EPWM - 6

NMED
PERMITS & MODS

DP-1634

State of New Mexico
ENVIRONMENT DEPARTMENT
Ground Water Quality Bureau
Harold Runnels Building
1190 St. Francis Drive, P.O. Box 26110
Santa Fe, New Mexico 87502-6110
Telephone (505) 827-2918
Fax (505) 827-2965

BILL RICHARDSON
GOVERNOR

RON CURRY
SECRETARY

CINDY PADILLA
DEPUTY SECRETARY

CERTIFIED MAIL – RETURN RECEIPT REQUESTED

June 26, 2007

Doug Lynn, Interim Executive Director
CEHMM
505 North Main Street
Carlsbad, NM 88220

RE: Discharge Permit, DP-1634, Center of Excellence for Hazardous Materials Management (CEHMM) Experimental Algae Propogation Ponds

Dear Mr. Lynn:

The New Mexico Environment Department (NMED) issues the enclosed Discharge Permit, DP-1634, to CEHMM pursuant to the New Mexico Water Quality Act (WQA), NMSA 1978 §§74-6-1 through 74-6-17, and the New Mexico Water Quality Control Commission (WQCC) Regulations (copy previously provided), 20.6.2 NMAC.

The Discharge Permit contains terms and conditions that shall be complied with by CEHMM and are enforceable by NMED pursuant to Section 20.6.2.3104 NMAC, WQA, NMSA 1978 §74-6-5 and §74-6-10. Issuance of this Discharge Permit does not relieve CEHMM of the responsibility to comply with the WQA, WQCC Regulations, and any other applicable federal, state and/or local laws and regulations, such as zoning requirements and nuisance ordinances.

Pursuant to Paragraph (4) of Subsection H of 20.6.2.3109 NMAC, the term of the Discharge Permit shall commence on the date the discharge begins. Prior to discharging, written notification shall be given to NMED stating the date the discharge is to commence. The term of this Discharge Permit shall be five years from the date the discharge commences, or seven years from the date of this letter, whichever occurs first. You must submit an application for renewal at least 180 days before the permit expiration date.

If you have any questions, please contact John Hall at (505) 505-827-1049. Thank you for your cooperation during this Discharge Permit review.

Sincerely,

George Schuman for W. Olson

William C. Olson, Chief
Ground Water Quality Bureau

WO:JH

Encs: Discharge Permit, DP-1634

cc: Carlos Romero, District Manager, NMED District IV (permit)
NMED Carlsbad Field Office (permit)
Jim Sizemore, Office of the State Engineer (permit)

GROUND WATER DISCHARGE PERMIT
Center of Excellence for Hazardous Materials Management (CEHMM) Experimental Algae Propogation Ponds, DP-1634

I. INTRODUCTION

The New Mexico Environment Department (NMED) issues this Discharge Permit, DP-1634, to CEHMM (permittee) pursuant to the New Mexico Water Quality Act (WQA), NMSA 1978 §§74-6-1 through 74-6-17, and the New Mexico Water Quality Control Commission (WQCC) Regulations, 20.6.2 NMAC.

NMED's purpose in issuing this Discharge Permit, and in imposing the requirements and conditions specified herein, is to control the discharge of water contaminants from the CEHMM Experimental Algae Propogation Ponds into ground and surface water, so as to protect ground and surface water for present and potential future use as domestic and agricultural water supply and other uses and protect public health. In issuing this Discharge Permit, NMED has determined that the requirements of Subsection C of 20.6.2.3109 NMAC have been met.

The activities which produce the discharge, the location of the discharge, and the quantity, quality and flow characteristics of the discharge are briefly described as follows:

Up to 670,000 gallons per year (gpy) of water containing sodium chloride plus lesser amounts of other salts and chemical fertilizer containing primarily nitrogen and phosphorous as nutrients will be discharged into two synthetically lined algae propogation ponds to fill them and to maintain their water level. The discharge contains water contaminants or toxic pollutants which may be elevated above the standards of Section 20.6.2.3103 NMAC. The facility is located at 67 East Four Dinkus Road, approximately 6 miles south of Artesia, in Section 16, Township 18S, Range 26E, Eddy County. Ground water most likely to be affected is at a depth of approximately 134 feet and has a total dissolved solids concentration of approximately 834 milligrams per liter.

The permittee's application constitutes the Discharge Plan and consists of the materials submitted by Doug Lynn dated January 25, 2007 and additional information received on DATE. The discharge shall be managed in accordance with the Discharge Plan as conditioned by this Discharge Permit.

Pursuant to Section 20.6.2.3109 NMAC, NMED reserves the right to require a Discharge Permit Modification in the event NMED determines that the requirements of 20.6.2 NMAC are being or may be violated or the standards of Section 20.6.2.3103 NMAC are being or may be violated. This may include a determination that structural controls and/or management practices approved under this Discharge Permit are not protective of ground water quality, and that more stringent requirements to protect and/or remediate ground water quality may be required by NMED. These requirements may include: lining/relining ponds; expanding monitoring requirements; and/or implementing abatement of water pollution.

Issuance of this Discharge Permit does not relieve CEHMM of the responsibility to comply with the WQA, WQCC Regulations, and any other applicable federal, state and/or local laws and regulations, such as zoning requirements and nuisance ordinances.

The following abbreviations may be used in this Discharge Permit:

Abbreviation	Explanation	Abbreviation	Explanation
BOD_5	biochemical oxygen demand (5-day)	NMSA	New Mexico Statutes Annotated
CFR	Code of Federal Regulations	NO_3-N	nitrate-nitrogen
CFU	colony forming units	NTU	nepholometric turbidity units
Cl	chloride	TDS	total dissolved solids
LADS	land application data sheet(s)	TKN	total Kjeldahl nitrogen
mg/L	milligrams per liter	TSS	total suspended solids
mL	milliliters	total nitrogen	TKN+NO_3-N
NMAC	New Mexico Administrative Code	WQCC	Water Quality Control Commission
NMED	New Mexico Environment Department		

II. FINDINGS

In issuing this Discharge Permit, NMED finds:

1. CEHMM is potentially discharging effluent or leachate from Experimental Algae Propogation Ponds so that such effluent or leachate may move directly or indirectly into ground water within the meaning of Section 20.6.2.3104 NMAC.

2. CEHMM is potentially discharging effluent or leachate from Experimental Algae Propogation Ponds so that such effluent or leachate may move into ground water of the State of New Mexico which has an existing concentration of 10,000 milligrams per liter or less of total dissolved solids within the meaning of Subsection A of 20.6.2.3101 NMAC.

3. The potential discharge from Experimental Algae Propogation Ponds is not subject to any of the exemptions of Section 20.6.2.3105 NMAC.

III. CONDITIONS

The following conditions shall be complied with by CEHMM and are enforceable by NMED. CEHMM is permitted to discharge water contaminants subject to the following conditions:

OPERATIONAL PLAN

#	**Terms and Conditions**
1.	The permittee shall implement the following operational plan to ensure compliance with Title 20, Chapter 6, Parts 1 and 2 NMAC. [20.6.2.3106.C NMAC, 20.6.2.3107 NMAC]
2.	The permittee shall operate in a manner such that standards and requirements of Section 20.6.2.3103 NMAC including human health, other domestic water supply and irrigation standards are not violated. [20.6.2.3103 NMAC]

3.	Prior to discharging nutrient and salt fortified water to the synthetically lined ponds, the permittee shall give written notification to NMED stating the date the discharge is to commence. [20.6.2.3109.H NMAC]
4.	The permittee is authorized to discharge up to 670,000 gallons per year (gpy) of water containing sodium chloride plus lesser amounts of other salts and chemical fertilizer containing primarily nitrogen and phosphorous as nutrients into two synthetically lined algae propogation ponds to fill them and to maintain their water level. [20.6.2.3104 NMAC]
5.	The permittee shall maintain a minimum of one foot of freeboard in the ponds at all times. In the event that a minimum of one foot of freeboard cannot be maintained at all times, the permittee shall submit a corrective action plan for NMED approval to modify the management of discharge volumes. [20.6.2.3107 NMAC, 20.6.2.3109 NMAC]
6.	The permittee shall post signs at the facility entrance indicating that the water is not potable within 90 days of the effective date of this Discharge Permit (by September 24, 2007). All signs shall remain visible and legible for the term of this Discharge Permit. [20.6.2.3109 NMAC]
7.	The permittee shall visually inspect the ponds and surrounding berms on a monthly basis to ensure proper maintenance. Any conditions that could damage the pond liners or affect the structural integrity of the ponds shall be corrected. Such conditions include but are not limited to erosion damage, animal activity/damage, the presence of potentially harmful vegetation such as woody shrubs or uncontrolled weeds, evidence of seepage, or the presence of large pieces or quantities of debris. The permittee shall keep a log of the inspection findings and repairs made. In the event that inspection findings reveal significant damage likely to affect the ability of the lined ponds to contain contaminants, the permittee shall submit a corrective action plan to NMED for approval. [20.6.2.3107 NMAC]

MONITORING, REPORTING, AND OTHER REQUIREMENTS

#	**Terms and Conditions**
8.	The permittee shall conduct the following monitoring, reporting, and other requirements listed below. [20.6.2.3107 NMAC]
9.	METHODOLOGY - Unless otherwise approved in writing by NMED, the permittee shall conduct sampling and analysis in accordance with the most recent edition of the following documents: a) American Public Health Association, Standard Methods for the Examination of Water and wastewater (18th, 19th or current); b) U.S. Environmental Protection Agency, Methods for Chemical Analysis of Water and Waste; c) U.S. Geological Survey, Techniques for Water Resources Investigations of the U.S. Geological Survey; d) American Society for Testing and Materials, Annual Book of ASTM Standards, Part 31.Water; e) U.S. Geological Survey, et al., National Handbook of Recommended Methods for Water Data Acquisition; and

	f) Methods of Soil Analysis: Part 1. Physical and Mineralogical Methods and Part 2. Chemical and Microbiological Properties, American Society of Agronomy. [20.6.2.3107.B NMAC]
10.	The permittee shall submit semi-annual monitoring reports to NMED by January 31 and July 31 of each year. Monitoring requirements detailed in this Discharge Permit are summarized on the sheet titled *Summary of Required Actions, Monitoring and Reporting.* [20.6.2.3107 NMAC]
11.	The permittee shall measure the volume of water discharged monthly to the ponds by recording the totalizing flow meter readings for the supply lines to each pond and calculating the monthly water usage. A log of meter readings, calculated water usage, notes and measured water volume discharged shall be submitted to NMED in the semi-annual monitoring reports. The water supply meter shall be kept operational at all times. [20.6.2.3107.A(1) NMAC, 20.6.2.3109.H(1) NMAC]
12.	The permittee shall sample water from a representative location within one pond on a semi-annual basis and analyze the samples for TKN, NO_3-N, TDS and Cl. Analytical results shall be submitted to NMED in the semi-annual monitoring reports. [20.6.2.3107 NMAC]
13.	Within 90 days of the effective date of this Discharge Permit (by September 24, 2007), the permittee shall install one new monitoring well. The permittee shall install: • One monitoring well (MW-1) located 20 to 50 feet hydrologically downgradient of the ponds. All monitoring well locations shall be approved by NMED prior to installation. Submit information documenting ground water flow direction with the proposed monitoring well location. The wells shall be completed in accordance with the attachment titled *Ground Water Discharge Permit Monitoring Well Construction and Abandonment Conditions*, Revision 0.0, January 2007. Construction and lithologic logs shall be submitted to NMED within 30 days of well completion. [20.6.2.3107 NMAC]
14.	The permittee shall perform semi-annual ground water sampling in one well used for monitoring. The permittee shall sample: • MW-1, intended to be located hydrologically downgradient of the ponds. The ground water sampling shall be performed according to the following procedure: a) measure the depth-to-ground water from the top of well casing to the nearest hundredth of a foot; b) purge three well volumes of water from the well prior to sample collection; and c) obtain samples from the well to be analyzed for NO_3-N, TKN, Cl, and TDS. Depth-to-water measurements, analytical results, and a facility layout map showing the location and number of the monitoring well shall be submitted to NMED in the semi-annual monitoring reports. [20.6.2.3107 NMAC]

CONTINGENCY PLAN

#	**Terms and Conditions**
15.	In the event that ground water standards are violated during the term of this Discharge Permit, upon closure of the facility or during the implementation of post-closure requirements, the permittee shall submit to NMED a corrective action plan that proposes measures to mitigate damage from the discharge including, at a minimum, source control

	measures and an implementation schedule. The permittee may be required to abate water pollution pursuant to Sections 20.6.2.4000 though 20.6.2.4115 NMAC, if the corrective action plan will not result in compliance with the standards and requirements set forth in Section 20.6.2.4103 NMAC within 180 days of confirmation of ground water contamination. [20.6.2.1203 NMAC, 20.6.2.4105.A(8) NMAC]
16.	In the event of a spill or release that is not authorized under this Discharge Permit, the permittee shall initiate the notifications and corrective actions as required in Section 20.6.2.1203 NMAC. The permittee shall take immediate corrective action to contain and remove or mitigate the damage caused by the discharge. Within 24 hours after discovery of the discharge, the permittee shall verbally notify NMED and provide the information required by Paragraph (1) of Subsection A of 20.6.2.1203 NMAC. Within 7 days of discovering the discharge, the permittee shall submit a written report to NMED verifying the oral notification and providing any additional information or changes. The permittee shall submit a corrective action report within 15 days after discovery of the discharge. [20.6.2.1203 NMAC]
17.	In the event NMED or the permittee identifies any other failures of the discharge plan or system not specifically noted herein, NMED may require the permittee to develop for NMED approval contingency plans and schedules to cope with the failures. [20.6.2.3107.A(10) NMAC]

CLOSURE PLAN

#	**Terms and Conditions**
18.	Upon closure of the facility, the permittee shall perform the following closure measures: a) Remove or plug all lines leading to the pond(s) so that a discharge can no longer occur. b) Evaporate all liquids from the pond(s) and dispose of all solids in accordance with all local, state, and federal (40 CFR Part 503) regulations. c) Perforate or remove the pond liner(s) and re-grade the ponds with clean fill to blend with surface topography and prevent ponding. When all post-closure requirements have been met, the permittee may request to terminate the Discharge Permit. [20.6.2.3107.A(11) NMAC]

GENERAL TERMS AND CONDITIONS

#	**Terms and Conditions**
19.	RECORD KEEPING - The permittee shall maintain at its facility a written record of all data and information related to field measurements, sampling, and analysis conducted pursuant to this Discharge Permit. The following information shall be recorded and shall be made available to NMED upon request: a) The dates, exact place and times of sampling or field measurements; b) The name and job title of the individuals who performed each sample collection or field measurement; c) The date of the analysis of each sample; d) The name and address of the laboratory and the name and job title of the person that performed the analysis of each sample;

	e) The analytical technique or method used to analyze each sample or take each field measurement; f) The results of each analysis or field measurement, including raw data; g) The results of any split sampling, spikes or repeat sampling; and h) A description of the quality assurance and quality control procedures used. [20.6.2.3107.A NMAC]
20.	RECORD KEEPING - The permittee shall maintain a written record of any spills, seeps, and/or leaks of effluent, and of leachate and/or process fluids not authorized by this Discharge Permit. [20.6.2.3107.A NMAC]
21.	RECORD KEEPING - The permittee shall maintain a written record of the operation, maintenance, and repair of all facilities/equipment used to treat, store or dispose of waste/process water; to measure flow rates, to monitor water quality, or to collect other data required by this Discharge Permit. This record shall include repair, replacement or calibration of any monitoring equipment and repair or replacement of any equipment used in the permittee's waste or waste/process water treatment and disposal system. [20.6.2.3107.A NMAC]
22.	RECORD KEEPING - The permittee shall maintain a written record of the amount of waste/process water, effluent, leachate or other wastes discharged pursuant to this Discharge Permit. [20.6.2.3107.A NMAC]
23.	RECORD KEEPING - The permittee shall retain records of all monitoring information, including all calibration and maintenance records, copies of all reports required by this Discharge Permit, and records of all data used to complete the application for this Discharge Permit for a period of at least five years from the date of the sample collection, measurement, report or application. This period may be extended by request of the Secretary at any time. [20.6.2.3107.A NMAC]
24.	INSPECTION and ENTRY - The permittee shall allow the Secretary or an authorized representative, upon the presentation of credentials, to: a) Enter at regular business hours or at other reasonable times upon the permittee's premises or other location where records must be kept under the conditions of this Discharge Permit, or under any federal or WQCC regulation. b) Inspect and copy, during regular business hours or at other reasonable times, any records required to be kept under the conditions of this Discharge Permit, or under any federal or WQCC regulation. c) Inspect, at regular business hours or at other reasonable times, any facility, equipment (including monitoring and control equipment or treatment works), practices or operations regulated or required under this Discharge Permit, or under any federal or WQCC regulation. d) Sample or monitor, at reasonable times for the purpose of assuring compliance with this Discharge Permit or as otherwise authorized by the New Mexico Water Quality Act, any effluent, water contaminant, or receiving water at any location before or after discharge. [20.6.2.3107.D NMAC, 74-6-9(B) & (E) WQA]
25.	INSPECTION and ENTRY - Nothing in this Discharge Permit shall be construed as limiting in any way the inspection and entry authority of NMED under the WQA, the

	WQCC Regulations, or any other applicable law or regulation. [20.6.2.3107 NMAC, 74-6-9(B) & (E) WQA]
26.	DUTY to PROVIDE INFORMATION - The permittee shall furnish to NMED, within a reasonable time, any documents or other information which it may request to determine whether cause exists for modifying, terminating and/or renewing this Discharge Permit or to determine compliance with this Discharge Permit. The permittee shall also furnish to NMED, upon request, copies of documents required to be kept by this Discharge Permit. [20.6.2.3107.D NMAC, 74-6-9(B) & (E) WQA]
27.	SPILLS, LEAKS, and OTHER UNAUTHORIZED DISCHARGES - This Discharge Permit authorizes only those discharges specified herein. Any unauthorized discharges violate Section 20.6.2.3104 NMAC and must be reported to NMED and remediated as required by Section 20.6.2.1203 NMAC. [20.6.2.1203 NMAC]
28.	MODIFICATIONS and/or AMENDMENTS - The permittee shall notify NMED of any changes to the permittee's waste/process water treatment and disposal system, including any changes in the waste/process water flow rate or the volume of waste/process water storage, or of any other changes to operations or processes that would result in any significant change in the discharge of water contaminants. The permittee shall obtain NMED's approval, as a modification to this Discharge Permit pursuant to Subsections E, F, or G of 20.6.2.3109 NMAC, prior to any increase in the quantity discharged, or any increase in the concentration of water contaminants discharged, above those levels approved in this Discharge Permit. [20.6.2.3107.C NMAC]
29.	ENFORCEMENT - Any violation of the requirements and conditions of this Discharge Permit, including any failure to allow NMED staff to enter and inspect records or facilities, or any refusal or failure to provide NMED with records or information, may subject the permittee to an enforcement action. Pursuant to WQA 74-6-10(A) and (B), such action may include a compliance order requiring compliance immediately or in a specified time, assessing a civil penalty, modifying or terminating the Discharge Permit, or any combination of the foregoing; or an action in district court seeking injunctive relief, civil penalties, or both. Pursuant to WQA 74-6-10(C) and 74-6-10.1, civil penalties of up to $15,000 per day of noncompliance may be assessed for each violation of the WQA 74-6-5, the WQCC Regulations, or this Discharge Permit, and civil penalties of up to $10,000 per day of noncompliance may be assessed for each violation of any other provision of the WQA, or any regulation, standard, or order adopted pursuant to such other provision. For certain violations specified in WQA 74-6-10.2, criminal penalties may also apply. In any action to enforce this Discharge Permit, the permittee waives any objection to the admissibility as evidence of any data generated pursuant to this Discharge Permit. [74-6 WQA]
30.	COMPLIANCE WITH OTHER LAWS - Nothing in this Discharge Permit shall be construed in any way as relieving the permittee of the obligation to comply with all applicable federal, state, and local laws, regulations, permits or orders. [20.6.2 NMAC]
31.	RIGHT to APPEAL - The permittee may file a petition for review before the WQCC on this Discharge Permit. Such petition shall be in writing to the WQCC within thirty (30) days of the receipt of this Discharge Permit. Unless a timely petition for review is made, the decision of NMED shall be final and not subject to judicial review. [74-6-5(O) WQA]

32.	TRANSFER of DISCHARGE PERMIT - Prior to the transfer of any ownership, control, or possession of this permitted facility or any portion thereof, the permittee shall notify the proposed transferee in writing of the existence of this Discharge Permit and include a copy of this Discharge Permit with the notice. The permittee shall deliver or send by certified mail to NMED a copy of the notification and proof that such notification has been received by the proposed transferee. [20.6.2.3111 NMAC]
33.	TERM - Pursuant to WQA 74-6-5(I) and Subsection H of 20.6.2.3109 NMAC, the term of this Discharge Permit is seven years from its effective date or five years from the date the discharge commences, whichever occurs first. To renew this Discharge Permit, the permittee must submit an application for renewal at least 180 days before the termination date. [20.6.2.3109.H NMAC, 74-6-5(I) WQA]

EFFECTIVE DATE: June 26, 2007

EXPIRATION DATE: June 26, 2014 or 5 years from the date the discharge commences

George Schuman for W. Olson

WILLIAM C. OLSON
Chief, Ground Water Quality Bureau
New Mexico Environment Department

New Mexico Environment Department Ground Water Quality Bureau
Discharge Permit Summary

Facility Information

Facility Name	Center of Excellence for Hazardous Materials Management Experimental Algae Propogation Ponds
Discharge Permit Number	DP-1634
Legally Responsible Party	Doug Lynn, Interim Executive Director CEHMM 505 North Main Street Carlsbad, NM 88220 (505) 885-3700

Treatment, Disposal and Site Information

Primary Waste Type	Agriculture
Facility Type	AGS- Experimental Algae Propogation Ponds

Discharge Locations

Discharge Type	Designation	Description & Comments
Lagoon	North	Synthetically lined
Lagoon	South	Synthetically lined

Depth-to-Ground Water	134 feet
Total Dissolved Solids (TDS)	834 mg/L

Permit Information

Application Received	January 25, 2007
Public Notice Published	April 26, 2007
Discharge Permit Issued	June 26, 2007
Discharge Permit Expires	June 26, 2007, or 5 years from the date the discharge commences
Permitted Discharge Volume	670,000 gallons per year

NMED Contact Information

Mailing Address	Ground Water Quality Bureau P.O. Box 26110 Santa Fe, New Mexico 87502
GWQB Telephone Number	(505) 827-2900
NMED Lead Staff	John Hall
Lead Staff Telephone Number	(505) 827-1049
Lead Staff Email	john.hall@state.nm.us

New Mexico Environment Department Ground Water Quality Bureau

Discharge Permit

Summary of Required Actions, Monitoring and Reporting

Center of Excellence for Hazardous Materials Management Experimental Algae Propogation Ponds, DP-1634

Effective Date: June 26, 2007

Required Actions

#	Description of Required Actions	Due Date
1.	Submit written notification of the date discharge is to begin.	prior to discharge
2.	Post signs	within 90 days of effective date (by September 24, 2007)
3.	Install 1 monitoring well. Obtain NMED approval of location prior to installation.	within 90 days of effective date (by September 24, 2007)
4.	Submit monitoring well construction and lithologic logs.	within 30 days of well completion
5.	Submit Monitoring Reports, containing items specified below.	Semi-annually by the 31st of Jan, Jul

Monitoring and Reporting Requirements

#	Description of Monitoring and Reporting Requirements	Monitoring Frequency	Reporting Due Dates
1.	Analyze water sample from one pond for TKN, NO3-N, TDS, Cl. Submit analytical results (laboratory reports or bench sheets).	semi-annually	31st of Jan, Jul
2.	Record supply well meter readings each discharge to estimate discharge volumes to lagoon(s). Submit meter readings, calculations and discharge volumes.	monthly	31st of Jan, Jul
3.	Inspect lagoons and berms. Keep log of inspection findings and repairs made.	monthly	keep on-site
4.	Submit depth to water and analytical results of ground water samples from 1 monitoring well for TKN, NO3-N, TDS, and Cl.	semi-annually	31st of Jan, Jul

NOTE: See Discharge Permit for full requirement details.

