The Dream Builders

The Story of Rubber Fabricators, B.F. Goodrich, Rubber Crafters and Demaree Inflatable Boats

In the "*History of Inflatable Boats*" I purposely omitted four important early inflatable river craft producers. Their stories are related and central to the production of modern river boats and the ability of people to experience the wonder of river canyons today. The people of West Virginia, who built the inflatable craft that became the standard of river boats probably did not realize it, but they were builders of dreams for dozens of outfitters and hundreds of thousands of people who floated the rivers.

Besides the pioneering commercial production of inflatable water craft, what sets these companies aside from others is the process they used in their production. In most cases these companies used uncured rubber for their boat fabric, seam tape, d-rings, and other accessories. The completed, uncured boat was then put in an autoclave which used heat and pressure to produce a boat that is virtually "one piece."(16)

In 1971 I drove to West Virginia to pick up my new Selway raft produced by Rubber Fabricators, Inc. As with much of West Virginia, Richwood was a small town nestled between steep, heavily forested mountains. Access to the town was a narrow, twisting and steep highway. On one end of town was a massive plant that produced "rubber" rafts. But recreational inflatables were only a small part of Rubber Fabricators business. In their gigantic open plant were inflatable pontoons, flotation collars for NASA's manned space craft and other inflatable devices being assembled and cured. The factory seemed out of place in the remote valley with such spatial confinement. Politics and affluence had a significant influence upon the scene. The Rockefeller family had a firm control on the political climate, and they brought jobs and funding to the state - not unlike the influence wielded by West Virginia's legendary Senator Robert C. Byrd.

In 1948 young Don Hatch convinced his dad, Bus, to look into military surplus sales in Salt Lake City.(1) Among the many surplus items were inflatable bridge pontoons and inflatable rafts produced by Goodyear, B.F. Goodrich, Uniroyal, Dunlop and several smaller manufacturers.(2, 11, 20, 22) Thus began the common use of inflatable river craft on whitewater rivers.

Randolph C. Flemming worked for a rubber company in Newburgh, New York.(*1) The company manufactured a variety of inflatable life preservers, life rafts, pneumatic mattresses, aprons, and boots. In 1954 Flemming was looking for a new site to produce rubber inflatable products. After reading a small advertisement in the *Wall Street Journal*(*2), Flemming visited Grantsville, West Virginia, to view the proposed plant site and meet with county businessmen.

The company feared a shortage of labor would be an obstacle to a plant at Grantsville. They preferred to hire women because of their hand dexterity and sewing skills as many of the products required seamstresses. The company expected to employ about 160 women and 40 men. When Flemming returned a month later to interview prospective employees over 1,200 people filed applications for work. (20, 3)

{Numbers in (1) are specific references identified on page 19; Numbers in (*1) are clarified in Significant Notes on page 17}

The Calhoun County Board of Education offered the National Youth Administration (N.Y.A.) Building as an industrial site. Previously the building had been used as a cannery and as a school. The initial leasing ran into difficulties as the state attorney general held the Board of Education had no authority to lease the site because it had been developed with federal funds. To comply with the legal opinion the board auctioned the building at a minimal fee to the Calhoun Recreational Development Center, a group of local business people. A twenty-year renewable lease with one rent-free year was offered to Rubber Fabricators.(3)

Rubber Fabricators (R.F.I.) began operations in autumn of 1954 with R. C. (Randolph Churchill) Flemming as President and A. J. (Tony) Petrosino, who knew about the process of rubber manufacturing as part owner and General Manager.(24,26) In a little over a year they were joined by P. J. (Pete John) Zannoni as executive vice president, and Robert L. Schnurr as plant manager in 1956.(3, 20, 23, 24, 33) A few years after Schnurr and Zannoni arrived, Tony Petrosino resigned.(26)

Before starting Rubber Fabricators Ran Flemming had met Pete Zannoni and Bob Schnurr in the rubber industry and they became friends.(42) Ran Flemming's specialty was marketing, although he had a background in rubber manufacturing. He worked for the New York Rubber Company of Beacon, N.Y. where he gained experience in every aspect of the operation from design to marketing. Bob Schnurr served as a gunner and instructor on WWII bombers in the Pacific Theater. He graduated from Iona College and eventually joined the New York Rubber Company where he met Ran Flemming.(42) Pete Zannoni held a Master of Mechanical Engineering Degree as well as A Bachelor of Chemical Engineering Degree. Prior to working for Rubber Fabricators he was a Company Commander for the U.S. Army Engineers in the Pacific Theater.(41) The combined skills and experience in production, design and sales of the threesome made them a very effective team.

The company relied on military, government and commercial contracts, producing life preservers, life rafts, and pneumatic mattresses. The firm celebrated its first delivery of life rafts to the U. S. Navy on March 18, 1955 by opening its plant to tours and demonstrations of its products. At that point, the company employed over 50 women. It had produced 1,600 submarine life preserver units, and 1,268 pneumatic rafts by the time of the celebration.(3) The company also produced inflatable military assault and rescue boats and bridge pontoons.

Eventually Rubber Fabricators expanded to six plants in Monroe County (Richwood -1959) and Nicholas County (Union - 1969) as well as the plants in Calhoun County.(20, 22, 25, 26) The Richwood Development Corporation had a new building constructed at Richwood that was 40,000 square feet in size. All of the companies plants were rented.(23, 26) The Grantsville and Richwood Plants had large steam heated vulcanizers. Besides its rubber manufacturing products the company had machine, woodworking and other specialty production shops. The woodworking shop made among other items, wood motor mounts for pneumatic boats. Sav-A-Tool and Vee Manufacturing (28) were among the metal shops. They were formed in 1966, and their original customer was FMC Corporation. The company reconditioned metal items like drill bits, made CO_2 canisters, pressure relief valves, pneumatic valves for inflatables d-rings, cradles for storing the life rafts on ships, and other things.(20,25)

Pete Zannoni was a good engineer, and he felt R.F.I. could design and manufacture better valves than they had been buying, as well as making them less expensive.(26) In a short time the company began manufacture of relief, pressure and other valves in their machine shop.

When the Richwood Plant opened in 1959, the plant managers anticipated a big contract making blimps. As it turned out the plant only produced a few "envelopes" of fabric that were about fifty yards long and 20 yards wide. The production of the new Richwood plant began to fall and Bob Schnurr was sent down to improve the plant's efficiency.(26) As the Viet Nam Conflict escalated R.F.I. at Richwood procured several large Army contracts to make pontoons, assault boats and other military materials. Schnurr had replaced the original management with several motivated local men including Edgel Blake, and the operation at Richwood turned around.(26)

R.F.I. was the primary contractor of the MK5 (15-man raft) to the U.S. Navy's Bureau of Ships (BuShips is now Naval Sea Systems Command NAVSEA). BuShips Harry Hindlin, from Norfolk, came to R.F.I. to see if an inflatable similar to the MK5 but with a capacity for 25 could be designed. With Uniroyal approval, R.F.I. began manufacture of a 25-man U.S. Coast Guard approved an inflatable boat of similar design. The R.F.I. design incorporated most of the Uniroyal MK5, but it was inflated rapidly under high pressure (5000 p.s.i.) CO_2 to rapidly inflate the boat.(27) Unfortunately the fabric failed and corrections had to be made.

