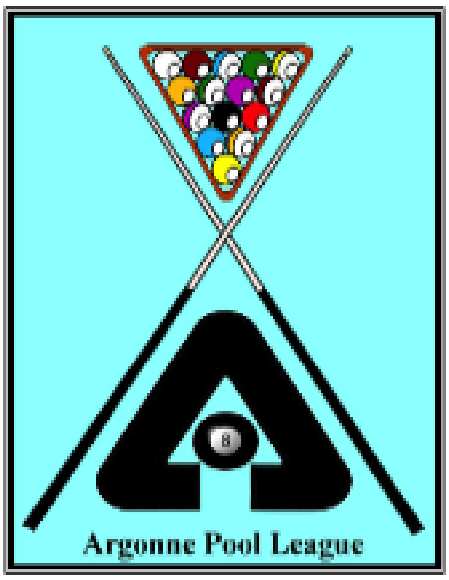
Argonne Pool League



Rules and General Information

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1. Overview

League History.

The Argonne Poolshooters began weekly play with eight (8) teams and became members of the American Poolplayers Association (APA) in September, 1993, utilizing the APA rules and handicap system. Along with providing the American Pool League with our weekly dues, we paid for our own table time at Le Cue on Cass Ave.

Due to various reasons, including local control over how our weekly dues were spent and a general lack of interest in traveling to compete in state and national tournaments, the majority of team members voted to drop participation in the APA and become an independent league competing against our own Argonne teams. Thus, the Argonne Pool League (APL) began in January, 1994, with ten (10) teams. League officers Debbie Mounce and Tim Klosowski along with Dean Bass developed software, scoresheets, team rosters, rules, and a handicap system.

In the fall of 1996, the league moved to Topspin Billiards in Lemont and the league stayed there for two sessions. Topspin Billiards relocated in the summer of 1997, and that fall the League moved to Cricket's in Bolingbrook. Also in the fall of 1997, Debbie left ANL and turned over the league management duties to Vince Battaglia. Vince, along with fellow APL member Ron Shepard, designed a new handicap system that overcame some of the previous systems shortcomings. However, Vince's League management career was short-lived. Due to a job opportunity in Washington DC, Vince left Illinois halfway through the fall 1997 session and handed over the APL management responsibilities to Stephan Wegerich. Stephan updated the scoresheets as well as implemented new software to track player performance and team statistics. In the fall of 1999 the league moved to Q-Billiards, which was at the previous Le Cue location but under new management. Art Kahaian took over operations of the league from the fall of 1999 through the spring of 2001. Bob Finch was the League Operator from the fall of 2001 through the spring of 2003. Chuck Batson was the League Operator from the Fall of 2003 through the fall of 2004. Kevin Beyer was the League Operator from the spring of 2005 through the spring of 2013. In the Fall of 2012 the league moved to Q Billiards on 63rd Street in Downers Grove. In the Fall of 2013 Q Billiards raised table fees to $60 and restricted table access after 10pm. At that time, Kevin shortened the handicap match-ups and increased league dues to $10 and weekly fees to $8. Only 4 matches were played per team per night. Dean Bass and Dave Stevens have been operating the league since the Spring of 2014. In the Spring of 2014, Dean and Dave utilized the 5th table to play 5 matches per night. League dues were returned to $5 and weekly fees were lowered to $7.

The league has enjoyed two bouts of national recognition. In January 2002, the *National Geographic Channel* in conjunction with the *New York Times* sent a camera crew to Argonne to interview our league members and to video tape one of our league nights. This footage was combined with video of trick shot artist Mike Massey, the late actor and pool player Jerry Orbach, professional player Jeanette Lee, and *Billiards Digest* columnist and physicist Michael Shamos, and edited into a feature about the physics of pool. This was broadcast several times through the summer and fall of 2002 beginning on the July 15 edition of *Science Times* on the *National Geographic Channel*. Our second round of national exposure came in November 2002 when the managing editor of *Billiards Digest*, Mason King, visited Argonne and interviewed several of the league members. The resulting article, entitled "Maybe it IS Rocket Science" was published in the January 2003 issue of *Billiards Digest* on pages 70-74.

Competition. The general session format is a round-robin competition among the teams. Usually, two full cycles are completed each session, meaning that each individual team plays every other team twice. At the end of each session (or optionally at the end of only the second session) there is a playoff tournament and a banquet. All of the prize

money, the table rental fees, and the banquets are funded from the session fees and weekly team dues.

Team Structure. There is a wide range of skill levels within the league, and some attempt is made to distribute these players among the teams so that each team has a range of weak to strong players. Our coaching sessions are relatively liberal, which encourages an educational environment within the league.

Team Captains. Each team captain is part of the league management and carries one vote for his team (whenever an issue is up for a vote). Most information contained herein has, at some time, been discussed and/or voted upon by the league management. The team captains are also the conduit of communication to their team members; for example, the League Operator will contact the team captains with important information, and they in turn contact their team members, or if a league member has information to distribute to the league, he would normally contact his team captain, who would then contact the League Operator, who would then distribute the information to the rest of the league.

2. League Operation

Currently there are three management roles that support the Argonne Pool League. The responsibilities of these three positions are outlined below.

2.1. APL President/Manager/Operator Duties

- Earns $500 per session.
- Knows rules well and makes ruling decisions.
- Backs-up the Vice-President and/or Treasurer when absent.
- Runs computerized handicap algorithm.
- Requests and participates in captain meetings.
- Deals with complaints and/or suggestions.
- Develops, maintains, and prints the schedule for each session.
- Maintains, updates, and prints team scoresheets weekly.
- Maintains, updates, prints, and distributes the team standings report weekly.
- Prepares team envelopes and distributes them at the league play location weekly.
- Performs most duties involved with our Argonne Club Charter.
- Maintains, updates, prints, and distributes the APL Rule Book.
- Maintains, prints, and distributes individual team reports periodically.
- Solicits for new members/teams and organizes same (with VP).

2.2. APL Vice-PresidentlManager Duties

- Earns $250 per session.
- Knows rules well and makes ruling decisions.
- Backs-up the League Operator and/or Treasurer when absent.
- Collects, reviews, corrects, marks-up, and inputs team scoresheets weekly.
- Solicits for new members/teams and organize same (with the League Operator).

2.3. Treasurer Duties

- Earns $250 per session.
- Ensures money cans are in place, collects money, and nags people to pay for practice tables weekly.
- Collects, counts, records, and deposits session and team dues weekly.
- Writes check for weekly table time and arranges for Tournament Tables.
- Submits names & badges with $1/each to Argonne Club to receive $3/each.
- Prepares and provides each team with Accounting sheet each session.
- Determines funds available & solicits votes on how to spend those funds.
- Makes all banquet arrangements & payments for Spring Session Banquet.
- Purchases needed supplies.

2.4 Operations Checklists

The following are some checklists of steps that are required for the standard operation of the league.

2.4.1. Before the Fall Session

- Consult with Team Captains and select the location for league play in the upcoming session.
- Four weeks prior to the Fall session, the League Operator should contact ANL media services and place an ad in the Argonne News soliciting new members.
- In order to attract new members, the APL requires proper advertising prior to the start of each session. The ads need to spell out where we play, when the league starts, and who to contact for more information. Prospective members need to know about the league if they are going to consider joining.
- Fliers can be placed on appropriate billboards within the lab.
- Small ads can be placed in the Argonne Today email distribution.
- Determine the number of teams to field for the upcoming session, and assist the team captains in filling their rosters.
- Negotiate with the Pool Room manager for an appropriate number of tables and the timeslot (customarily, 6 pm to 11 pm on Tuesdays).
- Demonstrations using DVDs can be set up in the Argonne cafeteria to assist in league promotion. Due to the constant turnover of students and employees at Argonne, the APL roster varies from year to year. It is important to get the word out as much as possible. These steps are needed for the Spring session, too.
- As the start of the new Fall season approaches, the League Operator should contact the current Team Captains to verify which players will be returning to the league.
- A ballot should be prepared to determine whether a playoff tournament will be held at the end of the first session, and which format should be used for the playoff tournament. If there are any proposed rule changes or procedure changes, these should be added to the ballot.
- The team rosters should be verified to ensure that each team has at least five players. The completed league roster is then submitted to the President of the Argonne Club.
- Once all of the starting teams rosters have been recorded, the initial Scoresheets for the first week of play can be printed.

2.4.2. Each Night

- The team envelopes, markerboard and money container, league paperwork and checkbook need to be brought to the Pool room every evening during the season.
- Nightly table rental fees should be paid to the Pool Room.
- Drink vouchers should be collected from the Pool Room and placed in the team envelopes.
- Envelopes should be distributed to the teams before 6 pm each night.
- The Team Captains should examine their envelopes to determine which table they will play on that night and to prepare for the first match.
- At 6 pm, the Team Captains should flip a coin to determine the players for the first match, and play should begin.
- If teams have new members who require a skill test, the League Operator should be notified so that the test can be scheduled.

- If there are any outstanding ballots, the teams should decide how to cast their vote on the various issues.
- The Team Captains should collect the weekly dues from each player, along with any session fees, late dues, table fees, and other expenses due to the league.
- During match play, the Scoresheets should be completed game by game and match by match.
- The completed Scoresheets should be collected from all the teams at the end of each night by the League Operator. Before the next week of play, the match results are recorded in the spreadsheet, skill ratings are adjusted, and new statistics are generated. At this time, new Scoresheets can be generated for the following week.

2.4.3. End of the Session

- Arrangements should be made for the end-of-session banquet.
- On the last night of the session, the rankings should be determined and the corresponding prize monies should be distributed to the teams.
- If there is a playoff tournament, the rankings during the session determine the seeding positions in the tournament. The elimination chart can be filled in in preparation for the tournament.
- A list of all the financial transactions for the session should be distributed by the Treasurer to the teams. This should include a summary of all dues and session fees collected along with all table time and other expenses.
- At the end of the spring session, new League officers should be elected, and each team should elect a Team Captain for the upcoming fall session.

3. General APL Member Rules and Etiquette

The general rules govern the conduct of regular Argonne Pool League weekly play. These rules are designed to cover as many of the possible situations that can and inevitably will occur during regular weekly play, except those pertaining to the "game rules" which are covered elsewhere in this manual. The areas covered include: coaching, forfeits, protest and dispute procedures, grace period, membership, dues, team skill level limit, how matches are started, sportsmanship issues and more.

3.1. Coaching

Coaching is defined as giving tactical advice as to which ball to shoot, where to leave the cue ball and other information relating to the specific game. Coaching is called by anyone on the current team (including the shooter) saying "Time-Out" or "Coach." To avoid any confusion, say it loudly and clearly enough for the opposing team to hear. Avoid disputes, when it is your turn, go to the table and begin your turn. Don't continue talking with your teammates as your opponent may think you are being illegally coached. The shooting player may ask for a rule clarification from any league player, anyone may remind the shooter to mark the 8-ball pocket, or that they are about to shoot the wrong group of object balls, or that they have a "cue-ball in hand"; these do not count as tactical coaching advice. Any current team member can give coaching advice to the designated coach before a "Coach" is called; the designated coach must be the person that relays the advice to the player. If the designated coach becomes unavailable during the match, another team member may assume the role provided notice is given to the opposing team beforehand. In the event that no team members are available to act as the designated coach, another league member may be enlisted to act as a substitute designated coach provided the opposing player approves the selection; if the opposing team does not approve a substitute designated coach, then the shooting player must continue play without the benefit of advice. The coach should approach the pool table (rather than the shooter going to the team's table). Violation of the following coaching rules results in a ball-in-hand for the opponent:

Coaching Violations (Ball-in-Hand Penalty)

- Only two coaching periods are allowed per shooter per game.
- Each coaching period is limited to approximately two minutes (after the two minute coaching period, the player then has one minute to execute the shot). The opposing team should give a 10 second warning, and if the coach does not leave the table by the two minute limit, the penalty is imposed.
- The coach may not place the cue ball on the table at any time. A coach may pick up the cue ball off of the floor, out of a pocket, or out of the ball return, but he must hand it to the shooting player, he may not place the ball on the table.
- The coach may not mark the 8-ball pocket.
- The coach must not mark the table in any way (chalk, powder, water, etc.) and he must leave the table before the shooter attempts the shot.

3.2. Membership Requirements

Session dues are $5 per player and are due to the Team Captain before a player plays his first match of the session and within the first four weeks of the session. The penalty for failing to pay the league session fee on the night that a player plays his or her first match is a forfeit of that match.

3.3. Weekly Dues

Weekly dues are $7 per shooter, per week, and are due to the Team Captain before 8 pm. The League Treasurer will collect the Team Dues in the small team envelope shortly after 8 pm. If your team still owes money for the night, it must be paid before the end of the next league night; otherwise your team will lose one (1) team point. Only the team members who play a match pay the weekly dues; team members who win by forfeit do not pay weekly dues.

3.4. Practice Tables

The cost to play on a practice table is $1 per game, to be placed in the coffee can before each game. Generally, the winner continues playing on the practice table, and the incoming challenger pays for the game. The challengers sign up on a marker board. At certain times during the night, the league may take over the practice table in order to administer skill tests, to play late-starting matches, or to schedule makeup matches; in these cases, the players will be allowed to finish their current game if possible.

3.5. Player Declaration, or How it is Decided Who Plays First

Team Captains (or their representatives) will flip a coin to decide who must declare their player first for the first match. Winner of the toss has choice of declaring first or forcing the opposing Captain to declare first. In subsequent matches, the winner of the previous match has the option of first declaration in the subsequent matches (i.e. the winner of a match will typically force the opposing team to declare their player for the subsequent match). In a situation where a new match is started before the subsequent match has finished, the team captains will flip a coin to decide which team must declare their player first (like the first match).

3.6. Disputes

Disputes should be resolved, whenever possible, by the players and/or the Team Captains. If a player, in the opinion of his opponent, is guilty of a foul - it must be called before the next shot. Calling a foul after the next shot cannot be honored. To avoid arguments, it is a good idea to call a mutually agreed upon observer to watch and call a possible bad hit. In cases where an agreement cannot be reached, the two Team Captains should consult the League Operator who will render a decision. It is the responsibility of all players and captains to be familiar with League rules. Sometimes irresolvable disputes are settled by the replaying of the game or by the flip of a coin.

3.7. Protests

Protests are made in writing to League Management within one week of the offending action and/or decision. Each team captain and the two League Operators will make-up the Arbitration Committee and will hear the protest, including but not limited to listening to all involved players and/or witnesses. The Committee's decision is final. There is no higher authority for appeal.

3.8. Multiple Tables

Normally, all matches between a pair of opposing teams in a night are played on a single table. The 5th table will be scheduled for dual matches and the order will rotate each week. The teams playing on Table 1 will play the first dual match (at 6pm). When they are finished they should notify the teams playing on Table 2 that they are up on the 5th Table for their duplicate match. When these teams are done they should notify Table 3 and so on. If teams are not ready, go down the tables to see if anyone is available to play on table 5. When no matches are available the table should be used for make up

matches. When no duplicate or make up matches are available, table 5 can be used for practice.

