

**REQUIREMENTS AND PROCEDURE IN THE MANAGEMENT OF WASTE WATER OF  
NATURAL OIL, GAS AND GEOTHERMAL UPSTREAM BUSINESS AND/OR ACTIVITIES  
BY INJECTION METHOD**

(Regulation of State Minister of Living Environment Affairs No. 13 Year 2007 dated November 6, 2007)

THE STATE MINISTER OF LIVING ENVIRONMENT  
AFFAIRS,

Considering:

That for the execution of Article 20 sub-article (4) and (5) of Law No. 23 Year 1997 concerning Management of Living Environment Affairs, it is necessary to stipulate a Regulation of State Minister of Living Environment Affairs concerning Requirements and Procedure in the Management of Waste Water of Natural Oil, Gas and Geothermal Upstream Business and/or Activities by Injection Method;

In view of:

1. Law No. 23 Year 1997 (*BN No. 6092 pages 148 - 208 and so forth*) concerning Management of the Living Environment (Statue Book of Republic of Indonesia Year 1997 No. 68, Supplement to Statue Book of Republic of Indonesia No. 3699);
2. Law No. 22 Year 2001 (*BN No. 6696 pages 16A - 27A and so forth*) concerning Natural Oil and Gas (Statue Book of Republic of Indonesia Year 2001 No. 136, Supplement to RI Statute Book No. 4152);
3. Law No. 27 Year 2003 (*BN No. 7018 pages 1A - 11A*) concerning Geothermal (Statue Book of Republic of Indonesia Year 2003 No. 115, Supplement to Statue Book of Republic of Indonesia No. 4327);
4. Law No. 32 Year 2004 (*BN No. 7183 pages 1A-11A and so forth*) concerning Regional Government Statue Book of Republic of Indonesia Year 2004 No. 125, Supplement to Statue Book of Republic of Indonesia

No. 4437) which had been amended by Law No. 8 Year 2005 concerning Stipulation of Government Regulation in Lieu of Law No. 3 year 2005 (*BN No. 7218 pages 20A-21A*) concerning Amendment to Law No. 32 Year 2004 concerning Regional Government to become a Law (Statue Book of Republic of Indonesia Year 2005 No. 108, Supplement to Statue Book of Republic of Indonesia No. 4548);

5. Government Regulation No. 82 year 2001 (BN No. 7450 pages 20A - 29A) concerning Management of Water Quality and Control of Water Contamination (Statue Book of Republic of Indonesia Year 2001 No. 153, Supplement to Statue Book of Republic of Indonesia No. 4161);
6. Presidential Regulation of the Republic of Indonesia No. 9 Year 2005 (BN No. 7182 pages 2A - 23A and so forth) concerning Position, Mission, Functions, Organization and Procedure of State Ministries of the Republic of Indonesia which had been amended several times, lastly by Presidential Regulation of the Republic of Indonesia No. 94 Year 2006;

D E C I D E S :

To stipulate:

REGULATION OF STATE MINISTER OF LIVING ENVIRONMENT AFFAIRS CONCERNING REQUIREMENTS AND PROCEDURE IN THE MANAGEMENT OF WASTE WATER OF NATURAL OIL, GAS AND GEOTHERMAL UPSTREAM BUSINESS AND/OR ACTIVITIES BY INJECTION METHOD.

CHAPTER I  
GENERAL PROVISIONS

Article 1

In this Minister Regulation, what is meant by:

