

TARONG ENERGY CORPORATION LIMITED

TARONG POWER STATION BUSINESS PROCEDURE FOR

Excavation and Digging Procedure

OHS-PROC-116

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1.0 Purpose

To ensure that all excavation and digging work is planned, critical services identified and progress of work controlled. The issue of an *Excavation and Digging Authorisation* will:

- Minimise risk to personnel, and
- Prevent damage to existing underground & overhead services and structures.

2.0 Scope

This procedure applies to any work location where excavation or digging is required within a Tarong Energy (TE) operated and/or maintained site or any situation in which a TE employee or TE controlled contractor is required to undertake specific excavation or digging tasks. [This procedure does not cover Wall Penetration which is covered by OHS-PROC-123 \(Draft\).](#)

Definitions

For PTW related definitions, refer to TE Permit to Work Manual (CORP-PTW-01) if clarification is required on any terms used in this procedure.

Battering back	Means the process of removing material around a trench or excavation such that the walls are sloped back at an angle rather than vertical
Benching	Means the process of removing material around a trench or excavation such that the walls are stepped or benched back rather than vertical
Competent Person	A person who has through a combination of training, education and experience, acquired knowledge and skills enabling that person to perform correctly the specified task.
Digging	any activity involving the use of hand tools or the insertion of objects into the ground, (e.g. driving a picket or boring of holes), whereby earth, rock, sand, soil or other material is moved or displaced at a depth exceeding 150mm Note: This does not include the digging or movement of material stockpiles such as coal and topsoil, the digging of raised garden beds, cleaning of culverts around drains to the natural ground shape, etc.
Excavating	any activity that results in a hole in the earth or face of the earth greater than 150mm deep after a material has been moved or removed
Excavation	a hole in the earth, or a face of earth, formed after rock, sand, soil or other material is removed. <i>Examples</i> <ul style="list-style-type: none">• a trench, ditch, shaft, well, tunnel, pier hole or cutting.• a hole drilled in the earth
Geo-Technical Engineer	means a person who (a) is a registered professional engineer under the Professional Engineers Act 1988, and (b) holds a professional engineering qualification relevant to geo-Technology (including a civil engineer).
OIC	Officer in Charge refer Corp-PTW-01

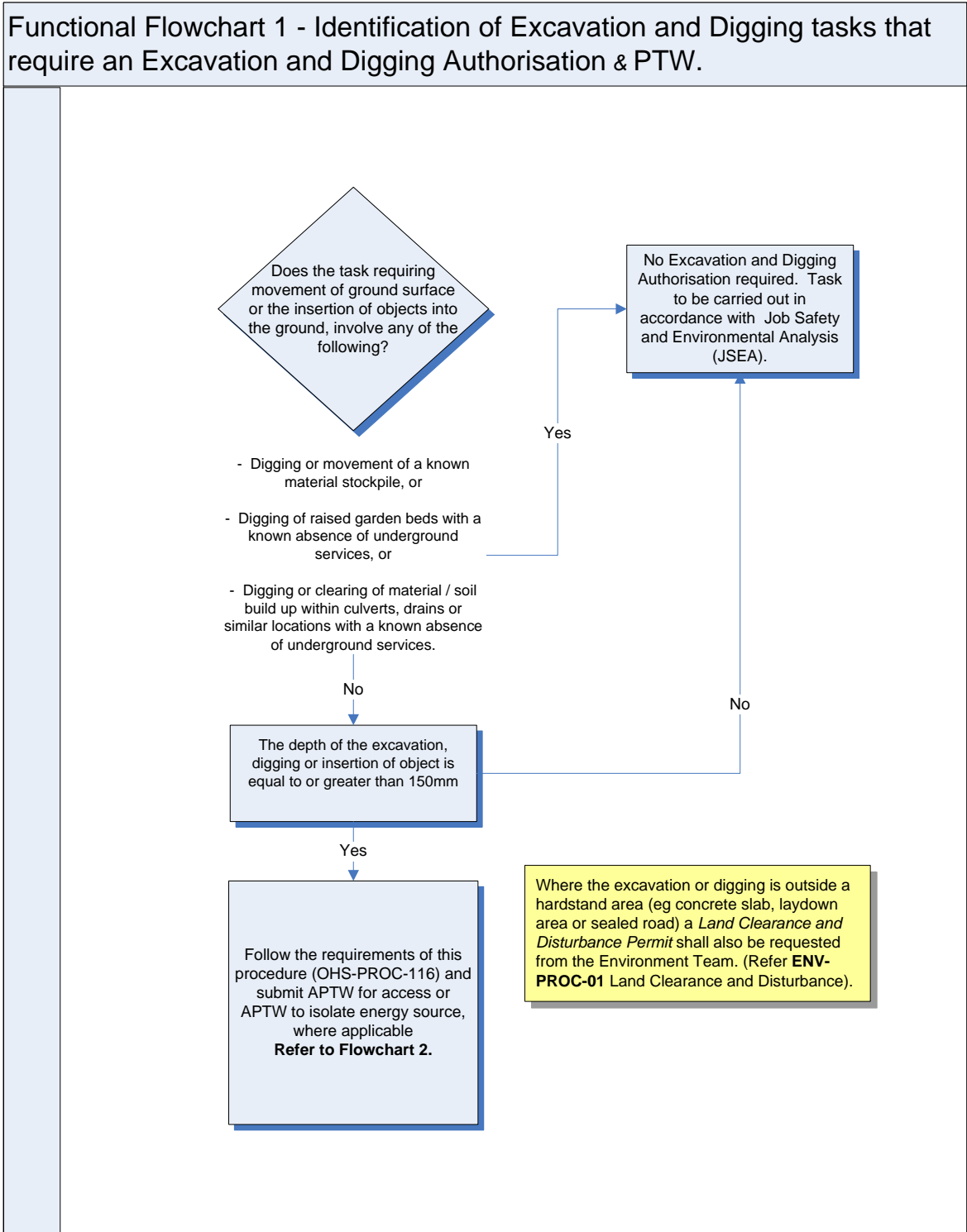
Prescribed Information	about an underground service, means the information about the service necessary to safely do excavation work at or near the service, including (a) the location of the service, and (b) the type of the service, and (c) the depth of the service, and (d) for an electrical service – whether the service is or is not live, and (e) the restrictions to be followed in doing the work.
PTW	Permit to Work, means a documented approval to carry out work on or associated with Tarong Energy's Corporation's assets or secure plant to prevent operation.
Shall	is to be interpreted as mandatory
Shoring	a system of temporary supports and sheeting material used to maintain the stability of the sides of an excavation
Should	is to be interpreted as advisory or discretionary
Trench	an excavation where the maximum depth is more than the minimum width.
Underground Service	a cable, pipe or other thing laid or installed underground for the transmission, transportation or storage of electricity, or a substance, including telephone and gas service lines.

