ALTERNATIVE GENERATION EVALUATION

FOR

SALUDA HYDRO

SALUDA HYDRO

SALUDA HYDRO

- TOTAL GENERATION 206 MW

SALUDA HYDRO

- TOTAL GENERATION 206 MW
- UNITS 1-4 34 MW EA.

SALUDA HYDRO

- TOTAL GENERATION 206 MW
- UNITS 1-4 34 MW EA.
- UNIT 5 70 MW

SALUDA HYDRO

- TOTAL GENERATION 206 MW
- UNITS 1-4 34 MW EA.
- UNIT 5 70 MW
- START TIME <15 MIN.

SALUDA HYDRO

- TOTAL GENERATION 206 MW
- UNITS 1-4 34 MW EA.
- UNIT 5 70 MW
- START TIME <15 MIN.
- RELIABILITY >95%

SALUDA HYDRO

- TOTAL GENERATION 206 MW
- UNITS 1-4 34 MW EA.
- UNIT 5 70 MW
- START TIME <15 MIN.
- RELIABILITY >95%
- QUICK START RESERVE 206 MW

SALUDA HYDRO

- TOTAL GENERATION 206 MW
- UNITS 1-4 34 MW EA.
- UNIT 5 70 MW
- START TIME <15 MIN.
- RELIABILITY >95%
- QUICK START RESERVE 206 MW
- BLACKSTART VC SUMMER

SALUDA HYDRO

- TOTAL GENERATION 206 MW
- UNITS 1-4 34 MW EA.
- UNIT 5 70MW
- START TIME <15 MIN.
- RELIABILITY >95%
- QUICK START RESERVE 206 MW
- BLACKSTART VC SUMMER
- LAKE LEVEL MANAGEMENT

ALTERNATIVE GENERATION TO SALUDA HYDRO

EVALUATION OF VIABLE OPTIONS

EVALUATION CONSIDERATIONS

EVALUATION CONSIDERATIONS

- ELECTRIC GENERATING EQUIPMENT

EVALUATION CONSIDERATIONS

- ELECTRIC GENERATING EQUIPMENT
- PLANT SITING

EVALUATION CONSIDERATIONS

- ELECTRIC GENERATING EQUIPMENT
- PLANT SITING
- CAPITAL AND O&M DOLLARS

EQUIPMENT EVALUATION

EQUIPMENT EVALUATION

- CAPACITY 200 MW

EQUIPMENT EVALUATION

- CAPACITY 200 MW
- START TIME <15 MIN.

EQUIPMENT EVALUATION

- CAPACITY 200 MW
- START TIME <15 MIN.
- EFFICIENCY

EQUIPMENT EVALUATION

- CAPACITY 200 MW
- START TIME <15 MIN.
- EFFICIENCY
- RELIABILITY

EQUIPMENT EVALUATION

- CAPACITY 200 MW
- START TIME <15 MIN.
- EFFICIENCY
- RELIABILITY
- PROVEN TECHNOLOGY

EQUIPMENT ALTERNATIVES

EQUIPMENT ALTERNATIVES

- DIESEL GENERATORS

EQUIPMENT ALTERNATIVES

- DIESEL GENERATORS
- GAS TURBINES (AERO DERIVED)

DIESEL GENERATORS

DIESEL GENERATORS

- SIZE 2 – 2 1/2 MW

DIESEL GENERATORS

- SIZE 2 – 2 1/2 MW
- GENSET

DIESEL GENERATORS

- SIZE 2 – 2 1/2 MW
- GENSET
- 80-100 UNITS

DIESEL GENERATORS

- SIZE 2 – 2 1/2 MW
- GENSET
- 83-100 UNITS
- START TIME 10 MIN.

