Sena Norton-NOAA Ship Rainier

Pre-Trip Day 1 & 2: Saturday, July 3rd, 2004 & Sunday, July 4th, 2004

Inport Seward, AK, Cruise Ship dock
Weather: Partly Cloudy, occasional fog, calm wind

Personal Log:

I was met at the train depot by two of the Junior Officers from the Rainier and brought on-board. After a quick tour of the common areas I was shown to my berth and allowed to get settled in. I will be sharing the room with one of the survey techs on board in a 4 person room. I met two more of my berth area mates while I was un-packing and settling in.

Location: In transit to Shumagin Islands, outside of Seward inlet.
Date: July 6, 2004
Latitude: 59.31 N
Longitude: 149.41 W
Visibility: To horizon
Wind Direction: NW
Wind Speed: 20 kt
Swell wave height: 6ft
Sea level pressure:
Cloud cover: High sparse cloud cover

Personal Log:

Day Activities

- Ship paper work
- Assign and don Survival Suit (communally called Gumby suit)
- Took part in Abandon ship and fire drill. Got to my muster stations with ease and with all the required equipment and needs. Aided in hose management and stow.
- Issued Mustang jacket and flotation vest for use on launches and skiffs.
- Observed getting underway from the flying wing.
- Took nature sightings: whale in distance, porpoise pod of 12+, puffin and gulls/seabirds.

We are in transit to our survey location and will be for the next 24-36 hours. Most personnel are on 4-hour watches and shifts. I watched the deck crew take care of the lines and stow all the equipment in its correct areas, which took longer than I first would have expected.

The "Gumby suit" was interesting to put on and try to get back into its bag. I could not believe how snuggly it fit around the wrist and neck…of course to be water proof that is the requirement. I feel very safe in knowing that I could survive if the need arouse.

I am a little queasy with the boat today…there isn't much of a sea but just getting used to the motion is going to be interesting. I have my patch on but many people have told me my berth is nicknamed the ANTI-GRAVITY CHAMBER…not very good words for a land lover like myself.

It is proper etiquette to keep your rack light on at all times unless you are trying to sleep. That is a cue to your roommate to be quiet. If the light is on all clear…if the light is off "shhhhhh". I didn't know that even with my prior experience.

The weather is going to be very nice for the next 6 days according to the weather report I received via email from the XO today. We are to expect light winds and the 3-6 foot sea swell. That is cause for good science and nice observations. We are scheduled to begin the hydro survey on Thursday.

Location: In transit to Shumagin Is. Via Shelikof Strait
Date: July 7, 2004
Latitude: 57 43.2 N
Longitude: 154 58.4 W
Visibility: 10+
Wind Direction: 280 degrees
Wind Speed: 18 kt
Sea wave height: 2-4 ft
Swell wave height: 2-4 ft at 210 degrees
Seawater temperature: 10.6 C
Sea level pressure: 1020.1 mb
Cloud cover: PC 2/8
Weather: 12.2 C, sunny with moon visible straight off bow

Science and Technology:

I learned about the NOAA Nautical Charting Program today. A nautical chart shows the marine environment in a visual format for navigation purposes primarily. Any mariner needs to have an ability to use fixed points to plot a course and know/avoid any underwater or other hazards along the way. Most charts show hazards, natural and dredged channels, water depth and other features that are needed for safe navigation. The National Ocean Services marine Chart Division is in charge of 1,000s of charts. Most mariners use these charts along with the U.S. Coast Pilot when ever they are out. When changes are charted a new chart is made. From the time the NOAA ship Rainier makes their readings it takes between 3-5 years to be produced in chart format and readily made available. New charts are asked to be made for uncharted, poorly charted or changed areas. The three hydrographic ships that NOAA maintains do on average 50 charting

runs a season for updates. However, with the current backlog of changes only 200-300 items are updated a year. The cycle of a update goes as follows: first chart users relay needs, second the Hydrographic Surveys Division prioritizes the resources and produces survey instructions, third, a NOAA field unit travels to the location and conducts the hydro survey, fourthly, the data is examined at a on shore branch and prepared for application on new chart and finally the Marine Chart Division is complied and printed. NOAA is not the only team member on this mission; other important organizations provide data for new charts. U.S. Army Corps of Engineers provide dredge and channels depths, U.S. Coast Guard maintains navigational aids, GPS beacons and other communication sources, while the Photogrammetry unit of NOAA complies aerial photos for shoreline and landmark additions.

