

## GLI

World Headquarters
600 Airport Road Lakewood, NJ 08701

Phone (732) 942-3999
Fax (732) 942-0043
www.gaminglabs.com

September 24, 2004

Mr. Clarence A. Greeno
Gaming Enforcement Manager
Missouri Gaming Commission
PO Box 1847
Jefferson City, MO 64102

## Re: House Way Pai Gow

Dear Mr. Greeno,
As per New Vision Gaming's request dated August 26, 2004, please find Gaming Laboratories International, Inc.'s analysis and opinion for the game of House Way Pai Gow. This letter will address two issues: 1) Whether or not the mathematical analysis as submitted is accurate, and 2) Whether this game is authorized under current Missouri Statutes and Regulations.

For use in this opinion document, I have utilized the following statutory definitions from Section 313.800 of the Missouri Statutes.
"(11) "Games of Chance", any gambling game in which the player's expected return is not favorably increased by his or her reason, foresight, dexterity, sagacity, design, information or strategy;"
"(12) "Games of skill, any gambling game in which there is an opportunity for the player to use his or reason, foresight, dexterity, sagacity, design, information or strategy to favorably increase the player's expected return including, but not limited to, the gambling games known as "poker", "blackjack' (twenty-one), "craps", "Caribbean stud", "pai gow poker", Texas hold 'em", "double down stud", and any video representation of such games;"

## House Way Pai Gow

House Way Pai Gow is a bonus bet appended to the traditional game Pai Gow Poker. The game is dealt from a single deck of cards with a Joker and can be played by up to six players. Each player can bet on up to three hands. The Joker can be used as an Ace or to complete a Straight, a Flush, or a Straight Flush. Players have the option of placing three Pai Gow bets along with three bonus bets (See Note below). Players can only make bonus bets on hands that they place a Pai Gow bet on. All bets must be made before dealing. To begin, the dealer will deal three player hands and one dealer hand. The dealer will then reveal all hands and set each hand according to the Casino's House Way.

The dealer settles all Pai Gow bets and Bonus bets for the first of the three hands for each of the Player's bets from left to right. The dealer will continue this process for hand two and then hand three. Each of the hands are played the same way that traditional Pai Gow Poker is played with a $5 \%$ commission collected on winning hands. No commission will be collected for Bonus wins. All Bonus bet hands are paid according to a pay schedule.

In this version of Pai Gow there are five Bonus paytables. Three of the five paytables found in Table 1 pay natural straight flushes and straight flushes with a joker the same amount. The other two paytables located in Table 2 pay natural straight flushes more than straight flushes with a joker.

A computer program was written to cycle through all possible combinations of 3 and 7 cards from a 53 -card Joker deck and compute the occurances of each possible winning combination for each bet. The results of each analysis are displayed in Table 3. The house edge upon the player wagering on any single bonus bet are displayed in Table 4.

In conclusion, the maximum return to the player occurs at a $6.00 \%$ house edge, when the player makes the Bonus Wager on Pay Table A and achieves a $94.00 \%$ return on investment. The minimum is $90.89 \%$ when the player bets on Pay Table D, in which the house has a $9.11 \%$ edge.

Table 1: Pai Gow Bonus Standard Pay Schedules

| Hand | Pay Table <br> A | Pay Table <br> B | Pay Table <br> C |
| :--- | :---: | :---: | :---: |
| 5 Aces | 1000 | 500 | 500 |
| Royal Flush | 250 | 250 | 200 |
| Straight Flush | 50 | 50 | 40 |
| Four of a Kind | 25 | 25 | 25 |
| Full House | 5 | 5 | 5 |
| Flush | 4 | 4 | 4 |
| Three of a Kind | 3 | 3 | 3 |
| Straight | 2 | 2 | 2 |

Table 2: Pai Gow Bonus Joker Pay Schedules

| Hand | Pay Table <br> D | Pay Table E |
| :--- | :---: | :---: |
| 5 Aces | 500 | 500 |
| Royal Flush | 200 | 200 |
| Straight Flush | 50 | 50 |
| Straight Flush With | 30 | 30 |
| Joker |  |  |
| Four of a Kind | 25 | 25 |
| Full House | 5 | 6 |
| Flush | 4 | 4 |
| Three of a Kind | 3 | 3 |
| Straight | 2 | 2 |