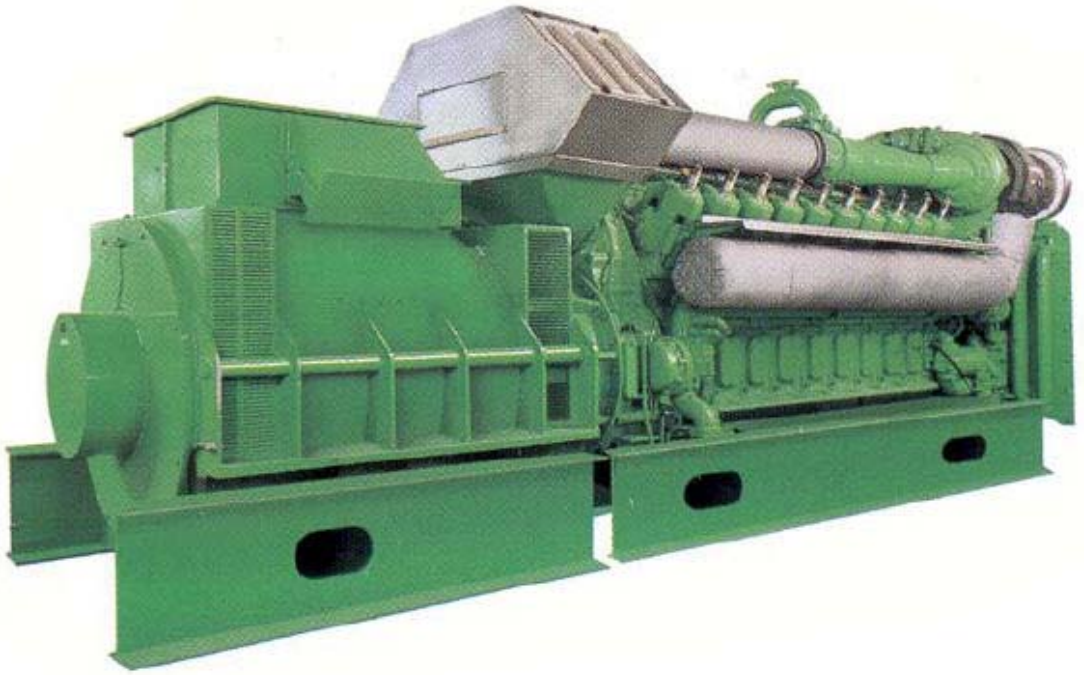
DIESEL GENERATORS

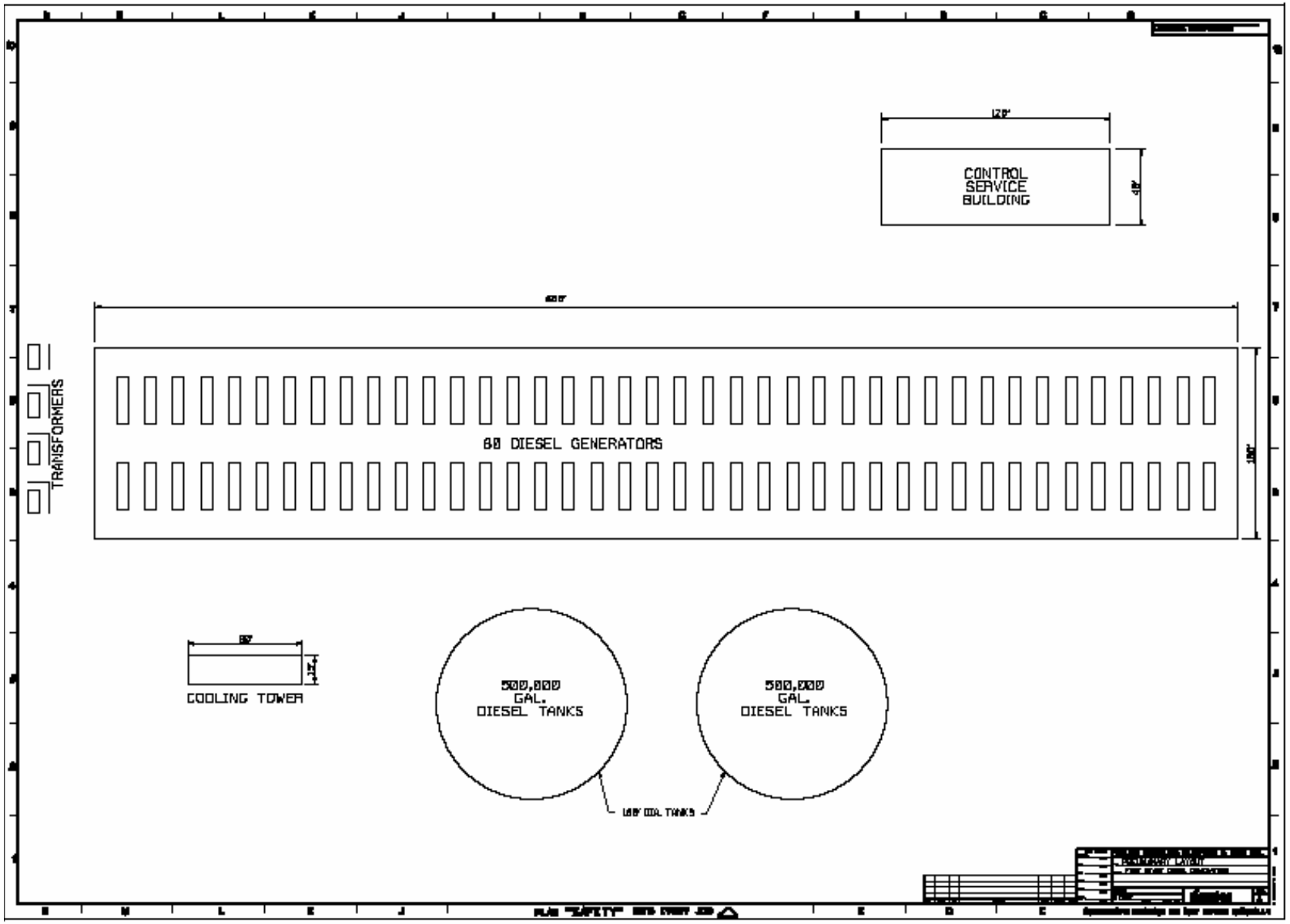
- SIZE 2 – 2 1/2 MW
- GENSET
- 83-100 UNITS
- START TIME 10 MIN.
- EFFICIENCY 37%

