OFFICIAL PROCEEDINGS
CITY COUNCIL
ELECTRICAL ADVISORY COMMITTEE
CITY OF ESCANABA, MICHIGAN
Special Joint Meeting
Wednesday, February 11, 2015

Pursuit to a meeting notice posted February 6, 2015, the meeting was called to order by the Mayor Marc D. Tall at 6:00 p.m. in the Council Chambers of City Hall located at 410 Ludington Street.

Present: Mayor Marc D. Tall, Council Members, Patricia A. Baribeau, Ronald J. Beauchamp, and Michael R. Sattem.

Absent: Ralph B. Blasier.

Sattem moved, Baribeau seconded, **CARREID UNANIMOUSLY**, to excuse Council Member Blasier.

Present: Electrical Advisory Committee (EAC) Members: Chairperson Tim Wilson, and John Anthony.

Absent: Two vacancies, Power Plant Liaison, Larry Arkens, Ann Bissell, and Glendon Brown.

Also Present: City Manager James V. O'Toole, Electric Superintendent Mike Furmanski, City Controller Michael Dewar, City Attorney Ralph B. K. Peterson, Pro Energy Services, Inc. Representative Jack Scott, members of the public and media.

ADJUSTMENTS TO THE AGENDA

Beauchamp moved, Sattem seconded, **CARRIED UNANIMOUSLY**, to approve the Joint City Council & Electrical Advisory Committee Agenda as submitted.

CONFLICT OF INTEREST – None

NEW BUSINESS

Update - Electric Department –General Operations.

Electrical Superintendent Mike Furmanski updated the City Council, Electrical Advisory Committee and Citizens of Escanaba on the current departmental activities.

- Completed temporary service for an Industrial customer;
- LED street light replacement program on Lincoln Road was completed;
- Worked with Water department to thaw out two residential freeze ups.

Update– Operation and Maintenance of Power Plant – Pro Energy Services, Inc.

Jack Scott of Pro Energy Services, Inc. updated the City Council, Electrical Advisory Committee and Citizens of Escanaba on the status of the operation and maintenance of the power plant.

- Reviewed Unit starts for Units 1 & 2. CT unit was in outage due to burnt out oil heaters and a frozen water injection pump which was being rebuilt;
- No planned or Unplanned outages;
- One forced outage on Unit 1 and Unit 2 due to a tube leak in the boiler;
- Reviewed maintenance activities for the month;
- One Air Monitoring deviations in the month of January due to maintenance;
- No NPDES Permit or Water Monitoring Deviations for the month of January;
- No OSHA work or lost time injuries or accidents for the month.

Update– Substation Repair/Replacement/Restoration Project.

Manager O'Toole and Electric Superintendent Furmanski presented an update to the City Council and Electrical Advisory Committee on the progress of the substation repair, replacement and restoration project associated with the substation damage of February 2, 2015. (See Attachment – A)

- Reviewed Staff recommendations;
- Discussed testing performed by Energis that was accomplished to date;
- Discussed possible insurance settlements;
- Option #3 took care of the City needs immediately.

Beauchamp moved, Baribeau seconded, to approve option #3 as presented by City Administration for the Substation Repair/Replacement/Restoration Project.

Upon a call of the roll, the vote was as follows:

Ayes: Beauchamp, Baribeau, Sattem, Tall
Nays: None

MOTION CARRIED.

Administration advised further updates would be presented to Council as information was received.

GENERAL PUBLIC COMMENT

City resident James Hellermann questioned Administration on the length of down time when construction was being accomplished. Mr. Hellermann concluded by stating how appreciative he was for all the individual work to bring the City back online.

COUNCIL/COMMITTEE, STAFF REPORTS – None

ADJOURNMENT

Hearing no further public comment, or further reports from the Electrical Advisory Committee or Council, the meeting adjourned at 6:57 p.m.

