Bison Basin Project

EVAPORATION PONDS

INFORMATION SUPPLEMENT

TO

ENVIRONMENTAL REPORT

Docket No. 40-8745

Ogle Petroleum Inc.

October, 1980

TABLE OF CONTENTS

OGLE PETROLEUM INC.

TELEPHONE (805) 969-5941
TELECOPIER (805) 969-3278
TELEX No. 658-430

P.O. Box 5549
559 SAN YSIDRO ROAD
SANTA BARBARA, CALIFORNIA 93108

October 13, 1980

PLEASE DIRECT REPLY TO:

150 North Nichols Avenue
Casper, Wyoming 82601
(307) 266-6456

Mr. J. E. Rothfleisch
Uranium Recovery Licensing Branch
Division of Waste Management
U.S. Nuclear Regulatory Commission
Washington, D. C. 20555

RE: Commercial Source Material
License Application, Docket
No. 40-8745

SUBJECT: Evaporation Pond Report

Dear Mr. Rothfleisch:

Ogle Petroleum Inc. (OPI) herewith submits five copies of the subject Report. The information contained in this Report was requested by Mr. Hubert J. Miller during a meeting in the NRC offices on July 29, 1980.

The NRC staff indicated during the meeting in July that OPI should use Regulatory Guide 3.11 as a basis for preparing the Evaporation Pond Report. It appears to OPI that Regulatory Guide 3.11 applies to the design, construction, and inspection of large tailings impoundments used in connection with conventional uranium mines. Even the one paragraph in the Guide that mentions small retention dams does not apply to OPI since our ponds will not be built in or across a stream.

The Corps of Engineers' publication referenced in Regulatory Guide 3.11 does not directly apply to OPI's ponds since each pond is less than 25 feet in height and has an impounding capacity of less than 50 acre-feet. Additionally, the presentation in the Corps of Engineers' publication does not consider the fact that the OPI ponds will have an artificial liner thus eliminating the phreatic surface that exists with unlined embankment-type dams.

Notwithstanding the above discussion, OPI has attempted to include the information in this Evaporation Pond Report that will meet the very general

requirements mentioned in the Corps of Engineers' "Recommended Guidelines for Safety Inspection of Dams."

Sincerely,

OGLE PETROLEUM INC.

Glenn J. Catchpole, P.E.
Project Manager

Wyoming Registered Professional
Engineer's License No. 2266

GJC:jm

Enclosures

CC: Dr. Minton Kelly, ORNL, w/Enclosures (2 copies)
Document Management Branch w/Enclosures (1 copy)

## 1. SUMMARY OF PROPOSED ACTIVITY

Ogle Petroleum Inc. (OPI) is the operator for a joint venture known as the OPI-Western Joint Venture. The non-operator of the joint venture is Western Fuel Inc., a wholly-owned subsidiary of Duke Power Company, a public utility whose principal offices are in Charlotte, North Carolina. Reference to "OPI" throughout this report is to be construed as Ogle Petroleum Inc. as operator for the OPI-Western Joint Venture.

OPI proposes to mine a uranium orebody in southern Fremont County, Wyoming using in-situ solution mining techniques. The orebody, as presently delineated, covers approximately 40 acres and contains about one million pounds of recoverable uranium (as $U_3O_8$). The "Project Area" containing the orebody embraces about 761 acres, defined as follows:

> All of Section 25, T27N, R97W and, starting at the SW corner of Section 30, T27N, R96W proceed 1000 feet east along the south line of said Section 30, thence north to the north line of said Section 30, thence west 1000 feet to the NW corner of said Section 30, thence south to the place of beginning, all located in Fremont County, Wyoming and containing in all approximately 761 acres.

The basic chemistry of the uranium in-situ solution mining process consists, in a sense, of reversing the process that occurred in nature by oxidizing the +4 uranium to +6 and causing it to enter solution as a stable compound. OPI proposes to accomplish this by using an array of injection and recovery wells, employing hydrogen peroxide ($H_2O_2$) or oxygen ($O_2$) as the oxidizing agent, and a dilute mixture of sodium carbonate ($Na_2CO_3$) and/or sodium bicarbonate ($NaHCO_3$) as leaching agents.

The uranium will be recovered in ion exchange columns at the on-site processing plant largely in the form of the stable compound sodium uranyl tricarbonate ($Na_4UO_2(CO_3)_3$). The final product will be yellowcake slurry which will be transported by truck to a plant owned and operated by others for further processing.

A processing plant with a capacity of up to 1,200 gallons per minute (gpm) will be constructed on site. Based on the above figures, the estimated life of

the proposed operation, including startup and decommissioning, is five years. However, because of the potential for additional reserves within the Project Area, this mine life might possibly be extended.

