



Tree savers

JSC employees, through their paper recycling efforts, have saved almost 5,000 trees. Story on Page 3.



Drilling for dirt

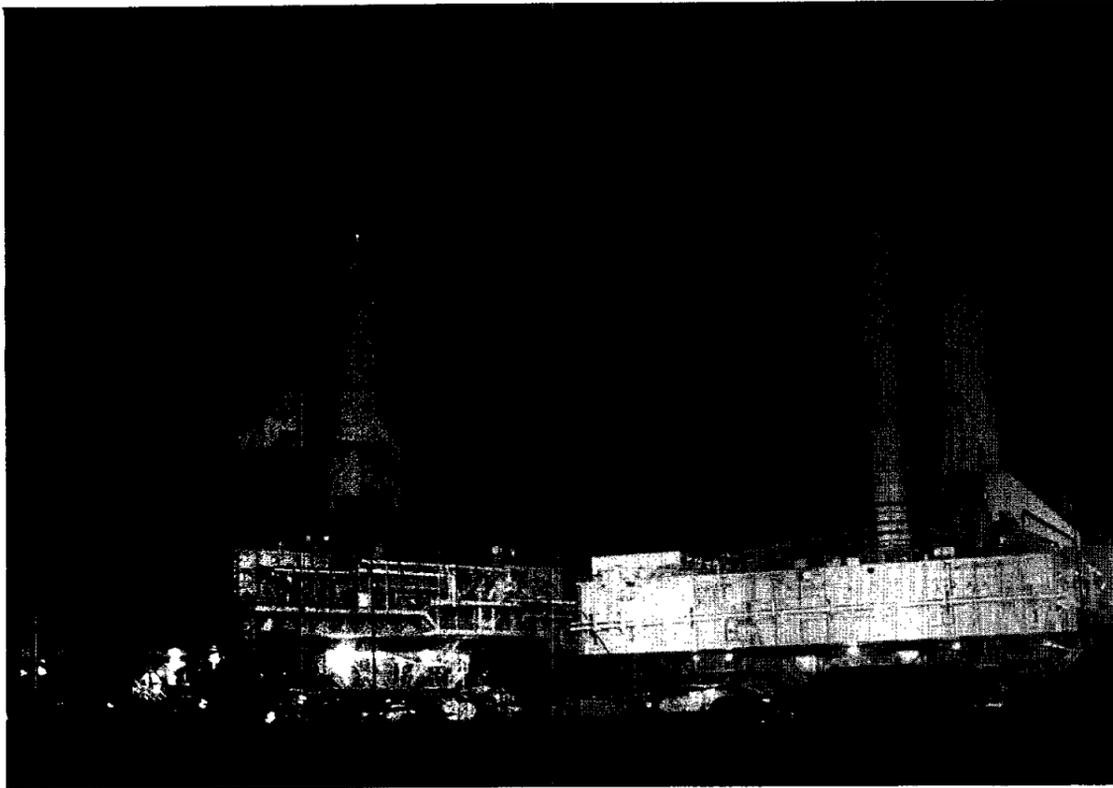
Drillers began taking soil samples between Bldgs. 3 and 4 this week to prepare for upcoming construction. Photos on Page 4.

Space News Roundup

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No. 33



NASA Photo

The Space Shuttle *Columbia*, left, rolls past *Atlantis* on its way to Launch Pad 39A at Kennedy Space Center. *Atlantis*, being readied for STS-38, is parked in front of the Vehicle Assembly Bldg. following its rollback from the pad for liquid hydrogen line repairs. While standing outside the VAB, *Atlantis* was caught in a hail storm that damaged some of its thermal protection system tiles.

Columbia nearly ready to set sail on 10th voyage

By Kyle Herring

As the STS-35 crew took part in this week's long simulation of the impending mission, launch pad processing of *Columbia* sailed smoothly toward a Sept. 1 launch.

Shuttle managers will meet Monday and Tuesday to assess the readiness of *Columbia*, the flight control team and crew to support the mission. An official launch target date is expected to be announced following the meeting Tuesday.

"Right now, we're floating

along right on schedule with no major problems," said Mike Conley, JSC vehicle manager for *Columbia*. "I think we're doing pretty well."

If processing continues to proceed smoothly and weather is favorable, launch would occur at 12:17 a.m. CDT on Sept. 1.

The helium signature leak check of the three space shuttle main engines began yesterday to verify the integrity of all shuttle systems.

The flight control team and crew this week practiced for the nine-day mission in a two-day, long-duration simulation.

The crew—Commander Vance Brand, Pilot Guy Gardner, Mission Specialists Mike Lounge, Jeff Hoffman and Robert Parker and Payload Specialists Sam Durrance and Ron Parise—will travel to the Kennedy Space Center about three days prior to the mission.

The Broad Band X-Ray Telescope was serviced early in the week with liquid argon for cooling of the instruments. BBXRT and the Astro-1 ultraviolet astronomy observatory will make around-the-clock observations and take precise measurements of

objects such as planets, stars and galaxies. The observations are expected to reveal the secrets of processes that emitted radiation thousands to billions of years ago.

After switching places with *Atlantis* on Pad 39A last Thursday, pad validation testing and shuttle interface testing were completed. Leak checks of *Columbia's* main propulsion and power reactant storage and distribution systems also were completed.

As *Columbia* was being prepared for its 10th space mission and 36th shuttle flight overall, *Atlantis* was returning to the Orbiter Processing Facility to await repairs on the flange seal of its external tank.

Atlantis will return to the Vehicle Assembly Building once repairs are made and is scheduled to launch its Defense Department payload in early November on the STS-38 mission.

Minor repair work to some of *Atlantis's* tiles will be made while in the OPF. The tiles were damaged during a hail storm before *Atlantis* could be moved into the VAB.

Discovery's processing continues toward its Oct. 5 launch of the Ulysses solar probe.

Leak and functional tests of the auxiliary power units are under way. The main landing gear doors were being rigged and tiles around the doors were being inspected. All areas of the vehicle are being closed out for roll to the VAB.

Discovery is scheduled to roll to the VAB next week for mating with its solid rocket booster/external tank stack. The shuttle stack is scheduled to be rolled to launch pad 39B prior to *Columbia's* launch from pad 39A.



STS-35
Astro-1

Lockheed shares quality keys

Total Quality Management efforts gaining steam

More than 250 executives from JSC's aerospace contractors and other industries met Wednesday to share information on the keys to a successful Total Quality Management plan.

The meeting was an indication that JSC and contractor efforts to implement TQM are gaining steam. The TQM Working Group has completed its analysis of how TQM can be applied to the center's work products and processes, and is prepared to recommend aggressive implementation of TQM principles, said Les Sullivan, chief of JSC's Management Analysis Office. The working group now is developing implementation recommendations for JSC Director

Aaron Cohen.

TQM is a widely recognized set of principles, processes and techniques that, when personally embraced by all of an organization's employees, can help bring about significant changes in work product quality.

NASA Administrator Richard Truly has targeted 1991 as the year NASA will try to win the President's Award for Quality and Productivity, and has directed a NASA-wide implementation of TQM in support of that goal.

