



Expanded Training for Process Technology, Instrumentation and Related Technologies

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County:	Nueces
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Project Summary

For decades, Del Mar College (DMC) has partnered with industry to address employers' workforce development needs, providing quality instruction through credit, continuing education and specialized contract training to produce the skilled employees needed in South Texas' Coastal Bend region. As more businesses and industries locate here from other parts of the United States and from around the globe, the College serves as the primary responsive training resource addressing their essential workforce requirements.

The College's Process Technology Program and Industrial Instrumentation Program address the region's growing need for skilled technicians in process technology, instrumentation, industrial automation, process control, safety and related fields. DMC proposes to expand its abilities to deliver training in these areas by adding training in ethylene cracker systems, industrial process maintenance, and the full scope of industrial pump and tank transfer training to further support our area's workforce needs. The target goals are six-fold:

1. Significantly increase the number of awards in Process Technology and Instrumentation Specialist to 400 related awards annually and an enrollment of 1000.
2. Increase the awards in the newly added Millwright Program (Industrial Rotating Equipment Specialists). The addition of the Pump Transfer skid will further support Process and Instrumentation training programs and Transportation Training Services.
3. Increase the number of awards in Environmental Science to support safety assessment and OSHA requirements throughout multiple industrial applications directly related to area petrochemical and industrial plants.
4. Increase the job-ready proficiency of graduates from the Process and Instrumentation Technology program in response to area industry needs by adding Industrial Process Maintenance Training and Ethylene Cracker Training Skids as well and provide cross training for multiple industrial applications directly related to area plants.
5. Add one more Instrumentation Control Room with full integration into all training skids to increase training related to Industrial Instrumentation Technology.
6. Increase the number of Safety and Welding graduates to support technology fields.

DMC is working with Advanced Technologies Consultants, Inc. to develop the Ethylene Cracker Simulation Training and Industrial Process Maintenance Training Units and all related training modules. The estimated cost of these training skids with the additional instrument control room and equipment is \$2,006,000. NuStar will relocate a pump transfer unit (\$1 million value) to DMC. Deconstruction, transportation, pad and infrastructure preparation and reinstallation of the unit at a West Campus site is \$350,000. All additional training skids will be installed at locations contiguous with the original Pilot Plant. The full cost of the expansion project is \$2,356,000.

Program Need

Economic opportunities and demand for a highly skilled workforce are the driving forces in the region. The MSA is experiencing significant capital investment in new and existing industries which total approximately \$50 billion over the five year period. Documents from the Corpus Christi Regional Economic Development Corporation list the new investments, related jobs and average salaries. The following are significant capital investments to the College's service area:

- Gulf Coast Growth Ventures – comprised of ExxonMobil Chemical Corp. and Saudi Basic Industrial Corp. announced a \$10 billion investment that will create 11,000 construction jobs and 600 permanent jobs with average salaries of \$90,000.
- M & G Resins – an Italian company at the Port of Corpus Christi with direct investment of \$1.1 billion and creating 225 permanent jobs is in the final stages of construction.
- OxyChem – finalizing construction on a joint venture with Mexichem to build an ethylene cracker in San Patricio County.
- Cheniere Energy – liquefaction project under construction with a direct investment of \$14.5 billion and creating 250 permanent jobs. Presently 3,500 construction workers are on location. The company has announced the addition of trains four and five and is also in the process of purchasing the existing Sherwin Alumina site to expand further.
- LyondellBassell, Inc. – expansion of operations with an investment of \$500 million and creation of 18 additional permanent jobs.
- voelstapine Texas, LLC – largest direct investment in new steel production by the Austrian company with a direct investment of \$740 million.

The Port of Corpus Christi completed a \$70 million expansion of the La Quinta canal that provides additional capacity for this growth and diversification of industries. The Port has moved from the 6th largest port in tonnage to the 5th largest port in the United States. Along with the opening of the Panama Canal this year, the port will continue to grow.

The existing Harbor Bridge, built during the 1950s, will be replaced with a new expanded bridge to accommodate larger ships. Construction on the \$1 billion project began in 2017. Contractors are presently on site.

Existing petrochemical industry leaders located on the Corpus Christi ship channel are facing retirements from their workforce. As a result, the competition for a skilled workforce will continue to grow, compounded by increased interest from international and national investors.