"During the period of its existence, Rubber Fabricators, Inc. also performed sub-contract work for Goodyear Tire and Rubber Co. and B.F. Goodrich Co. as well as Uniroyal."(25) At its peak Rubber Fabricators and its subsidiaries had an annual sales of ten to twelve million dollars and employed approximately one thousand people.(29) In 1966 R.C. Flemming was named Small Businessman of the Year at the Governor's Industrial Conference. Flemming received the award for his imagination, initiative, and his significant contributions to the economy of West Virginia.(30) In 1967 Flemming contracted a rare disease that partially paralyzed him.(25)

R.F.I. was purchased in an unsolicited bid by Hitco (Gardena, CA), a subsidiary of the Armco Steel Corporation in 1967 to enhance Armco Steel's stock portfolio. R.F.I. continued to operate independently as a wholly-owned subsidiary of Hitco with Flemming, Zannoni and Schnurr at the helm. (22, 23, 25, 26)

In 1964, Ron Smith of Grand Canyon River Expeditions came to Rubber Fabricators with some suggestions to build specific river inflatables.(9) Ron's design modified a ten-man assault raft that became the Yampa Model. He proposed to cut a ten-man assault raft in half and spliced two pointed bows together to produce the Green River Model.(9, 11) In his design the cross tube spacing was 50" so a piece of plywood could be used full width as a floor board. Smith also designed the Salmon and thirty-seven foot pontoon.(45)

R.F.I. began manufacturing a full line of river craft, some from military design and others designed by outfitters. The company was hesitant to build rafts for whitewater outfitters as they had never made inflatable boats crafts except for the Military. Bob Schnurr remembers: "And they wanted them vulcanized, especially Ron Smith. We started and one outfitter came in had his own design, it was interesting but still a pain in the neck, because they weren't buying many.

One guy would want four or five, another wanted three. It was hard to turn them down because they were starting little businesses and I was always appreciative when anybody went out on their own and tried to start something. I think the biggest order was from Lance Martin who did the Youghiogheny and a few other rivers in Pennsylvania and Ron Smith(*6) was our biggest customer because he was running the Colorado and was buying those big pontoon babies. He did that because we were making pontoons for the Viet Nam crisis."(26)

When Dick Barker began rafting on the Snake in 1956 he purchased a MK12 military assault raft with a spray tube on top of the regular tube from Smith and Edwards, an army surplus store in Ogden, Utah. In 1964 Dick took a "family vacation" to visit relatives. In the process he searched army/navy surplus stores for rafts. Dick's travels took him to Miami where he contacted the Patten Company, a producer of inflatable boats for the military. The Patten Company had no interest in making and selling recreational inflatables, but put Dick into contact with RFI in West Virginia.(*8)

In 1965 Dick Barker and Frank Ewing developed a design of what was to be called the Snake River Float Raft for use by Barker-Ewing Float trips on the Snake River in Jackson, Wyoming. The boat design had a 4" drop stitch inflatable, self-bailing floor.(*13) The rafts had removable floors, and the entire boat was made from 9A black, rip stop nylon. The cost per raft was $1,575. Frank Ewing contacted Bob Schnurr of RFI in Richwood, West Virginia to make two of the rafts.(44, 16, 22) Goodyear and other companies had been making I-beam self-bailing floors for the military since World War II. In the 1960's Reeves Brothers began making an inflatable drop-stitch floor fabric. The scenic rafts RFI made for Barker-Ewing is the first known application of the self-bailing technology for recreational river inflatables. (31, 32, 26, 44)(*8)

Around 1972 Barker and Ewing redesigned Ron Smith's Salmon Model, a modified bridge pontoon, to be used mainly for white water. Modifications included adding thwarts and a floor. The Salmon model also had an inflatable, self-bailing floor but the floor was ribbed rather than drop-stitch material. Again RFI manufactured the rafts. (44) (*8)

Surplus boats were harder to find and B.A. Hanten of Oregon was not pleased with the boats being produced.(*5) In 1966 B.A. went to Rubber Fabricators and "gave them drawings of a boat with a rake on both ends, and made of rip stop nylon. The "first order was for twenty-five boats, 17' long with an 18" tube. The boats were light weight and rowed very well"(8). B.A.'s friend Jerry Briggs and other outfitters liked the boats and bought the balance of the order.(8) H. Lance Martin and Jon Dragon modified the 7-man air force lifeboat with larger 16" tubes as the Voyageur Model to be used as a paddle boat on Eastern rivers.(16)(*4)

Rubber Fabricators boats were constructed from nylon material coated with Dupont neoprene. Nylon inner fabric did not rot as the old cotton inner fabric did. Dupont produced the neoprene coatings, Milliken provided the woven fiberglass fabric and Archer and Reeves Brothers (now Trelleborg) produced the final product. These fabrics met military specifications, which are required to exceed a full range of tests. Dupont stopped making hypalon, a trademarked product, in 2011, but other companies make a similar coating sold under different names. (16) Rubber Fabricators used three different neoprene impregnated weight fabrics; Class 9A (24 oz. ripstop), Class 6 (48 oz.) and Class 7 (64 oz.). The latter two were neoprene impregnated, but

not ripstop, instead they used a heavier cord on the inner fabric. The 48 oz. and 64 oz. were heavy fabrics called heavinchord, and were not required to be ripstop because of their weight and application. The 24 oz. and 30 oz. were ripstop because they were used on Navy lifeboats and assault fabric. They used the same nylon inner fabric but the ripstop 24/30 oz. fabric had 80 threads to the inch with a heavier thread woven in the cross pattern every half inch. The 24/30 ripstop fabric gave navy lifeboat and assault boats a much lighter weight fabric. The 64 oz. fabric used a much heavier nylon cord and was used for the air force life boat.