Respectfully submitted,

Robert S. Richards
City Clerk

Approved: _____
Marc D. Tall, Mayor

City of Escanaba Substation Incident
February 2, 2015

Presented to the City Council and Electrical Advisory Committee
February 11, 2015

Discussion Topics

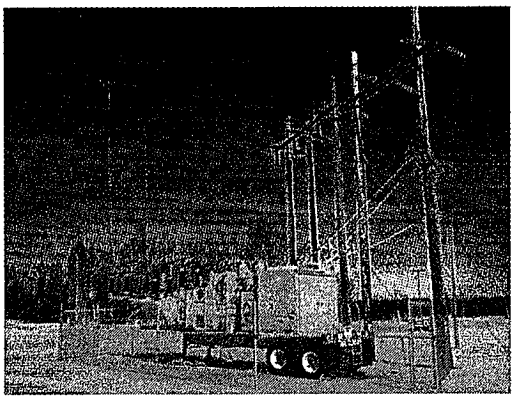
- Background
- Council approvals to date
- Insurance
- MISO SSR Responsibility
- Preliminary Substation Damage
- Preliminary Power Plant Damage
- Preliminary Combustion Turbine Damage
- Substation Restoration Options
- Substation Restoration Summary
- Staff Recommendation
- Q/A

Background

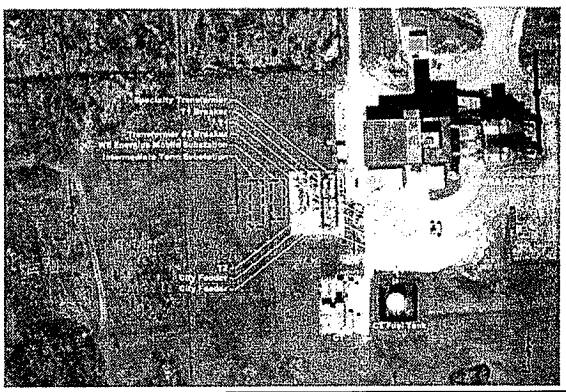
- On February 2, 2015 at approximately 1:30 am, an explosion occurred at the power plant substation which resulted in a fire with major damage to the substation, power plant and combustion turbine.
- City crews worked to restore power through the West Side Substation.
- Contractors worked to install a mobile substation adjacent to the power plant substation to provide electricity to our customers.
- The mobile substation was energized at 5:45 am on February 3.

Aerial View of Power Plant Property

W.E. Mobile Substation



Existing Substation Diagram



Council Approvals to Date

1. **Purchasing Policy Waiver** – On February 5, 2015, the City Council approved a temporary waiver on purchasing policy requirements for work associated with the substation damage of February 2, 2015.

Council Approval to Date - Continued

2. **Emergency Response Cost/Repair/ Replacement/Restoration Costs** – On February 5, 2015, the City Council authorized to pay for all initial emergency response costs and future costs associated with the substation damage including, but not limited to, the deployment of resources, labor, materials, repair/replacement/restoration of damaged equipment, fuel, supplies, engineering design, permits, legal costs (SSR matters) and any other costs related to the substation incident up to $1 million.

Council Approval to Date – Continued

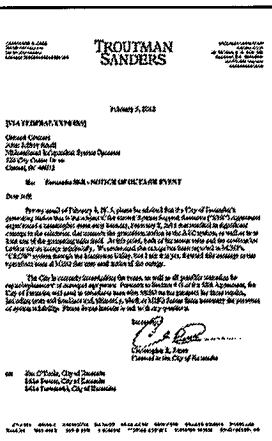
3. **Mobile Substation Lease** - On February 5, 2015, the City Council approved an "Equipment Lease" between the City of Escanaba and the Wisconsin Electric Power Company for the use of a mobile substation, temporary fencing, wiring and other miscellaneous materials needed until a more permanent substation solution is engineered, constructed and energized.

