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Reuse and the Benefit to Community

Phoenix-Goodyear Airport Area Superfund Site

Executive Summary

Goodyear, Arizona, has long been one of the southwest's aviation and defense-related manufacturing hubs. Decades of industrial and waste disposal activities in the area contaminated soil and groundwater. Cooperation among the U.S. Environmental Protection Agency (EPA), the City of Goodyear, the Arizona Department of Environmental Quality (ADEQ), potentially responsible parties (PRPs) and local businesses has resulted in the successful cleanup, reuse and continued use of this area, known as the Phoenix-Goodyear Airport (PGA) Area Superfund site. Stakeholders recognized that a carefully designed cleanup could not only enable the continued operation of businesses on site, but also provide a powerful solution to a high-priority regional concern – the availability and affordability of clean water.

Today, 31 new and long-time businesses operate at the site, providing aviation-related, industrial and commercial resources. Treated groundwater from the site provides billions of gallons of clean water to the surrounding community for various uses. In addition, through a remarkable partnership between EPA, one of the site's PRPs and a local farmer, agricultural reuse on part of the site helps stabilize and improve the soil, while providing hay for livestock feed and for sale. This case study explores the area's cleanup, reuse and continued use, illustrating the opportunities and beneficial effects of Superfund redevelopment in action.

Beneficial Effects

- **Thirty-one industrial and commercial businesses are currently active at the site.**
- **In 2013, Crane Co., one of the site's PRPs, generated nearly 1.5 billion gallons of treated groundwater for beneficial reuse. In 2013, Crane Co. provided the City of Goodyear with 21 million gallons of the treated groundwater to irrigate the Goodyear Community Park, saving the locality an estimated $75,000 a year in irrigation costs.**
- **The use of treated groundwater, provided by site PRP Goodyear Tire and Rubber Co., to irrigate athletic fields at the Goodyear Ballpark, saves the City of Goodyear about $200,000 a year.**
- **Site businesses employ about 1,025 people, providing annual employment income of over $40 million to the local community.**
- **In 2014, site properties generated nearly $165,000 in tax revenues and had an estimated property value of over $43.5 million.**

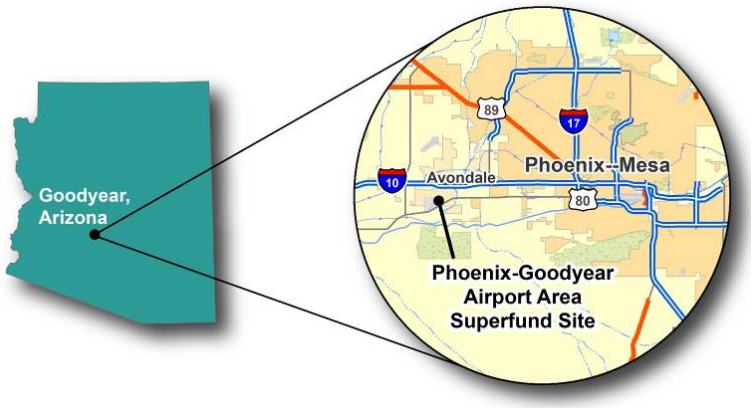

Figure 1. The site's location in Goodyear, Maricopa County, Arizona.

Introduction

When a site is restored for reuse, it can revitalize a local economy with jobs, new businesses, tax revenues and spending. Cleanup may also take place while there are active land uses on site. This case study captures the beneficial effects of the continued use and redevelopment at the PGA Superfund site.

The site is located about 17 miles west of downtown Phoenix, in Maricopa County in central Arizona (Figure 1). It includes two distinct contaminant source areas – PGA-North and PGA-South – and associated plumes of contaminated groundwater. The source areas occupy less than one square mile (Figure 5). The source areas and groundwater plumes combined cover about 33 square miles.

The PGA-North source area is the former location of the Unidynamics-Phoenix Incorporated (UPI) facility. Commercial and industrial properties are located north and south of the former UPI facility. Agricultural land is located to the west. Residential and commercial properties are located to the east. Current features at PGA-North include groundwater treatment systems, a soil vapor extraction system, plots of vegetation and open areas. The PGA-South source area is the former location of the Goodyear Aerospace Facility. Commercial and industrial properties are located east of the airport. Agricultural land is located to the north, south and west. Current features at PGA-South include the Phoenix-Goodyear Airport and several commercial and industrial businesses.

Except for the airport, which is owned by the City of Phoenix, the site is located almost entirely within the City of Goodyear. Groundwater contamination extends into the City of Avondale along part of the site's northern boundary. About 75,000 people live within a 5-mile radius of the site.

Site History

PGA-North

UPI was established in 1963 as a research, development and manufacturing plant for defense and aerospace equipment. Facility operations included machining and the manufacture of rocket propellant, powder processing and blending, assembling of ordnance components, and testing explosives and ballistics. Until 1978, facility operators disposed of waste solvents and contaminated washing and cooling water in dry wells at the site. Crane Co. purchased UPI in 1985.

Figure 2. The former Unidynamics Phoenix, Inc. facility. Image source: Crane Co.

PGA-South

PGA-South includes two adjacent areas previously used for aircraft maintenance and preservation activities – the Goodyear Aerospace (later Aircraft) Corporation and the Litchfield Naval Air Facility (NAF). Goodyear Aerospace Corporation, Arizona Division began operations at the site in 1942. The plant closed from 1946 to 1949, when it reopened under the name of Goodyear Aircraft Corporation. During the 1940s, aircraft from the neighboring Litchfield NAF were brought into the hangars of the plant for parts machining and installation. Facility operations included cleaning aircraft engines with solvents prior to maintenance work. Site operators disposed of facility wastes in three on-site sludge ponds. Wastes generated by

facility operations have included waste solvents, sludge contaminated with chrome, acids and process wastewater.

