ENVIRONMENTAL IMPACT REPORT

PROPOSED EXTENDED PRODUCTION TEST BY STUART PETROLEUM NL AT ACRASIA FIELD, COOPER BASIN, SA

Prepared for

Stuart Petroleum NL

by

Fatchen Environmental Pty Ltd

Adelaide, July 2002

SP-02-04b

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1. PROPOSED ACTIVITIES

1.1 Introduction

Stuart Petroleum NL proposes an extended oil production test within the Cooper Basin at Acrasia 1 (27º 14' 3.94" S 140º 59' 43.21" E), in PEL 90 (Figure 1). A smaller scale initial production test will already have been performed at Acrasia 1: that initial test was the subject of an earlier Environmental Impact Report (EIR) and Statement of Environmental Objectives (SEO) (Fatchen Environmental June 2002 a,b). The following EIR in most respects is similar to that for the initial production test, the main differences being the increased scale and term of production, and the consequent increase of local and transportation infrastructure, and transport movements.

The extended production test is the second stage in moving to full production:

- Initial production test: a short flow and shut-in operation to set initial reservoir and production parameters. Run over a few hours with limited oil quantities produced
- Extended production test: run for some months at or near expected full production rates. Production-level quantities of oil produced during the test. Some pumping likely to be involved.
- Full production: run potentially for some years at full production rates until reservoir depletion.

Oil produced will be sold at the Acrasia 1 wellhead delivery point. Responsibility for the safe transportation of the oil is the prime responsibility of the transporter, under the *Dangerous Substances Act* 1979 and the *Environmental Protection Act* 1993. However, under the *Petroleum Act* 2000, Stuart Petroleum has responsibility for ensuring minimisation of impacts, and cleanup and remediation of impacts such as transportation spills, within its licence area (PEL 90).

Oil will be transported from the wellhead via double trailer road train or equivalent (approximately 400bbl/train) along the existing Acrasia 1 rig road, via Reg Sprigg 1 well, some 15km distance to the Innamincka-Cordillo public road (Figure 2), and then via the public road system north or south, depending on buyer.

1.2 Extended production test description

1.2.1 Extended production test parameters

Extended production testing will be consecutive in the two formations under test. The stratigraphy is given in the Appendix. Indicative estimates of test duration and daily volumes on present knowledge are as follows:

Sequence	Formation	Indicative duration	Indicative daily volume (Stock Tank Barrels)	
#1	Tinchoo	100 days	800 STBO	All figures are indicative only. The actual course of the test will be determined by ongoing results.
#2	Hutton	100 days	500 STBO	

The course of the extended production test itself may modify both output and duration of testing.

1.2.2 Production and loading installations

Most production test installations will be on the existing Acrasia 1 pad. If minor extension of the pad proves necessary, materials can be sourced from borrow areas already in use or proposed in relation to the upgrade of access, and which have heritage clearances in place. Pad boundaries can be expanded south or east while still remaining in areas already documented in the original Acrasia 1 drilling EIR and subsequently inspected and cleared in relation to heritage issues. An area between the Acrasia 1 pad and the Queensland border may be necessary for turning loops and will not require new pads or pad extensions.

A schematic of holding and loading facilities is given in Figure 3. The schematic is similar to that provided for the initial production test, with the addition of provisions for water-handling.

The stock tanks and well-to-tank delivery systems already installed for the initial production test will continue to be used for the extended production test. The stock tanks are three 370 Bbl skid-mounted frac tanks, manifolded for inflow and outflow. Tanks have been placed on the unlined pad surface, with a common bund provided around them. Tanks are intended to be filled sequentially. On current best estimates, the 1100 Bbl combined capacity will be sufficient for 36-48 hrs production flow.

Delivery to the tanks is by hard pipe from the wellhead. Delivery from the tanks will be hard pipe to a dedicated diesel delivery pump, within its own bund, and then via flexible delivery hose for loading vehicles. All hard pipe is steel and will be pressure-tested.

Filling systems and operation of the storage tanks and the tankers will be in accordance with AS1940 (*The Storage and Handling of Flammable and Combustible Liquids)*. The loading area will be a clay pad, lined, with a further clay cap on the lining for protection and absorption of small spills. For the initial production test, the loading area was unlined in view of the very limited (2-7 total) train fills involved. For the 300+ train fills likely in the extended production test, a higher level of spill protection is warranted.

Flexible delivery pipes have automatic shutoffs and will be fitted with dry-break couplings: spillage is unlikely, or minor at worst when hoses are disconnected. A worst-case spill for these loading arrangements is of the order 1-2L for each trailer filling.

"Speed-hump" bunding will be constructed around the loading area, both as a guard against wash-off of minor spills and as protection against the low risk of catastrophic failure of a road-train compartment during loading. Minor spillages will be either left in place to bio-remediate or land farmed on the pad area. For a catastrophic spillage, oil will be salvaged where possible and the clay cap on the liner either landfarmed on the pad or removed for disposal by arrangement at Moomba.

All installations will be earthed to a common earthing stake, following AS3000 (*Wiring Rules*). Flexible hose will be conductive. Tankers prior to loading will also earth to the common stake.

1.3 Water handling and disposal

The extended production test installation will provide for water handling, although significant water quantities are not expected in the short term. If major water production were to commence during the extended production test beyond the capabilities of the water handling facilities, the zone would be shut in. On that basis, the following should be adequate provision for water handling.

The schematic for water handling is given in Figure 4. Initial water separation will take place in the stock tanks. A fourth, equivalent tank will be provided and used as a dedicated tank for extended time separation of any entrained oil (in effect, an enclosed guard pond), and will be fed by bottom drainage of water from stock tanks. Any separated oil will be pumped back to stock tanks, while the water will be fed by bottom drainage to the equivalent of a weired pondage for final clarification. It is proposed to use the lined turkey's nest dam, of about 1000 Bbl capacity, for this purpose. Any oil which does appear on the surface will be skimmed. The turkey's nest will be fenced to exclude stock. Clean water will be siphoned from the bottom of this pond for disposal. Clean water will be removed from the bottom of this pondage using a breaker siphon, where the siphon is automatically broken if the surface level falls below a given point. The breaker can be set to ensure that all siphon flow stops well before the water surface approaches the bottom offtake.