The bridge is an important part of the overall ship function. The ship is driven from this location, the progress made is plotted and recorded and hourly logs are kept with various location and condition data. I take my condition and location directly from the ships log when I write these logs. Today there were a few ships on the radar and the officers wanted to make visual contact with them. I got to keep a lookout for the one off the port/south side of the ship with binoculars. The helm is where the ship is driven from and is kept on course with direction relation to the nautical chart and heading. Small adjustments have to be made from time to time to keep the correct bearing due to changed in sea swell and wind direction. The bridge is always manned 24 hours a day because of the importance of what is done there. We are making about 13 knots today with a friendly wind and hope to be anchored in the Shumagin Is. by tomorrow. We will commence the ships hydro at 0300 tomorrow morning to begin the surveying of the area.

Question of the Day:

How far is a fathom? 6 feet
How many people are on board? 74 crew/officers 5 visitors / 79 total

Day Activities:

- Interviewed Chief Yeoman Paul and discussed his role/responsibilities on the ship. He in charge of bills, keeping track of expenses, ordering fuel and stores, personnel changes and promotions, a liaison between crew and command and manages expenses overall.
- Visited the bridge and interviewed various officers and crew about bridge processes and equipment.
- Wrote down some possible classroom curriculum options.
- Discussed curriculum with fellow TAS, read some NOAA research and PR.
- Downloaded some important pictures for use in curriculum/reports from ships computer network.

Personal Log:

The night was a little rough with the swell height and wind direction and speed. They call my room the anti-gravity chamber and every once in awhile I could tell why. Today the rocking and rolling is much better and at times I think that I have my sea legs back. It is still unique to walk around on a ship that is bobbing; you get a different feeling when the deck is not where your foot thought it should be. I have put much thought into what I can turn this experience into as far as curriculum goes and my fellow TAS and I have been bouncing some ideas off of each other. There is much to say about the value of sharing this experience with a colleague as well as having the chance to discuss in general with that same colleague. I think that there is a professional connection being made thanks to the NOAA Teacher At Sea program! The science behind the survey process with help and that is a main goal to learn about, however there is something more to this experience that I haven't put my finger on yet…give it some time…something that the sea is very well trained at allowing you to have.
For now,
S.

Location: Sonar Patch cruise, SE of Devils Bay on AK peninsula
Date: Thursday, July 08, 2004
Latitude: 55 46.163 N
Longitude: 158 03.557 W
Visibility: < 1 nm
Direction: 229 degrees
Wind Speed: 16 kt
Sea wave height: 1-2 ft
Swell wave height: 1.2 ft
Seawater temperature: 8.9 deg C
Sea level pressure: 1021.1 mb
Cloud Cover: n/a fog
Weather: Fair and foggy, 8.9 deg C dry / 9.4 deg C wet

Plan of Day: 1.5 days of sonar readings in patch with lines of 2.5 hours each. Launch #5 boat for survey north of ship around a possible rock pinnacle.

Science and Technology:

Sonar Systems on board Rainier: How they work.

What is Sonar?
In its most basic sonar are sound waves that are produced and then bounced back off of an object and recorded. Since the speed of sound is a known figure, the amount of time it takes for the sound wave to return to the transmitter/receiver gives a collectable image of that object. The deeper objects are the longer the sound wave takes to bounce back. Two types of sonar are single beam and multi-beam. Single beam is able to give high detail to an object but only shows a narrow swath, while multi-beam has a large footprint and can show a larger over all area. There are limits to the depth sonar can go because of the density of the water column. If the water is very dense the sound waves are slowed down

and do not transmit the correct timing, therefore the image will be distorted. All images created must be analyzed after the density, temperature and salinity of the water column is taken into consideration.

