SAGE TECHNOLOGY

The Calculated Benefits of Electronic PTW Systems

White Paper

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Identifying and calculating the benefits of implementing of electronic Permit to Work and integrated safe work systems in operating facilities

INTRODUCTION

Permit to Work (PTW) systems are key to ensuring the safe execution of hazardous work activities at operational facilities. PTW procedures are usually supported by a Job Safety Analysis (JSA) process and a range of related procedures for high risk activities such as confined space, hot work etc. Different activities require different processes and authorizations which must be learned by personnel and properly applied. The significant majority of operational facilities world-wide utilize manual paper-based PTW procedures and forms.

A number of electronic PTW (ePTW) systems are now available in the market place and the question must be asked whether we should continue to rely on personal knowledge, memory and pieces of paper to manage these critical safety-related matters. This White Paper explores the benefits of implementing SageSURPASS (an ePTW system), including the improved efficiencies it can deliver in areas such as:

- Job Safety Analyses
- Planning and approvals
- Isolation management
- Shutdown performance

Conservative estimates of efficiencies gained through the implementation of an ePTW system which integrates the JSA functionality and isolation management will demonstrate how quickly such systems can deliver a substantial Return on Investment.

This paper is concentrated on defining the quantifiable benefits of ePTW particularly with regard to improved efficiency. Other benefits such as improved safety benefits and protection of corporate social reputation are also addressed.

Efficiency

Manual PTW procedures and their accompanying paper support documents are labour-intensive and often ambiguous. Personnel spend many hours filling out forms, writing out tags and moving the paper forms from place to place with an associated loss of tool time. i.e. The work time lost because work parties are waiting for their permit.

The potential efficiency benefits of ePTW systems include:

- Reduced time to perform Job Safety Analyses
- Early identification of work conflicts thus eliminated wasted effort in planning and implementing controls only to find the work cannot proceed
- Faster permit planning with equipment items and isolation points selected from plant equipment lists and the ability to reuse preapproved isolation lists
- Quicker electronic approval of permits as there is no need to physically move the forms from one place to another
- Reduced lost tool time with faster permit issue
- Reduced permit volume through improved work packaging

The following sections explore each of these efficiency benefits.

Permit Work Request and JSA

The first step in most permit processes is the permit request and the related JSA for the task to be performed. In many cases this involves filling in a permit request form, undertaking the JSA and then delivering them to a supervisor or permit authority. This task alone can take from a few minutes to an hour or more.

SageSURPASS has the permit request and JSA processes integrated which allows the permit request and JSA to be prepared and submitted, often in just a few minutes with no need to physically deliver the paperwork. In fact, at this stage there is no need for paperwork because work requests and JSAs can be prepared and submitted online.

SageSURPASS can deliver time savings of 50% to 75% for this activity alone. i.e. what took say 20 minutes can be reduced to as little 10 or even five minutes for each permit request. This is achieved by minimizing typing through the use of drop down lists, integration with ERP systems and copying previous requests.

Typical medium to large operating facilities will have between 200 and 1,000 requests per month which would result in savings of 33 to 250 hours per month. Assuming an average hourly rate of $80 per hour means the savings could be anywhere between $2,600 and $20,000/month.

No of Permit Requests/month	Minimum Manual Time Taken	Time Saving using SageSURPASS	Cost Saving using SageSURPASS
200	20 minutes each	33 hours/month	$2,600/month
1,000	20 minutes each	250 hours/month	$20,000/month

Note: Tables show the minimum manual time taken so results are conservative

Permit Request Approval and Work Conflict Management

The permit request is typically submitted to the permit authority who will:

- Validate that the request is complete and the JSA adequate
- Confirm that the plant can be released from operational service
- Confirm that the work doesn't conflict with other planned work
- Identify any additional requirements i.e. special permits/certificates
- Determine whether a higher level risk assessment is required

These manual checks take time and the identification of potential conflicting work can mean reading and reviewing permits folders or, even worse, piles of paper permits which may be in multiple locations.

In practice this activity can take between five and 15 minutes to perform effectively. SageSURPASS will automatically cross reference and highlight work on the same plant items, other automated methods also check for work conflicts. This may reduce the time taken to perform this activity by about 50%. Based on the example permit volumes above this would result in savings of eight to 41 hours/month.

