'Iron Sun' is not a rock band, Sandia researchers find

By Neal Singer

Working at temperatures matching the interior of the sun, researchers at Sandia's Z machine have been able to determine experimentally, for the first time in history, iron's role in inhibiting energy transmission from the center of the sun to near the edge of its radiative band. Because that role is much greater than formerly suspected, the new, experimentally derived amount of iron's opacity — essentially, its capacity for hindering the transport of radiative energy originating in nuclear fusion reactions deep in the sun's interior — helps close a theoretical gap for a theory called the Standard Solar Model, widely used by astrophysicists as a foundation to model the behavior of stars.

“Our data, when inserted into the theoretical model, bring its predictions more closely into alignment with physical observations,” says lead investigator Jim Bailey (1683). His team's work appeared Jan. 1 in the journal Nature.

The gap between the model and observations appeared in 2000 when analysis of spectra emerging from the sun, researchers at Sandia's Z machine, Jim and his team have been able to determine experimentally, for the first time in history, iron's role in inhibiting energy transmission from the center of the sun to near the edge of its radiative band. (Photo by Randy Montoya)
2014 Safety Survey Results

By Janeen Miller

In August, Sandians were asked to share their thoughts about safety by taking the 2014 Safety Survey. The survey, fielded by DuPont, used employee responses from 30 questions to identify safety-related strengths and opportunities in three categories: leadership, structure, and processes. Participants also used DuPont's Bradley Curve to measure the company's safety culture and its injury frequency rate and sustainable safety performance.

The data shows signs of progress in reducing accident rates, and Paul notes, “If we continue the progress that we’ve made reducing accident rates, we’re on a path to Benchmark best performance.”

The vertical axis shows accident rates, and Paul observes, “People see safety as a matter of follow-through that the threats we face today are serious ones, as serious as they’ve been for some time.”

The horizontal axis breaks safety culture and performance into four stages:

• Independent: People take responsibility for themselves and management believes that safety could be managed “if only people would follow the rules.”

• Interdependent: Teams of employees feel ownership for safety, and management believes that safety could be managed “even if people would follow the rules.”

• Dependent: People see safety as a matter of follow-through that the threats we face today are serious ones, as serious as they’ve been for some time.

• Reactive: People do not accept low standards and management.

The Bradley Curve indicates Sandia’s improvement in safety culture and recordable safety incident rates from the 2005 to the 2014 surveys, as well as what it takes to be considered among the benchmark best.

The DuPont Bradley Curve indicates Sandia’s improvement in safety culture and recordable safety incident rates from the 2005 to the 2014 surveys, as well as what it takes to be considered among the benchmark best.
Linde, Sandia partnership looks to expand hydrogen fueling network, boost H2 research

By Mike Janes

Sandia and industrial gas giant Linde LLC have signed an umbrella cooperative research and development agreement (CRADA) that is expected to accelerate the development of low-carbon energy and industrial technologies, beginning with hydrogen and fuel cells.

The CRADA will kick off with two new research and development projects to accelerate the expansion of hydrogen fueling stations to continue to support the market growth of fuel cell electric vehicles proliferating among the major auto manufacturers. On Nov. 17, Toyota became the latest to unveil a fuel cell electric vehicle.

Last week, Linde opened the first-ever, fully certified commercial hydrogen fueling station near Sacramento with support from the California Energy Commission.

Kickoff projects will help increase H2 fuel station openings

A recent Sandia study, funded by DOE's Fuel Cell Vehicle Technology Program states that Linde expects will include support from DOE.

The project will include support from DOE.

California's Alternative and Renewable Fuel and Infrastructure Program states that Linde expects to open new fueling stations in late 2015.

Researchers report breakthrough in predictions of pressure-dependent combustion chemical reactions

(Continued from page 1)

Combustion involve elementary chemical reactions that are strongly pressure-dependent, and a detailed description of these reactions is required for research to develop combustion models.

Researchers report breakthrough in predictions of pressure-dependent combustion chemical reactions

But, while significant progress has been made over the years in understanding combustion chemistry, the outcome and rates of pressure-dependent chemical reactions — those that depend on the pressure of the gas in the engine — have been very difficult to predict. These reactions depend on the temperature because the redistribution of energy that occurs when the reacting molecules collide with other gas molecules changes the outcome of the reaction.