Key skills needed to support the expanding local industrial base include Process Technology, Industrial Instrumentation, Millwright or Industrial Mechanics, Environmental/Petrochemical Lab Technology, Occupational Safety and Health Technology and Welding, as each of these technicians support the operational activities of local refining and manufacturing plants. This proposal addresses the need for additional training facilities to increase both the scope of training and the numbers of students served to further develop the skill workforce needed to support local industry.

Program Narrative

The long term objective of the project is to enhance and expand training programs to further support existing and proposed business developments that rely on well-trained technicians. Del Mar College's mission is to provide access to quality education, workforce preparation, and lifelong learning for students and community success. As a nationally recognized, locally focused community college, DMC serves a diverse population of adult learners, dual credit students, continuing education students, and high school graduates seeking to grow in knowledge, skills and career opportunities. Ninety percent of our students come from and remain in our community, making Del Mar College a primary economic catalyst for the region as we increase the educational level and workforce skills available to support local business and industry.

In 2014 and 2016, the community approved nearly \$300 million in bonds for creation of a south-side campus, new construction on East and West Campuses and improvements to the infrastructure of the College. These improvements include more than \$30 million to build a new Workforce Development Center on the West Campus and expand the Emerging Technology Building. The new facilities will provide state-of-the-art laboratories, dedicated corporate training bays and integrated classrooms.

Since 2013, the College has received funds totaling nearly \$2.4 million from the Texas Workforce Commission through six Skills Development Fund grants supporting local job training for industry partners such as TPCO America Corporation, Valero Refining – Texas LP, CB & I Inc., Dynamic Industries Inc., voestalpine, M&G Resin USA, and others.

The College's Process Technology and revised Industrial Instrumentation Programs are currently addressing the region's growing need for skilled technicians in process technology, instrumentation, industrial automation, process control, safety and related fields by upgrading and adding state-of-the-art instructional equipment, including a nearly \$2 million Glycol Pilot Plant. This unit is located on the College's West Campus and provides hands-on training simulating real world experiences.

The Glycol Pilot Plant includes a large-scale industrial process system that facilitates training in operational activities regularly undertaken by process operators/technicians within the refining, petrochemical and oil and gas industries. Features focus on common tasks and formal procedures and include calibration of equipment, operation of pumps, control valves, wireless controllers and manual and digital control systems. The fully-computerized control room simulates real-time operations similar to any industrial site.

Additionally, the College outfitted process and instrumentation labs with large-scale fluid process systems allowing for hands-on training related to measurement and control of four process variables: level, pressure, temperature and flow. This equipment allows for creating simple and advanced process loops using common industrial-quality instruments and controllers. The modular concept for this facility allows for integration of alternative instrumentation as needed to address local training needs.

Funding for the original Pilot Plant represented support from the Corpus Christi City Council's Type A Board for almost \$1.4 million, along with nearly \$450,000 in contributions from partners tied to the refining, petrochemical, and oil and gas industries. The College also funded \$321,000 toward the skid unit, which uses heated water to simulate refinery processes and expands training that directly meets industry's skills and knowledge requirements. Overall, the Pilot Plant integrates multiple career tracks and crossover skills so that students can transition into numerous areas within industry.

The number of students majoring in Process Technology continues to grow. From fall 2009 to fall 2016 program enrollment increased from 86 students to 295, more than tripling the number of declared majors in the field.

Del Mar College foresees increasing enrollment by 200%, to 600 students within the first year after fully implementing the proposed enhanced training program with a goal of maintaining 1000 enrollments annually no later than year five (5) of the program expansion. This increase includes diverse learning awards from high schools, college credit programs and corporate training and continuing education certificates. The target range for degree and certification awards through the expanded program is 100 to 400 awards annually, with an anticipated 400 awards annually by year five (5).

The College added training for Millwrights, or industrial rotating equipment specialists, who troubleshoot issues and maintain and repair equipment within refineries and other industrial and manufacturing facilities. Del Mar College also has the ability to add multi-craft certification that incorporates welding, pump, mechanical, instrumentation and process technology training with students focusing on one of these areas to earn an associate's degree and then earning certifications in the other areas to become multi-skilled employees.

