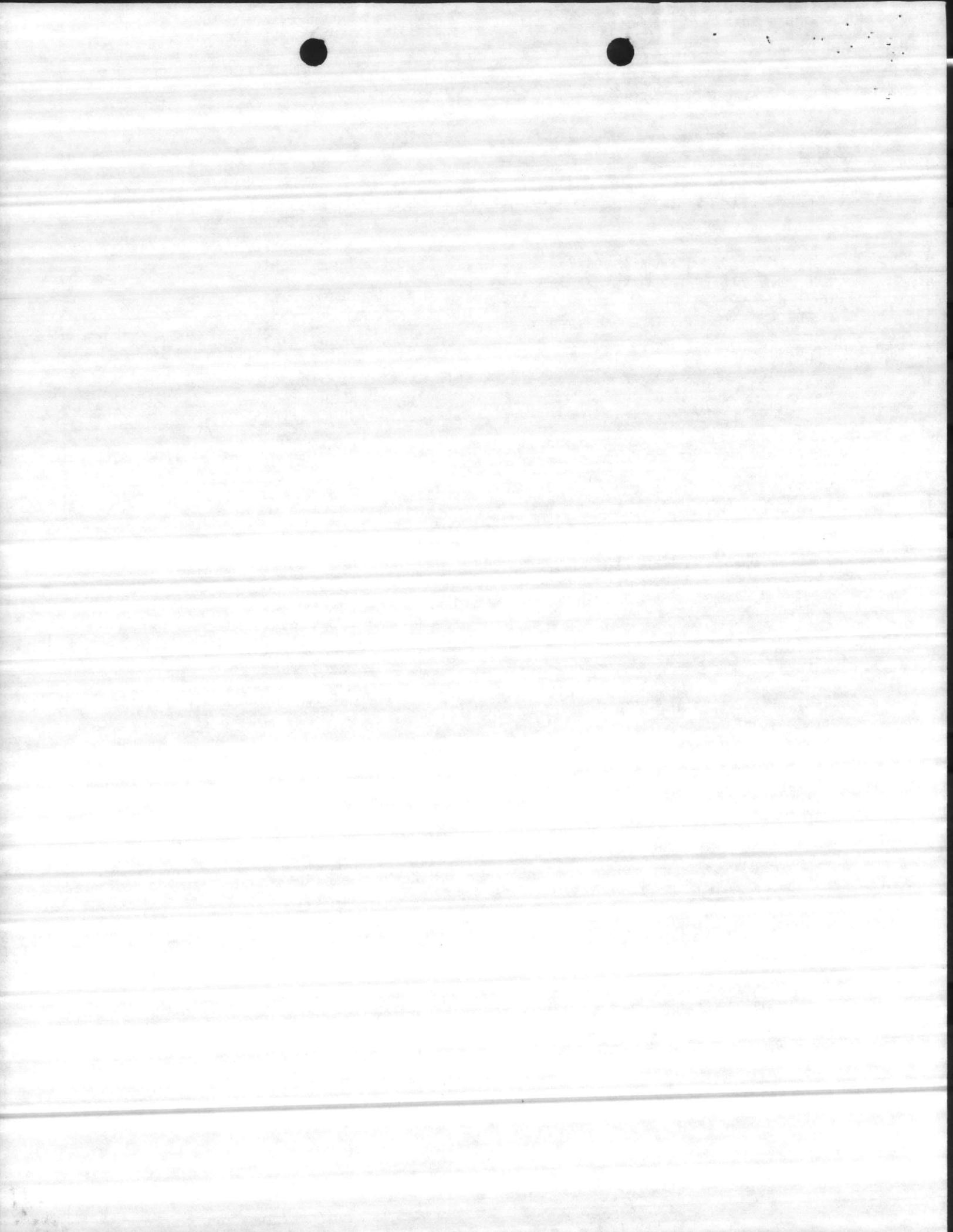
Equipment	\$ 8,984,000	
Equipment Erection	170,600	
Equipment Foundations and Other Costs	294,400	
Buidings & Structures	3,700,000	
Electrical Installation Cost	463,000	
Instrumentation Installation Cost	250,000	
Piping Cost	2,246,000	
Area Cost	<u>380,000</u>	
SUBTOTAL CONSTRUCTION COST		\$ 16,488,000
SIOH @ 5.5% (Supervision, inspection & overhead)		906,800
Contingency @ 10%		<u>1,739,500.</u>
TOTAL CONSTRUCTION COST		\$ 19,134,300



ITEMIZED CONSTRUCTION COST ESTIMATE

EQUIPMENT LIST
CASE 2

<u>Item Description</u>	<u>Motor HP-RPM</u>	<u>Equipment \$</u>	<u>Equipment Erection \$</u>	<u>Equip. Supports Platforms and Other Costs \$</u>
1. Boiler, 100 T/D Maximum Input 600 PSIG 725°F Unit No. 1		2,750,000	w/Equipment	w/Bldg. Cost
2. F.D. Fan		Incl.	w/Equipment	4,000
Coupling		Incl.	w/Equipment	
Controls		Incl.	w/Equipment	
Motor	50	Incl.	w/Equipment	
Intake Silencer		Incl.	w/Equipment	
3. Combustion Controls		Incl.	w/Equipment	
4. Boiler Breeching		Incl.	w/Equipment	w/Bldg.
5. Economizer		Incl.	w/Equipment	w/Bldg.
6. Stoker	10	Incl.	w/Equipment	w/Boiler
7. I.D. Fan		Incl.	w/Equipment	7,000
Coupling		Incl.	w/Equipment	
Fluid Drive		Incl.	w/Equipment	
Motor	75	Incl.	w/Equipment	
8. Precipitator No. 1		600,000	w/Equip. Cost	20,000
9. Ductwork - To Precip., Fan, Stack w/Insulation		45,000	D&E	65,000
10. Expansion Joints		12,000	2,000	N/A
11. Isolation Damper	5	28,000	2,000	Incl.
12. Boiler, 100 T/D Maximum Input 600 PSIG 725°F Unit No. 2		2,750,000	w/Equip. Cost	w/Bldg.
13. F.D. Fan		Incl.	Incl.	4,000
Coupling		Incl.	Incl.	Incl.
Controls		Incl.	Incl.	Incl.
Motor	50	Incl.	Incl.	Incl.
Intake Silencer		Incl.	Incl.	Incl.

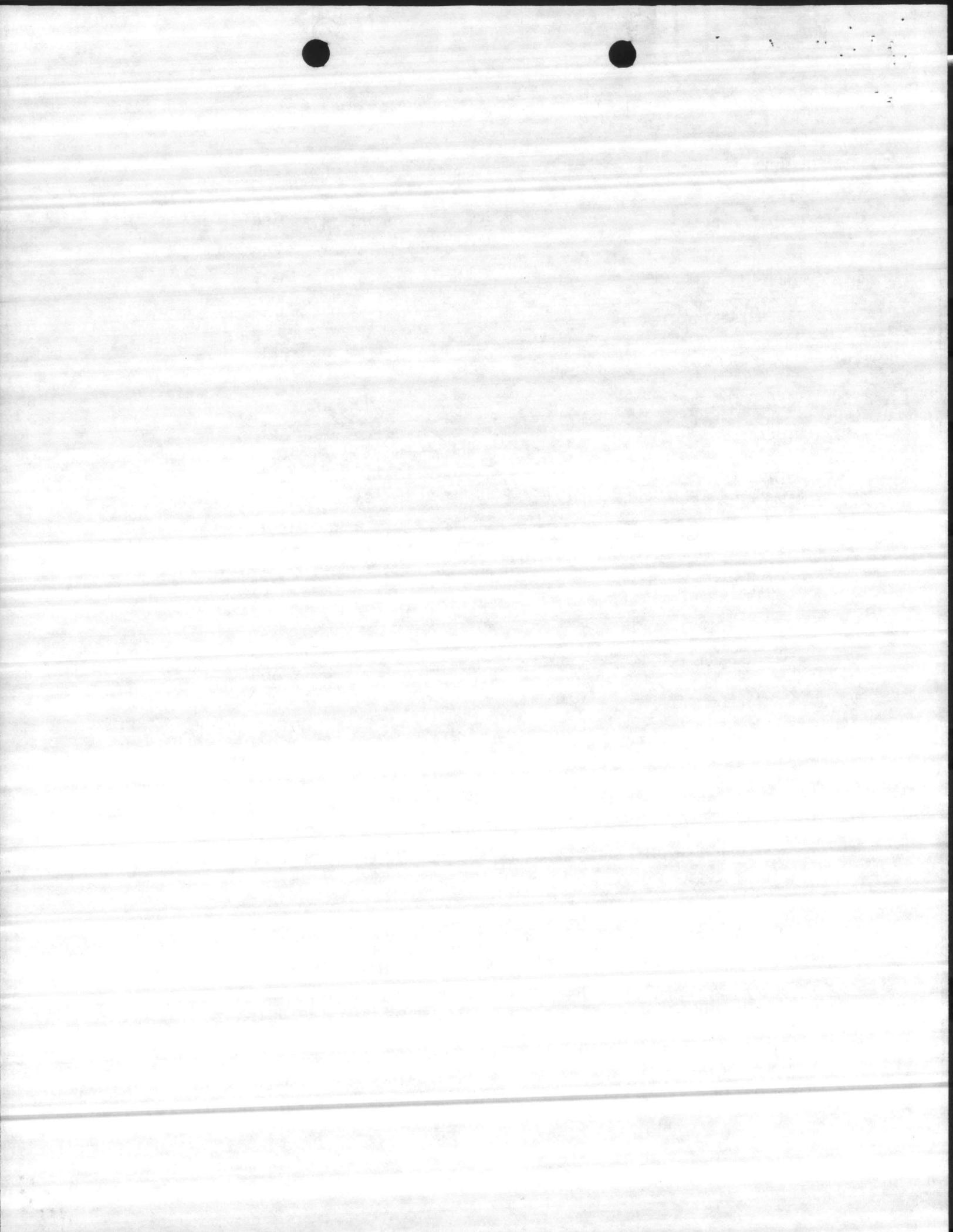


ITEMIZED CONSTRUCTION COST ESTIMATE

EQUIPMENT LIST
CASE 2

<u>Item Description</u>	<u>Motor HP-RPM</u>	<u>Equipment \$</u>	<u>Equipment Erection \$</u>	<u>Equip. Supports Platforms and Other Costs \$</u>
14. Combustion Controls		Incl.	Incl.	
15. Boiler Breeching		Incl.	Incl.	w/Bldg.
16. Economizer		Incl.	Incl.	w/Bldg.
17. Stoker	10	Incl.	Incl.	w/Boiler
18. I.D. Fan		Incl.	Incl.	7,000
Coupling		Incl.	Incl.	
Fluid Drive		Incl.	Incl.	
Motor	75	Incl.	Incl.	
19. Precipitator No. 2		600,000	Incl.	20,000
20. Ductwork - To Precip., Fan, Stack w/Insulation		45,000	D&E	65,000
21. Expansion Joints		12,000	2,000	N/A
22. Isolation Damper	5	28,000	2,000	N/A
23. Ash Handling System	80 (Total)	575,000	Incl.	w/Bldg.
24. Overhead Crane - 5 Ton		375,000	50,000	w/Bldg.
Control Cab		Incl.		
Grapple		Incl.		
Bridge Motor	15	Incl.		
Trolley Motor	10	Incl.		
Hoist Motors (2)	10 (Ea)	Incl.		
25. Spare Crane		375,000	50,000	w/Bldg.
Control Cab		Incl.		
Grapple		Incl.		
Bridge Motor	15	Incl.		
Trolley Motor	10	Incl.		
Hoist Motors (2)	10 (Ea)	Incl.		
26. Deaerator		30,000	2,000	1,500
27. Blow-Off Tank		5,000	1,000	100

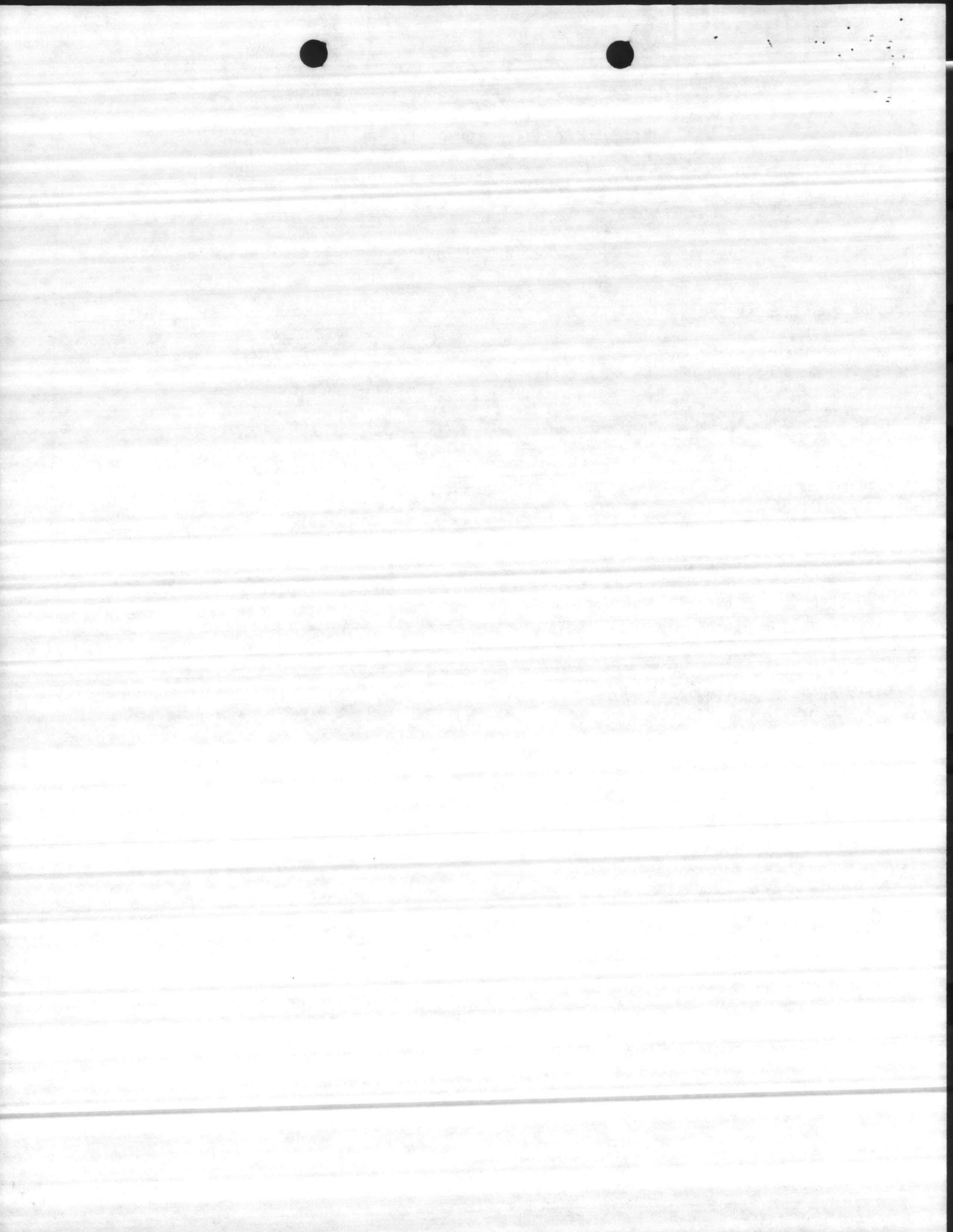
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ITEMIZED CONSTRUCTION COST ESTIMATE

EQUIPMENT LIST
CASE 2

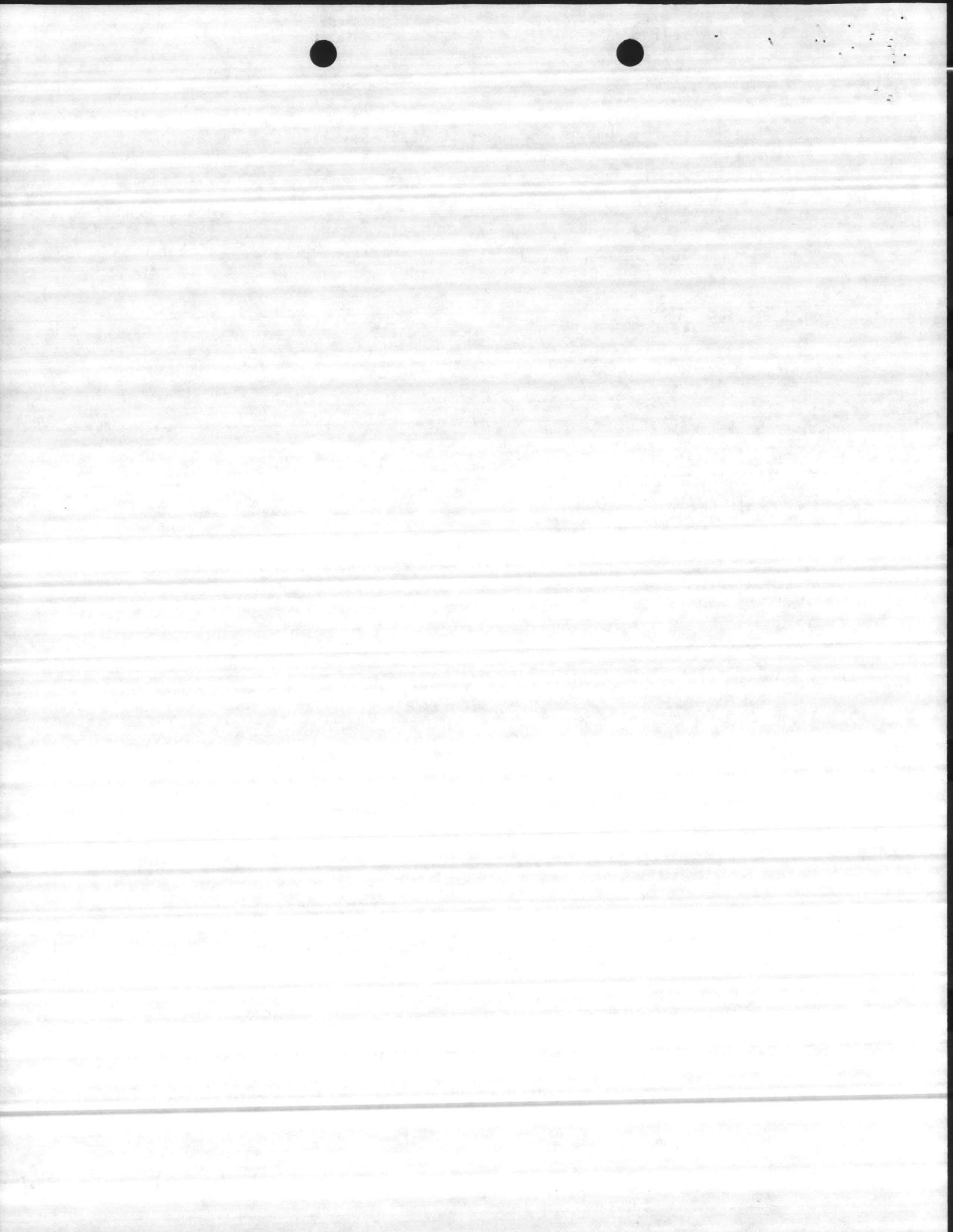
<u>Item Description</u>	<u>Motor HP-RPM</u>	<u>Equipment \$</u>	<u>Equipment Erection \$</u>	<u>Equip. Supports Platforms and Other Costs \$</u>
28. Continuous Blowdown System		17,000	2,500	500
Flash Tank		Incl.	Incl.	
Heat Exchanger		Incl.	Incl.	
Valves		Incl.	Incl.	
29. Condensate Tank		15,000	1,000	100
30. Condensate Transfer Pump		3,000	500	200
Motor	10	Incl.	500	200
31. Air Compressor	25	6,000	500	200
Air Receiver		Incl.		
32. Air Compressor	25	6,000	500	200
Air Receiver		Incl.		
33. Air Dryer		3,000	200	100
34. Stack - Dual Wall (2) 150' x 9'-0" Dia.		310,000	Incl.	90,000
35. Raw Water Booster Pump		3,000	500	100
Motor	20	Incl.	Incl.	Incl.
36. Raw Water Booster Pump		3,000	500	100
Motor	20	Incl.		
37. Feedwater Treatment Equipment	30 Total	70,000	8,000	1,000
38. Boiler Feed Pumps (2)		16,000	1,000	1,000
Motor	2 @ 75	Incl.	Incl.	Incl.
39. Boiler Feed Pump		8,000	500	500
Turbine		12,000	Incl.	Incl.
40. Chemical Feed Equipment	2 @ 5	10,000	800	300



ITEMIZED CONSTRUCTION COST ESTIMATE

EQUIPMENT LIST
CASE 2

<u>Item Description</u>	<u>Motor HP-RPM</u>	<u>Equipment \$</u>	<u>Equipment Erection \$</u>	<u>Equip. Supports Platforms and Other Costs \$</u>
41. Camp Geiger Condensate Transfer Pump Motor	30	7,000 Incl.	500 200	100 Incl.
42. Air Station Condensate Transfer Pump Motor	50	7,000 Incl.	500 200	100 Incl.
43. Condensate Collection Tank Pump Motor	10	15,000 3,000 Incl.	500 200 Incl.	200 100 Incl.
44. No. 2 Oil Storage Tank & Pump 10,000 Gallon	5	25,000	500	500
45. HVAC Equipment	20	15,000	Incl.	500
46. Turbine Generator 900 KW Nominal Output 12,470 Volt Generator 1175 KVA Rating		200,000	40,000	4,800
TOTAL, Equipment		\$8,984,000	\$170,600	\$294,400



ITEMIZED CONSTRUCTION COST ESTIMATE

CASE 2

47. Buildings and Structures

Structural Steel	\$ 880,000
Excavation and Backfill	445,000
Refuse Pit and Basement	690,000
Mat	365,000
Piling	86,000
Roof Deck and Roofing	190,000
Walls and Siding	270,000
Intermediate Floors	89,000
Stairs, Doors and Drains	160,000
Miscellaneous Steel and Grating	135,000
Support Steel and Miscellaneous	<u>390,000</u>

TOTAL, Building and Structures \$ 3,700,000

48. Electrical

Building Lighting	63,000
Electrical Equipment & Wiring	<u>400,000</u>

TOTAL, Electrical \$ 463,000

49. Instrumentation

\$ 250,000

50. Piping

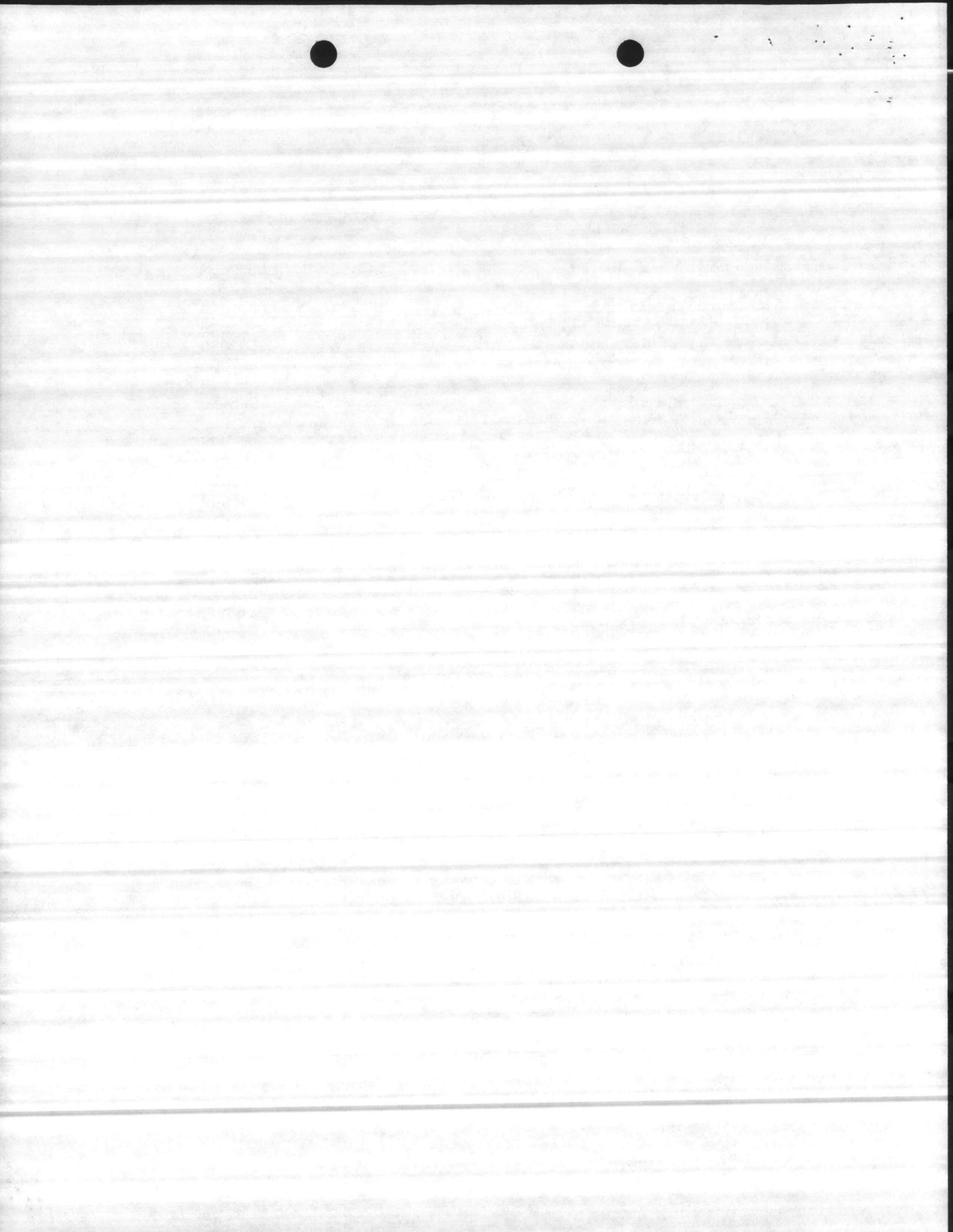
Boiler Plant	870,000
Export Steam & Condensate Return Lines	<u>1,376,000</u>

TOTAL, Piping \$ 2,246,000

51. Area

Area	\$ 130,000
Road Paving	<u>250,000</u>

TOTAL, Area \$ 380,000



CASE 2
DESIGN ANALYSIS COMPUTATIONS
JANUARY 1982
(Present Value = 1986 Dollars)

ALTERNATIVE A - Refuse-Burning Plant

1. Investment Cost

a. Refuse-Burning Plant Capital Costs (from equipment list)

Construction \$16,488,000

Escalated to April 1985

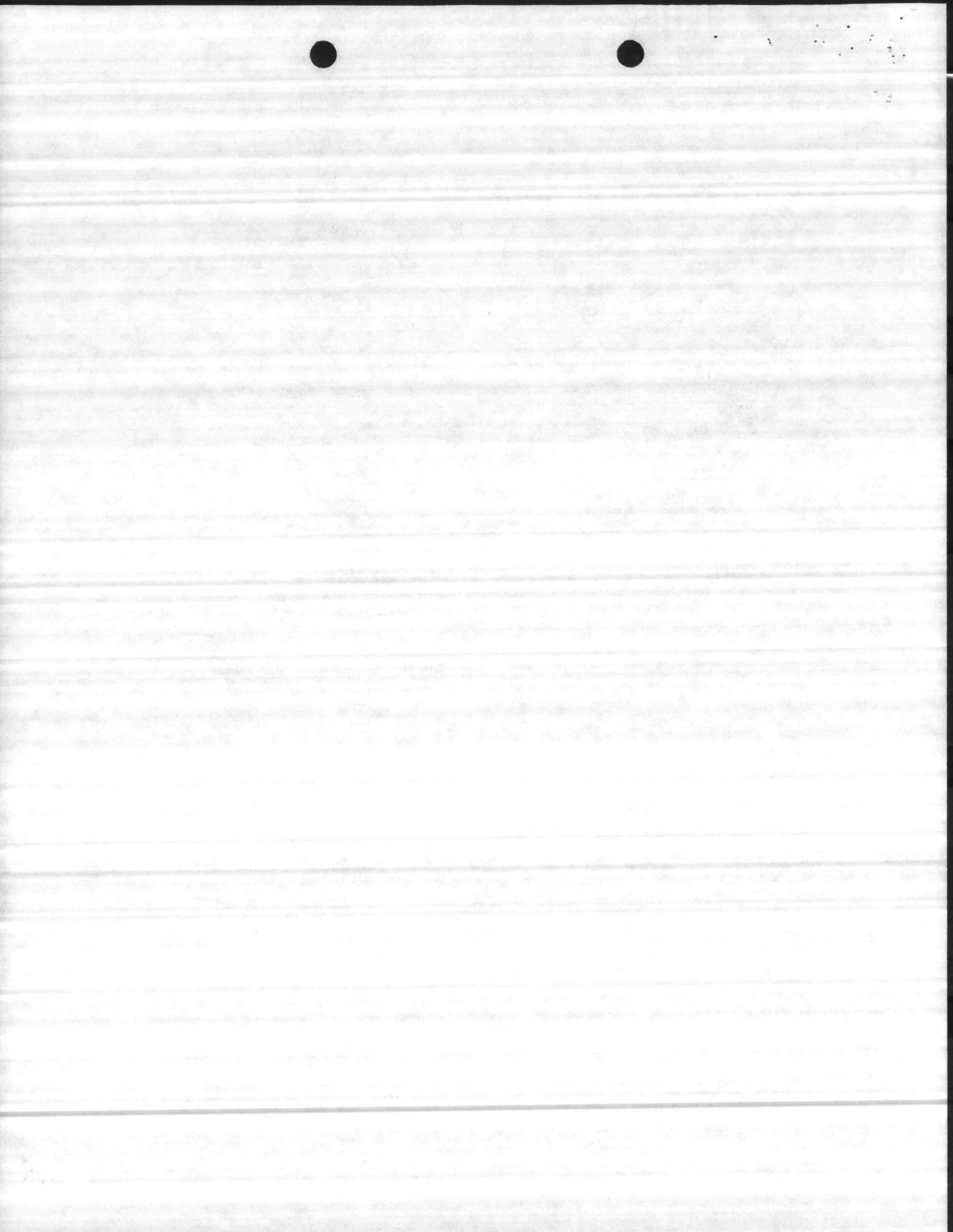
$$\frac{\$16,488,000 \times 2167}{1870} = \$19,106,682$$

Escalated to FY86 10% Discount (2% differential)

$$\$19,106,682 \times 1.0384 = \$19,840,378$$

Total Escalated Cost	\$19,840,378
Contingency @ 10%	1,984,037
S.I.O.H. @ 5.5%	<u>1,200,342</u>

TOTAL 23,024,757



Engineering @ 6% = \$989,280

Escalated to April 1984

$$\begin{array}{r} \$989,280 \times \frac{2066}{1870} = \$1,092,969 \end{array}$$

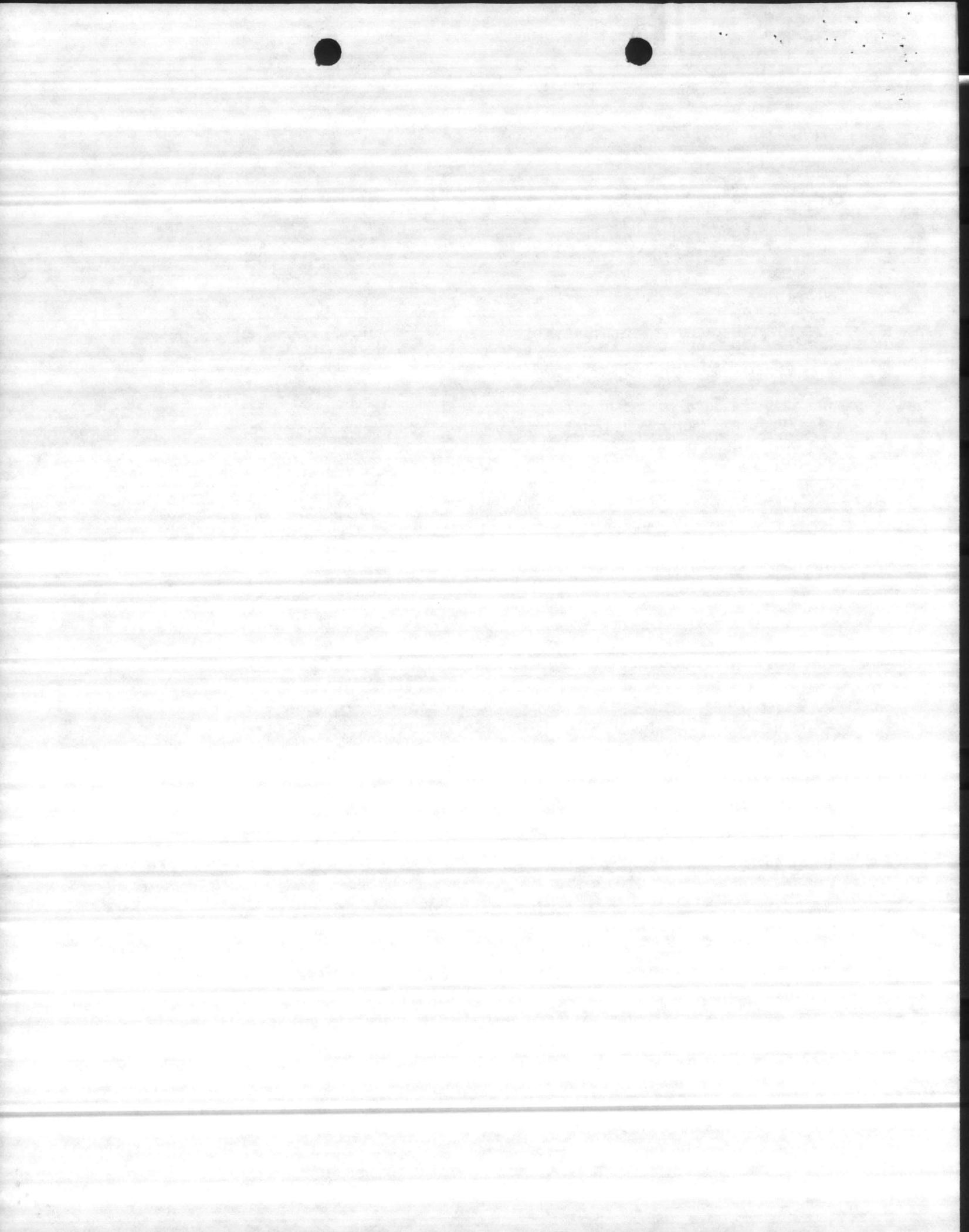
Escalated to FY-86

10% Discount (2% differential)

$$\$1,092,969 \times 1.1198 = \$1,223,906$$

Total Present Value Construction & Engineering

	\$23,024,757
	<u>+1,223,906</u>
TOTAL	\$24,248,663

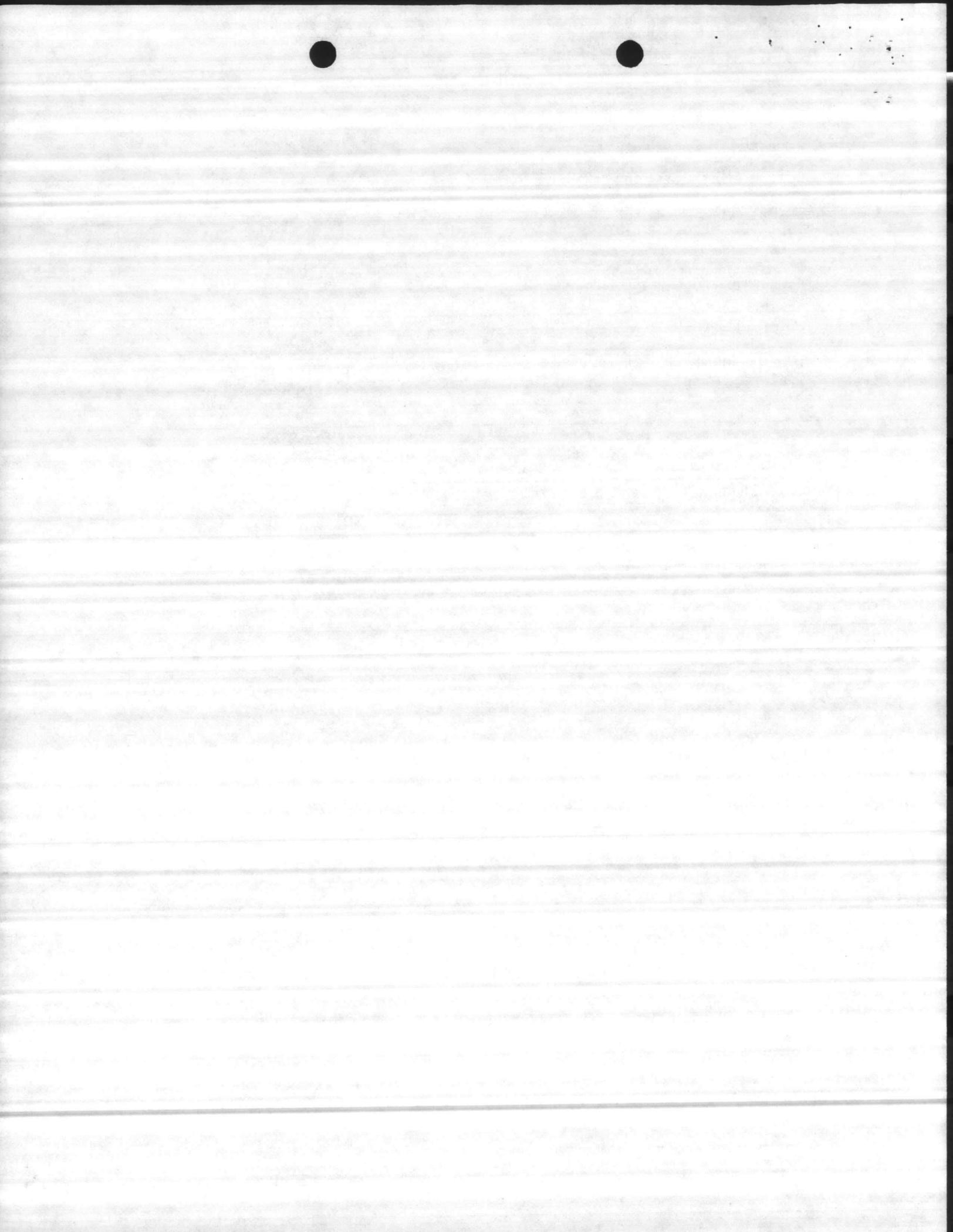


b. Capital Costs for Ash Disposal

Investment for truck (\$70,000) and disposal containers (\$26,000)
\$96,000 in years 1, 9, 17

Escalated to Oct. 1986
$$\frac{\$96,000 \times 2317}{1870} = \$118,947$$

10% Discount (2% differential) year 1	.963	
Present Value		\$114,545
10% Discount (2% differential) year 9	.526	
Present Value		\$ 62,566
10% Discount (2% differential) year 17	.288	
Present Value		<u>34,256</u>
Total Present Value Ash Disposal Investment		\$211,367



2. Recurring Costs

a. Annual Boiler Plant Labor Costs

- 4 Crane Operators (WG-8) @ \$9.98/hr. (incl. benefits)
- 4 Boiler Operators (WG-7) @ 9.43/hr. (incl. benefits)
- 4 Boiler Mechanics (WG-10) @ 11.09/hr. (incl. benefits)
- 3 Supervisors (WS-7) @ \$12.78/hr. (incl. benefits)

Unescalated Labor Cost

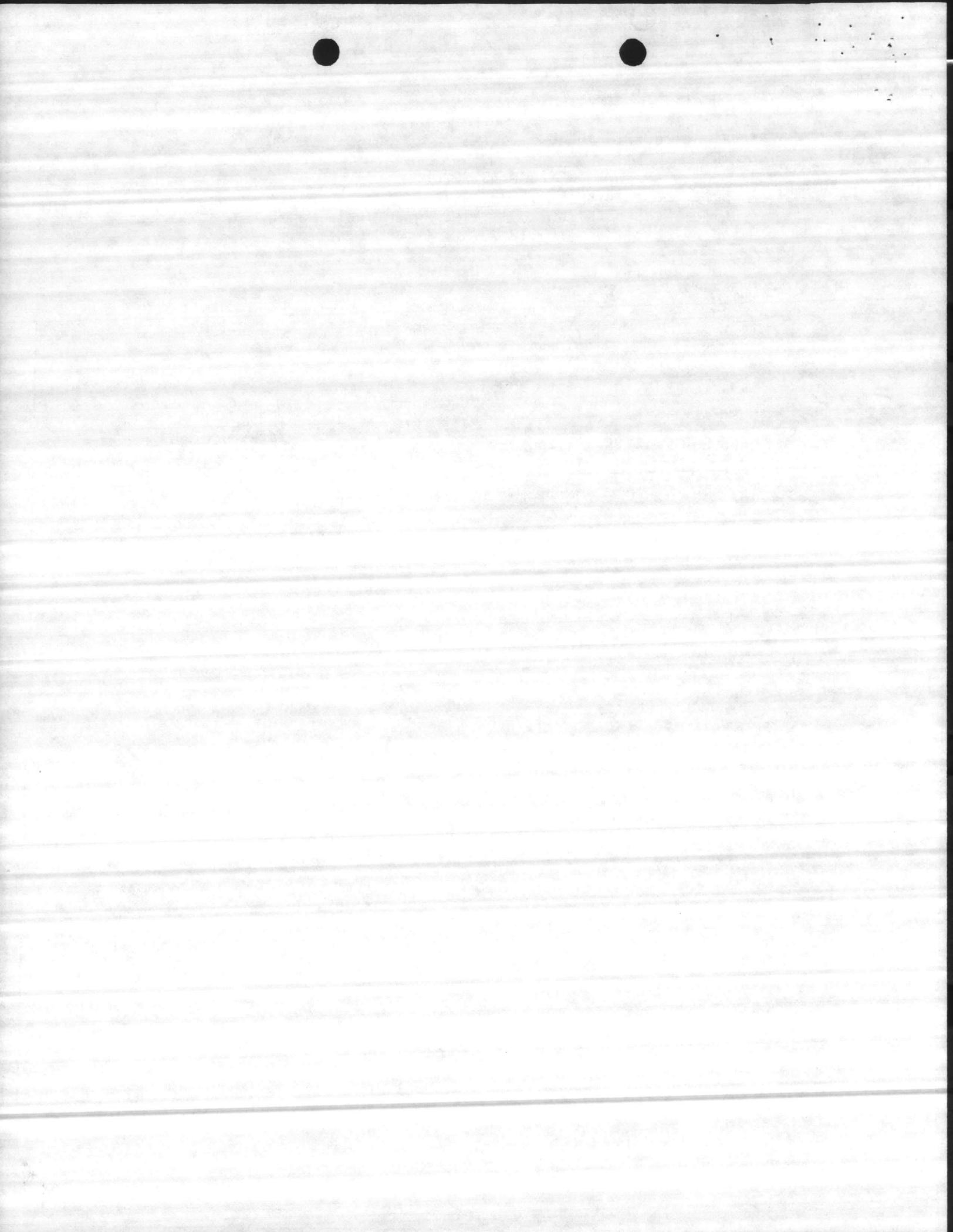
$$(4 \times 9.98 \times 2080) + (4 \times 9.43 \times 2080) + (4 \times 11.09 \times 2080) + (3 \times 12.78 \times 2080) = \$333,508$$

Labor escalated to Oct. 1986

	FY82	FY83	FY84	FY85	FY86	
\$333,508	x 1.056	= 437,951				

10¢ Discount (0% differential) 9.524

Present Value Labor Cost \$4,171,048



b. Annual Boiler Maintenance Cost

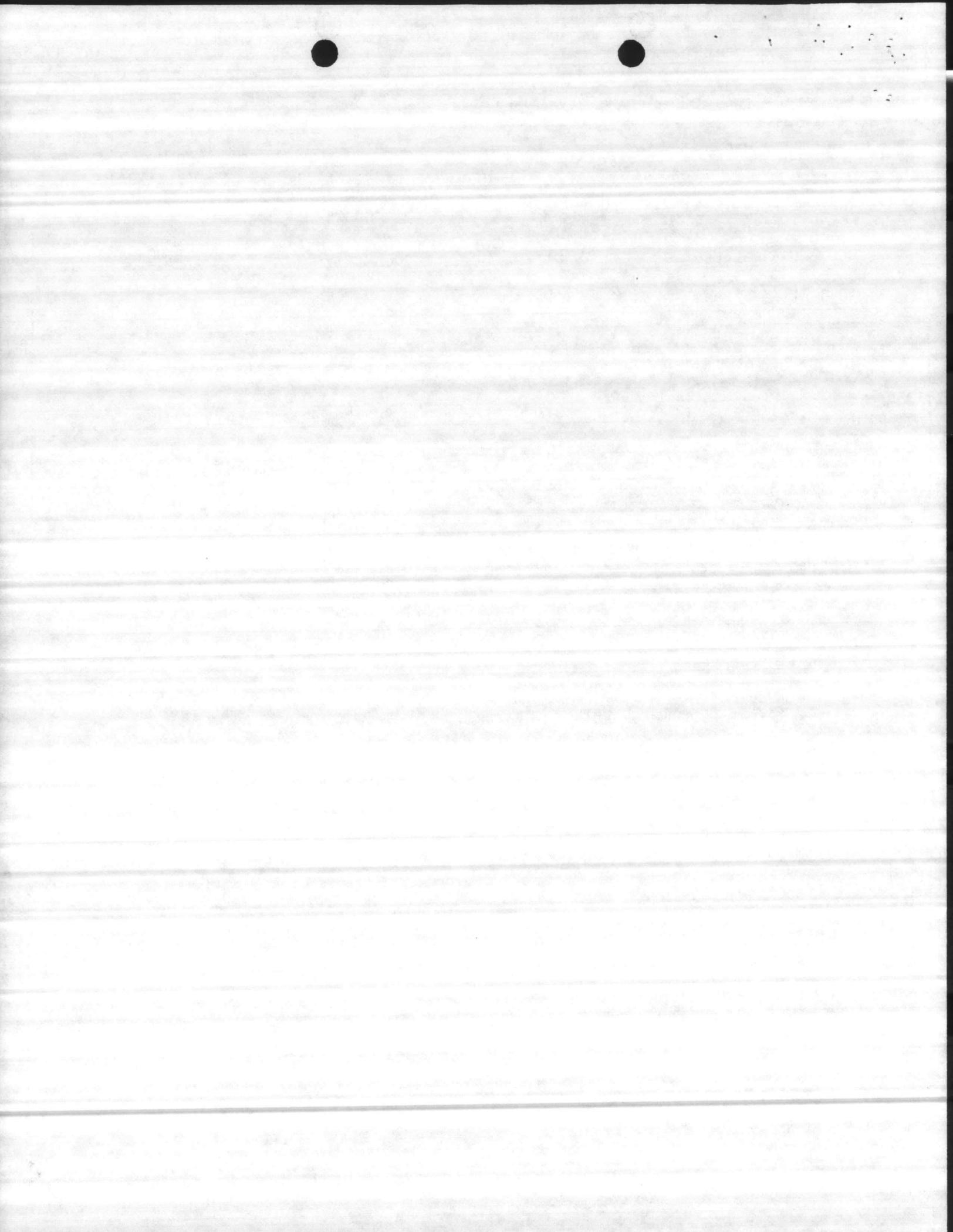
ITEM	INSTALLED COST (\$ X 10 ³)	MAINT. FACTOR	COST (\$ X 10 ³)
Boilers & Fans	3,250	0.025	81.25
Precipitators	1,200	0.015	18.00
Ducts & Stack	245	0.010	2.45
Ash Handling	575	0.025	14.38
Pumps	33	0.015	0.50
Water Treatment	37	0.020	.74
Building	3,400	0.005	17.00
Internal Piping	740	0.005	3.70
Export Piping	1,376	0.010	13.76
Cranes	850	0.020	17.00
Electrical Instrumentation	538	0.020	10.76
Turbine Generator	200	0.020	4.00
Total Unescalated Maintenance			183.54

Maintenance escalated to Oct. 1986

Fy 82 Fy 83 Fy 84 Fy 85 Fy 86
 $\$183,540 \times 1.056 \times 1.056 \times 1.056 \times 1.056 \times 1.056 = \$241,018$

10% Discount (0% differential) 9.524

Present Value Maintenance Costs \$2,295,459



c. Plant Overhaul

\$ 50,000 every 5 years

Escalated to Oct. 1986

$$\begin{array}{cccccc} & \text{Fy 82} & \text{Fy 83} & \text{Fy 84} & \text{Fy 85} & \text{Fy 86} \\ \$ 50,000 & \times 1.056 = \$65,658 \end{array}$$

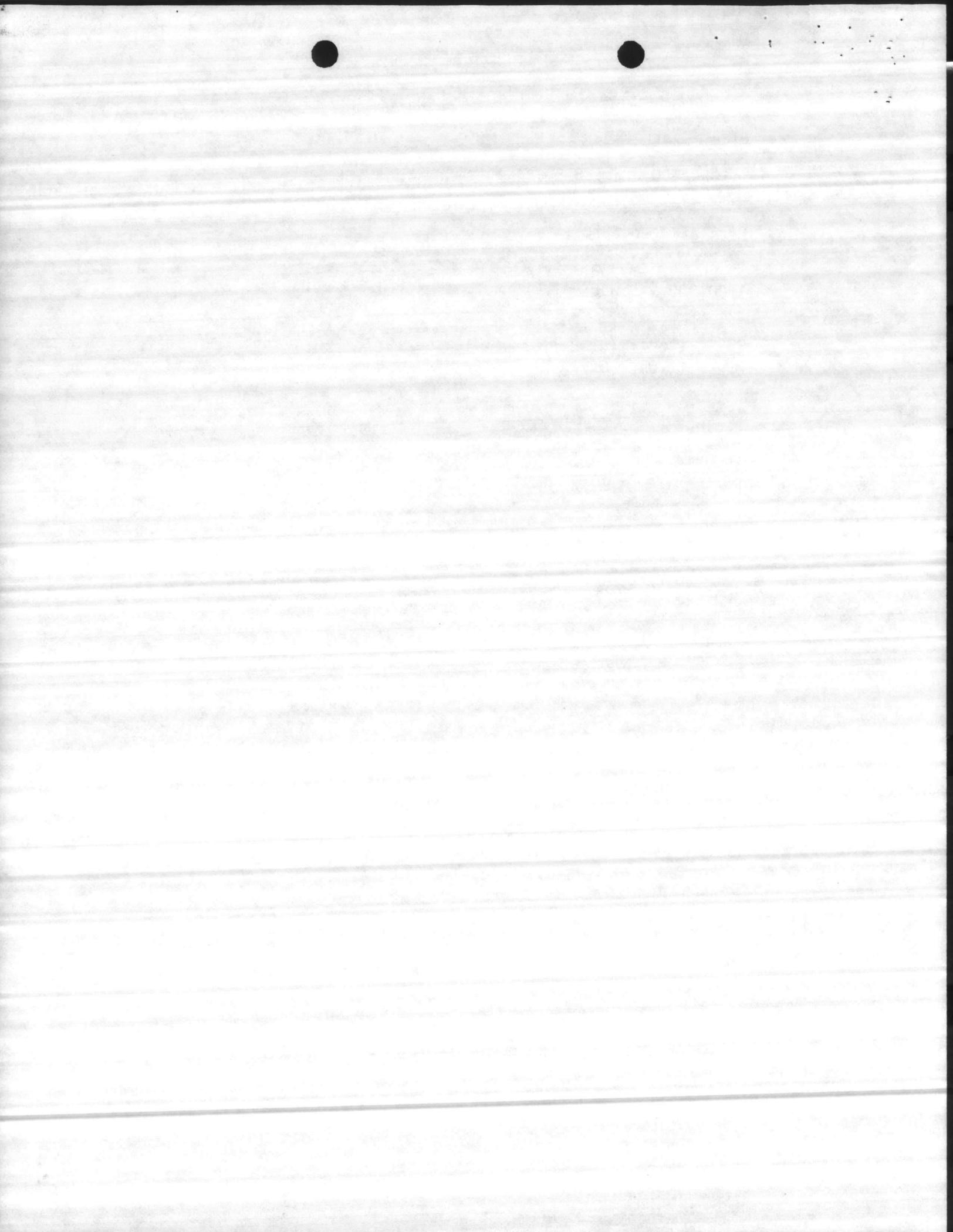
10% Discount (0% differential) year 5
Present Value Overhaul Cost .652 \$ 42,809

10% Discount (0% differential) year 10
Present Value Overhaul Cost .405 \$ 26,591

10% Discount (0% differential) year 15
Present Value Overhaul Cost .251 \$ 16,480

10% Discount (0% differential) year 20
Present Value Overhaul Cost .156 \$ 10,242

Total Present Value Overhaul Costs \$ 96,122



d. Annual Incremental Electrical Costs

SERVICE	POWER (KW)	USE FACTOR	EFFECTIVE POWER
Pumping Power*	110	0.8	88
Crane Operation	30	1.0	30
Precipitators	400	0.8	320
Ash Handling	60	0.8	48
TOTAL			486 KW

* NOTE: Feedwater pumping is not included since a reduction in existing feedwater pumping will be realized. Adjustment is made for higher pressure feedwater.

