Blanco F.Z. cruise
1994
Results

#19

A92-4R2 BFZ

BFZ

A92-4R2 BFZ

A92-4R2 BFZ

1994 CRUISE PLAN: BLANCO FRACTURE ZONE
(revised 8/15/94)

Part 1. Deformation and Rock/Water Interchange Along an Oceanic Transform Fault: Turtle and ATV Investigations of Strike-Slip and Extensional Segments of the Blanco Ridge

Part 2. Investigations of a Probable Volcanogenic T-Wave Swarm in the Western Blanco Transform Fault Zone Using the U.S. Navy ATV

PRINCIPAL INVESTIGATORS

Randolph A. Koski, U.S. Geological Survey, Menlo Park, California
Robert W. Embley, NOAA/PMEL, Hatfield Marine Science Center, Newport, Oregon
Stephanie L. Ross, U.S. Geological Survey, Menlo Park, California

PROJECT OBJECTIVES

1. Blanco Ridge from Gorda Depression to Cascadia Depression

The overall objective of the study is to examine the structural setting, petrology, and hydrothermal processes at five sites along strike-slip segments (Blanco Ridge) and an extensional basin (the East Blanco Depression) of the Blanco Fracture Zone. It is the first systematic attempt to relate the structural style along an oceanic transform to fluid circulation. More specifically, the objectives of the program are to (1) investigate the structural relations of extensional offsets in the Blanco Ridge; (2) determine petrological and geochemical characteristics of the oceanic crust exposed along the Blanco Ridge; and (3) determine the extent of hydrothermal venting within extensional segments of the Blanco Ridge. We plan to test structural models that predict the movement of fluids in dilational jogs of seismically active transform fault systems.

2. East Blanco Depression

In January, 1994, a swarm of earthquakes with an associated tremor-like signal was recorded on the NOAA/Navy real-time T-wave monitoring system in Newport, Oregon. This episode was similar in character to the June/July CoAxial event, which has been shown to be a volcanic dike injection. The dives at two sites within the basin will look for evidence of recent volcanism and hydrothermal activity in the basin and collect rock and water samples for laboratory analysis.

STUDY AREAS

1. The Blanco Ridge

The Blanco Ridge is a transform-parallel ridge, but the geology of this morphotectonic feature is not well known. A series of lozenge-shaped highs trend at 108°from the Gorda Depression on the east to the Cascadia Depression on the west. The only samples collected on the ridge to date are dredge samples of greenstones and greenstone breccias from near the eastern end and a single sample of carbonate from the western end. It is uncertain whether the ridge has formed as a result of volcanism, serpentinite or magmatic intrusions, or uplift caused by compression along this predominantly strike-slip boundary. The detailed topography of the ridge reveals a series of closed depressions and short lineaments

that appear to be continuous in a broad sense but are in places offset by a few hundred meters. These features may represent recent faulting. SeaMarc II and GLORIA data show well-defined lineations along the central portion of the Blanco Ridge at the same locations. Teleseismic data also indicate that the Blanco Ridge is the site of the largest earthquakes within the Blanco Transform Fault. Our primary objectives for the Turtle and ATV deployments along the Blanco Ridge are: (1) map the structural styles of the active fault trace along the ridge and at boundaries with large basins, (2) examine right stepping offsets along the fault zone for evidence of extension and active or recently active venting; and (3) determine the composition and igneous stratigraphy of the Blanco Ridge by obtaining samples during traverses of the steepest scarps.

2. The East Blanco Depression

The East Blanco depression is an extensional basin lying along the Blanco Transform Fault Zone. The western side, where the T-wave epicenters occurred, is a 10 km long basin oriented northwest-southeast; scarps, probably faults, up to several hundred meters high bound the basin. Several irregularly-shaped hills, including a 4 km diameter cone-ridge (Blanco Volcano) lie within the southeastern sector. A maximum depth of 3650 meters occurs in the northwesternmost portion of the basin. A series of northeast-facing scarps bound benches southwest of the basin (quite a large number of T-wave events occurred in this region also). The East Blanco Depression has probably formed in the past several hundred thousand years by extension along this portion of the transform fault.