Note: As per the *Workplace Health and Safety Regulation 1997 Part 17*, the definition of a competent person for the use, installation, inspection, and placement of sheeting or timber shoring for the shoring of a trench, is a person who

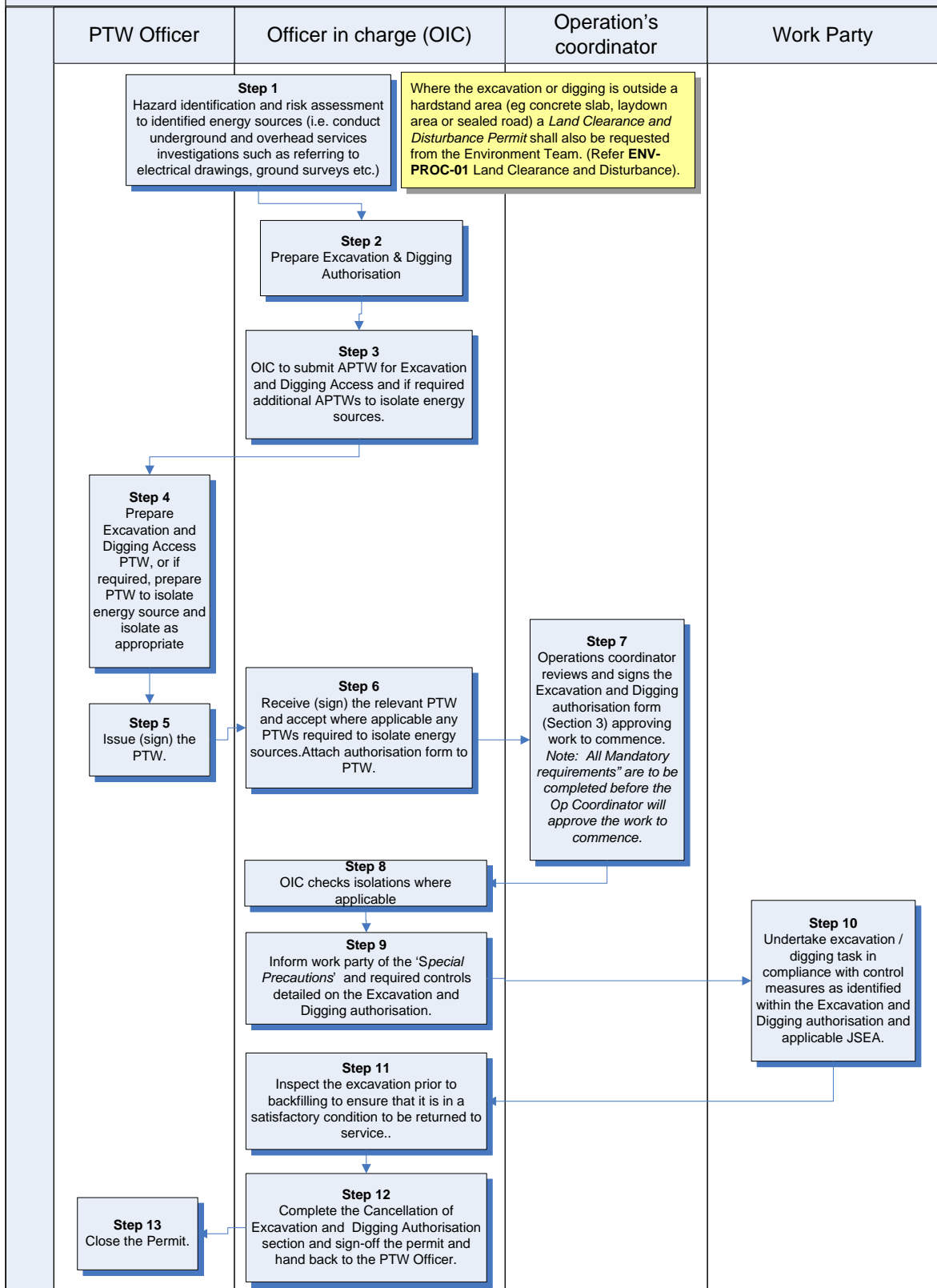
- (a) either
 - (i) has at least 3 years practical experience in trenching work, including the shoring of trenches, and a sound understanding of the technical principles involved in trenching work; or
 - (ii) is a geo-technical engineer; and
- (b) has acquired, through training, qualifications or experience the knowledge and skills to do the work in a safe way, including
 - (i) sound knowledge of relevant Australian Standards and of Advisory Standards, Industry Codes of Practices and other relevant legislation; and
 - (ii) sound knowledge of, and competence in, the risk management process for trenching work, including
- (c) hazard identification and risk assessment for trenching work; and
- (d) measures to control exposure to risks from trenching work, including shoring systems; and
- (e) safe work practices and procedures for trenching; and
- (f) how to plan and prepare trenching work; and
- (g) how to identify the location of underground services; and
- (h) how to identify soil types and other factors that affect the safety of a trench.