Annual Demand Cost Increase
 $486 \text{ KW} \times \$ 73.598/\text{KW} = \$ 35,769/\text{yr}.$

Annual KWH Increase
 $486 \text{ KW} \times 7000 \text{ hrs/yr.} = 3,402,000 \text{ KWh/yr}.$

Annual Dollar Increase per KWH
 $3,402,000 \text{ KWh/yr.} \times \$.02726/\text{KWh} = \$ 92,738/\text{yr}.$

Total Annual Increase Electrical Cost
 $\$ 35,769 + \$ 92,738 = \$ 128,507$

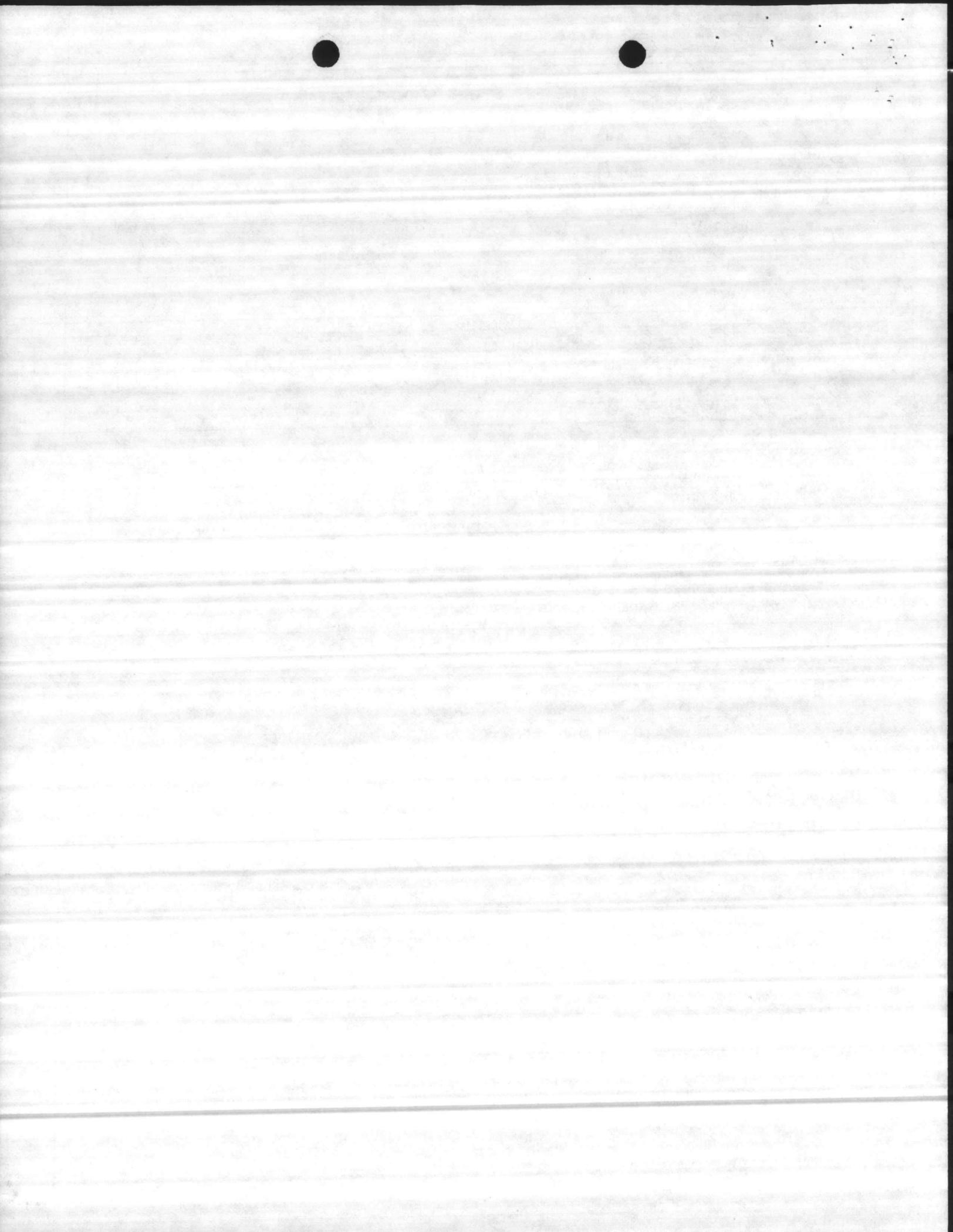
Escalated to Oct. 1986
 $\$ 128,507 \times 1.13 \text{ (FY82)} \times 1.13 \text{ (FY83)} \times 1.13 \text{ (FY84)} \times 1.13 \text{ (FY85)} \times 1.13 \text{ (FY86)} = \$ 236,765$

10% Discount (7% differential)

Present Value Incremental Electrical Cost

18.049

\$4,273,386



e. Annual Trash Transfer Cost from Cherry Point to Lejeune

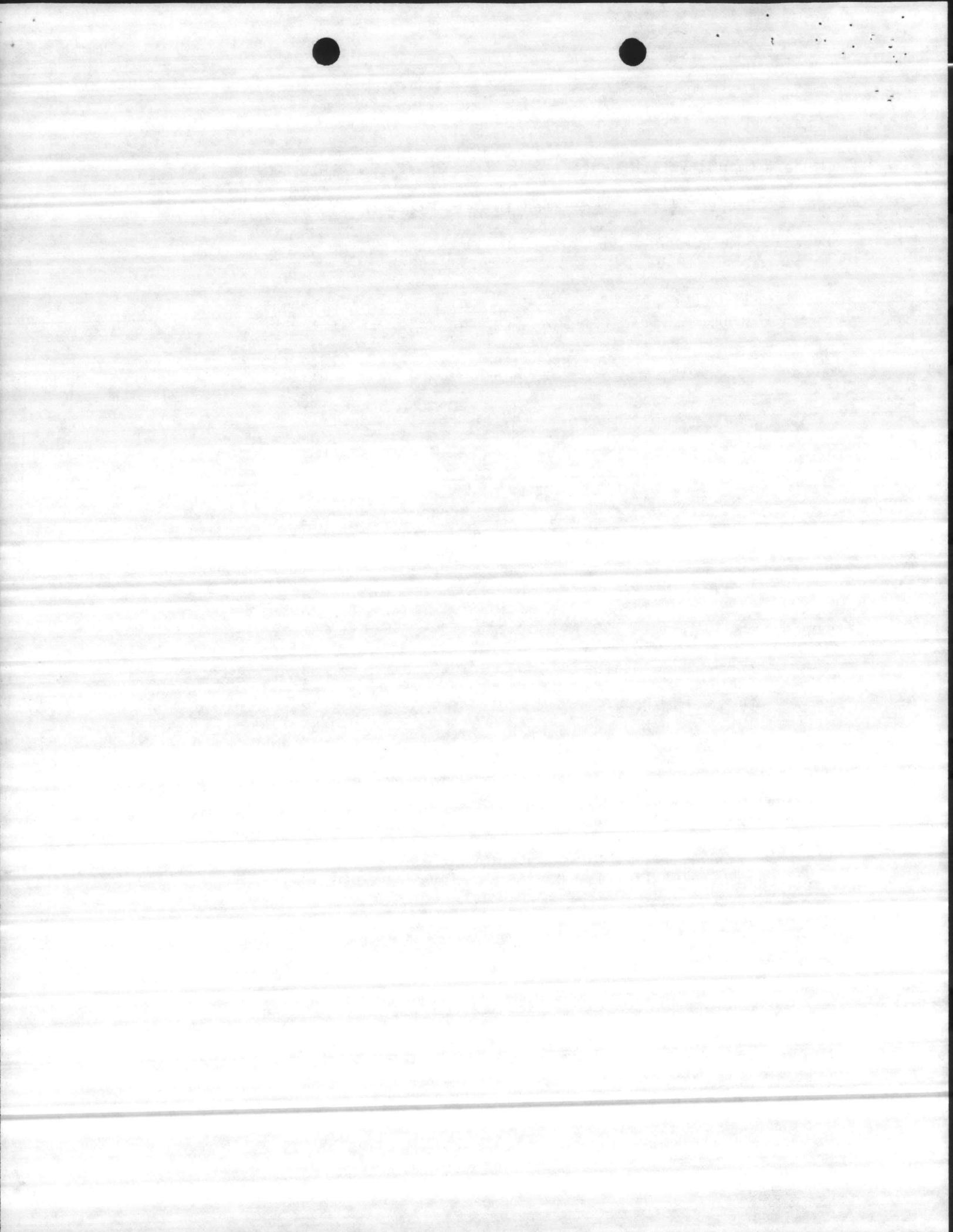
\$10/ton (1977) escalated to Oct. 1986

$$\frac{\$10 \times 2317}{1355} = \$17.10$$

Yr. of Op.	Tons/yr.	\$/yr.	10% Discount (0% differential)	Present Value	
1986	1	15,538	\$ 265,699	.954	\$ 253,477
	2	15,793	270,060	.867	234,142
	3	16,048	274,420	.788	216,243
	4	16,303	278,781	.717	199,886
1990	5	16,558	283,141	.652	184,608
	6	16,813	287,502	.592	170,201
	7	17,068	291,862	.538	157,022
	8	17,323	296,223	.489	144,853
	9	17,578	300,583	.445	133,759
	10	17,833	304,944	.405	123,502
	11	18,088	309,304	.368	113,824
	12	18,343	313,665	.334	104,764
	13	18,598	318,025	.304	96,679
	14	18,853	322,386	.276	88,978
2000	15	19,108	326,746	.251	82,013
	16	19,363	331,107	.228	75,492
	17	19,618	335,467	.208	69,777
	18	19,873	339,823	.189	64,227
	19	20,128	344,188	.172	59,200
	20	20,383	348,549	.156	54,373
	21	20,638	352,909	.142	50,113
	22	20,893	357,270	.129	46,087
	23	21,148	361,630	.117	42,310
	24	21,403	365,991	.107	39,161
2010	25	21,658	370,351	.097	35,924

Total Present Value Transfer Cost

\$2,840,615



f. Annual Ash Disposal Cost

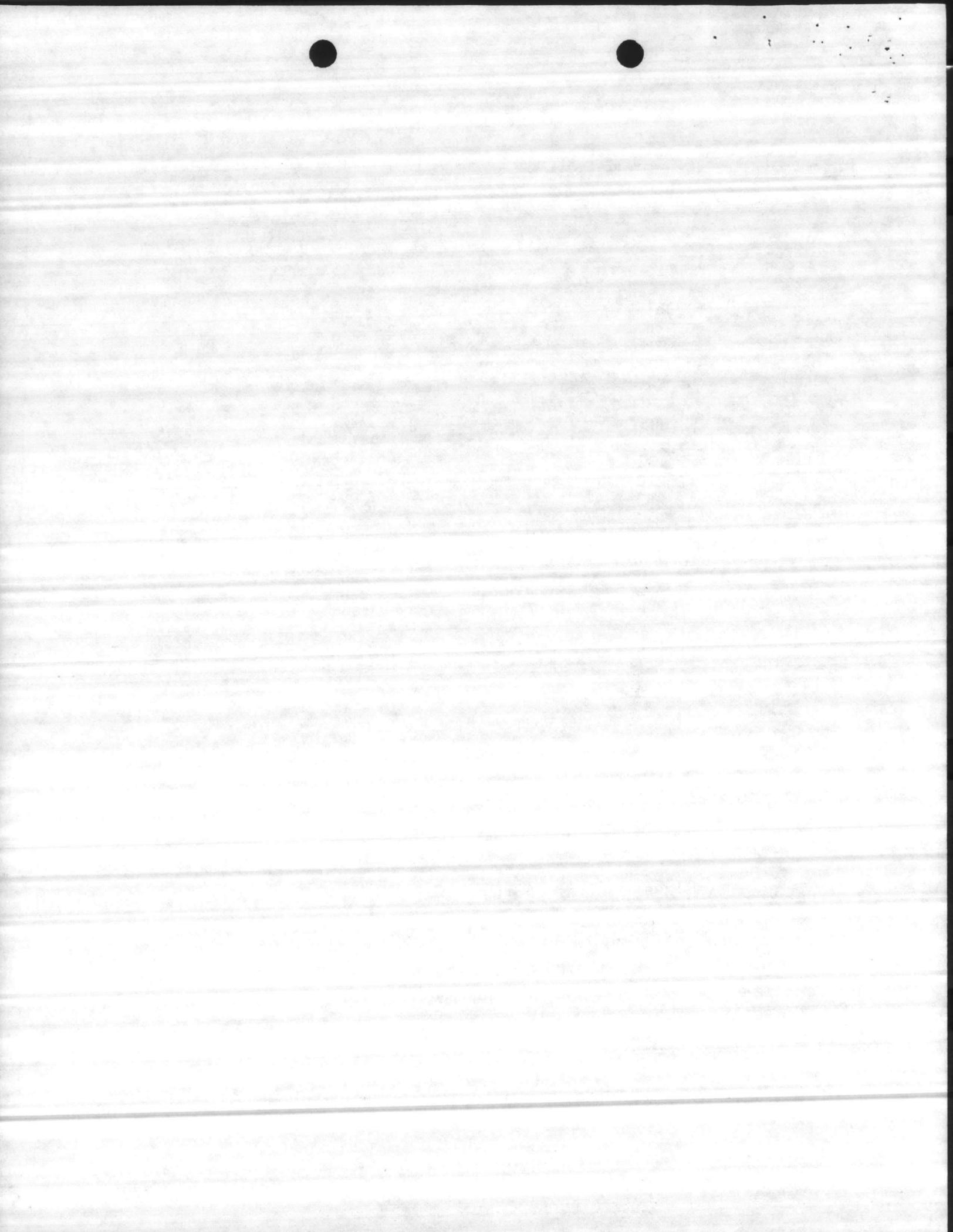
Yr. of Op.	1982 \$*	1986 \$*	10% Discount (0% differential)	Present Value
1986				\$ 16,109
1	\$ 13,702	\$ 16,886	.954	14,698
2	13,756	16,952	.867	13,461
3	13,862	17,083	.788	12,296
4	13,916	17,150	.717	11,267
1990	14,022	17,280	.652	10,268
5	14,075	17,346	.592	9,367
6	14,128	17,411	.538	9,009
7	14,128	17,411	.489	8,227
8	14,950	18,424	.445	7,541
9	15,003	18,489	.405	6,876
10	15,110	18,621	.368	6,263
11	15,163	18,686	.334	5,720
12	15,216	18,752	.304	5,212
13	15,269	18,817	.276	4,756
14	15,323	18,884	.251	4,335
2000	15,376	18,949	.228	3,982
15	15,429	19,014	.208	3,630
16	15,535	19,145	.189	3,315
17	15,588	19,210	.172	3,027
18	15,642	19,277	.156	2,765
19	15,748	19,407	.142	2,520
20	15,802	19,474	.129	2,293
21	15,855	19,539	.117	2,111
22	15,908	19,605	.107	1,920
23	16,014	19,735	.097	
24	16,067	19,800		
2010				
				\$ 170,968

Total Present Value Ash Disposal Cost

* Escalation from 1982 to 1986 = $\frac{2317}{1880} = 1.2324$

Ash - 80 lbs/cf. 30% moisture

Ash Disposal - 5 days per week



3. Benefits -

Revenues generated from sales of electricity to CP&L

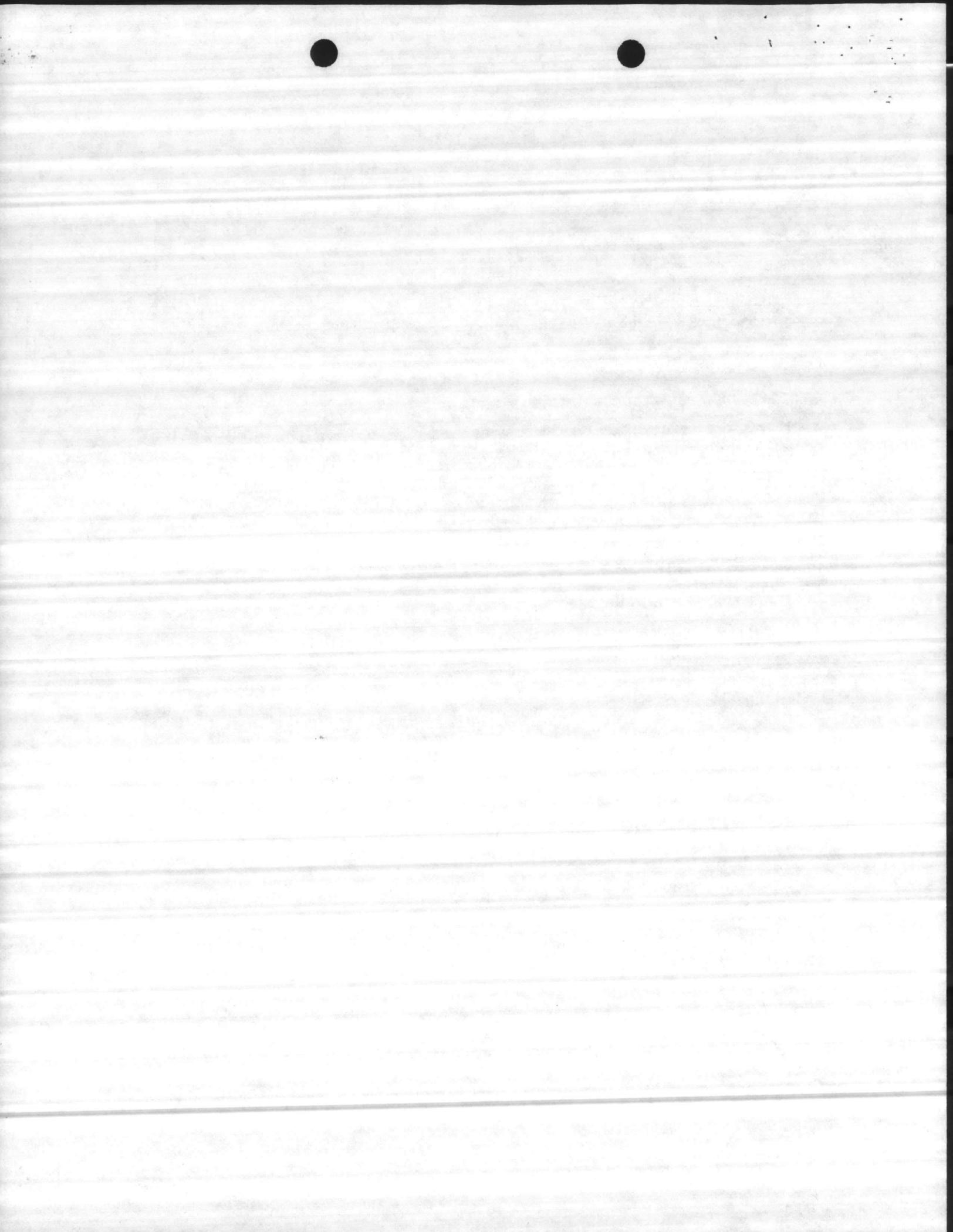
Year	Av. Kw/hr Generated	*Net Revenue Jan. 1982 \$	** Oct, 1986 \$	10% Discount (7% differential)	Present Value	
1986	1	640	\$232,640	\$428,624	.986	\$ 422,623
	2	646	234,821	432,642	.959	414,904
	3	655	238,092	438,669	.933	409,278
	4	660	239,910	442,019	.908	401,353
	5	670	243,545	448,716	.883	396,216
	6	674	244,999	451,395	.859	387,748
	7	680	247,180	455,413	.836	380,725
	8	685	248,998	458,763	.813	372,974
	9	690	250,815	462,110	.791	365,529
	10	700	254,450	468,808	.769	360,513
	11	705	256,268	472,157	.748	353,174
	12	710	258,085	475,505	.728	346,168
	13	715	259,902	478,853	.708	339,028
	14	720	261,720	482,202	.688	331,755
2000	15	725	263,538	485,552	.670	325,320
	16	730	265,355	488,899	.651	318,273
	17	740	268,990	495,597	.634	314,208
	18	745	270,808	498,946	.616	307,351
	19	750	272,625	502,294	.600	301,376
	20	750	276,260	508,991	.583	296,742
	21	766	278,441	513,009	.567	290,876
	22	770	279,895	515,688	.552	284,660
	23	775	281,712	519,036	.537	278,722
	24	785	285,348	525,735	.522	274,434
2010	25	790	287,165	529,083	.508	268,774

Total Present Value Electricity Revenues Benefit = \$8,542,724

* Source: CP&L Schedule CSP-3B effective 9-24-82 Variable Energy Credit and 10-Year Capacity Credit

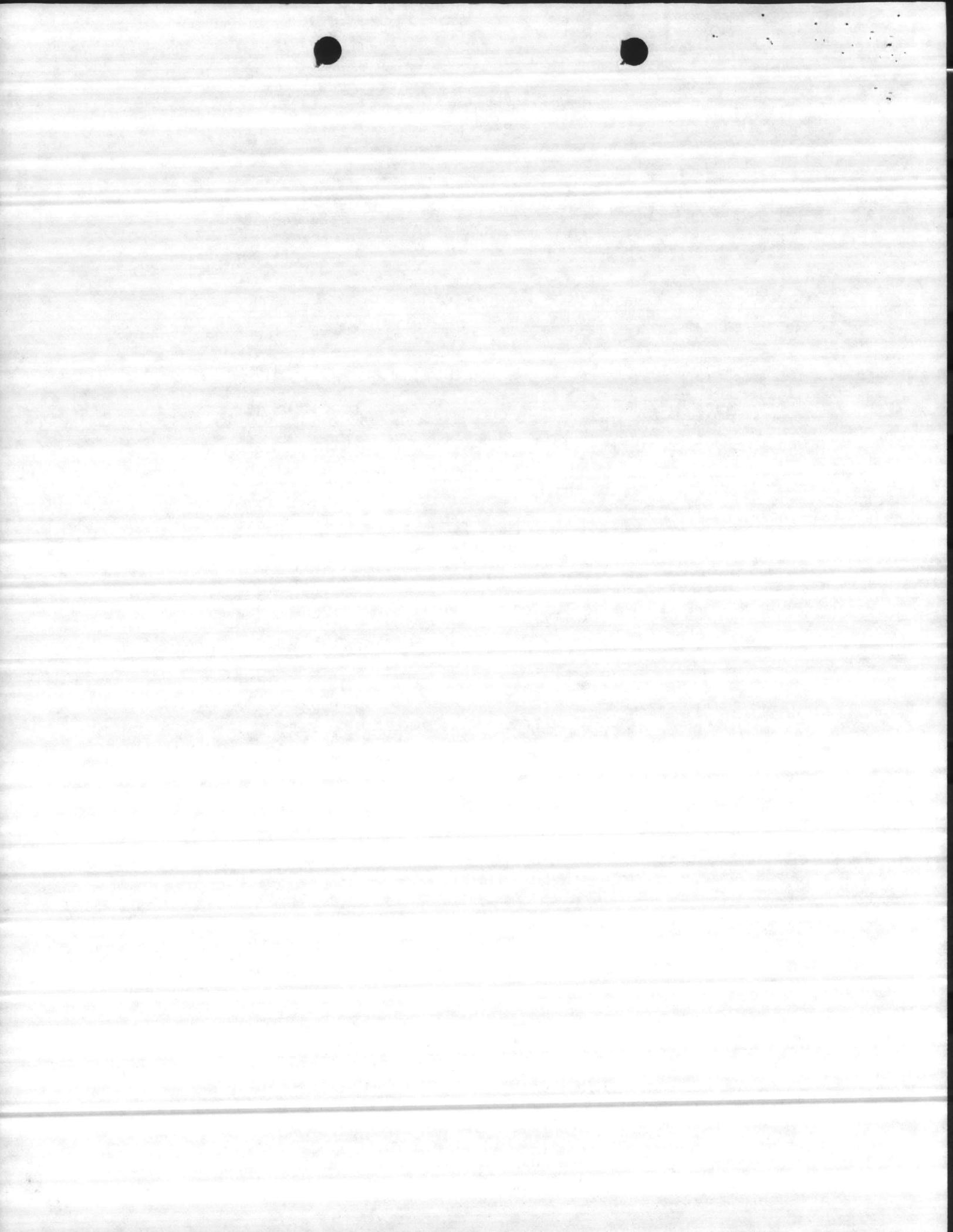
**Escalation from Jan. 1982 to Oct. 1986 =

$$1.13 \times 1.13 \times 1.13 \times 1.13 \times 1.13 = 1.842435$$



Summary Sheet Alternative 2A - Total Present Value

Investment Cost	
Boiler Plant	\$24,248,663
Ash Disposal	211,367
Recurring Costs	
Labor	4,171,048
Maintenance	2,295,459
Plant Overhaul	96,122
Incremental Electrical	4,273,386
Trash Transfer	2,840,615
Ash Disposal	<u>170,968</u>
Total Present Value Cost	\$38,307,628
Less Present Value Benefits Sale of Electricity	<u>8,542,724</u>
Net Present Value Alterantive 2A	\$29,764,904
Discount Factor 9.524	
Uniform Annual Cost	\$ 3,125,252



ALTERNATIVE B - Incremental Cost of Refuse Landfills at Cherry Point and Camp Lejeune

1. Investment Costs

a. Incremental Cost of Landfill - Cherry Point

Capital Cost

\$298,704 (1977) in year 5

Escalated to Oct 86

$\$298,704 \times \frac{2317}{1355} = \$510,772$

10% Discount (2% differential) year 5 .712

Present Value Capital Cost \$363,669

Capital Cost

\$36,000 (1977) in years 8, 16, 23

Escalated to Oct. 1986

$\$36,000 \times \frac{2317}{1355} = \$61,558$

10% Discount (2% differential) year 8 .568

Present Value Capital Cost \$ 34,965

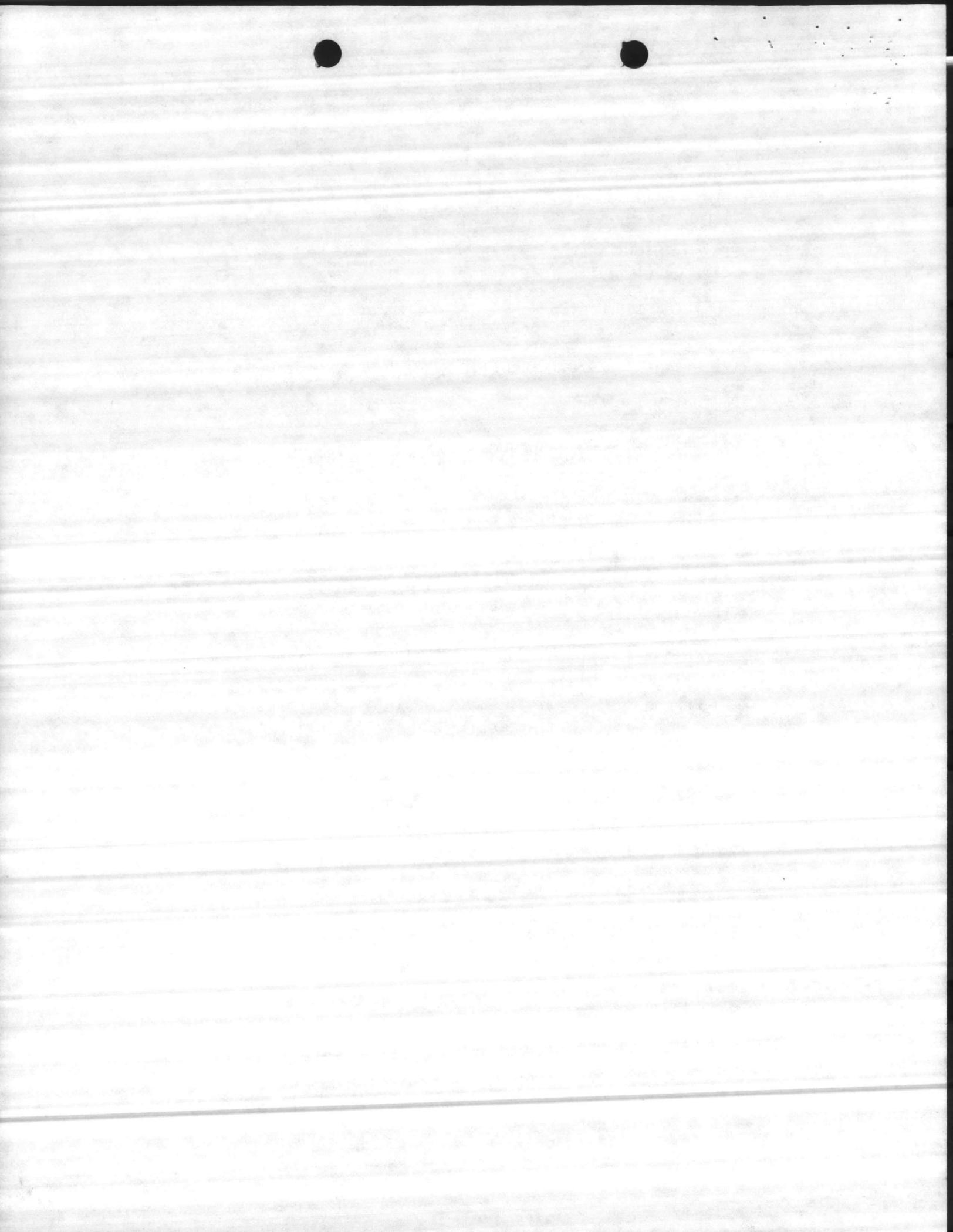
10% Discount (2% differential) year 16 .310

Present Value Capital Cost \$ 19,082

10% Discount (2% differential) in year 23 .183

Present Value Capital Cost \$ 11,265

Total Present Value Capital Costs - Cherry Point \$428,981



b. Existing Boiler Plant Replacement/Upgrading Cost

Camp Geiger Capital Cost
\$2,000,000 (1982\$) in 1989

Escalated to Oct. 1986
$$\$2,000,000 \times \frac{2317}{1880} = \$2,464,893$$

10% Discount (2% differential) year 2 .893

Present Value Capital Cost \$2,201,150

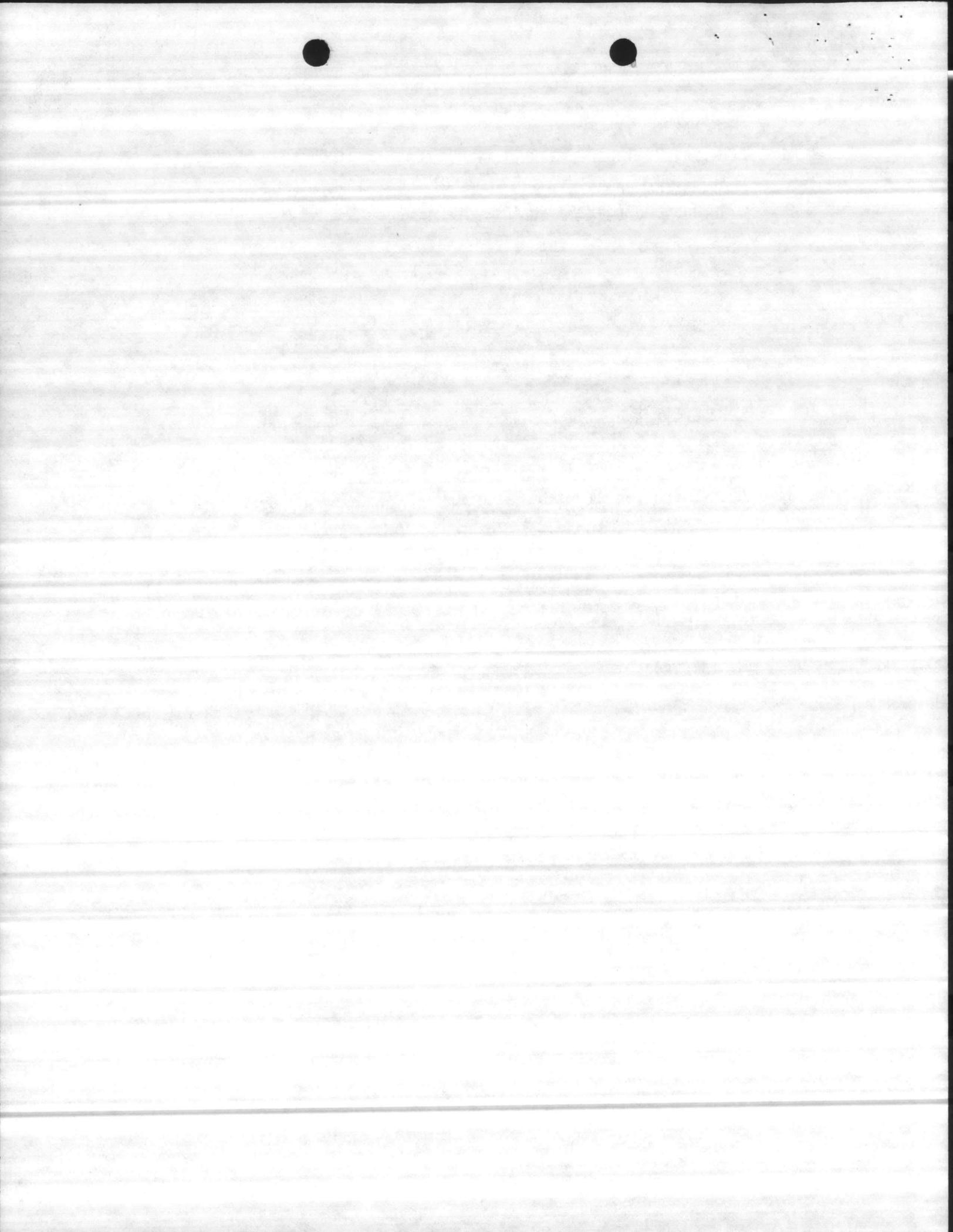
Air Station Capital Cost
\$2,000,000 (1982) in 1996

Escalated to Oct. 1986
$$\$2,000,000 \times \frac{2317}{1880} = \$2,464,893$$

10% Discount (2% differential) year 10 .488

Present Value Capital Cost \$1,202,867

Total Present Value Replacement Costs \$3,404,017



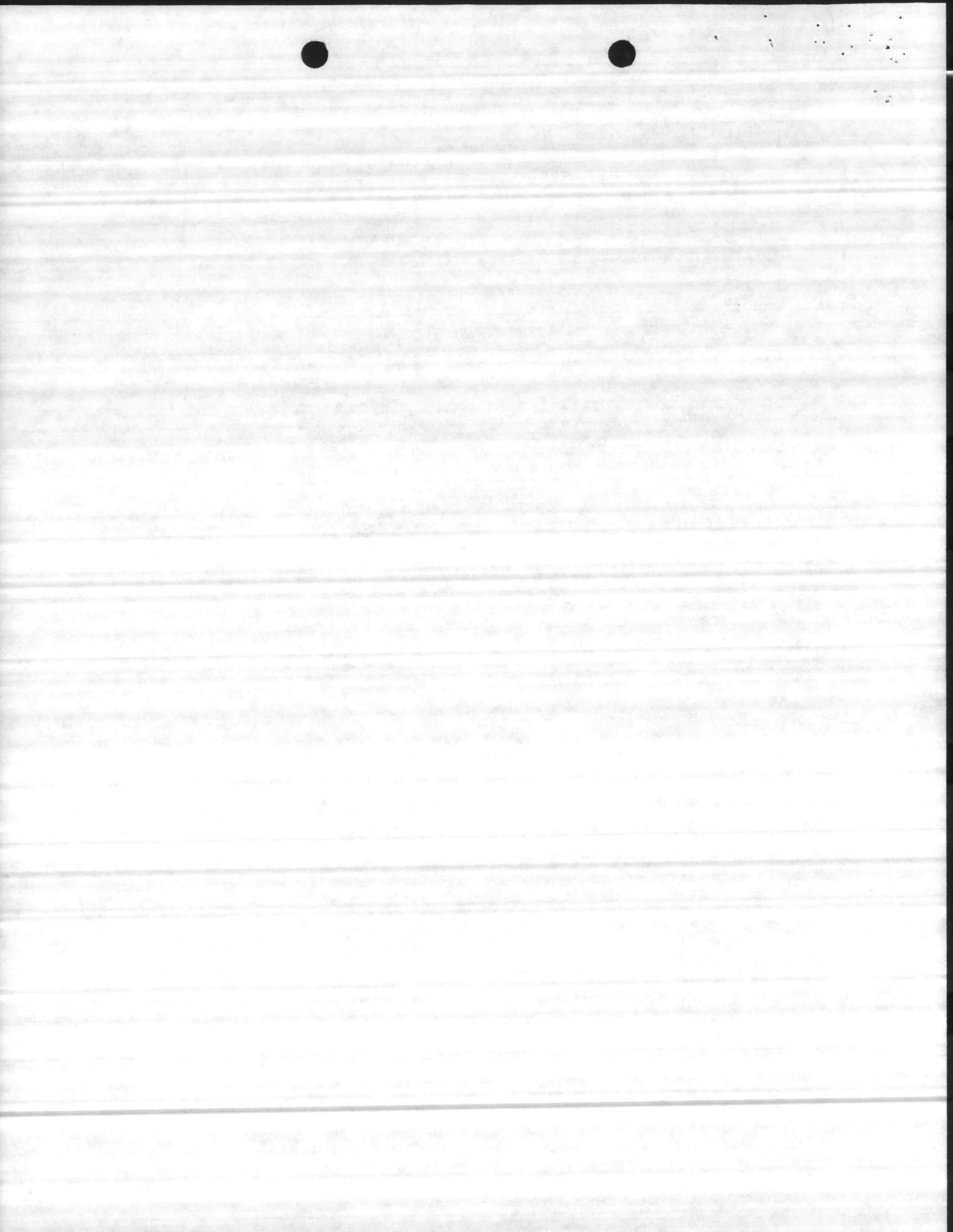
Costs:

Annual Incremental Landfill Development Cost - Cherry Point

p.	1977\$	1987\$*	10% Discount (2% differential)	Present Value
			0.963	\$ 87,788
	53,312	91,161	0.893	82,775
	54,208	92,694	0.828	78,019
	55,104	94,226	0.768	73,542
	56,000	95,758	0.712	69,270
	56,896	97,290	0.660	65,223
	57,792	98,822	0.612	63,248
	60,438	103,347	0.568	59,571
	61,334	104,879	0.526	55,972
	62,230	106,411	0.488	52,676
	63,126	107,943	0.453	49,592
	64,022	109,475	0.420	46,623
	64,918	111,007	0.389	43,778
	65,814	112,539	0.361	41,180
	66,710	114,071	0.335	38,727
	67,606	115,604	0.310	36,312
	68,502	117,136	0.288	34,176
	69,398	118,668	0.267	32,093
	70,294	120,200	0.247	30,068
	71,190	121,732	0.229	28,227
	72,086	123,264	0.213	26,582
	72,982	124,796	0.197	24,887
	73,878	126,328	0.183	23,398
	74,774	127,861	0.170	21,997
	75,670	129,393	0.157	20,555
	76,566	130,924		

Annual Present Value Development Cost - Cherry Point - \$1,186,279

$$\text{Increase from 1977 to 1986} = \frac{2317}{1355} = 1.70996$$

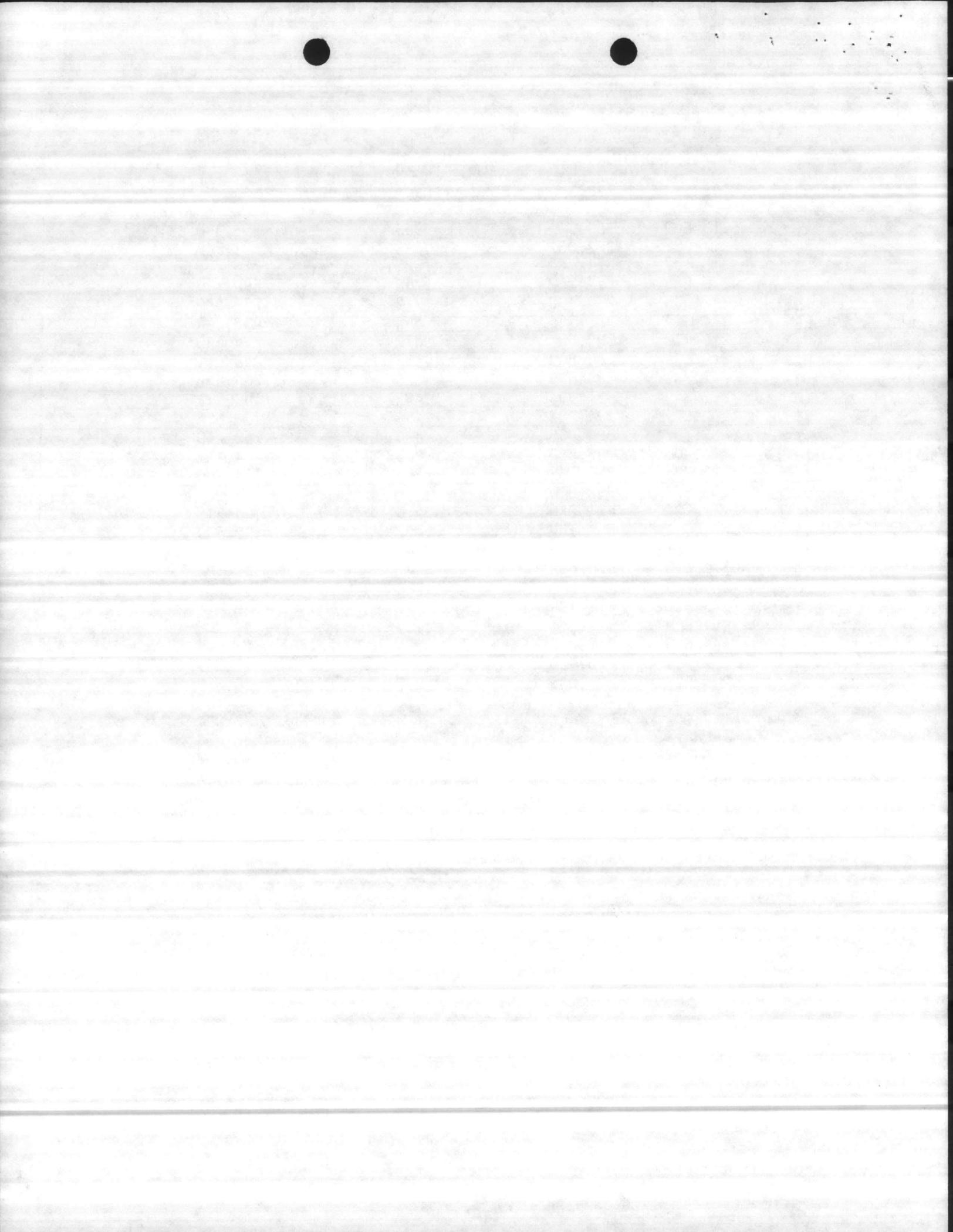


b. Annual Incremental Landfill Development Cost - Camp Lejeune

Yr. of Op.	1977\$*	1987\$*	10% Discount (2% differential)	Present Value
1986 1	\$215,809	368,960	.963	\$ 355,308
2	217,609	372,037	.893	332,229
3	219,157	374,684	.828	310,238
4	220,956	377,760	.768	290,119
5	222,505	380,408	.712	270,850
6	224,304	383,484	.660	253,099
7	223,732	382,506	.612	234,093
8	225,532	385,583	.568	219,011
9	227,331	388,659	.526	204,434
10	228,879	391,305	.488	190,957
11	230,679	394,383	.453	178,655
12	230,107	393,405	.420	165,230
13	231,906	396,480	.389	154,231
14	233,706	399,558	.361	144,240
2000 15	233,134	398,580	.335	133,524
16	234,933	401,656	.310	124,513
17	236,481	404,302	.288	116,439
18	238,281	407,379	.267	108,770
19	240,080	410,455	.247	101,382
20	241,629	413,103	.229	94,601
21	243,428	416,179	.213	88,646
22	242,856	415,201	.197	81,795
23	244,655	418,277	.183	76,545
24	246,204	420,925	.170	71,557
2010 25	248,003	424,001	.157	66,568

Total Present Value Development Costs - Camp Lejeune - \$4,367,034

* Escalation from 1977 to 1986 = $\frac{2317}{1355} = 1.70966$

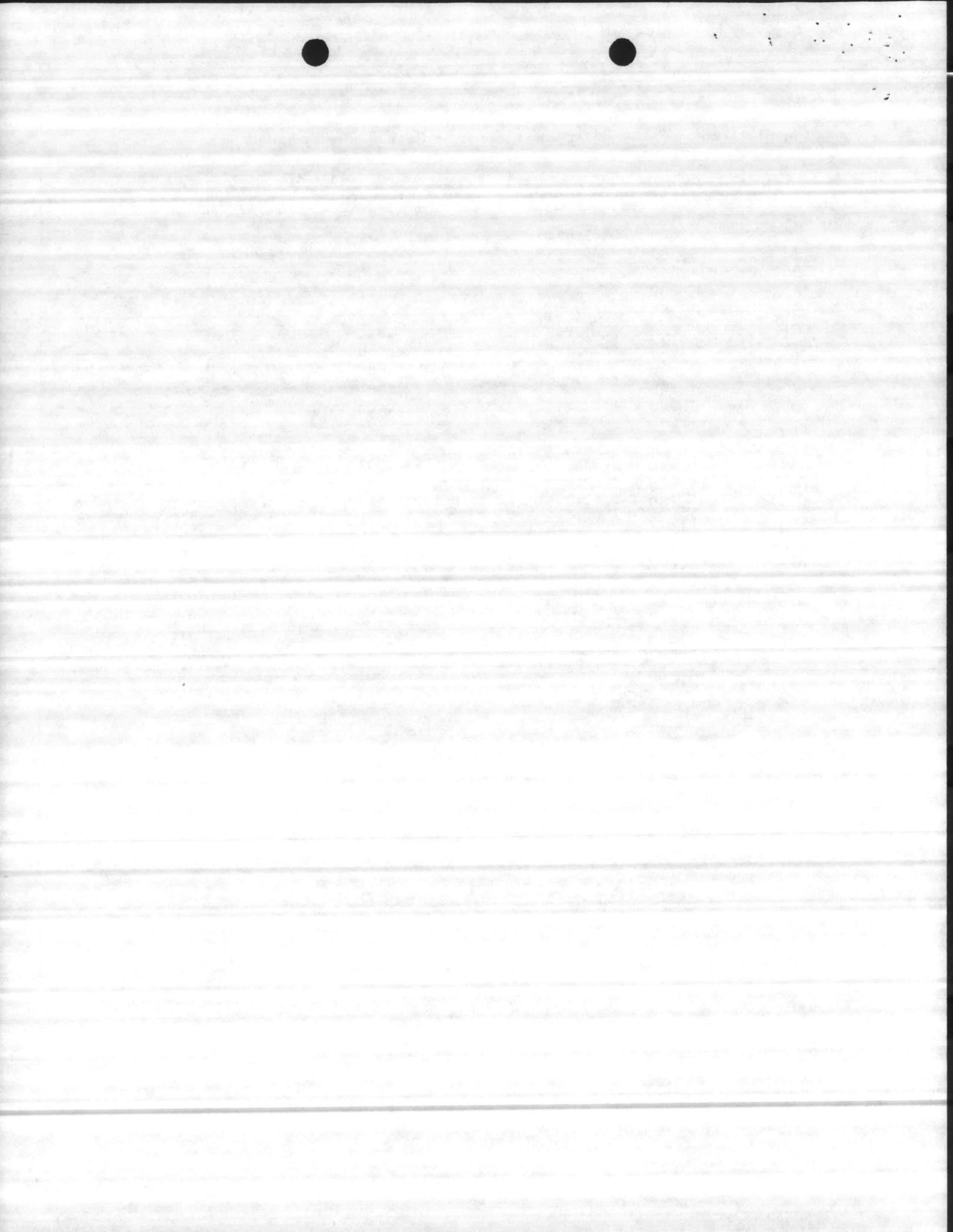


c. Annual Incremental Landfill Maintenance Cost - Cherry Point

Year	Yr. of Op.	1977\$*	1986\$*	10% Discount (0% differential)	Present Value
1986	1	\$ 9,520	\$ 16,278	.954	\$ 15,530
	2	9,680	16,552	.867	14,350
	3	9,840	16,826	.788	13,258
	4	10,000	17,099	.717	12,260
	5	10,160	17,373	.652	11,327
	6	10,230	17,492	.592	10,355
	7	10,480	17,920	.538	9,643
	8	10,640	18,194	.489	8,896
	9	10,800	18,467	.445	8,218
	10	10,960	18,741	.405	7,590
	11	11,120	19,014	.368	6,997
	12	11,280	19,288	.334	6,442
	13	11,440	19,561	.304	5,946
	14	11,600	19,835	.276	5,474
2000	15	11,760	20,109	.251	5,047
	16	11,920	20,382	.228	4,647
	17	12,080	20,656	.208	4,296
	18	12,240	20,929	.189	3,955
	19	12,400	21,203	.172	3,647
	20	12,560	21,477	.156	3,350
	21	12,720	21,750	.142	3,088
	22	12,880	22,024	.129	2,841
	23	13,040	22,297	.117	2,608
	24	13,200	22,571	.107	2,415
2010	25	13,360	22,845	.097	2,215

Total Present Value Maintenance Costs - Cherry Point \$174,393

* Escalation from 1977 to 1986 = $\frac{2317}{1355} = 1.70966$

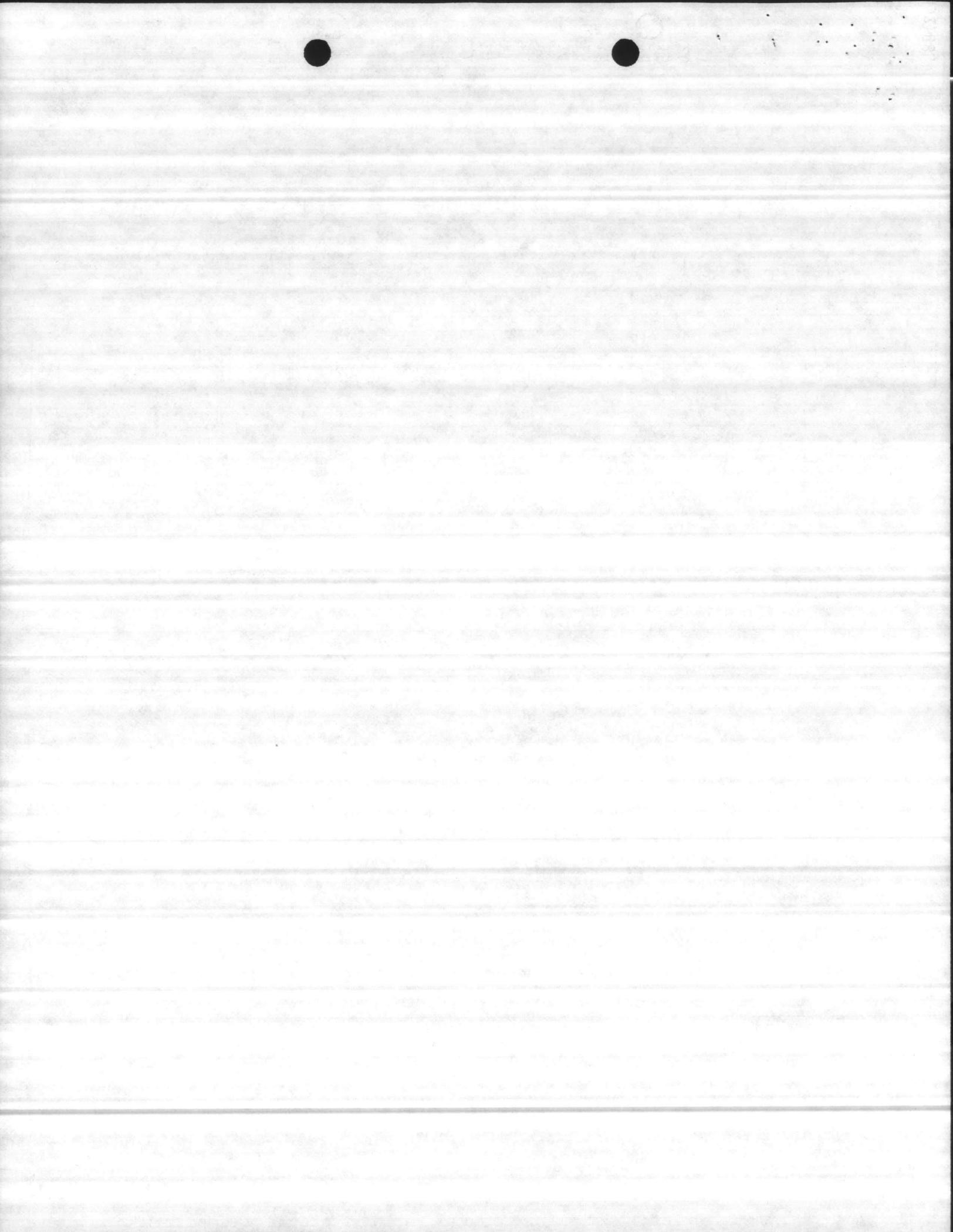


d. Annual Incremental Landfill Maintenance Cost - Camp Lejeune

<u>Yr. of Op.</u>		<u>1977\$*</u>	<u>1986\$*</u>	<u>10% Discount (0% differential)</u>	<u>Present Value</u>
1986	1	\$ 16,460	\$ 28,145	.954	\$ 26,851
	2	16,597	28,380	.867	24,605
	3	16,715	28,582	.788	22,522
	4	16,853	28,818	.717	20,662
	5	16,971	29,019	.652	18,920
	6	17,108	29,254	.592	17,318
	7	17,064	29,178	.538	15,698
	8	17,202	29,414	.489	14,383
	9	17,339	29,649	.445	13,193
	10	17,457	29,850	.405	12,089
	11	17,594	30,085	.368	11,071
	12	17,551	30,011	.334	10,023
	13	17,688	30,211	.304	9,184
	14	17,825	30,480	.276	8,412
2000	15	17,781	30,404	.251	7,631
	16	17,919	30,640	.228	6,986
	17	18,037	30,842	.208	6,415
	18	18,174	31,076	.189	5,873
	19	18,311	31,311	.172	5,385
	20	18,429	31,512	.156	4,916
	21	18,567	31,748	.142	4,508
	22	18,523	31,673	.129	4,085
	23	18,660	31,907	.117	3,733
	24	18,778	32,109	.107	3,435
2010	25	18,915	32,343	.097	3,137

Total Present Value Maintenance Costs - Camp Lejeune = \$281,035.