3.9. Teams

Teams are made up of 5 to 11 players. It is recommended that the Team Captain and the majority of a team should be made up of on-site employees (ANL, DOE, Students, and/or Contractors). Each team should try to be mixed (male and female) and have a wide range of skill levels. By the fourth week of play of the session, each team must be formed and each player must have joined the Argonne Pool League (APL) and paid their $10 session fee. Team members may be added beyond this date only in special circumstances with approval by a majority of the team captains. Although the League does recruit some new players through local advertising, the main recruitment of players should be done by the individual teams themselves.

3.10. Team Captains

The team captains are the link between their team and League Management. They are responsible for
(a) appointing an alternate to fulfill Captain duties while absent,
(b) completing team rosters,
(c) understanding and communicating rules to their team,
(d) deciding (via coin toss) which team declares the first player,
(e) identifying the next shooter to play when it is their teams turn to declare,
(f) collecting dues and ensuring that all dues owed for the week are in their small team envelope by 8 pm,
(g) voting for League issues,
(h) attending all Captains' Meetings or sending their alternate,
(i) arranging with their team members to ensure that at least five players will be available each week, and
(j) informing the opposing Captain of a forfeit as soon as they know they will not have five shooters for the night. This last item also includes when the forfeit rule is not in effect (see Forfeits, section 3.11). If you know your team cannot play all five matches, please be courteous and don't wait until the last match to tell the opposing team.

3.11. Team Skill Level Limit

There is no cumulative skill level limit imposed on the teams or on the selected players each week. Any eligible player on a team may play one match each week. However, each team should endeavor to have a mix of strong and weak players on their roster; this makes the competition more interesting, and it also provides the best educational environment for the weaker players.

3.12. Make-up Matches

Match play should begin promptly at 6 pm. A team match will result in a make-up penalty if the first match has not started by 6:30 pm. A team must have a 2nd player by 7pm, a 3rd player by 8pm, a 4th player by 9pm and a 5th player by 10pm. If a team does not have players for this time they are subject to a make-up match penalty. The match may still be played that night or later as a makeup, at the discretion of the non-offending team. If a team does not have sufficient players on a night they should notify the opposing team that they do not have enough players and that they will need to schedule a make-up match. Both teams should indicate on their score sheet which team was short. If both teams were short, indicate that as well (there will be no penalty).

Make-up match penalty. When a team does not have enough players and a make up match needs to be scheduled, the make up match will be played with an additional handicap on the offending team. This will be in the form of subtracting one game from the race for the non-offending team. If that team is going to 1 or 2 games without the penalty, then 1 game will be added to the race of the offending team.

3.13. Individual Etiquette

For everyone's enjoyment, please observe the following rules of etiquette during league play. Each of these rules lies within the boundaries of gentlemanly and ladylike behavior. Please be courteous and use some good common sense each League night. You will appreciate good sportsmanship from your opponent and your opponent deserves good sportsmanship from you and your fellow teammates.

Verbal Abuse. Verbal or physical abuse will not be tolerated. All members will conduct themselves as ladies and gentlemen or their membership may be suspended and canceled. This includes remarks that would be considered "sexual harassment" by Lab policy.

Sportsmanship. Good sportsmanship is important and it is not sportsmanlike to aggravate your opponent by bothering him while he is shooting, by "slow playing" or by any other method.

Player Selection. Each team should have selected their player before the current match has completed in the event that they lose that match and are required to declare their player. The point is to move quickly from one match to the next. A team should take no longer than one minute to select a player for a match.

Be Ready. If you are going to be playing the next match, have your cue ready and be ready to play as soon as the previous match is over. When it's your turn to play, that does not mean it's time to go to the rest room, order another drink, make a phone call or get involved in some other activity – go to the table and start playing.

Stay By The Table. While playing, remain fairly near the table (but at least six feet back) and be ready to shoot when it's your turn. Too many players continue to carry on conversations, light up another cigarette, order another drink or do something that slows the game down.

Pay Attention. Generally, relax while you're not involved in a match; but when it's your match, pay attention until the match is over.

Perform Your Duties Promptly. If it is your turn to rack the balls, then begin racking the balls as soon as the previous game has ended. If you are the breaking player, then use this racking time constructively to remove dirt or lint from the table, wipe the cue ball clean, change shafts on your cue, chalk your tip, powder your hands, clean your shaft, or any other necessary duties; don't wait until after the balls are racked and waste everyone's time. Help the racker gather the balls from the pockets or from the other end of the table.

4. APL 8-Ball Rules

4.1. Billiards Congress of America (BCA) Official Rule Book

Except when clearly contradicted by these additional rules, the BCA "General Rules of Pocket Billiards" and the BCA "Rules for Tournament Play" apply (see the Appendix or a current printed version of the *BCA Rules and Records* book).

4.2. General Description

8-Ball is played with a cue ball and normal rack of fifteen (15) object balls. The purpose of this game is for one player to pocket either the solid colored group of balls (numbered from 1 to 7) or the striped balls (9 to 15). Choice of balls to be pocketed is made by the player pocketing the first ball of the game (exceptions involving multiple-ball shots are described below). A player wins by pocketing all his object balls in his group followed by legally pocketing the 8-ball in a marked pocket.

4.3. Lag for Break – Winner Breaks

The players lag for break for the first game in a match. The winner of the lag has the option of breaking or having the opponent break. Note: BCA rule 3.5 states that non-striped balls must be used for the lag, in the APL any object ball may be used. In subsequent games in a match, the winner of the previous game has the break option.

4.4. Racking

Balls are racked with the front ball on the foot spot and the 8-ball in the center. The other balls may be placed arbitrarily in the rack. All balls should be frozen (touching) as tightly as possible. The breaking player may request and receive a rerack if the balls are loose. Normally, the opponent racks the balls for the breaking player, but the breaking player may rack the balls for himself if he chooses.

4.5. Breaking

On the break shot, the cue ball must be placed behind the headstring (i.e. in the kitchen). "Breaking safe" or soft is not allowed. For a break to be legal, at least four balls must be driven to the cushions or a ball must be pocketed. If these conditions are not met, the balls are reracked and rebroken by the same player. This continues until a legal break is made. A game not legally broken (e.g. four balls were not driven to cushions) but resulting in a scratch or foul will be reracked and broken by the opposite player. The head ball or the second ball must be struck on the break and the cue ball may not be shot into a cushion before hitting the rack. The League Operator may make judgments and issue penalties to teams and players who are not breaking hard. Breaking just hard enough to comply with this rule is not a guarantee against penalties. Break as hard as you can with control.

4.6. Open Table

The table is open when the players have not yet chosen their groups of balls. The choice of ball group is determined when a player first pockets one or more balls of a single group with a legal shot. If the table is open and a player pockets one or more balls of both groups, the table remains open. If the table is open and a player fails to pocket a ball, or pockets one or more balls while committing a foul, the table remains open. If the table is open, a player may shoot a combination involving a stripe and a solid, whichever he makes becomes his group, and he continues to shoot. If the table is open, the player

may shoot and hit any ball, except the 8-ball, and each pocketed ball counts (i.e. remains pocketed).

In the unlikely event that the table is open and all balls of one type have been pocketed, the player has the option to proceed to call and shoot the 8-ball, or to shoot at one of the other balls, but he must declare his intention before the shot (a foul penalty applies to bad hits in either case).

4.7. After the Break

Various situations can occur upon completion of the break:

4.7.1. Foul on the Break: A foul on the break results in cue ball in hand behind the headstring (see BCA 3.9) and the incoming player may shoot directly at any ball on or outside the headstring (see diagram in the BCA rulebook, p. 31). In close situations, both players must agree that an object ball is out of the kitchen. It is up to the opponent to call the cue ball "out" before it is shot. The shooter must move the ball into a position acceptable by the opponent; to refuse and shoot anyway will be considered a sportsmanship violation to be reported to the League Operator, and the game will be forfeited.

4.7.2. No Balls Pocketed: No balls are pocketed and it is the other player's turn with an open table.

4.7.3. Made The 8-Ball: The 8-ball is made, resulting in a win, unless the player fouls, in which case he loses.

4.7.4. Made One or More Balls of One Group: One or more object ball are made from only one group, it is still the breaker's turn, he continues shooting the group of balls he just made, and the table is not open.

4.7.5. Made One or More of Each: One (or more) of each type ball is made. The table is open and the breaker has his choice of balls.

4.7.6. Made All Seven: If a player pockets all seven balls of one type on the break, and no balls of the other type, the table is not open and he must shoot the 8-ball on the following shot; if he also pocketed balls of the other type on the break, then the table is open.

4.7.7. Shooting at the Wrong Balls: Occasionally it occurs after the break, or any other time during the game, that a player mistakenly starts shooting the wrong group of balls. Once the shooter has hit a ball of the wrong group, the foul has occurred whether the ball is pocketed or not. As soon as it is noticed that the wrong group of balls has been struck first, a foul should be called. Before any foul has occurred, the shooter may avoid penalty by asking the sitting player which group of balls he has; the sitting player must tell him the truth.

4.8. Combination Shots

Combination shots are legal, but striking first a ball of the correct group is required, except in an "open table" situation (4.6) in which a ball of either group may be hit first. The 8-ball is not neutral; it may not be hit first in a combination shot to pocket an object ball of one of the groups. A player is credited with all balls he legally pockets. When a player does not pocket one of his balls but does pocket an opponent's ball, he loses his turn, and the opponent gets credit for the pocketed ball. No pocketed ball is ever spotted.

4.9. Balls Jumped Off Table

When a stroke results in the cue ball or any object ball being a jumped ball off the table, the stroke is a foul. If the 8-ball is jumped off the table, it is loss of game. All jumped object balls are spotted when all balls have stopped moving.

4.10. Pocketed Balls

Balls must remain in a pocket to be legal. If an object ball goes into a pocket, but bounces back onto the playing surface, it is not considered pocketed. If it is the 8-ball, it is not considered either a win or loss. If it is the cue ball, it is not considered a scratch, unless it touches another object ball that was already pocketed. [In other words, a player may not fill a pocket with object balls as a means of avoiding a scratch shot.] The nonshooting player may also clear pockets, or request that the shooting player do so. [In other words, a player may not fill a pocket with object balls as a means of avoiding pocketing an 8-ball out of turn.]

4.11. Fouls

If any of the following fouls are committed, the penalty is cue ball in hand for the incoming player. Make certain you have ball-in-hand before you touch the cue ball by confirming with your opponent. Ball-in-hand means you are allowed to place the cue ball anywhere on the playing surface of the table (with the exception of fouls on the break which result in ball-in-hand behind the headstring) and shoot any of your balls (or the 8-ball, if all your group of balls have been pocketed). Cue ball placement is governed by BCA Rule 3.39. The ball-in-hand rule penalizes a player for an error. Without this rule, a player could benefit by accidentally or purposely scratching or fouling.

4.11.1. Calling Fouls: ONLY THE PLAYER OR THE COACH MAY OFFICIALLY CALL A FOUL, Although anyone may suggest to the player or the coach that a foul should be called. The coach for a match is designated by the first person to give the player advice. This means that if no coach has been designated that only the player can "officially" call a foul. In the event that a third party has been called upon to judge a close situation, the player is obligated to call the foul as judged by this third party. It is perfectly acceptable for the shooting player to inform his opponent of a foul; many fouls are difficult to see from a distance, and the shooting player is often in the best position to know that a foul occurred.

4.11.2. Call Foul Before Next Shot: A FOUL MUST BE CALLED IMMEDIATELY, BEFORE THE NEXT SHOT IS EXECUTED.

4.11.3. Stalemate: In the unlikely event that a game should ever become stalemated, meaning that neither player wants to, or can, pocket a ball or make use of ball-in-hand to win the game, then the balls should be reracked and the game should be replayed with the same breaker.

4.11.4. Ball-in-Hand Fouls Summary:

In addition to the five coaching fouls (see Section 3.1), the following are the playing fouls that result in ball-in-hand:

- Scratch (BCA 3.19)
- No Contact (BCA 3.17, 3.18)
- Bad Hit (BCA3.18)
- No Cushion (BCA 3.18, 3.37)

- Frozen Ball Foul (BCA 3.37)
- Intentional Scoop (BCA 3.25)
- Jumped Ball Off the Table (BCA 3.27)
- Touching the Cue Ball (BCA 3.20)
- Deflecting a Ball in Play (BCA 3.8, 3.20, 3.24)
- Shaft Foul (BCA 3.20)
- Placement Foul (BCA 3.21)
- Shooting with Balls in Motion (BCA 3.13)
- Double Hit (BCA 3.22) Push Shot (BCA 3.23)
- Illegal Device (BCA 3.41)
- Illegal Marking (BCA 3.42)
- Moving an Obstructing Ball on a Curve Shot (BCA 1.16.2)

4.11.5. Bad Hit: Failure to hit your object ball first is a foul. (A player who is shooting stripes must hit a striped ball first.) The shooter has the advantage in these situations unless his opponent has asked an outside party to watch the hit. Protect yourself. If you think your opponent is attempting a shot that could result in a bad hit, get someone to watch the shot before he starts shooting. Teams involved in repeatedly calling bad hits without outside party verification may be subject to penalty points for disruptive unsportsmanlike behavior.

4.11.6. Touching an Object Ball Accidentally: Touching an object ball accidentally is not a foul unless the accidentally moved ball affects the outcome of a shot (see BCA rule 1.16.1). The nonshooting player is responsible for restoring ball positions. If the shooter is unaware that balls have been moved during a shot, the opponent must notify him. If a disturbed ball is pocketed, the nonshooting player may choose to leave the ball in the pocket or to restore it to its original position on the table, unless the disturbed pocketed ball is the 8-ball, in which case the nonshooting player must restore its original position. The nonshooting player may ask for advice from any league member about the original ball positions.

4.11.7. Receiving Illegal Aid: Coaching from person(s) other than the designated coach during a match is illegal. It is not considered illegal aid to remind a player to mark the 8-ball pocket, or to tell a player a foul has occurred, or to explain a rule situation; anyone may do so at any time during a match.

4.11.8. Placing the Cue Ball in Hand: Only the player, and not the coach or the team captain, may place the cue ball in a ball-in-hand situation. If a player shoots a cue ball that was placed in position by his coach, then a foul has occurred.

4.11.9. Touching an Object Ball with Cue Ball in Hand: Touching any object ball with the cue ball while it is in hand is a foul (see BCA 3.21). Use caution when placing the cue ball on the table. The cue ball is always “alive” and if it touches another ball, it is a cue ball foul and your opponent has ball-in-hand. Be especially careful when placing the cue ball in a tight spot

4.11.10. Jump Shots: Jumping any part of a ball with the cue ball is illegal regardless of the elevation of the stick. In many cases the cue ball jumps when a player

executes a normal shot; if the cue ball does not jump any part of another ball the shot is legal.