The United States Navy established the Litchfield NAF in 1943 as an Auxiliary Acceptance Unit. The Unit accepted modified aircraft for the Navy from the Goodyear Aircraft plant adjacent to the Litchfield Airport (now known as the Phoenix-Goodyear Airport). From 1946 to 1968, the facility's primary purpose was the preservation and activation of military aircraft. Aircraft preservation activities at the site involved the use of solvents and discharge of solvent and other aircraft maintenance wastes directly into the airport's main drainage ditch.

In 1952, the Navy began diverting industrial wastewater to its on-site domestic sewage treatment system. The system used a gravity flotation process to separate wastes. As part of that process, facility operators skimmed off oil and other floatable wastes and spread them over the airport grounds as weed control. Solvents remained in the wastewater and were discharged back into the drainage channel. In 1968, the Navy transferred ownership of the property to the City of Phoenix, and the airport became Phoenix-Litchfield Municipal Airport. In 1986, the airport was renamed the Phoenix-Goodyear Airport. Today, the airport supports several passenger airlines and provides space for the operation of several aviation-related businesses.

Discovery of Site Contamination

In 1981, the Arizona Department of Health Services (ADHS) discovered that groundwater in the PGA area was contaminated with solvents and chromium. Additional sampling of wells in 1982 and 1983 by ADHS and EPA found 18 wells contaminated with a volatile organic compound (VOC) called trichloroethylene (TCE). As a result, EPA added the site to the Superfund program's National Priorities List (NPL) in September 1983. In 1984, a remedial investigation by EPA determined that activities at the former Goodyear Aerospace Corporation facility, Litchfield NAF and the former UPI facility contaminated soil and groundwater with VOCs and metals.

Site Cleanup

Between 1987 and 2014, EPA selected and modified cleanup plans to address site contamination in two Records of Decision (RODs), one ROD Amendment, two Removal Action Memorandums and five Explanations of Significant Differences (ESDs).

PGA-North

Crane Co. is the PRP for the PGA-North area. Crane Co. began cleanup activities at PGA-North in 1994 with the construction of the site's first groundwater pump-and-treat system and a soil vapor extraction system for cleanup of impacted soil. Cleanup at PGA-North includes a complex network of groundwater extraction and injection wells, and the operation of five separate groundwater treatment systems.

The groundwater treatment facility and soil vapor extraction system at the PGA-North area have removed over 58,000 pounds of TCE from soil and groundwater on site. New treatment facilities, which Crane Co. voluntarily built at the northern extent of the plume, are expected to provide additional plume control and capture and reduce the overall footprint of the TCE plume.

Figure 3. The main PGA-North groundwater treatment system.

EPA began evaluating different options to speed up groundwater cleanup in 2013. In September 2014, EPA selected an amended remedy to address remaining source area and groundwater contamination at PGA-North. The revised cleanup plan includes in-place groundwater treatment and the use of extraction wells to hydraulically capture and control the movement of contaminated groundwater.

PGA-South

PGA-South's PRP, Goodyear Tire & Rubber Co., began cleanup activities in 1988 to address contaminated groundwater and soil at and near the Phoenix-Goodyear Airport. Cleanup of the former chromium sludge-drying beds included stabilization and capping of contaminated soil. Goodyear completed cleanup of the sludge-drying beds in 1993. Additional soil cleanup activities, performed between 1993 and 2003, included soil vapor extraction and air sparging. Ongoing cleanup at PGA-South includes the operation of two separate groundwater extraction and treatment systems.

Phoenix-Goodyear Airport is one of the busiest airports in the region. From the start, a top priority for all parties was making sure that PGA-South cleanup activities did not impact vital airport operations. Cooperation between EPA, the Goodyear Tire & Rubber Co., and the airport enables the effective operation and maintenance of the PGA-South groundwater treatment systems, with little-to-no disruption of airport activities. Extensive planning and coordination is required prior to any remedial work at the airport.

EPA Technical Assistance Grant (TAG)

In early 2011, EPA awarded a local non-profit group, the Environmental Community Outreach Association (ECO), a $50,000 TAG. EPA awards TAG grants to incorporated non-profit organizations in communities affected by Superfund sites. ECO used the grant to consult with technical advisors who assisted them in interpreting technical site information. ECO then used that information to help the community better understand site conditions and the steps being taken to address the contamination.

The airport closes the runway and taxiways, and makes sure that all City of Phoenix and Federal Aviation Administration airspace requirements are met prior to any work. Goodyear Tire & Rubber Co. typically performs remedial work at night, to minimize the impact on airport operations. The airport has also entered into an agreement with the PRP to accommodate any needed remedial or maintenance activities. This successful partnership not only enables the continued operation of the airport throughout the ongoing cleanup, but also supports the operation of several other active businesses on the airport property.

Treated Groundwater – Cleanup Generates a Valuable Resource

Water is a precious resource in the southwest. Goodyear, Arizona, relies entirely on groundwater as the area's primary drinking water source. The West Salt River Valley Sub-Basin aquifer, located between 100 and 1,000 feet below ground surface, supplies all of the city's drinking water. In 2014, the U.S. Census Bureau ranked Goodyear as the sixth fastest growing city, with a population greater than 50,000, in the United States[1]. In an arid place

[1] Population data provided by the City of Goodyear's website: http://www.goodyearaz.gov/about-us/demographics-growth.

where fresh water is in short supply and the community continues to grow, the need to conserve existing water resources and employ innovative methods to recycle water has never been more important.