The primary color was black, although some models came in gray and orange color. The boats had standard 1&3/4" and 5" D-rings, and had recessed metal military type valves. All boats, including seams, were vulcanized and boats were heat cured through vulcanization.
Rubber fabricators, Inc. made the following river models:

- Colorado Model from 22' to 37' length x 9' beam - 36" diameter tubes; made with class 7 material; 12 air chambers , 700 pounds;
- Green River Model 17' x 8' - 18" diameter tubes; made with class 7 material; 4 air chambers & 2 thwarts, 260 pounds;
- Yampa Model 15'7" x 7'10"-18" diameter tubes; The tubes were Class 9A material while the bottom material was Class 6'. 2 air chambers & 2 thwart; 110 pounds;
- Selway Model 12' x 5'6" - 16" diameter tubes; made of 9A material; This was primarily a military assault craft with an upswept bow. 2 air chambers & 1 thwart; 85 pounds;
- Rio Grande Model 12' x 5'4" - 16" diameter tubes; made of 9A material. It was green in color and primarily for fishing, scuba diving and as a boat tender (liferaft). 2 air chambers & 1 thwart, 60 pounds;
- Salmon Model 17'-18' x 8' - 24" diameter tubes; made of Class 7 material. This boat had an optional spray rail. 6 air chambers, 300 pounds;
- Snake Model 18' x 8' - 18" tube diameter; tubes made of 9A material and Class 6 bottom. 10 air chambers, 325 pounds.
- Voyageur Model 12' x 5'4" x 16"; came with lifeline, pump and carrying case; 3 air compartments(7)(*14)
- Zeebird Model 16' x 6'2" - 18" diameter tube; made to Military Specifications. It had a motor transom, floorboards, and inflatable keel. Although it saw some river use, this model was proposed to Rubber Fabricators by the Navy Seals. It combines the speed of a planing hull with the ruggedness of an inflatable hull. The V-bottom allowed excellent handling even at high speed turns. (7, 13)

Rubber Fabricator boats were distributed through Ron Smith’s Inflatable Boats Unlimited (Grand Canyon Expeditions of Kanab, Utah), Wilderness Voyageurs Outfitters (Ohiopyle, Pennsylvania) and Wild Water Expeditions Unlimited (Thurmond, West Virginia).(*9)

Dee Holiday began his company in 1966 and had purchased a number of the old military surplus 7 and 10-man rafts. In 1970 Dee bought six Green River boats from Rubber Fabricators. Lighter than the older surplus boats, Holiday used them commercially as individual boats and as triple rigs on high water Cataract Canyon trips.(17) Colorado Outward Bound had used the Rubber Fabricators Yampa and Green River Models in the 1960's.(19) Around 1972 they purchased the 18' and 22' Salmon Model for their gear boats, and over time they purchased the

same models manufactured by Rubber Crafters.(21) The boats were still in use until the 1990's. Outward Bound used the Yampa Model as a paddle boat in Desolation Canyon on the Green River in their “Juniors” courses. The 18" tubes made paddling easier. The Yampa Model was also used as a support boat in Lodore Canyon in Dinosaur National Monument. The highly maneuverable and stable Green River Model was the mainstay of the fleet.(19) Outward Bound had around 25 boats, and rotated in about three new boats every year. Outward Bound painted their Yampa boats blue and all the others with silver Gacoflex. The boats were “indestructible” and a pleasure to row, but problems arose when Goodrich began manufacturing them.(21)

Because of labor problems the B.F. Goodrich Company (B.F.G.) made a corporate decision to move from Akron, Ohio. The R.F.I. plants were non-union shops and Goodrich felt they could solve their labor issues in West Virginia.(16, 22, 26) They made an offer to Hitco and purchased Rubber Fabricators in May 1972, buying the plants at Grantsville, Richwood and Union, West Virginia. Soon the United Rubber, Cork, Linoleum and Plastic Workers of America began organizing the West Virginia plants.

R.F.I. initially operated as a subsidiary of B.F.G., but in a later reorganization R.F.I. became part of the Engineered Products Division of B.F.G.(25)(*3) The Grantsville plant produced materials for the Navy, as well as aviation escape ramps, materials for safety, and survival rafts for the military. The Goodrich plant at Union made continued to make military survival rafts, but they shifted to related work including life preservers and other military products.

Recreational inflatables were a small part of the B.F.G. product line but the plant at Richwood continued to make seven and ten man rafts for the recreational market for a year. Rubber Fabricators had been making the boats for B.A. Hanten out of orange material. When Rubber Fabricators sold out to B.F. Goodrich, Goodrich accepted Hanten’s order but would only furnish black material. Hanten wrote: “Goodrich was hard to deal with as our orders were small, and they were big. Their boats were poor quality in both material and workmanship,” so Hanten began producing his own rafts through the Toyo Rubber Company in Japan.(8)

Benjamin Franklin Goodrich followed a circuitous route into the rubber industry. Goodrich pursued education in medicine and served as an assistant surgeon during the Civil War. After the war Goodrich entered into a real estate partnership with John P. Morris of New York City. In 1869, they found themselves investors in a small operation called the Hudson River Rubber Company. They soon acquired ownership of the company, and Goodrich became its president. A group of potential investors from Ohio sent George T. Perkins back to New York to examine the Goodrich operations. They were impressed and loaned Goodrich money to move to Akron, Ohio. On December 31, 1870, Goodrich formed the partnership of Goodrich, Tew & Company with his brother-in-law Harvey W. Tew and the Akron investors.

The company's first product was a fire-hose designed to withstand high pressures and low temperatures that caused leather hoses to burst. The fire-hose was a welcome innovation but failed to materialize expected profits. George W. Crouse, one of the original Akron investors,

stabilized the company's finances with an additional loan in 1880, and it was incorporated in the state of Ohio as the B.F. Goodrich Company. B. F. Goodrich died in 1888, a few years before the bicycle craze of the 1890s revolutionized his company and the rubber industry.

Goodrich built its business on rubber production, and was a leader in product development and innovation. Arthur H. Marks, one of Goodrich's engineers, was responsible for breakthroughs in the processing of crude rubber. In its natural form, crude rubber is sensitive to changes in temperature, becoming hard and brittle when cooled, and soft and tacky when heated. Marks pioneered a procedure for de-vulcanizing vulcanized rubber, enabling producers to reclaim crude rubber from manufactured goods for re-use.

The company applied new technology to its tire production including the use of organic compounds to resist deterioration by heat, oxidation, and flexing, and the inclusion in its manufacturing process of carbon black, a coloring pigment that improved the tire's resistance to abrasion. For a long time carbon black was the best neoprene fabric strengthening material, and thus most of the early boats were black or dark gray in color.(14, 16)

Neoprene with carbon black was two times stronger than without the carbon black additive. But carbon black made the boats difficult to color. There are two ways to color a neoprene boat. A boat made of cured rubber can be painted with a neoprene paint, (originally called Gacoflex), but it will scratch, peel and wear off. Today neoprene boats are given a rainbow of colors by coating the uncured boat with a thin colored hypalon sheet. The colored fabric is then vulcanized to the boat in an autoclave during the curing process and it becomes an integral part of the boat. It will not scratch, peel or wear off.(16)

B.F. Goodrich expanded into chemical production. One of its first products, called Vulcalock, was an adhesive capable of bonding rubber to metal. In 1926, a Goodrich engineer developed a method for plasticizing polyvinyl chloride (PVC), turning a waste chemical compound into the material recognized today as vinyl. Goodrich marketed its PVC products under the brand names Geon and Koroseal. The growing automobile and aviation industries, along with the rubber demand created by World War I, powered Goodrich's expansion through the first 30 years of the 20th century.

