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**COMBINED ANNUAL REPORT FOR THE  
BILLY BOY GROUP  
ML's 22284, 30815, 30945 & 30938  
GR393**

**01 DECEMBER 2015 – 30 NOVEMBER 2016**

*LICENSEE:*

**GIANTS REEF EXPLORATION PTY LTD**

A.B.N.009 200 346

**SANTEXCO PTY LTD**

A.B.N.002 910 296

*(both are wholly owned subsidiaries of Emmerson Resources Ltd)*

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DECEMBER 2016

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<input type="checkbox"/>	TENNANT CREEK	SE53-14
<input type="checkbox"/>		1:250 000
<input type="checkbox"/>	TENNANT CREEK	5758
<input type="checkbox"/>		1:100 000

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## **1.0 SUMMARY**

The titles of the Billy Boy Group were acquired by Giants Reef Exploration Pty Ltd (Giants Reef) and Santexco Pty Ltd (Santexco) to search for Tennant Creek style iron oxide copper-gold deposits (IOCG). Giants Reef and Santexco are wholly owned subsidiaries of Emmerson Resources Ltd (Emmerson).

This combined report records the exploration work completed on these titles during the period from 01 December 2015 to the 30 November 2016.

The targets generated in the Billy Boy Group area exhibited geological prospective rocks and structures with overall rankings of Pprb's between 0.310107496 and 0.80479995, unfortunately the target ranking wasn't high enough for exploration activities to re-commence immediately.

Emmerson is currently trialing the application of a new technology 'Archimedes' which is the application of a proprietary algorithm to geophysical data, this is done by the Archimedes group. The aim is to define the existence of ironstones at depth, whether magnetite or hematite and a more accurate representation of the position of such an ironstone in 3D space. Emmerson is trialing this at two separate areas, one in the Eastern Project Area (The Susan Block) and one in the Northern Project Area (Gecko Block). The success of this technology may have large implications for targeting techniques in the entire Tennant Creek Mineral Field, but more specifically the Billy Boy Group.

## **2.0 INTRODUCTION**

The titles of the Billy Boy Group were acquired by Giants Reef and Santexco to search for Tennant Creek style IOCG deposits. Giants Reef and Santexco are wholly owned subsidiaries of Emmerson. And forms part of Emmerson's Eastern Project Area (EPA).

This combined report records the exploration work completed on these titles during the period from 01 December 2015 to the 30 November 2016.

Figure 1 shows the location of the Billy Boy Group with respect to the Tennant Creek Township and figure 2 details the tenure of the Billy Boy Group.

## **3.0 LOCATION**

The Billy Boy Group is located approximately between 19.5km and 26.5km east of the Tennant Creek Township. The Licence falls on the Tennant Creek (5758) 1:100,000 scale map sheet.

The principal access to the group from Tennant Creek is east north east via the Lone Star Mine Road past the Lone Star and Mulga Mines and then on further eastwards, access to the group is via various dirt roads and fence line tracks. However, much of the area is rocky, without tracks and difficult to reach, even in a 4x4 vehicle. The unsealed tracks become impassable during the wet season.

