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INITIATION REPORT

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GSE Systems, Inc. (NASDAQ/GVP)

BUY - Current Price $2.65 /Price Target: $5.00

GSE Systems provides simulators and consulting services to the global nuclear power industry.

December 18, 2018

Barry M. Sine
Senior Research Analyst
561-208-2925
bsine@dawsonjames.com

Nuclear is the Future – Initiate at Buy

- We initiate coverage of GSE Systems with a twelve-month price target of $5 and a Buy rating.
- GSE mainly provides services to the nuclear power industry with about half of revenue comprised of high margin power plant simulators and the other half lower margin consulting work around training or preparing for inspections.
- Surprisingly, the nuclear industry has extremely strong growth prospects, especially on a global basis. GSE's simulators can easily be used globally and its consulting business typically takes U.S. expertise from retired nuclear plant workers and applies it globally in markets such as China.
- In the U.S. some of the most liberal previously anti-nuclear states including New Jersey, New York, Connecticut and Illinois have recently passed laws to subsidize their nuclear industries as they realize that nuclear power is crucial to meeting aggressive carbon emission reduction goals.
- Globally, the number of nuclear plants in operation is expected to double over the next two decades.
- All of the major nuclear catastrophes have been found to be due to human error – Three Mile Island, Chernobyl and Fukushima. Thus the simulators and training provided by GSE is critically important. Another major accident would likely lead to another round of plant closings and halt new construction for a decade.
- GSE is also highly acquisitive and expects to more than double revenue by 2020 with about two acquisitions annually. The founders of many of its targets are nearing retirement age and are eager to sell. GSE is an ideal buyer due to its strong relationships and reputation in the industry.
- We forecast revenue of $96.6 mm in 2019 and $106.2 mm in 2020. Our EBITDA forecast calls for adjusted EBITDA of $8.7 mm in 2019 and $10.7 mm in 2020. We do not assume any acquisitions.
- Our price target equates to 0.9x our 2020 revenue estimate and 9.2x our EBITDA estimate, implying 24% and 29% discounts, respectively to where comps currently trade.

Please find Important Disclosures beginning on Page 16.

GSE Systems, Inc.
1332 Londontown Boulevard
Sykesville, MD 21784
+1.410.970.7800
http://www.gses.com

Rating	Buy
Target Price	$5.00
Ticker Symbol	GVP
Market	NASDAQ
Stock Price	$2.65
52 wk High	$3.85
52 wk Low	$2.10
Shares Outstanding:	19.8 M
Public Market Float:	15.4 M
Avg. Daily Volume	14,272
Market Capitalization:	$53 M
Institutional Holdings:	40.3%
Dividend Yield:	0.0%

Earnings Per Share	**Normalized to exclude unusual items**			
FYE - December	**2017**	**2018E**	**2019E**	**2020E**
1Q - March	($0.01)	($0.08) A	$0.02	$0.04
2Q - June	$0.04	$0.05 A	$0.03	$0.05
3Q - September	($0.03)	($0.03) A	$0.03	$0.04
4Q - December	$0.27	$0.00	$0.02	$0.04
Year	**$0.27**	**($0.05)**	**$0.10**	**$0.17**
Revenue ($mm)	**$70.9**	**$91.4**	**$96.6**	**$106.2**
EV/Rev	0.7X	0.6X	0.5X	0.5X
EBITDA ($mm)	**$5.6**	**$6.3**	**$8.7**	**$10.7**
EV/EBITDA	9.2X	8.2X	5.9X	4.8X

Senior Executives

Kyle Loudermilk	Chief Executive Officer
Chris Sorrells	Chief Operating Officer
Emmett Pepe	Chief Financial Officer
Bahrma Meyssami	Chief Technology Officer
Dan Pugh	SVP - General Counsel
Gill Grady	SVP - Corp. Bus. Dev.

Common Ownership Profile

Shareholder	**Shares ('000)**	**% of Total**
Pacific View Asset Management LLC	1,698.8	8.6%
SIAR Capital LLC	1,459.6	7.4%
Needham Investment Management LLC	1,120.0	5.6%
S Squared Technology LLC	786.6	4.0%
Renaissance Technologies LLC	577.1	2.9%
Directors and Officers	1,278	6.4%

Capitalization

Market Value Basis ('000)	**12/14/2018**	**%**
Long-Term Debt	$8,990	17.4%
Market Value of Equity	52,557	101.7%
Less: cash	-9,854	-19.1%
Enterprise Value	$51,693	100.0%

Book Value Basis ('000)	**09/30/2018**	**%**
Long-Term Debt	$8,990	15.6%
Other Liabilities	18,447	32.1%
Book Value of Equity	30,114	52.3%
Total Capital	$57,551	100.0%

Source: Company reports, FactSet Data Systems and Dawson James estimates.

Nuclear is the Future

We initiate coverage of GSE Systems with a Buy rating and a $5 price target. GSE is a provider of highly specialized temporary personnel and training to the nuclear power industry (91% of revenue) and others such as fossil fuel power plants and oil and gas refineries. The company's key assets, in our opinion, are its high level of competency and pool of talent. The nuclear power industry faces severe public perception challenges, so it must perform to perfection, making GSE's services essential. While the nuclear industry is stalled in the U.S., growth is surging globally. GSE is taking the decades of experience and strong operating history in the U.S. to sell expertise around the world. Surprisingly even in the U.S., nuclear power is grudgingly being recognized as critical to goals of a carbon neutral economy with the federal government, New York, Connecticut, Illinois and New Jersey recently passing legislation providing financial support to the industry.

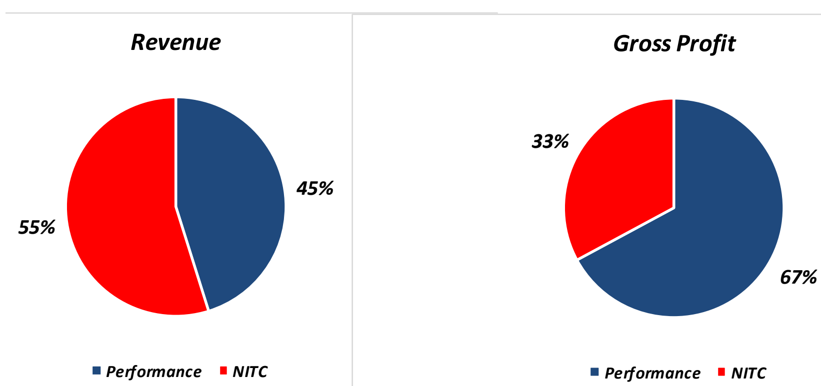
GSE was founded in 1994 by five companies consolidating their related businesses:

- ManTech International
- National Patent Development Corp.
- General Physics
- GPS Technologies
- Vattenfall AB

GSE stands for Global Simulation and Engineering Systems and that is still a good description of the business although the current legal name, GSE Systems, rolls off the tongue a bit easier. GSE's predecessor companies have a long history of innovation going back to 1929 when Edwin Link invented the first aircraft flight simulator for training pilots. In 1971 predecessor company Link Simulation invented the first nuclear plant simulator.