* Escalation from 1977 to 1986 = $\frac{2317}{1355} = 1.70966$



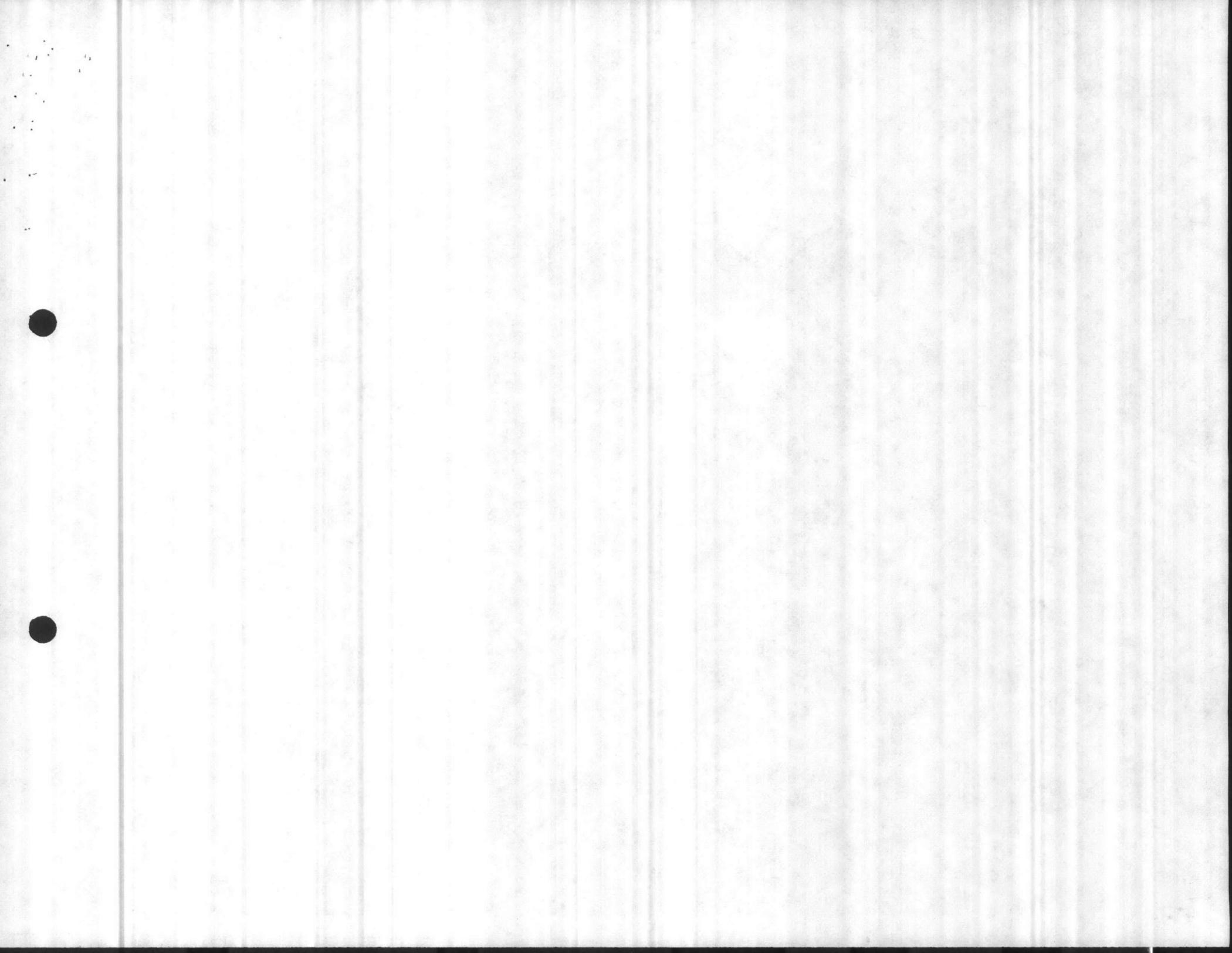
e. Annual Incremental Cost of #6 Fuel Oil at Camp Geiger and Air Station Plants

av. tons/day trash burned	- 24 hours/day	= tons/hr trash
tons/hr trash	X 5830 lb. steam/ton trash	= equivalent lbs steam/hr*
lbs steam/hr	X 1254 Btu/lb**	= MMBtu/hr
MMBtu/hr	X \$12.99/MMBtu***	= \$/hr
\$/hr	X 8760 hrs/yr	= \$/yr
\$/yr	X discount factor	= present value

Year	tons/day	tons/hr.	lbs steam/hr.	Displaced Oil Input MMBtu/hr.	\$/hr.	\$/yr.	10% Discount (8% differential)	Present Value
986	128	5.33	31,093	38.99	\$ 444.87	\$3,893,697	.991	\$3,858,654
	129	5.38	31,336	39.30	448.02	3,924,655	.973	3,818,689
2	131	5.46	31,822	39.90	454.86	3,984,573	.955	3,805,267
3	132	5.50	32,065	40.21	458.40	4,015,531	.938	3,766,568
4	134	5.58	32,551	40.82	465.35	4,076,448	.921	3,754,409
990	135	5.62	32,794	41.12	468.77	4,106,407	.904	3,712,192
6	136	5.67	33,037	41.43	472.30	4,137,365	.888	3,673,980
7	137	5.71	33,280	41.73	475.72	4,167,324	.871	3,629,739
8	138	5.75	33,522	42.04	479.26	4,198,282	.856	3,593,729
9	140	5.83	34,008	42.65	486.21	4,259,199	.840	3,577,727
10	141	5.88	34,251	42.95	489.63	4,289,158	.825	3,538,556
11	142	5.92	34,494	43.26	493.16	4,320,116	.810	3,499,294
12	143	5.96	34,737	43.56	496.58	4,350,075	.795	3,458,310
13	144	6.00	34,980	43.86	500.00	4,380,035	.781	3,420,807
14	145	6.04	35,223	44.17	503.54	4,410,992	.766	3,378,820
15	146	6.08	35,466	44.47	506.96	4,440,952	.752	3,339,595
16	148	6.17	35,952	45.08	513.91	4,501,869	.739	3,326,881
17	149	6.21	36,194	45.39	517.46	4,532,826	.725	3,286,299
18	150	6.25	36,438	45.69	520.87	4,562,786	.712	3,248,703
19	152	6.33	36,923	46.30	527.82	4,623,703	.699	3,231,968
20	153	6.38	37,166	46.61	531.35	4,654,661	.687	3,197,752
21	154	6.42	37,409	46.91	534.77	4,684,620	.674	3,157,434
22	155	6.46	37,652	47.22	538.30	4,715,578	.662	3,121,712
23	157	6.54	38,138	47.82	545.15	4,775,496	.650	3,104,072
24	158	6.58	38,381	48.13	548.68	4,806,454	.638	3,066,517
010	25							

Total Present Value Fuel Oil Cost \$86,567,674

* Includes blowdown and feedwater heating
 ** Includes Camp Geiger Plant Efficiency
 *** \$5.92 (Jan. 82) escalated to Oct. 87
 \$5.92 X 1.14 X 1.14 X 1.14 X 1.14 X 1.14 = 11.40



Summary Sheet Alternative 2B - Total Present Value

Investment Costs

Cherry Point Capital Costs \$ 428,981

Boiler Plant Replacement Cost 3,404,017

Recurring Costs

Cherry Point Development 1,186,279

Camp Lejeune Development 4,367,034

Cherry Point Maintenance 174,393

Camp Lejeune Maintenance 281,035

Fuel Oil \$86,567,674

Total Present Value Alternative 2B 96,409,413

Discount Factor 9.524

Uniform Annual Cost 10,122,785

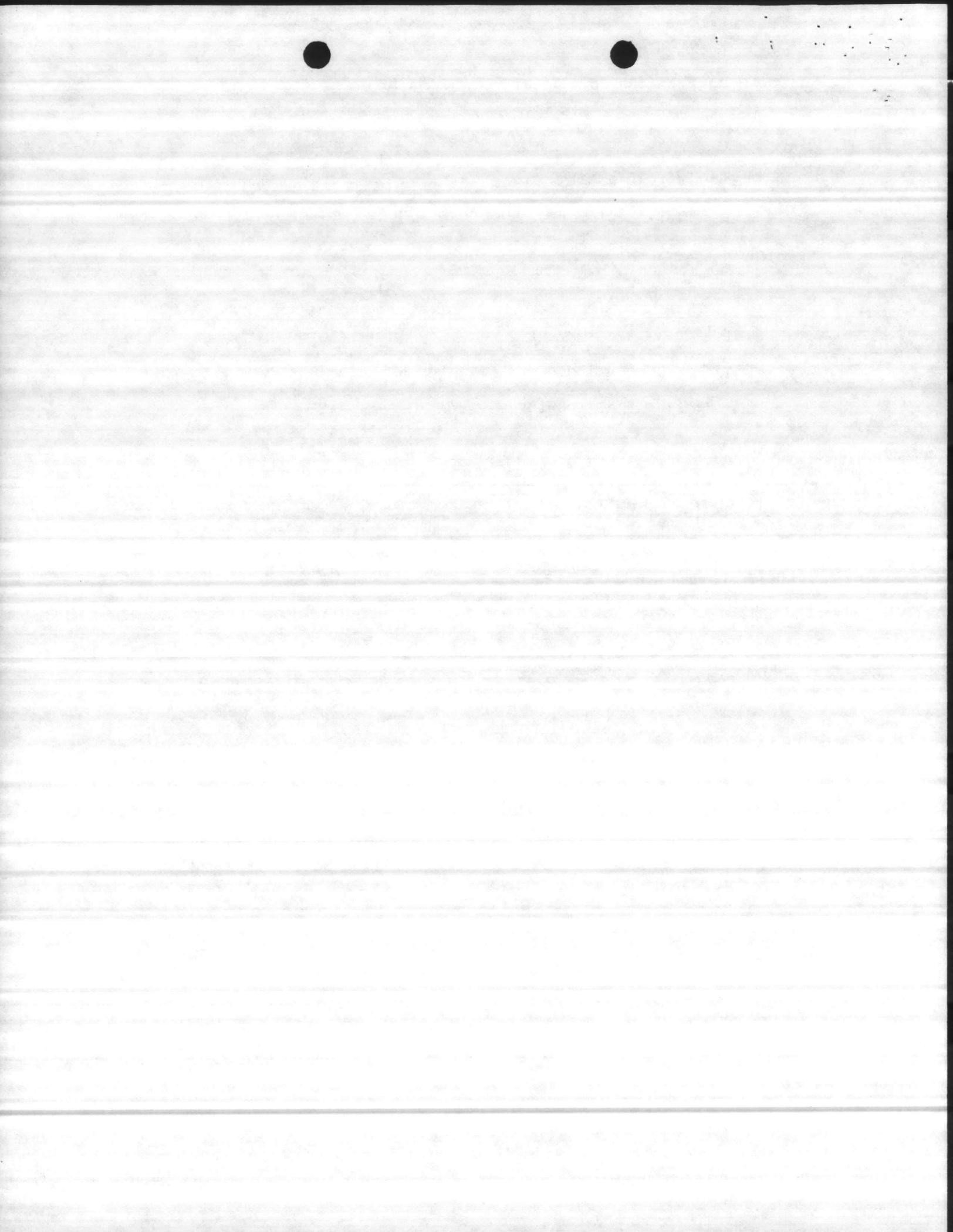


TABLE 1
 COST SUMMARY
 DESIGN ANALYSIS (FY 87)
 DIFFERENTIAL INFLATION

	Construction Costs (1982 \$)	Total Project Cost Present Value	Total Refuse Plant Savings	Uniform Annual Cost	Annual Refuse Plant Savings
**Case 1A- Refuse-fired plant producing steam only	15,468,300	*37,728,035	78,850,695	3,961,400	8,279,157
Case 1B- Incremental cost of landfill for refuse and oil for steam	--	116,579,069	--	12,240,557	--
**Case 2A- Refuse-fired plant producing steam and electricity with a backpressure turbine, sell elect	19,134,300	34,027,792	74,348,706	3,572,847	7,806,458
Case 2B- Incremental cost of landfill for refuse and oil for steam	--	109,376,498	--	11,484,303	--
Case 3A- Refuse-fired plant producing electricity with a back pressure turbine, use elect on base	19,134,300	38,868,016	--	4,081,060	--
Case 3B- Incremental cost of a landfill for refuse and oil for steam	--	109,376,498	70,508,482	7,403,243	7,403,242

*Escalated to April 1988 = 37,728,035 X 1.046 = 39,463,525 Say 39,464,000

**Case 2A is shown as lowest project cost. However, Case 1A was recommended by NAVFACENCOM, Norfolk, VA.

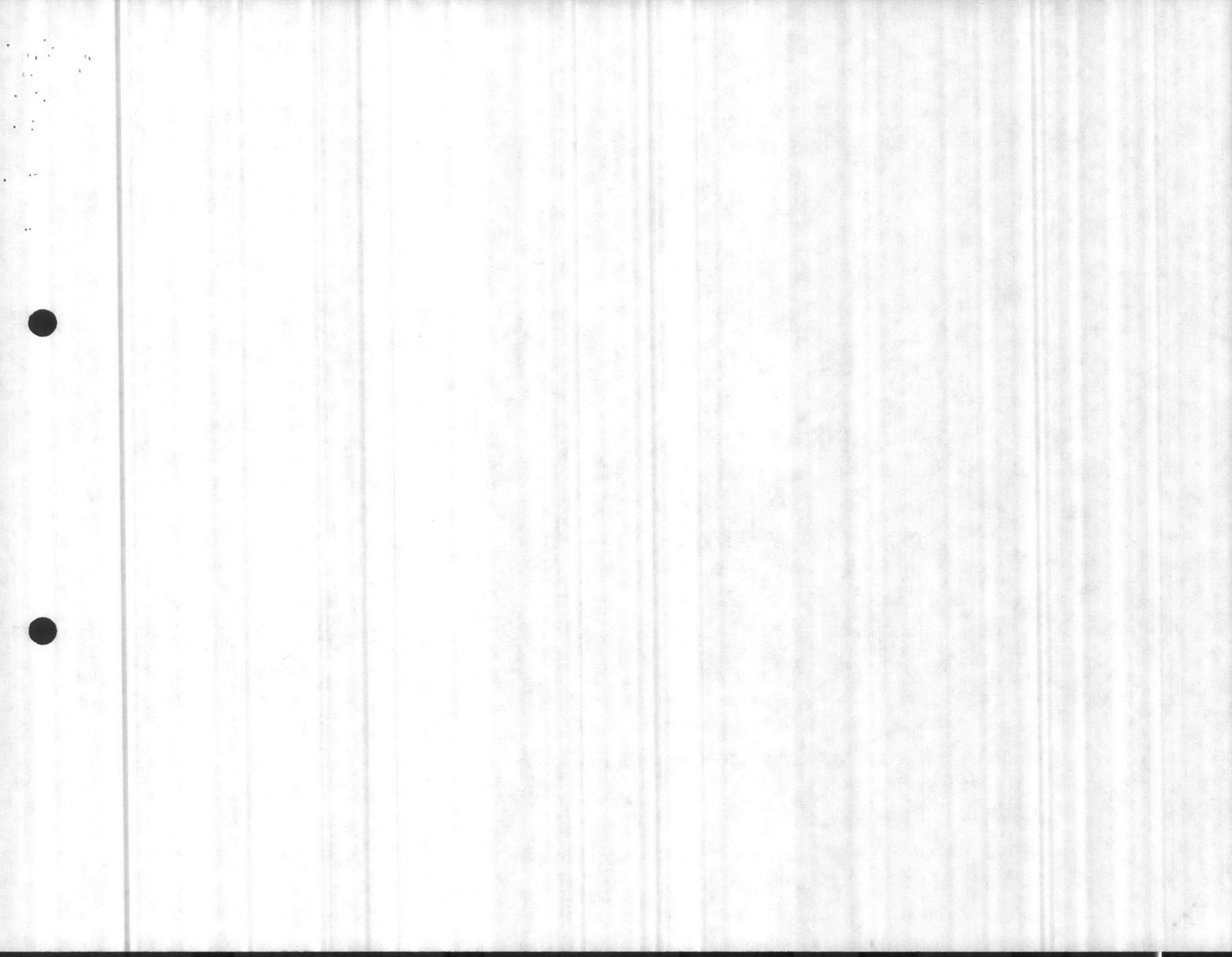
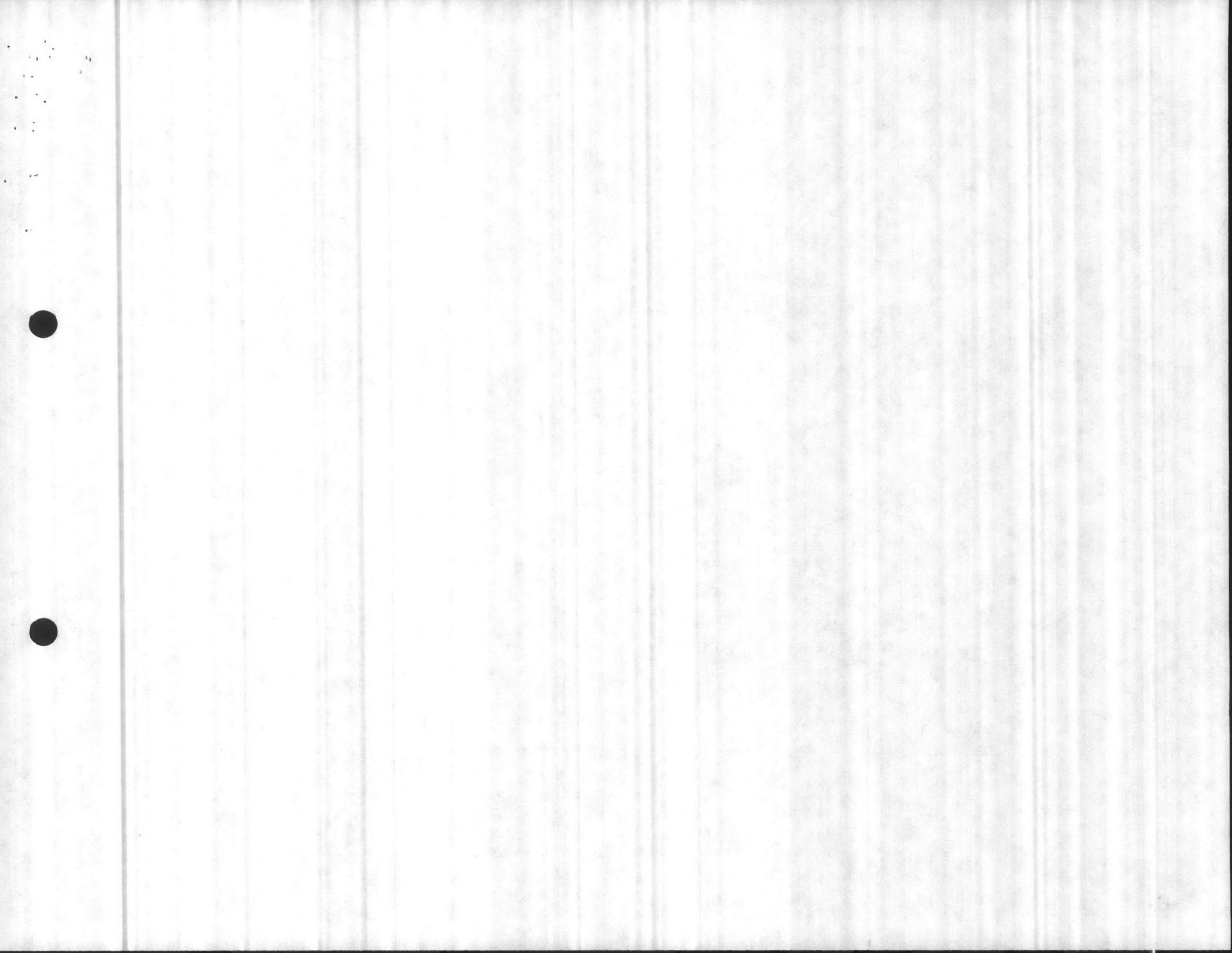


TABLE I
 COST SUMMARY
 DESIGN ANALYSIS (FY87)
 NO DIFFERENTIAL INFLATION

	<u>Construction Costs (1982 \$)</u>	<u>Total Project Cost Present Value</u>	<u>Total Refuse Plant Savings</u>	<u>Uniform Annual cost</u>	<u>Annual Refuse Plant Savings</u>
Case 1A - Refuse-fired plant producing steam only	15,468,300	35,634,955	24,081,669	3,741,595	2,528,524
Case 1B - Incremental cost of landfill for refuse and oil for steam	--	59,716,624	--	6,270,120	--
Case 2A - Refuse-fired plant producing steam and electricity with a backpressure turbine, sell elect	19,134,300	36,446,074	19,978,502	3,826,761	2,097,700
Case 2B - Incremental cost of landfill for refuse and oil for steam	--	56,424,576	--	5,924,462	--
Case 3A - Refuse-fired plant producing electricity with a backpressure turbine, use elect on base	14,134,300	38,930,007	17,494,569	4,087,569	1,836,893
Case 3B - Incremental cost of a landfill for refuse and oil for steam	--	56,424,576	--	5,924,451	--



CAMP LEJEUNE COGENERATION

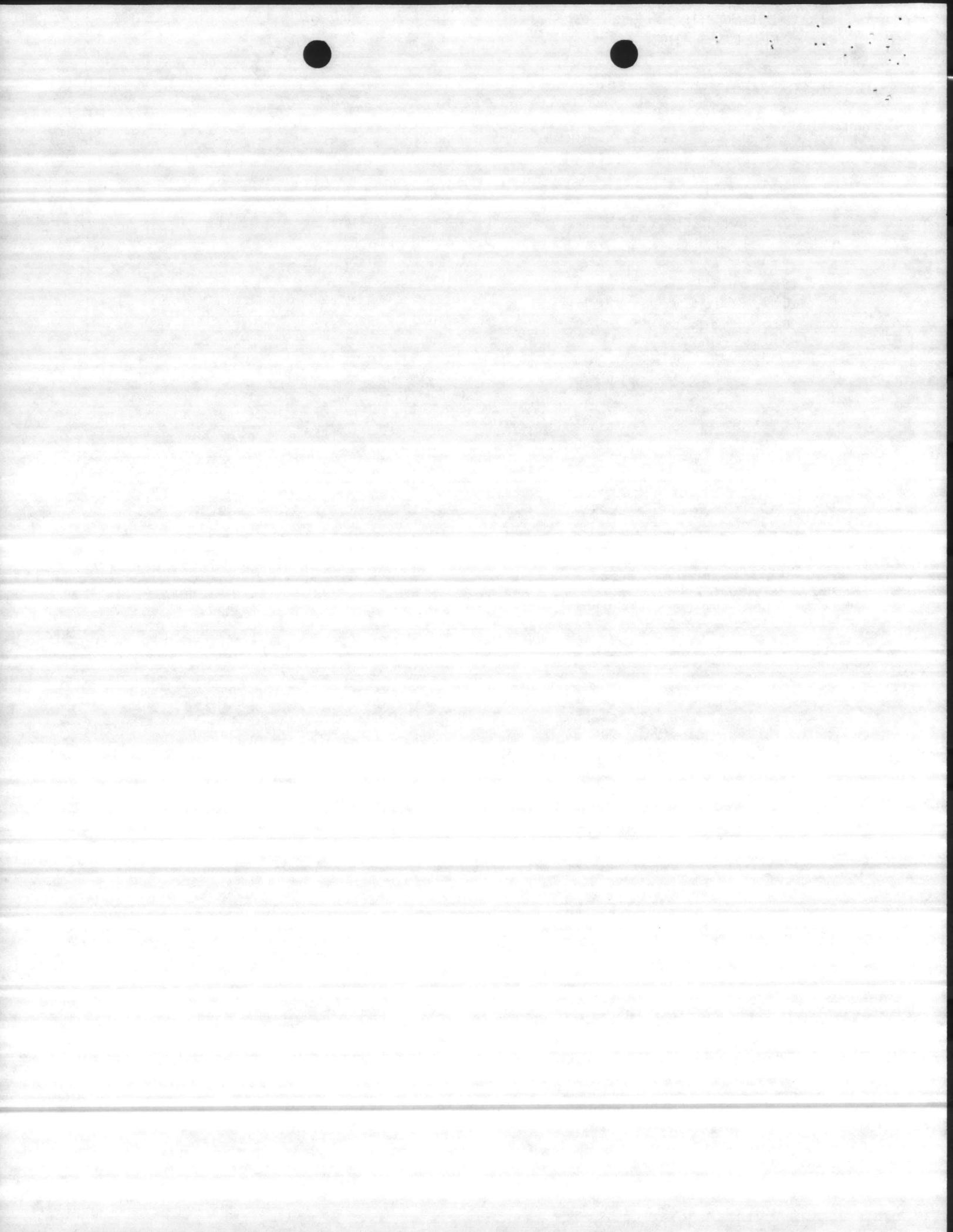
ECONOMIC LIFE: 25

DISCOUNT RATE: 10

ALTERNATIVE:

CASE 1 ALTERNATIVE A

PROJECT YEARS		ITEM	ANNUAL COST	DIFF	PV FACTOR	PV COST
START	FINISH					
0	0	INVESTMENT	22,798,246	0	1.000	22,798,246
0	0	INVESTMENT	238,225	0	1.000	238,225
1	25	LABOR	462,476	0	9.524	4,404,474
1	25	MAINTENANCE	248,969	0	9.524	2,371,101
1	25	INC ELECT	245,527	0	9.524	2,338,321
0	0	TRASH TRANS	3,290,806	0	1.000	3,290,806
0	0	ASH DISP	193,781	0	1.000	193,781
			TOTAL			35,634,955



CAMP LEJUNE COGENERATION

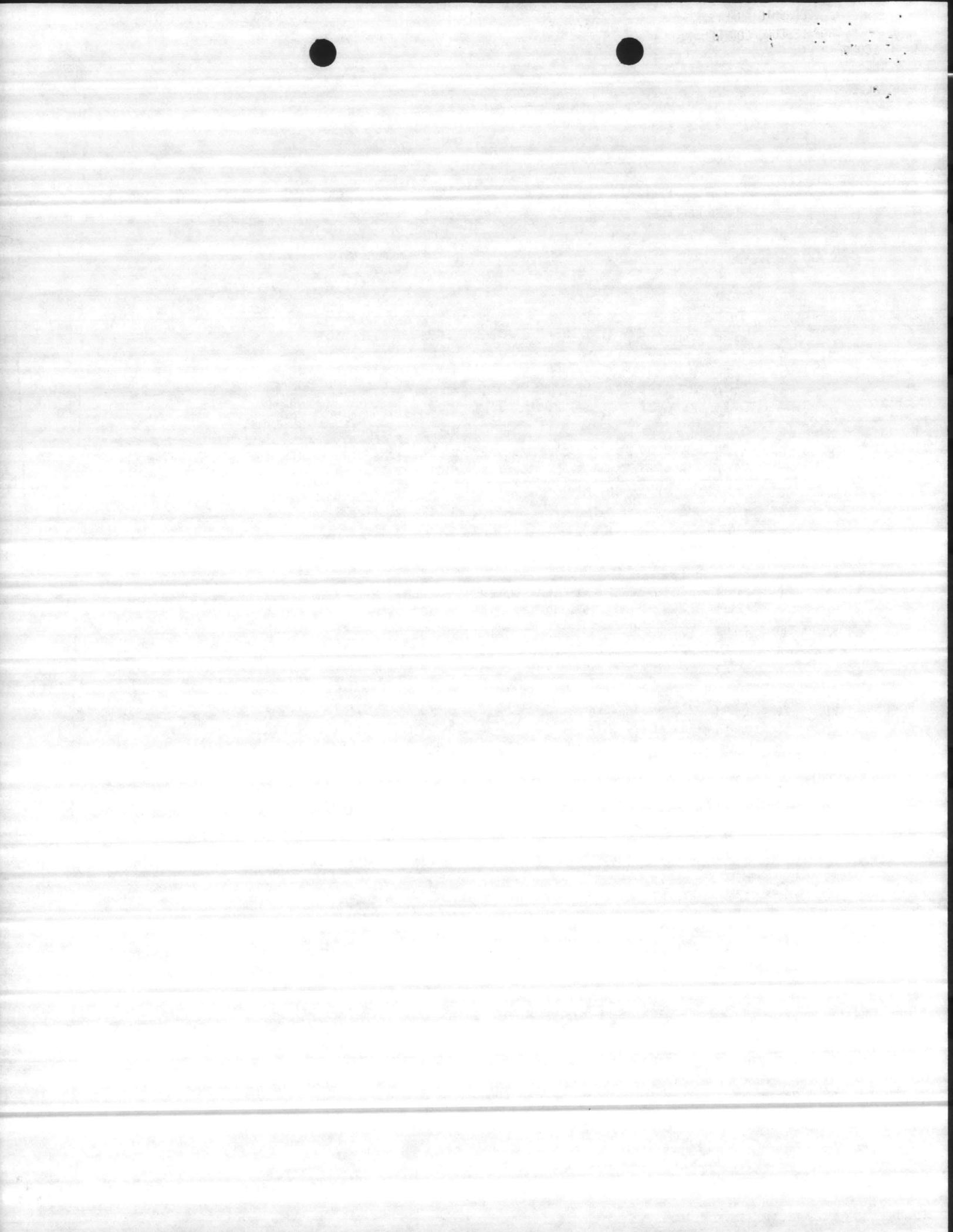
ECONOMIC LIFE: 25

DISCOUNT RATE: 10

ALTERNATIVE:

CASE 1 ALTERNATIVE B

PROJECT YEARS		ITEM	ANNUAL COST -	DIFF	PV	
START	FINISH				FACTOR	COST
0	0	LANDFILL INVST	496,934	0	1.000	496,934
0	0	PLANT UPGRADE	3,857,028	0	1.000	3,857,028
0	0	LAND INVST CP	1,374,128	0	1.000	1,374,128
0	0	LAND INVST LEJ	5,053,651	0	1.000	5,053,651
0	0	LAND MAINT CP	119,295	0	1.000	119,295
0	0	LAND MAINT LEJ	325,577	0	1.000	325,577
1	0	FUEL	4,739,018	0	0.954	4,520,183
2	0	FUEL	4,776,042	0	0.867	4,141,362
3	0	FUEL	4,850,089	0	0.788	3,823,245
4	0	FUEL	4,887,113	0	0.717	3,502,209
5	0	FUEL	4,961,160	0	0.651	3,232,066
6	0	FUEL	4,998,193	0	0.592	2,960,169
7	0	FUEL	5,035,207	0	0.538	2,710,997
8	0	FUEL	5,072,230	0	0.489	2,482,664
9	0	FUEL	5,109,254	0	0.445	2,273,442
10	0	FUEL	5,183,301	0	0.405	2,096,719
11	0	FUEL	5,220,325	0	0.368	1,919,723
12	0	FUEL	5,257,348	0	0.334	1,757,580
13	0	FUEL	5,294,372	0	0.304	1,609,052
14	0	FUEL	5,331,396	0	0.276	1,473,004
15	0	FUEL	5,368,419	0	0.251	1,348,394
16	0	FUEL	5,405,442	0	0.228	1,234,266
17	0	FUEL	5,479,490	0	0.208	1,137,431
18	0	FUEL	5,516,513	0	0.189	1,041,015
19	0	FUEL	5,553,537	0	0.172	952,729
20	0	FUEL	5,627,584	0	0.156	877,445
21	0	FUEL	5,664,608	0	0.142	803,127
22	0	FUEL	5,701,631	0	0.129	734,887
23	0	FUEL	5,738,655	0	0.117	672,418
24	0	FUEL	5,812,702	0	0.107	619,176
25	0	FUEL	5,849,726	0	0.097	566,473
TOTAL						59,716,624



CAMP LEJUNE COGENERATION

ECONOMIC LIFE: 25

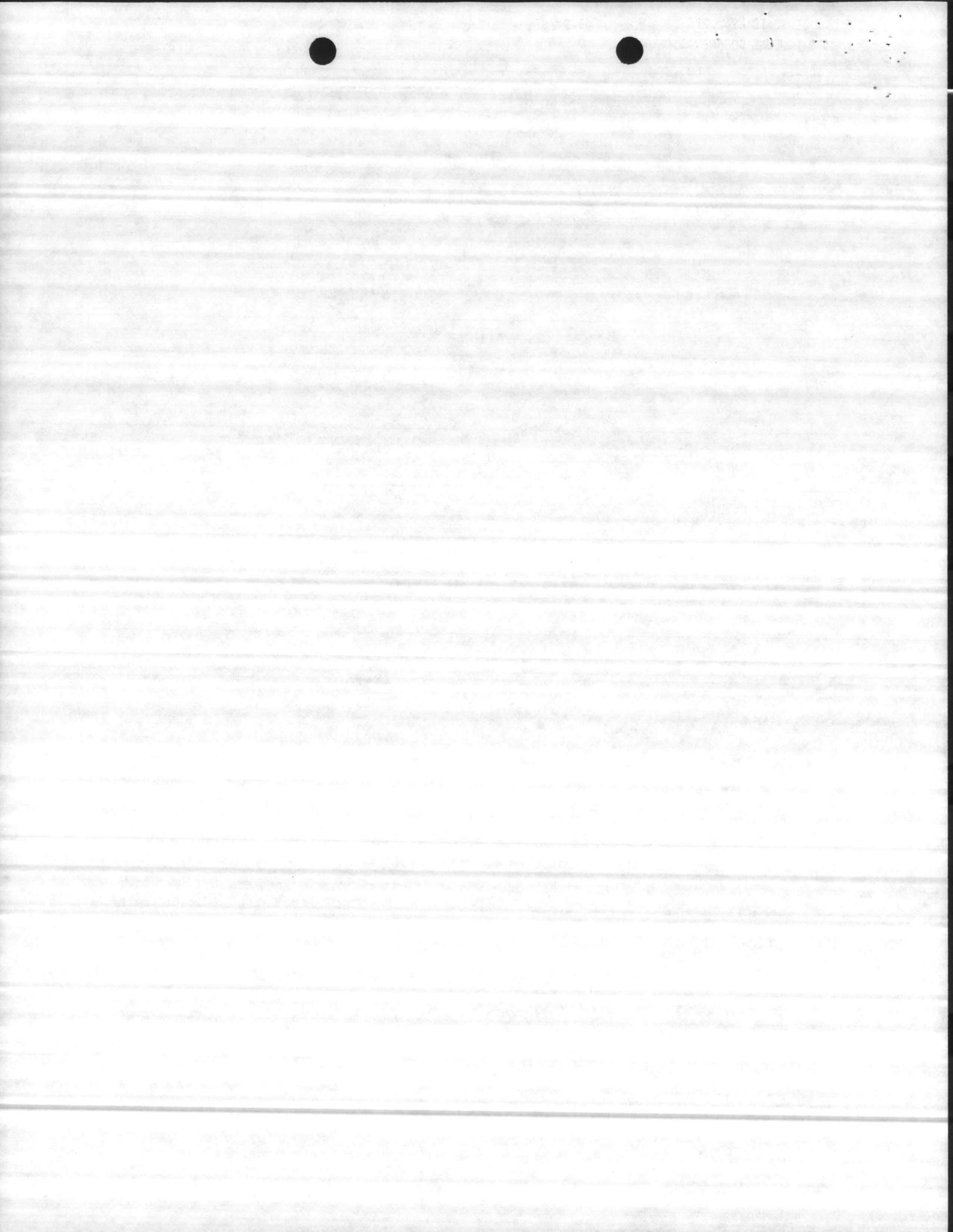
DISCOUNT RATE: 10

ALTERNATIVE:

CASE 2 ALTERNATIVE A

PROJECT YEARS

START	FINISH	ITEM	ANNUAL COST	DIFF	PV FACTOR	PV COST
0	0	INVESTMENT	28,201,512	0	1.000	28,201,512
0	0	INVESTMENT	238,225	0	1.000	238,225
1	25	LABOR	462,476	0	9.524	4,404,474
1	25	MAINTENANCE	254,515	0	9.524	2,423,919
0	0	PLANT O&M	101,516	0	1.000	101,516
1	25	INC ELECT	267,545	0	9.524	2,548,013
0	0	TRASH TRANS	3,290,806	0	1.000	3,290,806
0	0	ASH DISP	193,781	0	1.000	193,781
1	0	ELECT REV	484,345 CR	0	0.954	461,979 CR
2	0	ELEC REV	488,886 CR	0	0.867	423,918 CR
3	0	ELEC REV	495,697 CR	0	0.786	390,749 CR
4	0	ELEC REV	499,481 CR	0	0.717	357,938 CR
5	0	ELEC REV	507,049 CR	0	0.651	330,329 CR
6	0	ELEC REV	510,076 CR	0	0.592	302,092 CR
7	0	ELEC REV	514,617 CR	0	0.538	277,074 CR
8	0	ELEC REV	518,401 CR	0	0.489	253,737 CR
9	0	ELEC REV	522,185 CR	0	0.445	232,354 CR
10	0	ELEC REV	529,752 CR	0	0.405	214,292 CR
11	0	ELEC REV	533,536 CR	0	0.368	196,202 CR
12	0	ELEC REV	537,320 CR	0	0.334	179,631 CR
13	0	ELEC REV	541,104 CR	0	0.304	164,451 CR
14	0	ELEC REV	544,888 CR	0	0.276	150,546 CR
15	0	ELEC REV	548,672 CR	0	0.251	137,810 CR
16	0	ELEC REV	552,456 CR	0	0.228	126,146 CR
17	0	ELEC REV	560,024 CR	0	0.208	116,249 CR
18	0	ELEC REV	563,808 CR	0	0.189	106,395 CR
19	0	ELEC REV	567,592 CR	0	0.172	97,372 CR
20	0	ELEC REV	575,160 CR	0	0.156	89,700 CR
21	0	ELEC REV	579,701 CR	0	0.142	82,189 CR
22	0	ELEC REV	582,728 CR	0	0.129	75,108 CR
23	0	ELEC REV	586,512 CR	0	0.117	68,723 CR
24	0	ELEC REV	594,080 CR	0	0.107	63,282 CR
25	0	ELEC REV	597,864 CR	0	0.097	57,895 CR
TOTAL						36,466,074



CAMP LEJEDRE COGENERATION

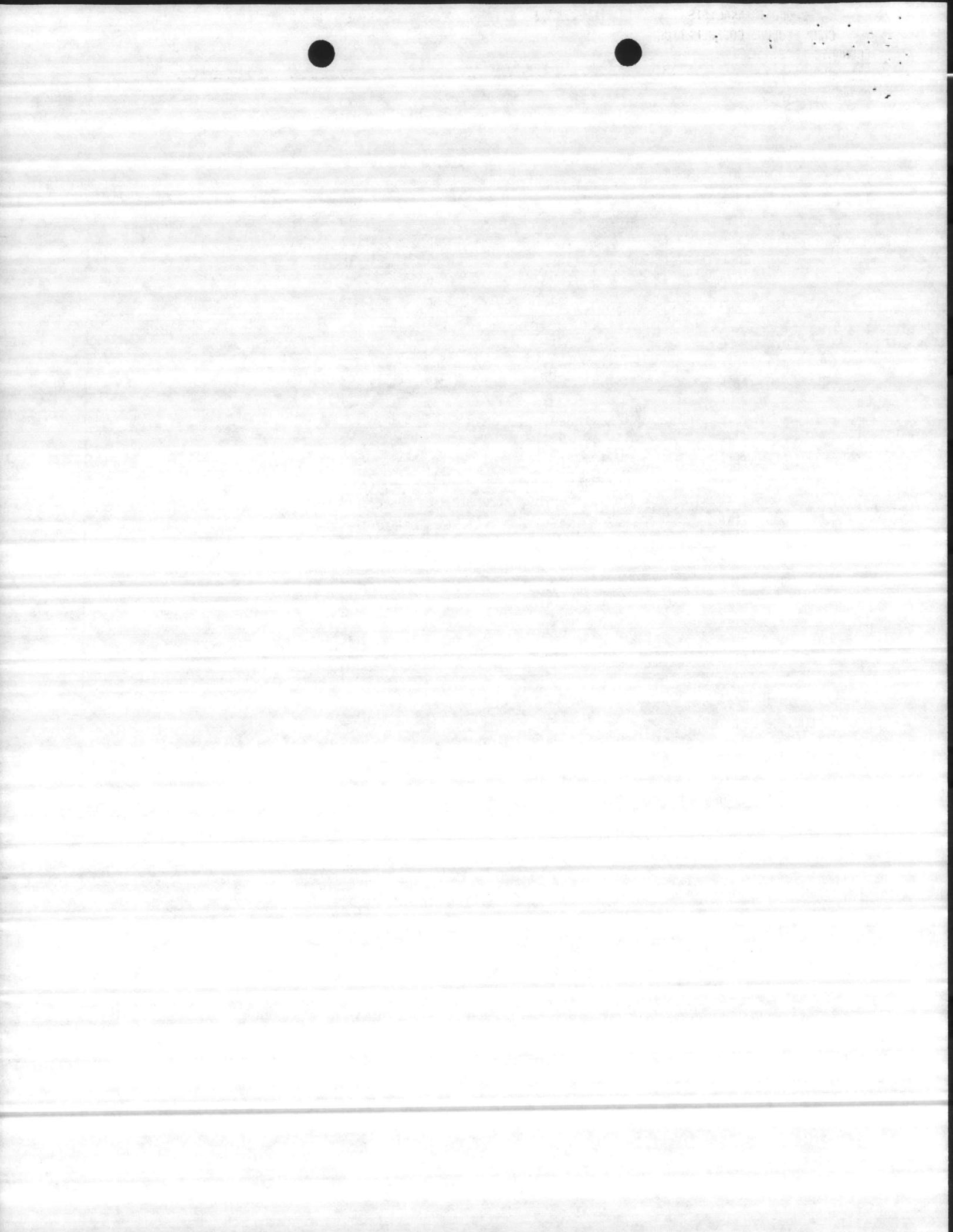
ECONOMIC LIFE: 25

DISCOUNT RATE: 10

ALTERNATIVE:

CASE 2 ALTERNATIVE B

PROJECT YEARS		ITEM	ANNUAL COST	DIFF	PV FACTOR	PV COST
START	FINISH					
0	0	LANDFILL INVST	496,934	0	1.000	496,934
0	0	PLANT UPGRADE	3,857,028	0	1.000	3,857,028
0	0	LAND INVST CP	1,374,128	0	1.000	1,374,128
0	0	LAND INVST LEJ	5,053,651	0	1.000	5,053,651
0	0	LAND MAINT CP	119,295	0	1.000	119,295
0	0	LAND MAINT LEJ	325,577	0	1.000	325,577
1	0	FUEL	4,436,884	0	0.954	4,232,001
2	0	FUEL	4,471,547	0	0.867	3,877,331
3	0	FUEL	4,540,873	0	0.788	3,579,495
4	0	FUEL	4,575,537	0	0.717	3,278,927
5	0	FUEL	4,644,863	0	0.651	3,026,007
6	0	FUEL	4,679,526	0	0.592	2,771,445
7	0	FUEL	4,714,189	0	0.538	2,538,158
8	0	FUEL	4,748,852	0	0.489	2,324,383
9	0	FUEL	4,783,516	0	0.445	2,128,500
10	0	FUEL	4,852,842	0	0.405	1,963,043
11	0	FUEL	4,887,505	0	0.368	1,797,332
12	0	FUEL	4,322,168	0	0.334	1,444,941
13	0	FUEL	4,956,831	0	0.304	1,506,468
14	0	FUEL	4,991,494	0	0.276	1,379,093
15	0	FUEL	5,026,157	0	0.251	1,262,427
16	0	FUEL	5,060,821	0	0.228	1,155,576
17	0	FUEL	5,130,147	0	0.208	1,064,915
18	0	FUEL	5,164,810	0	0.189	974,646
19	0	FUEL	5,199,473	0	0.172	891,988
20	0	FUEL	5,268,800	0	0.156	821,710
21	0	FUEL	5,303,463	0	0.142	751,924
22	0	FUEL	5,338,126	0	0.129	688,035
23	0	FUEL	5,372,789	0	0.117	629,548
24	0	FUEL	5,442,115	0	0.107	579,701
25	0	FUEL	5,476,778	0	0.097	530,357
TOTAL						56,424,576



