

**STATE OF NEW MEXICO
ENERGY, MINERALS, AND NATURAL RESOURCES DEPARTMENT
OIL CONSERVATION DIVISION**

**IN THE MATTER OF THE HEARING
CALLED BY THE OIL CONSERVATION
DIVISION FOR THE PURPOSE OF
CONSIDERING:**

**CASE NO. 12112 (Reopened)
ORDER NO. R-11435**

**APPLICATION OF GP II ENERGY, INC. FOR APPROVAL OF A
WATERFLOOD PROJECT AND TO QUALIFY THE PROJECT FOR THE
RECOVERED OIL TAX RATE PURSUANT TO THE ENHANCED OIL
RECOVERY ACT, EDDY COUNTY, NEW MEXICO.**

ORDER OF THE DIVISION

BY THE DIVISION:

This case came on for hearing at 8:15 a.m. on June 1, 2000, at Santa Fe, New Mexico, before Examiner Mark W. Ashley.

NOW, on this 10th day of August, 2000, the Division Director, having considered the testimony, the record, and the recommendations of the Examiner,

FINDS THAT:

- (1) Due public notice has been given and the Division has jurisdiction of this case and its subject matter.
- (2) The applicant, GP II Energy, Inc. ("GP II"), seeks authority to institute a waterflood project in the North Square Lake Unit ("Unit Area") by the injection of water into the Grayburg and San Andres formations, Square Lake Grayburg-San Andres Pool, Eddy County, New Mexico, through 23 proposed injection wells shown on the attached Exhibit "A."
- (3) GP II stated that its application to qualify this project for the recovered oil tax rate pursuant to the "New Mexico Enhanced Oil Recovery Act" (Laws 1992, Chapter 38, Sections 1 through 5) would be presented by separate application and requested that this portion of this case be dismissed.
- (4) Initial waterflood operations into the Lower Grayburg and the Upper San Andres formations through six converted oil wells located in Sections 29, 30 and 32 of Township 16 South, Range 31 East, NMPM, Eddy County, New Mexico, were approved

by Division Order No. R-1 110, issued in Case No. 1368 and dated January 15, 1958, as amended.

(5) In 1998, GP II proposed to unitize approximately 4500 acres in which it owned 100% of the working interest. However, the Bureau of Land Management required that the Unit Area be expanded to include 6,155.96 acres, more or less.

(6) GP II's applications for statutory unitization of the Unit Area in Case No. 12113 and approval of the unit waterflood project in Case No. 12112 were heard by a Division Examiner on February 4, 1999, and June 17, 1999.

(7) By Order No. R-11207, issued in Case No. 12113 and dated June 17, 1999, the Unit Area was approved pursuant to the "Statutory Unitization Act," Sections 70-7-1 through 70-7-21 NMSA 1978, for the purpose of establishing a secondary recovery project. The Unit Area is comprised of 6,155.96 acres, more or less, of state and federal lands located in the following described acreage in Eddy County, New Mexico:

TOWNSHIP 16 SOUTH, RANGE 30 EAST, NMPM

Section 25: E/2

Section 36: N/2

TOWNSHIP 16 SOUTH, RANGE 31 EAST, NMPM

Section 19: S/2

Section 20: S/2

Section 27: SW/4, W/2 SE/4, SE/4 SE/4, SW/4 NE/4,

S/2 NW/4, NW/4 NW/4

Sections 28 through 34: All.

(8) Pursuant to Section 70-7-8 NMSA 1978, sufficient ratifications of the Division's statutory unitization order were obtained from the interest owners in the Unit Area and the unit became effective on January 1, 2000.

(9) The unitized formation is that interval underlying the Unit Area, the vertical extent of which extends from the top of the Grayburg formation to the base of the San Andres formation, at depths of 3,050 feet and 4,206 feet, respectively, as shown on the type log from the Zephyr "ZQ" State Well No. 1, located 330 feet from the North line and 2310 feet from the East line (Unit B) of Section 32, Township 16 South, Range 31 East, NMPM.

(10) The Division did not enter an order in Case 12112 but, instead, requested that GP II file an application to re-open Case No. 12112 and a revised C-108 application. The Division also directed that injection into the proposed injection wells should not

commence within the Unit Area until such time as the Division approved the proposed waterflood project and entered an order in Case No. 12112.

