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February 10, 2020

Mr. John Watts, Owner
Jackpot 16 Card Game
2501 West View Street, Unit 215
Los Angeles, California 90016

Re: Mathematical Analysis of *Jackpot 16* (Proposal #LO-20191218-6376 dated December 18, 2019)

REF: LO-00-J16-20-01

Dear Mr. Watts,

As per Jackpot 16 Card Game's request, please find **Gaming Laboratories International, LLC's (GLI)** math analysis for the table game, *Jackpot 16*.

This report only verifies the mathematical aspects of this game and DOES NOT offer an opinion as to whether or not this game is currently authorized for use in any jurisdiction.

Game Description

Jackpot 16 is a card game played with a shoe of 6 or 8 custom decks of cards. The decks are standard 52-card decks which have had all Nines, Tens, and face cards removed. The player begins by placing a main wager. Optionally, they may also place a Progressive wager. Each player is then dealt one card face-up, and the dealer also receives one card face-up.

The player will then act on their hand. The player may make choose one of the following actions:

- Double: The player may double the amount of their main wager. Note, this may only be done once, as a first action, when the player has just one card. If the player doubles they will receive one additional card, and cannot hit any further.
- Hit: The hand is dealt an additional card.
- Stand: The player indicates that their actions on the hand are complete.



The hand is scored, with each card from Ace to Eight being worth 1 to 8 points, respectively. If the player has a 2-card 16, this is considered a “Natural 16”, and they automatically stand. If the player has more than 16, they have busted, and their wager is immediately resolved. If the player has 4 cards, they must stand. Once the player has finished acting, the dealer will hit until one of the following conditions is met:

- The dealer has a 2-card 16.
- The dealer has a total of 13 or higher.
- The dealer has four cards.
- The dealer busts.

All remaining active wagers are then resolved.

The main wager is resolved by comparing the player hand to the dealer hand using the following rules:

- If the player has a Natural 16 and the dealer does not, the wager wins and pays 3 to 2.
- If both the player and the dealer have Natural 16s, the main wager pushes.
- If the dealer has a Natural 16 and the player does not, the main wager loses.
- If the player busts (has a total greater than 16), the main wager loses.
- If the dealer busts and the player does not, the wager wins and pays 1 to 1.
- If neither the player nor the dealer has Natural 16 and neither has busted, then the point totals of the player and dealer hands are compared. If the player has the higher non-busted total, the wager wins and pays 1 to 1. If the totals are equal, the wager pushes. Otherwise, the wager loses.

The Progressive wager is a fixed-value wager resolved by comparing the player’s hand against a paytable. If the player’s hand meets one of the scenarios listed in the paytable, then the wager wins and pays according to the highest qualifying scenario as given in Table 1. Note that the “First Two Cards – 4’s” and “First Three Cards – 4’s” scenarios apply only to the first two or three cards that are dealt to the player’s hand. The top two awards are paid from the Progressive meter, while the fixed prize awards are paid directly by the operator. All awards for the Progressive wager are paid “for 1”, meaning that the original wager is not returned on a win.

Table 1. Progressive Wager Paytable

Scenario	Pay
Four Suited 4's	100% of Progressive
Four Same Color 4's	10% of Progressive
Four 4's	300 for 1
First Three Cards – 4's	75 for 1
First Two Cards – 4's	25 for 1

A configured percentage of each Progressive wager is used to increment a primary progressive meter and a reserve meter. In the event of a 100% progressive award, the primary meter will be reseeded with the full value of the secondary meter. The progressive configuration details are given in [Table 2](#).

Table 2. Progressive Configuration

Primary Increment Rate	20%
Reserve Increment Rate	8%

Mathematical Analysis

The math analysis for *Jackpot 16* was performed by analytically determining the optimal strategy for all possible player hands and dealer up-cards. This strategy was then used in to simulate one billion plays of the game. The strategy used is summarized in [Table 3](#), which lists player totals vs. dealer up-cards. The return summary from the simulations is listed in [Table 4](#). In the table, RTP represents the Return to Player, which is the ratio of Average Win to Average Wager. RTH represents the Return to House, also known as the Element of Risk, and is the expected house earnings scaled relative to the Average Wager. The HE is the traditional House Edge measurement, scaled relative to the Initial Wager.

Table 3. Main Wager Strategy

Player Total	Dealer Card							
	A	2	3	4	5	6	7	8
1	H	H	H	H	H	H	H	H
2	H	H	H	H	H	H	H	H
3	H	H	H	H	H	H	H	H
4	H	H	H	H	H	H	H	H
5	H	H	H	H	H	H	H	H
6	H	H	H	H	H	H	H	H
7	H	H	H	H	H	H	H	H
8	Dh	Dh	Dh	Dh	H	H	H	H
9	H	H	H	H	H	H	H	H
10	H	H	H	H	H	H	H	H
11	H	H	H	H	H	H	H	H
12	S	S	S	S	H	H	H	H
13	S	S	S	S	S	S	S	S
14	S	S	S	S	S	S	S	S
15	S	S	S	S	S	S	S	S

H

S

Dh

Hit

Stand

Double if allowed, else hit

Table 4. Return Summary

	6 Decks	8 Decks
Initial Wager	1	1
Average Wager	1.0628	1.0627
RTP	96.46%	96.48%
RTH	3.54%	3.52%
HE Per Initial Wager	3.76%	3.75%

The math analysis for the Progressive wager was performed by directly calculating the probability of each outcome. These probabilities were then used to determine the RTP and HE. The calculated probabilities can be found in [Table 5](#), and the return summary can be found in [Table 6](#).

Table 5. Progressive Wager Probabilities

Scenario	6 Decks	8 Decks
Four Suited 4's	0.000001	0.000002
Four Same Color 4's	0.000017	0.000019
Four 4's	0.000176	0.000185
First Three Cards – 4's	0.001549	0.001589
First Two Cards – 4's	0.013309	0.013401

Table 6. Progressive Wager Return Summary

#Decks	RTP	HE
6	78.16%	21.84%
8	78.97%	21.03%

Summary

The overall maximum RTP available for *Jackpot 16* is 96.48%, occurring when the player places the main wager and optimizes their decisions in the game when it is configured with eight decks. The minimum individual wager RTP is 78.16%, occurring when a player places a Progressive side wager when the game is configured with six decks.

It should be noted that this evaluation does not cover the review or use of the progressive equipment itself.

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Should you have any questions, please feel free to contact our office.

Sincerely,

GAMING LABORATORIES INTERNATIONAL, LLC



Christine M. Gallo

Vice President of Technical Compliance and Quality Assurance