Project Order

Proforma 2016

1. Short Project Title

Decommissioning CSG wells

Long Project Title	Decommissioning CSG wells
GISERA Project Number	S.9
Proposed Start Date	15 November 2016
Proposed End Date	28 February 2018
Project Leader	Tom Measham and Cameron Huddlestone-Holmes

2. GISERA Region

☐ Queensland ☒ New South Wales ☐ Northern Territory

3. GISERA Research Program

☐ Water Research ☐ GHG Research ☒ Social & Economic Research

☐ Biodiversity Research ☐ Agricultural Land Management Research ☐ Health

4. Research Leader, Title and Organisation

Tom Measham and Cameron Huddlestone-Holmes

5. Background

Efficient, effective and socially acceptable decommissioning of CSG wells and infrastructure at end of life is a requirement for a viable unconventional gas industry and maintaining a social licence. However the optimum method to address the diverse range of engineering, environmental and social challenges involved in decommissioning onshore gas assets is not clear. The decision by AGL to cease production of the Camden project was partly in response to changing public values (amongst other factors). This demonstrates that decommissioning is already a live issue and a recognised area of community concern. These concerns indicate that regulatory requirements alone may not be an adequate guideline for acceptable decommissioning. Decommissioning is also relevant in Queensland considering that some wells may only have 10 year lifespans.

Efficient and acceptable decommissioning is an important component of the CSG life-cycle and constitutes a pre-condition for securing a social license for future CSG projects. This is best illustrated by the counter condition: the inability to demonstrate effective and responsible decommissioning would substantially undermine the viability of future CSG proposals. Considering that the CSG industry has a rolling approach to well-establishment as drill teams complete one well and move on to the next; likewise decommissioning can be viewed as ongoing process of removal and rehabilitation. Initial discussions with operators of established CSG projects in the Surat Basin have highlighted that they are aware of the need to make sure that these initial efforts at decommissioning are seen to be successful as it will feed into the overall social license for CSG projects. Operators have also identified the need for long-term planning of decommissioning activities so that end-of-life considerations are addressed during the planning phase of development and incorporated more effectively into project costs. There may also be opportunities to create value for local communities and industry through effective management of the decommissioning process e.g. by identifying infrastructure (e.g. fences, concrete installations) which landholders seek to retain.

The NSW Chief Scientist noted in 2014 that decommissioning guidelines were comparable with international practice, however decommissioning procedures evolve over time. Furthermore, unless community concerns about the decommissioning process are recognised and understood, there is a risk that well rehabilitation could be technically proficient but inefficient and socially unacceptable. An understanding of the intersection of technical requirements, regulatory and community expectations is necessary to allow for the efficient, effective and socially acceptable decommissioning.

Decommissioning is a national issue and will impact CSG operations wherever they occur. NSW has the opportunity to learn from the Queensland experience while the industry is still at the nascent stage.

The focus of this project is on CSG wells and well pads which were identified as a community concern and because these are first in line for decommissioning as they cease to be productive. Over time additional infrastructure may need to be decommissioned and may require additional research that is beyond the scope of the current project:

- Access tracks: (limited use tracks to wells through to paved roads to plant);
- Pipelines (gas and water; gathering networks through to large transmission pipelines);

- Compression Stations
- Water treatment facilities (plant, storage ponds, brine ponds)

The project will consider what recommendations can be put in place to address social concerns with regard to decommissioning of infrastructure and confidence in the integrity of underground infrastructure including steel and concrete over time.

This project will address in part the following recommendations of the NSW Chief Scientist CSG Review:

"Recommendation 9

That Government consider a robust and comprehensive policy of appropriate insurance and environmental risk coverage of the CSG industry to ensure financial protection short and long term. Government should examine the potential adoption of a three-layered policy of security deposits, enhanced insurance coverage, and an environmental rehabilitation fund."

"Recommendation 15

That Government develop a plan to manage legacy matters associated with CSG. This would need to cover abandoned wells, past incomplete compliance checking, and the collection of data that was not yet supplied as required under licences and regulations. There will also need to be a formal mechanism to transition existing projects to any new regulatory system."

