

**SS Independence – Parametric Waste Stream Estimates.**

Waste stream estimates were developed from my knowledge, experience and data from similarly constructed vessels from the same period. Additional information was derived from surveys for ship disposal of similar period vessels, shipbreaking and remediation data I hold for work on vessels of similar construction methods and period. PCB use throughout shipbuilding and other types of construction from the 1940s to the late 1970s was extremely common due to the properties of PCBs to provide longevity, flexibility and fire retardancy for plastic, rubberized and fluid applications. Vessels constructed prior to the recognition of PCB's as a problem and their subsequent control in my experience all contain PCB's in concentrations exceeding 50 parts per million (ppm). These waste streams create high costs for recyclers in North America but are completely ignored by shipbreakers in the beaching yards of South Asia. There the significant costs and impacts of PCBs and other hazardous wastes such as asbestos, and heavy metals are simply externalized.

The SS Independence was laid down in 1949 and placed in service in 1950. She was constructed under civilian funding, and subsidized Title XI funding to meet the requirements of her secondary mission as a troopship. Characteristics of watertight integrity, fire resistance, military troop transport capacity, speed and range were part of the Title XI funding requirements.

In my expert opinion it is a virtual certainty that PCBs, asbestos and other hazardous materials will be present on the SS Independence (aka SS Oceanic) in significant concentrations. What will not be known with precision is just how much is expected. Testing must be accomplished to better quantify waste streams and to provide documentation for manifesting to the appropriate disposal facility. However prior to that exercise it is common practice to utilize parametric waste stream estimation techniques to predict likely remediation costs. That is the exercise that is provided herein for the SS Independence.

**Estimates**

Hull characteristics: Clean hull, bow and stern thrusters, no blisters, no protrusions.

Overall dimensions: 692' Length Overall, 90' beam, 23' draft fwd 26' draft aft 24' mean draft.

The SS Independence has a current estimated displacement of 17,677 LT (19798 short tons).

The estimated waste stream of 3072 short tons contains:

**PCB's** – Ocean/Marine construction for Military/Government/Civilian vessels incorporated similar building techniques and materials.

1. **Ships wiring – Estimate 206 tons of cable containing regulated levels of PCB's** (greater than 50 ppm). Cabling was installed during original construction

with modifications though 2002 during maintenance and repair. All armored ships power distribution wiring (480V, 120V) installed originally will have PCB's and asbestos in the wiring matrix. Unarmored Poly Vinyl cables installed during the 1980 normally contained PCB's but were asbestos free. Cables installed during the 1990's require testing to determine if PCB free. Unless MILSPEC and certified PCB free cables are to be assumed as containing PCB's until tested. Navy has had problems obtaining PCB free cable when material comes from overseas manufacturing sources.

2. **Flourescent Lighting – Estimate 4 tons of PCB containing Ballasts**
3. **Ventilation gaskets –Estimate 2.9 tons of PCB impregnated felt.** During manufacture and repairs until PCB's were recognized as problem PCB impregnated felt was utilized as gasket material. Gasket samples typically will run greater than 50,000 ppm and greater. Gasket material will often run 25 or more % by weight PCB's. Felt was dipped into the PCB oil to make it stick in place during construction of the vent duct. Quantity of PCB found in each sample is a function of the installer's technique.
4. **Greases and Hydraulic Fluids –** Test positive for regulated levels of PCB's 25% of the time. Testing of greases and hydraulic fluids for both anchor windlass and steering gear highly recommended.
5. **Electric cableway transit box packing putty –** tests positive for regulated levels of PCB's 50% of the time. Likely hood this material is on SS Independence – highly probable.
6. **Paint –** PCB's were utilized in paints as a fire retardant. Testing is accomplished to determine presence and how recycling will be accomplished. Recommended for any formal survey of SS Independence.
7. **Electronic Components –** transformers, capacitors, ballasts as of 1988 are considered to be PCB containing unless specifically labeled non-pcb.

#### **ACM (Asbestos Containing Materials) – 250 tons estimated**

1. Thermal Shield Insulation (TSI) on steam piping, boilers, escape piping  
2 Machinery Plants  
4 Boilers
2. Deck tile mastic.
3. Electric Wiring – wiring matrix
4. Piping gaskets – at flange connections in FW, SW, lube oil, hydraulic oil, fuel oil systems, CHT drain, secondary drain systems.
5. Boiler air casing gaskets, steam piping gaskets, uptakes
6. Stateroom Non structural bulkhead partitions

Pb – Superstructure paints, primer coats internally, engine journal bearings.