Most previous research has focused on qualitative parametric studies to determine how energy transfer rates depend on various properties of a molecule, but no accurate method had ever been developed to make a priori predictions based on theoretical deduction rather than evidence-based observation of the rate constants.

“We desperately needed the ability to compute and calculate precisely how this important class of chemical reactions depends on temperature and pressure, and now we have that,” says Ahren.

Focus on energy transfer leads to technical solution

In arriving at a technical solution, Ahren focused on modeling the collisions of molecules in atomic detail and the characterization of energy transfer that takes place as a result of those collisions. “We succeeded by using more accurate models for describing the interaction of the colliding species and by focusing on only those aspects of energy transfer that are most relevant in determining the reaction rate,” he says, which allowed the researchers to develop a detailed description of the outcomes of the collisions.

Ahren and his colleagues then were able to obtain that information using direct “classical trajectories” that explicitly describe the motion of the atoms in the molecules and to use this information in calculating chemical reaction rates.

A key step, Ahren says, was the development of a model for the collisional energy transfer function that both reproduced detailed features predicted by the trajectories and that was simple enough to be used in practical reaction rate calculations.

“Finding a way to accurately compute the energy transfer from these vibrationally excited molecules proved to be the final piece needed to solve the problem,” says Ahren.

Inter-lab cooperation pays dividends

Ahren is quick to credit colleagues at Argonne National Laboratory and mentors at Sandia who contributed to the work.

The Science paper was co-authored by Stephen Klippenstein and Larry Harding, both Distinguished Fellows at Argonne, and the influential combustion modeler Jim Miller, a former Sandia staff member now at Argonne. This work continues the team’s longstanding effort developing master equations and elementary reaction rate theories.

“A close but loose-knit working group was developed with these combustion modeling experts over the years, and we’ve developed excellent professional relationships that have led to this technical achievement,” says Miller.

The work was supported by DOE’s Office of Science.

SANDIA AND LINDE are partnering to accelerate the development of low-carbon energy and industrial technologies, beginning with hydrogen and fuel cells. To that end, Linde recently opened the first-ever, fully-certified commercial hydrogen fueling station near Sacramento. (Photo courtesy of Linde)
from the sun lowered the estimated amount of energy-absorbing elements such as oxygen, nitrogen, and carbon by 30 to 50 percent. The decreased abundances meant that, plugged into the model, energy would arrive at the sun’s radiative edge more readily than before. This created a discrepancy between the star’s theoretical and measured structure. (Structure here refers to the sun’s varying temperatures and densities at different spatial locations.)

What was needed to reestablish the model agreement with observations was a way to balance the decrease in resistance to radiation transport caused by the lowered amounts of some elements.

Jim’s experimental group, including Taisuke Nagayama, Gaouline Lousel, and Greg Rochau (all 6915), in painstaking experiments spanning a 10-year period, discovered that the worldwide astrophysical number of bound electrons that are essential in radiative energy transfer of any element abundant in the sun. Still, the upward revision of opacities as a solution is bound to be controversial.

“Nothing no matter what we do, we can’t make measurements at all the different conditions we need to know,” team member Taisuke says. “There are 20 elements present, and a large range of temperatures and densities. We study iron because its complex electronic structure is a challenge to represent in opacity theories. And it is important in solar physics. The sun is a test bed to model other stars. Without experimental tests we don’t know if these models are accurate. To the extent we fail to understand the sun, then the workings of other stars are subject to some uncertainty.”

The target design of the experiments most recently involves iron. “The sun is the most well-studied element,” Jim is able to do what theorists cannot: He can hold tangible evidence for the way iron atoms behave inside stars in his hand. No metal has ever been sponsored by NNSS and the DOE Office of Science.
By Stephanie Hobby

I t’s admittedly one of the cooler jobs at Sandia. Tucked away in Tech Area3, a team of 12 regularly gets to witness nearly all the big — and the very small — shake, rattle, and roll tests the Labs has to offer. And while the photometrics team is perhaps most widely recognized for the unmatched images it produces, such as the well-known sequence of the F-4 screaming down the sled track and its ultimate annihilation, the images are really only a part of the product.

“A lot of people think photometrics is about photography, and it absolutely is not photography,” says department manager Jody Smith (1535). “This truly is about measurement, and we’re measuring using imagery.”