This work will provide valuable input into determining the scale of insurance and environmental risk coverage for the CSG industry for the long-term (Recommendation 9) by identifying the key requirements for CSG project decommissioning, and defining what decommissioning means to range of stakeholders.

The project is directly aimed at the legacy issues identified in Recommendation 15 by making recommendations on the management of the decommissioning process for CSG projects.

6. Project Description

The decommissioning phase of CSG in Australia has not been studied by GISERA researchers to date. Where possible, we will draw on knowledge from other types of decommissioning processes and destinations such as the UK (see for example www.refine.org.uk). The project will focus on Surat basin and MacArthur regions.

The research will undertake the following steps.

1. Review of regulatory frameworks.
   The research team will conduct a review of legislative and regulatory frameworks comprising:
- General principles for effective regulation distilled from international literature
- Overview of NSW regulatory framework
- Overview of Queensland regulatory framework

2. Stakeholder response to frameworks.

Workshops will be conducted with industry, policy stakeholders and local residents to consider how the CSG industry has responded to regulatory frameworks to date. The workshops will seek to identify areas for improvement in policy design and industry practice.

3. Recommendations
   Based on the review of regulatory frameworks (1) and the industry response to those frameworks (2), the research team will develop recommendations for improved policy design and improved industry practice in areas including:
   a) Technical proficiency
   b) Community expectations
   c) Economic effectiveness

Through literature review and stakeholder engagement, this project will identify engineering, environmental, social and legislative opportunities around:

- Decommissioning and rehabilitation leading practice
- The characteristics of socially acceptable decommissioning
- Suggestions for adapting exploration, construction and operation/production processes to help reduce the decommissioning burden
- Minimising social impact of the onshore gas industry decommissioning and exiting a region
- Needs of the various stakeholders identified above

Importance and necessity

Effective, efficient and socially acceptable decommissioning is not only a requirement for current industry activity: unless this can be demonstrated by existing projects then new CSG projects will likely not proceed due to impacts on social licence. Extractive industries have a history of underestimating decommissioning costs resulting in a legacy of insufficiently rehabilitated past projects placing a cost on the public and governments. To date, CSG exploration wells are at risk of repeating this historical trend. This is evidenced by the NSW Chief Scientist Independent Review of Coal Seam Gas Activities in NSW which indicated that multiple suspended and abandoned wells had provided incomplete rehabilitation reports. This project is important because it will identify what risks are important to be identified and mitigated in particular with regard to long term legacy issues around water, soil and environment for communities.

The project will identify recommendations which are specifically relevant to NSW and QLD contexts. In addition, these may provide general principles for other jurisdictions which may experience CSG future industry development.

The project will deliver:
1. Literature review of regulatory environments and broader policy guidelines
2. Recommendations that can inform socially acceptable decommissioning for CSG wells in other contexts
3. Guidelines for implementing the recommendations.

7. Budget Summary

Expenditure	2016/17	2017/18	2018/19	Total
Labour	176,746	97,130		273,876
Operating	21,000	4,000	-	25,000
Subcontractors	-	-	-	-
Total Expenditure	**197,746**	**101,130**	-	**298,876**

Expenditure per Task	2016/17	2017/18	2018/19	Total
Task 1	25,553	-	-	25,553
Task 2	45,593	-	-	45,593
Task 3	14,603	-	-	14,603
Task 4	40,885	-	-	40,885
Task 5	38,148	-	-	38,148
Task 6	32,964	9,723	-	42,687
Task 7	-	47,220	-	47,220
Task 8	-	44,187	-	44,187
Total Expenditure	**197,746**	**101,130**	-	**298,876**

Source of Cash Contributions	2016/17	2017/18	2018/19	Total
GISERA Industry Partners (25%)	49,436	$25,282	-	74,719
- Santos (12.5%)	24,718	12,641	-	37,360
- AGL (12.5%)	24,718	12,641	-	37,360
NSW Government (25%)	49,436	$25,282	-	74,719
Federal Government (25%)	49,436	$25,282	-	74,719
Total Cash Contributions	**148,308**	**75,846**	-	**224,157**