CAMP LEJEUNE COOPERATION

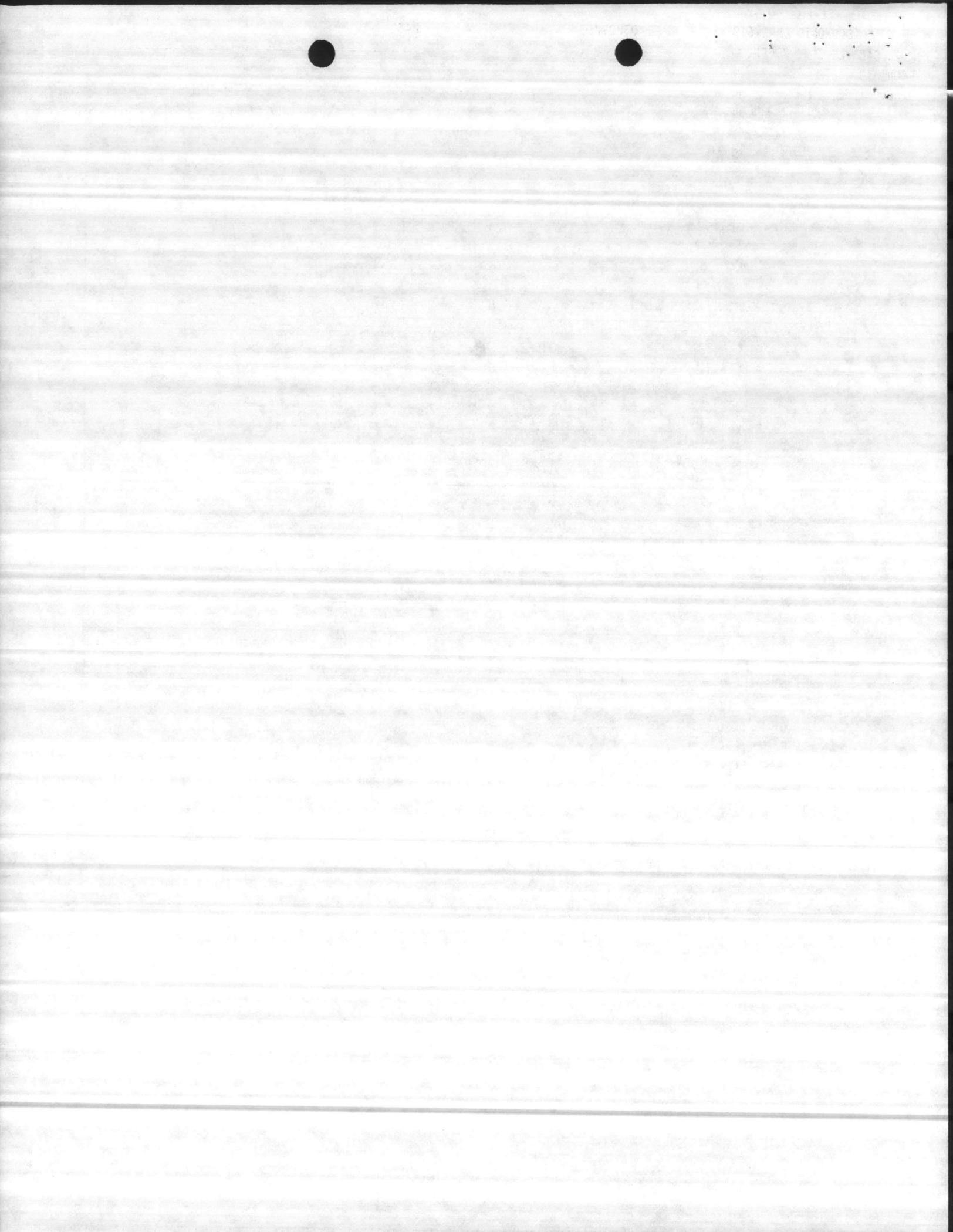
ECONOMIC LIFE: 25

DISCOUNT RATE: 10

ALTERNATIVE:

CASE 3 ALTERNATIVE A

PROJECT YEARS			ANNUAL		FV	FV
START	FINISH	ITEM	COST	DIFF	FACTOR	COST
0	0	INVESTMENT	28,201,512	0	1.000	28,201,512
0	0	INVESTMENT	238,225	0	1.000	238,225
1	25	LABOR	462,476	0	9.524	4,404,474
1	25	MAINTENANCE	254,515	0	9.524	2,423,919
0	0	PLANT DM	101,516	0	1.000	101,516
1	25	INC ELECT	267,545	0	9.524	2,548,013
0	0	TRASH TRANS	3,290,806	0	1.000	3,290,806
0	0	ASH DISP	193,781	0	1.000	193,781
1	0	ELEC SAV	241,606 CR	0	0.954	230,449 CR
2	0	ELEC SAV	243,872 CR	0	0.867	211,464 CR
3	0	ELEC SAV	247,269 CR	0	0.789	194,918 CR
4	0	ELEC SAV	249,157 CR	0	0.717	178,551 CR
5	0	ELEC SAV	252,932 CR	0	0.651	164,778 CR
6	0	ELEC SAV	254,442 CR	0	0.592	150,693 CR
7	0	ELEC SAV	256,707 CR	0	0.538	138,213 CR
8	0	ELEC SAV	258,594 CR	0	0.489	126,571 CR
9	0	ELEC SAV	260,482 CR	0	0.445	115,905 CR
10	0	ELEC SAV	264,257 CR	0	0.405	106,895 CR
11	0	ELEC SAV	266,145 CR	0	0.368	97,872 CR
12	0	ELEC SAV	268,032 CR	0	0.334	89,605 CR
13	0	ELEC SAV	269,920 CR	0	0.304	82,033 CR
14	0	ELEC SAV	271,807 CR	0	0.276	75,097 CR
15	0	ELEC SAV	273,695 CR	0	0.251	68,744 CR
16	0	ELEC SAV	275,582 CR	0	0.228	62,925 CR
17	0	ELEC SAV	279,357 CR	0	0.208	57,988 CR
18	0	ELEC SAV	281,245 CR	0	0.189	53,073 CR
19	0	ELEC SAV	283,133 CR	0	0.172	48,572 CR
20	0	ELEC SAV	286,908 CR	0	0.156	44,745 CR
21	0	ELEC SAV	288,795 CR	0	0.142	40,945 CR
22	0	ELEC SAV	290,683 CR	0	0.129	37,446 CR
23	0	ELEC SAV	292,570 CR	0	0.117	34,281 CR
24	0	ELEC SAV	296,345 CR	0	0.107	31,567 CR
25	0	ELEC SAV	298,233 CR	0	0.097	28,680 CR
			TOTAL			39,930,007



CAMP-LEJEUNE COGENERATION

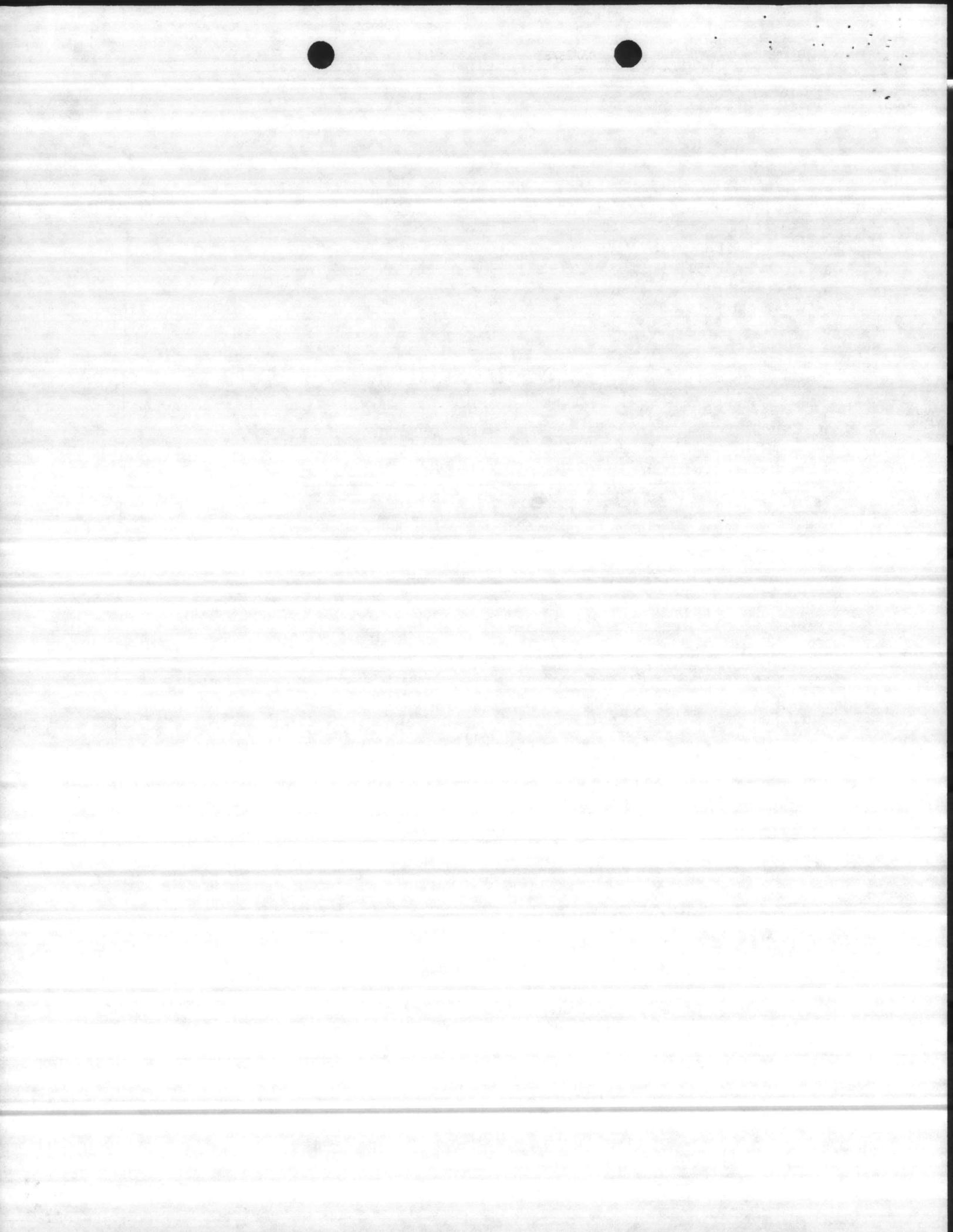
ECONOMIC LIFE: 25

DISCOUNT RATE: 10

ALTERNATIVE:

CASE 3 ALTERNATIVE B

PROJECT YEARS		ITEM	ANNUAL COST	DIFF	PV FACTOR	PV COST
START	FINISH					
0	0	LANDFILL INVST	496,934	0	1.000	496,934
0	0	PLANT UPGRADE	3,857,028	0	1.000	3,857,028
0	0	LAND INVST CP	1,374,128	0	1.000	1,374,128
0	0	LAND INVST LEJ	5,053,651	0	1.000	5,053,651
0	0	LAND MAINT CP	119,295	0	1.000	119,295
0	0	LAND MAINT LEJ	325,577	0	1.000	325,577
1	0	FUEL	4,436,884	0	0.954	4,232,001
2	0	FUEL	4,471,547	0	0.867	3,877,331
3	0	FUEL	4,540,873	0	0.788	3,579,495
4	0	FUEL	4,575,537	0	0.717	3,278,927
5	0	FUEL	4,644,863	0	0.651	3,026,007
6	0	FUEL	4,679,526	0	0.592	2,771,445
7	0	FUEL	4,714,189	0	0.538	2,538,158
8	0	FUEL	4,748,852	0	0.489	2,324,383
9	0	FUEL	4,783,516	0	0.445	2,128,500
10	0	FUEL	4,852,842	0	0.405	1,963,043
11	0	FUEL	4,897,505	0	0.368	1,797,332
12	0	FUEL	4,322,168	0	0.334	1,444,941
13	0	FUEL	4,956,831	0	0.304	1,506,468
14	0	FUEL	4,991,494	0	0.276	1,379,093
15	0	FUEL	5,026,157	0	0.251	1,262,427
16	0	FUEL	5,060,821	0	0.228	1,155,576
17	0	FUEL	5,130,147	0	0.208	1,064,915
18	0	FUEL	5,164,810	0	0.189	974,646
19	0	FUEL	5,199,473	0	0.172	891,988
20	0	FUEL	5,268,800	0	0.156	821,710
21	0	FUEL	5,303,463	0	0.142	751,924
22	0	FUEL	5,338,126	0	0.129	688,635
23	0	FUEL	5,372,789	0	0.117	629,548
24	0	FUEL	5,442,115	0	0.107	579,701
25	0	FUEL	5,476,778	0	0.097	530,357
TOTAL						56,424,576



* CAMP LEJEUNE COGENERATION

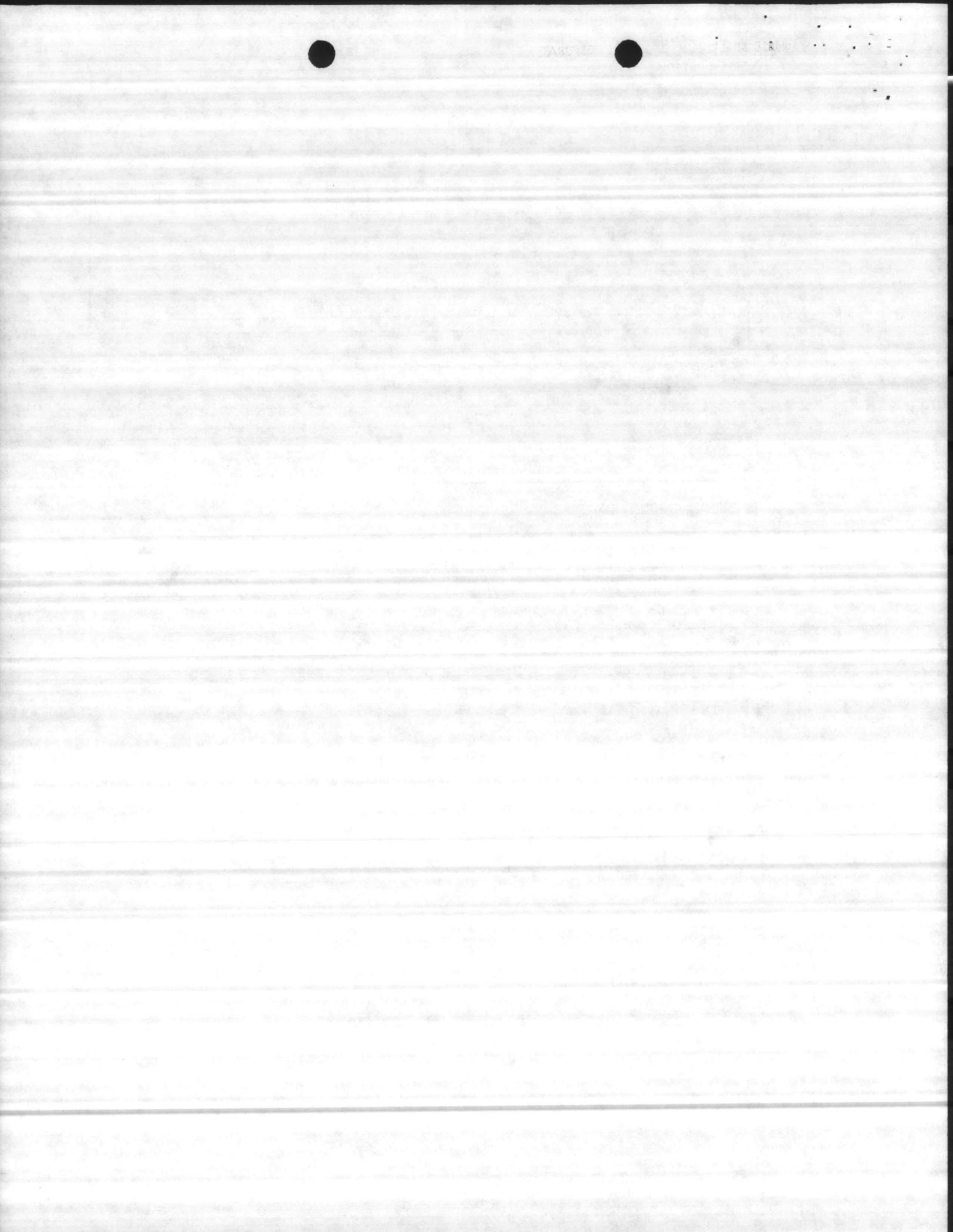
ECONOMIC LIFE: 25

DISCOUNT RATE: 10

ALTERNATIVE:

CASE 1 ALTERNATIVE A

PROJECT YEARS		ITEM	ANNUAL COST	DIFF	PV FACTOR	PV COST
START	FINISH					
0	0	INVESTMENT	22,798,246	0	1.000	22,798,246
0	0	INVESTMENT	238,225	0	1.000	238,225
1	25	LABOR	462,476	0	9.524	4,404,474
1	25	MAINTENANCE	248,969	0	9.524	2,371,101
1	25	INC ELECT	245,527	7	18.049	4,431,401
0	0	TRASH TRANS	3,290,806	0	1.000	3,290,806
0	0	ASH DISP	193,781	0	1.000	193,781
			TOTAL			37,728,035



CAMP LEJEUNE COGENERATION

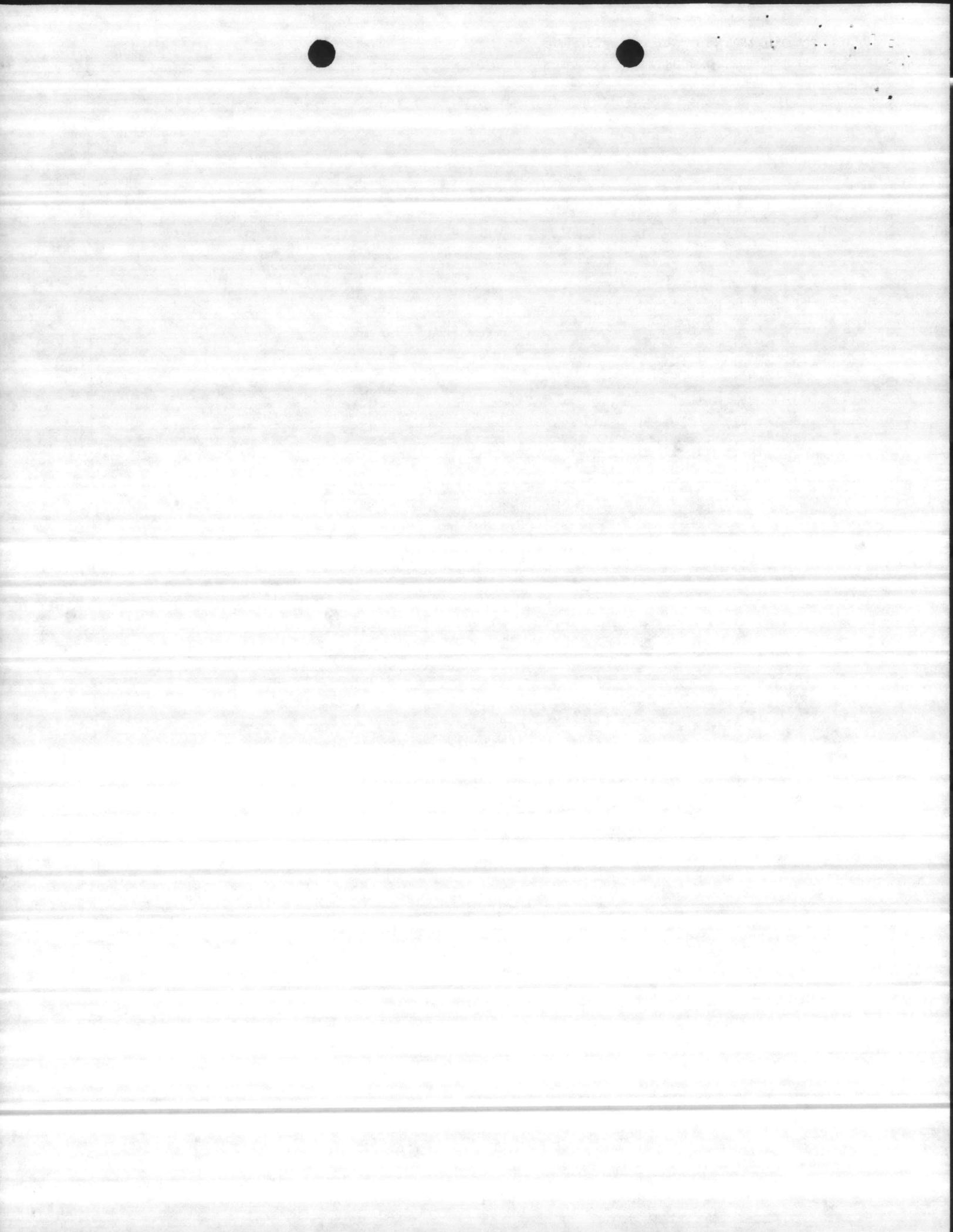
ECONOMIC LIFE: 25

DISCOUNT RATE: 10

ALTERNATIVE:

CASE 1 ALTERNATIVE B

PROJECT START	PROJECT FINISH	ITEM	ANNUAL COST	DIFF	FV FACTOR	FV COST
0	0	LANDFILL INVT.	496,934	0	1.000	496,934
0	0	PLANT UPGRADE	3,857,028	0	1.000	3,857,028
0	0	LAND INVT CP	1,374,128	0	1.000	1,374,128
0	0	LAND INVT LEJ	5,053,651	0	1.000	5,053,651
0	0	LAND MAINT CP	119,295	0	1.000	119,295
0	0	LAND MAINT LEJ	325,577	0	1.000	325,577
1	0	FUEL	4,739,018	8	0.991	4,695,801
2	0	FUEL	4,776,042	8	0.973	4,646,442
3	0	FUEL	4,850,089	8	0.955	4,632,689
4	0	FUEL	4,887,113	8	0.938	4,583,180
5	0	FUEL	4,961,160	8	0.921	4,568,029
6	0	FUEL	4,998,183	8	0.904	4,518,443
7	0	FUEL	5,035,207	8	0.888	4,469,151
8	0	FUEL	5,072,230	8	0.871	4,420,158
9	0	FUEL	5,109,254	8	0.856	4,371,469
10	0	FUEL	5,183,301	8	0.840	4,354,190
11	0	FUEL	5,220,325	8	0.825	4,305,559
12	0	FUEL	5,257,348	8	0.810	4,257,257
13	0	FUEL	5,294,372	8	0.795	4,209,288
14	0	FUEL	5,331,396	8	0.781	4,161,656
15	0	FUEL	5,368,419	8	0.766	4,114,364
16	0	FUEL	5,405,442	8	0.752	4,067,416
17	0	FUEL	5,479,490	8	0.739	4,048,169
18	0	FUEL	5,516,513	8	0.725	4,001,421
19	0	FUEL	5,553,537	8	0.712	3,955,035
20	0	FUEL	5,627,584	8	0.699	3,934,900
21	0	FUEL	5,664,608	8	0.687	3,888,774
22	0	FUEL	5,701,631	8	0.674	3,843,023
23	0	FUEL	5,738,655	8	0.662	3,797,651
24	0	FUEL	5,812,702	8	0.650	3,776,714
25	0	FUEL	5,849,726	8	0.638	3,731,665
TOTAL						116,579,069



CAMP LEJEUNE COGENERATION

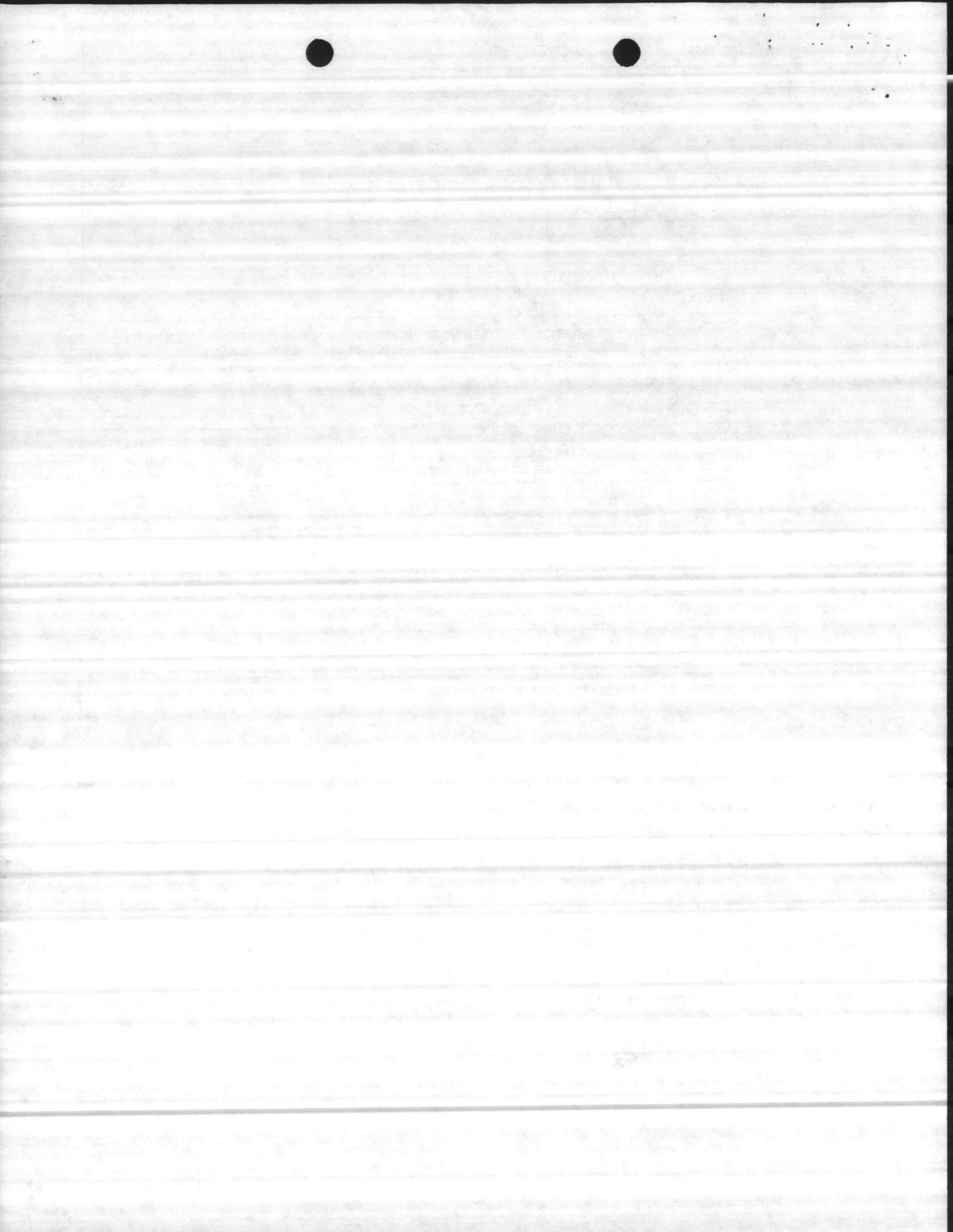
ECONOMIC LIFE: 25

DISCOUNT RATE: 10

ALTERNATIVE:

CASE 2 ALTERNATIVE A

PROJECT START	PROJECT FINISH	ITEM	ANNUAL COST	DIFF	PV FACTOR	PV COST
0	0	INVESTMENT	28,201,512	0	1.000	28,201,512
0	0	INVESTMENT	238,225	0	1.000	238,225
1	25	LABOR	462,476	0	9.524	4,404,474
1	25	MAINTENANCE	254,515	0	9.524	2,423,919
0	0	PLANT O&M	101,516	0	1.000	101,516
1	25	INC ELECT	267,545	7	18.049	4,828,793
0	0	TRASH TRANS	3,290,806	0	1.000	3,290,806
0	0	ASH DISP	193,781	0	1.000	193,781
1	0	ELECT REV	484,345 CR	8	0.991	479,928 CR
2	0	ELEC REV	488,886 CR	7	0.959	469,037 CR
3	0	ELEC REV	495,697 CR	7	0.933	462,602 CR
4	0	ELEC REV	499,481 CR	7	0.908	453,420 CR
5	0	ELEC REV	507,049 CR	7	0.883	447,737 CR
6	0	ELEC REV	510,076 CR	7	0.859	438,126 CR
7	0	ELEC REV	514,617 CR	7	0.836	429,971 CR
8	0	ELEC REV	518,401 CR	7	0.813	421,320 CR
9	0	ELEC REV	522,185 CR	7	0.791	412,821 CR
10	0	ELEC REV	529,752 CR	7	0.769	407,381 CR
11	0	ELEC REV	533,536 CR	7	0.748	399,101 CR
12	0	ELEC REV	537,320 CR	7	0.728	390,970 CR
13	0	ELEC REV	541,104 CR	7	0.708	382,986 CR
14	0	ELEC REV	544,888 CR	7	0.688	375,146 CR
15	0	ELEC REV	548,672 CR	7	0.670	367,449 CR
16	0	ELEC REV	552,456 CR	7	0.651	359,892 CR
17	0	ELEC REV	560,024 CR	7	0.634	354,873 CR
18	0	ELEC REV	563,808 CR	7	0.616	347,527 CR
19	0	ELEC REV	567,592 CR	7	0.600	340,318 CR
20	0	ELEC REV	575,160 CR	7	0.583	335,450 CR
21	0	ELEC REV	579,701 CR	7	0.567	328,828 CR
22	0	ELEC REV	582,728 CR	7	0.552	321,579 CR
23	0	ELEC REV	586,512 CR	7	0.537	314,840 CR
24	0	ELEC REV	594,080 CR	7	0.522	310,205 CR
25	0	ELEC REV	597,864 CR	7	0.508	303,667 CR
TOTAL						34,027,792



CAMP LEJEUNE COGENERATION

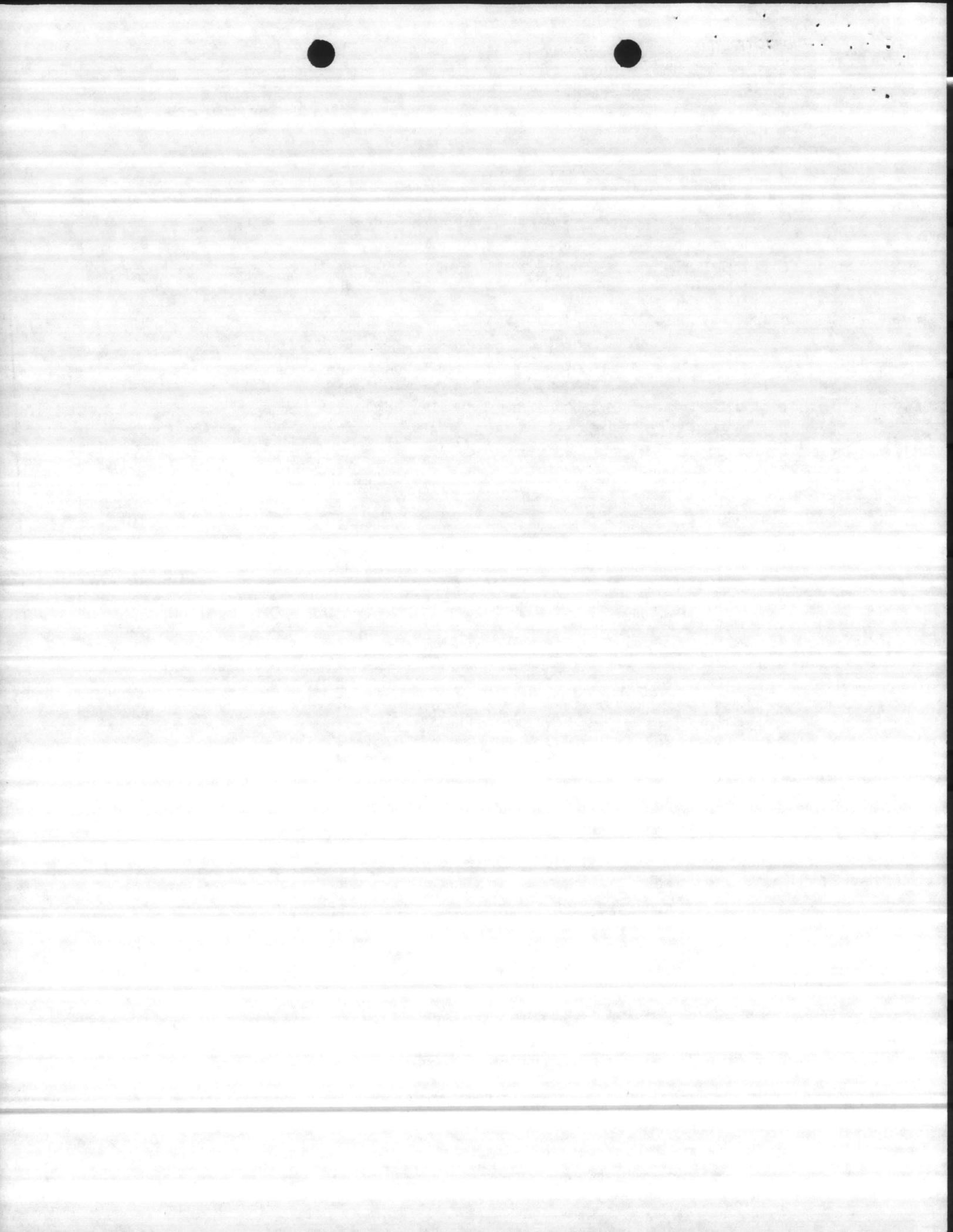
ECONOMIC LIFE: 25

DISCOUNT RATE: 10

ALTERNATIVE:

CASE 2 ALTERNATIVE B

PROJECT YEARS		ITEM	ANNUAL COST	DIFF	PV FACTOR	PV COST
START	FINISH					
0	0	LANDFILL INVST	496,934	0	1.000	496,934
0	0	PLANT UPGRADE	3,857,028	0	1.000	3,857,028
0	0	LAND INVST CP	1,374,128	0	1.000	1,374,128
0	0	LAND INVST LEJ	5,053,651	0	1.000	5,053,651
0	0	LAND MAINT CP	119,295	0	1.000	119,295
0	0	LAND MAINT LEJ	325,577	0	1.000	325,577
1	0	FUEL	4,436,884	8	0.991	4,396,422
2	0	FUEL	4,471,547	8	0.973	4,350,209
3	0	FUEL	4,540,873	8	0.955	4,337,333
4	0	FUEL	4,575,537	8	0.938	4,290,981
5	0	FUEL	4,644,863	8	0.921	4,276,796
6	0	FUEL	4,679,526	8	0.904	4,230,372
7	0	FUEL	4,714,189	8	0.888	4,184,222
8	0	FUEL	4,748,852	8	0.871	4,138,352
9	0	FUEL	4,783,516	8	0.856	4,092,768
10	0	FUEL	4,852,842	8	0.840	4,076,591
11	0	FUEL	4,887,505	8	0.825	4,031,060
12	0	FUEL	4,322,168	8	0.810	3,499,973
13	0	FUEL	4,956,831	8	0.795	3,940,926
14	0	FUEL	4,991,494	8	0.781	3,896,331
15	0	FUEL	5,026,157	8	0.766	3,852,054
16	0	FUEL	5,060,821	8	0.752	3,808,100
17	0	FUEL	5,130,147	8	0.739	3,790,079
18	0	FUEL	5,164,810	8	0.725	3,746,312
19	0	FUEL	5,199,473	8	0.712	3,702,883
20	0	FUEL	5,268,800	8	0.699	3,684,032
21	0	FUEL	5,303,463	8	0.687	3,640,846
22	0	FUEL	5,338,126	8	0.674	3,598,013
23	0	FUEL	5,372,789	8	0.662	3,555,533
24	0	FUEL	5,442,115	8	0.650	3,535,931
25	0	FUEL	5,476,778	8	0.638	3,493,753
				TOTAL		109,376,498



ECONOMIC ANALYSIS
 CAMP LEJEUNE COGENERATION

03/28/83

PAGE

ECONOMIC LIFE: 25

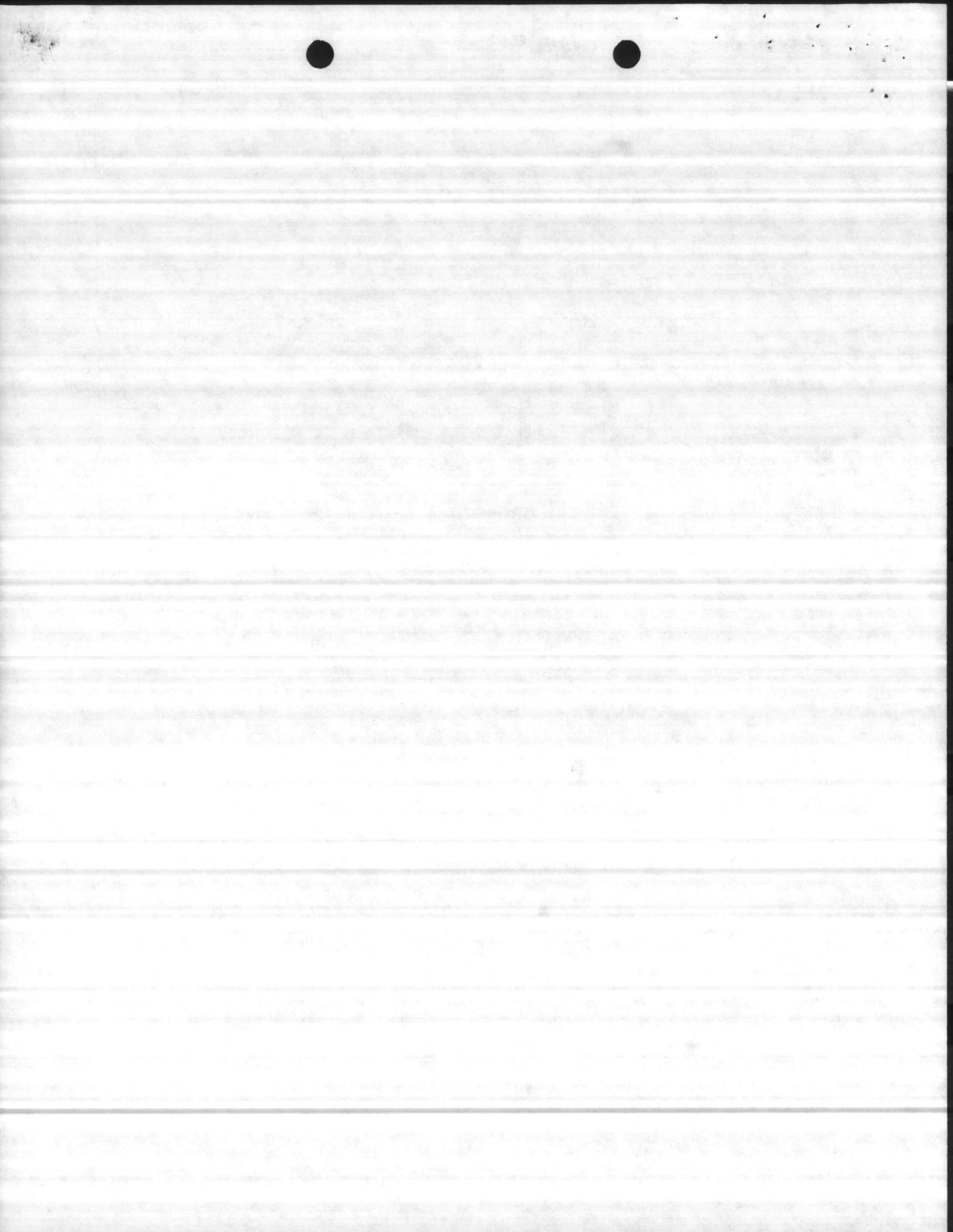
DISCOUNT RATE: 10

ALTERNATIVE:

CASE 3 ALTERNATIVE A

PROJECT YEARS

START	FINISH	ITEM	ANNUAL COST	DIFF	PV FACTOR	PV COST
0	0	INVESTMENT	28,201,512	0	1.000	28,201,512
0	0	INVESTMENT	238,225	0	1.000	238,225
1	25	LABOR	462,476	0	9.524	4,404,474
1	25	MAINTENANCE	254,515	0	9.524	2,423,919
0	0	PLANT OVR	101,516	0	1.000	101,516
1	25	INC ELECT	267,545	7	18.049	4,828,793
0	0	TRASH TRANS	3,290,806	0	1.000	3,290,806
0	0	ASH DISP	193,781	0	1.000	193,781
1	0	ELEC SAV	241,606 CR	7	0.986	238,296 CR
2	0	ELEC SAV	243,872 CR	7	0.959	233,971 CR
3	0	ELEC SAV	247,269 CR	7	0.933	230,760 CR
4	0	ELEC SAV	249,157 CR	7	0.908	226,180 CR
5	0	ELEC SAV	252,932 CR	7	0.883	223,345 CR
6	0	ELEC SAV	254,442 CR	7	0.859	218,551 CR
7	0	ELEC SAV	256,707 CR	7	0.836	214,483 CR
8	0	ELEC SAV	258,594 CR	7	0.813	210,167 CR
9	0	ELEC SAV	260,482 CR	7	0.791	205,928 CR
10	0	ELEC SAV	264,257 CR	7	0.769	203,214 CR
11	0	ELEC SAV	266,145 CR	7	0.748	199,084 CR
12	0	ELEC SAV	268,032 CR	7	0.728	195,028 CR
13	0	ELEC SAV	269,920 CR	7	0.708	191,045 CR
14	0	ELEC SAV	271,807 CR	7	0.688	187,134 CR
15	0	ELEC SAV	273,695 CR	7	0.670	183,295 CR
16	0	ELEC SAV	275,582 CR	7	0.651	179,525 CR
17	0	ELEC SAV	279,357 CR	7	0.634	177,021 CR
18	0	ELEC SAV	281,245 CR	7	0.616	173,357 CR
19	0	ELEC SAV	283,133 CR	7	0.600	169,761 CR
20	0	ELEC SAV	286,908 CR	7	0.583	167,333 CR
21	0	ELEC SAV	288,795 CR	7	0.567	163,840 CR
22	0	ELEC SAV	290,683 CR	7	0.552	160,413 CR
23	0	ELEC SAV	292,570 CR	7	0.537	157,051 CR
24	0	ELEC SAV	296,345 CR	7	0.522	154,739 CR
25	0	ELEC SAV	298,233 CR	7	0.508	151,478 CR
			TOTAL			38,868,016



CAMP LEJEUNE COGENERATION

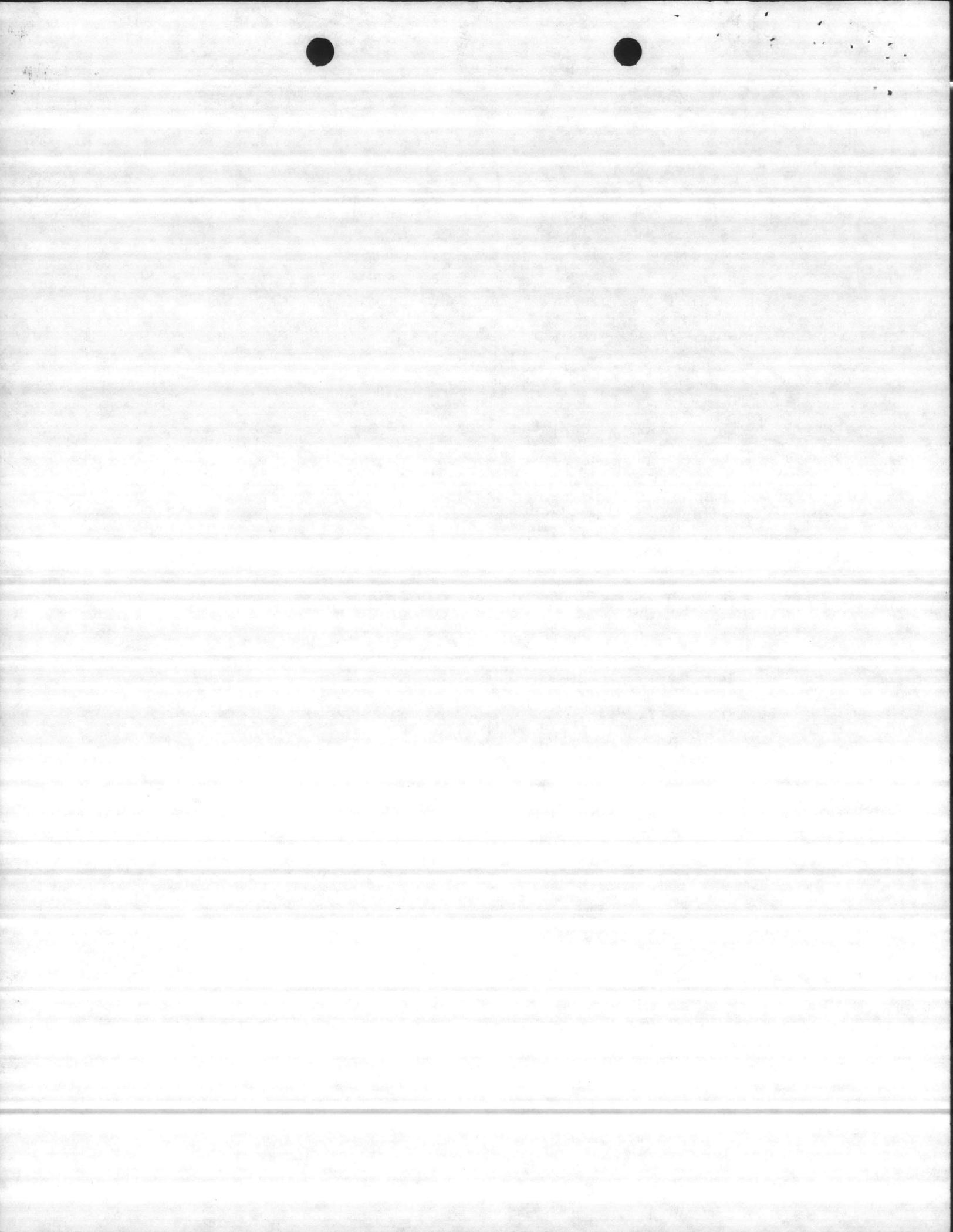
ECONOMIC LIFE: 25

DISCOUNT RATE: 10

ALTERNATIVE:

CASE 3 ALTERNATIVE B

PROJECT YEARS			ANNUAL	FV	FV
START	FINISH	ITEM	COST	DIFF	FACTOR COST
0	0	LANDFILL INVST	496,934	0	1.000 496,934
0	0	PLANT UPGRADE	3,857,028	0	1.000 3,857,028
0	0	LAND INVST CP	1,374,128	0	1.000 1,374,128
0	0	LAND INVST LEJ	5,053,651	0	1.000 5,053,651
0	0	LAND MAINT CP	119,295	0	1.000 119,295
0	0	LAND MAINT LEJ	325,577	0	1.000 325,577
1	0	FUEL	4,436,884	8	0.991 4,396,422
2	0	FUEL	4,471,547	8	0.973 4,350,209
3	0	FUEL	4,540,873	8	0.955 4,337,333
4	0	FUEL	4,575,537	8	0.938 4,290,981
5	0	FUEL	4,644,863	8	0.921 4,276,796
6	0	FUEL	4,679,526	8	0.904 4,230,372
7	0	FUEL	4,714,189	8	0.888 4,184,222
8	0	FUEL	4,748,852	8	0.871 4,138,352
9	0	FUEL	4,783,516	8	0.856 4,092,768
10	0	FUEL	4,852,842	8	0.840 4,076,591
11	0	FUEL	4,887,505	8	0.825 4,031,060
12	0	FUEL	4,322,168	8	0.810 3,499,973
13	0	FUEL	4,956,831	8	0.795 3,940,926
14	0	FUEL	4,991,494	8	0.781 3,896,331
15	0	FUEL	5,026,157	8	0.766 3,852,054
16	0	FUEL	5,060,821	8	0.752 3,808,100
17	0	FUEL	5,130,147	8	0.739 3,790,079
18	0	FUEL	5,164,810	8	0.725 3,746,312
19	0	FUEL	5,199,473	8	0.712 3,702,883
20	0	FUEL	5,268,800	8	0.699 3,684,032
21	0	FUEL	5,303,463	8	0.687 3,640,846
22	0	FUEL	5,338,126	8	0.674 3,598,013
23	0	FUEL	5,372,789	8	0.662 3,555,533
24	0	FUEL	5,442,115	8	0.650 3,535,931
25	0	FUEL	5,476,778	8	0.638 3,493,753
TOTAL					109,376,498