DIESEL GENERATORS

- SIZE 2 – 2 1/2 MW
- GENSET
- 83-100 UNITS
- START TIME 10 MIN.
- EFFICIENCY 37%
- RELIABILITY 90%

DIESEL GENSET




CONTROL
SERVICE
BUILDING
TRANSFORMERS
60 DIESEL GENERATORS
COOLING TOWER
500,000
GAL.
DIESEL TANKS
500,000
GAL.
DIESEL TANKS

GAS TURBINES(AERO DERIVED)

GAS TURBINES(AERO DERIVED)

- SIZE 50 MW

GAS TURBINES(AERO DERIVED)

- SIZE 50 MW
- GENERAL ELECTRIC LM6000

GAS TURBINES(AERO DERIVED)

- SIZE 50 MW
- GENERAL ELECTRIC LM6000
- 4 UNITS

GAS TURBINES(AERO DERIVED)

- SIZE 50 MW
- GENERAL ELECTRIC LM6000
- 4 UNITS
- START TIME 10 MIN.

GAS TURBINES(AERO DERIVED)

- SIZE 50 MW
- GENERAL ELECTRIC LM6000
- 4 UNITS
- START TIME 10 MIN.
- EFFICIENCY 40%

GAS TURBINES(AERO DERIVED)

- SIZE 50 MW
- GENERAL ELECTRIC LM6000
- 4 UNITS
- START TIME 10 MIN.
- EFFICIENCY 40%
- RELIABILITY 90%

PLANT SITING EVALUATION

PLANT SITING EVALUATION

- PERMITTING

PLANT SITING EVALUATION

- PERMITTING
- WATER AVAILABLITY

PLANT SITING EVALUATION

- PERMITTING
- WATER AVAILABLITY
- INTERCONNECTIONS

PLANT SITING EVALUATION

- PERMITTING
- WATER AVAILABLITY
- INTERCONNECTIONS
- PLANT LAYOUT /CONSTRUCTABILITY

PLANT SITING EVALUATION

- PERMITTING
- WATER AVAILABLITY
- INTERCONNECTIONS
- PLANT LAYOUT /CONSTRUCTABILITY
- LAND AVAILABILITY

PLANT SITING EVALUATION

- PERMITTING
- WATER AVAILABLITY
- INTERCONNECTIONS
- PLANT LAYOUT /CONSTRUCTABILITY
- LAND AVAILABILITY
- PSC APPROVAL

PERMITTING

PERMITTING

- AIR EMISSIONS

PERMITTING

- AIR EMISSIONS
- WATER INTAKE

PERMITTING

- AIR EMISSIONS
- WATER INTAKE
- WATER DISCHARGE

PERMITTING

- AIR EMISSIONS
- WATER INTAKE
- WATER DISCHARGE
- STORM WATER CONTROL

PERMITTING

- AIR EMISSIONS
- WATER INTAKE
- WATER DISCHARGE
- STORM WATER CONTROL
- WETLANDS

PERMITTING

- AIR EMISSIONS
- WATER INTAKE
- WATER DISCHARGE
- STORM WATER CONTROL
- WETLANDS
- COUNTY REGULATIONS

PERMITTING

- AIR EMISSIONS
- WATER INTAKE
- WATER DISCHARGE