Three alternatives may each be used for disposal of clean water (<30ppm contained hydrocarbons):

- Disposal via surface line (polypipe or flat pipe) to evaporation/soakage in the existing borrow area at the Acrasia 1 well, with or without stock-proof fencing depending on requirements of the pastoral leaseholder.
- By arrangement and agreement with the pastoral leaseholder, disposal via surface line to a pastoral dam about 1km westward, for use as stockwater.

- Surface spread for infiltration and evaporation on level gibber, utilising perforated pipe or similar means of spreading water to minimise water erosion potential from a single outlet.

1.4 Transportation and other infrastructure

1.4.1 Transportation

Oil produced will be progressively transported by truck to the purchasers' receiving facilities. Purchasers are Santos (receiving facilities in the SA Cooper Basin beyond PEL90) and Inland Oil (receiving facilities in Queensland). The most probable trucking configuration is two-unit road trains with a total capacity of 400bbl per load. Transportation is expected to be via existing roads, including portion of the Innamincka-Cordillo Downs public road, as well as immediate access via the existing Acrasia #1 rig road.

1.4.2 Access infrastructure

The production area will be permanently manned for the duration of the extended production test. Some accommodation facilities will therefore be reinstalled at the former Acrasia 1 drilling camp which has the necessary sewage treatment facilities still in place.

The Acrasia #1 rig road will require upgrading to cope with the envisaged traffic. Carriageways will normally be 6m. Forming will be required on portions of the road to avoid erosion and dust generation problems, and to minimise local transportation risk from uneven surfaces. Much of the road at present is simply rolled gibber on uplands and graded unformed on lower areas. On gibber surfaces, where formation is needed, clay borrow will be laid and formed over the gibber mantle, without the gibber mantle being cut. Drainage lines along the Acrasia #1 access will be crossed at grade. On diffuse drainage in gibber, shallow spoon-drain crossings will be provided to avoid re-direction of diffuse flows by the road formation.

The required borrow for road upgrading will be taken from an existing pit and new pits shown in Figure 5. Borrow pit sites were selected from several possibilities following heritage and biophysical examination.

Indicative vehicle movements for the extended production test duration are expected to be:

Installation	4 loaded, 4 unloaded tail roll truck movements	Tankage delivery
	4 general truck movements	Delivery and installation
Oil transport	2 loaded, 2 unloaded double train movements /day, approx 350 loaded, 350 unloaded total*	Oil delivery and return
Light vehicle	2/day movement	General purpose, crew changeovers; also includes estimate for access road upgrade
Access road construction/ maintenance	20 heavy vehicle movements for construction Minor movements of construction/earthmoving equipment for minor construction work at installation, road maintenance.	Road construction setup and departure. Construction movement will largely be on the Acrasia 1 rig access road.

* On present estimates

1.4.3 Other infrastructure

The production area will be permanently manned for the duration of the extended production test. Some accommodation facilities will therefore be reinstalled at the former Acrasia 1 drilling camp which has the necessary sewage treatment facilities still in place.

1.5 Manning and responsibilities

The test will be manned and overseen on a 24-hr basis. Stuart Petroleum's nominated representative will be responsible for supervision of the initial site preparation, enforcement of vehicle movement limitations, tidiness and cleanliness of the site and access, and supervision and documentation of remediation works. The production-testing contractor will have immediate responsibility for the installation and the testing under the general direction and overall control of Stuart Petroleum. Ultimate responsibility for the road transportation of oil lies with the purchaser of the oil, but Stuart Petroleum will ensure that necessary impact avoidance and emergency response procedures or plans are in place within Stuart Petroleum's licence area.

2. SUMMARY OF LOCAL ENVIRONMENT

2.1 Biophysical environment

The regional context for the area has been described in the Acrasia 1 EIR (Fatchen Environmental 2000), which is provided as an addendum for detailed substantiation. In summary:

- The wellsite and access all lie within the Innamincka Regional Reserve, but in an area where the primary landuse has been livestock grazing. There are no special wilderness or conservation attributes known for the area, other than those which apply throughout the Regional Reserve generally. In particular, all areas lie outside the boundaries defining the areas of the Coongie Lakes Wetlands of International Importance under the 1971 Ramsar Convention. The area is not particularly remote, being at most 15km distant from the main north-south public access and an equivalent distance from major trucking yards to the northwest. The area is grazed by cattle, and a new pastoral dam has been developed near Acrasia 1. The area has been a focus of oil exploration, with seismic surveys intermittently from the 1960's to the late 1990's. There are at present four oil wells in the immediate locality, together with the associated rig road. Wilderness values are affected accordingly.
- Part of the access within PEL 90 is in the Merninie Land System (Marree Soil Conservation Board 1997), which in this area is a gibber land system of long gradual and relatively gentle gibber slopes and drainage lines with small clayey floodouts. Slopes of greater than 1º (>2%) are likely to erode irreversibly if the gibber pavement is disturbed. This imposes limitations on the safe cleanup of spills. The remainder of access is on non-gibber landscapes
- The drainage systems within PEL 90 have no connection to the Cooper Creek system to the south and only tenuous at most connection to the Coongie Lakes to the west (Figure 6).
- There is no record of rare or threatened species under the SA NPWS Act or the EPBC Act about Acrasia 1 or its immediate access. The habitats show no special characteristics which might suggest a heightened possibility of such a species being present: if such species are in fact present, though undetected, they can be expected to be found throughout equivalent habitat in the general area.

The environments along access are as already described for Acrasia 1 (EIR appended). As with the wellsite and its surrounds, the access possesses no characteristics indicating particular conservation significance, or the possibility of particular significance. Hence impact significance and mitigation are generally a matter of "good housekeeping" rather than special protection needs, and in particular, the avoidance of significant transportation spills.

2.2 Heritage

There are no sites or items of non-indigenous heritage present. There is Aboriginal cultural material present in the general area. Production activities are proposed either for areas which have previously been cleared for use, or which were examined on the ground and cleared for use in June 2002 by representatives of the signatories to the CO-98E Native Title Agreement.

3. ENVIRONMENTAL RISKS AND RISK MINIMISATION

3.1 Downhole risks

No downhole environmental risks are anticipated. The main sources of risk have been dealt with in the Acrasia #1 EIR and additions, providing for drill and completion of the Acrasia #1 well. There is understood to be no gas associated with the completed well.