4.11.11. Masse Shots: For the purposes of this rule, a masse shot involves a stick elevation of 45 degrees or greater with the intention of curving the cue ball around an obstacle. The opponent must warn the shooting player that the stick is elevated beyond this limit, and it is only if the player continues to shoot with that elevation that a foul occurs. A player is allowed to curve the cue ball around an obstacle with a stick elevation of less than 45 degrees, and BCA rule 1.16.2 is in effect for such curve shots. Stick elevations of greater than 45 degrees are allowed in other situations, such as to avoid a double hit on the cue ball or to achieve a clean hit on the cue ball when it is close to a cushion or when an object ball obstructs the path of the cue tip and shaft.

4.11.12. Touching the Cue Ball: Touching the cue ball (when it is not in hand) is a foul (see BCA 3.20). If the cue ball is near a pocket that is full and must be cleared, the shooting player may request that the nonshooting player clear the pocket in order to avoid fouling the cue ball.

4.11.13. Slow Play: Slow playing is particularly aggravating and is not acceptable. While at the table, please execute each shot within one minute (excludes coaching time). A coaching period should take no longer than two minutes.

4.12. Loss of Game

Unlike most pool games in which there are only one or two ways for a player to lose, in 8-Ball here are many ways to lose a game.

4.12.1. Opponent Legally Pockets the 8-Ball: The opposing player wins by pocketing his numerical group and legally pocketing the 8-ball as described in Section 4.13.

4.12.2. Pocketing the 8-Ball Out of Turn: A player pockets the 8-ball out of turn or jumps it off the table. The 8-ball cannot be pocketed simultaneously with the last ball of the player's group; the 8-ball must be a separate shot.

4.12.3. Pocketing the 8-Ball in the Wrong Pocket: A player pockets the 8-ball in the wrong pocket or fails to properly mark the pocket.

4.12.4. Fouling While pocketing the 8-Ball: The player fouls while pocketing the 8-ball.

4.12.5. Scratching on the 8-Ball: When playing the 8-ball, a player scratches the cue ball whether the 8-ball was pocketed or not. Note: A player attempting to shoot and hit the 8-ball but missing it has fouled, resulting in ball-in-hand for his opponent; this is NOT loss of game.

4.12.6. Altering the Course of the 8-Ball: A game is forfeited if the shooter alters the course of the 8-ball, the cue ball, or any other object ball in play in a game-losing situation. It is best to not alter the course of a ball in play, even if it was moved accidentally during the shot.

4.12.7. Unsportsmanlike Conduct: A serious display of unsportsmanlike conduct may result in forfeiture of a game, or of the entire match. Minor violations, such as deflecting balls (BCA 3.8), moving balls with the shaft (BCA 3.28), or interference (BCA

3.40) may be preceded with a warning, but more serious violations may be imposed by the League Operator without such a warning.

4.13. Winning a Game

A player has won the game when all the balls of his numerical group have been pocketed and he has legally pocketed the 8-ball in a properly marked pocket.

4.13.1. Marking the Pocket: To properly mark the pocket, a coaster or some other reasonable object, not chalk, must be placed next to the pocket the 8-ball is intended to enter. Both teams may use the same marker. Only one marker may be on the table. If the marker is already at the intended pocket from a previous attempt or game, it is not necessary for the shooter to touch it, pick it up, or reposition it. If, and only if, both players agree beforehand, then the pocket may be designated verbally or with a pointing motion of the shooter.

4.13.2. Opponent Loses: A player wins if his opponent loses according to any of the situations in Section 4.12.

5. APL Handicap System

5.1. Description

The Argonne Pool League handicap system is designed to allow "fair" matches between players with different skill levels using an open, objective, and unbiased method. A "fair" match is one in which either player is about equally likely to win based on their average skill levels. Each player has a "skill rating" that is determined from his (or her) win/loss history. The difference in the skill ratings of the two players in a match determines how many games are required by each of the two players in order to win the match; the higher rated player generally needs more games than the lower rated player, and larger rating differences mean larger differences in the number of games required by the two players to win a match. Skill ratings range from less than 0 to over 100. Beginners have ratings in the 20's or 30's, more experienced players will be in the 60's to 80's, and professional-level players will be well over 100. The average for the Argonne Pool League is usually about 45 to 50.

Initial skill ratings will be assigned by the league. A skill test, which is described in the following section, may be used for new players. Regular or returning players will generally carry over their ratings from the previous season.

Every time a player plays a match, his skill rating will change. It will increase if he wins, and it will decrease if he loses. The number of points that a player's skill rating changes depends on the number of matches he has played during the two sessions that make up a league season.

Number of Matches Played	Skill Rating Change
1	±6
2-3	±4

4-6	±3
7-28	±2

At the end of a match, the scorekeeper should indicate on the scoresheet the player's new skill ratings. An important aspect of this handicap system is that the skill rating adjustments are done openly and with a known procedure; it is not a secret hidden process. Match forfeits do not affect skill ratings. In rare situations it may be necessary to adjust a player's skill rating outside of the normal ratings adjustment. If two or more team captains believe that a skill rating for a particular player is significantly incorrect, then they should notify the other team captains of the situation, and a written notice should be given to the League Operator; the next time the player in question plays a match, the other team captains, or their representatives, can observe the player. If ⅔ or more of the team captains agree that there is a rating mismatch, then the player's skill rating can be adjusted by an amount, not to exceed ±20 rating points, determined by a plurality of the captains.

In the Argonne Pool League, players with higher skill ratings are rewarded by being allowed to play longer matches. An advantage of longer matches is that the game ratio may be chosen to more accurately reflect the two player's skill ratings, and blind luck is less important to the match outcome. The following charts (normal followed by reduced race) give the number of games required to win a match by the two players. The skill rating of the stronger player determines which chart is used for the match, or, if both players agree, shorter charts may be used as a means of speeding up a match.

5.2 Handicap Chart – Long matches

Chart-4 (Highest Skill Rating: up to 39)

Rating Difference	Match Games
0-19	2:2
20-up	3:2

Chart-6 (Highest Skill Rating: 40-49)

Rating Difference	Match Games
0-10	3:3
11-26	3:2
27-53	4:2
54-up	4:1

Chart-10 (Highest Skill Rating: 70-89)

Rating Difference	Match Games
0-5	5:5
6-14	5:4
15-21	6:4
22-28	5:3

Chart-8 (Highest Skill Rating: 50-69)

Rating Difference	Match Games
0-6	4:4
7-18	4:3
19-29	5:3
30-39	4:2
40-48	5:2
49-68	6:2
69-up	5:1

Chart-12 (Highest Skill Rating: 90-up)

Rating Difference	Match Games
0-4	6:6
5-11	6:5
12-17	7:5
18-22	6:4
23-28	7:4
29-35	8:4

29-36	6:3	36-42	7:3
37-46	7:3	43-48	8:3
47-56	6:2	49-58	9:3
57-62	7:2	59-68	8:2
63-82	8:2	69-74	9:2
83-101	7:1	75-93	10:2
102-up	8:1	94-112	9:1
		113-up	10:1

Example: Here is an example of how to determine a matchup and to adjust handicaps. Player-A has a skill rating of 55, and player-B has a rating of 40. The highest rating, 55, means that Chart-8 should be used. The rating difference of 15 (i.e. 55-40) gives the matchup of 4:3. This means that player-A must win 4 games to win the match, while player-B must win only 3. Suppose that player-A, a new player who has played 1 time previously, wins the match, while player-B, an established player who has played 14 times this session, loses the match. Player-A's new skill rating will be 59 (i.e. 55+4), and player-B's new rating will be 38 (i.e. 40-2).

If these same two players were to play again, with their new skill ratings, they would again use Chart-8, but this time the rating difference of 21 (i.e. 59-38) would mean that they would play a 5:3 match, which is slightly tougher for Player-A. This shows how the skill ratings for the players adjust after each match until each player has a roughly equal chance of winning the match.

5.3 Handicap Chart – Short Matches

Chart-4 (Highest Skill Rating: up to 49)

Rating Difference	Match Games
0-19	2:2
20-up	3:2

Chart-6 (Highest Skill Rating: 50-79)

Rating Difference	Match Games
0-10	3:3
11-26	3:2
27-53	4:2
54-up	4:1

Chart-8 (Highest Skill Rating: 80-119)

Rating Difference	Match Games
0-6	4:4
7-18	4:3
19-29	5:3
30-39	4:2
40-48	5:2
49-68	6:2
69-up	5:1

Chart-10 (Highest Skill Rating: 120-up)

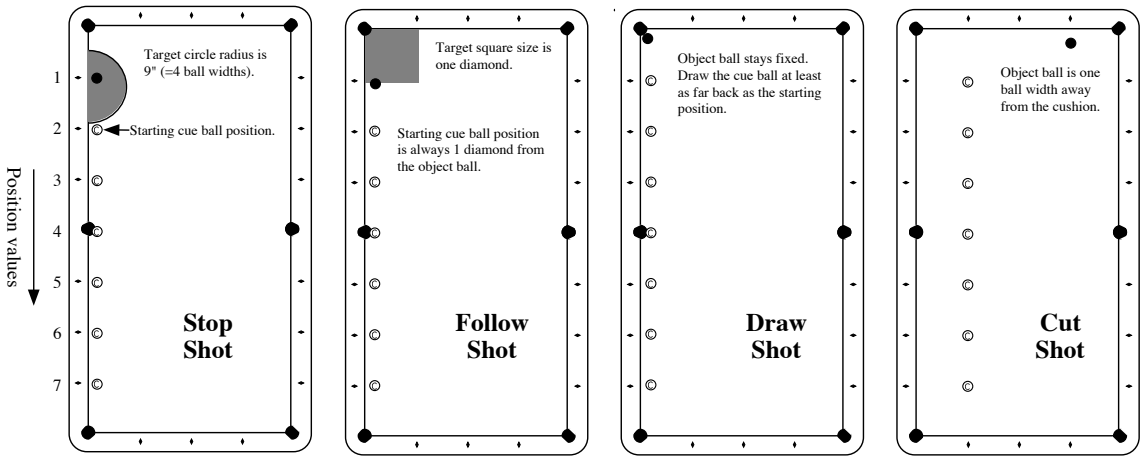
Rating Difference	Match Games
0-5	5:5
6-14	5:4
15-21	6:4
22-28	5:3
29-36	6:3
37-46	7:3

47-56	6:2
57-62	7:2
63-82	8:2
83-101	7:1
102-up	8:1

5.4 New Player Skill Assessment

A skill test may be used for the purpose of rating new players. Individual players may also be asked to take a skill test at various times for calibration purposes. When a skill test is taken, the player should endeavor to perform as well as possible during the test.

The test consists of four groups of shots, each of which measures a specific skill. This test should be given to a player after he has warmed up enough to be playing his best and he is accustomed to the equipment characteristics. There are four groups of shots, consisting of a stop-shot group, a follow-shot group, a draw-shot group, and a cut-shot group. The shots are diagrammed for a right-handed player, but the player may switch sides of the table if he chooses. In each case, a success means that the object ball was pocketed correctly and, if appropriate, the cue ball was positioned correctly afterwards. A cue ball scratch counts as a miss.



In the stop-shot group, the goal is to pocket the object ball in the corner pocket and to stop the cue ball within 9 inches of the "ghost ball" position. The object ball is one diamond away from the corner pocket and about an inch or so away from the side cushion. The object ball is always placed in the same position in this shot group, and the cue ball moves farther away from the object ball upon success or closer upon failure. 9 inches is four ball widths, but it may be more convenient to use a hand span for measurements. The cue ball should be close to the side cushion, but the player is allowed to move the cue ball sideways in order to make a comfortable bridge.

In the follow-shot group of shots the goal is to pocket the object ball in the corner pocket while using topspin on the cue ball to position it within a one-diamond square of the corner pocket without scratching. In this group of shots, both the cue ball and the

object ball are moved back farther from the pocket upon success, and moved closer to the corner pocket upon a failure. The initial distance between the cue ball and the object ball is always one diamond. The player is allowed to make small sideways adjustments to the initial cue ball position in order to avoid a scratch.

In the draw-shot group, the goal is to draw the cue ball straight back to at least the starting position. In this group of shots the object ball position remains fixed in the center of the pocket opening and about a ball width from the end cushion, and only the cue ball is moved farther or closer upon success or failure. The player is allowed to move the cue ball sideways away from the cushion in order to make a comfortable bridge.

In the cut-shot group, the goal is to pocket the object ball in the corner pocket without scratching. The object ball position remains fixed one diamond from the pocket and about one ball width from the end cushion, and the cue ball is moved farther or closer upon success or failure. The cue ball should always be one diamond from the side rail.

The numerical score for each of these tests is determined as follows. The player should begin a group of shots at an estimated starting point that is close to his final score, or at diamond 2 if no estimate can be made. The player should move back one full diamond upon success, and forward one full diamond upon failure, until about three failures have occurred and the player appears to be moving back and forth about his final scoring distance. The player should use a coin on the rail to mark his position before each shot. After the third failure, the cue ball should be moved by half-diamond steps rather than full-diamond steps, and the player should execute four more shot attempts. The total of the starting diamond numbers for these last four shots is then the player's score for that group. The sum of the four scores for the four groups is then used to estimate the skill rating *R*. For example, suppose that a player has the following shot scores for the four shot groups:

Shot Group:	Stop	Follow	Draw	Cut	Skill Rating
Individual Shot Scores	4.5	5	2	3	
	4	5.5	2.5	3.5	
	3.5	5	3	4	
	4	4.5	2.5	4.5	
Total	16	20	10	15	61

This player would have an initial skill rating of 61, which would be a little above average in our league. For fractional values, round to the nearest integer.

This assessment procedure is, of course, only approximate, since it depends only on limited and specific tests of skill. It ignores tactical ability, shot choice decisions, runout ability, and many other aspects of actual game play. Furthermore, it tends to consistently overestimate the playing ability of weak players (skill ratings below 20), and it underestimates the differences between stronger players (skill ratings above 90); for extreme situations involving these players, initial skill levels may be manually adjusted to account for these biases.

Acknowledgments: This skill assessment is based on an article in *Billiards Digest* by Bob Jewett. Some modifications have been made in order to adapt this method to the Argonne 8-ball league.

6. Score Sheets

Accurate and conscientious scorekeeping is the Team Captain's greatest contribution to the smooth operation of the handicap system. The weekly score sheet is very important and should be filled out neatly, completely, and correctly. Each team receives a score sheet before play begins on league night. An example score sheet is shown below.