- STORM WATER CONTROL
- WETLANDS
- COUNTY REGULATIONS
- SCHEDULE IMPACT 1-2 YEARS

DOLLARS EVALUATION

DOLLARS EVALUATION

- CAPITAL COST

DOLLARS EVALUATION

- CAPITAL COST
- LIFE CYCLE COST 30 YRS

COST OF:

COST OF:

- LAND

COST OF:

- LAND
- PERMITTING

COST OF:

- LAND
- PERMITTING
- GENERATING EQUIPMENT

COST OF:

- LAND
- PERMITTING
- GENERATING EQUIPMENT
- BALANCE OF PLANT

COST OF:

- LAND
- PERMITTING
- GENERATING EQUIPMENT
- BALANCE OF PLANT
- ENGINEERING

COST OF:

- LAND
- PERMITTING
- GENERATING EQUIPMENT
- BALANCE OF PLANT
- ENGINEERING
- CONSTRUCTION

COST OF:

- LAND
- PERMITTING
- GENERATING EQUIPMENT
- BALANCE OF PLANT
- ENGINEERING
- CONSTRUCTION
- START-UP

COST OF:

- LAND
- PERMITTING
- GENERATING EQUIPMENT
- BALANCE OF PLANT
- ENGINEERING
- CONSTRUCTION
- START-UP
- PROJECT MANAGEMENT

PARAMETERS / ASSUMPTIONS

PARAMETERS / ASSUMPTIONS

- ORDER OF MAGNITUDE ESTIMATE

PARAMETERS / ASSUMPTIONS

- ORDER OF MAGNITUDE ESTIMATE
- +25% / -10% ACCURACY

PARAMETERS / ASSUMPTIONS

- ORDER OF MAGNITUDE ESTIMATE
- +25% / -10% ACCURACY
- 2006 DOLLARS FOR CAPITAL $
- 2010 DOLLARS FOR LIFE CYCLE $

PARAMETERS / ASSUMPTIONS

- ORDER OF MAGNITUDE ESTIMATE
- +25% / -10% ACCURACY
- 2006 DOLLARS FOR CAPITAL $
- 2010 DOLLARS FOR LIFE CYCLE $
- ESCALATION EXCLUDED

PARAMETERS / ASSUMPTIONS

- ORDER OF MAGNITUDE ESTIMATE
- +25% / -10% ACCURACY
- 2006 DOLLARS FOR CAPITAL $
- 2010 DOLLARS FOR LIFE CYCLE $
- ESCALATION EXCLUDED
- COST OF MONEY EXCLUDED

PARAMETERS / ASSUMPTIONS

- ORDER OF MAGNITUDE ESTIMATE
- +25% / -10% ACCURACY
- 2006 DOLLARS FOR CAPITAL $
- 2010 DOLLARS FOR LIFE CYCLE $
- ESCALATION EXCLUDED
- COST OF MONEY EXCLUDED
- PROVEN GENERATION TECHNOLOGY

PARAMETERS / ASSUMPTIONS

- ORDER OF MAGNITUDE ESTIMATE
- +25% / -10% ACCURACY
- 2006 DOLLARS FOR CAPTIAL $
- 2010 DOLLARS FOR LIFE CYCLE $
- ESCALATION EXCLUDED
- COST OF MONEY EXCLUDED
- PROVEN GENERATION TECHNOLOGY
- NEW PLANT SITE