3.2 Risks to the natural environment

3.2.1 Processes creating risks

The primary risks to the natural environment arise from:

- Catastrophic failure of storage facilities, including fire
- Spills during loading
- Spills during transportation
- Impacts of spills extending downslope or downstream beyond the initially affected area
- Hydrocarbon pollution of stock or natural waters
- Deterioration of access under increased traffic and potential erosion issues resulting from the deterioration
- Sourcing of materials for road maintenance
- Limitations on remediation of spill affected areas, particularly on the gibber landscapes.

Other risks to the natural environment appear to be low.

Table 1 summarises possible risks, their avoidance or amelioration, and suggested environmental objectives to be pursued during operations.

3.3 Risk minimisation

3.3.1 Spillages at wellhead

The highest risks of spillages at the wellhead come from road tanker filling operations, and from storage tank overfill. Specific procedures will be developed and implemented to mitigate tank storage, bund compound and road tanker filling overflow risks. These procedures will include requirements for emergency manual isolation of the inflow and outflow, and for the design and integrity management of bund containment systems. In particular, attendance at the equipment will be required at all times during road tanker filling. Active management of storage tank filling will also be undertaken. The site will be manned on a 24 hr/day basis throughout the extended production test.

Bunding will be provided as a secondary containment about the stock tanks (Figure 3). The volume enclosed by the bund will be sufficient to cope with catastrophic failure of all three oil tanks. A major spill into the bund would be pumped out using portable equipment and taken offsite for salvage.

The proposed guard tank (for extended period water separation) will either be included within the stock tank bund or have its own bund, depending on final location.

The bunding is envisaged as sufficient secondary containment not to require additional bunds or catches to avoid spillage into general drainage, or towards the (distant) site accommodation or other ignition sources.

The loading pump will have its own secondary containment bund, both to isolate any pump-related spill and also to limit and simplify firefighting around the pump.

To minimise loss of fluids for production items located outside these bunded areas, the following will apply:

- High containment integrity systems will be used. Steel piping will be used: product containment integrity will be assured by compliance with AS4041 (*Pressure Piping*) and pressure testing to withstand the highest forecast production operating pressures and production conditions.
- Piping and equipment systems will be appropriately routed and guarded to prevent mechanical interference and damage which might cause a lessening of containment integrity. Procedures including signage will be provided to restrict access to only authorised personnel.
- Installation and operation will provide for preventing overpressure from thermal or production shock effects
- Regular inspections will apply
- Systems will be manually operated within their design capability and following appropriate procedure
- The emergency response plan developed for the initial production test will be expanded as necessary and implemented.

3.3.2 Fire

The primary strategy for fires at the storage and loading facility is containment and isolation. The separations indicated in Figure 3 should prevent an escalating event as well as allow for the safe manual use of appropriate shutoff devices. The use of high integrity delivery equipment should limit initial losses.

In an emergency event where an item of plant is on fire, production flows will be manually isolated where it is safe to do so. In the case of a fire associated with the storage tanks, it is intended to simply let it burn out. There will be provision for firefighting first attack using fire extinguishers if the fire is at the loading pump or at the tanker, but if initial attack is not successful, fires in these situations will also be allowed to burn out. Personnel will be evacuated as necessary. Specific procedures will be developed as part of the site's emergency response plan, and approval to accept this plant loss strategy, under AS1940, will be sought from the relevant authority.

Ignition potential will be minimised by providing earthing in accordance with AS3000.

Transportation fires will be left to burn out. Emergency response plans will be drawn up, but the reality of the remoteness of the locality and the shortage of ready water sources and distance away of specialised firefighting equipment mean that, in real terms, a transportation fire which cannot be extinguished with initial attack equipment (truck-mounted fire extinguishers) will have progressed too far by the time major liquids-fire equipment could be brought to the scene. Emergency response plans will, however, provide for the use of earthmoving equipment to contain and extinguish any secondary fires started by the transportation fire.

3.3.3 Hydrocarbon pollution to stock and natural waters

Issues of hydrocarbon pollution arise from disposal of formation water generated during the test; and from transportation spillages.

The proposed handling of formation water generated during the test (Figure 4) provides for:

- Initial separation of water in the stock tanks and its drainage to:

- Further separation in a dedicated extended period separation tank, with any entrained oil returned to stock tanks and clean water sent to:
- Final clarification in the existing turkey's nest dam on the pad, which is lined, with a clean water offtake via a breaker siphon so there is no possibility of any remnant surface oil film becoming entrained in the clean water take off. This dam, the first open-water installation in the sequence, would be stock-proof fenced.

For the limited volumes of water expected in the extended production test, the proposed water handling should result in water with no oil visible (ie <30ppm hydrocarbon content). Production of formation water in quantities beyond those which the proposed system could satisfactorily handle would be reason for ceasing the extended production test within the particular formation. The water output with no visible oil should not pose a threat to either stock or natural waters. One option for disposal is for stock use (section 1.3 above), depending on discussion with the pastoral landholder .

There is a possibility of transportation spills resulting in some hydrocarbon pollution of natural and surface stock waters. The risk will be minimised by not transporting oil in conditions conducive to accidents nor across areas likely to transport spills into water bodies:

- No night movements
- No movement in wet conditions
- No fording of flowing streams

3.3.4 Spill prevention and remediation in gibber

The gibber areas regarded as presenting the highest transportation spill hazard are on the Acrasia #1 rig access road, due to the currently uneven road surface and narrow carriageway. Upgrading of this access will reduce the hazard. Risks will further be reduced by limiting vehicle speeds along the access (40-60 km/hr) as well as prohibitions on tanker and train movements at night or in wet conditions.

Gibber areas present a particular problem in spill remediation if any slope is present. Generally, small spills will have least permanent impact if they are simply left to bio-remediate, as this does not entail disturbance of gibbers. Large spills on flat (<2% slope) surfaces, large enough to require additional treatment, could be land-farmed in place, or contaminated soil removed for landfarming or other disposal elsewhere, but on sloping surfaces such actions will inevitably lead to accelerated and irreversible erosion: the remediation in the long term is likely to have more impact than the original spill. It is proposed to leave large spills in sloping gibber surfaces in place, but provide separation pondages in depositional areas downslope to catch contaminated runoff and sediment. Temporary fencing of a major spill and the catches would be necessary to prevent impact on stock.