The Great Depression reduced rubber demand, and Goodrich incurred financial losses between 1930 and 1933. The depression also affected the company's labor relations. In 1937, Goodrich opened a plant for producing butadiene-copolymer synthetic rubber, and began using synthetic rubber in some of its products. But crude rubber supplies were cheap and plentiful, and synthetic rubber remained an expensive alternative.

At the outbreak of World War II the United States was importing 97 percent of its crude rubber and supplies were threatened. The government committed itself to developing synthetic rubber technology and Goodrich cooperated with this effort making Goodrich the nation's leading synthetic rubber manufacturer by the war's end.(3) During WWII the Goodrich plant in Akron,

Ohio built “a fleet a week” of pontoon-like boats for the U.S. Navy to haul supplies from ship to shores with no docks.(*7)

By 1955, the company had diversified manufacturing in other arenas. Goodrich's fortunes declined when a 1967 strike began a decade of rocky labor relations and interrupted production. These crippling experiences with labor disputes and the stagnation of the U.S. auto industry convinced Goodrich that its future was not in tires. In 1972 O. Pendleton Thomas shook up Goodrich by having chemicals and plastics replace tires as the foundation of the company and unprofitable plants. By late 1973 B.F. Goodrich had stopped making inflatable river boats. (16, 22)

Thomas' successor, John D. Ong, developed Goodrich's chemical’s business in the 1980's. Goodrich's chemical production was hurt by the petroleum shortages and sluggish national economy of the 1970s. Continuing labor disputes of the 1970's brought Goodyear to purchase the non-unionized plants in West Virginia. In 1982 Goodrich suddenly found itself plagued by an overcapacity in its chemical production, and ended the year with a $32.8 million loss.(3)

Goodrich's tailspin in the early 1980s led to Ong merging Goodrich's tire division with Uniroyal. The relationship faltered, and in December 1987 Goodrich sold its interest in the venture, ending its nearly century-long association with the U.S. tire industry. In 1988, Goodrich acquired Tramco Incorporated, a provider of maintenance and repair services for commercial aircraft. Goodrich became a company devoted to production of chemicals, plastics, and aerospace goods. Around this time the plant at Union began production of airline products like deicers. The recovery of its PVC business stabilized the company. By the 1990's Goodrich had stopped work at the old N.Y.A. building in Grantsville.(20) In 1993 Ong sold the PVC operation, to the concern of investors, in favor of emphasizing the company's other chemical businesses.

By the end of 2000, its aerospace division accounted for 84 percent of total sales, and the firm decided to divest its performance chemicals operations. In 2001 the company announced a new name and a new corporate logo. Adopting Goodrich Corporation as its official title, the firm hoped to distance itself from its former tire-making image, promoting itself instead as a global supplier of aerospace and industrial products. The terrorist attacks of September 11, 2001 initiated a major downturn in the commercial airline industry. Goodrich was forced to lower revenue expectations and make employee cutbacks.

Former Rubber Fabricators executives R.C. Flemming, P.J. Zannoni and Robert Schnurr of Rubber Fabricators had continued working for B.F. Goodrich until 1974. Pete Zannoni worked to have Tony Petrosino hired by Goodrich in Grantsville.(24, 26, 36) Late in 1974 Flemming, Zannoni and Schnurr resigned from B.F. Goodrich.
A combination of events contributed to their resignation. They saw that Goodrich lacked their passion for efficiency, loyalty to the communities, and dedication to creativity they had fostered. All three men were very active in their communities, and worked to support those communities as philanthropists. Certainly the unionization and a strike at the Richwood Plant weighed on them. It became apparent that B.F. Goodrich was replacing many former local Rubber Fabricators managers and workers with transfers from their Akron, Ohio plants and that

concerned Flemming, Schnurr and Zannoni. Some of the changes were unsettling. The company had lost its identity in Goodrich's reorganization. It might have been when Goodrich sought a new valve source with the Brunswick Corporation in Marion, Virginia, it was "the last straw," and they resigned.(47)

After leaving Goodrich Schnurr had been teaching some tennis, would come home and drink a few martinis and his wife thought he needed to do something. He was bored, and the rubber business was what he knew and he had contacts.(22) The three men worked well together and enjoyed being productive. They had a no compete clause with Goodyear, the year had passed and in late 1974 they organized a new company they named Rubber Crafters, Inc. (R.C.I.). The new company began manufacturing inflatable boats and lifesaving equipment at sites in the Grantsville, West Virginia area.(11) A subsidiary of the company, Sav-A-Tool, had a machine shop on the West Little Kanawha Highway near Grantsville.

Anita West (Eagle) started work with Rubber Fabricators in 1971, and for B.F. Goodrich in 1973 began work for Rubber Crafters in 1974. The office at that time was on Grant Street in Grantsville until 1996 when it was moved into the N.Y.A. building. In 1997 the operation moved to their current office behind Sav-A-Tool.(34) By 1976 the sales reached $600,000 with a one-million dollar backlog and 70 employees working in two plants.(35) Rubber Crafters eventually operated seven plants in West Virginia, and they were a significant part of the economy, employing over 300 people, many of them former Rubber Fabricators employees. The company produced many of the products that Rubber Fabricators manufactured.

Rubber Crafters first big project was in 1974 when renowned artists Jean-Claude Christo approached the company to manufacture fabric for their "Running Fence" art project in Marin and Sonoma Counties, California. The fabric was 18' high and 24.5 miles long.(20, 25)

By late 1974 R.C.I. opened a large plant in Smithville to produce the Christo Project. Smithville "was a boomtown following the 1911 development of the oil and gas industry in West Virginia. The businesses included a bank, restaurants, gas stations, a car dealership, oil and gas companies, a manufacturer of aluminum truck bodies and a company called Rubber Crafters."(4) The Smithville Plant had a large autoclave to vulcanize their products. By their nature, autoclaves operating under high pressure and heat can be dangerous machines. The Smithville autoclave exploded on the evening shift of July, 15, 1984 and exposed a large hole in the roof.(37, 39) After 1996 the Smithville Plant was closed and is now used for storage (2011).