Thanks to cooperation and open communication between EPA, ADEQ, site PRPs, the City of Goodyear and local businesses, groundwater cleanup efforts at the PGA site have resulted in the beneficial reuse of billions of gallons of treated groundwater annually. Before a drop of treated PGA groundwater is reused, EPA, ADEQ, the City of Goodyear and site PRPs make sure the water is safe for human health and the environment. All requests to use the treated groundwater must be reviewed and approved by EPA. The PRPs first present such requests to EPA and then work with EPA to analyze the groundwater to make sure it will be safe for the desired use. Following EPA-approval, the PRPs and entities requesting to use the treated groundwater move forward with plans to make the reuse a reality.

The entire PGA-South project team has been an excellent airport partner. EPA, ADEQ, Goodyear Tire & Rubber and their consultant teams work very collaboratively with the airport to minimize operational impacts to airport users.

– Joe Husband, Phoenix-Goodyear Airport Manager

The City of Goodyear has been a champion of these reuse efforts. In October 2012, the City and Crane Co. entered into an Environmental Access and Remediated Groundwater Reuse Agreement. It allows the PRP unrestricted access and permission to install, operate and maintain any necessary remedial components, such as groundwater treatment systems, piping and extraction/injection wells, on any city property.

These partnerships help the PRPs carry out necessary cleanup activities more efficiently and support the beneficial reuse of treated groundwater. At the same time, this water reuse provides the locality and the community with an ample supply of a valuable resource, free of charge. Reuse of treated groundwater from the PGA site saves the City of Goodyear an estimated $275,000 a year in irrigation costs.

The sections below highlight a few of the water reuse success stories made possible by innovative thinking and cooperation among the City of Goodyear, EPA, ADEQ, site PRPs, the community and other project partners.

Goodyear Recreational Complex

Cooperation between Goodyear Tire & Rubber Co., EPA, ADEQ and the City of Goodyear results in significant cost savings for the locality and supports a valuable recreation amenity for the community. The use of once-contaminated groundwater from PGA-South now brings life to 16 athletic fields at Goodyear Ballpark at Goodyear's Recreational Complex. Major League Baseball's Cleveland Indians and Cincinnati Reds use the complex as their spring training ground.

Figure 4: Treated groundwater from PGA-South irrigates ball fields at the Goodyear Ballpark.

In 2012, the City of Goodyear put in a mile-long pipeline to transfer treated groundwater from PGA-South to the complex to irrigate the athletic fields. The baseball complex uses about 81.5 million gallons of water per year, and the new pipeline can deliver up to 263 million gallons of water per year. The locality previously had to pay by the gallon for the water they used to irrigate the complex. The City's ability to irrigate using treated groundwater from PGA-South, free of charge, has resulted in significant cost savings. According to Goodyear Water Resources Manager Mark Holmes, the City saves an estimated $200,000 a year by using the treated groundwater. Excess water flows to an irrigation channel and then to the Buckeye Water Conservation and Drainage District, where it is used for irrigation.

EPA, ADEQ, Goodyear Tire & Rubber Co. and the City of Goodyear have worked together to make the innovative reuse of the treated groundwater a reality. In March 2014, the Goodyear Town Council approved a partnership with Goodyear Tire & Rubber Co. to allow the reuse of the treated groundwater. EPA and Goodyear Tire & Rubber Co. first analyzed the treated groundwater and determined that irrigation of the ball fields would be an appropriate option. EPA then approved the request to use the treated groundwater.

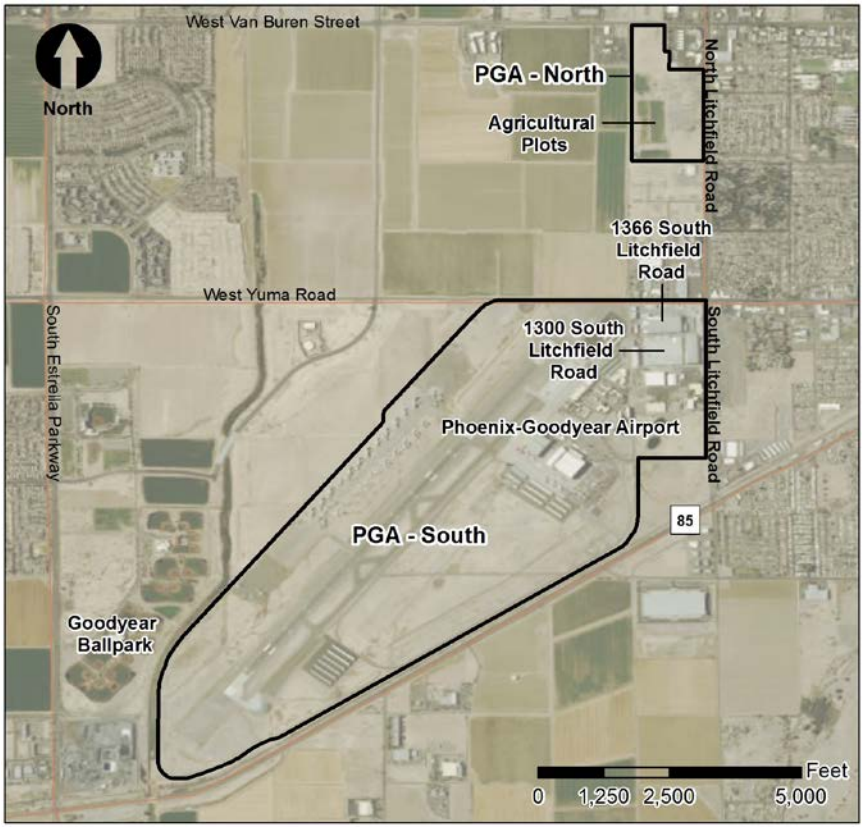

Figure 5. Source area layout – locations of water reuse and site businesses.