Wednesday's meeting at South Shore Harbour Resort and Conference Center was hosted by Lockheed Engineering and Sciences Co., Houston, winner of the 1988/1989

NASA Excellence Award. Lockheed, which furnishes engineering and science services in support of space shuttle and space station programs, was the first service contractor to win the annual award.

Wednesday's meeting followed a three-day gathering in July at which Cohen and senior contractor executives discussed TQM as a strategic center issue.

At that meeting, Cohen asked the executives to react to his suggested goal of a tenfold increase in the quality of JSC's products and processes by 1995.

Of the 55 executives who responded to the survey, 77 percent

Please see **TQM**, Page 4

Hubble images ignite scientific excitement

The Hubble Space Telescope lit a fire of excitement in the scientific community this week when its cameras discovered a massive stellar nursery with almost 60 stars in a cluster formerly thought to include 27 objects.

Scientists at the HST Control Center Monday released four photos of a star cluster called R-136 in 30 Doradus— "The Swordfish"—which resides in the large Magellanic Cloud in the Southern Hemisphere.

The four photos are an unenhanced picture taken by Hubble, a closeup of R-136, the best comparable photo available from a ground-based telescope and a computer enhanced version that removes the "halos" from the stars in the photo.

"The image...has exciting scientific content and demonstrates that HST remains very, very much alive," said Ed Weiler, HST program scientist

The discovery comes as good news to the telescope team following weeks of controversy regarding a

spherical aberration in the telescope's mirror system that hinders the capabilities of the observatory's cameras.

"I heard the words when we announced the problem," Weiler said. "I heard the words that we would still achieve the resolution but a picture is worth a thousand words. I'm elated."

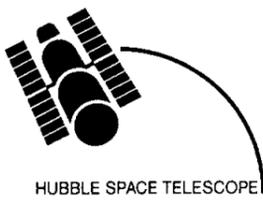
The discovery occurred Aug. 2 almost by accident during "target practice" with the Goddard High Resolution Spectrograph. The spectrograph team, while learning how to locate

objects with the instrument, snapped a 40 second exposure—short by astronomical standards—with the Wide Field/Planetary Camera to check their aim against established star charts.

Upon further late-night inspection of the photo, the astronomers were able to distinguish almost 60 stars in R-136 despite the mirror's flaw.

"We knew we were sitting on a pot of gold," said Sally Heap, a member of the spectrograph team.

Please see **HUBBLE**, Page 4



HUBBLE SPACE TELESCOPE



NASA Photo

ULYSSES LOOK—Technicians perform preflight checks and testing of the Ulysses solar polar explorer at Cape Canaveral Air Force Station prior to its move to Kennedy Space Center. Ulysses, now stacked with its inertial upper stage and payload assist module, is in the Vertical Processing Facility being prepared for installation in *Discovery's* payload bay. The European Space Agency-made probe is scheduled to be launched in early October. It will use a gravity assist from Jupiter to leave the ecliptic plane and sample the Sun's polar magnetic fields and measure the solar wind.

JSC studies impact of potential cuts

A law that requires the President to issue orders for massive federal budget cuts if the Congress has not enacted deficit control legislation by Aug. 25 has all U.S. government departments and agencies scrambling to predict the impact on their operations.

As part of the NASA exercise, JSC was tasked by Headquarters Wednesday to look at how the center would handle a Gramm-Rudman Act sequester resulting in spending authority 30 percent below fiscal 1990 funding levels.

Employee furloughs are among the measures NASA must consider, according to directions received from White House Budget Director Richard G. Darman. Results from similar exercises at all NASA centers will be considered by the agency's top management in framing NASA's response to the Office of Management and Budget directive.

Following a telephone conversation with Associate Deputy Administrator William Lenoir, JSC Director Aaron Cohen said, "Things are proceeding in a reasonable fashion. We are presently putting in place the planning actions necessary to implement a

Please see **BUDGET**, Page 4

JSC

Ticket Window

The following discount tickets are available for purchase in the Bldg. 11 Exchange Gift Store from 10 a.m.-2 p.m. weekdays.

General Cinema (valid for one year): \$3.75 each.

AMC Theater (valid until May 1991): \$3.50 each.

Sea World (San Antonio, year long): adults, \$17.25; children (age 3-11) \$14.75, (2-day \$18.95).

Astroworld (valid 1990 season): adult \$15.97; children \$9.21; season pass, \$39.95; Waterworld, \$8.15; two-day—AW/WW \$18.47.

Astroworld Discount Sunday 8/19/90 (see flyer with \$8 discount coupon).

End of Summer Fling (Sept. 1-3, South Padre Island): \$199. Breakfast, lunch, two nights at Bahia Mar Resort Hotel. Sunday breakfast buffet, Sunday dinner cruise, Monday lunch buffet at hotel. Dinner snack on return trip.

Deep Sea Fishing (Sept. 15, New Buccaneer): fishing \$45; riding \$20.

JSC

Gilruth Center News

Sign up policy—All classes and athletic activities are first come, first served. To enroll, you must sign up in person at the Gilruth Recreation Center. Everyone will be required to show a badge or EAA membership card. Payment must be made in full at the time of registration. Classes tend to fill up four weeks in advance.

EAA badges—Dependents and spouses may apply for a photo I.D. 6:30-9:30 p.m. Monday-Friday.

Defensive driving—Course is offered from 8 a.m.-5 p.m., Sept. 15 and Oct. 13; cost is \$15.

Weight safety—Required for use of the Rec Center weight room. The next class will be from 8-9:30 p.m. Aug. 23. Cost is \$4.

Aerobics and exercise—Both classes are ongoing.

Country and western dance—Lessons begin Sept. 10 and will be held every Monday for six weeks; cost is \$20 per couple.

JSC

Technical Library News

The following selections are now available in JSC's Technical Library, Bldg. 45, Rm. 100.

Successful Training Strategies: Twenty-Six Innovative Corporate Models, Jill Casner-Lotto, 1988.

Fast-Track Japanese [audiocassette], Peter Leimbiger, 1985.

Expert Systems: The User Interface, Ablex Pub. Corp., 1988.

Mathematical Methods of Classical Mechanics, V. I. Arnold, 1989.

Race to Mars: ITN Mars Flight Atlas, London Macmillan, 1988.

Flow-Induced Vibration, Robert D. Blevins, 1990.

Research in Structures, Structural Dynamics and Materials 1990, NASA, 1990.

Electrostatic Discharge and Electronic Equipment: A Practical Guide for Designing to Prevent ESD Problems, Warren Boxleitner, 1989.

JSC

Swap Shop

Swap shop ads are accepted from current and retired NASA civil service employees and on-site contractor employees. Each ad must be submitted on a separate full-sized, revised JSC Form 1452. Deadline is 5 p.m. every Friday, two weeks before the desired date of publication. Send ads to Roundup Swap Shop, Code AP3, or deliver them to the deposit box outside Rm. 147 in Bldg. 2. No phone or fax ads accepted.

Property

Sale: Wtfrnt. beach house on pilings, 3-2-3 on San Bernard River. 862-3929.

Sale/Lease: 3-2-2, Friendswood Wedgewood Village, 1,650 sq. ft., formal DR, new paint/carpet, \$64,900 or \$750/mo. Gretchen, 282-6650 or 482-6744.

Lease: Univ. Trace condo, 1 BR, study, W/D, D/W, fans, CP, \$450/mo. plus dep. 282-4616 or 488-2946.