The Rubber Crafters, and the old Rubber Fabricators Grantsville buildings were occasionally plagued by floods from the Little Kanawha River. The 1964 flood could have wiped out the company. One hundred new sewing machines had just been moved into the new plant. In the morning Pete Zannoni took a look at the Little Kanawha River. It had been raining for several days and the river was up. Suspecting a potential flood, Zannoni had employees quietly move the company records, equipment and supplies to higher ground. That night a devastating flood occurred, but work at the plant was only delayed for ten days.(23) During the 1967 flood, the

water was up so far on the N.Y.A. building that they had to use one of the life rafts to paddle out from the second story window. The employees worked overtime to vacate the buildings when floods threatened and they worked hard to reclaim them after the floods.(37, 38) A flood affected both plants in 1985. There was 18" of water in the Sav-A-Tool building, and over five feet of water in the old office on River Street. The N.Y.A. building on Russett Road was under water.(23,37)

As work increased R.C.I. opened the Richwood Plant that Goodrich had abandoned. The Richwood plant manufactured pontoons and inflatable craft, including boats similar to those marketed by Rubber Fabricators. The Grantsville Sav-A-Tool machine shop produced metal d-rings and valves. A sewing shop was on the upper floor of the factory.

The R.C.I. Plants in West Virginia were not union shops, but when a new plant in Craigsville opened some of the employees tried to unionize. Flemming and Schnurr locked the doors, moved the plant to a different location, and hired new employees. It was a very competitive business, and most of the employees knew that they went from contract to contract, if they didn't get the contract there was no work.

Charlie Walbridge, in his *"The Glory Days of Cheat River Rafting"* tells of meeting Ralph McCarty in the 1970's: "Ralph McCarty was a man who spent his entire life thinking outside the box." He'd been a successful engineer in the aircraft and automotive industries of the Midwest since the early days of World War II. He soon became better known as a riverman."(5) "As McCarty reached mid-life he entered the outfitting business." He bought a batch of European inflatable duckies and started Mountain Streams and Trails in 1967. In 1968 he bought a single huge raft he called the Black Mariah to accommodate clients who didn't want to paddle the duckies. The raft trips always booked fast, and he geared up to meet this demand. "For this, he designed a unique raft referred to as Ralph's Rocket."(5) The side tubes extended back past a square stern to make the boat track better and to help push the boat out of river hydraulics.(16) A guide who knew how to use these stern tubes could climb back aboard very fast after a flip. McCarty contracted with Rubber Crafters of West Virginia to build them.(5)

Rubber Crafters river boats were manufactured using Government Specification MIL-I-45208 and like Rubber Fabricators they purchased the bulk of their fabric from Reeves Brothers.(26, 37) The models were similar to those produced by Rubber Fabricators craft with some modified dimensions. They came with d-rings, inflatable thwart seats, and military valves.

The models produced by Rubber Crafters were:

Model	Length	Beam	Tube Diameter
Lehigh	11'	5'6"	15"
Voyageur	12'	5'6"	16"
Potomac	14'	7'	18"
Yampa	15'	7'	18"
Green River	16'6"	8'	18"

Grand Canyon	17' -18'4"	8'	22"
Salmon	16-24'	8'	24"
Colorado	22-37'	9'	36"

After a Western River Guides Convention in 1976 Dave Demaree, who was the sales representative for Rubber Crafters, designed the 17' Grand Canyon Model for Moki Mac River Expeditions while sitting at Ben's Restaurant in Green River, Utah with Bob and Claire Quist.(11) Dave drew it as a concept on a napkin as they were talking. The Quist's felt the "Green River boat was too small and the larger pontoons were too big, we wanted to design something in between them in size."(16) Tom Klienschnitz, of Adventure Bound remembers a River Guides meeting in Salt Lake City around 1974, when Rubber Crafters was displaying a 27' raft in the hallway outside the meeting room. Keith Counts, former owner of Adventure Bound bought one of them and two more the following year. One of them is still in use (2010). As Tom Klienschnitz, a young river guide of 17 remembers, they cost around $1300 each depending on how many d-rings were attached.(10) George Wendt (OARS) purchased Grand Canyon Models from Ron Smith; "The initial rafts were, I think, $875."(12)

In the early 1980's Rubber Crafters had a healthy million-dollar income from recreational boat sales, but by1982 they stopped making inflatables for river outfitters.(11) As of 1991 Rubber Crafters continued to produce inflatables on government contracts. Rubber Crafters, Incorporated, Grantsville, West Virginia, received a $2.6 million increment as part of a $5.5 million contract for 573 Pneumatic Pontoon Floats. Work was performed in Grantsville, West Virginia. In 1987 Pete Zannoni was recognized as Small Business Person for West Virginia.(29) Over the years one of Rubber Crafters most innovative and successful products was the Givens Buoy Life Raft.(*11) Rubber Crafters produced a varied line of very successful inflatable products for industry and government.(*12)

In the early 1980's there were a number of small company's making inflatables, some of which found their way into the recreational river craft market. In Morgantown, West Virginia, Mountain State Inflatables was owned by Ear Hoffman. The company eventually moved to Glenmora, Louisiana. (11) Shirley Fitzwater came down from Akron in 1973 when B.F.G. took over Rubber Fabricators. He left in May 1978 when he started Wirt Inflatable Specialists in Elizabeth. He sold the business to Mustang Survival in 1999. The company employed around 200 employees and made various inflatables including life preservers, baby cots, air mattresses, waterproof clothing bags, inflatable shower and decontamination tents. It now operates under the name of Mustang Survival both in Elizabeth and Spencer, West Virginia.(37)
Anita West worked for the various (R.F.I., B.F.G. & R.C.I.) companies for 40 years. She is now (2011) the Customer Specialist for R.C.I. and R.P.R. Industries in Grantsville. R.P.R. stands for Randolph (Flemming), Pete (Zannoni) and Robert (Bob Schnurr). R.P.R. Industries, Inc. began in 1976 and was incorporated in North Carolina. Until 1993 R.P.R. operated a plant in Apex, N.C. They manufactured life vests, pontoon bridges, inflatable survival tents for the mining industry, protective suits for the petroleum industry and Butyl suits for the chemical industry.(40,43)

“In 1976 Dave Demaree became the national sales representative for Rubber Crafters. He took the opportunity to learn about the design and production of commercial grade inflatable boats, waterproof bags, and other items.”(6) Dave established relationships with many commercial outfitters and soon he was selling boats faster than R.C.I. could produce them. The company was expanding into the military boat market they and they could not keep up with Dave's growing commercial whitewater boat sales.(16)

“In 1982, Dave took a huge step by teaming with his older brother Chuck to establish Demaree Inflatable Boats (D.I.B.) in Friendsville, Maryland. In 1983, their younger brother Dan joined D.I.B. as the quality control manager. For a few years, the Demaree brothers had the rare opportunity to build the company together, but eventually, Chuck and Dan each left to pursue other interests.” (6) The first major product was for Jean & Claude Christo’s “Surrounded Island” art project in Miami, Florida. DIB manufactured 16 - 12' inflatables with motor transoms to work on the project.