1. Natural oil, gas and geothermal upstream business and/or activities are business and/or activities in the field of natural oil, gas and geothermal covering exploration and production of natural oil and gas both on-shore as well as off-shore, exploration and production of geothermal, natural oil, liquefied natural gas (LNG) and liquefied petroleum gas (LPG) refining, and oil installations, depots and terminals.
2. Exploration are activities with the purpose to get information on geology condition to find and acquire estimated reserve of natural oil, gas and geothermal in a determined work area;
3. Exploitation is a series of activities with the purpose of producing natural oil, gas and geothermal from a determined work area, consisting of well drilling and completion, construction of transportation means, storage, and processing for the separation and purification of natural oil, gas and geothermal in the field, and other supporting activities.
4. Waste water injection is the placement or disposal of waste water of natural oil, gas and geothermal upstream business and/or activities into a certain formation in the earth.
5. Injection well is a well used to inject waste water which can be a new well particularly allotted as injection well or a well converted into an injection well.
6. Area of Review is an area having a radius that is the same as the lateral distance where the pressure in the Injection Target Zone can cause displacement of injected waste water or formation fluids into underground drinking water sources.
7. Total Dissolved Solids is the total solids escaping from the standard glass fiber disk and still existing after being vaporized and dried up to a constant weight at 180°C temperature and can be used as a measurement of content of salt dissolved in water.
8. Packer is a kind of expandable plug to separate the annulus space between series of piping and casing to limit one zone from another so as not to be inter-connected.
9. Casing is a steel pipe installed at the well wall to prevent the well-hole wall from caving-in.
10. Tubing is a series of steel pipes hung at the top end of casing series, functioning to protect production pipe series or can also function as production pipe series.
11. Wellhead is an equipment to control a well consisting of casing-head, tubing-head, and tubing hose.
12. Annulus is a space between two walls of a cylinder having different radii.
13. Aquifer is a geology formation or part of a formation containing underground water sources.
14. Mechanical integrity is a situation where there are no significant leakages of the casing, tubing and/or packer of an injection well and/or there are no waste water displacements to underground drinking water sources through vertical channels connected with the well hole.
15. Confinement Zone layer is a geology formation consisting of a group of formations, a formation, or part of a formation that is impermeable, therefore it can isolate/prevent the displacements of injected waste water to enter into an aquifer.
16. Containment . . . . .

16. Containment Zone layer is a geology formation consisting of a group of formations, a formation, or part of a formation which can still accommodate seepage/overflow of injected waste water.
17. Injection Target Zone is a geology formation consisting of a group of formations, a formation, or part of a formation which can accommodate waste water to be injected.
18. Emergency is a situation covering catastrophe, blow-out, shallow gas, fire and other force majeure.
19. Minister is the Minister performing government affairs in the field of living environment.
20. Related minister is the minister having a scope of duty in the field of natural oil, gas and geothermal.
21. Technical Agencies are agencies having scope of duties in the field of nurturing natural oil, gas and geothermal activities.

## CHAPTER II

### SCOPE

#### Article 2

- (1) Any natural oil, gas and geothermal upstream business and/or activities must perform waste water management until it meets determined requirements before disposed off to the environment.
- (2) The waste water management referred to in sub-article (1) is entitled to be performed waste water injection method.
- (3) Waste water that may be injected as meant in sub-article (2) shall be in the form of fluids brought up from strata containing hydrocarbon during intake activities on natural oil, gas and geothermal, and can be mixed with waste water originating from processing

installations constituting an integral part of the production process, except if the waste is stated as hazardous and toxic waste or containing radioactive substances.

#### Article 3

This Minister Regulation is not applicable to:

- a. Water injection activities related with production improvement processes (enhanced recovery) of natural oil, gas and geothermal; and
- b. Pressure maintenance activities of natural oil, gas and geothermal business and/or activities.

## CHAPTER III

### INJECTION TARGET ZONE AND INJECTION AREA OF REVIEW

#### Article 4

- (1) Waste water injection referred to in Article 2 sub-article (2) is performed in the Injection Target Zone not connected with underground drinking water source aquifer separated by a Confinement Zone.
- (2) In the determination of the Injection Target Zone referred to in sub-article (1), the party responsible for natural oil, gas and geothermal upstream business and/or activities should determine an Injection Area of Review

#### Article 5

The Injection Area of Review referred to in Article 4 sub-article (2) shall be stipulated with the following provisions:

- a. for a permit request for one (1) injection well, the Injection Area of Review covers an area with a radius determined based on a lateral distance from the well to a point where the pressure in the Injection Target Zone can cause displacement of injected waste water or formation fluids into underground drinking water sources.
- b. for a permit request for more than one (1) injection wells in the same production field, the Injection Area of Review covers the outermost border of the project area added with a radius determined based on a lateral distance from the well to a point where the pressure in the Injection Target Zone can cause displacement of waste water fluids or formation fluids into underground drinking water sources aquifer.