3.0 Procedure

3.1 Functional Flowcharts



Functional Flowchart 2 – Excavation and Digging Access



4.0 Personnel Responsibilities

4.1 Responsibilities of PTW Officer

4.1.1 Preparing the Excavation and Digging PTW

- The PTWO shall prepare the Excavation & Digging PTW in accordance with Corp-PTW-01.
- Any isolations shall be performed in accordance with Corp-PTW-01

4.1.2 Closing the Excavation and Digging PTW

- The PTWO shall close the Excavation & Digging PTW in accordance with Corp-PTW-01.
- Any de-isolations shall be performed in accordance with Corp-PTW-01

4.2 Responsibilities of Officer-in-Charge (OIC)

4.2.1 General Responsibilities

Before excavation work is carried out, the OIC shall:

- Complete section 1, 2 & 3 of Excavation & Digging Authorisation
- Ensure Operation Coordinator approves the proposed work by signing section 3 of the Excavation & Digging Authorisation
- Provide any relevant Contractor Supervisors with:
 - A copy of the *Excavation and Digging Authorisation*,
 - A copy of the PTW, and
 - Any associated drawings and documentation.
- Where the excavation or digging is outside a hardstand area (eg concrete slab, lay down area or sealed road) a *Land Clearance and Disturbance Permit* should also be requested from the Environment Team (Refer **ENV-PROC-01** Land Clearance and Disturbance).

4.2.2 Completing the Authorisation Form:

This position shall:

- Ensure all relevant information is included within the Excavation & Digging Authorisation,
- Ensure that the details on the Excavation & Digging Authorisation are manually completed by:
 - Carrying out a site assessment of the proposed excavation site (refer to Appendix 2 - What to look for during on site inspection for underground services) and by referring to the relevant drawings,
 - Note in the "Special Precautions" Section of the *Excavation and Digging Authorisation* any specific requirements for the work, e.g. road closures.

- Determine the level of risk assessment required.
- Complete an electronic survey and/or pot holing of the proposed site, and noting on the authorisation any critical services within or in close proximity to the site.



Section 1 & 2 of the Excavation & Digging Authorisation Form must be completed before the Operations Coordinator will approve the authorisation form & the applicable PTW.



Where a critical service is identified, the minimum requirement for hazard identification and risk control is a documented **Job Safety and Environmental Analysis**. Isolation of potential damaging energy sources shall be considered as a **primary** risk control.

- Identify any hazards that may be introduced during the course of the work.
- Arrange for updates to existing site drawings where required.
- Return the *Excavation and Digging Authorisation* to the Operations Coordinator for approval to commence work.

4.2.3 Submitting the APTW:

This position shall:

- Ensure that an APTW for *Excavation and Digging* is submitted in accordance with the requirements of Functional Flowchart 1 "*Identification of Excavation and Digging Tasks that require an Excavation and Digging PTW*" of this procedure.