Sale: Wtfrnt. lot, 80x150, Clear Creek Village. Bill, x31167 or 334-1307.

Rent: Lake Travis cabin, priv. dock, CA/H, equipped, accomm. 8, sum./fall, \$425/\$325 w/ky, \$85/\$80 diy. 326-5652.

Sale: Warehouse, 13K sq. ft. on 1.1 acres, Bayview, \$85K. 776-2375 or 339-1957.

Sale: Meadowbend, 3-2-2, blinds, fans, microwave, gar. door opener, 8.5% FHA assum. 538-1071.

Sale: Lake Livingston lot, Westwood Shores, 60x115, near lake, util avail., \$9,500, OBO. x30032 or x31834.

Sale: Dickinson, brick 4-2-2D, 2,800 sq. ft., open concept, FPL, trees, x31466 or 534-3932.

Sale: Dickinson, 2 acres, Humble camp RD, util. avail., trees, \$12K/acre. Shelly 333-7153.

Sale: Texas City, 2-1-1, den, encl. back porch, \$32,500, OBO. Shelly, 333-7153.

Sale: 60 acres on Hwy. 80, 3 mi. from Karnes, City, TX, 50 mi. from San Antonio; 2-story house in El Campo on 1.5 lot, fruit trees. 783-9164.

Sale: Cassco, ARK, 3-2, 3K sq. ft., 3 acres, duck capital USA, near lake/White River, \$89K. Dorothy Kerkisiek, (501) 241-3293.

Rent: Lake Livingston wtfrnt. house, 3-2, CA/H, furn., decks, pier, ex. cond., wknd./wk. rates. 482-1582.

Sale: Pasadena, 3-1-2, appl., furn. opt., new paint, fans, stor., priv. fence, \$45K, 472-6980.

Sale: Univ. Green, 2-1-2 patio home, new paint, blinds, fans, FPL, deck, \$76K, 480-7338.

Lease: 3-2-2, near JSC, new paint/carpet, \$595/mo. Minh/Danh, 484-4944.

Sale: Water view lots near NASA, mid \$30's. Don, x38039 or 333-1751.

Sale: Shoreacres, contemp., 5-4, study, mother-in-law suite on wooded acre, \$114,900, x38039 or 333-1751.

Sale/Lease: Owner fin., 1K sq. ft., new appl., carpet, fans, blinds, trees, near Lake Livingston. 992-1853.

Sale: Friendswood lot, Wilderness Trails Subdiv. 996-9157.

Sale: Missouri City, 3-2-5, 2 gamerooms/study, 9% VA loans. Jim, x32722.

Rent: BR in lg. house, tennis courts, W/D, maid, util. pd., \$270/mo. Eric, x38420 or 484-9179.

Sale/Lease: Friendswood/Wedgewood, 4-2-2, FPL, \$700 to \$725, dep. and ref., avail. end of Aug. x37041 or 996-0033.

Sale: 4-2-2 Mission Bend, assum. no app., no escalation, \$12K equity, \$728/mo., near Sugarland, FPL. 495-1040.

Cars & Trucks

'78 Honda Accord, 5-spd., air, needs work, \$500. x31945 or 482-5948.

'83 Chevy Malibu Classic, new tires, good cond., 101K mi., \$2K nego. 333-5710 or 333-6647.

Travel trlr., 15' dbl. bed, dinette, galley, potty, recent refurb., \$1,950. 326-1457.

'68 Mustang, 289, V8, 3-spd., AC, sev. new parts, \$2,500. x30852 or 996-0981.

'80 VW Rabbit, AC, ex. cond., many new parts, one owner, \$1,700. 486-5527.

'77 Cadillac El Dorado, ex. cond., \$4K. 486-4916.

'71 Volvo 144, 4--spd., air, good cond., \$800, OBO.

326-2180 or 474-6977.

'87 Pontiac TA, loaded, T-tops, sec. sys., ext. warr., 37K mi., \$9,200. Brian, 532-3507.

'69 Chevy Nova, PS, PB, auto., 4-dr., good cond., \$500, OBO. Jeannette, x35816 or 488-2509.

'85 Nissan Maxima, ex. cond., low mi., loaded, \$7,200. 488-2573.

'71 Ford Mustang, reb. 351c w/10K mi., good cond., \$2,200, OBO. David, 480-8278.

'84 Mazda RX-7, ex. cond., \$5K. Rick, 283-1988 or 996-8961.

'81 Plymouth Horizon, auto., AC, 77K mi., ex. cond., \$1,400. Mary, x33360 or 481-3859.

'79 Toyota Corona, deluxe model, 4-dr. liftback, auto., good cond., low mi., \$1,950. 333-7480.

'89 Acura Legend 'L', auto., 9K mi., ex. cond., \$23,500. x37487.

'87 Trans Am GTA, 350 TPI, new tires, ex. cond. 332-1187.

'88 Toyota Celica, 20K mi., ex. cond., warr., \$8,995. x37432 or 480-7213.

'83 Chev. Bonaventure, 8 pass. window van, dual air, 305 V8, auto., good cond., \$3,400. Bob, x36527 or 482-6730.

'87 Volvo 245 GL, ex. cond., loaded, \$12,300, OBO. Scott, 283-5611 or 482-1809.

'80 GMC van Rally STX, 8 pass., loaded, x33656 or 486-8276.

'86 Mazda SE5 PU, 5-spd., longbed, mags, ex. cond., 46K mi., \$4,700. 480-5215.

'65 Mustang, reb. 6 cyl., 3-spd., some new parts, \$3K, OBO. Rob, x30762 or 486-1847.

'80 Mazda 626, new paint/int., \$350. (409) 925-4784.

Cycles

'78 Yamaha, 80cc, runs but needs work, \$50. 486-4940.

'84 Harley Davidson FXRS Lowrider, 4,600 mi., ex. cond., \$5K. Vince, 484-3575.

'85 Honda Shadow, 700cc, 35K mi., \$450. Daniel, x38835 or 482-8494.

'80 Kawasaki 440, needs batt. carb. clean, \$200; '80 Yamaha 650, needs batt. tune-up, \$300. 486-1756.

27" Schwinn World Sport 10-spd., ex. cond., \$125; 27" Schwinn Le Tour 10-spd., good cond., \$100. Ruben, x33829 or 486-0817.

Boats & Planes

'59 Duracraft, galv. tr., 40hp Johnson, \$700. Sean, 480-8190 or 996-7693.

'72 Crestline 19' boat IB & OB, 165hp, ex. cond. 862-3929.

Lido-14 sailboat, sails, trlr., cntrbd. sloop, loaded, \$2,100. R. Hoover, x31360 or 996-7716.

'85 Wellcraft 180 Elite, 170 I/O Merc., ex. cond., trlr., \$9,200. 332-3730.

17' canoe w/sailing rig, 482-6671.

'14 Chrysler sailboat, trlr., 2 sails, good cond., \$800. Doug, x39173 or 486-4316.

'88 Larson D.C. 204 cen. console, 200hp Evln. tandem axel EZ loader, VHF, Lorán, sonar, sel. for payoff. Mike, 333-6821 or 326-3474.