At an early age Dave had a goal of learning to paddle whitewater rivers. Today he has exceeded that goal by rowing and motoring the largest whitewater rapids in the world, and he does that on inflatables he designed.

“As President, head boat designer, and head salesman of Demaree Inflatable Boats, Dave draws on... experience and skills that he has accumulated from his diverse background. His experience with canoeing dates back to 1956, where he first learned the joys of paddling an open canoe.” Later, as a Maryland teenager, “Dave transitioned from lakes to paddling some of the toughest whitewater streams in the Eastern United States”. In 1970, he took the first of what was to become many trips down the Colorado River through the Grand Canyon with Hatch River Expeditions.” (6)

“In 1973, Dave began a three-year stint as manager of Wilderness Voyagers Outfitters in Ohiopyle, Pennsylvania. As manager, Dave got his "feet wet" in the outdoor recreational industry by selling canoes, kayaks, camping equipment, and related gear to outdoor enthusiasts. He also worked both as a whitewater raft guide and a canoe instructor on the Youghiogheny River.”(6)

Wilderness Voyagers was a distributor for Rubber Fabricators and Dave began selling boats to commercial outfitters. During that time, he became convinced of the superior durability of vulcanized neoprene boats over the "cold lay-up" models produced by other manufacturers.

Dave and Mimi Demaree spearheaded the growth of Demaree Inflatable Boats, and expanded the company's presence into the commercial work boat and military boat markets, while maintaining a strong presence in the commercial rafting industry. Dave and his staff have developed unique designs for various uses, including inflatable and self-bailing floors since the company began.(6)

Mimi Demaree oversees the everyday business and the challenges that come with running a growing business. Mimi began her whitewater experience around 1969 and met Dave the same year. In 1970 Mimi and Dave took their first trip down the Colorado River with Hatch River

Expeditions. In a time when most raft guides were men, Mimi broke new ground by guiding for outfitters on rivers including the Cheat, New, Gauley, Youghiogheny, and the Salmon River in Idaho.(6) During this time, the long and intermittent relationship with Dave began to get serious and they married in 1981, overlooking Ohiopyle Falls on the Youghiogheny River.(6)

Dave located his operation in Friendsville, Maryland, near the border of West Virginia, perhaps because the expected workforce of five or six did not impress the West Virginia communities. Within a few days of contacting the officials at Friendsville, Dave was invited to tour the area for a site and introduced to potential financial lenders. They purchased and built all of the manufacturing equipment, including the large 9' by 22' autoclave.(11) D.I.B. started production in an old two story 14,000 square foot school building. In 1994 they expanded, and in 2004 the operation expanded to 25,000 square feet. They employ between ten and fifteen people depending on production requirements.(16)

The second floor of the old school building annex has offices, store room, and two large work rooms. In one of the rooms specialty items are built on two long tables and on the floor. In a second room uncured d-ring pads, handles and other accessories are assembled. Downstairs in the school gymnasium are finished boats taken from or waiting to be placed in the autoclave. In the spacious new addition there are fabric cutting tables and a large boat are assembly area.

D.I.B. products are built to U.S. Military Specifications using a process similar to Rubber Fabricators and Rubber Crafters in their products. The boats are fabricated from uncured, neoprene-coated nylon fabrics. After assembly, the boat is cured as a unit under pressure at elevated temperatures (vulcanized in a dry heat autoclave) to produce an integral product. All the fabric coatings, tapes, cements and moldings are chemically matched to yield cohesive bonding when the boat is cured and the result is an integral, industrial-grade, one-piece boat.(16)

A cold bonded boat uses cured fabric bonded with a cement creating an adhesive bond. The D.I.B. process uses a cohesive cement that has a neoprene base. They cut the forms, and use neoprene tape, inside and outside of the seams, all of uncured rubber. D-rings, patches and handles are made of uncured rubber, and adhered with a neoprene cement. Then a powder is put inside the tubes to prevent them from sticking together in the heat and pressure that cures the boat in the autoclave. “If the boat is too long to fit into the autoclave it can be folded, with a sheet placed between the folded fabric to prevent it from adhering to itself, and placed in a vacuum bag. The autoclave cures the entire boat, handles, d-rings, seams and everything. When it comes out of the autoclave and is cooled, everything is one piece.”(16)
“There are 28 basic neoprenes and they all have different properties, applications and functions. When the fabric is produced, be it neoprene, PVC, urethane, hypalon or whatever, a lot of components go into it. There are base chemicals, thinners to make more volume for cost, additives to protect it from weather and ultraviolet, polymers to give it color, and chemicals to make the fabric strong. All kinds of modifiers are added to the fabric coatings to produce the desired product.”(16) “D.I.B.’s desired product is longevity, and longevity is the controlling factor for all of the types of additives D.I.B. uses. The desired element for many other company’s product may be cost, or color, or appearance or ease of handling. We have a system of specifications we work within to give us the desired results - we want longevity. That is why

our boats last a long time." "We have two Moki Mac boats on the floor that are over twenty years old, bucket boats, and still in great condition. We are installing inflatable, self-bailing floors in them and those boats are still good for more than another twenty years."(16)

Because DIB purchases fabric that meets military specifications the manufacturer of the fabric must conduct a full number of tests on each roll to assure it meets specifications. They record, and document the tests. "If something happens, or someone has questions we know what roll of fabric the boats were made from and can get the information from the producer." The neoprene coated fabric is purchased from Reeves Brothers (now Trelleborg Fabrics).

"We run sample strength tests on our bonds, and keep the samples and documentation as military specifications require. A representative sample is taken from every piece of fabric and that is traceable to the National Standards, therefore you know what roll of fabric it came from, when it was produced and the manufacturer's technical information on it. We keep a fabric log, adhesive log, sheet from the curing document, peel test, and samples are sent to Reeves certified laboratory. We put it in the oven and hang a 50-pound weight from it for 24 hours, make sure the seams don't peel, do a hot test, a cold test and all of that is documented."(16)

"When we first started out we knew this was really good stuff, but we couldn't afford our own laboratory or technician. So we fell back on the military specifications because we knew that we could take the specification, send it to the producer to get the product that meets it." It limits us, from say, some fabric producer coming to us and saying, hey, we have this excess 600' roll of fabric that we can sell you at a very low price."