#### Article 6

- (1) Injection Area of Review shall be calculated by paying due observance on:
  - a. hydraulic conductivity of injection zone;
  - b. Thickness of injection zone;
  - c. Time of injection;
  - d. Storage coefficient;
  - e. Injection rate;
  - f. hydrostatic pressure in injection zone; and
  - g. hydrostatic pressure of drinking water source aquifer.
- (2) In the event the determination of an Injection Area of Review cannot be calculated, then:
  - a. for permit request for one (1) injection well in one (1) area, the outermost border of the Injection Area of Review is a lateral distance in a radius of 450 m from the well;

- b. for permit request for more than one (1) injection wells in the same production field, the outermost border of the Injection Area of Review is the border of the project added with a lateral distance in a radius of 450 m from the well perpendicular to the outermost border of the of the project.

#### Article 7

- (1) Any natural oil, gas and geothermal upstream business and/or activity are prohibited to perform waste water injection into underground drinking water source aquifer.
- (2) Criteria of the underground drinking water source aquifer referred to in sub-article (1) is as follows:
  - a. being used as drinking water source;
  - b. having water quantity sufficient for drinking water reserve;
  - c. containing total dissolved solids less than 10,000 mg/l; and
  - d. not stipulated as an aquifer which can be used as Injection Target Zone.

#### Article 8

- Aquifer may be stipulated as Injection Target Zone if it meets the following criteria:
- a. not being used as drinking water source;
  - b. will not be used as underground drinking water source in the present nor in the future because:
    - i. it contains mineral, hydrocarbon or geothermal energy source;
    - ii. it is in a depth making it impossible to be utilized as proper drinking water economically and technically;
    - or

- iii. very contaminated, making it impossible to be processed economically and technically into drinking water consumable for human being.
- c. containing total dissolved solids more than 3,000 mg/l and less than 10,000 mg/l but impossible to be used as drinking water source.

#### CHAPTER IV

#### PERMITS

##### Article 9

- (1) Any natural oil, gas and geothermal upstream business and/or activity going to perform waste water injection referred to in Article 2 sub-article (2) must obtain a permit from the Minister.
- (2) The business and/or activity responsible party is entitled to submit a permit request for one (1) injection well or more than one (1) injection wells in the same producing field.
- (3) Permit for waste water injection referred to in sub-article (1) should be based on a technical study on waste water injection, and fulfill all the requirements contained in the attachment of this Minister Regulation.
- (4) The requirements referred to in sub-article (3) shall be evaluated by a team consisting of representatives of the State Minister of Living Environment Affairs, technical agencies and experts in their field.
- (5) The Minister shall issue or reject the request for waste water injection permit referred to in sub-article (1) no later than 90 (ninety) working days from the permit request is received and declared as complete.
- (6) Rejection of the request for waste water injection permit referred to in sub-article (5) should be accompanied with reasons of the rejection.

##### Article 10

- (1) In the submission of the permit referred to in Article 9 sub-article (2), the party responsible on the business and/or activity should be able to show that the waste water injection fulfills mechanical integrity tests.
- (2) The mechanical integrity test referred to in sub-article (1) is performed to know:
  - a. there are no significant leakage at the casing, tubing and/or packer ; and
  - b. there are no significant displacement of fluids or gas to underground drinking water sources through vertical channels connected with the well hole.
- (3) The mechanical integrity test referred to in sub-article (1) should be performed at least once in every five (5) years.
- (4) The mechanical integrity test referred to in sub-article (1) should be performed based on methods approved by technical agencies, or methods which are commonly used scientifically for exploration and production activities of natural oil, gas and geothermal.
- (5) The mechanical integrity test referred to in sub-article (1) for operating injection wells is performed by showing documents which can prove that the cement being used can prevent the occurrence of leakages.

##### Article 11

- (1) Permit for waste water injection referred to in sub-article (1) is valid for five (5) years and extendable.
- (2) The extension of the waste water injection permit referred to in sub-article (1) should be submitted by the business and/or activity responsible party no later than 60 (sixty) work days from the permit expiry date.

