

**A Report To The
Corporation for Public Broadcasting
Regarding**

**Potential Impacts To
Public Television Transmission
Facilities From
Post-Auction TV Band Repacking**



**Dennis Wallace
William Meintel
MEINTEL, SGRIGNOLI, & WALLACE, LLC
1282 Smallwood Drive, Suite 372
Waldorf, MD 20603
(202) 251-7589**

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Executive Summary

The firm of Meintel, Sgrignoli, and Wallace, LLC (MSW) is pleased to provide the following report to the Corporation for Public Broadcasting (CPB) in response to its Scope of Work to provide Post-Auction Spectrum Planning services to CPB. Specifically, MSW was tasked with studying the potential impacts to Public Television Station Transmitter Facilities that may result from the TV Band Repack and associated DTV Station channel changes and facility modifications (TV Bystander Stations).

With the FCC's Incentive Auction now complete, Digital Television stations will be repacked to channels 2-36. These channel changes are likely to impact some Public Television stations that will not be changing channels in the TV Band Repacking; but they do share tower or are near-co-located with a television station that is being repacked to a new channel. These are so-called "Bystander" stations in that they are impacted, but are not changing channels as part of the channel re-assignment and repacking.

There are several possible impacts to Bystander stations ranging from down-time during rigging and derigging operations to loss of tower space and possible relocation due to tower structural limits. The specific impact is highly dependent upon the specific tower situation as well as the new channel assigned to the co-located TV Station(s).

A. Potentially Impacted Television Stations

With the completion of the FCC's Incentive Auction, MSW has updated its study to determine the number of CPB Eligible Television Stations that are co-located on the same tower as one or more TV Stations that are being repacked. The study indicates that approximately 22 CPB-Eligible television stations are co-located with another Full Power TV station or Class A TV station that will be repacked as part of the FCC's repacking process. See Appendix A for a list of stations meeting this criterion.

In addition, MSW conducted a study to determine the number of CPB Eligible Television Stations that are near-co-located (within 250 Meters) with one or more TV Stations that are being repacked. The study indicated that approximately 14 CPB-Eligible television stations are near-co-located within 250 meters of a full-power or class A TV station that is being repacked to a new channel. These near-co-located stations may also be impacted to a lesser extent. However, there is still some potential for impact to these stations such as reduced power operation to meet RFR compliance requirements. See Appendix B for a list of these stations.

B. Possible Repack Effects

There are a number of possible scenarios and situations that could lead to an impact on a public television station. These impacts range the gamut from some off-air or reduced power operation to loss of the stations antenna location due to overloading of the tower

structure and the need to remove loads to accommodate the new DTV antennas on the tower structure.

Below we've attempted to list the most likely situations or scenarios that television stations will likely face with the facility modifications required for the DTV repack.

- **RF Radiation Compliance** – The television station may need to reduce power or go off the air during rigging and derigging operations on a shared tower structure. Stations may also find that reduced power or off-air time is required for tower crews working in or near the aperture of the television station.
- **Tower Rigging in Aperture of TV Antenna** – Stations may find that gin poles, transmission lines, or other rigging requires the temporary removal of the TV antenna in order to accommodate the construction or installation of the new DTV antenna.
- **Transmission Line Changes** – Television Stations may find that transmission lines for their facilities or those of the co-located TV station need to be relocated on the tower to accommodate new loads, changes in routing, or other necessary changes.
- **Tower Structural Loading Changes** – Stations may find that new DTV antennas are much larger structural loads (lower frequency) which require the removal of other loads in order to accommodate the new DTV antenna. Several scenarios are possible here such as reduced TV antenna aperture, removal of other Antennas in order to free up structural capacity, or possibly the need to change the height or location of the TV antenna in order to meet the structural loading limits of the tower.
- **New Structural Loading Standard** – There are new structural standards in place now that EIA-222-G is the current standard. Many structures will not pass the loading analysis under the new standard and may need to be significantly modified in order to support the new DTV antenna. In the worst case scenario, for some towers it may not be feasible to modify them to meet the new structural standards in which case, they may need to be completely replaced with a new tower. There exist many towers that were built under the EIA-222-C revision and may not be candidates for structural modifications without significant reduction in loading.
- **Removal of Old Antennas and Transmission Lines** – Some TV stations that have “won” in the auction and have agreed to give up their existing TV Channel, may need to remove their decommissioned equipment and this process of equipment removal may impact television stations significantly.
- **TV Station Auxiliary or Temporary Antennas** – The FCC has a very aggressive schedule for the TV Band Repack. This schedule is broken into 10 phases over 39 months. Many TV Stations are unlikely to be able to complete the construction of the final DTV Facilities within the 39 month (or shorter) construction window. Therefore, many TV stations are likely to build “temporary” or “interim” facilities with side-mounted antennas. In this case, additional space may be needed on the tower to accommodate the temporary facilities that many TV stations are likely to build.