No of Permit Requests/month	Minimum Manual Time Taken	Time Saving using SageSURPASS	Cost Saving using SageSURPASS
200	5 minutes each	8 hours/month	$640/month
1,000	5 minutes each	41.5 hours/month	$3,320/month

This example calculation **excludes** the savings from inadvertently approving a request that is later found to conflict with other works and the subsequent planning and preparation work that has been done but cannot go ahead due to the conflict.

Provides superior safety advantages by automated identification of potential work conflicts compared to paper-based systems

Moving Paper

Manual paper-based PTW systems require the physical movement of paperwork around the organization to be actioned by appropriately authorized personnel, or the movement of those people to the paper. More complex types of work, such as say hot work inside a confined space, require more authorizations and even more time to get the people and the paper co-ordinated.

Conservatively, each permit could require 10 to 20 minutes of movement time. SageSURPASS does not require the physical movement of paper nor, in most cases, people to perform this action. Personnel can access the system and perform their authorization actions from their access device. Thus, it would be easy to achieve at least a 70% reduction in effort in this area resulting in savings of between 23 to 116 hours/month.

No of Permit Requests/month	Minimum Manual Time Taken	Time Saving using SageSURPASS	Cost Saving using SageSURPASS
200	10 minutes each	16 hours/month	$1,280/month
1,000	10 minutes each	80 hours/month	$6,400/month

These savings **exclude** the time lost when paper permits are lost during the movement process and the whole process must start over again!

Isolation Planning

The process of planning the appropriate isolations for a given task typically involves the following steps:

1. Identify the plant item required to be worked on
2. Check whether it is already isolated on another isolation certificate
3. If so, check whether the isolations are adequate for the work and validate work compatibility
4. If not, use Piping & Instrumentation Diagrams (P&IDs), electrical schematics and other information to identify the isolation points appropriate for the work
5. Write the isolation certificate and isolation tags
6. Have the isolation plan checked by an authorized person
7. Check that the plant is available for release
8. Isolate the plant

The planning steps (1-7) can take a significant amount of time particularly for work requiring a large number of isolation points and if there is no library of pre-approved isolation lists.

A single isolation certificate can easily take 20 to 90 minutes to plan. In SageSURPASS where all the isolation points are identified in the equipment list, and with approved standard isolation lists available, will deliver a significant reduction in this planning time. SageSURPASS will reduce planning time by 50% to 75%.

Assuming that standard isolation lists are available for 50% of the work and applying the savings to the sample permit volumes will result in savings of between 16 and 560 hours.

No of Isolation Certificates/ month	Minimum Manual Time Taken	Time Saving using SageSURPASS	Cost Saving using SageSURPASS
200	20 minutes each	16 hours/month	$1,280/month
1,000	20 minutes each	80 hours/month	$6,400/month

Shutdowns are discussed below, however, it is worth noting that the review of one facility following the implementation of Sage Technology's permit system identified savings in this area, and in the writing of permits and tags, of in excess of 700 hours per outage. In this case, a large, four unit power station with at least one major shut per annum has achieved significant, repeatable and identifiable savings.

Use of pre-approved task/plant isolation lists will deliver consistent repeatable savings

Isolation Point Tags

A significant number of facilities write isolation point tags by hand. This activity is generally loathed by personnel and issues around the quality and legibility of handwriting are quite common.   Another issue which frequently arises is the accuracy of description of the isolation point. Given the laborious nature of this activity, personnel often abbreviate the isolation point name leading to de facto short names which can be confusing to personnel who are not familiar with the plant. This can result in incidents caused by misidentified isolation points.

Let's assume we have an average of six isolation points per isolation certificate. Manually writing the tags takes about one minute each i.e. an average of six minutes is required for each isolation certificate.   Using our sample permit volumes, handwriting of isolation tags can take up between 20 and 100 hours per month. Electronic systems that automatically print the tags will save 100% of this time.

No of Permit Requests/month	Minimum Manual Time Taken	Time Saving using SageSURPASS	Cost Saving using SageSURPASS
200	6 minutes each	20 hours/month	$1,600/month
1,000	6 minutes each	100 hours/month	$8.000/month

Reduces human error and saves significant time writing isolation tags

Cross Referencing Isolation Points

Another key isolation activity is cross referencing; the process of checking that planned isolation points do not conflict with the state of existing isolation points on active isolation certificates. i.e. Isolation certificate B needs valve V456 in the shut isolated state whereas isolation certificate A, which is on issue, has the same valve V456 in the open state. This is clearly a contradictory state and if it was attempted could result in a serious permit breach.