METHODOLOGY

The DSV Turtle and Advanced Tethered Vehicle will be used on a continuous and alternating basis on the Blanco Ridge. The ATV only will be used in the East Blanco Depression. The program involves systematic mapping and sampling of the two field areas with the submersible assets followed by shorebased data and sample processing and analysis. Transponders may be deployed on one study site on Blanco Ridge. Down time with respect to Turtle and ATV will be utilized for SeaBeam surveys. The principal effort on Blanco Ridge will be dedicated to photograhic surveys, mapping volcanic, sedimentary, structural, and hydrothermal features, and sampling rocks and sediment.

WORK SITES

1. Blanco Ridge

The five work sites on the Blanco Ridge lie within an area defined by the following coordinates:

43°50' N lat, -128°45' W long	43°20' N lat, -127°00' W long
43°35' N lat, -128°45' W long	43°05' N lat, -127°00' W long

This area covers the length of the Blanco Ridge and includes 5 separate dive sites.

Site 1 is the steep southern flank of Blanco Ridge on the north side of Gorda Depression at approximately 43°16' N latitude and -127°06' W longitude. A87, T783

Site 2 is the offset in the ridge axis at about 43°23' N latitude and between -127°33' and -127°39' W longitude. A88, A89

Site 3 is the crest and steep flanks of the ridge at approximately 43°26' N latitude and -127°48' W longitude. A90
Site 4 is the crest and steep flanks of Blanco Ridge at approximately 43°29' N latitude and -127°59' W longitude. T784
Site 5 is the junction between the western end of the Blanco Ridge and the eastern Cascadia Depression at approximately 43°40' N latitude and -128°40' W longitude.

2. East Blanco Depression
Dive sites 6 and 7 lie within a box bounded by: (lower left) 44°05' N latitude; 129°50' W longitude; (upper right) 44°20' N latitude; 129°30' W longitude. A92

WORK PLAN

The schedule of this work plan is based on departure from Coos Bay early on August 26 and return to Astoria on the afternoon of September 7. After arrival at the first site on August 27, we will begin a schedule of continuing alternating deployments with Turtle (assuming a 10 to 12 hour period for launch, dive, and recovery) and ATV (a 24 hour period for launch, dive, and recovery).

August 26 Transit to Site 1 from Coos Bay (approximatly 12 hours). Conduct Sea Beam survey on the eastern Blanco Ridge as time permits before the first dive on August 27.

0800 hrs to 2000 hrs August 27. At Site 1, conduct a south to north traverse with Turtle up the steep southern flank of Blanco Ridge where the ridge lies immediately north of the Gorda Depression. The mission is to map the stratigraphy and collect samples of the crustal section and hydrothermal deposits exposed on the south side of the ridge.

2000 hrs August 27 to 2000 hrs August 28. Survey in the area of Site 1 with ATV.

2000 hrs August 28 to 0800 hrs August 29. Transit to Site 2, deploy 5 or 6 transponders, and survey DOT field.

0800 hrs August 29 to 2000 hrs August 29. With Turtle, conduct detailed mapping and sampling at Site 2. The mission is to investigate and map the structural discontinuity of the ridge crest and to collect rock and sediment samples.

2000 hrs August 29 to 2000 hrs August 30. With ATV, continue survey of the offset ridge structure at Site 2.

2000 hrs August 30 to 0800 hrs August 31. With Turtle, continue detailed mapping and sampling of Site 2.

0800 hrs August 31 to 0800 hrs September 1. With ATV, complete survey of Site 2.

0800 hrs September 1 to 1200 hrs September 1. Recover transponders and transit to Site 3.

1200 hrs September 1 to 0000 hrs September 2. With Turtle, conduct upslope traverse on steep northern flank of Blanco Ridge at Site 3. The mission is to map the geologic section in detail and collect rock and sediment samples.

0000 hrs September 2 to 2000 hrs September 2. ATV survey of Site 3 along the ridge crest and on the northern (or southern) flank to depth limit of vehicle.

2000 hrs September 2 to 0800 hrs September 3. Transit to Site 4 and with Turtle, investigate the steep northern flank of Blanco Ridge. The mission is to map the geologic section in detail and collect rock and sediment samples.

0800 hrs September 3 to 0600 hrs September 4. Transit to Site 5 and conduct ATV survey at the structural boundary between Blanco Ridge and Cascadia Depression. The mission is to look for evidence of structural deformation and hydrothermal activity along this complex junction at the western end of Blanco Ridge.

0600 hrs September 4 to 1200 hrs September 4. Transit from western end of Blanco Ridge to Site 6 in the East Blanco Depression.