Sonar is a very powerful sound wave and it can be dangerous, although it is at a frequency that humans or marine mammals cannot hear. If a diver were scanned they would be susceptible to a high-level concussive power. The emitter itself requires a large volume of power and if a human were to be near it during an emission it would do a great deal of damage. Think of the concussion from a bomb or firework, sonar is many, many more times as powerful.

Rainier's Sonar:

The ship is equipped with a deep sonar transmitter; it is attached to the hull and is used for scanning deep water where resolution is not a large issue. The boat "mows the lawn" in a patch of ocean. Each pass is numbered and the data collected. The lines are about 2 hours at 7-8 knots long. For more detailed work or a smaller area the ship will use one of its 6 launches that are also equipped with various sonar transmitters. These small boats will conduct and similar pattern of lines and collect the data right on board. The data is then transferred to the computers on board to go through technician cleaning and final analysis.

Sonar Types:

Single-beam – one beam sent and received.

Multi-beam – up to 240 beams per 180 degrees sent and received. As depth increases the foot print widens.

Analysis of data:

When the soundings are collected they are run through a Carris computer program where the technicians can manually scan each line. There are techs assigned to each "sheet" or area. Each line is cleaned, meaning outliers are removed or other "noise" is deleted. Once the data is clean a complete 3-D image of the patch can be looked at with all the data points represented. Once an entire area has been scanned objects become very clear, as if you were looking at them. From outlines of sunken ships from the side to large monolithic rocks protruding from the ocean floor, the detail and accuracy of the image is amazing. Once there is enough data the sounds can be turned into color-coded overlays that fit right on top of the fathom charts, so as to give a 3-D view of what those fathom readings represent. Red and orange or shallow and the colors move through yellow, green and finally blues, which are the deepest readings. Mountain ridges, lava floes, old wrecks, valleys and monoliths all come to life on the chart.

<u>Personal:</u>

Steve Foye gave me a quick training with another new member of the crew on the job of Lookout on the flying bridge last night. He reviewed the 32-point compass and the difference between saying North relative to the ship verses trying to figure out the "real" compass coordinate. He explained you could use directions (NW or SE) or give the coordinates (90 or 270). Dead ahead would be 000, north relative to the ship or 360, all are correct for locating something directly off the bow of the ship.

Question of the Day:

When is the ship required to sound foghorn and place lookouts on the Bow/Flying Bridge?

When the visibility gets below 1 nm the ship is required to blow the foghorn or ring a bell every 2 minutes. A lookout is placed on the flying bridge during hours of darkness or low visibility. They move to the bow when the foghorn is turned on so they do not damage their ears.

Location: In transit to Shumagin Island collection, due to anchor at NW Egg Island
Date: Friday, July 09, 2004
Latitude: N 55 degrees 26.60'
Longitude: W 159 degrees 33.97'
Visibility: <1 mile
Direction: 221 degrees
Wind Speed: 13 kts
Sea wave height: 0-1 ft
Swell wave height: 1-2 ft
Seawater temperature: 10.6 deg C
Sea level pressure: 1016.0 mb
Cloud Cover: 8/8
Weather: 11.7 deg C, fog cover most of the day, some clearing into high cloud cover.

Plan of Day:

1200 stop ship hydro and begin transit to Shumagin Is, specifically Egg Island for anchorage. Anchor set for 2100 or earlier.

Science and Technology:

The local patch that was being surveyed is too large to finish in one pass. The Rainier had already done a few lines during their previous legs and on this pass we got about 10-12 lines surveyed. They will steam back by here to finish the patch at a later date. Tomorrow is set for the first of 5 days of small boat launches and survey. Because I will be aboard a launch I was run through some basic boat safety this afternoon. I was also given an engine room tour and simple explanation and spoke with some crewmembers about standing watch. The XO showed me some books that might be of interest for my curriculum planning and also my general knowledge.