This potential breach is sometimes only discovered when the Authorized Isolation Representative goes to the isolation point to isolate it only to find it is already isolated in the opposite condition. Other than being a complete waste of time, it can result in a breach if it is not effectively identified and implementation halted.

Manual cross referencing isolations can take anywhere between one and five minutes depending on the size of the plant and the current permit volume. Applying our sample average isolation points and permit volumes, manual cross referencing takes between three and 83 hours per month. An electronic PTW system should automatically cross reference isolation points and prevent the printing of the conflicting isolation point tags, thus entirely eliminating the time required for cross referencing.

No of Isolation Certificates/ month	Minimum Manual Time Taken	Time Saving using SageSURPASS	Cost Saving using SageSURPASS
200 (6 RAs used)	1 minute each	3.2 hours/month	$264/month
1,000 (30 RAs used)	1 minute each	16.6 hours/month	$1,328/month
Cumulative Savings		96.2 – 568.1 hours/ month	$7,144 - $43,568/ month

Automated cross referencing delivers improved safety performance by preventing isolation conflicts

Reuse of Formal Risk Assessments

Many facilities have more formal/higher level risk assessment processes, in addition to their JSAs, that are applied to more hazardous works such as hot work in hazardous areas. These are usually based on published risk management standards such as ISO 31000 or organizational risk management processes. These risk assessments are typically prepared by a team of people such as the work party and other specialists.

Some facilities allow the reuse of risk assessments while other sites prohibit the practice. There are arguments both for and against this practice; however, an ePTW system such as SageSURPASS with risk assessment capabilities supports the reuse of risk assessments. This includes enforceable re-approval steps that ensure that the risk assessment is relevant to the planned scope of work.

Assuming that 10% of permits require this additional higher level risk assessment, a reuse rate of 30% and 60 minutes to prepare a risk assessment, the potential saving is between six and 30 hours per month.

No of Permits/ month	Minimum Manual Time Taken	Time Saving using SageSURPASS	Cost Saving using SageSURPASS
200 (6 RAs used)	60 minutes each	6 hours/month	$480/month
1,000 (30 RAs used)	60 minutes each	30 hours/month	$2,400/month

Shutdowns/Outages

Shutdowns are periods of intensive plant activity which require large volumes of permits and isolations. It is difficult to manage this volume using manual, paper-based systems which means that the risk of a permit breach or isolation conflict is significantly higher during shutdowns. Additionally, poorly planned work scopes and the need for plant testing can lead to significant lost tool time.

SageSURPASS provides significant value in the management of the increased number of permits and isolations required during shutdowns. The benefits fall into several areas including:

- Faster planning and approval of work

- Easier to check for work and isolation conflicts
- Improved management of work scope change or isolation changes
- Potential for faster return to service of plant through appropriate permit and isolation packaging
- Reduced lost tool time

SageSURPASS provides specific functions to aid in the above specifically:

- Automated cross referencing
- Ability to reschedule permits or defer the work
- Ability to see potential work conflicts on a plant layout view of the site, cross referencing and automated hazard conflict checking between permits
- Enabling the safe sharing of isolation certificate/s by multiple permits

Many of these benefits have been previously discussed except for faster return to service of plant and improved tool time.

SageSURPASS outage management capabilities include the ability to link and cascade isolation and other certificates to form appropriate structures and dependencies that support the progressive restoration and re-commissioning of plant.

Used effectively these tools can result in a faster return to service of plant. A typical facility will have between two and eight shutdowns per annum. Hourly revenues obviously vary considerably but we'll assume $4,000 per hour for this calculation. Using SageSURPASS and appropriately structuring isolations, certificates and permits can achieve a conservative return to service saving of between four and eight hours.

No of Shutdowns/annum	Revenue/hour	Time Saving using SageSURPASS	Cost Saving using SageSURPASS
2	$4,000	4 hours/shutdown	$32,000/annum
8	$4,000	4 hours/shutdown	$128,000/annum

A key area where substantial costs are incurred is in the area of contractors and employee work group waiting for permits during shutdowns. The causes of this wait time are many but typically include poor shutdown planning, short notice requests, time to prepare permit documents and scheduling of permit issue times.

The cost of work groups waiting for permits can be substantial as shown by the following example. A typically work group of eight people waiting one hour for a permit may cost $640 (8 x $80), if there are 10 work groups waiting an hour then the cost is $6,400. If we consider this can occur daily for a 10 day shutdown then the cost is $64,000 per shutdown.

