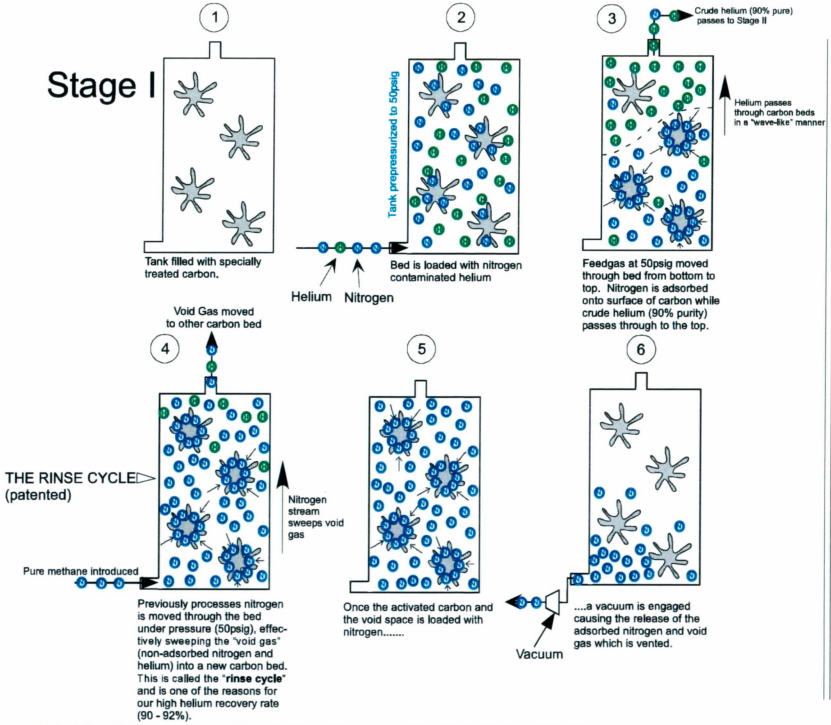
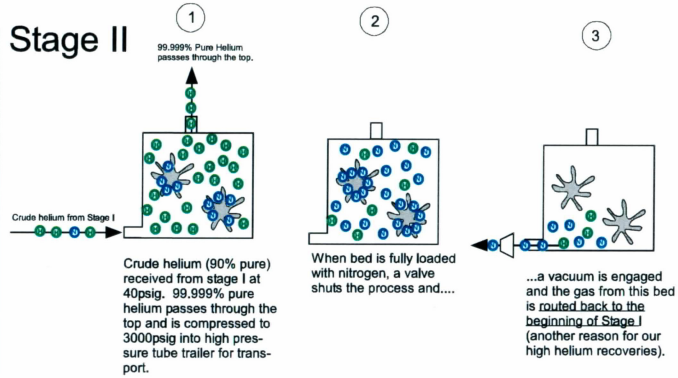
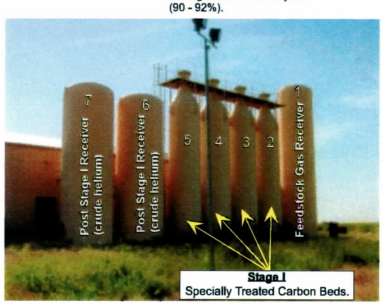
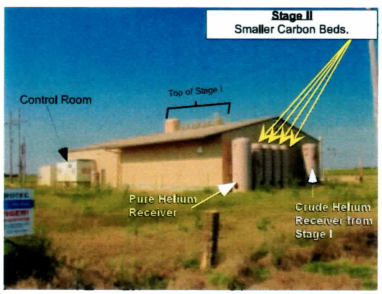
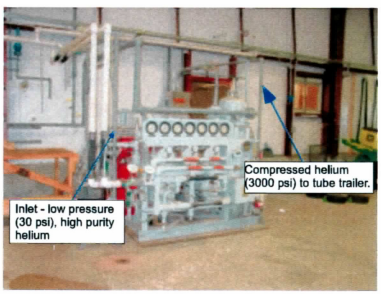










STAGE I of *Pressure Swing Adsorption* Process

Stage I of this pressure swing adsorption process occurs in vessels #2 - #5. Raw feed stock from the wells is received in vessel #1. This feed stock flows to vessels #2 - #5 under pressure (50psi). The pressuring process causes the *adsorption* of nitrogen, methane, CO_2, etc. onto the surface of the specially treated carbon material (helium is *not* adsorbed). Once the carbon material is fully loaded with non-helium gases, a vacuum is engaged and these gases are "desorbed" and vented. As multiple processes are ongoing simultaneously in Stage I, vessels #2 - #5 are always in fluctuating stages of adsorption, recycle, depressurization and evacuation.

Crude helium (>90% pure) is the product of this first stage and is received in vessels #6 & #7, ready for Stage II.....

STAGE II of *Pressure Swing Adsorption* Process

Crude helium (90% pure) from Stage I is taken through a second pressure swing adsorption process, with slight variations. After this process, Grade-M helium (99.999% pure) is received in the left-most vessel for compression.