Small Boat Safety and Etiquette

The launches are put in the water around 0800 and will stay out doing survey work till 1600 or so. There will be a complement of people aboard: the coxsin who drives the boat and in charge of safety, three officers from the ship who will run the program and collect data and myself. The launches are stored on the gravity davits along the ship. The boats will be lowered to deck level where the crew will get on board and then the boat is lowered to the water and un-hooked. Getting on board the launch you must wear the Mustang survival coat and a hard hat. Nothing is to be in your hands while you board, so all other material need to be near the rail and will be handed over once you are onboard. One of the most dangerous times on the ship are launching and taking up the smaller boats. You are required to wear positive flotation at all times and since the Mustang jacket is bulky and warm, I was issued a float vest. We are launching number 5 and number 3 boats tomorrow.

Standing Watch

While underway there is a rotating watch schedule 4 on, 8 off, 4 on is its most simple explanation. An example watch schedule would be 0800 – 1200 on watch 1200 – 2000 off, 2000 – 2400 on again. So you work 8-12 on both sides of am and pm. Even though the routine is easy to remember it is very difficult on your body and your sleep schedule. The added hardship is the constant light this far north and the pitch black of your berth. For a visitor who has kept a normal sleeping routine you have a different perspective on just what is required for this ship to keep going 24 hours a day. There is a lot more upkeep then I expected and the watch standers are those people. While anchored most people go back to a normal 8 hour work shift, although some of those work shifts are at night there isn't the constant change.

Engine Room Tour

The engine room tour was loud, even through earplugs and head phone like muffs that roar is amazing. You hear it throughout the ship but nothing compares to the pure sound when you are right next to it. The control room looks out over the two main engines. Each engine turns the port or starboard screw. Control over the engines can be given to the bridge but ultimately if the engineers need to control anything that comes from that area they are all powerful. There is fuel to keep moving to balance out the ships list, fresh water to make, generators to watch so as not to over load any of their out-puts. In a sense the engine room is the heart of the ship. Being self contained completely means that everything has to be running well. This ship even in port generates its own power and while out at sea is capable of making fresh water from salt water. I felt very much at home seeing as I have been in many engine rooms in my life with my father, I plan on going down there a few more times during my time on board.

Question of Day:

How long would it take to survey the entire patch? *8 days going 24 hours/day.*

Personal:
I did a lot of research today from the resources made available to me from the XO. Today was also a day I collaborated with my fellow TAS, something educators rarely get enough time to do. We bounced off a few adaptations of what we have already learned from our time on board. I hope to continue this process throughout my time onboard. No more seasick patch, I think that I am doing well and can handle the rolls. There is some crazy weather on the way too! If it chooses to run up into the Bering Strait we are okay but according to the XO, if the low pressure rides on the south side of the Aleutians it might get sketchy. The Rainier would have to find a place to hole up and wait for the storm to pass because she is such a small, top-heavy ship. So I might just get a wild Alaskan ship ride after all.

Location: At anchor Popof Strait, Shumagin Islands, AK
Date: Sunday, July 11, 2004 15:00
Latitude: 55 deg 17.30' N
Longitude: 160 deg 32.14' W
Visibility: 5 nm
Direction: 110 deg
Wind Speed: 10 kts
Sea wave height: 0-1 ft
Swell wave height: n/a
Seawater temperature: 10.0 deg C
Sea level pressure: 1018.2 mb
Cloud Cover: 5/8
Weather: Fair to Partly cloudy, spots of fog dissipating. 12.12 deg C

Plan of the Day:
Continue the launch survey with 2 boats. In house data cleaning and processing. Meeting with LIDAR tech stationed in Sandpoint.

Science and Technology:

I personally spoke with a survey technician, Amanda McKinney on board to gather more information on hydrography and the process behind it. There were two main topics that we discussed: Application and history of marine survey, and the math/science behind the techniques.