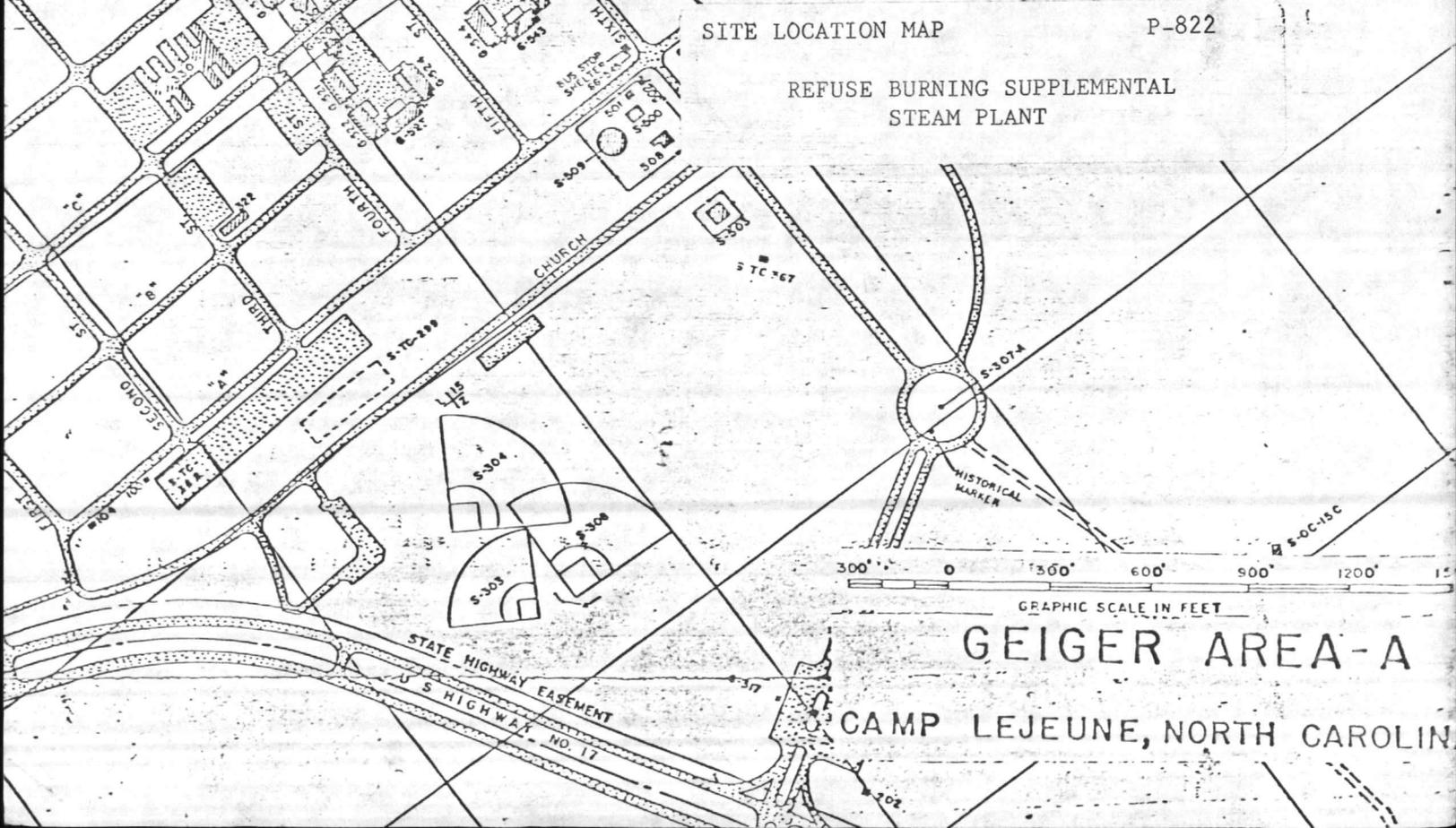




SITE LOCATION MAP

P-822

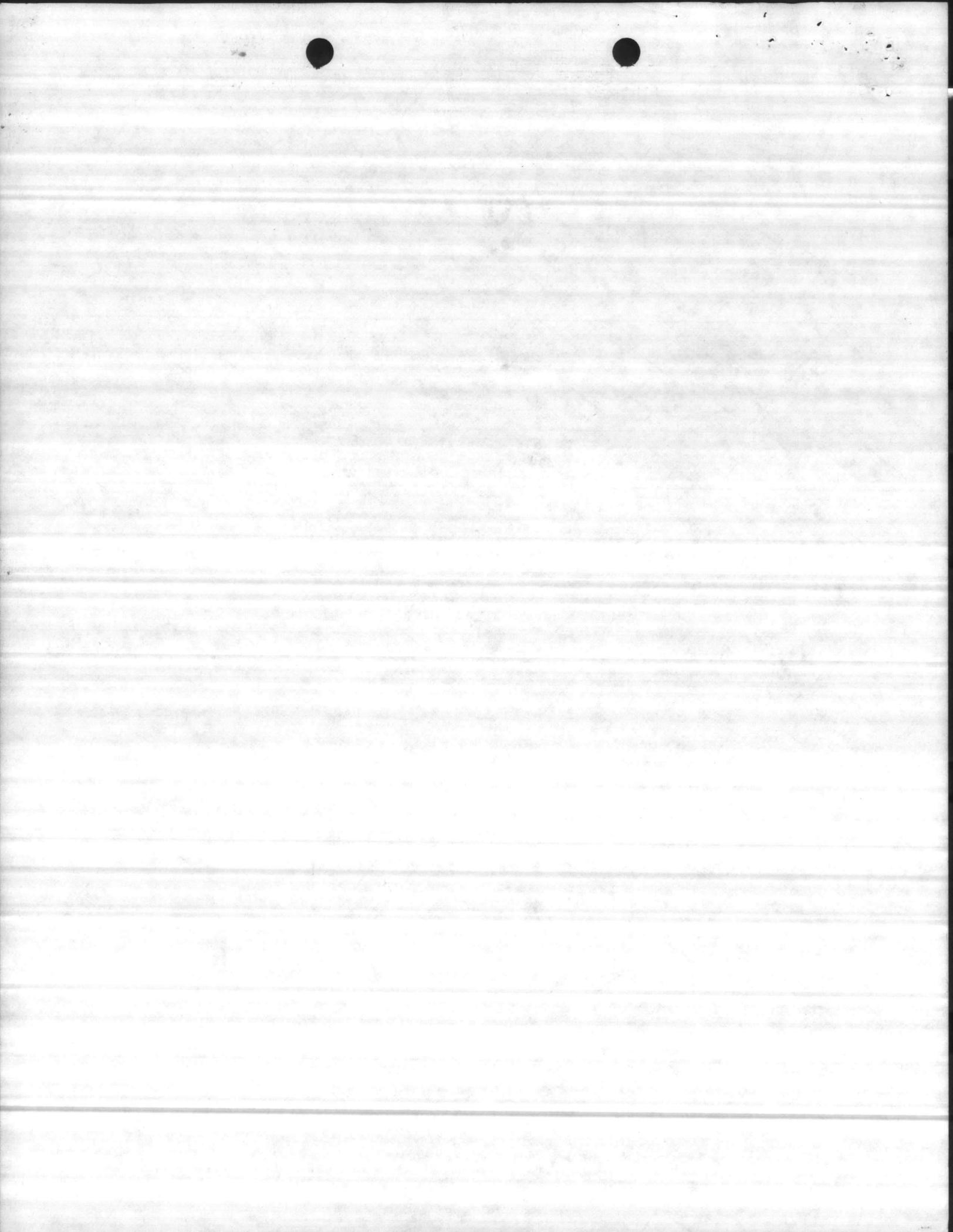
REFUSE BURNING SUPPLEMENTAL
STEAM PLANT



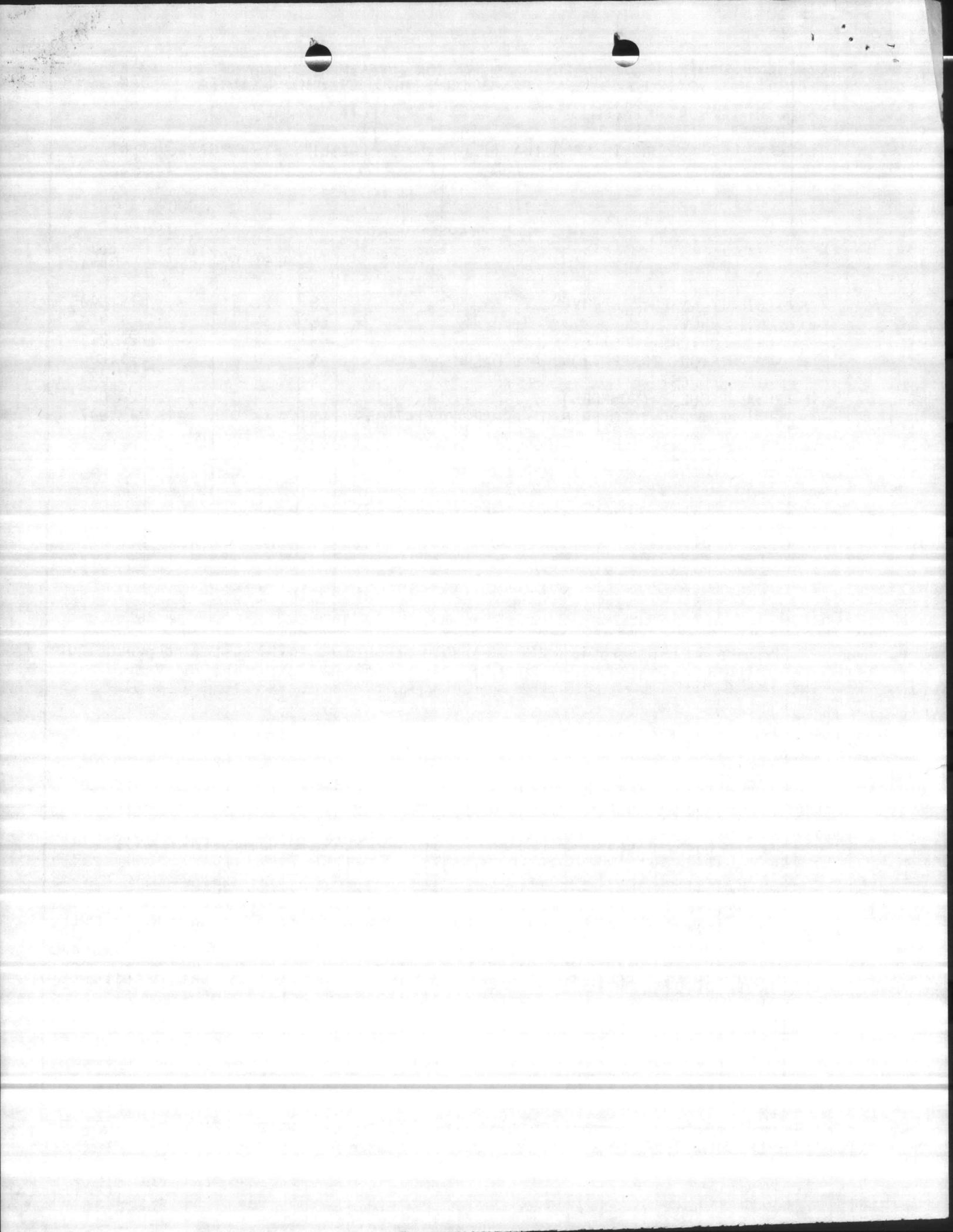
GRAPHIC SCALE IN FEET

GEIGER AREA-A

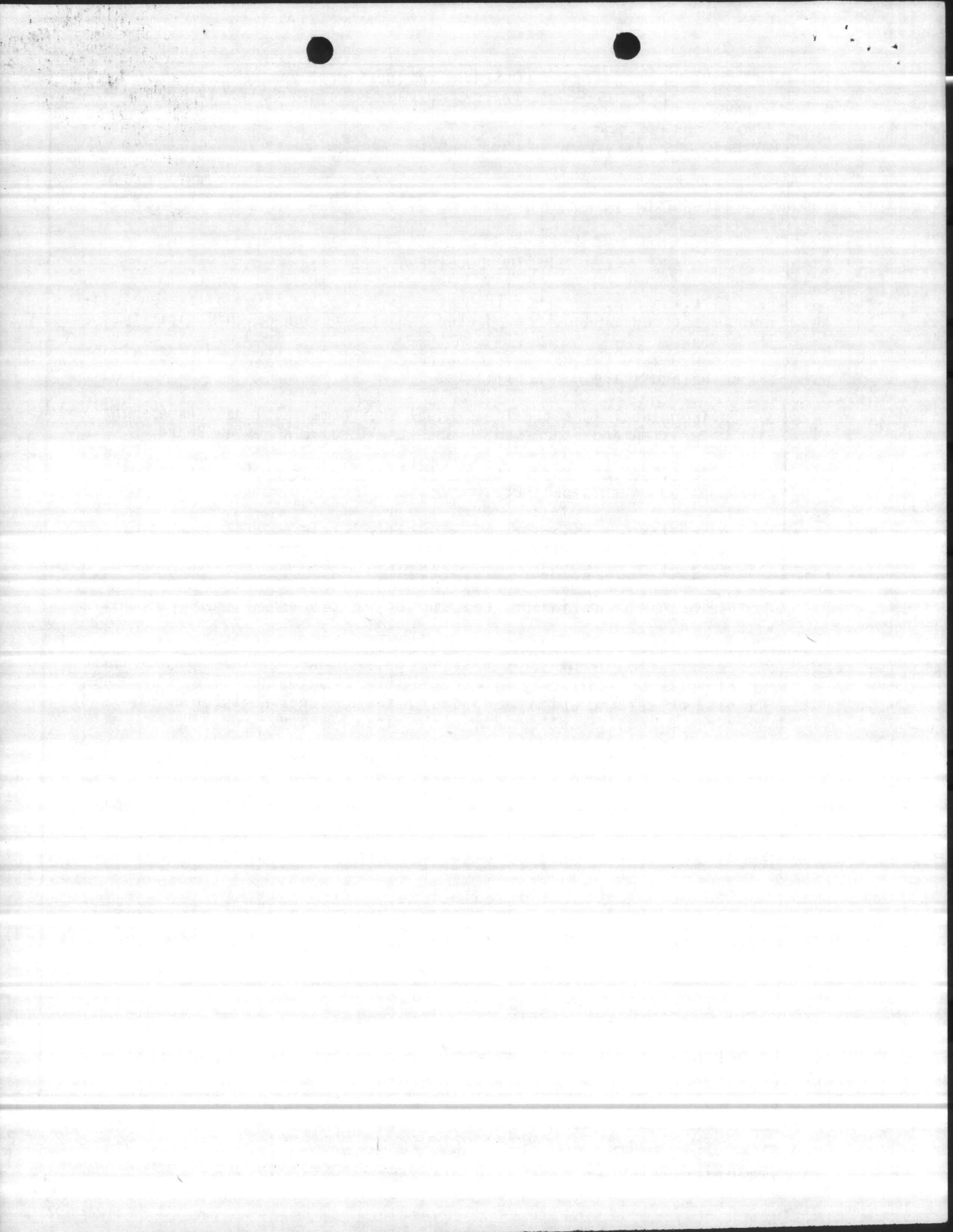
CAMP LEJEUNE, NORTH CAROLINA



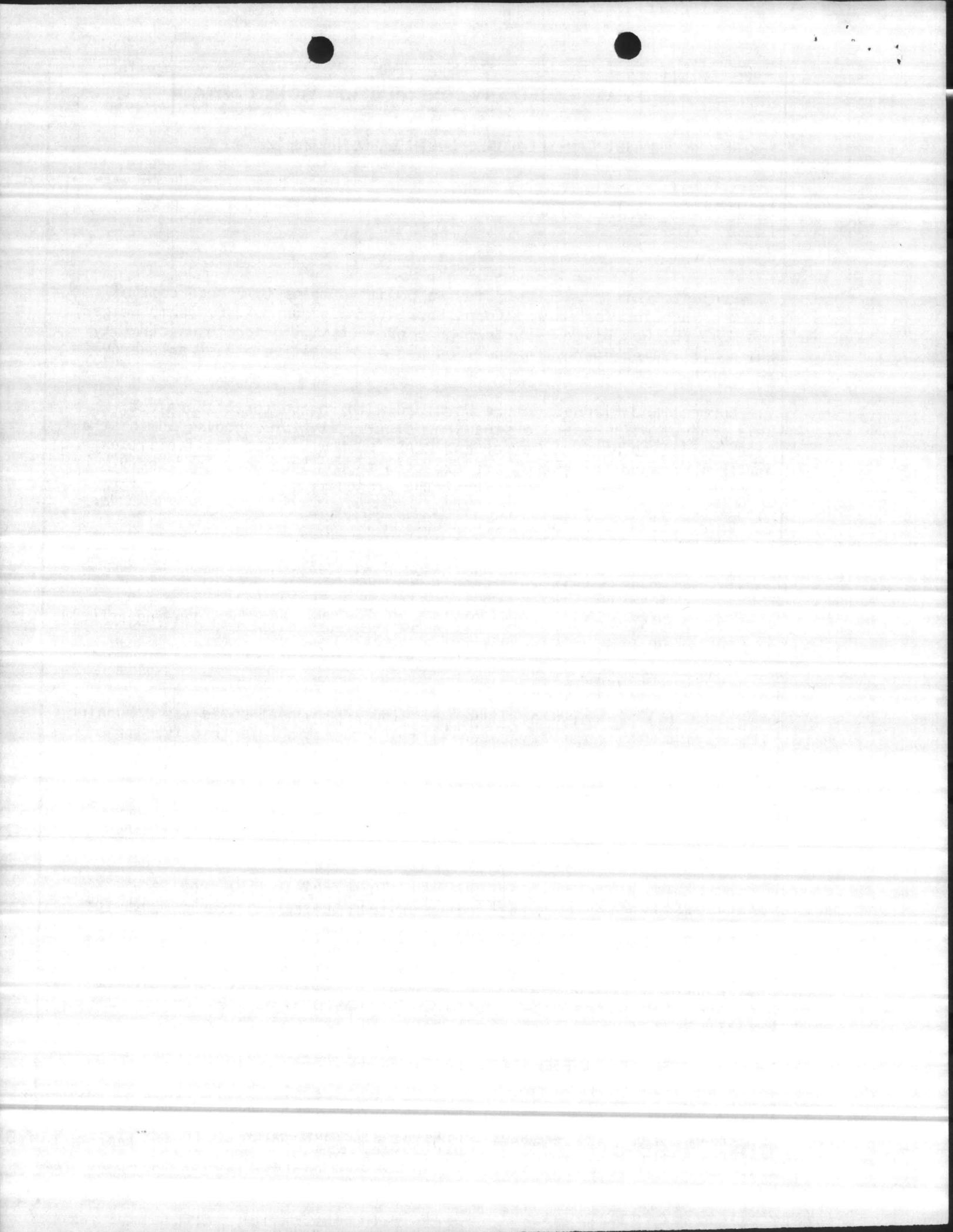
1. COMPONENT NAVY		ENERGY CONSERVATION INVESTMENT PROGRAM FY 19 ⁸⁶ MILITARY CONSTRUCTION PROJECT DATA		2. DATE 7 JAN 83	
3. INSTALLATION AND LOCATION MARINE CORPS BASE CAMP LEJEUNE, NORTH CAROLINA 28542			4. PROJECT TITLE FACILITY ENERGY IMPROVEMENT		
5. PROGRAM ELEMENT		6. CATEGORY CODE 821-09	7. PROJECT NUMBER P-822	8. PROJECT COST (\$000) \$23,000	
9. COST ESTIMATES					
ITEM		U/M	QUANTITY	UNIT COST	COST (\$000)
FACILITY ENERGY IMPROVEMENT		LS	-	-	19,840
CONTINGENCY		LS	-	-	1,984
TOTAL CONTRACT COST		LS	-	-	21,824
SUPERVISION, INSPECTION, AND OVERHEAD		LS	-	-	1,200
TOTAL REQUEST		LS	-	-	23,024
TOTAL REQUEST (ROUNDED)		LS	-	-	23,000
EQUIPMENT PROVIDED FROM OTHER APPROPRIATIONS		LS	-	-	118,947
10. DESCRIPTION OF PROPOSED CONSTRUCTION Provide a Co-Generation Plant capable of burning solid waste and producing 30,200lb/hour steam and 725KW of electricity during the initial year.					
11. REQUIREMENT PROJECT: Provide Co-Generation Plant for Camp Geiger and MCAS (H) New River. REQUIREMENT: The Co-Generation Plant will reduce energy requirements for steam generation for Marine Corps Base, Camp Lejeune, N. C. and Marine Corps Air Station (H), New River. Further, utilization of solid waste from Marine Corps Base, Camp Lejeune, N. C. and MCAS (H) Cherry Point will eliminate costly expansion of facility landfills. CURRENT SITUATION: Steam is generated using costly fossil fuel with the present value cost for 25 years operation of \$86.5 million dollars. Current landfill operations at Marine Corps Base, Camp Lejeune, N. C. and MCAS Cherry Point will require extensive improvements to contain estimated increases in solid waste disposal. IMPACT IF NOT PROVIDED: The activity will not be able to avail itself of the energy savings offered by this project.					
VM					



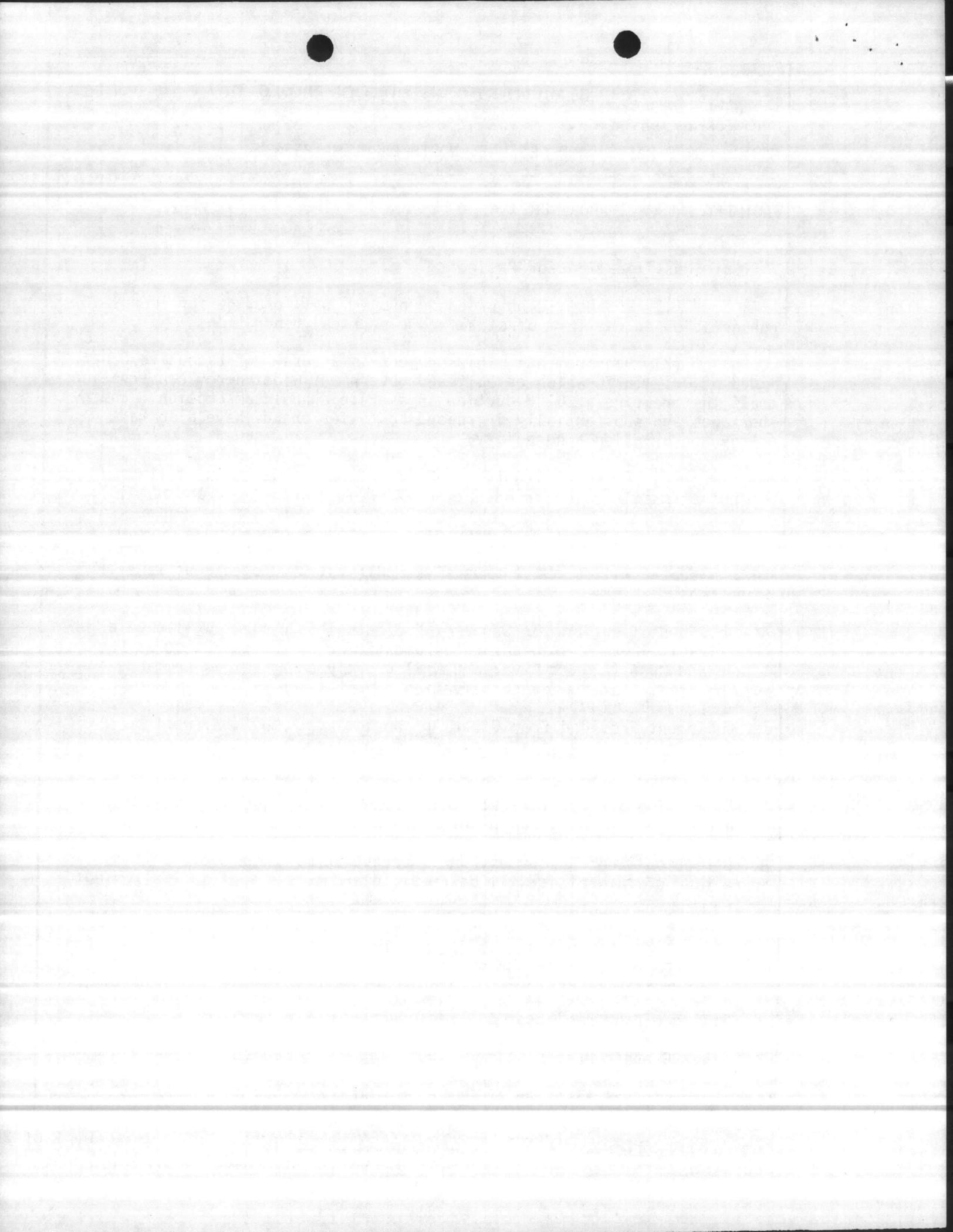
1. COMPONENT NAVY	ENERGY CONSERVATION INVESTMENT PROGRAM FY 19 <u>86</u> MILITARY CONSTRUCTION PROJECT DATA	2. DATE 7 JAN 83
3. INSTALLATION AND LOCATION MARINE CORPS BASE, CAMP LEJEUNE, NORTH CAROLINA 28542		
4. PROJECT TITLE FACILITY ENERGY IMPROVEMENT facility ener	5. PROJECT NUMBER P-822	
<p style="text-align: center;"><u>SPECIAL CONSIDERATIONS</u></p> <ol style="list-style-type: none"> 1. <u>Pollution Abatement Requirement:</u> Will be identified by the environment impact review and incorporated into the design of this facility. 2. <u>Flood Hazard Evaluation:</u> Requirements of Executive Order No. 11296 (Flood Hazards) are not applicable. 3. <u>Environmental Impact:</u> The project Environmental Impact Assessment will be written and processed through the local EIA Review Board. 4. <u>Fallout Shelter Construction:</u> Fallout shelter protection is not incorporated in this project. 5. <u>Design for Accessibility of Physically Handicapped Personnel:</u> Provisions for physically handicapped personnel are not incorporated in this project. 6. <u>Use of Air Conditioning:</u> Ceiling "U" factors will be made to conform with DOD 4270.1-M. 7. <u>Preservation of Historical Sites and Structures:</u> This project does not directly or indirectly affect a district, site, building, structure, object, or setting which is listed in the National Register or otherwise possesses a significant quality of American history. 8. <u>"New Start" Criteria for Commercial or Industrial Activities Program (OMB Circular A-76):</u> Not applicable. 		



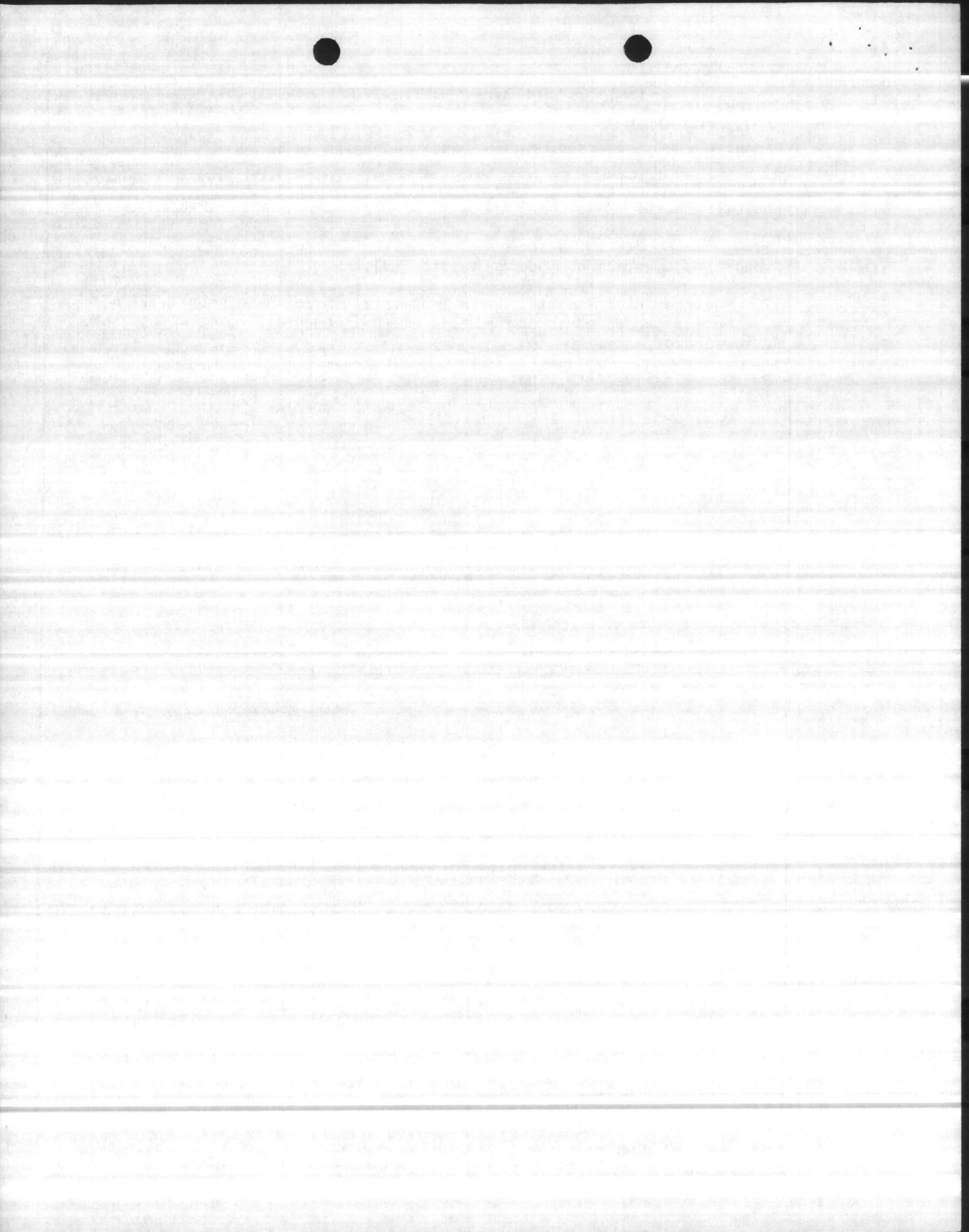
1. COMPONENT NAVY	FY 1986 MILITARY CONSTRUCTION PROJECT DATA	2. DATE 7 JAN 83
3. INSTALLATION AND LOCATION MARINE CORPS BASE, CAMP LEJEUNE, NORTH CAROLINA 28542		
4. PROJECT TITLE FACILITY ENERGY IMPROVEMENT	5. PROJECT NUMBER P-822	
<p style="text-align: center;"><u>FACILITY STUDY</u></p> <p>1. <u>Project</u>: This project provides a positive means to reduce cost of steam production for Marine Corps Base, Camp Lejeune, N. C. (Camp Geiger) and MCAS (H) New River. Further this project will generate electricity which will defer energy consumption and be a positive impact on energy reduction efforts.</p> <p>2. <u>Current and Planned Future Workload with regard to this project</u>: This project will generate steam and electricity for schools, administrative facilities at Camp Geiger and MCAS (H) New River. The facilities and their demand for energy are expected to continue as a necessary requirement throughout the life of the project.</p> <p>3. <u>Description of Proposed Construction</u>:</p> <p style="padding-left: 40px;">a. <u>Type of Construction</u>: This project will provide a permanent facility with a 25 year life span.</p> <p style="padding-left: 40px;">b. <u>Replacement</u>: Boiler Plant G-650 may be shut down pending actual co-generation plant efficiency and generating capabilities.</p> <p style="padding-left: 40px;">c. <u>Description of work to be done</u>:</p> <p style="padding-left: 80px;">(1) <u>Primary Facility</u>: Provide a permanent solid waste burning steam plant with secondary capability of generating electricity.</p> <p style="padding-left: 80px;">(2) <u>Energy Conservation</u>: This project will save 414,777 MBTU's of energy per year.</p> <p style="padding-left: 80px;">(3) <u>Collateral Equipment</u>: Requirements will be determined during preliminary design procedures.</p> <p style="padding-left: 80px;">(4) <u>Supporting Facilities</u>: This project will provide a co-generation plant that will relieve steam generating requirements for G-650 and AS4151 steam plant during the summer months.</p> <p>4. <u>Cost Estimate</u>: Costs were derived from the Solid Waste and Wood Waste Burning and Co-Generation Study as accomplished by J. E. Serrine Company. Costs were escalated to FY-86 vice FY-87 as submitted by the study.</p> <p>5. <u>Justification for Project and for Scope of Project</u>:</p>		



1. COMPONENT NAVY	FY 19 <u>86</u> MILITARY CONSTRUCTION PROJECT DATA	2. DATE 7 JAN 83
3. INSTALLATION AND LOCATION MARINE CORPS BASE, CAMP LEJEUNE, NORTH CAROLINA 28542		
4. PROJECT TITLE FACILITY ENERGY IMPROVEMENT	5. PROJECT NUMBER P-822	
<p>a. <u>Justification for Project:</u></p> <p>(1) <u>Project:</u> The proposed project will provide for energy conservation in the form of steam and electrical generation.</p> <p>(2) <u>Requirement:</u> This project is a result of Executive Order 12003 of July 1977, which established government wide energy conservation goals that require a 20% reduction in average annual consumption. Energy shortages and substantially increased costs for energy have also made energy conservation a necessity.</p> <p>(3) <u>Current Situation:</u> Current steam generation utilizes expensive fossil fuels for operation of steam plants G-650 and AS-4151.</p> <p>(4) <u>Impact if Not Provided:</u> Continued operation of steam plants utilizing expensive fuels. Further the continued impact of solid waste disposal will mandate expensive modifications to current landfill operations.</p> <p>b. <u>Justification for Scope of Project:</u> This project will have a significant impact in energy requirements for steam generation at Camp Geiger and MCAS (H) New River and will greatly enhance this Commands ongoing attempt at energy conservation.</p> <p>6. <u>Equipment Provided from Other Appropriations:</u> \$118,947 will be required for purchase of a truck and disposal containers in support of this facility.</p> <p>7. <u>Common Support Facilities:</u> This project will supplement steam generating requirements of steam plant G-650 and AS-4151.</p> <p>8. <u>Effect on Other Resources:</u> An increase in manpower to facilitate operation of this plant will be required and consists of the following:</p> <ul style="list-style-type: none"> 4 Crane Operators WG-8 4 Boiler Operators WG-7 4 Boiler Mechanics WG-10 3 Supervisors WS-7 <p>9. <u>Siting of the Project:</u> See Enclosure (1).</p> <p>10. <u>Other Graphic Presentations, including Photographs:</u> See Enclosure (2).</p> <p>11. <u>Economic Analysis:</u> An ECIP economic analysis has been made with</p>		

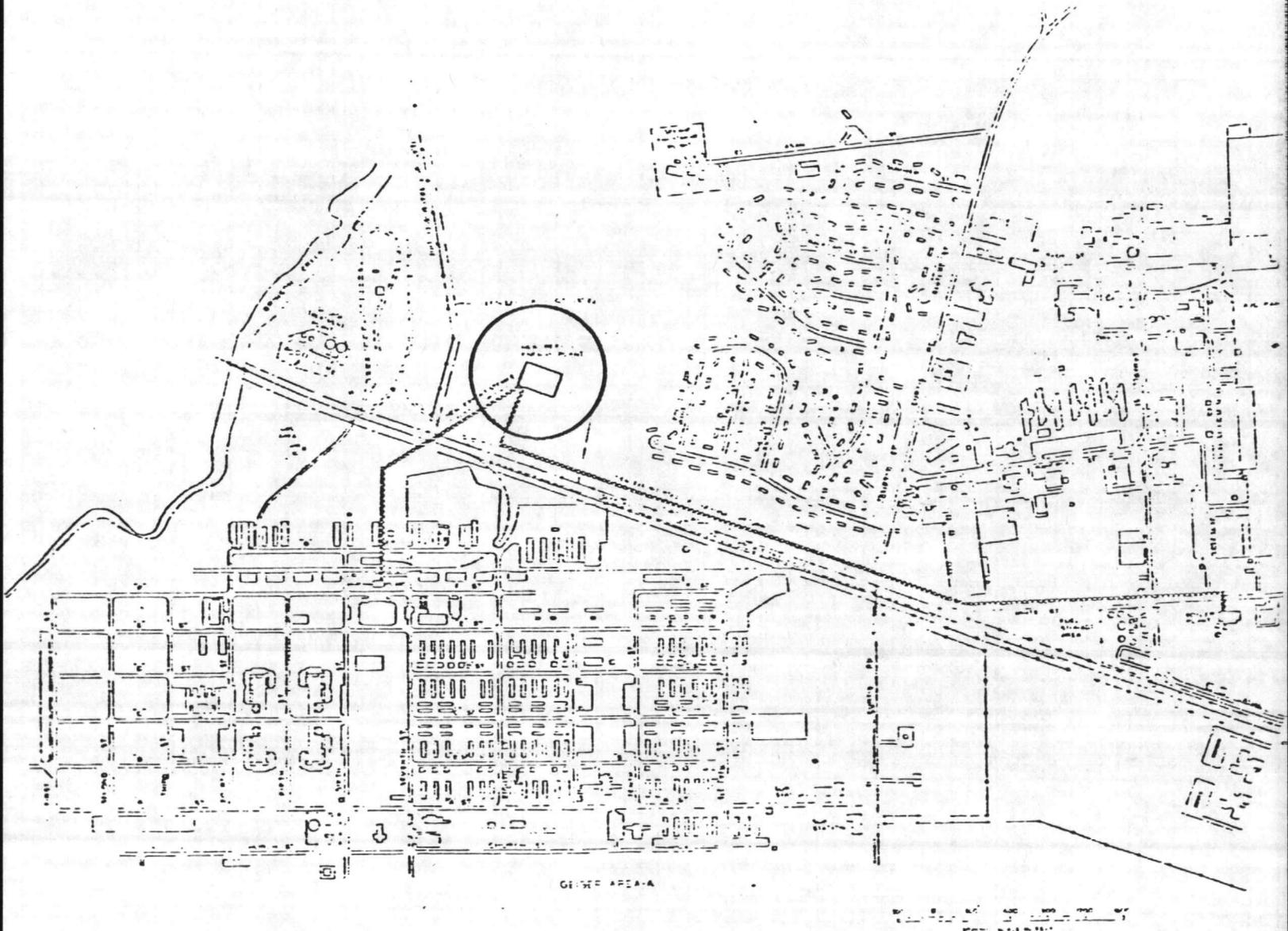


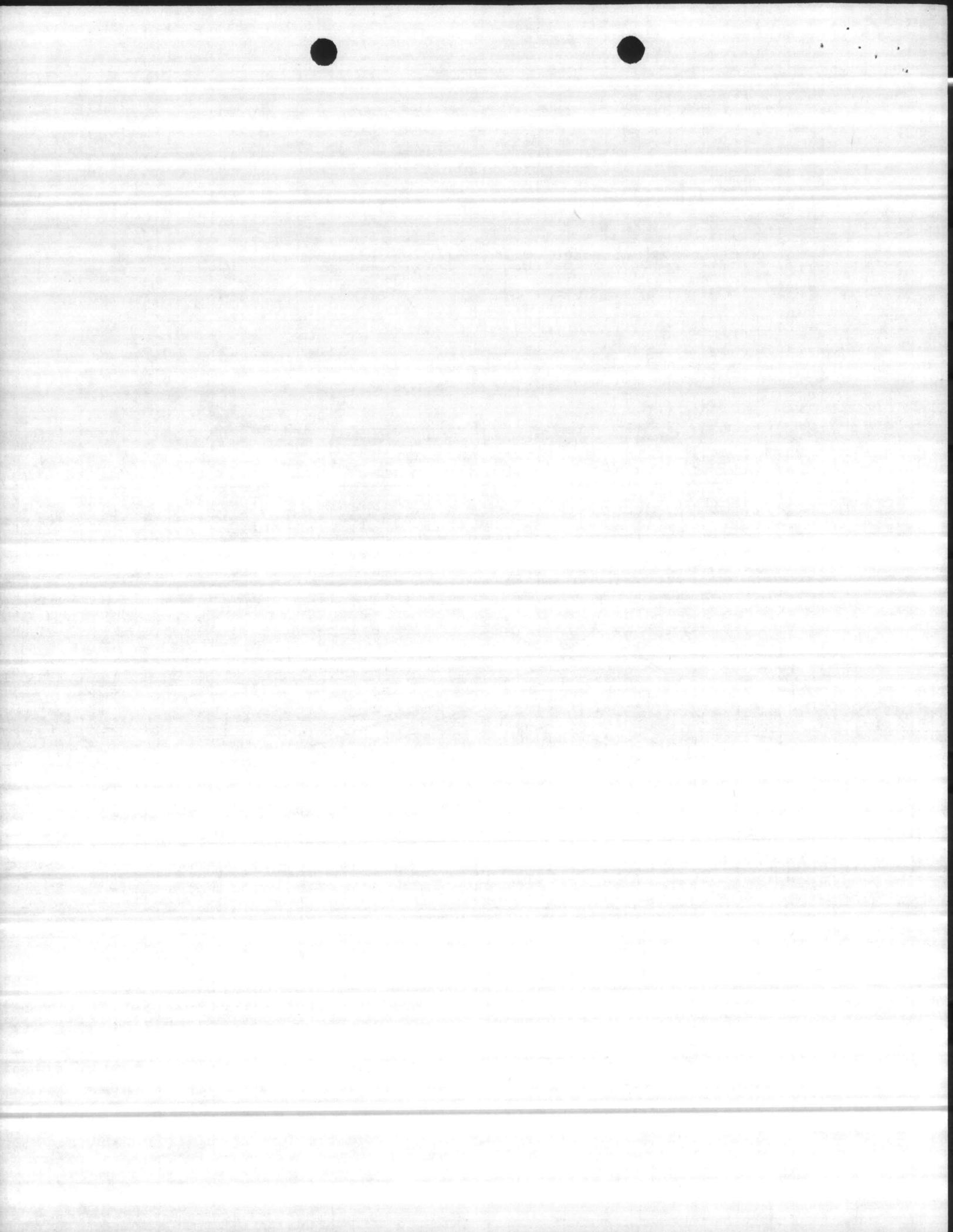
1. COMPONENT NAVY	FY 19 <u>86</u> MILITARY CONSTRUCTION PROJECT DATA	2. DATE 7 JAN 83
3. INSTALLATION AND LOCATION MARINE CORPS BASE, CAMP LEJEUNE, NORTH CAROLINA 28542		
4. PROJECT TITLE FACILITY ENERGY IMPROVEMENT	5. PROJECT NUMBER P-822	
<p>support documentation. See Enclosure (3).</p> <p>12. <u>Environmental Impact</u>: An Environmental Impact Assessment will be written and processed through the local Environmental Impact Assessment Review Board.</p> <p>13. <u>Quantitative Data</u>: Not applicable.</p>		



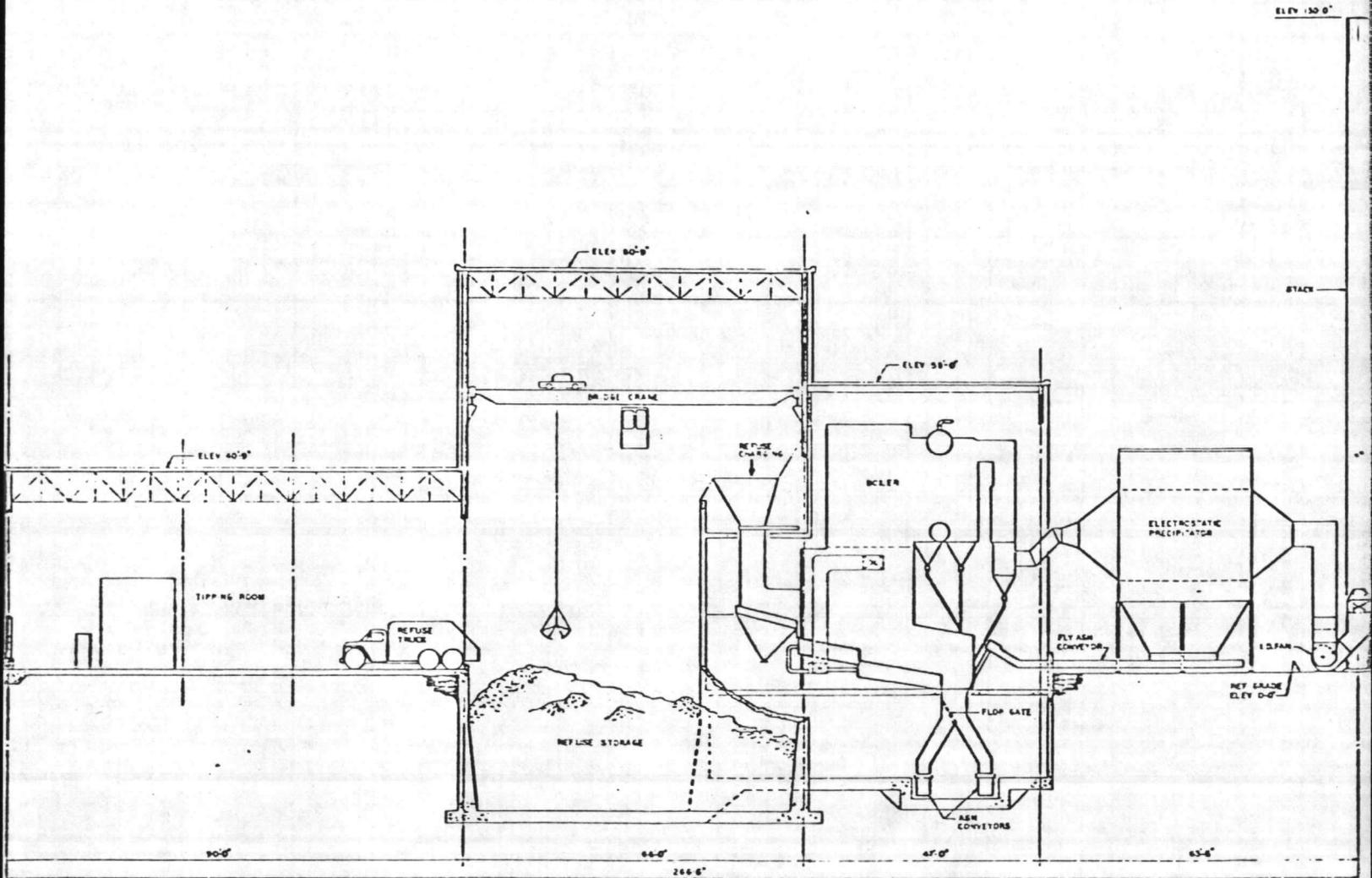
SITE LOCATION MAP

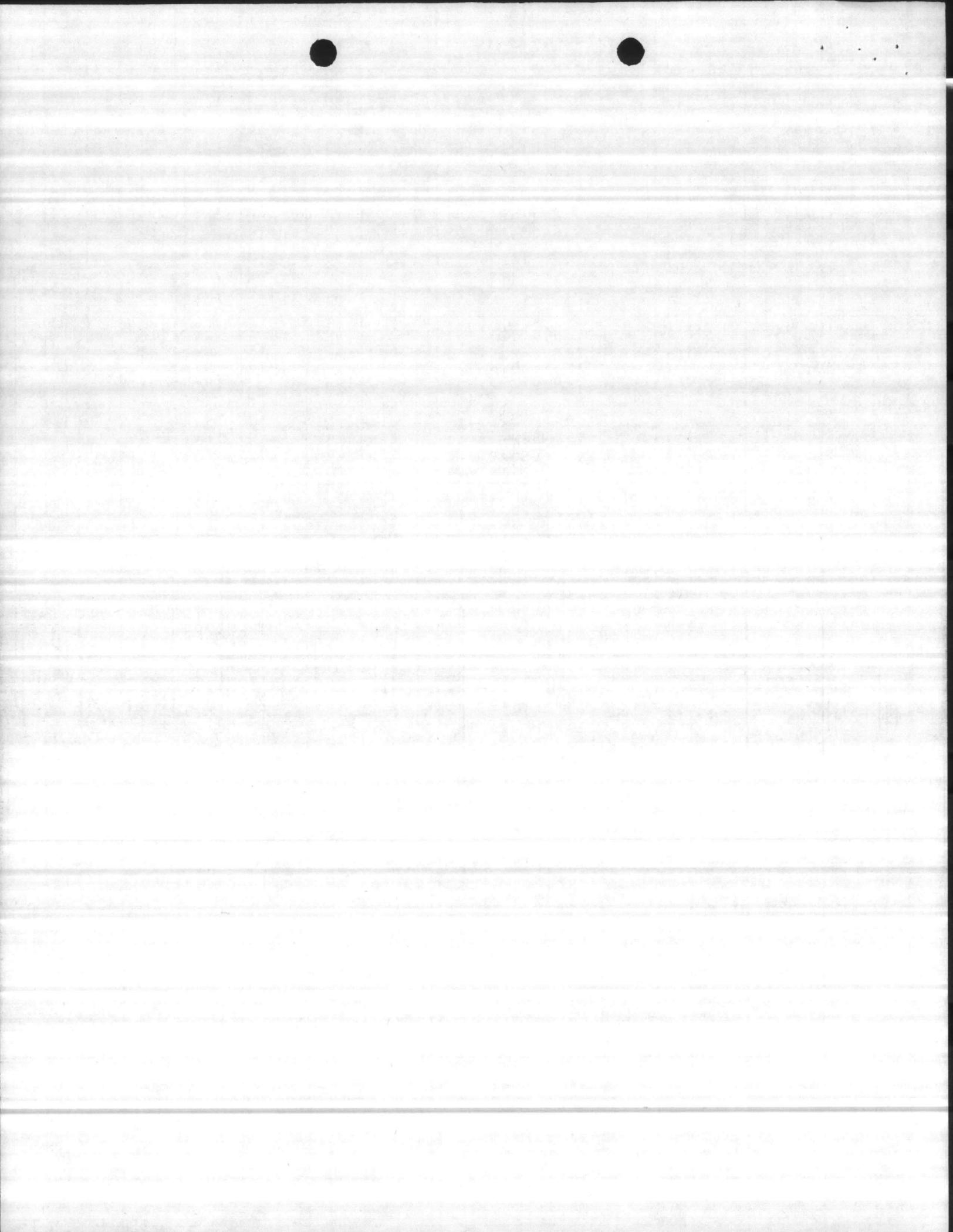
P-822, proposed CO-GENERATION PLANT



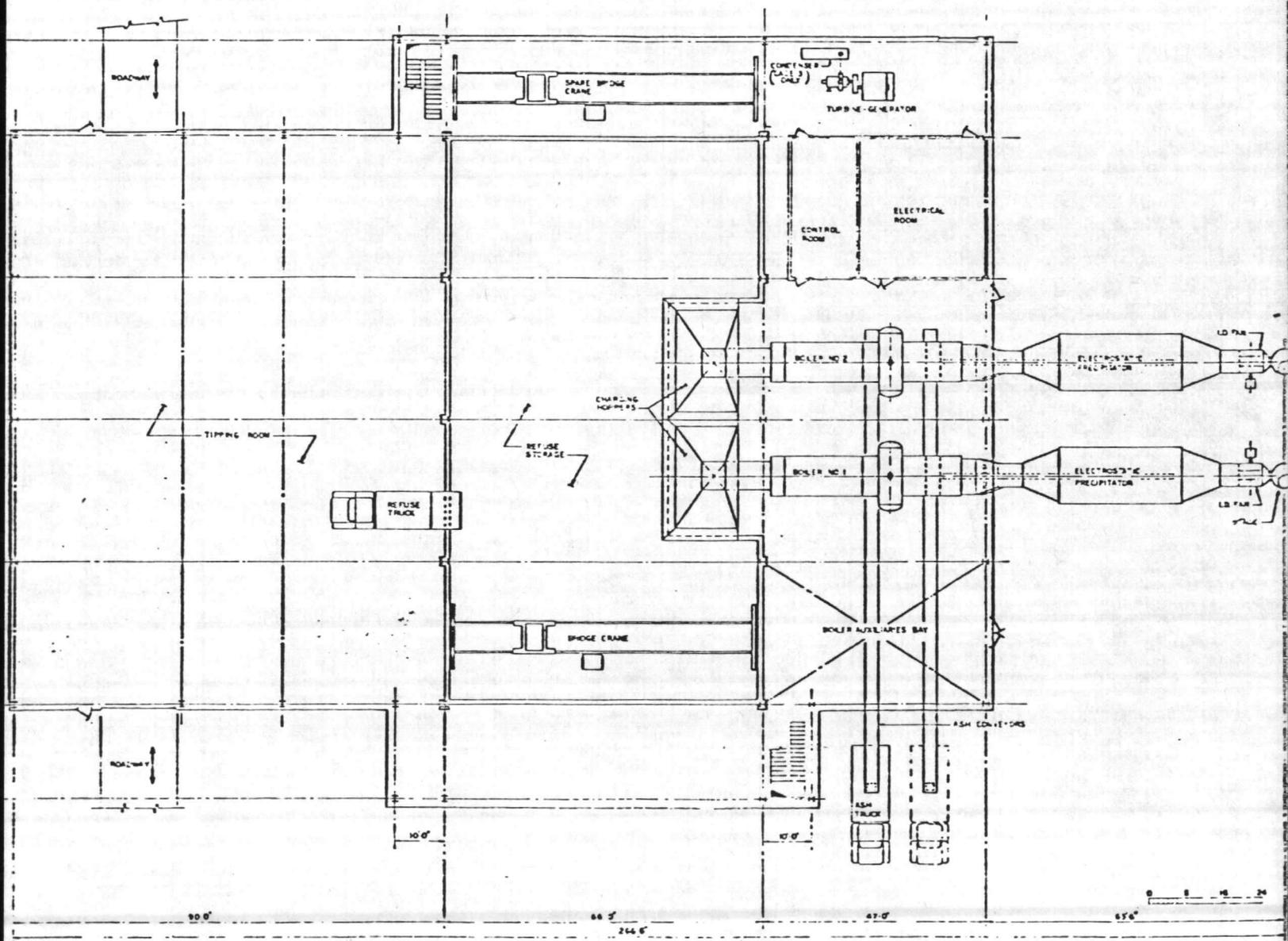


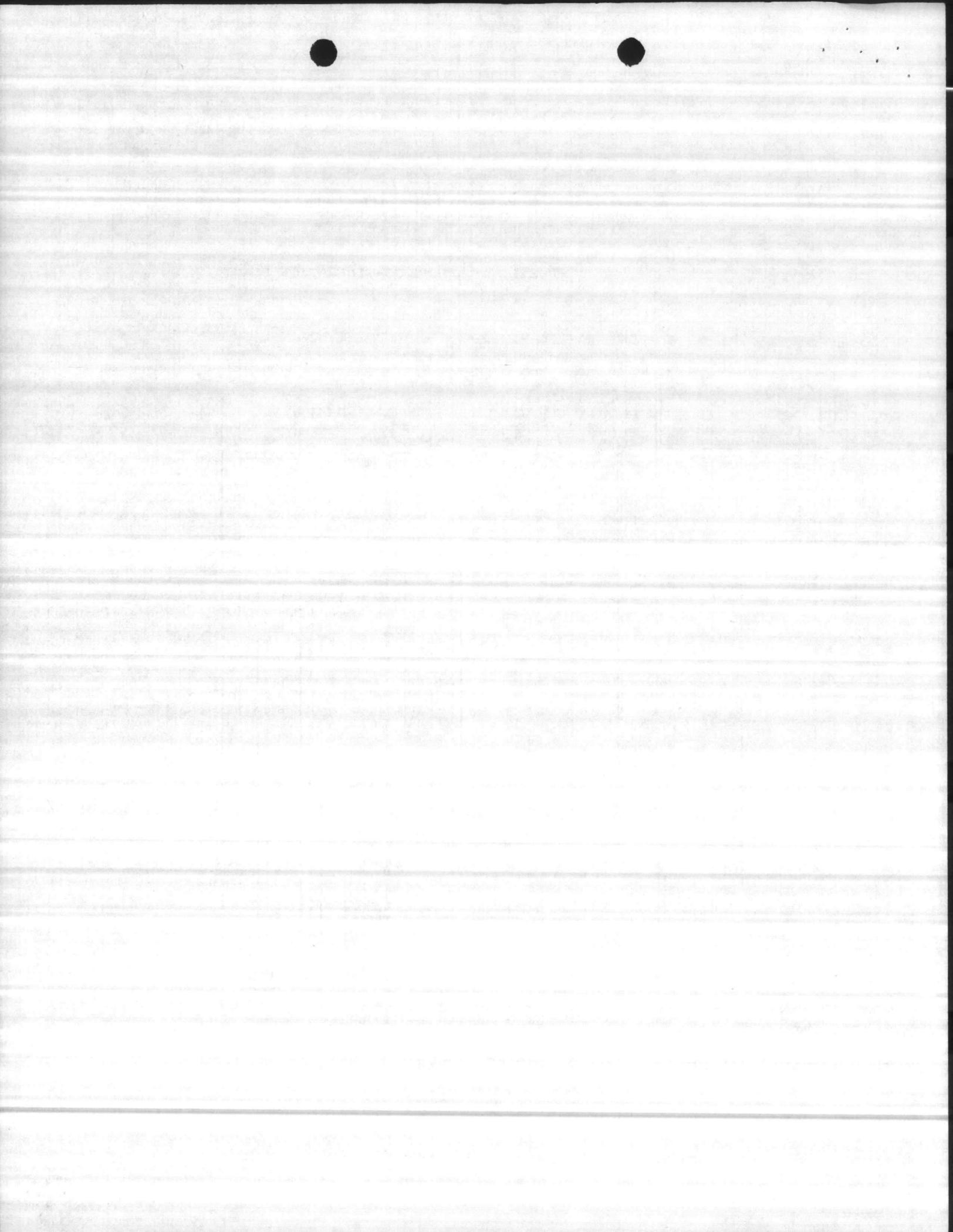
P-822, proposed CO-GENERATION PLANT





P-822, proposed CO-GENERATION PLANT





LIFE CYCLE COST ANALYSIS SUMMARY
ENERGY CONSERVATION INVESTMENT PROGRAM (ECIP)

LOCATION: MCB, CAMP LEJEUNE, NORTH CAROLINA REGION NO. _____ PROJECT NUMBER P-822

PROJECT TITLE FACILITY ENERGY IMPROVEMENT FISCAL YEAR 1986

DISCRETE PORTION NAME CO- GENERATION OF STEAM AND ELECTRICITY.