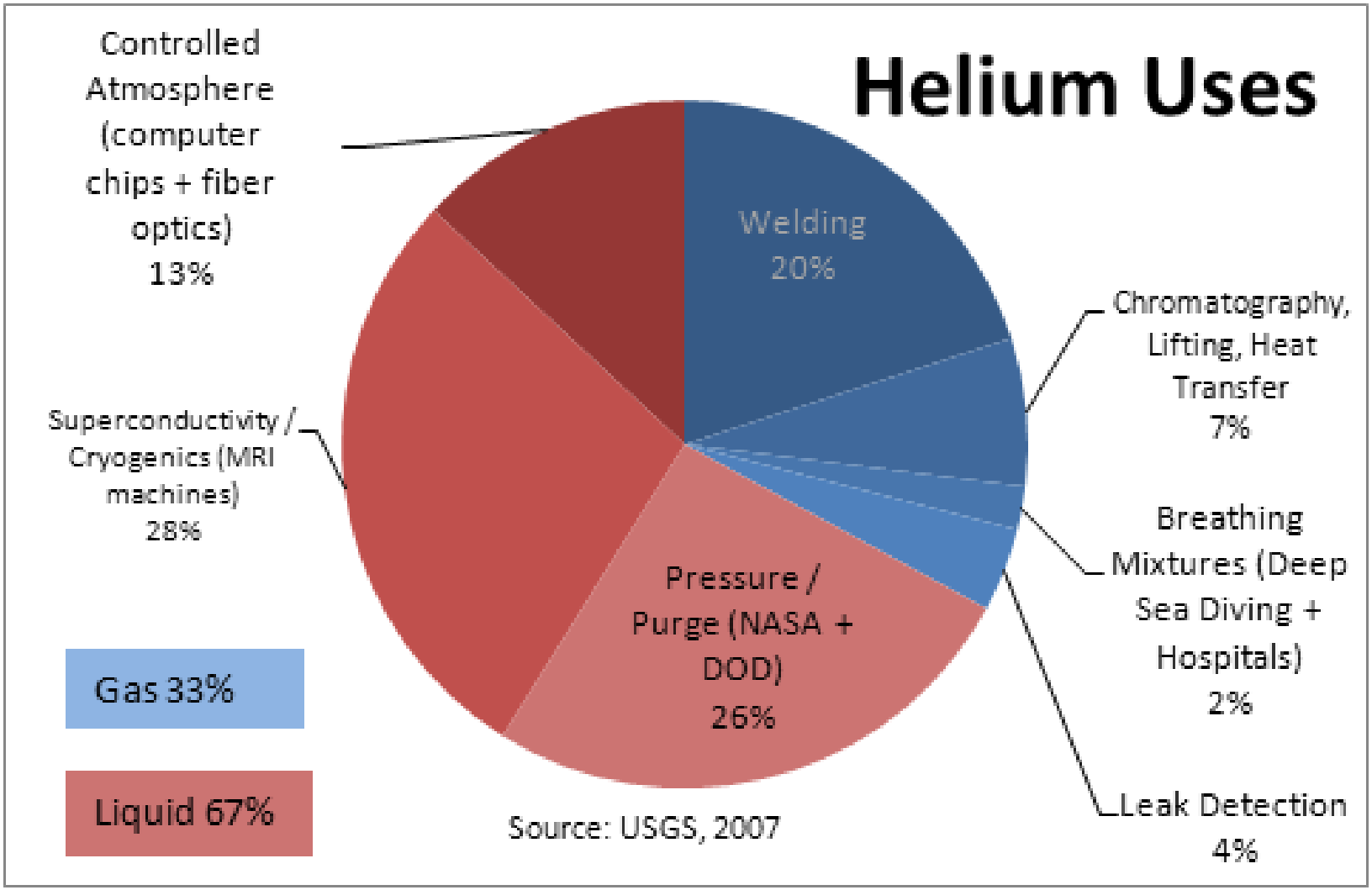
Note that the vessels in Stage II are much smaller than those in Stage I. Because Stage I has removed 90% of the "non helium" products, the feed stock (crude helium) for Stage II is a much smaller volume.

Two Stage Vacuum Pump

This vacuum system is critical to the Pressure Swing Adsorption process. As byproduct materials are adsorbed onto the surface of the specially treated carbon material under pressure, they are desorbed (or released from the carbon) during the low pressure swing (vacuum).

High Pressure Helium Compressor

Here, the Grade-M helium from Stage II is compressed from 30psi to 3000psi. It is then stored to be picked up in high pressure tube trailers.

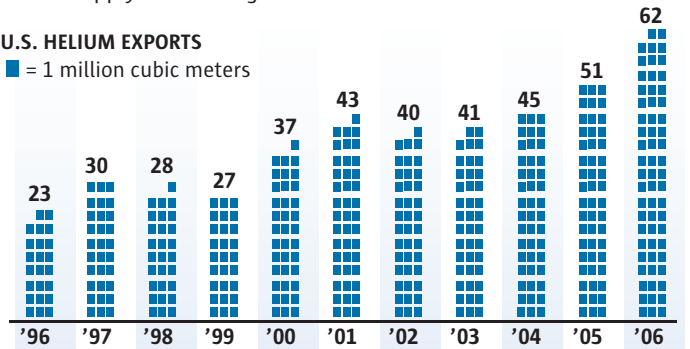

Helium Uses
Controlled Atmosphere (computer chips + fiber optics) 13%
Welding 20%
Chromatography, Lifting, Heat Transfer 7%
Superconductivity / Cryogenics (MRI machines) 28%
Breathing Mixtures (Deep Sea Diving + Hospitals) 2%
Pressure / Purge (NASA + DOD) 26%
Gas 33%
Liquid 67%
Source: USGS, 2007
Leak Detection 4%

A shrinking helium stockpile

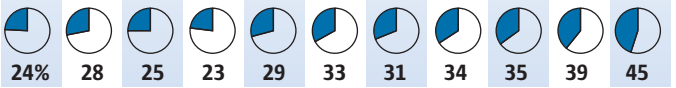
The United States is the world's leading source of helium but its supply is declining.

U.S. HELIUM EXPORTS

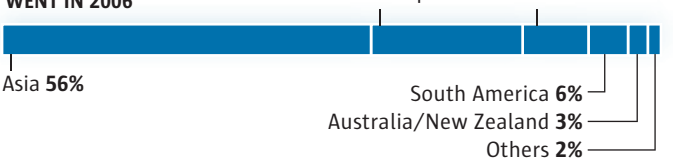
■ = 1 million cubic meters



PERCENTAGE OF U.S. HELIUM SALES EXPORTED

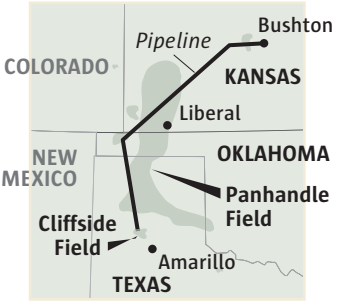


WHERE U.S. HELIUM EXPORTS WENT IN 2006



TOP SOURCES

Natural-gas fields where helium is found; Cliffside Field has one-third of the world's supply



TOP USES

- For launching space shuttles
- To toughen industrial welds of metals, such as gold, copper
- Coolant for magnetic resonance imaging machines
- To create optical fibers for telecommunications cables

Source: Norbert Pacheco, team leader for helium evaluation and analysis at the U.S. Bureau of Land Management; U.S. Geological Survey Minerals Yearbooks; Praxair Technology

McCLATCHY-TRIBUNE

TESTIMONY OF
GARY W. PAGE
PRESIDENT, HELIUM & BALLOONS ACROSS AMERICA
BEFORE THE
COMMITTEE ON NATURAL RESOURCES
U.S. HOUSE OF REPRESENTATIVES
ON
HR. 527, THE RESPONSIBLE HELIUM ADMINISTRATION AND STEWARDSHIP ACT
FEBRUARY 14, 2013

Mr. Chairman, Members of the Committee, thank you for the opportunity to testify today on the Responsible Helium Administration and Stewardship Act. Sir Isaac Newton said, "What goes up, must come down." Clearly, he was not following the current domestic helium market.