Results For
September 19, 2006

Argonne Pool League Scoresheet

N * Members must pay the $10.00 league fee before a match can be played

Next Week
8: X-CUE-SES

Table 3

7: Mr mR

Player	Num.	Hand	+/-	Strea	Pd.	MP	MW
Jeff Fortner	01070	41	6	0	N	0	0
Dick Weeks	01076	49	6	0	N	0	0
Allen Bakel	01071	56	6	0	N	0	0
Richard Essex	01077	78	6	0	N	0	0
Michael Sprung	01078	128	6	0	N	0	0
Dave Chamberlain	01079	54	6	0	N	0	0
Ryoji Kiyanagi	01072	77	6	0	N	0	0
Henry Hodges	01075	61	6	0	N	0	0
Jim Adduci	11075	53	6	0	N	0	0
Tom Wiencek	01073	47	6	0	N	0	0
		NA	6	0	N	0	0
Sum of Five Highest Handicaps =400					Totals	0	0

Argonne Pool League

10: We Used To Be Good

Player	Num.	Hand	+/-	Strea	Pd.	MP	MW
Jenny Erdmann	01100	50	6	0	N	0	0
Mark Erdmann	01105	87	6	0	N	0	0
Scott Petersen	01104	60	6	0	N	0	0
Todd Brade	01102	74	6	0	N	0	0
Ed Wrobel	01106	66	6	0	N	0	0
Rob Witkowski	01101	41	6	0	N	0	0
Fred Nobrega	01103	47	6	0	N	0	0
Stan Niehoff	01105	74	6	0	N	0	0
Kevin Beyer	01107	40	6	0	N	0	0
Jim Kubik	01109	40	6	0	N	0	0
		20	6	0	N	0	0
Sum of Five Highest Handicaps =361					Totals	0	0

League Handicap Statistics

Median	Mean	Stdev	Min	Max
47.00	48.39	33.29	-20	153

Spring 2006 Session Standings

Team Number	1	2	3	4	7	8	9	10
Total Wins	0	0	0	0	0	0	0	0
Ranking	1	1	1	1	1	1	1	1

Higher HC	Difference	Matchup
0-39	0-19	2:2
	20-up	3:2
40-49	0-10	3:3
	11-26	3:2
	27-53	4:2
	54-up	4:1
90-up	0-4	6:6
	5-11	6:5
	12-17	7:5
	18-22	6:4
	23-28	7:4
	29-35	8:4
	36-42	7:3
	43-48	8:3
	49-58	9:3
	59-68	8:2
	69-74	9:2
	75-93	10:2
	94-112	9:1
	113-up	10:1

Higher HC	Difference	Matchup
50-69	0-6	4:4
	7-18	4:3
	19-29	5:3
	30-39	4:2
	40-48	5:2
	49-68	6:2
	69-up	5:1
70-89	0-5	5:5
	6-14	5:4
	15-21	6:4
	22-28	5:3
	29-36	6:3
	37-46	7:3
	47-56	6:2
	57-62	7:2
	63-82	8:2
	83-101	7:1
	102-up	8:1

	a	Player Name	Player Number														
$6		coaches															
$6																	
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$6		coaches															
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$6		coaches															

In the upper right is a box that indicates which team will be your opponent the following week.

Below the title is a weekly announcement. This might be a reminder for the teams to collect session fees, or a reminder for the team to cast a vote on some issue, or it might be an announcement for some kind of special event (such as the season banquet). Please read these announcements and respond in a timely manner if necessary.

Right below the weekly announcement is the Table Number that your team will use that night.

Below the Table Number are the team roster and player information boxes. Your team will be on the left, and your opposing team for that week will be on the right. At the top of this section the team number and name is printed. Information for each player is displayed in columns. The first two columns contain the player's name and league ID number. The next column is the player's skill rating; the skill ratings of the two players in a match determines the number of games each player must win in order to win that match. The next column shows how many points will be added or subtracted from the skill rating if the player wins or loses, respectively, his next match. The next column indicates how many consecutive matches the player has recently won (if positive) or lost (if negative); this information may be used in determining if a player might be under- or

overrated during the matchup process. The “Pd” column indicates whether that player has paid his $5 session fee; this fee must be paid before a player is eligible to play a match, and payment of this fee should be indicated by writing a “Y” in this position. The last two columns give the total number of matches played and matches won by that player; these numbers are accumulated over both sessions in the season. The team total matches played and matches won are given in the bottom row of this box.

In the middle right is a summary box that gives the overall league skill rating statistics. This allows each player to judge where he stands relative to the league as a whole, and to watch his progress over time as his game improves.

Below the skill rating statistics box is a summary box for the team standing within the league. This gives the total number of matches each team has accumulated along with their standing for that week.

In the lower left is the match scoring section. This section is filled in each night, game by game and match by match. For each match, the player who wins the lag is listed first (on top). List first initial and last name, player number (from team roster on the top portion of score sheet) and the number of games he must win in order to win the match. When a player wins a game his box should be marked (usually with an “X” or by filling solid the box). The "1 2" boxes are used to keep track of the number of coaching sessions that a player uses during a game. When the match is finished write in the total number of games won by each player in the "Total" column and indicate who won by writing " W" in the "Winner" box at the far left. The $6 in the first column should be circled when the player pays his weekly match fee. If a match is forfeited, then “FORFEIT” should be written in this section. Similarly, if a match is postponed, then “POSTPONED” should be written in this section.

In the lower right are the matchup charts that indicate the number of games each player is required to win in order to win a handicapped match. This information is also included on the outside of the team folder and in Section 5 of this manual.

At the end of each league night, the league score sheets are collected by the league treasurer along with the weekly dues($30 total) and any session fees. The information from the score sheets is collected together, handicaps and other statistics are adjusted, and new score sheets are printed out for the next weeks play. Therefore it is important that the score sheets are filled out correctly, neatly, and promptly each league night.

7. Playoffs and Prizes

In order to encourage enthusiastic participation by all league members on all of the teams throughout the session, the league prize money is split into two parts. The first part, consisting of 80% of the total prize money is divided among the teams based on their standing at the end of the session. The second part, consisting of 20% of the total prize money, is divided among the teams based on their standing in the playoff tournaments, which are held after the regular session play. Even the teams that are near the bottom of the standings in the final few weeks of the regular session play have a chance at the playoff prize money, and this provides incentive for active and enthusiastic participation. The league may choose to have two playoff tournaments, one at the end of each session, or it may choose to carry over the playoff tournament prize fund from the first session and include it in the (single) playoff tournament prize fund at the end of the second session. The team captains should vote on the choice between one or two playoff tournaments either before the first session begins, or as early in the first session as is practical so that a particular team's vote is not influenced unduly by its current standing.

For an individual player to be eligible to play in the playoff tournament, he must have played at least four regular session matches. If a single playoff tournament is held after the spring session, than an eligible player must have qualified in at least one of the sessions.

The seeding (team position) in the playoff tournament is based on the session standing. If a single playoff tournament is conducted at the end of the spring session, the seeding is determined by the team standing from the spring session only. If two (or more) teams have the same match score, then a tie-breaking procedure will be applied to determine the playoff tournament seeding. First, the total number of match wins between the two teams will be considered. During the session the two teams will have played each other at least once and usually twice. For example, if the match scores for two nights are 3:2 and 3:2, then the cumulative score of 6:4 would break the tie in favor of the first team; if the match scores are 3:2 and 1:4, then the cumulative score of 4:6 would break the tie in favor of the second team. If the cumulative match scores are tied for the two teams (e.g. 3:2 and 2:3, resulting in a cumulative 5:5), then the seeding position will be determined by a coin toss. If three or more teams are tied for some position, and if there is no clear ranking of these teams based on the preceding two-way tie-breaking procedure, then the seeding order will be determined by lot (coin toss, cutting cards, etc. as appropriate for the number of tied teams).

The session prize money is determined using a "linear payout" model. An example of this is given below in Section 7.3 for eight teams. In general, if there are N teams, then the prize money is divided into $N(N+1)/2$ equal units. The last place team gets 1 unit, the second to last team gets 2 units, and so on up to the 2nd place team which receives $(N–1)$ units and the 1st place team which receives N units.

The above tie-breaking procedure does not apply to session ranking payouts. If two (or more) teams are tied in the session ranking, then the corresponding prize monies will be split evenly between the tied teams. For example, if two teams are tied for 3rd and 4th place, and if the prize money for these two places is $200 and $240, then each of the two teams will receive $220. If there were a 3-way tie for 3-5th place, and if the prize money for these three positions is $160, $200, and $240, then the three teams would each

receive $200. Teams that are not involved in the tied positions receive their normal payouts, it is only the payouts of the tied teams that are affected by this procedure.

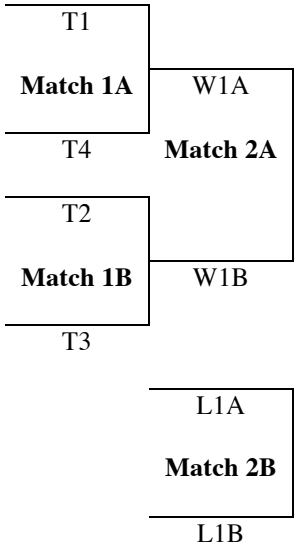
There are several possible playoff formats described below, and the particular format is decided by vote of the team captains as early in a session as is practical.

7.1. Wild-Card Format

In the wild-card format, the top three teams from the regular session, along with one other team chosen at random, compete in a four-field tournament spread over two weeks. These teams are denoted T1, T2, T3, and T4, where T4 is the wild-card team. The playoff tournament is seeded; during the first week, the team pairings are between T1:T4, and between T2:T3. The T1 team is allowed to play the presumably weaker T4 team as a reward for their regular session performance. There are two variations of the wild-card format, the choice of which is determined by vote of the team captains.

Elimination: The two winners from the first week meet each other the second week to determine the playoff positions 1 and 2; the two losers from the first week tie for 3rd place and do not play Match 2B. The playoff prize money is divided among the four teams as 40%, 30%, 15%, and 15% for playoff positions 1, 2, and 3-4 (tie) respectively.

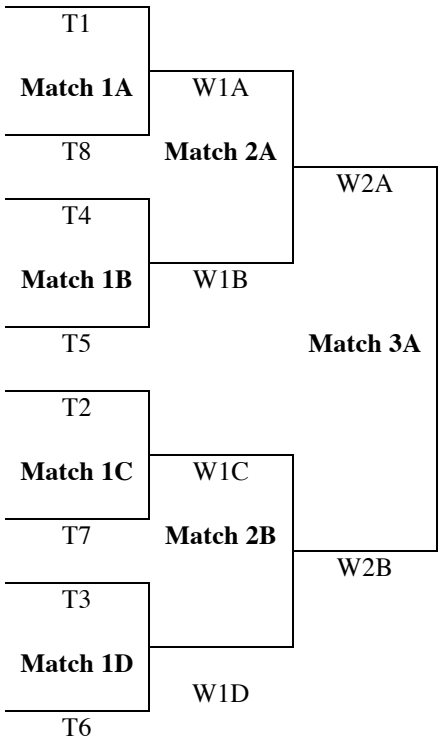
No-Elimination: As above, but the two losing teams from the first week meet each other the second week in Match 2B to determine the playoff positions 3 and 4. The playoff prize money is divided among the four teams as 40%, 30%, 20%, and 10% for playoff positions 1, 2, 3, and 4 respectively.



		Elimination	No-Elimination
1st Place	W2A	40%	40%
2nd Place	L2A	30%	30%
3rd Place	W2B	15%	20%
4th Place	L2B	15%	10%

7.2. Seeded Single-Elimination Format

In the single-elimination format, the top eight teams from the regular session compete in an eight-field single elimination tournament spread over three weeks. The playoff tournament is seeded; the higher-ranking teams are rewarded for their regular session performance by being paired in the first week against the lower-ranking teams. The pairings during the first week are shown in the chart below. When a team loses, they are eliminated from further competition; there are four pairings of teams the first week, two pairings the second week, and a single pairing the third week. The playoff prize money is divided among the top four teams as 40%, 30%, 15% and 15% for playoff positions 1, 2, and 3-4 (tie) respectively. If necessary, byes are assigned to the lowest empty positions, in the order T8, T7, and T6.



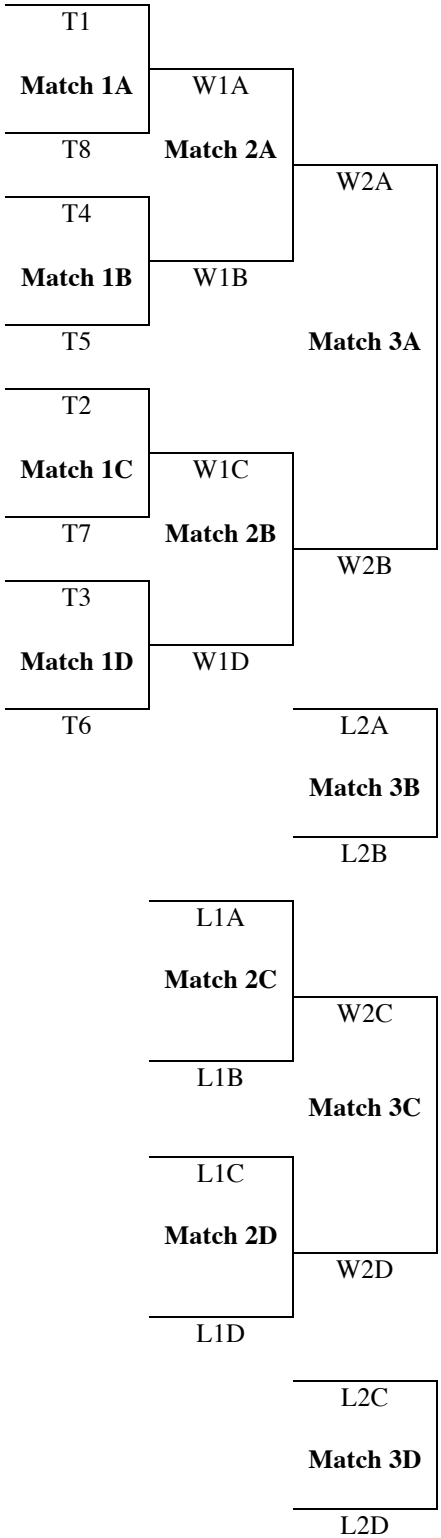
1st Place	W3A	40%
2nd Place	L3A	30%
3rd Place	L2A	15%
	L2B	15%
5th Place	L1A	0%
	L1B	0%
	L1C	0%
	L1D	0%

7.3. Seeded No-Elimination Format

In the seeded no-elimination format, the teams are chosen and seeded as in the single-elimination format. However, teams are not eliminated as they lose, they remain in competition against other teams with the same win/loss records. Consequently, there are four team pairings for all three weeks of the playoff competition. The playoff prize money is divided among the teams in one of the two following ways, the choice of which is determined by the vote of the team captains.

In the *linear payout* method, the playoff prize money is divided into 36 parts. The 8th place team gets one part, the 7th place team gets two parts, the 6th place team gets three parts, and so on, with the 2nd place team getting seven parts and the 1st place team getting eight parts.