Submit all reports to:

NMED Ground Water Quality Bureau
PO Box 26110
Santa Fe, New Mexico 87502

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NEW MEXICO ENVIRONMENT DEPARTMENT
GROUND WATER QUALITY BUREAU

DISCHARGE PERMIT APPLICATION

Type of Application. Check appropriate box.

☒ Application for new Discharge Permit -- new facility

☐ Application for new Discharge Permit -- existing (unpermitted) facility

☐ Application for Discharge Permit Renewal

☐ Application for Discharge Permit Modification
"Modification" is defined as a change to the permit requirements that result from a change in the location of the discharge, a significant increase in the quantity of the discharge, or a significant change in the quality of the discharge.

☐ Application for Discharge Permit Renewal and Modification

For an existing Discharge Permit, please indicate: DP Number _____ Expiration date _____

Checklist of Application Components.

☒ Part A: Administrative Completeness.	*Instructions for completing the application are included on the form itself and on Supplemental Instructions for Parts A and B.* *You may fill out the application manually, or a Microsoft Word version may be downloaded from www.nmenv.state.nm.us (Ground Water Quality) and filled out electronically.*
☒ Part B: Operational, Monitoring, Contingency and Closure Plans, with required attachments. *Choose appropriate option:* ☐ Septic Tank System ☒ General – Various Facility Types	
☒ Part C: Site Information, with required attachments.	
☒ $100 Filing Fee, payable to the New Mexico Environment Department. *Required from all applicants.* An additional fee will be assessed prior to permit issuance. Permit fees are listed in Section 20.6.2.3114 NMAC.	

Certification. Signature must be that of the person named in Item A-3 of Part A of the application.

I certify under penalty of law that I am knowledgeable about the information contained in this application. The information is, to the best of my knowledge and belief, true, accurate and complete.

Signature: _____ Date: 15 Jan 2007

Printed Name: Doug Lynn

Title: Interim Executive Director, Center of Excellence for Hazardous Materials Management (CEHMM)

Send three complete copies of this application and the filing fee to:

Program Manager
Ground Water Pollution Prevention Section
New Mexico Environment Department
PO Box 26110
Santa Fe, NM 87502-6110

Form updated May 2006

GROUND WATER DISCHARGE PERMIT APPLICATION
PART A: ADMINISTRATIVE COMPLETENESS
All Facilities

A-1. Facility Information. See Supplemental Instructions to determine what constitutes the "facility." The physical location of the facility must be provided. If the facility does not have an address, the location can be described by road intersections, mile posts, or landmarks, as appropriate.

Facility Name: CEHMM Experimental Algae Propagation Ponds

Former Names (if any): N/A

Physical address/location *(mandatory)*: 67 E. Four Dinkus Road, Artesia, NM 88210-9110

County: Eddy

Mailing address: 505 North Main Street
Carlsbad, NM 88220

Contact person: Doug Lynn

Title: Interim Executive Director, CEHMM

Telephone number(s): 505-885-3700

Fax number: 505-885-6422 E-mail address: doug.lynn@cehmm.org

A-2. Type of Discharge and Type of Facility. See Supplemental Instructions.

Type of discharge: ☐ Domestic ☒ Agricultural ☐ Industrial ☐ Mining

Type of facility: Algae propagation ponds

A-3. Applicant Information. The applicant is the person or entity (e.g., corporation, partnership, organization, municipality, etc.) legally responsible for the discharge and for complying with the terms of the Discharge Permit. If the applicant is an entity, then the name and title of a contact person must be provided. This application must be signed by the applicant or contact person named here.

Applicant Name: Center of Excellence for Hazardous Materials Management (CEHMM)

Mailing address: 505 North Main Street
Carlsbad, NM 88220

Contact person: Doug Lynn

Title: Interim Executive Director

Telephone number(s): 505-885-3700

Fax number: 505-885-6422 E-mail address: doug.lynn@cehmm.org

A-4. Consultant Information (if applicable). If the consultant is a company or organization, then the name and title of a contact person must be provided.

Consultant/Firm Name: N/A

Mailing address: _____

_____

Contact person: _____

Title: _____

Telephone number(s): _____

Fax number: _____ E-mail address: _____

A-5. Permit Contact Information (if applicable). If someone other the applicant listed in Item A-3 or a consultant listed in Item A-4 is a primary contact for this application and/or facility, list here.

Permit Contact Name: Ron Reeves

Title: Environmental Scientist

Mailing address: 505 North Main Street

Carlsbad, NM 88220

Telephone number(s): 505-885-3700

Fax number: 505-885-6422 E-mail address: ron.reeves@cehmm.org

A-6. Ownership.

The applicant owns (check as appropriate): ☒ the facility ☐ some discharge sites ☒ all discharge sites

If other parties own the facility or any of the discharge sites, attach their names and contact information.

A-7. Discharge Quantity.

Your Discharge Permit will specify a maximum discharge volume, which is typically expressed as the maximum number of gallons per day that may be treated and/or disposed of. Please indicate below the maximum discharge volume for your facility. You must show how it was determined in Part B of your application. For further explanation, see Supplemental Instructions for Part B.

Maximum discharge volume: 0 gallons per day (or other units: _____)

A-8. Processing, Treatment, Storage and Disposal System. Briefly describe how wastewater, sludge, etc. is processed, treated, stored, and/or disposed of at your facility. See Supplemental Instructions for examples of system components.

This is not a wastewater treatment facility – it is an aquaculture facility. The facility is being constructed and operated to conduct research on the propagation and harvesting of algae to produce oil feedstock for biodiesel. The facility will consist of two synthetically lined "raceway" ponds and associated R&D equipment.

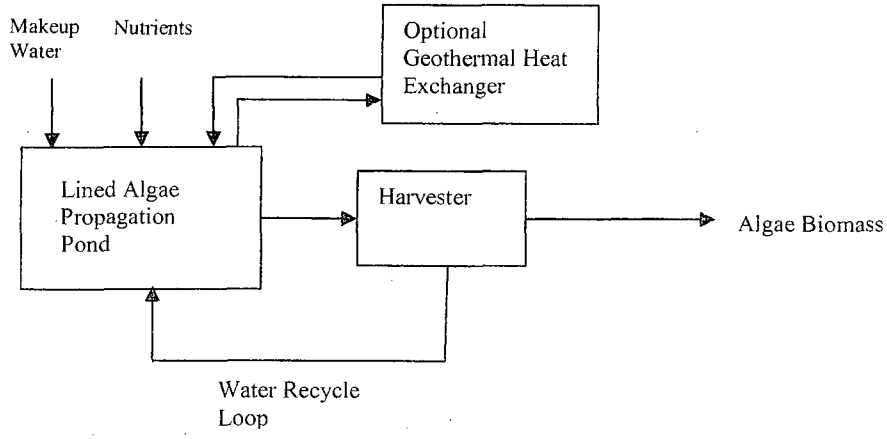
Irrigation water will be added to the ponds from well RA00827 and amended with sodium chloride and nutrients as appropriate for the target algae strain. The ponds will then be inoculated with the target algae strain. Each algae pond will be circulated with a paddlewheel or other device. Algae will be harvested for the purpose of biodiesel research. Makeup water from well RA00827 will be added to the pond as needed to compensate for losses due to evaporation and water entrained in harvested biomass. Water amendments will be added as necessary to maintain the algal culture.

Because this is a research facility, operational parameters and associated equipment will be varied to determine optimal process for biodiesel feedstock production. Operating parameters may include, but not be limited to the following:

- water depth (not to exceed 12 inches)
- nutrient concentrations
- circulation rates and methods
- harvesting methods

Any water derived from harvesting that is not consumed by the harvesting process will be returned to the ponds. Salt and nutrients required for pond maintenance will be stored in a covered and enclosed structure safe from flooding to minimize any accidental release of these materials to the environment. Any solid waste generated by the facility will be managed in accordance with applicable solid waste requirements. A simple process flow diagram is provided in Figure A-8.

Figure A-8
Pond Process Flow Diagram



A-9. Discharge Locations. List the locations of your facility and of all components of your processing, treatment, storage and/or disposal system. Examples of components include septic tanks, lagoons, leachfields, irrigation sites, mine stockpiles, etc. Additional examples are listed in the Supplemental Instructions. Latitude and longitude are optional unless township, range and section are not available.

Components	Township	Range	Section(s)	Latitude	Longitude
Experimental Algae Propagation Ponds	18 S	26 E	16		
Well RA00827	18 S	26 E	16		

A-10. Discharge Quality.

Indicate the expected quality of the discharge -- wastewater, leachate, sludge, etc. -- generated, stored, treated, processed and/or discharged at your facility. List the contaminants of concern and the expected concentrations. *Not all facilities need to characterize influent quality.* See Supplemental Instructions for typical contaminants and additional guidance.

Expected or Known Contaminants	**Expected concentration range** Indicate units: mg/L, CFU/100 ml, etc.	
	Incoming (Influent)	Final (Effluent)
Nitrate	N/A	<40 mg/l
Total Kjeldahl nitrogen (TKN)	N/A	<12 mg/l
Total Dissolved Solids (TDS)	N/A	<40,000 mg/l
Chloride (Cl)	N/A	<36,000 mg/l
pH	N/A	7.0 – 9.0

For **new** septic tank systems, you may either fill out the chart above or simply check one of the following options:

☐ typical domestic wastewater

☐ low-strength domestic wastewater (large gray water component; e.g., laundromat, spa, etc.)

☐ high-strength domestic wastewater (low water use; e.g., RV park, low-flow toilets at campground, etc.)

A-11. Ground Water Conditions.

All applicants must provide the depth to and pre-discharge TDS concentration of the ground water that could be affected by the discharge. Refer to Supplemental Instructions for details on how to obtain these values.

Indicate the depth to the most shallow ground water beneath the discharge site. If there are multiple discharge sites, indicate the range of depths.	Indicate the total dissolved solids (TDS) concentration of most shallow ground water beneath the discharge site. Attach copies of analyses.
Depth to water (feet): 134 BGS Reference: ☐ Measurement, nearby monitoring well ☐ Measurement, nearby supply well ☒ Well log from nearby well (attach copy) ☐ Office of the State Engineer http://www.ose.state.nm.us/ ☐ Report or study (give citation here and attach relevant portion): ☐ Other (describe):	TDS (mg/L): 834 Reference: ☐ Analysis from upgradient monitoring well ☐ Analysis from on-site supply well ☒ Analysis from shallow nearby supply well ☐ Concentration provided in previous Discharge Permit application ☐ Report or study (give citation here and attach relevant portion): ☐ Other (describe):

A-12. Public Notice. See Supplemental Instructions.

a) The public notice packet including instructions and materials should be sent to:

☒ Applicant ☐ Consultant ☐ Other: _____

b) Copies of the public notice packet (excluding sign) should be sent to:

☐ Applicant ☐ Consultant ☐ Other: N/A

c) The applicant is required to provide public notice of this application by placing a display ad in a newspaper of general circulation near the location of the proposed discharge. Indicate newspaper you intend to place the ad in:

Newspaper: Artesia Daily Press, 503 W. Main St., Artesia NM 88210

d) *For new or modification applications only:* The applicant must post a sign for 30 days in a conspicuous location at or near the facility, as approved by NMED. One sign must be posted for each 640 contiguous acres or less of the discharge site. An additional notice must be posted at an off-site location conspicuous to the public. Describe the locations below where you intend to post the notices. You may also attach sketches or photographs.

At or near facility: Sign will be placed on the public road frontage bordering the SE ¼ of the N ½ of Section 16, Township 18S, Range 26 E.

2 by 3 feet in size

Off-site location: The Artesia Public Library, 306 West Richardson, Artesia, NM 88210

flyer size

Supplemental Instructions for Part A
All Facilities

Please note: Discharge Permits are required for a wide range of facilities that process, treat, store and/or dispose of wastewater, sludge, septage, leachate, contaminated soils, mine tailings, industrial waste, mine ore, waste rock, or other similar materials. For the purposes of this application form, the term "discharge" applies to any of these materials whether they are actually discharged or whether they represent only a potential discharge that could occur due to factors such as poor maintenance, improper installation, equipment failure or accidents.

A-1. Facility Information.

The "facility" may be identified as:

a) a treatment facility, such as a municipal wastewater treatment plant;
b) the source of the discharge, such as a subdivision, dairy, or waste rock pile;
c) a disposal facility or operation, such as for sludge or septage;
d) the discharge location or recipient of reclaimed wastewater for reuse, such as a golf course or cement plant;
e) a storage and/or processing facility with off-site disposal;
f) a collection of facilities, such as numerous comfort stations at a state park; or
g) a project or operation, such as a construction project or a system to distribute reclaimed wastewater throughout a city.

A-2. Type of Discharge and Type of Facility.

Characterize the type of discharge, wastewater, sludge, leachate, etc. generated, processed or received by your facility as domestic, agricultural, industrial or mining. Examples of a variety of facility types are categorized below.

Domestic Waste

"Domestic" waste contains human excreta or originates from typical residential plumbing fixtures.

- Municipal wastewater treatment plant
- Septage disposal
- Sludge disposal
- Mobile home/RV park
- Campground/park
- School/educational facility
- Restaurant
- Subdivision/apartment complex
- Unincorporated community
- Lodging/resort/spa
- Residential facility
- Commercial/shopping complex
- Laundromat
- Facility using reclaimed domestic wastewater

Agricultural Waste

- Dairy
- Food processing
- Slaughter facility
- Nursery/greenhouse
- Manufacture/processing of agricultural chemicals
- Feedlot
- Livestock truck washout

Industrial Waste

- Manufacturing
- Power plant
- Military installation
- Vehicle/equipment wash
- Mortuary
- Hydrocarbon landfarm
- Ground water remediation
- Ethanol plant
- Asphalt plant

Mining Discharges

- tailing impoundment
- mine dewatering
- waste rock pile
- smelter slag
- in-situ leach
- leach piles
- pipelines
- collection ponds
- concentrator – other beneficiation

This listing is only a guide, as there can be crossover between categories. For example, a golf course might use treated industrial wastewater for irrigation. The type of facility in that case is "golf course" and the type of waste is "industrial." A mining operation may need a permit for its restroom and shower facilities. In that case, the type of facility is a "mining operation" and the type of discharge is "domestic waste."

A-7. Discharge Quantity.

Refer to the Supplemental Instructions for Part B for information on how to calculate the maximum discharge volume for your facility.

A-8 and A-9. Treatment, Storage, Disposal System.

The following are examples of treatment, storage and disposal methods:

Treatment Methods

- Septic tank
- Grease interceptor
- Oil/water separator
- Manure separator
- Wetlands
- Lagoon (indicate whether aerated and type of liner)
- Trickling filter
- Activated sludge (extended air, SBR, etc.)
- Sand filter
- Membranes
- Sludge drying bed
- Disinfection (specify type)
  - chlorination
  - UV/ozone
- Water treatment plant

Storage Methods

- Above/below ground tank
- Storage lagoon (indicate type of liner)
- Holding tank
- Pit toilet
- Stockpile
- Tailing impoundment

Disposal Methods

- Leachfield
- Infiltration gallery
- Evaporation lagoon (indicate type of liner)
- Evaporation tank
- Impoundment
- Discharge to waters of the US (NPDES permit required)
- Ongoing land application (specify type)
  - subsurface irrigation
  - sprinkler irrigation
  - flood irrigation
  - drip irrigation
  - surface spreading (solids)
  - surface injection (solids)
- Temporary uses of reclaimed wastewater
- Ongoing use of reclaimed wastewater for:
  - manufacturing
  - construction or dust control

A-9. Discharge Quality.

Untreated wastewater entering a treatment facility (also referred to as "influent") must be characterized so that the treatment process can be evaluated. It is not necessary to provide influent quality for systems providing minimal treatment prior to discharge or disposal, such as systems relying on crop uptake for treatment (e.g., dairies), septic tank – leachfield systems, storage/processing facilities or evaporative systems. The final quality of the waste or wastewater disposed of or discharged must be characterized for all facilities.

For most agricultural and domestic facilities, the contaminants of concern include nitrate as nitrogen (NO_3-N), total Kjeldahl nitrogen (TKN), total dissolved solids (TDS), and chloride (Cl). For domestic facilities with advanced treatment, additional contaminants include total suspended solids (TSS), biochemical oxygen demand (BOD_5), and fecal coliform bacteria. Contaminants of concern at industrial and mining sites include pH, metals, and organic compounds. List all that apply.

A-10. Ground Water Conditions.

The depth to ground water beneath your facility and/or discharge site must be provided. This is true even if your facility or operation is intended to have no discharge. Discharge Permits are required for "no-discharge" lagoons, storage tanks, etc. because of the potential for a discharge to occur due to factors such as improper installation, poor maintenance, equipment failure or accidents.

The best way to determine the depth to water is to measure it in an on-site or nearby monitoring well. If a monitoring well is not available, the measurement may be from a water supply well. If there is a well but it is not possible to access it for a measurement, you could refer to the well log for that well and/or others in the vicinity. Well log information is available on the website of the State Engineer's office:

http://www.ose.state.nm.us/.

Be aware that water levels have dropped in many areas of the state, so more recent well logs in those areas are more reliable.

There may be a significant discrepancy in the depth to water in different wells, even when falling water levels is not a factor. One reason for this is that a water supply well may rely on a deep aquifer rather than water in the "first" or most shallow aquifer. Discharge Permits are intended to protect all ground water, so it is important to report the most shallow depth in the vicinity of your site.

The total dissolved solids (TDS) concentration of the ground water prior to discharge must be provided. As explained for the depth to water, this is true even if your facility or operation is intended to have no discharge. The TDS value provides a general indication of the quality of the ground water that could be affected by your operation.

The best way to obtain a pre-discharge TDS concentration is to sample an on-site or nearby well

before your facility begins operating. It is better to sample a shallow rather than a deep well, if possible. It may be that a neighboring facility has existing analytical data for its Discharge Permit. (If so, be sure to obtain data from a non-impacted well.)

If there are no wells in your vicinity or it is not possible to sample them, you may find general TDS concentrations in reports available from sources such as a university, the State Engineer's Office (http://www.ose.state.nm.us/) or the US Geological Survey (http://nm.water.usgs.gov/). If you are renewing or modifying your Discharge Permit, you may refer to the TDS concentration previously determined if there was a sound basis for it. Monitoring data or other information obtained since the permit was issued, however, may warrant listing a different value.

A-12. Public Notice.

The latest revision of 20.6.2.3108 NMAC, which specifies the applicant's public notice requirements, is effective as of July 16, 2006. Once NMED has determined that your application is administratively complete, **the instructions and materials necessary to complete the public notice requirements will be sent to you.**

GROUND WATER DISCHARGE PERMIT APPLICATION
PART B: OPERATIONAL, MONITORING, CONTINGENCY AND CLOSURE PLANS
GENERAL FORM (VARIOUS FACILITY TYPES)

Operational Plan *[Section 20.6.2.3106.C, 3109.C NMAC]*

B-1. Source(s) of the Discharge. Describe what generates the wastewater, sludge or other discharges processed and/or disposed of at your facility. Identify all sources. Attach additional pages, if needed. See Supplemental Instructions.

There will be no discharges from this facility. This is not a wastewater treatment facility – it is an aquaculture facility. The facility is being constructed and operated to conduct research on the propagation and harvesting of algae to produce oil feedstock for biodiesel. The facility will consist of two synthetically lined "raceway" ponds, aquaculture media, pumps, valves, motors, piping and harvesting equipment.

Chemicals used by the facility, such as water amendments, will be stored in a manner to prevent their release to the environment. Any solid waste generated by the facility will be managed in accordance with applicable solid waste requirements. A simple process flow diagram is provided in Figure A-8.

B-2. Discharge Quantity. Describe the methods/calculations used to determine the maximum discharge volume listed in Item A-6 in Part A of your application. Attach additional pages, if needed. See Supplemental Instructions.

N/A. There will be no discharges from this facility.