My name is Gary Page and my company, proudly based on Christian principles, Helium & Balloons Across America (HABAA) in Charlotte, NC, started in my home and has been servicing our customers for over 32 years with balloons and helium. HABAA began helium distribution regionally in the Southeast and amassed ~8,000 helium cylinders; a super jumbo tube trailer purchasing ~200,000 cu. ft. of helium at a time; a cylinder fill station; a fleet of delivery trucks and tractor trailers; and in-store service personnel. When we secured a national chain (i.e. Kmart), or a set of stores with a large footprint, we solicited partnerships locally for helium distribution and handled orders centrally through HABAA for better customer service and accountability of cylinder assets—mostly under supply agreement contracts. Eventually, HABAA was distributing helium across the continental USA including Hawaii, Alaska, and Canada internationally.

Helium & Balloons Across America (HABAA) is the "face" of small businesses across the country. It is at the core of what the "Responsible Helium Administration and Stewardship Act" is all about, though literally hundreds of other business from diversely different industries could be providing testimony before the House Committee on Natural Resources today. Most of those businesses do not have the clout of the current refiners – who dominate the market with the help of the current system. Entrepreneurs such as me are truly "small businesses" who create jobs, but are unable to come to Washington to make their case. I hope my perspectives add some context from the real pain end users feel as a result of the current structure.

I want to commend the Committee leadership for coming together, on a bipartisan basis, to address the systemic issues that exist within our domestic helium production and distribution markets. The bipartisan feeling in this room is buoyed by the fact that today is Valentine's Day and coincidentally

February 14th is also the largest retail balloon sales day of the year. However, as I testify today, hundreds of my best customers are either without any helium, or have received a ration that will not allow them to meet the demands of the day. This is the second year in a row and I hope, with the passage of H.R. 527, the last.

I am here before you today as a businessman who has tried to buy volumes of helium via the auction process, but was unable to receive my helium for lack of access to infrastructure. When I purchased the technology needed to access volumes directly, I was blocked by the Bureau of Land Management (BLM) from gaining access to the pipelines they oversee. I have tried to follow the processes to allow open access and competition that are supposed to exist today, but found those processes in practice to be little more than theoretical.

The market has become so tight for helium that HABAA has two employees who are largely dedicated to searching for helium supply and managing our vendor relationships. We have hundreds of customers who have been waiting for up to a year for a delivery of a single helium cylinder—with no real prospect that they will be serviced. Before this shortage, a typical delivery would take a few days. HABAA has grown from 3 vendor partners to over 93 with several hundred more vendors waiting for helium to begin servicing our customers. We have made thousands of phone calls, emails, and other contacts looking for helium for our customers. Even a company as large as Airgas can geographically help HABAA in less than 16% of their service area—in all other areas there is no reliable helium supply.

HABAA was growing at a rate of ~28% compounded year over year for about five consecutive years. We were forced into a second warehouse, which kept growing in size, and finally placed HABAA in a position of an aggressive consolidation and building program plan—we had ~75 full-time employees and ~100 part-time employees. HABAA occupies a unique position in the balloon industry as the hinge between balloon manufacturers and suppliers; new and unique proprietary marketing programs (i.e. Scan Based Trading = SBT); program implementation and management with retail chains; and the supply, distribution, and "back office control" of helium needed to drive this business.

In 2006 there were shortages of helium and prices spiked dramatically every few months. There seemed to be less product available to some customers than to others—even with contractual agreements, forced majeure or invoked allocations. Upon further investigation, it was my conviction that there was plenty of helium, but that the refiners had made business decisions to sell their product for higher profits, usually overseas. I found some older proven technology for the refinement of helium called Nitrotec, and purchased a system which was being taken offline in Chillicothe, TX, due to the fact that the helium supply had been exhausted at that site (please see an attached diagram of facility and system process).

HABAA recognized a "broken" helium refinement paradigm that did not even represent or accommodate a third of their customer base. In 2007, we realized that we needed to process our own helium gas to meet our own demands and those of our customers. In the summer of 2008, I purchased a Nitrotec portable refinery that has a current market value of approximately $4 million. We made a huge

capital risk for a small business and purchased helium refinement equipment when we purchased the Nitrotec. This acquired capability was necessary so that HABAA could be taken seriously and with the hope we could compete for federal helium and receive needed access to helium gas in order to sustain our business and support the larger industry.

HABAA's Nitrotec helium refinement capability produces gas as an end product and could potentially lower end user cost dramatically. As important as serving the existing refining needs for gasified helium demand, the HABAA's Nitrotec unit will be able to maximize the depletion of the helium reserve. The lower pressure and smaller gas requirements (3 MM cu. ft. day) necessary to remain profitable for a Nitrotec unit will allow continued operations long after current refiners have been forced to shut down due to operational economic considerations. This will allow increased utilization of this important natural resource and ensure that the public maximizes the development of this resource. The Committee's measure, the "Responsible Helium Administration and Stewardship Act", creates an environment that both allows competition and will ensure the helium reserve is maximized.

In March of 2008, we purchased a non-allotted volume of raw helium from the BLM and were denied tolling by all current refiners, without any real discussion or even having them extend the courtesy of placing a price on the table. Then HABAA went directly to the BLM with our request to become a refiner on the pipeline, which was summarily denied without any hearing or due process. Our email, protesting the nonsensical notion that the BLM would accept money for helium which had no realistic opportunity to ever be delivered to us, was never responded to by the BLM. Since mid-2007, we have attempted various ways to access the BLM pipeline via direct contact and consultants. All have ended without success, but we have great hope with the access provisions included within H.R.527.

I want to highlight seven problems with the current system:

1. **THE LOSS OF MANY AMERICAN JOBS**: Elimination of the balloon industry will cause the loss of significant jobs – the International Balloon Association estimates that hundreds of thousands of jobs are impacted by helium supply issues. HABAA's current staffing of only ~10% of the employees which were employed by our company when this disaster began is a testament to this fact. There will be a significant economic impact as balloon manufacturing plants are forced to close as well as commerce from associated industries. Sales and marketing, display manufacturers, ribbon and balloon weight manufacturers, sticks and cup manufacturers, regulator and safety equipment manufacturers, cylinder manufacturers, store service and set-up crews, industrial gas suppliers, accounting, customer service, technology support, and other back-office functions will all be affected as industry infrastructure crumbles to maintain profitability for diminishing sales. Thousands upon thousands of retailers (party stores, grocery stores, dollar stores, card stores, drug stores, discount chains, and small gift shops) all rely on the income produced by the sale of balloons. There are full-time staff positions which are totally (or partially) supported by this single source of retail sales. A balloon

manufacturer estimated that at any given time, 20% to 25% of retailers are totally out of helium without knowing when they will be in stock.

