



**American Avalanche Association  
Forest Service National Avalanche Center  
Avalanche Incident Report: Short Form**



Occurrence Date (YYYYMMDD): 20170104 and Time (HHMM): 0

Comments: Estimated date and location of victim in relation to the start zone based on skin track and avalanche path. The victim was last seen in the Crystal Mt Ski area riding the lower lifts (upper lifts on wind hold) around mid-day 1/4/17 and told a friend she was going to ski a local run outside the ski area's Southback boundary known as "Joe's Shoulder".

**Reporting Party Name and Address:** Peter Dale  
Crystal Mt Ski Patrol  
33914 Crystal Mt Blvd  
Enumclaw, WA 98022

**Avalanche Characteristics:**

Type: HS (Hard Slab) Aspect: 330 (NNW)  
Trigger: ASu Slope Angle: 43 degrees average  
(Skier/unintentional) in start zone  
Size: R 3 \ D 2 Elevation: 6400 m / ft  
Sliding surface (check one):  
 In new  New/old  In old  Ground

**Location:**

State: WA County: Pierce Forest: Mt Baker Snoqualmie  
Peak, Mtn Pass, or Drainage: Crystal Mt area, Silver Basin  
Site Name: Joe's Shoulder  
Lat/Lon or UTM:

Group	Number of People	Time recovered	Duration of burial	Depth to Face <input type="checkbox"/> m / <input checked="" type="checkbox"/> ft
Caught	1			
Partially Buried— Not critical	0			
Partially Buried-- Critical	1	10:52 next day	est 18+ hrs/unk	1
Completely Buried	0			
Number of people injured: 0		Number of people killed: 1		

Dimensions <input type="checkbox"/> m / <input checked="" type="checkbox"/> ft	Average	Maximum	
	Height of Crown Face	1-2	3
Width of Fracture	73		
Vertical Fall	400		
Snow	Hardness	Grain Type	Grain Size (mm)
Slab	1F/P	DF/RG	.25
Weak Layer	1F	DF/RG	.5
Bed Surface	1F	RG	.5-1
Thickness of weak layer: See attached profile <input type="checkbox"/> mm / <input type="checkbox"/> cm / <input type="checkbox"/> in			

Burial involved a terrain trap?  no  yes → type:  
Number of people that crossed start zone before the avalanche: 0  
Location of group in relation to start zone during avalanche:  high  middle  low  below  all  unknown  
Avalanche occurred during  ascent  descent

Subject	Name	Age	Gender	Address	Phone	Activity
1	Elizabeth Hampson	64	F			Skiing
2						
3						
4						
5						

**Equipment Carried**

1	2	3	4	5	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Transceiver
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Shovel
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Probe
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

**Experience at Activity**

1	2	3	4	5	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Unknown
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Novice
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Intermediate
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Advanced
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Expert

**Avalanche Training**

1	2	3	4	5	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Unknown
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	None
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Some
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Advanced
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Expert

Signs of Instability Noted by Group	Injuries Sustained						Extent of Injuries or Cause of Death					
	1	2	3	4	5		1	2	3	4	5	
<input checked="" type="checkbox"/> Unknown	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	None	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Asphyxiation
<input type="checkbox"/> None	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	First Aid	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Head Trauma
<input type="checkbox"/> Recent avalanches	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Doctor's care	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Spinal Injury
<input type="checkbox"/> Shooting cracks	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Hospital Stay	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Chest Trauma
<input type="checkbox"/> Collapse or whumphing	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Fatal	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Skeletal Fractures
<input type="checkbox"/> Low test scores							<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Other: Coroner's report unavailable at time of preliminary report

**Damage** Number of Vehicles Caught:0 Number Structures Destroyed: 0 Estimated Loss: \$

**Accident Summary** Include: events leading to accident, group's familiarity with location, objectives, route, hazard evaluation, etc. Following an unusually strong east wind event the CMSP observed avalanche debris just outside the ski area boundary on 1/5/17 in Silver Basin and found the victim upon investigation. Based on the debris, the victim's skin track and the victim's condition it was estimated that the avalanche occurred the day prior, 1/4/17. Other backcountry skiers in the area reported seeing no tracks or people near the accident site two days prior, 1/3/17. A natural wind slab avalanche in Silver Basin on a similar aspect/elevation was observed by ski patrol earlier on 1/4/17 and at that time the crown of the victim's avalanche was not observed. The victim was reportedly very familiar with the area and was traveling alone. She reportedly had been skiing inbounds earlier that day. The easterly winds on 1/4/17 exceeded 100mph at a weather station nearby (top of Crystal - see attached weather data).The upper lifts for the ski area did not run due to high winds on 1/4/17.