GSE provides two types of services, primarily to nuclear power plant operators. Its Performance Improvement Solutions unit provides simulator software to train plant operators. Its Nuclear Industry Training and Consulting (NITC) unit provides highly skilled specialized nuclear experts for temporary projects at nuclear plants such as training or preparations for inspections. The company also does some work for fossil fuel plants and refineries.

Performance and NITC Relatively Equal in Revenue, But Performance Is More Profitable



Source: Company reports and Dawson James estimates

Revenue is split fairly evenly between Performance, at 55% of consolidated revenue in the most recent quarter, and 45% from NITC. But Performance is far more profitable, with a gross margin of 37% versus 15% for NITC in the most recent quarter, so Performance makes up 67% of gross profit versus just 33% for NITC.

A major part of GSE's strategy is acquisitions. There are dozens of small, specialized consulting companies around the U.S. where the founder is at an age where they are looking to retire and seek-a highly trusted buyer who can offer fair value for their business. GSE is uniquely positioned as such a buyer. Being a public company with the ability to utilize either equity or debt gives it flexibility in structuring deals.

We highlight four recent relevant acquisitions in the table below. The current CEO, Kyle Loudermilk, came on board in July 2015 and has put his own team in place. One transaction, Hyperspring, was in place before he joined but he has completed two subsequent transactions: Absolute and True North.

Acquisitions are a Key Part of the Strategy

Date	Target	Segment	Founded	Employees	Value $mm	EBITDA Multiple
1/5/2011	EnVision Systems Madison, NJ	Performance	1991	54	4.25	
11/17/2014	Hyperspring Huntsville, AL	NITC	2004	80	3.00	1.9x
9/20/2017	Absolute Consulting Navarre, FL	NITC	1997	150	8.75	4.4x
5/14/2018	True North Consulting Montrose, CO	Performance	1999	60	9.75	4.2x

Source: Company reports and Dawson James estimates

Management is targeting acquisitions in the nuclear industry and is looking to pay between 4x and 6x pro forma EBITDA. Transactions should be accretive and the company is especially looking for targets that are a good cultural fit because it is buying teams of people, not physical assets. It notes there are about 70 potential targets in the Performance sector, with a typical revenue range of $10 mm to $15 mm. In NITC, it notes there are over 100 potential targets with revenue in the $10 to $80 mm range. Management has also stated that it may also consider expanding outside of its two core segments looking at related acquisitions in software and the transmission/distribution EPC (engineer, procure and construct) sector.

The Performance segment dates back to 1976 under predecessor companies and operates highly specialized simulators for nuclear power plants, fossil fuel plants and, to a lesser extent, refineries. It has built more nuclear plant simulators than any other company globally including the first simulator for the new Westinghouse AP1000 and the small modular reactors (SMRs) built by NuScale. Performance generated 12.7% revenue growth in the third quarter and a 36.9% gross margin. Growth was accelerated by the May acquisition of True North Consulting. GSE lists three key categories of simulators in its most recent 10Q:

- **Universal training** – these simulators are called universal since they do not attempt to mimic a specific design or plant, but to provide general training. The company has delivered over 360 of these simulators. Its key customers for this product are oil companies and universities.

- **Part-task training** – these simulators mimic very specific severe accidents such as the 2011 Fukushima Daiichi accident in Japan to hopefully prevent future accidents. Every major nuclear power plant accident has been found to have been caused by human error so this type of training is critical to improving safety.
- **Plant specific operator training** – these simulators exactly replicate the control room of a nuclear or fossil fuel power plant or oil refinery. They also exactly mimic individual plant owners' procedures. These simulators can be used to train operators on plant startup, shutdown, and normal as well as critical event operations. GSE has delivered over 480 of these simulators.

As noted, the company acquired True North to bolster this sector in May 2018. True North specializes in ASME OM code training. ASME is the American Society of Mechanical Engineers and it has long established very detailed codes for power plant operation which, despite ASME's name, are the standard used in over 100 countries. OM stands for operation and maintenance of nuclear power plants. True North is even more specialized than that focusing specifically on appendix J and section XI. Presumably, GSE could target acquisitions of companies specializing in the other appendices and sections of the AMSE OM code to round out its capabilities. These are new capabilities for GSE although True North served many of the same customers. True North is headquartered in Montrose, Colorado with 60 employees. Roughly 85% of True North's business was for nuclear plants, but it also did work for fossil fuel plants.

The NITC segment is much more labor intensive, providing highly experienced, skilled people for short-term contracts such as training, writing new procedure manuals or preparing for inspections. Its operations date back to 1997. NITC grew revenue 79.1% YoY in the third quarter and posted a 14.9% gross margin. This growth was accelerated by the September 2017 acquisition of Absolute Consulting, so growth should slow to purely organic levels from 4Q onward until the next acquisition.

GSE's competitive strength in the segment is its huge rolodex of experienced individuals. Since its projects often require specific knowledge of a particular plant and the procedures of a particular operator, GSE generally hires retirees who spent their careers in the plant. These grey-haired experts return to the plants where they spent their careers to train new workers. Projects are generally for a few months at a time. This relationship is a win-win for the contractors and GSE. GSE can hire the very specific talent it needs only when it needs it while the workers can continue to enjoy their retirement while supplementing their income with short-term projects. *Power Engineering* magazine reported that 39% of power plant employees are eligible for retirement. This presents an opportunity for GSE to train their replacements, via both the Performance segment simulators, and the NITC hands on trainers. It also provides a ready supply of experienced talent ready to supplement their retirement income with consulting projects.

As noted, the NITC segment has been bolstered by recent acquisitions. In November 2014, it acquired Hyperspring LLC of Huntsville, Alabama which brought on 80 employees. Over 90% of its revenue came from staff augmentation and 70% of revenue from one customer, which we believe to be Southern Company. In the acquisition, the CEO stayed on with GSE and most of the purchase price was structured as an earn out. Management has repeatedly referenced Hyperspring as a strong performer and it appears to be exceeding earn out targets. The other acquisition was the September 2017 acquisition of Absolute Consulting of Navarre, Florida which brought on 150 employees.

