

## NASA ORAL HISTORY PROJECT – DAVID L. PIPPEN

The most significant contributors to the Laboratories Office success during my tenure are listed below.

During my tenure at the WSTF, the Laboratories Office progressed from an organization that supported only the local WSTF organizations to a valuable world wide resource in hazardous materials testing. We not only supported the site's NASA Offices and the local organizations including TDRSS, we supported most of the other NASA centers, Industry the Department of Defense, Japan, Russia, and other countries.

The laboratories established a state-of-the-art non metallic materials test capability in hazardous environments which began shortly before the Apollo 204 fire. Over the years we performed test programs for the Apollo, Skylab, MOL, Apollo Soyuz, and Shuttle space initiatives. We developed many test methods, procedures, and test facilities and a large data base of materials was established.

The capability continuously expanded to include testing of metallic materials for oxygen service at pressures exceeding 10,000 psia. Test fluids included oxygen, nitrogen, hydrogen, air, hydrazine, monomethyl hydrazine, nitrogen tetroxide, red fuming nitrogen acid, fluorine, nitrogen tetra fluoride, jet aircraft fuel, and others. A unique odor test using humans as test subjects was established along with over 15 other standard test methods. Many special tests involving high energy explosions were performed as well as performing hypervelocity impact testing involving large light gas guns.

Laboratory personnel(NASA and site support contractor) were heavily involved in establishing standard test methods via the NASA Headquarters, Office of Manned Space Flight, published as NHB8060.1A, "Flammability, Odor, Offgassing, and Requirements and Test Procedures for Materials in Environments that Support Combustion", (and several subsequent documents) and were actively engaged in several test societies including the American Society for Testing and Materials (ASTM).

The many successes of the NASA Laboratories Office during my tenure required a tremendous effort from many people, both from NASA and NASA contractors. It would be an insurmountable task for me to remember and attempt to identify all the significant contributors to the Laboratories Office successes. However, it is possible to recognize those who were the most instrumental in the laboratories' success and who endorsed and vigorously pursued our mutual goal of attaining "world class" status. I feel compelled to attempt to recognize those who come to my mind even though I have had over 10 years to forget some highly deserving people and not provide them recognition in this document.

The WSTF professional people mentioned below were visionaries. They demonstrated the ability to "see" what we had to do to become a world class test organization and vigorously pursued attaining it. The technicians mentioned were those whose attitude, dedication, and ability set them apart

from even the best technicians. Their tireless energy, high work ethic, and willingness to work extra hours on short notice to accomplish critical tests characterized their normal behavior.

Ken Gilbreath, NASA Site Manager – Ken Gilbreath was the founder of the Laboratories Office. He had the foresight to see that WSTF could play a more vital role in NASA by providing an agency resource in those areas that the remote desert location afforded. He worked tirelessly to set up a viable organization even in the face of those who expressed that WSTF's sole purpose was to provide propulsion testing support. This was especially critical since the new organization necessarily drew very limited budget and manpower resources away from other areas on site. He provided the Laboratories office with strong managerial support and encouragement. He encouraged the laboratories to expand and seek reimbursable work from other agencies.

Jesse C. Jones, NASA Site Manager - Without Jesse's managerial support, the laboratories would never have been able to gain international recognition with NASA, DOD, and industry. He supported our requirements for specialized laboratory equipment in times of tight budgets. He was instrumental in establishing the laboratories as JSC's site for materials testing. He worked to get the 800 area test building and many of our ancillary test areas; some contested by other site organizations. Also, he managed to convince those in NASA who would close WSTF that among other things, there was an irreplaceable resource in the Laboratories Office. He displayed trust and confidence in the NASA Laboratories Office personnel's ability to handle any task we undertook.

Jack Stradling, NASA Laboratory Manager, Material Test Facility (Mechanical Engineer) Jack was a WSTF laboratories Office pioneer. He had superb technical abilities, highly self motivated, dedicated, and completely trustworthy. He was instrumental in the design of the 800 area test building and most of the facilities it contained. I believe his attention to detail, his ability to foresee potential hazards from reviewing schematics and drawings, and his high level of safety consciousness were instrumental in the materials test efforts' outstanding safety record that spanned many years. His total of assigned tasks added up to what would generally require 2 or three people. His ability to recognize material reactivity patterns and analyze test results allowed NASA to select materials that prevented equipment failure and hazards and provided safer aerospace systems. His expertise in materials compatibility issues was eagerly sought out by NASA, industry, and DOD. He gave frequent presentations, published many papers, and was a major contributor to ASTM (American Society for Testing and Materials). He was a coeditor of ASTM publication STP 1040, "Flammability and Sensitivity of Materials in Oxygen-Enriched Atmospheres". He was a tireless worker and subscribed fully to our world class goal and was a major contributor to any success we enjoyed. He is among the Laboratories top 5 contributors during my tenure with the WSTF laboratories. He also was a major contributor to developing an oxygen safety course that is recognized as being unique.

