

DEPARTMENT OF MINES  
SOUTH AUSTRALIA

GEOLOGICAL SURVEY  
HYDROLOGY SECTION

"CONTROL OF GROUND WATER SUPPLIES"

by

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DEPARTMENT OF MINES.  
SOUTH AUSTRALIA.CONTROL OF GROUND WATER SUPPLIES.

Although all civilised countries throughout the world have introduced legislation in some form or other to control the exploitation of the natural resources such as mineral wealth, forests, wild life and surface waters within their borders, legislation to conserve and control the usage of ground waters has not generally been introduced in a comprehensive form, except in isolated cases where a crisis has precipitated the necessity for action in controlling and conserving water supplies for the benefit of the community concerned.

Reasons for such an apparently apathetic attitude may be ascribed to:-

1. Sufficiency of surface water supplies.
2. Sparseness of population.
3. Ignorance or lack of realisation of the potential value of ground water resources.

Some countries may be geographically or topographically fortunate in that the natural rainfall is conserved in surface catchments to provide the entire water needs of the populace. Other countries, states or regions may be so sparsely populated that the need for water control, both surface and ground, has not arisen.

Thirdly, and of paramount importance, is the general lack of understanding and appreciation of the value of ground water as a natural asset.

Changing circumstances, can, and have, in each of these cases, awakened communities to the necessity for dependence upon ground water resources.

In the case of South Australia, a large proportion of which is comparatively arid and low in rainfall, the increase in population and heavier demands of the pastoral industry for water supply is fast reaching a stage when legislation to conserve and

control ground water usage in some areas must be introduced for the communal good.

Chief among the hazards of uncontrolled exploitation of ground water supplies are depletion of supplies and pollution of storage zones and basins, or a combination of these hazards. Equally dangerous in some areas is the indiscriminate drilling of bores, faulty construction and unscrupulous abandonment of unsuccessful bores by unwittingly incompetent drilling, over which no control can, at present, be exercised.

Experience in other countries has shown that in regions dependant upon ground water supply, where there is more arable land than can be watered from supplies available, some measure of control is necessary to prevent depletion of the ground water supplies.

In many cases this is effected by appropriation of the waters in a proclaimed area by the controlling authority. Claims of landholders for enlargement of existing, or commencement of fresh ground water developments are adjudicated by the controlling authority.

Legislation governing the operation of well drillers is essential to the satisfactory operation of any form of control. In addition to permits for the drilling of each bore to prevent over development in a proclaimed area, all work must be done in accordance with specifications governing the proper drilling, casing, cementing, repairing and plugging of bores to prevent wastage, leakage and possible pollution of the ground supply.

Existing legislation (in Australia at present) is designed principally to control the artesian waters of the Great Artesian Basin in New South Wales, Queensland and South Australia, the three States in which this artesian water is utilised.

In Queensland and New South Wales legislation controlling ground water supply embraces within limits, ground water other than artesian, but in South Australia legislation is confined to waters of the Great Artesian Basin.

Summarising, the existing legislation in each State is as follows:-

New South Wales.

The Irrigation Act of 1912-1944, the Water Act of 1912-44 Part V, and the Farm Water Supplies Act of 1946, apply to the conservation and proper use of ground water supplies in proclaimed districts throughout New South Wales. These Acts are administered by the Water Conservation and Irrigation Commission of N.S.W.

In both central and western districts a licence is required to drill to a depth of 100 feet or more for water.

Where a bore is constructed within the area of the Great Artesian Basin, but only for shallower supplies than the aquifer, the same type of licence is issued, and a limitation placed on the depth of drilling.

If a bore is to penetrate into the aquifers of the Great Artesian Basin, a separate type of licence is required which specifies the conditions of construction and the use of the water. Such a licence is not issued for all bores in the Western Division but only for those reaching the aquifer. The amount of water that can be extracted per day from an artesian bore is also restricted by the licence. Construction of bores must conform to specifications laid down by the Commission and construction reports supplied by the driller. Drillers are not licensed.

Queensland.

The Water Act of 1926-42 Section 4, Part II apply to the usage and control of both surface and ground water, and is administered by the Irrigation and Water Supply Commission.

Control is exercised over artesian and sub-artesian bores, and all drillers must be licensed to drill any type of water bore.