1200 hrs September 4 to 1200 hrs September 5. ATV survey at Site 6 in East Blanco Depression. The mission includes a traverse up the eastern side of Blanco Volcano to shoalest portion, then northeast off crest onto plateau to survey possible hydrothermal vent area. After this is completed, the traverse will continue west-northwest and over the eastern scarp of the basin. Samples will be taken at significant locations.

1200 hrs September 5 to 1600 hrs September 5. Transit to Site 7 in East Blanco Depression.

1600 hrs September 5 to 1600 hrs September 6. ATV survey at Site 7 in East Blanco Depression. The mission is to survey the northwestern part of the basin and the southwest wall.

1600 hrs September 6 to 1600 hrs September 7. Transit to Astoria.

This is a tentative plan subject to revision within the two regions of interest.

SCIENTIFIC PERSONNEL

Randolph A. Koski, U.S. Geological Survey, MS 999, 345 Middlefield Road, Menlo Park, CA 94025 (cochief scientist)
Robert W. Embley, NOAA/PMEL, Hatfield Marine Science Center, 2115 S. E. OSU Drive, Newport Oregon 97356-5258 (cochief scientist)
Stephanie L. Ross, U.S. Geological Survey, MS 999, 345 Middlefield Road, Menlo Park, CA 94025 (cochief scientist)
Robert Dziak, NOAA/PMEL, Hatfield Marine Science Center, 2115 S. E. OSU Drive, Newport Oregon 97356-5258
Robert Bohannon, U.S. Geological Survey, MS 999, 345 Middlefield Road, Menlo Park, CA 94025

LedaBeth Gray, U.S. Geological Survey, MS939, 345 Middlefield Road, Menlo Park, CA 94025
Jane Reid, U.S. Geological Survey, MS 999, 345 Middlefield Road, Menlo Park, CA 94025
Virginia Smith, U.S. Geological Survey, MS 999, 345 Middlefield Road, Menlo Park, CA 94025
Tuomo Tormanen, U.S. Geological Survey, MS 999, 345 Middlefield Road, Menlo park, CA 94025

SCHEDULE

		Approximate Location	
August 26	Transit, Coos Bay to Blanco Ridge		
August 27	Blanco Ridge, Site 1	43°16'N	127°06'W
August 28	Blanco Ridge, Site 1	43°15'N	127°04'W
August 29	Blanco Ridge, Site 2	43°23'N	127°37'W
August 30	Blanco Ridge, Site 2	43°23'N	127°37'W
August 31	Blanco Ridge, Site 2	43°23'N	127°38'W
September 1	Blanco Ridge, Site 2	43°22'N	127°37'W
September 1	Blanco Ridge, Site 3	43°26'N	127°48'W
September 2	Blanco Ridge, Site 3	43°27'N	127°47'W
September 3	Blanco Ridge, Site 4	43°29'N	127°59'W
September 4	Blanco Ridge, Site 5	43°40'N	128°40'W
September 5	East Blanco Depression, Site 6	44°13'N	129°39'W
September 6	East Blanco Depression, Site 7	44°15'N	129°40'W
September 7	Transit to Astoria		

