UNITED STATES SKI AND SNOWBOARD ASSOCIATION

CHIEF OF COURSE – ALPINE

2010-2011

STUDY GUIDE

This Study Guide* is intended to be used as an educational and review aid for individuals interested in alpine officiating. Downloading, printing and reading the Study Guide must not be substituted for actual attendance at a USSA-approved clinic or used as a replacement for actual instruction at any USSA-approved clinic.

****Alpine Officials' Manual, Chapter VII, maybe printed and used in place of this Study Guide.***

REFERENCE PUBLICATIONS:

1. USSA Alpine Competition Regulations (ACR)*
2. ICR of the FIS, 2008 Edition
3. ICR Precisions
4. USSA Alpine Officials' Manual

***NOTE:** ACR mirrors, when possible, ICR numbering. USSA exceptions have a "U" preceding the rule number; the "U" is a part of the number.

CERTIFICATION EXAMINATION:

Chief of Course Certification Examination will be available at USSA-approved Alpine Officials' Clinics. Allowed time limit is 2.5 hours. The examination is an open book exam and must be administered only at scheduled Clinics. It is NOT A TAKE HOME EXAM! Allowing use of computers in order to complete calculations or "search" rule books is strongly discouraged. Completed examinations must be retained by the clinic examiners; they are not returned to the individuals taking them. Please refer to Regional/Divisional/State publications for schedules. ***The Study Guide is not intended as a replacement for taking notes for use during an open-book examination at any USSA-approved Clinic***.

NOTE: In addition to Competition Official certification requirement in place for all Alpine Officials, Level 1 Chief of Course (CC) certification requirements include:

- Attendance at a level 1 Chief of Course (CC) clinic;
- Successful completion of Chief of Course (CC) exam.

If you have problems with this Study Guide or have suggestions for improvements, please contact the current Chairs of the Alpine Officials' Education Working Group. Thank you.

The current Chairs are: Thelma Hoessler **thoessler@wildblue.net** and Gretchen Ransom **gretch1099@msn.com**

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I. PERSONNEL:

A. MEMBERSHIP REQUIREMENTS

1. **USSA-SANCTIONED NON-FIS EVENTS:** Jury members, Jury Advisors (Start & Finish Referees), Chief of Course and Course Setters are required to be ***participant members of USSA*** as a Coach or Official. ***USSA Associate members are not "participant members". Qualified members of foreign federations recognized by FIS must hold a valid USSA membership in order to serve in the above positions at USSA-sanctioned non-FIS events.***
2. **USSA-SANCTIONED FIS EVENTS:** Jury members, Jury Advisors (Start & Finish Referees), Chief of Course and Course Setters are required to be ***participant members of USSA*** as a Coach or Official. If a foreign FIS Federation lists a coach on their entry form, the Federation is certifying that the coach has the knowledge and ability to fulfill the duties of a Team Captain: i.e. serve as a Jury member or set a course; *this satisfies the "qualified member of foreign federation" requirement for FIS events.*
3. USSA Coach or Officials members whose membership numbers on the USSA web site membership roster are highlighted indicates that USSA has received their completed membership applications. If the status, however, is marked "PENDING", this is an indication that the member may not have completed required background screening, and they must not be appointed to serve as Jury members, Jury Advisors, Chief of Course or Course Setters.
4. Failure to comply with membership requirements will invalidate event liability insurance.

B. CHIEF OF COURSE

CHIEF OF COURSE is responsible for the preparation of the courses in accordance with the directives and decisions of the Jury and as indicated on the homologation report. Chief of Course must be familiar with local snow conditions on the terrain concerned. **(**601.3.2**)** The Chief of Course is often a ski-area employee and is the "local authority" regarding area weather patterns, availability of resources and existing snow conditions.

1. Chief of Course needs to establish advance communication with ski area management.
2. Chief of Course needs to know race course and snow preparation and should be able to evaluate the race courses set under their jurisdiction. Their responsibilities include the start and finish areas as well as the actual race trail.
3. Chief of Course must work with Course Setters and supervising the cleanup immediately following the event.
4. Successful completion of these responsibilities requires organization, leadership, personnel and equipment.
5. Chief of Course should know and understand the rules and participate in Jury inspections and other Jury meetings.
6. Chief of Course must attend a bi-annual Alpine Officials' Update in order to retain certification.

C. COURSE SETTERS

COURSE SETTERS answer to the Jury of the particular competition. They need to follow the directives of the Jury and, if the race course has been set prior to the Team Captains' meeting, they are required to make a report at the Team Captains' meeting concerning their course set. Course setters are obliged to set in accordance with the course protection plan as set forth by the chief of course.