2. **OUTRAGEOUS AND UNFAIR "MONOPOLY" HELIUM MARKET PRICING**: Because the control of our nation's helium is bottlenecked by three refiners, it allows those refineries to have full control over supplies and ultimately drive pricing. These refineries can transact with subsidiaries and add cost during each internal transaction that far exceeds value. For example, one refiner and distributor of BLM helium pays $24.44 for the amount of helium required to fill one 291 cu. ft. cylinders (equivalent to ~$.04 per 18" foil balloon), using current BLM 2013 pricing of $84 per Mcf. In this example, this refiner then sells that cylinder to a distributer like me for $873. This is a markup at an unbelievable 3,572%! That price was for the helium only; it did not include the distribution costs of $30.96 ($5.95 haz mat + $4.01 fuel charge + $21.00 delivery) or the $52.98 taxes, which bring the total to $956.94 ($2.13 of helium cost per foil balloon). Those are my costs that then have to be marked up to my customers in order to stay in business. Quite simply, because there is limited to no competition in the refining market, the public and small business suffers.

3. **TOLLING DOES NOT WORK**: The current framework, and some prior legislative proposals, holds the noble goal of allowing companies who did not have access to the BLM pipeline the ability to purchase helium and receive it via one of the existing access points (refineries). This ended up being a good theory, but is not practical. Refiners who have complete control of the supply can and routinely prevent access by merely refusing to refine raw helium after it has been purchased directly. In fact, the refiners we reached out to would not even quote us a price for tolling. This inequity in the system is what drove me to make the capital purchase of the Nitrotec, as I was operating under the belief that I could secure the 6% set aside that is mandated by the law. Unfortunately, the current framework does not force the set aside to function as it was intended. Efforts to prod the BLM to change the way these set asides function are daunting for even large operations such as mine and why the changes within H.R. 527 are so important in their effort to ensure competition.

4. **NO HELIUM GAS REFINEMENT ON THE BLM PIPELINE**: The BLM has not supported businesses that need helium gas and not liquefied helium which creates additional capital costs to pay for purity and a product form which is not wanted nor useful in these applications. Helium gas is the "natural state" of helium found in nature; it requires huge capital investment to make it pure and cold enough to become a liquid, and consumers are saddled with that unnecessary cost. And even though two-thirds of helium is utilized in the liquid state (pressure/purge-NASA and DOD; superconductivity/cryogenics—MRI; controlled atmosphere-fiber optic and chip manufacturing), a third of current uses are for helium gas (leak detection; breathing

mixtures—deep sea diving and hospital use; welding; heat transfer; chromatography; lifting), and should have their own reliable supply source through the BLM.

5. **MARKET CHAOS IS EVERYWHERE**: End users in every state are impacted by the current helium refinery monopoly. As an example, Airgas has been excluded from the BLM process. They are the largest distribution outlet and depended upon for meeting helium needs of American industries and consumers, but are not stakeholders of the refining process. Two of what was the then three refiners, Air Products and BOC, sold their packaged gas businesses to Airgas, so they must have recognized that Airgas could "do" distribution better. However, some of those same forces have crippled Airgas during this helium supply crisis hurting many US businesses and the national economy. Some points to highlight a few of the market issues:

    i. For example, the average cost of wholesale helium has tripled, yet the price continues to move upward monthly. Other related costs, that have nothing to do with the price of helium, such as cylinder rental, have also approached tripling as vendors attempt to offset lower gas sales with increased costs elsewhere. For example, 18 months ago, a helium cylinder which cost HABAA less than $60 wholesale now averages ~$150 and the cost is going up every month. These costs are before the 30% price increase has been factored in, which was announced in late December and went into effect January 1, 2013 by both Praxair and Air Products—the 2 largest refiners on the BLM system.
    ii. We have made thousands of phone calls, emails, and other contacts looking for helium for our customers. Airgas can geographically help HABAA in less than 16% of their service area—in all other areas there is no reliable helium supply. Praxair, Airgas, and Matheson are buying small struggling distribution companies, damaged by the helium shortage, then giving HABAA notice that they will no longer be providing helium to our customers in these areas. This has occurred twice this week alone with Praxair, but has occurred 51 times in the past three months. For a reference point, the normal volume of such consolidation/acquisitions has historically been closer to a couple each quarter.
    iii. There is an unprecedented push toward consolidation, as a number of small businesses are being sold or approached for purchase for pennies on the dollar by the major players. This is due to their precarious business position or weak balance sheet, which is forcing them out of business. This consolidation disadvantages others in the market. For example, a refiner/distributor recently took a large chain customer we had under contract. The refiner/distributor had access to supplies and we were unable to service the account. The refinery monopoly has downstream competitive consequences – it is not simply limited to supply issues at the loading docks of the three refiners. HABAA has lost several thousand customers in addition to the chain referenced above. As a result, we have outsourced everything

we can, sold many of our hard assets (cylinders, tube trailer, etc.) to Airgas, and are now down to ~10% of our employees since 2009.

6. **THE BLM HAS BEEN COMPLICIT IN PERPETUATING THESE INEQUITIES BY BLOCKING ACCESS TO OTHER POTENTIAL REFINERS**: As mentioned above, the BLM has developed a cozy relationship with these refiners and refused to manage helium sales as far back as 1996. This relationship has been described by the Office of Inspector General as "less-than-arms-length" and "we found overcharging, possible double-billing, costly short-term financing, and unjustified allocation of equipment costs," and "weaknesses that leave the Government vulnerable to fraud, mismanagement, and potentially large monetary losses." More recently, in November 2012, an audit by the Office of Inspector General issued a scathing report which charged the BLM "to prepare and implement comprehensive procedures for managing its helium sales to nongovernmental buyers."

7. **EXPORTING VERSUS DOMESTIC NEEDS FOR HELIUM RESOURCES**: While I recognize that exporting commodities in times of low pricing could be in the government's best interest, helium's prices are excessively high (to the point of damaging the US economy) and helium supply is not currently abundant. Over nearly the past two years, helium supplies have dried up, and I believe that it is because there is effectively a helium refining monopoly which has taken the taxpayers' resources to higher profits overseas, while sticking the rest of the American business community with dramatically higher costs for their helium due to a manufactured shortage.