(11) At the time of the hearing, GP II had not commenced injection into the proposed injection wells in the Unit Area.

(12) During February and March 2000, certain interest owners in the Unit Area contacted the Division and expressed concern about the status of operations in the Unit Area.

(13) At the time of hearing, GP II testified that it had contacted each of these owners and had responded to their concerns.

(14) No interest owner appeared in opposition to the application or otherwise contacted the Division concerning the application.

(15) To be able to focus on specific areas within the Unit Area and thereby obtain data and better manage the issues related to wellbore integrity in this old producing area, GP II, after consultation with the Division, determined that it should implement this project in four phases (Phases IA East, IB West, II and III).

(16) In this case, GP II Energy, Inc. seeks approval of its Application for Permit to Inject into Phases IA East and IB West, which include the following acreage within the proposed waterflood project area:

PHASE IA EAST
TOWNSHIP 16 SOUTH, RANGE 31 EAST, NMPM
Sections 27: SW/4, W/2 SE/4, SE/4 SE/4, SW/4 NE/4,
S/2 NW/4, NW/4 NW/4
Sections 28, 33 and 34: All

PHASE IB WEST
TOWNSHIP 16 SOUTH, RANGE 30 EAST, NMPM
Section 36: N/2
TOWNSHIP 16 SOUTH, RANGE 31 EAST, NMPM
Section 31: All.

(17) The wells located within the Phase IA East and Phase IB West areas of GP II's proposed North Square Lake Unit Waterflood Project Area are in an advanced state of depletion and are only capable of marginal production.

(18) The evidence indicates the following proposed injection well does not have any surface casing and has production casing that is not adequately cemented to prevent fresh water aquifers from being adversely affected by injection operations:

Sheldon Well No. 3 (NSLU No. 63) located 1980 feet from the South line and 1980 feet from the West line of Section 28, Township 16 South, Range 31 East, NMPM.

(19) Prior to commencing injection operations into the wells shown in Exhibit "A," the Sheldon Well No. 3 (NSLU No. 63) should be cement squeezed from the calculated top of the cement behind the production casing to the surface. A cement bond log should be run prior to cement squeeze operations to determine the actual cement top. GP II should give advance notice to the supervisor of the Division's Artesia District Office of the date and time of all operations associated with the Sheldon Well No. 3 (NSLU No. 63), so these operations may be witnessed.

(20) The evidence indicates that the plugged and abandoned wells listed in the attached Exhibit "B," which will remain plugged and abandoned, are not adequately plugged and abandoned so as to confine injected fluid to the proposed injection interval.

(21) Prior to commencing injection operations into the wells shown in Exhibit "A," the wells listed in Exhibit "B" should be re-entered and replugged so as to confine injected fluid to the proposed injection interval.

(22) The evidence indicates that the plugged and abandoned wells listed in the attached Exhibit "C," which are to be converted to injection at a later date as part of another application, are not adequately plugged and abandoned so as to confine injected fluid to the proposed injection interval.

(23) Prior to commencing injection operations into the wells shown in Exhibit "A," the wells listed in Exhibit "C" should be re-entered and either replugged or recompleted as inactive injection wells to be approved for injection at a later date as part of another application. If the wells in Exhibit "C" are to be recompleted as inactive injection wells, they should be temporarily abandoned pursuant to Division Rule 203.

(24) The evidence indicates that the surface casings in the wells listed in the attached Exhibit "D" are not adequately cemented so as to protect fresh water aquifers from potential contamination due to injection operations.

(25) Prior to commencing injection operations into the wells shown in Exhibit "A," and annually thereafter, GP II should be required to conduct bradenhead surveys on each

casing string in every well listed in Exhibit "D" to ensure that fresh water aquifers are not being adversely affected by injection operations.