D. **CHIEF OF COURSE and COURSE WORKERS/VOLUNTEERS.**

1. Properly trained and equipped for their tasks.
2. Reasonable skiing skill necessary to perform work
3. Ability to maneuver competently on steep slopes while carrying equipment and materials, including heavy loads.
4. Supervised by trained and experienced crew leaders
5. Trained in proper radio communication procedures
6. Aware of details for improved margin of race course security
   a. Daily Program (schedule), including training, forerunner and racer start times
   b. Course inspection techniques authorized for competitors,
   c. Start intervals for competitors
   d. "Start Stop" procedures
   e. Location of staging areas, i.e. replacement poles and/or equipment
   f. List course positions

II. THE RACE COURSE AND THE TRACK

A. Race course or the *piste,* is the trail or slope, where the competition is to be contested

1. Proper preparation is essential for a good race.
   a. Course preparation starts with snowmaking in early season
      - Mixing snow types is critical in establishing consistent piste
      - Manage grooming throughout race season
   b. Apply proper grooming techniques immediately prior to race day
      - Slow track speed
      - Tiller bar control
        - Reverse till
        - Down pressure
   c. Managing snow depth
      - For adequate track condition
      - For adequate depth for fence installation
   d. Staffing for pieste preparation and maintenance
      - Fence crew
      - Section chiefs
      - Staff training
      - Course materials
        - Fence
        - Drills
        - Snow hardening agents
        - Dye
        - Gates and panels
        - Shovels and rakes
        - Timing installations and protection
        - Etc.
      - Snow plan staffing (extra people for initial prep)
      - Volunteers
        - Volunteer training and mgt.
      - Dispatcher
      - Slip crews
      - Figuring #'s (lift time, intervals, sections, travel time)

2. Ideal race course should be maintained so that all competitors have equal opportunities regardless of their start position.
3. After the race, the hill should be left clean of equipment and debris.
4. On-hill security/protection installations require specific knowledge and experience and should basically follow this creed:
    a. Avoid the obstacle
    b. Deflect a fallen competitor away from an obstacle
    c. Stop a fallen competitor before he gets to the obstacle
    d. Homologation requirements
    e. Jury inspection requests
    f. Manufacturer recommendations
5. FIS names specific individuals to some competitions, e.g. World Cup and Continental Cup, to work with the organizers in advance of the competition to ensure the condition of the race course and the availability of necessary competitor security/protection equipment.

6. USSA has an individuals charged with similar duties.

B. Race *track* is the sequence of gates through which the competitors pass and are required to be set within USSA and FIS specifications for each type of event, DH, SG, GS, or SL:
    1. Regarding the number of gates
    2. Regarding width between the poles of each gate
    3. Regarding the distance between successive gates
    4. Regarding the restrictions applied to vertical combinations (SL flushes and hairpins)
    5. Track should:
        a. Be set appropriate to the level of competition
        b. Have a variety of turns that involve skillful use of terrain.
        c. Be technically challenging
        d. Should require complete turns
        e. Have some rhythm and the preferred line should be obvious
        f. Should lead competitor through the center of the finish
        g. Be legal but also fair and appropriate for all competitors

III. RACE COURSE, THE "TRACK" AND THE RULES

A. Dimensions
    1. Minimum and maximum vertical drop per FIS ICR and USSA ACR
    2. Minimum width of the race course per FIS ICR and USSA ACR
    3. Number, width and separation of the gates per FIS ICR and USSA ACR
    4. Timing requirements (Manual and Electronic) per FIS ICR and USSA ACR

B. B. Some applicable rules for review
    1. Single Pole Slalom (Refer to current rule books; ACR and Precisions to FIS ICR).
        a. Where must both outside pole and turning pole be installed?
        b. What is the definition of "gate line" for single pole slalom?
        c. How far does a competitor have to hike in order to complete "clear passage" for a single-pole gate?
        d. How far does a competitor have to hike in order to complete "clear passage" for a double-pole gate?
    2. (Jury) Supervision of the Training
    3. Rights of the Jury During Competition
    4. The Start
    5. The Finish

6. Homologation: Course, Gate Panels, Poles
7. Preparing the Downhill race course, and its "dimensions"
8. Preparing the Slalom race course, and its "dimensions"
9. Preparing the Giant Slalom race course, and its "dimensions"
10. Preparing the Super G race course, and its "dimensions"
11. Inspection and Training (on the race course)

IV. RACE COURSE HOMOLOGATION

A. USSA Course Approval (Inventory available on USSA website)
   1. Required for all USSA Downhill (DH), Super G (SG), Giant Slalom (GS) and Slalom (SL) events, both scored and non-scored
   2. Required for USSA Masters' events
   3. Course setting needs to conform to the inspection report and FIS requirements
   4. FIS homologated trails are automatically accepted
   5. DH trails previously homologated by FIS but now lack the necessary vertical drop due to FIS rule changes are accepted - provided no major changes have taken place on the race course and reinspection is current.