## 2. LIQUID PROCESS WASTES

Liquid effluents from the operation will be derived from both uranium production and aquifer restoration. During production, a waste stream from the plant in the amount of approximately six gpm will be directed to the evaporation ponds. This bleed will serve to maintain a wellfield overproduction and will aid in establishing a plant water balance control. The estimated quality of this effluent is presented below:

| PARAMETER | ESTIMATED AVERAGE CONCENTRATION |
|---|---|
| Total Dissolved Solids | 5000 mg/1 |
| Sodium | 1500 mg/1 |
| Sulfate | 1800 mg/1 |
| Chloride | 1700 mg/1 |
| Calcium | 200 mg/1 |
| pH (pH units) | 7 to 9 |
| $U_3O_8$ | 2 mg/1 |
| Radium 226 | 100 to 300 pCi/1 |

Aquifer restoration will be achieved by groundwater sweeping and by cycling formation water through a water treatment unit (e.g., reverse osmosis unit) located on the surface. The reject effluent (brine) from the water treatment unit will be discharged to the evaporation ponds at approximately 17 gpm. The quality of this effluent is presented below:

| PARAMETER | ESTIMATED AVERAGE CONCENTRATION |
|---|---|
| Calcium | 75 mg/1 |
| Sodium | 1000 mg/1 |
| Chloride | 600 mg/1 |
| $U_3O_8$ | 0 to 10 mg/1 |
| Carbonate | 400 mg/1 |
| Sulfate | 4500 mg/1 |
| Specific Conductance (micromhos/cm @ $25^0$ C) | 9000 mg/1 |
| pH (pH units) | 7 |

## 3. LIQUID EFFLUENT DISPOSAL SYSTEM

### 3.1 General Description

The liquid effluent generated by the uranium extraction process and the aquifer restoration operation (see section 2 above) will be routed to evaporation ponds via a buried PVC pipeline. The effluent drain pipeline will be a gravity flow system eliminating the need for pressurizing the line. Other than evaporation, there will be no discharge of liquid effluent from the ponds.

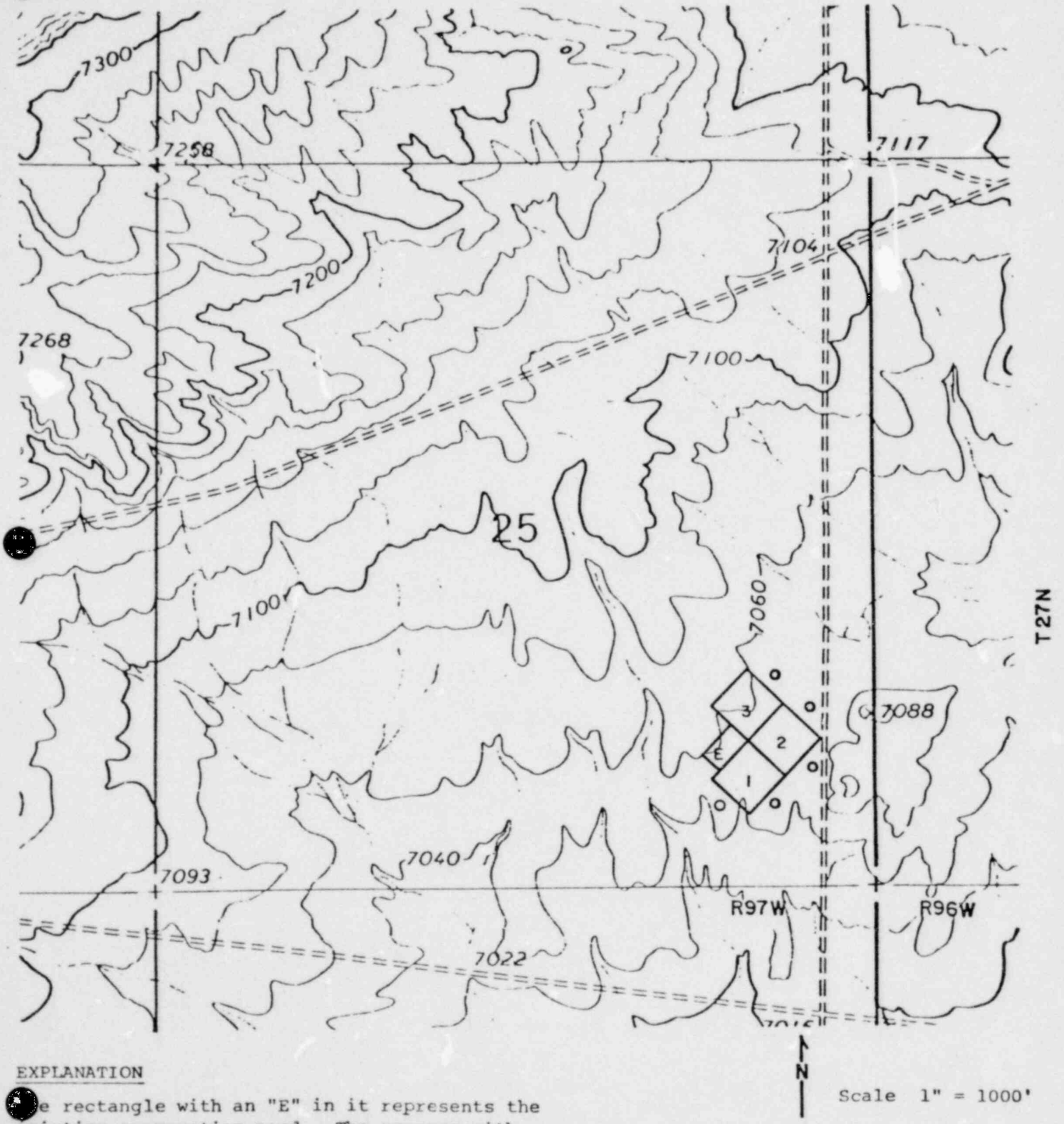
The evaporation pond system consists of the existing R & D pond plus the three additional ponds to be constructed adjacent to the existing R & D pond. The locations of the evaporation ponds in relation to the Project Area are shown in Figure 1. The three ponds will be located off-channel and will not receive runoff from the surrounding area since the tops of the pond embankments will be above the natural grade (see drawings).

