

# Analysis of Potential Media Interference for the Proposed NDBaldwin WindFarm

June 29, 2009

Previous literature has examined the impact of wind turbine generators on various media communications (AM/FM radio and Off-Air Television) and has demonstrated the potential for interference [1]. The extent of the interference created by wind turbines has been gradually diminished over the past decade due to advances in turbine manufacturing and transmitter/receiver antenna design. This has significantly reduced the impact on AM and FM radio systems to the point where only small degradation of signal is noticed a few meters from a turbine location [1]. With the switch to Digital Television (DTV) on June 12<sup>th</sup>, 2009 in the United States, the concern of ghost images and flickering caused by wind turbine interference with analogue signals are no longer an issue. Wind turbines have no impact on digital picture quality, but may impact signal strength to receivers within 5 km of a turbine [2]. To determine the potential effect of a wind farm the signal strength and coverage area of each television station is analyzed below. It is important to note that it is difficult to accurately pinpoint the impact of large wind farms for each individual household, as there are several factors that need to be considered.

- Coverage of AM and FM radio services are not expected to be impacted by the wind farm because there are no transmitter towers located within the project boundary and turbines will be constructed a sufficient distance from each dwelling (427m).
- According to the Federal Communications Commission (FCC), over the air television coverage is strong to moderate within the project area, with many stations transmitting from Bismarck, ND. Table 1 shows the signal strength of off-air stations near the project area as calculated by a terrain-sensitive propagation model.
- Coverage maps of each off-air station near the project boundary are available below. With the exception to station KNDX (FOX), full power coverage of the off-air stations fully encompass the project area providing strong to moderate signal strength. Coverage for KNDX extends to the northern edge of the project area and may be impacted.
- From the above analysis, it is expected that homes with the greatest potential of signal interference from wind turbines will be within the northern portion of the project area, where the signal is weakened. Station KNDX is expected to be impacted the most.

[1] Sengupta, D.L. and Senior, T. B. A., "Electromagnetic Interference from Wind Turbines", *Wind Turbine Technology*, Chapter 9, ASME Press, 1994.

[2] ITU-R BT.805, Assessment of impairment caused to television reception by a wind turbine, 1992.

CALLSIGN	LICENSEE	STATION / Network	LAT	LON	Distance to Project (km)
KBME	Prairie Public Broadcasting, INC.	3-1	46.5897222	-100.8005556	44.54
KFYR	Hoak Media of Dakota License, LLC	5-1	46.6055556	-100.8061111	42.91
KXMB	Reiten Television, INC.	12-1	46.5897222	-100.8005556	44.54
KNDX	Prime Cities Broadcasting, Inc.	26-1	46.5897222	-100.7941667	44.54

**Table 1** Digital television signal strength as indicated by the FCC terrain-sensitive propagation model for Regan, ND. A strong signal is indicated by the green highlight, a moderate signal by the yellow highlight, and a weak signal by the red highlight. These signal strength calculations are approximate and assume limited impacts of buildings, weather, and antenna design.