South Australia.

The Pastoral Act of 1936, Section 103-112 is designed to control the construction of artesian bores on pastoral leases, and is controlled by the Minister of Lands. A permit is necessary to construct or alter an artesian bore which must conform to certain specifications laid down. No control is exercised over the drillers, nor is a drilling licence necessary.

The Loans for Water Conservation Bill No. 53 provides

assistance to ex-servicemen settlers in the provision of ground water supply.

The prospects of obtaining ground water supplies are advised only by the Government Geologist. No other controls are exercised over the ground water supplies within the State.

#### Victoria.

Act No. 5396, Section 11, provides that notice in writing must be given to the Minister of Mines of any bore, well or shaft sunk for obtaining water, and a record of the strata cut be furnished to the Minister of Mines.

Exceptions are the sinking of wells and bores on private property.

No other control is exercised over ground water supplies.

#### United States.

Control of ground water supply (upon which 50% or more of the population depend) in the United States is exercised in some degree by at least forty of the forty-eight States. The degree of control ranges from limited control of public water supplies only, to complete control of all ground water supplies, drilling operations and drilling personnel. The States of Arizona and New Mexico, both arid regions of low rainfall, and principally dependent upon ground water supply, may be regarded as foremost in the degree of control exercised over ground water supplies.

To convince those sceptical of any communal benefit or advantage that might be gained by the introduction of hydrological legislation it must be made clear that the objective in no way usurps existing rights of landholders, nor is any financial gain from licences, permits or other means contemplated, but rather an extension of free public service to the community, in that the mass of hydrological information now denied the Government in the haphazard construction of bores by any person so inclined will be available, collated, and put at the service of the public.

Such a service is not brought into being overnight but requires years of study and observation in order to interpret the hydrological characteristics of the ground water resources of a region.

This is well illustrated in the United States, where States with comprehensive hydrological control are able to furnish hydrological maps of any ground water zone within the State and give with some degree of certainty, what characteristics might be expected with regard to water flow, quality and depth in any locality.

Other benefits equally important resulting from control of ground water resources are the prevention of wastage from defective bores, and the prevention and rectification of pollution problems.

Wastage occurs in many ways, but chiefly from artesian bores, flowing uncontrolled, badly capped, or through defective casing, and from sub artesian sources pumped continuously to waste in surface tanks or catchments.

Pollution is caused primarily through lack of understanding of the hydrological characteristics of a particular water bearing zone, where faulty drilling technique results in leakage of saline waters into fresh water aquifers, and again by overdrawing of supplies from a particular zone, permitting replacement by foreign undesirable water. These mistakes have occurred in other countries dependent upon ground water supply with disastrous results, and in some cases have taken critical years of rectification. The same mistakes have occurred in some measure in this State, and if allowed to continue unchecked and uncontrolled could quickly result in the ruination of the ground water supply in some localities.

Legislative measures envisaged to cover control of ground water supplies in South Australia are:-

1. The obtaining of a permit for construction, repair, etc. of any water well in South Australia exceeding 100 feet in depth, or any drainage well for disposal of effluent other than storm waters.
2. The registration and licensing of all percussion drillers throughout the State.
3. The compulsory furnishing of all hydrological and constructional information relating to such wells.
4. The administration of the necessary legislation to be under the control of the Director of Mines.

5. The formation of an Appeal Board comprising three members drawn one each from -

- a. Engineering and Water Supply Department.
- b. Lands Department.
- c. Private Boring Contractors.

The Appeal Board to be sole arbiter on all disputes arising in connection with the legislation.

6. The declaration and designation of critical ground water areas where ground waters may be jeopardised by over-production or pollution, and or where emergency measures may be necessary to try to preserve the water supply.

11-10-55.

DEPUTY DIRECTOR OF MINES.

GROUND WATER ACT OF 1955.

Under this Act the control of all ground water is to be vested in the Crown.

An act relating to ground water; declaration of public policy for regulation of its development and use; the designation of critical ground water areas; the control of subsurface drainage and prevention of pollution of ground water.

Section 1.

Short title - This Act may be cited as the Ground Water Act of 1955.

Section 2.

Definitions - In this Act, unless the context requires otherwise -

Ground Water means water under the surface of the earth regardless of the geological structure in which it is standing or moving.