19' Prindle Catamaran, race rigged incl. 1 dacron main, 2 jibs, trlr. w/sail box, \$4,500, OBO. Mike T., 333-6246 or 480-5615.

Aircraft propeller, Sensenich 74DM6-0-58, fits some Beech, Piper PA-18, PA-22, PA-28 series aircraft, \$900. 538-2299.

Audiovisual and Computers

Atrani 800 computer w/cass. drive, \$100, OBO. Gretchen, 282-6650 or 482-6744.

Macintosh 512K computer, ext. 400K drive, SW, \$550, nego. 333-6171 or 474-2631.

Star NX-1000 multi-font NLQ printer, IBM compat, w/cable I/F, ex. cond., \$150. Lonnie, x37876 or 482-0547.

386-20 MHz PC compat., 40 meg HD, 1 meg mem., 1.2 floppy, 800x600 VGA, 14" color monitor, \$1,600. Charles, x33599 or 474-9259.

Compaq 286, 1 meg RAM, tape backup, 70 meg

JSC

Dates & Data

Today

Cafeteria menu—Special: meat sauce and spaghetti. Entrees: baked scrod, liver and onions, fried shrimp. Soup: seafood gumbo. Vegetables: green beans, buttered broccoli, whipped potatoes.

Monday

GEHA service—A Government Employees Hospital Association (GEHA) representative will be available to answer your questions about claims, benefits, and service provided from 9 a.m.-noon and 12:30-4:30 p.m., in Bldg. 45, Rm. 116. For more information, call Bob Musgrove, x33057.

Cafeteria menu—Special: wieners with baked beans. Entrees: beef chop suey, breaded cutlet with cream gravy, grilled ham steak. Soup: beef and barley. Vegetables: buttered rice, Brussels sprouts, whipped potatoes.

Tuesday

Cafeteria menu—Special: pepper steak. Entrees: fried shrimp, pork chop with applesauce, turkey a la king. Soup: celery. Vegetables: au gratin potatoes, breaded squash, buttered spinach.

Wednesday

Astronomy Seminar—The next JSC Astronomy Seminar will be an open discussion meeting from noon-1 p.m. Aug. 22 in Bldg. 31, Rm. 120. For more information contact Al Jackson, x33709.

Threshold Group meeting—The Threshold Group coordinating committee will meet at 4 p.m. Aug. 22 in Bldg. 45, Rm. 351. Proposed changes to the Threshold charter will be discussed. For more information, contact James Sturm at x33085.

BANN meeting—BANN, the Bay

Area National Association of Female Executives Network, will meet at 6 p.m. Aug. 22 at the South Shore Harbour Country Club. Susan Spencer, executive director of Partners in Space, will speak. For more information call Wanda Spain, x31025, or Kathy Rogers, 335-8568.

NMA meets—The JSC chapter of the National Management Association invites non-members to a dinner meeting at 5 p.m. Aug. 22 at the Gilruth Recreation Center. JSC Deputy Director Paul J. Weitz will discuss "The State of the Center." Dinner cost is \$8. For reservations or additional information, contact Sue Leibert, x33037 before noon today. Current members should contact their boosters.

Cafeteria menu—Special: Mexican dinner. Entrees: fried catfish with hush puppies, braised beef ribs. Soup: seafood gumbo. Vegetables: Spanish rice, ranch beans, buttered peas.

Thursday

Solar System seminar—The Solar System Exploration Division Seminar Series will present Dr. David Talent, Lockheed, speaking on "The Debris Collision Warning Sensor Experiment: How it Will Help Us Understand the Orbital Debris Environment and How We Will Apply What We Learn to Space Station" at 3:30 p.m. Aug. 23 in Bldg. 31, Rm. 129. Call Nadine Barlow, x35044, for more information.

Cafeteria menu—Special: hamburger steak with onion gravy. Entrees: corned beef with cabbage and new potatoes, chicken and dumplings, tamales with chili. Soup: split pea. Vegetables: navy beans,

buttered cabbage, green beans.

Aug. 24

Heritage day—Asian Pacific American Heritage Day will be observed from 8:30 a.m. to 4:30 p.m. Aug. 24. The theme is "Reaching for the Stars in the 1990s." Tickets for the luncheon at 11:30 a.m. are \$7 and must be purchased by Aug. 20. Contact Freda Marks for more information at x30606.

Cafeteria menu—Special: barbecue link. Entrees: deviled crabs, broiled codfish, liver and onions. Soup: seafood gumbo. Vegetables: buttered corn, green beans, new potatoes.

Aug. 28

BAPCO meeting—The Bay Area PC Organization will meet at 7:30 p.m. Aug. 28 at the League City Bank and Trust. For more information call Earl Rubenstein, x34807, or Tom Kelly, 996-5019.

Aug. 29

JSC Astronomy Seminar—The JSC Astronomy Seminar will feature a Rice University videotape of Dr. P. Olson discussing "Geodynamical Consequences of Core-Mantle Interaction" from noon-1 p.m. Aug. 29 in Bldg. 31, Rm. 129. For more information, contact Al Jackson, x33709.

Sept. 5

AIAA/NASA Conference—The American Institute of Aeronautics and Astronautics and NASA will sponsor a conference of Innovative Technologies for the Exploration of Space Sept. 5-6, at the Ramada Renaissance Techworld in Washington, D.C. For more information, call Leslie Tavenner at (202) 646-7453.

HD, 1.2 meg floppy, 101 kybd., \$1,500. 339-1337.

AT&T 6300, IBM compat., 640K RAM, 30 meg HD, 1 floppy drive, CGA graphics, SW, \$900. David, 280-2266 or 332-3072.

XT clone 10 MHD 360 K FD 1/4 monochrome monitor, Okidata 182 prtr., SW, jg stick, \$800, OBO. 486-1756.

Apple IIE 64K, Amdek color monitor, 2 disk drives, Language Card, SW, \$400. x36077 or 326-2162.

Commodore MPS1000 Dot Matrix, B&W printer, IBM & C-64 interface, \$150. Carl, x37095 or 332-1487.

Hilachi port. video cass. rec. (VHS) w/video cam., 4 hr. batt., \$200, OBO. Lonnie, x37876 or 482-0547.

Microsoft Word 4.0/\$75; Quick Basic 4.0/\$40; Macro Assembler, \$75. Martin, x31692 or 488-0949.

Apple III comp., incl. kybd., soft & hard disk, monitor, printer, microsoft, 3 E-Z pcs., AC surge protector, \$600. 487-2197.

Magnavox Camcorder, ex. cond., \$650; PC-XT w/color, 20m HD, 640K, \$900. James, 554-2929.

Musical Instruments

Guitar amp, Peavey, used 1 mo., \$100. 488-6917.

King Comet mod. #603, good cond., stand, case, \$300. Estrella x31636 or 481-8595.

King French horn, good cond., case, stand, \$725 nego. 484-6729.

Mini baby grand piano, Italian made Crumar, rosewood casing, 7 elec. choices, \$1,500. x31045 or 454-5832.

Artley clarinet, ex. cond., \$250, OBO. x31593 or 480-6292.

Alto sax E flat w/case, ex. cond., \$450, OBO. 534-2985.

King trombone, \$85. Gary, x33786 or 499-5786.