The College partners with over 40 Coastal Bend high schools to deliver dual credit common core curriculum and technical programs. Ingleside Independent School District (ISD) offers a dual credit Instrumentation Program, and four industry partners supported this initiative with a combined \$251,000 for equipment and facility upgrades. Students work towards Level I certification to become industrial instrumentation installers and can complete their associate's degree after graduating from high school. Gregory-Portland ISD has aligned their priorities to place greater emphasis on Career and Technical Education initiatives as well. Already a dual credit partner with DMC for welding instruction onsite, GPISD offers their students Process Technology training.

Additionally, Del Mar College's General Education Development (GED) Program offers a Career Pathways program that connects education and training strategies to enable students to secure industry relevant certification while also earning their high school equivalency certificates. Industrial Instrumentation is among the fields offered.

As economic growth continues in the Coastal Bend, Del Mar College will serve as a resource to ensure our region's workforce is globally competitive. At Del Mar College ... "dreams are delivered."

Proposed Project Expansion

The increase in enrollment and graduates over the past four years is directly related to the development and implementation of the Glycol Distillation Pilot Plant which was completed and operational by March 2016. Plans for the expansion of this training facility with the construction of the Workforce Development Center will represent a world-class program unique in the United States. Once operational, it is expected this state-of-the-art training facility will allow Del Mar College to once again double its enrollment, allowing it to address the growing needs of the area for a skilled workforce training in multiple facets of the complex refining operations.



The new Workforce Development Center currently under construction creates a complex that combines the existing facilities, learning labs and Pilot Plant with new and expanded technical skills development facilities to educate the workforce of the future. This new building is designed to provide over 49,000 square feet of technical and industrial learning space with 31% dedicated to process technology, instrumentation, and millwright as well as an analytical lab for petrochemical and petroleum product analysis. Located on the first floor is the Process Technology Laboratory featuring a variety of functioning models simulating multiple aspects of petrochemical and chemical processing.

Process Technology Laboratory: The Process Technology Laboratory will feature chemical processing equipment to provide both theory and hands-on instruction in areas of chemical and unit operations. Examples include: continuous distillation equipment using Thermosiphon boiler, bubble tray column and external reflux to allow students to study the distillation process; three-phase separator to provide a study of a major step in the oil industry – water, oil and gas separation in extraction well outlet; liquid-extraction mixer settler to provide a study of a liquid-liquid extraction wherein students would learn the identification of the operation conditions; and control absorption and regeneration to provide a study on the migration of product from gas to liquid phase. The estimated cost of the required equipment is \$750,000. Only \$250,000 of this cost is being requested in this proposal. The remaining \$500,000 is being sought from industry partners.



Analytical Laboratory: The new analytical lab will contain instruments used in petrochemical and environmental laboratories to analyze the products from the refineries and oil field as well as the environmental samples from those industries and the water and waste water treatment facilities in South Texas. Some of the instruments students will work with include: atomic absorption spectrometer, gas chromatograph with mass spectrometer, ion chromatograph, automatic distillation apparatus, total organic carbon analyzer, UV-Vis spectrometer, auto and

flash point tester. These instruments are used by lab technicians to analyze product in the refineries from the time the product enters the plant as crude, through each step in each process unit, until it leaves the plant as finished product. The equipment is also used by lab technicians in environmental labs to analyze environmental samples to determine contaminant levels for treatment to efficiency to meet EPA and TCEQ permit requirements. The estimated cost of the required equipment is \$500,000. Only \$250,000 of this cost is being requested in this proposal. The remaining \$250,000 is being sought from industry partners.

Pump Transfer Technology: To address the ever expanding workforce needs of area industry, Del Mar College must obtain pump transfer technology. The current DMC machining program is being expanded to incorporate the advanced skills needed by millwrights including training on a wide variety of rotating equipment found on industrial job sites from simple pumps to complex power trains. NuStar is donating its pipeline and pump transfer training skid which is to be transferred to the DMC West Campus and located next to the Glycol Distillation Pilot Plant. The Pump Transfer skid will provide students with practical application of the theory and concepts taught in the classroom and introduced in the school's laboratory facilities.

Training will include:

Medium-voltage motor controls allowing students to troubleshoot and monitor motor control applications, and practice NFPA-70E arc flash electrical safety procedures, lockout/tagout, and condition monitoring of rotating equipment.

Advanced mass flow metering applications will give students opportunities to experience hands-on work with relevant process equipment equal to what they will encounter in the field.

Applications involving motorized valve actuators, material transfer and pipeline operations will prove invaluable as the students prepare to enter the workforce as trained process professionals.