B-3. Site Map. Attach a site map showing the components of your proposed system and relevant surrounding features, clearly labeled, such as:

- treatment units
- lagoons
- tanks
- sumps
- manure separators
- land application fields
- domestic wastewater reuse areas
- pits
- stockpiles
- leachfields
- sludge drying beds
- roads
- buildings
- supply wells
- monitoring wells
- extraction/injection wells
- arroyos
- nearby water bodies such as ponds or canals
- property boundaries
- other permitted discharges
- required setbacks
- north arrow

If map is not to scale, mark distances on the map.

☒ Site map is attached. (See Attachment B-3)

B-4. Flood Protection. Describe the methods used to prevent flooding and run-off at the facility (tank protection, berms, diversion channels, etc.)

Each algae pond will be constructed with drainage swales to prevent flooding of the ponds. A minimum of 12 inches of freeboard will be maintained in ponds. Ponds will be routinely inspected to maintain integrity of swales.

Best management practices will be followed when storing and transferring sources of pollutants used in the process. This will include routine inspections of dry material storage areas.

B-5. Plans and Specifications. For new facilities and for new components of existing systems, attach plans and specifications certified by a New Mexico registered professional engineer. *[Section 20.6.2.1202 NMAC]*

☐ Not applicable because no new facilities are proposed.

☒ Plans and specifications are attached. (See Attachment B-5)

☐ Plans and specifications were previously submitted. Submittal date(s): _____

B-6. Description of Components. Provide descriptive details of all components of your processing, treatment, storage and/or disposal system. Include all components listed under Item A-8 in Part A.

Component	Description (construction material, liner type, irrigation method, capacity, dimensions, area, etc.)
Synthetic liner	40 mil non-reinforced HDPE
Makeup water supply	Well RA00827, underground 8" PVC irrigation line with standpipe control valves, fittings, meter, and hoses
Circulation device	One or more of the following: Paddlewheel, drive motor, air pump, water pump, PVC pipe
Optional geothermal heat exchanger	2' deep excavation, drive motor, air pump, water pump, PVC pipe, valves, condensate pot
Harvesting loop	Drive motor, harvesting device, water pump, PVC pipe, valves

B-7. Operational Plan. Attach a detailed description of how you operate your processing, treatment, storage and/or disposal system.

Animal feeding operations: include stormwater management, nutrient management plans, method for mixing irrigation and wastewater.

Domestic wastewater treatment facilities: include pre-treatment, solids management, vegetation management for land application.

Facilities using reclaimed domestic wastewater above ground: include setbacks, irrigation schedules, employee training, public information, etc. as needed to comply with the *NMED Policy for the Above-Ground Use of Reclaimed Domestic Wastewater*. A copy of the policy is available on the NMED website www.nmenv.state.nm.us under Ground Water Quality.

☒ Operational plan is attached. (See attachment B-7.)

☐ Operational plan was previously submitted. Submittal date(s): _____

B-8. System Maintenance. Attach a description of the operations and maintenance procedures which ensure that your processing, treatment and disposal system functions properly; e.g., inspections, pumping schedules, equipment maintenance, etc.

☒ O & M procedures are attached. (See attachments B-7 and B-8.)

☐ O & M procedures were previously submitted. Submittal date(s): _____

B-9. Backflow Prevention. If wastewater is used for land application or irrigation, describe methods used to protect wells from contamination by wastewater backflow. For new facilities or new systems at an existing facility, only air gap or reduced pressure valve assemblies are acceptable methods.

a) Clearly describe and/or sketch the location of air gaps or devices and attach specifications.

N/A

b) Describe how devices are maintained.

N/A

B-10. Water Rights. Animal feeding operations which land apply wastewater must attach documentation of irrigation water rights for the proposed land application fields, sufficient to sustain the intended crop rotation.

☐ Water right documentation is attached.

☒ Not applicable.

B-11. Past Ground Water Monitoring Results. *This item applies only to existing facilities seeking renewal and/or modification of a Discharge Permit that required ground water monitoring.*

a) Attach a graph or a table showing all analytical results from ground water sampling at your facility. If preparing graphs, a separate graph should be developed for each constituent, except that nitrate and TKN may be shown on the same graph. Multiple wells may be shown on the same graph. See Supplemental Instructions for sample table and graph.

b) If the monitoring results indicate that ground water standards have been violated or that there is an upward trend approaching standards, attach a description of what actions you have taken or will take to address the elevated concentrations. Ground water standards are listed in Section 20.6.2.3103 NMAC. See the Supplemental Instructions for frequently referenced standards.

Monitoring Plan *[Section 20.6.2.3107.A NMAC]*

B-12. Discharge Volumes. Describe how and where the monthly discharge volume at your facility will be. For all measuring devices, provide type, location, and units of measure including multipliers (e.g., gallons, gallons x 100, acre-ft, etc.) See Supplemental Instructions. Attach additional pages, if necessary.

N/A. There will be no discharges from this facility; therefore, there will be no discharge volume monitoring devices or locations.

B-13. Discharge Quality Monitoring. Discharge Permits typically require that the discharge (treated wastewater, sludge, septage, etc.) be sampled on a regular basis. The frequency of sampling varies by type of facility, as do the contaminants of concern. Domestic and agricultural Discharge Permits typically require sampling for total Kjeldahl nitrogen (TKN), nitrate-nitrogen (NO_3-N), total dissolved solids (TDS) and chloride on a quarterly or semi-annual basis. *(continued on next page)*

The *NMED Policy for the Above-Ground Use of Reclaimed Domestic Wastewater* specifies additional sampling requirements for treatment facilities producing reclaimed wastewater for above-ground uses.

In the space below, provide a description or sketch of the sampling point(s) to be used for sampling the discharge at your facility.

There will be no discharges from this facility; therefore, there will be no discharge sampling points. However, operating parameters will be monitored to maintain the algae culture. These parameters will include water temperature, pH, nitrate (NO_3-N), TDS, salinity (NaCl), oxygen, CO_2, phosphate (PO_4) and turbidity. Grab samples will be collected and analyzed according to *Attachment B-7, Operational Plan for Experimental Algae Propagation Ponds.*

Optional: In the space below (or as an attachment), you may propose revisions or additions to the standard discharge quality monitoring requirements. If you do, provide the rationale for your proposal.

There is no discharge from this facility; therefore, the owners propose that sampling and analyses be performed as described in *Attachment B-7, Operational Plan for Experimental Algae Propagation Ponds.* This will include water quality parameters as well as inspections to maintain facility integrity and identify unintentional discharges.

B-14. Ground Water Quality Monitoring. Discharge Permits typically require that ground water samples be collected quarterly from properly constructed monitoring wells located downgradient from discharge locations. The samples must be analyzed for contaminants of concern. For most domestic and agricultural Discharge Permits, the typical contaminants of concern are total Kjeldahl nitrogen (TKN), nitrate-nitrogen (NO_3-N), total dissolved solids (TDS) and chloride.

Optional: In the space below (or as an attachment), you may propose revisions or additions to the standard ground water monitoring requirements. If you do, provide the rationale for your proposal.

Because there will be no discharge from this facility, ground water will not be impacted. Therefore, the owners propose that procedures to maintain facility integrity and promptly identify and respond to unintentional discharges be substituted for ground water quality monitoring.

For existing facilities:

Indicate number of existing monitoring wells: N/A

Attach copies of monitoring well logs.

☐ Well logs attached. ☐ Well logs cannot be located.

☐ Well logs previously submitted. Submittal date(s): _____

Attach copy of monitoring well survey (typically not applicable if fewer than 3 monitoring wells).

☐ Survey attached. ☐ No survey has been conducted.

☐ Survey previously submitted. Submittal date(s): _____

B-15. Other Monitoring. In addition to discharge volumes, discharge quality monitoring and ground water sampling, Discharge Permits typically require the following monitoring, depending on the type of facility:

- inspection and pumping of septic tanks, grease tanks, lift stations
- inspection of leachfields
- inspection of lagoons
- process testing for treatment plants

- land application data sheets (LADS)
- tracking of chemical fertilizer applications to land application areas
- soil sampling (agricultural and selected other facilities land applying wastewater)
- harvested plant material testing (agricultural facilities)

Optional: In the space below (or as an attachment), you may propose revisions or additions to the other standard monitoring requirements for your type of facility. If you do, provide the rationale for your proposal.

The owners propose the following monitoring based on the design and use of this facility:

- discharge quality monitoring described in B-13 above
- inspection of pond liners (Attachment B-8, System Maintenance for Experimental Algae Propagation Ponds)
- tracking amounts of makeup water added to ponds
- tracking the type and quantity of water amendments added to ponds
- tracking biomass harvested

Contingency Plan *[Section 20.6.2.3107.A.10 NMAC]*

B-16. System Failure. Describe your contingency plan in the event there is a failure of your wastewater or discharge system (e.g., wastewater back-up, pump failure, pipe breaks, tank overflow, leachfield failure, saturated fields etc.)

System failure will be defined as a release from the pond system due to liner failure or broken/leaking piping and/or releases from associated pumps, valves, etc. In the event of system failure, facility operators will place system in a safe condition and notify management. Affected components will be isolated, removed from service and repaired or replaced as necessary. In the event of liner failure, provisions will be made to empty the contents of the failed pond into a containment device (such as an above ground tank) to a point at which repairs can be made.

B-17. Contingency Leachfield Location. *This item applies only if your disposal system includes a leachfield.* Identify a location on your site map (Item B-3) for a contingency leachfield in the event that your leachfield must be replaced. If no land is available for a contingency leachfield at an existing facility, describe how you will address a failed leachfield. New facilities must provide for a contingency leachfield location.

N/A

B-18. Other Contingencies. Discharge Permits typically contain standard contingencies to address:

- exceeding wastewater quality limits
- violation of ground water or surface water standards
- spills or illegal releases of wastewater
- migration of soil nitrogen
- loading nitrogen above limit

Propose additional contingency plans, if appropriate:

N/A

Closure Plan *[Section 20.6.2.3107(A)11 NMAC]*

B-18. Facility Closure and Post-Closure Monitoring. Discharge Permits contain standard requirements to address the closure of part or all of your discharge system, as follows:

- cap or plug lines to prevent the flow of wastewater to treatment or disposal system
- empty and remove or backfill tanks
- empty lagoons, perforate or remove liners, re-grade to surface topography
- appropriately dispose of solids
- regrade and cover stockpiles at mine facilities
- continue ground water monitoring for at least two years, longer as appropriate
- enact contingency plans if ground water standards are violated
- financial assurance may be required.

Propose additional closure plans in the space below or as an attachment, if appropriate:

The facility will be closed as follows:

- The liquid in the ponds will be allowed to evaporate
- Solids remaining after evaporation will be disposed of according to solid waste management regulations
- Liners will be pulled up and disposed of according to solid waste management regulations
- Berms will be reduced and ponds will be filled with natural material to return site to original grade

Please Note: You must also complete Part C of the application.

Supplemental Instructions for Part B – General Form

B-1. Source(s) of the Discharge.

Be specific in describing all sources. Consider the following examples:

- Municipalities – identify particular industries or specialized facilities contributing wastewater.
- RV Parks – identify showers, dump stations, laundromat, etc.
- Subdivisions – identify homes, apartments, commercial developments, water softener backwash, etc.
- Landfarms or disposal facilities – specify type of materials accepted, e.g., residential septage, car wash grit trap waste, contaminated soils/water, treated municipal sludge, etc.
- Dairies – identify milking parlors, type of washdown used, sources of stormwater runoff, etc.
- Schools – identify cafeteria, gym, showers, etc.
- Truck stops – identify restaurant, showers, car wash, etc.
- Facilities receiving reclaimed wastewater – identify the treatment facility providing the reclaimed wastewater.
- Food processing and industrial facilities – describe the processes which produce the waste stream and chemicals used.
- Mines – identify processes including beneficiation, tailing, waste rock, leach facilities, pipelines, ponds, catchments, booster stations, in-situ leach facilities.

You do not need to include solid wastes, hazardous wastes or discharges being managed under other permits; however, these should be listed under Item C-7 in Part C of the application.

B-2. Discharge Quantity.

Your Discharge Permit will allow for the treatment, processing and/or discharge of up to a specified volume, generally, a maximum number of gallons per day. The flow at your facility on any given day must not exceed this "maximum discharge volume." It is determined based on the expected contributions from the sources you identified in Item B-1.

NMED will carefully review the basis of the maximum discharge volume you propose. Show all your calculations and assumptions.

Animal feeding operations must provide calculations based on the number of animals and water conservation practices in place.

Landfarms, disposal facilities, processing facilities typically identify the expected number of loads to be delivered.

For septic systems and wastewater treatment plants, the maximum discharge volume is also referred to as the "design flow." It includes a peaking or safety factor to guard against back-ups and overflows.

Municipal wastewater treatment facilities should identify the population served, growth assumptions, and expected per capita usage considering any contributing industries.

On-site domestic wastewater treatment facilities should rely on published design flows such as those provided in the NMED Liquid Waste Regulations (20.7.3 NMAC), the Uniform Plumbing Code or the USEPA On-site Wastewater Treatment Systems Manual.

For existing facilities, the maximum discharge volume may be based on a record of measured flows if no changes are anticipated. At least two years of flow data must be submitted, and the highest monthly discharge volume must be multiplied by a peaking factor of 1.5.

NMED will verify that your proposed or existing facility can handle maximum discharge volume you propose.

B-11. Past Monitoring Results.

A complete list of ground water standards can be found in Section 20.6.2.3103 NMAC. The standards for contaminants most frequently monitored under Discharge Permits are as follows:

Nitrate-nitrogen (NO_3-N)	10 mg/L
Chloride	250 mg/L
Total dissolved solids (TDS)	1000 mg/L
Sulfate (SO_4)	600 mg/L
pH	between 6 and 9

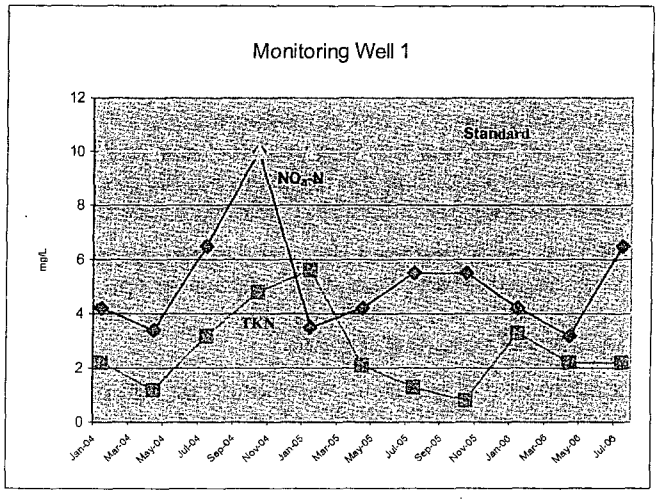
There is no ground water standard for total Kjeldahl nitrogen (TKN). Because TKN converts readily to nitrate as it moves through the vadose zone, however, concentrations approaching or exceeding 10 mg/L are of concern.

Additional parameters typically apply at mining or industrial facilities.

Some ground waters in the state have TDS or chloride concentrations that naturally exceed these standards. In that case, the standard is the naturally occurring level. You must provide documentation of such elevated natural conditions, such as analytical results from a non-impacted well.

An example table and graph follow:

Date	Monitoring Well 1	
	NO3-N	TKN
Jan-04	4.2	2.2
Apr-04	3.4	1.2
Jul-04	6.5	3.2
Oct-04	10	4.8
Jan-05	3.5	5.6
Apr-05	4.2	2.1
Jul-05	5.5	1.3
Oct-05	5.5	0.8
Jan-06	4.2	3.3
Apr-06	3.2	2.2
Jul-06	6.5	2.2



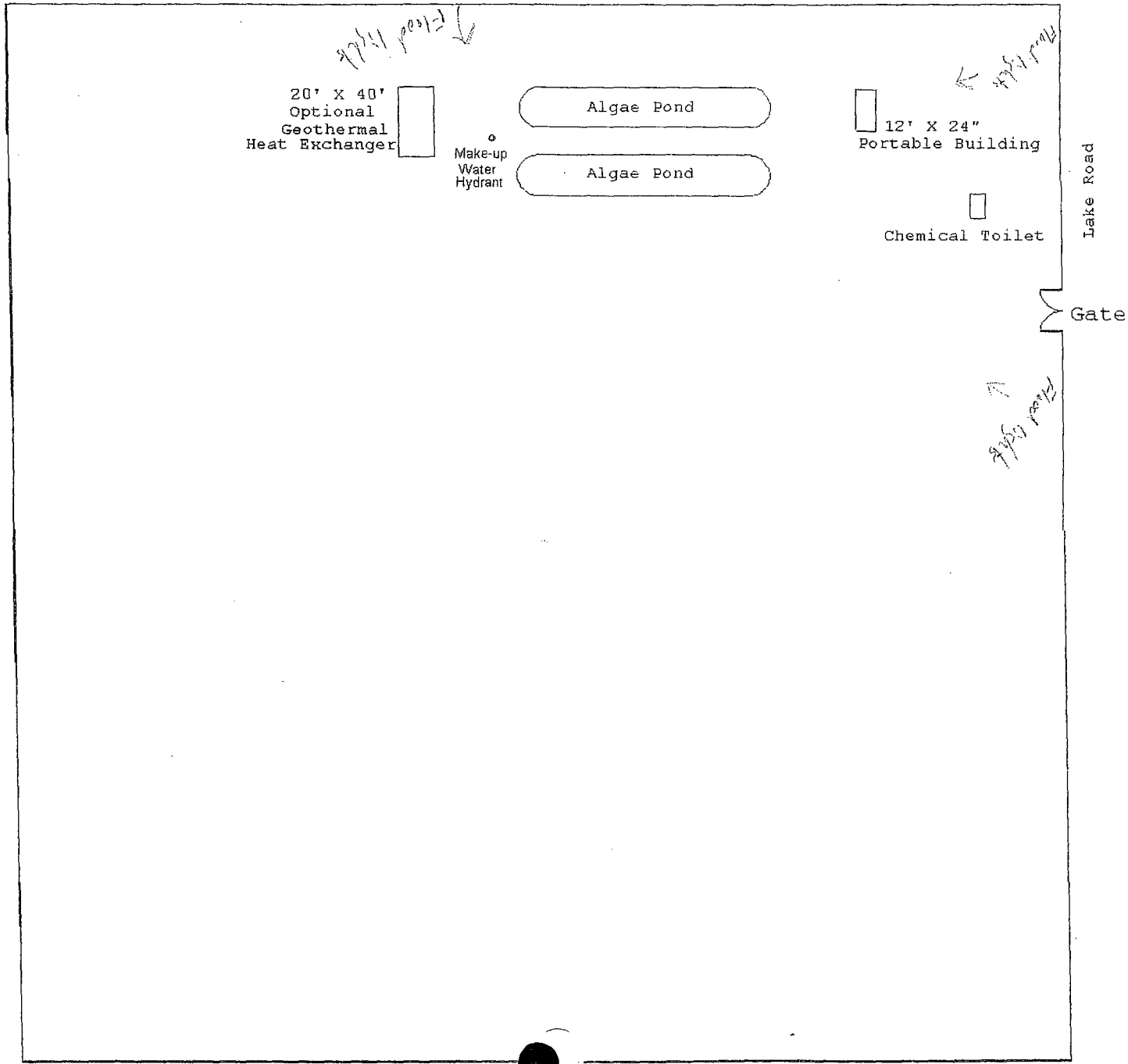
B-12. Discharge Volumes.

You must provide a method for measuring the discharge volume (Section 20.6.2.3109.H.1 NMAC). At facilities with treatment or storage lagoons, it is necessary to measure both the volume entering the treatment system as well as the volume ultimately discharged.

If you land apply wastewater to more that one discharge location, you must be able to track the volume to each location.

If your facility is small and relies on gravity to carry wastewater to the treatment and disposal system, it may be acceptable to estimate the wastewater flow. This can be done by metering water usage and deducting the volume of water used for fresh-water irrigation, swimming pools, evaporative cooling, livestock watering or other uses that do not result in wastewater flowing to the treatment system.

Attachment B-3
Site Map



CEHMM
Experimental Algae Propagation Ponds
12/29/2006

In addition to the drawings, the following construction requirements shall be adhered to:

LINER MATERIAL

1. The liner shall be chemically compatible with any material that will contact the liner;
2. The liner material shall be resistant to deterioration by sunlight if any portion of the liner will be exposed;
3. Liner material shall be 40 mil HDPE.

LAGOON SITE PREPARATION

1. The lagoon shall be lined with sufficient liner material to accommodate shrinkage due to temperature changes and with no folds in the liner.

2. The area shall be cleared and grubbed so that at least 6 inches below the liner is free of sharp rocks, vegetation and stubble. The soil surface in contact with the liner shall be compacted to a smooth surface to a minimum of 90% ASTM D-698 and shall be dry during liner installation. The liner shall not be installed in temperatures below freezing.

3. A liner vent shall be installed in each pond and shall be properly sealed.

4. The installer of the liner shall be certified by the liner manufacturer and shall follow manufacturer's installation and field seaming guidelines. All seams shall be field tested by the installer and certification of the adequacy of the seams shall be supplied.

Experimental Algae Propagation Ponds -
Stamped drawings are on file at CEHMM.
Available upon request.