Using imagery and other techniques, the team can measure physical phenomena, temperatures, displacements, and deformation in very small increments — for example, micron-sized displacements that happen over microseconds using cameras that capture one million frames per second.

The photometrics team spends a lot of time thinking of creative ways to capture data because so much of Sandia’s work involves one-of-a-kind, often destructive experiments with irreplaceable devices that can cost millions of dollars. Often that means actually helping to design the experiment. When a researcher needed to measure the heating effects of drag on a wing section going Mach 2 down the sled track, he turned to the photometrics team. They put a thermal imager on a laser tracker so they could measure the heating effects of drag on a wing section going Mach 2 down the sled track, he turned to the photometrics team. They put a thermal imager on a laser tracker and see things they had just waved away or assumed weren’t happening. Now, we can measure it and collect it, and that’s impacting how experiments can be designed,” says Phillip.

Today, more information can be produced from just one test, which takes less time and money, rather than running it many times as was done in the past. That also opens the door to more complex experiments.

Much of the team’s work is used to validate models. Researchers have traditionally used single-point strain gauges to validate models, which doesn’t always capture the full picture. “Single-point measurements using strain gauges are fine for certain measurements, but aren’t able to validate a full-field model. It says nothing about what the model might be doing in other places,” says Tim Miller (1535). “Presumably you put your gauge in the right spot, but you don’t always know that. Particularly with blast-loading environments where you might have some bizarre effects and non-uniform loading, you wouldn’t know about them without a full-field measurement. That’s the approach that we bring to the table with being able to look at the entire surface.”

They also can help quantify the uncertainty of data, which, when being measured in microns, is not a trivial matter. The team spends a lot of time understanding the details of the results and developing ways to put error bars on the measurements.

So the next time you need to know exactly what a sphere looks like as it’s exploding, in increments that are a fraction of the width of a human hair, or really, measure anything you can’t put a ruler up to, the photometrics team is ready to take up your challenge. “We have the ability to take amazing data. Our clients are used to having a few points to match to their model, and we can provide millions and millions,” Jody says. “That’s an area where we can really make a difference for Sandia.”

The photometrics team spends a lot of time thinking of creative ways to capture data because so much of Sandia’s work involves one-of-a-kind, often destructive experiments with irreplaceable devices that can cost millions of dollars. Often that means actually helping to design the experiment. When a researcher needed to measure the heating effects of drag on a wing section going Mach 2 down the sled track, he turned to the photometrics team. They put a thermal imager on a laser tracker and could explain exactly what was happening to the wing as a result of the drag.

Working in complex, unpredictable environments

“People come to us with a problem, and sometimes they don’t know exactly where the problem is. We worked on the geotmylar capacitor, which is a perfect example. It was arcing someplace, but this happens at the speed of light. Byron Demosthenous (1535) came up with a strategy to image it to identify the precise location,” Jody says.

Some of the work they do is in a controlled lab setting, but more often than not, they’re working in more complex, unpredictable environments. From freezing cold to fiery hot temperatures, to the notorious spring winds of New Mexico and the accompanying flying dust and dirt, the team has to be ready for it all, so there’s no one-size-fits-all approach. The team consists of a mechanical engineer, an electrical engineer, an optical engineer, and experienced technicians, but Jody jokes that the department requires them to also be part MacGyver to handle the variety of issues they run into.

In addition to the team’s immense creativity, technology has evolved considerably over the years and has added to their capabilities. Mark Nissen (1535) has been with the team since 1984, when film was king. High speed at that time was 400 frames per second, and capturing three-dimensional data points was all but impossible. “The reason? The movement of the film through the camera was actually different enough from the movement of the experiment that correlating the images to one another could not be precise. And in a world where data is gathered in microseconds, precision is everything. Unexpected findings

Today, with 3-D measurements and the ability to capture virtually every angle of an experiment, those concerns have diminished. “Previously, researchers had to make assumptions about where to place single-point detectors. Now, we’re able to measure the entire surface in three dimensions,” says Phillip Reu (1535). And that can lead to some unexpected findings. “It sometimes suprises people to see their data and see things they had just waved away or assumed weren’t happening. Now, we can measure it and collect it, and that’s impacting how experiments can be designed,” says Phillip.