- **Helicopter Lifts** – For some of the very large community tower structures (such as Willis Tower and others), the most efficient antenna removal and installation technique may involve using Helicopter Cranes for some of the work. These operations generally require stations to go off the air or significantly reduce power during these operations.
- **All Stations on the same tower may not be scheduled together** – The FCC has laid out a 10-phase transition schedule for TV Stations to build their new facilities and place them on the air in a staggered fashion. At this time, however, it is not known if all stations on the same tower would be scheduled in the same phase. Therefore, television stations may find that they have several stations making changes at different times and therefore may have to accommodate two or three different facility changes that are scheduled months apart.
- **Facility AC Power System Modifications** – Stations may find the in order to accommodate new transmitters, some electrical distribution system modifications are necessary for the site. Consequently, stations may find that some off-air time is required in order to allow electrical system modifications and construction as well as transitioning to new AC circuits.
- **Tower Crew Availability Will Be Limited** – Stations should be prepared for constraints in the availability of tower crews during the 39 month construction period. Tower Crews will likely be unavailable for regular maintenance operations as well as for emergency antenna or transmission line burn outs or repairs. Since most crews will be busy working on the TV Repack projects, other non-repack stations may find it difficult to find crews to work with on their antenna projects and other tower work. Any tower or antenna work that television stations anticipate completing in the next three years should be completed immediately or deferred until after the TV Repack is completed. See Appendix C for sample Station Phase Assignment and Construction Schedule.

C. No FCC Reimbursement for “Bystander” Television Station Costs

The FCC has made it clear that there will be no reimbursement of costs for “bystander” television station facility changes unless there is a written contractual obligation for the Repack TV station to pay for the Bystander station facility modifications. Consequently, it is not expected that any of the FCC Relocation Funds will be available to Bystander stations for their expenses.

Consequently, Bystander television stations should prepare for the expenses that are likely to be incurred by them and not reimbursable from the FCC. Budgeting for these scenarios would be prudent, given that the FCC schedule is very aggressive and will not likely be sympathetic to stations that cause delays in their repacking schedule.

D. Mitigation of Station Disruption

As noted above, there will be various situations and scenarios that may develop on the shared tower structures occupied by both Repack and Bystander TV Stations. Planning for these impacts and potential service disruptions should be undertaken immediately to ensure that stations are prepared. There are some potential options that Bystander television stations should consider to minimize the impact on their operations.

The best mitigation will vary from station-to-station and market-to-market, however, the following solutions may be useful for stations to consider:

- **Off Site Auxiliary or Temporary Operations** – The best logistical solution would be to operate from another site and tower some distance away while construction is underway on the main tower structure.
- **Off Site Auxiliary or Temporary Operations on Combined Antenna** – Another possibility would be to operate temporarily on a combined antenna system that is on another structure away from the main tower site.
- **Auxiliary Antenna Mounted in Location Away from Tower Workers** – If another tower site is not an option, and operations must continue at the existing site. A temporary or Aux antenna mounted at a lower height or in a location that would allow workers to work in the Repack TV Aperture would allow continued operations during modification work. Options such as a temporary broadband panel antenna or a small 8-bay slot antenna, side-mounted on a lower section of the tower may be viable or at least minimize the off-air time.
- **Combine with Other Stations for Temporary / Aux Antenna on the same tower** – Combining with other stations on a temporary antenna on another structure would allow stations to continue to operate without the need to power up/down during the times workers are near the main antenna. By spreading the costs across several stations, this may be an economical solution.

E. Suggested Station Preparation Steps

Stations should be prepared for possible impacts and disruptions from the DTV repack. It is suggested that stations take the following steps to prepare their facilities and stations in case the disruption to station operations becomes unavoidable.

- Research which DTV stations are on your shared tower and where they are located relative to your television station antenna.
- Understand which stations will be repacked such as stations on channels 38-51 as well as those stations on channels 2-36 that will be changing channels to accommodate stations moving to in-core channels.
- Understand which stations were “winners” in the spectrum auction and will be vacating their existing channel – and antenna aperture.

