B-98 Microwave Site Refurbishing, $364,000

Q. Provide the most recent engineering report on the condition of the West Coast Microwave infrastructure showing upgrade work performed to date, a comparison of budgeted and actual capital expenditures over the years from 2001 to 2006F, options considered at this time, and future plans.

A. This program began in 2005. The report on 2005 work is attached. The table below summarizes the information requested.

Year	Location	Budgeted	Actual
2005	Mary March Hill	330,556	347,171
2006F	Blue Grass Hill and Bay d'Espoir Hill	407,300	

Other sites will be budgeted in future as inspections identify deficiencies. Options normally considered include delaying the work or proceeding. Work only proceeds when it is felt that further delay will cause significant deterioration of the site.

Post Construction Inspection Report

EXISTING 387 ft. (118 m)
GUYED TOWER

Mary March Hill, NF.

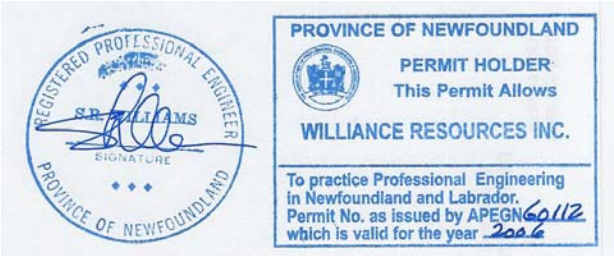
Williance Resources Inc.

Williance Resources Inc.

Issue Date – February 22, 2006

1.0 SITE INFORMATION:

Site Name:	**MARY MARCH HILL**	
Tower Owner:	**Newfoundland and Labrador Hydro**	
Coordinates:	Latitude:	48° 49′ 12″ North
	Longitude:	56° 43′ 15″ West
Structure:	Height:	387 ft. (118 m)
	Construction Type:	Guyed Knock Down LRM 1400
	Cross Section:	Triangular
	Face Width:	55” c/c
	Panel Height:	60” c/c
	Manufacturer:	Leblanc & Royle ~1979?
		Job No. 14B1090
Site Access:	Snowmobile, Compound Keyed (2 Km drive off Main Rd (RR 370) on route to Buchans)	
Inspected by:	Shawn R.Williams, P. Eng, Mark King (Rigger).	
Personnel on site:	NA	
Weather Conditions:	-20° C, Winds 23 KMH, Sunny	
Date of Inspection:	Feb 20 - 2006	
Project Manager :	Carl Holme, P. Eng. - N&L Hydro	
Report Preparation:	Shawn R. Williams, P. Eng.	
Report Review:	Shawn R. Williams, P. Eng.	



2.0 SCOPE OF WORK

Visit the site to perform a complete interim inspection on the work completed under project specification 2005-29646

On Feb 20 –2004 the tower was inspected in detail. Key findings are outlined in the following report.

A keynote is that it was determined that the guy tensions were out of tolerance with respect to CSA S37 – 01.

3.0 WORK CARRIED OUT

Approximately 4.5 hours were spent on site. The tower was climbed and all guy tensions checked.

The guy tensions were taken using the 3 Pulse/swing methods. Guy tensions for these anchors were evaluated with reference to tolerance specified in CSA S37 01 standard. For an existing tower, this is specified as +10% to -10% of the design tension.

As can been seen in the following table, the guys are now generally within tension with the exception of GL#3 which is very low.

Note: Anchor #1 is considered as and measured to be Mag 106º, which is the anchor behind you as one face the fence gate.

Inspection Details.

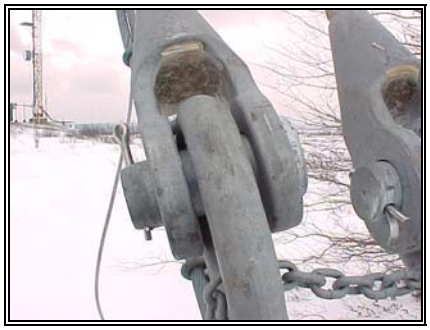
2.1.3 **Tower Paint refurbishment** - Only the top band of the tower has been completed.

2.1.3.5 **Anchors, Excavation and Coating - It is understood that these were completed under the supervision of a NF Hydro Engineer.**

2.1.4.1 **Replacement of the guys at level 4 – 362 ft (110m).** – Complete with note.

Additional Ice Clips are required as per spec, three clips per guy are required.

Note that the Turnbuckles used are larger than the previous, this is considered to be acceptable.