Yamaha V50 synthesizer, 16-note/8-voice multi-timbral polyphony, built-in 8-track sequencer, 800 total voices, performances, and rhythm patterns, \$1,150. Martin, x31692 or 488-0949.

French horn-Holton model H179, ex. cond., 3 mouth pieces/case, \$1,500. Michelle, x38289 or 585-4936.

Pets & Livestock

Zebra finches, white w/brn. doves, guinea pigs, \$5/ea. Jim, 282-3750 or 482-6744.

Exotic registered Vietnamese miniature pot-bellied pigs, breeders & pets avail., \$1K-\$3K/ea. James, 282-3750 or 482-6744.

Free, 2 kittens, 1 M, 1 F, all white, 8 wks. old. x31385 or 947-2025.

AKC Chihuahua pups, approx. 4 mosl old, shots, wormed, dipped, \$100-\$150 cash; male AKC Chihuahua w/floppy ears, free to older person or couple. 534-3893.

Hand fed baby cockatiels, very tame, grays, peds, cinnamon. Linda, 484-7834.

Free adorable kittens. 488-2963.

Mini-top rabbits, and New Zealand. 554-6200.

Household

Queen sz. matt., frame, ex. cond., \$75; antique dresser, \$250, chairs. 488-6917.

Kenmore washer, elec. dryer, good cond., \$150. Laurie, x32426 or 996-8807.

Antique lg. diameter bent brass bed, dbl. w/matt., \$300; fam. entertainment center, AM/FM, changer, reel-to-reel, \$80. Samouca, x35053 or 482-0702.

Queen sz. box spring/matt., \$100, OBO. x38918 or 482-9447.

Queen sz. wtrbds. w/sheets, incl. side railings, bkcs. hdbd., \$100. Kim, 283-5703 or 559-2764.

Girl's BR suite, single bed, canopy frame, chest w/6 drws., cab. w/hutch, pale green, yellow checked bedspread, pillow sham, lamp, \$150. 286-1506.

Brn. wood daybed w/matt., \$250, good cond. x38243 or 482-8490.

Wood kingsz. hdbd., contemp., bed spread, lt. blue, \$100 nego. Tom, x33208 or 388-2005.

Girl's yellow BR furn., 6-dwr. dbl. dresser w/mirror, 2-dwr. night stand, full hdbd., ex. cond., \$375. 282-3788 or 480-2188.

2-dwr. end table w/remov. glass top, 18x26x21; hexagon end table w/2 door access, int., 20x18; coffee table w/dwr., 48x20x18; 2 lamps w/shades, 34"x40". 532-1994.

Willow rocking chair, blue w/floral cushions, \$115. 480-8845.

Macy's print sofa, \$125, OBO; tan recliner, \$75, OBO; microwave, \$150, OBO; taupe balloon curtain/rod, \$25, OBO, all ex. cond.; solid wood coffee table, \$20, OBO. Jan, x32429 or 992-3522.

Kenmore W/D, clean, \$150/ea. 332-6530.

Girl's French Prov. canopy BR suite, \$175, OBO; Simmons queensz. sleeper sofa, ex. cond., \$200; 2 3x3 glass top coffee tables, \$50/ea.; 2-dwr. walnut stained file cab., \$40. Susan, 283-5704.

Photographic

135mm lens for Canon cam., bayonet mount, \$30, OBO; 2 cam. bags, BO. Bryan, 333-7152.

'80 Canon F-1 Winter Olympics Model w/50mm f1.8 lens, \$250; Nikonos IV A underwater cam. w/35mm lens. Carl, x37095 or 332-1487.

Wanted

Want source of fresh unpasteurized goats milk or cows milk. 280-2228.

Want a ride home from work everyday, Pasadena area near A.C. Collins Ford, will pay, 7:30 to 4, can flex. hrs., location Bldg. 4, x25893 or 472-5205.

Want steel guitar player for prog. country band. Steve, 335-2250 or Dennis, 335-2229.

Want '88 or '89 Mazda GXL RX7, low mi., ex. cond., w/maint. rec. x37611.

Want riders for vanpool, SW side and Braeswood to CL/JSC. Rudy, 335-4113.

Want daybed w/trundle. 554-6200.

Want roommate to rent room, all util pd., wkly. maid ser., \$270/mo. Eric, x38420 or 484-9179.

Want Brownie uniform, sm. sz. Donna, 280-2554 or 332-6991.

Want to store sm. amt. of furn. for 12 mos. w/fee use of W/D. x35208.

Miscellaneous

Custom 460 Weatherby Lazer Mark, Express sights, \$1,400; Ducks Unlimited, sweet 16, unfired, \$1,400. 332-5057.

Sta. exer. bike, sewing mach., beer bottle collection (over 150 bottles, BO, together or sep. Bryan, 333-7152.

Pioneer stereo, \$1,700. (409) 925-4784.

Fiberglass camper top, fits 8' bed, \$100, OBO or trade for truck tool box. 486-4940.

Cerwin Vega 200W spkrs., 15" woofer, 2 2" drivers, new fac. woofers, grilles, \$300/pr.; Realistic 50W bookshelf spkrs., ex. cond., \$70/pr. Frank, x33573, x39924 or 480-9376.

Golf clubs, 2-9 irons, 1-4 woods, putter, bag, new grips, \$50. Larry, 282-4026.

Go-cart, 18 wheeler type tractor, trlr., \$500. Larry, 282-4026.

6 wood DR chairs w/vinyl seats, natural fin., \$100; used treated 5x9 poles, \$2/ea.; ext. entrance door, 10 panel w/hardware, \$50. Steve, x36725.

Sony carousel CD player, Mod. CDP-500, ex. cond., \$190. 332-9009.

Shower doors, sliding glass, 2 sets, 58"-3 panel w/hdr., \$60/ea., \$110/pr.; auto. AM/FM ster. cass., \$20; rollup blinds, 4 white vinyl, 3x6, \$4/ea., \$12/set. Mario or Sue, x32799 or 532-1725.

Sears Coldspot freezer, 22.3 cu. ft., \$250; sleeper couch, \$65. Mario/Sue, x32799 or 532-1725.

3 60x40 Hamilton drafting tables, 1 wooden, 2 metal, \$125/ea. 996-6853.

75 cntry. west rec., 50's-60's-070's, \$50. 333-3017.

U.S. coins from 1800's to present, from Indian cent to like dollar, cir./uncir. 283-0265 or 488-4859.

Marquis diamond pendant, .50C; diamond eternity ring, 1.04C; diamond earrings, .40C. Dorothy, x38258.

Opal diamond cluster ring, .80C; pear shape opal earrings, pierced. Dorothy, x38258.

Pumpmaster 760 pellet-BB gun, ex. cond., \$30; bow/

arrow set, 15 lb. pull w/5 vacuum arrows, \$20. Aaron Brown, 944-0493.

Antique primitive blanket chest, \$135; country pine bench, \$45; sewing table, \$30. 996-1442.

Royal Academy elec. typewriter, port. w/case, \$45; 10-spd. bike, \$40; Smith Corona SC110 elec. port. typewriter w/case, \$75. Kathy, x36046 or 486-9890.

4 sets of rims, blk. wire mesh, Amer. Racing, 5 lugs, 14", \$280. Rick, 283-1988 or 996-8961.