In-Kind Contribution from Partners	2016/17	2017/18	2018/19	Total
CSIRO (25%)	49,436	25,282	-	74,719
Total In-Kind Contribution from Partners	**49,436**	**25,282**	**-**	**74,719**

	Total funding over all years	Percentage of Total Budget
GISERA Investment	$74,719	25%
NSW Government Investment	$74,719	25%
Federal Government Investment	$74,719	25%
CSIRO Investment	$74,719	25%
Total Other Investment	-	
TOTAL	**$298,876**	

Task	Milestone Number	Milestone Description	Funded by	Start Date (mm-yy)	Delivery Date (mm-yy)	Fiscal Year Completed	Payment $ (excluding CSIRO contribution)
Task 1	1.1	Project establishment workshop	GISERA	Nov 16	Dec 16	2016/17	$19,165
Task 2	2.1	Review of regulatory frameworks	GISERA	Jan 17	Apr 17	2016/17	$34,195
Task 3	3.1	Submit ethics approval	GISERA	Feb 17	Mar 17	2016/17	$10,952
Task 4	4.1	Conduct workshop in Camden	GISERA	Apr 17	Jun 17	2016/17	$30,664
Task 5	5.1	Conduct workshop in Surat basin	GISERA	Apr 17	Jun 17	2016/17	$28,611
Task 6	6.1	Conduct workshop in Narrabri	GISERA	Apr 17	Jul 17	2017/18	$32,015
Task 7	7.1	Develop recommendations	GISERA	Aug 17	Nov 17	2017/18	$35,415
Task 8	8.1	Extension to implement recommendations	GISERA	Nov 17	Feb 18	2017/18	$33,140

8. Other Researchers (include organisations)

Researcher	Time Commitment (project as a whole)	Principle area of expertise	Years of experience	Organisation
Tom Measham	25% EFT	Social science	20	**CSIRO**
Cameron Huddlestone-Holmes	25%	Resource Geologist	20	
James Kear	20%	Hydrologic fracturing engineer	10	
Simone Carr-Cornish	30%	Social science	5	

9. Subcontractors

Subcontractors (clause 9.5(a)(i))	**Subcontractor**	**Role**
	N/A	

10. Project Objectives and Outputs

The decommissioning of CSG wells in Australia represents a new topic for scientific research. The objective of this project is to develop and apply an integrated approach to improving the social, economic and environmental effectiveness of decommissioning of wells and well pads. The purpose is to develop recommendations for improving decommissioning by reviewing the latest knowledge and considering community concerns.

The project will deliver:
1. Literature review of regulatory environments and broader policy guidelines
2. Recommendations that can inform socially acceptable decommissioning for CSG wells in other contexts
3. Guidelines for implementing the recommendations.

11. GISERA Objectives Addressed

Carrying out of research and improving and extending knowledge of social and environmental impacts and opportunities of unconventional gas projects for the benefit of the Gas Industry, the relevant community and the broader public.

Informing government, regulators and policy-makers on key issues regarding policy and legislative framework for the Gas Industry.