- Understand that the FCC will repack approximately 987 TV stations as part of the repacking process. Determine which stations on your shared tower will be changing channels.
- Understand the FCC Phase Assignment process and which phases have been assigned to the DTV stations on your shared tower. These are the deadlines the TV Stations must meet for their project. (See Appendix C).
- What is the plan for the Repack DTV station antenna and transmission line change out?
- What is the rigging plan and will there be a requirement to remove any existing antenna sections?
- What is required of your station to power up/down when workers are on the tower?
- Is relocation of the Bystander TV Station antenna or other equipment required?
- Will there be any changes to the AC Power Distribution?

Conclusions:

Based upon the forgoing study, there are a significant number of CPB-Eligible public television stations that may potentially be impacted by the FCC TV Spectrum Repacking.

The MSW study indicates that approximately 14 CPB-Eligible television stations are near-co-located (within 250 meters) with a full power or class A TV station that will be repacked.

Furthermore, approximately 22 CPB-Eligible television stations are co-located on the same tower structure as a full power or class A TV station that is being repacked.

The constraints on tower crews and other resources may make any changes or modifications to television facilities problematic as tower crews with broadcast experience will likely be otherwise engaged with TV Repack projects.

Public Television Stations should understand the potential impacts to their operations, develop a plan on how to accommodate those impacts, as well as develop a budget for the expenses that are likely to be incurred and not reimbursed by the FCC.