4.2.4 Commencing the excavation:

After approval has been given to commence the excavation this position shall:

- Where a PTW has been issued to isolate service/s, confirm the isolation/s is correct.
- Before the OIC authorises access to the work area, the OIC shall ensure all members of the Working Party sign onto the *Working Party Sign on / Sign off Check Sheet* of the *Excavation and Digging PTW* after they acknowledge the following:
 - Who the OIC is
 - The conditions detailed on the PTW
 - The scope of the *Work to be Done*
 - The limits of the isolation and / or the nearest live electrical point/s for switching programs.
- Ensure that the equipment being used for the excavation is appropriate for the site to be excavated.
- Ensure that if during any excavation or digging work activity where a person has identified unstable rock or soil or movement that could place themselves or others at risk, the OIC will ensure that activities are temporarily stopped and/or additional controls are implemented to ensure personnel safety, as deemed appropriate.
- Ensure that the work is carried out in compliance with:
 - Section 5 of this procedure - HSE risk management
 - Corp-PTW-01

4.2.5 Surrender Excavation & Digging PTW

This position shall

- Ensure the status of the excavation is in a satisfactory condition to be returned to service and where applicable
 - All equipment has been removed and the area secured to ensure the safety of personnel.
 - Arrangements have been made to update existing drawings of site buried services.
 - Backfilling inspection check made and changes recorded
- Ensure that the *Working Party*, attached to the applicable *Excavation and Digging PTW* are aware that:
 - the status of the PTW is about to be handed back and have acknowledged this status by signing off the *Working Party Sign on / Sign off Check Sheet* attached to the PTW.
 - access to the excavation site is now prohibited; and,
 - they shall remain clear of the work area.
- Complete section 5 of the Excavation & Digging Authorisation

4.3 Responsibilities of a Working Party member

4.3.1 Prior to commencing work

This position shall:

- Before accessing the work area contact the *OIC / Contractor Supervisor* each day to check the status of the work before starting work.
- Before accessing the work area sign on to the *Working Party Sign on / Sign off Check Sheet* of the *Excavation and Digging PTW*, and acknowledge that they have a clear understanding of:
 - Who the OIC is.
 - The scope of the work.
 - The limits of the isolation or the nearest live electrical point/s for switching programs.

4.3.2 The Working Party member undertaking excavation work

This position shall

- if, during any excavation or digging work activity, a person identifies unstable rock or soil or movement that could place themselves or others at risk, they are to report this issue to the *OIC / contractor supervisor* who is to ensure activities are temporarily stopped and/or additional controls are implemented to ensure personnel safety, as deemed appropriate.

4.3.3 Completion of work

This position shall:

- Sign off the PTW *Working Party Sign on / Sign off Check Sheet* of the *Excavation and Digging PTW* and understand that access to the excavation site is now prohibited.

4.4 Responsibilities of Operations Coordinator

4.4.1 Approving work to commence

This position shall:

- Ensure *OIC* has completed the relevant sections of the *Excavation and Digging Authorisation* and
- Where applicable, confirming that the *OIC* has been issued with any *PTW*'s required to isolate services; and
- Sign the *Excavation and Digging Authorisation* approving work to commence.

4.5 The Manager Operations

This position shall

- Ensure that appropriate resources are available to enable compliance with this procedure. The Manager Operations shall ensure periodic audits are done to verify compliance with the procedure and the continuing integrity of the *PTW* system.

5.0 Health, Safety and Environment (HSE) Risk Management

In relation to excavation work, a safe system shall be implemented to control risks to health, safety and the environment arising from items such as, but not limited to

- underground services
- adjacent buildings, routes or roads that could become unstable as a result of excavation work
- nearby traffic hazards and hazards that the excavation work may cause for road users
- the collapse of the excavation
- objects or persons falling into the excavation
- the placement of excavated material
- a person inhaling or otherwise being exposed to, carbon monoxide or another impurity of the air
- contact with contaminated soil or excavated materials; and
- run-off of soil and materials onto roads and into drains and creek/catchment areas.

5.1 Planning to Excavate or Dig

OIC shall undertake all necessary investigations regarding excavations and underground services prior to excavation or digging work commencing on site.

This includes the requirement to:

- review current and controlled site service maps, plans, and underground service drawings,
- contact local authorities and service location record holders, where appropriate,
- where excavating or digging on co-used easements (eg. Caboombah pump station), seek approval from the other stakeholders prior to the performance of the work,



A complete record search can be undertaken by lodging an enquiry with the central call service, known as '**Dial Before You Dig**' www.dialbeforeyoudig.com.au or phoning **1100**.