Upon investigation of the site on 1/6/17, NWAC and CMSP personnel determined the avalanche to be a hard wind slab, with P hard snow at the top of the slab and 1F hard snow at the bottom of the slab in many places. The slab densities and crown face heights varied widely across the avalanche. A distinct weak layer and bed surface was not identified. It is estimated that the victim triggered the avalanche low in the starting zone and it propagated up to just shy of the ridgeline (start zone and likely trigger point classified as near treeline as it relates to NWAC forecast). If this is true, the slab would have been very shallow where the victim triggered the wind slab, yet much deeper at the ridgeline.

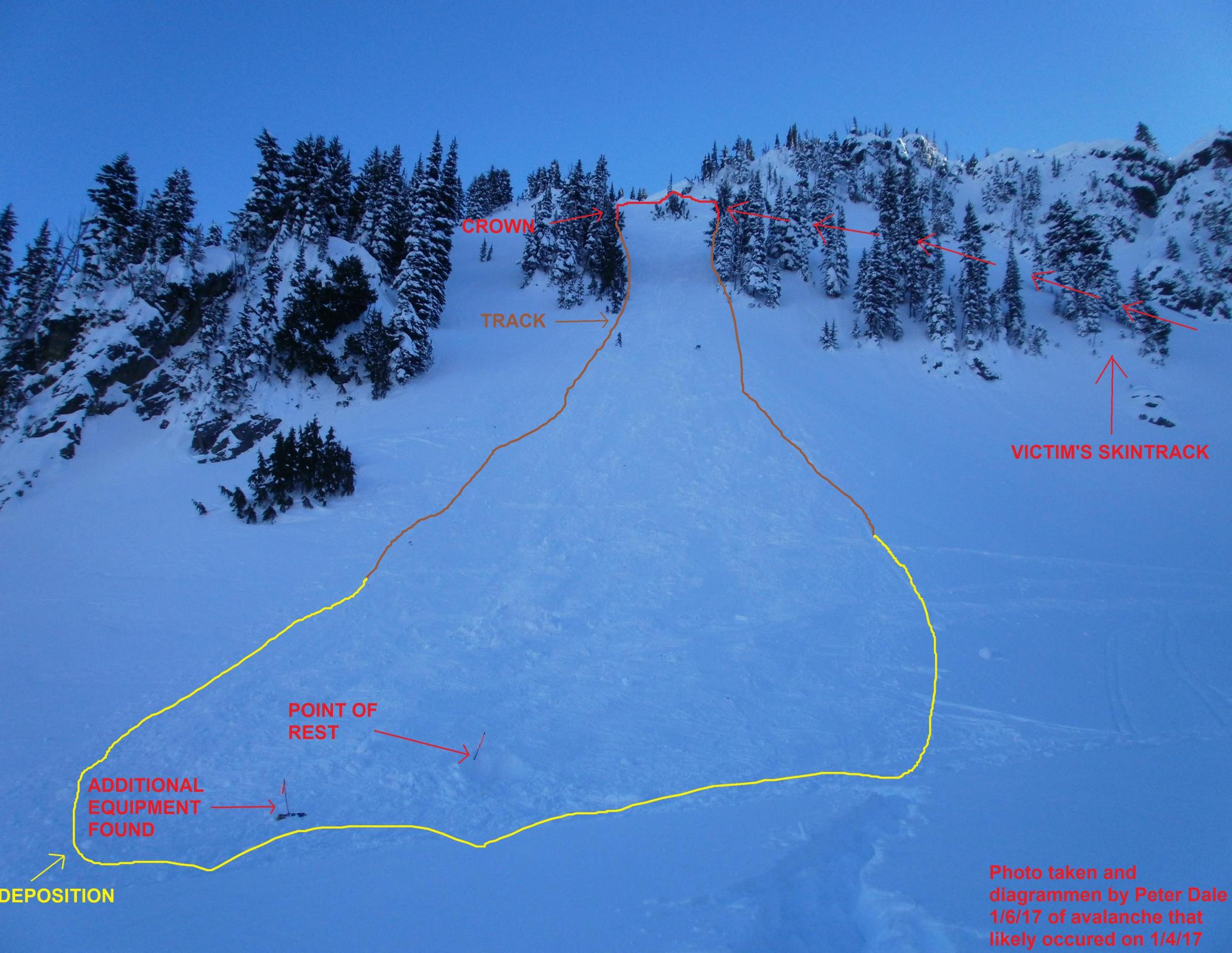
**Rescue Summary** Include: description of initial search, report of accident, organized rescue, etc.