3.3.5 Community resources and safety

The estimated 2 road trains per day will have some impact on the Innamincka-Cordillo Downs public road. Possibilities of major damage will be limited by the prohibition of movements in wet conditions.

There will be a marginal increase in public risk from the presence of oil tankers. Adherence to legislation governing transportation provides the main risk mitigation. Signage warning of trucks entering will be placed at the intersection of the Acrasia access road and the Innamincka-Cordillo Downs road.

3.3.6 Aboriginal heritage

Risks to Aboriginal cultural heritage relate first to the sourcing of materials for road upgrading, and secondly to damage incurred in the cleanup of transportation spills. All installations and transport routes are on areas already cleared for use by representatives of the signatories to the CO-98E Native Title Agreement.

Potential borrow areas were examined on the ground in June 2002 by representatives of the signatories to the CO-98E Native Title Agreement. Of a multiple of sites examined, those indicated in Figure 5 were cleared for use, in some cases with specific instructions on alignment and access.

3.3.7 Non-indigenous heritage

In the absence of any particular non-indigenous heritage items or relationships, the activities pose no risk to non-indigenous cultural aspects.

4. SITE CLEANUP AND REMEDIATION

The area is expected to develop into a producing field, and either the equipment and installations will be maintained into full production, or replaced by equivalent or larger equipment and installation. In the event of not proceeding to production, remediation or rehabilitation of the initial production test site will simply become incorporated with the eventual completion or rehabilitation of the Acrasia #1 pad, as described in the Acrasia #1 EIR.

5. REFERENCES

Marree Soil Conservation Board (1997) "Marree Soil Conservation Board District Plan" ISBN073084203 7

Fatchen TJ (June 2002a) "Environmental Impact Report: proposed petroleum production test by Stuart Petroleum NL at Acrasia 1 (27º 14' 3.94" S 140º 59' 43.21" E)" Prepared for Stuart Petroleum NL by Fatchen Environmental Pty Ltd Adelaide, June 2002 SP-02-04

Fatchen TJ (June 2002b) "Draft Statement of Environmental Objectives: Initial Petroleum Production Test by Stuart Petroleum NL at Acrasia 1 (PEL 90, Cooper Basin)" Prepared for Stuart Petroleum NL by Fatchen Environmental Pty Ltd Adelaide, June 2002 SP-02-04a

Fatchen TJ (2000) "Declaration Of Environmental Factors & Environmental Impact Report: proposed petroleum exploration drilling by Stuart Petroleum NL at Acrasia 1 (27º 14' 3.94" S 140º 59' 43.21" E) " Prepared for Stuart Petroleum NL by Fatchen Environmental Pty Ltd Adelaide, June 2000 SP-00-01

Table 1: Risks, impacts and management in relation to environmental objectives

Environmental objective	Possible impact	Main sources of risk	Avoidance, management, mitigation
Avoid disturbance to sites of Aboriginal and non-indigenous heritage significance	Intrusion or physical site damage to areas of Aboriginal and non-indigenous heritage significance	Access upgrades and maintenance, construction, vehicle and people movement	Use of existing access limits scope for impact. New construction if any on areas adjoining or close to existing pads, cleared for use by indigenous stakeholders. Construction is entirely on existing pad. Borrow for road construction and taken either from existing borrow sources, or from new sources cleared by indigenous stakeholders.
Minimise disturbance to vegetation and habitat	Physical damage to soils, vegetation and habitat; fires; oil spillage	Access upgrades; natural limits on rehabilitation; fires at well or in transit; spillages and spread of spilled oil	Use of existing access; upgrade of Acrasia 1 access to reduce erosion risks from breakup of rolled or other surfaces under additional traffic. Borrow for maintenance taken either from existing pits, or from sources checked for low erosion hazard and vegetation or habitat significance See procedures to limit risks of spills, under "Avoid spills" (below)
Minimise soil impacts Minimise disturbance to gibber surfaces	Accelerated soil erosion. Potential start-up of long term irreversible erosion on gibber slopes >2% Road formation creating water interception problems.	Access deterioration Drainage associated with new road formation	The recent drilling by Santos at Reg Sprigg 2 and by Stuart Petroleum at Acrasia 1 has necessitated construction of formation on parts of the existing Reg Sprigg 1 access road to stop dust generation and widening of the right of way by vehicles avoiding dust. Maintenance of the formation will be necessary to avoid recurrence of major dust formation. Upgrading elsewhere may also be necessary to permit increased traffic. On gibber areas, formation developed by laying clay directly over gibber mantle without cutting the mantle, to avoid drain-initiated gullying. Obvious drainage crossed at grade, and shallow spoon drains provided to minimise redirection of overland flow by formation. Existing access route will be followed; other risks minimised accordingly. Borrow taken from level or near-level areas.
Avoid disturbance to rare, endangered, vulnerable species	Oil contamination	Oil loading spills; transport spills	No such species known to be present along access within lease area; if present, then associated with common habitat and can be expected to be widespread in district.
Avoid impacts on high biological value or wilderness value areas	Oil contamination in high biological or wilderness value areas; fires originating from oil spillages extending into high value areas	Oil loading spills; transport spills; secondary fires from transportation fires	No high biological value areas within lease near access. Four oil wells/wellsites in the immediate vicinity, together with pastoral dam construction and proximity to Cordillo Downs-Innamincka road limit wilderness values. There is only a tenuous downstream connection at best between the lease area and the Ramsar "triangle". Over most of the lease roads, the carriageway is normally sufficiently distant from drainage lines for even extreme events such as complete single road train spill not to reach watercourses, other than at immediate crossings

(Table 1 cont...)

