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**WELL SITE GUARD**<sup>TM</sup>

**SUPERIOR STUFFING BOX CONTAINMENT**

**U.S. PATENTED**

# Well Site Guard – Superior Stuffing Box Leakage Protection

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# Introduction

Prevention technology can help companies minimize their environmental footprint at the source:

- benefits of providing a safer work environment
- minimizing their environmental impact while minimizing operational expenses.

With an increase in hydrocarbon extraction across the United States over the past few decades comes inherent risk of leakage or spills.



# Produced Water & Leaks



- Produced water is the largest waste stream generated by the oil and gas industry
- Anything injected into the well ends up in the produced water and part of the spill
- an average production of 12-20 pints (6-40 liters) of liquid is produced per stroke
- An average of 7 strokes per minute totals up to 10,800 stroke per day
- A stuffing box has a replaceable packing seal designed to withstand repetitive rod travel and prevent major leakage
- Packing wears and must be replaced every 3-12 months depending on the oil emulsion. The potential for leaks greatly increases as the packing seal wears
- Visible well leakage means that for every ounce of oil on the surface, as much as 12 ounces of water and salts have already seeped into the ground!



# Proactive vs. Reactive

It is a vital necessity to use safer equipment monitoring aimed at reducing the number of spills due to technical and mechanical failure, in order to minimize the repercussions of pollution on different environmental fates and repercussions on air, soil and groundwater.

- Improving and protecting the public corporate image
- Difficult to try to estimate the cost of a spill
- Simply waiting and hoping that a spill won't happen can be very costly



A small investment in CAPEX becomes a significant return in OPEX!