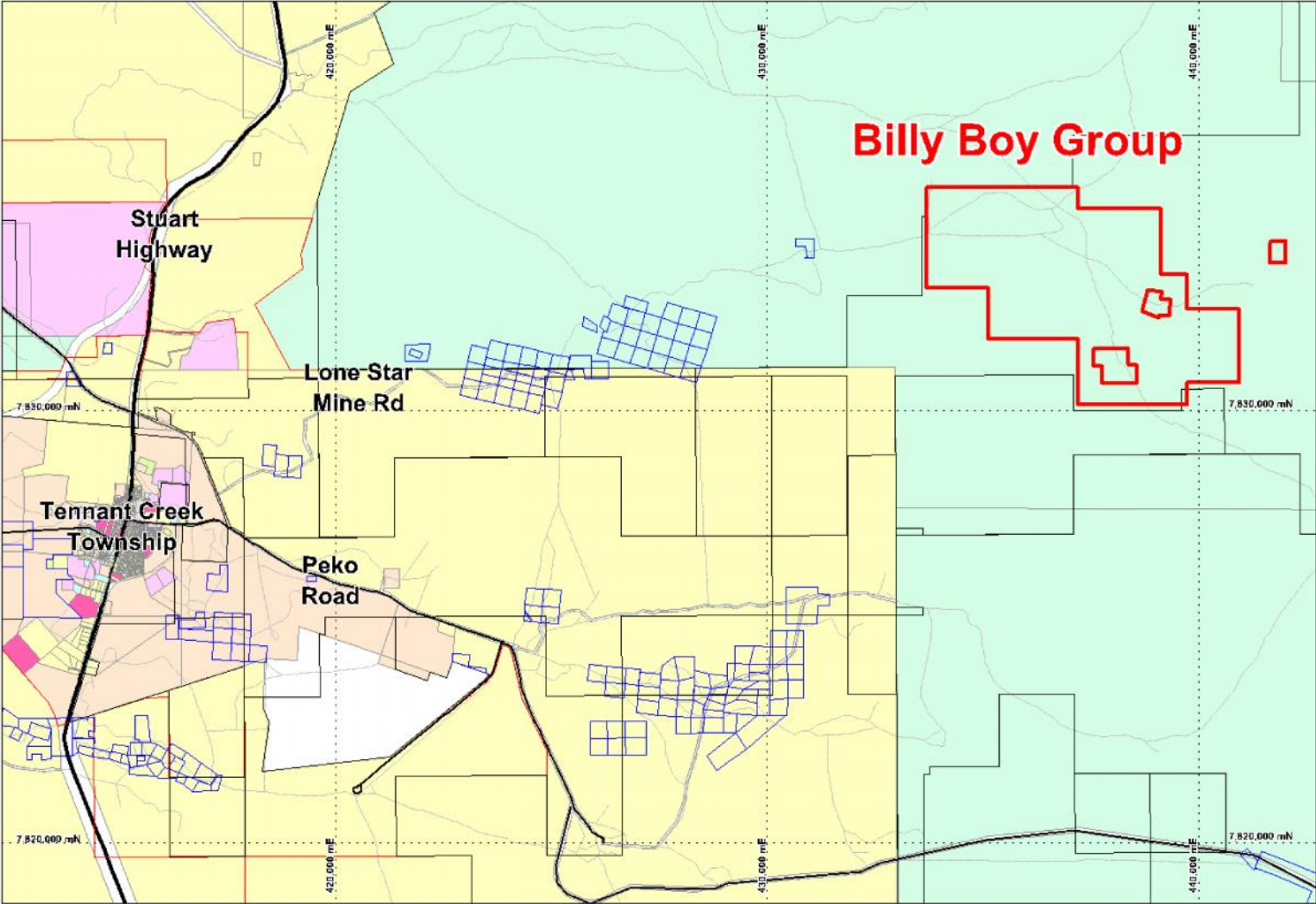


Figure 1: Location of the Billy Boy Group with respect to the Tennant Creek Township