In an effort to address the current issues of domestic availability of helium for the thousands of companies that comprise the balloon industry, I suggest the following:

1. Provide a distinction between end users who need refined liquid helium versus those who just need refined helium gas. There is a huge cost differential and current industrial companies have no interest in providing anything but liquid helium. This could potentially lower end user cost dramatically and improve availability to underserviced industries.
2. Ensure access to the BLM pipeline for small facilities, such as a Nitrotec unit. Competition will be enhanced with greater refining capacity and small facilities will maximize the depletion of the helium reserve and benefit to the taxpayers. The lower pressure and smaller gas requirements (3 MM cu. ft. day) necessary to remain profitable will allow continued operations long after all other refiners have been forced to shut down due to operational and economic considerations. This is why Nitrotec's technology was developed—to refine helium at the source for sale, rather than discarding it, and then move the plant to another source. Helium does not need to be a financial black hole, and some activities are appropriate for government to tackle until private industry can prove adequacy to stand in the gap.

3. The Committee should consider expanding the current BLM pipeline in a westerly direction and repopulate the Cliffside Storage Field. In 2010, a National Academy of Sciences study concluded that the 1996 Privatization Act had adversely affected critical users of helium and that selling off the supply, as required, was not in the best interest of U.S. taxpayers or the Nation. Because of the strategic importance of helium to America (the reason the BLM pipeline system was developed in the first place), the Federal Government should consider those voices on the National Research Council of the National Academies (authors of "Selling the Nation's Helium Reserve"). What was true then is true now—storage is the major issue, as helium is a "waste by-product" of the quest for hydrocarbons, and this resource will be lost because it cannot be stored physically and economically.
4. Stability to the federal program could allow for private capital to enter the market. It is a new concept and now conceivable that private companies could actively pursue drilling rights for helium wells on federal public lands and not just viewing helium as a byproduct in traditional drilling operations.
5. While I am for free trade and recognize that not all commodities should be treated equally with respect to export, many of the issues with availability and price of our domestic helium can be traced back to supply. If private companies find the helium, store it, refine it, and distribute it, there should be no restrictions as to where it goes, but volumes from the BLM system should be focused upon meeting domestic needs. Currently, there is not a shortage of helium, but rather a shortage of helium refinement capacity and competition in the American helium marketplace due to a lack of access. If one adds up the total helium domestic needs from all sources (MRI's and medical needs, manufacturing of fiber optics, computer chips, plasma TV's, welding, leak detection, scientific research, and yes, even balloons), it would require ~2.4 billion cubic feet a year. The BLM pipeline system refines ~2.1 billion cubic feet a year and all other sources, including EXXON in Wyoming produces another ~2.7 billion cubic feet of refined capacity for a net total of ~4.8 billion cubic feet. This is according to an independent consulting firm, RMW Solutions, LLC. This group is made up largely of ex-Air Products helium experts including Ben Reinoehl, a principal at RMW and a member of the National Research Council who wrote part of "Selling the Nation's Helium Reserve." The Congress has relied on this book to make decisions related to the national helium reserves. RMW has collected this data from BLM governmental and industry sources.
6. With the sale of BOC's packaged gas business (cylinder distribution), the Federal Government required the divestiture of refinement capabilities to a third party rather than bundling it to Airgas. This did not prevent a monopoly but effectively perpetuated one. Future decisions should take into consideration the larger market picture of creating more competition.

In closing, I want to thank the Committee for the opportunity to testify today on behalf of the small business end users who are dependent upon federal helium policies. I hope that my perspectives, as an entrepreneurial businessman, are of value to the Committee. Please know that I stand ready to assist your efforts and hope that Congress works in the same bipartisan manner the Committee has started with the introduction of H.R. 527, the Responsible Helium Administration and Stewardship Act. The current authorization for the helium reserve expires at the end of this fiscal year and it is critical that legislation move quickly through the process in order to be completed before October.

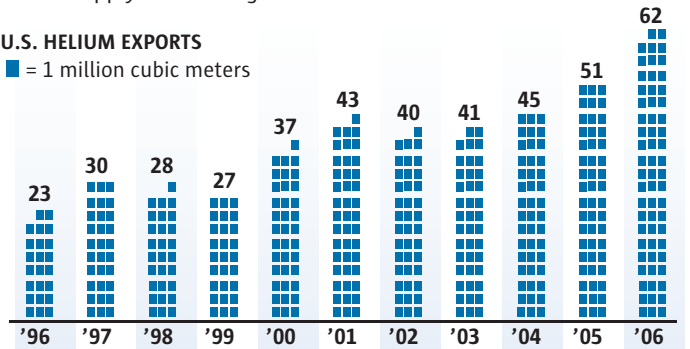
Thank you for your kind attention and the opportunity to present this testimony! Happy Valentine's Day to you, and to all those you love.

A shrinking helium stockpile

The United States is the world's leading source of helium but its supply is declining.

U.S. HELIUM EXPORTS

■ = 1 million cubic meters



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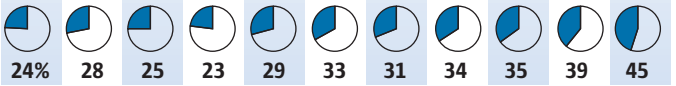

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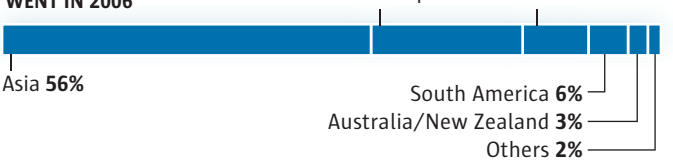

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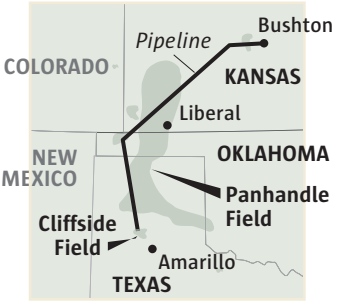

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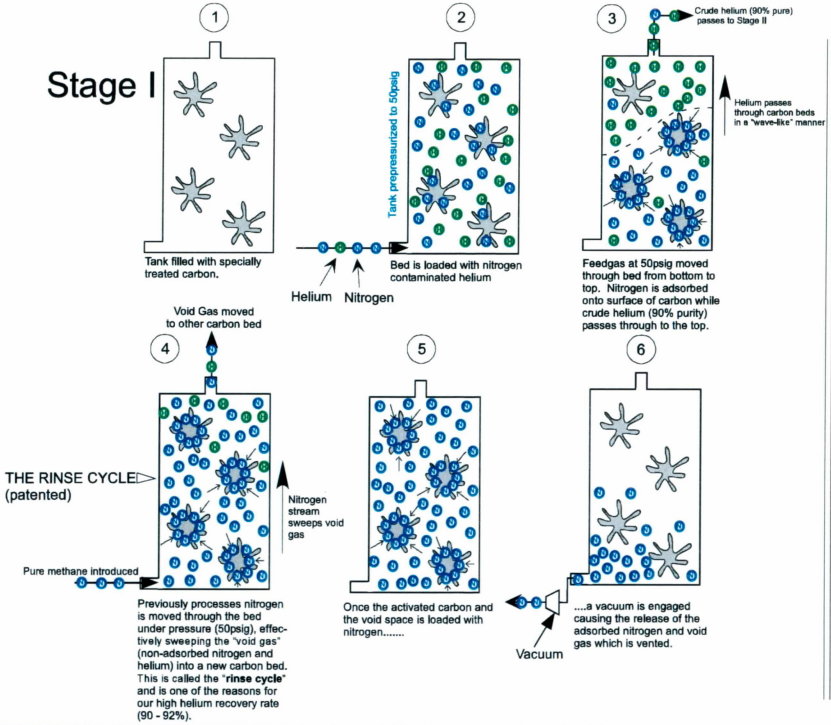