12. Project Development

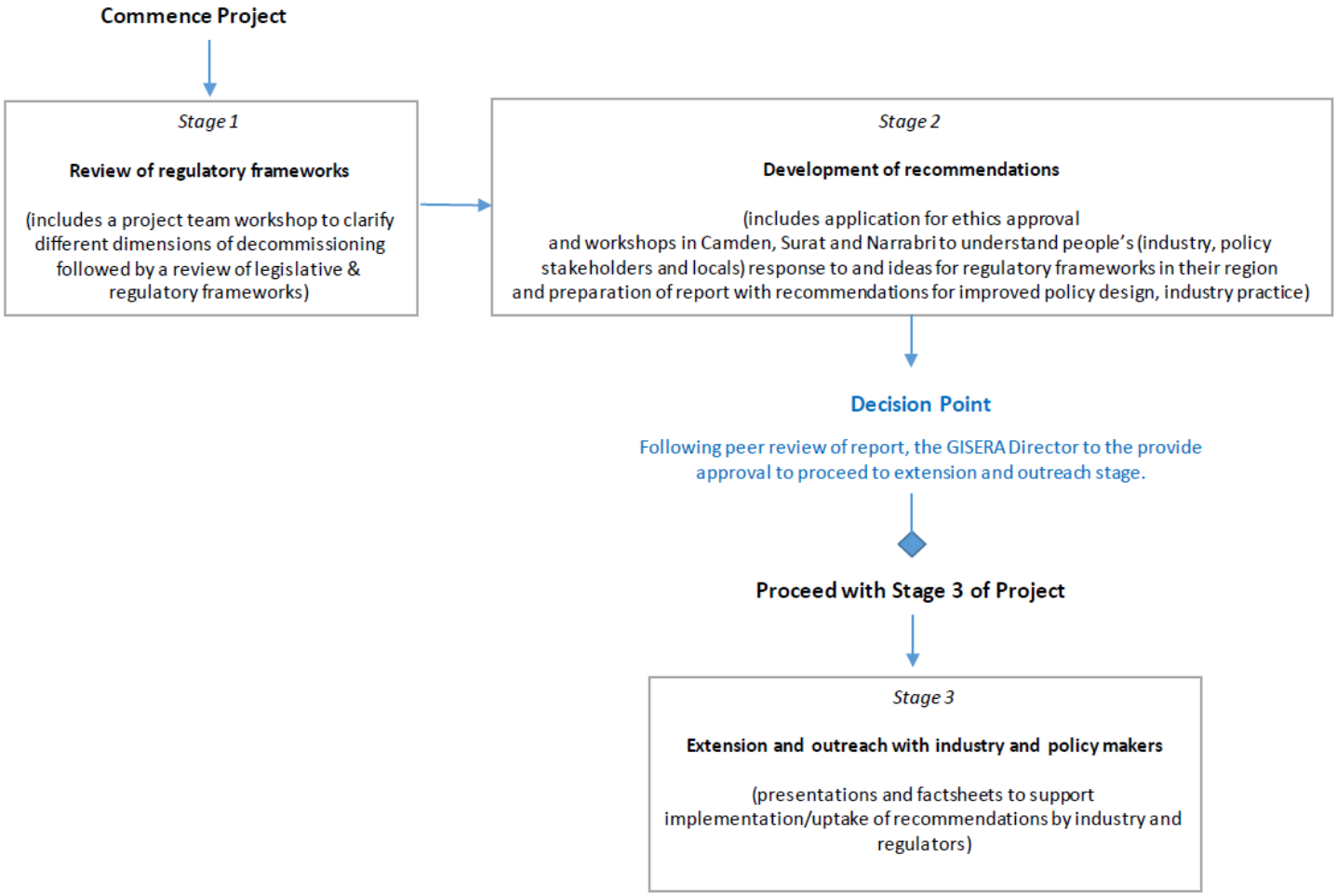
The project developed from two separate origins. In Camden, the decision by AGL to cease production of the Camden project in response to changing public values demonstrates that decommissioning is already a live issue and a recognized area of community concern. A field visit

to the Camden facility demonstrated the importance of decommissioning gas wells in way that not only meets regulatory requirements but also addresses the concerns and opportunities as viewed by local residents.

At the same time, environmental managers within the LNG industry in the Surat region of Queensland have been focused on the efficiency and effectiveness of decommissioning CSG wells as they cease to be productive throughout the industry lifespan. Having observed the decommissioning process in other more established industries such as mining, CSG operators are keen to be pro-active about retiring the wells and well pads. Being proactive has many advantages including accurate and adequate costing of the decommissioning process so it can be effectively incorporated into design and implementation and properly resourced throughout the life of the project.

In considering the decommissioning process in both contexts (Camden and Surat) with different regulatory frameworks, the research team sought to design an integrated approach that can be relevant to the industry beyond the specific cases encountered to date.