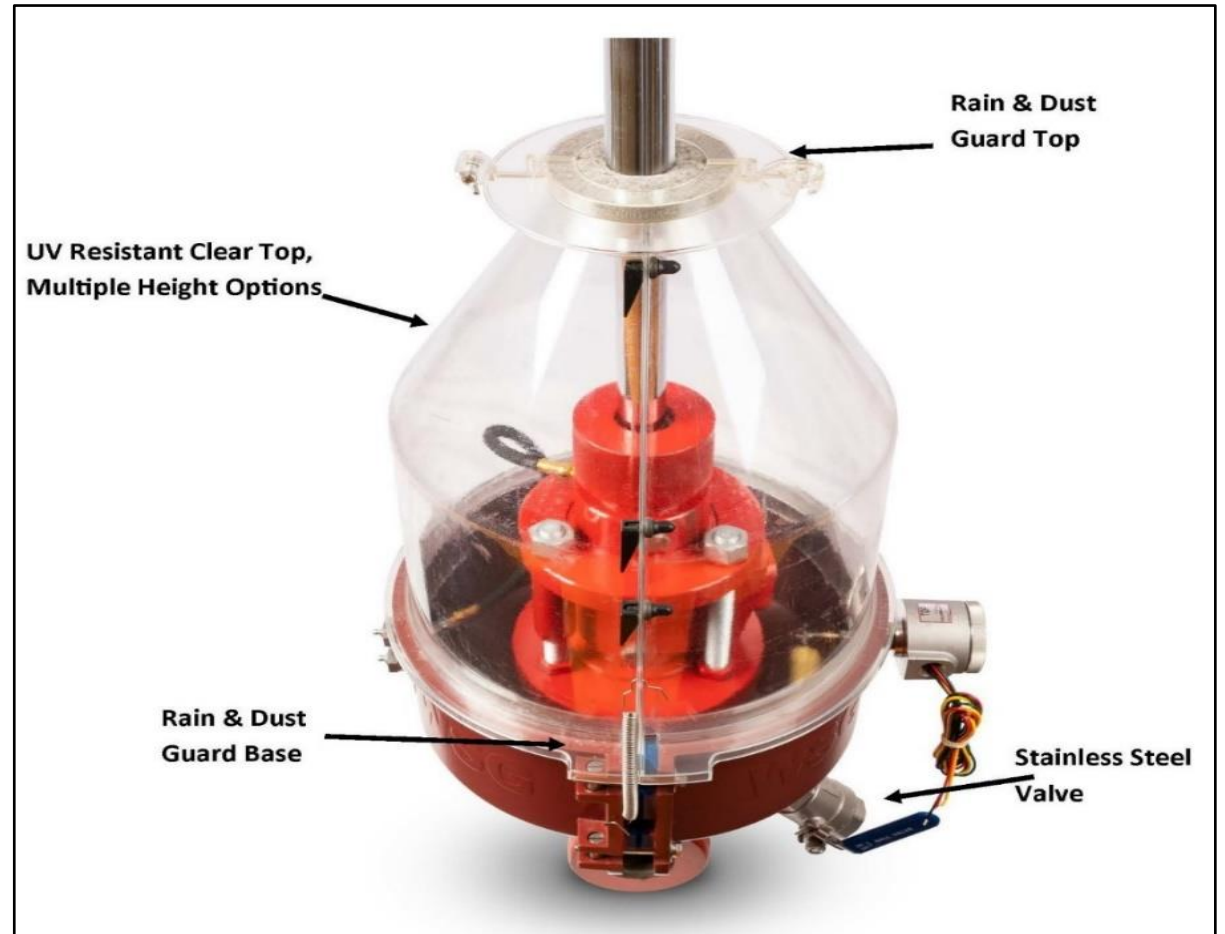
# Well Site Guard

Proactive state of the art stuffing box spill prevention system

- Collects spills
- Notifies operator for action
- Shuts down the well when fluid reach level
- Impact of WellSite Guard:
  - Keep control over minor spills
  - Improve efficiency of field personnel
  - Reduce cleaning and remediation costs
  - Flexibility for stuffing box maintenance
  - Prevent contaminants from entering and damaging stuffing box
  - Avoid clean up and remediation costs

# WSG Features

- Power coated aluminum basin
- Permanently attached urethane seal
- UV resistant polycarbonate clear tops
- Stainless steel
- Ultrasonic switch



# Other features

- WSG comes equipped with a rain guard
- External lubrication lines, which can accommodate up to two integrated grease lines
- Comes fully assembled
- Can accommodate non-flow Tee well
- Longevity – built to last
- Easy to install with 1 field technician

“Aside from the fact that protecting the environment should be a primary concern, WSG also returns on investment by minimizing downtime from stuffing box maintenance operations, avoiding clean up and remediation costs, the liberty to allocate personnel’s time to optimization instead of clean up and lowering stuffing box leaks and related maintenance costs”

# Cost of a Spill

Cost of a spill can be approximated by EPA Basic Oil Spill Cost Estimation Model (BOSCEM)

The Model specifies 8 separate factors for cost consideration:

- Per-Gallon oil spill response costs
- Socioeconomic base per-gallon costs
- Environmental base per-gallon costs
- Response Cost Modifiers for Location
- Socioeconomic & cultural value rankings
- Response method and effectiveness adjustment factors
- Freshwater vulnerability categories
- Habitat and wildlife sensitivity categories.

Regulatory Analysis, cost-benefit analysis, resource planning and impact analysis involve assigning a value for the damages caused by an oil spill.



# Typical Clean-up cost rates Etkins FSS 2004

Cost multiplier	Product	Response	Cost per gallon
Per-Gallon Oil Spill Response Costs Applied in EPA BOSCEM1	Crude Oil	Mechanical	\$199
Socioeconomic Base Per-Gallon Costs	Crude Oil	Mechanical	\$50
Environmental Base Per-Gallon Costs For Use in Basic Oils Spill Cost Estimation	Crude Oil	Mechanical	\$90
EPA BOSCEM Response Cost Modifiers for Location Medium Type Categories1	Crude Oil	Wetland modifier	\$54
EPA BOSCEM Socioeconomic & Cultural Value Rankings	Crude Oil	Moderate	\$24
Response Method and Effectiveness Adjustment Factors	Crude Oil	Mechanical	\$34
EPA BOSCEM Freshwater Vulnerability Categories	Crude Oil	Wildlife	\$58
EPA BOSCEM Habitat and Wildlife Sensitivity Categories1	Crude Oil	Agricultural	\$75
Spill Amount in Gallons	Total cost		
1 gallon	\$583		
<b>5 gallons</b>	<b>\$2,915</b>		
10 gallons	\$5,830		
25 gallons	\$14,575		
50 gallons	\$29,150		
100 gallons	\$58,300		