The existing R & D pond has a maximum licensed capacity of 3.55 acre-feet (1.16 million gallons). This pond is artificially-lined with 30 mil thick hypalon. The three additional evaporation ponds that OPI intends to construct will each have a capacity of 24.71 acre-feet (8.05 million gallons) at the maximum water surface elevation of eight feet (two feet of freeboard). A graph of storage volume and water surface area vs. depth of water in the pond is presented in Figure 2.

Each pond will be lined with 30 mil thick hypalon or equivalent. The leak detection and monitoring program for the evaporation ponds is described in OPI's Environmental Report and subsequent documents furnished to the NRC by OPI and will not be repeated in this report.

Permits to construct the three proposed evaporation ponds have been obtained from the Land Quality Division of the Wyoming DEQ (Permit to Mine No. 504), the Water Quality Division of the Wyoming DEQ (Permit to Construct No. 80-277), and the Office of the State Engineer (Permit Nos. 8153 Res. and 8154 Res.). Copies of these latter two Permits are contained in Appendix A to this report. A copy of the Land Quality Division Permit to Mine has previously been forwarded to the NRC.

FIGURE 1

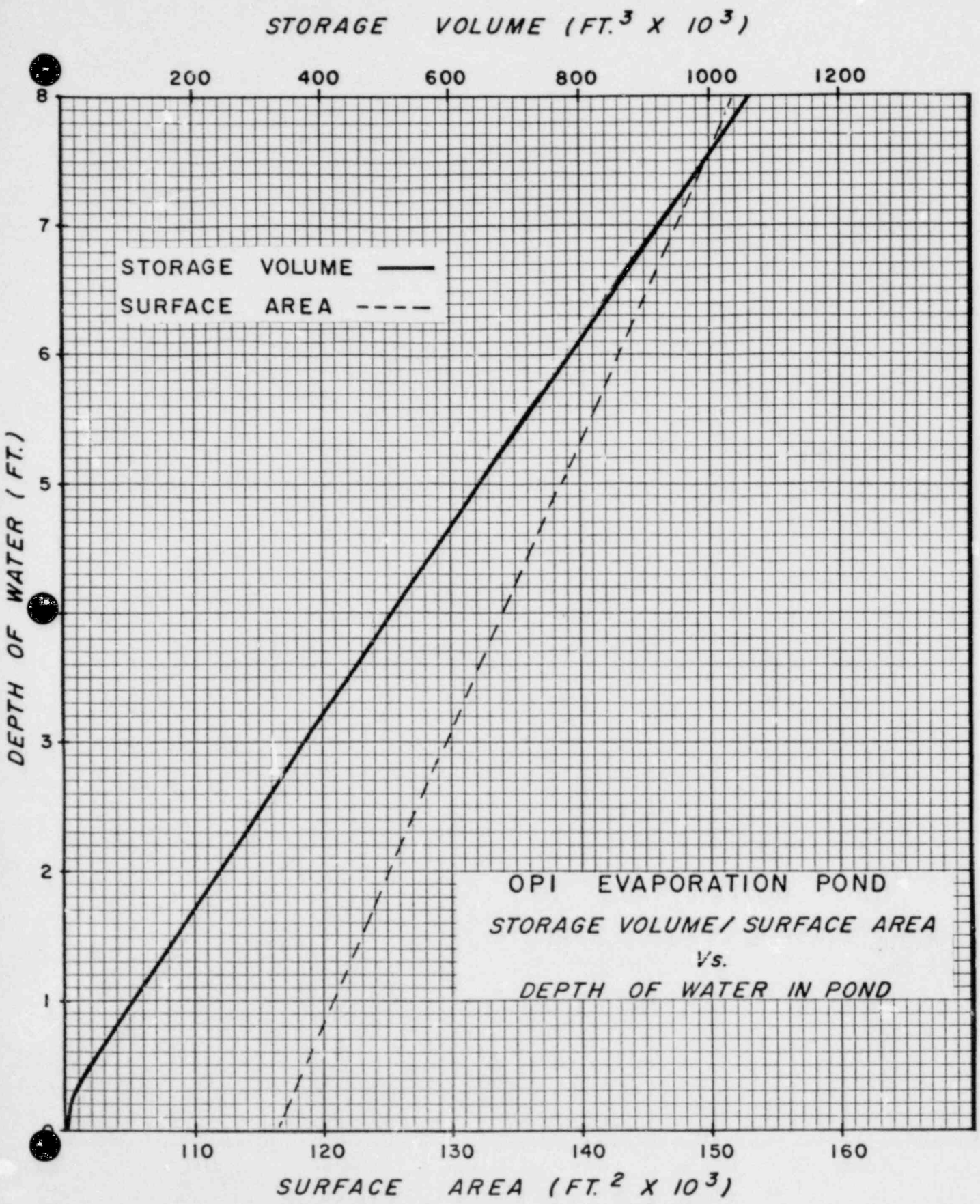



EXPLANATION

The rectangle with an "E" in it represents the existing evaporation pond. The squares with the numbers represent the proposed additional evaporation ponds. The small circles around the edge of the ponds represent the proposed location of the shallow monitor wells.