APPENDIX A

**CPB Eligible Television Stations Co-Located
With Full Power or Class A TV Stations
That Are Being Repacked**

POTENTIAL INCENTIVE AUCTION REPACK IMPACT ON CPB ELIGIBLE DTV STATIONS NOT BEING REPACKED

POTENTIALLY IMPACTED CPB ELIGIBLE DTV REPACKED DTV STATIONS

Site Proximity	Channel	City	State	Call	Facility ID	Channel	City	State	Call	Facility ID	Separation Distance (km)	ASR Number
Same Tower	10	BIRMINGHAM	AL	WBIQ	717	20	BIRMINGHAM	AL	WABM	16820	0.00	1226663
Same Tower	10	BIRMINGHAM	AL	WBIQ	717	21	HOMEWOOD	AL	WTTO	74138	0.00	1226663
Same Tower	7	LITTLE ROCK	AR	KETS	2770	34	PINE BLUFF	AR	KASN	41212	0.00	1036554
Same Tower	9	SACRAMENTO	CA	KVIE	35855	33	SACRAMENTO	CA	KTXL	10205	0.00	1012278
Same Tower	30	SAN FRANCISCO	CA	KQED	35500	12	SAN FRANCISCO	CA	KGO-TV	34470	0.00	1001289
Same Tower	30	SAN FRANCISCO	CA	KQED	35500	31	OAKLAND	CA	KTVU	35703	0.00	1001289
Same Tower	30	SAN FRANCISCO	CA	KQED	35500	27	SAN MATEO	CA	KCSM-TV	58912	0.00	1001289
Same Tower	30	SAN FRANCISCO	CA	KQED	35500	7	SAN FRANCISCO	CA	KRON-TV	65526	0.00	1001289
Same Tower	30	SAN FRANCISCO	CA	KQED	35500	28	SAN FRANCISCO	CA	KBCW	69619	0.00	1001289
Same Tower	30	SAN FRANCISCO	CA	KQED	35500	32	SAN FRANCISCO	CA	KCNS	71586	0.00	1001289
Same Tower	33	WASHINGTON	DC	WHUT-TV	27772	14	WASHINGTON	DC	WETA-TV	66670	0.00	1051670
Same Tower	33	WASHINGTON	DC	WHUT-TV	27772	35	MANASSAS	VA	WPXW-TV	74091	0.00	1051670
Same Tower	30	COCOA	FL	WEFS	6744	24	NEW SMYRNA BEACH	FL	WDSC-TV	12171	0.00	1063249
Same Tower	30	COCOA	FL	WEFS	6744	28	ORLANDO	FL	WRBW	54940	0.00	1063249
Same Tower	13	TAMPA	FL	WEDU	21808	20	TAMPA	FL	WFTT-DT	60559	0.00	1211242
Same Tower	34	DAVENPORT	IA	KQIN	5471	17	DAVENPORT	IA	KWQC-TV	6885	0.00	1225582
Same Tower	34	DAVENPORT	IA	KQIN	5471	30	DAVENPORT	IA	KLJB	54011	0.00	1225582
Same Tower	34	DAVENPORT	IA	KQIN	5471	31	MOLINE	IL	WQAD-TV	73319	0.00	1225582
Same Tower	18	MASON CITY	IA	KYIN	29086	24	MASON CITY	IA	KIMT	66402	0.00	1253749
Same Tower	23	MOLINE	IL	WQPT-TV	5468	17	DAVENPORT	IA	KWQC-TV	6885	0.00	1225582
Same Tower	23	MOLINE	IL	WQPT-TV	5468	30	DAVENPORT	IA	KLJB	54011	0.00	1225582
Same Tower	23	MOLINE	IL	WQPT-TV	5468	31	MOLINE	IL	WQAD-TV	73319	0.00	1225582
Same Tower	11	TOPEKA	KS	KTWU	70938	20	TOPEKA	KS	KTMJ-CD	43649	0.00	1032651
Same Tower	20	AUSTIN	MN	KSMQ-TV	28510	26	ROCHESTER	MN	KXLT-TV	35906	0.00	1063897
Same Tower	8	BOZEMAN	MT	KUSM-TV	43567	29	BOZEMAN	MT	KDBZ-CD	18083	0.00	1000681
Same Tower	35	ALBUQUERQUE	NM	KNME-TV	55528	36	ALBUQUERQUE	NM	KASY-TV	55049	0.00	1225205
Same Tower	13	OKLAHOMA CITY	OK	KETA-TV	50205	18	OKLAHOMA CITY	OK	KOPX-TV	2566	0.00	1045226
Same Tower	13	OKLAHOMA CITY	OK	KETA-TV	50205	25	OKLAHOMA CITY	OK	KWTV-DT	25382	0.00	1045226
Same Tower	13	OKLAHOMA CITY	OK	KETA-TV	50205	19	OKLAHOMA CITY	OK	KAUT-TV	50182	0.00	1045226
Same Tower	13	OKLAHOMA CITY	OK	KETA-TV	50205	16	NORMAN	OK	KOCM	84225	0.00	1045226
Same Tower	11	TULSA	OK	KOED-TV	66195	26	TULSA	OK	KOTV-DT	35434	0.00	1011355
Same Tower	11	TULSA	OK	KOED-TV	66195	16	TULSA	OK	KWHB	37099	0.00	1011355
Same Tower	10	PORTLAND	OR	KOPB-TV	50589	36	PORTLAND	OR	KKEI-CD	71078	0.00	1204059
Same Tower	10	PORTLAND	OR	KOPB-TV	50589	15	VANCOUVER	WA	KOXO-CD	71080	0.00	1204059
Same Tower	22	AUSTIN	TX	KLRU	8564	34	AUSTIN	TX	KEYE-TV	33691	0.00	1234758
Same Tower	14	DALLAS	TX	KERA-TV	49324	27	DALLAS	TX	KDFI	17037	0.00	1059733
Same Tower	14	DALLAS	TX	KERA-TV	49324	23	GREENVILLE	TX	KTXD-TV	42359	0.00	1059733
Same Tower	14	DALLAS	TX	KERA-TV	49324	29	DENTON	TX	KDTN	49326	0.00	1059733
Same Tower	14	DALLAS	TX	KERA-TV	49324	18	FORT WORTH	TX	KTXA	51517	0.00	1059733

Same Tower	14	DALLAS	TX	KERA-TV	49324	34	IRVING	TX	KSTR-DT	60534	0.00	1059733
Same Tower	14	DALLAS	TX	KERA-TV	49324	21	DALLAS	TX	KDTX-TV	67910	0.00	1059733
Same Tower	14	DALLAS	TX	KERA-TV	49324	25	ARLINGTON	TX	KPXD-TV	68834	0.00	1059733
Same Tower	36	OGDEN	UT	KUEN	69582	35	OGDEN	UT	KUCW	1136	0.00	1062408
Same Tower	36	OGDEN	UT	KUEN	69582	23	SALT LAKE CITY	UT	KSL-TV	6359	0.00	1062408
Same Tower	36	OGDEN	UT	KUEN	69582	17	PROVO	UT	KBYU-TV	6823	0.00	1062408
Same Tower	36	OGDEN	UT	KUEN	69582	19	SALT LAKE CITY	UT	KJZZ-TV	36607	0.00	1062408
Same Tower	36	OGDEN	UT	KUEN	69582	30	SALT LAKE CITY	UT	KTVX	68889	0.00	1062408
Same Tower	36	OGDEN	UT	KUEN	69582	15	SALT LAKE CITY	UT	KUED	69396	0.00	1062408
Same Tower	20	MADISON	WI	WHA-TV	6096	18	MADISON	WI	WMSN-TV	10221	0.00	1033919
Same Tower	20	MADISON	WI	WHA-TV	6096	11	MADISON	WI	WISC-TV	65143	0.00	1033919
Same Tower	8	MILWAUKEE	WI	WMVS	42663	36	MILWAUKEE	WI	WMKE-CD	35091	0.00	1057482
Same Tower	8	MILWAUKEE	WI	WMVS	42663	30	KENOSHA	WI	WPXE-TV	37104	0.00	1057482
Same Tower	8	MILWAUKEE	WI	WMVS	42663	27	MILWAUKEE	WI	WVTV	74174	0.00	1057482