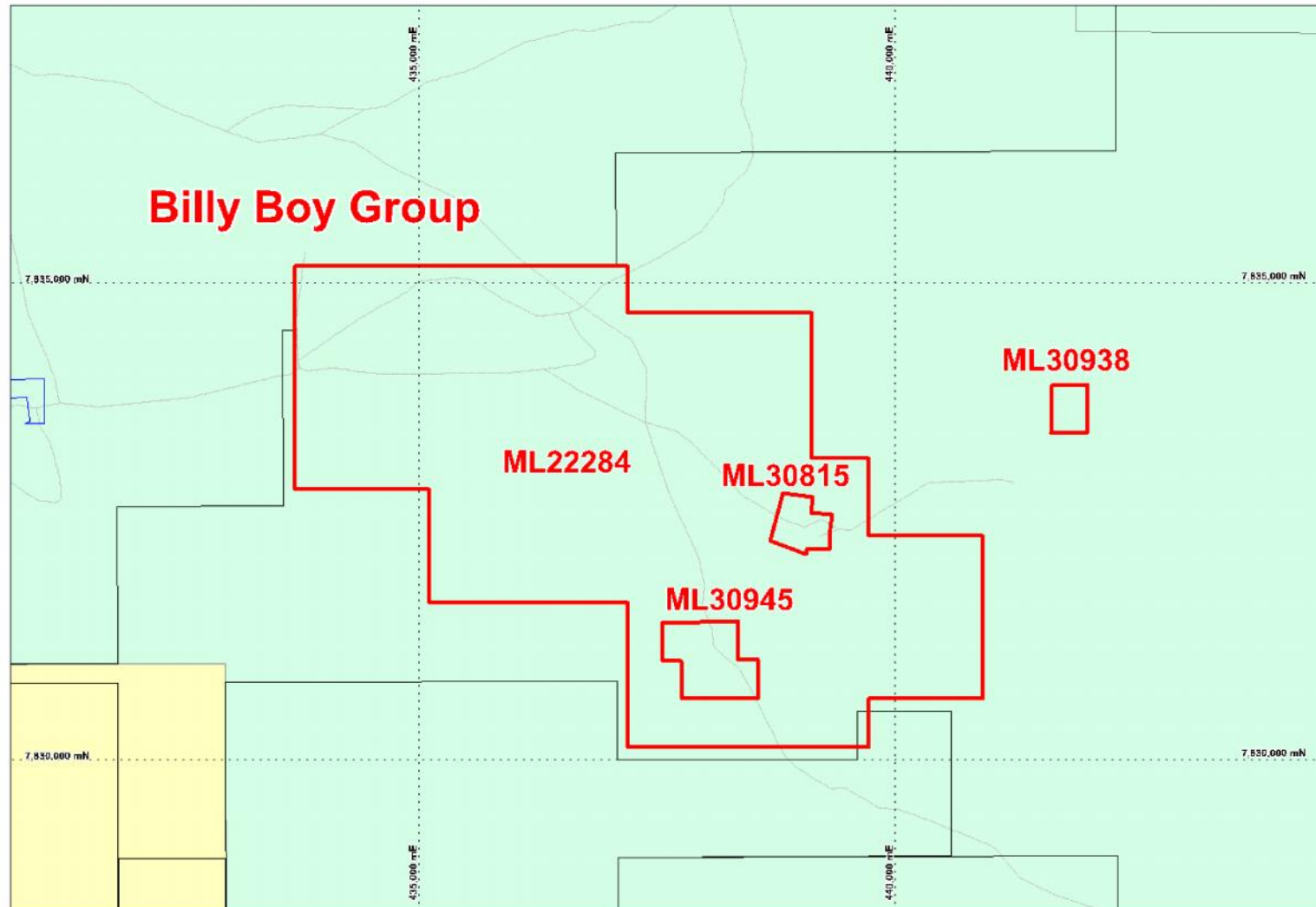


Figure 2: Tenure of the Billy Boy Group

## 4.0 TENURE

The tenure details of the Billy Boy Group are detailed in the following table;

Tenement ID	Tenement Name	Holder	Interest	Grant Date	Effective Date	Expiry Date	Area (Ha)
ML22284	Billy Boy	GRE	100	27/11/2006	27/11/2006	26/11/2031	2230
ML30815	Blue Moon	GRE	100	15/05/2015	15/05/2015	14/05/2025	30
ML30945	Metallic Hill	San	100	23/09/2015	23/09/2015	22/09/2020	64
ML30938	EXP195	San	100	18/08/2015	18/08/2015	17/08/2020	20

Table 1: Billy Boy Group Tenure Details

The Billy Boy Group comprises 4 granted Mineral Leases, refer to figure 2 and table 1, covering an area of 2344 hectares (2.44km<sup>2</sup>).

The Billy Boy Group is located on –

- NT Parcel 00494, Perpetual Pastoral Lease 1142, Tennant Creek Station

The Billy Boy Group is affected by 4 AAPA and 3 CLC registered sacred sites.





## **5.0 GEOLOGY**

### **5.1 Regional Geology**

The reader is referred to AusIMM Monograph 14 (Geology of the Mineral Deposits of Australia and Papua New Guinea), Volume 1, pp. 829-861, to gain a good introduction to the regional geology and styles of gold-copper mineralisation of the area.

In 1995 the Northern Territory Geological Survey released a geological map and explanatory notes for the Tennant Creek 1:100,000 sheet, which cover the area of the Licences.

The rocks of the Warramunga Formation host most of the orebodies in the region and underlie most of the Exploration Licences.

### **5.2 Geology of the Billy Boy Group**

The rocks of the Billy Boy Group consist of turbidite sediments of the Palaeoproterozoic Warramunga Formation (1865-1855 Ma), predominately greywacke and siltstones. This formation is host to virtually all the magnetite-haematite (ironstone-hosted) gold-copper-bismuth mineralisation and ore bodies in the Tennant Creek goldfield.