Hg – fluorescent tubes, instruments, tank level indicating systems, mercury in vacuum gages on main condensers.

Cr – Hexavalent Chromium – Likely to be found in internal and external primer coats on aluminum. Used on steel as a primer after use of red lead as primer was abolished. May also be found in water jackets on diesels as an anti-corrosive agent.

Fuel Bunker C” – estimate a minimum of 150 tons fuel remaining in Bunker tanks, fuel tanks below low suction, and piping fuel oil service and transfer system. Inventory of fuel in tanks 2PS and 3S03 is 18,929 gallons. (Sounded in 2003). Residuals in all other main fuel tanks.

Diesel – When last surveyed emergency diesel tanks were not sounded. Estimate 20,000 to 30,000 gallons of fuel onboard for emergency generators.

Waste Stream Analysis for SS Independence

Werner F. Hoyt, PE

682.0	90	0.80		
Deck Covering - 12x12 tile on underlayment				Tile mastic may contain ACM and/or PCB's
371.3	cu yds	1857	tons	
Insulation - glass				Paints on insulation surface may contain Pb paints and/or PCB Paints.
228,633	cu yds	114	tons	
ACM TSI				
418.5	cu yds	140	tons	
ACM structural materials (Marionite bulkhead panels and Transite overhead panels)				
81.3	cu yds	110	tons	Marrionite panels - 25 chrysotyle and amosite Transite panels - 25% amosite
Elect cable (PCB's and ACM)				
493.7	cu yds	206	tons	NOAA vessel Oceanographer - 24 tons for 2100 LT lightship
Vent Gaskets (PCB's)- estimated quantity of PCB impregnated felt.				NOAA vessel Oceanographer - 600 lbs for 2100 LT lighship
6.4	cu yds	2.9	tons	
Paint Chips (Pb, Cu, Cr and PCB's)				
92.0	cu yds	260	tons	
Construction Debris w/Pb paints				
498.0	cu yds	315	tons	
Marine growth - biowaste				
98.0	cu yds	60	tons	
Flourescent Tubes				
34.0	cu yds	3	ton	
Flourescent Ballasts				
11.3	cu yds	4	ton	
Total				
231,420	cu yds	3,072	tons	

I, Werner F. Hoyt, P.E. declare as follows:

1. I am an independent consulting engineer located in Mt. Shasta, California. I have an undergraduate degree in aerospace engineering from the University of Oklahoma and a masters degree in mechanical engineering with emphasis on metallurgy and Naval Engineering from the U.S. Naval Postgraduate School – Monterey. I am a registered professional mechanical engineer in California and hold USCG licences as a Chief Engineer, Limited and Second Assistant unlimited both motor and steam. I have over 25 years of experience in ship repair, conversion, reactivation, and breaking.

2. I contributed substantially to the VSE Corp proposal to accomplish ship breaking under the Navy's pilot ship disposal program reviewing and approving as senior engineer the operations plan developed by VSE and Earth Tech staffs. As operations manager and chief engineer for Ship Dismantling and Recycling joint venture between VSE Corp. and Earth Tech (a wholly owned subsidiary of Tyco Industries), SDR operated a model ship scrapping program at Hunters Point San Francisco, California. The SDR program was praised by the Navy for its environmental, health, safety, and production methods. SDR accomplished ship breaking from January 2000 to December 2001 when it was dissolved due to lack of Congressional Funding for ship disposal in the FY02 Congressional budget for Ship Breaking.

3. From 1980 to 1984 I served as both engineering watch officer and deck officer on the USS Worden (CG-18) and the USS Meyerkord (FF-1058) directly experiencing at sea the effect of hurricanes and typhoons with winds of over 100 knots and seas in excess of 35 feet.

4. From 1984 to 1996 I was a Naval Engineering Duty Officer accomplishing water front supervision, repair and overhaul planning, and supervision of contracts for Naval Ship repair and overhaul. This included dry dock hull and structural inspections, review of hull inspection reports, work orders, and inspection of work performed to repair hull deterioration. Work supervised included repair of damage from collision, grounding, corrosion, and storm damage due to high sea states. Specific storm damage repaired at Subic Bay was bow damage to the Amphibious Assault Carrier USS Peleliu (LHA-5). Damage was incurred to the ship's bow approximately 40-45 ft above waterline transiting a winter storm in the Bering Sea while accomplishing a Northern route passage in 1988. Positions held were Ship Superintendent (Corresponds to a marine port engineer) at Long Beach Naval Shipyard and Planning officer for Military Sealift Command Ships undergoing repair or drydocking overhaul at U.S. Naval Repair Facility Subic Bay. Work required compliance with either Navy Standards or ABS/USCG standards for ship repair as applicable.