The estimated value of the training unit is \$1,000,000. The cost of moving the NuStar pump transfer training unit to Del Mar College is \$350,000 and includes deconstruction of the facility at the NuStar site, transportation to Del Mar College West, site, utility installation and pad preparation at the West Campus location and reconstruction of the unit. The weight of this training unit calls for reinforced pad which is reflected in the cost estimate.

Instrument Control Room: A second instrument control assembly will be created in the current Flato building and subsequently relocated to the new Workforce Development Center as that facility comes online. Both control rooms will be designed or retrofitted to provide control and instrumentation process for all learning skids. The addition of a second control room will double student training access to all components of the Pilot Plant, Ethylene Cracker, Industrial Process Maintenance and Pump Transfer training skids. Opportunities to work with advanced instrumentation installation will help Del Mar College elevate the Process Technology and Instrumentations programs to new heights as we provide world-class training facilities for our developing area workforce. Training on this unit will support multiple educational programs including Millwright, Process Technology, Instrumentation and Transportation Training. The cost of the additional Instrument Control Room, including assembly, programming, computers, cameras, TV monitors and FFE (furniture, fixtures and equipment) is \$226,000.

Ethylene Cracker Technology: The Ethylene Cracker Training Unit will provide training systems to deliver competent students to the workforce with real-world hands-on experience in industrial equipment that is typical of multiple local operating facilities. This training system will consist of 1) a reactor, which is multiple tubes inside a high temperature fired heater; 2) heat recovery boiler to partially cool the gas from the reactor; 3) quench column to finish cooling; 4) compression to raise pressure for gas removal. The proposed system will use only nitrogen and water to prevent student exposure to chemical reactions yet provide simulations of the different kinds of operations utilized in the field. Students will gain a comprehensive understanding of the heat exchange principals to a level needed to control various operations. In particular, the operator needs to understand the factors affecting efficient operation of a heat exchanger in order to make appropriate adjustments or recognize when maintenance is required. Technologies employed at this facility will be common to technologies seen in the refining and petrochemical industries. The intent is to have a broad range of applicability to multiple disciplines and to serve a broad audience including students, technicians and engineers with a system designed to train on heat exchanger process controls and operations. The unit will simulate the industrial process of cracking controls and operations relevant to multiple operations and technologies. The equipment will be designed to accommodate up to 12 students in the skid decking during class to include knowledge of:

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- All items on a schematic of the heat exchanger system and the function of each
 - Principles of operation of heat exchangers
 - Correct methods of starting, operating and shutting down heat exchangers
 - Issues related to pressure vessels (regulations, requirements)
 - Physics and chemistry relevant to the process unit
 - Duty of care obligations
 - Hierarchy of control
 - Communication protocols, e.g. radio, phone, computer, paper, permissions/authorities
 - Routine problems, faults and other resolution
 - Relevant alarms and actions
 - Plan process idiosyncrasies
 - Cause of heat loss and change in heat transfer coefficient/rates
 - Corrective action appropriate to the problem cause
 - Function and troubleshooting of major internal components and their problems, such as tubes and baffles

Steam Boiler start up functions, skills will include:

- Numeracy: interpret instruments, gauges and data recording equipment, use measuring equipment
- Communication: use appropriate communication strategies with work colleagues and other personnel on site to manage steam boiler start up

- Reading: interpret documentation, procedure manuals and customer orders relevant to steam boilers
- Writing: record start up activities accurately and legibly, using correct technical vocabulary
- Problem solving: maintain situational awareness, analyze adjust process to maintain and coordinate safety, quality and productivity
- Technical: use electronic and other control systems to control equipment and processes; access, navigate and enter computer based information

Fired Heater functions, skills will include:

- Principles of combustion of fuels (natural gas and fuel oil)
- Use of combustion equipment and controls for thermal liquid heater and fired heater draft equipment; natural, induced, balanced burner management systems for heating boilers and fired heaters
- Methods of lighting gas and oil-fired thermal liquid heaters and fired heaters
- Methods of cleaning oil and based fired burners used in thermal liquid heaters and fired heaters
- Requirements for proper combustion of fuels
- Adjustments made for proper burner combustions
- Causes and prevention of furnace explosions
- Sizes and identification of piping, pipe fittings and value connections
- Expansion joints, bend, support, hangers and insulation
- Drainage requirement including separators, traps water hammer valve type, both construction and application

The cost of the Ethylene Cracker Unit is estimated at \$975,000 with an additional site preparation cost of \$100,000 which will include concrete pad installation to support the unit and utilities, water, nitrogen and natural gas supplies.