PARAMETERS / ASSUMPTIONS

- ORDER OF MAGNITUDE ESTIMATE
- +25% / -10% ACCURACY
- 2006 DOLLARS FOR CAPITAL $
- 2010 DOLLARS FOR LIFE CYCLE $
- ESCALATION EXCLUDED
- COST OF MONEY EXCLUDED
- PROVEN GENERATION TECHNOLOGY
- NEW PLANT SITE
- NATURAL GAS AVAILABLE

PARAMETERS / ASSUMPTIONS

- ORDER OF MAGNITUDE ESTIMATE
- +25% / -10% ACCURACY
- 2006 DOLLARS FOR CAPITAL $
- 2010 DOLLARS FOR LIFE CYCLE $
- ESCALATION EXCLUDED
- COST OF MONEY EXCLUDED
- PROVEN GENERATION TECHNOLOGY
- NEW PLANT SITE
- NATURAL GAS AVAILABLE
- TRANSMISSION CONNECTION AVAILABLE

PARAMETERS / ASSUMPTIONS

- ORDER OF MAGNITUDE ESTIMATE
- +25% / -10% ACCURACY
- 2006 DOLLARS FOR CAPITAL $
- 2010 DOLLARS FOR LIFE CYCLE $
- ESCALATION EXCLUDED
- COST OF MONEY EXCLUDED
- PROVEN GENERATION TECHNOLOGY
- NEW PLANT SITE
- NATURAL GAS AVAILABLE
- TRANSMISSION CONNECTION AVAILABLE
- WATER AVAILABLE

CAPTITAL COST DIESEL GEN

LAND	$100,000
PERMITTING	$160,000
EQUIPMENT	$40,500,000
BALANCE OF PLANT	$38,000,000
ENGINEERING	$500,000
CONSTRUCTION	$7,000,000
START-UP	$250,000
PROJECT MGMT	$250,000
TOTAL	$86,850,000

CAPITAL COST GAS TURBINES

LAND	$100,000
PERMITTING	$160,000
EQUIPMENT	$58,800,000
BALANCE OF PLANT	$18,780,000
ENGINEERING	$600,000
CONSTRUCTION	$11,400,000
START-UP	$200,000
PROJECT MGMT	$300,000
TOTAL	$90,390,000

CAPITAL COST SALUDA HYDRO

LAND	NA
RE-LICENSING	<$12 MILLION
EQUIPMENT	$20,000,000
BALANCE OF PLANT	In- above
ENGINEERING	In-above
CONSTRUCTION	In-above
START-UP	In-above
PROJECT MGMT	In-above
TOTAL	$32,000,000

LIFE CYCLE COSTS 30 YEARS (includes capital, O&M, fuel)

- SALUDA $174,000,000
- GAS TURBINES $508,230,000
- DIESEL GEN'S $705,000,000

SALUDA ADVANTAGES

SALUDA ADVANTAGES

- LOWER LIFE CYCLE COST

SALUDA ADVANTAGES

- LOWER LIFE CYCLE COST
- BETTER RELIABILITY

SALUDA ADVANTAGES

- LOWER LIFE CYCLE COST
- BETTER RELIABILITY
- NO AIR EMISSIONS

SALUDA ADVANTAGES

- LOWER LIFE CYCLE COST
- BETTER RELIABILITY
- NO AIR EMISSIONS
- NO NEW PLANT SITING IMPACT

SALUDA ADVANTAGES

- LOWER LIFE CYCLE COST
- BETTER RELIABILITY
- NO AIR EMISSIONS
- NO NEW PLANT SITING IMPACT
- AVAILABLE QUICK START RESERVE

SALUDA ADVANTAGES

- LOWER LIFE CYCLE COST
- BETTER RELIABILITY
- NO AIR EMISSIONS
- NO NEW PLANT SITING IMPACT
- AVAILABLE QUICK START RESERVE
- VCS BLACKSTART CAPABILTY

ALT GENERATION IMPACTS

ALT GENERATION IMPACTS

- HIGHER RATES FOR ELECTRICITY

ALT GENERATION IMPACTS

- HIGHER RATES FOR ELECTRICITY
- HIGHER EMISSIONS

ALT GENERATION IMPACTS

- HIGHER RATES FOR ELECTRICITY
- HIGHER EMISSIONS
- LAND USE

QUESTIONS?