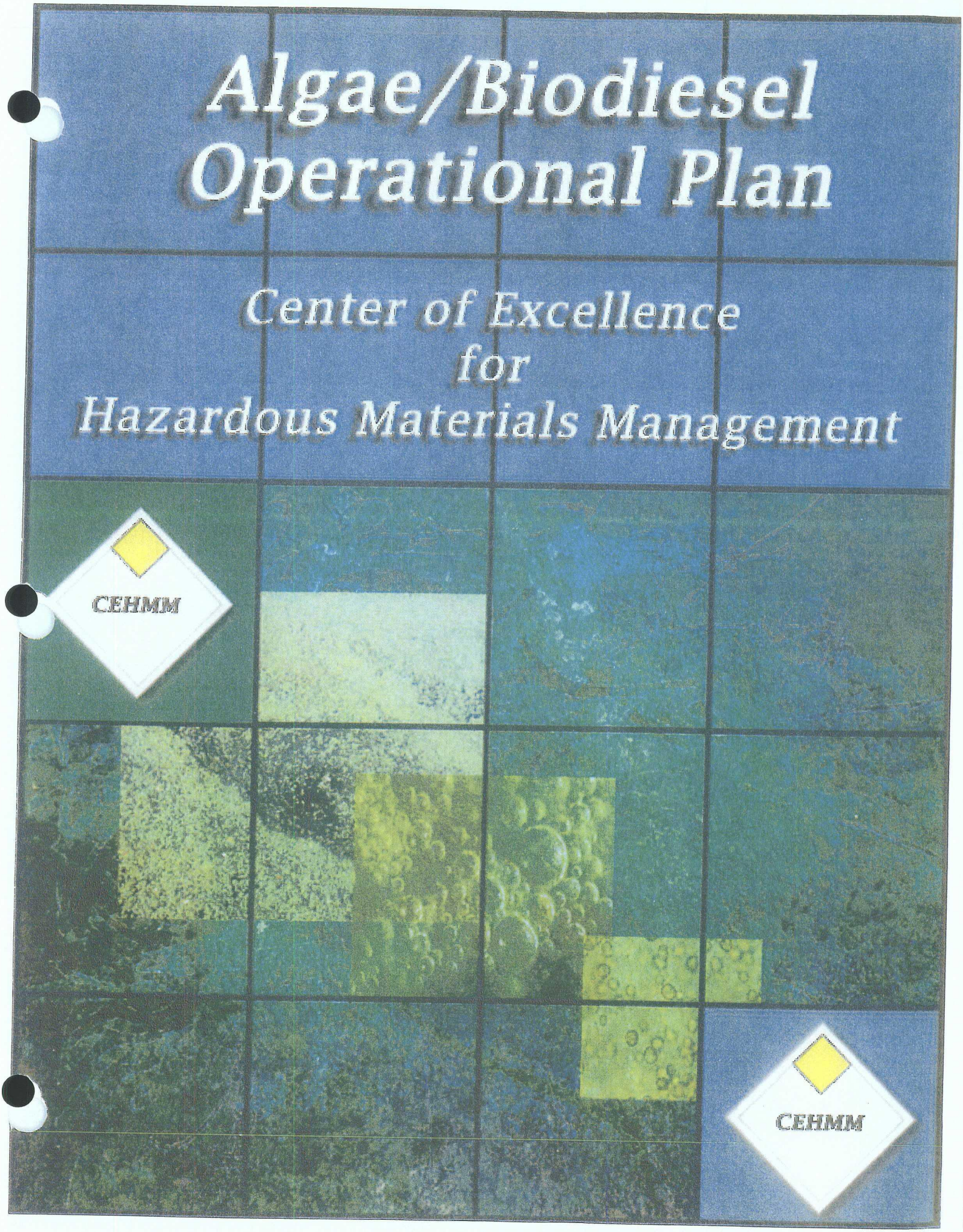
ATTACHMENT B-7

Operational Plan for Experimental Algae Propagation Ponds

Revision 0, January 12, 2007

Algae/Biodiesel Operational Plan

Center of Excellence for Hazardous Materials Management



Operational Plan for Experimental Algae Propagation Ponds

1. Filling and Make-up

The two experimental algae ponds will contain a total of approximately 29,000 gallons of water. The initial fill and subsequent make-up water for the ponds will come from a well owned by NMSU and located on the NMSU Agricultural Science Center property. The actual volume of water added will be measured and recorded in CEHMM operational records. CEHMM procedures call for the pond salinity (NaCl) to be maintained between 2.8 and 3.6%. The ponds will be brought to the required salinity using salt obtained from deposits in the Culebra Member of the Rustler Formation. A calculated weight of dry NaCl crystals will be dissolved in fresh water and physically added to circulating pond water as a solution.

1.1. Initial Fill

1.1.1. Determine desired water level for test series (not to exceed 12 inches).
1.1.2. Using make-up water hydrant, fill pond to desired level and record actual volume used per flow meter, date and time.
1.1.3. Measure salinity and calculate amount of NaCl to be added to pond. Dissolve required NaCl in container using water.
1.1.4. With pond circulating, add NaCl solution to pond.
1.1.5. Measure salinity again to ensure desired concentration in pond.
1.1.6. Repeat steps 1.1.3 through 1.1.5 as necessary until desired concentration is met. Record total NaCl added, date and time.

1.2. Adding Make-up Water

1.2.1. Add make-up water from the make-up water hydrant as needed to maintain pond level required for the test series.
1.2.2. Record the actual volume used per flow meter, date and time.

2. Inoculation

The ponds will be inoculated with selected species of algae. Nutrients to support these organisms will be added to the pond as required. Typical agricultural nutrients will contain nitrogen, phosphorous and carbon along with other trace elements. Salt and nutrients required for pond maintenance will be stored in a covered and enclosed structure safe from flooding to minimize any accidental release of these materials to the environment.

2.1. Strain

2.1.1. Obtain an algae culture of the proper volume and concentration for the strain selected for the test series.

2.1.2. Determine amounts of water amendments required. Add amendments to circulating pond and record amendments added, date and time.
2.1.3. Measure concentrations of amendments in pond and repeat step 2.1.2 as necessary until required concentration in pond is achieved.
2.1.4. Add algae culture obtained in step 2.1.1 to circulating pond and measure and record turbidity, chemical parameters in 3.0, date and time.

3. Testing

Testing of pond biological and chemical parameters will occur weekly or more frequently if necessary per specific procedures. Analyses will include algal density, pond turbidity, pH, TDS, O_2, CO_2, water temperature, salinity (NaCl), nitrate (NO_3-N), and phosphate (PO_4^{3-}). Peripheral measurements of photosynthetically active radiation (PAR) will be taken every 4 minutes with the hourly average recorded, ambient air temperature will be measured and recorded in a like manner. Rainfall will be collected continuously and recorded daily (M-F) in operational logs. Pond depths will be measured daily (M-F) and results will be recorded and charted to maintain operational control.

3.1. Specific Test Procedures (Attachment 1)

3.1.1. Determine parameter to test and identify applicable procedure(s).
3.1.2. Verify all items required for test are available.
3.1.3. Perform test per procedure and record results, date and time.

4. Harvesting

Algae will be harvested using proprietary equipment. Water removed from the pond will be returned to the pond minus water entrained in the harvested algae. During harvesting operations pond water will be transferred to and from harvesting equipment via above ground schedule 40 PVC pipe. During harvesting operations all piping, pumps, and valves will be fully visible with operators present to discontinue harvesting operations in the event of a leak.

4.1. Equipment Set-up

4.1.1. Obtain plans and specification of harvesting equipment from test engineer.
4.1.2. Procure materials necessary to install harvesting equipment in the harvesting loop.

4.2. Equipment Operation

4.2.1. In conjunction with the test engineer, develop operator aids and required log sheet specific to equipment to be tested.

4.2.2. Place system in operation. Unless specifically authorized by the approved test plan, an operator will be present when pond water is being actively harvested and circulated in the harvesting loop.
4.2.3. If leaks or other system failure occurs, shut down the system and isolate any releases. Notify management.

5. Pond Heating/Cooling

Algae grow best within certain water temperature ranges. The optimum range may vary from one algae strain to another. An optional geothermal heat exchanger may be installed and operated to assist in regulating water temperature. If installed, the geothermal heat exchanger will use the stable temperatures underground to moderate pond temperatures. Pond water, fresh water, or air will be used as the heat exchanger fluid. Multiple configurations may be tested. The system would likely be constructed of schedule 40 PVC pipe and associated pumps, and valves. Periodic pressurized testing will ensure early detection of underground leaks in the heat exchange system.

5.1. Equipment Set-up

5.1.1. Obtain plans and specification of geothermal heat exchanger equipment from test engineer.
5.1.2. Procure materials necessary to install geothermal heat exchanger equipment.
5.1.3. Install equipment in excavation and perform leak test prior to backfill.

5.2. Equipment Operation

5.2.1. In conjunction with the test engineer, develop operator aids and required log sheet specific to equipment to be tested.
5.2.2. Place system in operation.
5.2.3. Perform a weekly pressurized leak test on the geothermal heat exchanger.
5.2.4. If leaks or other system failure occurs, shut down the system and isolate any releases. Notify management.

Attachment 1

Operational Plan for Experimental Algae Propagation Ponds

Specific Test Procedures

Contents:

PROCEDURE: DETERMINATION OF OXYGEN IN WATER

1. Press PROGRAM on the HACH Photometer
2. Press 70 and ENTER
3. Fill a sample cell with at least 10 mills of sample water
4. Fill a blue ampule cap with sample water
5. Submerge ampule stem below sample water surface
6. Break stem against beaker wall and allow ampule to fill
7. Place cap on ampule without inverting ampule
8. Shake for 30 seconds
9. Press TIMER and ENTER
10. When timer sounds shake ampule for an additional 30 seconds
11. Place blank into cell holder and cover cell with cap
12. Press ZERO
13. Replace blank with ampule, cover cell with cap
14. Wait approximately 30 seconds
15. Press READ
16. Record results onto data sheet

Approved: _____ Date: _____

PROCEDURE: DETERMINATION OF TURBIDITY IN WATER

1. Press PROGRAM on HACH Photometer
2. Press 95 and ENTER
3. Fill a sample cell with 10 ml of distilled water
4. Place into cell holder and cover with cap
5. Press ZERO
6. Fill another sample cell with 10 ml of sample water
7. Place into cell holder and cover with cap
8. Press READ
9. Record results onto data sheet

Approved: _____ Date: _____

PROCEDURE: DETERMINATION OF pH AND CARBON DIOXIDE IN WATER

1. Remove pH electrode from electrode storage solution and rinse with distilled water
2. Dry exterior of probe with towels
3. Attach probe to digital titrator and pH meter
4. Insert Sodium Hydroxide Cartridge (0.3636 N) into digital titrator body
5. Insert clean delivery tube into cartridge
6. Purge delivery tube with Sodium Hydroxide solution
7. Reset counter to zero and wipe the tip
8. Add 200 ml of sample water to glass beaker
9. Place 2 inch stirring bar into beaker and place onto titra-stir
10. Place pH electrode (and NaOH tip into solution)
11. Press ON pH meter and press READ on pH meter
12. When meter sounds and locks record sample pH onto data sheet
13. Press READ on meter
14. Add NaOH to sample until meter locks at 9.3 pH
15. Multiply digital reading by 0.1 and record result on data sheet

Approved: _____ Date: _____

PROCEDURE: DETERMINATION OF TDS IN WATER

1. Add 1 ml of sample water to 500 ml beaker
2. Add 100 ml of distilled water to beaker
3. Mix well
4. Turn on Pocket Pal TDS tester
5. Record result on data sheet

Approved: _____ Date: _____

PROCEDURE: DETERMINATION OF SALINITY (NaCl) IN WATER

1. Insert delivery tube into Mercuric Nitrate Titration Cartridge (2.570 N)
2. Flush delivery tube by turning meter
3. Wipe tip and reset counter to zero
4. Place 2.0 ml of water sample into titration vial and fill to 10 ml mark with DW
5. Add 1 diphenylcarbazone powder pillow to contents of vial and mix
6. Place vial on titra-stir with paper towel beneath vial
7. Add Mercuric Nitrate until solution turns purple
8. Multiply digits required on micro-titrator by 0.1 to get ppt salinity
9. Multiply ppt salinity by 940 to get mg/l NaCl
10. Record mg/l NaCl on data sheet

Approved: _____ Date: _____

PROCEDURE: HOBO Data Logger

1. Open HOBO Software
2. Click on Readout Device Icon
3. Click OK
4. Click on "Don't Stop" Data Logging
5. Name file (use today's date)
6. Click on "Plot"
7. Click on "File"
8. Click on "Export File as Excel Text"
9. Click on "Export"
10. Save File in Desktop as "CSV" file
11. Close HOBO software
12. Close computer

Approved: _____ Date: _____

PROCEDURE: NO_3 –N Determination (mg/l)

1. Press Program
2. Press 5 and 1 then ENTER
3. Fill Sample Cell with 10 mls of sample
4. Add entire contents of NitraVer 5 Power Pillow to sample cell
5. Press TIMER and ENTER (starts 1 minute)
6. Shake vigorously until timer beeps
7. After timer beeps press ENTER (starts 5 minute)
8. Fill second sample cell with sample for blank
9. Place blank in cell holder and cover with cap
10. When timer beeps press ZERO
11. Place prepared sample in holder and cover with cap
12. Press READ
13. Record results in lab log book

Approved: _____ Date: _____

PROCEDURE: Reactive Phosphorus in wastewater & seawater (mg/l)

1. Press PROGRAM
2. Press 79 and ENTER
3. Fill Sample cell with 10 ml of sample
4. Add 1 Phosver 3 power pillow
5. Shake for 15 seconds
6. Press TIMER and ENTER (2 minutes)
7. Fill a second sample cell with sample for blank
8. Place blank in cell holder and cover with cap
9. Press EXIT and then ZERO
10. After timer beeps place prepared sample in and cover with cap
11. Press READ
12. Record results in lab logbook

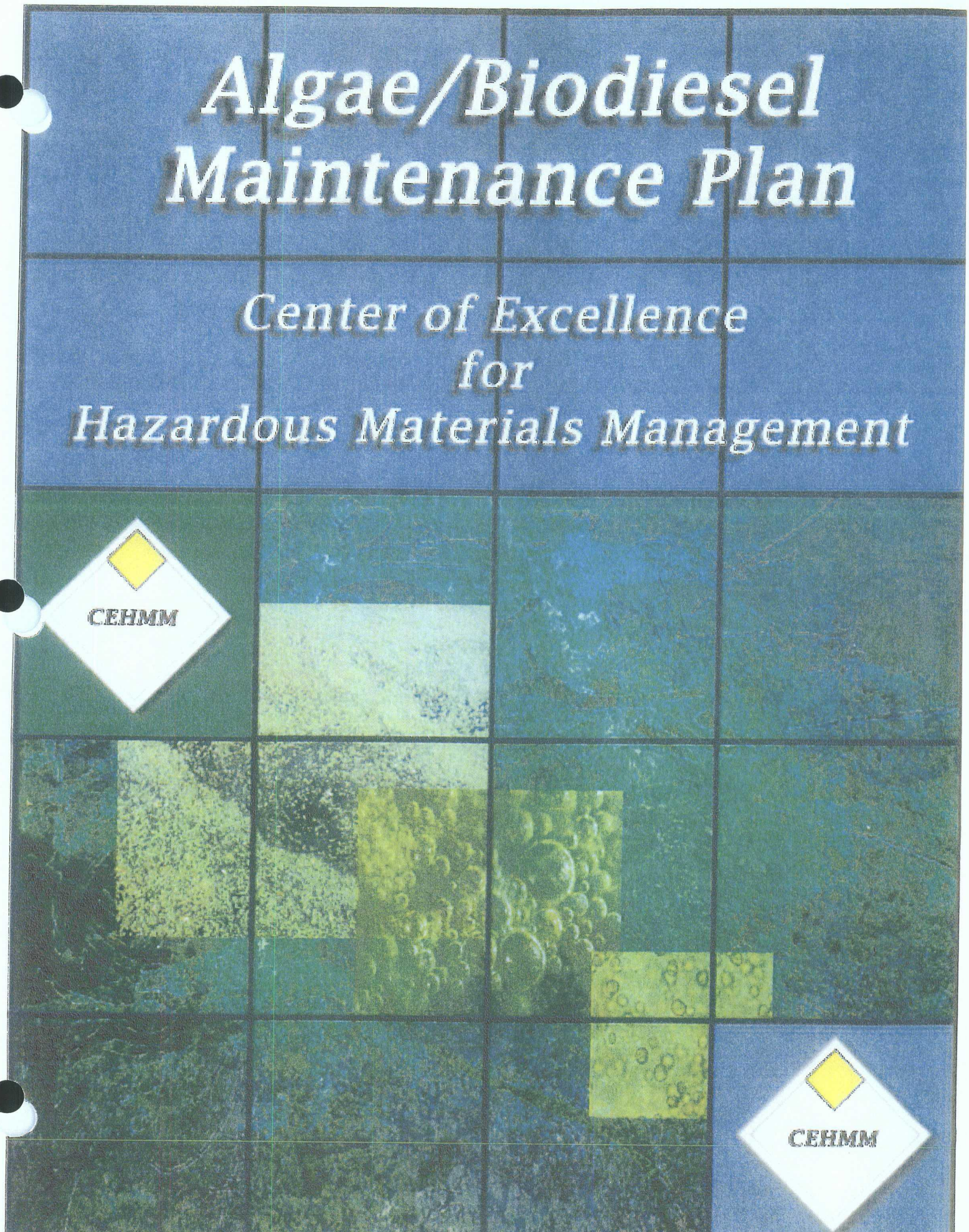
Approved: _____ Date: _____

ATTACHMENT B-8

Maintenance Plan for Experimental Algae Propagation Ponds

Algae/Biodiesel Maintenance Plan

Center of Excellence for Hazardous Materials Management



System Maintenance for Experimental Algae Propagation Ponds

1. Maintenance

In general, the facility will consist of synthetically lined ponds, PVC pipes, motors, pumps, and harvesting vessels. Equipment will be maintained according to the manufacturer's instructions. Motor driven water paddles or other devices will be located in each pond to maintain circulation of the cultures.

1.1. Motors

1.1.1. Check motor amperages weekly; record amps, date and time.
1.1.2. Check motor temperatures weekly; record temperatures, date and time.

1.2. Gear Reducers and Bearings

1.2.1. Check gear reducer and bearing temperatures weekly; record temperatures, date and time.
1.2.2. Lubricate bearings according to manufacture specifications and record date and time.

1.3. Structural Elements

1.3.1. Inspect all structural elements associated with the motor, gear reducer, paddle and catwalk monthly and record condition, date and time.
1.3.2. Inspect pond liners, berms and ground swales daily (M-F) and record condition, date and time. Any observations that indicate a degradation of the pond liner will be reported to management immediately.

2. Cleaning

Each pond will be emptied and cleaned as required to maintain operational parameters.

2.1. Water Removal

2.1.1. Cease pond operations and allow pond to evaporate to dryness.
2.1.2. Water will not be discharged to groundwater or to surface waters under any circumstances during maintenance operations.

2.2. Solids Removal

2.2.1. Collect solids remaining in bottom of pond and dispose of in accordance with solid waste management requirements.
2.2.2. Record method of solids disposal, amounts, date and time.

2.3. Returning Pond to Service

2.3.1. Visually inspect liner and record condition, date and time.
2.3.2. Report any observed liner defects to management.
2.3.3. Complete any necessary liner repairs.
2.3.4. Fill and inoculate according to the *Operational Plan for Experimental Algae Propagation Ponds*.

3. Erosion Control

Drainage swale around ponds will divert storm water and prevent overtopping of the ponds during heavy rainfall events. These structural elements must be maintained to ensure continued effectiveness.

3.1. Inspection

3.1.1. Inspect berms, swales, and surrounding ground cover weekly and record condition, date and time.

3.2. Repair

3.2.1. Repair erosion using natural material compatible with the structural component being repaired. Record location and type of repair, material used, date and time.

4. Site Security

The entire pond area will be fenced to prevent entry of livestock from the surrounding area. Signs will be posted to discourage unauthorized entry. Access to the pond area will be through a gate that will be locked during off hours. Security lights will operate from dusk until dawn each night. Certain areas may be lighted with flood lights activated by motion sensors.

GROUND WATER DISCHARGE PERMIT APPLICATION
PART C: SITE INFORMATION
All Facilities

C-1. **Area Map.** Attach a current area map showing roads and clearly mark the location of your facility. (See Attachment C-3)

C-2. **Directions to Site.** Provide driving directions to the site from the nearest town or, if located in a town, from an easily identifiable location.

See "MAPQUEST" Attachment C-2.

C-3. **Topographic Map.** Attach a copy of the appropriate US Geological Survey topographic map. You may provide just the relevant portion. USGS maps are available at many outdoor equipment stores or bookstores, from the USGS at www.usgs.gov or 1-888-ASKUSGS, and from commercial websites.

On the map clearly indicate the location of your facility. Also identify the approximate locations of all wells within 1,000 feet of your discharge locations. The Office of the State Engineer has a searchable database of supply wells on its website at www.ose.state.nm.us.

☒ USGS map attached with facility location and neighboring wells marked. (See Attachment C-3)

C-4. **Flood Potential.** Attach a copy of the latest Federal Emergency Management Agency (FEMA) flood map with your facility's location clearly marked, to the best of your ability. Information about how to obtain this map, formally known as a Flood Insurance Rate Map (FIRM) is available at www.fema.gov, insurance agencies or county government offices. A site specific analysis may be substituted.

☒ FEMA map or site-specific analysis attached. (See Attachment C-4)

☐ Previously submitted and still up-to-date. Submittal date(s): _____

C-5. **Soils.** Attach either:

a) A copy of the appropriate Natural Resource Conservation Service (NRCS) soil survey map, with your site clearly identified to the best of your ability. Include the descriptive information for soils associated with the discharge locations. To obtain the map, contact your local NRCS office – there is one in every county.

b) A site-specific assessment showing the soils classifications. This is preferred over the more generalized NRCS surveys.

☒ NRCS soil survey or site-specific assessment attached. (See Attachment C-5)

☐ Previously submitted. Submittal date(s): _____

C-6. **Geology.** Provide information on the geology beneath the site by attaching relevant portions of geologic reports, well logs for on-site or nearby wells, or site specific assessments. A variety of geology publications and resources are available from the New Mexico Bureau of Geology and Mineral Resources at http://geoinfo.nmt.edu or 505-835-5420 (Socorro). Well logs are available from the New Mexico State Engineer's Office at http://www.ose.state.nm.us/.

☒ Geologic report attached. (See Attachment C-6.a)

☒ Well log(s) attached. (See Attachment C-6.b)

☐ Geologic information previously submitted. Submittal date(s): _____

C-7. **Ground Water Hydrology.** Ground water hydrology refers to the occurrence, distribution, movement and chemistry of ground water. The ground water hydrology at your site will determine in large part whether your discharge will adversely affect ground water quality. You may need to present detailed information in order to "demonstrate that the Discharge Permit will not result in concentrations in excess of the standards of Section 20.6.2.3103 NMAC or the presence of any toxic pollutant." (20.2.3106.C.7 NMAC)

At a minimum, provide information below on the direction of ground water flow. Ground water may not flow in the same direction as water on the surface of the ground. A monitoring well survey is one of the best methods to determine the direction of ground water flow at a particular site. Such surveys are routinely required for many Discharge Permit locations.