Nuclear Plant Workers Portrayed as "Bungling Idiots"

GSE's services are incredibly important to maintain the tattered integrity of the nuclear industry. Major disasters such as Three Mile Island, Chernobyl and Fukushima caused immense damage both to the environment and the industry's image. Investigators later blamed human error for all three. If that weren't bad enough, the most popular television show of the last 29 years has portrayed the industry in a negative light. In a letter to the producers of *The Simpsons* the U.S. Council on Energy Awareness wrote "expressing their horror at watching plant workers painted as 'bungling idiots'." Even Indian convenience store workers have reportedly been able to get *The Simpsons* to stop caricaturing them recently, but not the nuclear industry. Numerous chat boards for nuclear engineers stress that Homer J. Simpson is not a nuclear engineer, but rather a nuclear plant safety inspector, as if that matters. But alas, the damage to industry's reputation is done.

Nuclear power has had a mixed history in the U.S. with plant shutdowns negatively impacting the industry but financial support bolstering the industry. In 2013, the San Onofre plant in San Diego County, California was shut down over concerns about its proximity to the San Andreas fault and the recent experience with Fukushima in Japan. In 2014 actions by the Vermont legislature forced the closure of the Vermont Yankee power plant in that state, despite the fact the that the Nuclear Regulatory Commission (NRC) had just extended its license by 20 years and it was responsible for 72% of the electricity in the state.

The International Atomic Energy Agency (IAEA) has created a seven-level scale to describe the magnitude of nuclear plant incidents/accidents called the International Nuclear Event Scale (INES). It is similar to the earthquake Richter scale in that it has seven levels and is logarithmic. Each higher level represents events ten times worse than the next lower level. The Chernobyl accident in the Soviet Union in 1986 and the Fukushima Daiichi accident in Japan in 2011 are the only level seven accidents. There has only been one level 6 accident, at the Mayak Chemical Combine in the Soviet Union in 1957. Three Mile Island in the U.S. in 1979 was categorized as a level 5 accident, along with two other nuclear plant accidents.

The IAEA Rates Nuclear Incidents from a Scale of 0 to 7 Under its INES System

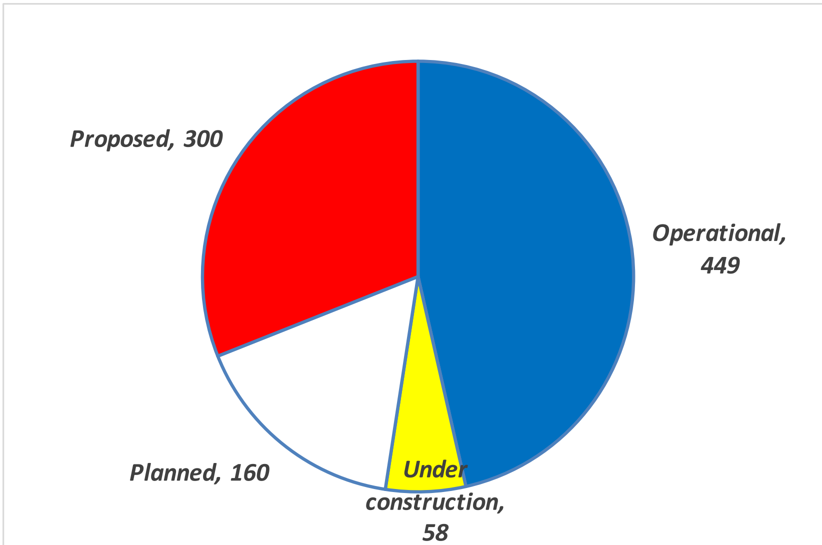
0	Deviation
1	Anomaly
2	Incident
3	Serious incident
4	Accident with local consequences
5	Accident with wider consequences
6	Serious accident
7	Major accident

Source: International Atomic Energy Agency

In reality, management describes the nuclear plant workers it staffs as extremely conservative individuals very resistant to change. Its typical NITC worker is hired on contract for a specific project to train plant workers or work on projects such as updating safety manuals or preparing for government inspections. The company will typically hire retired nuclear plant professionals to staff projects in the plants where they spent their careers. So they know the plants intimately.

There are presently 448 nuclear plants operating globally in 30 countries providing 11% of the world's electricity. Of these, there are 60 plants in the U.S. in 30 states with 98 operating nuclear reactors. There are 50 plants under construction globally including 20 in China, 7 in Russia and 2 in the U.S. GSE already does some business in China and we see this as an opportunity to export U.S. expertise around the world. Power demand globally is forecast to increase 28% from 2015 to 2040 by the U.S. Energy Information Agency (EIA). In addition to the 448 plants in operation and 58 under construction, another 160 are planned for construction by 2030 and 300 more are proposed.

The Number of Nuclear Plants is Expected to Double Globally Over Twenty Years



Source: Company reports

In the U.S. one plant is under construction in Georgia with two nuclear reactors and another in South Carolina was cancelled due to cost overruns. In total, 14 nuclear plants under construction in the United States have been cancelled in the last decade. The Vogtle plant in Georgia has been saved by federal subsidies but it is becoming obvious that the model of large nuclear plants which take a decade to construct is untenable. The cost overruns at the Virgil C. Summer Nuclear Generating Station in South Carolina led to the bankruptcy of major nuclear plant supplier Westinghouse and a $2.2 bn payment by Toshiba, its Japanese parent company.