B. FIS Race Course Homologation (Inventory on FIS website)
   1. FIS Calendared events are to be held on race course that are homologated (approved) in advance by the FIS.
   2. Homologation requests are directed to the USA representative on the FIS Alpine Race Courses Subcommittee through the USSA Alpine Office
   3. Downhill (DH) and Super G (SG) courses must be re-homologated every 5 years.
   4. Slalom (SL) and Giant Slalom (GS) courses must be re-homologated every 10 years.
   5. All courses – DH, SG, GS, and SL – must be re-homologated whenever there have been major modifications to the hill including, but not limited to:
      a. Erosion, land slides of overgrowth;
      b. Construction of buildings or lifts;
      c. Construction of shelters, parks, roads, tracks, etc.
      d. Installation of snowmaking hydrants, snow retention fences or other significant hardware.

NOTE: An Organizer should not depend entirely on the homologation of a race course by the FIS and ignore exceptional snow and weather conditions. Natural conditions like insufficient snow depth, unfavorable surface snow conditions, dense fog, heavy snow fall or rain may make the trail unsuitable for holding a specified competition.

V. RACE COURSE MATERIALS

A. Suggested List of Supplies

Poles:
Maximum: 252 per GS race course
Maximum: 168 per SL race course
Reserves: 10-50%
Barriers: As needed
Drills/Auger for hard snow/ice
"Willy bags" & filling
Air fences and inflating devices
Tags or stickers for numbering gates
Dye – for gate placement
Tape – duct, friction, etc.
Wrenches for screw-in gates
Wedges, hammers
Tool kit (pliers, screwdriver, etc.)
Shovels and rakes
Communications equipment
Chemicals for snow treatment
Buckets and spreaders
Rope/pennants for crowd control
Pine boughs/dye – course "paint" & sprayers
Plastic garbage bags
Heavy twine/baling wire

Official Notice Board(s)	"Zip" ties
Gate flags/banners DH/GS/SG	Support for banners
Banners: Start, Finish, Sponsors	Signs ("Closed", etc.)
Score Board	Timing equipment: electronic & Manual/hand
Public Address System	Finish Sensor protection devices

B. Factors to Consider
1. Type of event
2. Number, age and ability level of competitors
3. Nature of race course
4. Available personnel
5. Snow conditions
6. Anticipated weather

VI. START AREA, START LINE AND THE FINISH AREA

A. Start Area
1. Integral and important part of the race course carefully planned and prepared
2. Closed off from public
3. Sheltered or near shelter
4. Sufficient area for competitors, coaches, service personnel, extra clothing, extra equipment
5. Exit other than through start gate

B. Start Line and Start Gate
1. Location should be well considered
2. Level start line platform or area with restricted access
3. Start gate preparation and equipment in accordance with rules
4. Proper surface preparation to eliminate deterioration
5. Start gate leads competitors onto the race course through the first gates
6. Track from start line to first gate prepared and maintained as well as the rest of race course

C. Finish Area and Finish Line
1. Conforms to current requirements of USSA/FIS
2. Enough length and width to allow competitors to stop
3. Access and egress for officials and competitors
4. Adjacent areas to accommodate timing, scoreboard, media and spectators
5. Last gate directs competitors to middle of finish line
6. Vertical posts or banners may be installed to identify location; horizontal "FINISH" banner may be attached to vertical posts
7. Finish line clearly marked with coloring substance
8. All finish installations located and secured to protect competitors
9. Prepared and maintained as well as rest of race course

RACE COURSE PREPARATION SUGGESTIONS

A. Advance work is key
1. Organizing Committee should consider the recommendations of the area management and the consideration of the skiing public.
2. Keep area management informed, involved and committed