Goodyear Community Park

The City of Goodyear previously purchased water from a nearby water supply system to irrigate baseball fields and other turf areas at Goodyear Community Park. With a groundwater treatment system planned for the park property, the City's Parks and Recreation Department worked with Crane Co. on an agreement that benefited both parties. The City allowed the PRP to construct the treatment system on park property at no cost. In return, beginning in 2012, the City began using treated groundwater from PGA-North to irrigate the park. After the first year of operation, the City took over operation and maintenance of the irrigation system. In 2013, the City used 21 million gallons of treated groundwater from PGA-North to irrigate the park. This water reuse saves the locality an estimated $75,000 a year in irrigation costs.

"While the water reuse aspect of this Superfund remedy was not directly in response to the drought, the underlying idea and the timing for beneficial reuse of treated water by EPA was to help the City of Goodyear conserve water resources."

– Catherine Brown, EPA Project Manager

Saint Thomas Aquinas Grade School

The Saint Thomas Aquinas Catholic Church and Grade School is located about two miles north of PGA-North, in the town of Avondale. To meet the needs of their growing community, the church began expanding its school campus in 2011. At the same time, Crane Co. approached the church and requested permission to install a new treated groundwater pipeline on a part of the church property to help expand the PGA-North groundwater treatment network. The church and Crane Co. came to an agreement that proved beneficial for both parties. The church granted the PRP permission to install their pipeline at no cost. In exchange, the PRP would provide the school with treated groundwater that would be included in the process used to cool the new school buildings. The

Figure 6. St. Thomas Aquinas Grade School.

architect tasked with designing the school expansion, which included the construction of two new two-story buildings, incorporated the use of the treated groundwater into the design of the facility's heating, ventilation and air conditioning (HVAC) system. The architect included a specific style of non-contact heat exchanger that allowed for treated groundwater from PGA-North to be used in the cooling process. Beginning in 2012, treated groundwater from PGA-North was conveyed from the main effluent pipeline through this heat exchanger (part of their central air-conditioning system). This 'closed loop' of cold treated groundwater circulates through the heat exchanger, absorbing heat removed by the air conditioning system. Refrigeration is typically required in air conditioning units. However, this unique heat exchanger allows transfer of heat to the cold treated groundwater without refrigeration or the associated energy needed to produce it.

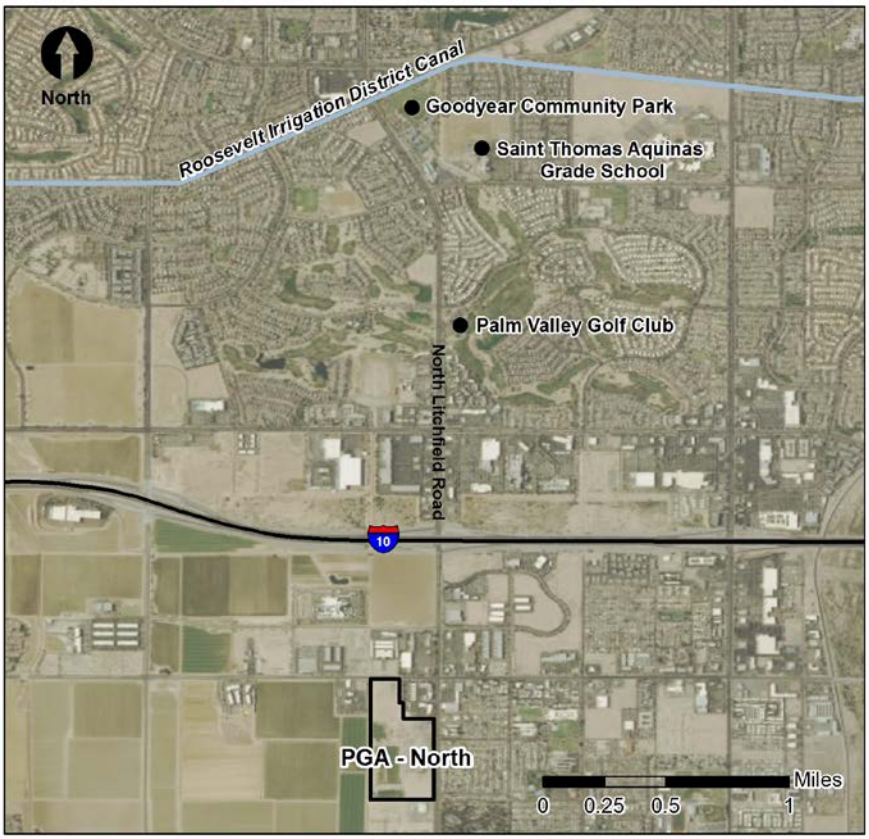

Figure 7. Locations of treated groundwater reuse, north of PGA-North.

This innovative partnership resulted in the creative and efficient reuse of treated PGA-North groundwater. It provides the school with valuable water free of charge and enabled Crane Co. to put in the pipeline needed to improve groundwater cleanup. In 2013, Saint Thomas Aquinas Grade School used 197 million gallons of treated PGA groundwater. After diversion through the heat exchanger, the treated groundwater is injected back into the aquifer to help hydraulically control the plume of contaminated groundwater. This effectively enables the beneficial reuse of the treated groundwater twice – once in the heat exchanger and once to aid in plume control.