1994 Blanco Fracture Zone Sample Summary

ATV Sample #	Time	Depth	ATV Latitude	ATV Longitude	Temperature	Comments
A87-1C	19:50	11639	43° 14.66	127° 05.17		Sediment core taken at Gorda Depression.
A87-2R empty	22:40	10670	43° 15.37	127° 05.74		Rock sample taken on the fly. Heavy sediment ar
A87-3R	23:20	10250	43° 15.54	127° 05.82		Rock sample
A87-4R	00:43	9690	43° 15.82	127° 05.89		Rubbly area, brecciated slope
A87-5R	01:07	9460	43°15.87	127° 05.81		
A87-6R	01:22	9320	43°16.06	127° 05.82		
A87-7R	01:55	9081	43° 16.06	127° 05.88		
A87-8R	02:17	8660	43° 16.08	127° 05.87		Fault scarp? Talus slope.
A87-9R	02:31	8570	43° 15.96	127° 05.82		Block of talus around in situ block of "serpentine
A87-10R	02:48	8330	43° 16.07	127° 05.82		
A87-11R	03:01	8150	43° 16.15	127° 05.82		
A87-12R	03:13	8100	43° 16.18	127° 05.79		Solid outcrop
A87-13R	03:13	8100	43° 16.32	127° 05.71		Bedrock basalt
A87-14R	04:00	7350	43° 16.31	127° 05.71		
A87-15R	04:12	7260	43° 16.32	127° 05.67		Sample of angular rock from spine of ridge.
A87-16R	04:22	7160	43° 16.32	127° 05.70		
→ A87-17C	433	7070	43° 16.29	127° 05.68		
A87-17R	436	7070	43° 16.34	127° 05.70		
A87-18R1 empty	503	7041	43° 16.34	127° 05.66		
A87-18R2 empty	503	7042	43° 16.34	127° 05.66		
→ A87-18C	518	7042	43° 16.30	127° 05.66		
A87-19R	1438	10390	43° 15.03	127° 04.27		
A87-20R1	1515	9830	43° 15.19	127° 04.12		
A87-20R2	1521	9830	43° 15.20	127° 04.14		
A87-20R3	1521	9830	43° 15.20	127° 04.14		
A87-21R	15:38	9500	43° 15.25	127° 04.09		In situ rock from scarp face.
A87-22R	16:05	9270	43° 15.32	127° 03.98		
ATV Sample #	Time	Depth	hip's Latitud	hip's Longitud	Temperature	Comments
A88: 8/29-30						
A88-1R	22:03	8350	43° 21.00	127° 35.72		rock cobble from base of slope
A88-2R	22:17	8100	43° 21.00	127° 35.73		rock from outcrop/possible jointing/may be dike

1994 Blanco Fracture Zone Sample Summary

ATV Sample #	Time	Depth	ATV Latitude	ATV Longitude	Temperature	Comments
A88-3R	01:20	8340	43° 21.65	127° 36.24		pillow basalt rubble from intact pillow field
A88-4R	02:45	8140	43° 21.83	127° 36.40		from cliff face of fractured flow
A88-5R	02:49	8140	43° 21.84	127° 36.41		from cliff face in solid flow - fault scarp
A88-6R1	03:15	8020	43° 21.87	127° 36.44		flow rock from high on fresh escarpment
A88-6R2	03:15	8020	43° 21.87	127° 36.44		flow rock from high on fresh escarpment, pillow
A88-7R	?	?	?	?		
ATV Sample #	Time	Depth	hip's Latitud	hip's Longitud	Temperature	Comments
8/30/31						
A89-1R	18:54	7795 ft.	43° 22.94	127° 36.82		Six inch rock, from heavily sedimental basin.
A89-2R	19:27	7900	43° 23.02	127° 36.86		Rock takenfrom heavily sedimented basin edge.
A89-3C	21:37	7790	43° 23.41	127° 37.30		Sediment core taken in center of basins. Possib
A89-4C	22:12	7830	43° 23.34	127° 37.43		Four inches of sample in end of tube. Starboard
A89-5R	22:33	7790	43° 23.30	127° 37.50		Moderately hard cobble from debris field.
A89-6R	22:45	7790	43° 23.29	127° 37.56		A few meters away from 5R. Tetragonal shaped.
A89-7R	23:33	7750	43° 23.25	127° 37.66		Rock fragment.
A89-8R	01:23	7550	43° 22.94	127° 38.22		Rock fragment from area of linear features on s
ATV Sample #	Time	Depth	hip's Latitud	hip's Longitud	Temperature	Comments
8/31/1994- 9/1						
A90-1C	14:44	9440	43° 27.82	127° 46.42		Sediment core. Low pushup of sediment.
A90-2C	15:52	8975	43° 27.49	127° 46.42		Sediment core.
A90-3C	18:05	8970	43° 27.20	127° 46.59		Heavy sediment. Medimum slope.
A90-4R	22:04	9640	43° 26.66	127° 46.95		Rocks scatterd about. Below sonar target-possb
A90-5R1	01:00	9600	43° 26.39	127° 47.01		Rock on scarp.
A90-5R2	01:04	9600	43° 26.38	127° 47.01		Rock on scarp. Same location as 5R1.
A90-6R	01:25	9400	43° 26.34	127° 47.02		Rock from skree slope.
A90-7C	01:45	9250	43° 26.30	127° 47.03		Sediment core taken on edge of scarp face and s
A90-8R	02:43	8810	43° 25.97	127° 47.10		Boulder on sediment. White fractured rock.
A90-9R	03:16	7990	43° 25.89	127° 47.11		Continuous scarp face.
A90-10R	03:42	7654	43° 25.84	127° 47.12		Taken from talus pile
A90-11R	03:56	7540	43° 25.81	127° 47.13		Taken from talus slope.