On 1/5/17, two Crystal Mountain ski patrollers discovered the victim (10:52) after completing avalanche control work in the ski area nearby. The victim was only partially buried (backpack above snow surface) so an initial beacon search was not needed to locate the victim. There were a couple pieces of gear on the surface about 15ft downslope of the victim as well. The ski patrollers determined CPR was not necessary, requested additional rescue resources (10:57) (dog, recco, medical gear, toboggan) and then completed a beacon search of the rest of the burial depth avalanche debris (10:59). They then formed a probe line and proceeded to probe the rest of the debris. Eventually more ski patrollers arrived that allowed the probe line to become larger. A paramedic arrived on scene (11:39) and obtained permission to transport the deceased (11:59). A dog arrived on scene (11:51) and worked for about an hour without any further findings. The victim was removed from the scene (12:19) and a Recco search was initiated (12:30). The Recco and dog searches were completed (12:59) and the avalanche site was deemed clear of any other victims.

	Rescue Method					
	1	2	3	4	5	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Self rescue
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Transceiver
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Spot probe
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Probe line
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Rescue dog
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Voice
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Object				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Digging
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Other:

**Attach additional pages as needed. Include weather history, snow profiles, reports from other agencies, diagram of site, photographs, and any other supporting information**

**Please send to: CAIC; 325 Broadway WS1; Boulder CO 80305; [caic@state.co.us](mailto:caic@state.co.us) and to the nearest Avalanche Center.**