In the *exponential payout* method, the playoff prize money is divided into 255 parts. The 8th place team gets one part, the 7th place team gets two parts, the 6th place team gets four parts, and so on, with the 2nd place team getting 64 parts, and the 1st place team getting 128 parts.



		Linear	Exponential
1st Place	W3A	8/36=22.2%	128/255=50%
2nd Place	L3A	7/36=19.4%	64/255=25%
3rd Place	W3B	6/36=16.7%	32/255=12.5%
4th Place	L3B	5/36=13.9%	16/255=6.3%
5th Place	W3C	4/36=11.1%	8/255=3.1%
6th Place	L3C	3/36=8.3%	4/255=1.6%
7th Place	W3D	2/36=5.6%	2/255=0.8%
8th Place	L3D	1/36=2.7%	1/255=0.4%

8. Glossary

Ball-in-Hand A player who receives "ball in hand" may place the cue ball anywhere on the table and shoot any ball he chooses.

Bank Shot A player drives the object ball to the rail or cushion in the course of attempting to make a shot.

Break (Break Shot) Refers to the first shot of the game when all the balls are packed together in a rack.

Bridge Refers to the hand that holds and guides the cue shaft, also the type of hold.

Bridge Stick/ Mechanical Bridge A cue-like stick with a specially shaped plate mounted on the end. This serves as a support for the cue when the shooter can't reach the spot where he would normally place his bridge.

Bye A bye is a missing team on a schedule. Schedules are always set up to accommodate an even number of teams. When there is an odd number of teams in a division, then there will be a bye. For example, a nine-team division will be playing a 10-team schedule with one bye. If your team is scheduled to "play" a bye, that means you don't play that week. A bye is a missing team or, in a singles event an individual.

Carom A term describing the glancing of one ball off another.

Defensive Shots Is a shot where the shooter deliberately misses (fails to pocket a ball) in order to pass his turn at the table on to his opponent. A safety (see "safety" in these definitions) is a defensive shot because the shooter had no intention of making the ball. "Intention" is the key word. Remember that defensive means deliberately missed.

Double-Clutching Is a double hit of the cue ball caused while actually stroking the cue ball and is a Foul.

Draw A method of stroking that causes the cue ball to spin backwards after contact with an object ball. The cue tip must contact the cue ball below center to cause the draw to happen.

English A method of stroking that causes the cue ball to spin to the right or left after contact with an object ball or cushion.

Follow A method of stroking that causes the cue ball to "follow" in the same direction as the object ball when struck. Also called "topspin."

Followthrough The action of carrying the cue through the area previously occupied by the cue ball.

Foot of Table The end designated for racking the balls. Generally, the end not marked with the maker's name plate, or on tables with ball returns, the end to which the balls return.

Foot Spot A black dot placed in the exact center of a line drawn between the second diamonds from the foot rail.

Foul An illegal shot or other infraction resulting in loss of turn at the table and "cue ball in hand" for the opponent, except on the break - then it is cue ball in hand behind the headstring or "in the kitchen."

Frozen Ball A ball that is touching a cushion or another ball. Special rules sometimes apply to frozen balls.

Head of Table Opposite of the foot. The end from which players break.

Headstring The imaginary line across the head of the table. The area between the headstring and the head cushion is called "the kitchen."

Inning Consists of one turn of each player. Player I shoots and, when done, Player 2 shoots.

Jump Shot This is illegal at Q Billiards and will be called as a foul. When one intentionally causes the cue ball to jump over a ball that is in the way in order to hit or pocket an object ball.

Kick Shot When a player drives the cue ball to a cushion before contacting the object ball. Note that a ball must still hit a rail or go into a pocket after contact, otherwise it is a foul.

Lag The method used to start a match. Players simultaneously shoot a ball from behind the head string, banking it off the foot rail and back to the head of the table. The closest ball to the head rail wins the lag.

Masse' Shot A shot where the shooter is attempting to curve the cue ball around a ball in order to strike an intended ball. A masse' is accomplished by raising the butt end of the cue and using either right or left english. Even raising the butt end of the cue a little and using right or left english will cause the cue ball to curve a little. The more the cue is raised, the more the cue ball will curve. Extreme masse' shots, improperly executed, can cause damage to pocket billiard equipment. Thus, for purposes of this league, a masse' will be defined as elevating the cue above 45 degrees to curve a ball around another ball.

Match Any number of games played between two opposing shooters. The winner earns 1 team point.

Miscue A stroke where the cue tip does not hit the cue ball squarely enough and glances off without driving the cue ball on its desired course, often caused by not enough chalk on the tip, an improperly shaped tip or an attempt at too much English. Accidental miscuing is not a Foul, unless other rules are violated.

Must Win Number of games a player must win to win the match.

Object Ball Is the ball you are trying to hit, or any other ball of your group.

Safety A defensive action taken when a player has no prospective shot on the table. It is a legal shot and is not considered to be “dirty pool.” A safety must still conform with the rule concerning hitting the "correct" ball first and striking a rail afterwards. If a “correct” ball is accidentally pocketed while playing safe, the shooter must continue to shoot. It is polite to call safeties but not required.

Sandbagging Sandbagging, in any handicapped sport, is the unethical practice of playing well below your ability in order to alter your skill rating so it does not reflect your true ability. Players determined to be sandbagging may be subject to membership suspension or cancellation by League Management. Players believed to be sandbagging may have their skill rating adjusted accordingly. In other words, sandbagging will not be tolerated.

Scratch A scratch occurs when the cue ball is pocketed or when it touches a previously pocketed object ball (e.g. in a full pocket).

Session Schedule consisting of 14-16 weeks of regular league play and two or three weeks of playoffs (depending on the number of teams). We play two sessions per season: (1) Fall (September through December), and (2) Spring (January through April).

Split Hits When the cue ball strikes a legal object ball and a non-legal object ball at approximately the same instant. If it cannot be clearly determined which ball was hit first, the judgment will go in favor of the shooter.

Stalemate Whenever neither player chooses to pocket a ball or accept and utilize a cue ball in hand in order to win the game. When this occurs, the balls will be reracked and the breaker of the stalemated game will break again.

Team Points The cumulative total of match points won by a team during the session. These points are used to determine 'team standings" to become eligible to participate in the playoffs. Each team has the potential to win a total of five (5) points each week of play (5 match wins per week).

9. Supplemental Material

9.1. APL Rules Rationale and Hypothetical Situations

This addendum contains discussions of the Argonne Pool League rules that are meant to clarify particular situations.

APL 3.5: The order of Player Declaration was originally the same as the APA system; namely, the first match was determined by a coin flip, and subsequent matches alternated between the two teams. The current approach (winner's choice) was adopted for several reasons. It makes the outcome of each match more important than just the resulting team point, it contributes to a sense of continuity for the night, and thereby enhances the team spirit, especially for the early matches. The difference between a win and a loss in an early match may make a difference in the matchups in the subsequent matches, and in tight competitive situations that can be a significant difference in the overall outcome for the night.

APL 3.8: The APL has always had a diverse collection of teams. Some teams consists of the minimal 5 or 6 players, each of whom expect to play almost every week. Other teams consist of up to 10 or 11 players, many of whom expect to play only rarely, even if they regularly show up on league night to socialize and to root for their team. Some team members consist of ANL employees who work together in the same building, the same division, or even the same research group. Some teams have several family members. Some teams have a core of "regular" players along with a few "substitute" players who show up only when one of the regular players is unavailable. All of these various models are entirely consistent with the goals of the league. League members are free to change teams, and if a particular player wants to play less often, or more often, trades of players between teams may be arranged.

APL 3.10: The APL originally had a cumulative skill level limit similar to the APA "23 rule." This was eliminated for two main reasons. First, it prevented some league members from playing as regularly as they wanted to play. Although a player has the option to play on a different team, there were some situations in which an individual would have been required to leave a team that included coworkers or family members, and this was not consistent with the goals of the APL. Second, one of the main reasons for the "23 rule" in the APA is because the APA handicap system is biased in favor of stronger players (i.e. if a typical APA 6 plays a typical APA 4, the higher ranked player will win more often than he will lose). This bias encourages teams to load up with the highest-rated players possible, and if it weren't for the "23 rule," everyone on a team might be the highest skill rating possible. In contrast, the APL handicap system is fair (not biased), so there is no inherent advantage for a team to load up with high-rated players. Indeed, if a team wants to "beat the system" with our handicap system, the best approach is to have lower- and mid-level players who work regularly on their skills and improve over time; these are the only players who, in the long run, will have a higher fraction of wins than loses with our handicap system.

APL 4.6: A) A player miscues on the break shot. The cue ball hits the rack and only two balls hit the cushion afterwards. The opponent says, "I'll rerack and you can break again." Is this correct?

Yes, there is no penalty for not satisfying the break shot requirements.

B) A player miscues on the break shot and only two balls hit the cushion. The cue ball scratches in the corner pocket, . The opponent says, “I’ll rerack and you can break again.” Is this correct?

No, a foul must be associated with a penalty. The correct penalty is for the balls to be reracked and the opponent is given the opportunity to break.

APL 4.6-4.7: A) The breaker pockets two solids and one stripe on the break, and he declares “I’ll shoot at solids." On his next shot he pockets two more solids and one more stripe. On his next shot he pockets three solids and another stripe, but he cannot shoot the 8-ball because he is snookered behind a stripe. He then declares, “I’ll shoot at the stripes.” The opponent says that he can't switch because he already called solids. Is the player allowed to switch?

Yes, the two verbal declarations by the shooter were irrelevant. The table is open, and according to APL 4.6 he may choose to shoot at either the stripes or the 8-ball, provided he declares his intentions before the shot.

B) The breaker pockets two solids and one stripe on the break, and he declares “I’ll shoot at solids.” On his next shot he pockets two more solids and one more stripe. On his next shot he pockets three solids and another stripe. On his next shot, he calls the 8-ball, but hits a striped ball first. Does the opponent get ball in hand? Which balls are the opponent allowed to shoot?

According to rule 4.6 the breaker committed a bad hit foul, so his opponent gets ball in hand. The table is open, so the opponent is allowed to call the 8-ball or to shoot at a striped ball, but he must declare his intention before his shot. The breaker's declaration for solids is irrelevant. If the opponent misses, then the table remains open.

APL 4.10: A player is shooting the 8-ball, and it is sitting close to a side pocket. If the player attempts to shoot the 8-ball in a corner pocket, the cue ball will scratch in the side pocket. The player walks around the table gathering up the pocketed balls, and places them in the side pocket. He then calls the 8-ball in the corner pocket and marks the pocket appropriately. He pockets the 8-ball, the cue ball hits a ball in the full side pocket and stays on the table. He declares that the cue ball didn't stay in the pocket, so it is not a scratch. Is he correct?

No, according to APL 4.10, the cue ball scratched when it touched one of the pocketed balls in the side pocket. In this case, the player loses the game since he scratched while shooting the 8-ball.

APL 4.11: A) The 3-ball is sitting close to a pocket, blocking the path of a striped ball. The player shooting stripes bumps the 3-ball accidentally with his cue stick while executing a shot and pockets it. The player claims that the ball stays down, since “no balls are ever spotted in 8-ball,” and that he should continue to shoot since touching object balls is not a foul. What is the correct ruling?

According to APL 4.11.6, the nonshooting player has the option of restoration. In this case, he could, if he chooses, pull the 3-ball from the pocket and place it back in its original position, blocking the striped ball. The shooting player would then continue his inning, with no foul.

B) In the above situation, the nonshooting player chooses to restore the position of the 3-ball. The shooting player disagrees with the placement saying that there was room for his striped ball to pass originally. What is the correct ruling?

Although the nonshooting player may ask for, and receive, outside advice on the original position of the 3-ball, the exact placement is his decision. The penalty to the shooter for moving balls is that the opponent gets the option of restoration, which includes the decision of ball placement. The nonshooting player should endeavor to replace balls as closely as possible to their original positions.

APL 4.12: A) The shooter is shooting the 4-ball, misses the pocket, and the 4-ball hits the 8-ball rolling it towards a pocket. The shooter reaches out and deflects the 8-ball, so that it does not drop into the pocket, and claims that it is only a ball-in-hand foul.

Wrong. In this game-losing situation, according to APL 4.12.6, the penalty is loss of game.

B) The shooter moves the 8-ball accidentally with his cue stick while shooting the 4-ball. The 4-ball hits the 8-ball, rolling it towards a pocket. The shooter reaches out and deflects the 8-ball, and claims that the 8-ball was not in play because it had been moved accidentally.

Wrong. The 8-ball was in play due to the accidental movement, and in this game-losing situation, the penalty for deflection of the 8-ball is loss of game. If the deflection had not occurred, and if the 8-ball was not pocketed, then the penalty would only have been ball-in-hand (because the accidentally moved 8-ball affected the shot outcome).

C) The shooter moves the 8-ball accidentally with his cue stick while shooting the 4-ball, and as it rolls towards a pocket, the shooter reaches out and deflects the 8-ball. He claims that the 8-ball was not in play because it had been moved accidentally.

Wrong. The 8-ball was in play due to the accidental movement, and in this game-losing situation, the penalty for deflection of the 8-ball is loss of game. In this example, if the deflection had not occurred, and if the accidentally moved 8-ball did not affect the outcome of the shot, then there would have been no penalty at all, even if the 8-ball was pocketed; in this case the 8-ball would have simply been replaced to its original position by the opponent, and the game would have resumed as if the accidental movement had not occurred.

APL 5.1: One important feature of the APL handicap system is that it is designed to allow "fair" matches. It is not "biased" like the former APA handicap system. This has some important consequences regarding the team skill rating limit rule, the optimal choice of team members, and the tactics involved in selecting individual players for matches. The league statistics over several years show that this goal of fairness is achieved in practice. Considering the many advantages of such a fair system, it is truly surprising that so few other leagues adopt this kind of approach.

APL 5.2: It is recommended that each team have one or more individuals that can administer the skill test. The test takes about 10 minutes, including the time it takes to explain the procedure to the new player. The test is relatively objective, and the results are consistent regardless of the administrator. Nonetheless, to avoid any hint of bias, a new player who has been recruited for one team should be tested by someone on a different team. The skill test is also a good way for individual players to monitor their own abilities over time, or to identify weaknesses in their skills in order to focus their

practice time. It should also be emphasized that a player's skills and abilities are not constant, they fluctuate day by day and week by week. The APL handicap system attempts to adjust the skill rating value to these fluctuations as much as possible.

APL 7: For the past several sessions, the league has chosen to have a single playoff tournament at the end of the second (spring) session. This is due in part simply to scheduling. If the first session playoff tournament is held in December, then it usually requires league play to continue right up until the week before Christmas, and this is inconvenient for many of the league members who travel with their families for the holidays. On the other hand, if the playoff tournament is postponed until the following January, then some of the enthusiasm for the tournament has been lost because of the break of several weeks in between. The January playoff tournament also delays the start of the spring session. However, this is still an issue that must be decided by vote of the Team Captains.