By Stephanie Hobby

Worth a thousand words (or gigabytes)

SANDIA’S PHOTOMETRIC TEAM uses imagery and other techniques to measure physical phenomena, temperatures, displacements, and deformation, in very small increments — for example, micron-sized displacements that happen over microseconds using cameras that capture one million frames per second. (Photo by Randy Montoya)

THIS ICONIC SEQUENCE OF IMAGES produced by Sandia’s Photometrics group in 1988 captures a test conducted at Sandia’s rocket sled track. The test was designed to determine the impact force of a complete F-4 Phantom slammed into a reinforced concrete target 12 feet thick at 480 miles per hour. The test was not intended to demonstrate the performance or survivability of any particular type of concrete structure to aircraft impact. The mass of the jet fuel was simulated by water, the effects of fire following such a collision was not a part of the test. The test established that the major impact force was from the engine. The test was performed by Sandia under terms of a contract with the Muto Institute of Structural Mechanics Inc., of Tokyo, Japan.
By Sandia Historian Rebecca Ullrich

S

Anda pioneer Ben Benjamin, who passed away on Nov. 30, 2014, in Albuquerque, began his career at the dawn of the atomic age filming the detonation of the first nuclear test device at Trinity and ended it the next generation of nuclear weaponers as a member of the Manhattan Project team. Here, Ben returns to the Trinity Site, where he witnessed the first atomic blast in July 1945.

In the months leading up to the July 16, 1945, test, Ben spent considerable time at the Trinity site, setting up equipment and experiments. He described the test shot itself as “brighter than 20 suns and the most spectacular sunrise ever seen.” He was just 22 years old.

After the United States entered World War II, Ben enlisted in the Army, was sent for further technical training, and underwent “a very mysterious interview process” to staff up the Manhattan Engineering District. During high school, Ben built a 6-inch telescope and mastered the optics to construct the eyepieces. After graduation, he attended the University of Minnesota and was involved in building optics, but he had trouble finding high-quality prisms so he and a friend decided they could learn to build them themselves. Using thick plate glass, they ground the prisms they needed, attaining a high degree of precision. They were subsequently recruited to build optics in a new Honeywell operation in Minneapolis, Minn.

In Minneapolis, Ben was directly involved in both the creation and operation in Minneapolis, Minn.

SITE-LINES — In September 1956, Ben Benjamin, above, and colleague Don Beatson staked out the control point area for Sandia’s Tonopah Test Range and then did the surveying to position each of the original tracking stations at the Range.

At the war’s end, he mustered out of the military and returned to the University of Minnesota to complete his degree in mechanical engineering, then moved to Pittsburgh for a job in optics. A colleague from the SED, H.C. “Curdy” Barr, was by then working for Sandia in field test and asked Ben to come out and work for him. Ben was hired in August 1948 and a week after arriving was sent to Salton Sea Test Base (SSTB) in southern California to build optics equipment for testing. He spent the next decade in optical measurements (later known as photometrics, see story on page 5), becoming a supervisor in 1957. Having seen the first atomic detonation at Trinity, he also witnessed the first nuclear test at the Nevada Test Site during Operation Ranger. As Sandia began to look for a permanent test site to replace SSTB, Ben became involved in the site selection process. On Sept. 12, 1956, he and Don Beatson staked out the control point area for Sandia’s Tonopah Test Range and then did the surveying to position each of the original tracking stations at the Range.

Ben took a rotation as a supervisor in data reduction and then moved to the seismic and test effects division before taking over the instrumentation fielding division, where he spent the bulk of his career. He returned to the Trinity site on the 40th anniversary of the test. He retired from Sandia two years later, but would return often to both the Labs and the stories of his Trinity experiences.

When John Hogan launched the Weapon Intern Program (WIP) at Sandia in 1998, his vision of knowledge preservation and transfer included a new generation of scientists and engineers learning directly from those who had gone before them in the nuclear weapons areas.

WIP, managed in its early years by Andy Rogulich (ret.), included senior mentors — weaponers from earlier in Sandia’s history, with a few, including Leon Smith and Ben, whose service reached right back into the Manhattan Project. They provided continuity to the intern’s understanding of weapon design, testing, production, handling, and surveillance, offering a level of detail in how things were done that was not always apparent in the written record.

“Ben was such a remarkable guy,” says Andy, “one that you would always want to have the privilege of working with, a true living embodiment of what it means to be a Sandian.”