**Digital Television Station Coverage  
Maps  
for the  
Baldwin, ND Wind Farm Project**

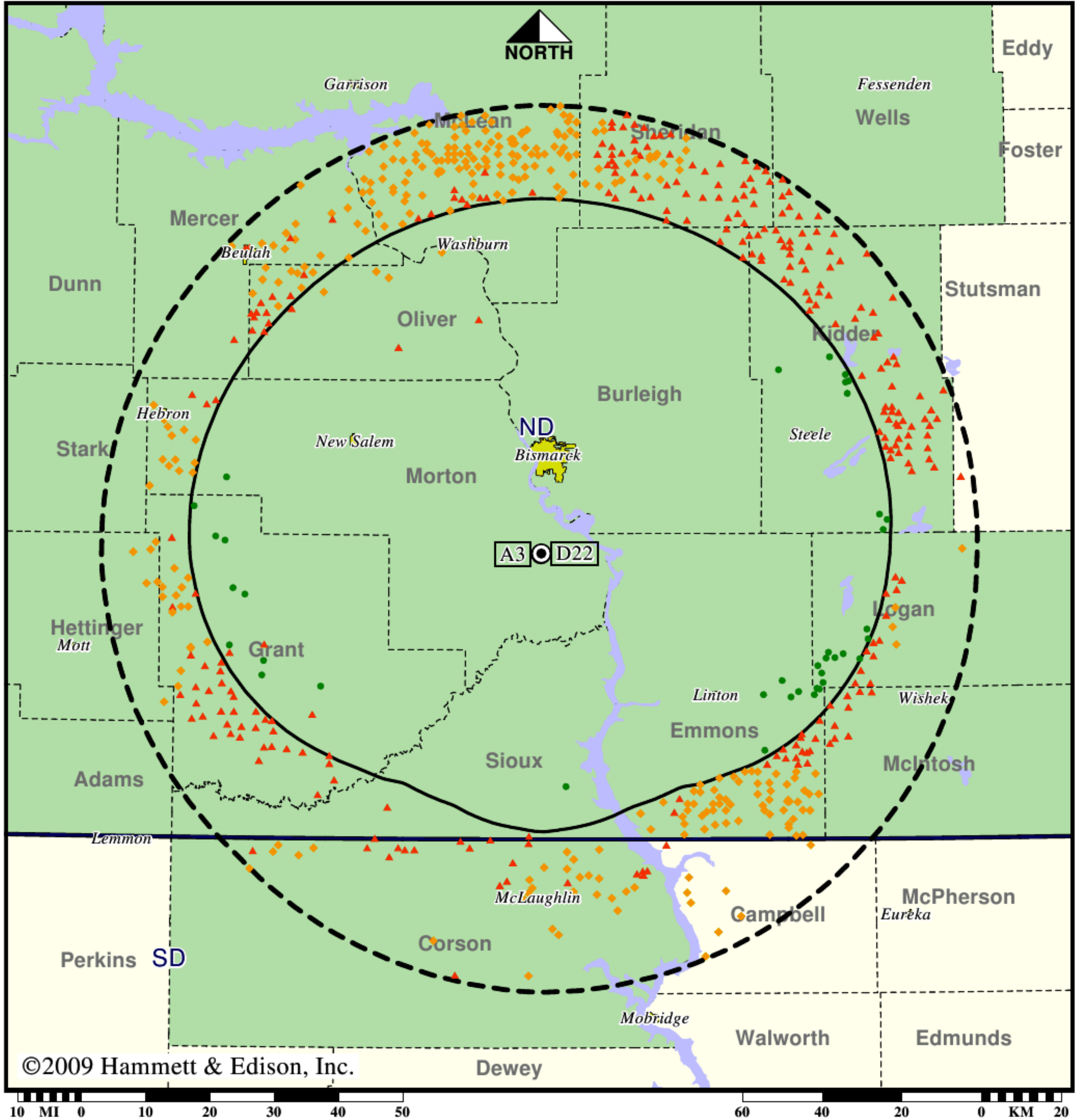
Maps courtesy of the FCC  
Expected digital coverage areas  
Current as of June 29, 2009

**Station KBME-TV • Analog Channel 3, DTV Channel 22 • Bismarck, ND**

**Expected Operation on June 13: Licensed**

**Digital License (solid): 97.3 kW ERP at 392 m HAAT, Network: PBS  
vs. Analog (dashed): 79.4 kW ERP at 425 m HAAT, Network: PBS**

**Market: Minot-Bismarck-Dickinson, ND**



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- Coverage gained after DTV transition
- No symbol = no change in coverage
- ◆ Coverage lost but still served by same network
- ▲ Coverage lost and no other service by same network