13. Project Plan



13.1 Project Schedule

ID	Task Title	Task Leader	Scheduled Start	Scheduled Finish	Predecessor
Task 1	Project establishment workshop	Tom Measham	15/11/16	30/12/16	None
Task 2	Review of regulatory frameworks	Cameron Huddlestone-Holmes & James Kear	15/01/17	15/04/17	Task 1
Task 3	Submit ethics approval	Simone Carr-Cornish	01/02/17	30/03/17	Task 2
Task 4	Conduct workshop in Camden	Tom Measham	01/04/17	30/06/17	Task 1, 2 & 3
Task 5	Conduct workshop in Surat basin	Cameron Huddlestone-Holmes	01/04/17	30/06/17	Task 1, 2 & 3
Task 6	Conduct workshop in Narrabri	Tom Measham	01/04/17	31/07/17	Task 1, 2 & 3
Task 7	Develop recommendations	Tom Measham & Cameron Huddlestone-Holmes	01/08/17	01/11/17	Task 4, 5 & 6
Task 8	Extension to implement recommendations	Tom Measham & Cameron Huddlestone-Holmes	01/11/17	28/02/18	Task 7

Task 1

TASK NAME: Project establishment workshop

TASK LEADER: Tom Measham

OVERALL TIMEFRAME: Nov 2016 – Dec 2016

BACKGROUND:

There are multiple aspects to effective decommissioning including engineering effectiveness, hydrological integrity, economic efficiency and public confidence. The project establishment workshop will bring together the research team along with any additional technical expertise as required to clarify how the project will address these different dimensions, and determine what is in scope and out of scope for the subsequent tasks.

TASK OBJECTIVE: Establish a highly functioning project team and clarify how the different dimensions of decommissioning can be addressed in an integrated way.

TASK OUTPUTS: clear understanding of how the different dimensions of decommissioning can be addressed in an integrated way.

SPECIFIC DELIVERABLES: Workshop completed

Task 2

TASK NAME: Review of regulatory frameworks

TASK LEADER: Cameron Huddlestone-Holmes and James Kear

OVERALL TIMEFRAME: Jan 2017 – Apr 2017

BACKGROUND:

It is important to understand the particular regulatory frameworks of jurisdictions where CSG extraction occurs. It is also relevant to understand how these sit within broader international contexts for regulating the CSG industry.

TASK OBJECTIVE: To review of legislative and regulatory frameworks comprising general principles for effective regulation distilled from international literature in addition to an overview of New South Wales and Queensland regulatory frameworks.

TASK OUTPUTS: A review of the regulatory frameworks and the general principles underpinning them is crucial step understanding what is working well and what can be improved.

SPECIFIC DELIVERABLES: A report reviewing the regulatory frameworks for NSW and QLD in the context of broader international principles relevant to CSG policy and regulation

Task 3:

TASK NAME: Prepare and submit ethics approval

TASK LEADER: Simone Carr-Cornish

OVERALL TIMEFRAME: Feb 2017 – Mar 2017

BACKGROUND: ethics approval is required for conducting research workshops with all participants including industry staff, local residents and regulators. The CSIRO ethics committee for research involving human subjects has two scales of approval requirements. A simplified approval process (around 5 pages) is employed for straight forward projects on uncontroversial topics. Projects on controversial issues and/or those which involve complex methods require more detailed application (around 30 pages) plus associated documentation including informed consent forms and project information sheets for participants demonstrating that the project meets ethics approval. The precedent for research on CSG is to require the more detailed application due to the contested nature of the industry.

TASK OBJECTIVE: Prepare and submit ethics approval

TASK OUTPUTS: Ethics application, project information sheet and informed consent form

SPECIFIC DELIVERABLES: Ethics application submitted.

Task 4:

TASK NAME: Workshop on industry responses and regulatory frameworks in Camden

TASK LEADER: Tom Measham

OVERALL TIMEFRAME: Apr 2017 – Jun 2017

BACKGROUND: Workshops with industry, policy stakeholders and local residents are required to consider how the CSG industry and regulators are responding to evolving best practices and to community concerns and identify areas for improvement in policy design and industry practice.

TASK OBJECTIVE: Conduct workshop in Camden with surrounding residents, AGL and NSW government.