- (3) The Minister shall issue an extension decision letter or reject the permit extension request for waste water injection in a period no later than 30 (thirty) work days from the date the permit request is received the party responsible on the business and/or activity.
- (4) Request for permit extension request for waste water injection should be completed with an evaluation of monitoring results stipulated in the permit during the last five (5) years, and had passed mechanical integrity tests.

#### CHAPTER V

#### REQUIREMENTS ON INJECTION AND INJECTION WELLS

##### Article 12

- (1) For the purpose of preventing the displacement of waste water fluids and formation fluids likely to contaminate underground drinking water sources, the responsible party on natural oil, gas and geothermal upstream business and/or activities are obliged to:
- study and repair wells uncovered or left improperly existing within the Injection Area of Review .
  - Submit plans containing steps or modifications to be undertaken.
- (2) In the event that repairs on wells existing within the Injection Area of Review having the potentials of causing displacements of waste water fluids and formation fluids likely to contaminate underground drinking water sources referred to in sub-article (1) letter a had not been completed, waste water injection activities shall not be performed.

##### Article 13

Waste water injection referred to in Article 2 sub-article (2) should be made through injection wells meeting the following construction requirements:

- Injection well should be provided with casing and cement to prevent the displacement of waste water fluids and formation fluids into underground drinking water sources;
- Surface casings must have an isolation in the form of cement up to the surface and shall be performed in accordance with standard procedure;
- Casings and cements that are used should be conformed with well age planning;
- Wells should be equipped with tubing and/or mechanic packer;
- Wellhead should be equipped with supporting facilities, such as measuring devices of injection pressure, rate of flow and volume of injected waste; and
- Annulus should be equipped with pressure measuring device to monitor leakage of packers.

##### Article 14

- (1) The waste water injection referred to in Article 2 must meet the following requirements:
- Injection pressure on wellhead shall not exceed maximum pressure causing new cracks or damaging/cracking/breaking existing cracks in the Confinement Zone causing displacements of waste water fluids and formation fluids into underground drinking water sources.
  - In any condition whatsoever, injection pressure shall not be allowed to cause displacements of waste water fluids and formation fluids into underground drinking water sources.
  - It is not allowed to make injections between the end of casings protecting soil water sources and well hole.
- (2) Business and/or activity responsible parties are obliged to install measuring devices in each injection well as follows:

- Injection.....

- a. Injection pressure on wellhead;
  - b. Casing pressure; and
  - c. Volume and rate of flow.
- (3) Business and/or activity responsible parties are obliged to operate the measuring devices referred to in sub-article (2) in conformance with its functions and shall ensure the accuracy of measurement results.

**CHAPTER VI  
OBLIGATIONS**

**Article 15**

Business and/or activity responsible parties are obliged to perform monitoring on the performance of waste water injection with the following provisions:

- a. Monitoring of well injection pressure in a frequency of at least once a week.
- b. Monitoring of casing pressure in a frequency of at least once a month
- c. Monitoring injection discharge and cumulative volume of waste water injection at least once in two (2) weeks.
- d. Monitoring of chemical-physical characteristics of waste must be executed at least before an injection activity is performed, unless there are significant changes on the type of injected waste water.

**Article 16**

Every responsible party on business and/or activities are obliged to:

- a. report the occurrence of an emergency orally in a period of 1 x 24 hours and in writing in a period of 2 x 24 hours to the Minister, related ministers, Governor, Regent/

Mayor, and head of agencies having a scope of duty in the field of living environment management at province and regency/city levels.

- b. stop injection activities, and report to the Minister no later than three (3) days accounted for from the date of incident, in the event of operational failures potential to inflict environment impacts.
- c. Handle the emergency by exercising stipulated handling procedure so as not to endanger human safety and health, as well as not to inflict contamination and/or environment damages.
- d. Report results of monitoring on the requirements contained in the permit for waste water injection at least once in six (6) months to the Minister and/or Governor with copies to related ministers, and Head of agencies having a scope of duty in the field of Living Environment management at province and regency/city levels.

**Article 17**

Responsible parties on natural oil, gas and geothermal upstream business and/or activities are obliged to:

- a. close injection wells that had expired as of its operations period in accordance with applicable provisions, and report it to the Minister and related ministers, with copies to the head of regional government agencies whose scope of duty is in the field of living environment affairs at province and regency/city levels;
- b. Prevent the occurrence of contamination of underground drinking water source caused by facilities of closed injection wells; and

c. Clean-up . . . . .