| Standard Pai Gow Bonus Results |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Hand | Occurrences | Probability | Returns Per Table |  |  |
|  |  |  | A | B | C |
| 5 Aces | 1128 | 0.0007\% | 0.007317876 | 0.003658938 | 0.003658938 |
| Royal Flush | 26132 | 0.0170\% | 0.042382701 | 0.042382701 | 0.03390616 |
| Natural Straight Flush | 184832 | 0.1199\% | 0.059954686 | 0.059954686 | 0.047963749 |
| Four of a Kind | 307472 | 0.1995\% | 0.049867954 | 0.049867954 | 0.049867954 |
| Full House | 4188528 | 2.7173\% | 0.135864938 | 0.135864938 | 0.135864938 |
| Flush | 6172088 | 4.0041\% | 0.160165166 | 0.160165166 | 0.160165166 |
| Three of a Kind | 7672500 | 4.9775\% | 0.149325549 | 0.149325549 | 0.149325549 |
| Straight | 11034204 | 7.1584\% | 0.143168334 | 0.143168334 | 0.143168334 |
| Nothing | 124556196 | 80.8056\% | -.808056\% | -.808056\% | -.808056\% |
| Total | 154143080 | 100.0000\% | 6.000851\% | 6.366744\% | 8.413492\% |

Table 3: Overall Program Results

| Pai Gow Bonus With Different Straight Flush Awards Results |  |  |  |  |  |
| :--- | :--- | :--- | :--- | :--- | :---: |
| Hand |  | Occurrences | Probability | Returns Per Table |  |
|  | 1128 |  | 0.003658938 | 0.003658938 |  |
| 5 Aces | 26132 | $0.0170 \%$ | 0.03390616 | 0.03390616 |  |
| Royal Flush |  | $0.0251 \%$ | 0.012562354 | 0.012562354 |  |
| Natural Straight Flush | 38728 | $0.0948 \%$ | 0.028435399 | 0.028435399 |  |
| Straight Flush With <br> Joker | 146104 | $0.1995 \%$ | 0.049867954 | 0.049867954 |  |
| Four of a Kind | 307472 | $2.7173 \%$ | 0.135864938 | 0.163037926 |  |
| Full House | 4188528 |  |  |  |  |

Table 3: Overall Program Results, continued

| Pai Gow Bonus With Different Straight Flush Awards Results |  |  |  |  |
| :--- | :--- | :--- | :--- | :--- |
| Hand | Occurrences | Probability | Returns Per Table |  |
|  |  |  |  |  |
| Flush | 6172088 | $4.0041 \%$ | 0.160165166 | 0.160165166 |
| Three of a Kind | 7672500 | $4.9775 \%$ | 0.149325549 | 0.149325549 |
| Straight | 11034204 | $7.1584 \%$ | 0.143168334 | 0.143168334 |
| Nothing | 124556196 | $80.8056 \%$ | $-.808056 \%$ | $-.808056 \%$ |
| Total | 154143080 | $100.0000 \%$ | $9.1101 \%$ | $6.3928 \%$ |

Table 4: Overall Summary of Analysis

| Summary |  |  |  |  |  |
| :--- | :---: | :---: | :---: | :---: | :---: |
| Table | A | B | C | D | E |
| House Edge | $\mathbf{6 . 0 0 \%}$ | $\mathbf{6 . 3 7 \%}$ | $\mathbf{8 . 4 1 \%}$ | $\mathbf{9 . 1 1 \%}$ | $\mathbf{6 . 3 9 \%}$ |
| Player Return |  |  |  |  |  |
| Percentage | $\mathbf{9 4 . 0 0}$ | $\mathbf{9 3 . 6 3}$ | $\mathbf{9 1 . 5 9}$ | $\mathbf{9 0 . 8 9}$ | $\mathbf{9 3 . 6 1}$ |

With House Way Pai Gow, New Vision Gaming has introduced a new side bet to the traditional Pai Gow Poker. This side bet does not impact the overall play of the Pai Gow Poker hand.

Players must play the underlying Pai Gow game to be eligible to place the side wager; however, players who are playing the underlying Pai Gow Poker game are NOT required to place the optimal side bet wager (See Note below). Once the player either wins or loses on this side bet he or she may not withdraw from the game and must play the Pai Gow Poker hand to completion.

After analyzing this submission it is our opinion that this game is a variant of Pai Gow Poker, which is an enumerated game under the Missouri Regulatory Scheme.

NOTE: In further discussion with John Feola of New Vision Gaming, he has requested to allow the casinos the option of playing the side bet without playing the base game of Pai Gow. Missouri requlations appear to allow this; however, New Vision Gaming must make a formal request to the Missouri Gaming Commission for this change.

Mr. Clarence A. Greeno, Gaming Enforcement Manager
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Should you have any other questions in this matter, please do not hesitate to contact me.


JRM/absI
c: Mr. John Feola, New Vision Gaming

LO-38-NVG-04-03

