

**ALASKA ENERGY AUTHORITY
VILLAGE POWER SYSTEM ASSESSMENT**

Community: **Kivalina**
Evaluation Date: **9/21/12** Time Started **1300** Completed **1630**
Evaluator(s): **Ben Hopkins**

*** Indicates that only one from the group shall be chosen. Otherwise choose all that apply**

Powerhouse Building

Site Location

- ☐ Site suitable for powerhouse
- ☐ < 100 feet from a public well
- ☒ < 25 feet from an eroding bank or beach, or in a flood plain

*** Foundation**

- ☐ Powerhouse on acceptable foundation (pad & post, piling, concrete, etc.)
- ☒ Powerhouse directly on gravel pad or light timbers (raised timbers, on permeable gravel)
- ☐ Powerhouse directly on tundra or natural soils (no foundation)
- ☐ Powerhouse leaning considerably or unstable foundations (seismic hazard)

*** Flooring**

- ☐ Welded steel deck plate or concrete (sealed)
- ☒ Steel deck plate or concrete (unsealed)
- ☐ Wood (sealed or painted)
- ☐ Wood (non-sealed or bare)

*** Interior Walls**

- ☐ Concrete or metal skin
- ☐ Fiberglass reinforced paneling (FRP)
- ☐ Gypsum board
- ☒ Wood (painted or sealed)
- ☐ Wood (non-painted or bare)

*** Exterior Walls**

- ☒ Concrete or metal siding
- ☐ Wood (painted or sealed)
- ☐ Wood (non-painted or bare)

* Roof Penetration

- ☐ None
- ☐ Properly installed (rain tight)
- ☒ Minor leaks (repairable)
- ☐ Major leaks (not repairable)

* Ventilation

- ☐ Proper ventilation (air intake & exhaust fans, louvers & hoods)
- ☒ Adequate ventilation (air intake & exhaust fans)
- ☐ Minimum ventilation (air intake)
- ☐ No ventilation (doors or windows have to be left open)

* Lighting

- ☐ Excellent lighting
- ☒ Adequate lighting
- ☐ Poor lighting
- ☐ No lighting

Security

- ☐ Powerhouse fenced in & door locks
- ☒ Door locks
- ☒ No fence
- ☐ No door locks

Generator Equipment and Installation

Diesel Engines

| | Unit #1 | Unit #2 | Unit #3 | Unit #4 | Unit # 5 |
|--------------------|---------|---------|---------|---------|----------|
| kW | 210 | 350 | 250 | 350 | _____ |
| Hours of Operation | 2413 | 30260 | 38382 | 72618 | _____ |

* Generator Condition

| | Unit #1 | Unit #2 | Unit #3 | Unit #4 | Unit #5 |
|-----------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|--------------------------|
| Good, like new | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Fair | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Poor, guards/covers missing | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

Load Sizing

- ☒ Properly sized generation to meet the community loads
- ☐ Undersized generation to meet the community loads
- ☐ Oversized generation to meet the community loads

* Load Balance

- ☒ <10% Imbalance
- ☐ 10% to 25% Imbalance
- ☐ >25% Imbalance

* Control Switchgear

- ☐ Fully automatic synchronizing switchgear
- ☐ Semi-automatic synchronizing switchgear
- ☒ Manually synchronizing switchgear
- ☐ Manual transfer switches
- ☐ Manual mounted breakers

* Electrical

- ☒ Wiring appears appropriate
- ☐ Exposed wiring, improper grounding, missing covers etc.

* Fuel System Inside Powerhouse

- ☐ Welded piping
- ☐ Welded & threaded piping
- ☒ Threaded piping
- ☐ Rubber hose

Fuel System Appurtenances

- ☐ No day-tank
- ☐ Additional for active leaks

Totalizing & Station Service Meter

- ☒ Properly installed and working totalizing & station service meter
- ☐ No totalizing meter
- ☐ No station service meter

*** Fuel Meter**

- ☒ Properly installed & working fuel meter
- ☐ No fuel meter

Environmental

Interior of Powerhouse

- ☐ Clean, well-kept
- ☒ Old generator part stored inside facility
- ☐ Waste oil stored inside facility
- ☐ Apparent oil spills