# Return on Investment

<b>Reduces Stuffing box leak failures (\$\$)</b>	<b>Avoid daily clean-up costs (\$\$)</b>	<b>Free personnel's time for optimization (\$\$\$)</b>
<b>Reduce remediation costs (\$\$\$)</b>	<b>Improve corporate image (\$\$\$\$)</b>	<b>Flexibility to schedule maintenance (\$)</b>
<b>Protect ground and surface waters</b>	<b>Environmental stewardship</b>	<b>De-risk pumping unit operation</b>

# Customer Driven Approach

- Well Site Guard is a customer driven product aimed at protecting customer's wells from leaks and guaranteeing return in investment while prioritizing an environmental focus
- The primary driving force behind customers installing WSG is clean up cost
- Operators today have a "Driving to Zero" approach when it comes to leaks and clean up costs.
- Customers have reported a 20% decrease in wellhead/packing leaks since installing well head protection on their equipment
- Operators are reporting that the initial cost of installing Well Site Guard has more than paid for itself since purchase in avoided spills and decreased clean up costs



# Cost Savings using WSG

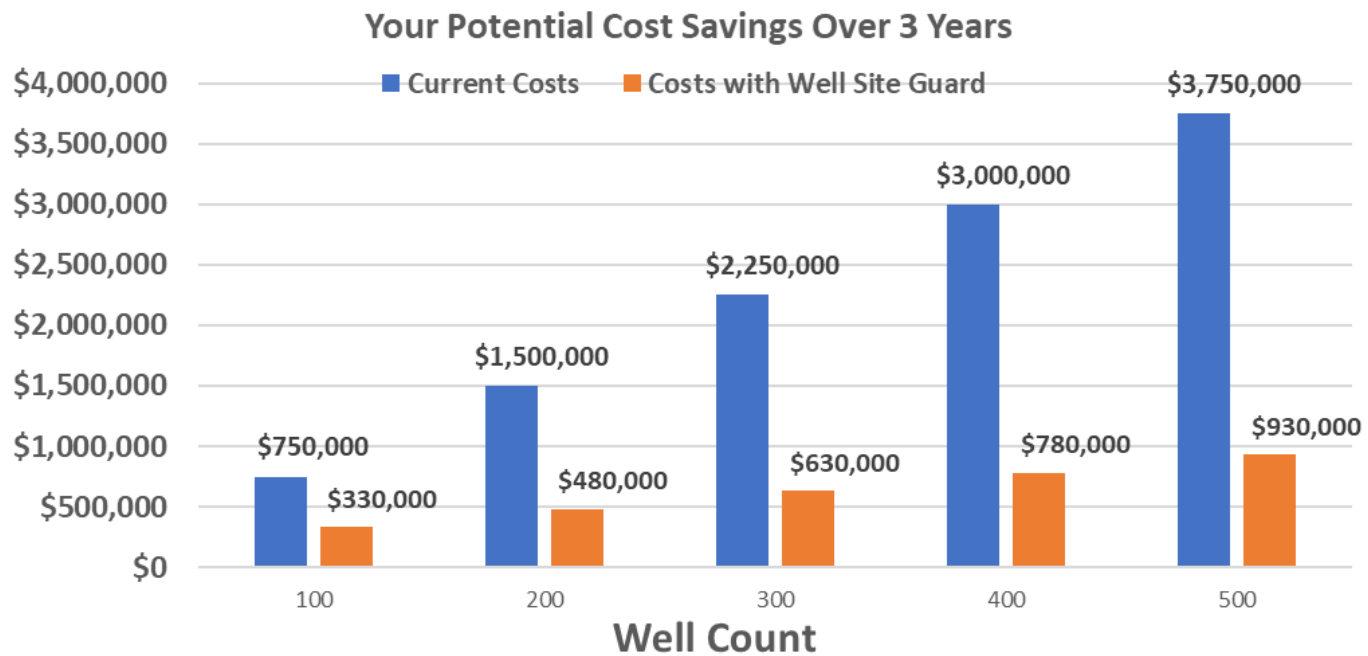
Working with North American producers, the total expense of cleanup and remediation costs relating to stuffing box leaks when amortized over the entire field, averages out to **\$2500 to \$4500 per well per year**.