"We still use the 1960's military specifications. But within that specification we have latitude to update our coatings and other things. A good example is our gum sheeting for the valves. According to the military specifications it's just a coating compound produced to a certain thickness without a cloth in it. It's gum sheet, and we had the latitude to change the compound. Right now, to give us more abrasion resistance we add about 5% Kevlar into the fiber of the gum sheet and it gives us almost 100% increase in abrasion resistance."(16)

The fabric patterns used to be cut by hand, now D.I.B. has a computer controlled pattern cutting machine on one of the long cutting tables. The company that makes the cutter has a one hundred year history making and cutting textiles of various types. "They have a five day training program to show your people how to run it and how to maintain it. This kid who runs it was petrified at first. He'd been doing the work with a pair of scissors. Two weeks later he was saying, "Hey, don't touch my machine!"" (16)

On D.I.B. boats, a thin color hypalon fabric sheet is vulcanized to the boat as a rubber/hypalon shield in the autoclave. "When the boat is down on the floor, to make a white boat say, we cover it with a thin sheet of uncured hypalon. You can vulcanize the hypalon to the neoprene in the autoclave. The hypalon coating will not scratch or peel off."(16)

Standard features on Demaree Inflatable Boats include: machined aluminum valves, fully taped seams (inside and out), bottom gum chafe strips, stainless steel "D" rings, self-bailing or full

floors, and custom color. D.I.B. boats, as the preceding companies, are designed to be inflated to around 3 p.s.i. All models can be customized in a variety of lengths and widths as well as offering custom configurations and construction materials. In addition to the models below D.I.B. makes a variety of work, rescue and military inflatable boats:

- Mini Snout: 14'3" to 23" x 7'4" to 9' beam - 26" to 36" pontoon diameter; This boat is made with 60 ounce/yard, Mil-C14505 Type 7 material. It has four separate air chambers.
- Cheat River Style 14' x 6'6"- 20" diameter tubes boat is made with 30 oz/yd2, type 9A material. It comes with and without the self-bailing floor. The floor on the standard model is made from 44 oz/yd2, type 6 material. It has eight air chambers. The self-bailing model has a floor made from 6" (150 mm) drop stitch, type 11 material and has nine air chambers.
- Grand Canyon Style 18'4" x 7'10"-22" diameter tubes; This boat is made with 60 oz. material with a floor made from 60 oz. material. It has eight separate air chambers.
- Section Four Style 14' x 6'4" - 18.5" diameter tubes; This paddle boat is a narrow, three cross tube model developed primarily for the Chattooga River. The boat has a 60 oz. floor and extensive gum sheeting applied to the bottom and around the sides for chafe protection from the abrasive river bed.
- Yough Style 12' x 5'8" - 17" tube diameter; This boat is made with 30 oz/yd2, type 9A material. The floor on the standard model is made from 44 oz./yd2, type 6 material . It has four air chambers and one cross tube. The self-bailing model has a floor made from 6" (150 mm) drop stitch, type 11 material and has five air chambers.
- Personal Paddle Boats (PBB) a small 2 pontoon craft
- Inflatable Kayaks in 1 and 2 man styles (6)

“Some years the river rafts are 10% of DIB’s business and in others 50%. Right now we have a good market for the petroleum, geology, and geophysicists. They like inflatables because they carry a heavy load with minimal draft, they have explored most of the deep waters, and with inflatables they can explore the shallow water. We make boats, both inflatable and rigid hull for the military. We also make specialty products like containment booms for the oil business.”(16) Dave Demaree can produce custom boats of any size or shape. The boats are more expensive because they are made in the U.S.A., use high quality materials and craftsmanship, and because they strictly adhere to military specifications.(16)

“Dave is widely recognized as one of the world's leading authorities on the history and manufacturing processes of inflatable boats. To illustrate his history in the industry, Dave has attended every national show of America Outdoors since it formed in 1990. He has also attended every national show of the two organizations that combined to form America Outdoors, namely: Eastern Professional River Outfitters Association (EPRO), and the Western River Guides Association (W.R.G.A.), since October 1976.” Each summer, Dave continues to guide a raft for one of several commercial outfitters down the Colorado River through the Grand Canyon.(6)

Boats made by these four companies have been, and are being used by Moki Mac, Canyonlands Expeditions, Western River Expeditions, Grand Canyon Expeditions, Don & Ted Hatch

Expeditions, Holiday Expeditions, Barker Ewing River Expeditions among others. The vulcanized boats, now exclusively produced by Demaree Inflatable Boats are stout, durable and last a long time. Although they are heavy river craft they are almost impervious to wear and damage. In heavy water and big rapids they are stable and agile.

Dave Demaree is a quiet, and unassuming man. His vast knowledge of inflatable boats comes from a rich heritage of those inflatables that echo the voices of the men and women in West Virginia who built the early inflatables. The quality of the boats, built in America is undisputable. The Demaree boats spring from that pedigree. After over forty years that heritage is still alive, not only in the Demaree inflatables, but in my 1971 Selway raft that is still running rivers in Alaska - a product of the Dream Builders.

Unknowingly Flemming, Zannoni, Schnurr and the men and women of West Virginia put a dream to reality. The part of the dream they never imagined is still being played out in dozens of raft manufacturing companies, hundreds of outfitters, and the hundreds of thousands of people running rivers each year.

*** SIGNIFICANT NOTES**

(*1) - The Origin of Rubber Fabricators has been recorded as both **Newburgh, NY** ((23) "Salute" a Special Supplement to *The Monroe County Watchman, Grantsville News, Calhoun County Chronicle and Nicholas County News Leader*; (Post 1969-Pre 1971) and *The New York Times* (*The Nicholas County News Leader*; July 15, 1959 - Volume XIV No. 4 and other sources) and **Scranton, PA.** (Calhoun County Historical Society documents).

(*2) - The initial advertisement that brought R.C. Flemming to Grantsville, WV has been reported as both in ***The Wall Street Journal*** ((23) "Salute" a Special Supplement to *The Monroe County Watchman, Grantsville News, Calhoun County Chronicle and Nicholas County News Leader*; (Post 1969-Pre 1971) and ***The New York Times*** (*The Nicholas County News Leader*; July 15, 1959 - Volume XIV No. 4 and other sources)

(*3) - Originally referred to as the Inflatable Division of B.F. Goodrich and revised to Commercial Marine Division, West Virginia Operations, Engineering System Company, B.F. Goodrich.

(*4) -*"The Complete Whitewater Rafter"*; (Jeff Bennett - 1996) (page 3) refers to Georgie White as working with Ran Flemming of Rubber Fabricators to design the Green River Model. Bob Schnurr, in several interviews insists that he and Ron Smith were the persons who designed the Green River Model. Schnurr was the most likely person anyone who wanted a new raft design would have to talk with as he was a design engineer and managed the Richwood RFI Plant where most inflatable boats were built. Schnurr (2011) has a clear memory of Lance Martin, Ron Smith and Frank Ewing, he does not remember Bryce Whitmore as the first to design river rafts. Flemming was more concerned with securing large military contracts. It is more likely that Whitmore used surplus or off the shelf tubes to create his "Spiderboat" and "Huck Finn" style (four 18" or 20" diameter tubes, 14 feet long tied together and topped with a rowing frame) boats that were basically four tubes lashed together with a rowing frame.(46)

(*5) - The end of government surplus inflatables occurred sometime between 1956 and the mid-1980s. Government surplus rafts were still available, but only from those suppliers who had the stock on hand. Dick Barker indicated that it was a response to an inflatable accident on the Great lakes around 1958. In *"Advanced River Rafting"* by Cecil Kuhne (page 19) is a discussion of the destruction of government surplus inflatables rather than selling them as surplus. Kuhne refers to store owners stating that the government's legal liability via surplus and to prevent lawsuits against the government by those injured using the surplus rafts in whitewater. Kuhne also indicates that military regulations required the shredding of inflatables after a specific length of time - used or unused.