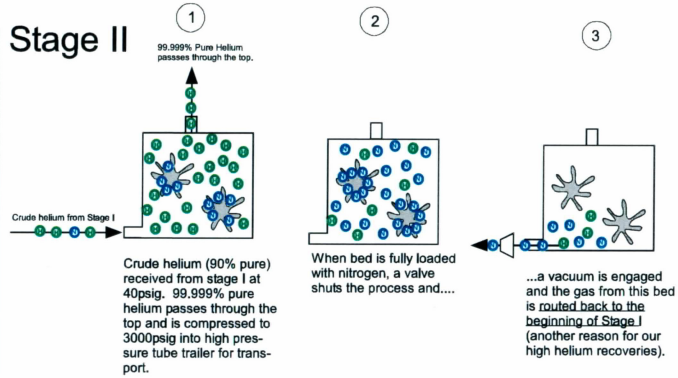

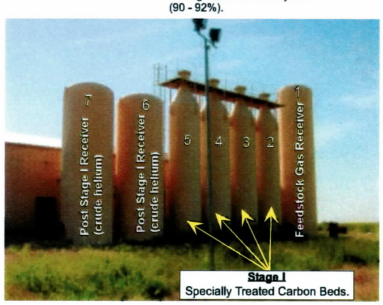

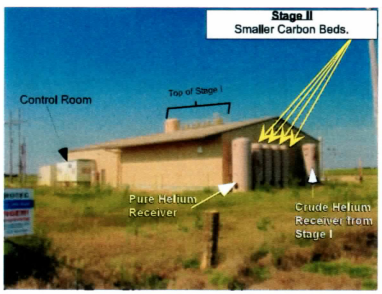

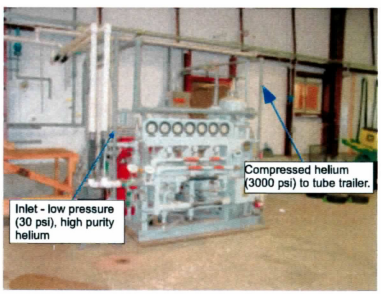

STAGE I of *Pressure Swing Adsorption* Process

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Crude helium (>90% pure) is the product of this first stage and is received in vessels #6 & #7, ready for Stage II.....

STAGE II of *Pressure Swing Adsorption* Process

Crude helium (90% pure) from Stage I is taken through a second pressure swing adsorption process, with slight variations. After this process, Grade-M helium (99.999% pure) is received in the left-most vessel for compression.

Note that the vessels in Stage II are much smaller than those in Stage I. Because Stage I has removed 90% of the "non helium" products, the feed stock (crude helium) for Stage II is a much smaller volume.

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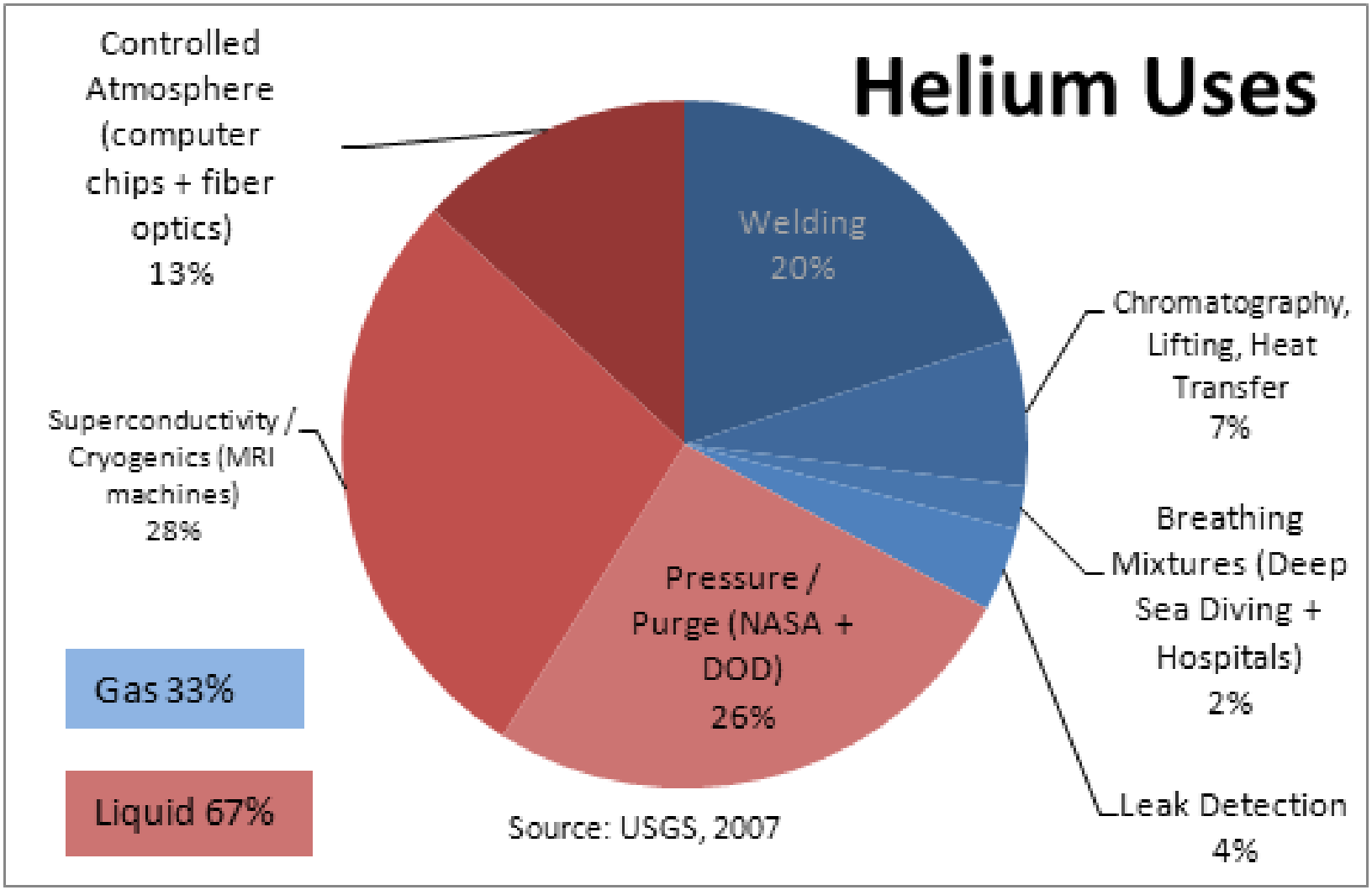
Here, the Grade-M helium from Stage II is compressed from 30psi to 3000psi. It is then stored to be picked up in high pressure tube trailers.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Controlled Atmosphere (computer chips + fiber optics) 13%
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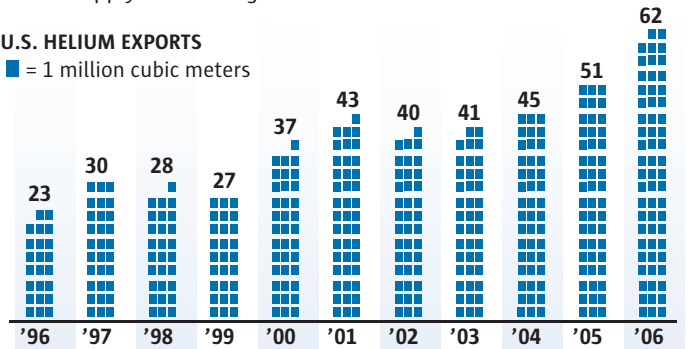
A shrinking helium stockpile