Environmental objective	Possible impact	Main sources of risk	Avoidance, management, mitigation
Avoid storage and loading facility spills; rapid cleanup and impact minimisation following spills	Pollution through local oil spills, tank or filling point overflows	Oil storage, pumping, loading facilities	High containment integrity systems using steel piping and complying with AS4041 *Pressure Piping.* Piping pressure tested to the highest forecast production operating pressures and production conditions. Tanks bunded with bunds sufficiently large to provide for catastrophic tank failure. Delivery pump and manifold(s) separately bunded to cope with local failure Hard-piped to pump and loading point. Loading area to be lined, over clay pad, over gibber surface. Flexible hose with cutoffs for train loading; any minor spillages at loading point to be left to evaporate and bio-remediate. Excessive contamination of surface clay (over liner) landfarmed on other portions of pad or removed for disposal at Moomba. Major spills will be held by lining and bund, salvaged by pumping. Procedures in place for minimising overflow and loading spill risks, and integrity management. Attendance at equipment at all times during road tanker filling. Active management of storage tank filling. Filling systems, storage tank operation and tanker procedures in accordance with AS1940 *The Storage and Handling of Flammable and Combustible Liquids*
Minimise fire risk at facility; prevent the spread of any fires to wellhead	Loss of resource (also OH&S considerations not covered in this EIR)	Spillage, overflow, ignition sources	Minimisation of ignition potential through earthing facility and tanker in accordance with AS3000. Containment and isolation of fires. Maintenance of separation distances of well, tanks, pump and tanker to avoid escalating events and to allow manual shutoff/isolation of fuel. Bunding as above. First attack extinguishers present for fires at loading pump or at tanker. Tank fires, or fires where first attack failed, allowed to burn out (approval will be sought under AS1940)

(Table 1 cont...)

Environmental objective	Possible impact	Main sources of risk	Avoidance, management, mitigation
Avoid transportation spills; minimise the likelihood of spread of a transportation spill; minimise impacts of fire from any transportation spill	Pollution through transportation oil spills; spread of spills; secondary fires from transportation fire	Road crashes, movement in unsafe (eg wet) situations, spillage in periods or locations where oil can be easily spread, particularly wet areas and flowing watercourses.	Procedures to limit risks of major spill, or to remediate, to include: --Full trains will only move in daylight hours --No movement on wet roads or in wet conditions --No "wet wheel" fording of flowing watercourses --Speed limitations on vehicle movement on the Acrasia #1 Access road (40-60 km/hr) In the event of a spill in transit within the lease area, contaminated soil on sandplain or dune will be either landfarmed in place for bio-remediation, or in extreme cases removed for pit disposal. Contaminated soil from spillage at a watercourse crossing will be removed Purchaser/transportation company will be required to have spill contingency and emergency response plans in place, and conform to Dangerous Substances Act 1979 and Environment Protection Act 1993 Actual transportation fires permitted to burn out. Earthmoving equipment will be brought to a transportation fire to contain and extinguish secondary fires resulting.
Minimise adverse impact on livestock; Avoid contamination of stockwaters with hydrocarbons	Interference with stock; pollution of stock water	Formation water disposal with hydrocarbons present polluting stock water	Formation water separated and cleaned through --initial separation in frac tanks --extended time separation of entrained oil in a dedicated tank --final clarification in fenced, lined turkey's nest, with takeoff via a breaker siphon to prevent any remnant surface film reaching outlet Disposal of cleaned water, in consultation and agreement with pastoral leaseholder, by one or more of: --evaporation/soakage in existing borrow pit at Acrasia #1 --transfer via line to pastoral dam for use as stock water --surface spread for infiltration and evaporation on level gibber, utilising perforated pipe or similar means of spreading water to minimise water erosion potential.

(Table 1 cont...)

Environmental objective	Possible impact	Main sources of risk	Avoidance, management, mitigation
Minimise visual impacts	Visual impacts through obtrusive access and development and/or visible long-term persistence of facility and access.	Access and facility construction	Access already exists, visual alterations due to formation construction are incremental only. Facility is out of sight and most access is masked from the Innamincka-Cordillo Downs road.
Minimise public and third party risks Minimise workforce hazards	Creation of new public and workforce risks: road train collisions, spills, fire	Oil transport; fire hazard at loading point	Signage on rig road/public road intersection prohibiting entry, warning against trespassing, and warning of danger associated with petroleum activity and truck movements. Limitations on road train movements as above. Protection of wellhead by cutoff valves. Firefighting provisions (extinguishers) for loading area and pump bunded area. Separation of wellhead, pump, tanks and loading sufficient for isolating major fires. Fully earthed storage and loading facilities.