(*6) - Bob Schnurr's sons worked for Ron Smith in 1969 and 1970.

(*7) - Dunlap, Goodyear, Uniroyal and several other companies built pontoons and assault boats during WWII. The production of the landing raft was to cure the rubber, cut it to shape and cement the edges with as many as seven coats of adhesive. In the time consuming process each coat of adhesive had to dry, and even then the seams were none too strong. Goodyear reduced the process to 15 hours, then 3 hours and finally to 50 minutes. In the new method they built forms the shape if the finished boat. Uncured fabric was stretched over the forms, one coat adhesive was applied to the seams and the entire boat was vulcanized. In vulcanizing the rubber flowed over the seams making a stronger joint. During the Korean and Viet Nam Conflicts the companies continued producing inflatable bridge pontoons, assault and landing craft and life boats, including the MK2, MK5 and MK6 Models.

(*8) When Dick Barker began rafting on the Snake River in 1956 he purchased a yellow 6-man Air Force survival raft from Smith and Edwards, an army surplus store in Ogden, Utah for $35.

In the spring of 1965 Dick and his wife Barbara and their two kids took a "family vacation" to visit relatives in Florida and New Jersey. En route he searched army/navy surplus stores for rafts. Dick's travels took him to Denver, New Orleans, and eventually to Miami where he purchased a MK-12 yellow survival raft for $170. Later in the trip he found and bought a 7-man assault raft from I. Goldberg in Philadelphia for $57. While he was in Miami at the surplus store Dick was told about The Patton Company, a producer of inflatable boats for the military, located in the Palm Beach area. John Patton had no interest in making and selling recreational inflatables, but suggested Dick contact RFI in West Virginia.

Dick used the rafts he purchased during the 1965 season. He was still not satisfied with the raft designs and on March 27, 1966 he wrote a letter to RFI inquiring about available rafts. On April 5 RC

Flemming, President of RFI, wrote and suggested a modified 15-passenger survival raft as used by Bryce Whitmore, Wilderness Waterways, in California. The design was still not right, so Dick telephoned RFI and spoke to Bob Schnurr, and asked if they would make a custom raft for him. Bob Schnurr said they would not make one raft, but would make two of a special custom design.

Dick Barker and Frank Ewing each began commercial scenic float trips on the Snake river within Grand Teton National Park in1963. As they got to know each other they often referred, or shared customers, with each other. Eventually the two established a third company, Barker-Ewing Float Trips, to handle overflow customers. They hired Verne Huser to guide the Barker-Ewing trips.

After talking to Bob Schnurr, Dick contacted Frank Ewing to see if he was interested in getting a custom-made raft. They put their heads together and came up with what they thought would be an ideal raft for their trips, now known as the Snake River Raft. They telephoned Bob Schnurr on April 26 to verify that RFI would build two custom rafts for them, and discussed their design. On April 30 they submitted a drawing and description of their design. The boats were 16' long, 8' wide, had two inflatable cross seats, three removable 2 1/2" drop- stitch inflatable floor mats, 18" main tubes with a 6" splash tube at 45 degrees around the outside. A letter from Bob Schnurr on May 17 suggested using 9A fabric. On May 24 Barker and Ewing telegraphed their order conformation., They received their new rafts on July 29, 1966.

Six years later Barker and Ewing modified a RFI raft designated as the Salmon River Raft which had been designed by Ron Smith, owner of Grand Canyon Expeditions. They added two inflatable cross thwarts and three inflatable floor mats which were tied/stitched in to a flap with grommets which was just above waterline around the inside of the raft. The floor mats were ribbed, and these were probably the first self-bailing commercial rafts manufactured. They used these rafts for whitewater trips through the Snake River Canyon after testing them through the Grand Canyon."Dick Barker, in 1964 took a vacation to visit relatives on Miami and New Jersey. (44, 49)

(*9) Dick Barker and Frank Ewing told me that John Cook (“Cookie) came through selling about a dozen 6 man survival rafts that people bought for fishing. Poncho Royce was involved as a representative selling boats in Wyoming for Rubber Fabricators. He may have been representing one of the other authorized dealers (Smith, Martin & Dragon).(44)

(*10) The claim that Rubber Fabricators sub-contracted work from major rubber companies is disputed by Bob Schnurr and Anita West. The documentation I have is from (25) Rubber Crafters, Inc.; “Abstract” provided by Betty Zannoni. That document includes some history of Rubber Fabricators. “During the period of its existence, Rubber Fabricators, Inc. Also performed sub-contract work for Goodyear Tire and Rubber Company... B.F. Goodrich, as well as Uniroyal.” Additionally two retired quality control inspectors mentioned the sub-contract work. In addition it appears that the principles of Rubber Fabricators worked closely with other rubber companies, especially B.F. Goodrich before the buyout. RFI, for example used, with permission, from Uniroyal, the design and production of the Uniroyal 25 man boat as a model.(27)

(*11) The Givens Buoy Life Raft (U.S. Patent 3883913 4001905) was designed by Jim Givens and manufactured by Rubber Crafters (see document in appendix). Givens developed the liferaft because of the loss of pilots’ lives during the Korean Conflict when they ditched over the ocean. He designed a liferaft that would not over turn in stormy seas by affixing a parachute-like piece of fabric to the bottom that automatically filled with water and acted as a drogue. This simple design is worth looking at.

(*12) Rubber Crafters manufactured inflatable airline escape chutes, lifting bags, protective suits, water tanks, life jackets, and a variety of boat tenders and utility craft.

(*13) Self-bailing, inflatable floors had been in use by the U.S. Military since early WWII, but for some reason were not in the surplus boats used by river runners. Initially around 1940 ribbed inflatable floors were developed, with the drop stitch inflatable floor coming into use in the 1950s. The 4" drop stitch floors, used initially, were replaced by 2" fabric. In 1966 Frank Ewing and Dick Barker developed the Snake River Model with a drop stitched inflatable self-bailing floor, the first such river raft. Later they modified Ron Smith's Salmon River Model, which initially had no floor with a ribbed floor. That floor proved unsatisfactory and later models had the drop stitch floor in them.

(*14) Although the Rubber Fabricators Advertisement spells it "Voyager," the Model was actually named "Voyageur" in honor of Lance Martin's Wilderness Voyageur's company.

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