Insurance

- The insurance adjuster came to the site on February 3, 2015, and conducted a preliminary investigation. At that time, the City was advised to stop testing pending further instruction from the insurance company.
- On February 6, 2015, the insurance company provided authorization to continue testing equipment.
- Testing was resumed on February 9, 2015.
- Beginning February 23, 2015, the City insurance company will be sending a Claim's Manager, Independent Claim's Adjuster, an Expert on subrogation rights, an Expert on cause and an Expert on boiler and maintenance matters to further investigate our claim.

MISO SSR Requirement

Pursuant to Section 9.G of the SSR Agreement, the City of Escanaba is required to coordinate with MISO on the prospect for repairs, including costs and timeliness and, ultimately, whether MISO deems them necessary for purposes of system reliability



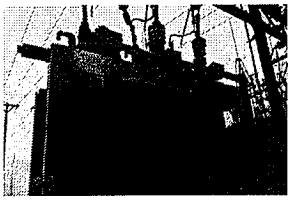
TROUTMAN SANDERS

Preliminary Substation Damage

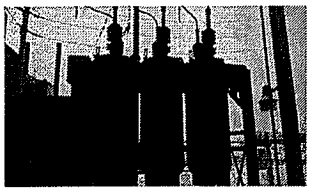
15kV Oil Circuit Breaker 467 is a complete loss. Likely a total loss.

Preliminary Substation Damage Continued

15kV Oil Circuit Breaker 467 C phase bus side bushing failure. Likely a total loss.



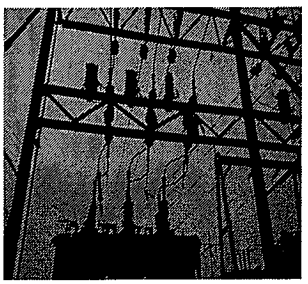
Preliminary Substation Damage Continued



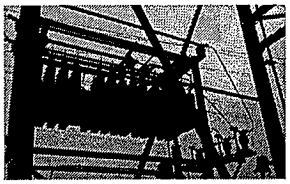
15kV Oil Circuit Breaker 471 received damage to the bus side bushings due to oil contamination, particulate, arch flash and blast from Oil Circuit Breaker 467. Likely a total loss.

Preliminary Substation Damage Continued

South main bus and tertiary bus structure, line and bus disconnects, line surge arresters all receive heat damage and contamination. Likely a total loss.



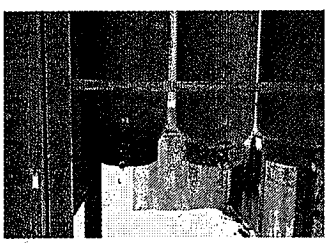
Preliminary Substation Damage Continued



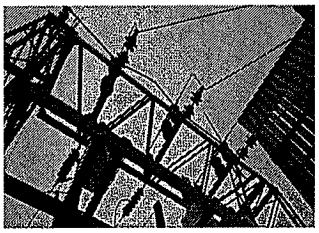
5.4MVAR Capacitor bank receive heat damage, contamination, and broken insulators from molten and dissipated debris.

Preliminary Substation Damage Continued

15kV GEN #1 Oil Circuit Breaker 451 and Oil Circuit Breaker 455 both show signs of heating on C phase tanks.



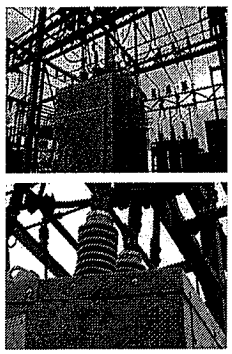
Preliminary Substation Damage Continued



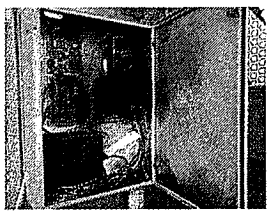
69kV disconnect 692 was found inoperative due to seized mechanism and will need to be replaced.