Palm Valley Golf Club

The Palm Valley Golf Club is located about 1.5 miles north of PGA-North. In 2010, Crane Co. approached the golf club's new owner to request permission to continue to use an existing irrigation well on the property as an extraction well to help improve the effectiveness of one of the PGA-North groundwater treatment systems. The parties came to an agreement that allowed Crane Co. to lease the well and surrounding compound, which contains a groundwater treatment system and, in return, provide the golf club with free treated groundwater to irrigate the golf course. In late 2010, the golf club began using the treated groundwater to fill their on-site irrigation ponds and irrigate their 18-hole golf greens. This arrangement resulted in cost savings for the golf course and enabled the improvement of the PGA-North treatment system. Before using the treated groundwater, the golf club purchased reclaimed water from the local water utility for irrigation. In 2013, Crane Co. pumped 140 million gallons of treated groundwater to the Palm Valley Golf Club to use for irrigation. Based on the current rate charged by the City of Goodyear for reclaimed water, it would have cost the golf club an estimated $252,000 to purchase 140 million gallons of reclaimed water from the City to irrigate the golf course[2].

Figure 8: The Palm Valley Golf Club fills this pond with treated groundwater from PGA-North and uses it to irrigate the golf course.

Agricultural Plots

A unique partnership between Crane Co. and a local farmer has resulted in the productive agricultural reuse of part of the PGA-North source area. PGA-North is mostly flat, dry and vacant, and is not currently well suited for most types of reuse since active remediation activities are being performed. Crane Co. needed a way to improve the visual appeal of the area and help control dust. In 2009, the PRP and a farmer entered into a partnership that greatly benefited both parties. The farmer uses about 12 acres of the PGA-North property to grow heat-tolerant Bermuda grass in the summer and Rye grass in the winter. In 2013, Crane Co. used 52 million gallons of treated groundwater to irrigate the grasses. The ability of the farmer and Crane Co. to use the free treated groundwater to irrigate the grass crops results in cost savings. The City of Goodyear charges different rates for different types of water that can be used for irrigation purposes. Potable irrigation water is the most expensive option. Reclaimed water is the lowest cost option. If the farmer and/or PRP had to purchase 52 million gallons of city water for irrigation,

Figure 9: Photos of the agricultural plot at PGA-North. Image source: Crane Co.

[2] The City of Goodyear currently (2015) charges $1.65 per thousand gallons of reclaimed water purchased. Reclaimed water is non-potable wastewater that has been treated by a wastewater reclamation facility and is suitable for industrial and turf-related uses. All water purchased from the city is also subject to sales tax of 8.80 percent of the total water charge, and a state-imposed water surcharge of $0.0065 per 1,000 gallons of water used. See the City of Goodyear's Service Rates website for additional information: http://www.goodyearaz.gov/residents/water-/wastewater-services/utilities-start-stop-billing-appeals-/service-rates#water within.

depending on which type of water they would use (reclaimed or potable irrigation water) it would cost between $94,000 (reclaimed water) and $322,000 (potable irrigation water) to irrigate the grass.[3] The well-established grass crops stabilize the surface of the ground, help control dust and greatly improve the visual appeal of the property. The farmer cuts the grass for use as hay and for feeding his horses, and sells the remaining hay to area farmers and ranchers. The average cost of a bale of Bermuda grass hay in Arizona is about $15. The ability of the local farmer to use the hay results in cost savings because the farmer does not have to purchase hay to feed his horses. The sale of the hay also generates income for the farmer.

Cleanup Supports the Continued Use of Commercial and Industrial Businesses

While the strategic reuse of treated groundwater at the site may be the most evident cleanup benefit, the continued operation of several on-site businesses is another significant outcome. During cleanup, PGA-South continues to be able to support a wide range of different uses. Today, 31 site businesses support about 1,025 jobs and contribute over $40 million in annual employment income to the community. Together, new and long-time businesses at the site bolster the region's economy, provide valuable services to the community, and help generate local and state sales and property tax revenues. The section below describes the specific beneficial effects of several businesses at the site.

Phoenix-Goodyear Airport

The City of Goodyear has a strong reputation as an aerospace-aviation hub. Phoenix-Goodyear Airport at PGA-South is home to several aviation-related industries, including companies such as AeroTurbine, Lux Air Jet Centers, Galaxy International, Airline Training Center Arizona, Lockheed Martin Flight Operations Group, CTC Aviation Training and others. The airport is a recognized center for aviation flight training. As a Military Reuse Zone, it is also attractive to aerospace-related businesses seeking lower real estate and personal property taxes. The state of Arizona established the airport as a Military Reuse Zone in 2002 to help lessen the impact of the closure of the former Litchfield NAF.

Figure 10. Photos of the Phoenix-Goodyear Airport.

[3] The City of Goodyear currently (2015) charges $4.95 per thousand gallons of potable irrigation water, for the first 80,000 gallons purchased. The city charges $5.69 per thousand gallons of potable irrigation water purchased over 80,000 gallons. See the City of Goodyear's Service Rates website for additional information: http://www.goodyearaz.gov/residents/water-/wastewater-services/utilities-start-stop-billing-appeals-/service-rates#water within.

The site's largest employer, Aeroturbine, performs maintenance, repair and overhaul work on large aircraft, stores aircraft, and disassembles old planes and sells the parts. This business contributes over $10.7 million in employment income to the local community.

Figure 11. The Aeroturbine facility at PGA-South.

According to a 2012 study by the W.P. Carey School of Business at Arizona State University, the combined estimated value of business and personal travel at Phoenix-Goodyear Airport reached $8.8 million in 2011. Today, the airport supports 11 other businesses at its 1658 South Litchfield Road address. Together, these businesses employ nearly 590 people and provide an estimated $21.7 million in estimated annual employment income. Combined estimated 2014 sales for these businesses were about $34 million. Airport-related construction projects also provide design and construction job opportunities for area residents.