Sears lifestyle skier/rower, ex. cond., \$175. Brent, x36456 or 486-0389.

Computer desk, ash wood, \$85; Sears upright vac. cleaner, \$35; Med. nightstand, \$30; '50's rocking chair, needs spokes, \$15; lg. dog house, \$30. 538-1071.

Exer. bike, w/digital comp. read out, \$125; motorcycle helmet, approved, lg. sz., new. x31367 or 996-1410.

Shop vac, wet/dry vacuum cleaner, good cond.; trampoline, 38" round, steel frame, padded vinyl cover, new. x31367 or 996-1410.

2000 PSI press, washer, 8hp Honda 50' hose/gun, \$1K, OBO. Mike, 333-6821 or 326-3474.

'81 ski nautique anniv. model, 450 hrs. Mary, 363-1480.

Executive chair, brn. fabric, swivels/tilts, \$100. Wayne, x31834.

T86 front fiberglass fenders, \$100/pr.; new soft top, \$100; racing wheels, set of 4, \$100; misc. parts, BO. 333-7480.

Childcraft conv. crib/toddler bed w/drws., dresser, desk, white w/multi-colored trim, ex. cond., \$300. 480-4536.

Sears lifestyle treadmill, 2800, auto-incline, 2 mos. old, \$400. x37467.

Diamond Marquis wedding ring, 3 rings sutured together, 7/8C. Lea, 333-7306 or (409) 925-6403.

Jobst extremity pump w/gauntlet, ex. cond., \$100. Earl Rubenstein, x34807 or 326-2354.

Baseball cards, curr. and older players. B.J., x34825 or 771-3279.

Henredon bev. glass & brass cocktail table, trad., ex. cond., \$200; tub/shower enclosure, clear glass fixer enclosure, 57" or smaller, ex. cond., \$50. 486-8865.

Free 1 inch fish for African aquariums. Andy, x34423 or 532-3120.

Lg. oak desk w/chair, \$50. Judy, 554-7318.

Uphol. kingsz. hdbd., lt. coral, ex. cond., \$75, OBO. 480-9184.

Celestron astronomical telescope, 1000mm, coated lens, eye pc., cam. adapter, \$450. 486-1756.

Fling, 4 diamonds, 3 sapphires, sz. 6, \$80; rabbit fur coats, white w/tan stripes, sm. \$

Success Story



JSC employees make recycling program a tree-saving success

By Barbara Schwartz

JSC's paper recycling program is on the verge of breaking even after less than a year, and organizers say much of the credit goes to the center's employees.

"We have saved 4,964 trees," said Ron Williams, chairman of JSC's Paper Recycling Committee, proudly acknowledging the success of the paper recycling program. By the end of June, 292 tons of paper had been saved and turned in for recycling. It takes 17 trees to make one ton of paper.

"We (the recycling committee) really thank the employees at JSC for making this a success and making our job easy," Williams said. "We had people anxious to participate before we were ready to let them participate."

Williams said the committee has been overwhelmed by the acceptance of the program. The pilot program began in October 1989 with Bldgs. 45 and 227. From October through January more than 40 tons of paper were collected from those locations. In January, Bldg. 4 was included and eight additional tons were saved in that one month.

Williams said the program will reach the break even point in December 1990. JSC receives credit for the recycled paper against its custodial contract. "We don't actually make any money. We just pay out less and reduce the cost of the custodial contract," he said.

Diversified Management Services, JSC's custodial contractor, handles the collection, and Best Waste is subcontracted to haul the paper to the recycler.

"Center Operations' budget is to serve the center; therefore, any money we save is put back into building more facilities, better maintenance and operations, buying more paper, and better services," Williams said.

The total credit to date, not counting the cost of the program, is about \$43,000. After December, Williams expects the yearly credit to be in the \$40,000 range. It will be that low because the value of the paper has been

reduced.

When the program began, recyclers were delighted to get the high-quality paper from JSC. Most of the paper they had been getting was composition notebook type paper. The recycler was willing to pay \$160 per ton for the paper. Since then, recycling has become popular, and with the increased supply, the price per ton has been reduced to \$100. Therefore, instead of making the anticipated credit of \$85,000, the value has been cut about in half.

"That's fine—we're saving trees, helping the environment, saving landfill, and reducing the cost of the government's operation," Williams said. The price of paper could go as low as \$46 a ton, and the program would still

pay for itself. However, Williams said there also are intangible savings for which a value has not been established. Before the recycling program started, Best Waste took the paper to a landfill, which reduces landfill fees and requires fewer trips, further lowering cost to JSC.

The method of operation and the amount of savings have improved with refinements made after lessons learned during the pilot program. The custodians collected regular trash one day and the paper the next. Having to lift heavy containers of loose paper and emptying them into dumpsters near each building caused problems and was time consuming. At the end of the pilot program, the credit was minimal—about \$300-\$400 for about \$6,000 worth of work.

The committee studied ways to streamline the system. An investment in toters, the beige



containers with wheels and lids, were part of the solution for making the system easier. As the toters are filled, the custodian takes them outside and attaches them to the building.

At the end of the day, information on how many toters need to be picked up at which buildings is given to the custodial supervisor. Then a compiled listing is given to Gary Jones, who spends about four hours each evening taking the toters to the compactor and returning

them to the appropriate buildings. Trucks that normally sat idle at night are used, and Jones splits his time between emptying the toters and his other assigned custodial duties.

Williams said the new system is cost effective and much easier than the one used during the pilot program. He shares the expertise gained through the committee's careful planning and improvements with people who hear about JSC's successful program and want to start recycling at their facilities.

Lewis Research Center and the City of Houston have asked for information on JSC's recycling process. Williams and Pat Kolkmeier, who is temporarily assigned to the project in the Special Purpose Maintenance and Services Office, have received numerous calls from local contractors in response to a letter from JSC Director Aaron Cohen inviting them to make paper recycling part of their operation.

IBM, Lockheed, and Rockwell already had started recycling programs. Other companies wanted information on how to get their own programs started, and a few of the small contractors are bringing their paper on site and

incorporating it into JSC's system.

Another aspect of making the recycling process work is creating a market for recycled items. Directives from Washington are encouraging government agencies to buy recycled paper products. According to Williams, the market isn't there yet. Some of the paper used in JSC's print shop is made of recycled paper. However, Linda Massey, chief of the Supply and Materials Management Branch, says that recycled copy paper costs 50 percent more and the quality of the paper tested is below JSC's usual standards. Massey said she is constantly checking the market for quality, cost-effective recycled paper products. Tom Howe, Special Purpose and Maintenance Office, found the price of paper towels and bathroom tissue made from recycled paper to be approximately 20 percent more than the cost of new paper products.

Employees have been very enthusiastic about the recycling program and have contributed many more suggestions for other recyclable items, Kolkmeier said. Suggestions for recycling glass and plastics have been studied and found not to be cost effective. A pilot program for recycling aluminum cans is being planned by Exchange Operations. Details of the program, scheduled to begin in October, will be announced soon.