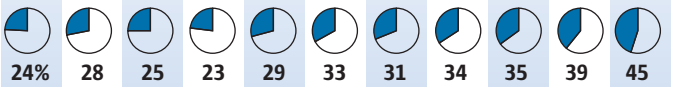
The United States is the world's leading source of helium but its supply is declining.

U.S. HELIUM EXPORTS

■ = 1 million cubic meters



PERCENTAGE OF U.S. HELIUM SALES EXPORTED



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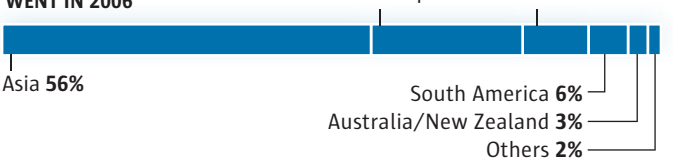
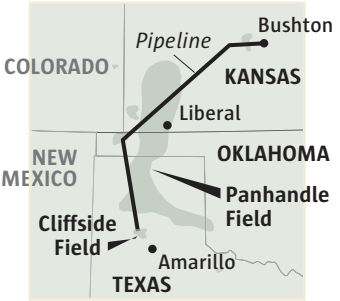


TOP SOURCES

Natural-gas fields where helium is found; Cliffside Field has one-third of the world's supply



TOP USES

- For launching space shuttles
- To toughen industrial welds of metals, such as gold, copper
- Coolant for magnetic resonance imaging machines
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Source: Norbert Pacheco, team leader for helium evaluation and analysis at the U.S. Bureau of Land Management; U.S. Geological Survey Minerals Yearbooks; Praxair Technology

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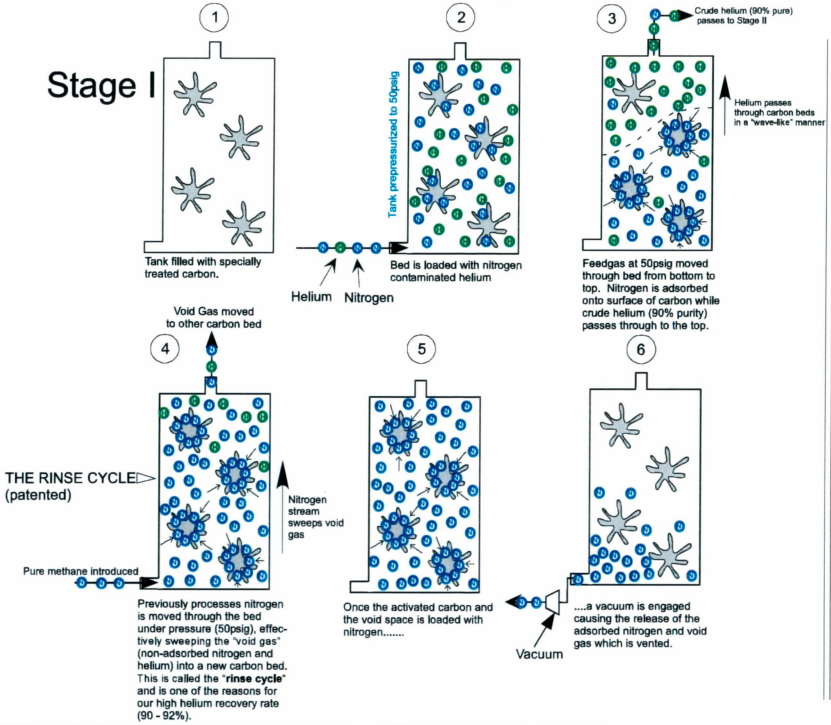