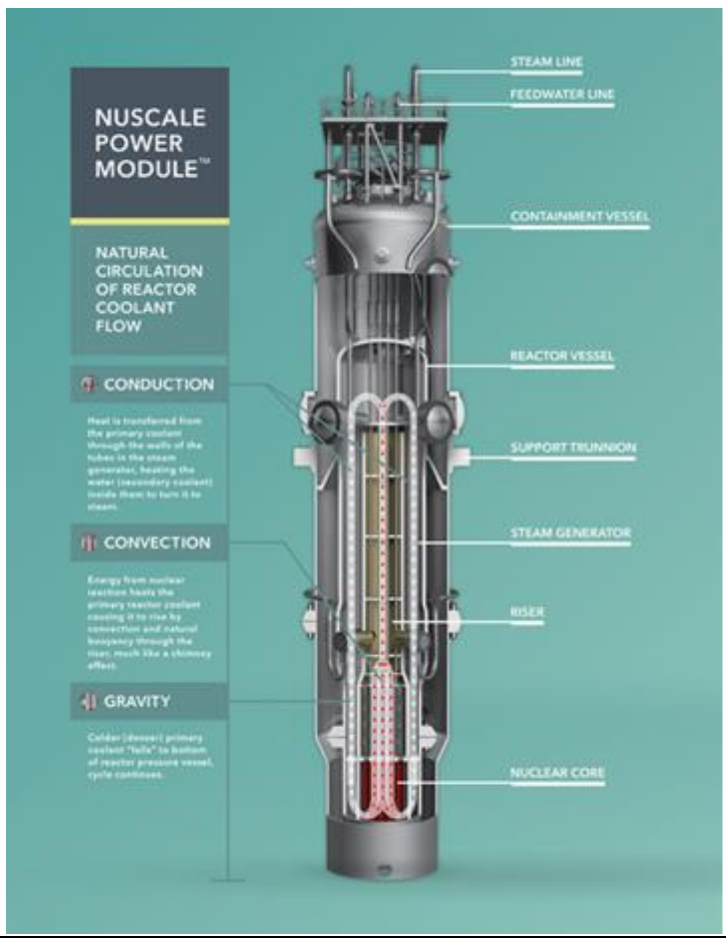
The Future of Nuclear is Spelled SMR

To address the cost and safety issues that nuclear plants have historically experienced, the industry is developing the small modular reactor or SMR. These are relatively small and modular, with major components constructed offsite in factories, where quality control is easier. Traditional plants are constructed over a decade or longer period from scratch requiring thousands of workers. Critical tasks such as welding are often conducted outdoors, and quality control has been an issue. Due to these advantages, SMR plants are far less expensive and can be sited on smaller footprints. Multiple SMRs can be sited together to match the output of a traditional reactor.

But the big advantage of SMR is safety. The plants are fully automated, eliminating manual operation which has been the source of all major accidents to date. The leading manufacturer of SMRs is a company called NuScale headquartered in Corvallis, Oregon. Its first SMR is planned for Idaho. In the event of a malfunction, its SMR automatically shuts down and self-cools. There is no need for human intervention, additional water or outside power. Failure of backup diesel generators destroyed in the tsunami was a major factor in the Fukushima disaster.

NuScale has chosen GSE to develop simulators for its SMRs. This too represents a sea change in how the industry operates. Previously, a plant was custom designed and constructed and a simulator was built to mimic its unique characteristics afterwards. With SMR, the simulator has been constructed ahead of the plant to assist in planning and regulation. Present rules limit nuclear plant control rooms to operating two reactors. With SMR, up to a dozen reactors may be located on a site but since they are automated, in theory it should be possible for operators to safely oversee more reactors. GSE's simulator is being used to prove this and assist regulators in setting safety requirements for this new type of plant.

NuScale's Small Modular Reactor May Revolutionize Nuclear Power



Source: Company reports

The relationship between the nuclear power industry and environmentalists is complex, especially in light of global warming and carbon emission concerns. While solar and wind power are favored, each have their drawbacks. Neither are considered base power supplies meaning they can be counted on to generate electricity regardless of the time or day or year or weather conditions. Wind turbines are a visual blight and responsible for an estimated 140,000 to 328,000 bird kills annually according to the Audubon Society. Solar power requires massive amounts of real estate, which is readily available in the desert southwest, but not in the rest of the country. Cutting forests to place solar plants is not an option since trees are the primary source of carbon removal from the environment.

The U.S. government and several states are stepping up financially to support the industry. The U.S. Department of Energy has offered $3.7 bn in loan guarantees for Southern Company's Vogtle Plant which is the only nuclear plant under construction in the U.S. with two reactors. Under the Bipartisan Budget Act of 2018, the 1.8 cent per kilowatt hour tax credit for nuclear power was extended beyond its prior expiration date. And surprisingly, four states which have been viewed as hostile to nuclear and have seen high profile plant closings, have also provided financial support to the industry.

In New York in 2016 the Public Service Commission approved a 1.7 cent per kilowatt subsidy for nuclear plants with support from Governor Andrew Cuomo. Governor Cuomo's father, Mario Cuomo, was instrumental in closing the Shoreham nuclear plant in the 1980s. This subsidy is less than the state's 4.5 cent subsidy for wind and solar but nuclear is now recognized as essential to the governor's goal of reducing greenhouse emissions by 40% by 2030.

In Illinois, which closed the Zion plant in 1997, the state enacted a bill in 2016 to provide $235 mm in annual subsidies for the Quad Cities and Clinton nuclear plants. The bill was approved by a strong Democrat majority legislature and signed into law by Republican Governor Bruce Rauner.

Connecticut, which witnessed the decommissioning of the Connecticut Yankee nuclear plant in 2004, has also provided financial support to the industry. In October 2017 Democrat Governor Dannel Malloy signed legislation to support the state's Millstone Nuclear Power Station. AARP, which opposed the legislation, estimated that it would cost taxpayers $300 mm annually. But again, nuclear power was deemed essential to meeting the state's environmental goals. Millstone generates nearly 50% of the state's electricity and 97% of its carbon-free electricity.

In May 2018, New Jersey's new Democrat governor Phil Murphy signed legislation providing up to $300 mm annually in state subsidies and allowing electricity rate increases to support Public Service Electric and Gas' two nuclear plants in the state. It may have helped that both plants are in the Senate president's district. Governor Murphy recognized that nuclear was essential to the state meeting his goal of 100% clean energy by 2050, up from just 13% presently.