- Operator labor per day, 35% to 80% of day spent cleaning minor leakage and issues with oil seepage.
- Reactive attitude to stuffing box leakage means shut down of well production until replacement seals can be sourced and stuffing box repaired
- Labor for site remediation, 3<sup>rd</sup> party services, steam truck, vacuum trucks, and hazardous material transportation
- Disposal fees for contaminated soil and transportation cost to nearest registered facility
- Procurement of clean soil, gravel, and labor for replacement of contaminated area
- Annual cost for disposable absorbents, absorbent wipes, onsite hazardous waste containment rental and disposal service
- Well site insurance liability expense and funding of deductible amounts in case of a spillage

Not included in the above is regulatory fines if spill exceeds reportable requirement, fines for excess spillage outside of lease site on to agricultural, wetlands or public domain.



# Potential Cost Savings Over 3 years



After an initial CAPEX cost of \$1800 per well the cost savings on cleanup and remediation costs is reduced by up to 80% for an example of 300 wells, meaning \$1,620,000 savings in operation expenses costs.

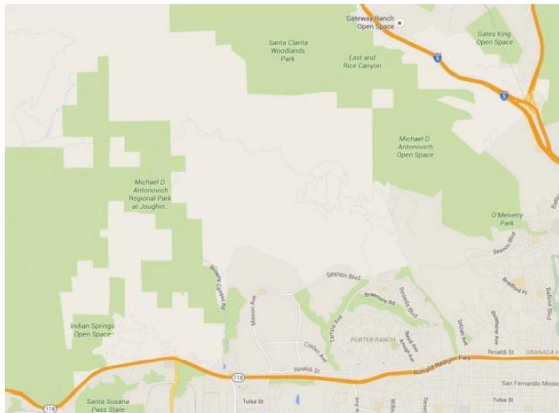
The cost with Well Site Guard includes:

- Basic Well Site Guard unit is \$1,800 per well, which does require electrical hook up
- Installation labor one operator under 30:00 minutes per unit

# Case Study – Minor Spill

## LOCAL NEWS

### Latest Aliso Canyon oil and gas leak due to failed rubber seal



The Aliso Canyon natural gas storage facility and oil fields are north of Porter Ranch. There have been recent leaks at both facilities. (Image via Google Maps)

By **BRENDA GAZZAR** | bgazzar@scng.com | Daily News

PUBLISHED: April 21, 2016 at 5:05 pm | UPDATED: August 28, 2017 at 6:15 am

- Failed stuffing box seal caused 84 gallons (317 L) spill of oil mixed with produced water with gas spilled or sprayed the area round the well head.
- Operator was able to stop the leak within a few hours after the notice was given
- Event was recorded in the news and social media, damaging the company's reputation
- Chief deputy director of the California Department of Conservation started an investigation with the company
- According to basic cost estimates, this spill cost the operator over \$45,000 in damages and remediation costs.
- **This could have been completely avoided with the use of Well Site Guard! WSG collects produced fluids and either shuts down the well or notifies the operator when the fluids reach critical level**

# Case Study – Current Customer

After installing WSG, operators reported a significant decrease in their monthly operating expenses.

Upon investigation they found:

- Multiple direct costs that are related to a small stuffing box leak or a critical seal failure
  - Site and equipment cleaning
  - Third party companies: vacuum trucks, steamer/pressure truck, specialty waste hauling services
  - Reclamation of surrounding ground surface, contaminated soil removal
  - Disposal at an authorized site
  - Regulatory fines
  - Reduced labor costs.
- Stuffing box seal repair often requires an unplanned pump shut down with lost production
- Increase optimization from less down time and better well optimization

All the above adds up to staggering savings and increased revenue!

# Conclusions

- Driven by operator feedback, WSG maximizes return on investment by effectively preventing spills and expensive clean-up operation, which can be damaging to the operator's reputation. WSG also reduces time spent by field personnel cleaning up day to day operations while allowing for more flexibility and reduction of stuffing box seal maintenance.
- Installing stuffing box leak prevention technology is a proactive way to reducing OPEX spending while fulfilling an operator's commitment to environment stewardship.
- The team at Well Site Guard spent years researching how to make the ultimate product for the oil and gas industry, which has made WSG the industry standard in stuffing box leak prevention technology.

"Beware of Little expenses. A small leak will sink a great ship." Benjamin Franklin