Ground Water Area is any area from which ground water may be withdrawn, and constitutes the entire earth surface within the State boundaries.

Critical Ground Water Area, is any defined subdivision of the ground water area not having sufficient ground water to provide a reasonably safe supply for purposes required, or where there exists a danger of contamination or pollution of the supply from any source.

Permit means a permit to construct and operate a well or other works for the withdrawal of ground water.

Person includes an individual, firm, public or private corporation or government agency.

Owner of Land means any person in whom legal title to real property is vested or any person having an equitable interest in real property.

User of Ground Water means any person who is putting ground water to a beneficial use.



Well shall mean any excavation or opening, bored, drilled or dug or made by jetting or driving or any other artificial way for oil, gas, water or for drainage purposes.

### Section 3.

#### Declaration of Policy.

South Australian Geological Survey Reports based on studies over a number of years indicate the limited nature of ground water basins, and that in a number of such basins the situation may arise where water could be withdrawn at a rate exceeding the safe annual yield, or salt water or noxious effluent or waste permitted to contaminate the good quality aquifers, to the serious injury of the general economy and welfare of the State and its citizens. It is, therefore, declared to be the public policy of the State in the interests of the general economy and welfare of the State and its citizens to conserve and protect the ground-water resources of the State from destruction, misuse (or contamination), and for that purpose to provide reasonable regulations for the control of ground-water usage and designation and establishment of such critical ground-water areas as may now or hereafter exist within the State.

### Section 4.

#### Administration.

This Act shall be administered by the Director of Mines or his representatives. The Director of Mines, in the administration thereof, shall have the authority and it shall be his duty:

- A. 1. To adopt, publish and make available to the public such reasonable rules and regulations, not in conflict with this Act, as may be necessary for the administration thereof.
2. To render any assistance necessary to the Geological Survey of South Australia to enable it to compile and maintain records of the various ground-water basins and subdivisions in the State, together with factual data as to yields and uses in such basins and subdivisions, to the end that the public may have an opportunity to understand their ground-water resources and what steps are necessary to obtain maximum beneficial use therefrom.

3. Direct such officers as may be appointed for the efficient administration of the provisions of this Act.

4. To co-operate with any agency of the Commonwealth, or States, or with any person as may be necessary to carry out the provisions of this Act.

B. 1. Any officer charged with administration of this Act may enter at reasonable times upon the lands of any ground-water basin or subdivision where a well or other works for the withdrawal of ground-water are located, for the purpose of examining any well or works, subject to the provisions of this Act, and for the purpose of obtaining factual data in any ground-water basin within the State of any subdivision thereof.

#### Section 5.

##### Application for permit to construct, alter, repair, etc. a well for water supply purposes.

1. No person shall construct, alter, repair, clean or deepen any well exceeding 100 feet in depth without a permit therefor. A person proposing to construct, alter, repair any such well shall make application to the Director of Mines for a permit authorising the construction etc. thereof. The application shall be on the prescribed form available at the office of the Director of Mines.

2. No permit shall be required for the completion of any well substantially commenced, or for the construction of any well, an uncancellable and binding contract in writing for the construction of which shall have been made and entered into, prior to the effective date of this Act; provided, however, that the well or other works for the withdrawal of ground water thus substantially commenced or under contract for construction shall be completed within 1 year from the effective date of this Act.

3. A permit shall not be required for any well constructed for water supply purposes, of a depth not exceeding 100 feet, except in critical ground water areas as designated by the Director of Mines.

Where doubt exists as to the ultimate depth of a bore the owner

is responsible for ensuring the necessary permit is obtained.

#### Section 6.

##### Application for permit to construct, alter, repair a well for drainage purposes.

A permit must be obtained before the disposal underground of any effluent or trade waste, excepting storm waters, by means of a well, regardless of the proposed depth.

#### Section 7.

##### Issuance of Permit.

The Director of Mines shall consider such evidence as deemed necessary to decide whether a permit shall be approved in existing or modified form or refused. When a permit is refused by the Director of Mines and no appeal lodged, an identical application will not be considered for a period of one year. A permit will expire 12 months after date of issue unless satisfactory proof is forthcoming to substantiate an extension of time.

Appeals will be dealt with by Appeal Board as in Section 15 hereafter.