- undertake site inspections to identify underground services using site drawings and other visual indicators and where appropriate an underground cable locator (*refer to appendix 2 for guidelines of what to be looking for when undertaking a site inspection*),
- investigate potential environment effects of the excavation activity and soil run-off paths into drains and catchment areas,
- investigate potential weather conditions that may impact on ground conditions and spoil run off; and
- where relevant due to the depth or complex nature of the excavation, organise for a geo-technical engineer to prepare a report with respect to the proposed excavation activities.

5.2 HSE Controls

Prior to an excavation or digging activity being initiated on site (*that meets the definition in [Flowchart 1](#)*) an *Excavation and Digging Authorisation* is to be completed by an OIC as part of the PTW process.

Prior to excavation work commencing the following control measures are to be implemented where applicable;

- the ground is to be marked (e.g. pressure paint spray) to indicate safe areas where excavations can be undertaken and to clearly mark in a different way/colour, any services traversing the general excavation area.
- planning and relevant measures are to be taken to ensure the stability of nearby buildings, adjoining structures, routes, roads and the edges of excavations, relative to the excavation work.
- all excavations and trenches over **1.5 metres** in depth, are to be approved by a Competent Person and where entry is required, are to be either shored, battered back or benched unless a geo-Technical engineer confirms in writing it is stable.
- all excavations and trenches less than 1.5 metres in depth with unstable rock or soil and where access is required shall be shored, battered back or benched in a manner approved by a *Competent Person*.

5.2.1 Shielding controls

- Installation and removal of shoring is to take place from outside the trench in accordance with the requirements of the shoring manufacturer or engineer where relevant.
- Non-proprietary shoring is to be designed by a suitably qualified engineer, and installed by trained personnel only after a *Competent Person* has inspected the trench, assessed the shoring and approved the use of the shoring.
- Battering is to be at an angle of 45° or less to the horizontal and start no higher than **1.5 metres** above the bottom of the trench or excavation, unless a geo-technical engineer has approved a greater batter angle in writing.
- Each bench cut into the side of the excavation or trench shall be no higher than it is wide and step dimensions are to be no greater than **1.5 metres** unless a geo-technical engineer has approved a greater height or dimension in writing.

5.2.2 Environmental controls

- soil run off controls are to be erected and put in place to prevent soil run-off onto roadways and footpaths and into drains, creeks and other catchment areas. Examples include silt fences, drain covers/sieves and warning signage.
- Where the excavation or digging is outside a hardstand area (eg slab or sealed road) a *Land Clearance and Disturbance Permit* should also be requested from the Environment Team (Refer **ENV-PROC-01 Land Clearance and Disturbance**).

5.2.3 Supervision

- A *Competent Person* shall supervise all personnel involved in trenching where access into the trench is required.
- No person is to work alone in an excavation or trench that is greater than **1.5 metres** deep.

5.2.4 Cover and Barricading controls

Wherever practicable, controls such as the following are to be erected to exclude entry to any excavation or trench where the public or workers not involved in the activity may be at risk due to its location and accessibility;

- 900mm high barricades or hoardings, and
- signage (**'Danger – Do Not Enter'**) hung independently or from barriers / hoardings.



Consultation between the *OIC* and *Environmental Officers, H&S Officers*, etc may need to be undertaken prior to excavation and trenching activities commencing.

- where practicable, barricades and signs are to be used at safe distances from edges to protect unattended excavations that cannot be practically covered.
- barricading around an open excavation should encompass spoil piles and earthmoving plant in close proximity to edges where practicable.
- covers are to be placed on unattended excavations where practicable on site.

5.2.5 Exclusion zones

- machinery is not to be located in or near excavations and trenches where exhaust fumes may contaminate below ground atmospheres that workers are required to access.
- All heavy machinery / mobile plant / equipment shall be stored at least 2 metres from the edges of the excavation or trench.
- any debris and spoils are to be kept at least 1 metre from the edges of an excavation or trench.

5.2.6 Access and Egress

- a safe means of access and egress is to be provided into excavations and trenches requiring access. Where a trench cannot simply be walked into by workers, ladders providing a safe access and egress are to be placed in every 9 metre length of trench where workers are required to work. Ladders should also extend at least one metre above the edge of the trench.

- No personnel shall be present in an excavation while that part is being mechanically dug.

5.2.7 Working at heights controls

- where a person may fall greater than **2 metres** into an excavation or a lesser height where a significant injury would be likely, working at height controls as per the *Working with Heights Procedure* (OHS-PROC-100) are to be implemented.

5.2.8 Hot work controls

- where hot work is to be undertaken in the excavation work area, a Hot Work and Ignition *Sources in Hazardous Areas Authorisation* (T-1044) is to be arranged and controls are to be implemented as per the Hot Work and Ignition *Sources in Hazardous Areas Procedure* (OHS-PROC-109).