OGLE PETROLEUM INC.
Evaporation Ponds Locations

FIGURE 2


STORAGE VOLUME (FT.³ X 10³)
200
400
600
800
1000
1200
8
7
6
5
3
2
1
0
STORAGE VOLUME
SURFACE AREA
DEPTH OF WATER (FT.)
OPI EVAPORATION POND
STORAGE VOLUME / SURFACE AREA
Vs.
DEPTH OF WATER IN POND
110
120
130
140
150
160
SURFACE AREA (FT.² X 10³)

## 3.2 Water Budget

The evaporation pond system will receive approximately six gpm of effluent from the processing plant and approximately 17 gpm of effluent from the aquifer restoration water treatment unit for a total discharge of approximately 23 gpm. However, during the first year of the project, there will be no restoration in progress; and thus, the effluent stream will be approximately six gpm. Likewise, during the final year of the project there will be no mining; and thus, the effluent stream will consist of the 17 gpm from the aquifer restoration water treatment unit. Based on these assumptions, a conservative water budget for the presently-planned life of the project is presented in Table 1. It can be seen from the numbers presented in Table 1 that there is always sufficient reserve capacity in the system (including the R & D pond) to transfer the contents of one pond to another pond(s) in the event of a leak.

## 3.3 Pond Construction

The design and construction information for the three evaporation ponds are presented in the drawings (Figure 3, sheets 1 and 2) located in a pocket in the back of this report. These drawings are the same drawings that were submitted to and approved by both the Wyoming State Engineer and the Water Quality Division of the Wyoming DEQ.

The evaporation pond embankments will be constructed from the earthen materials obtained during the excavation of the pond cavities. The topsoil will be removed and stockpiled nearby as per the Reclamation Plan presented in the Environmental Report. The earthwork has been engineered to approximately balance the excavation and fill. As shown on the drawings, the fill portion of the embankments will be compacted to 85% proctor density using water as necessary. The embankments will be constructed in approximately 6" to 12" lifts using a sheepfoots roller and water to obtain the specified compaction. Once excavation and embankment construction are complete, the leak detection piping network will be put into place (see drawings) and the artificial liner will be installed. The artificial liner will consist of 30 mil reinforced hypalon or equivalent. The 30 mil reinforced liner used in the R & D pond has proved to be very satisfactory for the Bison Basin operation.

In determining the stability of the embankment slopes, normal procedures

TABLE 1

WATER BUDGET FOR EVAPORATION POND SYSTEM

Bison Basin Project

| Project Year | Discharge Rate (gpm) | Total Discharge Volume for Year (Acre-Feet)[1] | Pond Number | Discharge Volume to Each Pond (Acre-Feet) | Assumed Water Depth for the Purpose of Calculating Water Surface Area and Resulting Evaporation (Feet)[2] | Average Surface Area (Feet$^2$) | Net Evaporation in Acre-Feet (3.5 Feet of Evaporation/Year) | Volume of Water in Ponds at End of Year (Acre-Feet)[3] | Depth of Water in Ponds at End of Year (Acre-Feet)[3] | Reserve Capacity End of Year (Acre-Feet)[4] |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 6 | 9.07 | 1 | 9.07 | 0.01 | 117,000 | 9.07+ | 0 | 0 | 24.71 |
| | | | 2 | -- | -- | -- | -- | -- | -- | -- |
| | | | 3 | -- | -- | -- | -- | -- | -- | -- |
| 2 | 23 | 34.97 | 1 | 17.48 | 0.01 | 117,000 | 9.40 | 8.08 | 2.9 | 16.63 |
| | | | 2 | 17.48 | 0.01 | 117,000 | 9.40 | 8.08 | 2.9 | 16.63 |
| | | | 3 | -- | -- | -- | -- | -- | -- | -- |
| 3 | 23 | 34.97 | 1 | 17.48 | 2.9 | 129,000 | 10.36 | 15.20 | 5.2 | 9.51 |
| | | | 2 | 17.48 | 2.9 | 129,000 | 10.36 | 15.20 | 5.2 | 9.51 |
| | | | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 24.71 |
| 4 | 23 | 34.97 | 1 | 11.66 | 5.2 | 139,000 | 11.17 | 15.69 | 5.3 | 9.02 |
| | | | 2 | 11.66 | 5.2 | 139,000 | 11.17 | 15.69 | 5.3 | 9.02 |
| | | | 3 | 11.66 | 0.01 | 117,000 | 9.07+ | 0 | 0 | 24.71 |
| 5 | 17 | 25.90<br>+30.10[5]<br>56.00 | 1 | 15.05 | 5.3 | 140,000 | 11.25 | 19.49 | 6.6 | 5.22 |
| | | | 2 | 15.05 | 5.3 | 140,000 | 11.25 | 19.49 | 6.6 | 5.22 |
| | | | 3 | 25.90 | 0.01 | 117,000 | 9.40 | 16.50 | 5.6 | 8.21 |

NOTES:

1) Based on 342 days of estimated operating time per year.

2) Depth of water for the purpose of calculating the water surface area and the resulting evaporation is assumed to be the water depth at the end of the previous year. This is a conservative approach since the average depth of the water during the year will be something greater than the value at the end of the previous year; thus making the actual evaporation volume greater than the volume calculated.

3) The actual volume and depth of water at the end of a project year will vary from these calculated values depending upon when the water year for a given pond starts.

4) Does not include 3.55 acre-feet of reserve capacity in R & D pond.

5) Direct transfer of initial (one) pore volume from the final mining unit to the evaporation pond system as per the Restoration Plan.

such as the "slip-circle" method do not apply since no phreatic surface is created when an artificial impervious liner is utilized. Therefore, the conservative recommendations given in the Bureau of Reclamation's "Design of Small Dams" of 3:1 upstream (inside) slope and 2:1 downstream (outside) slope have been utilized in the design of the OPI evaporation ponds. The existing approved and licensed R & D evaporation pond has the above-stated upstream and downstream slopes, and no indication whatsoever of instability has been observed during its two-plus years of operation. Protection of the upstream (inside) slope of the embankment from erosion due to wave action will be provided by the artificial liner.