1300 South Litchfield Road

The large facility located just north of the Phoenix-Goodyear Airport at 1300 South Litchfield Road is home to 18 businesses. This PGA-South business hub supports diverse commercial and light industrial operations, including American Precision Components, Great Garages, Inc., Polyone Corporation, Prime Solutions Group and Southwest Custom Manufacturing. Together, these businesses employ over 85 people and provide an estimated $4.3 million in annual employment income. Combined estimated 2014 sales for these businesses exceeded $5.4 million.

Figure 12. Commercial and light industrial businesses located at 1300 South Litchfield

Cavco West

Cavco West began operations at PGA-South in 1993. The company is a leading builder of manufactured and modular homes, recreational vehicles and vacation cabins. It provides over $14 million in estimated annual employment income.

Figure 13. Cavco operates at 1366 South Litchfield Road.

Property Values and Tax Revenues

On-site properties help generate property tax revenues that support local government. In 2014, PGA-North and PGA-South source area properties generated over $164,000 in total tax revenues, with an estimated property value of over $43.5 million. On-site businesses that produce retail sales and services also generate tax revenues through the collection of sales taxes, which support state and local governments. [4]

[4] The combined sales tax rate in the City of Goodyear is 8.8 percent. This includes sales tax rates for the state, county and city. For more information, see the Tax Rate page at the City of Goodyear's website: http://www.goodyearaz.gov/government/departments-divisions-a-z/finance/tax-services.

Future Site Use

Goodyear is becoming a hub of development activity in central Arizona's West Valley region. The city's location on Interstate 10, direct access to rail and air transportation, and its educated and diverse work force make Goodyear an attractive location for office and industrial development. By offering long-term, affordable and reliable water and power supplies, abundant expanses of land where industries can build-to-suit, a cost of living below the national average, and a wide array of housing options, Goodyear has already attracted several large employers.

The City of Goodyear refers to Phoenix-Goodyear Airport and its surroundings as the Airport Gateway Center, one of the locality's three Employment Corridors. In 2014, the City of Goodyear and the airport worked closely to develop and implement a master plan for the airport corridor. The master plan for the 4,000-acre employment corridor includes mixed-use development incorporating retail, commercial, multi-family and loft residential, flex-office, and industrial uses. Existing airport businesses continue to thrive and the City is actively working to recruit new businesses to the area.

Conclusion

Collaboration and cooperation among EPA, the City of Goodyear, PRPs, area businesses and the community has been key to the successful cleanup, reuse and continued use of the Phoenix-Goodyear Airport Area Superfund site. EPA's carefully designed cleanup supports the continued operation of site businesses, protects public health and the environment, and does so in a way that minimizes any impact on airport operations. Remarkable partnerships have resulted in the innovative reuse of billions of gallons of treated groundwater – saving money for all parties involved and recycling a valuable and finite resource. Today, on-site businesses also support local economic growth, providing about 1,025 jobs and over $40 million in estimated annual employee income. Looking forward, EPA will continue to work with site stakeholders to support protective site reuses and continued uses, and ensure the long-term stewardship of the remedy.

For more information about EPA's Superfund Redevelopment Initiative (SRI), visit: http://www.epa.gov/superfund-redevelopment-initiative.

Technical Appendix

Employment Information for On-site Jobs

Information on the number of employees and sales volume for on-site businesses came from the Hoovers/Dun & Bradstreet (D&B) database. EPA also gathered information on businesses and corporations from D&B. D&B maintains a database of over 225 million active and inactive businesses worldwide. Database data include public records, financials, private company insights, extensive global information, telephone numbers and physical addresses. The Data Universal Numbering System (DUNS) number is a unique nine-digit identification number assigned by D&B to each business and its location within the database for identifying each business. When Hoovers/D&B database research could not identify employment and sales volume for on-site businesses, EPA used the Manta database. Both databases include data reported by businesses. Accordingly, some reported values might be underestimates or overestimates. In some instances, business and employment information came from business representatives. While sales values typically exceed estimated totals of annual income, sales can sometimes be lower than estimated income. This could be attributed to a number of business conditions and/or data reporting. Data included in this Technical Appendix are obtained directly from reputable sources, and reported as presented by those sources.

Wage and Income Information for On-site Jobs

EPA obtained wage and income information from the U.S. Bureau of Labor Statistics (BLS). Part of the U.S. Department of Labor, the BLS is the principal federal agency responsible for measuring labor market activity, working conditions and price changes in the economy. Its mission is to collect, analyze and disseminate essential economic information to support public and private decision-making. All BLS data meets high standards of accuracy, statistical quality and impartiality.

EPA used the BLS Quarterly Census of Employment and Wages database to obtain average weekly wage data for the businesses located at Phoenix-Goodyear Airport Area Superfund site. Average weekly wage data were identified by matching the North American Industry Classification System (NAICS) codes corresponding with each type of business with weekly wage data for corresponding businesses in Maricopa County. If weekly wage data were not available at the county level, EPA sought wage data by state or national level, respectively. In cases where wage data were not available for the six-digit NAICS code, EPA used higher-level (less-detailed) NAICS codes to obtain the wage data.

To determine the annual wages (mean annual) earned from jobs generated by each of the selected businesses located at the Phoenix-Goodyear Airport Area Superfund site, EPA multiplied the average weekly wage figure by the number of weeks in a year (52) and by the number of jobs (employees) for each business.