6. FIGURES

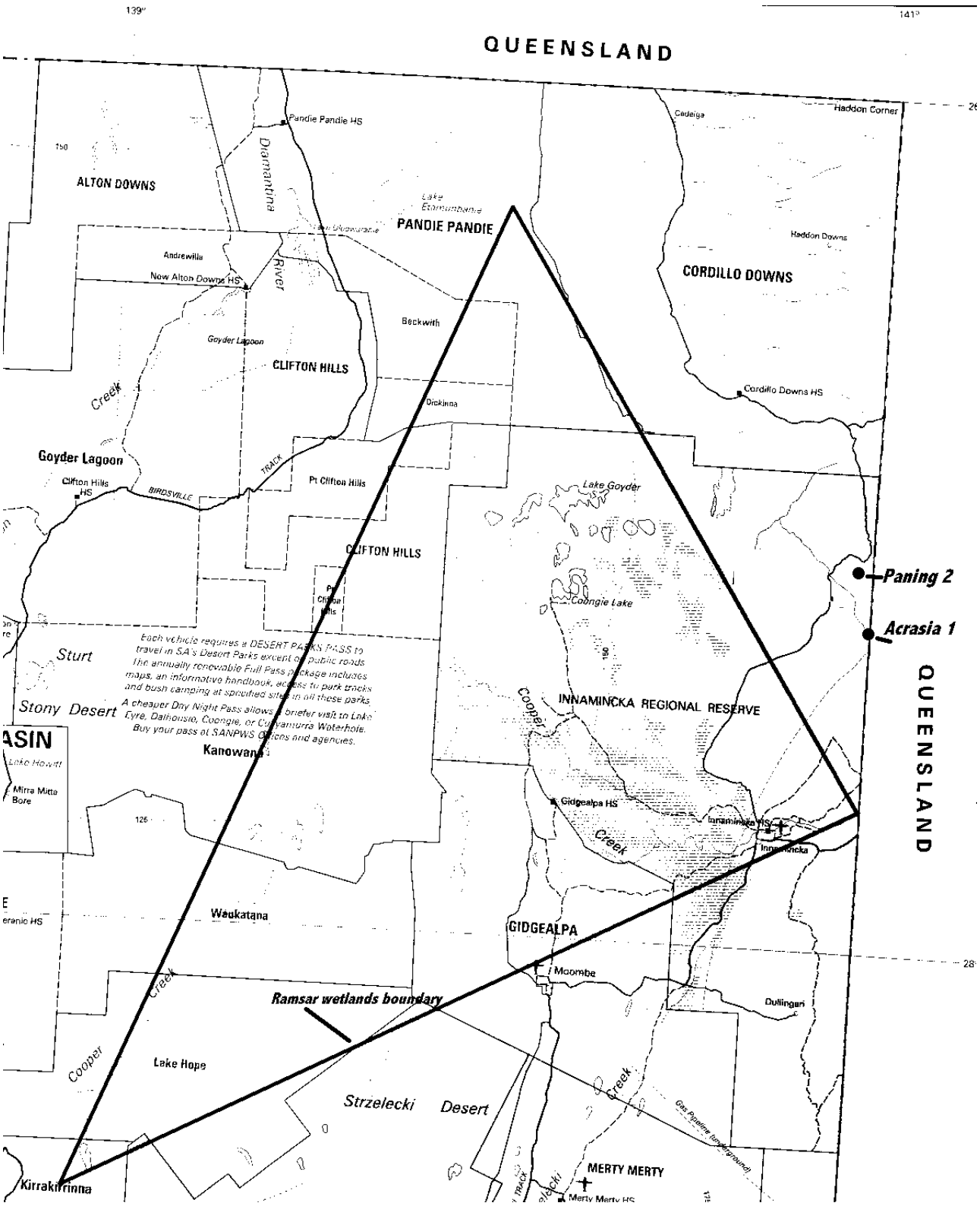
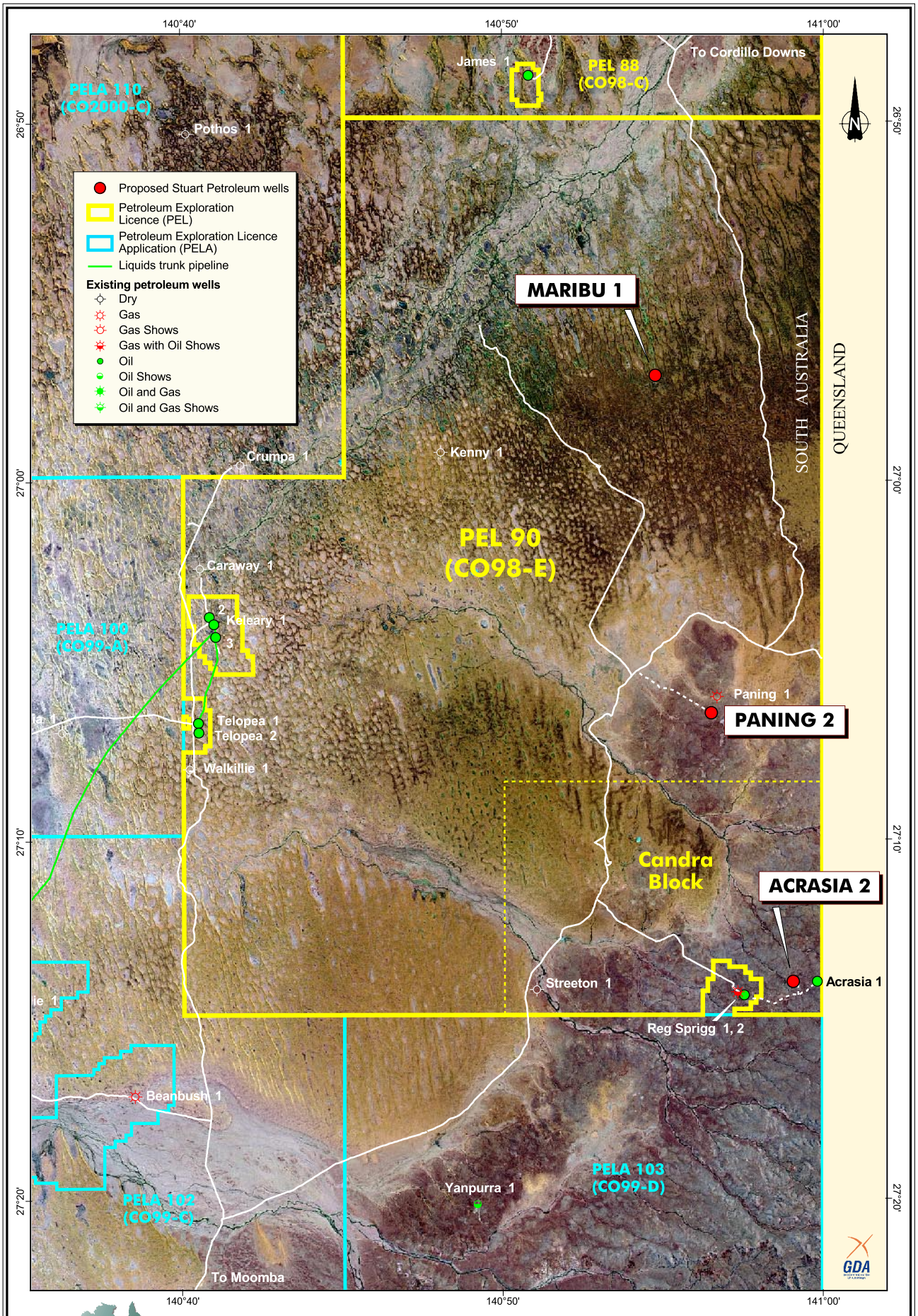


Figure 1. General location of Acrasia 1 wellsite in relation to Innamincka Regional Reserve, Ramsar Wetlands and local infrastructure. (Map base: DENR Pastoral areas 1:250000, 1993)

Figure 2. Local infrastructure and roads (PDF file image: 482-2345.pdf)