1994 Blanco Fracture Zone Sample Summary

ATV Sample #	Time	Depth	ATV Latitude	ATV Longitude	Temperature	Comments
A90-12R sed	04:46	6920	43° 25.62	127° 47.33		Taken from sediment slope with pebbles & cobble
A90-13R sed	07:43	7552	43° 25.08	127° 47.47		cobble on surface of sedimented slope with whi
A90-14R sed	07:49	7550	43° 25.10	127° 47.48		White sediment/ rock "insitu". Slope is toward A
A90-15R	07:56	7510	43° 25.10	127° 47.48		Rock of slope with white sediment.
A90-16R sed	08:07	7470	43° 25.09	127° 47.47		Slump deposits.
A90-17R	08:42	7280	43° 25.09	127° 47.47		Rock on Pebbly/ cobbled surface over sediment.
A90-18R	09:11	7082	43° 25.19	127° 47.46		Low slope strewn with boulders. Blocky
A90-19R sed	09:30	6980	43° 25.27	127° 47.46		Angular chunk on soft sediment.
A90-20R	09:41	6912	43° 25.33	127° 47.45		Fragment between two larger boulders.
A92-1R1	21:43	11117	44° 12.55	129° 37.93	39.1°F	Pillow lavas, spalled lava surfaces, shelly surfac
A92-1R2	21:50	11117	44° 12.55	129° 37.94	39.1°F	Flat piece/ slab from pillow lava pile taken a me
						from 1R1.
A92-2R	23:37	11130	44° 12.63	129° 37.13		Rounded blocks in loose aggragate, probably talus
						Broke small piece off from a pillow.
A92-3C	00:07	11170	44° 12.68	129° 38.25		LOST CORE. Sediment core of a reddish brown se
						From the base of a small ~1m high ridge.
A92-3R	00:11	11170	44° 12.68	129° 38.25		Rock from the same place as 3C. Loose broken p
A92-4R1	00:50	11350	44° 12.75	129° 38.42		Either inactive hydrothermal mound (barite -silic
						hydrothermally altered rock. Sample taken from
						of mound.
A92-4C	00:44	11357	44° 12.75	129° 38.42		Sediment core from the base of the mound. Core
A92-4R2	01:01	11357	44° 12.75	129° 38.42		Same mound as 4R1. Sample taken from top left.
A92-5R	02:49	11310	44° 12.76	129° 38.44		Pillow lava block from slope with linear tube for
						Flows down slope.
A92-6C	03:45	11330	44° 12.79	129° 38.52		White alteration on surface of sediment in sedim
						White alteration? in a ring.
A92-7R	04:15	11295	44° 12.77	129° 38.61		Small basalt fragment from talus apron.
A92-8R1	04:55	11190	44° 12.70	129° 38.90		Jointed basalt rocks- possible radiating structu
A92-8R2	04:55	11330	44° 12.70	129° 38.90		Radiation structures from a massive outcrop.
A92-9R	09:21	11330	44° 12.66	129° 39.07	39.1°F	pillow basalt talus. Temperature of seawater.
A92-10R	11:57	11500	44° 12.51	129° 39.54		pillow/tube basalt; tubes are intact

1994 Blanco Fracture Zone Sample Summary

ATV Sample #	Time	Depth	ATV Latitude	ATV Longitude	Temperature	Comments
A92-11R1	12:14	11490	44° 12.48	129° 39.61		glassy? top of tube basalt from near top of "hor
A92-11R2	12:20	11490	44° 12.48	129° 39.61		tube basalt from near top of "hornito #1"
A92-11R3	12:23	11490	44° 12.48	129° 39.61		tube basalt from near top of "hornito #1"
A92-12R	15:39	10481	44° 12.07	129° 40.70	39.0°F	talus block from near top of hill - western edge
						Blanco Depression. Temperature of seawater.
A92-12C	00:15	10437	44° 12.07	129° 40.72		Sacrificed bottom of core for sample at mound.
						Sediment core from near top of hill; same place a
						sample 12R-
A92-13C						Lost
A92-13R1	00:08	11244	44° 12.75	129° 38.34	39.2/ 39.3	Rock, Beginning broken/ sedimented slope; near
						/ below hydrothermal mounds. Temperature of s
A92-13R2	00:08	11244	44° 12.75	129° 38.34	39.2/ 39.3	Nice yellow, orange, red, color to outcrop.
						Temperature of seawater.
A92-14C	00:25	11220	44° 12.78	129° 38.31	39.2°F	Sediment core C. near hydrothermal mound
A92-15C	01:55	11220	44° 12.81	129° 38.38	70.0°F	Core A. Bottom of core with sample A92-12C. E
						mound. Maximum temperatures 70.5°F, (21.2°C)
						When leaving mound 49.0°C.
A92-16R1	02:55	11170	44° 12.80	129° 38.38	39.1°F	Sheet flow? Mn Crust?
A92-16R2	02:57	11170	44° 12.81	127° 38.38		Shee flow?
A92-16R3		11170				personal sample for pilot.