Industrial Process Maintenance Trainer: This training skid will provide training on multiple operations associated with industrial maintenance within the Process Technology industry. The system will be a modular, steel grated work surface with interchangeable systems including: welded-steel pump foundations and tank mounting pads; welded and flanged process piping systems fabricated to ANSI standards; parallel and paired centrifugal pumps designed for common maintenance activities; three hundred gallon tank including bulkhead fitting and flanges for process connection and instrumentation connections, all tanks to include vents, drains, sight glasses/level gauges with block valves; tank level gauges including gauge column sight glass and magnetic level indication gauges; Fisher brand diaphragm actuated control valves with pneumatic positioners; industrial hose station; removable pipe allowing for installation and calibration of alternate flow instrument types; an assortment of flanged connections; control

valves, PLC's and transmitter, and integrated safety features. The skid design will facilitate common exercises of related installation/removal of common piping components including Fox valves, then/trans, strainers, reducers and pressure gauges. The intent is to have a broad range of industrial maintenance procedures common to in field application within the process technology industry. The equipment will be designed to accommodate up to 12 students in the skid decking during class to include knowledge of:

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- Proper line break procedure and button back up
 - Lock out Tag Out (LOTO) procedures – HED, locks lists
 - Installation of blinds, blinds with spacers
 - Blind controls – blind boards, streamer, etc.
 - Group lock boxes and associated paperwork
 - Difference gaskets – ID them and change out
 - Installation of orifice plates, orientation and correct sizing
 - Cleaning/ clearing of equipment for maintenance and entry – steaming, chemical cleaning
 - Angle working of lines, drops and control valves
 - Purging, inventorying equipment for return to service
 - Entry permitting, vessel sniffing, purging with blowers
 - Isolation troubleshooting, checking LOTO sheets, blind sheet, hazardous energy control with students building and verifying the above
 - Using four gas meters for hot work and entry permits
 - Different types of equipment clearing – oily water sewer, flare. Common tank, etc.
 - Pumps, separation on/off switches, individual breakers, suction screens, common suction and discharge vessels, low point drains, high point vents
 - Leak testing using N2 and H2O and snoop
 - Punch out lists and guidelines
 - Piping, gasket IS on flanges
 - Injection quills and ID with chemical pump

The cost of the Industrial Process Maintenance Training Unit is estimated at \$355,000 per unit with an additional \$100,000 for site preparation which will include concrete pad installation to support the unit and utilities. DMC is actually seeking two such units, but will seek industry funding for the second unit.

Overall Cost Summary: The overall cost of the Training Expansion Project submitted for funding is \$2,356,000 which includes \$1,075,000 for the Ethylene Cracker Training skid including unit training and site preparation, \$455,000 for one of the Industrial Process Maintenance Training skid including unit training and site preparation, \$226,000 for the

additional Instrument Control Room and equipment, \$350,000 for the Pump Training Skid installation and site preparation, \$250,000 for additional technology for the Process Technology Lab and \$250,000 for additional technology and equipment for the Analytical Lab. The full project budget is outlined below based on estimates from vendors:

Total Project Budget				
Item	#	Unit Price	Total	Notes
Ethylene Cracker Simulation Training Unit	1	\$ 955,000	\$ 955,000	Estimates from Advanced Technology Consultants for custom designed training skid
Unit Training	1	\$ 20,000	\$ 20,000	Training on Unit for faculty
Site Preparation	1	\$ 100,000	\$ 100,000	For Ethylene Cracker Unit
Industrial Process Maintenance Training Unit	1	\$ 335,000	\$ 335,000	Estimates from Advanced Technology Consultants for custom designed training skid
Unit Training	1	\$ 20,000	\$ 20,000	Training on Unit for faculty
Site Preparation	1	\$ 100,000	\$ 100,000	For Ethylene Cracker Unit
Instrument Control Room Assembly & Programming	1	\$ 80,000	\$ 80,000	
Computers & software	6	\$ 2,500	\$ 15,000	
Cameras, purchase and installation	20	\$ 3,000	\$ 60,000	
TV Monitors & installation	8	\$ 4,500	\$ 36,000	
Furniture, Fixtures & Equipment (FFE) allotment	1	\$ 35,000	\$ 35,000	
Pump Training Unit Trucking and Installation	1	\$ 200,000	\$ 200,000	
Pump Training Unit site preparation	1	\$ 150,000	\$ 150,000	
Process Technology Lab Equipment		\$ 250,000	\$ 250,000	
Chemical Analytical Lab Equipment		\$ 250,000	\$ 250,000	
Total			\$ 2,356,000	