Frank Benz, NASA Laboratory Manager, Special Projects (Chemical Engineer) Frank came on board with the Laboratories Office after the standard materials test capability was established and successful. However, he excelled in hazardous testing involving all sorts of materials. He was highly self motivated, very innovative, and a tireless worker with outstanding technical ability. He was primarily responsible for increasing the laboratory capability from basic materials testing to state of the art advancements in particle impact in high temperature/high pressure oxygen, metals combustion in oxygen, developed combustion model of liquid-phase burning metal in oxygen, metals ignition by friction rubbing, and many others. He was considered a world expert in these and other areas and was frequently consulted by industry, NASA, and DOD in his areas of expertise. His countless contributions to the success of the laboratories cannot be adequately measured. He was responsible for obtaining many cost reimbursable projects that were "outside the box" of

normal testing. His attitude was, "If anyone can do it, WSTF labs can do it better and faster." I believe he was one of the nations top contributors in solving many tough materials compatibility problems. He was selected for many outside WSTF investigative boards and headed up the WSTF hazards Assessment Team. He coauthored ASTM's fourth volume of STP1040 "Flammability and Sensitivity of Materials in Oxygen-Enriched Atmospheres" and many authored many articles, test procedures, and analytical reports. He is among the tops 5 major contributors during my tenure with the WSTF laboratories.

Joel Stoltzfus, NASA Laboratories Office, Laboratory Manager, Special Projects (Mechanical Engineer) Joel's greatest contributions were in the area of developing test methods and procedures to test metals in high temperature, high pressure oxygen. One of his greatest successes was in developing a state of the art method to evaluate alloys for their susceptibility to frictional heating. His contributions in this area alone provided the world with data that enable designing oxygen systems that are resistant to catastrophic fires due to frictional heating. He also was heavily involved in designing a universally accepted oxygen safety course and he was an author of the fourth volume of the ASTM publication, STP 1040, "Flammability and Sensitivity of Materials in Oxygen-Enriched Atmospheres." His expertise and the test methodology he developed allowed significant expansion in the range of testing performed by the Laboratories Office.

Dr. Leonard Schluter, NASA Laboratory Manager, Analytical Laboratory (Chemist) Leonard was a person of great vision for the laboratories Office. He was primarily responsible for developing the early chemistry and analytical techniques and processes for non-metallic materials testing. He developed (with input from JSC and local medical personnel) the protocol for odor testing and established through analysis the threshold levels that humans could be subjected to without harm. He established an odor panel of local NASA and support contractor personnel and established the means to motivate personnel to become involved in the testing. One of his greatest contributions came in his ability to convince outside customers that the Labs was the place of choice to do special tests. He worked closely with other centers and industry to direct testing to WSTF. He was primary in developing our precision clean room capability and was the WSTF person responsible for setting up the processes and procedures for cleaning the tools for the Lunar Curator. He was tireless in his effort, promoted WSTF as a world-class operation and was instrumental in the early success of the laboratory effort. I rate Leonard among the top 5 people responsible for putting the laboratories in position to reach world class.

Carol Irby, NASA Laboratories Office (Later Secretary to the NASA Site Manager) Carol was the secretary of the Laboratories Office from its beginning until our great expansion started. We were severely understaffed for the activities we undertook. Carol directed the numerous phone calls, was a one person visitors center for the constant stream of customers, kept track of time cards, and typed a mountain of test reports from handwritten manuscripts and prepared NASA presentations before the day of the word processor. Her outstanding telephone manner and ability to communicate important schedule and test information to the customer and local staff were instrumental in the early success of the laboratory. She knew what the office staff was trying to accomplish and endorsed our efforts with great commitment with an outstanding attitude under tremendous personal pressure from many different sources. We suffered greatly for a time after she left to become the NASA Site Manager's Secretary. It is doubtful that we would have been successful without her efforts.