Guy level 3 is considerably under tensioned.

Guy Tension Table									
	Anchor 1			Anchor 2			Anchor 3		
	3 Pulse	Tension	% Des.T.	3 Pulse	Tension	% Des.T.	3 Pulse	Tension	% Des.T
Guy Level 1L	6.87	38,007.62	7%	6.67	9,758.01	22%	6.85	8,982.07	12%
Guy Level 1R	7.17	34,078.96	-4%	6.86	9,102.68	14%	6.87	8,916.87	11%
Guy Level 2	9.80	12,952.78	-6%	9.40	14,921.90	8%	9.53	14335.77	4%
Guy Level 3	7.77	5,278.58	-66%	7.85	5,492.46	-65%	8.39	4,292.79	-72%
Guy Level 4L	5.99	16,463.83	6%	6.14	16,336.01	5%	6.15	15,942.00	2%
Guy Level 4R	6.05	16,091.49	3%	6.09	16,646.02	7%	6.07	16,429.59	5%

As can be seen in following table the tower is slightly out of alignment tolerance as recommended in CSA S37 – 01. This is not considered to be of critical concern.

CALCULATED TWIST						CALCULATED ALIGNMENT					
Angle Calc. fr base DEG.	Angle Allow fr base DEG	Status	Angle betw. Elev. DEG.	Angle Allow DEG	Status	R Calc fr base IN.	R Allow fr base IN.	Status	R-Calc betw. Elev. IN.	R-All betw. Elev. IN.	Status
									0.00	0.00	
0.38	5.00	OK				0.46	9.29	OK			
			-1.14	1.25	OK				0.79	0.60	NOK
1.52	5.00	OK				0.46	8.69	OK			
			0.40	4.65	OK				0.48	2.23	OK
1.12	5.00	OK				0.72	6.46	OK			
			0.45	4.95	OK				0.27	2.38	OK
0.67	5.00	OK				0.47	4.08	OK			
			0.67	4.75	OK				0.47	2.28	OK
0.00	3.75	OK				0.00	1.80	OK			
			0.00	3.75	OK				0.00	1.80	OK

2.1.5 **Replacement of the Complete Obstruction Lighting System On The tower - Complete**

As was inspected in the tower and outside the building, all work appears to be complete and work is of good quality.



All connectors are stainless and receptacles have been installed as per specification.

2.1.6 – **Building Foundation Repair and Backfill – Complete with Note**.

New frame material requires painting as per specification.

Back Fill of Site – Complete as per specification.



2.1.7 **Replacement of Security Fence** – Complete with Minor Note

Top row of barbwire needs to be reaffixed at various locations as it has come loose from the stanchions, recommend using tywraps to ensure barbwire remains in place.

2.1.8 **Upgrade of Tower Fall Protection System** - Complete

New Trylon Safety rail has been installed as required throughout the tower.

2.1.9 **Installation of Ice Shield Over Propane Tanks** – Complete

The following is the list of various Maintenance Work as identified in the Specification.

Table 2.1 - MMH Tower Maintenance Work	
Item	Issue
1	Install end cap on top termination for fast arrest cable. – NA new rail was installed

Table 2.1 - MMH Tower Maintenance Work	
Item	Issue
2	The Cable wave dish 6 ft @ 26m Az 282º needs to have the connector sealant removed, drained of water and resealed with electronic curable silicone. Complete
3	Relocate both the support guys for the ice guard over the Andrew HP10 @ 94m, to prevent chafing and replace one ½" turnbuckle. Not Complete
4	**Fix ground at Anchor #3, GL 4 left, no material required.** Complete
5	**Guy markers are to be placed at each guy anchor on the lower of the two guys. 12 markers required.** Complete
6	Tower base **" trim"** grout needs to be replaced. **Do not remove any grout below the tower base.** Complete
7	The three wave guide peers need to be grouted with same material and specification as the tower base restoration. Complete
8	There are existing cement form works rods (12) protruding from the base. These are to be cut flush and sealed with grout while the base is being repaired. Complete
9	Install 2 additional Crosby Group ice clips on all each guys. Lines currently have only 1 clip. Materials: 12 – 13/16" Clips 24 – 1 1/8" Clips Not Complete

Table 2.2 - Radome Replacement						
Supply and Installation of new Radome c/w j-bolts and wire model and removal of existing radomes						
	Path	**Size**	**Make**	**Type**	**Height**	**Model #**
MMH	SBH	3.6m(12')	CW	DA127.1hp	114.3(375)	RFS/CW 311544 Sn #: A912044