ANALYSIS DATE _____ ECONOMIC LIFE 25 YEARS PREPARED BY V. MARSHBURN

1. INVESTMENT

A. CONSTRUCTION COST	\$ 21,824,415
B. SIOB	\$ 1,200,342
C. DESIGN COST	\$ 1,223,906
D. ENERGY CREDIT CALC (1A+1B+1C)X.9	\$ 21,823,796
E. SALVAGE VALUE OF EXISTING EQUIPMENT	-\$ _____
F. TOTAL INVESTMENT (1D-1E)	<u>\$21,823,796</u>

2. ENERGY SAVINGS (+) / COST (-)

ANALYSIS DATE _____ ANNUAL SAVINGS, UNIT COST & DISCOUNTED SAVINGS

FUEL	COST \$/MBTU(1)	SAVINGS MBTU/YR(2)	ANNUAL \$ SAVINGS(3)	DISCOUNT FACTOR(4)	DISCOUNTED SAVINGS(5)
A. ELEC	\$ 5.45	33,192	\$ 180,896	18.049	\$ 3,264,991
B. DIST	\$ 11.48	381,586	\$ 4,380,607	20.05	\$ 87,831,170
C. RESID	\$ _____	_____	\$ _____	_____	\$ _____
D. NG	\$ _____	_____	\$ _____	_____	\$ _____
E. COAL	\$ _____	_____	\$ _____	_____	\$ _____
F. TOTAL		<u>414,778</u>	<u>\$ 4,561,503</u>		<u>\$91,096,161</u>

3. NON ENERGY SAVINGS (+) / COST (-)

A. ANNUAL RECURRING (+/-)	\$ - 411,543
(1) DISCOUNT FACTOR (TABLE A)	<u>9.524</u>
(2) DISCOUNTED SAVING/COST (3A X 3A1)	<u>\$ -3,919,535</u>

B. NON RECURRING SAVINGS (+) / COST (-)

ITEM	SAVINGS (+) COST (-)(1)	YEAR OF OCCURRENCE(2)	DISCOUNT FACTOR(3)	DISCOUNTED SAV- INGS (+) COST (-)(4)
a. _____	\$ 65,658	5	.652	\$ 42,809
b. _____	\$ 65,658	10	.405	\$ 26,591
c. _____	\$ 65,658	15	.251	\$ 16,480
d. _____	\$ 65,658	20	.156	\$ 10,242
e. TOTAL	<u>\$ 262,632</u>			<u>\$ -96,122</u>

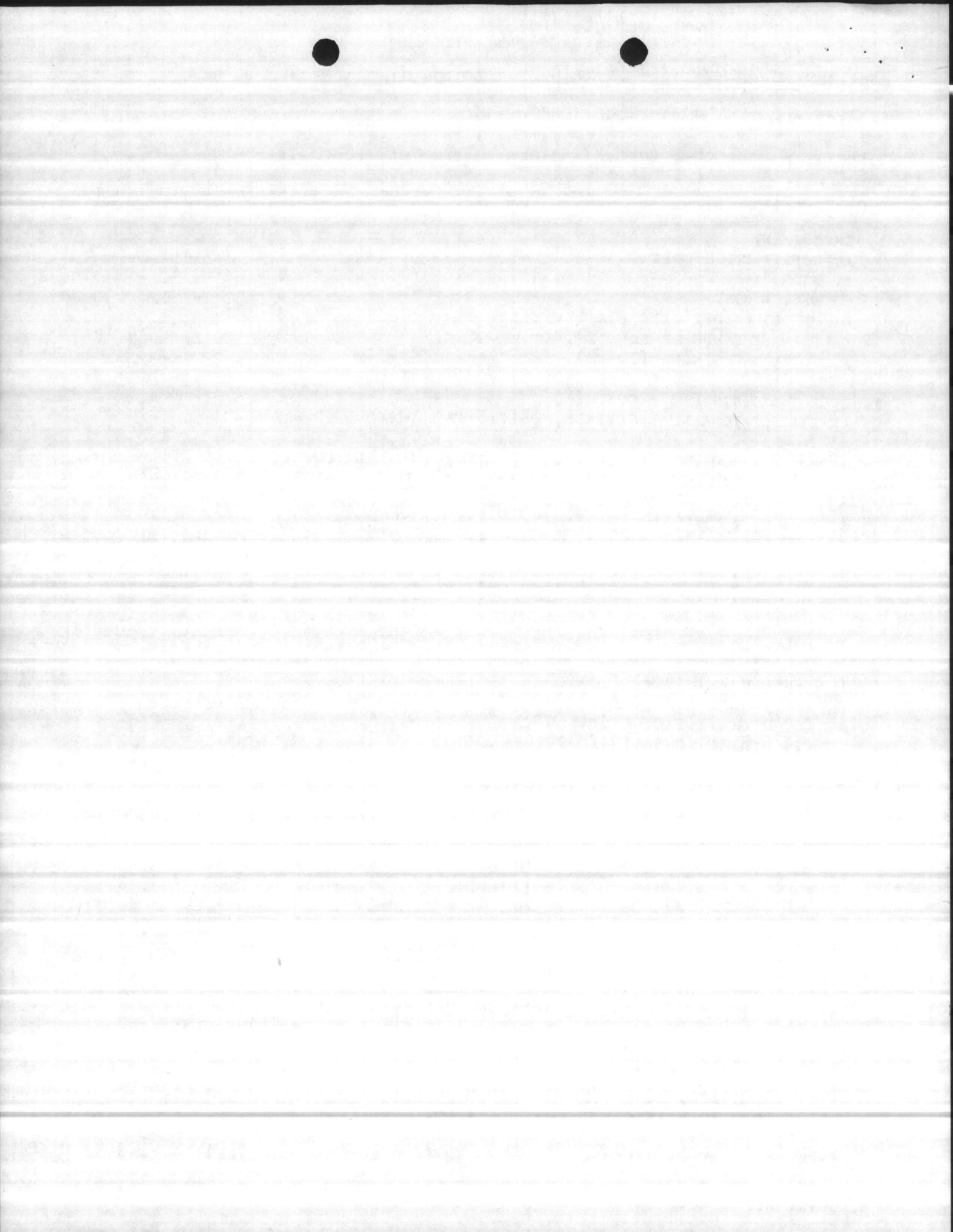
C. TOTAL NON ENERGY DISCOUNTED SAVINGS (+) / COST (-) (3A2+3Bd4) \$ -4,015,657

D. PROJECT NON ENERGY QUALIFICATION TEST

- (1) 25% MAX NON ENERGY CALC (2F5 X .33) \$ 30,061,733
- a IF 3D1 IS = OR > 3C GO TO ITEM 4
- b IF 3D1 IS < 3C CALC SIR = (2F5+3D1) ÷ 1F= _____
- c IF 3D1b IS = > 1 GO TO ITEM 4
- d IF 3D1b IS < 1 PROJECT DOES NOT QUALIFY

4. FIRST YEAR DOLLAR SAVINGS 2F3+3A+(3B1d ÷ YEARS ECONOMIC LIFE) \$ 631,462

5. TOTAL NET DISCOUNTED SAVINGS (2F5+3C) \$ 87,080,504



SUMMARY

LIFE CYCLE COST ANALYSIS

Information utilized in this analysis was obtained from the Solid Waste and Wood Waste Burning and Coal - Generation Study as provided by LANTNAVFAC-ENGCOM. The study pertaining to Co-Generation is attached as supporting documentation.

I. INVESTMENT:

Construction Cost	\$21,824,415
SIOH	1,200,342
Design Cost	1,223,906

II. ENERGY SAVINGS

Co-Generation Plant

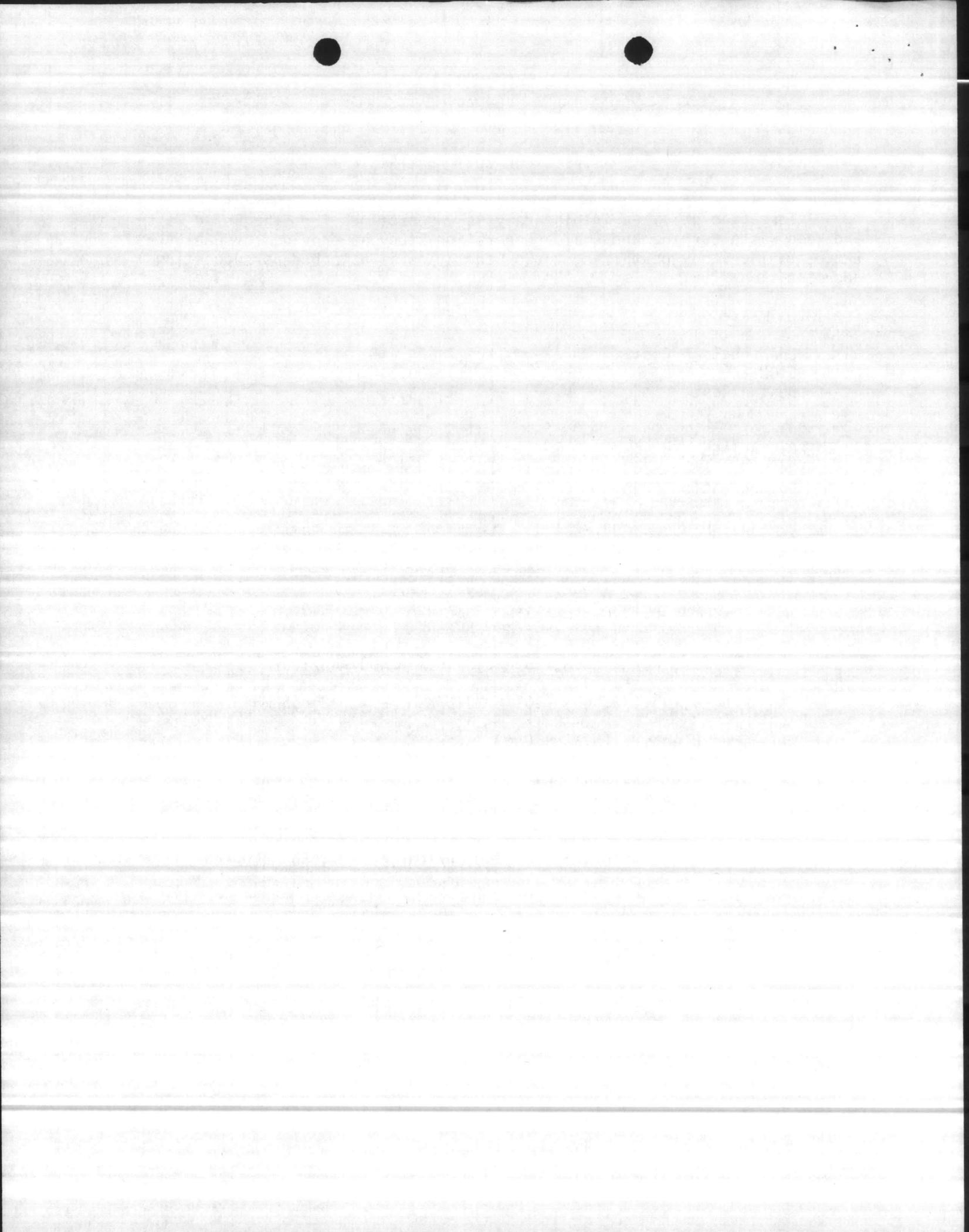
- a. Usage (Page VI-14)
 $(3,402,000 \text{ KWH/year}) \times (.0116 \text{ MBTU/KWH}) = \underline{\$39,463 \text{ MBTU}}$
- b. Resources Generated (Page VI-17)
 $\frac{(640 \text{ KW/HR} + 790 \text{ KW/HR})}{2} = 715 \text{ KW/HR Average}$
 $(715 \text{ KW/HR} \times 8,760 \text{ HRS}) = 6,263,400 \text{ KWH/Year}$
 $(6,263,400 \text{ KWH}) (.0116 \text{ MBTU/KWH}) = + \$72,655 \text{ MBTU}$

Oil-Fired Plants (Status Quo)

- a. Usage (Page VI-25)
 $\frac{(38.99 \text{ MBTU/HR} + 48.13 \text{ MBTU/HR})}{2} = 43.56 \text{ MBTU/HR Average}$
 $(43.56 \text{ MBTU/HR}) \times (8,760 \text{ HR/Year}) = 381,586 \text{ MBTU/Year}$

III. ENERGY COSTS

- a. Electricity $(.03434\text{¢/KW}) \div (.0116 \text{ MBTU/KW}) = \$2.9603/\text{MBTU}$
 $\$2.96 \times 1.13 \times 1.13 \times 1.13 \times 1.13 \times 1.13 = \$5.45/\text{MBTU}$
- b. Fuel Oil (Page VI-25) \$11.48/MBTU



IV. Non-Energy (Annual) Costs (Recurring) Pages VI-18 and VI-26)

<u>Co-Generation</u>		<u>Oil-Fired Boilers (Status Quo)</u>	
Labor	\$437,951	CP Development	\$124,556
Maintenance	241,018	CL Development	458,529
Trash Transfer	345,527	CP Maintenance	18,310
Ash Disposal	<u>17,951</u>	CL Maintenance	<u>29,508</u>
TOTAL	\$1,042,447	TOTAL	\$630,903

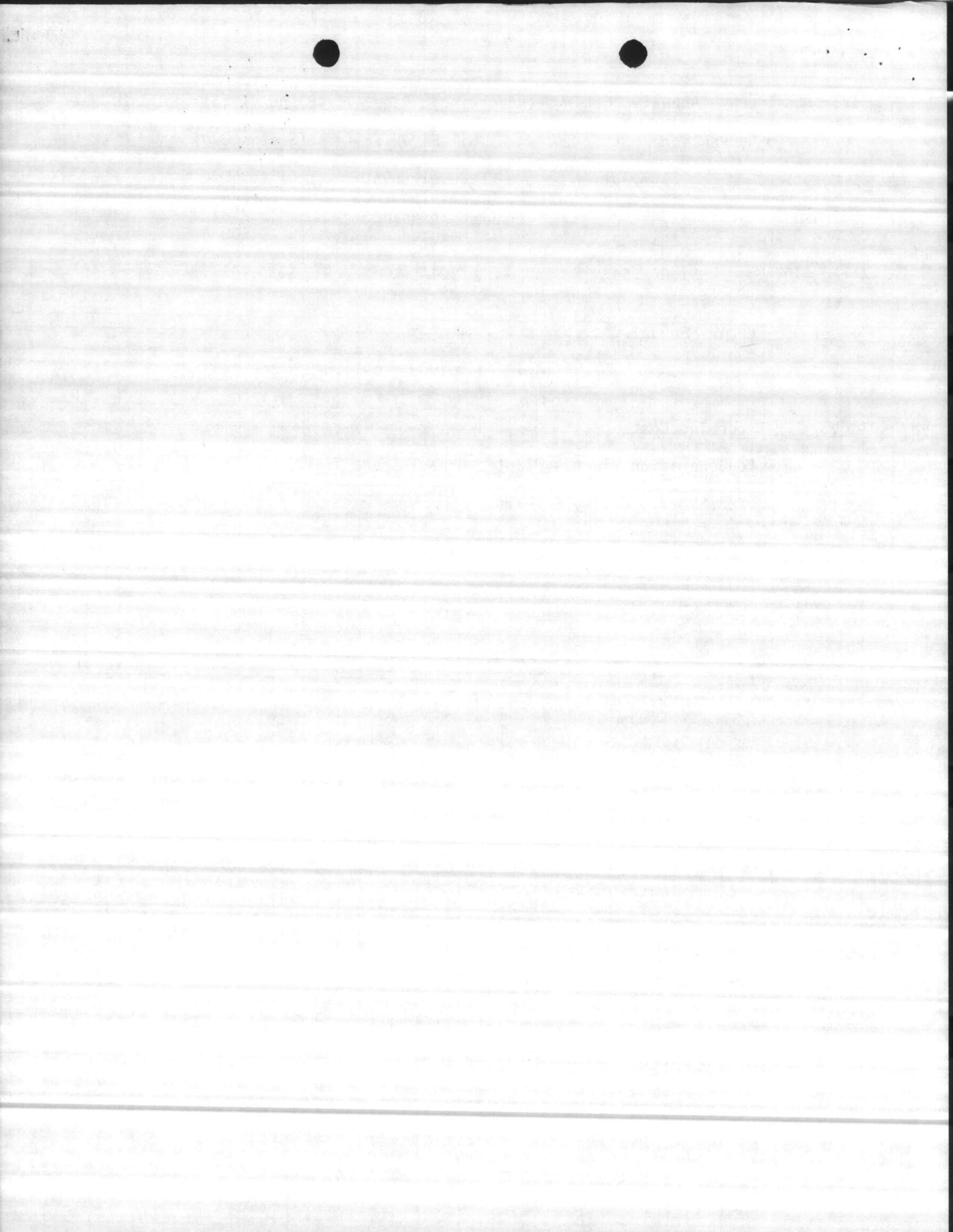
Net Non-Energy Annual Costs:

$$\$1,042,447 - \$630,903 = \$411,543$$

V. Non-Recurring Costs

a. Co-Generation Plant - Plant overhaul (Page VI-13)

\$65,658/Year every 5 years.

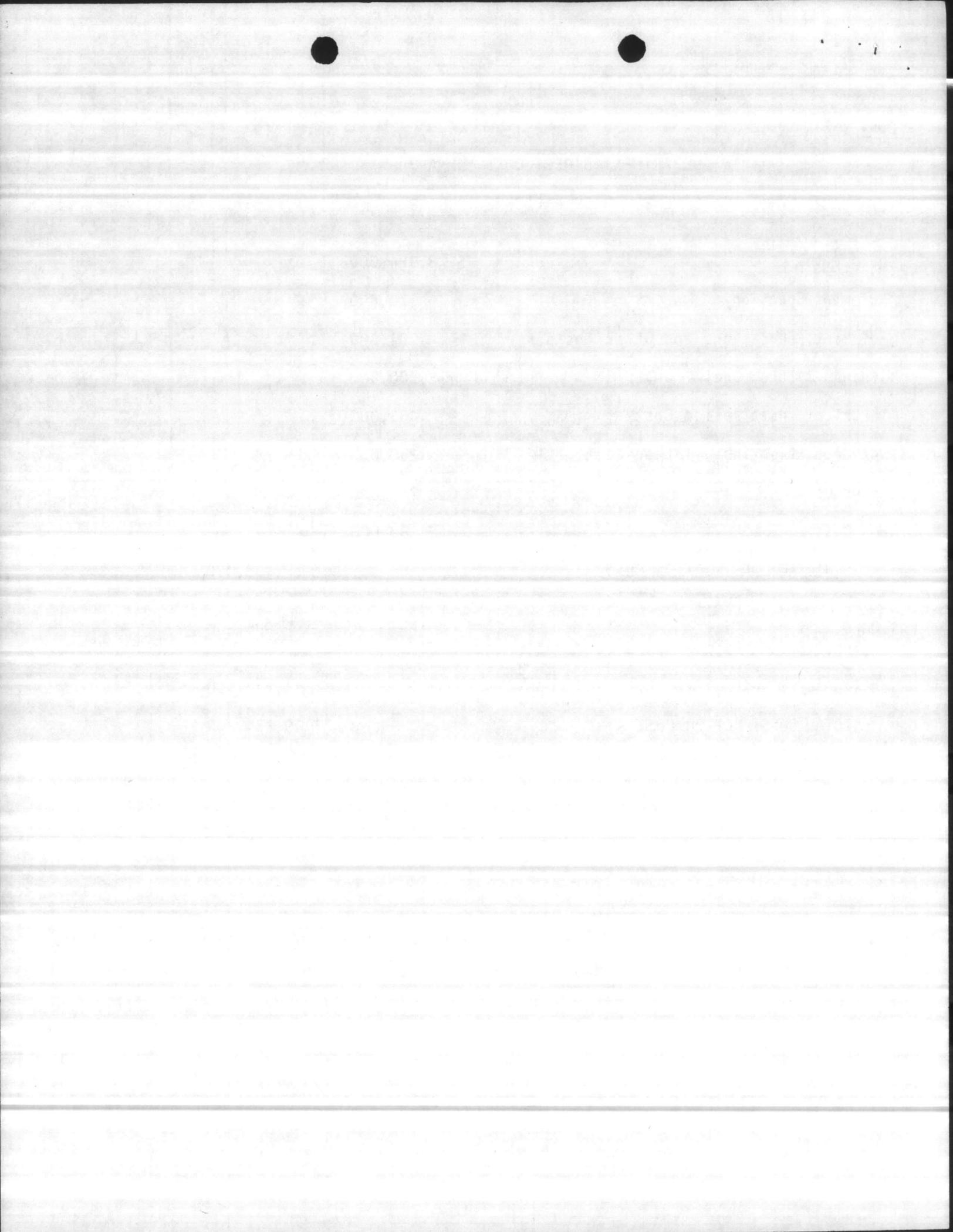


Cost Estimate

DEPARTMENT DIRECT COST SUMMARY

CASE 2 - BACK PRESSURE TURBINE

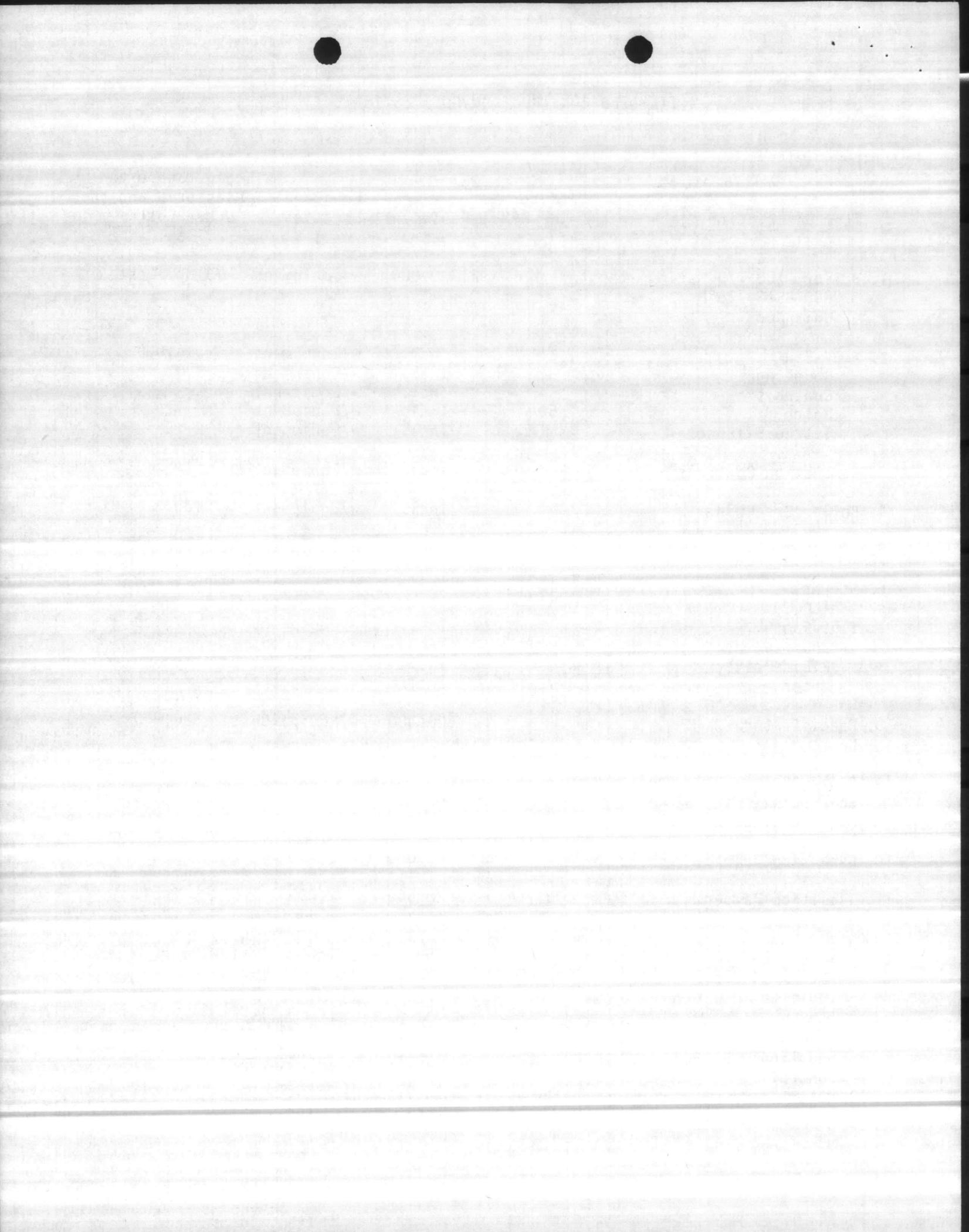
Equipment	\$ 8,984,000	
Equipment Erection	170,600	
Equipment Foundations and Other Costs	294,400	7
Buidings & Structures	3,700,000	3
Electrical Installation Cost	463,000	
Instrumentation Installation Cost	250,000	
Piping Cost	2,246,000	
Area Cost	<u>380,000</u>	
SUBTOTAL CONSTRUCTION COST		\$ 16,488,000
SIOH @ 5.5% (Supervision, inspection & overhead)		906,800
Contingency @ 10%		<u>1,739,500</u>
TOTAL CONSTRUCTION COST		\$ 19,134,300



ITEMIZED CONSTRUCTION COST ESTIMATE

EQUIPMENT LIST
CASE 2

<u>Item Description</u>	<u>Motor HP-RPM</u>	<u>Equipment \$</u>	<u>Equipment Erection \$</u>	<u>Equip. Supports Platforms and Other Costs \$</u>
1. Boiler, 100 T/D Maximum Input 600 PSIG 725°F Unit No. 1		2,750,000	w/Equipment	w/Bldg. Cost
2. F.D. Fan Coupling Controls Motor Intake Silencer	50	Incl. Incl. Incl. Incl. Incl.	w/Equipment w/Equipment w/Equipment w/Equipment w/Equipment	4,000
3. Combustion Controls		Incl.	w/Equipment	
4. Boiler Breeching		Incl.	w/Equipment	w/Bldg.
5. Economizer		Incl.	w/Equipment	w/Bldg.
6. Stoker	10	Incl.	w/Equipment	w/Boiler
7. I.D. Fan Coupling Fluid Drive Motor	75	Incl. Incl. Incl. Incl.	w/Equipment w/Equipment w/Equipment w/Equipment	7,000
8. Precipitator No. 1		600,000	w/Equip. Cost	20,000
9. Ductwork - To Precip., Fan, Stack w/Insulation		45,000	D&E	65,000
10. Expansion Joints		12,000	2,000	N/A
11. Isolation Damper	5	28,000	2,000	Incl.
12. Boiler, 100 T/D Maximum Input 600 PSIG 725°F Unit No. 2		2,750,000	w/Equip. Cost	w/Bldg.
13. F.D. Fan Coupling Controls Motor Intake Silencer	50	Incl. Incl. Incl. Incl. Incl.	Incl. Incl. Incl. Incl. Incl.	4,000

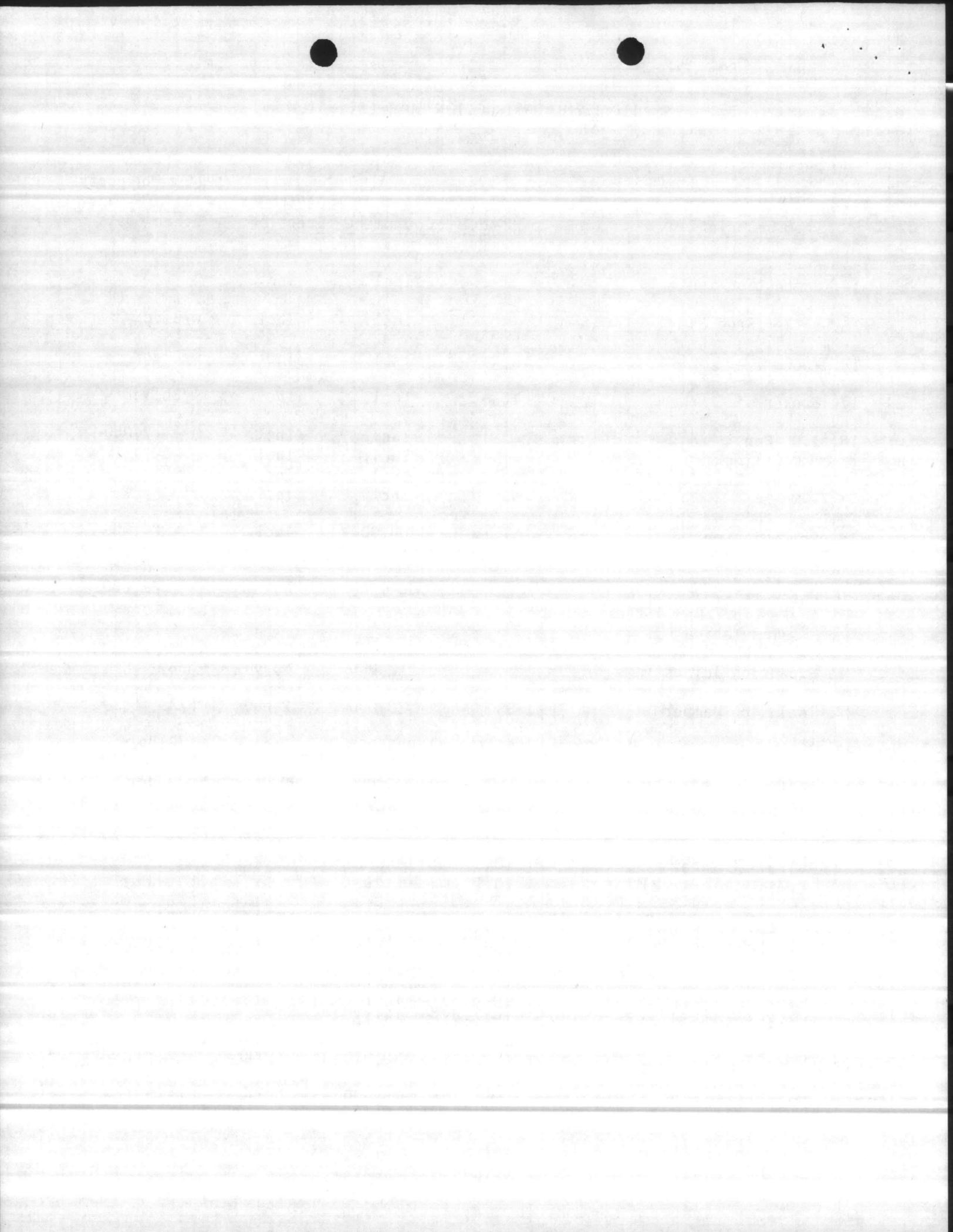


ITEMIZED CONSTRUCTION COST ESTIMATE

EQUIPMENT LIST
CASE 2

<u>Item Description</u>	<u>Motor HP-RPM</u>	<u>Equipment \$</u>	<u>Equipment Erection \$</u>	<u>Equip. Supports Platforms and Other Costs \$</u>
14. Combustion Controls		Incl.	Incl.	
15. Boiler Breeching		Incl.	Incl.	w/Bldg.
16. Economizer		Incl.	Incl.	w/Bldg.
17. Stoker	10	Incl.	Incl.	w/Boiler
18. I.D. Fan		Incl.	Incl.	7,000
Coupling		Incl.	Incl.	
Fluid Drive		Incl.	Incl.	
Motor	75	Incl.	Incl.	
19. Precipitator No. 2		600,000	Incl.	20,000
20. Ductwork - To Precip., Fan, Stack w/Insulation		45,000	D&E	65,000
21. Expansion Joints		12,000	2,000	N/A
22. Isolation Damper	5	28,000	2,000	N/A
23. Ash Handling System	80 (Total)	575,000	Incl.	w/Bldg.
24. Overhead Crane - 5 Ton		375,000	50,000	w/Bldg.
Control Cab		Incl.		
Grapple		Incl.		
Bridge Motor	15	Incl.		
Trolley Motor	10	Incl.		
Hoist Motors (2)	10 (Ea)	Incl.		
25. Spare Crane		375,000	50,000	w/Bldg.
Control Cab		Incl.		
Grapple		Incl.		
Bridge Motor	15	Incl.		
Trolley Motor	10	Incl.		
Hoist Motors (2)	10 (Ea)	Incl.		
26. Deaerator		30,000	2,000	1,500
27. Blow-Off Tank		5,000	1,000	100

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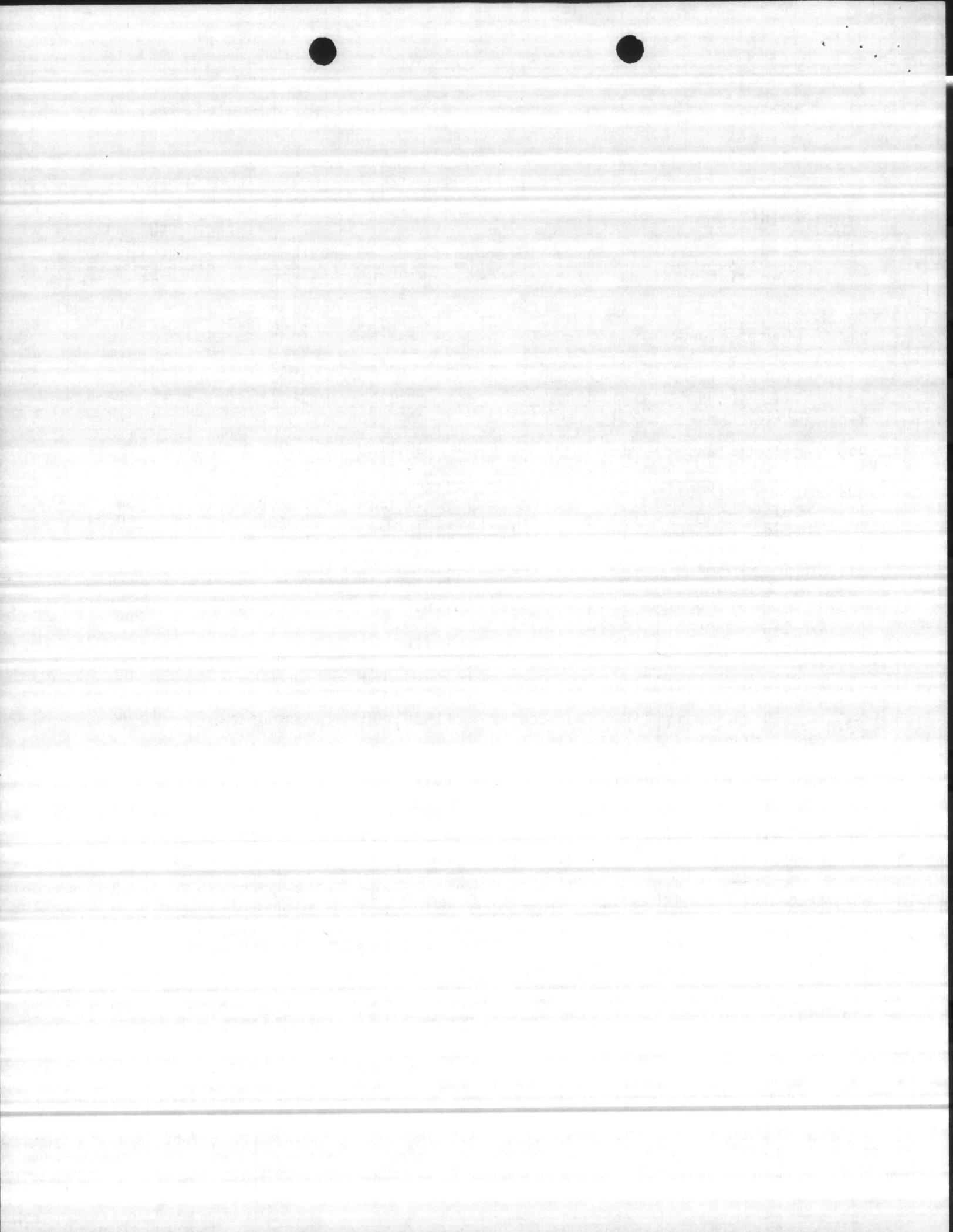


ITEMIZED CONSTRUCTION COST ESTIMATE

EQUIPMENT LIST

CASE 2

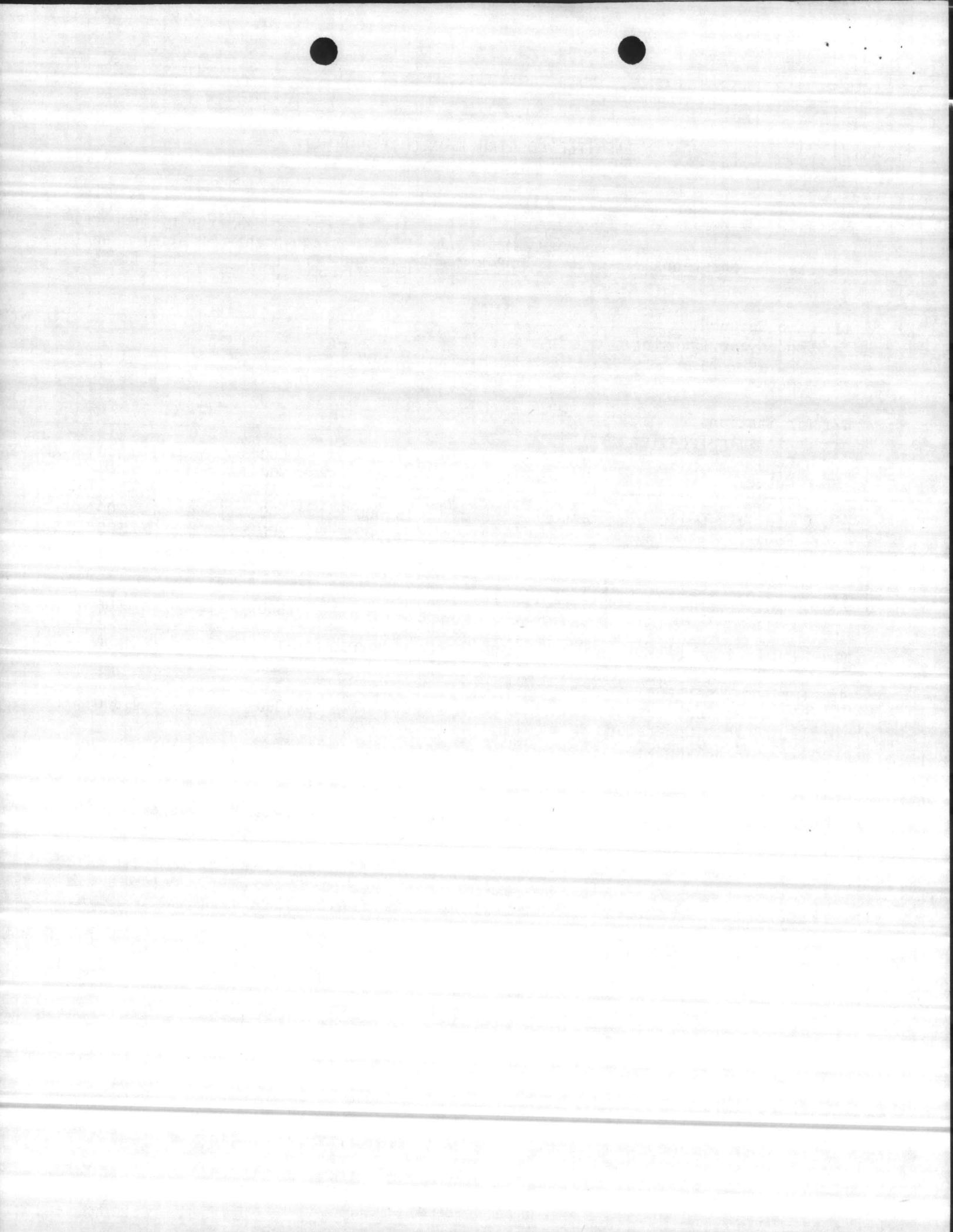
<u>Item Description</u>	<u>Motor HP-RPM</u>	<u>Equipment \$</u>	<u>Equipment Erection \$</u>	<u>Equip. Supports Platforms and Other Costs \$</u>
28. Continuous Blowdown System		17,000	2,500	500
Flash Tank		Incl.	Incl.	
Heat Exchanger		Incl.	Incl.	
Valves		Incl.	Incl.	
29. Condensate Tank		15,000	1,000	100
30. Condensate Transfer Pump		3,000	500	200
Motor	10	Incl.	500	200
31. Air Compressor	25	6,000	500	200
Air Receiver		Incl.		
32. Air Compressor	25	6,000	500	200
Air Receiver		Incl.		
33. Air Dryer		3,000	200	100
34. Stack - Dual Wall (2) 150' x 9'-0" Dia.		310,000	Incl.	90,000
35. Raw Water Booster Pump		3,000	500	100
Motor	20	Incl.	Incl.	Incl.
36. Raw Water Booster Pump		3,000	500	100
Motor	20	Incl.		
37. Feedwater Treatment Equipment	30 Total	70,000	8,000	1,000
38. Boiler Feed Pumps (2)		16,000	1,000	1,000
Motor	2 @ 75	Incl.	Incl.	Incl.
39. Boiler Feed Pump		8,000	500	500
Turbine		12,000	Incl.	Incl.
40. Chemical Feed Equipment	2 @ 5	10,000	800	300



ITEMIZED CONSTRUCTION COST ESTIMATE

EQUIPMENT LIST
CASE 2

<u>Item Description</u>	<u>Motor HP-RPM</u>	<u>Equipment \$</u>	<u>Equipment Erection \$</u>	<u>Equip. Supports Platforms and Other Costs \$</u>
41. Camp Geiger Condensate Transfer Pump Motor	30	7,000 Incl.	500 200	Incl. 100
42. Air Station Condensate Transfer Pump Motor	50	7,000 Incl.	500 200	Incl. 100
43. Condensate Collection Tank Pump Motor	10	15,000 3,000 Incl.	500 200 Incl.	200 100 Incl.
44. No. 2 Oil Storage Tank & Pump 10,000 Gallon	5	25,000	500	500
45. HVAC Equipment	20	15,000	Incl.	500
46. Turbine Generator 900 KW Nominal Output 12,470 Volt Generator 1175 KVA Rating		200,000	40,000	4,800
TOTAL, Equipment		\$8,984,000	\$170,600	\$294,400



ITEMIZED CONSTRUCTION COST ESTIMATECASE 2

47. Buildings and Structures

Structural Steel	\$ 880,000
Excavation and Backfill	445,000
Refuse Pit and Basement	690,000
Mat	365,000
Piling	86,000
Roof Deck and Roofing	190,000
Walls and Siding	270,000
Intermediate Floors	89,000
Stairs, Doors and Drains	160,000
Miscellaneous Steel and Grating	135,000
Support Steel and Miscellaneous	<u>390,000</u>