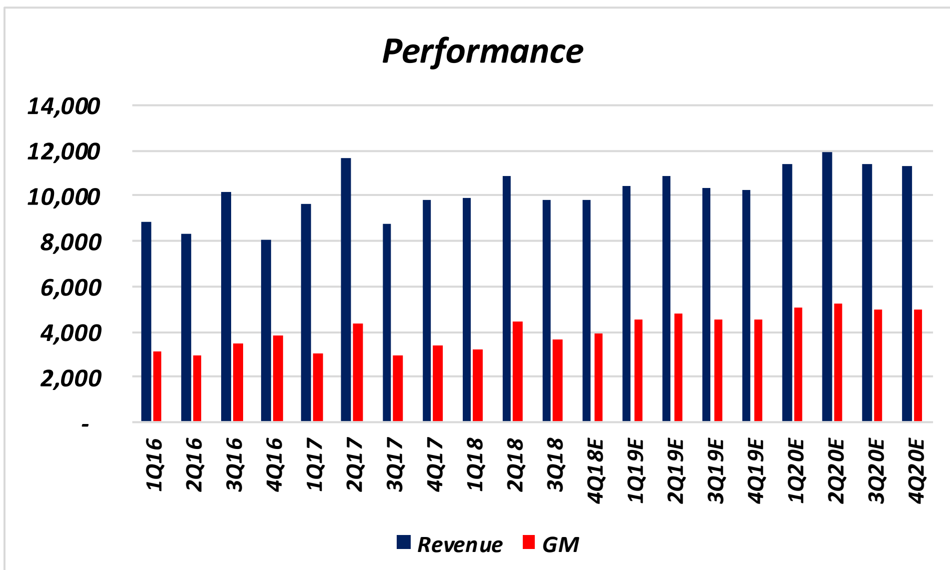
In addition to these states, Ohio and Pennsylvania are also considering legislation to support their nuclear industries. We think it is notable that support for the industry is bipartisan with President Trump signing legislation, and liberal states such as New York, New Jersey, Connecticut and Illinois also passing laws to subsidize large electric utility companies.

This growing, bipartisan support could come crashing to a halt, however, in the event of another major nuclear power plant accident. The Fukushima accident happened in Japan but led to the closure of nuclear plants around the world including Germany and California. The fact that all major nuclear accidents were caused by human error makes GSE's business essential. With workers retiring and thousands of new hires in the U.S. and dozens of new plants globally, GSE's simulation programs and training programs are likely to be more in demand than ever.

Our financial forecast is included at the end of this report. We would caution investors that GSE's business is highly project dependent, so some quarters may see surges in revenue in one or both segments, while other quarters may see lighter revenue in one or both segments.

The figure below charts the historical revenue and gross profit of the Performance segment, and our forecast. In the most recent quarter, revenue was up 12.7% and the gross margin was 36.9%. We model revenue at about $10 mm per quarter in 2019, consistent with recent quarters and $11 mm in 2020. Over the last three years the segment's gross margin has ranged from 31.5% in 1Q 2017 to a high of 46.8% in 4Q 2016. We model 40%. Recall that Absolute Consulting was acquired in September 2017, so it had the effect of accelerating year over year revenue comparisons. With a greater scale, the gross margin also increased after that transaction. The impact on growth should be short lived once the anniversary of the acquisition passes, whereas we expect the gross margin benefit to be sustained.

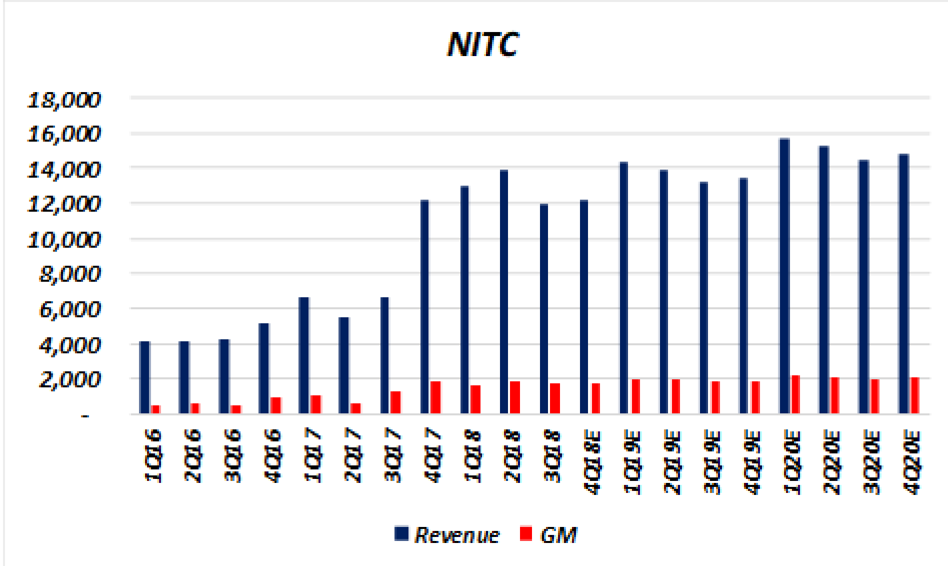
Performance Segment Carries High Margins



Source: Company reports and Dawson James estimates

The next figure similarly illustrates historical and forecast results for NITC. This segment posted 79.1% revenue growth and a 19.8% gross margin in 3Q. Note that NITC's gross margin is far lower than that of the Performance segment since Performance is more of a software business where previously developed software can be licensed again and again, whereas NITC requires that GSE staff each project with uniquely experienced and expensive talent. NITC is also being accelerated by the acquisition of True North Consulting in May 2018 so we expect higher comps through 2Q19. We model 10% growth in this segment and a 14% gross margin.

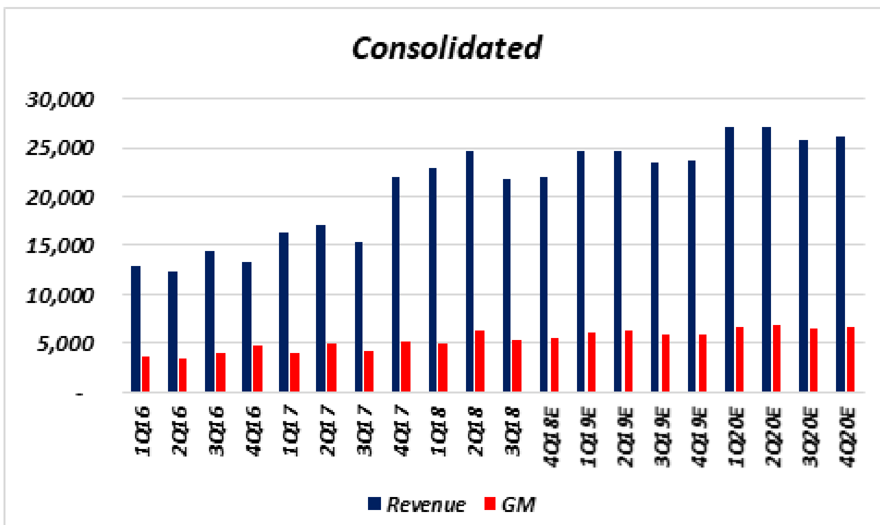
NITC Revenue Surged on the True North Acquisition



Source: Company reports and Dawson James estimates

The next figure combines our segment forecasts to create a consolidated revenue and gross margin forecast. We expect revenue of $96 mm next year, growing to $106 mm in 2020. We model the gross margin in the same 25% range it has been in in recent quarters going forward. Should the higher margin Performance segment grow faster than NITC, this would have a positive bias on margins, and vice versa.