Known as a good storyteller with an important story to tell, Ben was also recruited to give lectures at the then-National Atomic Museum the evening before tours left for the Trinity site during its semi-annual openings.

At Ben’s request, the intern program was named in his honor as the Ben Benjamin Intern Program (BBIP), a legacy that continues today.

Ben delighted in his time with the interns and Trinity tour participants, joking that he’d told “Oppy” how things should be done. He instinctively understood that Sandians benefit from knowing where we come from and who got us here. He spoke of his experiences at both Los Alamos and Sandia with humor and pride, giving clear insight into the development of the US nuclear weapons program.

NEW MOON RISING — Ben Benjamin, seated, and colleagues track Sputnik using high-tech gear circa 1957.

He appeared in televised specials on PBS and the Discovery Channel and a presentation of his Trinity experiences is available in the Tech Symposium streaming video collection on Sandia’s internal web at http://digitalmedia.sandia.gov/Mediasite/Play/299f7f1c378e4baab fda76d6307bfa9c1d.

A memorial service is scheduled for Monday, Jan. 12, 4-7 p.m. at the National Museum of Nuclear Science and History at 609 Eubank Blvd. SE.

fta76d6307bfa9c1d.
How to submit classified ads DEADLINE: Friday noon before week of publication unless changed by holiday. Submit by one of these methods: 

- EMAIL: Michelle Fleming (classads@sandia.gov) 
- FAX: 844-0465 
- MAIL: MS 1468 (Dept. 3651) 
- FAX: 844-0645

* INTERNAL WEB: On internal web homepage, click on News Center, then on Classified Ads link, and then on the very top of Lab News homepage

* Submit a Classified Ad. If you have questions, call Michelle at 844-4012. Because of space constraints, ads will be printed on a first-come basis.

Ad rules:
1. Link 18 words, including last name and home phone (If you include a website or e-mail address, it will count as two or three words, depending on length of the address.)
2. Include organization and full name with the ad submission.
4. Type or print ad legibly; use accepted abbreviations.
5. One ad per issue.
6. We will not run the same ad more than twice.
7. No “for rent” ads except for employees on temporary assignment.
8. No commercial ads.
9. Housing listed for sale is available without regard to race, color, or national origin.
10. Housing listed for rent is available without regard to race, color, or national origin.
11. WE will not run ads for babysitters.
12. We reserve the right to reject any ad that is not consistent with our standards.

Lab News

MISCELLANEOUS

QUEEN BED, REA, wood frame, Simmons Beautyrest mattress, excellent condition, photo available, $250. Motella, 296-3259.

GIRL’S CLOTHING, sizes G12-juniors small, great condition, large box, list of items & photos available, $10. Wells, 286-1937.

SKI RACK, for SUV w/roof rails, $50; cross bar for Lexus RX 450, roof rails, $10. Cough, 822-0000.

TRUCK SEATS, front bucket, captain’s chair w/center console, near 60/60 folding bench, for ‘00-’06 extended cab Toyota Tundra, $195. Harding, 977-0897.

SNOWSHOES, Red/Blue FACES 500, weight up to 125-lbs., used twice, $90. Brewer, 238-4704, ask for Julie.

ADJUSTABLE BED, Ergomotion long twin, 36” x 80”, head & knee lift, 2 massageers, excellent condition, $500. Harsche, 281-6623.

PRO BOWL TICKETS, sec. 443, row G, $275; dual-sided futon, $75. Brewster, 238-4704, ask for Julie. Witek, 505-296-5198, humwet@comcast.net.

FORD EXPLORER, Eddie Bauer, white, tan interior, Michelle tires, complete service records, 107,700 miles, very good condition, $1,500. Vanwinkle, 505-296-5198, hensela@comcast.net.

FORD DURANGO CIVITADEL, black, leather, VR, sunroof, seats, 7,338 miles, excellent condition, $27,000. Webb, 505-221-8241.

MERCEDES BENZ ESS AMG, AT, 469-hp VR supercharged, white/ black, loaded, 93,884 miles, $35,000 OBO. Sedillo, 505-890-2699.

#4 TOYOTA 4RUNNER, S-ispd, 4x4, V6, sold drivetrain, exterior shows wear, dually driver, runs smoothly, 192k miles, $3,000. Wolfgang, 505-414-1483.