The shutdown planning support provided in SageSURPASS can help minimize this lost tool time by reducing the wait time for permits. A conservative estimate would be a 30% reduction, applied to the same shutdown frequency use previously can deliver savings as shown in the following table.

No of Shutdowns/annum	Work Group Wait Time Costs	Time Saving using SageSURPASS	Cost Saving using SageSURPASS
2	$128,000	30%	$38,400/annum
8	$512,000	30%	$153,600/annum

Audit Effort

One of the primary mechanisms used to monitor the compliance of PTW systems is the audit process. The level of audit activity varies from facility to facility and is often one of those activities that suffers from operational pressures. i.e. facilities may plan to do 10 random audits per month but only complete two because of a shutdown. Part of the reason for the lower level of activity in audit is that it can be quite time-consuming.

A limitation of auditing manual PTW processes is that the review of the associated paperwork is only as good as the information written. For example, the dates/times recorded for various approvals may not represent the actual dates and times that those approvals were given because there is nothing to stop the forms from being completed after the fact. Regular random audits of current permits are really the only way to check that the PTW system is operating in a compliant manner.

SageSURPASS with its automated activity logging generates a real time transactional record of the permit lifecycle providing an audit history which is irrefutable evidence of the date/times of the permit activities as well as the names of the person/s performing those activities. Automatically generated audit histories contribute to an improved workplace culture and deliver efficiency savings in both the initial recording and audit/governance process.

Audit trail records are an excellent source of data for desk audits. The person responsible for this task can randomly audit active or completed permits and see who did what when, and look for anomalies. This ready access to information in a single electronic location reduces the effort required to do audits or allows more to be done in the available time.

SageSURPASS will reduce audit effort by at least 50%. Assuming that each audit currently takes 60 minutes and a site is auditing 5% of permits per month, the resultant saving is between five and 25 hours per month.

No of Permits/ month	Minimum Manual Time Taken	Time Saving using SageSURPASS	Cost Saving using SageSURPASS
200 (10 audits)	60 minutes each	5 hours/month	$400/month
1,000 (50 audits)	60 minutes each	25 hours/month	$2,000/month

Protecting Plant

SageSURPASS will help to mitigate incidents related to the incorrect restoration of plant. Some plant items can suffer significant damage if they are not correctly restored to a safe prestart condition before being operated.

These types of incidents may be infrequent but the costs in terms of repair or replacement and lost production can be significant. They can occur across all industry sectors and are particularly damaging in oil/gas, power generation and other complex processing plant.

The root cause of these incidents is that a step has been missed in the restoration of isolation points either because the restoration plan was incomplete or the step was simply missed. Some sites use prestart checklists as a defence against missed isolation points. However, the better approach is to ensure they are not missed in the first place.

SageSURPASS requires the individual validation using tags of the restored isolation points before the isolation certificate can be closed out. This is a robust mechanism to prevent missed isolations which provides greater certainty of a complete restoration process rather than simply ticking a box on a form.

It is not easy to quantify the savings of avoiding such incidents; however, the author is aware of incidents ranging in cost of $1,000,000 to $20,000,000. Assuming an incident frequency rate of one in 20 years at a cost of $5,000,000 the avoided cost is potentially $250,000 pa.

The table below provides a few scenarios.

Incident Cost	Frequency Rate	Avoided Cost per annum
$1,000,000	1 in 20 years	$50,000
	1 in 10 years	$100,000
$5,000,000	1 in 20 years	$250,000
	1 in 10 years	$500,000
$10,000,000	1 in 20 years	$500,000
	1 in 10 years	$1,000,000
$20,000,000	1 in 20 years	$1,000,000
	1 in 10 years	$2,000,000

Regulation

The Occupational Health and Safety (OHS) regulatory environment is tightening and placing an even greater obligation on corporations to comply with an increasing level of regulation or face significant penalties. Company fines of US$500,000 are becoming more common for single person incidents.

The new Harmonised Work Health Safety (WHS) Act and Regulations under implementation in Australia will increase penalties to a maximum of AUD$3,000,000 for corporations and AUD$600,000 or five years' imprisonment for individuals, particularly Directors and Managers. Implementing an electronic PTW system which enforces business rules and adds rigour to PTW and associated processes is an effective control to reduce this risk.
Increased penalties offer another compelling reason to adopt the highest OHS standards on our work sites. It is clear that avoiding an incident has significant potential cost avoidance returns.