- c. Clean-up oil spills or other wastes due to a process of injection well closing.

CHAPTER VII  
TRANSITIONAL PROVISIONS

Article 18

Every responsible party on business and/or activities who had performed disposal of waste water by injection method before the stipulation of this Minister Regulation, are obliged to conform to this Minister Regulation two (2) years at the latest from the stipulation of this Minister Regulation.

CHAPTER VIII  
CLOSING PROVISIONS

Article 19

This Regulation commences to come to effect from the date of stipulation.

Stipulated in Jakarta  
On November 6, 2007  
State Minister of Living Environment Affairs,  
Sgd  
Ir. Rachmat Witoelar

**ATTACHMENT**

FORM OF PERMIT FOR THE MANAGEMENT OF WASTE WATER OF NATURAL OIL, GAS AND GEOTHERMAL  
UPSTREAM BUSINESS AND/OR ACTIVITIES OF

I. TO BE FILLED IN BY THE OFFICIAL							
A. DATE OF RECEIPT			B. DATE OF APPROVAL			C. PERMIT NO.	D. WELL IDENTITY
Date	Month	Year	Date	Month	Year		
II. TO BE FILLED-IN BY PERMIT REQUESTOR							
A. REQUESTOR/ PROXY		B. ACTIVITY LOCATION		C. COMPANY			
Name :		Name of Location and Position		Name:		Field of Business	
Address:		Address:		Address:		Deed of Establishment	
Regency/City:		Regency/City:		Regency/City:		AMDAL Approval	
Province:		Province:		Province:			
Phone / Fax No.		Phone / Fax No.		Phone / Fax No.			
E-mail :		E-mail :		E-mail :			
III. WELL STATUS							
<input type="checkbox"/>	Operations Commence from:			<input type="checkbox"/>	<input type="checkbox"/>		
	A. OPERATIONAL	Date	Month				Year
IV. WELL LOCATION							
No.	Latitude	Longitude	Nearest Place (in meters) to:				
			Water Body	Settlement	Vital Infrastructures / Archeological Relics / Cultural Heritage / Holy Places		
V. ATTACHMENT							
Complete the Attachment as stipulated in the provisions on the below-mentioned Attachment							
VI. STATEMENT ON OBLIGATIONS							
I hereby declare that I had individually checked and understood the information contained in this permit request with its attachments, and shall be responsible on the information. I declare that the information are true, accurate and complete. I also know that submitting a false and incorrect information can be subject to sanctions in accordance with prevailing regulations.							
Place and Date							
Name:							
Signature:							

**A. Method for the Determination of Area of Review**

Describe the method used with the calculation used to determine the width of the Area of Review. If the method used to calculate the Area of Review cannot be included, the width shall be determined with a radius of 450 meters from the well hole.

**B. Map of Well and Area of Review**

Attach topography map with outermost limit as of 450 meters from the border of land ownership. The map should show the location of the well or area of operations which is being submitted with the width of the Area of Review of each well. Maps shall also show facilities on the living environment management, such as drinking water intakes, disposal of waste water, storage warehouse for hazardous and toxic substance and waste, or other waste disposal locations. If the permit submitted is for the injection of waste water for the area of operations, the map must show the distribution of manifold to inject waste water, including monitoring sites.

In the Area of Review, the map should show the number, name, location of all producing wells, disposal wells, abandoned wells, dry wells, surface water bodies, such as springs, rivers and lakes, mines, quarries, settlements, roads, fractures both known and suspected to be in existence. As an addition, the maps should also be able to depict the availability of water bodies and drinking water wells available at a distance of 450 meters from the border of land ownership.

**C. Well Data and Impact Control Efforts.**

Attach data of each well, including the type, construction, date of drilling, depth, notes on plugging and/or completion, and other necessary information. If a proposed disposal well is a new one, it should be accompanied with descriptions on efforts required to prevent the displacement of fluids to underground drinking water sources. In the event injection activities operate exceeding the fracture pressure of injection formations, the activity responsible party must provide explanations of wells in the Area of Review where the

formation is affected by pressure increase due to injection activities. Such explanation is not required for submission of permit for operating disposal wells.