The Warramunga Formation is characterised in a number of places by outcropping ridges which comprise scattered outcrops of weathered siltstone and greywacke with felsic volcanics or volcanically derived sedimentary rocks of the Flynn Sub-group/ Tomkinson Creek Sub-group (Ooradidgee Group), quartz-rich dissected colluvial fan deposits with minor, colluvium scree, felsic porphyry and alluvial deposits in active channels and on floodplains.

## **6.0 WORK DONE DURING THE REPORT PERIOD**

Following the recent years of major exploration activities including airborne magnetics survey and RAB, RC and DDH drilling exploration activity was limited due to the downgrading of the Billy Boy Group and exploration focus elsewhere but those that were conducted consisted of a continuing desktop evaluation to geologically assess further Kenex generated targets within the Billy Boy Group area, refer to figure 4.

Kenex targets are generated from the Kenex Pty Ltd (Kenex) predictive modelling of the Tennant Creek Mineral Field, this product is a statistical predictive tool for predicting the possible prospective sites for Tennant Creek style mineralisation. The model produced many target areas which contain all or some of the essential criteria for possible economic mineralisation in the Tennant Creek Mineral Field. Emmerson is assessing the generated targets and ranking them in order of potential prospectivity. The highly ranked targets are selected for field visits and desktop data compilation and validation. All this data is compiled and some rock chipping may take place during site visits to compile a geological and geophysical assessment of the target which is then ranked for future exploration.

Emmerson provided Kenex with the Tennant Creek Datasets available, from these data sets Kenex generated 15 predictive maps of 15 key parameters, as listed in the table below. Kenex run to models a Weights of Evidence (WOE) model, which used all 15 predictive maps, a Lineal Regression (LR) model which used 12 of the 15 predictive maps and they also generated a 3D model which used 11 of the predictive maps.

A selected area for target generation is gridded into cells and these predictive maps give a numerical weighting for each cell in terms of its adherence to the parameter being assessed. The values for each parameter are combined to give a number of resultant values predicting different statistical relationships. The aim of these resultant values is to generate a target area that has the essential parameters to host Tennant Creek Style Mineralisation. Of all the resultant values Emmerson uses the Post Probability (Pprb) value to identify and rank its targets, in a range of 0 – 1, with 1 being the highest potential value and values above 0.85 to be very significant, although all targets need to be considered in the context of “if the assessed cell has a low value” is it because the relevant data isn’t significant or has it not been recorded/captured.

	<b>PARAMETER</b>	<b>Description</b>
1	Warramunga Formation	Spatial relationship of stratigraphy to mineralisation
2	Distance to porphyry	Distance to porphyries that pre-date or are synchronous with mineralisation
3	Distance to mafics (Mafic Lithologies)	Spatial relationship of mafic lithologies older than cover to mineralisation
4	Radiometry - U	Anomalous U relation to mineralisation
5	Distance to D <sub>0</sub> -D <sub>1 major</sub> faults	Faults of D1 age relation to mineralisation
6	Distance to low order faults (Faults length < 1 km)	Fault length pre to syn mineralisation
7	Distance to F1 Antidines	Spatial relationship of antiforms pre to syn mineralisation to mineralisation.
8	Distance to F1 Syndines	Spatial relationship of synforms pre to syn mineralisation to mineralisation.
9	Distance to Redox boundaries	Base of oxidation as the boundary between haematite/magnetite.
10	Distance to IOCG Haematite end-member	Relationship of iron alteration to mineralisation
11	Distance to mag and gravity slope highs coincident	Proximity to dense, magnetic highs
12	Distance to ironstones	Ironstones - All
13	Ironstones - high mag/gravity coincident	Ironstones - All - High gravity & mag
14	Distance to anomalous rock/DH geochem	Combined anomalous Au, Cu and Bi buffered ((Au >= 0.1ppm, Bi >= 10ppm, Cu >= 100ppm)
15	Distance to anomalous regolith Au geochem	Soil & Vacuum Au