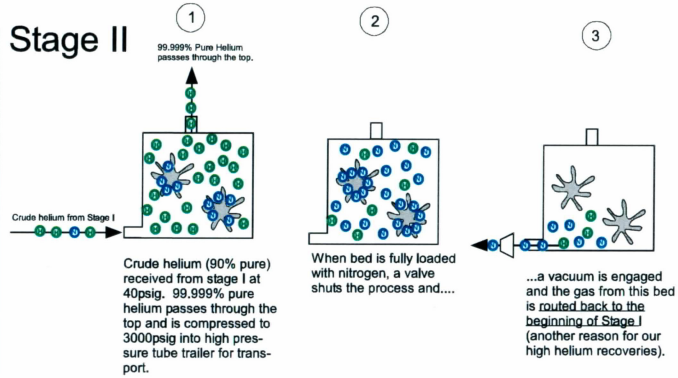

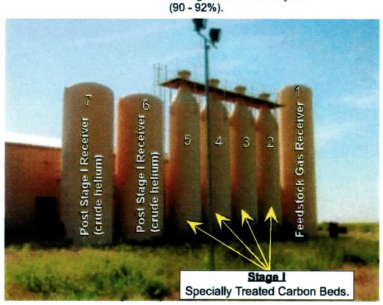

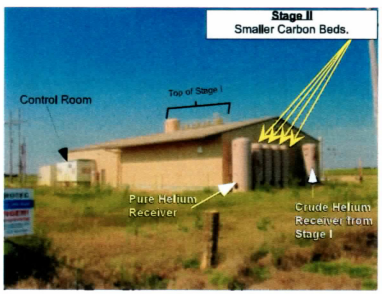

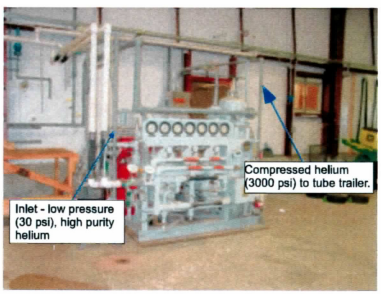

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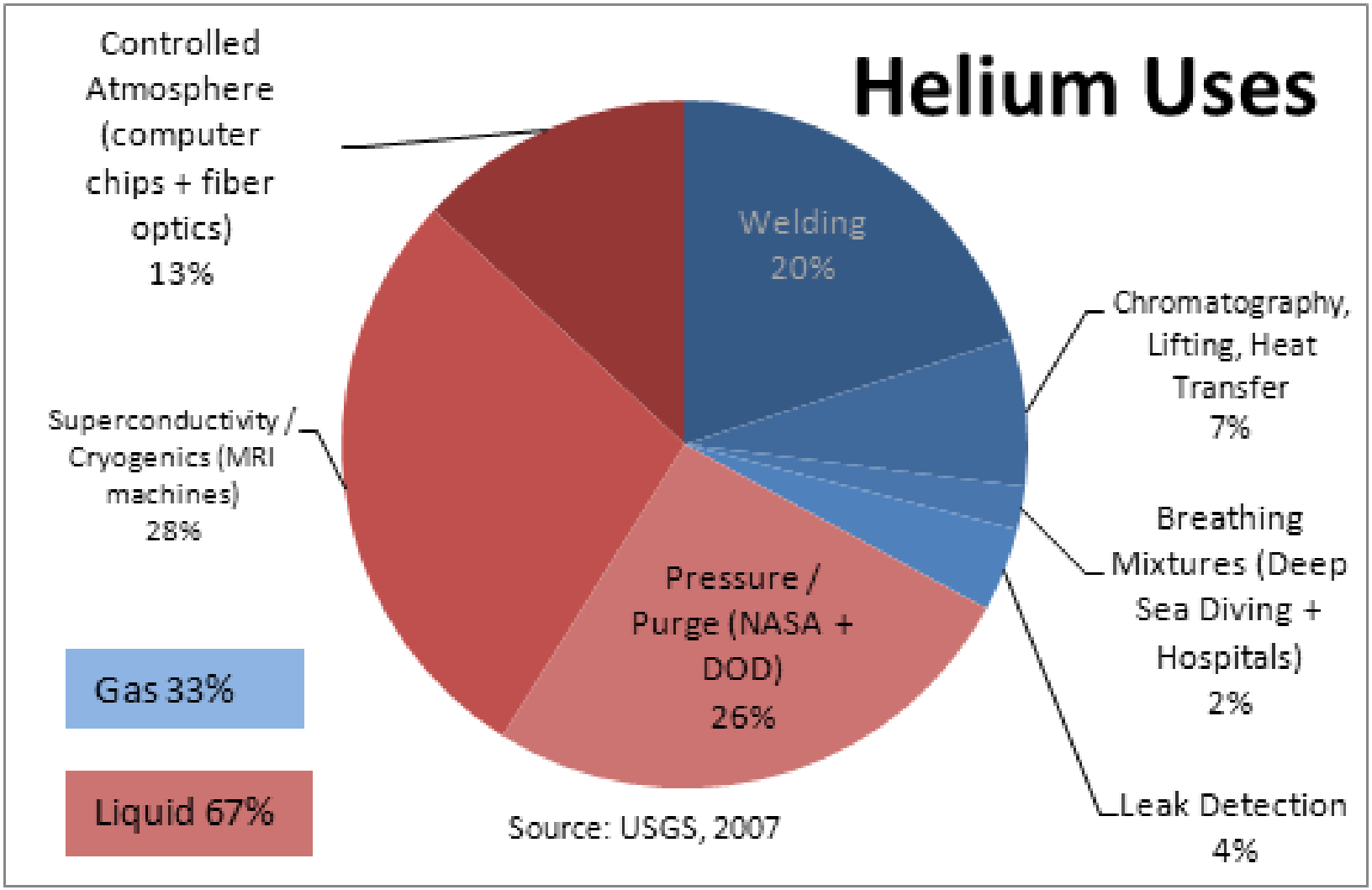
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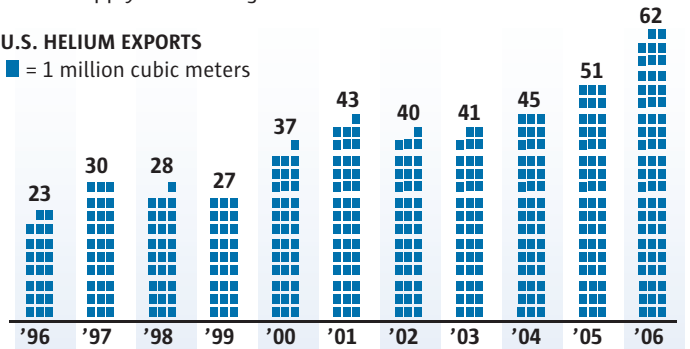

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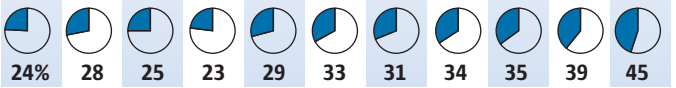

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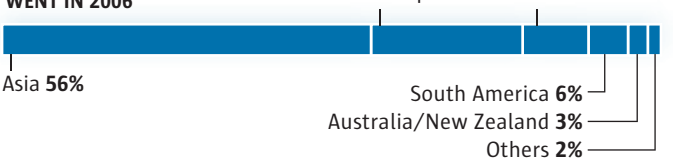

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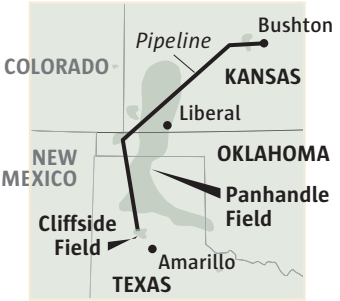

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