3.4 Freeboard

The determination of the required freeboard is based upon the amount of precipitation that will fall directly on the ponds (no runoff can flow into the ponds) and the height of the wave action. In regards to selecting a precipitation event for the determination of freeboard neither NRC Regulatory Guide 3.11 nor Corps of Engineers' Recommended Guidelines for Safety Inspection of Dams were specific as to the precipitation event to use. Therefore, in view of the remote location of the Bison Basin Project (low hazard potential) and small size of each pond, OPI has utilized back-to-back 100-year 24-hour precipitation events in selecting the required freeboard. The 100-year 24-hour precipitation event is 2.7 inches. The above-mentioned Corps of Engineers' Guidelines call for the use of one 100-year 24-hour precipitation event for low hazard potential impoundments instead of the back-to-back 100-year event utilized by OPI.

The height of the wave action is a function of the total of the wind tide plus the wave height plus the wave run-up. Using the graphs in the "Handbook of Applied Hydraulics" by C. V. Davis and K. E. Sorensen, the value of wind tide plus wave height plus wave run-up was calculated to be 1.43 feet. This value is based on an 80 mph wind and the minimum fetch distance given in the graphs of 0.1 mile. The 1.43 foot value is conservative since the tables are for deep-water conditions and the actual maximum fetch is approximately one-half the value of the fetch in the graphs.

The total required freeboard based upon the above presentation is 0.45 feet

(2.7 inches x 2) for direct precipitation plus 1.43 feet for wave action for a total of 1.88 feet. For practical purposes, the proposed minimum freeboard is 2.00 feet. This is the value approved for the R & D pond and is the value approved by the Wyoming State Engineer and the Wyoming DEQ.

## REFERENCES

1. Davis, C. V. and K. E. Sorensen, Handbook of Applied Hydraulics, McGraw-Hill Book Co., 1969.

2. U. S. Army Corps of Engineers, Recommended Guidelines for Safety Inspection of Dams, Washington, D. C., 1976.

3. U. S. Bureau of Reclamation, Design of Small Dams, U. S. Government Printing Office, Washington, D. C., 1977.

4. U. S. Nuclear Regulatory Commission, Regulatory Guide 3.11, Design, Construction, and Inspection of Embankment Retention Systems for Uranium Mills, Washington, D. C., 1977.

APPENDIX A

# PERMIT TO CONSTRUCT

/X/ New

/__/ Renewal

/__/ Modified

Permit No. 80-277

Ogle Petroleum Inc. - Bison No. 2, 3 and 4 Reservoirs
(Name of Facility)

This permit hereby authorizes the applicant:

OPI-Western Joint Venture - c/o Glenn Catchpole
(Last) (First) (Middle)

150 N. Nichols Avenue
(Street or P.O. Box)

Casper Wyoming 82601
(City) (County) (State)

to construct, install, or modify ~~a~~ three non-discharging settling ponds

facility located in SE¼, SE¼ and NE¼, SE¼, Sec. 25, T. 27N, R. 97W
(Legal Description)

in the County of Fremont, in the State of Wyoming. This permit shall be effective for a period of two years from the date of issuance of this permit not to exceed five (5) years.

NOTE THE ATTACHED COMMENT

AUTHORIZED BY:

William L. Garland
Administrator
Water Quality Division

REGISTERED PROFESSIONAL ENGINEER
WILLIAM L. GARLAND
P.E. # 1479
STATE OF WYOMING

Robert E. Sundin
Director
Wyoming Dept. of Environmental Quality

REGISTERED PROFESSIONAL ENGINEER
ROBERT E. SUNDIN
NO. 285
STATE OF WYOMING

July 11, 1980
Date of Issuance

"The authority to construct granted by this permit does not mean or imply that the Wyoming Department of Environmental Quality guarantees or insures that the permitted facility, when constructed, will meet applicable discharge permit conditions or other effluent or operational requirements."

MRC/kn

Form S.W. 3
Rev. 8-73

P.A.Velez

NOTE: Do not fold this form. Use typewriter or print neatly with black ink.

# STATE OF WYOMING

OFFICE OF THE STATE ENGINEER

## APPLICATION FOR PERMIT TO APPROPRIATE SURFACE WATER

THIS SECTION IS NOT TO BE FILLED IN BY APPLICANT

Filing/Priority Date

THE STATE OF WYOMING, STATE ENGINEER'S OFFICE } SS.

This instrument was received and filed for record on the 19th day of June, A.D. 1980, at 10:30 o'clock A. M.

ROSS P. BROWN, Assistant State Engineer

Recorded in Book 35 of Reservoirs, on Page 7.

Fee Paid $ 25.00 Map Filed E.