OPERATIONAL PLAN FOR 26-28 AUG.
CRUISE L2-94-WO
BLANCO FRACTURE ZONE

AUGUST 26

0800 LEAVE COOS BAY

~0900 CROSS THE BAR (**~43° 21',-124° 20'**), **SOL 1**
START SEABEAM SURVEY
LINE 1 RANGE AND BEARING: 100 N.MILE, 260°

~2000 **EOL1/SOL2** (**43° 05',-126° 35'**)
LINE 2 R&B: 20.9 N.MILE, 294°

~2200 **EOL2** (**43°15',-127°00'**)
END SEABEAM SURVEY
START ATV TETHER UNKINKING OP

AUGUST 27

~0600 END ATV UNKINKING OP
PROCEED T0 **43°12',-126°59.5'** (**SOL3**),
BEGIN SEABEAM SURVEY WHILE ATV PREPARES FOR DIVE
LINE 3 R&B: 19.4NM, 117.5°

~0800 **EOL3** (**43°03', -126°36'**)
PROCEED TO **43°04',-126°35.5'**; **SOL4**
LINE 4 R&B: 19.1NM, 298.2°

~1000 **EOL4/SOL5**(**43°13',-126°58.5**)
LINE 5 R&B: 8.4NM, 294.6°

~1100 **EOL5** (**43°16.5',-127°09'**)
END SEABEAM SURVEY
PROCEED TO WAYPOINT 1 FOR ATV TOW

~1130 BEGIN ATV TOW 94-43-87
PREDIVE: ATTACH CTD
START AT **WAYPT 1**(**43°14.57',-127°05.13'**)
HEAD TOWARDS **WP2** (**43°15.5,-127°05.85'**)
R&B FROM WP1 TO WP2: 1.0NM, 335.4°
WHEN REACH WP2, CHANGE BEARING TO 007.6° AND HEAD TOWARDS **WP3**(**43°16.33',-127°05.68'**)
R&B FROM WP2 TO WP3: 1.0NM, 007.6°
DIVE OBJECTIVE: DRIVE UPSLOPE FROM 3615m (11860') TO 2160m (7090'), GATHERING VIDEO, PHOTOS, AND ROCKS
FINISH DIVE NEAR WP3

CC: NORTHAM
CAPT. VIC
GASH
WENDE
WET LAB
UMV NAVIGATOR
USGS NAVIGATOR

OPERATIONAL PLAN FOR 29-30 AUG.
CRUISE L2-94-WO
BLANCO FRACTURE ZONE

AUGUST 29

1500 END TURTLE DIVE 783-16-94
TRANSIT TO SITE 2.
SEABEAM ALONG TRANSIT AND AT SITE 2.
SEABEAM WAYPOINTS:

1. **43°22.75', -127°33.00'**
   RANGE AND BEARING: 4.3N.MI, 342°
2. **43°24.25', -127°38.5'**
   R&B: .85NM, 206°
3. **43°23.5', -127°39.0'**
   R&B: 2.7NM, 111°
4. **43°23.0', -127°37.0'**
   R&B: 1.55NM, 119°
5. **43°21.0', -127°35.72'**

1800 COMPARE NEW SEABEAM DATA WITH OLD NOAA SEABEAM TO DETERMINE OFFSET (WAS 0.2'LATITUDE AT SITE 1). [TURNED OUT TO BE 0.1'LAT. HERE AT SITE 2. OLD NOAA SEABEAM POSIT + 0.1'LAT = NEW POSIT.] CONTINUE TO COLLECT SEABEAM IN SITE 2 VICINITY.