TOTAL, Building and Structures \$ 3,700,000

48. Electrical

Building Lighting	63,000
Electrical Equipment & Wiring	<u>400,000</u>

TOTAL, Electrical \$ 463,000

49. Instrumentation

\$ 250,000

50. Piping

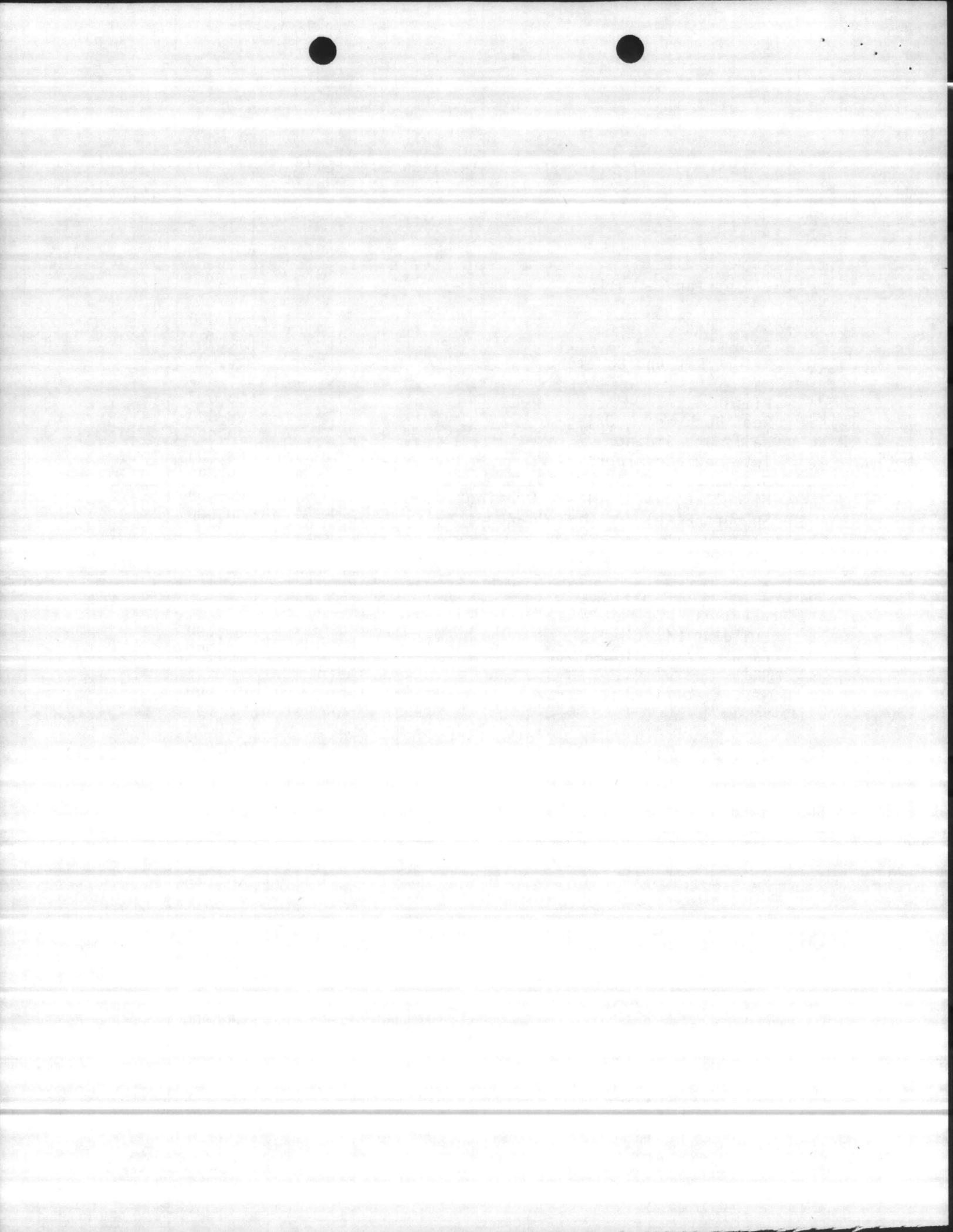
Boiler Plant	870,000
Export Steam & Condensate Return Lines	<u>1,376,000</u>

TOTAL, Piping \$ 2,246,000

51. Area

Area	\$ 130,000
Road Paving	<u>250,000</u>

TOTAL, Area \$ 380,000



CASE 2
DESIGN ANALYSIS COMPUTATIONS
JANUARY 1982
(Present Value = 1986 Dollars)

ALTERNATIVE A - Refuse-Burning Plant

1. Investment Cost

a. Refuse-Burning Plant Capital Costs (from equipment list)

Construction \$16,488,000

Escalated to April 1985

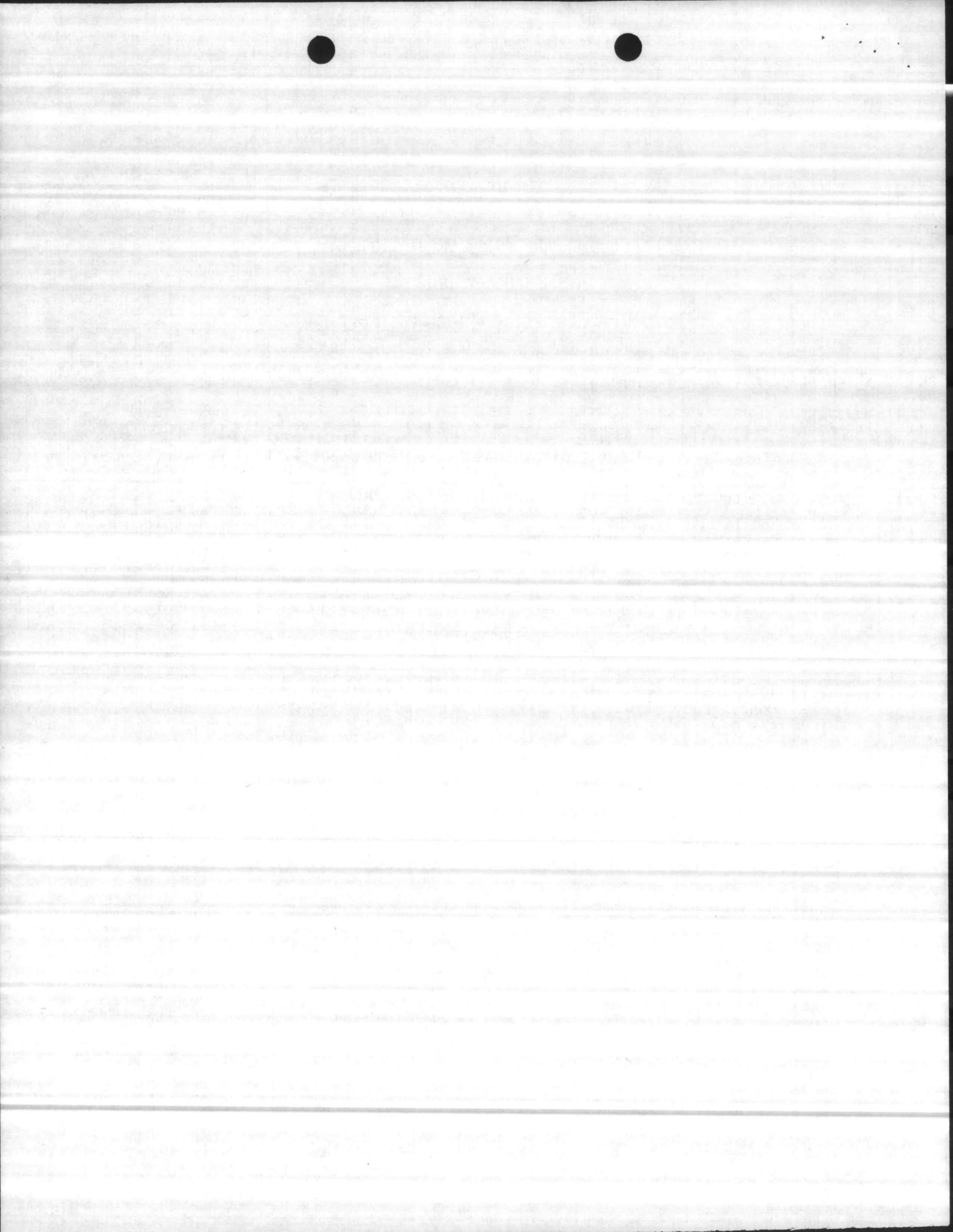
$$\$16,488,000 \times \frac{2167}{1870} = \$19,106,682$$

Escalated to FY86 10% Discount (2% differential)

$$\$19,106,682 \times 1.0384 = \$19,840,378$$

Total Escalated Cost	\$19,840,378
Contingency @ 10%	1,984,037
S.I.O.H. @ 5.5%	<u>1,200,342</u>

TOTAL 23,024,757



Engineering @ 6% = \$989,280

Escalated to April 1984

$$\$989,280 \times \frac{2066}{1870} = \$1,092,969$$

Escalated to FY-86

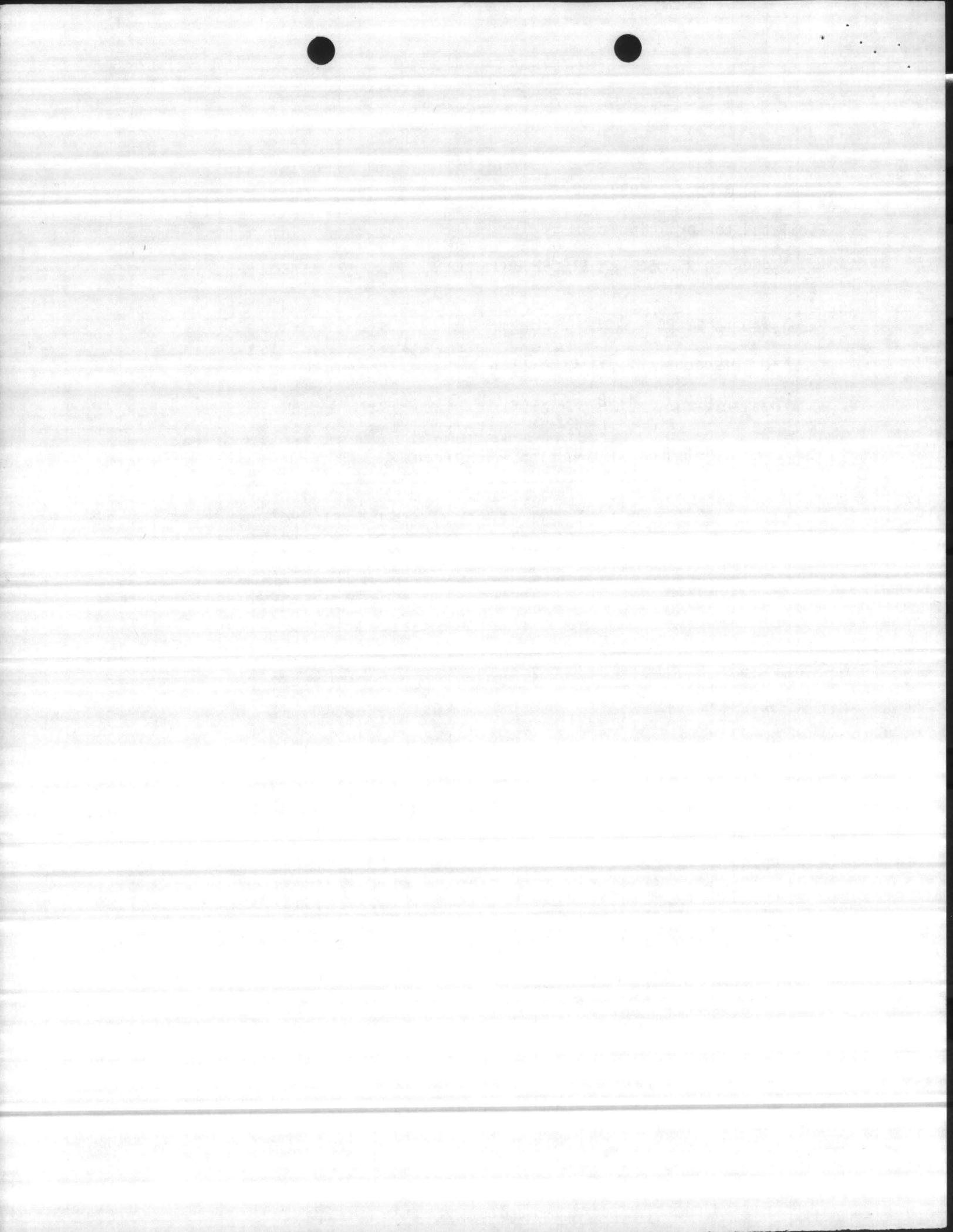
10% Discount (2% differential)

$$\$1,092,969 \times 1.1198 = \$1,223,906$$

Total Present Value Construction & Engineering

$$\begin{array}{r} \$23,024,757 \\ +1,223,906 \\ \hline \end{array}$$

TOTAL \$24,248,663

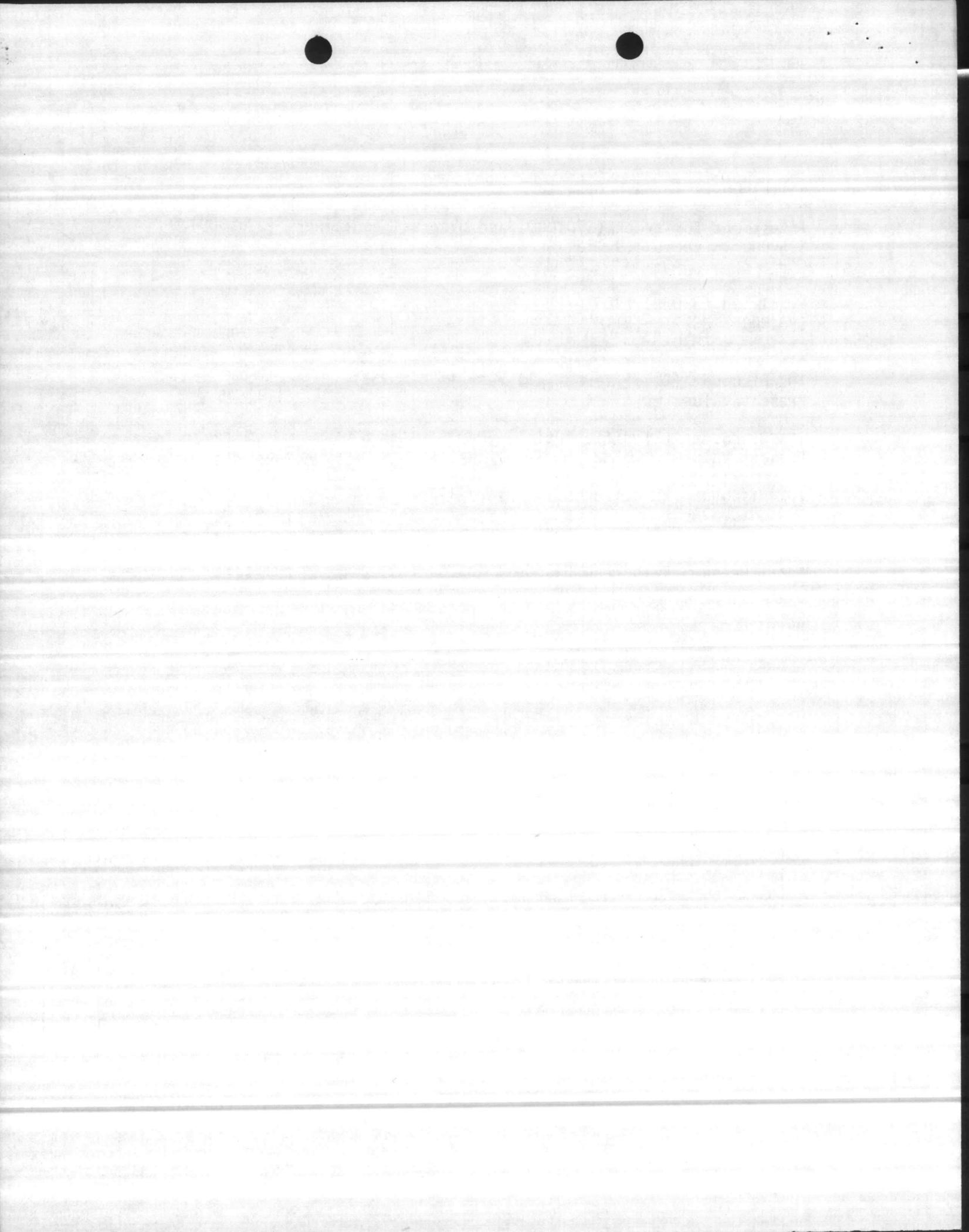


b. Capital Costs for Ash Disposal

Investment for truck (\$70,000) and disposal containers (\$26,000)
\$96,000 in years 1, 9, 17

Escalated to Oct. 1986
 $96,000 \times \frac{2317}{1870} = \$118,947$

10% Discount (2% differential) year 1 Present Value	.963	\$114,545
10% Discount (2% differential) year 9 Present Value	.526	\$ 62,566
10% Discount (2% differential) year 17 Present Value	.288	<u>34,256</u>
Total Present Value Ash Disposal Investment		\$211,367



2. Recurring Costs

a. Annual Boiler Plant Labor Costs

- 4 Crane Operators (WG-8) @ \$9.98/hr. (incl. benefits)
- 4 Boiler Operators (WG-7) @ 9.43/hr. (incl. benefits)
- 4 Boiler Mechanics (WG-10) @ 11.09/hr. (incl. benefits)
- 3 Supervisors (WS-7) @ \$12.78/hr. (incl. benefits)

Unescalated Labor Cost

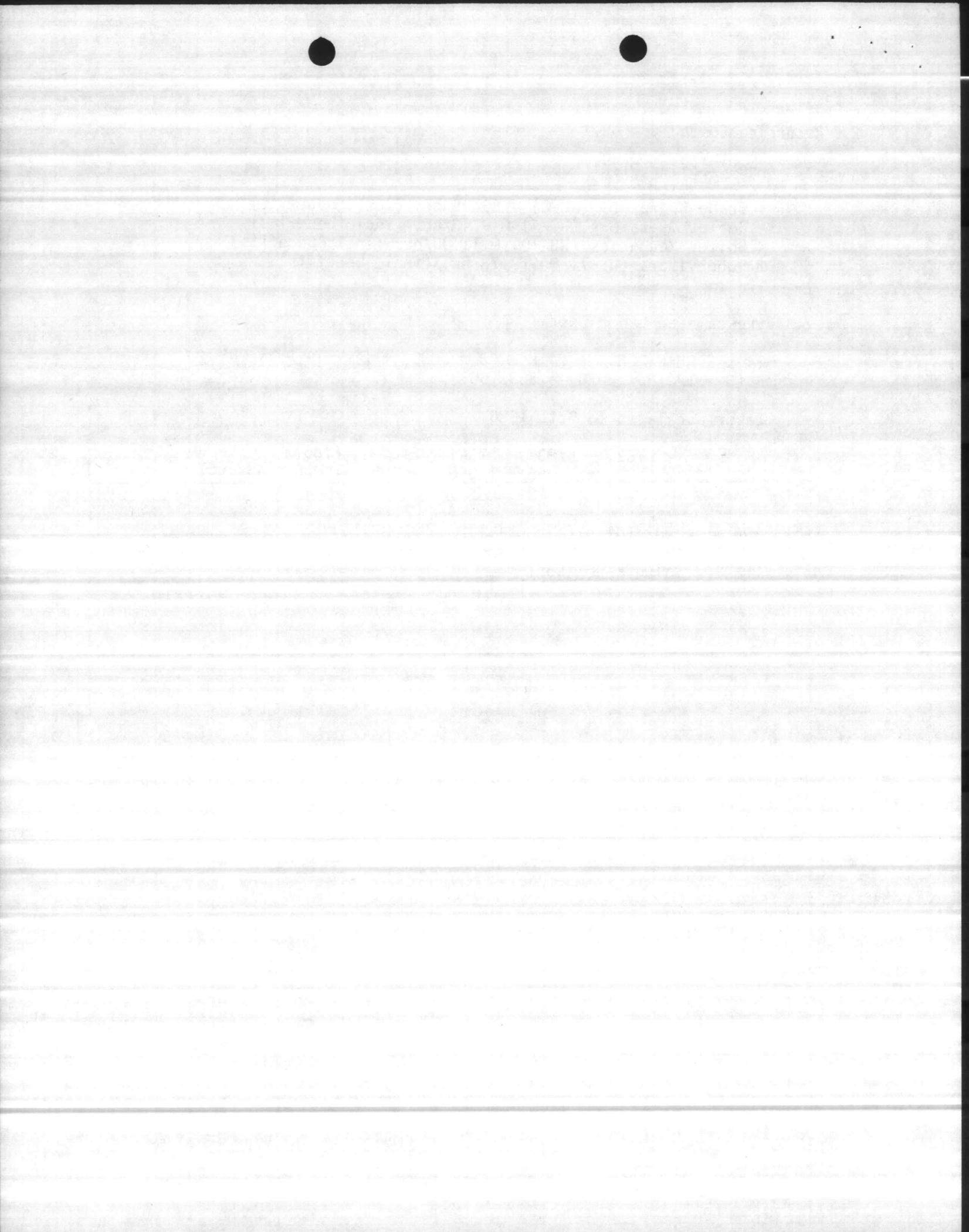
$$(4 \times 9.98 \times 2080) + (4 \times 9.43 \times 2080) + (4 \times 11.09 \times 2080) + (3 \times 12.78 \times 2080) = \$333,508$$

Labor escalated to Oct. 1986

	FY82	FY83	FY84	FY85	FY86	
\$333,508	x 1.056	= 437,951				

10¢ Discount (0% differential) 9.524

Present Value Labor Cost \$4,171,048



b. Annual Boiler Maintenance Cost

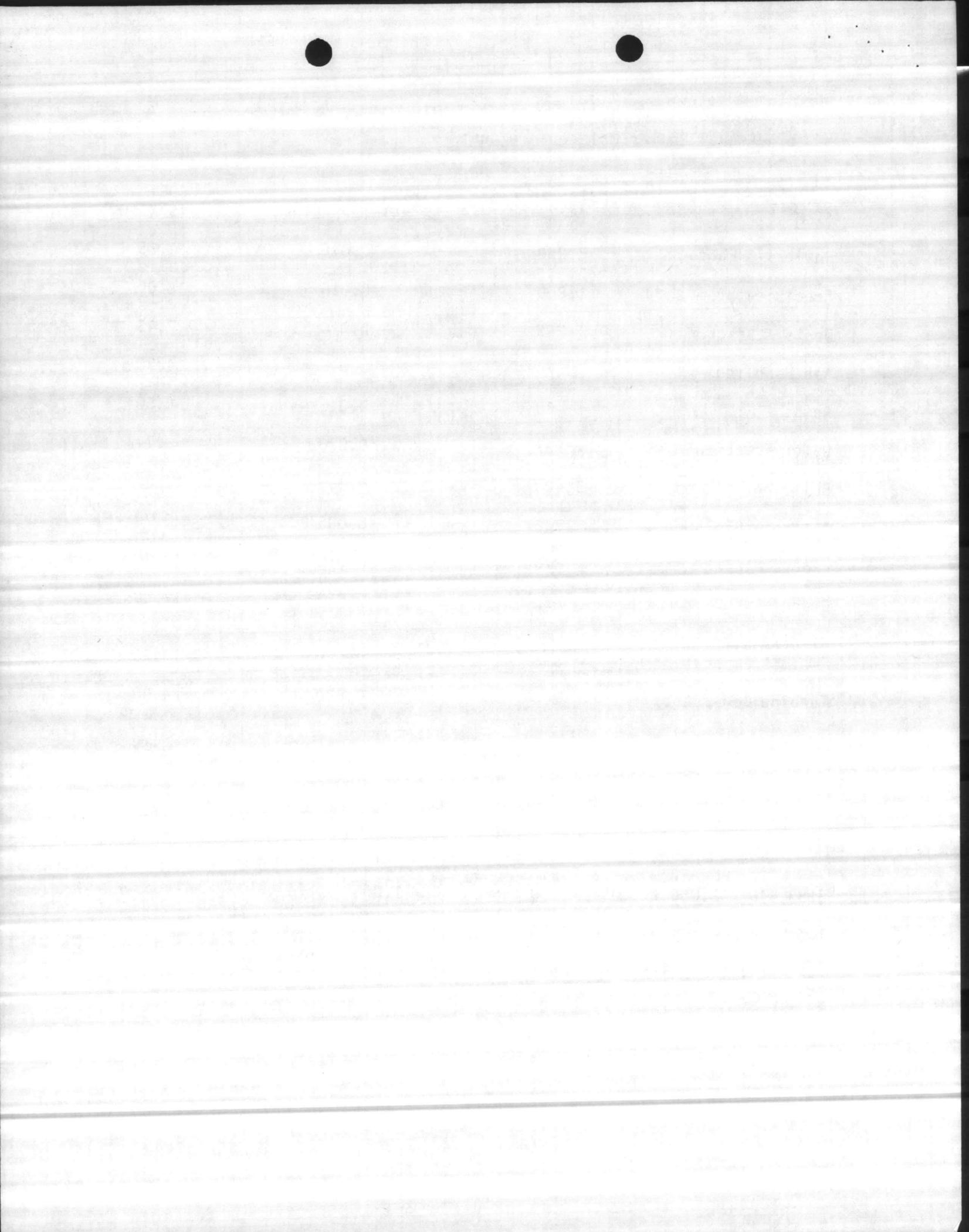
<u>ITEM</u>	<u>INSTALLED COST (\$ X 10³)</u>	<u>MAINT. FACTOR</u>	<u>COST (\$ X 10³)</u>
Boilers & Fans	3,250	0.025	81.25
Precipitators	1,200	0.015	18.00
Ducts & Stack	245	0.010	2.45
Ash Handling	575	0.025	14.38
Pumps	33	0.015	0.50
Water Treatment	37	0.020	.74
Building	3,400	0.005	17.00
Internal Piping	740	0.005	3.70
Export Piping	1,376	0.010	13.76
Cranes	850	0.020	17.00
Electrical Instrumentation	538	0.020	10.76
Turbine Generator	200	0.020	<u>4.00</u>
Total Unescalated Maintenance			183.54

Maintenance escalated to Oct. 1986

$$\$183,540 \times 1.056 \times 1.056 \times 1.056 \times 1.056 \times 1.056 = \$241,018$$

10% Discount (0% differential) 9.524

Present Value Maintenance Costs \$2,295,459



c. Plant Overhaul

\$ 50,000 every 5 years

Escalated to Oct. 1986

$$\$ 50,000 \times 1.056^{\text{Fy 82}} \times 1.056^{\text{Fy 83}} \times 1.056^{\text{Fy 84}} \times 1.056^{\text{Fy 85}} \times 1.056^{\text{Fy 86}} = \$65,658$$

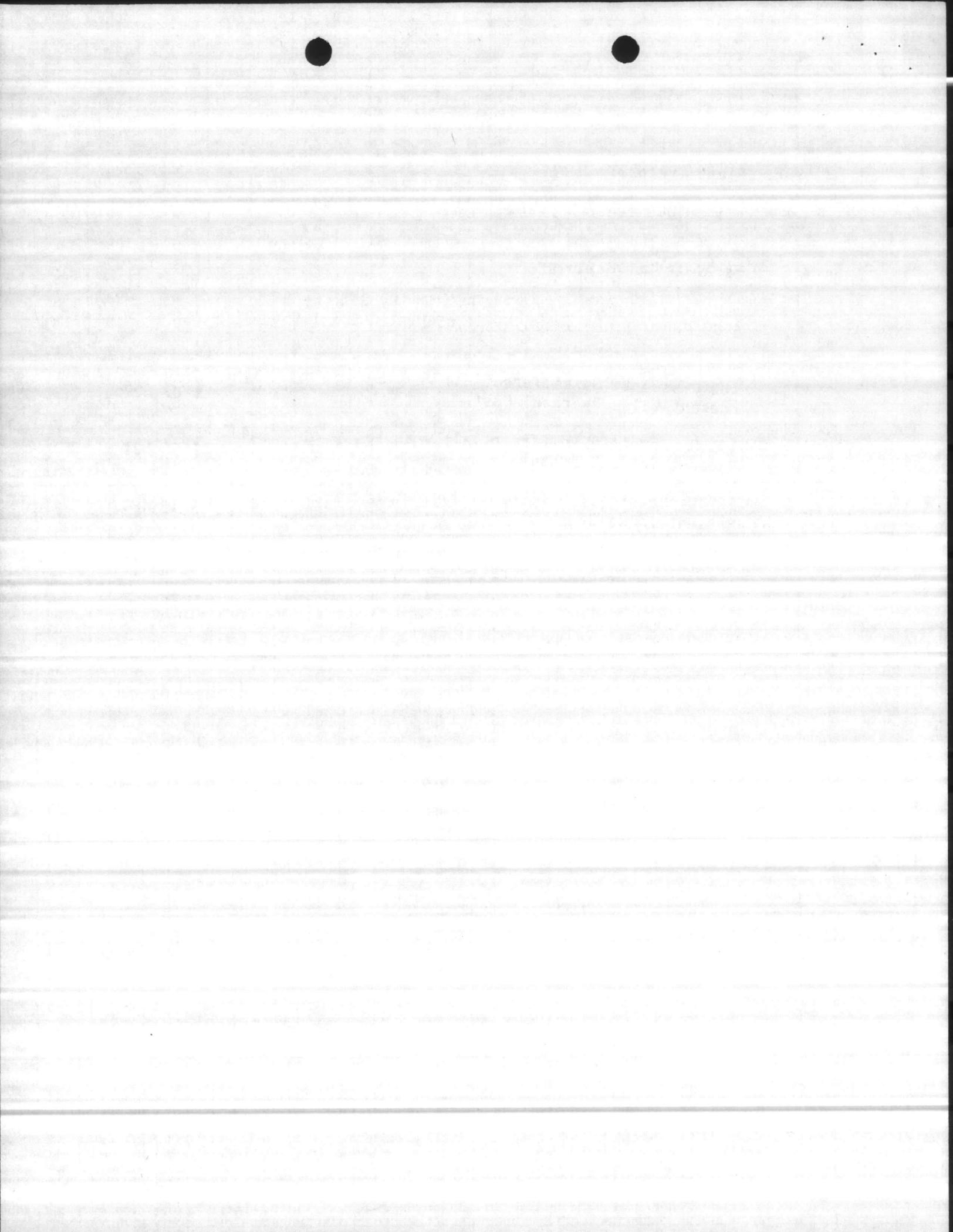
10% Discount (0% differential) year 5 Present Value Overhaul Cost	.652	\$ 42,809
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10% Discount (0% differential) year 10 Present Value Overhaul Cost	.405	\$ 26,591
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10% Discount (0% differential) year 15 Present Value Overhaul Cost	.251	\$ 16,480
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10% Discount (0% differential) year 20 Present Value Overhaul Cost	.156	\$ 10,242
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Total Present Value Overhaul Costs		<u>\$ 96,122</u>
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d. Annual Incremental Electrical Costs

<u>SERVICE</u>	<u>POWER (KW)</u>	<u>USE FACTOR</u>	<u>EFFECTIVE POWER</u>
Pumping Power*	110	0.8	88
Crane Operation	30	1.0	30
Precipitators	400	0.8	320
Ash Handling	60	0.8	48
		TOTAL	486 KW

* NOTE: Feedwater pumping is not included since a reduction in existing feedwater pumping will be realized. Adjustment is made for higher pressure feedwater.

Annual Demand Cost Increase
 $486 \text{ KW} \times \$ 73.598/\text{KW} = \$ 35,769/\text{yr.}$

Annual KWH Increase
 $486 \text{ KW} \times 7000 \text{ hrs/yr.} = 3,402,000 \text{ KWh/yr.}$

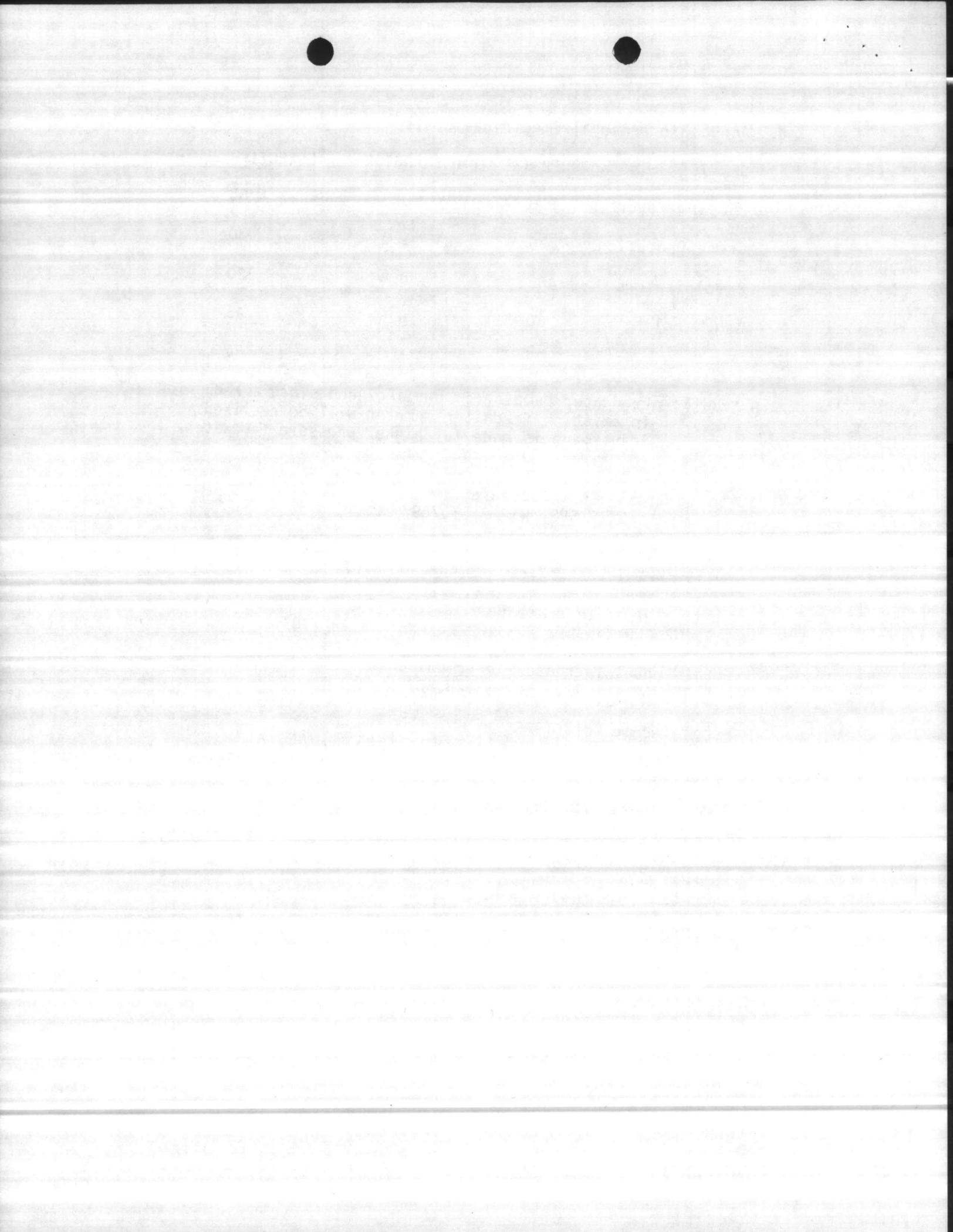
Annual Dollar Increase per KWH
 $3,402,000 \text{ KWh/hr.} \times \$.02726/\text{KWh} = \$ 92,738/\text{yr.}$

Total Annual Increase Electrical Cost
 $\$ 35,769 + \$ 92,738 = \$ 128,507$

Escalated to Oct. 1986
 $\$ 128,507 \times 1.13 \times 1.13 \times 1.13 \times 1.13 \times 1.13 = \$ 236,765$

10% Discount (7% differential) 18.049

Present Value Incremental Electrical Cost \$4,273,386

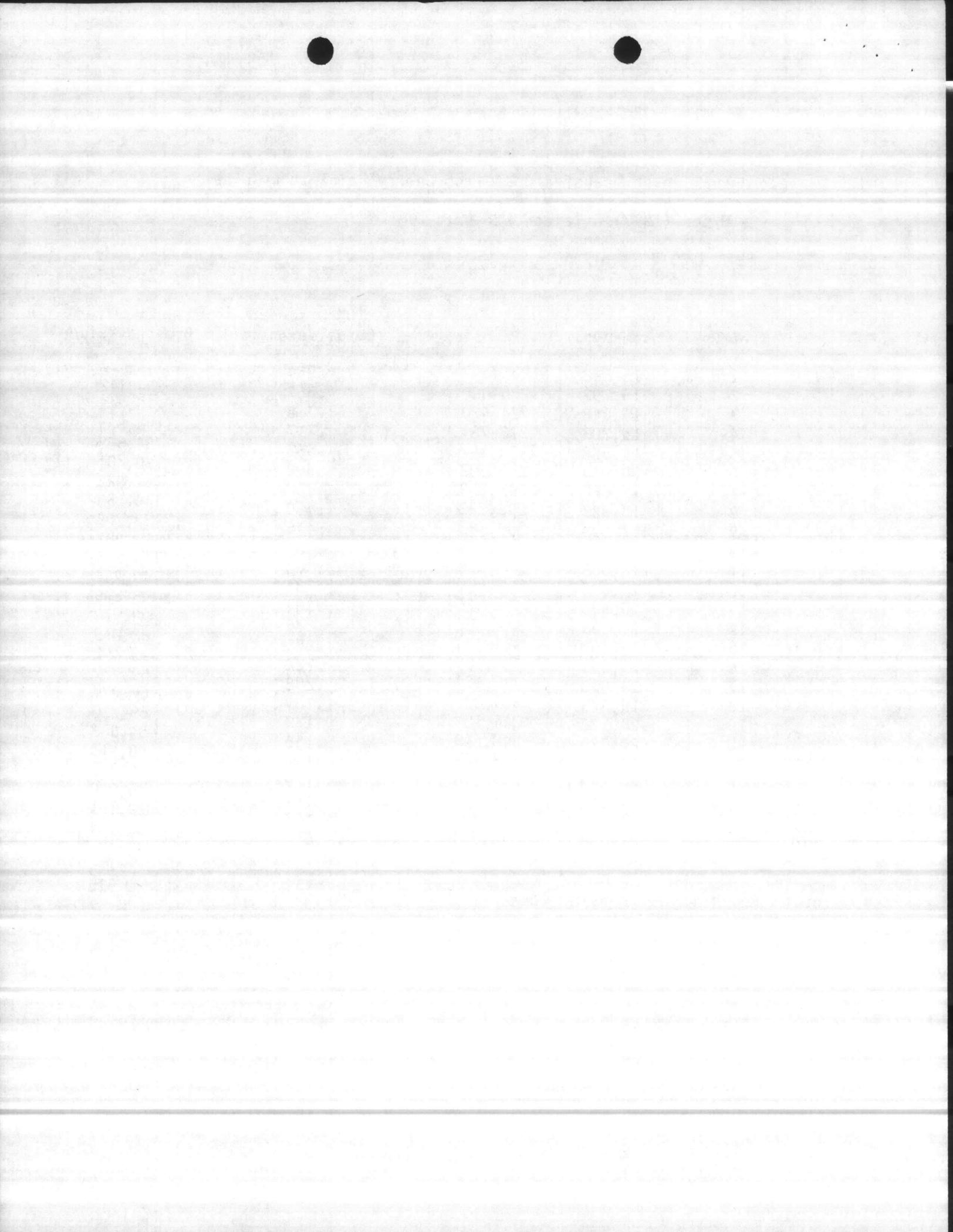


e. Annual Trash Transfer Cost from Cherry Point to Lejeune

\$10/ton (1977) escalated to Oct. 1986

$$\$10 \times \frac{2317}{1355} = \$17.10$$

	<u>Yr. of Op.</u>	<u>Tons/yr.</u>	<u>\$/yr.</u>	<u>10% Discount (0% differential)</u>	<u>Present Value</u>
1986	1	15,538	\$ 265,699	.954	\$ 253,477
	2	15,793	270,060	.867	234,142
	3	16,048	274,420	.788	216,243
	4	16,303	278,781	.717	199,886
1990	5	16,558	283,141	.652	184,608
	6	16,813	287,502	.592	170,201
	7	17,068	291,862	.538	157,022
	8	17,323	296,223	.489	144,853
	9	17,578	300,583	.445	133,759
	10	17,833	304,944	.405	123,502
	11	18,088	309,304	.368	113,824
	12	18,343	313,665	.334	104,764
	13	18,598	318,025	.304	96,679
	14	18,853	322,386	.276	88,978
2000	15	19,108	326,746	.251	82,013
	16	19,363	331,107	.228	75,492
	17	19,618	335,467	.208	69,777
	18	19,873	339,823	.189	64,227
	19	20,128	344,188	.172	59,200
	20	20,383	348,549	.156	54,373
	21	20,638	352,909	.142	50,113
	22	20,893	357,270	.129	46,087
	23	21,148	361,630	.117	42,310
	24	21,403	365,991	.107	39,161
2010	25	21,658	370,351	.097	35,924
Total Present Value Transfer Cost					\$2,840,615



f. Annual Ash Disposal Cost

<u>Yr. of Op.</u>		<u>1982 \$*</u>	<u>1986 \$*</u>	<u>10% Discount (0% differential)</u>	<u>Present Value</u>
1986	1	\$ 13,702	\$ 16,886	.954	\$ 16,109
	2	13,756	16,952	.867	14,698
	3	13,862	17,083	.788	13,461
	4	13,916	17,150	.717	12,296
1990	5	14,022	17,280	.652	11,267
	6	14,075	17,346	.592	10,268
	7	14,128	17,411	.538	9,367
	8	14,950	18,424	.489	9,009
	9	15,003	18,489	.445	8,227
	10	15,110	18,621	.405	7,541
	11	15,163	18,686	.368	6,876
	12	15,216	18,752	.334	6,263
	13	15,269	18,817	.304	5,720
	14	15,323	18,884	.276	5,212
2000	15	15,376	18,949	.251	4,756
	16	15,429	19,014	.228	4,335
	17	15,535	19,145	.208	3,982
	18	15,588	19,210	.189	3,630
	19	15,642	19,277	.172	3,315
	20	15,748	19,407	.156	3,027
	21	15,802	19,474	.142	2,765
	22	15,855	19,539	.129	2,520
	23	15,908	19,605	.117	2,293
	24	16,014	19,735	.107	2,111
2010	25	16,067	19,800	.097	1,920

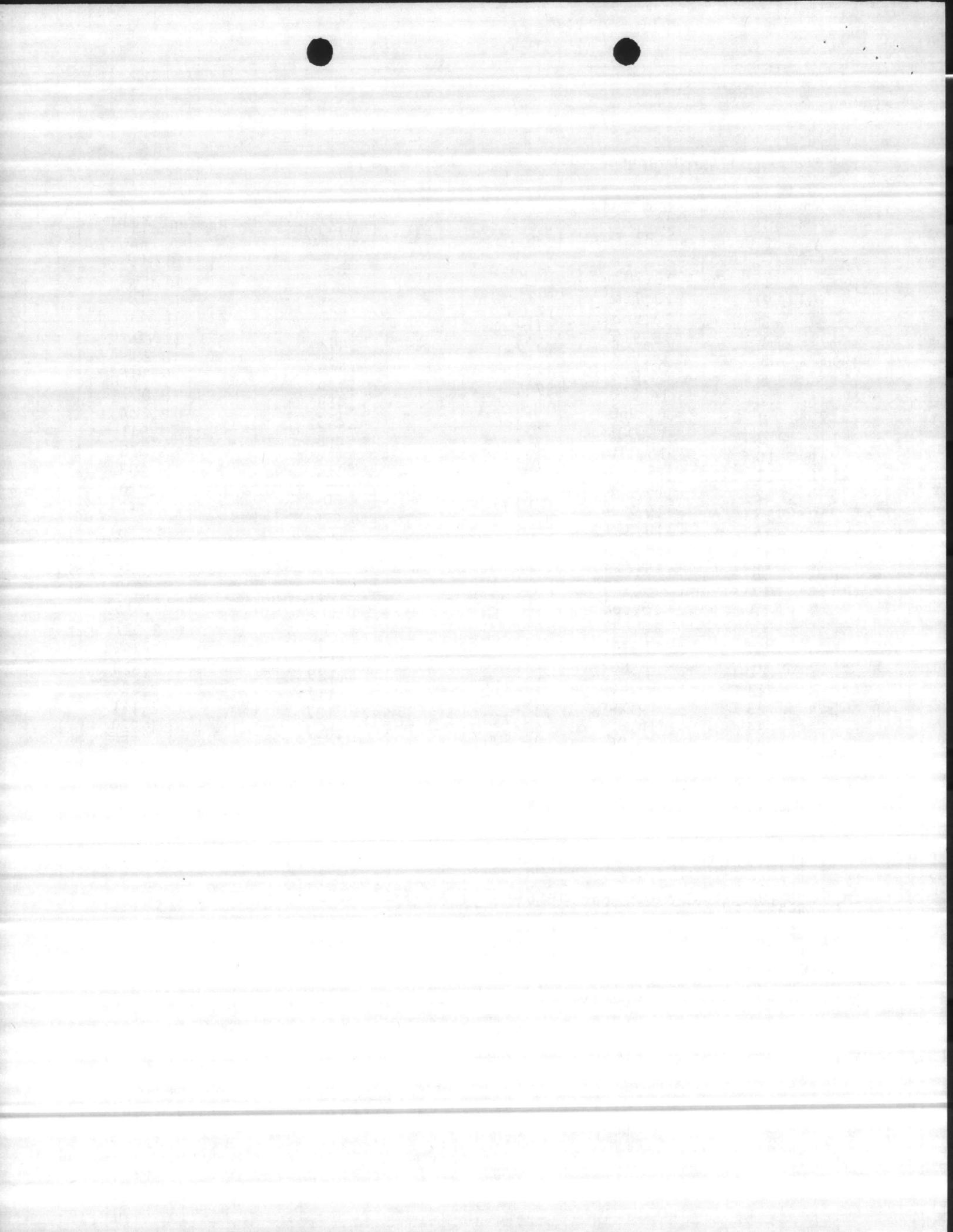
Total Present Value Ash Disposal Cost

\$ 170,968

* Escalation from 1982 to 1986 = $\frac{2317}{1880} = 1.2324$

Ash - 80 lbs/cf. 30% moisture

Ash Disposal - 5 days per week



3. Benefits -

Revenues generated from sales of electricity to CP&L

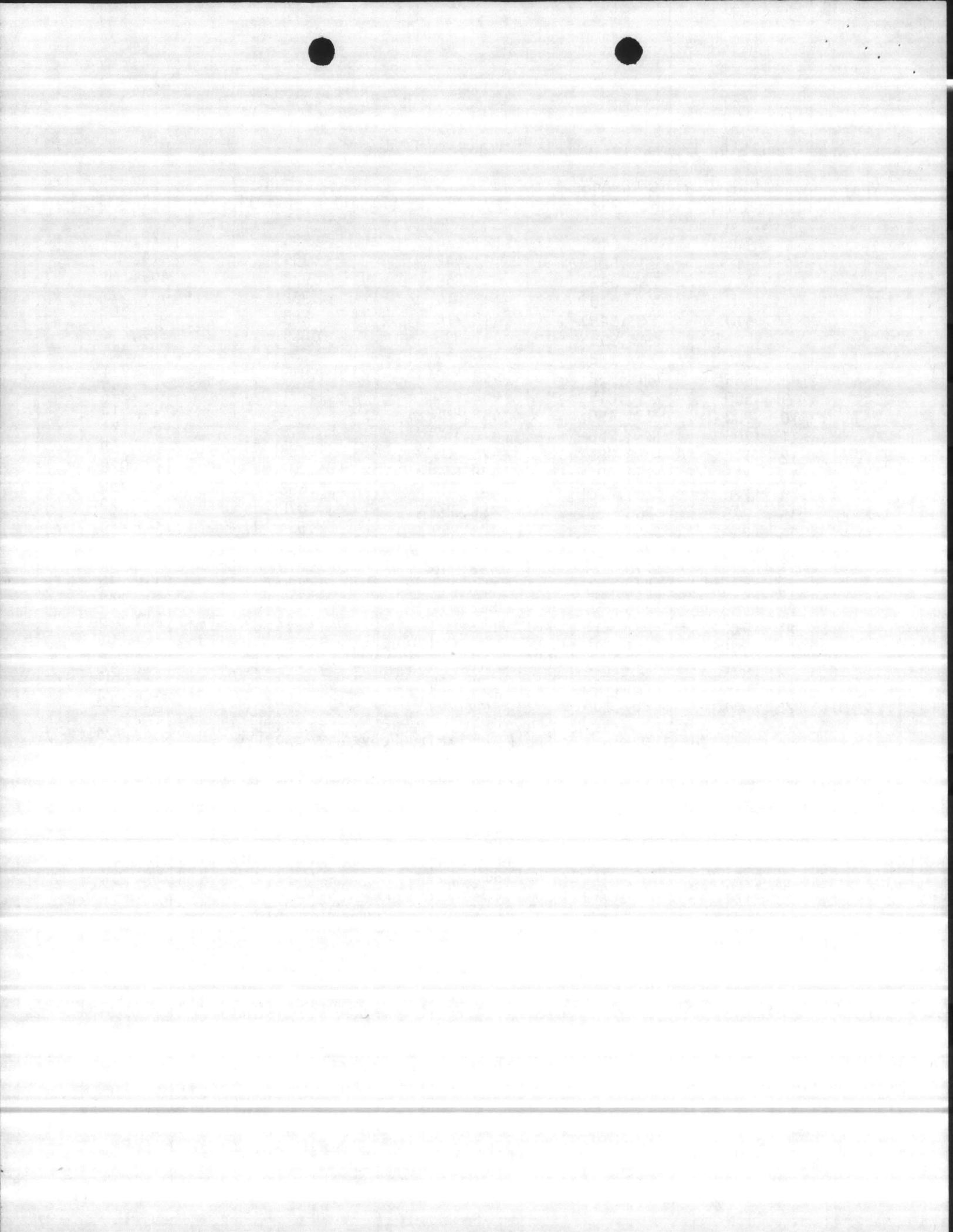
Year	Av. Kw/hr Generated	*Net Revenue Jan. 1982 \$	** Oct, 1986 \$	10% Discount (7% differential)	Present Value	
1986	1	640	\$232,640	\$428,624	.986	\$ 422,623
	2	646	234,821	432,642	.959	414,904
	3	655	238,092	438,669	.933	409,278
	4	660	239,910	442,019	.908	401,353
	5	670	243,545	448,716	.883	396,216
	6	674	244,999	451,395	.859	387,748
	7	680	247,180	455,413	.836	380,725
	8	685	248,998	458,763	.813	372,974
	9	690	250,815	462,110	.791	365,529
	10	700	254,450	468,808	.769	360,513
	11	705	256,268	472,157	.748	353,174
	12	710	258,085	475,505	.728	346,168
	13	715	259,902	478,853	.708	339,028
	14	720	261,720	482,202	.688	331,755
2000	15	725	263,538	485,552	.670	325,320
	16	730	265,355	488,899	.651	318,273
	17	740	268,990	495,597	.634	314,208
	18	745	270,808	498,946	.616	307,351
	19	750	272,625	502,294	.600	301,376
	20	750	276,260	508,991	.583	296,742
	21	766	278,441	513,009	.567	290,876
	22	770	279,895	515,688	.552	284,660
	23	775	281,712	519,036	.537	278,722
	24	785	285,348	525,735	.522	274,434
2010	25	790	287,165	529,083	.508	268,774