#### Section 8.

##### Well Driller's Licence.

1. Only such persons as have been issued with and are in possession of a current well driller's licence will be permitted to construct, alter, repair, etc. any well within the State boundaries, for which a permit to construct is required.

2. Such licence will be issued firstly to persons producing satisfactory evidence of being actively in charge of well boring operations at the time this legislation is promulgated, and, subsequently to all persons satisfying the Director of Mines of their drilling capabilities.

3. Licences are renewable on the last day of each year for an annual fee of five shillings. Licences revoked cannot be re-applied for under a period of 12 months. The Director of Mines is empowered at any time to revoke or suspend the licence of any driller proved by his appointed officers to be incompetent or negligent in carrying out well drilling operations, or intentionally making a material mis-statement of fact in applications for

a licence or in furnishing a drilling report or wilfully violating any of the prescribed rules or regulations.

4. A provisional licence may be issued to an unlicensed driller where a licensed driller maintains close supervision of boring operations and accepts full responsibility.

5. Drillers will be licensed under two categories - firstly A. class for all types of wells including Artesian wells and secondly, B. class for all wells excluding Artesian wells.

#### Section 9.

##### Change of Location of Well.

The holder of a permit desiring to materially change the location of the well thereby authorised shall make a further application for a fresh permit, which shall be decided by the Director of Mines.

#### Section 10.

##### Reports.

Within 30 days of completion of construction of any well in compliance with the terms of the permit therefor, the driller shall furnish details required to the Director of Mines on the prescribed form.

#### Section 11.

##### Designation, alteration or dissolution of Critical Ground-Water Areas.

The Director of Mines is hereby authorised and it is his duty from time to time as adequate factual data become available justifying such action, to designate or abolish critical ground-water areas, and as future conditions may require and factual data justify, to alter the boundaries thereof. Such action may be taken either on his own motion, or by petition to him signed by not less than 20 or  $\frac{1}{4}$ , whichever is the less number, of users of ground water within the exterior boundaries included in the proposed Critical Ground Water Area.

2. Before designating or abolishing the proposed critical ground water area or altering the exterior boundaries thereof, notice of such intention will be given by the Director of Mines, and shall include -

(1) The legal description of the lands proposed to be included in such critical ground water area. Such notice clearly describing all lands proposed to be included in such critical ground water areas, shall be published in the S.A. Government Gazette, three weeks clear ahead, and once per week for three successive weeks in a newspaper of general circulation in which said lands are located, and also in a newspaper of general circulation throughout the State. The publication of such notice when completed shall be deemed to be sufficient notice of such intention to all interested persons.

(2) Any interested person may lodge an objection to such intention within 30 days of the publication of the final notice. Any such objection will be referred to the Appeal Board, which shall arrange a public hearing within 30 days on receipt of such appeal at which all persons lodging objections may present evidence either orally or by document.

3. After the conclusion of such public hearing the Board shall make and file in the office of the Director of Mines, written findings of fact with respect to the designation or abolition of the proposed critical ground water area, or alteration of exterior boundaries of existing critical ground water area considered during such public hearing. If the Board shall in such findings of fact conclude to designate or abolish a critical ground water area, it shall make and file in the office of the Director of Mines an order designating or abolishing such critical ground water area, or altering the boundaries pursuant to such findings. Such finding of fact and order shall be published in the S.A. Government Gazette and shall be final and conclusive.

4. All factual data and evidence taken, together with a copy of the findings of fact and an accurate map locating and describing the lands included in such critical ground water area shall be and remain a public record in the office of the Director of Mines, and shall, at all reasonable times be made available for examination

by the public.

5. Any order of the Director of Mines issued pursuant to this Act may be altered, modified or dissolved in the manner and at such times as provided in this section for the designation or alteration of a critical ground water area; provided, however, that no petition to abolish a critical ground water area shall be received by the Director of Mines within a period of 1 year following a rejection of an identical petition.

## Section 12

### Measures to be adopted in Critical Ground Water Areas.

Where critical ground water areas have been duly designated the Director of Mines is empowered, and it shall be his duty, to take such action as he deems necessary, to preserve the ground water from exhaustion or pollution.