5.2.9 Atmospheric contaminant controls

- any excavation greater than **2 metres** or where an *OIC* identifies during the work planning process that a trench or excavation may contain, or has the potential to contain an unsafe atmosphere shall be assessed for Confined Space requirements and appropriate controls implemented, such as but not limited to ensuring that atmospheric gas testing is undertaken. Refer to the *Safe Working in a Confined Space Procedure* (OHS-PROC-18) regarding confined space entry / atmospheric testing / monitoring protocols.

5.2.10 Underground Services controls

- Only hand tools (i.e. shovels, picks, crow-bars, etc) are to be used when digging within 2 metres of a gas line. Powered machinery or equipment such as jackhammers are not to be used when undertaking digging activities. This requirement may also be extended to other underground services as deemed appropriate for specific excavation activities.
- Following the completion of excavation and trenching work, personnel responsible for coordinating or supervising the work are to ensure that site drawings and underground service maps are accurately updated.

6.0 Contact or damage to underground services

In the event of an underground service being contacted or damaged during excavation activities, the following is to be undertaken.

6.1 Contact or arcing with an underground electrical cable

Should contact be made with an underground cable or arcing occur between the cable and an item of plant and/or employee, the following actions shall be taken

- All work should cease immediately.
- Operator should remain inside cabin. If it is essential to leave the cab or operators station due to fire or other life-threatening reasons, jump clear of the equipment. Do not touch the equipment and ground at the same time. When moving away from the equipment, the operator should hop slowly, shuffle or jump away from the plant (with feet together) until at least 10 m from the nearest part of the plant item.
- Warn all other personnel / public to keep at least 10 m clear from equipment. Do not touch any part of the equipment or load and do not attempt to

approach or re-enter the vehicle until the relevant authorities have determined the site is safe.

- Facilitate First Aid treatment and seek medical aid as required.
- Advise your organisations emergency contact and request they immediately notify the relevant authorities.
- Initiate the emergency management plan and incident investigation process.

6.2 Contact or damage to gas assets

Should an incident occur involving gas assets, the following actions should be taken

- All work should cease immediately.
- Operator is to shut down the plant or equipment UNLESS this process may provide an ignition source for any escaping gas. It is essential to leave the cab or operator station, trench or enclosure and maintain an exclusion perimeter due to the risk of explosion or fire. Do not attempt to use any instrument which may provide an ignition source near the gas escape. This may include mobile phones, two way radios, etc.
- Facilitate First Aid treatment and seek medical aid as required.
- Advise your organisations emergency contact and request they immediately notify the relevant authorities.
- Warn all other personnel / public to keep clear from the worksite and equipment. **DO NOT** attempt to approach or re-enter or start the vehicle until the relevant authorities have determined the site is safe.
- Initiate the emergency management plan and incident investigation process.

6.3 Contact or damage to sewerage assets

Should an incident occur involving sewerage assets, the following actions should be taken

- All work should cease immediately.
- Operator should remove contaminated clothing immediately.
- Shower or wash down with copious amounts of clean water.
- Use eye wash if eyes are contaminated.
- If wastewater is ingested, advice from a doctor should be sought immediately regarding a dose of *immunoglobulin* which can prevent *Hepatitis A*.
- If a person develops symptoms of nausea, vomiting, diarrhoea or fever then a doctor should be consulted immediately.
- Initiate your emergency plan and incident investigation process.

7.0 Installing of new underground services or modification of old underground services

Where new underground services are located on site, on landowner controlled areas, or where the path of an underground service is modified in any way, the following measures are to be implemented to provide future warning to those who may excavate or dig in the area

- the new services are to be entrenched in or filled in with sand or friable soil free of sharp stone, and colour coded marker tape and/or wire is to be located approximately **200mm** above the service.

- the underground services are to be identified via the marker tape/wire colours and requirements as detailed in *Appendix 1*.
- on completion of all excavation work that has involved the installation or modification of site services, updates of all site service drawings to 'As Built' status is to take place as coordinated by TE's *OIC* involved with the work activities.
- Refer to the AS/NZS 3000:2000 Wiring Rules for more details.

8.0 Excavations / Digging operations under the control of a Principal Contractor

Where an excavation and digging operation is within the scope of work of an appointed Principal Contractor on site, the Principal Contractor is responsible for ensuring that the work is undertaken in accordance with the principals of this procedure and in line with the *Queensland Workplace Health and Safety Regulation 1997 Part 17 – Construction Work*.

TE may however, undertake consultation and assist the Principal Contractor by providing TE site-specific information.

9.0 Contractor Management

TE *OIC*'s will provide contractors undertaking excavation and digging work all relevant prescribed information about underground services prior to work commencing. The TE *OIC* is to provide the contractor with details of TE's *Excavation and Digging Documentation* and associated forms.

The TE *OIC* is to monitor the contractor's methods of work and the implementation of the proposed controls to ensure that TE standards for managing excavation and digging activities are achieved by undertaking regular visual inspections of the excavation work area and conducting at least one *Behaviour Safety Audit (T-1133)* during the excavation work.