CROWN

TRACK

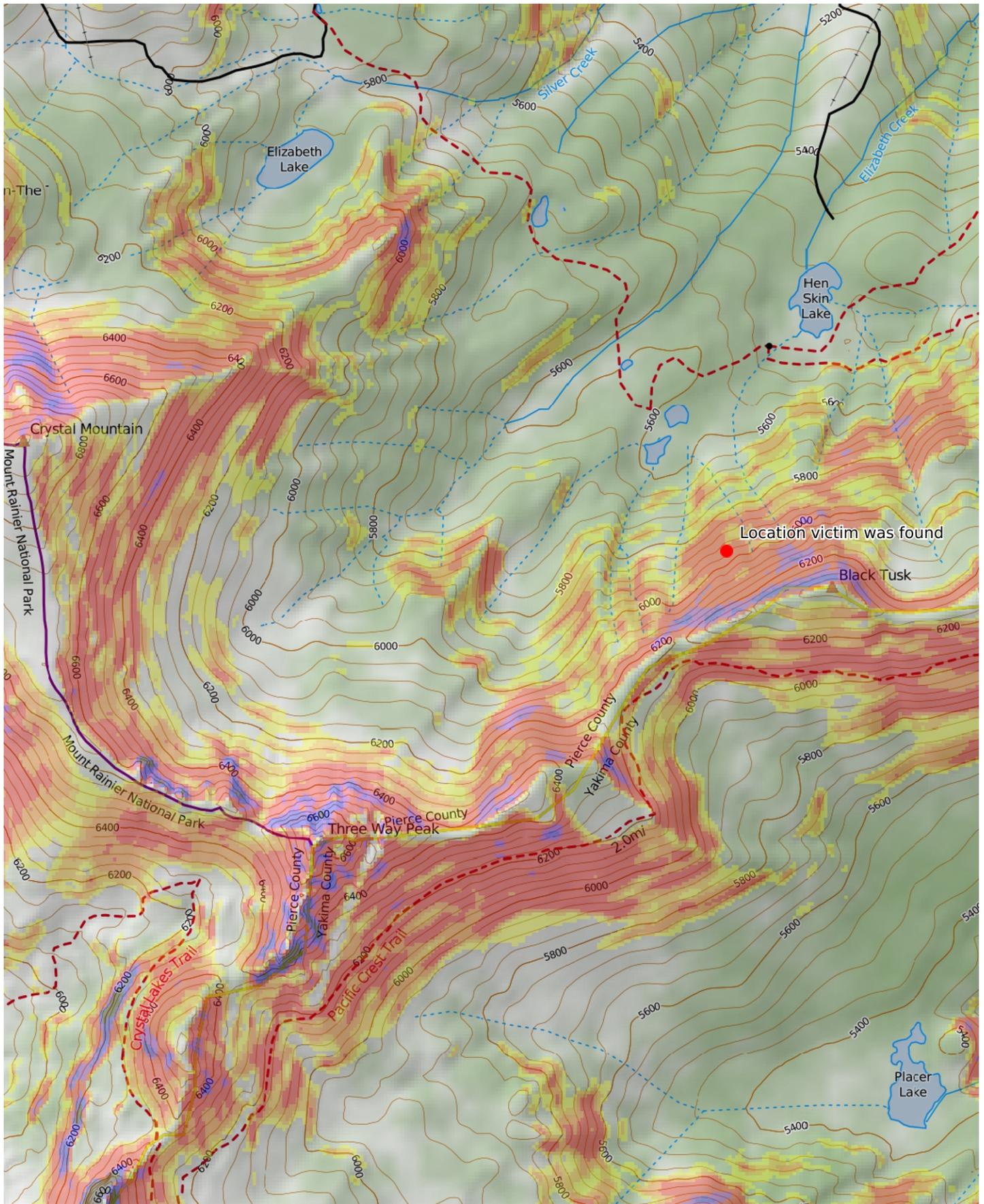
VICTIM'S SKINTRACK

POINT OF REST

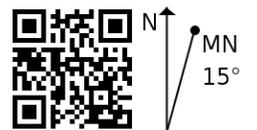
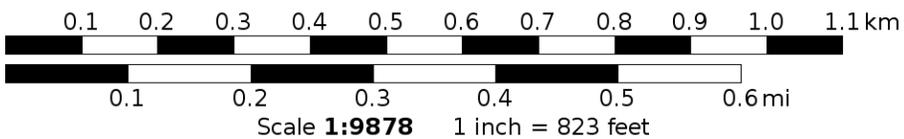
ADDITIONAL EQUIPMENT FOUND

DEPOSITION

Photo taken and diagrammed by Peter Dale 1/6/17 of avalanche that likely occurred on 1/4/17



Mercator Projection  
 WGS84  
 USNG Zone 10TFS  
 CalTopo.com



Snow Pit Profile

Observer: **peter dale**

Stability on similar slopes:

**HS190**

Layer notes:

**Joe's Shoulder**

**Fri Jan 06 12:45:00 PST 2017**

Air Temperature: **C**

Stability Test Notes:

**45-73: Problematic Layer**

**Crystal, WA**

Co-ord: **N W**

Sky Cover: **Clear**

Elevation (ft) **6400**

Slope: **43**

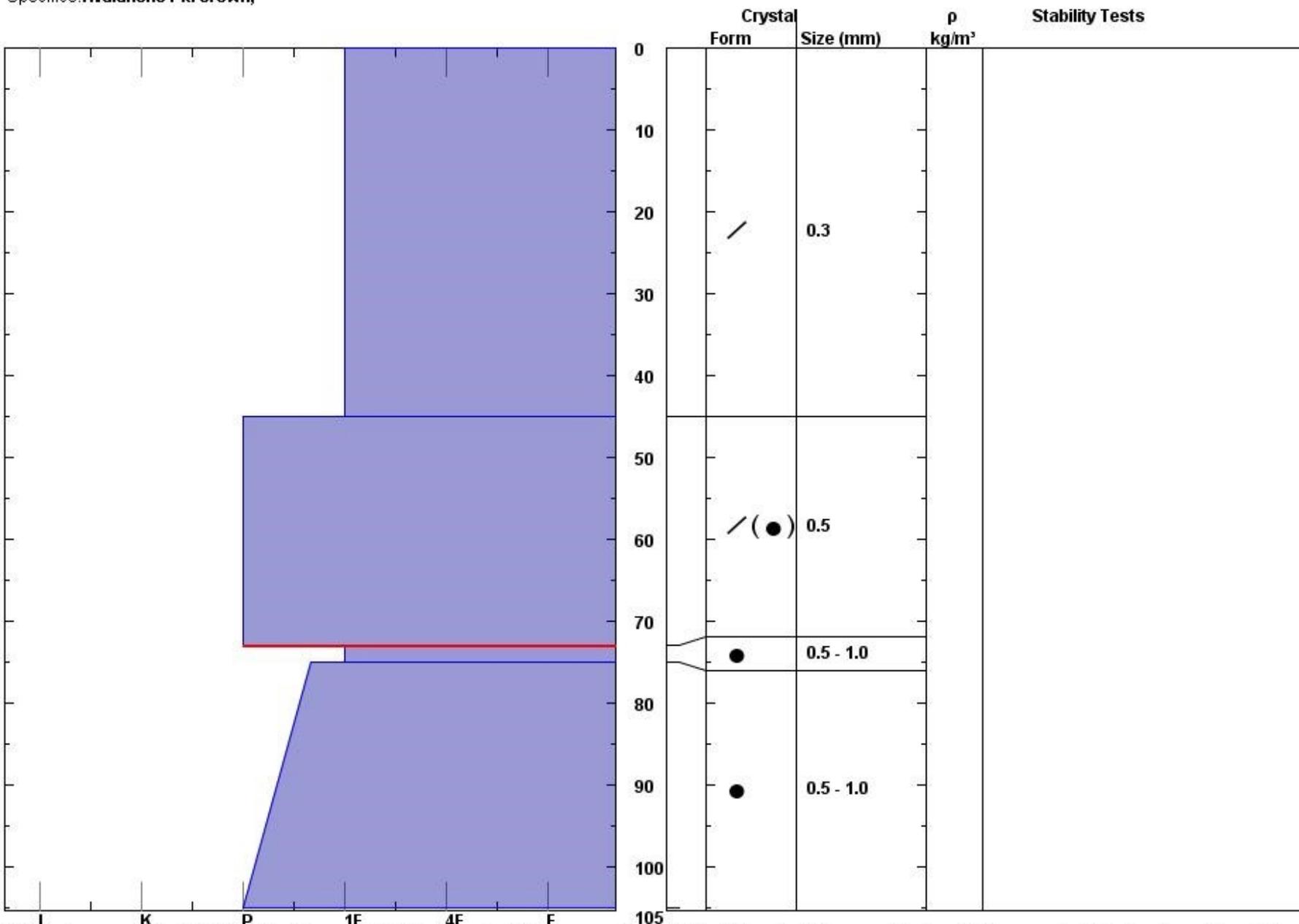
Precipitation: **None**

Aspect: **330**

Wind loading: **previous**

Wind: **Calm**

Specifics: **Avalanche Pit: crown;**



**Notes:** Crown profile of a fatal skier triggered R3-D2 avalanche. Likely occurred on 1/4/17 while solo victim was skinning. Slab was variable in hardness (P and 1F) and depth (10cm-96cm), and was approximately 75ft wide. Pit dug in location where crown was approximately 50-75 cm deep. No definite weak layer or bed surface identified. Elsewhere a thinner slab comprised of P to 1F (upside down hardness profile) existed. Dug by NWAC and CM Ski Patrol.



Northwest  
Avalanche  
Center



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## West Slopes North - Canadian Border to Skagit River

Issued: 6:00 PM PST Tuesday, January 3, 2017

by Garth Ferber

NWAC avalanche forecasts apply to backcountry avalanche terrain in the Olympics, Washington Cascades and Mt Hood area. These forecasts do not apply to developed ski areas, avalanche terrain affecting highways and higher terrain on the volcanic peaks above the Cascade crest level.

A preliminary incident report completed by the White Pass Ski Patrol and NWAC for the avalanche fatality that occurred on Tuesday, December 27th, 2016 is now available on the [NWAC accidents](#) page.

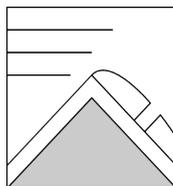
**The Bottom Line:** Further building or new wind slab should be the main avalanche problem on Wednesday. Be sure to read the forecast since wind slab may build on aspects where you don't expect it.