We Forecast Steady Growth and Modest Margin Expansion



Source: Company reports and Dawson James estimates

Our forecast shows revenue of $96.6 mm in 2019 and $106.2 mm in 2020. The company's Vision 2020 strategy calls for $200 mm to $300 mm in revenue by 2020, with much of this growth coming from acquisitions. We have not assumed any acquisitions in our model.

GSE provides both backlog and order information in its earnings releases, giving investors valuable forward-looking information, although it does not provide guidance. In 3Q overall orders came in at $27.9 mm, nearly triple the year ago level and hitting the highest level since 1Q 2016. We note that a major contract Performance received in 2016 is scheduled to conclude by the middle of next year, so this has to be considered in context with the new order growth. Most of the new orders, $17 mm, came from the Performance segment with contracts in Slovakia and South Korea and for the U.S. Navy highlighted on the company's earnings call. The book to bill ratio was a solidly positive 1.73 for Performance but just 0.91 for NITC combining for a 1.28 book to bill ratio.

The backlog at the end of the quarter was $74 mm, down about 3% from a year ago, so strong new order activity is roughly matching completion of existing orders. The Performance backlog was $50.8 mm, down on an organic basis but nearly flat thanks to a $5.6 mm backlog from recently acquired True North. In Performance, the company typically has about a year and a half's worth of revenue in backlog. Contracts are typically for 12 to 18 months with some as much as 24 months. The $50.8 mm in Performance backlog equates to 123% of our next twelve month's revenue, consistent with past trends.

In NITC contracts are shorter, typically for three to six months with some up to a year. The company ended 3Q with NITC backlog of $23.2 mm down 5.7% from a year ago. Our NITC segment revenue forecast for the next four quarters equates to 43% of segment backlog, again consistent with past trends. We have attempted to look at the past relationship between orders, backlog and revenue, and make our forecast consistent with the most recently reported levels.

Below the gross margin line, we model SG&A at 20% of revenue this year, dropping to 19% next year and 18% in 2020 as the business scales but fixed cost growth is not as fast as revenue growth. R&D typically consumes about 1% of revenue, which is what we assume in our model.

This gets us to adjusted EBITDA of $6.1 mm in 2019 and $7.7 mm in 2020. Under Vision 2020, the company has set a 2020 EBITDA goal of $20 mm to $30 mm in that timeframe, again assuming acquisitions which are not in our model. We note that past acquisitions have boosted margins since fixed costs are spread over a larger revenue base.

At 9.2x 2020 Estimated EBITDA, GVP Shares Worth $5

We Value GVP at $5 per share, about double the current stock price. GSE management has helpfully provided its view of relevant comps in its slide deck. We have reviewed the composition of this list and generally agree with the caveat that there are never perfect comps. Comps are divided into two categories depending on which sector they comp to. Performance segment comps trade at 1.8x trailing twelve months revenue and 12.8x EBITDA. NITC segment comps trade at 0.7x revenue and 13.0x EBITDA with the lower revenue multiple due to the fact that NITC is labor intensive and thus carries lower margins. The blended comps average is 1.2x revenue and 12.9x EBITDA. GVP shares trade at 0.5x trailing revenue or a 62% discount and 11.5x EBITDA or a 65% discount. Our $5 target implies a multiple of 0.9x revenue and 9.2x EBITDA still representing discounts of 24% and 29%, respectively taking into account that GSE is considerably smaller than many comps, and its shares considerably less liquid.

Our $5 Target Implies a 9.2x EBITDA Multiple on our 2020 EBITDA Estimate

Company Name	Fiscal Period	Price	Shares Outstanding	Market Value	Enterprise Value	Sales	EBIT	EBITDA	Enterprise Value/ Sales	Enterprise Value/ EBIT	Enterprise Value/ EBITDA
GSE Systems	09/30/2018	$2.65	19.8	50.8	49.9	70.9	1.5	2.6	0.5x	23.7x	11.5x
GVP @ 2020E	12/31/20	$2.65	19.8	50.8	49.9	106.2	4.1	10.7	0.5x	12.3x	4.7x
GVP @ target on 2020E	12/31/20	$5.00	19.8	99.2	98.3	106.2	4.1	10.7	0.9x	24.2x	9.2x
Performance Improvement Comps											
BWX Technologies, Inc.	09/30/2018	$41.82	98.7	4,128.7	4,826.8	1,687.6	295.0	356.2	2.9x	16.4x	13.5x
Charah Solutions, Inc.	09/30/2018	$6.26	29.1	182.1	419.4	430.4	32.5	59.0	1.0x	12.9x	7.1x
Curtiss-Wright Corporation	09/30/2018	$103.34	43.8	4,525.3	5,093.1	2,271.0	344.8	444.8	2.2x	14.8x	11.5x
NV5 Global Inc	09/30/2018	$63.43	12.5	791.5	768.5	333.0	27.1	40.3	2.3x	28.3x	19.1x
Studsvik AB	09/30/2018	$4.18	8.2	34.4	42.6	82.5	(2.8)	(0.8)	0.5x	-	-
Average									**1.8x**	**18.1x**	**12.8x**
Nuclear Training and Consulting Comps											
Barrett Business Services, Inc.	09/30/2018	$59.12	7.4	436.4	292.8	920.4	29.9	35.4	0.3x	NM	NM
BG Staffing, Inc.	09/30/2018	$21.87	10.2	222.2	246.1	272.6	18.1	24.4	0.9x	13.6x	10.1x
GP Strategies Corporation	09/30/2018	$12.25	16.6	202.9	298.6	509.2	24.6	31.6	0.6x	12.1x	9.5x
GEE Group, Inc.	06/30/2018	$1.37	10.8	14.8	113.2	135.0	1.5	5.5	0.8x	74.3x	20.7x
Kforce Inc.	09/30/2018	$29.88	26.1	778.8	859.4	1,357.9	65.3	73.6	0.6x	13.2x	11.7x
Average				**331.0**					**0.7x**	**28.3x**	**13.0x**
Average									**1.2x**	**23.2x**	**12.9x**
GVE discount									**61%**	**47%**	**64%**
GVE discount @ target on 2020E									**24%**	**-4%**	**29%**