TASK OUTPUTS: workshop completed

SPECIFIC DELIVERABLES: short report on workshop findings

Task 5:

TASK NAME: Workshop on industry responses and regulatory frameworks in Surat basin

TASK LEADER: Cameron Huddlestone-Holmes

OVERALL TIMEFRAME: Apr 2017 – Jul 2017

BACKGROUND: Workshops with industry, policy stakeholders and local residents are required to consider how the CSG industry and regulators are responding to evolving best practices and to community concerns and identify areas for improvement in policy design and industry practice.

TASK OBJECTIVE: Conduct workshop in Surat with CSG companies and QLD government.

TASK OUTPUTS: workshop completed

SPECIFIC DELIVERABLES: short report on workshop findings

Task 6:

TASK NAME: Workshop on industry responses and regulatory frameworks in Narrabri

TASK LEADER: Tom Measham

OVERALL TIMEFRAME: Apr 2017 – Jul 2017

BACKGROUND Workshops with industry, policy stakeholders and local residents are required to consider how the CSG industry and regulators are responding to evolving best practices and to community concerns and identify areas for improvement in policy design and industry practice.

TASK OBJECTIVE: Conduct workshop in Narrabri with surrounding residents, Santos and NSW government.

TASK OUTPUTS: workshop completed

SPECIFIC DELIVERABLES: short report on workshop findings

Task 7:

TASK NAME: Develop recommendations

TASK LEADER: Tom Measham and Cameron Huddlestone-Holmes

OVERALL TIMEFRAME: Aug 2017 – Nov 2017

BACKGROUND: Effective regulation and industry practice in regards to decommissioning are important issues affecting public confidence in the CSG sector.

TASK OBJECTIVE: Recommend improvements in both industry practice based on the outcomes of tasks 1-6.

TASK OUTPUTS: Recommendations for improved policy design and improved industry practice in areas including technical proficiency, Community expectations and economic effectiveness of decommissioning of CSG well sites.

SPECIFIC DELIVERABLES: Report with recommendations for decommissioning

Task 8:

TASK NAME: Extension (including conference) and outreach with industry and policy makers to implement recommendations

TASK LEADER: Tom Measham and Cameron Huddlestone-Holmes

OVERALL TIMEFRAME: Nov 2017 – Feb 2018

BACKGROUND: The recommendations are only useful if they are communicated to industry and regulators in a way that supports implementation. The purpose of this task is to facilitate extension and uptake of the recommendations.

TASK OBJECTIVE: Implementation workshops conducted to facilitate uptake of recommendations in NSW and QLD.

TASK OUTPUTS: PowerPoint presentations with stakeholders and fact sheets tailored to NSW and QLD contexts. Question and answer sessions with stakeholders to facilitate uptake of recommendations

SPECIFIC DELIVERABLES: Implementation workshops in QLD and NSW completed.

14. Communications Plan

Communication of the results of the project will be managed in accordance with GISERA's communication strategy. This may include presentations at community and industry meetings, conferences and publication of reports, scientific articles and factsheets. In addition, communication with relevant state and federal government departments including NSW Chief Scientist Office will be maintained to ensure that they are aware of the outcomes of the research and possible policy implications.

The project will establish a Technical Reference Group (TRG) aimed at seeking advice on contextual matters and to discuss research needs as well as outputs as the project progresses. The TRC will include the project leader and a group of different stakeholders, as appropriate (noting NSW Chief Scientist Office have been approached and declined).

15. Intellectual Property and Confidentiality

Background IP (clause 11.1, 11.2)	**Party**	**Description of Background IP**	**Restrictions on use (if any)**	**Value**
				$
				$
Ownership of Non-Derivative IP (clause 12.3)	CSIRO			
Confidentiality of Project Results (clause 15.6)	Project Results are not confidential.			
Additional Commercialisation requirements (clause 13.1)	Not applicable			
Distribution of Commercialisation Income (clause 13.4)	Not applicable			
Commercialisation Interest (clause 1.1)	**Party**		**Commercialisation Interest**	
	Santos		N/A	
	AGL		N/A	
	CSIRO		N/A	