140°40'
140°50'
141°00'
26°50'
27°00'
27°10'
27°20'
Proposed Stuart Petroleum wells
Petroleum Exploration Licence (PEL)
Petroleum Exploration Licence Application (PELA)
Liquids trunk pipeline
Existing petroleum wells
Dry
Gas
Gas Shows
Gas with Oil Shows
Oil
Oil Shows
Oil and Gas
Oil and Gas Shows
PELA 110 (CO2000-C)
Pothos 1
James 1
PEL 88 (CO98-C)
To Cordillo Downs
MARIBU 1
SOUTH AUSTRALIA
QUEENSLAND
Kenny 1
Crumpa 1
PEL 90 (CO98-E)
Caraway 1
Keleary 1
2
3
PELA 100 (CO99-A)
Telopea 1
Telopea 2
Walkillie 1
Paning 1
PANING 2
Candra Block
ACRASIA 2
Acrasia 1
Streeton 1
Reg Sprigg 1, 2
Beanbush 1
PELA 102 (CO99-C)
Yanpurra 1
PELA 103 (CO99-D)
To Moomba
GDA
STUART PETROLEUM NL ACN 059 146 226
0 2 4 6 8 10 Kilometers
Datum GDA94- Map projection MGA Zone 54
GeoTech Graphics 482-2345
Cooper Basin - South Australia
PEL 90 (CO98-E) over Landsat 5 Image
REGIONAL INFRASTRUCTURE

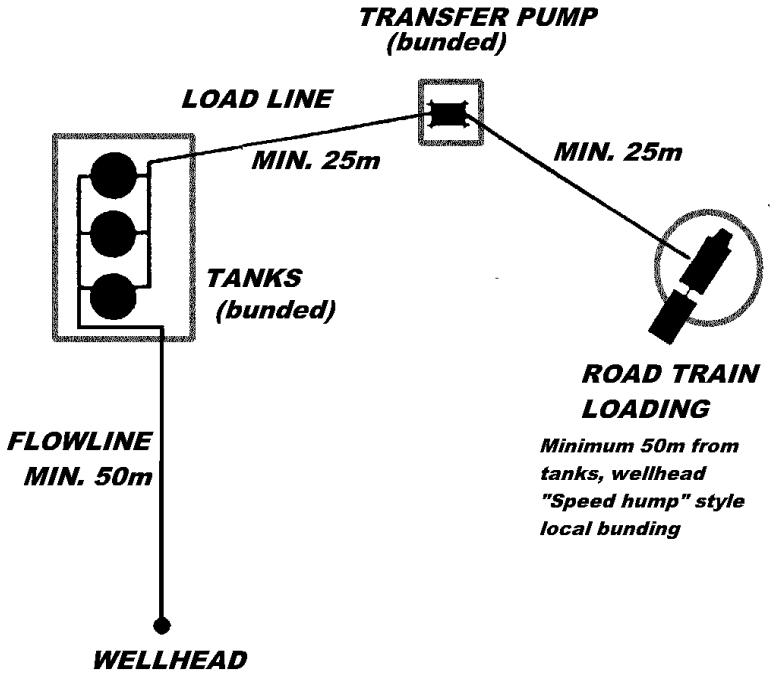


Figure 3. Schematic of loading station

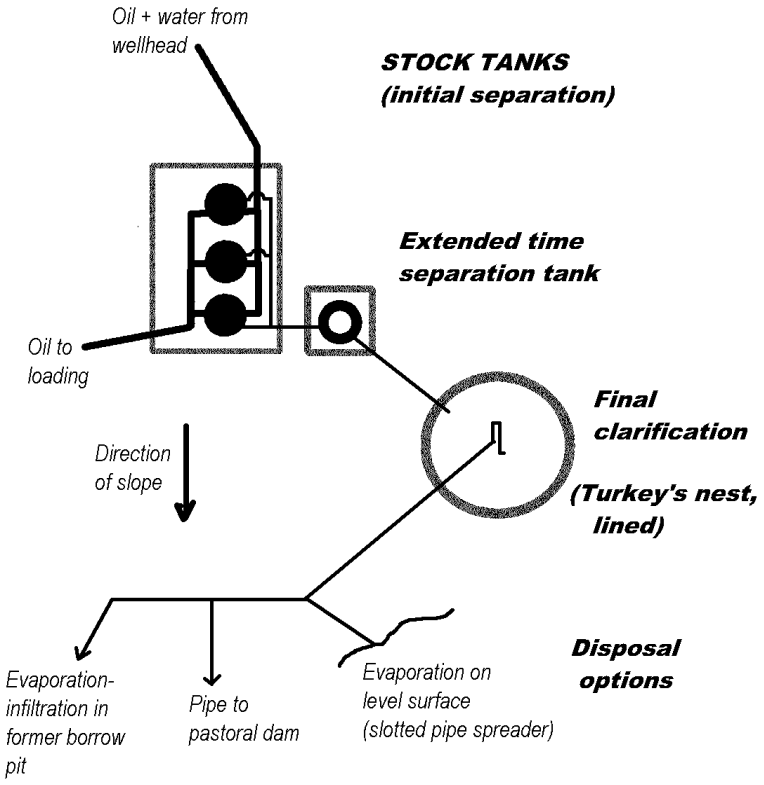
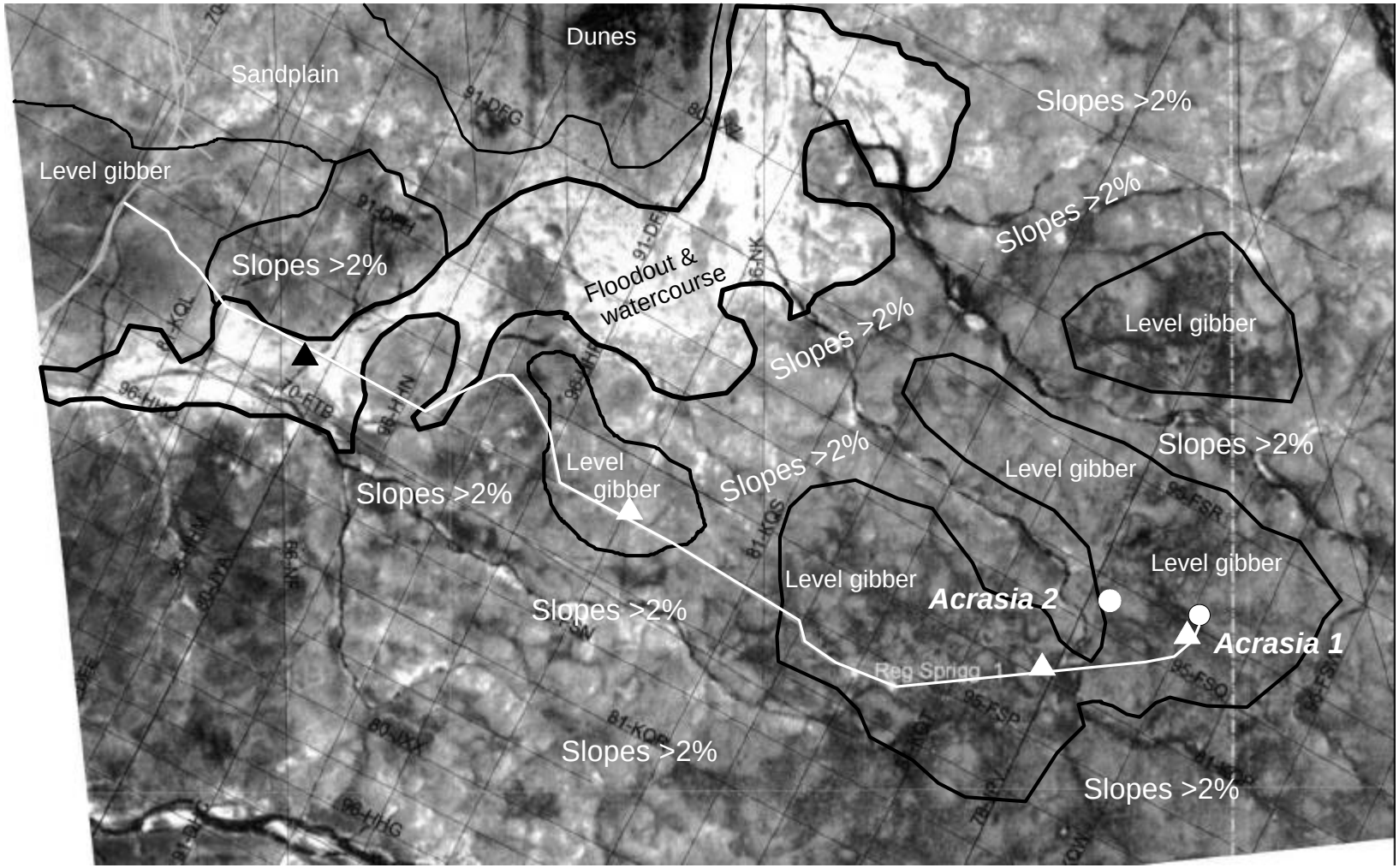