Quantifying the savings of avoided incidents is not simple but with a few assumptions a nominal avoided cost can be determined. There are two fundamental groups of incidents, namely High Impact Low Frequency events (such as the Piper Alpha disaster) and Low Impact High Frequency events (sprains and cuts - Loss Time Injury type). The tables below provide scenarios using a nominal total cost comprised of elements including:

- Lost production for incident/investigation period
- Lost productivity during the investigation
- Fines from regulator
- Investigation costs
- Legal costs
- Civil claims

High Impact, Low Frequency Events		
Incident Cost	Frequency Rate	Avoided Cost per annum
$5,000,000	1 in 20 years	$250,000
	1 in 10 years	$500,000
$10,000,000	1 in 20 years	$500,000
	1 in 10 years	$1,000,000
$20,000,000	1 in 20 years	$1,000,000
	1 in 10 years	$2,000,000

Low Impact, High Frequency Events		
Incident Cost	Frequency Rate	Avoided Cost per annum
$100,000	1 in 2 years	$50,000
	1 in 5 years	$20,000
$200,000	1 in 2 years	$100,000
	1 in 5 years	$40,000
$500,000	1 in 2 years	$250,000
	1 in 5 years	$100,000
$1,000,000	1 in 2 years	$500,000
	1 in 5 years	$200,000

Safety and Culture

In the author's experience, many facilities struggle with an appropriate response to incidents. The standard response is to investigate to determine the causal factors which may result in a revision of the PTW procedure. This will in turn add another checklist, checkbox and/or approval to the permit forms and deliver updated training.

Procedures and forms become larger and more complex and the workforce is faced with information overload which makes it even more difficult for them to do their job properly and safely. It is not uncommon for a single PTW procedure to include 200 or even up to 1000 business rules i.e. the responsible person SHALL…….

Risk management and PTW activities are not the appropriate place for personal creativity - they must be performed with absolute consistency. SageSURPASS is a workflow engine applying the business rules with almost absolute consistency. This technology assisted process is much better at identifying and preventing errors because the information is more visible and approval steps are enforced.

Business rules are applied via workflows in SageSURPASS. Additional rules can be applied by modifying these workflows if necessary. The ability to capture lessons learnt and provide a mechanism for these to be assessed, acted upon and shared is leading practice. Particularly these lessons are incorporated into the JSA process to allow facilities to implement continuous learning processes and knowledge sharing far more easily than with manual processes.

SageSURPASS includes automated logging of the permit lifecycle i.e. who did what when for the entire life of the permit. The value of the visibility of this information should not be underestimated. People are be far more careful about what they do and approve if they know there is an irrefutable record of their actions. i.e. accountability is very clear.

Compliance/Audit

Most facilities will have experienced compliance issues with their PTW systems. These can range from simple administrative oversights through to serious incidents because a key check and/or control had not been planned or implemented. Humans are not infallible so oversights will still occur even with the best procedures and the best training. Even the barriers we put in place to prevent these errors getting through can and do fail.

SageSURPASS is workflow-driven which ensures each and every step in the process has been completed with a high level of consistency by preventing personnel from proceeding to the next step until they confirm that the previous step has been completed.

As noted previously SageSURPASS's audit trail functionality provides an enduring record of the permit lifecycle that is ideal for current and post-permit auditing. PTW managers can easily and routinely audit permits and look for any usual behaviors i.e. Permit timings all very close so was this a rush job and, if so, why. In the unfortunate event of an incident, the audit trail is the key source of data in an investigation.

Corporate Social Responsibility

There are increasing levels of activism amongst shareholders of public companies. Boards of Directors are becoming very sensitive to decisions and outcomes that damage corporate reputation and impede their Corporate Social Responsibilities.

The Gulf of Mexico incident has done irreparable damage to that company's international reputation not to mention the significant direct costs and loss of company value. It will take years to rebuild their reputation and in fact they may never fully recover from the impact of the incident.

The simple fact is that if there are work place incidents or, even worse, fatalities, the company's Corporate Social Responsibility has failed to meet its objectives. It has been suggested by some that employees will, if they are not already are doing so, choose only to work at companies with good safety records. They are not as likely to join a company with a history of safety related incidents.

Environment

Corporations with hazardous plant will usually be operating under an Environment Protection Authority (EPA) License. Release of hazardous chemicals or materials leads to potential injury, plant and environmental damage as well as any clean up costs and EPA penalties.