If a survey is not available, check with well drillers, the city water department, staff at the Office of the State Engineer, environmental consultants or other knowledgeable persons in your area. In addition, relevant reports have been published for some areas. See the OSE website at www.ose.state.nm.us or the NMBGMR website at http://geoinfo.nmt.edu.

Direction of ground water flow: To the east

If ground water flow shifts seasonally, describe here: N/A

Reference:

☐ On-site well survey attached.

☐ Previously submitted. Submittal date(s): _____

☐ Nearby well survey attached.

☐ Previously submitted. Submittal date(s):

☒ Other. Specify: Direction based on water elevation shown on map provided by the Office of the State Engineer. See Attachment C-7.

☐ Relevant portion attached.

☐ Previously submitted. Submittal date(s): _____

Attach any additional information available about ground water hydrology at the site. *See Attachment C-6b, Well Logs.*

C-8. **Other Permitted Discharge Locations.** If applicable, list other locations of wastewater or stormwater discharges on your site that are not described in this application and indicate what permits apply to them. Examples include discharges from small septic systems (covered by Liquid Waste Permits, discharges to surface waters under a NPDES permit, a discharge covered by a separate Discharge Permit, etc. Be sure these other discharge locations are identified on the site map required in Item B-3.

Discharge Type	Permit Identification
None	

C-9. **Other Information.** Describe below or attach any additional information to demonstrate that your proposed discharge plan will be protective of ground water quality, public health and property.

N/A

MAPQUEST

Start: S 1st St & W Main St
Artesia, NM 88210, US

End: 67 E Four Dinkus Rd
Artesia, NM 88210-9110, US

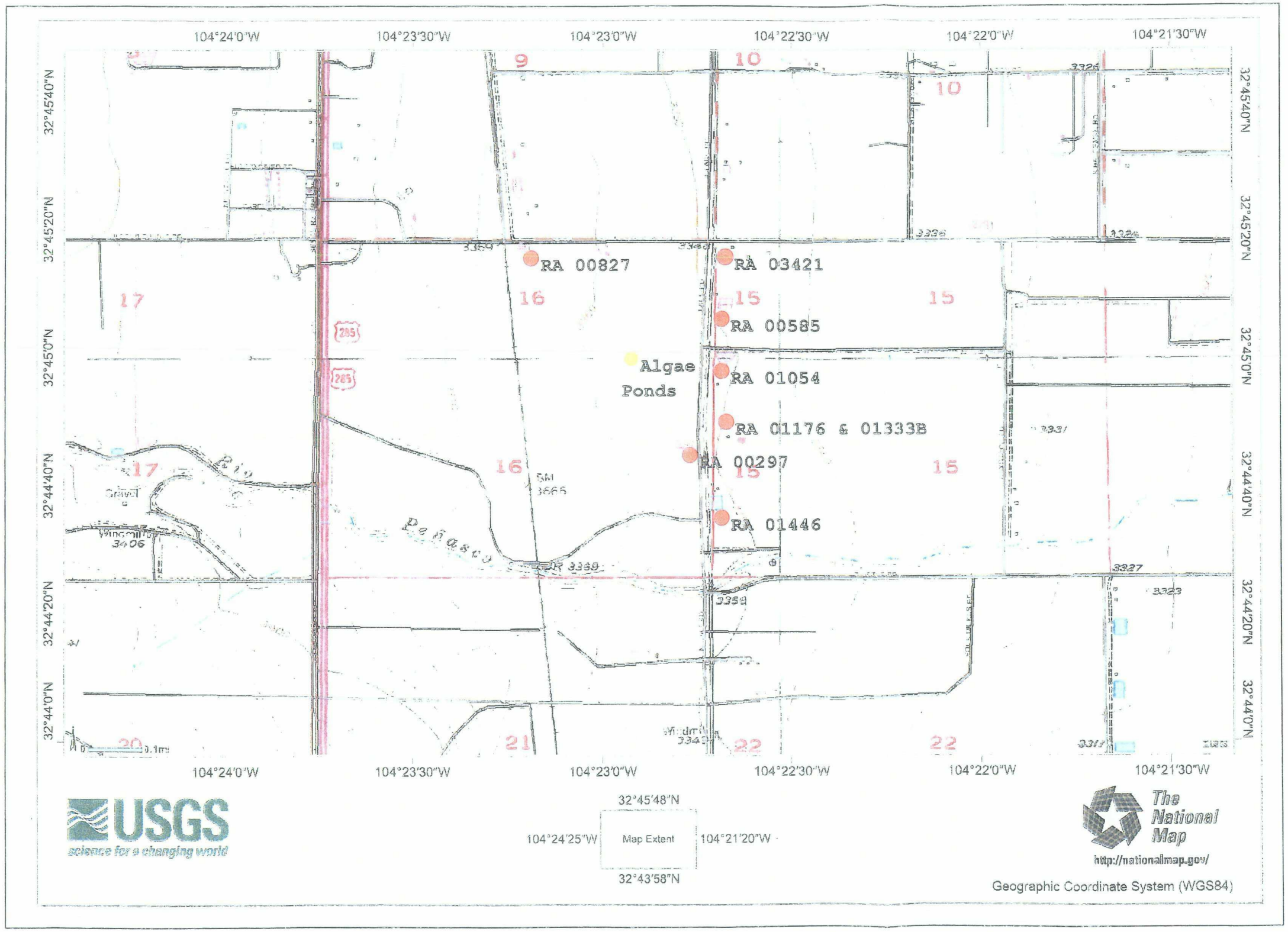
Notes:
Attachment C-2

Directions	Distance
Total Est. Time: 10 minutes **Total Est. Distance:** 6.88 miles	
1: Start out going SOUTH on S 1ST ST / US-285 S toward W QUAY AVE. Continue to follow US-285 S.	6.0 miles
2: Turn LEFT onto CR-39.	0.8 miles
3: End at 67 E Four Dinkus Rd Artesia, NM 88210-9110, US	
Total Est. Time: 10 minutes **Total Est. Distance:** 6.88 miles	

Start:
S 1st St & W Main St
Artesia, NM 88210, US

End:
67 E Four Dinkus Rd
Artesia, NM 88210-9110, US

Attachment C-3
USGS Topographic Map



32°45'48"N
104°24'25"W Map Extent 104°21'20"W
32°43'58"N

Geographic Coordinate System (WGS84)

Legend

- Algae Ponds
- Production Wells

TOPOGRAPHIC MAPS
100,000 Index
Quad Index - 100K
USGS Raster Graphics (Topo Maps)
No legend available

BOUNDARIES
US States
National Atlas States
National Atlas States
National Atlas States

TRANSPORTATION
County Road Labels (USGS)
No legend available
National Road Dataset (CENSUS)
No legend available
National Road Dataset Labels (CENSUS)
No legend available
New Mexico Roads (BTS)
BTS Roads-New Mexico Ferry Crossings
BTS Roads-New Mexico Interstates
BTS Roads-New Mexico Local Roads
BTS Roads-New Mexico Local Roads (Small Scale)
BTS Roads-New Mexico Secondary Roads
BTS Roads-New Mexico Trails
BTS Roads-NewMexico US/Major St Highway
State Highway Labels (USGS)
No legend available
US Highways Labels (USGS)
No legend available
US Road Labels (BTS)
No legend available
US Roads (BTS)
Light Duty Road
Primary Highway
Secondary Highway
Trail
Other Road

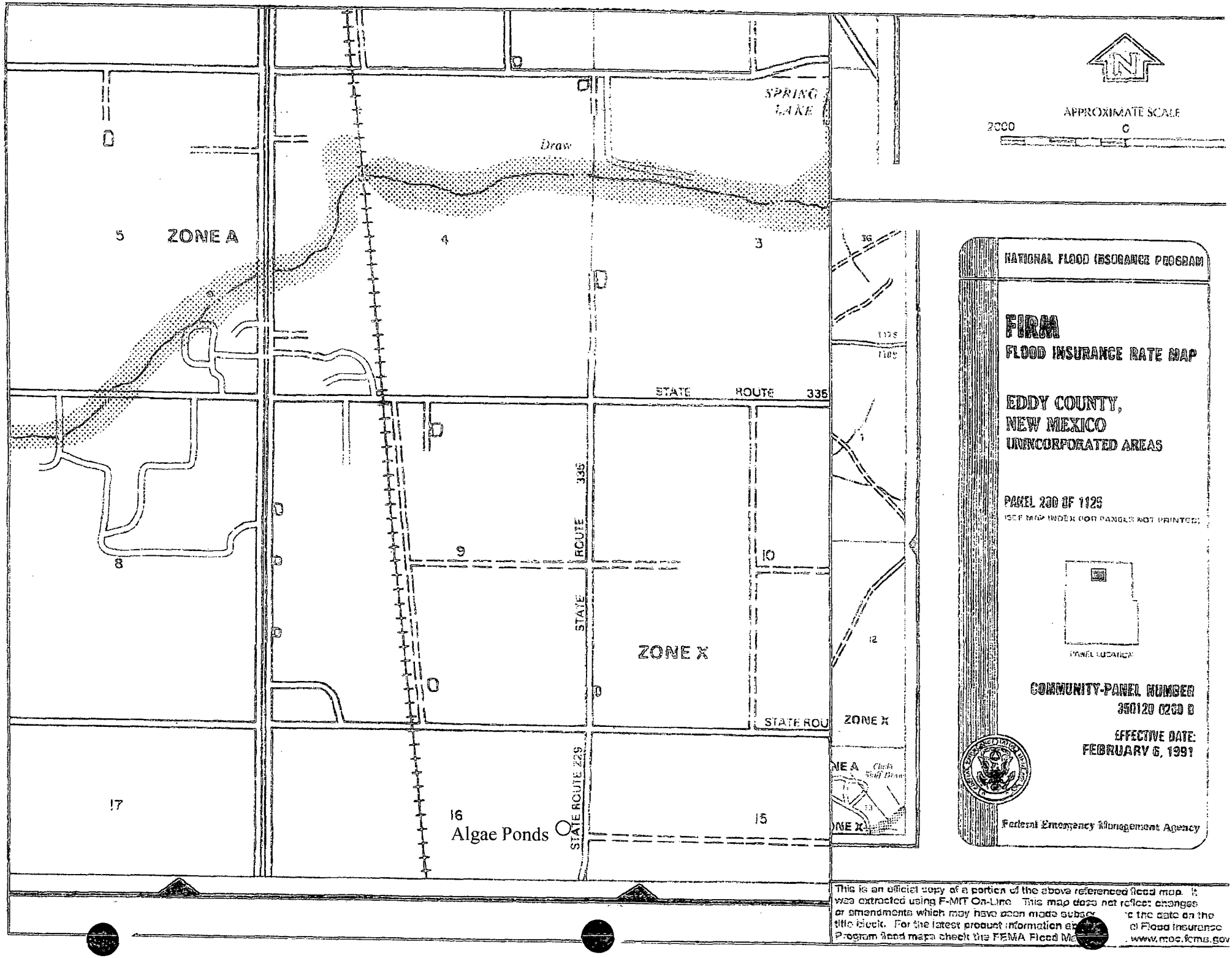
OTHER
Section Labels (BLM)
No legend available
Township Boundaries (BLM)
detail_typ
Township Labels (BLM)

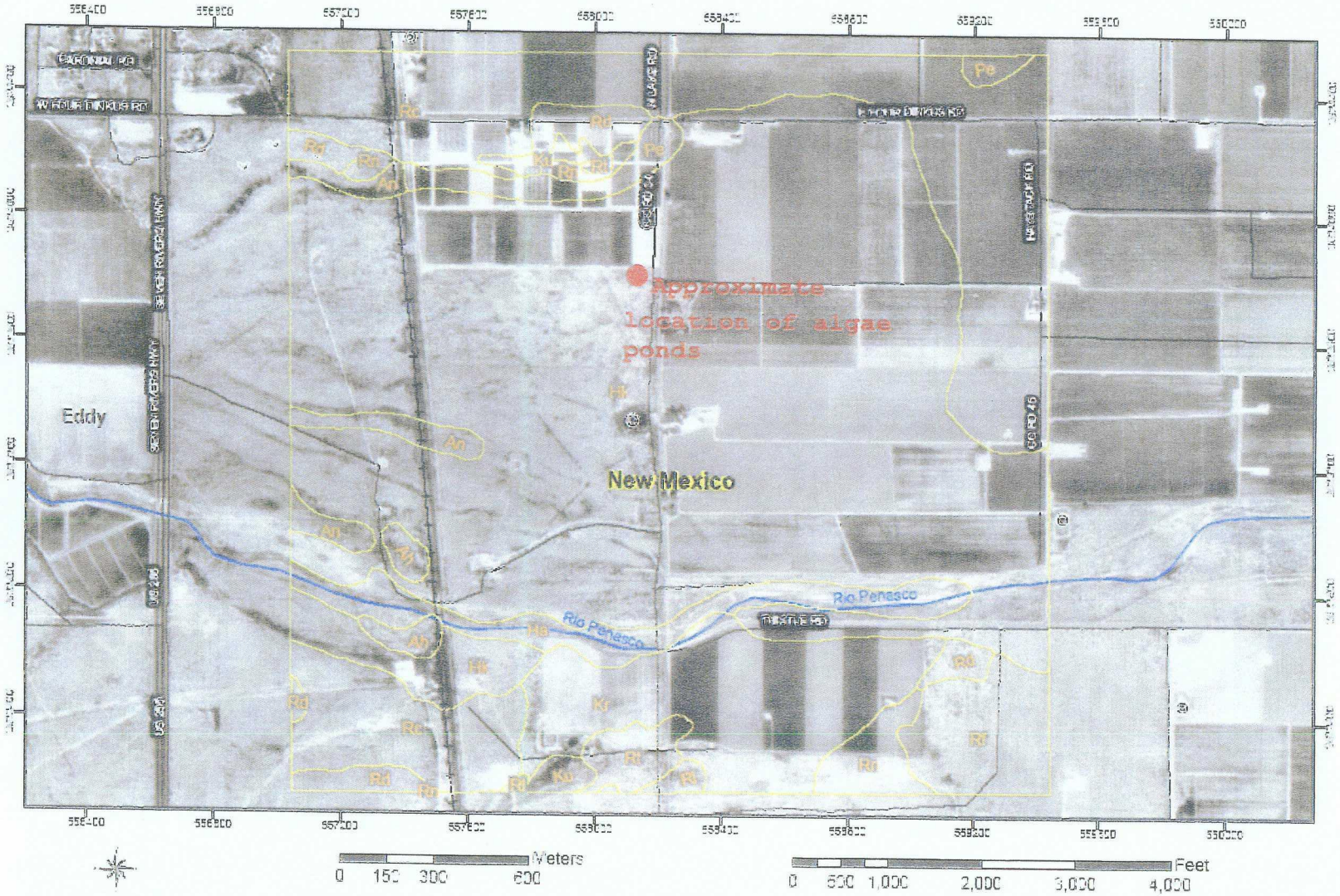
No legend available

ELEVATION
1 X ArcSecond NE CONUS

USGS science for a changing world

The National Map
http://nationalmap.gov/




Approximate location of algae ponds
Eddy
New Mexico
Rio Penasco
Rio Penasco
Meters
0 150 300 600
Feet
0 500 1,000 2,000 3,000 4,000

Rio Penasco

MAP LEGEND

- Soil Map Units
- Cities
- Detailed Counties
- Detailed States
- Interstate Highways
- Roads
- Rails
- Water
- Hydrography
- Oceans
- Escarpment, bedrock
- Escarpment, non-bedrock
- Gully
- Levee
- Slope
- Blowout
- Borrow Pit
- Clay Spot
- Depression, closed
- Eroded Spot
- Gravel Pit
- Gravelly Spot
- Gully
- Lava Flow
- Landfill
- Marsh or Swamp
- Miscellaneous Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Slide or Slip
- Sinkhole
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Perennial Water
- Wet Spot

MAP INFORMATION

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov

Coordinate System: UTM Zone 13

Soil Survey Area: Eddy Area, New Mexico
Spatial Version of Data:
Soil Map Compilation Scale: 1:20000

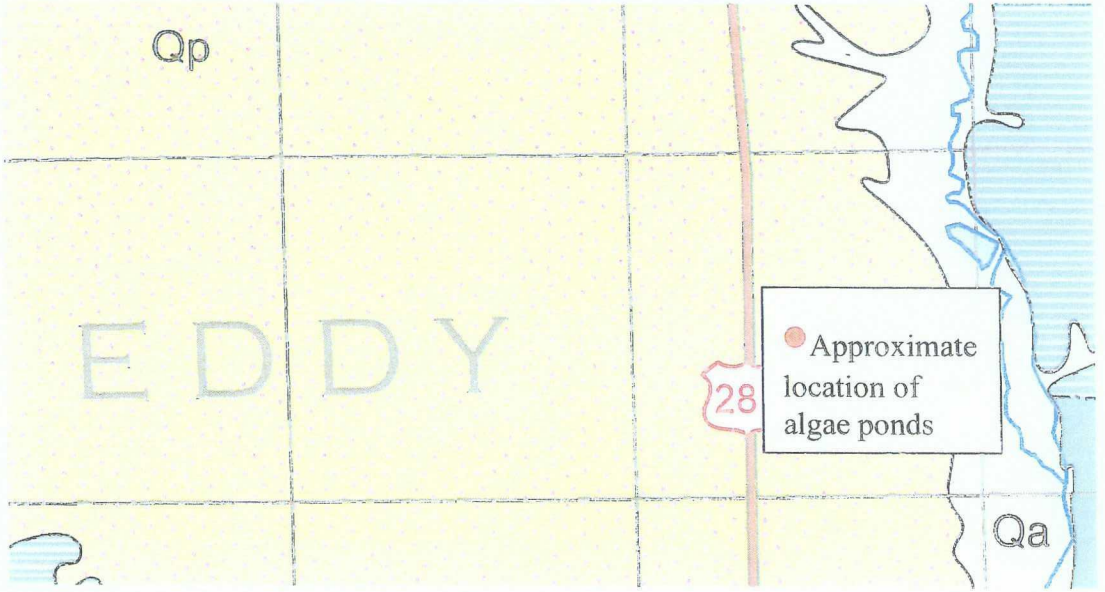
Map composed of aerial images photographed on these dates:
10/19/1997

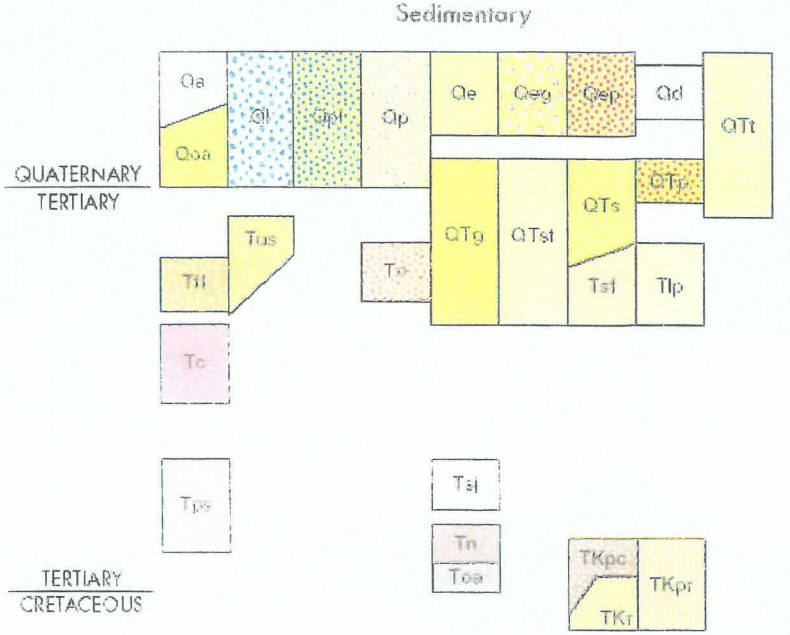
The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend Summary

Eddy Area, New Mexico

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
Ah	Anthony sandy loam, 0 to 1 percent slopes	9.5	0.2
An	Arno silty clay loam, 0 to 1 percent slopes	15.2	0.3
At	Atoka loam, 1 to 3 percent slopes	28.8	0.6
Gs	Gypsum land-Cottonwood complex, 0 to 3 percent slopes	56.3	1.2
Ha	Harkey sandy loam, 0 to 1 percent slopes	62.1	1.3
Hk	Harkey very fine sandy loam, 0 to 1 percent slopes	1,191.3	25.5
Kr	Karro loam, 0 to 1 percent slopes	252.9	5.4
Ku	Karro loam, 1 to 3 percent slopes	50.4	1.1
Pe	Pima silt loam, 0 to 1 percent slopes	194.6	4.2
Rc	Reagan loam, 0 to 1 percent slopes	1,498.4	32.1
Rd	Reagan loam, 1 to 3 percent slopes	154.2	3.3
Rf	Reagan loam, saline, 0 to 1 percent slopes	704.7	15.1
Rl	Reeves loam, 0 to 1 percent slopes	79.2	1.7
Rn	Reeves loam, 1 to 3 percent slopes	365.5	7.8
Rr	Reeves loam, shallow, 0 to 1 percent slopes	18.5	0.4
Uo	Upton gravelly loam, 0 to 9 percent slopes	7.0	0.2





CITATION – Please cite this work as follows:
New Mexico Bureau of Geology and Mineral Resources, 2003,
Geologic Map of New Mexico, 1:500,000:
New Mexico Bureau of Geology and Mineral Resources

DESCRIPTION OF MAP UNITS

QUATERNARY

Qa Alluvium (Holocene to upper Pleistocene)

Ql Landslide deposits and colluvium (Holocene to Pleistocene)—Landslide deposits on western flanks of Socorro Mountains not shown for clarity

Qpl Lacustrine and playa deposits (Holocene)—Includes associated alluvial and eolian deposits of major lake basins

Qp Piedmont alluvial deposits (Holocene to lower Pleistocene)—Includes deposits of higher gradient tributaries bordering major stream valleys, alluvial veneers of the piedmont slope, and alluvial fans. May locally include uppermost Pliocene deposits

Qe Eolian deposits (Holocene to middle Pleistocene)

Qeg Gypsiferous eolian deposits (Holocene to middle Pleistocene)

Qep Eolian and piedmont deposits (Holocene to middle Pleistocene)—Interlayed eolian sands and piedmont-slope deposits along the eastern flank of the Pecos River valley, primarily between Roswell and Carlsbad. Typically capped by thin eolian deposits

Attachment C-6b consists of well records
on file at CEHMM.
Available upon request.