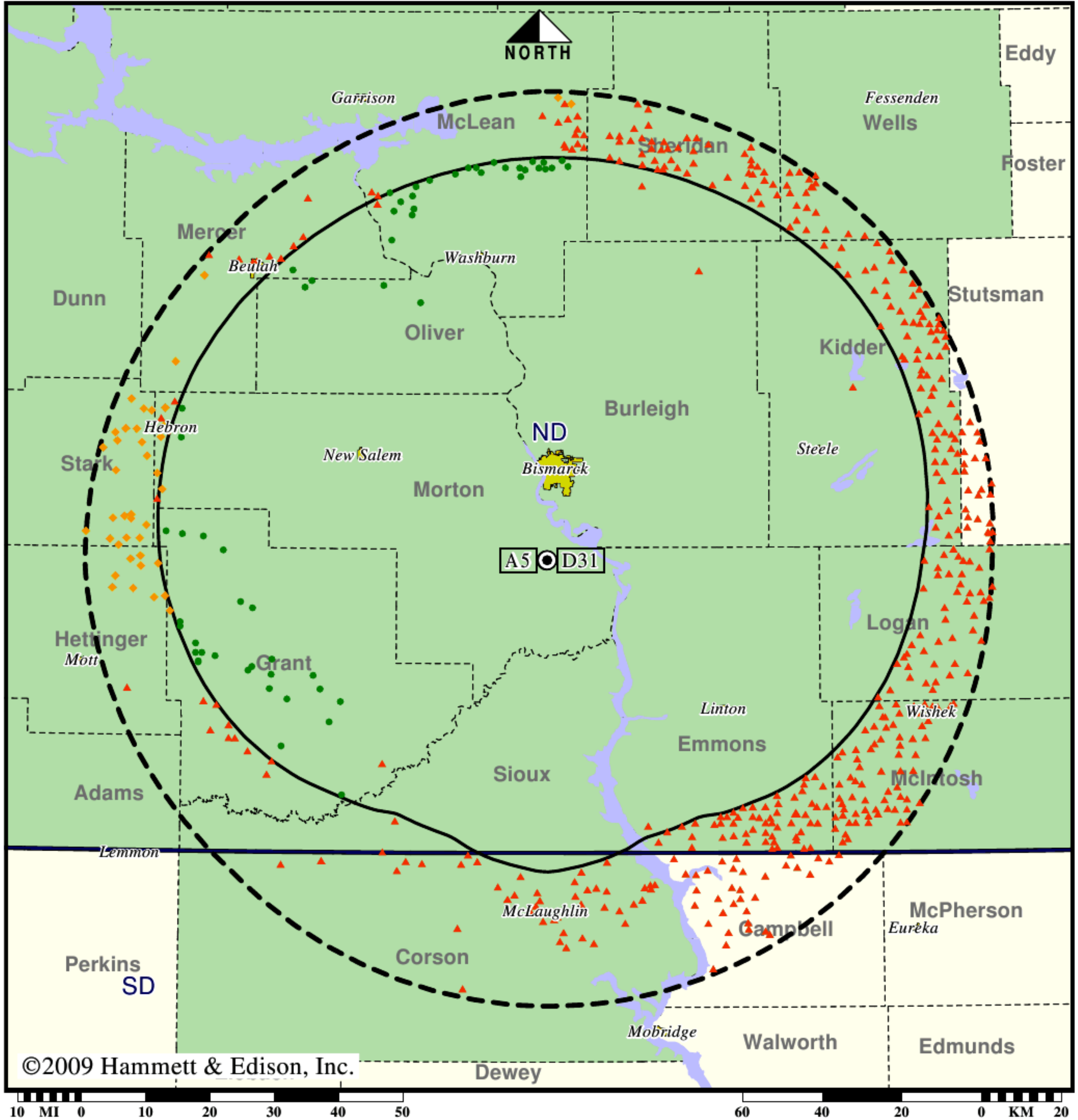
Analog service	121,020 persons
Digital service	110,625
Analog loss	10,941
Digital gain	546
Net gain	-10,395

**Station KFYP-TV • Analog Channel 5, DTV Channel 31 • Bismarck, ND**

**Expected Operation on June 13: Licensed**

**Digital License (solid): 500 kW ERP at 389 m HAAT, Network: NBC**  
**vs. Analog (dashed): 100 kW ERP at 427 m HAAT, Network: NBC**

**Market: Minot-Bismarck-Dickinson, ND**



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- Coverage gained after DTV transition
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- ◆ Coverage lost but still served by same network
- ▲ Coverage lost and no other service by same network