(26) The applicant presented engineering evidence indicating that:

- (a) there are currently 65 active producing wells and 10 active injection wells within the Unit Area. The producing wells are in an advanced state of depletion and produce at an average rate of approximately 2 barrels of oil and 9 barrels of water per day from the Grayburg Jackson Seven Rivers-Queen-Grayburg San Andres Pool;
- (b) as of January 1, 1999, cumulative oil production within the Unit Area was approximately 8.95 million barrels of oil, and remaining reserves under current operations are estimated at 367,000 barrels of oil;
- (c) it proposes, in phases, to drill 115 new producers and 6 new injectors and convert 147 producers to injection, which will downspace the proposed waterflood to 20 acres per well; and
- (d) an estimated 8.8 million barrels of additional oil will be recovered as a result of the proposed infill drilling and waterflood program that would otherwise not be recovered, thereby preventing waste.

(27) The applicant estimates that \$24.97 million in capital costs will be required to conduct waterflood operations within the Unit Area.

(28) The proposed waterflood project should be approved.

(29) GP II should take all steps necessary to ensure that the injected water enters only the proposed injection interval and is not permitted to escape to other formations or onto the surface from injection, production or plugged and abandoned wells.

(30) The injection of water into each of the wells shown in Exhibit "A" should be accomplished through 2 3/8 inch internally plastic-lined tubing installed in a packer set within 100 feet of the uppermost injection perforations. The casing-tubing annulus should be filled with an inert fluid and a gauge or approved leak-detection device should be attached to the annulus in order to detect leakage in the casing, tubing or packer.

(31) Prior to commencing injection operations into the wells shown in Exhibit "A," the casing in each well should be pressure tested throughout the interval from the surface down to the proposed packer setting depth to ensure the integrity of such casing.

(32) The wells in Exhibit "A" should be equipped with a pressure control device or acceptable substitute that will limit the surface injection pressure to that shown in Exhibit "A."

(33) The Division Director should have the authority to administratively authorize an increase in injection pressure upon a showing by the operator that such higher pressure will not result in fracturing of the injection formation or confining strata.

(34) GP II should give advance notice to the supervisor of the Division's Artesia District Office of the date and time i) injection equipment will be installed on each of the proposed injection wells, ii) the mechanical integrity pressure tests will be conducted on each of the proposed injection wells, and iii) the remedial work will be performed on each of the wells listed in Exhibits "B," "C" and "D," so these operations may be witnessed.

(35) GP II should immediately notify the supervisor of the Division's Artesia District Office of any failure of the tubing, casing or packer in the subject wells and should take such steps as may be timely and necessary to correct such failure or leakage.

(36) The waterflood project should be governed by Division Rules No. 701 through 708.

(37) The injection authority granted herein for any well shown on Exhibit "A" should terminate one year after the effective date of this order if the operator has not commenced injection operations into the well; provided however the Division, upon written request by GP II, may grant an extension for good cause.

IT IS THEREFORE ORDERED THAT:

(1) The applicant, GP II Energy, Inc., (GP II) is hereby authorized to institute a waterflood project within Phases IA East and IB West of its Unit Area by the injection of water into the Grayburg and San Andres formations, Square Lake Grayburg-San Andres Pool, Eddy County, New Mexico, through 23 proposed injection wells shown on the attached Exhibit "A."

(2) That portion of the application to qualify this project for the recovered oil tax rate pursuant to the "New Mexico Enhanced Oil Recovery Act" (Laws 1992, Chapter 38, Sections 1 through 5) is hereby dismissed.

(3) GP II shall take all steps necessary to ensure that the injected fluid enters only the proposed injection interval and is not permitted to escape to other formations or onto the surface from injection, production or plugged and abandoned wells.

(4) The injection of water into each of the wells shown on Exhibit "A" shall be accomplished through 2 3/8 inch internally plastic-lined tubing installed in a packer set within 100 feet of the uppermost injection perforations. The casing-tubing annulus shall be filled with an inert fluid and a gauge or approved leak-detection device shall be attached to the annulus in order to detect leakage in the casing, tubing or packer.

(5) Prior to commencing injection operations into the wells shown in Exhibit "A", the Sheldon Well No. 3 (NSLU No. 63) shall be cement squeezed from the calculated top of the cement behind the production casing to the surface. A cement bond log shall be run prior to cement squeeze operations to determine the actual cement top. GP II shall give advance notice to the supervisor of the Division's Artesia District Office of the date and time of the logging and cementing operations associated with the Sheldon Well No. 3 (NSLU No. 63), so these operations may be witnessed.