Attachment C-7

Facility Location

Ground Water Flow to the east.

Map obtained from Roswell OSE.

EXPLANATION

154/3284 — WELL--Upper number is water level below land surface, in feet. Lower number is altitude of water level, in feet. National Geodetic Vertical Datum of 1929. "e" means the values are estimated

3260 — CONTROL POINT ON PECOS RIVER--Number is altitude of river level, in feet, from U.S. Geological Survey topographic maps

⊙ — OBSERVATION WELL--The hydrographs of water levels measured in observation wells are shown in figure 23

3230 — WATER-LEVEL CONTOUR--Shows altitude of water level in January 1975. National Geodetic Vertical Datum of 1929. Contour interval 10 feet. Dashed where approximate

AQUIFER BOUNDARY--Approximately located; queried where probable

Modified from Welder, G. E. (1977, Map showing the altitude and configuration of the water level in the shallow aquifer, January 1975, Roswell basin, Chaves and Eddy Counties, New Mexico: U.S. Geological Survey Open-File Map 77-505).

the water level in the shallow aquifer in January 1975,

and Eddy Counties, New Mexico.

CEHMM Center of Excellence for Hazardous Materials Management

505 North Main Street • Carlsbad, New Mexico 88220 • 575.885.3700 • FAX 575.885.6422 • www.cehmm.org

March 22, 2010

Brad A. Jones. Environmental Engineer
Environmental Bureau
NM Oil Conservation Division
1220 S. St. Francis Drive
Santa Fe, New Mexico 87505

Dear Mr. Jones:

Pursuant to our discussions of 18 March 2010 concerning the application by Tim Coackley to provide clean water to our algae ponds from produced water, I have enclosed copies of our original permit application, our pending permit modification, the NMED original permit and the NMED permit modification for our third pond.

Our current modification (#2) was submitted in October of last year. Our NMED contact in Roswell is Shawna Clark, who may be reached at 575-624-6046.

If you have any question about this material or require additional documentation, please let me know at 575-885-3700.

Thanks.

Louis A. Ogaard

Louis A. Ogaard, Ph.D.
Environmental Scientist

NEW MEXICO
ENVIRONMENT DEPARTMENT

Ground Water Quality Bureau

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Governor
DIANE DENISH
Lieutenant Governor

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RON CURRY
Secretary
JON GOLDSTEIN
Deputy Secretary

CERTIFIED MAIL – RETURN RECEIPT REQUESTED

April 28, 2009

Douglas Lynn, Executive Director
CEHMM
505 North Main Street
Carlsbad, NM 88220

RE: Discharge Permit Modification, DP-1634, Center of Excellence for Hazardous Materials Management (CEHMM) Experimental Algae Propagation Ponds

Dear Mr. Lynn:

The New Mexico Environment Department (NMED) issues the enclosed Discharge Permit Modification, DP-1634, to CEHMM Experimental Algae Propagation Ponds, pursuant to the New Mexico Water Quality Act (WQA), NMSA 1978 §§74-6-1 through 74-6-17, and the New Mexico Water Quality Control Commission (WQCC) Regulations (copy previously provided), 20.6.2 NMAC. This Discharge Permit Modification shall supersede, in its entirety, the Discharge Permit, DP-1634, CEHMM Experimental Algae Propagation Ponds, issued June 26, 2007.

The Discharge Permit contains terms and conditions that shall be complied with by CEHMM Experimental Algae Propagation Ponds and are enforceable by NMED pursuant to Section 20.6.2.3104 NMAC, WQA, NMSA 1978 §74-6-5 and §74-6-10. Issuance of this Discharge Permit does not relieve CEHMM Experimental Algae Propagation Ponds of the responsibility to comply with the WQA, WQCC Regulations, and any other applicable federal, state and/or local laws and regulations, such as zoning requirements and nuisance ordinances.

Pursuant to Paragraph (4) of Subsection H of 20.6.2.3109 NMAC, the term of the Discharge Permit shall expire on July 11, 2012, the same day as the expiration of the now superseded

Discharge Permit issued on June 26, 2007. You must submit an application for renewal at least 180 days before the permit expiration date.

An invoice for the Discharge Permit Modification Fee of $575 is being sent under separate cover. Payment of the Discharge Permit Fee must be received by NMED within 30 days of the date the Discharge Permit is issued.

If you have any questions, please contact Shawna Clark at (575) 624-6046. Thank you for your cooperation during this Discharge Permit review.

Sincerely,

George Schuman for W. Olson

William C. Olson, Chief
Ground Water Quality Bureau

WO:SDC/sdc

Encs: Discharge Permit Modification, DP-1634
Ground Water Discharge Permit Conditions for Synthetically Lined Lagoons – Liner Material and Site Preparation, Revision 0.0, May 2007
Ground Water Discharge Permit Monitoring Well Construction and Abandonment Conditions, Revision 1.0, July 2008

cc: Gary Beatty, District Manager, NMED District IV (permit)
NMED Roswell Field Office (permit)
Jim Sizemore, Office of the State Engineer (permit)

GROUND WATER DISCHARGE PERMIT MODIFICATION
Center of Excellence for Hazardous Materials Management (CEHMM) Experimental Algae Propagation Ponds, DP-1634

I. INTRODUCTION

The New Mexico Environment Department (NMED) issues this Discharge Permit Modification (Discharge Permit), DP-1634, to CEHMM (permittee) pursuant to the New Mexico Water Quality Act (WQA), NMSA 1978 §§74-6-1 through 74-6-17, and the New Mexico Water Quality Control Commission (WQCC) Regulations, 20.6.2 NMAC. This Discharge Permit Modification shall supersede, in its entirety, the Discharge Permit, DP-1634, CEHMM Experimental Algae Propagation Ponds, issued June 26, 2007.

NMED's purpose in issuing this Discharge Permit, and in imposing the requirements and conditions specified herein, is to control the discharge of water contaminants from the CEHMM Experimental Algae Propagation Ponds (facility) into ground and surface water, so as to protect ground and surface water for present and potential future use as domestic and agricultural water supply and other uses and protect public health. In issuing this Discharge Permit, NMED has determined that the requirements of Subsection C of 20.6.2.3109 NMAC have been met.

The activities which produce the discharge, the location of the discharge, and the quantity, quality and flow characteristics of the discharge are briefly described as follows:

Up to 1,340,000 gallons per year (gpy) of nutrient-enriched fresh water for algae propagation is discharged into three synthetically lined ponds. Fresh water is enriched with sodium chloride, plus lesser amounts of other salts, and chemical fertilizers containing nitrogen and phosphorus to be used as an algal growth medium. This nutrient-enriched water will be used to fill and maintain the water levels in the ponds. The third synthetically lined pond is to be constructed under this Discharge Permit. The modification consists of increasing the volume of potential discharge at this site from 670,000 gpy to 1,340,000 gpy. The discharge contains water contaminants or toxic pollutants which may be elevated above the standards of Section 20.6.2.3103 NMAC. The facility is located at 67 East Four Dinkus Road, approximately six miles south of Artesia, in Section 16, Township 18S, Range 26E, Eddy County. Ground water most likely to be affected is at a depth of approximately 52 feet and has a total dissolved solids concentration of approximately 2,950 milligrams per liter.

The original Discharge Permit was issued on June 26, 2007. The permittee's application for permit modification consists of the materials submitted by CEHMM dated October 10, 2008. The discharge shall be managed in accordance with all conditions and requirements of this Discharge Permit.

Pursuant to Section 20.6.2.3109 NMAC, NMED reserves the right to require a Discharge Permit Modification in the event NMED determines that the requirements of 20.6.2 NMAC are being or may be violated or the standards of Section 20.6.2.3103 NMAC are being or may be violated. This may include a determination that structural controls and/or management practices approved under this Discharge Permit are not protective of ground water quality, and that more stringent requirements to protect and/or remediate ground water quality may be required by NMED. These

requirements may include: lining/relining ponds; expanding monitoring requirements; and/or implementing abatement of water pollution.

Issuance of this Discharge Permit does not relieve the permittee of the responsibility to comply with the WQA, WQCC Regulations, and any other applicable federal, state and/or local laws and regulations, such as zoning requirements and nuisance ordinances.

The following abbreviations may be used in this Discharge Permit:

Abbreviation	Explanation	Abbreviation	Explanation
BOD_5	biochemical oxygen demand (5-day)	NTU	nephelometric turbidity units
CFR	Code of Federal Regulations	Org	organisms
Cl	chloride	TDS	total dissolved solids
LADS	land application data sheet(s)	TKN	total Kjeldahl nitrogen
mg/L	milligrams per liter	total nitrogen	TKN+NO_3-N
mL	milliliters	TRC	Total Residual Chlorine
NMAC	New Mexico Administrative Code	TSS	total suspended solids
NMED	New Mexico Environment Department	WQA	New Mexico Water Quality Act
NMSA	New Mexico Statutes Annotated	WQCC	Water Quality Control Commission
NO_3-N	nitrate-nitrogen		

II. FINDINGS

In issuing this Discharge Permit, NMED finds:

1. The permittee is discharging effluent or leachate from the facility so that such effluent or leachate may move directly or indirectly into ground water within the meaning of Section 20.6.2.3104 NMAC.

2. The permittee is discharging effluent or leachate from the facility so that such effluent or leachate may move into ground water of the State of New Mexico which has an existing concentration of 10,000 milligrams per liter or less of total dissolved solids within the meaning of Subsection A of 20.6.2.3101 NMAC.

3. The discharge from the facility is not subject to any of the exemptions of Section 20.6.2.3105 NMAC.

III. CONDITIONS

The following conditions shall be complied with by the permittee and are enforceable by NMED. The permittee is authorized to discharge water contaminants subject to the following conditions:

OPERATIONAL PLAN

#	Terms and Conditions
1.	The permittee shall implement the following operational plan to ensure compliance with Title 20, Chapter 6, Parts 1 and 2 NMAC. [20.6.2.3106.C NMAC, 20.6.2.3107 NMAC]
2.	The permittee shall operate in a manner such that standards and requirements of Sections 20.6.2.3101 and 20.6.2.3103 NMAC are not violated. [20.6.2.3101 NMAC, 20.6.2.3103 NMAC]
3.	The permittee is authorized to discharge up to 1,340,000 gpy nutrient-enriched fresh water for algae propagation into three synthetically lined ponds. Fresh water is enriched with sodium chloride, plus lesser amounts of other salts, and chemical fertilizers containing nitrogen and phosphorus to be used as an algal growth medium. This nutrient-enriched water shall be used to fill and maintain the water levels in the ponds. The third synthetically lined pond is to be constructed under this Discharge Permit. [20.6.2.3104 NMAC]
4.	Within 180 days of the effective date of this Discharge Permit (by October 25, 2009), the permittee shall construct one additional synthetically lined pond for the storage of algal growth media. The pond shall be constructed in accordance with the construction plans and specifications submitted with the Discharge Permit Modification application, received October 10, 2008, and the attachment titled *Ground Water Discharge Permit Conditions for Synthetically Lined Lagoons - Liner Material and Site Preparation*, Revision 0.0, May 2007. The permittee shall notify NMED at least five working days prior to pond construction to allow NMED personnel to be on-site for inspection. Record drawings and final specifications for the pond and pond liner, and final pond capacity calculations, shall be submitted to NMED within 60 days of liner installation. A licensed New Mexico professional engineer shall certify all record drawings and final specifications for the pond and liner, as well as final capacity calculations. [20.6.2.3109 NMAC]
5.	The permittee shall operate and maintain the synthetically lined pond system for the management of algal growth media and algae propagation. The permittee shall maintain a minimum of one foot of freeboard in all ponds at all times. [20.6.2.3109 NMAC]
6.	The ponds shall be maintained in such a manner as to avoid conditions which could affect the structural integrity of the ponds and/or the associated liners. Such conditions include, but are not limited to: • Erosion damage; • Animal activity/damage; • The presence of vegetation such as: aquatic plants, weeds, woody shrubs or trees growing within five feet of the pond edge or within the pond or impoundment itself; • Evidence of seepage; • Evidence of berm subsidence; and/or • The presence of large pieces or large quantities of debris in the pond or impoundment. The permittee shall visually inspect the ponds and surrounding berms on a monthly basis to ensure proper maintenance. Vegetation growing around the ponds shall be routinely controlled by mechanical removal in a manner that is protective of liners. Any evidence of

	damage to the berm of a pond or impoundment or to a liner shall be reported to NMED immediately upon discovery. [20.6.2.3107 NMAC]
7.	Within 120 days of the effective date of this Discharge Permit (by August 26, 2009) the permittee shall submit to NMED an up-to-date scaled map of the entire facility. The map shall be clear and legible, and drawn to a scale such that all necessary information is plainly shown and identified. The map shall show the scale in feet or metric measure, a graphical scale, a north arrow, and the effective date of the map. Documentation identifying the means used to locate the mapped objects (i.e., GPS, land survey, digital map interpolation, etc.) and the relative accuracy of the data (i.e., +/- XX feet or meters) shall be included with the map. The map shall include the following objects: a) Location of all ponds; b) Location of monitoring wells (including permanent designation); and c) Location of the meter measuring wastewater discharges to ponds. If these items cannot be directly shown, due to their location inside of existing structures or because they are buried without surface identification, they shall be identified on the map in a schematic format and called out as such. The facility map shall be updated and resubmitted to NMED within 120 days of any additions or changes to the facility layout which includes any of the items listed above. [20.6.2.3106 NMAC, 20.6.2.3109 NMAC]
8.	The permittee shall maintain signs at the facility entrance and other areas where public contact is possible indicating that the water is not potable. All signs shall remain visible and legible for the term of this Discharge Permit. [20.6.2.3109 NMAC]

MONITORING, REPORTING, AND OTHER REQUIREMENTS

#	**Terms and Conditions**
9.	The permittee shall conduct the monitoring, reporting, and other requirements listed below. [20.6.2.3107 NMAC]
10.	METHODOLOGY - Unless otherwise approved in writing by NMED, the permittee shall conduct sampling and analysis in accordance with the most recent edition of the following documents: a) American Public Health Association, Standard Methods for the Examination of Water and Wastewater (18^{th}, 19^{th} or current); b) U.S. Environmental Protection Agency, Methods for Chemical Analysis of Water and Waste; c) U.S. Geological Survey, Techniques for Water Resources Investigations of the U.S. Geological Survey; d) American Society for Testing and Materials, Annual Book of ASTM Standards, Part 31.Water; e) U.S. Geological Survey, et al., National Handbook of Recommended Methods for Water Data Acquisition; and/or

	f) Methods of Soil Analysis: Part 1. Physical and Mineralogical Methods and Part 2. Chemical and Microbiological Properties, American Society of Agronomy. [20.6.2.3107.B NMAC]
11.	The permittee shall submit quarterly monitoring reports to NMED by the 1st of February, May, August, and November of each year. Quarterly monitoring shall be performed during the following quarters and submitted as follows: • January 1st through March 31st (first quarter) – **due by May 1st**; • April 1st through June 30th (second quarter) – **due by August 1st**; • July 1st through September 30th (third quarter) - **due by November 1st**; and • October 1st through December 31st (fourth quarter) - **due by February 1st**. Monitoring requirements detailed in this Discharge Permit are summarized on the sheet titled *Summary of Required Actions, Monitoring and Reporting*. [20.6.2.3107 NMAC]
12.	The permittee shall measure the monthly volume of water discharged to the pond system using the totalizing flow meter located at the fresh water supply well. Monthly meter readings including units of measurement, calculations, and monthly discharge volumes for the previous three-month period shall be submitted to NMED in the quarterly monitoring reports. The flow meter shall be kept operational at all times. [20.6.2.3107.A(1) NMAC, 20.6.2.3109.H NMAC]
13.	Once prior to the expiration date of this Discharge Permit, NMED shall have the option to require the permittee to temporarily remove any dedicated pump from each monitoring well to provide access for a complete well inspection by NMED personnel. NMED shall establish the inspection date and provide at least 60 days notice to the permittee by certified mail. Dedicated pumps shall be removed at least 48 hours prior to NMED inspection to allow adequate settling time for sediment agitated from pump removal. [20.6.2.3107 NMAC]
14.	Within 90 days of the effective date of this Discharge Permit (by July 27, 2009), the permittee shall install two new monitoring wells. The permittee shall install: • One monitoring well (MW-2) located 20 to 50 feet hydrologically downgradient of the new (third) synthetically lined pond (Pond 3); and • One monitoring well (MW-3) hydrologically upgradient of the entire facility. All monitoring well locations shall be approved by NMED prior to installation. The wells shall be completed in accordance with the attachment titled *Ground Water Discharge Permit Monitoring Well Construction and Abandonment Conditions*, Revision 1.0, July 2008. Construction and lithologic logs shall be submitted to NMED within 30 days of well completion. [20.6.2.3107 NMAC]
15.	Following well development and no more than five days after installation of the new monitoring wells required by this Discharge Permit, the permittee shall sample ground water in the new wells and analyze the samples for NO_3-N, TKN, Cl, and TDS. The permittee shall sample: • MW-2, intended to be located hydrologically downgradient of the new (third) synthetically lined pond (Pond 3); and • MW-3, intended to be located hydrologically upgradient of the entire facility.

	Ground water sample collection, preservation, transport and analysis shall be performed according to the following procedure: a) measure the depth-to-ground water from the top of well casing to the nearest hundredth of a foot; b) purge three well volumes of water from the well prior to sample collection; c) obtain samples from the well for analysis; d) properly prepare, preserve and transport samples; and e) analyze samples in accordance with the methods authorized in this Discharge Permit. Depth-to-water measurements, analytical results, including laboratory QA/QC summary report, and a facility layout map showing the location and number of each well shall be submitted to NMED within 45 days of the installation of the monitoring wells. [20.6.2.3107 NMAC]
16.	Within 120 days of the effective date of this Discharge Permit (by August 26, 2009), the permittee shall survey all wells approved by NMED for Discharge Permit monitoring purposes to a U.S. Geological Survey (USGS) or other permanent benchmark. Survey data shall include northing, easting and elevation to the nearest hundredth of a foot or in accordance with the "Minimum Standards for Surveying in New Mexico" (12.8.2 NMAC). A survey elevation shall be established at the top-of-casing, with a permanent marking indicating the point of survey. The survey shall be completed and certified by a licensed New Mexico professional surveyor. Depth-to-water shall be measured to the nearest hundredth of a foot in all surveyed wells, and the data shall be used to develop a map showing the location of all monitoring wells and the direction and gradient of ground water flow at the facility. The data and map of ground water flow direction at the facility shall be submitted to NMED within 30 days of survey completion. [20.6.2.3107 NMAC]
17.	The permittee shall perform quarterly ground water sampling in three monitoring wells and analyze the samples for NO_3-N, TKN, Cl, and TDS. The permittee shall sample: • MW-1, intended to be located hydrologically downgradient of the original (two) synthetically lined ponds (located east of the adjoining berm of Ponds 1 & 2); • MW-2, intended to be located hydrologically downgradient of the new (third) synthetically lined pond (Pond 3); and • MW-3, intended to be located hydrologically upgradient of the entire facility. Ground water sample collection, preservation, transport and analysis shall be performed according to the following procedure: a) measure the depth-to-ground water from the top of well casing to the nearest hundredth of a foot; b) purge three well volumes of water from the well prior to sample collection; c) obtain samples from the well for analysis; d) properly prepare, preserve and transport samples; and e) analyze samples in accordance with the methods authorized in this Discharge Permit. Depth-to-water measurements, analytical results, including laboratory QA/QC summary report, and a facility layout map showing the location and number of each well shall be

	submitted to NMED in the quarterly monitoring report. [20.6.2.3107 NMAC]
18.	The permittee shall develop a ground water elevation contour map on a quarterly basis using the monitoring well survey data and quarterly depth-to-water measurements as required by this Discharge Permit. The ground water elevation contour map shall depict the ground water flow direction based on the ground water elevation contours. The data and ground water elevation contour maps shall be submitted to NMED in the quarterly monitoring report. [20.6.2.3107 NMAC]
19.	The permittee shall analyze water samples collected from the algae propagation pond system on a semi-annual basis for NO_3-N, TKN, Cl, and TDS. Samples shall be collected on a rotating basis from each pond, beginning with Pond 1, and continuing each six-month period with Pond 2 and Pond 3, such that each pond is sampled every 18 months. Analytical results and a map showing the wastewater sampling location shall be submitted to NMED in the quarterly monitoring reports due on February 1st and August 1st. [20.6.2.3107 NMAC]