Preliminary Power Plant Damage

15kV Vacuum Breaker Circuit 479 and GEN#2 Vacuum Breaker Circuit 455 both need external cleaning of bushings and should be maintenance tested for electrical quality prior to return to service. Mechanical inspection shows units should be functional and returned to service upon minor reconditioning.



Preliminary Power Plant Damage Continued



RTU in Power Plant. A complete loss.

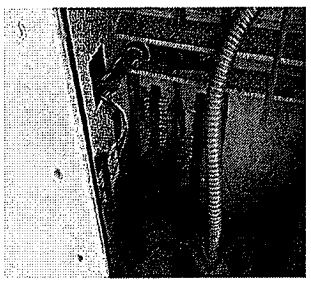
Power Plant Updates

- The steam generator leads, station service transformer leads, station service transformers, switch gear leads, and generator breakers were tested on February 10, 2015, and were mostly found to be in good condition. The 480 V bus off of the #1 station service transformer needs to be repaired.
- Further testing in the Power Plant is scheduled for February 12, 2015.

Preliminary Combustion Turbine Damage

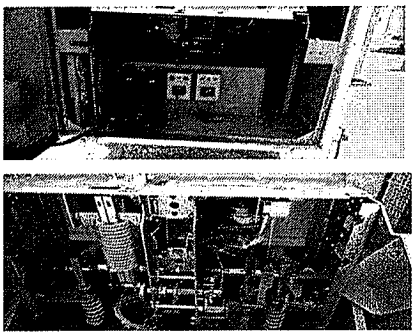
15kV Combustion Generator riser and underground cables burned from the bus and will need to be replaced.

Preliminary Combustion Turbine Damage Continued



Gas combustion turbine controls and related auxiliary systems. Multiple points of burned control wiring include output breaker enclosure, battery charger, and main control/relay panels.

Preliminary Combustion Turbine Damage Continued



Preliminary Combustion Turbine Damage Continued

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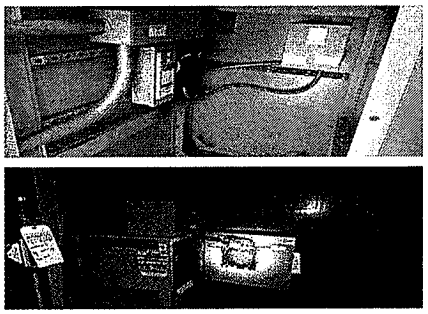
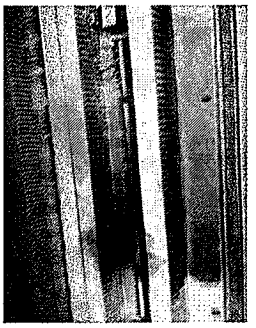


Preliminary Combustion Turbine Damage Continued

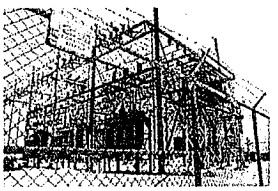


Combustion Turbine Generator Update

- On February 10, 2015, a partial visual inspection was completed on the combustion turbine generator. In the course of the evaluation, obvious damage to the power cables, breaker, battery charger, relays, control wiring and other equipment was observed.
- Additional testing of the combustion turbine generator will be needed to determine the extent of the damage.
- Many parts in the combustion turbine generator will need to be replaced.

Substation Options - Overview

1. Fix all existing issues within the existing substation
2. Fix part of existing substation
3. Construct new intermediate substation adjacent to the existing substation
4. Combine new intermediate substation and partially repair existing substation
5. Construct new intermediate substation at permanent location on 20th Avenue North



Option #1
Fix All Existing Issues Within the Existing Substation

- New transformer #2, new feeder, generation and transmission breakers, new controls/relays, new control cables, new fence/grounding, new switches and structures, new capacitor bank, new metering, new power cables
- Estimated cost to complete $4,000,000
- Estimated time to complete is 40 weeks +/-