Application/History
The technology used for marine survey has been improving by leaps and bounds and we are currently using a collection of old and new technology to gather data. Many nautical charts have not been charted for almost 80 years or more and some areas have never been accurately charted at all. The old process was to drag a lead line behind a transiting ship. This process was full of errors because you could never accurately know your depth, even if the length of the line was known; it was drug and therefore skewed the data. Very often a charted depth from these old processes are found to be dangerous wrong. Another

mode of survey is the wire drag, where multiple ships drag a wire through the water column. Once a target has been hit, the depth of that underwater target is calculated, but never truly charted accurately. Side scan sonar came around and improved the survey capability, but it too has its drawbacks. Because the "fish" is towed there are many more mathematical corrections that must be made in order to get a reading that is close to the actual target. It does produce wonderfully clear pictures of what is around the "fish" but those images lack depth of field and the sonar cannot read directly below the transmitter. Quite often with side scan images, divers are needed to dive the sight of a possible target to get accurate readings. Multi-beam sonar can be used in conjunction with side scan to better improve the over all picture of the underwater area. Because multi-beam is able to give more accurate readings and the data is complied in 3-D images, surveyors can have both a clear image and precise depth reading all together. It is hoped in the future that there will be new sonar systems that can scan at 480 beams over .25 x .25 deg per beam with 40+ pings per second. The highest level of technology currently used by NOAA is the Reson 8125 (this system is attached to two boats currently) and it sends out 240 beams over 0.5 x 1 deg / beam at 15 pings per second and runs with 455kHz. Remember, that a short pulse (wavelength) will give better vertical resolution and higher frequencies give shorter pulses or wavelengths.

The math required to figure the depth is not very difficult, however in the case of the ocean, the computers must adjust all readings for depth, salinity, temperature and density, which in a way makes the math more difficult if done by hand.

Depth = Speed + Time / 2

Personal:

I was able to spend some time with the survey tech's today and got through some of the PowerPoint presentations that are available here on the intranet to educate myself more on the technology and process. I was pleased to see that I can apply some of the simple ideas to my classroom. When I teach certain science skills I will have real life data sets and examples for the kids to analyze. I also hope to get some of the kids excited in the field of sonar and survey, much needs to be done to improve the accuracy and reliability of these systems and the product they produce.

Sunday equals fishing off the fantail in between shifts. We have a resident pack of gulls that have found it much to their benefit to hang out for the halibut leftovers that get tossed overboard or that slip from bait hooks.

I found a whale bone yesterday on Egg Island and had the boat shop guys saw it in half so that both of us TAS's could bring something back for the classroom. It is not a large chunk, but authentic to say the least. I also gathered some sea sponge that had washed up and a very unique white rock.

I was very surprised to see the people working on a Sunday. No one should ever question the dedication of the folks on board or say that this is an easy job. One of the engineers has not had a day off in two months or more. The ship is something that has to be tended

too by her crew and command 24 hours a day 7 days a week. Self-sufficiency comes with some responsibilities!

Question of the Day:
Which is better: side scan or multi-beam sonar?
There is not one that is better than the other so much as they can compliment each other to produce and more detailed and accurate product, namely the nautical charts and other products that use the information gathered via the sonar medium.

Location: At anchor, Popof Strait, Shumagin Is. AK
Date: Tuesday, July 13, 2004
Latitude: 55 deg 17.9' N
Longitude: 160 deg 32.13'W
Visibility: 1nm
Direction: 116 deg
Wind Speed: 10 kts
Sea wave height: n/a
Swell wave height: 0-1 ft
Seawater temperature: 10.1 deg C
Sea level pressure: 1011.0 mb
Cloud Cover: 8/8 Fog
Weather: Foggy with drizzle and areas of rain 12.1 deg C (air temp)

Plan of the Day:
Four launches for shoreline verification and continuation of hydro in deeper water.