Table 2: Kenex Predictive Modelling Parameters

01 December 2015 to 30 November 2016

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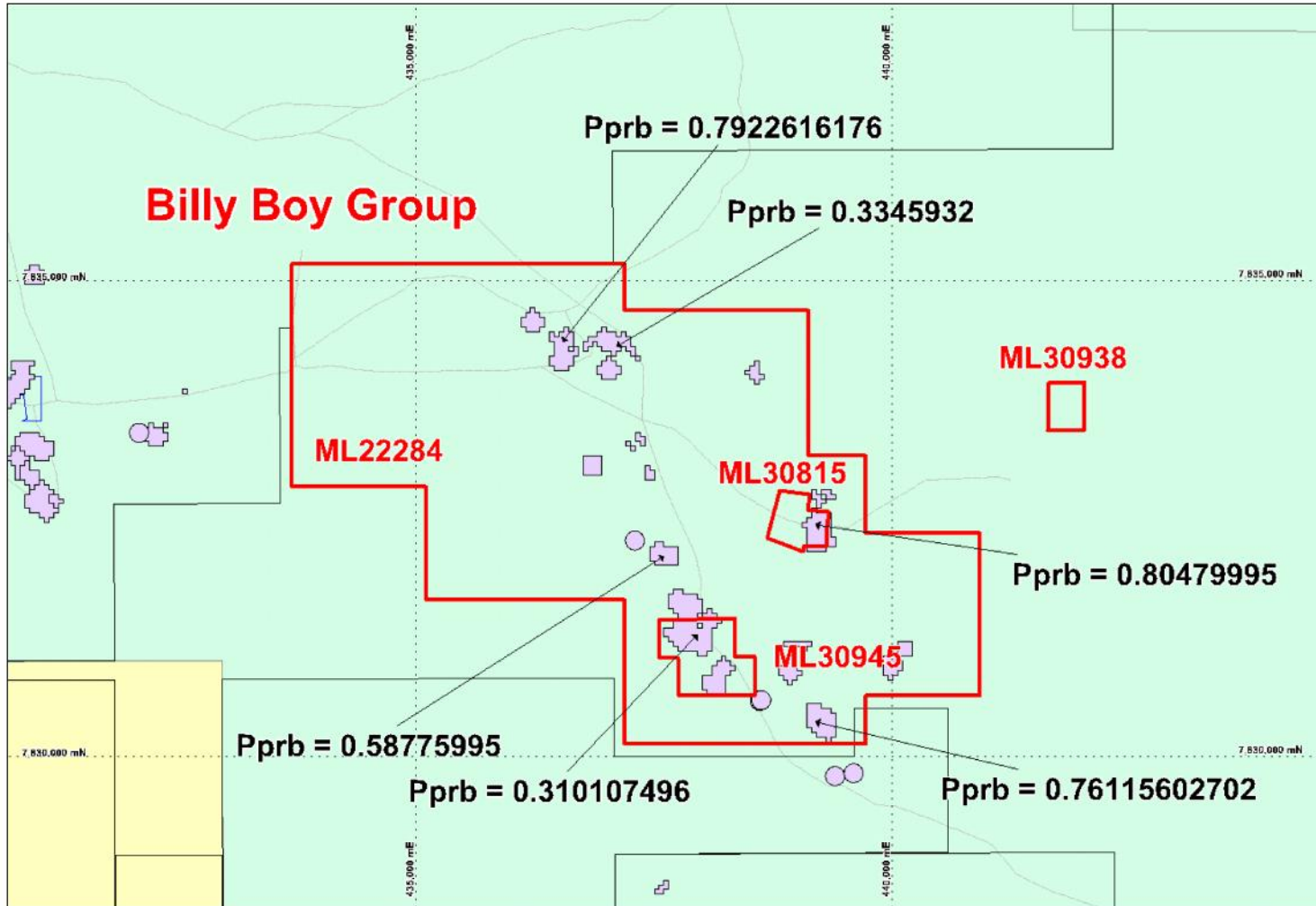


Figure 4: Billy Boy Group vs. Kenex generated targets (magenta polygons)

## **7.0 REHABILITATION**

Rehabilitation was not required as no ground disturbing activities were conducted. All future rehabilitation will be completed and performed as detailed in the EPA Mining Management Plan – Authorisation 0463-04 which includes the titles of the Billy Boy Group.

## **8.0 CONCLUSIONS**

The targets generated in the Billy Boy Group area exhibited geological prospective rocks and structures with overall rankings of Pprb's between 0.310107496 and 0.80479995, unfortunately the target ranking wasn't high enough for exploration activities to re-commence immediately.

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