WATER DIVISION NO. 1 DISTRICT NO. 12 Trm Filing No. 23 6/310

PERMIT NO. 8153 E-18 RESERVOIR

NAME OF FACILITY

THE Bison No. 2, ~~[illegible]~~ INCLUDES CELL 1 & 2 RESERVOIR

1. The name(s) and complete mailing address(es) of the applicant(s) is/are
Ogle Petroleum Inc.
150 North Nichols Avenue
Casper, Wyoming 82601
(If more than one applicant, designate one to act as Agent for the others)

2. Name & address of agent to receive correspondence and notices
Gary A. Saunders (address same as above)

3. The use to which the water is to be applied is Industrial (evaporation pollution control)
(a) If more than one beneficial use is being applied for, the reservoir capacity must be allocated in acre-feet to the various uses.

| Active Capacity | Inactive Capacity |
|---|---|
| | ~~24.71 Acre feet for each pond Industrial~~ |
| 0 | 49.42 AF |

(b) The area of the high water line of the reservoir is ~~3.49 acres for each pond~~ 6.98 AC

(c) The total available capacity of the reservoir is ~~24.71 acre-feet for each pond~~ 49.42 AF

(d) If enlargement, the capacity of this enlargement is N/A acre-feet. four ground water filings SEE

4. The source of the proposed appropriation is Water from Laney Member/Green River Formation ~~(well permits have been applied for)~~ REMARKS. Note: Reservoir is located in the drainage of Bison Draw, trib. Grassy Lake, ~~in the drainage of West Draw, trib. West Lake, in the drainage of East Draw, trib. East Lake,~~ in the drainage of South Fork Sulphur Creek, trib. Sulphur Creek, trib. Alkali Creek, trib. Sweetwater River, trib. North Platte River.

5. The outlet of the proposed reservoir is located no outlet, the reservoirs are tied to a steel fence post, N 52°24' W 1582 feet distant from the SE corner of Section 25 T. 27 N. R. 97 W., and is in the SE¼SE¼ ~~and NE¼SE¼~~ of Section 25 T. 27 N. R. 97 W.

6. Are any of the lands covered by the proposed reservoir owned by the State or Federal Government? If so, describe lands and designate whether State or Federally owned.
Federal, Bureau of Land Management
(SE¼SE¼ and NE¼SE¼ of Section 25, T27N, R97W)

7. Fill out either (a) or (b).
(a) The reservoir is located in the channel of N/A

(b) The reservoir is to be filled through the 4" PVC pipeline from in-situ uranium wells ~~(with permits have been applied for)~~ SEE REMARKS Canal, which has a carrying capacity of 0.7 cubic feet per second.

8. (a) The dam is to be constructed as follows: In maximum of 1' compacted lifts, 43,500 yd³ from excavation of reservoir and 6,000 yd³ of additional excavation
Contents = 49,500 Cubic Yards.

(b) The water face of the dam is to be protected from wave action in the following manner:
Hypalon liner, or equivalent, will prevent erosion.

Permit No. 8153 Res. Page No. 7 (Leave Blank)

POOR ORIGINAL

9. The estimated time required for commencement of work is August, 1980, for completion of Construction is November, 1980.

10. The accompanying map is prepared in accordance with the State Engineer's Manual of Regulations and Instructions for filing applications and is hereby declared a part of this application. The State Engineer may require the filing of detailed construction plans.

Under penalties of perjury, I declare that I have examined this application and to the best of my knowledge and belief it is true, correct and complete.

Mary A. Saunders
Signature of Applicant or Agent

Date 6-9-80

NOTE: If construction under this application is for enlargement of an existing reservoir, a consent to this enlargement should be attached hereto from the present owners.

REMARKS

The life of these reservoirs is 15 years and, therefore, will automatically cancel in November, 1995. Reservoir No. 2 ~~and No. 3~~ will normally be operated at the 7,047 level and Reservoir No. 3 at the 7,056 level with inflow ranging from .009 to .03 MGD. POW

A freeboard of two feet was selected for these reservoirs. Wind tide, wave height, and wave run-up were computed to establish the requiren freeboard of 1.43 feet. The 1.43 value is conservative since the tables used are for deep water conditions and the actual maximum fetch is approximately one-half the value of the fetch in the graphs.

The embankment material is silty sand with some fine gravel (2 to 6 mm) and will be compacted in maximum 1' lifts. Four to six inches of sandy material will be in the bottom of the reservoirs underlying the liner. Six inches of topsoil will be stripped and stockpiled for reclamation.

The following is a list of concentrations of the type of water which the reservoir will contain:

TDS, 5000; B, -1.0; Ca, 200; Cl, 2000; F, 0.2; K, 20; Mg, 60; Na, 1650; $SO_4$, 450; $HCO_3$, 900; $NH_3$, 0.20; $U_3O_8$, 1.0 to 10.0 in mg/l; pH, 7.0; Ra 226, 250 to 5000 pCi/l

The inspection tubes will be monitored to detect a leak.

The source of this water is solution mining wells which obtain their water from the Laney Member of the Green River Formation. Wells permits have been applied for to cover usage of this water. Water will be discharged from the plant to the Reservoir during normal operations. During aquifer cleanup, water will be discharged to the Reservoir from the plant and wellfield. Water is provided under Permit Nos. U.W. 53490, U.W. 53491 , U.W. 53492 and U.W.53493 . POW

NOTICE

A Manual of Regulations and Instructions for filing applications will be furnished by the State Engineer's Office upon request. By carefully complying with the instructions contained in the Manual, much trouble and delay will be saved the applicant, the professional engineer or land surveyor, and the State Engineer's Office.

This application must be accompanied by maps in duplicate, prepared in accordance with the Manual, and by a filing fee of Two Dollars ($2.00).

Applications returned for corrections must be resubmitted to the State Engineer within 90 days with the corrections properly made, otherwise the filing will be canceled.

This application, when approved, does not constitute a complete water right. It is your authority to begin construction work, which must be commenced within the time allowed in the permit.

Notice of commencement of work and completion of the work described in the permit, must be filed in the State Engineer's Office before the expiration of the time allowed in the permit.