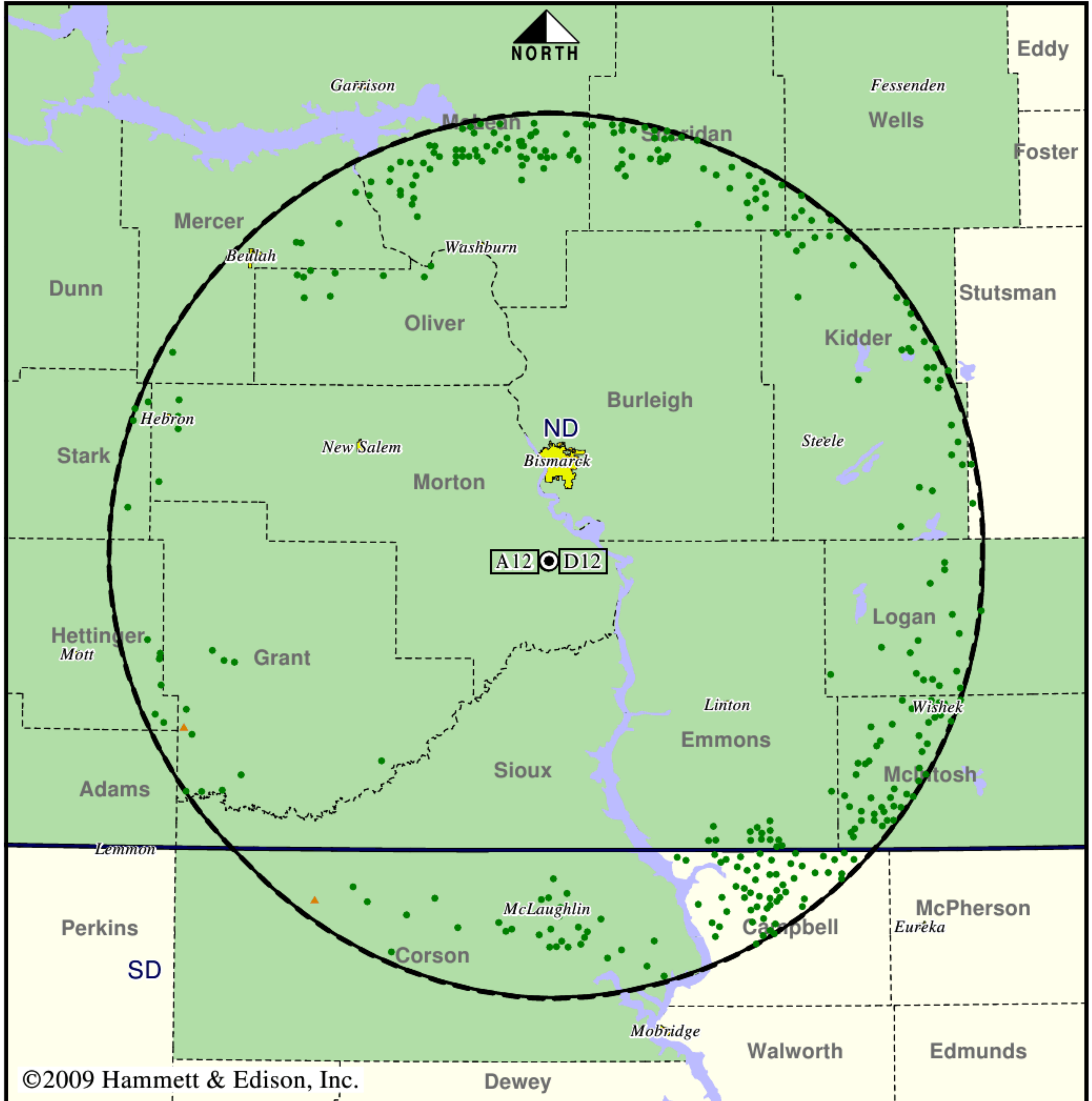
Analog service	125,413 persons
Digital service	118,436
Analog loss	8,387
Digital gain	1,410
Net gain	-6,977

**Station KXMB-TV • Analog Channel 12, DTV Channel 12 • Bismarck, ND**

**Expected Operation on June 13: Granted Construction Permit**

**Digital CP (solid): 19.1 kW ERP at 444 m HAAT, Network: CBS  
vs. Analog (dashed): 316 kW ERP at 466 m HAAT, Network: CBS**

**Market: Minot-Bismarck-Dickinson, ND**



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- Coverage gained after DTV transition
- No symbol = no change in coverage
- ▲ Coverage lost after DTV transition