22 Bystander TV Stations on the same tower

APPENDIX B

**CPB-Eligible Television Stations Near Co-Located
(Within 250 Meters)
With Full Power or Class A TV Stations
That Are Being Repacked**

POTENTIAL INCENTIVE AUCTION REPACK IMPACT ON CPB ELIGIBLE DTV STATIONS NOT BEING REPACKED

POTENTIALLY IMPACTED CPB ELIGIBLE DTV REPACKED DTV STATIONS

Site Proximity	Channel	City	State	Call	Facility ID	Channel	City	State	Call	Facility ID	Separation Distance (km)
Near Tower	8	PHOENIX	AZ	KAET	2728	27	PHOENIX	AZ	KASW	7143	0.14
Near Tower	8	PHOENIX	AZ	KAET	2728	22	PHOENIX	AZ	KPDF-CA	73764	0.10
Near Tower	30	TUCSON	AZ	KUAT-TV	2731	34	GREEN VALLEY	AZ	KUVE-DT	63927	0.13
Near Tower	25	WATSONVILLE	CA	KQET	8214	11	SALINAS	CA	KCBA	14867	0.04
Near Tower	8	PUEBLO	CO	KTSC	69170	26	COLORADO SPRINGS	CO	KKTV	35037	0.10
Near Tower	8	PUEBLO	CO	KTSC	69170	28	PUEBLO	CO	KOAA-TV	59014	0.03
Near Tower	8	PUEBLO	CO	KTSC	69170	25	PUEBLO	CO	KVSN-DT	166331	0.06
Near Tower	10	AUGUSTA	ME	WCBB	39659	17	WATERVILLE	ME	WPFO	84088	0.00
Near Tower	17	OMAHA	NE	KYNE-TV	47974	31	OMAHA	NE	KMTV-TV	35190	0.24
Near Tower	8	SANTA FE	NM	KNMD-TV	84215	16	ALBUQUERQUE	NM	KLUZ-TV	35084	0.10
Near Tower	8	SANTA FE	NM	KNMD-TV	84215	36	ALBUQUERQUE	NM	KASY-TV	55049	0.21
Near Tower	11	LAS VEGAS	NV	KLVX	11683	20	PARADISE	NV	KBLR	63768	0.25
Near Tower	11	BEND	OR	KOAB-TV	50588	15	BEND	OR	KFXO-LD	35464	0.18
Near Tower	36	HARRISBURG	PA	WTF-TV	73083	32	HARRISBURG	PA	WHP-TV	72313	0.00
Near Tower	36	OGDEN	UT	KUEN	69582	21	SALT LAKE CITY	UT	KEJT-CD	64974	0.13
Near Tower	3	ROANOKE	VA	WBRA-TV	5981	36	ROANOKE	VA	WFXR	24813	0.04
Near Tower	3	ROANOKE	VA	WBRA-TV	5981	30	ROANOKE	VA	WDBJ	71329	0.19
Near Tower	32	BURLINGTON	VT	WETK	69944	16	BURLINGTON	VT	WFFF-TV	10132	0.14
Near Tower	32	BURLINGTON	VT	WETK	69944	7	BURLINGTON	VT	WVNY	11259	0.14
Near Tower	32	BURLINGTON	VT	WETK	69944	20	BURLINGTON	VT	WCAX-TV	46728	0.15
Near Tower	9	SEATTLE	WA	KCTS-TV	33749	16	SEATTLE	WA	KFFV	49264	0.07
Near Tower	9	SEATTLE	WA	KCTS-TV	33749	36	SEATTLE	WA	KZJO	69571	0.05

14 Bystander TV Stations Near Repack Station

APPENDIX C

**DTV REPACK PHASED
TRANSITION SCHEDULE**