Table 1. Phoenix-Goodyear Airport Area Superfund Site: Information for On-Site Organizations and Businesses

On-site Business	NAICS Code[a]	NAICS Title	Number of Employees[b]	Average Weekly Wage (2014)[c]	Annual Wage (Mean Annual) per Employee	Total Annual Income[d]	Annual Sales (2014)[b]
Aeroturbine, Inc.	561990	All Other Support Services	360[e]	$572	$29,744	$10,707,840	$830,000[f]
Airline Training Center Arizona, Inc.	611699	All Other Miscellaneous Schools and Instruction	110	$635	$33,020	$3,632,200	$21,300,000
American Precision Components, Inc.	561499	All Other Business Support Services	21	$960	$49,920	$1,048,320	$1,000,000[f]
America's Best AMT	611691[g]	Exam Preparation and Tutoring	NA	$436	$22,672	NA	NA
Argent Solar Cod Acct	541219	Other Accounting Services	4	$946	$49,192	$196,768	$230,000
Cavco West	321991[g]	Manufactured Home (Mobile Home) Manufacturing	350[h]	$770	$40,040	$14,014,000	$460,000[f]
Ctc Aviation Training (U.S.), Inc.	611512	Flight Training	2	$935	$48,620	$97,240	$160,000
Dean Baldwin Painting Limited Partnership	238320	Painting and Wall Covering Contractors	5[i]	$678	$35,256	$176,280	$50,000[f]
Diversified Government Services Group	236220	Commercial and Institutional Building Construction	2	$1,268	$65,936	$131,872	$150,000
Fealty Arms LLC	331318	Other Aluminum Rolling, Drawing, and Extruding	4	$1,053	$54,756	$219,024	$510,000
Fly. At Goodyear	611512[g]	Flight Training	NA	$935	$48,620	NA	NA
Galaxy International, Inc.	811310	Commercial and Industrial Machinery and Equipment (except Automotive and Electronic) Repair and Maintenance	18	$1,112	$57,824	$1,040,832	$1,200,000

On-site Business	NAICS Code[a]	NAICS Title	Number of Employees[b]	Average Weekly Wage (2014)[c]	Annual Wage (Mean Annual) per Employee	Total Annual Income[d]	Annual Sales (2014)[b]
Great Closets & Cabinets	337110	Wood Kitchen Cabinet and Countertop Manufacturing	1[i]	$650	$33,800	$33,800	$73,000[i]
Great Garages, Inc.	337211	Wood Office Furniture Manufacturing	22	$662	$34,424	$757,328	$1,880,000
Kieran	524210	Insurance Agencies and Brokerages	2	$1,263	$65,676	$131,352	$170,000
Lockheed Martin Flight Operations	NA	NA	NA	NA	NA	NA	NA
Lux Air Goodyear (Jet Centers)	423860	Transportation Equipment and Supplies (except Motor Vehicle) Merchant Wholesalers	2	$1,716	$89,232	$178,464	$170,000[f]
Near & Far Gunsmithing	451110	Sporting Goods Stores	1	$409	$21,268	$21,268	$53,000
Ocotillo Welding and Equipment Service, Inc.	811310	Commercial and Industrial Machinery and Equipment (except Automotive and Electronic) Repair and Maintenance	7	$1,112	$57,824	$404,768	$440,000
Phoenix Goodyear Airport	488119	Other Airport Operations	12	$1,173	$60,996	$731,952	$860,000
Polyone Corporation	326113	Unlaminated Plastics Film and Sheet (except Packaging) Manufacturing	7	$736	$38,272	$267,904	NA
Prime Solutions Group, Incorporated	541330	Engineering Services	6	$2,202	$114,504	$687,024	$400,000[f]
PSG Couriers LLC	492110	Couriers and Express Delivery Services	1	$771	$40,092	$40,092	$82,000
Raylynn	453310	Used Merchandise Stores	1	$416	$21,632	$21,632	$46,000

On-site Business	NAICS Code[a]	NAICS Title	Number of Employees[b]	Average Weekly Wage (2014)[c]	Annual Wage (Mean Annual) per Employee	Total Annual Income[d]	Annual Sales (2014)[b]
Robson Community	561740	Carpet and Upholstery Cleaning Services	1	$588	$30,576	$30,576	$61,000
Rss Industries LLC	332710	Machine Shops	3	$990	$51,480	$154,440	$130,000[f]
Southwest Custom Manufacturing LLC	811121	Automotive Body, Paint, and Interior Repair and Maintenance	2	$947	$49,244	$98,488	$110,000
Sun-Western Flyers, Inc.	481219	Other Nonscheduled Air Transportation	80	$1,237	$64,324	$5,145,920	$9,400,000
The 3rd German Air Force Training Squadron	NA	NA	NA	NA	NA	NA	NA
Tons of Toner	423990	Other Miscellaneous Durable Goods Merchant Wholesalers	NA	$996	$51,792	NA	NA
Wrap It	561910	Packaging and Labeling Services	1	$605	$31,460	$31,460	$66,000
Totals			**1,025**			**$40,000,844**	**$39,831,000**

[a] NAICS code provided in the D&B database, unless otherwise noted.
[b] Data are from the D&B database, unless otherwise noted.
[c] Average weekly wage per employee based on BLS 2014 Average Weekly Wage data.
[d] Total annual income figures derived by multiplying "Number of Employees" by "Annual Wage (Mean Annual) per Employee."
[e] Value provided by Phoenix-Goodyear Airport Manager Joe Husband during a 6/12/2015 phone interview.
[f] While sales values typically exceed estimated totals of annual employee income, annual reported sales can sometimes be lower than estimated annual income. This atypical condition of estimated income exceeding sales can be a result of business conditions, estimated business wages not accurately reflecting actual wages for the site-specific business, annual sales being under-reported, a business loss for the year, or a combination of those factors.
[g] NAICS code assumed.
[h] Value provided by Cavco West contact Mary Ruehs during a 6/18/2015 phone interview.
[i] Value provided by Manta.
NA – Not available

Property Values and Local Tax Revenue Generated from Property Taxes

EPA obtained data on the most recently assessed values for property parcels at the Phoenix-Goodyear Airport Area Superfund site in June 2015 through property records accessible through the Maricopa County Assessor's online database (http://maps.mcassessor.maricopa.gov/maps/default.aspx). EPA also obtained 2014 property tax information for the site parcels.