Regarding playoff tournament formats, the league has chosen the no-elimination format (Section 7.3) fairly consistently for the past several years, along with the linear payout model. Although many league members probably consider this to be the *de facto* standard format, it also is still something that must be decided by vote. The League has had eight teams during this time, so this results in every team being eligible to play in the playoff tournament.

The tie-breaking procedure has undergone many changes since the founding of the League. The problem is to find a fair procedure to determine which teams can play in the playoff tournament and how the prize money is distributed among the tied teams. In general, the changes over time have tended toward simplicity. In the past few sessions, the tie-breaking procedure has not been applied to the session payouts, the simple idea of dividing the prize money evenly among the tied teams ultimately being selected. In the no-elimination tournament format, all eight teams participate, so the only remaining role for the tie-breaking procedure is the seeding of the teams into the playoff tournament chart positions. This is a relatively minor role, and any impact of this procedure on the team's final standing is correspondingly minor. Since any tie-breaking procedure is ultimately arbitrary, this is probably the fairest approach.

The League end-of-season banquet is sometimes scheduled after the last week of the playoff tournament, but usually it is scheduled on the last night of the tournament itself. This is probably another reason why the no-elimination format is usually selected – most league members plan to attend the banquet, and they would rather play than not if they are there anyway. The league banquet is usually a buffet of chicken, ribs, pizza, sandwiches, etc. that the players eat in between their league matches.

9.2. Mathematical Model

The following is a description of the mathematical model used for the APL handicap system. It is not necessary to understand this model in order to use the system, but these details are provided for those who are interested. In a match between player-1 and player-2, the probability for player-1 to win an individual game, p_1, is assumed to be related to the skill rating difference according to

$$p_1 = \frac{1}{1 + 2^{-(R_1 - R_2)/30}}$$

or equivalently

$$R_1 - R_2 = \frac{30}{\log 2} \log\left(\frac{p_1}{1 - p_1} \right) = \frac{30}{\log 2} \log\left(\frac{p_1}{p_2} \right)$$

where R_1 and R_2 are the skill ratings of the two players and p_2=1-p_1. If R_1=R_2, then p_1=p_2=0.5 and each player has an equal chance of winning a game. If R_1-R_2=30, then p_1=⅔ and p_2=⅓; this means that player-1 is twice as likely to win an individual game as player-2. If R_1-R_2=60, then p_1=⅘ and p_2=⅕; this means that player-1 is four times as likely to win an individual game as player-2. Every additional 30 points of skill-rating difference results in another factor of two in the individual game probability ratio.

If the probability of player-1 winning an individual game is independent of the match score and is given by the value p_1, and if the two players play N=n+m games, then the probability distribution of possible outcomes is given by

$$P(p_1; m, n) = \binom{m+n}{m} p_1^m p_2^n$$

where $P(p_1;m,n)$ is the probability of player-1 winning exactly m games out of the N total, which of course is the same as the probability of player-2 winning n games out of the N total. The binomial coefficient $\binom{m+n}{m} = \frac{(m+n)!}{m!n!}$ is the number of distinct ways to arrive at a given score, and the factor $p_1^m p_2^n$ is the probability, based on the skills of the two players, to arrive at such a score in any particular one of these ways.

For example, suppose that p_1=⅔ and p_2=⅓, and these players play 1 game. The two possible outcomes are $P(⅔;1,0)$=⅔ and $P(⅔;0,1)$=⅓, which means that player-1 is twice as likely to win as to lose, as expected. If they play 2 games, then there are three outcomes given by the probabilities $P(⅔;2,0)$=⅘, $P(⅔;1,1)$=⅘, and $P(⅔;0,2)$=⅑.

In a handicapped match in which player-1 is required to win N_1 games and player-2 is required to win N_2 games, the probability of player-1 winning is given by the sum of the probabilities for that player winning in all possible ways. For example, if a match is handicapped at 4:3, then player-1 can win in the three possible ways: 4:0, 4:1, and 4:2. The probabilities of winning in each of these three ways is $p_1P(p_1;3,0)$, $p_1P(p_1;3,1)$, and

$p_1P(p_1;3,2)$ respectively, and the probability of player-1 winning the match is the sum of these three terms. In the general case, the probability for player-1 winning a match handicapped at N_1 to N_2 is given by

$$W(p_1;N_1,N_2) = \sum_{k=0}^{N_2-1} p_1 P\left(p_1;N_1-1,k\right) = \sum_{k=0}^{N_2-1} \binom{N_1-1+k}{k} p_1^{N_1} p_2^k$$

$$= \sum_{j=0}^{N_2-1} p_1^{N_1+j} (-1)^j \left\{ \sum_{k=j}^{N_2-1} \binom{N_1-1+k}{k} \binom{k}{j} \right\}$$

The last equation gives the match win-probability $W(p_1;N_1,N_2)$ as a polynomial function of the player-1 game probability p_1. Solving the polynomial equation $W(p_1;N_1,N_2)-\frac{1}{2}=0$ numerically for the root in the domain $0 \le p_1 \le 1$ gives the game probability for player-1 that results in a "fair" match of N_1 to N_2. This game probability can then be converted into the following table of skill rating differences which was used to determine the handicap charts. To determine a fair matchup of N_1 to N_2, go to the appropriate row and column of this table; the entry is the rating difference for which both players have exactly a 50% chance of winning that match. For example, a fair 5:4 match would require the long-time average rating difference between the two players to be 10.4. If the actual skill difference between two opponents is higher than that value for a 5:4 match, then that matchup would favor the higher-rated player; if the actual skill difference is less than that value, then the matchup would favor the lower-rated player. The handicap charts (Chart-4 through Chart-12) were constructed by splitting these differences as fairly as possible between the higher and lower rated players.

Skill Rating Differences for Fair Handicapped Matches

$N_1 \backslash N_2$	1	2	3	4	5	6	7	8	9	10
1	0.0									
2	38.1	0.0								
3	58.3	20.1	0.0							
4	72.1	33.9	13.7	0.0						
5	82.5	44.3	24.1	10.4	0.0					
6	90.9	52.7	32.5	18.8	8.4	0.0				
7	97.9	59.7	39.5	25.8	15.4	7.0	0.0			
8	104.0	65.7	45.6	31.9	21.5	13.1	6.0	0.0		
9	109.3	71.0	50.9	37.2	26.8	18.4	11.3	5.3	0.0	
10	114.0	75.8	55.6	41.9	31.5	23.1	16.1	10.0	4.7	0.0
11	118.3	80.0	59.9	46.2	35.7	27.4	20.3	14.3	9.0	4.3
12	122.2	83.9	63.8	50.0	39.6	31.2	24.2	18.2	12.9	8.1
13	125.7	87.5	67.3	53.6	43.2	34.8	27.8	21.7	16.4	11.7
14	129.0	90.8	70.6	56.9	46.5	38.1	31.1	25.0	19.7	15.0
15	132.1	93.8	73.7	59.9	49.5	41.1	34.1	28.1	22.8	18.0
16	134.9	96.7	76.5	62.8	52.4	44.0	37.0	30.9	25.6	20.9
17	137.6	99.3	79.2	65.5	55.1	46.7	39.6	33.6	28.3	23.6
18	140.1	101.9	81.7	68.0	57.6	49.2	42.2	36.1	30.8	26.1
19	142.5	104.3	84.1	70.4	60.0	51.6	44.5	38.5	33.2	28.5
20	144.8	106.5	86.4	72.6	62.2	53.8	46.8	40.8	35.5	30.7

Suppose that a sample set $\{x_i\}$ of size N is drawn fairly from a large, or infinite, population. The average of the sample set $\bar{x}$ provides an estimate of the true population

average $\bar{x}_p$ according to the equation $\bar{x}_p = \bar{x} \pm z_c \frac{\sigma}{\sqrt{N}}$ where σ is the population standard deviation and z_c is the confidence parameter. The confidence parameter is determined by the integral under the standard normal distribution curve; for example, z_c =1.96 for a 95% confidence estimate. This equation says that for a fixed confidence, the estimate of the true population average improves with larger sample sets, and the rate of improvement of that estimate is proportional to $1/\sqrt{N}$. This relation is used as the basis of the ratings adjustment. The match outcomes are treated as a sample space, and the uncertainty in the skill rating is the statistical uncertainty due to the finite sample size. The empirical relation used is $\Delta R_n = \sqrt{\sigma_0^2 + \sigma_1^2/N}$, where ΔR_n is the convolution of two uncertainties: σ_0=1.0 is an estimate of the intrinsic uncertainty of the skill of a typical player and σ_1=6.0 is the estimate of the initial rating uncertainty. ΔR_n, rounded to the nearest integer, is taken as the rating change after the *n*th match.

Acknowledgments: This handicap system is based on the National Pool League (NPL) handicap system for 9-ball developed by Bob Jewett. Some modifications have been made in order to adapt this method to the Argonne 8-ball league.

Appendix

In this appendix Sections 1, 2, and 3 of the WPA/BCA rules are reproduced. Although some of these rules do not apply to the Argonne Pool League, they are included here in their entirety, in their unmodified original form (Version 1/1/06), as obtained from http://www.wpa-pool.com.

1. Rules For Tournament Play

The following rules concern the play, scoring, officiating and responsibilities for tournament competition in all pocket billiard games. However, the precepts and principles of these rules are to be considered part of the games' General Rules and should be applied as appropriate to all play, whether or not a formal tournament.

1.1 PLAYER RESPONSIBILITY

It is the player's responsibility to be aware of all rules, regulations and schedules applying to competition. While tournament officials will make every reasonable effort to have such information readily available to all players as appropriate, the ultimate responsibility rests with the player. *(For exceptions to this rule, see Rule 2.16.)* The player has no recourse if such information is not volunteered; the responsibility for knowing the situation and/or the rules lies with the player.

1.2 ACCEPTANCE OF EQUIPMENT

Tournament players should assure themselves, prior to beginning play, that the balls and other equipment are standard and legal. Once they begin play of a match, they may no longer question the legality of the equipment in use (unless the opponent and tournament officials both agree with the objection and any available remedy proposed by the tournament officials).

1.3 USE OF EQUIPMENT

Players may not use equipment or accessory items for purposes or in a manner other than those for which the items were intended (refer to rules 3.41 and 3.42). For example, powder containers, chalk cubes, etc., may not be used to prop up a mechanical bridge (or natural hand bridge); no more than two mechanical bridges may be used at one time, nor may they be used to support anything other than the cue shaft. Extra or out-of-play balls may not be used by players to check clearances or for any other reason (except to lag for break); the triangle may be employed by players to ascertain whether a ball is in the rack when a match is not officiated and the table has not been pencil-marked around the triangle area. *(Also see Rule 2.15.)*

1.4 PERMITTED USE OF EQUIPMENT

The following is a list of acceptable equipment items a player may bring to the table to use in a World Pool-Billiard Association sanctioned event:

(a.) Cue Stick – Each player is permitted to use one or more cue sticks which meet the specifications listed in the equipment specifications section.. He may use

either a built-in extender or an add-on extender to increase the length of the stick.

(b.) Chalk – The player may apply chalk to his tip to prevent miscues, and may use his own chalk, provided its color is compatible with the cloth.

(c.) Talcum Powder.

(d.) Mechanical Bridges – The player may use up to two mechanical bridges to support the cue stick during the shot. He may use his own bridge if it is similar to standard commercial bridges.

(e.) Gloves – The player may use gloves to improve the grip and/or bridge hand function.

1.5 MARKING OF TABLES

When racking the balls, a triangle must be used. Prior to competition, each table and the triangle to be used on it shall be marked so as to ensure that the same triangle will be used throughout the tournament on the same table. An accurate and clearly visible pencil line must also be marked on the cloth: (1) around the outer edge of the triangle to ensure accurate and consistent placement to enable accurate judgement as to ball positions; (2) on the long string to enable accurate spotting of balls; and (3) on the head string to facilitate determinations of whether balls are behind the head string. The head spot, center spot and foot spot must also be determined to be accurately marked, whether with discreet penciled "plus" marks, or with standard spots if being employed. In games which do not require them, the center and head spots do not need to be marked.

1.6 ADMINISTRATIVE DISCRETION

The management of each tournament shall reserve the right to set forth rules and procedures appropriate and reasonable for the particular tournament involved, such as may regard players' dress requirements, method of receiving entry fees, refund policy of entry fees, scheduling flexibility, pairing procedures, practice procedures, etc. However, for tournaments to receive a WPA sanction, certain requirements must be met, primarily with regard to safeguarding and ensuring proper distribution of the prize fund.

1.7 LATE START

A player must be ready to begin a match within 15 minutes of the start of the match, or the opponent wins by forfeit. The starting time is considered to be the scheduled time or the time the match is announced, whichever is later.

1.8 NO PRACTICE DURING MATCH

While a match is in progress, practice is not allowed. Taking a shot that is not part of that match is a foul. *(Refer to Rule 1.6)*

1.9 ASSISTANCE NOT ALLOWED

While a match is in progress, players are not allowed to ask spectators for assistance in planning or executing shots. If a player asks for and receives such assistance, he loses the game. Any person, except the opponent, who offers any significant assistance to a player, verbal or non-verbal, will be removed from the area. *(Refer to Rule 2.28)*

1.10 FAILURE TO LEAVE THE TABLE

When a player's inning comes to an end, the player must discontinue shooting. Failure to do so is loss of game (exception in 14.1 - ruled as "deliberate foul").

1.11 SLOW PLAY

If in the opinion of the referee a player is impeding the progress of the tournament or game with consistently slow play, the referee can warn the player and then at his discretion impose a time limit up to a maximum of 45 seconds that applies to both players between shots (that is, both players are put on a shot-clock). If the referee does impose a time limit and that limit is exceeded by a player who has received a 10 second “time” warning, a foul will be called and the incoming player is rewarded according to the rules applicable to the game being played. During a player's inning, the shot-clock starts when the previous shot ends, and runs until tip-to-ball contact begins the next shot. The time while a shot is in progress is not counted. If a player begins with cue ball in hand, the shot-clock starts when he has possession of the cue ball, and any spotting or racking is finished. If a player has not approached the shot, a warning with the announcement of “time” should be made 10 seconds prior to the time limit being reached. If a player exceeds the time limit specified for the tournament, a foul will be called and the incoming player is rewarded according to the rules applicable to the game being played. In the case of a player down over the ball at the 10 second mark prior to the time limit, no announcement is to be made and no penalty is to be imposed. In the event of a player standing up off the shot, “time” will be called at that point and normal shot clock procedure is followed. Each player may call for one extension per rack. The extension period is identical to the time limit imposed. In the event of a tie score with only one game remaining, each player may utilize two extensions. Player must insure that the referee/timekeeper is aware when an extension is called.