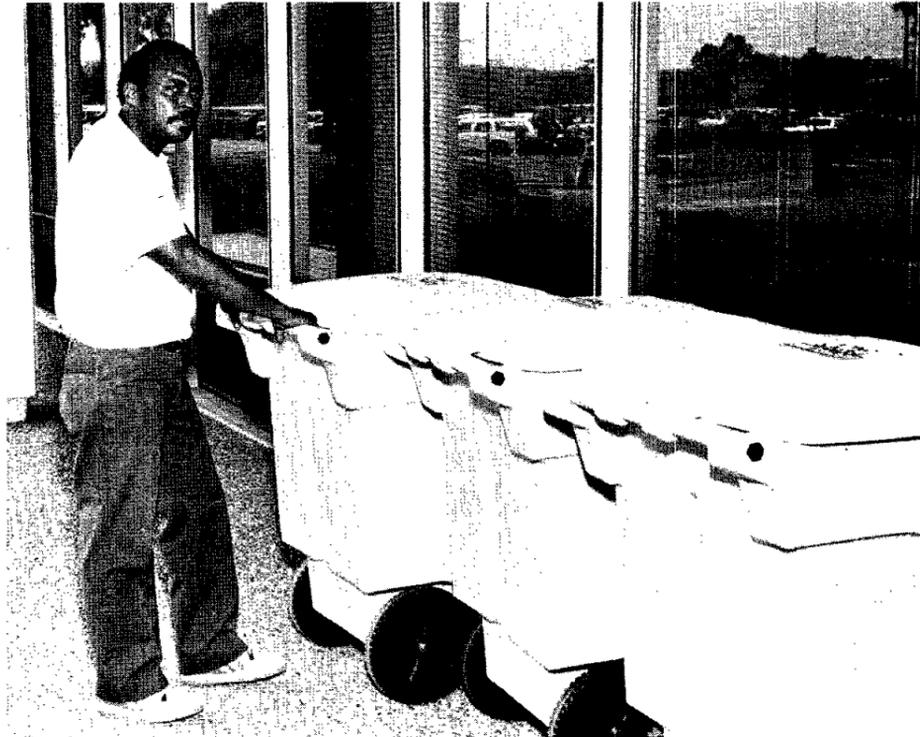
Kolkmeier said questions about recycling or requests for paper recycling supplies are being handled by the Special Purpose Maintenance and Services Office at x33206.

Williams said the JSC Paper Recycling Committee is being disbanded because its job is finished, but he wants to publicly thank the members for the outstanding service they performed. The members of the committee were James L. Doyle, Printing Management Branch; Mary A. Mueller, Logistics Division; Dale L. Martin, Television Office; Michael J. Scott, Patricia A. Kolkmeier, and Thomas L. Howe, Special Purpose Maintenance and Services Office.



Any money we save is put back into building more facilities, better maintenance and operations, buying more paper, and better services.'

—Recycling Committee Chairman Ron Williams



The paper recycling process at JSC starts with Diversified Management Services employees like Robert Phillips, top, who empty the individual recycling boxes into toters in the hallways of JSC buildings. When full, the toters are placed outside each building, left. DMS's Gary Jones empties the toters into a truck and transports the used paper to the on-site recycling compactors. At far left, DMS's Joe Montemayor prepares to dump a toter into a compactor. When the compactor is full, Best Waste transports it to a recycling plant.

Magellan bounces radar signals off Venus

Extensive mapping phase expected to begin by end of August

By Kelly Humphries

Magellan, poised to begin mapping Venus strip by strip, bounced its first radar signals through the murky atmosphere and off the planet's surface Thursday.

Program officials said Tuesday the orbital insertion was precise enough that a trim burn is not needed, which means the 243-day mapping phase can begin Aug. 29, two days earlier than expected.

Last Friday's 83-second solid rocket motor burn placed the spacecraft, launched by the crew of Atlantis in May 1989, in a near-target orbit of 159-by-4,391 nautical miles. It has an orbital period of 3.26 hours and an inclination of 85.5 degrees.

Only one problem was encountered

during orbital insertion, when the backup attitude control and articulation subsystem experienced a logic failure after separation of the solid rocket motor. The computer was reprogrammed to bypass the memory chip in question.

"It slipped right into orbit just like it was on a rail," said Ken Ledbetter, spacecraft team chief for Martin Marietta. "We're ready to start mapping now."

NASA's Deep Space Network station in California was the first to regain contact with Magellan after it flew over and behind Venus. The probe emerged at 11:53 a.m. CDT Friday.

The spacecraft will be operated out of Denver for the mapping phase.

Tony Spear, Magellan project manager at NASA's Jet Propulsion Laboratory, said controllers will need two more weeks to set up the spacecraft and radar. He also said he doubted that Thursday's "postage stamp" images would be of release quality.

"This team has worked very hard and has done a fantastic job," he said. Among others, Spear extended special thanks to STS-30 Pilot Ron Grabe and Mission Specialist Mark Lee for the part they played in deploying Magellan in Earth orbit.

Dr. Lennard Fisk, NASA associate administrator for space science and applications, congratulated the entire team on an outstanding job, and noted that Magellan's \$550 million primary mission is only the first step

in a space science renaissance.

"The plan has been to place an orbiter about every accessible body of the solar system, and Magellan is the beginning of that," he said.

Mars Orbiter will reach its target in 1993, Galileo will arrive at Jupiter in 1996, the Comet Rendezvous and Flyby mission will reach its comet in 2000 and Cassini will go into orbit around Saturn in 2002.

"From this day forward, there will be a U.S. planetary mission continuously about a significant body of our solar system... well in to the next century."

Fisk said Magellan should serve as an example of NASA's formidable success rate.

"We take on some of the most

technologically challenging activities of this generation," he said. "For the most part, we succeed very well as we did this morning putting Magellan into orbit around Venus. Occasionally we fall short. I hope that people are reminded when we do fall short of the many successes we have."

Magellan's instruments will cut 15-foot-wide and 10,000-mile-long swaths through the Venusian atmosphere that blocks visible light cameras. The radar images will be stripped together to form a mosaic of the planet's surface, believed to be rocky and volcanic. The primary mission will map 90 percent of the surface, and if approved a secondary mapping mission could cover the entire planet.

Finarelli named acting external relations chief

NASA Administrator Richard H. Truly has appointed Margaret G. Finarelli acting associate administrator for external relations. Finarelli has been deputy associate administrator since December 1988.

Kenneth S. Pedersen, associate administrator for external relations since November 1988, began a one-year teaching assignment as a Visiting Professor at Georgetown University, Washington, D.C., on Aug. 6.

In her new position, Finarelli will be responsible for the agency's intergovernmental, international and industrial relations, and educational activities.

Finarelli joined NASA in 1981 as chief of the International Planning and Programs Office. From 1986 to December 1988, she was director of the Policy Division in the Office of Space Station. She was NASA's chief negotiator for the international agreements that govern U.S. cooperation with Europe, Japan and Canada in the Space Station *Freedom* program.

Prior to joining NASA, Finarelli served in a number of positions in other U.S. government agencies including senior policy analyst for International Science and Technology at the White House Office of Science and Technology Policy and technical adviser at the Arms Control and Disarmament Agency.

HST discovers stellar nursery

(Continued from Page 1)

R-136 was originally thought to be a single massive star, curious in that the large star did not blow itself apart. In the early 1980s, however, astronomers using images from ground-based telescopes were able to distinguish about 27 stars in the area, still curious because of their perceived size.