**D. Map and Cross Section of Underground Drinking Water Aquifer**

Attach maps and cross sections indicating the vertical limit of the whole aquifer which can be used as drinking water source in the Area of Review.

**E. Name and Depth of Aquifer which can be Used as Drinking Water Source**

Attach maps showing geological names and depth down to the base of aquifer which can be used as drinking water sources likely to be affected by injection activities.

**F. Geological data of Injection Target Zone and Confinement Zone Layers.**

Attach geological data related with Injection Target Zone and Confinement Zone layers including descriptions on lithology, geological names, thickness, depth, and fracture pressure.

Attach and describe geological conditions explaining surface geology and sub-surface geology where waste injection activities are performed, and should cover the following parameter:

1. Lithology, covering physics, chemical characteristics, and rocks or sediment geology in the Area of Review covering types of rocks at the surface and sub-surface in the Confinement Zone and Injection Target Zone layers.
2. Stratigraphy, covering relationship of rock lithology dispersion or sedimentation process laterally and vertically enabling to display the relationship of inter-connection and dispersion in the Area of Review.
3. Geo-dynamics, covering inter-relationship of rocks physics nature in and/or around the Area of Review and the geological structure condition, earthquake area condition or tectonic condition.

4. Hydrogeology, covering inter-relationship of geology condition dispersion in and/or around the Area of Review, flow pattern condition, and flow of surface water and sub-surface water.

Attach relevant data, maps, descriptions or calculations so it can explain the Injection Target Zone layer parameter constituting data of sub-surface condition illustrating the layer ability to receive/accommodate injected liquid waste, and should cover the following parameter:

- a) Physics characteristics covering porosity, permeability, saturation, crack pressure, formation pressure and temperature.
- b) Total accommodation capacity of Injection Target Zone layers.
- c) Relation between wells to illustrate possibilities of the occurrence of communications between an injection-well and other wells around the Area of Review. These information are important to forecast the possibility of injected waste to exit through other wells around the Area of Review due to a difference of the injection pressure and the well base pressure on wells around the injection-well.

#### G. Operational Data

Attach and explain operational data of each well, such as:

1. Average and maximum injection discharge with the volume of fluid to be injected.
2. Average and maximum injection pressure.
3. Annulus fluid characteristics
4. Source and physics and chemical characteristics of waste water to be injected.

#### H. Formation Testing Program

Explain plans on Formation Testing Program purported to obtain data on fluid pressure, fracture pressure forecast, and physics and chemical characteristics of Injection Target Zone layer.

#### I. Injection Procedure

Describe the injection procedure to be exercised or which had been performed including pumping, accommodation system, flow of waste water to be injected, injection facilities layout, operations safe area, diagram of process flow, and supporting equipments.

#### J. Construction Procedure

Describe construction procedure to be exercised covering detailed description on casing, drilling, logging procedure, deviation checks, testing and coring, and plan on annulus fluid to be used.

#### K. Construction Details

Attach schematic drawing or other appropriate pictures to explain construction of injection well facilities at the surface and sub-surface.

#### Emergency Response Plan

Describe Emergency Response Plan to overcome failure of injection wells and to prevent displacement of fluids to drinking water sources.

#### L. Emergency Response Plan

Describe Emergency Response Plan to overcome failure of injection wells and to prevent displacement of fluids to drinking water sources.

#### M. Monitoring Plan

Describe the Monitoring Plan to be executed.

#### N. Well Closing Plan.

Attach Well Closing Plan including:

1. Description on the type, number and placement (including top height and bottom height) of plug to be used;
2. Description on the type, quality and quantity of cement to be used;
3. Description on the method to be used to place plugs, including the method to be used to place well in balance position prior to placing plugs.

#### O. Environment Management Documents

Attach documents on Analysis on Environmental Impacts (AMDAL), Plan on Environment Management and Monitoring documents, or Efforts on Environment Management and Monitoring documents relevant with injection of waste water activities.

State Minister of Living Environment Affairs

Sgd

Ir. Rachmat Witoelar

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