CONTINGENCY PLAN

#	Terms and Conditions
20.	In the event that monitoring indicates ground water standards are violated during the term of this Discharge Permit, upon closure of the facility or during post-closure monitoring, the permittee shall collect a confirmatory sample from the monitoring well within 15 days to confirm the initial sampling results. Within 15 days of confirmation of ground water contamination, the permittee shall submit to NMED a corrective action plan that proposes measures to mitigate damage from the discharge including, at a minimum, source control measures and an implementation schedule. The permittee may be required to abate water pollution pursuant to Sections 20.6.2.4000 though 20.6.2.4115 NMAC, if the corrective action plan will not result in compliance with the standards and requirements set forth in Section 20.6.2.4103 NMAC within 180 days of confirmation of ground water contamination. [20.6.2.1203 NMAC, 20.6.2.4105.A(8) NMAC]
21.	In the event that a minimum of one foot of freeboard cannot be maintained in the pond system at all times, the permittee shall submit a corrective action plan for NMED approval within 30 days of the date when the one foot of freeboard limit was initially exceeded. [20.6.2.3107 NMAC, 20.6.2.3109 NMAC]
22.	In the event that information available to NMED indicates that a well is not appropriately constructed to effectively monitor ground water quality, contains insufficient water to allow the collection of representative ground water samples, or is not completed in a manner that is protective of ground water quality, the permittee shall install a replacement well(s) within 90 days of notification from NMED. The replacement well location(s) shall be approved by NMED prior to installation and completed in accordance with the attachment titled *Ground Water Discharge Permit Monitoring Well Construction and Abandonment Conditions*, Revision 1.0, July 2008. Construction and lithologic logs shall be submitted to NMED within 30 days of well completion. Upon completion of the replacement monitoring well(s), the monitoring well(s) requiring replacement shall be properly plugged and abandoned. The well(s) shall be plugged and

	abandoned in accordance with the abandonment details in the attachment titled *Ground Water Discharge Permit Monitoring Well Construction and Abandonment Conditions*, Revision 1.0, July 2008, and any applicable local, state, and federal regulations. Documentation describing the plugging and abandonment procedures, including photographic documentation, shall be submitted to NMED within 30 days of completed well abandonment. [20.6.2.3107 NMAC]
23.	In the event that ground water flow information obtained pursuant to this Discharge Permit indicates that a monitoring well(s) was not installed hydrologically downgradient of the intended discharge location(s), the permittee shall install a replacement well(s) within 90 days of notification from NMED. The well location(s) shall be approved by NMED prior to installation and completed in accordance with the attachment titled *Ground Water Discharge Permit Monitoring Well Construction and Abandonment Conditions*, Revision 1.0, July 2008. Construction and lithologic logs shall be submitted to NMED within 30 days of well completion. [20.6.2.3107 NMAC]
24.	In the event of a spill or release that is not authorized under this Discharge Permit, the permittee shall initiate the notifications and corrective actions as required in Section 20.6.2.1203 NMAC. The permittee shall take immediate corrective action to contain and remove or mitigate the damage caused by the discharge. Within 24 hours after discovery of the discharge, the permittee shall verbally notify NMED and provide the information required by Paragraph (1) of Subsection A of 20.6.2.1203 NMAC. Wastewater shall be contained, pumped and/or transferred to the concrete sump, pond and/or land application area as necessary. Failed components shall be repaired or replaced within 48 hours from the time of failure or as soon as possible. Within seven days of discovering the discharge, the permittee shall submit a written report to NMED verifying the oral notification and providing any additional information or changes. The permittee shall submit a corrective action report within 15 days after discovery of the discharge. [20.6.2.1203 NMAC]
25.	In the event NMED or the permittee identifies any other failures of the Discharge Permit or system not specifically noted herein, NMED may require the permittee to develop for NMED approval contingency plans and schedules to cope with the failures. [20.6.2.3107.A(10) NMAC]

CLOSURE PLAN

#	Terms and Conditions
26.	Upon closure of the facility, the permittee shall perform the following closure measures: a) Complete the installation of all monitoring wells as required by this Discharge Permit. b) Empty ponds and dispose of algae growth media in a manner that is protective of ground water quality. c) Perforate or remove the pond liner(s) and re-grade the pond(s) with clean fill to blend with surface topography and prevent ponding. d) Continue ground water monitoring as required by this Discharge Permit for two years after closure to confirm the absence of ground water contamination. If monitoring results show that the ground water standards in Section 20.6.2.3103 NMAC are being violated, the permittee shall implement the contingency plan required by this Discharge Permit.

	e) Following notification from NMED that post-closure monitoring may cease, the permittee shall plug and abandon the monitoring well(s) in accordance with the attachment titled *Ground Water Discharge Permit Monitoring Well Construction and Abandonment Conditions*, Revision 1.0, July 2008. When all post-closure requirements have been met, the permittee may request to terminate the Discharge Permit. [20.6.2.3107.A(11) NMAC]

GENERAL TERMS AND CONDITIONS

#	Terms and Conditions
27.	RECORD KEEPING - The permittee shall maintain at its facility a written record of all data and information related to field measurements, sampling, and analysis conducted pursuant to this Discharge Permit. The following information shall be recorded and shall be made available to NMED upon request: a) The dates, exact place and times of sampling or field measurements; b) The name and job title of the individuals who performed each sample collection or field measurement; c) The date of the analysis of each sample; d) The name and address of the laboratory and the name and job title of the person that performed the analysis of each sample; e) The analytical technique or method used to analyze each sample or take each field measurement; f) The results of each analysis or field measurement, including raw data; g) The results of any split sampling, spikes or repeat sampling; and h) A description of the quality assurance and quality control procedures used. [20.6.2.3107.A NMAC]
28.	RECORD KEEPING - The permittee shall maintain a written record of any spills, seeps, and/or leaks of effluent, and of leachate and/or process fluids not authorized by this Discharge Permit. [20.6.2.3107.A NMAC]
29.	RECORD KEEPING - The permittee shall maintain a written record of the operation, maintenance, and repair of all facilities/equipment used to treat, store or dispose of wastewater; to measure flow rates, to monitor water quality, or to collect other data required by this Discharge Permit. This record shall include repair, replacement or calibration of any monitoring equipment and repair or replacement of any equipment used in the permittee's waste or wastewater treatment and disposal system. [20.6.2.3107.A NMAC]
30.	RECORD KEEPING - The permittee shall maintain a written record of the amount of wastewater, effluent, leachate or other wastes discharged pursuant to this Discharge Permit. [20.6.2.3107.A NMAC]
31.	RECORD KEEPING - The permittee shall retain records of all monitoring information, including all calibration and maintenance records, copies of all reports required by this Discharge Permit, and records of all data used to complete the application for this Discharge Permit for a period of at least five years from the date of the sample collection, measurement, report or application. This period may be extended by request of the

	Secretary at any time. [20.6.2.3107.A NMAC]
32.	INSPECTION and ENTRY - The permittee shall allow the Secretary or an authorized representative, upon the presentation of credentials, to: a) Enter at regular business hours or at other reasonable times upon the permittee's premises or other location where records must be kept under the conditions of this Discharge Permit, or under any federal or WQCC regulation. b) Inspect and copy, during regular business hours or at other reasonable times, any records required to be kept under the conditions of this Discharge Permit, or under any federal or WQCC regulation. c) Inspect, at regular business hours or at other reasonable times, any facility, equipment (including monitoring and control equipment or treatment works), practices or operations regulated or required under this Discharge Permit, or under any federal or WQCC regulation. d) Sample or monitor, at reasonable times for the purpose of assuring compliance with this Discharge Permit or as otherwise authorized by the WQA, any effluent, water contaminant, or receiving water at any location before or after discharge. [20.6.2.3107.D NMAC, 74-6-9(B) & (E) WQA]
33.	INSPECTION and ENTRY - Nothing in this Discharge Permit shall be construed as limiting in any way the inspection and entry authority of NMED under the WQA, the WQCC Regulations, or any other applicable law or regulation. [20.6.2.3107 NMAC, 74-6-9(B) & (E) WQA]
34.	DUTY to PROVIDE INFORMATION - The permittee shall furnish to NMED, within a reasonable time, any documents or other information which it may request to determine whether cause exists for modifying, terminating and/or renewing this Discharge Permit or to determine compliance with this Discharge Permit. The permittee shall also furnish to NMED, upon request, copies of documents required to be kept by this Discharge Permit. [20.6.2.3107.D NMAC, 74-6-9(B) & (E) WQA]
35.	SPILLS, LEAKS, and OTHER UNAUTHORIZED DISCHARGES - This Discharge Permit authorizes only those discharges specified herein. Any unauthorized discharges violate Section 20.6.2.3104 NMAC and must be reported to NMED and remediated as required by Section 20.6.2.1203 NMAC. [20.6.2.1203 NMAC]
36.	MODIFICATIONS and/or AMENDMENTS - The permittee shall notify NMED of any changes to the permittee's wastewater treatment and disposal system, including any changes in the wastewater flow rate or the volume of wastewater storage, or of any other changes to operations or processes that would result in any significant change in the discharge of water contaminants. The permittee shall obtain NMED's approval, as a modification to this Discharge Permit pursuant to Subsections E, F, or G of 20.6.2.3109 NMAC, prior to any increase in the quantity discharged, or any increase in the concentration of water contaminants discharged, above those levels approved in this Discharge Permit. [20.6.2.3107.C NMAC]
37.	PLANS and SPECIFICATIONS - The permittee shall file plans and specifications with NMED for the construction of a wastewater system and for proposed changes that will change substantially the quantity or quality of the discharge from the system. The permittee shall file plans and specifications prior to the commencement of construction. Changes to the wastewater system having a minor effect on the character of the discharge

	shall be reported as of January 1 and June 30 of each year to NMED. [20.6.2.1202 NMAC]
38.	CIVIL PENALTIES - Any violation of the requirements and conditions of this Discharge Permit, including any failure to allow NMED staff to enter and inspect records or facilities, or any refusal or failure to provide NMED with records or information, may subject the permittee to a civil enforcement action. Pursuant to WQA 74-6-10(A) and (B), such action may include a compliance order requiring compliance immediately or in a specified time, assessing a civil penalty, modifying or terminating the Discharge Permit, or any combination of the foregoing; or an action in district court seeking injunctive relief, civil penalties, or both. Pursuant to WQA 74-6-10(C) and 74-6-10.1, civil penalties of up to $15,000 per day of noncompliance may be assessed for each violation of the WQA 74-6-5, the WQCC Regulations, or this Discharge Permit, and civil penalties of up to $10,000 per day of noncompliance may be assessed for each violation of any other provision of the WQA, or any regulation, standard, or order adopted pursuant to such other provision. In any action to enforce this Discharge Permit, the permittee waives any objection to the admissibility as evidence of any data generated pursuant to this Discharge Permit. [74-6-10 WQA, 74-6-10.1 WQA]
39.	CRIMINAL PENALTIES – Any person who knowingly violates or knowingly causes or allows another person to: 1) make any false material statement, representation, certification or omission of material fact in an application, record, report, plan or other document filed, submitted or required to be maintained under the WQA; 2) falsify, tamper with or render inaccurate any monitoring device, method or record required to be maintained under the WQA; or 3) fail to monitor, sample or report as required by a permit issued pursuant to a state or federal law or regulation, is subject to felony charges and shall be sentenced in accordance with the provisions of Section 31-18-15 NMSA 1978. [74-6-10.2(A-F) WQA]
40.	COMPLIANCE WITH OTHER LAWS - Nothing in this Discharge Permit shall be construed in any way as relieving the permittee of the obligation to comply with all applicable federal, state, and local laws, regulations, permits or orders. [20.6.2 NMAC]
41.	RIGHT to APPEAL - The permittee may file a petition for review before the WQCC on this Discharge Permit. Such petition shall be in writing to the WQCC within thirty (30) days of the receipt of this Discharge Permit. Unless a timely petition for review is made, the decision of NMED shall be final and not subject to judicial review. [74-6-5(O) WQA]
42.	TRANSFER of DISCHARGE PERMIT - Prior to the transfer of any ownership, control, or possession of this permitted facility or any portion thereof, the permittee shall notify the proposed transferee in writing of the existence of this Discharge Permit and include a copy of this Discharge Permit with the notice. The permittee shall deliver or send by certified mail to NMED a copy of the notification and proof that such notification has been received by the proposed transferee. [20.6.2.3111 NMAC]
43.	TERM - Pursuant to the WQA 74-6-5(I) and Subsection H of 20.6.2.3109 NMAC, the term of this Discharge Permit Modification shall expire on July 11, 2012, the same day the Discharge Permit replaced by this Discharge Permit Modification would automatically expire. To renew this Discharge Permit, the permittee must submit an application for

	renewal at least 180 days before the termination date. [20.6.2.3109.H NMAC, 74-6-5(I) WQA]
44.	Payment of permit fees is due at the time of Discharge Permit approval. Permit fees shall be paid in a single payment or shall be paid in equal installments on a yearly basis over the term of the Discharge Permit. Single payments shall be remitted to NMED no later than 30 days after the Discharge Permit effective date. Initial installment payments shall be remitted to NMED no later than 30 days after the Discharge Permit effective date; subsequent installment payments shall be remitted to NMED no later than the anniversary of the Discharge Permit effective date. An approved Discharge Permit shall be suspended or terminated if the facility fails to remit an installment payment by its due date. [20.6.2.3114.F NMAC, 74-6-5(K) WQA]

EFFECTIVE DATE: April 28, 2009
EXPIRATION DATE: July 11, 2012

George Schuman for W. Olson

WILLIAM C. OLSON
Chief, Ground Water Quality Bureau
New Mexico Environment Department

CEHMM Experimental Algae Propagation Ponds, DP-1634
Effective Date: April 28, 2009

Required Actions

#	Description of Required Actions	Due Date
1.	**Construction of Synthetically Lined Pond:**	
	Notify NMED prior to pond construction and liner installation.	At least 5 days prior to pond construction
	Complete construction of synthetically lined Pond 3.	Within 180 days of effective date (October 25, 2009)
	Submit as-built documentation for Pond 3 and final pond capacity calculations certified by PE.	Within 60 days of lagoon completion
2.	Submit and up-to-date scaled site map of entire facility.	Within 120 days of effective date (by August 26, 2009)
3.	Make wells available for well inspection by NMED, including temporary removal of pumps from monitoring wells if necessary for well access.	Upon written notification from NMED
4.	**Installation of Monitoring Wells:**	
	Install two monitoring wells. Obtain NMED approval of locations prior to installation.	Within 90 days of effective date (by July 27, 2009)
	Submit monitoring well construction and lithologic logs.	Within 30 days of well completions
5.	**Monitoring Well Survey and Ground Water Flow Determination:**	
	Survey monitoring wells to a U.S. Geological Survey (USGS) or other permanent benchmark.	Within 120 days of effective date (by August 26, 2009)
	Submit survey data and map of ground water flow direction and gradient.	Within 30 days of survey completion
6.	**Sampling of New Monitoring Wells**	
	Analyze initial ground water samples from two new monitoring wells (MW-2 and MW-3) for NO_3-N, TKN, TDS and Cl^-.	Immediately following installation and development of each well
	Submit depth-to-water measurements, analytical results (laboratory reports), and facility map with MW location.	Within 45 days of installation of each well

Monitoring and Reporting Requirements

Submit quarterly monitoring reports containing items specified below, beginning August 2009. Monitoring shall be performed during the following quarters and submitted as follows:

Jan 1st to Mar 31st (first quarter) – due by May 1st
Apr 1st to Jun 30th (second quarter) – due by August 1st
Jul 1st to Sept 30th (third quarter) – due by November 1st
Oct 1st to Dec 31st (fourth quarter) – due by February 1st

#	Description of Monitoring and Reporting Requirements	Monitoring Frequency	Reporting Due Dates
1.	Measure depth-to-water and analyze ground water samples from three monitoring wells for NO_3-N, TKN, TDS and Cl^-. Submit measurements, field data log, analytical results (laboratory reports), and facility map with MW locations.	Quarterly	1st of Feb, May, Aug, and Nov
2.	Develop a ground water elevation contour map using monitoring well survey data and quarterly depth-to-water measurements. Submit data and contour map.	Quarterly	1st of Feb, May, Aug, and Nov
3.	Analyze a water sample from one pond for TKN, NO_3-N, TDS and Cl^-. Follow a rotating schedule so that one sample from each pond is analyzed every 18 months. Submit analytical results (laboratory reports).	Semi-annually	1st of May and Nov
4.	Record monthly meter readings and calculate discharge volumes from the supply well to the pond system. Submit meter readings, calculations and discharge volumes.	Monthly	1st of May and Nov
5.	Inspect ponds and berms. Keep log of inspection findings and repairs made.	As needed	keep on-site

NOTE: See Discharge Permit for full requirement details.

Submit all reports to:

NMED Ground Water Quality Bureau
P.O. Box 5469
Santa Fe, New Mexico 87502-5469

New Mexico Environment Department Ground Water Quality Bureau
Discharge Permit Summary

Facility Information

Facility Name CEHMM Experimental Algae Propagation Ponds
Discharge Permit Number DP-1634

Legally Responsible Party

Douglas Lynn, Executive Director
CEHMM Experimental Algae Propagation Ponds
505 North Main Street
Carlsbad, NM 88220
(575) 885-3700

Treatment, Disposal and Site Information

Primary Waste Type Agriculture
Facility Type AGS-Experimental Algae Propagation Ponds

Discharge Locations

Discharge Type	Designation	Description & Comments
Lagoon	Pond 1	Synthetically lined; formerly known as North Pond
Lagoon	Pond 2	Synthetically lined; formerly known as South Pond
Lagoon	Pond 3	Synthetically lined; to be constructed south of Pond 2

Ground Water Monitoring Locations

Type	Designation	Description & Comments
Monitoring Well	MW-1	Intended to be located hydrologically downgradient of Ponds 1 & 2; located East of the adjoining berm of Ponds 1 & 2
Monitoring Well	MW-2	To be located hydrologically downgradient of Pond 3
Monitoring Well	MW-3	To be located hydrologically upgradient of entire facility

Depth-to-Ground Water 52 feet
Total Dissolved Solids (TDS) 2,950 mg/L

Permit Information

Application Received October 10, 2008
Public Notice Published March 5, 2009
Discharge Permit Modification Issued April 28, 2009
Discharge Permit Modification Expires July 11, 2012
Permitted Discharge Volume 1,340,000 gallons per year

NMED Contact Information

Mailing Address

Ground Water Quality Bureau
P.O. Box 5469
Santa Fe, New Mexico 87502-5469

GWQB Telephone Number	(505) 827-2900
NMED Lead Staff	Shawna D. Clark
Lead Staff Telephone Number	(575) 624-6046
Lead Staff Email	shawna.clark@state.nm.us

Ground Water Discharge Permit Monitoring Well Construction and Abandonment Conditions

These conditions represent minimum construction and abandonment standards for installation of water table monitoring wells pursuant to the requirements of ground water Discharge Permits. If a person wishes to use alternate installation and/or construction methods, the methods shall be submitted to NMED for approval prior to drilling and construction.

General Drilling Specifications:

1. All well drilling activities shall be performed by an individual with a current and valid well driller license issued by the State of New Mexico in accordance with 19.27.4 NMAC. Use of drillers with environmental well drilling experience and expertise is highly recommended.
2. Drilling methods that allow for accurate determinations of water table locations shall be employed. All drill bits, drill rods, and down-hole tools shall be thoroughly cleaned immediately prior to the start of drilling. The bore hole diameter shall be drilled a minimum of 4 inches larger than the casing diameter to allow for the emplacement of sand and sealant.
3. After completion, the well shall be allowed to stabilize for a minimum of 12 hours before development is initiated.
4. The well shall be developed so that formation water flows freely through the screen and is not turbid, and all sediment and drilling disturbances are removed from the well.

Well Specifications (see attached monitoring well schematic):

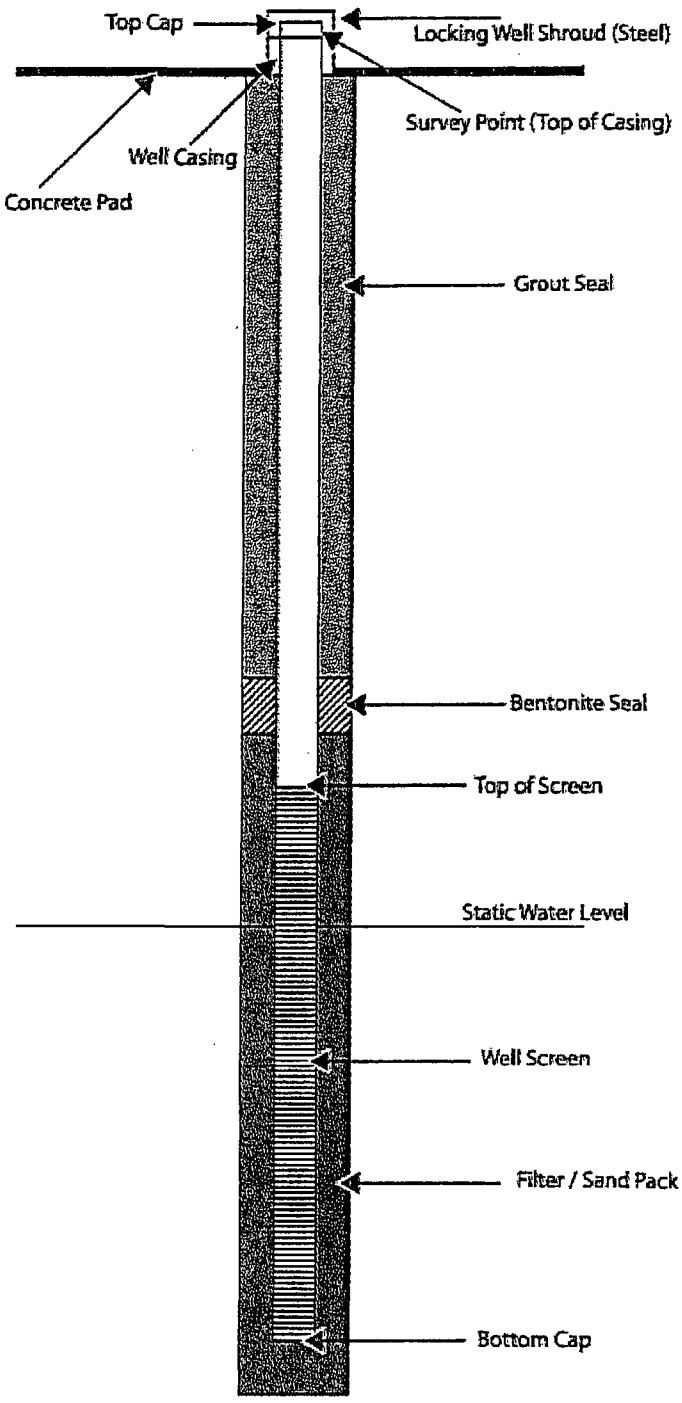
5. Schedule 40 (or heavier) PVC pipe, stainless steel pipe, carbon steel pipe, or pipe of an alternate appropriate material that has been approved for use by NMED shall be used as casing. The casing shall have an inside diameter not less than 2 inches. The casing material selected for use must be compatible with the anticipated chemistry of the ground water and appropriate for the contaminants of interest at the facility. The casing material and thickness selected for use shall have sufficient collapse strength to withstand the pressure exerted by grouts used as annular seals and thermal properties sufficient to withstand the heat generated by the hydration of cement-based grouts. Casing sections may be joined using welded or threaded joints; the method selected shall provide sufficient joint strength for the specific well installation. The casing shall extend from the top of the screen to at least one foot above ground surface. The top of the casing shall be fitted with a removable cap, and the exposed casing must be protected by a locking steel well shroud. The shroud shall be large enough in diameter to allow easy access for removal of the cap. Alternatively, monitoring wells may be completed below grade. In this case, the casing shall extend from the top of the screen to 6 to 12 inches below the ground surface; the monitoring wells shall be sealed with locking, expandable well plugs; a flush-mount, watertight well vault that is rated to withstand traffic loads shall be emplaced around the wellhead; and the cover shall be secured with at least one bolt. The vault cover shall indicate that the wellhead of a monitoring well is contained within the vault.
6. A 20-foot section (maximum) of continuous-slot, machine slotted, or other manufactured PVC or stainless steel well screen or well screen of an alternate appropriate material that has been approved for use by NMED shall be installed across the water table. Screens created by cutting slots into solid casing with saws or other tools shall not be used. The screen material selected for use must be compatible with the anticipated chemistry of the ground water and appropriate for the contaminants of interest at the facility. Screen sections may be joined using welded or threaded joints; the method selected shall provide sufficient joint strength for the specific well installation and shall not introduce constituents that may reasonably be considered contaminants of interest at the facility. A cap shall be attached to the bottom of the well screen; sumps (i.e., casing attached to the bottom of a well screen) shall not be installed. The bottom of the screen shall be installed no more than 15 feet below the water table; the top of the well screen shall be positioned not less than 5 feet above the water table. The well screen slots should be appropriately sized for the formation materials. A slot size of 0.010 inches is generally adequate for most installations.
7. Casing and well screen shall be centered in the borehole. Placement of centralizers near the top and bottom of the well screen is recommended.