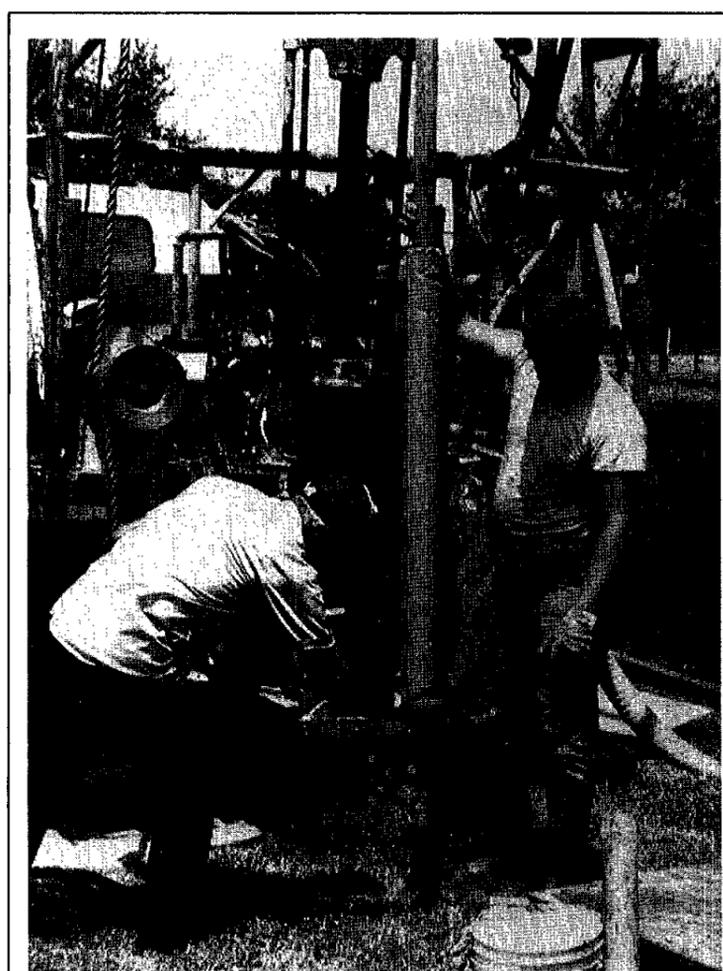
The area occupied by R-136 is about four light years across, equivalent to the area between our Sun and Alpha Centauri, our closest astronomical neighbor.

Heap said many scientists theorize that heavy stars break the mold. Once they form, no other stars of lower mass can form. Observations of R-136 and other formations in the Magellanic Cloud will unravel some of the mysteries of this cluster as well as give astronomers information about the origins of stellar bodies, she said.

"We've got a wonderful image of things to come," Heap said. "Stay tuned."

Weiler said the continued tests and calibrations of the telescope will tell controllers much more about the science capabilities of HST's instruments.

"I think it's true to say there's a myriad of important and unique scientific programs that we can do with our spectrographs, photometer and our astrometry device," he said. "I think our recent WFPC image is exciting because it also shows that on relatively bright objects we can do some unique science with the wide field camera and the faint object camera."



JSC Electronic Photos by Mark Sowa

DIRT DRILLING—Van and Son Drilling, a local contractor, took soil samples for JSC's construction experts this week between Bldgs. 3 and 4 in preparation for the construction of Bldg. 4B. Above: Louis Vanantwerp, left, and Ivan Nobel, use a drilling rig to take a core sample. Below: Lonnie Brown inspects one of the samples being taken to determine what kind of foundation will be needed to support the planned six-story building. The facility, which will be connected to Bldg. 4 by a three-story passageway, will house Mission Operations Directorate workers and astronauts. Construction is scheduled to start in April 1991.



Macintosh-DOS Integration to be featured at ISD expo

JSC's Information Systems Directorate will host a Macintosh-DOS Integration Expo in September to help users of both operating systems learn how to communicate more easily between the two platforms.

The exposition is scheduled to run from 9 a.m.-4 p.m. Sept. 12-13 at the Product Demonstration Facility in

Bldg. 12, Rm. 112.

ISD personnel and representatives of about 10 computer companies will demonstrate file conversion products, a DOS emulator and dual-platform products.

All JSC computer users are encouraged to attend as their workloads permit.

Rocketdyne receives contract extension to improve engines

NASA has awarded an \$818.9 million extension to an existing contract with the Rocketdyne Division of Rockwell International to continue efforts to improve the safety, reliability, performance and operational life of space shuttle main engines.

The extension provides for a four-year effort managed by Marshall Space Flight Center and covers work that began Jan. 1, 1989, under supplemental agreements to the original contract.

The main engine's successful performance record over the years has not stopped engine designers and project managers from pursuing improvements in areas such as increased durability and operating

margins.

Specific types of work being performed include design, analysis, laboratory testing and engine hot-firing. Three specific areas that are being looked at are the engine's high pressure turbopumps, the configuration of the engine's powerhead, and an improved concept for the oxidizer heat exchanger, which provides gaseous oxygen to pressurize the external tank.

Design changes to the engine must be thoroughly certified before they are implemented, and extensive hot-fire testing at Stennis Space Center is a key part of the certification process. The contract extension includes the operation of three engine test stands at Stennis.

KSC releases bid package for space station facility

Kennedy Space Center has reached a major milestone in preparations for Space Station *Freedom* work at KSC with the release of a bid package for construction of the new Space Station Processing Facility.

The solicitation package details the requirements a bidder must meet in construction of the new facility, which will be built in a "phased construction" plan extending three years.

The \$88 million facility, which will be in KSC's Industrial Area, is being designed for the processing of space station manned base hardware components.

To accommodate items ranging from unpressurized hardware to

pressurized modules, the SSPF will include both a high and an intermediate bay, and various laboratories. The SSPF also will process scientific payloads from around the world.

"The completion of design and the issuance of the invitation for bid marks a big step forward in KSC space station work," said Dick Lyon, manager of KSC's Space Station Projects Office. "A lot of hard work has gone into moving toward this step, and we are looking forward to seeing the actual construction get under way."

Prospective bidders have until Oct. 15 to respond. Procurement officials anticipate a contract award by Jan. 1, 1991, with construction beginning soon after.

TQM effort builds momentum

(Continued from Page 1) said they believe Cohen's goal is both challenging and achievable. However, 19 percent said the goal was not bold enough.

But 96 percent agreed that improving quality is an increasingly important issue for the U.S. space team and 85 percent agreed that a challenging common goal is important.

Survey responses indicated that 83 percent of JSC's contractors are exploring the technique of bench-

marking, or comparing their productivity to other organizations. Thirteen percent said they are aggressively pursuing that technique.

Robust design techniques to improve quality are being explored by 73 percent of the companies, and 12 percent are aggressively implementing those techniques. Work process analysis is being aggressively pursued by 33 percent, and 65 percent are exploring the use of that tool.

JSC reviews budget

(Continued from Page 1)

potential sequestration as required by law. There are no plans to implement any of these actions at this time."

Human Resources Director Jack Lister emphasized, "This is a planning exercise only. We have not been directed to take any action on possible furloughs, only to determine the options for responding to a sequester if it should occur."

The report will be published in the Federal Register.

NASA-JSC

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