1900-?? ATV DIVE 94-44-88
WAYPOINTS:

1. 43°21.1', -127°35.75'
2. 43°22.5', -127°37.0'
3. 43°23.0', -127°36.8'

3A.43°23.5', -127°37.05'
3B.43°23.63',-127°37.65'

4. 43°24.3', -127°38.0'
5. 43°23.4', -127°35.0'

OBJECTIVE: TO COLLECT SAMPLES, PHOTOS AND VIDEOS OF SEAFLOOR RIDGE FABRIC (WP1-2), POSSIBLE PULLAPART BASIN (WP3-4), AND RIDGE CREST (WP4-5). DEPTHS THROUGHOUT DIVE SHOULD BE BETWEEN 7510' AND 8370'.

CC: NORTHAM
CAPT. VIC
GASH
WENDE
WET LAB
UMV NAVIGATOR
USGS NAVIGATOR

OPERATIONAL PLAN FOR 29-30 AUG.
CRUISE L2-94-WO
BLANCO FRACTURE ZONE

AUGUST 30

0640 END ATV DIVE 94-44-88 AT SITE 2 EARLY DUE TO MECHANICAL DIFFICULTY

1430 PERTRANS BOB EMBLEY FROM THE DISCOVERER HEAD TO WAYPOINT 3 (**43°23.0', -127°36.8**).

1700 ATV IN WATER FOR DIVE 94-45-89 (CONTINUATION OF OBJECTIVES FOR DIVE 94-44-88 BUT SKIPPING SECTION BETWEEN WP2 AND WP3).

~1830 ON BOTTOM. WILL START AT WP3, CONTINUE TO
WP 3A(**43°23.5', -127°37.05**), THEN
WP 3B(**43°23.63',-127°37.65'**), THEN
WP 4 (**43°24.3', -127°38.0'**).

[2100: CHANGE OF PLANS. ABORT WP PLAN AND HEAD 240° HOPING TO FIND SOMETHING BESIDES MUD.]

AUGUST 31

~0230 END ATV DIVE 94-45-89 AT WP4.

~0400 ATV ON DECK. BEGIN TRANSIT WITH SEABEAM FROM WP4 AT SITE 2 TO SITE 4(**43°27.75',-127°57.1**').

~0530 CONTINUE SEABEAMING TO **43°29.62',-128°02.1'**. THIS SEGMENT WILL BE USED TO CALIBRATE THE NOAA SEABEAM CHART WITH THE SEABEAM WE ARE COLLECTING ON THIS CRUISE.
R&B OF THIS LINE: 4.1NM, 297°.

~0600 END SEABEAM COLLECTION.
DEPLOY DOT AT **43°29.23',-128°00.83'**.POSIT MAY SHIFT ACCORDING TO SEABEAM CALIBRATION.

0800 BEGIN TURTLE DIVE 784-17-94 ON THE BLANCO RIDGE. SITE 4 WAYPOINTS (WILL BE SHIFTED ACCORDING TO CALIBRATION OF SEABEAM DATA SETS):
WP1:43°29.03',-128°01.44',D:7218',R&B:.25NM,067°
WP2:43°29.14',-128°01.13',D:7052',R&B:.11NM,064°
WP3:43°29.19',-128°01.0', D:6724',R&B:.17NM,100°
WP4:43°29.16',128°00.77', D:6593',R&B:.57NM,116°
WP5:43°28.95', -128°00.2',D:6150'
PILOTS: BUTLER, DOUGLAS. SCIENCE OBS: DZIAK

CC: NORTHAM
CAPT. VIC
GASH
WENDE
WET LAB
UMV NAVIGATOR

Operational Plan for 28 and 29 August
Cruise L2-94-WO
Blanco Fracture Zone

To 0945 hrs Continue ATV dive 94-43-87 at Site 1, Gorda Depression.

0945 hrs Arrived at location approximately 0.25 n.m. west of Way point 4.

0945 to 1400 hrs Transit at 180 to near Way Point 6 (Way Point 5 was scratched), approximately 1 n.m.