1.12 SUSPENDED PLAY

If a player shoots while play is suspended by the referee, he loses the game. Announcement of the suspension is considered sufficient warning. *(Also see Rule 2.27)*

1.13 TIME OUT

If time outs are allowed, a player is only allowed to take a time out during his/her turn at the table or between sets (if a format with sets is used). During a time out, a sign should be placed on the table by the referee, and no practice will be allowed on that table. In general, each player will be allowed one time out per match, and a maximum of five minutes per time out. When a format with sets is used, each player will be allowed one time out in the final set (in the third set if playing best-of-3, or in the fifth set if playing

the best-of-5 sets). This final-set rule applies regardless of whether a player has taken a time out in an earlier set.

1.14 CONCESSION

If a player concedes, he loses the match. That is, if a player attempts to unscrew his jointed playing cue stick while the opponent is at the table and during the opponent's decisive game of a match, it will be considered a concession of the match. No warning from the referee is required in the case of a concession. *(Refer to Rule 2.22)*

1.15 SCORING OF FORFEITS

Matches forfeited for any reason under these rules shall not result in any scores being included in the statistics of a tournament, regardless of whether any score had been reached prior to the declaration of forfeiture. For official records, no point scores should be recorded, but rather the notations "W(F)" and "L(F)" as appropriate should be employed. (Matches lost through disqualification are considered forfeits for purposes of this rule.) If, however, the player awarded a match through the opponent's forfeiture has posted a high run (or similar accomplishment for which an award is granted) during play of the match prior to declaration of forfeiture, that high run or other mark shall be eligible for the tournament award or prize.

1.16 PLAYING WITHOUT A REFEREE

When a referee is not available, any dispute between the two players will be resolved by the Tournament Director or an appointed substitute.

1.16.1 CUE BALL FOULS ONLY

When a referee is presiding over a match, it is a foul for a player to touch any ball (cue ball or object ball) with the cue, clothing, body, mechanical bridge or chalk, before, during or after a shot. However, when a referee is not presiding over a game, it is not a foul to accidentally touch stationary balls located between the cue ball and the shooter while in the act of shooting. If such an accident occurs, the player should allow the Tournament Director to restore the object balls to their correct positions. If the player does not allow such a restoration, and a ball set in motion as a normal part of the shot touches such an unrestored ball, or passes partly into a region originally occupied by a disturbed ball, the shot is a foul. In short, if the accident has any effect on the outcome of the shot, it is a foul. In any case, the Tournament Director must be called upon to restore the positions of the disturbed balls as soon as possible, but not during the shot. It is a foul to play another shot before the Tournament Director has restored any accidentally moved balls.

At the non-shooting player's option, the disturbed balls will be left in their new positions. In this case, the balls are considered restored, and subsequent contact on them is not a foul.

1.16.2 JUMP AND MASSE SHOT FOUL

If a match is not refereed, it will be considered a cue ball foul if during an attempt to jump, curve or masse the cue ball over or around an impeding numbered ball that is not a legal object ball, the impeding ball moves (regardless of whether it was moved by a hand, cue stick follow-through or bridge).

1.16.3 THIRD OPINION

When a shot comes up that seems likely to lead to controversy, either party may request a tournament official or a third party to judge the legality of the shot.

1.16.4 SPLIT HITS

If the cue ball strikes a legal object ball and a non-legal object ball at approximately the same instant, and it cannot be determined which ball was hit first, the judgement will go in favor of the shooter.

1.16.5 RACKING

The balls must be racked as tightly as possible, which means each ball should be touching its neighbor. Refrain from tapping object balls more than absolutely necessary; it is preferable to thoroughly brush the area of the rack to even out the cloth.

2. Instructions For Referees

2.1 TOURNAMENT OFFICIALS/REFEREES

Where these rules refer to a "referee," it should be noted that the referees' prerogatives and discretion also pertain to other tournament officials as appropriate.

2.2 REFEREE'S AUTHORITY

The referee will maintain order and enforce the rules of the game. The referee is the final judge in all matters of fact, and is in complete charge of the match. The referee may consult other tournament officials for rule interpretations, ball positions, etc. However, all matters of judgement are his and his alone; they cannot be appealed to higher tournament authority by players; only if the referee is in error on a rule or its application may higher tournament authority overrule him.

2.3 REFEREE'S RESPONSIVENESS

The referee shall be totally responsive to players' inquiries regarding objective data, such as whether a ball will be in the rack, if a ball is in the kitchen, what the count is, how many points are needed for a victory, if a player or his opponent is on a foul, what rule would apply if a certain shot is made, etc. When asked for a clarification of a rule, the referee will explain the applicable rule to the best of his ability, but any misstatement by the referee will not protect a player from enforcement of the actual rules. The referee must not offer or provide any subjective opinion that would affect play, such as whether a good hit can be made on a prospective shot, whether a combination is can be made, or how the table seems to be playing, etc.

2.4 FINAL TOURNAMENT AUTHORITY

Though these rules attempt to cover the vast majority of situations that arise in competition, there still may be the occasional need for interpretation of the rules and their proper application under unusual circumstances. The Tournament Director or other official who assumes final responsibility for a tournament will make any such required decision (other than referee's judgement calls) at his discretion, and they shall be final.

2.5 WAGERING BY REFEREES

Referees are strictly prohibited from any wagering of any kind involving the games, players or tournament in any way. Any such wagering by a referee (or other tournament official) shall result in his immediate dismissal and the forfeiture of his entire financial compensation for the tournament.

2.6 EQUIPMENT PREPARATION

In general, the referee will clean or have the table and balls cleaned as necessary. He will ensure that chalk, powder and mechanical bridges are available. He will mark or have marked, the spots, the head string, the long string and the outer edge of the triangle, directly on the playing surface, when required by specific game rules.

2.7 RACKING

After the referee has racked the balls for a game, the player may examine the balls as racked but the referee shall be the sole authority regarding the suitability of the rack for play.

2.8 CALLING SHOTS

If a referee incorrectly calls a shot, where required by specific game rules, a player should correct him before completing the shot. If an incorrect call does occur for any reason, the shot shall be credited if, in the judgement of the referee, the player did legally execute the shot as intended.

2.9 CALLING FOULS

The referee will call fouls as soon as possible after they occur. No further play may occur until a decision regarding a foul has been rendered and both players informed. If the offending player continues to shoot after a foul is called, the referee may consider the action to be unsportsmanlike conduct, and the offending player loses the game (or fifteen (15) points if playing 14.1 Continuous). The referee shall inform the incoming player of ball-in-hand where specific game rules apply and should pick up the cue ball and hand it to the incoming player. The referee may announce “Ball-in-hand.”

2.10 SPLIT HITS

When the referee observes that the cue ball strikes a legal object ball and a non-legal object ball at approximately the same instant, and it cannot be determined which ball was hit first, the judgement will go in favor of the shooter.

2.11 CLEARING POCKETS

On tables which do not have ball return systems, the referee will remove pocketed object balls from full or nearly full pockets. It is the player's responsibility to see that this duty is performed; he has no recourse if a ball rebounds from a full pocket.

2.12 CLEANING BALLS

During a game a player may ask the referee to clean one or more balls. The referee will clean any visibly soiled ball.

2.13 SPOTTING BALLS

To avoid any unnecessary guidance to a player when spotting balls, the referee should position each ball so that the number is facing upward.

2.14 SOLICITING INFORMATION

If the referee does not have a clear view of a possible foul, he may form his decision by any means by which he feels comfortable.

2.15 INAPPROPRIATE USE OF EQUIPMENT

The referee should be alert for a player using equipment or accessory items for purposes or in a manner other than those for which the items were intended, or for the use of illegal equipment, as defined under “equipment specifications.” Generally, no penalty is applied. However, should a player persist in such activity or use of equipment, after having been advised that such activity or use is nor permissable, the referee or other tournament official may take action against him as appropriate under the provisions of "Unsportsmanlike Conduct." (Also see Rules 1.3 and 1.4.)

2.16 MANDATORY WARNINGS.

The referee must warn a player who is about to commit a serious foul (such as three consecutive fouls, requesting coaching assistance, or failure to stop shooting after a foul has been called) whenever the referee has been given enough time to do so; otherwise, any foul is considered to be a standard foul (except as specially noted). For instance, in games where the rule applies the referee must inform a player who has had two (2) consecutive fouls; otherwise, the player is considered to have had only one foul prior to the shot. The referee must inform a player when an object ball is touching a rail; otherwise, any contact on that ball is considered to have driven that ball to the rail. The referee should notify the player as soon as the corresponding situation arises and whenever enough time was given to issue the warning. A warning issued just as a stroke occurs or is about to occur is not considered sufficient time for the shooter to react, and the warning will be considered not to have been issued.

2.17 RESTORING A POSITION

When necessary for balls to be restored or cleaned, the referee will restore disturbed balls to their original positions to the best of his ability. The players must accept the referees

judgement as to placement. The referee may ask for information for this purpose from whatever source deemed appropriate.

2.18 OUTSIDE INTERFERENCE

When outside interference occurs during a shot that has an effect on the outcome of that shot, the referee will restore the balls to the positions they had before the shot, and the shot will be replayed. If the interference had no effect on the shot, the referee will restore the disturbed balls and play will continue. If the balls cannot be restored to their original positions, the game should be replayed with the original player breaking.

2.19 ILLEGALLY CAUSING BALL TO MOVE

Any player who, in the referee's judgement, intentionally causes a ball to move by any illegal means (pushing on bed cloth, bumping or slapping table, etc.) will lose the game and/or match by forfeit. No preliminary warning from the referee is required. (Referee's judgement and discretion under "Unsportsmanlike Conduct.")

2.20 JUDGING DOUBLE HITS

When the distance between the cue ball and the object ball is less than the width of a chalk cube, special attention from the referee is required. In such a situation, unless the referee can positively determine a legal shot has been performed, the following guidance may apply: if the cue ball follows through the object ball more than 1/2 ball, it is a foul.

2.21 OUT OF HEAD STRING WARNING

When player has the cue ball in hand behind the head string, the referee shall warn him before he shoots if he has placed the cue ball on or within 1/2 ball width outside of the head string. If the player then shoots from on or within the specified distance outside the string the stroke is a foul. If the shooter places the cue ball outside of the head string beyond the specified limit, no warning is required and the stroke is a foul. (See specific game rules for penalty. Also refer to Rule 3.9.)

2.22 REMAINING IN PLAYER'S CHAIR

Players are to remain in the chair designated for their use while opponent is at the table. Should a player need to leave the playing area during matches, he must request and receive permission from the referee. Should a player leave the playing area without the permission of the referee, it will be a concession and loss of game (or fifteen (15) points if playing 14.1 Continuous). The referee shall apply his good judgement to ensure that undue time is not being used or that a player is not abusing the privilege as a means of unsettling an opponent.

2.23 OUTSIDE ASSISTANCE PROHIBITED

Unless specifically permitted by the rules of a given tournament, players may not knowingly accept any form of playing advice during a match. A player may not engage in communication, either verbal or nonverbal, with persons other than the tournament officials or his opponent during play, or during time-outs. Should a player desire to so communicate, for example to obtain a beverage, get a piece of equipment, etc., he should

either communicate through a tournament official or with the approval and observance of the referee. If the referee has reason to believe that a player knowingly solicited or accepted outside assistance in any manner regarding the play of a game or match, he shall take steps appropriate under the provisions of "Unsportsmanlike Conduct." In team or doubles play, communication rules may be altered by the appropriate organization as provided for under “Administrative Discretion.”

2.24 NON-PLAYER INTERFERENCE OR HARASSMENT

If a non-player by any means interferes with either or both players, the referee should request the offending non-player or players be removed from the playing area for the duration of the match.

2.25 SLOW PLAY

(Refer to Rule 1.11)

2.26 PROTESTS

A player may request a rule interpretation or protest a failure to call a foul to the referee or appropriate tournament authority, but the request or protest must be made immediately and prior to any subsequent shot being taken, or it cannot be considered or honored. If the player fails to do so, the foul is considered not to have occurred. The referee is the final judge on all matters of fact. If either player thinks the referee is applying the rules incorrectly or has made an interpretation incorrectly, the referee must take the protest to the tournament director or an appointed substitute. The tournament director or his appointed substitute’s interpretation of the rules is final. Play will be suspended until the protest is resolved. All players must honor an opponent's request that play be halted if an official is to be summoned or if a referee is to check or verify a rule question with other officials. Failure to honor such requests may result in disqualification or forfeiture of the game or match under the provisions of "Unsportsmanlike Conduct."

2.27 SUSPENDING PLAY

The referee has the authority to suspend play during protests by players and whenever he feels that conditions are unsuitable for play to continue. If a spectator is interfering with the game, play may be suspended until that spectator is removed from area. (Also see Rule 1.12.)

2.28 UNSPORTSMANLIKE CONDUCT

The referee has the right and obligation to ensure that no player engages in any activity which, in his judgement, is unsportsmanlike in nature, embarrassing, disruptive or detrimental to other players, tournament officials or hosts, or the sport in general. The referee or other officials shall have the right to penalize or disqualify, with or without warning, any player who acts in an unsportsmanlike manner.

3. General Rules for Pocket Billiards

These general rules apply to all pocket billiard games, UNLESS specifically noted to the contrary in the individual game rules.

3.1 TABLES, BALLS, EQUIPMENT

All games described in these rules are designed for tables, balls and equipment meeting the standards prescribed in the WPA Equipment Specifications.

3.2 RACKING THE BALLS

When racking the balls a triangle must be used, and the apex ball is to be spotted on the foot spot. All the balls must be lined up behind the apex ball and pressed together so that they all have contact with each other.

3.3 STRIKING CUE BALL

Legal shots require that the cue ball be struck only with the cue tip. Failure to meet this requirement is a foul.

3.4 CALLING SHOTS

For games of call-shot a player may shoot any ball he chooses, but before he shoots, must designate the called ball and called pocket. He need not indicate any detail such as kisses, caroms, combinations, or cushions (all of which are legal). Any additionally pocketed ball(s) on a legal stroke is counted in the shooter's favor.

3.5 FAILURE TO POCKET A BALL

If a player fails to pocket a ball on a legal shot, then the player's inning is over, and it is the opponent's turn at the table.

3.6 LAG FOR BREAK

The following procedure is used for the lag for the opening break. Each player should use balls of equal size and weight (preferably cue balls but, when not available, non-striped object balls). With the balls in hand behind the head string, one player to the left and one to the right of the head spot, the balls are shot simultaneously to the foot cushion and back to the head end of the table. The player whose ball is the closest to the innermost edge of the head cushion wins the lag. The lagged ball must contact the foot cushion at least once. Other cushion contacts are immaterial, except as prohibited below. It is an automatic loss of the lag if: (a) The ball crosses into the opponent's half of the table; (b) The ball fails to contact the foot cushion; (c) The ball drops into a pocket; (d) The ball jumps the table; (e) The ball touches the long cushion; (f) The ball rests within the corner pocket and past the nose of the head cushion, or; (g) The ball contacts the foot rail more than once. If both players violate automatic-loss lag rules, or if the referee is unable to determine which ball is closer, the lag is a tie and is replayed.