Science and Technology:
I learned the process and background concerning shoreline verification. This process ties in nicely with my new understanding of the process of Laser Airborne Bathymetry and how the two connect together. Shoreline verification is a process where a launch surveys to the 4-meter line and in the process correctly locates any targets found close to shore. The launch actually touches the target, at times from multiple sides so that a true GPS tag can be attached to the feature. This process helps the survey crew make better sense of wide swath readings and discern between sonar "fluff" and true features. Sometimes kelp or other objects block the sonar from capturing an accurate image and in the case of larger objects they are required to be "eye ball" verified for all survey areas. Shoreline is also used to double check location of known targets for drift or geologic movement. In the case of these Alaskan waters, the bottom changes yearly and the same can be said for the shoreline. Rocks move, and sand drifts cause sediment build-ups in different areas and underwater features might not have been placed accurately on the chart in the first place. All these factors add in to the need for physical shoreline verification of the survey swaths.

The jet boat launches are able to go almost all the way into shore but are not used until a prop motor launch has already done a through evaluation of the grid. According to the coxswains, shoreline is one of the more nerve-racking operations that they conduct. They

are in shallow water trying to find hazards to navigation and they are still asked to safely navigate themselves. At times they are going into pockets almost blind because of the initial survey information being a tad sketchy. After of day of shoreline the coxswain is mentally and physically worn out.

Personal:
Last night was a fun night on board, a group of crew and corps officers played some board games and let off some steam. This really is a fun crew to be around they are ready to have a good time and I believe they genuinely enjoy each other's company. (Even if at times I know they drive each other crazy!) I am feeling more a part of the ship now as ever before, everyone is a friendly face and people are interested in what I am doing and what I do on dry land. They are very supportive of teachers and education and that is a boost to my morale because I feel supported in what I am doing here. I have also enjoyed the time made available by being on board to work with the other TAS and collaborate with lesson ideas and simply "talk" to each other. Many times the one thing that teachers starve for is a chance to really get down and work with their colleagues. We are already planning on linking our classrooms, like Sister Classes for projects, pen pal and even to track the weather on opposite sides of the U.S. An added benefit is that she also just finished her first year of teaching and teaches at the same middle school level and I do. We have our careers in common and seem to have similar ideas on the direction of science education and its benefit to our students. We have completely different experiences as an educator because I teach in public school and she teaches in a small private school, but hearing the experience of the other has put a perspective not only on education but also on my professional/personal goals for the future of my career.

Question of the Day:
What is a "gyro" and why is it used on a ship?

A "gyro" or gyroscopic compass is the ships compass that is always pointed at the North/South axis no matter what the ship is doing in the water. It can be compared to a child's top in the way that it works. It is important for a ships compass to be oriented in the N/S axis to accurately navigate and find the exact lat/long point. A compass will always point toward magnetic North which is about 1,600 km south of the North Pole (where all the meridians of longitude converge).

Location: At anchor, Popof Strait, Shumagin Islands, Ak
Date: Wednesday, July 14, 2004
Latitude: 55 deg 17.24' N
Longitude: 160 deg 32.17' N
Visibility: 6 nm
Direction: 060
Wind Speed: 6 kts
Sea wave height: 1 ft
Swell wave height: n/a
Seawater temperature: 10.0 deg C
Sea level pressure: 1009.3 mb

Cloud Cover: 8/8
Weather: Temp: 12.2 deg C, showers, some fog in higher elevations

Plan of Day:
Five launches out for shoreline, multi-beam and visitors tour. I was on RA 1 for shoreline verification and LIDAR disproval.

Science and Technology:

RA 1 is a jet boat, which means it can get into shallow waters to take readings and not worry about ripping a prop or high centering…both are not good ideas! I was out with Megan Palmer, Brie Welton, KC Longly and the other TAS Leyf Peirce. It was a cozy ride. There were a handful of targets that we set out to visually verify. The nice addition to this launch was that the computer had the updated LIDAR data from a fly over a few days earlier to use, so the launch did not have to take its own shoreline readings, cutting down on the time needed for the mission goals. There was one islet that was misplaced on the chart and so we had to take a picture of where it really was and then disprove its old location by taking depth readings and marking the bearing. This way the rock feature can be moved when the charts are updated.