By:-

- (1) Reducing rate of withdrawal of ground water on an equitable basis.
- (2) Modification, or abandonment and plugging, of existing wells, whether used for water supply or drainage purposes, which constitute a possible pollution hazard to the ground water.
- (3) Directing and supervising well construction and water supply development.

All parties likely to be affected by such measures shall be duly informed in writing of the proposals, and may lodge an appeal with the Appeal Board within 30 days of dispatch of advice.

Where an appeal has been lodged no action shall be taken by the Director of Mines to implement the proposed measures until the appeal has been decided by the Appeal Board.

## Section 13.

### Waste Prohibited

a. Ground water which is being withdrawn shall not be suffered to waste. To effectuate the purpose of this section it shall be the duty of the Director of Mines :

1. to require all flowing wells to be capped or equipped with valves so that the flow of water can be completely stopped when not in use.
2. to require both flowing and non-flowing wells to be so constructed and maintained as to :

- (1) prevent the waste of ground water through leaky casing, lack of casing, pipes, fittings, valves or pumps, either above or below the surface.
- (2) prevent contamination of the aquifers by the intrusion of saline waters or any noxious effluent or waste.

b. The reasonable withdrawal of ground water for purposes such as stock, garden or domestic use, or in connection with the construction, development, testing, or repair of a well, or the inadvertent loss of water due to breakage of a pump, valve, pipe or fitting shall not be construed as waste, if reasonable diligence is shown by the permittee in effecting the necessary repairs.

#### Section 14.

##### Fees

Permit to construct a well - no charge

Well Driller's licence - five shillings per annum.

#### Section 15

##### Penalties

Any person who refuses or neglects to comply with any provision of this Act, or of any rule or regulation promulgated by the Director of Mines pursuant thereto, is guilty of a misdemeanor, and upon conviction shall be fined not more than £50 for each offence. Any person who after notice that he is in violation thereof, continues to violate any provision of this Act, and fails to comply therewith within a reasonable length of time, is guilty of a separate offence for each day the violation continues, and may be subject to a separate similar penalty for each day or part thereof.

#### Section 16

##### Appeals

Any person aggrieved by any determination, order or decision of the Director of Mines may have the decision reviewed by a Board of Appeal. Notice of intention to appeal must be in writing, witnessed by a J.P. and reach the Board within 30 days after publication of the Director of Mines' determination order or decision.

The Board of Appeal will comprise 3 officers, consisting of :

- (1) A representative of the Engineering and Water Supply Department.
- (2) Lands Department

(3) Private boring contractor.

The Board must meet within 30 days of an appeal being lodged to deal with said appeal, and where necessary proxies for regular Board members shall be appointed. The decision of the Board will be final and binding on all parties.

Section 17

Wells not affected

Nothing in this Act shall be construed to affect the right of any person to continue the use of water from existing wells, except in critical ground water areas.

Section 18

Plugging of Wells

Any well situated in the critical areas defined by the Director of Mines which is to be abandoned for any cause whatsoever, shall only be abandoned in the following manner :-

1. Four weeks' notice in writing to Director of Mines of intention to abandon well, together with a detailed log of the well, including strata, waters, casing and all relevant details, as far as available
  2. The Director of Mines will arrange for his officers to interview the owner and advise the form of plugging to be adopted. Bore will then be plugged as directed under the supervision of the officer, all costs to be borne by the landowner.
  3. The owner of any bore not being utilized by the owner, which in the opinion of the Director of Mines should be plugged for the safeguarding of the ground water resources, shall be duly notified of this finding and given one month to arrange the plugging to the satisfaction of and under the supervision of the Director of Mines' officer.
- If the owner does not take action to comply with the Director of Mines' instruction within the period stated, or produce satisfactory reasons for delaying further, the Director of Mines is empowered to proceed with plugging the bore to his satisfaction, and recover all costs of the said plugging operations from the owner.
4. Any well in use which, in the opinion of the Director of Mines, is leaking to the detriment of the ground water resources shall be repaired or plugged to the satisfaction of the Director of Mines.

Notice and action as for 3.



DEPARTMENT OF MINES  
SOUTH AUSTRALIA.

WELL DRILLER'S LICENCE.

Applicant's Name }      BLOCK LETTERS      Application No. ....  
"      Address }

I, the undersigned, do hereby apply for a Well Driller's Licence in the State of South Australia and in support of my application do submit herewith a sworn statement of drilling qualifications and equipment.