B. Actual Preparation
1. Clear obstacles from slope and course – prior to first snowfall

2. Slopes used by recreational skiers groomed on regular basis; supply input on scheduling to ensure good density
3. Surface as firm and smooth as possible prior to race day
    a. Mogul cutting, use of grooming machines well in advance of event
    b. 12 hours required for reworked snow to properly "set"
    c. Manmade snow requires additional time for undisturbed setting due to its high water content, extra density and compaction
4. Mechanical preparations are dependent on the ski area "rolling stock", the snow conditions and anticipated weather; the ski area employee in charge of grooming is generally the most knowledgeable. Qualified personnel should discuss preparation of the race course well in advance of the event. This will ensure that the grooming staff is aware of current course preparation requirements. The security of ski competitions demands recognition of the difference between snow preparation for competition and snow preparation for recreation.
    a. *Track Packing* can be used early in the season to develop a base. This increases friction and tilling and provides a rough surface to which future snow can adhere. This may also help in consolidating deep, dry snowfalls until they can be worked more intensely. With care, track packing may provide enough consolidation and adhesion for new snow to adhere to a frozen base.
    b. A *Compaction Bar, "Wing", or "Dovetail"*, is hydraulic powered to apply significant down pressure and is the standard grooming device for most ski areas with modern grooming equipment. It leaves a smooth or slightly rippled surface, but if worked in very deep snowfalls, it may leave layers of compacted snow. Continuous packing is necessary during heavy storms or a sufficient period of time must be allowed to elapse after grooming to allow top layers to "set".
    c. A *Cutter Bar or Blade* is used to "cut" moguls and move snow and should be followed up by finish grooming to leave a skiable surface. This type of grooming requires skilled operators.
    d. *Rotary Tilling* is the most effective tool over a wide range of conditions. These conditions include: new snow, old snow, loose snow, crust layer, frozen granular with ice patches and spring snow. Its thorough cutting, aeration and subsequent compaction provide worked snow that will set overnight in most conditions. During new snowfall and under ideal conditions, "setting" may occur in minutes with the use of this tool.
    e. Upper level events require that a race course be prepared with the use of a water injection bar. This machine adds water to the race course and, when set, provides a firmer racing surface.
5. Mechanical Preparation Issues. Mechanical preparation is quick and usually effective, but machines do have their limitations.
    a. Compacting power is diminished on very steep slopes (45 %+)
    b. Control of the machine may be difficult in some conditions.
    c. Some machines do not maneuver or pack well on a side-hill
    d. Under some circumstances, can damage the prepared track
    e. If insufficient time for the surface to be slipped by skis after working, machinery is best kept off DH race courses until the depth of new snow can no longer be handled by working on skis
6. Manual Preparation. If machines are not available or their use would be ineffective
    a. Snow cover is very thin
    b. Slope is too steep for effective machine use
    c. Crust layer will support skis but break under machines,
    d. Race course is covered with old unpacked snow
    e. Great depth of new snow

7. Types of Manual Preparation
    a. *Boot Packing* should be done several days in advance to be as effective as possible. When boot packing, several passes over the slope are usually needed. Boot holes should be left open and not packed or slipped over until two days before the event or beginning of training. The race course should then be ski packed on the day before the event, and the ridges should not be slipped.
    b. *Ski Packing* is necessary when there is very thin snow cover, a race course needs smoothing after being boot packed, there are isolated areas that cannot be reached by machinery or machinery is not available.
    c. *Side Slipping* is used for final smoothing of the race course and/or removing loose snow from the track.

VII. SPECIAL SITUATIONS

A. New Snow Expected Overnight
    1. Defer course setting until morning.
    2. Cat crews should be constantly packing new snow as it falls
    3. Race course maintenance crews should be prepared to begin work on the race course as early as possible to move new snow off to the sides if it is not too deep or heavy

B. Snow cover is thin,
    1. Dry snow can be sprayed with water in order that available snow becomes more resistant to ski traffic
    2. Loose snow, when chemicals are applied, will create a more durable racing surface

C. Ice patches can either be
    1. Sprayed with water or
    2. Industrial-type propane torches can be used to partially melt relatively large areas that will also allow loose snow to adhere

D. Chemicals Required. Chemicals can be used to freeze moisture in snow and/or melt ice sufficiently for new snow to adhere in a variety of situations including:
    1. When snow sticky – it is too soft or wet due to mild weather and/or rain
    2. When the snow is actually hard ice
    3. Adding “texture” to an ice surface

NOTE: Organizers should work with ski area management regarding types of chemicals allowed by the area/local environmental agencies/regulations.

E. Chemical Application
    1. Upper layer of snow is ski packed and then smoothed with skis or rakes and shovels.
    2. The section to be prepared is “salted” by hand or with a spreader
    3. “Salt” is scattered on the surface and then covered with a thin layer of snow by side slipping or shoveling
    4. The treated area should extend beyond the track itself
    5. Start and finish areas should also be prepared in the same manner as the race course.
    6. A treated race course may become smooth only after several skiers use it so advance preparation for an adequate number of forerunners will assist in providing an even surface for all competitors
    7. Practice areas should be treated in the same manner as the race course.