Processes like a Job Safety and Environment Analysis (JSEA) are often the first line of defense in preventing the release of hazardous substances. The worrying thing here is corporations still rely on people filling out pieces of paper to make this process work. Basically they are trusting people's memories, level of hazard awareness, plant knowledge and maybe some checklists to make this work.

SageSURPASS has the capability to support the JSA/JSEA process and provide a database of known environmental hazards and appropriate controls. Managing environmental hazards in this way means that the probability of missing the appropriate treatment of a hazardous substance is decreased markedly. The protective controls will be more consistently applied and people will become more aware of the appropriate controls.

EPA penalties can range from a couple of thousand dollars and/or funding of community environmental projects to many millions of dollars. The following table gives an overview of actual regulatory authority fines:

Year of Offence	Type of Offence	EPA Penalty AU$
2008	Breach of operating license	75,000
2008	Leak of unleaded petrol from corroded pipe	350,00
2008	Discharge into stormwater drain	200,000
2010	Clean air violations by an oil refinery	US15,000,000
1991	Discharge of LPG	75,000
1999	Oil leak, 7,000 litres	15,000
2009	Permitting an environmental hazard with an associated risk of explosion/fire (accidental oil leak)Oil refinery	100,000
2009	Marine terminal discharge of ethyl acrylate, polluting the atmosphere	80,000
2009	Accidental chemical release during transfer	90,000
2006	Emitting odorous gases from a refinery	1,000,000

In Australia, the average maximum total penalty that has been ordered by the Courts in Vic, NSW and SA for 2008/2009 was almost $500,000.

A conservative indication of potential avoided costs are shown in the table below –

Incident Cost	Frequency Rate	Avoided Cost per annum
$200,000	1 in 2 years	$100,000
	1 in 5 years	$40,000
	1 in 10 years	$20,000
$500,000	1 in 2 years	$250,000
	1 in 5 years	$100,000
	1 in 10 years	$50,000
$1,000,000	1 in 2 years	$500,000
	1 in 5 years	$200,000
	1 in 10 years	$100,000

Summary of Benefits

The summary of benefits is shown below calculated on using the lower permit volumes, and the lower avoided cost values.

Benefit	Cost Saving using SageSURPASS Per month	Cost Saving using SageSURPASS Per annum
Permit request and JSA	$2,600	$31,200
Request approval and work conflict check	$640	$7,680
Moving paperwork	$1,840	$22,080
Isolation planning	$2,640	$31,380
Isolation point tags	$1,600	$19,200
Isolation point cross referencing	$264	$3,168
Formal risk assessment reuse	$480	$5,760
Shutdown – return to service	$2,666	$32,000
Auditing	$400	$4,800
Protecting plant	$4,166	$50,000
Regulation – High impact/low frequency	$20,833	$250,000
Regulation – Low impact/high frequency	$1,666	$20,000
Environment	$1,666	$20,000
TOTAL	**$41,439**	**$497,268**

Not all benefits apply to every facility and the profile of benefits will also vary, however using the quite conservative parameters clear cost saving are evident that can be used in a Cost Benefit Analysis.

Conclusion

This paper has identified a wide range of benefits which can be achieved via the implementation of SageSURPASS. The conservative calculations used throughout show that benefits can be achieved at many stages of the risk assessment, permit and isolation process. Benefits extend beyond actual cost savings to avoided costs such as loss of production, compensation, fines and loss of reputation.

Clearly, all corporations using Permit to Work procedures can gain immediate and valuable tangible and intangible benefits through the introduction of SageSURPASS.

Sage Technology has compiled this paper based on its experience and knowledge of permit to work processes. We welcome any feedback to further develop or even correct the concepts outlined in this paper.

The savings calculations used throughout are conservative estimates and may not accurately reflect circumstances at your site. Sage Technology has an ROI spreadsheet available to assist you in calculating the actual time and cost savings which can be achieved as well as the ROI period for implementing SageSURPASS which is able to deliver the functionality and efficiency gains described.

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Peter has an extensive practical working history in the electricity industry and has worked as a business technology consultant on projects such as IT strategies, reviews, audits and implementation project management.

He has a strong knowledge and understanding of Permit to Work, safe system of work, isolation management and lockout tag out practices. Peter consults with clients to deliver Gap Analysis and Process Discovery Reports to ensure a solid fit between Sage Technology's safe work systems and our client's current or desired practices.

He is in demand as an electronic PTW expert and is actively involved in the ongoing development of Sage Technology's safe work software systems.

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