Source: Company reports and Dawson James estimates

GSE Systems, Inc. Segment Forecast

Dollars in thousands, except per share data			2018E					2019E					2020E		
Fiscal years ended March 31	1QA	2QA	3QA	4Q	YEAR	1Q	2Q	3Q	4Q	YEAR	1Q	2Q	3Q	4Q	YEAR
Performance															
Revenue	9,901	10,864	9,849	9,806	40,420	10,396	10,864	10,341	10,296	41,898	11,436	11,950	11,376	11,326	46,088
YoY Growth	2.4%	-7.0%	12.7%	0.0%	1.3%	5.0%	0.0%	5.0%	5.0%	3.7%	10.0%	10.0%	10.0%	10.0%	10.0%
Sequential growth															
As a pct. of revenue	43.2%	44.0%	45.2%	44.6%	44.2%	42.1%	44.0%	44.0%	43.4%	43.4%	42.1%	44.0%	44.0%	43.4%	43.4%
Gross profit	3,251	4,429	3,638	3,922	15,240	4,158	4,346	4,137	4,119	16,759	4,574	4,780	4,550	4,530	18,435
As a pct. of revenue	32.8%	40.8%	36.9%	40.0%	37.7%	40.0%	40.0%	40.0%	40.0%	40.0%	40.0%	40.0%	40.0%	40.0%	40.0%
NITC															
Revenue	12,994	13,834	11,952	12,198	50,978	14,293	13,834	13,147	13,418	54,692	15,723	15,217	14,462	14,760	60,162
YoY Growth	94.8%	154.3%	79.1%	0.0%		10.0%	0.0%	10.0%	10.0%	7.3%	10.0%	10.0%	10.0%	10.0%	
Sequential growth															
As a pct. of revenue	56.8%	56.0%	54.8%	55.4%	55.8%	57.9%	56.0%	56.0%	56.6%	56.6%	57.9%	56.0%	56.0%	56.6%	56.6%
Gross profit	1,647	1,911	1,783	1,708	7,049	2,001	1,937	1,841	1,878	7,657	2,201	2,130	2,025	2,066	8,423
As a pct. of revenue	12.7%	13.8%	14.9%	14.0%	13.8%	14.0%	14.0%	14.0%	14.0%	14.0%	14.0%	14.0%	14.0%	14.0%	14.0%
Total															
Revenue	**22,895**	**24,698**	**21,801**	**22,004**	**91,398**	**24,689**	**24,698**	**23,489**	**23,714**	**96,590**	**27,158**	**27,168**	**25,838**	**26,086**	**106,249**
YoY Growth	40.1%	44.2%	41.5%	0.0%	28.9%	7.8%	0.0%	7.7%	7.8%	5.7%	10.0%	10.0%	10.0%	10.0%	10.0%
Sequential growth															
Gross profit	**4,898**	**6,340**	**5,421**	**5,630**	**22,289**	**6,159**	**6,282**	**5,977**	**5,997**	**24,416**	**6,775**	**6,911**	**6,575**	**6,597**	**26,858**
As a pct. of revenue	21.4%	25.7%	24.9%	25.6%	24.4%	24.9%	25.4%	25.4%	25.3%	25.3%	24.9%	25.4%	25.4%	25.3%	25.3%