Type A Funding Request: Del Mar College through the Del Mar College Foundation, Inc. requests education/skills development funds from the Type A fund to assist in acquiring the necessary equipment to expand the Process Technology, Instrumentation, Millwright and related training programs such as welding and safety in the amount of \$2,356,000. With this investment from Type A support, potential implementation of the new training skids would be completed in fall 2018 with the target opening of the new Workforce Development Center in spring 2019.

Del Mar College Contribution: Del Mar College is investing over \$30,000,000 for West Campus expansions, including a construction of a new Workforce Development Center (WDC) and expansion of the Emerging Technologies Building. The Workforce Development Center will be located adjacent to the current Pilot Plant and include state-of-the-art laboratories, dedicated Corporate training bays and integrated classrooms. The cost of the Workforce Development Center is \$14,700,000 and is being funded out of approved 2014 General Obligation Bond funds. The new building is designed to provide over 49,000 square feet of technical and industrial learning space. With 31% of the space dedicated to process technology, instrumentation and millwright as well as an analytical lab for petrochemical and petroleum product analysis, Del Mar College is investing \$4,557,000 into expansion of the Process Technology, Instrumentation and related technologies with construction of this facility which is critical to the expansion of the workforce training program. The additional training skids and technology requested in this proposal are needed to fully integrate the training for all aspects of industry needs. The total DMC match is \$4,557,000.

Other support: Del Mar College is working with multiple industrial partners to secure additional funding for the project including \$355,000 for a second Industrial Process Maintenance Training Unit, \$500,000 for additional technical instruction equipment for the new Process Technology Lab and \$250,000 for additional technical instruction equipment for the new Analytical Lab and \$200,000 for advanced welding laboratory equipment for an anticipated outside investment of \$1,305,000. Multiple proposals have already been submitted.

Combined, the match components equal \$5,862,000.

While in-kind donations may not count toward the match component, it is noteworthy to mention that NuStar will be transferring its pump transfer training unit, valued at \$1,000,000, to the Del Mar College West Campus at a location contiguous with the Pilot Plant and additional training skids. In addition OSIsoft has donated in excess of \$1 million in software to support integration of educational software in all training skids. This software is comparable to that used within local industry.

Economic Impact

The expanded program is anticipated to support between 100 and 400 additional Process Technology and Instrumentation Technology graduates per year with average annual salaries of \$63,441.27 and \$61,568.18 respectively. Charts of salary calculations and economic impact are provided in the Economic Impact Calculations attachment section and include detailed impact with graduations levels at 100, 200 and 400 annually over the next five years. Annual salary estimates also include a 2% annual increase for subsequent years to reflect anticipated cost of living increases.

At the minimum level of 100 additional associates degrees and certificate graduates annually (75 Process Technology and 25 Instrumentation each year), the program would provide area industry

with an additional 375 Process Technology and 125 Instrumentation professionals by year five. The direct economic impact to the community based on salary earnings would be \$98,301,407 over the five-year period. Adding the indirect factor with a 1.5 multiplier, as recommended by EMSI (www.economicmodeling.com), increases the economic impact to \$245,753,516.

Using the mid-range graduation levels of 200 additional graduates each year (150 Process Technology and 50 Instrumentation), area industry would have an increased workforce pool of 1,000 trained technicians by year five. The direct and indirect economic impact of this range over the five-year period is \$196,602,813 and \$491,507,033 respectively.

Del Mar College has a target level of 400 additional associate's degrees and certification graduates annually (250 Process Technology and 150 Instrumentation). At this level, the program would provide area industry with an additional 1250 Process Technology and 750 Instrumentation professionals by year five. The direct and indirect economic impact to the community at this target level is \$391,743,666 and \$979,359,166 respectively.

The anticipated actual outcomes will reflect a ramping-up effect, moving over time from 100 annual awards/graduates to 400 annual awards/graduates. Estimated final indirect economic impact of this training program for the five-year period can be estimated between the \$500,000,000 and \$750,000,000.