(6) Prior to commencing injection operations into the wells shown on Exhibit "A," the casing in each well shall be pressure tested throughout the interval from the surface down to the proposed packer setting depth to ensure the integrity of such casing.

(7) The wells in Exhibit "A" shall be equipped with a pressure control device or acceptable substitute that will limit the surface injection pressure to that shown in Exhibit "A."

(8) Prior to commencing injection operations into the wells shown in Exhibit "A," the wells listed in Exhibit "B" shall be re-entered and replugged so as to confine injected fluid to the proposed injection interval.

(9) Prior to commencing injection operations into the wells shown in Exhibit "A," the wells listed in Exhibit "C" shall be re-entered and either replugged or recompleted as inactive injection wells to be approved for injection at a later date as part of another application. If the wells in Exhibit "C" are to be recompleted as inactive injection wells, they shall be temporarily abandoned pursuant to Division Rule 203.

(10) Prior to commencing injection operations into the wells shown in Exhibit "A," and annually thereafter, GP II shall be required to conduct bradenhead surveys on each casing string in every well listed in Exhibit "D" to ensure that fresh water aquifers are not being adversely affected by injection operations.

- (11) The Division Director shall have the authority to administratively authorize an increase in injection pressure upon a showing by the operator that such higher pressure will not result in fracturing of the injection formation or confining strata.
- (12) GP II shall give advance notice to the supervisor of the Division's Artesia District Office of the date and time i) injection equipment will be installed on each of the proposed injection wells, ii) the mechanical integrity pressure tests will be conducted on each of the proposed injection wells, and iii) the remedial work will be performed on each of the wells listed in Exhibits "B," "C" and "D," so these operations may be witnessed.
- (13) GP II shall immediately notify the supervisor of the Division's Artesia District Office of any failure of the tubing, casing or packer in any of the injection wells or the leakage of water or oil from or around any producing or plugged and abandoned well within the project area, and shall take such steps as may be necessary and timely to correct the failure or leakage.
- (14) The waterflood project is hereby designated the North Square Lake Unit Waterflood Project, and GP II shall conduct injection operations in accordance with Division Rules No. 701 through 708, and shall submit monthly progress reports in accordance with Division Rules No. 706 and 1115.
- (15) The injection authority granted herein for any well shown on Exhibit "A" shall terminate one year after the effective date of this order if GP II has not commenced injection operations into the well; provided however the Division, upon written request by GP II, may grant an extension for good cause.
- (16) Jurisdiction is hereby retained for the entry of such further orders as the Division may deem necessary.

DONE at Santa Fe, New Mexico, on the day and year hereinabove designated.

STATE OF NEW MEXICO
OIL CONSERVATION DIVISION


LORI WROTENBERY
Director

S E A L

EXHIBIT "A"
CASE NO. 12112 REOPENED
ORDER NO. R-11435

GP II Energy, Inc.
Injection Wells
North Square Lake Unit Waterflood Project Area

PHASE IA EAST
TOWNSHIP 16 SOUTH, RANGE 31 EAST, NMPM
Sections 27: SW/4, W/2 SE/4, SE/4 SE/4, SW/4 NE/4,
S/2 NW/4, NW/4 NW/4
Sections 28, 33 and 34: All

<u>Well Name</u>	<u>Location</u>	<u>Section</u>	<u>Interval (Feet)</u>	<u>Pressure Limit</u> <u>(psig)</u>
Sheldon Well No. 1 (NSLU No. 63)	1980 FSL & 1980 FWL	28	3,439-3449	688
Kennedy Well No. 3 (NSLU No. 64)	2310 FSL & 1650 FEL	28	3,444-3,674	689
Sheldon Well No. 5(2) (NSLU No. 65)	2310 FSL & 660 FEL	28	3,450-3,710	690
Sheldon Well No. 2 (NSLU No. 85)	660 FSL & 1980 FWL	28	3,352-3,376	670
Johnson B Well No. 7 (NSLU No. 86)	660 FSL & 1980 FEL	28	3,373-3,457 OH	675
Sheldon Well No. 3 (NSLU No. 87)	330 FSL & 626 FEL	28	3,446-3,708	689
Valentine Well No. 1 (NSLU No. 88)	660 FSL & 660 FWL	27	3,492-3,815	698
Johnson A Well No. 1 (NSLU No. 110)	660 FNL & 1980 FWL	33	3,375-3,477 OH	675