Table 2. Property Value and Tax Summary for Taxes Payable

Parcel ID No.	Parcel Address	Total Market Value of Land and Improvements (2015)	Total Property Tax (2014)
PGA-North Properties			
500-04-016J	NA	$664,700	$16,839
500-04-017A	1000 S Litchfield Rd. Goodyear, AZ 85338	$1,122,400	$28,434
500-04-016K	102 S Litchfield Rd. Goodyear, AZ 85338	$1,054,300	$26,709
PGA-South Properties			
500-07-003J	1300 S Litchfield Rd. Goodyear, AZ 85338	$14,761,200	$87,498
500-07-003K	1658 S Litchfield Rd. Goodyear, AZ 85338	$707,000	$5,269
500-07-006R	1658 S Litchfield Rd. Goodyear, AZ 85338	$21,928,800	Exempt
500-07-006G	1658 S Litchfield Rd. Goodyear, AZ 85338	$1,275,600	Exempt
500-07-006K	NA	$838,500	Exempt
500-07-009B	NA	$617,700	Exempt
500-07-031J	NA	$53,000	Exempt
500-07-031M	NA	$529,400	Exempt
	Totals	**$43,552,600**	**$164,750**

NA – Not available

Estimated Cost Savings Associated With Using Free Treated Water for Irrigation

The City of Goodyear currently (2015) charges $4.95 per thousand gallons of potable water used for irrigation purposes for the first 80,000 gallons purchased. The city charges $5.69 per thousand gallons of potable irrigation water purchased over 80,000 gallons.

The City of Goodyear currently (2015) charges $1.65 per thousand gallons of reclaimed water purchased. Reclaimed water is non-potable wastewater that has been treated by a wastewater reclamation facility and is suitable for industrial and turf-related uses.

All water purchased from the city is also subject to sales tax of 8.80 percent of the total water charge, and a state-imposed water surcharge of $0.0065 per 1,000 gallons of water used. See the City of Goodyear's Service Rates website for additional information: http://www.goodyearaz.gov/residents/water-/wastewater-services/utilities-start-stop-billing-appeals-/service-rates#water within.

Table 3. Calculations of Estimated Cost Savings for the Palm Valley Golf Club (2015 City of Goodyear Reclaimed Water Rates)

Entity	2013 Total Amount of Irrigation Water Used (Gallons)[a]	Total Estimated Pre-tax Water Cost[b]	Total City Sales Tax (2015) (Total pre-tax water cost x 8.8 percent)	Total State Tax (2015) ((Total gallons used÷1,000) x $0.0065))	Total Annual Estimated Cost Savings (using 2015 reclaimed water rates and 2013 amount used)
Palm Valley Golf Club	140,000,000	$231,000	$20,328	$910	$252,238

[a] Crane Co. provided information regarding the actual amounts of irrigation water provided to the Palm Valley Golf Club in 2013.

[b] Estimated cost savings were calculated using 2015 reclaimed water usage rates for amounts of actual irrigation water used in 2013. On July 28, 2015, Crane Co. verified that prior to using treated PGA-North groundwater for irrigation, the Palm Valley Golf Club purchased reclaimed water from the City of Goodyear to irrigate the golf course.

Table 4. Calculations of Estimated Cost Savings for the PGA-North Agricultural Plots (2015 City of Goodyear Reclaimed Water Rates)

Entity	2013 Total Amount of Irrigation Water Used (Gallons)[a]	Total Estimated Pre-tax Water Cost[b]	Total City Sales Tax (2015) (Total pre-tax water cost x 8.8 percent)	Total State Tax (2015) ((Total gallons used÷1,000) x $0.0065))	Total Annual Estimated Cost Savings (using 2015 reclaimed water rates and 2013 amount used)
PGA-North Agricultural Plots	52,000,000	$85,800	$7,550	$338	$93,688

[a] Crane Co. provided information regarding the actual amounts of irrigation water provided to the PGA-North agricultural plots in 2013.

[b] Estimated cost savings for the PGA-North Agricultural Plots were calculated using both 2015 reclaimed water usage rates and potable irrigation water rates for amounts of actual irrigation water used in 2013. If the farmer and Crane Co. did not have access to the free treated PGA-North water for irrigation, they would have the option to purchase either potable irrigation water, or reclaimed water from the City. Estimated cost saving have been calculated for both water options in order to present a range of cost savings.

Table 5. Calculations of Estimated Cost Savings for the PGA-North Agricultural Plots (2015 City of Goodyear Potable Irrigation Water Rates)

Entity	2013 Total Amount of Irrigation Water Used (Gallons)[a]	Total Estimated Pre-tax Water Cost[b]	Total City Sales Tax (2015) (Total pre-tax water cost x 8.8 percent)	Total State Tax (2015) ((Total gallons used÷1,000) x $0.0065))	Total Annual Estimated Cost Savings (using 2015 potable irrigation water rates and 2013 amount used)
PGA-North Agricultural Plots	52,000,000	$295,821	$26,032	$338	$322,191

[a] Crane Co. provided information regarding the actual amounts of irrigation water provided to the PGA-North agricultural plots in 2013.

[b] Estimated cost savings for the PGA-North Agricultural Plots were calculated using both 2015 reclaimed water usage rates and potable irrigation water rates for amounts of actual irrigation water used in 2013. If the farmer and Crane Co. did not have access to the free treated PGA-North water for irrigation, they would have the option to purchase either potable irrigation water, or reclaimed water from the City. Estimated cost saving have been calculated for both water options in order to present a range of cost savings.