Thurston County - Step by Step

Simulcast Forum 2000

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Fire Simulcast System

- Multiple simplex sites with voted receivers.
- Dispatchers had to manually select sites for dispatch.
- Some departments had to be toned on two sites.
- 727 square miles - 230,000 population
Radio System Improvements

• New dispatch center
• Digital loop microwave
• Simulcast fire radio system
Simulcast System Design Steps

• Five sites
• Five frequencies
• Not all frequencies on all sites.
Initial situation

- Owner’s goal to use existing sites.
- Not all sites on new digital microwave.
- Fire users were a particular bunch.
- CTCSS required on transmit.
- High frequency Plectron paging tones >2500 Hz.
Design situation

- Customer self maintained so an automated system was desired.
- Computer generated coverage predictions showed:
  - New sites needed to provide for coverage.
  - New sites needed because overlaps too big.
- High paging frequencies resulted in a modified approach.
- Loop microwave required special switching.
Design steps taken

• Develop coverage and timing predictions.
• Select sites.
• Review site facility requirements.
• Review customer paging tone and CTCSS requirements.
• Review and develop customer console interfaces.
• Review and engineer microwave changes.
• Evaluate existing RF infrastructure.
• Select equipment.
Equipment selection

• Tait simulcast controller.
• New Tait base stations.
• Spectracom GPS oscillators with CTCSS.
• Telco Systems channel banks.
• Western Multiplex 5.8 GHz microwave.
System Testing

- Verify basic system connectivity and basic channel bank adjustment.
- Input phase delay offsets into the Tait controller, controller automatically adjusts levels and timing.
- Drive testing, showed overlap problems and frequency offset problems.
- Removing offsets made big improvement in system.
- Adjusted delay offsets in Tait controller and modified base station power levels to adjust overlap area.
- Tested microwave loop back switching to make sure system is properly adjusted for both directions.
End results

• Tait system has been reliable.
• RF performance of the Tait base stations has been excellent.
• Generating CTCSS at the Spectracom works well.
• Audio quality not as good as single site systems but users are getting used to it and RF coverage is much better.