If extensions of time beyond the time limits set forth in the permit are required, requests for same must be in writing, stating why the additional time is required, and must be received in the State Engineer's Office before the expiration of the time allowed in the permit.

To perfect your water right, notify your Water Division Superintendent that you are ready to submit final proof of construction. This notice should be sent to the Superintendent as soon as possible after the terms of the permit have been complied with. When you have submitted your proof before the Superintendent, it will be considered by the State Board of Control and, if found to be satisfactory, the Board will issue to you a Certificate of Appropriation which will constitute a completed water right.

The granting of a permit does not constitute the granting of right-of-way. If any right-of-way is necessary in connection with the application, it should be understood that this responsibility is the applicant's.

THE STATE OF WYOMING, }
STATE ENGINEER'S OFFICE } SS.

**THIS IS TO CERTIFY that I have examined the foregoing application and do hereby grant ~~NOT~~ the same subject to the following limitations and conditions:**
**This permit grants only the right to use the water available in the stream after all prior rights are satisfied.**

This permit is granted for industrial - pollution control ( evaporation of plant discharge during in-situ uranium mining operation) purposes.

Water stored in this reservoir is provided under Permit Nos. U.W.53490, U.W. 53491 , U.W. 53492 , and U.W. 53493 . With the exception of direct precipitation, no surface water will be stored in this reservoir.

The holder of this permit is hereby notified that the proposed facility is located in the North Platte River drainage area which is subject to the Decree of the United States Supreme Court, 1945. Therefore, if it is found that use of water hereunder interferes with the proper regulation and administration of said Decree, the holder of this permit may be required by the State Engineer to make available to the drainage any water used by this facility to which the prior downstream appropriators may be entitled. In lieu of releasing said water, the holder of this permit may provide make-up water from another source as approved by the State Engineer.

This permit will be automatically cancelled on December 31, 1995, unless proper request for an extension of time is submitted to the State Engineer

No final proof to be accepted under this permit.

The time for commencement of construction work shall terminate on DECEMBER 31, 1981.
The time for completing the construction of the reservoir shall terminate on December 31, 19 81.

Witness my hand this 9TH day of SEPTEMBER, A.D. 19 80.

George L. Christopulos
GEORGE L. CHRISTOPULOS, State Engineer

Permit No. 8153 Res.

Page No. 7
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Form S.W. 3
Rev. 1-80
P.A.Velez

NOTE: Do not fold this form. Use typewriter or print neatly with black ink.

# STATE OF WYOMING

OFFICE OF THE STATE ENGINEER

APPLICATION FOR PERMIT TO APPROPRIATE SURFACE WATER

THIS SECTION IS NOT TO BE FILLED IN BY APPLICANT

Filing/Priority Date

THE STATE OF WYOMING, STATE ENGINEER'S OFFICE } SS.

This instrument was received and filed for record on the 24th day of July, A.D. 19 80, at 2:30 o'clock P. M.

Gail N. Thompson
ROSS P. BROWN, Assistant State Engineer

Recorded in Book 35 of Reservoirs, on Page 8.

Fee Paid 25.00 Map Filed E

WATER DIVISION NO. 1 DISTRICT NO. 12 Temp. Filing No. 23 3/324

PERMIT NO. 8154 E-18 RESERVOIR

NAME OF FACILITY

THE Bison No. 3 RESERVOIR

1. The name(s) and complete mailing address(es) of the applicant(s) is/are
Ogle Petroleum Inc.
150 North Nichols Avenue
Casper, Wyoming 82601
(If more than one applicant, designate one to act as Agent for the others)

2. Name & address of agent to receive correspondence and notices
Gary A. Summers (address as above)

3. The use to which the water is to be applied is INDUSTRIAL (pollution control)
(a) If more than one beneficial use is being applied for, the reservoir capacity must be allocated in acre-feet to the various uses.

| Active Capacity | Inactive Capacity |
|---|---|
| 0 | 24.71 AF |

(b) The area of the high-water line of the reservoir is 3.49 acres.

(c) The total available capacity of the reservoir is 24.71 acre-feet.

(d) If enlargement, the capacity of this enlargement is --- acre-feet.

4. The source of the proposed appropriation is four ground water filings SEE REMARKS water from Laney Member, Green River Formation.
NOTE: Reservoir is located in the drainage of Bison Draw, trib. Grassy Lake, ~~in the drainage of West Draw, trib. West Lake, in the drainage of East Draw, trib. East Lake,~~ in the drainage of South Fork Sulphur Creek, trib. Sulphur Creek, trib. Alkali Creek, trib. Sweetwater River, trib. North Platte River POW

5. The ~~proposed~~ reservoir is located N 52° 24' W, 1582 feet distant from the SE corner of Section 25 T. 27 N. R. 97 W. and is in the SE¼SE¼ of Section 25 T. 27 N. R. 97 W.

6. Are any of the lands covered by the proposed reservoir owned by the State or Federal Government? If so, describe lands and designate whether State or Federally owned.
SE¼SE¼ and NE¼SE¼ of Section 25, T27N, R97W is Federally owned (BLM)

7. Fill out either (a) or (b).
(a) The reservoir is located in the channel of ---
(b) The reservoir is to be filled through the 4" PVC pipeline from in-situ uranium wells ~~(E.P.U.U.W. 14-8-253)~~ SEE REMARKS POW
Canal, which has a carrying capacity of 0.7 cubic feet per second.

8. (a) The dam is to be constructed as follows: in maximum of 1' compacted lifts, 10,000 yd³ from excavation of the reservoir and 3,000 yd³ of additional excavation
Contents = 13,000 Cubic Yards.