Fix All Existing

Pro's

- Can support generation
- Don't need more grading/earthwork
- Can use two existing 15kV breakers
- Controls are routed to plant control room
- Provides electrical path for plant aux power
- Adds line relaying

Con's

- Need to find second power transformer (could be 6 months or more)
- Need multiple new breakers
- Don't know extent of control system damage/replacement
- Costs more than Temporary or Partial Fix option
- Cleanup has to occur before return-to-service
- Can't start until insurance survey is completed
- Most expensive option
- Will not be completed in time for "summer peak"

Option #2
Fix Part of Existing Substation

- Move T1 to T2 location to utilize existing transmission line termination/switch, install stock gas breaker, relay panels, 15kV bus breaker, move two feeder breakers, extend two feeder overhead lines to new bays, abandon south four bay positions, install temporary control building/battery system, cables for new protection relays.
- Estimated cost to complete $800,000
- Estimated time to complete 8 weeks +/-

Partial Fix Existing

Pro's

- Can support generation
- Don't need more grading/earthwork
- Can use two existing 15kV breakers
- Controls are routed to plant control room
- Provides electrical path for plant aux power
- Faster and cheaper plan than Fix All
- Adds line relaying

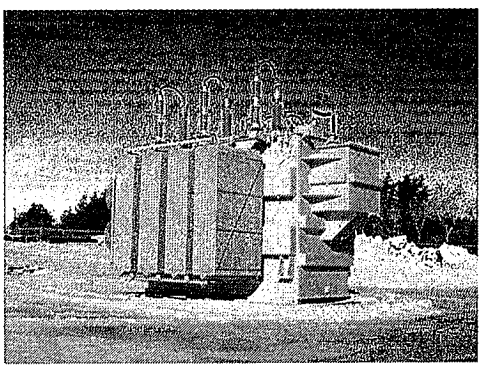
Con's

- Does not have full capacity for loss of West Sub (only 2 feeders).
- Don't know extent of control system damage/replacement
- Costs more than intermediate
- Cleanup has to occur before return-to-service
- Impedes T2 repair/replacement

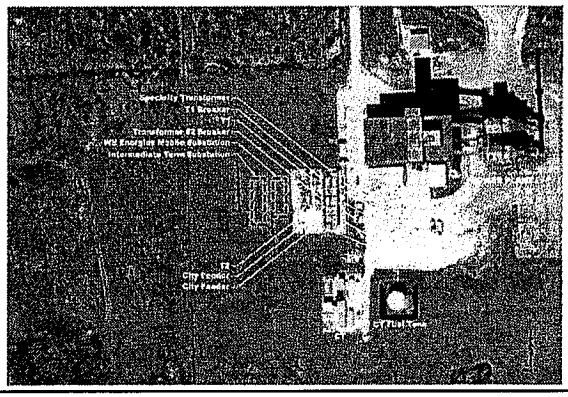
Option #3
Construct New Intermediate Substation Adjacent to the Existing Substation

- Grade and fence area west of existing sub under ESC #2 line, move and set 69kV breaker, spare transformer, relay panels and install four (4) temporary cable feeder lines to connect to existing overhead feeder lines. Requires temporary control enclosure/battery/grounding-tie to existing substation grounding grid for support.
- Estimated cost to complete $500,000 (with the use of our on-hand transformer and other on-hand equipment)
- Estimated time to complete 4 weeks +/-

TRANSFORMER



Intermediate Term Substation Relocation Site



Intermediate at Power Plant

Pro's

- Fastest full capacity backup for West Sub/all of City
- Controllable Schedule – all new/no surprises
- Implementation does not require assessment of existing damaged equipment nor does proceeding with the plan impede insurance survey.
- No reliance on existing/damaged infrastructure
- Does not hamper repair option if generation is needed
- Quickest way to return leased mobile sub to WE Energies

Con's

- Some grading/earthwork/ fencing required
- Some construction/grounding will be abandoned when complete.
- Needs temporary feeder tie lines.
- Costs to relocate equipment to permanent site once that project is complete.
- Does not support generation restoration