F. Chemical (Snow Hardening) Agent Preparation Issues. Preparation of the run with chemicals, if done in due time, is more effective than applying water because it allows the snow to become moist and even. However, the following should be noted.

1. Granular spring snow may be hardened by the use of additives
2. With new snowfall, the snow needs to be treated and compressed during, or immediately after, the snowfall to take advantage of the humidity in the new snow
3. When using chemicals, prepare several test patches adjacent to the course in order to evaluate the effectiveness of the chemicals
4. Chemicals are generally not recommended for use with dry snow at low temperatures
5. When chemicals are used, the snow becomes hard more quickly at varying depths and hardness lasts for differing amounts of time
6. When time is short, or if a SL run needs overnight preparation with cold and loose snow, water and chemicals may be used in combination. In this case, the run
   a. Should be boot packed or track packed
   b. Water should be spread and then worked into the snow by tracking and tilling.
   d. Working the run in small areas, this mixture of chemical and water should be immediately boot packed into the snow and then ski packed to make it smooth
7. Although chemicals may be used in varying amounts on certain sections of GS, SG and DH race courses, it is best to prepare an entire SL race course evenly
8. When there is damp or wet snow that does not freeze because of mild temperatures, compact snow may be obtained through the use of chemicals. Such products may also be effective because of rain and/or a rise in temperature
9. Very wet, rippled snow is usually found in the spring when there is warm, rainy weather or when rainfall mixes with snow. The same substances used for wet snow are effective, but much deeper preparation is needed before chemicals are spread and must be repeated after spreading. If the snow is very humid, it may be necessary to use a different chemical
10. Chemicals may be used to make frozen or icy runs softer or to soften a run so it can be smoothed. A race course may need to be softened when rainfall is followed by a sudden freeze
    a. Chemicals should be spread on icy surfaces that have been raked slightly to scratch the surface so it can hold the chemical
    b. Amounts, methods and time needed depend on the temperatures
    c. A test may be necessary to determine the time required for softening
    d. **If chemical (snow hardening) agents are to be considered, a "test" area should be prepared to assure that the expected result is attained.**

NOTE: *Traces of some "chemicals" can be transferred from on-hill clothing/equipment to travel clothing/equipment and may cause airport security alerts.*

VII. RACE COURSE MAINTENANCE SUGGESTIONS

A. Race course maintenance begins with preparation of the slope that is to be used and ends after the last competitor has crossed the finish line and the race course has been removed.

B. Potential trouble areas should be anticipated and proper planning should be undertaken to avoid problems.

C. Constant race course maintenance work is necessary during the race to slip out ruts, holes and "chatter marks" from the turning areas.

D. Objective is to make the race course as equitable for the last competitor out of the start gate as it was for the first competitor.

E. Maintenance of the start area and finish area is as important as the maintenance of the actual race course.

F. If pre-race preparation has been successful, maintaining the race course during the race itself will be easier. If the race is a DH, part of maintenance will be preparation for the next day's training or race.

G. As with other race operations, race course maintenance is easier, more enjoyable and more effective if
   1. It is properly organized
   2. The workers are shown leadership and coordination
   3. Communication is in place so that there is no delay in response or any error in assigned tasks
   4. Race course maintenance work is done by several crews under the direction of an experienced leader and staffed by skiers with sufficient weight and skill for the job
   5. Crews are assigned a section of the race course that they will work continuously, or they rotate down the race course and move from one section to another.
   6. If a rotation system is used, one crew should always be either already at the start or on the lift headed for the start.

H. Repairing damage. With sufficient organization, it should not be necessary to interrupt the race for maintenance other than at brief predetermined intervals. Should an interruption be needed, the delay should be approved by the Jury and announced to all officials, competitors and coaches.
   1. Competitor inspections may damage a race course more than race or training runs will and may necessitate repair before the race or training run can start.
   2. Establish communication system to make sure race course is clear of all competitors so that maintenance work can start
   3. Turns, landing areas after jumps, flats and traverses are all areas that require regular maintenance. Some sections will only need side slipping, but others may require major work with shovels, torches, water and chemicals
   4. Weather permitting, maintenance work should be done as soon as possible so a developing problem is not aggravated, and all major repair work should be completed after the last run of the day so the race course may “set” overnight
   5. A good Chief of Course will anticipate problem areas and organize crews accordingly.