Elevation	Wednesday		Outlook for Thursday
Above Treeline	Considerable	Dangerous avalanche conditions. Careful snowpack evaluation, cautious route-finding and conservative decision-making essential.	Considerable
Near Treeline	Moderate	Heightened avalanche conditions on specific terrain features. Evaluate snow and terrain carefully; identify problem features.	Moderate
Below Treeline	Moderate	Heightened avalanche conditions on specific terrain features. Evaluate snow and terrain carefully; identify problem features.	Moderate

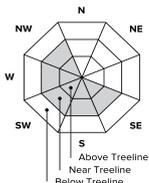
### Avalanche Problems for Wednesday

#### Wind Slab

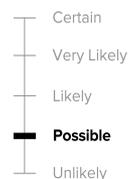
Wind slabs can take up to a week to stabilize. They are confined to lee and cross-loaded terrain features and can be avoided by sticking to sheltered or wind scoured areas.



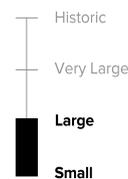
Avalanche Problem



Aspect/Elevation



Likelihood



Size

# Snowpack Analysis

## Weather and Snowpack

A low pressure system moved south over western Washington on Saturday night followed by cold Arctic air. NWAC stations along the west slopes had W-SW winds Saturday and 5-13 inches of snowfall by Sunday morning.

An unusual moist reverse orographic east flow caused snow mainly in the central to south Cascades Sunday afternoon and night. NWAC stations along the west slopes had a shift to NE winds and another 0-10 inches of snow on Monday morning with the most snow in the central to south part and further cooling.

Fair cold weather with east winds has been seen on Monday and Tuesday with clouds lingering from the Columbia Basin to the Cascade east slopes and the east side of Mt Hood.

## Recent Observations

Consistent observations were received on New Year's Day from three NWAC pro-observer's out enjoying the after champagne, champagne powder! Their reports from the Mt Baker area, Stevens Pass and the Alpentel Valley all indicated deep, low density surface conditions, right side profiles and good skiing. Crusts layers were buried fairly deeply and unreactive in tests (Solstice crust at Snoqualmie buried 90 cm on average).

East winds began to affect some areas by Monday.

The NPS ranger at Paradise on Monday reported low visibility with significant snow transport to SW-W slopes on Monday.

A couple reports area available via the NWAC Observations tab. A report from the Artist Point/Table Mountain area near Mt Baker indicated continued good stability with some wind slab starting to form on Monday. A skier on Mt Roosevelt at Snoqualmie Pass triggered a 10-20 inch wind slab and was carried but not injured in a WNW couloir on Monday.

## Detailed Avalanche Forecast for Wednesday

Fair cold weather is generally expected to continue over the Olympics and Cascades on Wednesday. Low clouds will probably linger from the Columbia Basin to the Cascade east slopes and the east side of Mt Hood.

But expect locally strong east winds to develop over the Olympics and Washington Cascades Tuesday night and Wednesday. Therefore new or further building wind slab should be the main avalanche problem on Wednesday. This new wind slab should be found mainly on NW to SE aspects on Wednesday especially at exposed locations such as around Snoqualmie, Crystal Mountain, Paradise and White Pass. There should be quite a bit of recent snow available for transport. Watch for firmer wind transported snow and remember that stiffer wind slab has the potential to propagate to larger avalanches.

Although NW to SE aspects will be indicated in the wind slab avalanche problem diagram remember to watch for firmer wind transported snow on all slope aspects or cross loaded slopes especially in areas with varied terrain and modified wind directions. Older wind slab may also linger on other slope aspects.

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## Mountain Weather Synopsis for Wednesday & Thursday

An elongated E-W oriented upper level trough over central Oregon is causing some light snow for Mt. Hood and the far south Washington Cascades this morning. This trough will drift south during the the day and weaken, allowing for a clearing trend over these areas. Further north, it's clear and very cold. East winds will be moderate to strong at Pass and crest level today. Winds should ease over the north Cascades this morning but stay elevated for the south and central Washington Cascades through mid-afternoon. Upper level ridging over the NE Pacific will build into British Columbia overnight turning our flow aloft northerly and allowing winds to ease over the region. A weak shortwave upstream in NW flow aloft will begin to slide south along the B.C. coast Thursday, spreading increasing clouds into the north Cascades and Olympics and producing a few light snow showers through Thursday night. Temperatures should slowly moderate on Thursday and Thursday night.