.....  
Applicant.

Affidavit

I                      being first duly sworn upon my oath depose and say that I have carefully read the foregoing application and the following statement and attachments which are part thereof; that I am familiar with laws of the State in regard to ground water areas and critical portions thereof, and will comply with them; and that each and all of the statements in the application and attachments are true to the best of my knowledge and belief.

.....  
Applicant

Subscribed and sworn to before me this                      day of                      19 .

.....  
J.P.

Approved / Rejected

A Class Licence

or

B Class Licence

Director of Mines

Date

Revoked or Suspended

Director of Mines

Date

DATE OF EXPIRY

Appeal

Before Board

Upheld/Rejected

Chairman of Appeal Board

Date

STATEMENT

STATEMENT

Experience Record

Commenced drilling water wells  
on or about . . . . .

Number of water wells drilled in  
past 5 years (approximate) . . . . .

Maximum depth drilled . . . . .

Types of drilling plant used

References

Names and Addresses of at least 3 persons or firms having firsthand  
knowledge of applicant and his experience as a well driller.

Description of Drilling Equipment to be used.

Signed . . . . .  
Applicant

Date . . . . .19 .

Examined by the Director of Mines

Nature of Examination

Result of Examination

. . . . .  
Examiner

Date . . . . .19 .

DEPARTMENT OF MINES  
SOUTH AUSTRALIA.

WATER BORE RECORD.

No. \_\_\_\_\_

Occupier's Name \_\_\_\_\_ Permit No. \_\_\_\_\_

Occupier's Address \_\_\_\_\_ Driller's Name \_\_\_\_\_

\_\_\_\_\_ Driller's Address \_\_\_\_\_

Pastoral Lease or Hundred \_\_\_\_\_

Section No. \_\_\_\_\_ "Licence No." \_\_\_\_\_

Date drilling commenced \_\_\_\_\_ Date drilling completed \_\_\_\_\_

LOG

Depth Feet below surface	Type of Strata	Depth Continued	Type of Strata Continued
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WATER DETAILS				CASING DETAILS			
WATER CUT	WATER LEVEL	Gall/hr.	How Tested	QUALITY	Size	Length of String	PERFORATIONS Type, size & Length spacing From - To - Ft. below surface
(1)				10"			
(2)				8"			
(3)				6"			
(4)				5"			
(5)				4"			

SCREEN

SPECIFICATIONS

Size fitted  
From  
ft below

To  
surface

Full details of pumping equipment to be forwarded separately when fitted.

Signed

(Driller) . . . . .

Date

NOTE: SPECIAL containers for water and sludge samples will be provided on application to Mines Dept., Works Depot, Dalgleish Street, West Thebarton - filled containers to be forwarded same address and freight charges referred to Mines Dept.

PERMIT TO CONSTRUCT, DEEPEN, ALTER,  
REPAIR A WELL FOR WATER SUPPLY

DATE OF ISSUE

DEPARTMENT OF MINES  
SOUTH AUSTRALIA.

PERMIT TO CONSTRUCT, DEEPEN, ALTER,  
REPAIR A WELL FOR DRAINAGE PURPOSES.

Application No. ....

Applicant's Name &  
Address (Block letters)

Name and Address of owner  
of land on which well to  
be constructed, etc.

Name and address of per-  
sons constructing well.

Location of Well (County  
or Pastoral Lease)

Hundred

Section No.

Distance from two permanent marks  
(e.g. roads, section boundaries).

Name of critical ground water area from  
which water to be withdrawn (if designated).

Amount of drainage proposed.  
(galls./hour)

Nature of effluent

Depth & type of construction proposed

Affidavit

I, being first duly sworn upon my oath depose and  
say that I have carefully read the foregoing application and statements  
which are part thereof; and that each and all of the statements in the  
application and attachments are true to the best of my knowledge and  
belief.

Signed . . . . .  
Applicant

Subscribed and sworn to before me this                      day of                      19 .

. . . . .  
J.P.

Before Director of Mines

Approved or Rejected

. . . . .  
Director of Mines

Date . . . . . 19 .

Appeal

Before Board

Upheld or Rejected

Chairman of Appeal Board

Date

DATE OF ISSUE