Total Present Value Electricity Revenues Benefit \$8,542,724

* Source: CP&L Schedule CSP-3B effective 9-24-82 Variable Energy Credit and 10-Year Capacity Credit

**Escalation from Jan. 1982 to Oct. 1986 =

$$\begin{matrix} \text{FY82} & \text{FY83} & \text{FY84} & \text{FY85} & \text{FY86} \\ 1.13 & \times 1.13 & \times 1.13 & \times 1.13 & \times 1.13 = 1.842435 \end{matrix}$$



Summary Sheet Alternative 2A - Total Present Value,

Investment Cost

Boiler Plant	\$24,248,663
Ash Disposal	211,367

Recurring Costs

Labor	4,171,048
Maintenance	2,295,459
Plant Overhaul	96,122
Incremental Electrical	4,273,386
Trash Transfer	2,840,615
Ash Disposal	<u>170,968</u>

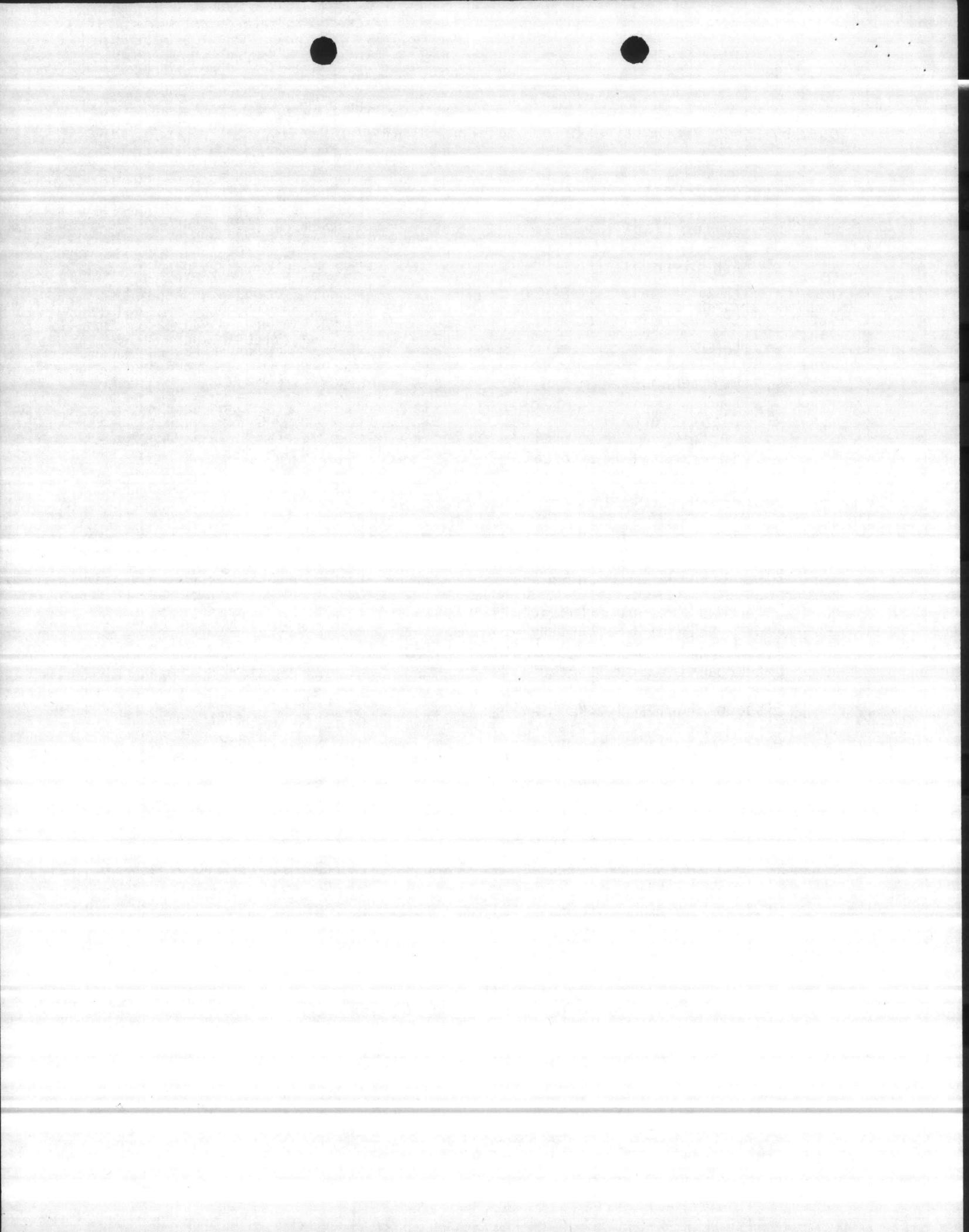
Total Present Value Cost \$38,307,628

Less Present Value Benefits
Sale of Electricity 8,542,724

Net Present Value Alternative 2A \$29,764,904

Discount Factor 9.524

Uniform Annual Cost \$ 3,125,252



ALTERNATIVE B - Incremental Cost of Refuse Landfills at Cherry Point and Camp Lejeune

1. Investment Costs

a. Incremental Cost of Landfill - Cherry Point

Capital Cost

\$298,704 (1977) in year 5

Escalated to Oct 86

$\$298,704 \times \frac{2317}{1355} = \$510,772$

10% Discount (2% differential) year 5 .712

Present Value Capital Cost \$363,669

Capital Cost

\$36,000 (1977) in years 8, 16, 23

Escalated to Oct. 1986

$\$36,000 \times \frac{2317}{1355} = \$61,558$

10% Discount (2% differential) year 8 .568

Present Value Capital Cost \$ 34,965

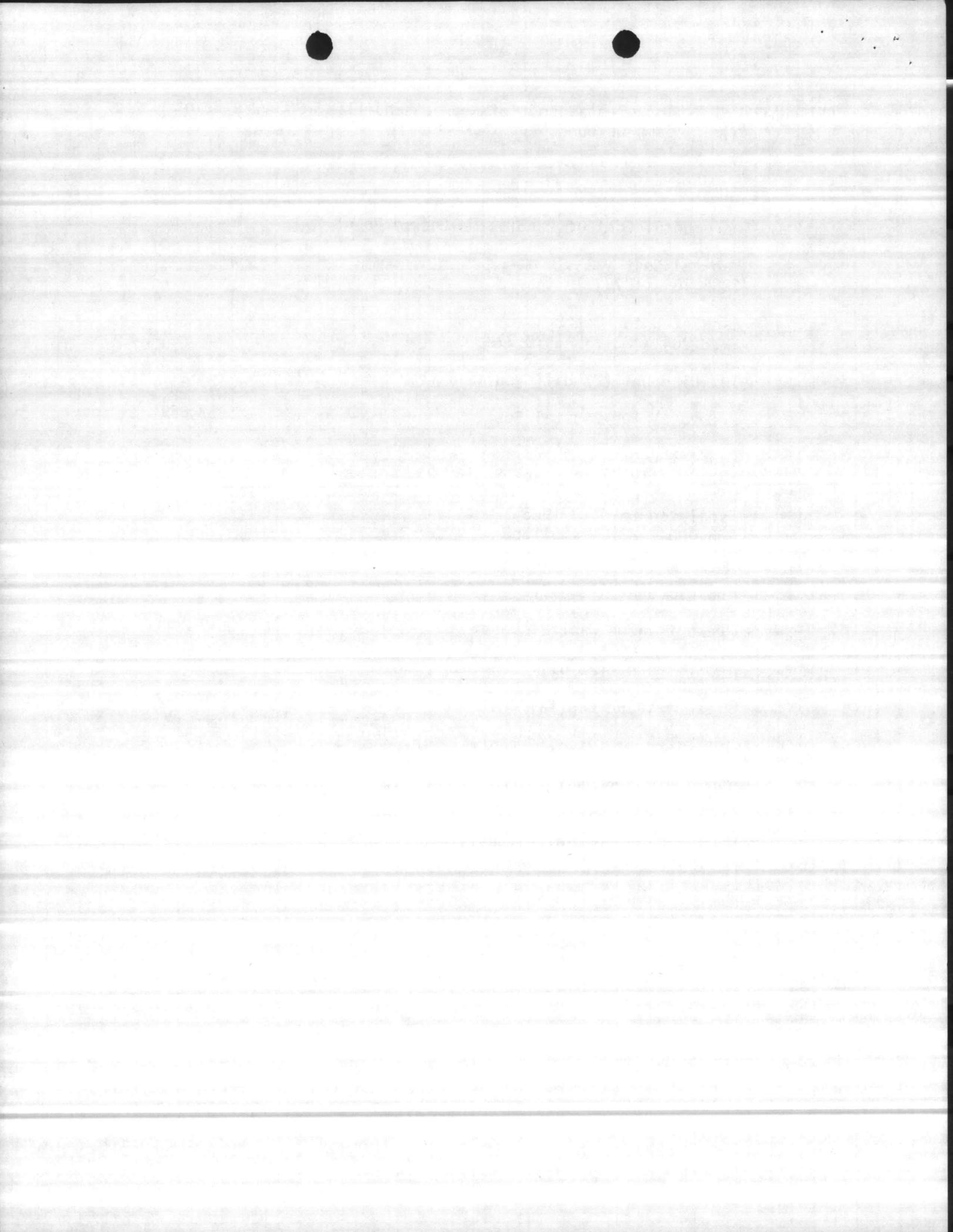
10% Discount (2% differential) year 16 .310

Present Value Capital Cost \$ 19,082

10% Discount (2% differential) in year 23 .183

Present Value Capital Cost \$ 11,265

Total Present Value Capital Costs - Cherry Point \$428,981



b. Existing Boiler Plant Replacement/Upgrading Cost

Camp Geiger Capital Cost
\$2,000,000 (1982\$) in 1989

Escalated to Oct. 1986
$$\$2,000,000 \times \frac{2317}{1880} = \$2,464,893$$

10% Discount (2% differential) year 2 .893

Present Value Capital Cost \$2,201,150

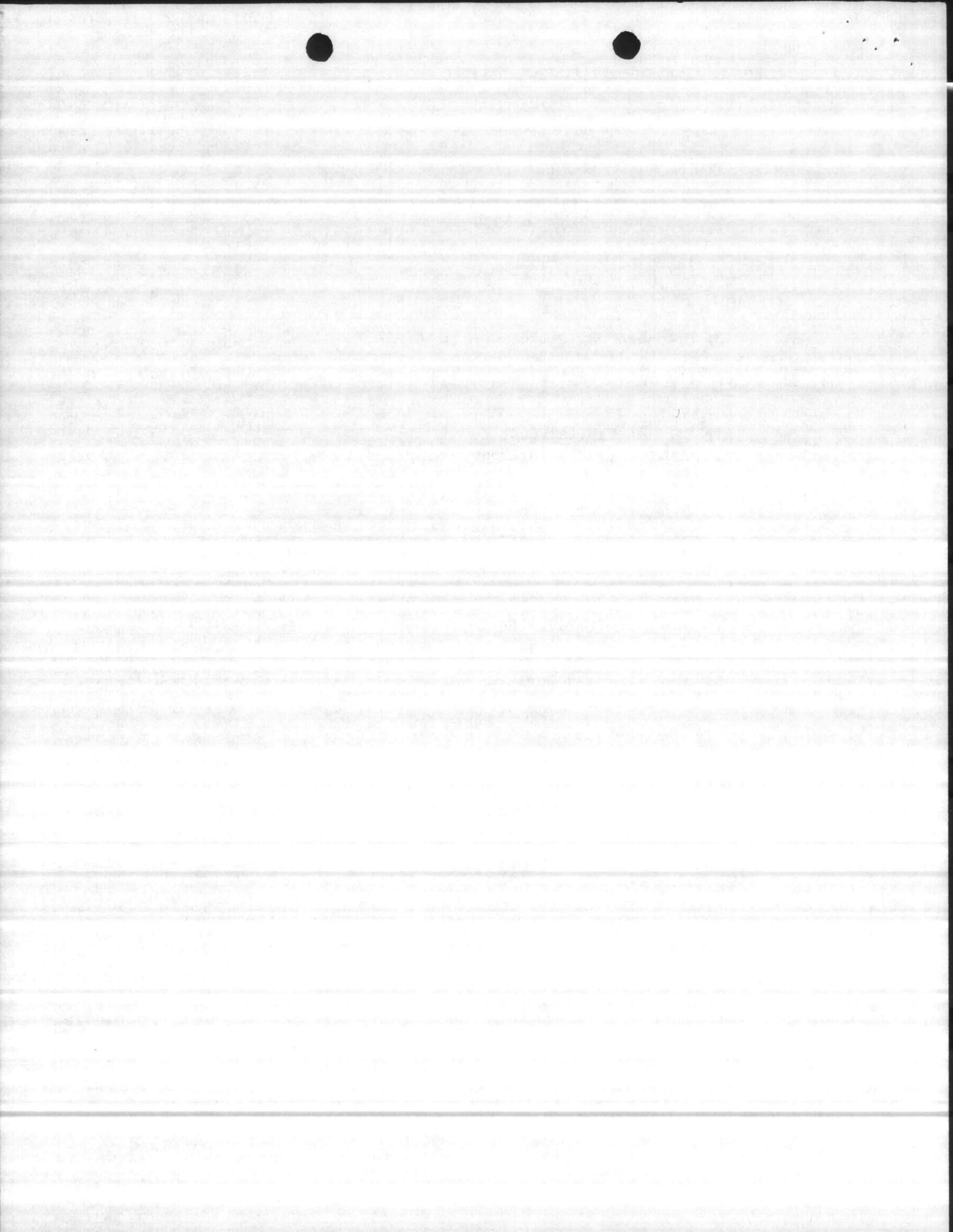
Air Station Capital Cost
\$2,000,000 (1982) in 1996

Escalated to Oct. 1986
$$\$2,000,000 \times \frac{2317}{1880} = \$2,464,893$$

10% Discount (2% differential) year 10 .488

Present Value Capital Cost \$1,202,867

Total Present Value Replacement Costs \$3,404,017



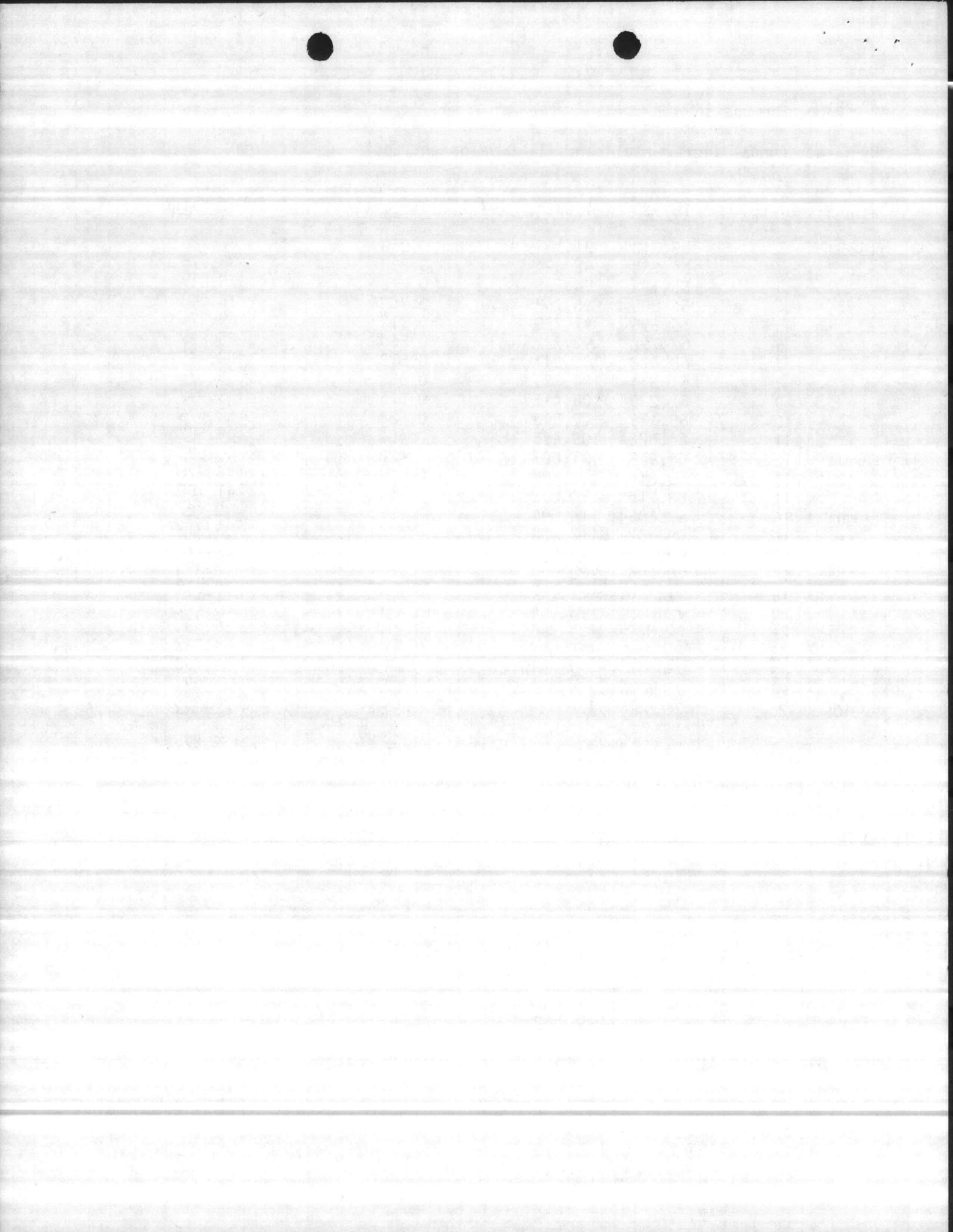
2. Recurring Costs

a. Annual Incremental Landfill Development Cost - Cherry Point

<u>Year</u>	<u>Yr. of Op.</u>	<u>1977\$</u>	<u>1987\$*</u>	<u>10% Discount (2% differential)</u>	<u>Present Value</u>
1986	1	53,312	91,161	0.963	\$ 87,788
	2	54,208	92,694	0.893	82,775
	3	55,104	94,226	0.828	78,019
	4	56,000	95,758	0.768	73,542
	5	56,896	97,290	0.712	69,270
	6	57,792	98,822	0.660	65,223
	7	60,438	103,347	0.612	63,248
	8	61,334	104,879	0.568	59,571
	9	62,230	106,411	0.526	55,972
	10	63,126	107,943	0.488	52,676
	11	64,022	109,475	0.453	49,592
	12	64,918	111,007	0.420	46,623
	13	65,814	112,539	0.389	43,778
	14	66,710	114,071	0.361	41,180
2000	15	67,606	115,604	0.335	38,727
	16	68,502	117,136	0.310	36,312
	17	69,398	118,668	0.288	34,176
	18	70,294	120,200	0.267	32,093
	19	71,190	121,732	0.247	30,068
	20	72,086	123,264	0.229	28,227
	21	72,982	124,796	0.213	26,582
	22	73,878	126,328	0.197	24,887
	23	74,774	127,861	0.183	23,398
	24	75,670	129,393	0.170	21,997
2010	25	76,566	130,924	0.157	<u>20,555</u>

Total Present Value Development Cost - Cherry Point \$1,186,279

*Escalation from 1977 to 1986 = $\frac{2317}{1355} = 1.70996$

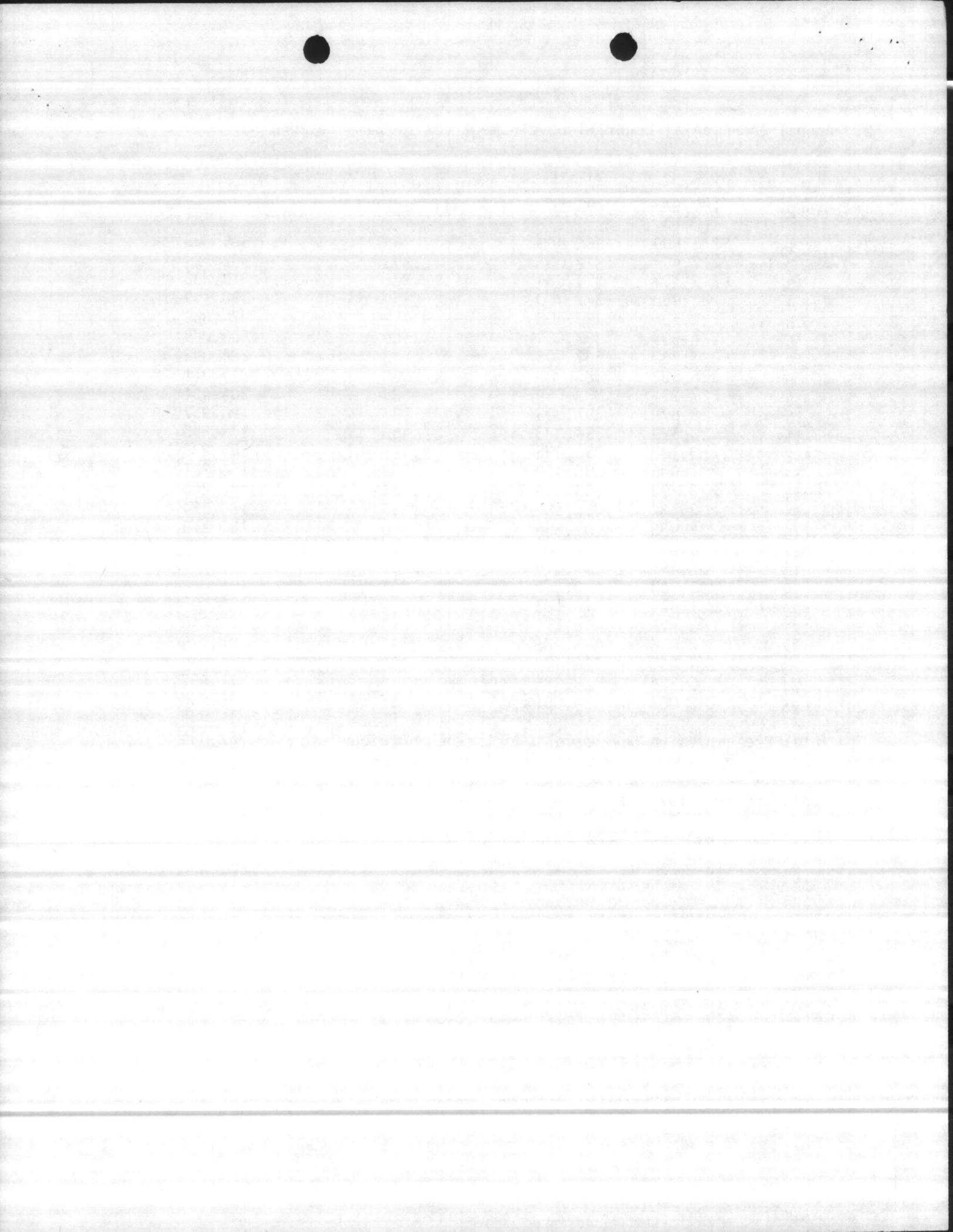


b. Annual Incremental Landfill Development Cost - Camp Lejeune

Yr. of Op.	1977\$*	1987\$*	10% Discount (2% differential)	Present Value
1986 1	\$215,809	368,960	.963	\$ 355,308
2	217,609	372,037	.893	332,229
3	219,157	374,684	.828	310,238
4	220,956	377,760	.768	290,119
5	222,505	380,408	.712	270,850
6	224,304	383,484	.660	253,099
7	223,732	382,506	.612	234,093
8	225,532	385,583	.568	219,011
9	227,331	388,659	.526	204,434
10	228,879	391,305	.488	190,957
11	230,679	394,383	.453	178,655
12	230,107	393,405	.420	165,230
13	231,906	396,480	.389	154,231
14	233,706	399,558	.361	144,240
2000 15	233,134	398,580	.335	133,524
16	234,933	401,656	.310	124,513
17	236,481	404,302	.288	116,439
18	238,281	407,379	.267	108,770
19	240,080	410,455	.247	101,382
20	241,629	413,103	.229	94,601
21	243,428	416,179	.213	88,646
22	242,856	415,201	.197	81,795
23	244,655	418,277	.183	76,545
24	246,204	420,925	.170	71,557
2010 25	248,003	424,001	.157	66,568

Total Present Value Development Costs - Camp Lejeune \$4,367,034

* Escalation from 1977 to 1986 = $\frac{2317}{1355} = 1.70966$



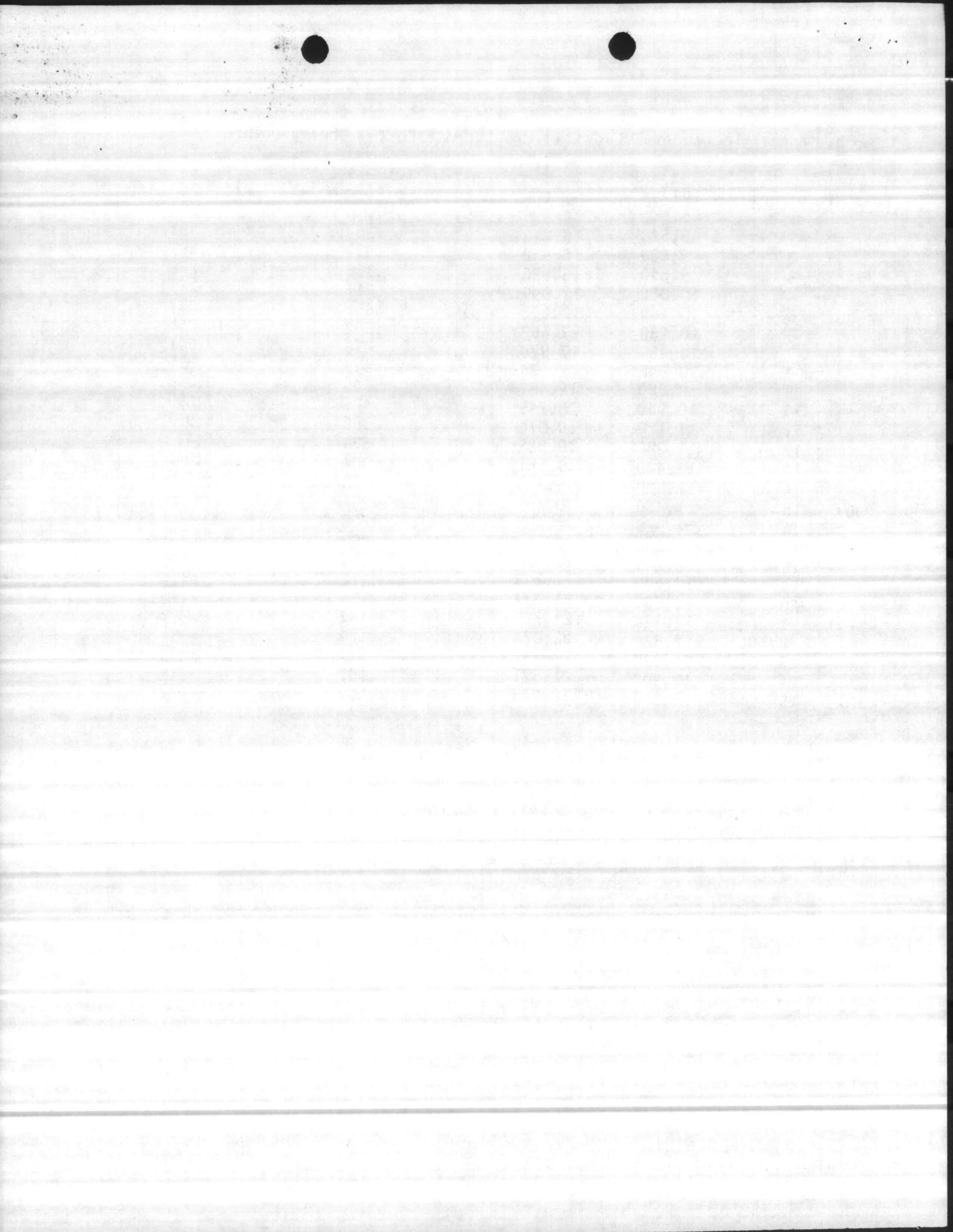
c. Annual Incremental Landfill Maintenance Cost - Cherry Point

<u>Year</u>	<u>Yr. of Op.</u>	<u>1977\$*</u>	<u>1986\$*</u>	<u>10% Discount (0% differential)</u>	<u>Present Value</u>
1986	1	\$ 9,520	\$ 16,278	.954	\$ 15,530
	2	9,680	16,552	.867	14,350
	3	9,840	16,826	.788	13,258
	4	10,000	17,099	.717	12,260
	5	10,160	17,373	.652	11,327
	6	10,230	17,492	.592	10,355
	7	10,480	17,920	.538	9,641
	8	10,640	18,194	.489	8,896
	9	10,800	18,467	.445	8,218
	10	10,960	18,741	.405	7,590
	11	11,120	19,014	.368	6,997
	12	11,280	19,288	.334	6,442
	13	11,440	19,561	.304	5,946
	14	11,600	19,835	.276	5,474
2000	15	11,760	20,109	.251	5,047
	16	11,920	20,382	.228	4,647
	17	12,080	20,656	.208	4,296
	18	12,240	20,929	.189	3,955
	19	12,400	21,203	.172	3,647
	20	12,560	21,477	.156	3,350
	21	12,720	21,750	.142	3,088
	22	12,880	22,024	.129	2,841
	23	13,040	22,297	.117	2,608
	24	13,200	22,571	.107	2,415
	2010	25	13,360	22,845	.097

Total Present Value Maintenance Costs - Cherry Point

\$174,393

* Escalation from 1977 to 1986 = $\frac{2317}{1355} = 1.70966$



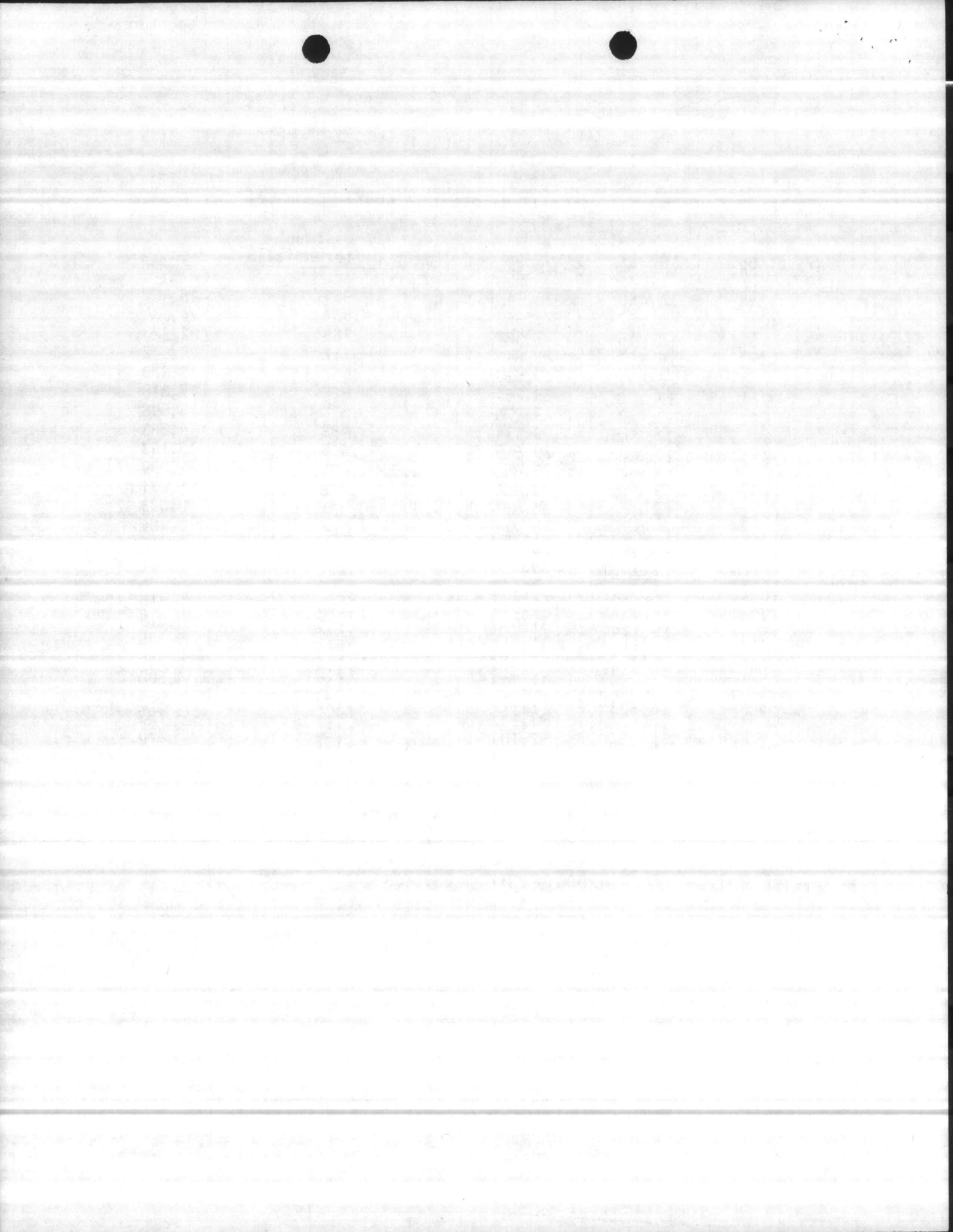
d. Annual Incremental Landfill Maintenance Cost - Camp Lejeune

	<u>Yr. of Op.</u>	<u>1977\$*</u>	<u>1986\$*</u>	<u>10% Discount (0% differential)</u>	<u>Present Value</u>
1986	1	\$ 16,460	\$ 28,145	.954	\$ 26,851
	2	16,597	28,380	.867	24,605
	3	16,715	28,582	.788	22,522
	4	16,853	28,818	.717	20,662
	5	16,971	29,019	.652	18,920
	6	17,108	29,254	.592	17,318
	7	17,064	29,178	.538	15,698
	8	17,202	29,414	.489	14,383
	9	17,339	29,649	.445	13,193
	10	17,457	29,850	.405	12,089
	11	17,594	30,085	.368	11,071
	12	17,551	30,011	.334	10,023
	13	17,688	30,211	.304	9,184
	14	17,825	30,480	.276	8,412
2000	15	17,781	30,404	.251	7,631
	16	17,919	30,640	.228	6,986
	17	18,037	30,842	.208	6,415
	18	18,174	31,076	.189	5,873
	19	18,311	31,311	.172	5,385
	20	18,429	31,512	.156	4,916
	21	18,567	31,748	.142	4,508
	22	18,523	31,673	.129	4,085
	23	18,660	31,907	.117	3,733
	24	18,778	32,109	.107	3,435
2010	25	18,915	32,343	.097	3,137

Total Present Value Maintenance Costs - Camp Lejeune

\$281,035

* Escalation from 1977 to 1986 = $\frac{2317}{1355} = 1.70966$



e. Annual Incremental Cost of #6 Fuel Oil at Camp Geiger and Air Station Plants

av. tons/day trash burned
 tons/hr trash
 lbs steam/hr
 MMBtu/hr
 \$/hr
 \$/yr

- 24 hours/day
 X 5830 lb. steam/ton trash
 X 1254 Btu/lb**
 X \$12.99/MMBtu***
 X 8760 hrs/yr
 X discount factor

= tons/hr trash
 = equivalent lbs steam/hr*
 = MMBtu/hr
 = \$/hr
 = \$/yr
 = present value

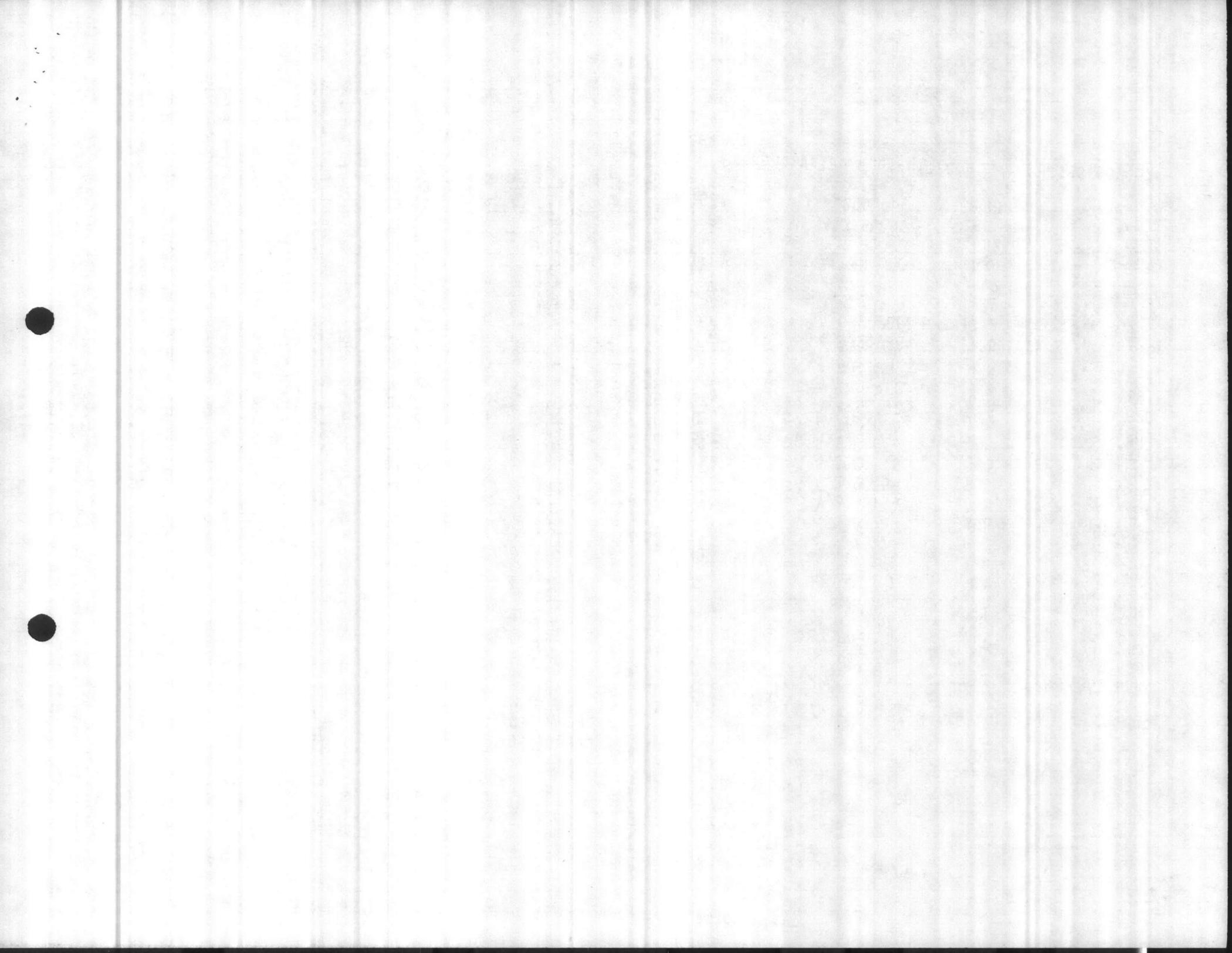
Year	tons/day	tons/hr.	lbs steam/hr.	Displaced Oil Input MMBtu/hr.	\$/hr.	\$/yr.	10% Discount (8% differential)	Present Value
1986 1	128	5.33	31,093	38.99	\$ 444.87	\$3,893,697	.991	\$3,858,654
2	129	5.38	31,336	39.30	448.02	3,924,655	.973	3,818,689
3	131	5.46	31,822	39.90	454.86	3,984,573	.955	3,805,267
4	132	5.50	32,065	40.21	458.40	4,015,531	.938	3,766,568
1990 5	134	5.58	32,551	40.82	465.35	4,076,448	.921	3,754,409
6	135	5.62	32,794	41.12	468.77	4,106,407	.904	3,712,192
7	136	5.67	33,037	41.43	472.30	4,137,365	.888	3,673,980
8	137	5.71	33,280	41.73	475.72	4,167,324	.871	3,629,739
9	138	5.75	33,522	42.04	479.26	4,198,282	.856	3,593,729
10	140	5.83	34,008	42.65	486.21	4,259,199	.840	3,577,727
11	141	5.88	34,251	42.95	489.63	4,289,158	.825	3,538,556
12	142	5.92	34,494	43.26	493.16	4,320,116	.810	3,499,294
13	143	5.96	34,737	43.56	496.58	4,350,075	.795	3,458,310
14	144	6.00	34,980	43.86	500.00	4,380,035	.781	3,420,807
2000 15	145	6.04	34,980	44.17	503.54	4,410,992	.766	3,378,820
16	146	6.08	35,223	44.47	506.96	4,440,952	.752	3,339,595
17	148	6.17	35,466	44.77	513.91	4,501,869	.739	3,326,881
18	149	6.21	35,952	45.08	517.46	4,532,826	.725	3,286,299
19	150	6.25	36,194	45.39	520.87	4,562,786	.712	3,248,703
20	152	6.33	36,438	45.69	527.82	4,623,703	.699	3,231,968
21	153	6.38	36,923	46.30	534.77	4,654,661	.687	3,197,752
22	154	6.42	37,166	46.61	538.30	4,684,620	.674	3,157,434
23	155	6.46	37,409	46.91	545.15	4,715,578	.662	3,121,712
24	157	6.54	37,652	47.22	548.68	4,775,496	.650	3,104,072
2010 25	158	6.58	38,138	47.82		4,806,454	.638	3,066,517
			38,381	48.13				
Total Present Value Fuel Oil Cost								\$86,567,674

* Includes blowdown and feedwater heating

** Includes Camp Geiger Plant Efficiency

*** \$5.92 (Jan. 82) escalated to Oct. 87

$$\begin{matrix}
 & \text{Fy82} & \text{Fy83} & \text{Fy84} & \text{Fy85} & \text{Fy86} \\
 \$5.92 \times & 1.14 & \times 1.14 & \times 1.14 & \times 1.14 & \times 1.14 = 11.40
 \end{matrix}$$



Summary Sheet Alternative 2B - Total Present Value

Investment Costs

Cherry Point Capital Costs	\$ 428,981
Boiler Plant Replacement Cost	3,404,017

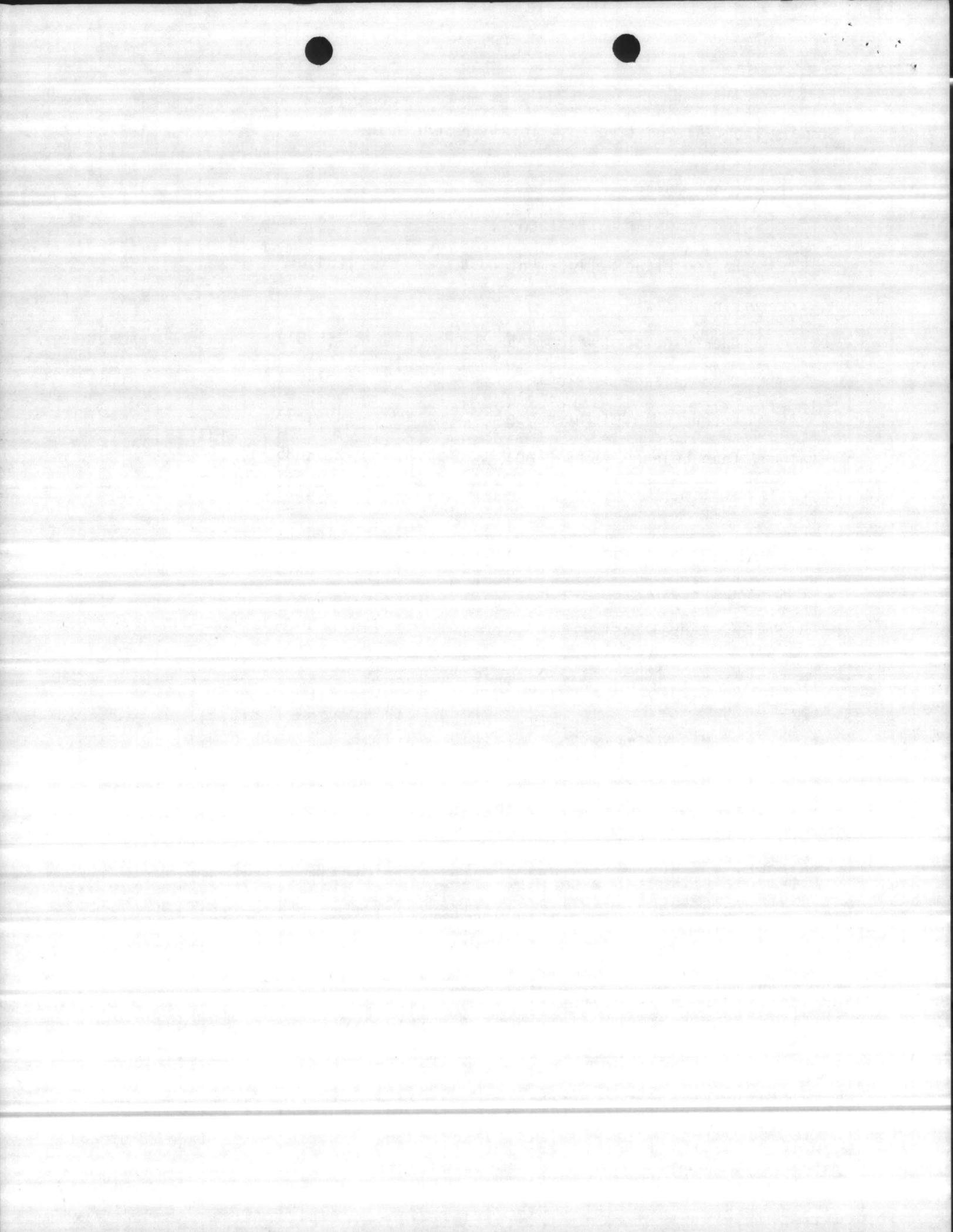
Recurring Costs

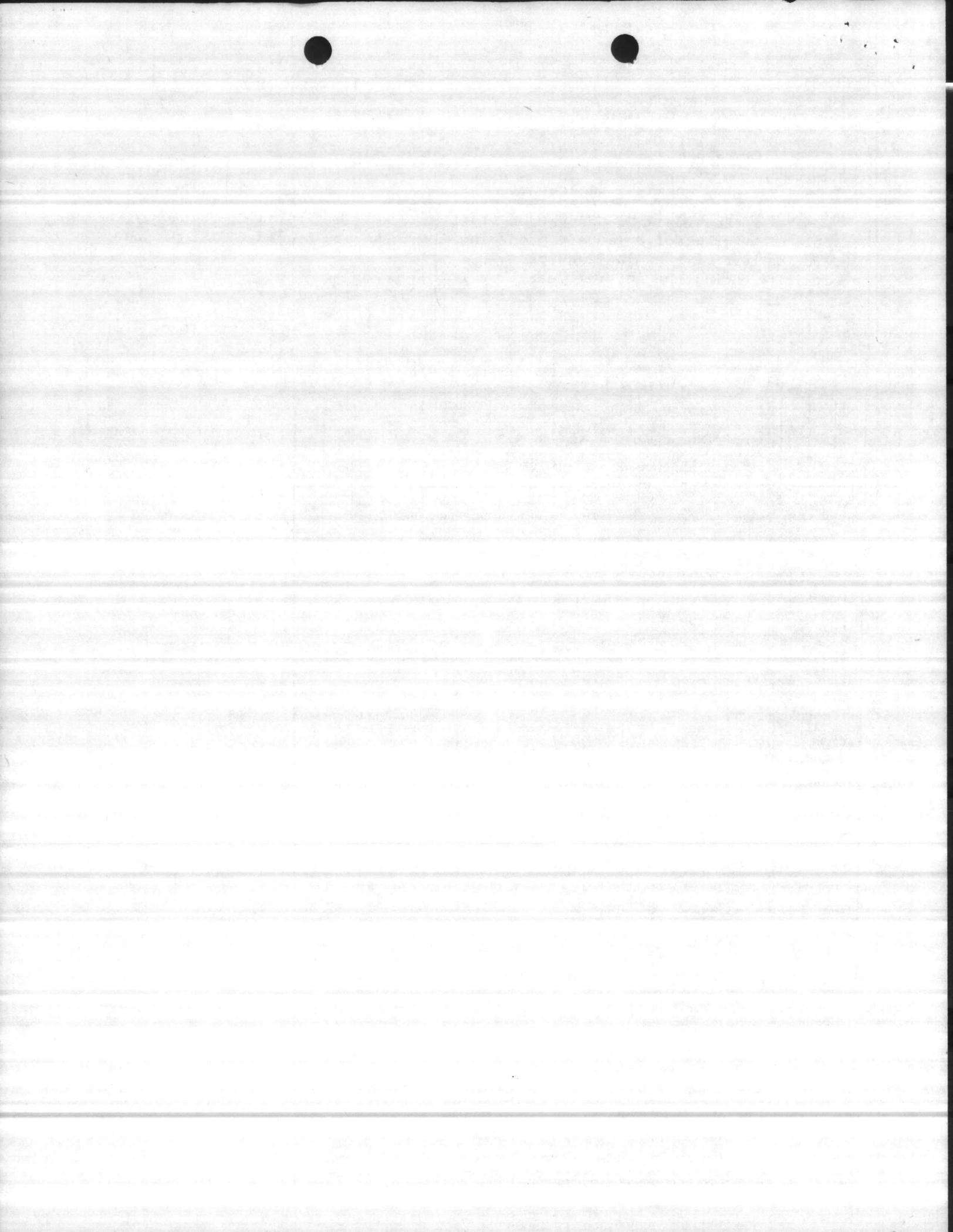
Cherry Point Development	1,186,279
Camp Lejeune Development	4,367,034
Cherry Point Maintenance	174,393
Camp Lejeune Maintenance	281,035
Fuel Oil	<u>\$86,567,674</u>

Total Present Value Alternative 2B	96,409,413
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Discount Factor	9.524
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Uniform Annual Cost	10,122,785
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SITE LOCATION MAP

P-822, proposed CO-GENERATION PLANT