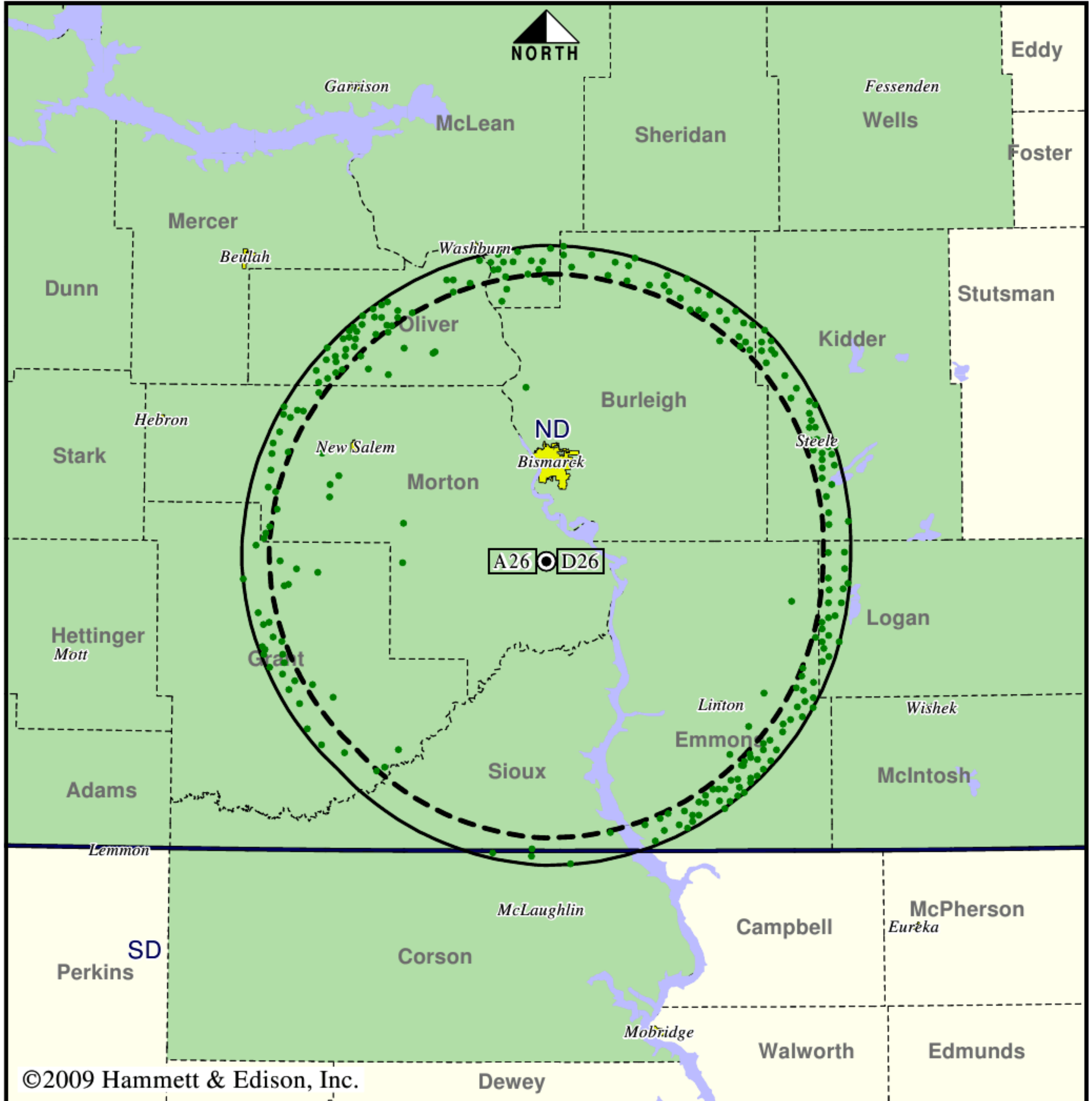
Analog service	119,433 persons
Digital service	126,503
Analog loss	4
Digital gain	7,074
Net gain	7,070

**TV Station KNDX • Analog Channel 26, DTV Channel 26 • Bismarck, ND**

**Expected Operation on June 13: Granted Construction Permit**

**Digital CP (solid): 50.0 kW ERP at 300 m HAAT, Network: Fox  
vs. Analog (dashed): 741 kW ERP at 300 m HAAT, Network: Fox**

**Market: Minot-Bismarck-Dickinson, ND**



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- Coverage gained after DTV transition
- No symbol = no change in coverage

Analog service	100,820 persons
Digital service	104,571
Analog loss	0
Digital gain	3,751
Net gain	3,751