Complete

2.3 – <u>MMH Site Maintenance</u>

Table 2.3 - MMH Site Maintenance	
Item	Issue
1	**<u>Brush Clearing</u>** Contractor is to complete minor brushing clearing around all 6 anchors to completely clear to within 50 mm of ground level and to 3 meters of the guy anchors. Allow 5 hrs total in contract. Complete
2	<u>Replace Mounting Bracket for Street Light</u> Complete

Table 2.3 - MMH Site Maintenance	
Item	Issue
3	Securing of Exhaust fan Ice Shield All bolts used to secure ice guard to protect exhaust fan are to be removed, and ice guard is to be repositioned in order to secure bolts in new holes. Existing holes are to be made watertight, and masking compound is to be used with new bolts to ensure watertight seal. Replacement bolts and washers are to be galvanized steel. Ice shield is to be repainted black when removed. Complete Replacement of Building Exterior Steps Existing Pressure Treated exterior steps are to be replaced after building foundation work and leveling work is completed. Steps are to be replaced with grated metal steps (made from welded bar grating), with min 6 ‘ side channel and are to be securely affixed to the new steel building foundation framework. Steps to be primed and painted in accordance with tower painting specifications. See Appendix D for step support details. Complete
4	**Installation of Warning Signage at the Site** Complete – Recommend however, additional Hazard signs be installed in tower at all points where obstructions or platforms are positioned (estimate 8 required). 

Table 2.3 - MMH Site Maintenance	
Item	Issue
5	**Caulking/Sealing of Building Exterior** Exterior surfaces of building must be thoroughly inspected and all deteriorated caulking and electricians mastic putty is to be removed and replaced. All intrusions into building are to be made watertight using professional-grade materials and industry-accepted practices. After porch extension has been correctly leveled/supported, the seam between the building and the extension must also be properly sealed as per this section. Complete
6	**Repair to Steel Building Framework** Existing steel building foundation framework to be completely fully repainted. Surface to be scraped, cleaned with wire brush, as per tower painting specifications. The existing building underside floor truss steelwork is to also completely prepped, primed and painted. Complete
7	**Replacement of Missing/Damaged Fasteners** Exterior of building to be thoroughly inspected (including roof) and any missing, all rusting or damaged fasteners or hangers are to be replaced with stainless steel, self-sealing fasteners. Where holes for missing fasteners exist, new holes should be drilled and correct threaded fasteners used and existing holes sealed as per section above. Complete
8	**Refinishing of Generator Muffler** Generator muffler to be cleaned with wire brushed, prepped and refinished with high-heat muffler paint (aluminum color). Complete
9	**Replace section of Top Fascia approximately 8 ft. (2.75m)** To match existing detail Complete

Table 2.3 - MMH Site Maintenance	
Item	Issue
10	**Gate Repair** Gate was removed at request of NF Hydro Complete

2.4 – MMH Electrical

Table 2.4 - MMH Electrical	
Item	Issue
	Installation of New Underground Service Complete
2.	Remove one auxiliary 120V Duplex receptacle on the end of the porch section and associated tech. wiring back to the duplex receptacle below the HVAC intake near the entrance and seal receptacle box as required. Repair and make good all building damage. Complete

GENERAL NOTES

1) Initial Tension is the design tension which is considered at 10 C for locations below 55° Latitude and 0 C for locations above 55° Latitude. If not specifically given, it is assumed to be 10% of the breaking strength of the guy wire.
2) Measured pulse times, in seconds, are for a total of 3 or 9 pulses.
3) Leg diameter is the projection of the leg, normal to the line of sight and field readings are given in fractions (+/- 1/16's) of the leg diameter.
4) Anchor number one (1) is typically designated as the first anchor clockwise of Magnetic North. Other anchors are noted in a clockwise direction (looking from tower base).
5) Direct and Reversed transit readings (ie. two sets for each anchor set up) are used to compensate for any transit errors.
6) Anchor location are designated as : Outer (A), Middle (B), and Inner (C).
7) L and R reference to guys indicates Left (L) or Right (R)guy (as viewed from the anchor) of a torsion resistor.

The tower inspection is limited to random visual sampling of the steel tower members, bolts, connections, antennas and appurtenances. The inspection sampling refers to surface inspection observations only. All inspections are performed in accordance with CSA S37-01.

The foundation, guys and anchor hardware inspection is limited to an above grade surface inspection of these systems.