Kathy Pacheco, NASA Laboratories Office (Office Secretary and later Office Management Assistant) Kathy assumed the role of Office Management Assistant long before she was given the title. She was an outstanding "first contact" for the many customers we had. The volume of work she produced and the professionalism she displayed under perpetual high stress were outstanding. She kept the office running smoothly allowing all of us to take care of our own areas of responsibilities. I received numerous compliments on her work from customers outside WSTF. We would have sunk in our own pile of work had she not been so dedicated and willing to do whatever work was necessary for us to succeed She understood the goal of the office and endorsed it fully. It would have been very difficult to advance toward our world class goal without her dedicated and consistent efforts

Leroy Luchini, NASA Administration Office (budget Management) Leroy was our "money man". He set up the means of handling the numerous reimbursable projects and kept us informed of our money situations. He provided council that we needed to assure that we remained "legal" when we purchased equipment for our off site customers. Because of his diligence and dedication, we always knew where we stood with NASA equipment purchases and our reimbursable funding. His efforts were instrumental in our being able to control funding for numerous simultaneous reimbursable projects.

WSTF Site Support Contractor John Schentrup, Lockheed Program Director (and Contractor Laboratory Dept. Manager. John was initially the WSTF Laboratory Dept. Manager. He was very cooperative and always tried his best to implement those practices aimed at reaching "world class" status. He was hampered by Lockheed policy that prevented hiring the best personnel and paying the best personnel a salary comparable to other outside WSTF employers. He took the brunt of many negative evaluation comments with a very good attitude even though he knew the solution to the problem was outside his authority. My philosophy was that the support contractor must meet the criteria of the contract in order to make the highest grades and that the grades given were directly dependent upon performance. The site support contractor and often NASA Site Managers expressed the view that high grades were deserved of a contractor that performed in a reasonable manner. Some NASA managers even felt sorry for a contractor that performed well, but got less than an outstanding grade by NASA evaluators. John always took the Laboratories Office criticisms seriously and acted on them to the best of his ability/authority even though his superior did not always support his efforts. When he became the contactor Program Director, The Laboratories Office experienced its most dramatic growth both in size and technical competence. He allowed the hiring of high quality people and did his best, even when discouraged by Lockheed policy and pressure from his superior to do otherwise. He always understood the Laboratories Office goal and worked diligently to reach it.

Dr. Craig Leasure, Lockheed Laboratory Department Manager Craig was an outstanding technical talent even though young in years. He understood and heavily endorsed the Laboratories goal. He always tried to hire the best technical people with the highest skills and relentlessly pressured his superiors to promote his highest quality people. He responded positively to constructive criticisms presented on the contractor's evaluations and worked hand-in-glove with NASA personnel. As a result, under his guidance, the contractor reached its highest technical capability. This resulted in fast and "world-class" response to customer requirements.

Rollin Christianson, Lockheed, (Mechanical Design Engineer) Rollin was a very talented design mechanical engineer. He designed many of the special complicated test fixtures required to perform special test activities. He was a primary designer of a WSTF developed Shuttle oxygen control valve that was not susceptible to ignition by particle impact. Even though not adopted by Shuttle, the design displayed his outstanding design talent. His keen insights into mechanisms provided invaluable insight into failure analyses and hazards assessments.

Benz, Lockheed (Data Office and Technical Editor Martha displayed a very high level of wisdom in laboratory operations. She solved two of the most difficult and plaguing problems in the Laboratories Office. She developed a way to expeditiously generate materials test reports. The testing always seemed to be the easy part. Obtaining a quality test report in a reasonable time while being required to run many different tests simultaneously was each test engineer's nightmare. Her dedication to this task and her great desire for the laboratories to excel were instrumental in attaining the success we enjoyed. She also developed and implemented a system for reporting standard test data. She set up a very useful materials test data base that enabled providing our customers test data very expeditiously. This capability enabled us not only to rapidly perform tests, but report the data in a very professional manner. This capability was a requirement for any world class organization.

Dr. Ralph Taphorn, Lockheed, (Physicist) Ralph was exceptionally talented not only theoretically but experimentally. He was as much an engineer as he was a scientist. He was equally versatile in basic properties of materials, instrumentation, and experiment design. Many of his concepts were innovative and directly resulted in WSTF obtaining some very complex and rewarding projects. He mentored many of WSTF Laboratories engineers and scientists, both NASA and contractor. He was more interested in work quality and good science than position or promotion.

Bob Horrigan, Lockheed, ESC (metallurgist) Bob was highly motivated, very dedicated, and an outstanding metallurgist. His ability to operate even the most complicated analytical tools allowed WSTF to excel in the area of failed component analysis. He personally developed the test methods for testing materials in oxidizers and fuels. His talents allowed the Laboratories to undertake many very complex test programs that advanced us towards our world class goal. He also was a major contributor to solving many of the engine related problems that occurred in the propulsion testing, thus enabled the laboratories to not only support outside of WSTF customers, but on site customers as well.