5. From 1993 to 1996 I accomplished survey and certification of repairs to privately owned drydocks accomplishing Navy ship repair in the Long Beach/Los Angeles area for Naval Sea Systems Command Quality Office for Drydock Certification. Accomplished reactivation, drydock and overhaul repairs to three Knox class frigates at Long Beach removed from layup. During this period I served concurrently as the Planning Officer and Contracting Officer for Supervisor of Shipbuilding Conversion and Repair, Long Beach.

6. During the period Nov 1996 to Nov 1998 I was the VSE Corporation senior port engineer in charge for the removal from storage, inspection, repair, activation and sea trialing of two Navy ocean salvage tugs and one Knox class frigate for transfer to

foreign Navies. As port engineer I was responsible for visual hull inspections, review and evaluation of non destructive test method hull thickness surveys for required repairs as well as all salt water, waste, or other systems with suction or discharge to the sea.

7. From 1995 to 2001 I have directly supervised preparation for tow and pre tow condition inspections with determination of preparation requirements for the following ships.

- Ex-Wabash (AOR-5)
- Ex-Mobile (LKA-115)
- Ex-Bolster (ATS-3)
- Ex-Oullet (FF-1077)
- Ex-Lockwood (FF-1064) – Scrapped by SDR
- Ex-Gray(FF-1054) – Scrapped by SDR
- Ex-Lang (FF-1060)
- Ex-Meyerkord (FF-1058)

8. I have accomplished environmental assessments and hull surveys, and pre tow inspections without towing from 2000 to 2001 for the following ships.

- Ex- England (CG-22)
- Ex- Halsey (CG-23)
- Ex- Francis Hammond (FF-1067)
- Ex- Cochrane (DDG-21)
- Ex- Benjamin Stoddert (DDG-22)

9. I accomplished and hull survey, environmental health and safety, and hazmat assessment inspection utilizing the Red Oak Victory as representative of the aging ships in the fleet in storage at the Ready Reserve Fleets for NEETC under a DOD grant by the Strategic Environmental Development Program during January to March of 2003.

10. From 2003 to 2005 drafted and submitted Technical Compliance Plans as part of Contract Proposals to the US Navy and to MARAD for recycling of ships at Mare Island Vallejo. Proposal to MARAD was accepted and qualified Allied Defense Recycling to Bid MARAD Disposal Projects. The environmental compliance plan details material sampling for disposal, removal, and transportation to qualified disposal sites.

11. From 2005 to present have surveyed the following ships for disposal, salvage, or towing:

- Nemaskett (AOG)
- Montcello (LPD)
- SS Connecticut
- Taluga (AO)
- Sioux Falls Victory
- Barnard Victory
- Hannibal Victory
- Occidental Victory
- USS Crecent City, AKA Golden Bear, AKA Artship
- SS Esso Florence
- USNS Point Loma
- MV Fresno

MV San Leandro  
Queens Victory  
USS Jason  
USS Beaufort (ATS)  
USS Florikan (ATS)  
USS Reclaimer (ATS)  
USS Sacramento (AOE-1)  
USS Camden (AOE-2)  
General Pope (troopship)  
General Patrick (troopship)  
Rider Victory  
Earlham Victory  
USS Hoga

Bid preparations for disposal ships included waste stream analysis to as part of the bidding processes with specific focus on PCB's, ACM, and other hazardous materials requiring either recycling or waste processing.

12. Experience with specific vessels built to ABS standards (Commercial/USCG) are:

Victory Class Cargo Ships  
SS Connecticut (1950's supertanker)  
SS Esso Florence (1950 gasoline/product tanker)  
SS Harkness – Survey ship  
SS Chauvenet – Survey ship  
SS Mercury (ro/ro)  
USS Mercy (Hospital Ship/converted supertanker)  
Ocean Tugs (various years of manufacture)  
NOAA survey vessels circa mid 1950's to 1964 remediated for PCB's and ACM for sale including SS McArthur, SS Oceanographer.

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