There was also a shoal that was mis-assigned as to its depth. The LIDAR computers got a reading but were unsure and wanted field verification. We drove a star pattern over the shoal and logged readings, marked the area and took visual cues. Palmer will then work with the sheet and update from our field verifications and re-work the depths.

I was able to help run the logging computer. I marked the targets on the cue from the coxswain and then filled in the bearing, notes and depth or height of the target with the survey tech. I was also able to take digital pictures of some of the targets that we wanted to disprove or assign different locations.

Personal:

Shoreline was much faster paced because the coxswain has to look out for kelp, watch his depth meter, and stay on target and read bearings/heading and depths to the survey tech. The launch itself is much more maneuverable because of the jet and has more room on deck to move around. Both of the TAS's were on board this launch today so we were able to talk a little more about our plans for using the science we have learned and linking our classrooms in the future for some investigations.

We are pulling up the anchor and steaming for Kodiak this evening after dinner to arrive early on Friday morning. I am going to miss the crew on aboard. I feel that I have been here long enough to begin really getting to know people and they have added me into their daily schedules and have been patient with my questions or my getting in the way. I feel very safe and know that there are people who are looking out for me. I hope to keep in contact with some of the people on-board and maybe have them become part of my

classroom as a resident scientist for the kids to interact with over the course of a season. The possibilities are endless.

Question of the Day:

Can the cartographers change locations of rocks when they make the final charts?
It all depends on the scale of the chart. If the chart is a small scale the cartographer might not worry about the exact location of rocks and might add in that there is a "rocky area". If the chart is more specific to this area, the exact locations of rocks, shoals and other hazards are important.

Location: In transit to Kodiak
Date: Thursday, July 15, 2004
Latitude: 55 deg 50.440' N
Longitude: 154 deg 13.187'W
Visibility: 10+ nm
Direction: 060
Wind Speed: 11 kts
Sea wave height: 1-2 ft
Swell wave height: 2-3 ft
Seawater temperature: 12.2 deg C
Sea level pressure: 1011.9 mb
Cloud Cover: 6/8
Weather: Partly cloudy with spots of rain and fog. Temp 12.8 deg C

Plan of the Day:
Transit to Kodiak, arrival Friday morning 0900 hours.

Science and Technology:

There is not much science going on during a transit except for cleaning the data that was recovered and doing some analysis. Most everyone is either on watch or in their rack catching up on sleep before or after their watches.

Fresh water is made on board from salt water when the fresh water tanks get low. It is an easy process but like all desalination it takes a large amount of energy. There are not really deep-set conservation issues on board, but they ask for people to use good judgment. Wash full loads of laundry, take quick showers and not waste water in other forms. The water is filtered and the salt is removed, bromide is added to sterilize it and finally it is then run through processors that measure its purity. I have not personally seen a difference in water quality from the water that was pumped on-board and the desalinated water that the ship made. However, I am even more conscious of the water that I use because it is a limiting factor out at sea.

Personal:

Last night during our transit there was a call from the bridge of whales on the starboard bow. Sure enough 180 degrees and as far as you could see were whales. You could see their blow mist and then ever so often see them breech or dive down and show their flukes. Anytime I see a whale my heart races, I was jumping like a kid during Christmas to see that many whales all collected together. What an experience!

SW region: takes in Kodiak Island, the AK peninsula and the Aleutian Islands. Kodiak was the first Russian capital city and home to many brown bear. Many of the Aleutian Island communities are isolated. The environment is very harsh and limits the plant and animal production. Some of the Aleutian Islands cross the 180 meridian, making AK the most eastern state in the union. They are closer to Tokyo than to Anchorage.

Question of the Day:

How many days could the ship go without making its water?

According to the Chief Engineer, with this many people on-board the storage capacity of the water tanks the Rainier would be out of water in 5 days. That is why it is important for fresh water to be made from salt water.