(b) The water face of the dam is to be protected from wave action in the following manner:
Hypalon liner, or equivalent, will prevent erosion

Permit No. 8154 Res. Page No. 8 (Leave Blank)

9. The estimated time required for commencement of work is August, 1980. for completion of Construction is November, 1980.

10. The accompanying map is prepared in accordance with the State Engineer's Manual of Regulations and Instructions for filing applications and is hereby declared a part of this application. The State Engineer may require the filing of detailed construction plans.

Under penalties of perjury, I declare that I have examined this application and to the best of my knowledge and belief it is true, correct and complete.

Signature of Applicant or Agent

Date 7/23/80

NOTE: If construction under this application is for enlargement of an existing reservoir, a consent to this enlargement should be attached hereto from the present owners.

## REMARKS

The life of this reservo[illegible] years and, therefore, will automatically cancel in November, 1995. Bison No. 1 will normally be operated at the 7,056 level with inflow ranging from 0.009 to 0.03 MGD.

A freeboard of two feet was selected for the reservoir. Wind tide, wave height, and wave run-up were computed to establish the required freeboard of 1.43 feet. The 1.43 value is conservative since the tables used are for deep water conditions and the actual maximum fetch is approximately one-half the value of the fetch in the graphs.

The embankment material is silty sand with some fine gravel (2 to 6 mm) and will be compacted in maximum 1' lifts. Four to six inches of sandy material will be in the bottom of the reservoir underlying the liner. Six inches of topsoil will be stripped and stockpiled for reclamation.

The following is a list of concentrations of the type of water which the reservoir will contain:

TDS, 5000; B, -1.0; Ca, 200; Cl, 2000; F, 0.2; K, 20; Mg, 60; Na, 1650; $SO_4$, 450; $HCO_3$, 900; $NH_3$, 0.20; $U_3O_8$, 1.0 to 10.0 in mg/l; pH, 7.0; Ra 226, 250 to 5000 pCi/l.

The inspection tubes will be monitored every two weeks to detect a leak.

The source of this water is solution mining wells which obtain their water from the Laney Member of the Green River Formation. Well permits have been applied for to cover usage of this water (T.F. # U.W. 14-8-253). Water will be discharged from the plant to the reservoir during normal operations. During aquifer cleanup, water will be discharged to the reservoir from the plant and wellfield.

Surface runoff will not enter the reservoir.

POW

Water to be supplied under Permit Nos. U.W. 53490, U.W.53491 U.W.53492 and U.W.53493.

## NOTICE

A Manual of Regulations and Instructions for filing applications will be furnished by the State Engineer's Office upon request. By carefully complying with the instructions contained in the Manual, much trouble and delay will be saved the applicant, the professional engineer or land surveyor, and the State Engineer's Office.

This application must be accompanied by maps in duplicate, prepared in accordance with the Manual and by a filing fee of twenty-five dollars ($25.00).

Applications returned for corrections must be resubmitted to the State Engineer within 90 days with the corrections properly made; otherwise the filing will be canceled.

This application, when approved, does not constitute a complete water right. It is your authority to begin construction work, which must be commenced within the time allowed in the permit.

Notice of commencement of work and completion of the work described in the permit, must be filed in the State Engineer's Office before the expiration of the time allowed in the permit.

If extensions of time beyond the time limits set forth in the permit are required, requests for same must be in writing, stating why the additional time is required, and must be received in the State Engineer's Office before the expiration of the time allowed in the permit.

To perfect your water right, your Water Division Superintendent, or his authorized representative, will contact you after you have submitted notice to the State Engineer stating you have completed the construction as described in your permit. After execution of the proof, it will be considered by the State Board of Control, and, if found to be satisfactory, the Board will issue to you a Certificate of Appropriation which will constitute a completed water right.

The granting of a permit does not constitute the granting of right-of-way. If any right-of-way is necessary in connection with the application, it should be understood that this responsibility is the applicant's.

THE STATE OF WYOMING,
STATE ENGINEER'S OFFICE } SS.

THIS IS TO CERTIFY that I have examined the foregoing application and do hereby grant the same subject to the following limitations and conditions:
This permit grants only the right to use the water available in the stream after all prior rights are satisfied.

This permit is granted for industrial - pollution control ( evaporation of plant discharge during in-situ uranium mining operation) purposes.

Water stored in this reservoir is provided under Permit Nos. U.W.53490, U.W.53491, U.W.53492, and U.W.53493. With the exception of direct precipitation, no surface water will be stored in this reservoir.

The holder of this permit is hereby notified that the proposed facility is located in the North Platte River drainage area which is subject to the Decree of the United States Supreme Court, 1945. Therefore, if it is found that use of water hereunder interferes with the proper regulation and administration of said Decree, the holder of this permit may be required by the State Engineer to make available to the drainage any water used by this facility to which the prior downstream appropriators may be entitled. In lieu of releasing said water, the holder of this permit may provide make-up water from another source as approved by the State Engineer.

This permit will be automatically cancelled on December 31, 1995, unless proper request for an extension of time is submitted to the State Engineer.

No final proof to be accepted under this permit.

The time for commencement of construction work shall terminate on DECEMBER 31, 1981.
The time for completing the construction of the reservoir shall terminate on December 31, 19 81.

Witness my hand this 9TH day of SEPTEMBER, A.D. 19 80.

George L. Christopulos
GEORGE L. CHRISTOPULOS, State Engineer

Permit No. 8154 Rec.

Page No. 8
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