<u>Well Name</u>	<u>Location</u>	<u>Section</u>	<u>Interval (Feet)</u>	<u>Pressure Limit (psig)</u>
Texas Trading Well No. 3 (NSLU No. 111)	660 FNL & 1980 FEL	33	3,381-3,600 OH	676
Johnson Well No. 6 (NSLU No. 112)	660 FNL & 660 FEL	33	3,416-3,620 OH	683
Carper "AB" Well No. 4 (NSLU No. 113)	660 FNL & 660 FWL	34	3,380-3,617 OH	676
Johnson "A" Well No. 3 (NSLU No. 133)	1980 FNL & 1980 FWL	33	3,363-3,612 OH	673
Texas Trading Well No. 4 (NSLU No. 134)	1980 FNL & 1980 FEL	33	3,370-3,615	674

PHASE IB WEST
Township 16 South, Range 30 East, NMPM.
Section 36: N/2
Township 16 South, Range 31 East, NMPM.
Section 31: All

Grier Well No. 11 (NSLU No. 101)	660 FNL & 1980 FEL	31	2,988-3,336	598
Grier Well No. 17 (NSLU No. 102)	330 FNL & 660 FEL	31	3,132-3,338	626
Grier Well No. 2 (NSLU No. 123)	1980 FNL & 660 FWL	31	3,050-3,240	618
Grier Well No. 4Y (NSLU No. 125)	1980 FNL & 1,650 FWL	31	2,965-3,265	593
Grier Well No. 5 (NSLU No. 126)	1980 FNL & 1980 FEL	31	2,965-3,265	593

<u>Well Name</u>	<u>Location</u>	<u>Section</u>	<u>Interval (Feet)</u>	<u>Pressure Limit (psig)</u>
Grier Well No. 7X (NSLU No. 127)	1980 FNL & 660 FEL	31	3,055-3,367	611
New Injection Well	1980 FSL & 660 FEL	31	2,980-3,350	596
Grier A Well No. 1 (NSLU No. 143)	1980 FSL & 511 FWL	31	2,955-3,060	591
Grier A Well No. 1 (NSLU No. 144)	1980 FSL & 1680 FWL	31	2,838-3,232	568
Grier Well No. 6 (NSLU No. 145)	1980 FSL & 1980 FEL	31	2,980-3,338 OH	596

EXHIBIT "B"
CASE NO. 12112 REOPENED
ORDER NO. R-11435

GP II Energy, Inc.
Inadequately Plugged and Abandoned Wells
North Square Lake Unit Waterflood Project Area

PHASE IB WEST

<u>Well Name</u>	<u>Location</u>
Tidewater Well No. 7	1980 FSL & 1980 FEL Section 36, Township 16 South, Range 30 East
State B Well No. 1	660 FNL & 660 FEL Section 36, Township 16 South, Range 30 East
Grier Well No. 3	660 FSL & 660 FWL Section 31, Township 16 South, Range 31 East
Overton State Well No. 9	1980 FSL & 660 FEL Section 36, Township 16 South, Range 30 East

EXHIBIT "C"
CASE NO. 12112 REOPENED
ORDER NO. R-11435

GP II Energy, Inc.
Inadequately Plugged and Abandoned Wells to be
Recompleted as Inactive Injection Wells or Replugged
North Square Lake Unit Waterflood Project Area

PHASE IA EAST

<u>Well Name</u>	<u>Location</u>
Kennedy Federal Well No. 1 (NSLU No. 47)	1980 FNL & 660 FEL Section 28, Township 16 South, Range 31 East
Trust Well No. 1 (NSLU No. 49)	1980 FNL & 1650 FWL Section 27, Township 16 South, Range 31 East
Texas Trading Well No. 2 (NSLU No. 132)	1880 FNL & 660 FWL Section 33, Township 16 South, Range 31 East
Johnson Well No. 14 (NSLU No. 169)	510 FSL & 2310 FEL Section 33, Township 16 South, Range 31 East