GOLD LUXURY CADILLAC DTS, sunroof, Bose-multi-CID, leather, heated/cooled seats, 1,006 miles, $10,500. Crenshaw, 440-3433.

PONTIAC GRAND PRIX GT, supercharged, loaded, heated seats, head-up display, well-maintained, 100k miles, $7,000 OBO. Musgrove, 505-814-4122.

REAL ESTATE


LAKEFRONT HOME, 1,500-sq. ft., 3426 Mountainside Parkway NE, $179,000. Walker, 918-244-3898, ask for David.

WANTED

CONCERT MUSICIANS, for community band, toba players needed, rehearsals on Tuesday evenings. Bliss, 259-0153 or 239-3555, ask for John.

LOVING HOME, beautiful female ragdoll kitty, 3 yrs. old, purebred, needs to be only pet. Harger, 238-3879.

WASHER, very good condition, not HE, $5.50 or $1 each day. 5-year-old, one owner preferred, owner’s manual & repair receipts required. Rodwell, 505-250-3737.


HANDYMAN, for miscellaneous household repairs. Kaplan, 298-7953.

New Mexico photos by Michelle Fleming

California photos by Dino Vournas


LASERJET 4L PRINTER, gently used, $45; Brother plain paper fax machine, $45. Molina, 292-4117.

NEW MEXICO 3-BDR. HOME, 1,644-sq. ft., near base, $298,795. Walker, 918-244-3898, ask for David.

REAL ESTATE

WANTED

Handyman, $50. Kaplan, 505-332-0773.

HANDYMAN, for miscellaneous home repairs. Kaplan, 298-7953.

MILEPOSTS

New Mexico photos by Michelle Fleming

California photos by Dino Vournas

Anthony Comer 30 1522

Dave Jones 30 2953

Russ Skypescy 25 150

Dora Wilemann 25 5754

Garth Kircher 45 8315

Mary Compton 25 9524

Max Decker 25 5780

Jeff Downs 25 2223

W. Philip Kegelmeyer 25 8900

Kevin Malone 25 5963

Kevin Francis 20 1314

Christine Northrop 20 10615

Anita Reeve 20 4135

Gary Finley 45 8315

Len Napolitano 35 8900

Karen Erickson 15 5146

Dora Wiemann 25 1832

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Save Sandia Lab News

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‘A fascinating time’

Sandia was a pioneer in the dawn of a new, diverse workforce

By Nancy Salem

Sandia played a key role in the early years of the affirmative action and equal employment movement as one of the first organizations to sign on to the Plans for Progress (PfP), a strategy created by US employers to end discrimination and build job opportunities for minorities.

“Ivory Alexander (6523) worked during his career to increase opportunities for African Americans at Sandia. His efforts coincided with affirmative action policies being put in place. “I was in the right place at the right time,” he says.

“Sandia has been exceptional in its efforts to recruit and hire African Americans and other minorities,” says Ken Holley (35553), who joined the Labs in 1985 and devoted much of his career to recruiting. “We’ve been willing to hire the talent we helped produce through the early minority programs. To do what we have to do, we have to increase the number of minorities with graduate degrees in engineering and science, and we have to do it from within the national laboratory. It was not easy, but Sandia was willing to push against the external and internal challenges.”

The earliest record of a non-discrimination policy at Sandia Corp., then operated by Western Electric Co. for the US Atomic Energy Commission (AEC), came in a Jan. 25, 1951, letter. It read, “The management of Sandia Corporation has always been a sincere effort to select the best qualified candidate for each vacancy regardless of race, color, or creed. In the future, we will continue to observe this policy and make sure that no group is treated unfairly.”

A July 15, 1954, letter to Sandia holds the first reference to the policy being a requirement of AEC contractors: “The policy of the United States Government is to promote equal employment opportunity for all qualified persons seeking employment or employed in connection with government contracts.” It continued that contractors will “not discriminate against any employee or applicant for employment because of race, creed, color, or national origin.”

In 1961, President John F. Kennedy issued an executive order requiring that provisions of non-discrimination in employment be included in all new government contracts. The order included the first use of the term “affirmative action” to achieve non-discrimination. Around the same time, Western Electric became one of the original companies to join the PfP. Sandia moved from a policy of non-discrimination to one of affirmative action to address inequality. Sandia’s Plans for Progress was signed by Labs Director Sigmund Schwartz and President Lyndon Johnson in 1964 and announced to the workforce in the Oct. 9, 1964, Lab News.