TE *OIC*s shall request and review the following information

- JSEA/Work Method Statement for any work involving excavation work greater than 1.5m deep that identifies and details controls for excavation collapse, falling objects, being struck by machinery, falling into the excavation and inhaling or being exposed to impurities in the air
- request training and competency evidence of all those contracted workers who will be involved in the work and those operating earthmoving machinery (ie. copies of current certificates, etc)
- details of a competent person who will be directly involved in the supervision of the work and inspection of the excavation where the *OIC* will not fill this role
- request earthmoving machinery inspection and maintenance details (ie. registers/log books/inspection records, etc).
- where the excavation or digging is outside a hardstand area (eg slab or sealed road) a *Land Clearance and Disturbance Permit* should also be requested from the Environment Team (Refer **ENV-PROC-01** Land Clearance and Disturbance).

The contractor supervisor is to undertake, as a minimum, daily inspections of trenches and excavations and details of these inspections are to be recorded (e.g. diary entry or by completing a *Behaviour Safety Audit (T-1133)* if requested to do so by the *OIC*). On a weekly basis the contractor supervisor is to complete *Housekeeping and General Inspection Report (T-1036)* and forward the completed report to the TE *OIC*.

Contractor excavation and digging documentation, daily inspection reports, surveys and other records are to be maintained on site for future reference.

10.0 Competency Requirements

Service location personnel

Service location personnel are to be instructed in relation to the use of service location devices, be familiar with the manufacturer's requirements and experienced with respect to the services that they are routinely required to search for and locate.

Excavator / Earth Moving Equipment Operators

All persons operating excavators and earth moving machinery are to possess the appropriate licences/certification for the specific plant items that they are to be operating on site.

Working Party members

All Working Party members (employees or contractors) involved in excavation work shall receive basic training on the requirements of this procedure. The workgroup coordinator or supervisor shall be responsible for arranging the delivery of the training and recording attendance.

Where proprietary shoring is purchased, training on the use of the shoring should be provided where it is deemed appropriate.

Officers in Charge of Work & PTW Officers

Personnel shall demonstrate their competence in the relevant TE PTW training course before doing the duties of these positions. The PTW Administrator maintains course notes and handouts. Refresher training will be done every 2 years to ensure maintenance of competency.

11.0 Process Improvement

11.1 Measurement and Analysis

A deliberate, intentional breach of this procedure may result in disciplinary action. Any breach will result in an investigation by the OIC and/or the HSE section.

Record keeping requirements are as follows:

- ***Excavation and Digging Authorisation*** and where applicable any *PTW's* required to isolate energy sources - following completion of the work, any *PTW/s* and *Excavation and Digging Authorisation* shall be returned to the site PTW Office for retention in a suitably marked file for a period of at least one month.
- ***Job Safety & Environmental Analysis Worksheet*** – where a *JSEA* has been completed, this is considered a formal risk assessment. On completion of job, send the original copy to Asset Services for registration and filing.
Note The person in charge of the job shall ensure that all work team members involved in the job are informed of the *JSEA* & a copy is kept at the job site.
- ***Training Records*** – The site *PTW Register* contains a listing of all authorised personnel associated with the PTW system. The *PTW Administrator* is responsible for maintaining this register and *PTW Trainers* are responsible for advising the TPS HR Department of the results of competency-based PTW training. *People Services* is responsible for logging training attendance in the Ellipse training database. All training records associated with PTW training shall be maintained for at least 30 years.

11.2 Review

It is the responsibility of the *OIC* and workgroup supervisor to ensure that the provisions of this procedure are being complied with. The workgroup supervisor or delegate shall do at least one *Behaviour Safety Audit (T-1133)* during excavation work and provide feedback to the team on positive recognition and opportunities for improvement.

The *Manager Operations* will nominate a competent person to do a formal audit against this procedure on an two yearly basis. The procedure shall also be reviewed following any significant incident involving failure of the safety systems governing excavation.

12.0 Reference Documentation

12.1 Tarong Energy Documentation and Forms

ENV - PROC - 01	Land Clearance and Disturbance
CORP - PTW - 01	Corporate Permit to Work Manual
OHS - PROC - 100	Working with Heights Procedure
OHS - PROC - 108	Job Safety and Environmental Analysis
OHS - PROC - 109	Hot Work and Ignition Sources in Hazardous Areas
OHS - PROC - 123	Wall Penetration Procedure (DRAFT)
OHS - PROC - 18	Safe Working in a Confined Space
T-1022	Job Safety and Environmental Analysis
T-1036	Housekeeping and General Inspection Form
T-1044	Hot work and ignition sources in hazardous areas Authorisation
T-1117	<i>Excavation and Digging Access</i>
T-1133	Behaviour Safety Audit
TE Drawings	As Built Underground Piping and Cabling Drawings