3.7 OPENING BREAK SHOT

The opening break shot is determined by either lag or lot. (The lag for break procedure is required for formal competition.) The player winning the lag or lot has the choice of performing the opening break shot or assigning it to the opponent.

3.8 CUE BALL ON OPENING BREAK

The opening break shot is taken with cue ball in hand behind the head string. The object balls are positioned according to specific game rules. On the opening break, the game is considered to have commenced once the cue ball has been struck by the cue tip.

3.9 DEFLECTING THE CUE BALL ON THE GAME'S OPENING BREAK

On the break shot, stopping or deflecting the cue ball after it has crossed the head string and prior to hitting the racked balls is considered a foul and loss of turn. The opponent has the option of receiving cue ball in hand behind the head string or passing the cue ball in hand behind the head string back to the offending player. (Exception: 9-Ball, see rule 5.3: "cue ball in hand anywhere on the table"). A warning must be given that a second violation during the match will result in the loss of the match by forfeiture. (See Rule 3.28.)

3.10 CUE BALL IN HAND BEHIND THE HEAD STRING

This situation applies in specific games whereby the opening break is administered or a player's scratching is penalized by the incoming player having cue ball in hand behind the head string. The incoming player may place the cue ball anywhere behind the head string. The shooting player may shoot at any object ball as long as the base of the object ball is on or below the head string. He may not shoot at any ball, the base of which is above the head string, unless he first shoots the cue ball below the head string and then by hitting a rail causes the cue ball to come back above the head string and hit the object ball. The base of the ball (the point of the ball touching the table) determines whether it is above or below the head string. If the incoming player inadvertently places the cue ball on or below the head string, the referee or the opposing player must inform the shooting player of improper positioning of the cue ball before the shot is made. If the opposing player does not so inform the shooting player before the shot is made, the shot is considered legal. If the shooting player is informed of improper positioning, he must then reposition the cue ball. If a player positions the cue ball completely and obviously outside the kitchen and shoots the cue ball, it is a foul. (Refer to Rule 2.21) When the cue ball is in hand behind the head string, it remains in hand (not in play) until the player drives the cue ball past the head string by striking it with his cue tip. The cue ball may be adjusted by the player's hand, cue, etc., so long as it remains in hand. Once the cue ball is in play per the above, it may not be impeded in any way by the player; to do so is to commit a foul. Additionally, if the shot fails to contact a legal object ball or fails to drive the cue ball over the head string, the shot is a foul and the opposing player has ball in hand according to the specific game rules.

3.11 POCKETED BALLS

A ball is considered pocketed if as a result of an otherwise legal shot, it drops off the bed of the table into the pocket and remains there. (A ball that drops out of a ball return system onto the floor is not to be construed as a ball that has not remained pocketed.) A ball that re-bounds from a pocket back onto the table bed is not a pocketed ball.

3.12 POSITION OF BALLS

The position of a ball is judged by where its base (or center) rests.

3.13 FOOT ON FLOOR

Player must have at least one foot in contact with the floor at the moment the cue tip contacts the cue ball, or the shot is a foul. Foot attire must be normal in regard to size, shape and manner in which it is worn.

3.14 SHOOTING WITH BALLS IN MOTION

It is a foul if a player shoots while the cue ball or any object ball is in motion (a spinning ball is in motion).

3.15 COMPLETION OF STROKE

A stroke is not complete (and therefore is not counted) until all balls on the table have become motionless after the stroke (a spinning ball is in motion).

3.16 HEAD STRING DEFINED

The area behind the head string does not include the head string. Thus, an object ball that is dead center on the head string is playable when specific game rules require that a player must shoot at a ball past the head string. Likewise, the cue ball when being put in play behind the head string (cue ball in hand behind the head string), may not be placed directly on the head string; it must be behind it.

3.17 GENERAL RULE, ALL FOULS

Though the penalties for fouls differ from game to game, the following apply to all fouls: (a) Player's inning ends; (b) If on a stroke, the stroke is invalid and any pocketed balls are not counted to the shooter's credit, and; (c) Any ball(s) is respotted only if the rules of the specific game require it.

3.18 FAILURE TO CONTACT OBJECT BALL

It is a foul if on a stroke the cue ball fails to make contact with any legal object ball first. Playing away from a touching ball does not constitute having hit that ball.

3.19 LEGAL SHOT

Unless otherwise stated in a specific game rule, a player must cause the cue ball to contact a legal object ball and then: (a) Pocket a numbered ball, or; (b) Cause the cue ball or any numbered ball to contact a cushion or any part of the rail. Failure to meet these requirements is a foul.

3.20 CUE BALL SCRATCH

It is a foul (scratch) if on a stroke, the cue ball is pocketed. If the cue ball touches an object ball that was already pocketed (for example, in a pocket full of object balls), the shot is a foul.

3.21 FOULS BY TOUCHING BALLS

It is a foul to strike, touch or in any way make contact with the cue ball in play or any object balls in play with anything (the body, clothing, chalk, mechanical bridge, cue shaft, etc.) except the cue tip (while attached to the cue shaft), which may contact the cue ball in the execution of a legal shot. Whenever a referee is presiding over a match, any object ball moved during a standard foul must be returned as closely as possible to its original position as judged by the referee, and the incoming player does not have the option of restoration. (Also see Rule 1.16)

3.22 FOUL BY PLACEMENT

Touching any object ball with the cue ball while it is in hand is a foul.

3.23 FOULS BY DOUBLE HITS

If the cue ball is touching the required object ball prior to the shot, the player may shoot toward it, providing that any normal stroke is employed. If the cue stick strikes the cue ball more than once on a shot, or if the cue stick is in contact with the cue ball when or after the cue ball contacts an object ball, the shot is foul. (See Rule 2.20. for judging this kind of shot.) If a third ball is close by, care should be taken not to foul that ball under the first part of this rule.

3.24 PUSH SHOT FOULS

It is a foul if the cue ball is pushed by the cue tip, with contact being maintained for more than the momentary time commensurate with a stroked shot. (Such shots are usually referred to as push shots.)

3.25 PLAYER RESPONSIBILITY FOULS

The player is responsible for chalk, bridges, files and any other items or equipment he brings to, uses at, or causes to approximate the table. If he drops a piece of chalk, or knocks off a mechanical bridge head, as examples, he is guilty of a foul should such an object make contact with any ball in play (or the cue ball only if no referee is presiding over the match).

3.26 ILLEGAL JUMPING OF BALL

It is a foul if a player strikes the cue ball below center ("digs under" it) and intentionally causes it to rise off the bed of the table in an effort to clear an obstructing ball. Such jumping action may occasionally occur accidentally, and such "jumps" are not to be considered fouls on their face; they may still be ruled foul strokes, if for example, the ferrule or cue shaft makes contact with the cue ball in the course of the shot.

3.27 JUMP SHOTS

Unless otherwise stated in rules for a specific game it is legal to cause the cue ball to rise off the bed of the table by elevating the cue stick on the shot, and forcing the cue ball to rebound from the bed of the table. Any miscue when executing a jump shot is a foul.

3.28 BALLS JUMPED OFF TABLE

Balls coming to rest other than on the bed of the table after a stroke (on the cushion top, rail surface, floor, etc.) are considered jumped balls. Balls may bounce on the cushion tops and rails of the table in play without being jumped balls if they return to the bed of the table under their own power and without touching anything not a part of the table. The table shall consist of the permanent part of the table proper. (Balls that strike or touch anything not a part of the table, such as the light fixture, chalk on the rails and cushion tops, etc., shall be considered jumped balls even though they might return to the bed of the table after contacting items which are not parts of the table proper). In all pocket billiard games, when a stroke results in the cue ball or any object ball being a jumped ball off the table, the stroke is a foul. All jumped object balls are spotted (except in Nine-Ball and in Eight Ball) when all balls have stopped moving. See specific game rules for putting the cue ball in play after a jumped cue ball foul.

3.29 SPECIAL INTENTIONAL FOUL PENALTY

The cue ball in play shall not be intentionally struck with anything other than a cue's attached tip (such as the ferrule, shaft, etc.). While such contact is automatically a foul under the provisions of Rule 3.19., if the referee deems the contact to be intentional, he shall warn the player once during a match that a second violation during that match will result in the loss of the match by forfeiture. If a second violation does occur, the match must be forfeited.

3.30 ONE FOUL LIMIT

Unless specific game rules dictate otherwise, only one foul is assessed on a player in each inning; if different penalties can apply, the most severe penalty is the factor determining which foul is assessed.

3.31 BALLS MOVING SPONTANEOUSLY

If a ball shifts, settles, turns or otherwise moves "by itself," the ball shall remain in the position it assumed and play continues. A hanging ball that falls into a pocket "by itself" after being motionless for 5 seconds or longer shall be replaced as closely as possible to its position prior to falling, and play shall continue. If an object ball drops into a pocket "by itself" as a player shoots at it, so that the cue ball passes over the spot the ball had been on, unable to hit it, the cue ball and object ball are to be replaced to their positions prior to the stroke, and the player may shoot again. Any other object balls disturbed on the stroke are also to be replaced to their original positions before the shooter replays.

3.32 SPOTTING BALLS

When specific game rules call for spotting balls, they shall be replaced on the table on the long string after the stroke is complete. A single ball is placed on the foot spot; if more than one ball is to be spotted, they are placed on the long string in ascending numerical order, beginning on the foot spot and advancing toward the foot rail. When balls on or near the foot spot or long string interfere with the spotting of balls, the balls to be spotted are placed on the long string as close as possible to the foot spot without moving the interfering balls. Spotted balls are to be placed as close as possible or frozen (at the referee's discretion) to such interfering balls, except when the cue ball is interfering; balls to be spotted against the cue ball are placed as close as possible without being frozen. If there is insufficient room on the long string between the foot spot and the foot rail cushion for balls that must be spotted, such balls are then placed on the extension of the long string "in front" of the foot spot (between the foot spot and the center spot), as near as possible to the foot spot and in the same numerical order as if they were spotted "behind" the foot spot (lowest numbered ball closest to the foot spot).

3.33 JAWED BALLS

If two or more balls are locked between the jaws or sides of the pocket, with one or more suspended in air, the referee shall inspect the balls in position and follow this procedure: he shall visually (or physically if he desires) project each ball directly downward from its locked position; any ball that in his judgement would fall in the pocket if so moved directly downward is a pocketed ball, while any ball that would come to rest on the bed of the table is not pocketed. The balls are then placed according to the referee's assessment, and play continues according to specific game rules as if no locking or jawing of balls had occurred.

3.34 ADDITIONAL POCKETED BALLS

If extra balls are pocketed on a legal scoring stroke, they are counted in accord with the scoring rules for the particular game.

3.35 NON-PLAYER INTERFERENCE

If the balls are moved (or a player bumped such that play is directly affected) by a nonplayer during the match, the balls shall be replaced as near as possible to their original positions immediately prior to the incident, and play shall resume with no penalty on the player affected. If the match is officiated, the referee shall replace the balls. This rule shall also apply to "act of God" interference, such as earthquake, hurricane, light fixture falling, power failure, etc. If the balls cannot be restored to their original positions, replay the game with the original player breaking. This rule is not applicable to 14.1 Continuous where the game consists of successive racks: the rack in progress will be discontinued and a completely new rack will be started with the requirements of the normal opening break (players lag for break). Scoring of points is to be resumed at the score as it stood at the moment of game disruption.

3.36 BREAKING SUBSEQUENT RACKS

In a match that consists of short rack games, the winner of each game breaks in the next. The following are common options that may be designated by tournament officials in advance: (a) Players alternate break. (b) Loser breaks. (c) Player trailing in game count breaks the next game.

3.37 PLAY BY INNINGS

During the course of play, players alternate turns (innings) at the table, with a player's inning ending when he either fails to legally pocket a ball, or fouls. When an inning ends free of a foul, the incoming player accepts the table in position.

3.38 OBJECT BALL FROZEN TO CUSHION OR CUE BALL

This rule applies to any shot where the cue ball's first contact with a ball is with one that is frozen to a cushion or to the cue ball itself. After the cue ball makes contact with the frozen object ball, the shot must result in either: (a) A ball being pocketed, or; (b) The cue ball contacting a cushion, or; (c) The frozen ball being caused to contact a cushion attached to a separate rail, or; (d) Another object ball being caused to contact a cushion with which it was not already in contact. Failure to satisfy one of those four requirements is a foul. (Note: 14.1 Continuous and other games specify additional requirements and applications of this rule; see specific game rules.) A ball which is touching a cushion at the start of a shot and then is forced into a cushion attached to the same rail is not considered to have been driven to that cushion unless it leaves the cushion, contacts another ball, and then contacts the cushion again. An object ball is not considered frozen to a cushion unless it is examined and announced as such by either the referee or one of the players prior to that object ball being involved in a shot.

3.39 PLAYING FROM BEHIND THE STRING

When a player has the cue ball in hand behind the head string (in the kitchen), he must drive the cue ball to a point across the head string before it contacts either a cushion, an object ball, or returns to the kitchen. Failure to do so is a foul if a referee is presiding over a match. If no referee, the opponent has the option to call it either a foul or to require the offending player to replay the shot again with the balls restored to their positions prior to the shot (and with no foul penalty imposed). Exception: if an object ball lies on or outside the head string (and is thus playable) but so close that the cue ball contacts it before the cue ball is out of the kitchen, the ball can be legally played, and will be considered to have crossed the head string. If, with cue ball in hand behind the headstring and while the shooter is attempting a legitimate shot, the cue ball accidentally hits a ball behind the head string, and the cue ball crosses the line, it is a foul. If with cue ball in hand behind the head string, the shooter causes the cue ball to hit an object ball accidentally, and the cue ball does not cross the headstring, the following applies: the incoming player has the option of calling a foul and having cue ball in hand, or having the balls returned to their original position, and having the offending player replay the shot. If a player under the same conditions intentionally causes the cue ball to contact an object ball behind the headstring, it is unsportsmanlike conduct.

3.40 CUE BALL IN HAND FOUL

During cue ball in hand placement, the player may use his hand or any part of his cue (including the tip) to position the cue ball. When placing the cue ball in position, any forward stroke motion of the cue stick contacting the cue ball will be considered a foul if not a legal shot.

3.41 INTERFERENCE

If the non-shooting player distracts his opponent or interferes with his play, he has fouled. If a player shoots out of turn, or moves any ball except during his inning, it is considered to be interference.

3.42 DEVICES

Players are not allowed to use a ball, the triangle or any other width-measuring device to see if the cue ball or an object ball would travel through a gap, etc. Only the cue stick may be used as an aid to judge gaps or as an aid to aligning a shot, so long as the cue is held by the hand. To do so otherwise is a foul and unsportsmanlike conduct. (Also see Rules 1.3, 1.4 and 2.15)

3.43 ILLEGAL MARKING

If a player intentionally marks the table in any way to assist in executing the shot, including the placement of chalk, it is a foul.