Figure 4. Schematic of formation water disposal

Figure 5. General location (filled triangles) of borrow areas cleared for heritage purposes along Acrasia 1 rig access.



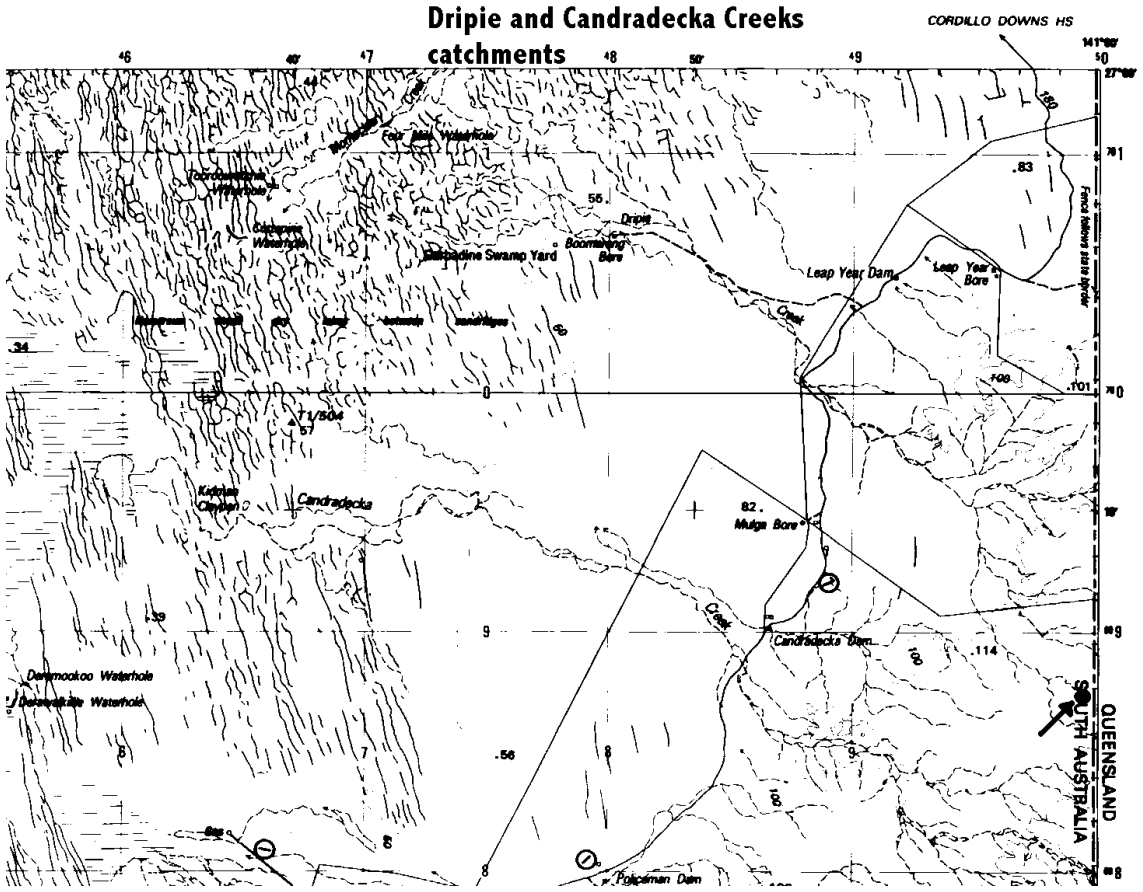


Figure 6. Dripie Creek and Candradecka Creek catchments showing location of Acrasia #1 (arrowed) ***(Natmap SG 54-14)***

7. APPENDIX: WELL STRATIGRAPHY AND CONSTRUCTION OUTLINE

Tinchoo and Hutton formations for production testing indicated

Stuart Petroleum

Well: Acrasia # 1

Stratigraphic Column