Under Facility

- ☐ Clean, well-kept
- ☒ Old generator part stored under facility
- ☒ Waste oil stored under facility
- ☐ Apparent oil spills

Surrounding of Powerhouse

- ☐ Clean, well-kept
- ☒ Old generator part stored on site
- ☐ Waste oil stored on site
- ☐ Apparent oil spills

*** Waste Oil Disposal**

- ☐ Waste oil blending system
- ☐ Waste oil incinerator
- ☒ Drum or tank storage for waste oils

*** Life, Health, & Safety**

- ☐ Code Compliant
- ☐ Low risk
- ☒ Medium risk
- ☐ High risk
- ☐ Potential for loss of life

Electrical Distribution Line Evaluation

Overhead Distribution System

* Pole type

- ☒ Fully treated poles
- ☐ Butt treated poles
- ☐ Native pole (trees)

* Pole installation

- ☐ Proper depth (can be determined by the manufacture's mark or button on pole)
- ☒ Within 12 inches of recommended depth
- ☐ Within 24 inches of recommended depth
- ☐ Greater than 24 inches of recommended depth

* Pole alignment

- ☐ Poles straight
- ☒ Poles leaning less than 10°
- ☐ Poles leaning greater than 10°

* Distribution voltage

- ☒ =>7200 volts
- ☐ 2400 volts
- ☐ 480/277 volts
- ☐ 208/120 volts

* Anchors

- ☐ Properly installed (<12 inches of the anchor rod exposed)
- ☒ 12 - 24 inches of the anchor rod exposed
- ☐ >24 inches of the anchor rod exposed

* Primary conductor

- ☒ Appears properly installed (sag, conductor size, etc)
- ☐ Improperly installed (conductor needs resagging, etc)

* Service conductor

- ☐ Appears properly installed (sag, conductor size, etc)
- ☒ Improperly installed (conductor needs resagging, etc)

*** Meter installation**

- ☒ Appears to be properly installed (height, grounding, etc)
- ☐ Improperly installed (height, no ground, etc)

*** Meter Condition Residential & Commercial**

- ☐ Good (appears in good condition)
- ☒ Fair (minor corrosion)
- ☐ Poor (major corrosion, needs replacing)

*** Over all condition of the system**

- ☐ Excellent (no repairs needed)
- ☐ Good (minor repairs, re-sag guys, re-sag service drops, etc.)
- ☒ Poor (major repairs needed, pole, guy, conductor, meter replacement, etc)

Underground Distribution System

*** Primary conductor**

- ☒ Appears to be properly installed
- ☐ Exposed conductor

*** Transformers**

- ☒ Appears to be properly installed
- ☐ Improperly installed (no pad, leaning, etc)

*** Service conductor**

- ☒ Appears to be properly installed
- ☐ Exposed conductor

Operator Proficiency

* Meter Reading

- ☐ Excellent
- ☒ Good
- ☐ Acceptable
- ☐ Unacceptable

* Daily Logs

- ☐ Excellent
- ☒ Good
- ☐ Acceptable
- ☐ Unacceptable

* Routine Maintenance

- ☐ Excellent
- ☐ Good
- ☒ Acceptable
- ☐ Unacceptable

* Scheduled Maintenance

- ☐ Excellent
- ☐ Good
- ☒ Acceptable
- ☐ Unacceptable

* Maintenance Planning

- ☐ Excellent
- ☒ Good
- ☐ Acceptable
- ☐ Unacceptable

Waste Heat Recovery

* Waste Heat Recovery Operational

☒ Yes

☐ No

List current users

Water plant

* BTU/Hr Meter

☐ Yes

☒ No

* Additional Waste Heat Available

☐ No

☒ Yes

List Potential New Users

Church

Washeteria

School

System Information

Supply / Return Delta T

8°F

Estimate of current annual heating fuel gallons displaced

Operator is new, not aware, AVEC has records

Estimate of potential annual heating fuel gallons displaced

Operator is new, not aware, AVEC has records

Existing Heat Sales Agreement(s)

Operator is new, not aware, AVEC has records

General Questions

Use separate sheet(s) to answer these questions.