1400 to 0400 hrs August 29 Continue dive 94-43-87 to map and sample south flank of Blanco Ridge which is north slope of Gorda Depression

-Move toward Way Point 7, R & B 0.5 n.m. @ 035
-Move toward Way Point 8, R & B 0.4 n.m. @ 040
-Move toward Way Point 9, R & B 0.5 n.m. @ 105

0400 hrs Complete dive 94-43-87

0600 hrs ATV on deck

0700 to 1700 hrs Turtle dive 783-16-94 along top of Blanco Ridge to examine rock outcrops, sediment and lava types, hydrothermal veins, breccia accumulations, and structural features.

The dive starts at the shoalest part of the ridge and has way points at
1. 43°16.35', 127 05°.7';
2. 43°16.4', 127.06.25;
3. 43°16.2', 127°05.7'
4. 43°16.35', 127°05.7'
5. 43°16.1'; 127°04.3'
6. 43°15.8'; 127°03.65'
7. 43°15.65'; 127°03.1'

1700 hrs to 2000 hrs Transit to Site 2, an offset in the Blanco Ridge. SeaBeam part of the transit including dive area at 43°23' N lat, 127°39' W long.

2000 hrs Begin ATV survey of Site 2.

cc: Northam
Capt. Vic
Gash
Wende
Wet Lab
UMV Navigator
USGS Navigator

Operational Plan for 31August--1 September
Cruise L2-94-WO
Blanco Fracture Zone

To 1800-- TURTLE Dive 784
1830 to 1930 hrs Transit to begin ATV Dive 94-46-90 Waypoint 1

1930 31 August to 0330 hrs September 2 Continue dive 94-46-90 to map and sample north flank of Blanco Ridge

Dive will be conducted generally in a north to south direction (except for two slope traverses from south to north) with six waypoints defining a track over the steepest slopes on ridge and basin topography across the Blanco Ridge. The goal is a complete geological traverse across the Blanco Ridge. Continuous video and still camera mapping will be conducted and a series of rock and sediment samples will be collected along the track at regular intervals and/or at particularly interesting outcrops.

Special considerations-- In order to look at both sides of the ridges, downslope above-bottom traverses will be made from Waypoints 2 to 3 and Waypoints 5 and 6. Upon reaching the waypoints in each case,the ATV will then proceed up slope.

1 September, 2330 hrs ATV on deck

TOTAL ESTIMATED DIVE TIME (Inc. down/up and above bottom downslope transits)== @30 HRS. ESTIMATED SHALLOWEST DEPTH= 7040' (UNCORR.); EST. DEEPEST DEPTH =9817'.

WAYPOINTS:
1-43 28.04; 127 46.42 (also launch position) ESTIMATED LAUNCH DEPTH =9797'
2-43°27.42, 127 46.42';
Midwater Transit to--
3-43°26.66; 127 46.95
2-43°27.42, 127 46.42
Midwater Transit to:
3-43°26.66; 127 46.95
4-43°25.70, 127°47.15
5-43°25.62; 127 47.43'
Midwater Transit to:
6-43°24.74'; 127 47.50'
5-43°25.62; 127 47.43'

cc: Northam
Capt. Vic
Gash
Wende
Wet Lab
Navigators

ATV

#	Bottom time	hrs video	35 mm	cores	rocks
92)	29:33	19	198	4	14
91)	—	—	—	—	—
90)	20:44	16	160	4	17
89)	6:53	7	65	2	6
88)	8:03	9	43	–	6
81)	31:35	31	215	3	23
	96:48	82	681	13	65

AUGUST 1994

Sun	Mon	Tue	Wed	Thu	Fri	Sat
21	22	23	24	25	26	27
233	234	235	236	237	238	239
28	29	30	31			
240	241	242				

DOLPHINS AT PLAY ON THE BOW

ATV IN THE WATER

31:35 and 6 MILES LATER ATV COMES OUT OF THE WATER

A QUICK TURTLE TRIP

PER TRANS OIL SLICKS

PLUMB BOB

L2-94-WO

QUALITY IS A JOURNEY – NOT A DESTINATION

UNITED STATES GOVERNMENT

JANUARY

SEPTEMBER 1994

Sun	Mon	Tue	Wed	Thu	Fri	Sat
4	5	6	7	8	9	10
247	248	249	250	251	252	253
				1	2	3
				244	245	246

WHERE'S THE VEHICAL

SMOKIN

DUSTED OUT ON HUMP DAY

THE SEAS PREVAIL

ATV PHONE HOME

"Gunney" the potter

IN HOT WATER NOW!

Headed for the barn

PIZZA & BEER IN ASTORIA