12.2 External References

AS 1345 Identification of the Contents of Pipes, Conduits and Ducts
AS 2700 Colour Standards for General Purposes
AS/NZS 2648.1 Underground Marking Tape – Part 1: Non-Detectable Tape
AS/NZS 3000:2000 Wiring Rules
Code of Practice - Works (Protective earthing, underground cable systems and maintenance of supporting structures for powerlines)
QLD Workplace Health and Safety Regulation 1997, Part 17
Worksafe Victoria, Guide for undertaking work near underground assets (July 2004)

13.0 Revision History

Rev. No.	Rev. Date	Revision Description	Owned by	Approved by
0	-	Procedure Issued	M. Barry	B. Beasley
1	30.09.1998	Procedure Revised and put into Tarong Energy Format	M. Barry	L. Tellam
2	16.07.1999	Procedure Revised as per Audit Report No. T-AUD-417	R J Kruger	G. Campbell
3	23.02.2003	Include in the procedure the requirement of an Electronic survey.	R J Kruger	W Renshaw
4	21.09.2003	Procedure format revised. Introduction of specific Excavation Permit. Highlighting the requirement of identifying critical services. Procedure raised to Corporate level document.	R J Kruger	W Renshaw
5	30.09.2003	Add Flow Chart.	M. Barry	W Renshaw
6	19.06.2007	Reformatted document, changed terminology i.e. Site Manager to Manager Operations. Removed old flowchart and replaced with function flowchart 1 and 2. Amended Health and Safety Requirements section to reflect excavation work requirements under the Queensland Workplace Health and Safety Regulation 1997 Part 17. Addition of Appendix 1 – Underground service identification Addition of Appendix 2 - What to look for during on site inspection for underground services	M. Barry / M Joy	W. Renshaw
7	06.10.2008	Added reference to <i>Wall Penetration</i> OHS-PROC-123. Changed priority risk to primary risk Planning to Excavate or Dig: changed responsibility from Tarong Energy to OIC Edited procedure to account for Excavation & Digging Authorisation instead of Excavation & Digging Access PTW. Changed procedure from a PTW procedure to an OHS Procedure.	M. Barry & T. Young	W. Renshaw
8	24/08/09	Amended section 5.1 to include process when digging on co-used easements.	T. Young	P. David

Appendix 1. Underground Service Identification (From AS/NZS 2648.1 – Table 1)

Underground Service	Tape Colour
Gas	Yellow
Water	Green
Communications	White
Fire-fighting	Red
Sewerage	Cream
Reclaimed Water	Purple
Electricity	Orange
	 Refer to the <i>Code of Practice - Works (Protective earthing, underground cable systems and maintenance of supporting structures for powerlines)</i> for guidelines on the acceptable methods of identification for the presence of buried underground electric cables and underground control cables.

Note 1: Identification colours for other underground services should be of a bright colour. Guidance may be obtained from AS 1345 and AS 2700

Note 2: The use of the colour canary yellow to identify pipelines containing gases is adopted in AS/NZS 2648.1, as this is the colour commonly used in Australia to identify gas pipes by gas supply authorities and users. It should be noted however, that AS 1345 specifies a colour of light beige for this purpose, this being the internationally agreed colour.

Summary of Underground Service Marking Tape Requirements (From 2648.1)

- **Detection:** Wire lines or traces may also be located with marker tape to enable easy service detection as well as a visual marker to identify service location.
- **Tape Width:** The minimum nominal width is to be 75mm. Preferred nominal widths are 100mm and 150mm.
- **Marking:** Warning lettering printed in the tape is to be black in colour and of a minimum size of 25mm. The text is to be repeated at intervals of not more than 1m.
- **Tear Resistance:** Longitudinal direction – not less than 3.0 N.
- **Transverse direction** – not less than 3.5 N.

 Additional requirements in relation to tape properties are included within AS/NZS 2648.1.

Appendix 2. What to look for during on site inspection for underground services

Prior to any excavation work, check at least 100 m along the road or footpath in each direction and around nearby corners for indications of existing services.

These include

- Indicators or markers for underground services
- Drainage pits and manhole covers
- Damaged footpaths, driveways or depressions which may indicate the presence of a trench
- Cables running up a pole
- Overhead cables near the worksite
- Control cabinets
- No overhead wires to a building or premise
- Above ground connection cabinets
- Light poles without an overhead service
- Service pits for gas, water, electricity, communications, sewerage and drainage connections
- Down pipes or vent poles
- Underground storage tank fill points and venting systems
- Kerb markings
- Water valves
- Fire hydrants and plugs
- Sprinkler systems
- Trap doors or access-covers
 - Access to Underground electricity substations
 - Access to cable jointing pits or tunnels
 - Access to sewerage or stormwater trunks
 - Underground gas regulators, syphons and valve assemblies
 - Access to shafts
- Domestic service pits
- Gas or water metres
- Electricity pillars and metre boxes
- Any other signs out of character with the surrounding area

If such indications exist, the service shall be located by hand or another approved method.