Option #4
Combine New Intermediate Substation and Partially Repair Existing Substation

- Construct temporary sub first to mitigate public safety/operational risk concerns (get full-capacity backup)
- Damage assessment then fix existing substation to get some generation plus two feeder outlets
- Shares control enclosure, battery system, grounding, line protection panel
- Estimated cost to complete $1,200,000 (as we will share some work if we do Option #3 then have to extend it to Option #4)
- Estimated time to complete 8 weeks +/-

Intermediate at Power Plant + Partial Fix

Pro's

- Full capacity backup for West Sub/all of City first and fastest
- Provides generation outlet
- Does not require second power transformer nor replacement of some breakers which results in less cost than fix all option
- Isolates generation controls from substation/feeder controls
- Adds line protection relaying

Con's

- Some grading/earthwork/ fencing required
- Some construction/grounding will be abandoned when complete.
- Needs temporary feeder tie lines.
- Costs more than single options.
- Costs to relocate equipment to permanent site once that project is complete.

Option #5
Construct New Intermediate Substation at Permanent Location on 20th Avenue North

- Grade and fence undefined total substation area, install grounding grid, concrete foundations, cable raceways, ask ATC to build temporary transmission line extension, install spare transformer/69kV breaker/ switches /steel/concrete pads/building, control systems.
- Estimated cost to complete $2,000,000
- Estimated time to complete 50 weeks +/-

Intermediate at Permanent Location

Pro's

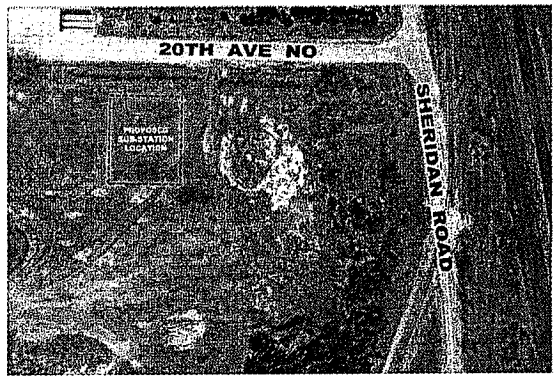
- Full capacity backup for West Sub/all of City
- Does not require equipment relocation when complete

Con's

- Complete grading/earthwork/fencing required
- Winter construction for subgrade excavations
- Requires more design time for foundations/steel structures
- Have to work around energized equipment for completion of project
- Coordination/design details not vetted
- Takes longer to implement than other options
- Will not be completed in time for "summer peak"

Siting Location in Relation to Power Plant – Bird's Eye View

Siting Location in Relation to Power Plant – Close Up



Restoration Option Summary

Option	Estimated Cost	Estimated Timeframe
#1 Fix All of Existing Substation	$4,000,000	40 weeks +/-
#2 Fix Part of Existing Substation	$800,000	8 weeks +/-
#3 New Intermediate Sub near Power Plant	$500,000	4 weeks +/-
#4 New Intermediate and Partial Fix of Existing Substation	$1,200,000[1]	8 weeks +/-
#5 New Intermediate Sub at Permanent Location	$2,000,000	50 weeks +/-

[1] As we will share some work if we do Option #3 then have to extend it to Option #4.

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Staff Recommendation

- Staff is recommending Council approve proceeding with Option 3 which is the fastest path "to normal" distribution strength. Additionally, it is the least cost option and can be turned into Option 4 if MISO determines that our generation must be placed back in service.
- It is the opinion of staff and others that Option 1 and 5 will take too long to complete and will not be ready and able to support City load in the months of June to September.
- It is the opinion of staff and others that Option 2 places the City of Escanaba in a vulnerable situation should something occur at the west side substation.
- Depending on the needs of MISO, Option 4 is an extension of Option 3 which would allow generation to be added to the system should MISO call for that.

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