Conclusion

Del Mar College is grateful for past support provided by the City of Corpus Christi's Type A funds. Investment in 2009 assisted the College in establishing the Northwest Center. Today that center is serving more than 300 students in healthcare, GED, and core English programs. The 2012 expansion of the Del Mar's Aviation Maintenance Training program located at the Corpus Christi International Airport began providing classes in the facility made possible by Type A funds in 2013-2014. Type A funding supported expansion of Transportation Training Services (TTS) in 2012. Since 2013, the program has successfully trained 1,447 students with 98% of students completing the program and 87% successfully entering the transportation industry. A 2013 grant provided essential funds to develop and install the College's first Pilot Plant providing a state-of-the-art, hands-on learning lab for Process Technology and Instrumentation students. Since 2009, enrollment in these programs has more than tripled, from 86 students in fall 2009 to 295 declared majors in these fields in fall 2016. We believe these programs are excellent examples of positive investment by the Board, providing jobs and economic growth for our community.

The participation by the Type A program is critical to the expansion of Del Mar College's Process Technology and Instrumentation Training program at this time. We believe an investment of \$2,356,000 from the Type A program would enable Del Mar College to ramp up its training to serve the growing and urgent need for trained technicians.

Economic Impact Calculations

Del Mar College

Academic Program Descriptions

Training Synopsis

The **Process Technology** program at Del Mar College is designed to prepare graduates to work as process operators in the petrochemical, refining and manufacturing industries. The curriculum provides general education in mathematics, applied physical science, communications, basic computer principles and operation, process operating procedures, fundamentals of process instrumentation, statistical quality control, process equipment, reactions, reactors, distillation process, safety and problem solving/troubleshooting. Students can earn Associate in Applied Science Degrees and Certifications in this program.

The **Industrial Instrumentation** program prepares student for area industries that rely heavily on automated control systems that depend on instrumentation to enhance their efficiency and safety. There are currently no other colleges in the area with this type of Instrumentation degree. Students acquire skills in safety, automatic control systems, instrumentation calibration, instrument installation and instrumentation systems troubleshooting. Students can earn Associate in Applied Science Degrees and Certifications in this program.

Millwrights or Industrial Mechanics work on a wide variety of equipment from simple pumps to complex power trains. Technicians in this field may work in a refinery, power plant, or local repair shop. Technicians work on rotating equipment including all types of pumps, blowers, fans, turbines, gear boxes, rotary valves, clarifiers, compressors and turbines just to name a few. Millwrights play a vital role in troubleshooting damaged equipment and working alongside engineers to help determine the root cause of failure. Technicians will also work alongside operations to determine the best way to warm up, start or stop equipment, as well as helping determine a strong preventive maintenance plan to minimize downtime and help predict failures before they occur. Students can earn Associate in Applied Science Degrees and Certifications in this program.

Welding is used in all aspects of construction, repair and industrial maintenance where metal components need to be fused for a permanent bond. Welders use all types of welding equipment in a variety of positions, such as flat, vertical, horizontal and overhead. They generally work from drawings or specifications or by analyzing damaged metal, using their knowledge of welding and metals. Students can earn Associate in Applied Science Degrees and Certifications at multiple levels in this program.

The **Environmental/Petrochemical Lab Technology Program** prepares students for careers in the Chemical Process Industry or related laboratory-type jobs. The curriculum allows student to assimilate chemical knowledge, develop laboratory skills and competencies, and develop attitudes and abilities consistent with teamwork necessary to work effectively in the field. Student can earn Associated in Applied Science Degrees or Certifications in this program.

The **Occupational Safety and Health Technology Program** prepares students for careers as Safety Specialists within industry and business. Through the program, the students assimilate knowledge, develop skills, and acquire competencies for careers in the field.

Upon completion of the program, graduates will be eligible to sit for the Occupational Health and Safety Technologist (OSHT) certification. The program can either lead to an Associates in Applied Science Degree or transfer to a four year institution to complete a Bachelor of Applied Arts and Science Degree.

The DMC **Transportation Training Services** is an intensive training program to help the Transportation Industry with the high demand for qualified truck drivers. Students gain the knowledge and skills to obtain a Class A CDL driver's license through training on state-of-the-art equipment included full motion cab simulators and comparable truck and trailers that are used in the industry. This is a 3 week certification continuing education program.