PHASE IB WEST

Grier Well No. 1 (NSLU No. 73)	660 FSL & 660 FWL Section 30, Township 16 South, Range 31 East
Grier Well No. 1 (NSLU No. 76)	660 FSL & 1980 FWL Section 30, Township 16 South, Range 31 East
Grier Well No. 10 (NSLU No. 77)	660 FSL & 1980 FEL Section 30, Township 16 South, Range 31 East

<u>Well Name</u>	<u>Location</u>
Grier Well No. 9 (NSLU No. 103)	660 FNL & 660 FEL Section 31, Township 16 South, Range 31 East
State R Well No. 1 (NSLU No. 104)	660 FNL & 660 FWL Section 32, Township 16 South, Range 31 East
Tellyer State Well No. 1 (NSLU No. 122)	1980 FNL & 660 FEL Section 36, Township 16 South, Range 31 East
State R Well No. 4 (NSLU No. 129)	1980 FNL & 1980 FWL Section 32, Township 16 South, Range 31 East
Doolin Well No. 2 (NSLU No. 146)	1980 FSL & 660 FWL Section 32, Township 16 South, Range 31 East
Grier Well No. 4 (NSLU No. 161)	660 FSL & 1980 FWL Section 31, Township 16 South, Range 31 East

EXHIBIT "D"
CASE NO. 12112 REOPENED
ORDER NO. R-11435

GP II Energy, Inc.
Wells with Inadequately Cemented Casing
North Square Lake Unit Waterflood Project Area

PHASE IA EAST

<u>Well Name</u>	<u>Location</u>	<u>Status</u>
Carper "G" Well No. 4 (NSLU No. 83)	550 FSL & 550 FEL Section 29, Township 16 South, Range 31 East	Inactive Producer
Texas Trading Well No. 1 (NSLU No. 109)	660 FNL & 660 FWL Section 33, Township 16 South, Range 31 East	Inactive Producer
Texas Trading Well No. 8 (NSLU No. 135)	1270 FNL & 1650 FEL Section 33, Township 16 South, Range 31 East	Active Producer
Johnson Well No. 13 (NSLU No. 136)	1370 FNL & 990 FEL Section 33, Township 16 South, Range 31 East	Inactive Producer
Johnson Well No. 5 (NSLU No. 137)	1980 FNL & 660 FEL Section 33, Township 16 South, Range 31 East	Inactive Producer
Johnson Well No. 9 (NSLU No. 139)	1980 FNL & 1980 FWL Section 34, Township 16 South, Range 31 East	Active Producer
Johnson Well No. 15 (NSLU No. 151)	2310 FSL & 1650 FEL Section 33, Township 16 South, Range 31 East	Inactive Producer
Johnson Well No. 8 (NSLU No. 153)	1980 FSL & 660 FWL Section 34, Township 16 South, Range 31 East	Active Producer

<u>Well Name</u>	<u>Location</u>	<u>Status</u>
Texas Trading Well No. 7 (NSLU No. 167)	810 FSL & 1980 FWL Section 33, Township 16 South, Range 31 East	Inactive Producer

PHASE IB WEST

Grier Well No. 12 (NSLU No. 56)	1980 FSL & 1980 FEL Section 30, Township 16 South, Range 31 East	Active Producer
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Texas Trading "A" Well No. 3 (NSLU No. 58)	1980 FSL & 660 FWL Section 29, Township 16 South, Range 31 East	Active Producer
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J.N. Fidel Well No. 1 (NSLU No. 79)	660 FSL & 660 FEL Section 30, Township 16 South, Range 31 East	Inactive Producer
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Grier Well No. 1 (NSLU No. 97)	660 FNL & 660 FWL Section 31, Township 16 South, Range 31 East	Active Producer
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Desa Well No. 1 (NSLU No. 120)	1650 FNL & 1650 FEL Section 32, Township 16 South, Range 31 East	Active Producer
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HJ Loe Well No. 1 (NSLU No. 160)	330 FSL & 1980 FWL Section 31, Township 16 South, Range 31 East	Active Producer
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WSLU Well No. 10	660 FSL & 660 FEL Section 36, Township 16 South, Range 30 East	Active Producer
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