A range of programs

Sandia and other PfP companies adopted a wide range of programs covering the recruitment, hiring, training, and promotion of African Americans and other minorities. A Sandia memo read, “In the area of affirmative action it has been said that advancing basic human rights to the full potential of our nation’s human resources capability even with the full cooperation of American business and industry will take many years. The problem is so great, so complex, so involved, and has been with us for so long, that great change will be necessary for many years to come.”

Sandia went on to launch a variety of equal employment — a concept that became part of the Civil Rights Act of 1964 and affirmative action acts — including sponsoring the Labs to tour by minority leaders, attending state and national conferences, organizing youth opportunity programs, and participating in community-based vocational guidance and training. Labs officials met with representatives of Bernalillo County, Job Corps, Manpower Development Training, and minority organizations to seek job candidates.

Ivory Alexander, manager of Network Centric Security System Design Dept. 6523, says among the most successful programs was One Year On Campus (OYOC), which allowed the Labs to recruit minorities with bachelor’s degrees, send them to a master’s, then bring them back to be members of the technical staff. Ivory was recruited from Michigan State in 1974 and earned a master’s in electrical engineering from Stanford in 1975. OYOC, which evolved into the Master’s Fellowship Program and opened to more people, was exclusively for minority candidates at that time, he says. “It was very attractive to me. I had a similar offer from Bell Labs but figured I’d give this place in the desert a try. That was 40 years ago.”

He says OYOC brought a large influx of African Americans to Sandia in the 1970s. “There was a small group of African American employees in the early 1970s who met with the Labs president about increasing the opportunities for African Americans at Sandia. That occurred in parallel with affirmative action policies being put in place. I was in the right place at the right time.”

Ivory recruited for Sandia the first 20 years of his career. The Labs had a list of Historically Black Colleges and Universities (HBCUs) where it focused recruiting efforts. HBCUs were established in the US in the mid-1800s to give African Americans access to higher education during the time of racial segregation. Sandia developed recruiting relationships with Prairie View A&M University in Texas, North Carolina A&T University, Howard University, and Tennessee State University.

Ivory says that becoming part of the Black Outreach Committee, now called the Black Leadership Committee, formed and helped recruits understand the Sandia culture. “While it wasn’t always easy in the early days to build a career at Sandia as an African American, the Labs environment has changed over time and a recognition exists today that the benefits of and contributions by a diverse workforce enable Sandia to fulfill its mission,” he says.

Lessons to learn

Shortly after joining Sandia, Ken became chairman of the Black Outreach Committee. He also headed HBCU recruiting, which brought more African Americans to the Labs in the 1980s. “We hired a lot of talented students who have been here now over 20 years,” he says.

But there were lessons to learn. The first was that African Americans needed more than just a primer on Sandia to form a lasting bond. “We thought all we had to do was put in a program and people would come,” Ken says. “But coming to New Mexico for an African American was like going to the moon. We learned we had to develop sponsors in addition to technical mentors, or else they would come and leave and never come back.”

Mentors showed the students where to live, shop, and socialize, and how to get around town. “This was right after the Civil Rights Act, so many of these kids were the first in their families to go to college, and we were grabbing them right then,” Ken says. “A lot of them didn’t have cars. We learned that the technical part didn’t mean as much as if you didn’t have a life. Mentorship brought them back, and kept them coming.”

Sandia was involved in other minority recruitment programs including the National Physical Sciences Consortium (NPSC), the National Consortium for Graduate Degrees in Electrical Engineering and Science (GCES), and the Science and Technology Alliance.

“We used whatever program was necessary at the time to make it work. In the early years we were an unknown entity. The kids on campus knew about Los Alamos because of the history of the atomic bomb, but not Sandia. We had a job to do,” Ken says. “About 25 Sandians were recruited at HBCUs and brought dozens of African Americans to the Labs. We were hiring into the OYOC program every year. It was a fascinating time.”

Ivory says the years following the launch of affirmative action and equal opportunity were compelling at Sandia and set the stage for continuing efforts to build a diverse workforce.

“Those were the days, and it’s been enjoyable. If I had the chance to do it again, I would.”