Dean Whitaker, Dynaelectron ,Laboratory Department Manager (physicist Dean was one of the most dedicated and motivated professional personnel we ever had at WSTF. He was involved in designing and developing test methodology in the very early days of materials testing. He was instrumental in setting up and developing the initial test facility for the GOX pneumatic and mechanical impact tests. He spent many uncompensated hours at WSTF right along with his NASA counterpart. Not only was he outstanding technically, but he mentored many new engineers. He was very safety conscious but always came up a way to do even the most hazardous testing. I consider him to be among the top 5 WSTF Laboratories scientists during my tenure.

Betty Hoffman, Lockheed (Chemist) Betty was the "plodder" of materials testing in the chemistry/analytical area. She excelled in assuring that the routine but exceedingly important testing was correctly performed with a high class of professionalism . Among the worst problems

we had was the customer's changing priorities in the middle of testing. She handled this without anger or any display of frustration. She just consistently "got the job done".

Dr. Eric Miller, Lockheed, (Chemist) Eric was a very dedicated and talented chemist who was instrumental in solving many of the very complex analytical problems presented to the Laboratories Office as we transitioned into the materials testing effort. He worked tirelessly and effectively on all assigned tasks. His work stood up under heavy scrutiny by scientists and engineers of the scientific community. His capability and motivation were major factors in the Laboratories attaining a high level of technical competence. The following technicians were all major contributors to the laboratories advancing toward world-class status. They displayed an eagerness to respond to changing requirements at a moment's notice even though it would take them past quitting time. They were innovative, full of excellent ideas on how to better operate very complex test apparatus. Their attitude was always positive, they made very few mistakes and never watched the clock. This was amazing since WSTF was unionized and many techs considered the Labs, "just another 8 hour job". The engineers for time critical and technically challenging projects always attempted to get these people on their test team.

William Weed, Lockheed (supervisor of machine shop) Bill provided machine shop support to our many lab projects. He understood the importance of precision machining and high volume work output. He worked very closely with the design engineers and voluntarily worked extra time to assure our critical schedules were met. He was able to adjust his shop priorities so that everyone received what they needed and on time. We could not have enjoyed any success without the efforts of Bill Weed. He understood where we wanted to go with our Laboratories and he was a willing partner in that endeavor.

Elvin, Magee, STC (mechanical engineer, head of prototype development shop) Elvin was head of the prototype development shop in the early days of the laboratories. He was a tireless worker and designed and "haywired" as necessary from available supplies to get our unique test systems operational. He was very enthusiastic even though under consistent pressure to produce more than his manpower allotment would allow. His individual efforts were instrumental in getting our materials test equipment operational.

Ernie Ceroky, STC, Analytical Chemist Ernie was a very hard working innovative analytical chemist who worked closely with Leonard Schluter in setting up the initial analytical non-materials tests (example: fuel and oxidizer compatibility tests). He also was instrumental in establishing methods to evaluate the effectiveness of cleaning processes like was required by Viking and the Lunar Curator. He set up many of the initial analytical instruments required to assure that the odor panel was not subjected to hazardous materials. He was a mainstay in the early days of the laboratories. Without his expertise, it is doubtful if we could have developed the test techniques and procedures required to support the multiplicity of laboratories tasks.

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- Edward Denzler, Lockheed, (laboratory technician)
- Sammy Motto, Lockheed (laboratory technician)
- Jack West - Lockheed (laboratory technician)
- Joe Diaz - (Lockheed Technician)
- Kenneth McCardle (Lockheed Specialist)
- Don Saunders (Lockheed Technician)

#### JSC

The following personnel enthusiastically supported WSTF Laboratories Office test activities even when WSTF faced closure. They defended our positions, had confidence in our data, and supported new facilities and equipment when needed. Many of them kept us informed of political activity and helped us prepare positions that would enhance our standing with senior JSC officials. Many of them gave us encouragement when competing centers questioned our data and/or test procedures. They helped us get projects that augmented our regular budget. & Without their support, we would not have been successful.

- Martin Raines, as MSC R&QA chief. He assigned the WSTF laboratories the initial responsibility for performing JSC's Apollo materials testing.
- Mike Steinthal
- Howard Kimzey
- Norm Chaffee
- Alex Bond
- Michael B. Duke
- Chester Vaughan
- Jeanne Crews

#### JSC McDonald Douglas

- Paul LeDeaux

#### NASA Headquarters

- Wayne Frazier

#### Lewis Research Center

- Irvin Pinkel
- Paul M. Ordin

#### KSC

- Coleman Bryan
- Mel Olson

#### Air Products and Chemicals

- Barry Werley