Source: Company reports and Dawson James estimates

GSE Systems, Inc. Income Forecast

Dollars in thousands, except per share data			2018E					2019E					2020E		
Fiscal years ended December 31	1QA	2QA	3QA	4Q	YEAR	1Q	2Q	3Q	4Q	YEAR	1Q	2Q	3Q	4Q	YEAR
Revenue	**22,895**	**24,698**	**21,801**	**22,004**	**91,398**	**24,689**	**24,698**	**23,489**	**23,714**	**96,590**	**27,158**	**27,168**	**25,838**	**26,086**	**106,249**
YoY growth	40.1%	44.2%	41.5%	0.0%	28.9%	7.8%	0.0%	7.7%	7.8%	5.7%	10.0%	10.0%	10.0%	10.0%	10.0%
Seq growth	4.0%	7.9%	-11.7%	0.9%	415.4%	12.2%	0.0%	-4.9%	1.0%	407.3%	14.5%	0.0%	-4.9%	1.0%	407.3%
Cost of revenue	17,997	18,358	16,380	16,374	69,109	18,530	18,416	17,511	17,717	72,174	20,383	20,257	19,263	19,489	79,392
As a percent of revenue	78.6%	74.3%	75.1%	74.4%	75.6%	75.1%	74.6%	74.6%	74.7%	74.7%	75.1%	74.6%	74.6%	74.7%	74.7%
Gross margin	4,898	6,340	5,421	5,630	22,289	6,159	6,282	5,977	5,997	24,416	6,775	6,911	6,575	6,597	26,858
As a percent of revenue	21.4%	25.7%	24.9%	25.6%	24.4%	24.9%	25.4%	25.4%	25.3%	25.3%	24.9%	25.4%	25.4%	25.3%	25.3%
Selling, general and administrative	4,527	4,793	4,366	4,401	18,087	4,691	4,693	4,463	4,506	18,352	4,889	4,890	4,651	4,695	19,125
As a percent of revenue	19.8%	19.4%	20.0%	20.0%	19.8%	19.0%	19.0%	19.0%	19.0%	19.0%	18.0%	18.0%	18.0%	18.0%	18.0%
Research and development	329	189	247	220	985	247	247	235	237	966	272	272	258	261	1,062
As a percent of revenue	1.4%	0.8%	1.1%	1.0%	1.1%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%
Restructuring charges	917	190	70	50	1,227	50	50	50	50	200	50	50	50	50	200
Depreciation	103	176	132	150	561	150	150	150	150	600	150	150	150	150	600
Amortization	150	312	632	600	1,694	600	600	600	600	2,400	600	600	600	600	2,400
Operating income	**(1,128)**	**680**	**(26)**	**209**	**(265)**	**572**	**693**	**629**	**604**	**2,498**	**965**	**1,099**	**1,016**	**990**	**4,070**
Operating margin	-4.9%	2.8%	-0.1%	1.0%	-0.3%	2.3%	2.8%	2.7%	2.5%	2.6%	3.6%	4.0%	3.9%	3.8%	3.8%
Interest income (expense)	22	(61)	(114)	(112)	(265)	(112)	(112)	(112)	(112)	(450)	(112)	(112)	(112)	(112)	(450)
Gain/(loss) on derivatives	(156)	(91)	(59)	-	(306)	-	-	-	-	-	-	-	-	-	-
Other	25	4	(5)		24										
Pretax Income	(1,237)	532	(204)	97	(812)	459	580	517	492	2,049	853	986	903	878	3,621
Taxes	259	(449)	314	-	124	-	-	-	-	-	-	-	-	-	-
Tax rate	-20.9%	-84.4%	-153.9%	0.0%	-15.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Net income to common	**(1,496)**	**981**	**(518)**	**97**	**(936)**	**459**	**580**	**517**	**492**	**2,049**	**853**	**986**	**903**	**878**	**3,621**
Net income margin	-6.5%	4.0%	-2.4%	0.4%	-1.0%	1.9%	2.3%	2.2%	2.1%	2.1%	3.1%	3.6%	3.5%	3.4%	3.4%
Diluted shares outstanding	19,514	20,029	20,167	20,267	19,994	20,367	20,467	20,567	20,667	20,517	20,767	20,867	20,967	21,067	20,917
Seq change	(276.3)	514.7	137.8	100.0		100.0	100.0	100.0	100.0		100.0	100.0	100.0	100.0	
EPS diluted - continuing	**($0.08)**	**$0.05**	**($0.03)**	**$0.00**	**($0.05)**	**$0.02**	**$0.03**	**$0.03**	**$0.02**	**$0.10**	**$0.04**	**$0.05**	**$0.04**	**$0.04**	**$0.17**
EBITDA															
Net income	(1,496)	981	(518)	97	(936)	459	580	517	492	2,049	853	986	903	878	3,621
Interest expense (income)	(22)	61	114	112	265	112	112	112	112	450	112	112	112	112	450
Provision for income taxes	259	(449)	314	-	124	-	-	-	-	-	-	-	-	-	-
Depreciation and amortization	371	573	900	900	2,744	900	900	900	900	3,600	900	900	900	900	3,600
EBITDA	**(888)**	**1,166**	**810**	**1,109**	**2,197**	**1,472**	**1,593**	**1,529**	**1,504**	**6,098**	**1,865**	**1,999**	**1,916**	**1,890**	**7,670**
Change in fair value of contingent cons.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Restructuring charges	917	190	70	50	1,227	50	50	50	50	200	50	50	50	50	200
Stock-based comp	627	401	507	500	2,035	600	600	600	600	2,400	700	700	700	700	2,800
Impact of the change in FV of deriv.	156	91	59	-	306	-	-	-	-	-	-	-	-	-	-
Acquisition-related expense	-	491	-	-	491	-	-	-	-	-	-	-	-	-	-
Bad debt expense	-	65	-	-	65	-	-	-	-	-	-	-	-	-	-
Adjusted EBITDA	**812**	**2,404**	**1,446**	**1,659**	**6,321**	**2,122**	**2,243**	**2,179**	**2,154**	**8,698**	**2,615**	**2,749**	**2,666**	**2,640**	**10,670**
YoY growth	-0.4%	14.0%	54.0%	-5.9%	12.4%	161.3%	-6.7%	50.7%	29.8%	37.6%	23.3%	22.6%	22.3%	22.6%	22.7%
EBITDA margin	3.5%	9.7%	6.6%	7.5%	6.9%	8.6%	9.1%	9.3%	9.1%	9.0%	9.6%	10.1%	10.3%	10.1%	10.0%
Adjusted EPS															
Net income	(1,496)	981	(518)	97	(936)	459	580	517	492	2,049	853	986	903	878	3,621
Change in fair value of contingent	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Restructuring	917	190	70	50	1,227	50	50	50	50	200	50	50	50	50	200
Stock-based comp	627	401	507	500	2,035	600	600	600	600	2,400	700	700	700	700	2,800
Impact of change in FV of derivatives	156	91	59	-	306	-	-	-	-	-	-	-	-	-	-
Acquisition-related expenses	-	491	-	-	491	-	-	-	-	-	-	-	-	-	-
Amortization of intangibles	-	312	632	600	1,544	600	600	600	600	2,400	600	600	600	600	2,400
Bad debt expense	-	65	-	-	65	-	-	-	-	-	-	-	-	-	-
Adjusted net income	204	2,531	750	1,247	4,732	1,709	1,830	1,767	1,742	7,049	2,203	2,336	2,253	2,228	9,021
Adjusted EPS	**$0.01**	**$0.13**	**$0.04**	**$0.06**	**$0.24**	**$0.08**	**$0.09**	**$0.09**	**$0.08**	**$0.34**	**$0.11**	**$0.11**	**$0.11**	**$0.11**	**$0.43**

Source: Company reports and Dawson James estimates

Important Disclosures:

Source: FactSet Data Systems

Price target and ratings changes over the past 3 years:
Initiated – Buy – December 18, 2018 – Price Target $5.00

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VALUATION

We value GVP shares at 0.9x our 2020 revenue estimate and 9.2x our 2020 EBITDA estimate.

RISK FACTORS

1. The key risk we see would be another major nuclear plant accident which would presumably lead to another round of plant closings and stalled new construction, hurting GSE's current business and growth prospects. We see a relatively low risk of an error by GSE causing an accident as GSE is more involved in training, consulting and plant simulations and its workers do not participate in plant operation.
2. The NITC business is dependent on hiring experienced individuals for short-term projects. While we expect the steady flow of retirees and GSE's excellent reputation to allow it to continue to attract top talent, if this was not the case, growth in this segment would be impossible.
3. For a company looking to double its revenue via acquisitions, potential errors in the evaluation, purchase and integration process could have a negative impact on results. Even, worse, a failed acquisition might make the debt and/or equity capital providers less likely to fund future deals, reducing the company's growth prospects..

Ratings Definitions:

1) **Buy**: the analyst believes the price of the stock will appreciate and produce a total return of at least 20% over the next 12-18 months;
2) **Neutral**: the analyst believes the price of the stock is fairly valued for the next 12-18 months;
3) **Sell**: the analyst believes the price of the stock will decline by at least 20% over the next 12-18 months and should be sold.

The following chart reflects the range of current research report ratings for all companies followed by the analysts of the Firm. The chart also reflects the research report ratings relating to those companies for which the Firm has performed investment banking services in the last twelve months.

	Company Coverage		Investment Banking	
Ratings Distribution	# of Companies	% of Total	# of Companies	% of Totals
Market Outperform (Buy)	38	88%	10	26%
Market Perform (Neutral)	5	12%	0	0%
Market Underperform (Sell)	0	0%	0	0%
Total	43	100%	10	23%

Analyst Certification:

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