1. If records are available, indicate the number, duration, and causes of all forced outages during the last 12 months. If records are not available, provide whatever reasonable estimates available from utility personnel regarding outages number, duration, and causes.

Operator error has been the main source of outages. New operator took over early this year. There are load swings from the school and washeteria that he is not anticipating. Distribution was worked on by AVEC earlier this year. Operator feels that AVEC is supporting him when needed. Plant is showing it's age.

ALASKA ENERGY AUTHORITY

VILLAGE POWER SYSTEM INVENTORY

| | | | | | |
|-----------|--------------------------|------------|------------|----------|------|
| DATE | 9/21/12 | TIME START | 1300 | TIME END | 1630 |
| COMMUNITY | Kivalina | UTILITY | AVEC | | |
| OWNERSHIP | AVEC | CONTACT | Mark Bryan | | |
| OPERATOR | Ray A. Hawley @ 645-2001 | PHONE | 565-5316 | | |

| | G-1 | G-2 | G-3 | G-4 | G-5 |
|-----------------------------------|---|---------------------|---------------------|-----------------|-----|
| ENGINE MAKE | Detroit | Caterpillar | Cummins | Detroit | |
| ENGINE MODEL | Series 60 | D353 | L10 | Series 60 | |
| ENGINE RPM | 1200 | 1200 | 1800 | 1800 | |
| SERIAL NUMBER | Label painted over | 46B5699 | Data tag missing | 06R0730882 | |
| GOVERNOR TYPE | DDC Electronic | Mechanical | Cummins | DDC Electronic | |
| MODEL ACTUATOR | -- | Woodward UG-8 | EFC | -- | |
| MODEL SPEED CONTROL | -- | | GAC ESD5520E | -- | |
| DC VOLTAGE | 24VDC | 24VDC | 24VDC | 24VDC | |
| UNIT CIRCUIT BREAKER | GE Molded Case | GE Molded Case | GE Molded Case | GE Molded Case | |
| TYPE/AMP/VOLT | 3ph/480V/300A | 3ph/480V/500A | 3ph/480V/350A | 3ph/480V/400A | |
| CURRENT HOURS | 2413 | 30260 | 38382 | 72618 | |
| GENERATOR MAKE | Kato | Kato | Kato | Kohler | |
| GENERATOR MODEL # | 160SU9D | Data tag unreadable | Data tag unreadable | 350RE0ZD | |
| GENERATOR SERIAL # | 69257-1 | Data tag unreadable | Data tag unreadable | 9763679 | |
| GENERATOR CAPACITY (kW) | 210 | 350 | 250 | 350 | |
| GENERATOR VOLTAGE | 480V | 480V | 480V | 480V | |
| VOLTAGE REGULATOR, MAKE & MODEL | Basler APR 63-5 | Basler APR 63-5 | Basler APR 63-5 | Basler APR 63-5 | |
| PARALLEL SWITCH GEAR (Y or N) | Yes, manual | Yes, manual | Yes, manual | Yes, manual | |
| kWh METER(Yes or No) | Yes | | | | |
| POWERHOUSE kWh METER TYPE | Elster CL20, FM9S, Kh 1.8 P/R 24, TA 2.5A | | | | |
| CATALOG # or TYPE | A3TL | | | | |
| DEMAND ? | 247 | | | | |
| CT RATIO | Unknown | | | | |
| STATION SERVICE METER (Yes or No) | Yes | | | | |
| STATION SERVICE METER TYPE | Elster CL200, FM16S, Kh 21.6, P/R 24, TA 30A | | | | |
| CATALOG # or TYPE | A3TL | | | | |
| BATT. CHARGER/TYPE/MODEL | Nife SCB 110-24-40 | | | | |
| FUEL DAY TANK TYPE | Single wall, 300 gallon | | | | |
| PUMP # | Worthington 36AU | | | | |
| MOTOR # | 1.5HP 115/230V | | | | |
| FUEL DAY TANK METER | Gasboy | | | | |
| FIRE PROTECTION TYPE/OPERATIONAL? | Halon, 20lb. ABC extinguishers, all show charged, no recent inspections on tags | | | | |
| ORIGINAL CONTRACTOR | Unknown | | | | |
| | | | | | |
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