**24 Hour Quantitative Precipitation ending at 4 am**

Location	Thu	Fri
Hurricane Ridge	0	lt .10
Mt Baker Ski Area	0	lt .10
Washington Pass	0	0
Stevens Pass	0	0
Snoqualmie Pass	0	0
Mission Ridge	0	0
Crystal Mt	0	0
Paradise	0	0
White Pass	0	0
Mt Hood Meadows	0	0
Timberline	0	0

LT = less than; WE or Water equivalent is the liquid water equivalent of melted snow in hundredths of inches. As a rough approximation 1 inch of snow = about .10 inches WE, or 10 inches of snow = about 1 inch WE.

**Snow Level/Freezing Level in feet**

Day	Northwest	Northeast	Central	South	Easterly
	Olympics	Cascades	Cascades	Cascades	Flow in Passes
Wednesday - Thursday	0'	0'	0'	0'	*
Thursday Night	1000'	0'	0'	0'	*

Cascade Snow / Freezing Levels noted above refer to the north (approximately Mt Baker and Washington Pass), central (approximately Stevens to White Pass) and south (near Mt Hood). Freezing Level is when no precipitation is forecast.

\* Note that surface snow levels are common near the passes during easterly pass flow and may result in multiple snow / freezing levels.

1-05-2017

Northwest Avalanche Center

Crystal Mountain Ski Area, Washington

MM/DD	Hour PST	Temp	Temp	RH	RH	Wind	Wind	Wind	Wind	Hour	Total	24 Hr	Total
		F 6830'	F 4570'	% 6830'	% 4570'	Min 6830'	Avg 6830'	Max 6830'	Dir 6830'	Prec. 4570'	Prec. 4570'	Snow 4570'	Snow 4570'
1/5	700	9	9	92	91	11	18	25	93	0	0	0	44
1/5	600	8	8	91	94	16	27	44	94	0	0	0	44
1/5	500	8	9	91	94	16	26	40	81	0	0	0	44
1/5	400	7	9	91	93	18	30	42	100	0	0	0	44
1/5	300	6	9	91	92	16	29	42	104	0	0	0	-134
1/5	200	6	9	91	93	12	30	49	106	0	0	0	-9
1/5	100	5	9	90	93	14	26	43	98	0	0	0	44
1/5	0	5	9	90	91	16	26	49	86	0	0	0	44
1/4	2300	5	10	90	91	22	33	59	86	0	0	0	45
1/4	2200	5	9	90	91	20	34	61	95	0	0	0	44
1/4	2100	5	8	90	91	14	39	67	85	0	0	0	45
1/4	2000	4	9	90	82	18	37	62	86	0	0	0	46
1/4	1900	3	10	90	83	20	36	59	91	0	0	0	46
1/4	1800	3	9	90	80	18	33	48	82	0	0	0	45
1/4	1700	3	10	90	84	15	34	58	73	0	0	0	-9
1/4	1600	4	10	90	89	10	25	48	89	0	0	0	45
1/4	1500	6	10	91	92	10	27	53	99	0	0	0	45
1/4	1400	5	10	90	90	13	37	71	90	0	0	0	46
1/4	1300	4	11	90	85	14	49	85	84	0	0	0	44
1/4	1200	3	9	90	86	21	45	78	83	0	0	0	45
1/4	1100	1	9	89	83	23	47	88	80	0	0	0	45
1/4	1000	1	8	89	80	21	48	80	86	0	0	0	-134
1/4	900	-0	8	88	76	26	57	93	81	0	0	0	45
1/4	800	1	9	89	79	32	63	104	82	0	0	0	45
1/4	700	0	8	89	85	25	57	88	81	0	0	0	45
1/4	600	0	8	89	85	25	53	99	80	0	0	0	46
1/4	500	-0	8	88	77	17	51	82	91	0	0	0	46
1/4	400	-1	7	88	87	19	49	76	80	0	0	0	45
1/4	300	-1	6	88	87	20	44	68	76	0	0	0	45