8. A filter pack shall be installed around the screen by filling the annular space from 1 foot below the bottom of the screen to 2 feet above the top of the screen with clean silica sand. The filter pack shall be properly sized to prevent fine particles in the formation from entering the well; clean medium to coarse silica sand is generally adequate as filter pack material for 0.010-inch slotted well screen. For wells deeper than 30 feet, the sand shall be emplaced by a tremmie pipe. The well shall be surged or bailed to settle the filter pack and additional sand added, if necessary, before the bentonite seal is emplaced.
9. A bentonite seal shall be constructed immediately above the filter pack by emplacing bentonite chips or pellets (3/8-inch in size or smaller) in a manner that prevents bridging of the chips/pellets in the annular space. The bentonite seal shall be 3 feet in thickness and hydrated with clean water. Adequate time should be allowed for expansion of the bentonite seal before installation of the annular space seal.
10. The annular space above the bentonite seal shall be sealed with a bentonite-cement grout (5 lbs. of powdered bentonite, 94 lbs. of Portland cement, and 6½ to 8½ gallons of clean water), neat cement grout (94 lbs. of Portland cement and 5 to 6 gallons of clean water), or bentonite grout (20 percent solids, created by mixing 50 lbs. of bentonite grout with 24 gallons of clean water). Emplacement of the annular space seal using a tremmie pipe (flow by gravity or pumping through the pipe) is preferred. Annular space seals shall extend from the top of the bentonite seal to the ground surface (for wells completed above grade) or to a level 3 to 6 inches below the top of casing (for wells completed below grade).
11. For monitoring wells finished above grade, a concrete pad (2-foot minimum radius, 4-inch minimum thickness) shall be poured around the shroud and wellhead. The concrete and surrounding soil shall be sloped to direct rainfall and runoff away from the wellhead. The installation of steel posts around the well shroud and wellhead is recommended for monitoring wells finished above grade to protect the wellhead from damage by vehicles or equipment. For monitoring wells finished below grade, a concrete pad (2-foot minimum radius, 4-inch minimum thickness) shall be poured around the well vault and wellhead. The concrete and surrounding soil shall be sloped to direct rainfall and runoff away from the well vault.

Abandonment:

12. Approval for abandonment of monitoring wells used for ground water monitoring in accordance with Discharge Permit requirements must be obtained from NMED prior to abandonment.
13. Monitoring wells no longer in use shall be plugged in a manner to prevent migration of surface runoff or ground water along the length of the well casing. Where possible, this shall be accomplished by removing the well casing and pumping bentonite-cement grout, neat cement grout, or bentonite grout (prepared as specified above for annular space seals) from the bottom of the borehole to the ground surface using a tremmie pipe. If the casing cannot be removed, bentonite-cement grout, neat cement grout, or bentonite grout shall be emplaced in the well using a tremmie pipe from the bottom of the well to the ground surface.
14. After abandonment, written notification shall be submitted to the NMED with the date and method of abandonment.

Monitoring Well Schematic



NEW MEXICO ENVIRONMENT DEPARTMENT
GROUND WATER POLLUTION PREVENTION SECTION
SYNTHETICALLY LINED LAGOONS - LINER MATERIAL AND SITE PREPARATION GUIDELINES

Purpose: These guidelines represent minimum liner material and site preparation requirements for wastewater treatment, storage and evaporation lagoons. These requirements do not apply to lagoons storing hazardous wastes or high strength waste. The Ground Water Quality Bureau may impose additional requirements (e.g., double-lined lagoons with leak detection) for facilities discharging hazardous or high strength waste to lagoons through the development of specific Discharge Permit conditions for such facilities.

Liner Material Requirements:

1. The liner shall be chemically compatible with any material that will contact the liner.
2. The liner material shall be resistant to deterioration by sunlight if any portion of the liner will be exposed.
3. Synthetic liner material shall be of sufficient thickness to have adequate tensile strength and tear and puncture resistance. Under no circumstances shall a synthetic liner material less than 40 mils in thickness be accepted. Any liner material shall be certified by a licensed New Mexico professional engineer and approved by the New Mexico Environment Department (NMED) prior to its installation.

Lagoon Design and Site Preparation Requirements:

1. The system shall be certified by a licensed New Mexico professional engineer and approved by NMED prior to installation.
2. Inside slopes shall be a maximum of 3 (horizontal): 1 (vertical), and a minimum of 4 (horizontal); 1 (vertical).
3. Lagoon volume shall be designed to allow for a minimum of 24 inches of freeboard.
4. The liner shall be installed with sufficient liner material to accommodate shrinkage due to temperature changes. Folds in the liner are not acceptable.
5. To a depth of at least six inches below the liner, the sub-grade shall be free of sharp rocks, vegetation and stubble. In addition, liners shall be placed on a sub-grade of sand or fine soil. The surface in contact with the liner shall be smooth to allow for good contact between liner and sub-grade. The surface shall be dry during liner installation.
6. Sub-grade shall be compacted to a minimum of 90% of standard proctor density.
7. The minimum dike width shall be eight feet to allow vehicle traffic for maintenance.
8. The base of the pond shall be as uniform as possible and shall not vary more than three inches from the average finished elevation.
9. Synthetic liners shall be anchored in an anchor trench in the top of the berm. The trench shall be a minimum of 12 inches wide, 12 inches deep and shall be set back at least 24 inches from the inside edge of the berm.
10. If the lagoon is installed over areas of decomposing organic materials or shallow ground water, a liner vent system shall be installed.
11. Any opening in the liner through which a pipe or other fixture protrudes shall be properly sealed. Liner penetrations shall be detailed in the construction plans and record drawings.
12. A synthetic liner shall not be installed in temperatures below freezing.
13. The liner shall be installed or supervised by an individual that has the necessary training and experience as required by the liner manufacturer.
14. All manufacturer's installation and field seaming guidelines shall be followed.
15. All synthetic liner seams shall be field tested by the installer and verification of the adequacy of the seams shall be submitted to NMED along with the record drawings.

16. Concrete slabs installed on top of the synthetic liner for operational purposes shall be completed in accordance with manufacturer and installer recommendations to ensure liner integrity.
17. NMED shall be notified in advance when construction of the lagoon is to begin. NMED shall be notified upon completion of the liner installation and prior to any discharge to the lagoon to allow NMED the opportunity to inspect the liner installation.
18. Record drawings, final specifications and final lagoon capacity calculations shall be submitted to NMED within 30 days of completion of construction. These plans shall be certified by a licensed New Mexico professional engineer.

GROUND WATER DISCHARGE PERMIT MODIFICATION
Center of Excellence for Hazardous Materials Management (CEHMM) Experimental Algae Propagation Ponds, DP-1634

I. INTRODUCTION

The New Mexico Environment Department (NMED) issues this Discharge Permit Modification (Discharge Permit), DP-1634, to Center of Excellence for Hazardous Materials Management (CEHMM) (permittee) pursuant to the New Mexico Water Quality Act (WQA), NMSA 1978 §§74-6-1 through 74-6-17, and the New Mexico Water Quality Control Commission (WQCC) Regulations, 20.6.2 NMAC. This Discharge Permit Modification shall supersede, in its entirety, the Discharge Permit Modification, DP-1634, CEHMM Experimental Algae Propagation Ponds, issued April 28, 2009.

NMED's purpose in issuing this Discharge Permit, and in imposing the requirements and conditions specified herein, is to control the discharge of water contaminants from the CEHMM Experimental Algae Propagation Ponds (facility) into ground and surface water, so as to protect ground and surface water for present and potential future use as domestic and agricultural water supply and other uses and protect public health. In issuing this Discharge Permit, NMED has determined that the requirements of Subsection C of 20.6.2.3109 NMAC have been met.

The activities which produce the discharge, the location of the discharge, and the quantity, quality and flow characteristics of the discharge are briefly described as follows:

Up to 14,740,000 gallons per year (gpy) of nutrient-enriched fresh water for algae propagation is discharged and contained in twenty-three synthetically lined ponds. Fresh water is enriched with sodium chloride, plus lesser amounts of other salts, and chemical fertilizers containing nitrogen and phosphorus to be used as an algal growth medium. This nutrient-enriched water will be used to fill and maintain the water levels in the ponds. The modification consists of increasing the number of synthetically lined ponds to twenty-three and the volume of potential discharge at this site from 1,340,000 gpy to 14,740,000 gpy. The discharge contains water contaminants or toxic pollutants which may be elevated above the standards of Section 20.6.2.3103 NMAC. The facility is located at 67 East Four Dinkus Road, approximately six miles south of Artesia, in Section 16, Township 18S, Range 26E, Eddy County. Ground water most likely to be affected is at a depth of approximately 52 feet and has a total dissolved solids concentration of approximately 2,950 milligrams per liter.

The original Discharge Permit was issued on June 26, 2007 and subsequently modified on April 28, 2009. The permittee's application for permit modification consists of the materials submitted by CEHMM dated October 13, 2009. The discharge shall be managed in accordance with all conditions and requirements of this Discharge Permit.

Pursuant to Section 20.6.2.3109 NMAC, NMED reserves the right to require a Discharge Permit Modification in the event NMED determines that the requirements of 20.6.2 NMAC are being or may be violated or the standards of Section 20.6.2.3103 NMAC are being or may be violated. This may include a determination that structural controls and/or management practices approved under this Discharge Permit are not protective of ground water quality, and that more stringent

requirements to protect and/or remediate ground water quality may be required by NMED. These requirements may include: lining/relining ponds; expanding monitoring requirements; and/or implementing abatement of water pollution.

Issuance of this Discharge Permit does not relieve the permittee of the responsibility to comply with the WQA, WQCC Regulations, and any other applicable federal, state and/or local laws and regulations, such as zoning requirements and nuisance ordinances.

The following abbreviations may be used in this Discharge Permit:

Abbreviation	Explanation	Abbreviation	Explanation
BOD_5	biochemical oxygen demand (5-day)	NTU	nephelometric turbidity units
CFR	Code of Federal Regulations	Org	organisms
Cl	chloride	TDS	total dissolved solids
LADS	land application data sheet(s)	TKN	total Kjeldahl nitrogen
mg/L	milligrams per liter	total nitrogen	TKN+NO_3-N
mL	milliliters	TRC	Total Residual Chlorine
NMAC	New Mexico Administrative Code	TSS	total suspended solids
NMED	New Mexico Environment Department	WQA	New Mexico Water Quality Act
NMSA	New Mexico Statutes Annotated	WQCC	Water Quality Control Commission
NO_3-N	nitrate-nitrogen		

II. FINDINGS

In issuing this Discharge Permit, NMED finds:

1. The permittee is discharging effluent or leachate from the facility so that such effluent or leachate may move directly or indirectly into ground water within the meaning of Section 20.6.2.3104 NMAC.

2. The permittee is discharging effluent or leachate from the facility so that such effluent or leachate may move into ground water of the State of New Mexico which has an existing concentration of 10,000 milligrams per liter or less of total dissolved solids within the meaning of Subsection A of 20.6.2.3101 NMAC.

3. The discharge from the facility is not subject to any of the exemptions of Section 20.6.2.3105 NMAC.

III. CONDITIONS

The following conditions shall be complied with by the permittee and are enforceable by NMED. The permittee is authorized to discharge water contaminants subject to the following conditions:

OPERATIONAL PLAN

#	Terms and Conditions
1.	The permittee shall implement the following operational plan to ensure compliance with Title 20, Chapter 6, Parts 1 and 2 NMAC. [20.6.2.3106.C NMAC, 20.6.2.3107 NMAC]
2.	The permittee shall operate in a manner such that standards and requirements of Sections 20.6.2.3101 and 20.6.2.3103 NMAC are not violated. [20.6.2.3101 NMAC, 20.6.2.3103 NMAC]
3.	The permittee is authorized to discharge and contain up to 14,740,000 gpy nutrient-enriched fresh water for algae propagation in twenty-three synthetically lined ponds. Fresh water is enriched with sodium chloride, plus lesser amounts of other salts, and chemical fertilizers containing nitrogen and phosphorus to be used as an algal growth medium. This nutrient-enriched water shall be used to fill and maintain the water levels in the ponds. Twenty synthetically lined ponds are to be constructed under this Discharge Permit for a total of twenty-three ponds at the facility. [20.6.2.3104 NMAC]
4.	The ponds shall be constructed in accordance with the construction plans and specifications submitted with the Discharge Permit Modification application, received October 13, 2009, and the attachment titled *Ground Water Discharge Permit Conditions for Synthetically Lined Lagoons - Liner Material and Site Preparation*, Revision 0.0, May 2007. The permittee shall notify NMED at least five working days prior to pond construction to allow NMED personnel to be on-site for inspection. Record drawings and final specifications for the pond and pond liner, and final pond capacity calculations, shall be submitted to NMED within 60 days of liner installation. A licensed New Mexico professional engineer shall certify all record drawings and final specifications for the pond and liner, as well as final capacity calculations. [20.6.2.3109 NMAC]
5.	Within 120 days of the completion of the new ponds the permittee shall submit to NMED an up-to-date scaled map of the entire facility. The map shall be clear and legible, and drawn to a scale such that all necessary information is plainly shown and identified. The map shall show the scale in feet or metric measure, a graphical scale, a north arrow, and the effective date of the map. Documentation identifying the means used to locate the mapped objects (i.e., GPS, land survey, digital map interpolation, etc.) and the relative accuracy of the data (i.e., +/- XX feet or meters) shall be included with the map. The map shall include the following objects: a) Location of all ponds; b) Location of monitoring wells (including permanent designation); and c) Location of the meter measuring wastewater discharges to ponds. If these items cannot be directly shown, due to their location inside of existing structures or because they are buried without surface identification, they shall be

	identified on the map in a schematic format and called out as such. The facility map shall be updated and resubmitted to NMED within 120 days of any additions or changes to the facility layout which includes any of the items listed above. [20.6.2.3106 NMAC, 20.6.2.3109 NMAC]
6.	The permittee shall maintain a minimum of one foot of freeboard in the ponds at all times. [20.6.2.3107 NMAC, 20.6.2.3109 NMAC]
7.	The permittee shall maintain signs at the facility entrance and other areas where public contact is possible indicating that the water is not potable. All signs shall remain visible and legible for the term of this Discharge Permit. [20.6.2.3109 NMAC]
8.	The ponds shall be maintained in such a manner as to avoid conditions which could affect the structural integrity of the ponds and/or the associated liners. Such conditions include, but are not limited to: • Erosion damage; • Animal activity/damage; • The presence of vegetation such as: aquatic plants, weeds, woody shrubs or trees growing within five feet of the pond edge or within the pond or impoundment itself; • Evidence of seepage; • Evidence of berm subsidence; and/or • The presence of large pieces or large quantities of debris in the pond or impoundment. The permittee shall visually inspect the ponds and surrounding berms on a monthly basis to ensure proper maintenance. Vegetation growing around the ponds shall be routinely controlled by mechanical removal in a manner that is protective of liners. Any evidence of damage to the berm of a pond or impoundment or to a liner shall be reported to NMED immediately upon discovery. [20.6.2.3107 NMAC]

MONITORING, REPORTING, AND OTHER REQUIREMENTS

#	Terms and Conditions
9.	The permittee shall conduct the monitoring, reporting, and other requirements listed below. [20.6.2.3107 NMAC]
10.	METHODOLOGY - Unless otherwise approved in writing by NMED, the permittee shall conduct sampling and analysis in accordance with the most recent edition of the following documents: a) American Public Health Association, Standard Methods for the Examination of Water and Wastewater (18^{th}, 19^{th} or current); b) U.S. Environmental Protection Agency, Methods for Chemical Analysis of Water and Waste; c) U.S. Geological Survey, Techniques for Water Resources Investigations of the U.S. Geological Survey; d) American Society for Testing and Materials, Annual Book of ASTM Standards, Part 31.Water; e) U.S. Geological Survey, et al., National Handbook of Recommended Methods for

	Water Data Acquisition; and/or f) Methods of Soil Analysis: Part 1. Physical and Mineralogical Methods and Part 2. Chemical and Microbiological Properties, American Society of Agronomy. [20.6.2.3107.B NMAC]
11.	The permittee shall submit quarterly monitoring reports to NMED by the 1st of February, May, August, and November of each year. Quarterly monitoring shall be performed during the following quarters and submitted as follows: • January 1st through March 31st (first quarter) – **due by May 1st**; • April 1st through June 30th (second quarter) – **due by August 1st**; • July 1st through September 30th (third quarter) - **due by November 1st**; and • October 1st through December 31st (fourth quarter) - **due by February 1st**. Monitoring requirements detailed in this Discharge Permit are summarized on the sheet titled *Summary of Required Actions, Monitoring and Reporting*. [20.6.2.3107 NMAC]
12.	The permittee shall measure the monthly volume of water discharged to the pond system using the totalizing flow meter located at the fresh water supply well. Monthly meter readings including units of measurement, calculations, and monthly discharge volumes for the previous three-month period shall be submitted to NMED in the quarterly monitoring reports. The flow meter shall be kept operational at all times. [20.6.2.3107.A(1) NMAC, 20.6.2.3109.H NMAC]
13.	Once prior to the expiration date of this Discharge Permit, NMED shall have the option to require the permittee to temporarily remove any dedicated pump from each monitoring well to provide access for a complete well inspection by NMED personnel. NMED shall establish the inspection date and provide at least 60 days notice to the permittee by certified mail. Dedicated pumps shall be removed at least 48 hours prior to NMED inspection to allow adequate settling time for sediment agitated from pump removal. [20.6.2.3107 NMAC]
14.	The permittee shall perform quarterly ground water sampling in three monitoring wells and analyze the samples for NO_3-N, TKN, Cl, and TDS. The permittee shall sample: • MW-1, intended to be located hydrologically downgradient of the original (two) synthetically lined ponds (located east of the adjoining berm of Ponds 1 & 2); • MW-2, intended to be located hydrologically downgradient (located east of Pond 3); and • MW-3, located west of the facility buildings. Ground water sample collection, preservation, transport and analysis shall be performed according to the following procedure: a) measure the depth-to-ground water from the top of well casing to the nearest hundredth of a foot; b) purge three well volumes of water from the well prior to sample collection; c) obtain samples from the well for analysis; d) properly prepare, preserve and transport samples; and e) analyze samples in accordance with the methods authorized in this Discharge Permit.

	Depth-to-water measurements, analytical results, including laboratory QA/QC summary report, and a facility layout map showing the location and number of each well shall be submitted to NMED in the quarterly monitoring report. [20.6.2.3107 NMAC]
15.	The permittee shall develop a ground water elevation contour map on a quarterly basis using the monitoring well survey data and quarterly depth-to-water measurements as required by this Discharge Permit. The ground water elevation contour map shall depict the ground water flow direction based on the ground water elevation contours. The data and ground water elevation contour maps shall be submitted to NMED in the quarterly monitoring report. [20.6.2.3107 NMAC]
16.	The permittee shall analyze water samples collected from the algae propagation pond system on a semi-annual basis for NO_3-N, TKN, Cl, and TDS. Samples shall be collected on a rotating basis from 25 percent of the ponds. The ponds sampled shall be representative of the mixtures and concentrations of salts and nutrients in use at the facility. Analytical results and a map showing the water sampling locations shall be submitted to NMED in the quarterly monitoring reports due on February 1st and August 1st. [20.6.2.3107 NMAC]

CONTINGENCY PLAN

#	Terms and Conditions
17.	In the event that monitoring indicates ground water standards are violated during the term of this Discharge Permit, upon closure of the facility or during post-closure monitoring, the permittee shall collect a confirmatory sample from the monitoring well within 15 days to confirm the initial sampling results. Within 15 days of confirmation of ground water contamination, the permittee shall submit to NMED a corrective action plan that proposes measures to mitigate damage from the discharge including, at a minimum, source control measures and an implementation schedule. The permittee may be required to abate water pollution pursuant to Sections 20.6.2.4000 though 20.6.2.4115 NMAC, if the corrective action plan will not result in compliance with the standards and requirements set forth in Section 20.6.2.4103 NMAC within 180 days of confirmation of ground water contamination. [20.6.2.1203 NMAC, 20.6.2.4105.A(8) NMAC]
18.	In the event that a minimum of one foot of freeboard cannot be maintained in the pond system at all times, the permittee shall submit a corrective action plan for NMED approval within 30 days of the date when the one foot of freeboard limit was initially exceeded. [20.6.2.3107 NMAC, 20.6.2.3109 NMAC]
19.	In the event that information available to NMED indicates that a well is not appropriately constructed to effectively monitor ground water quality, contains insufficient water to allow the collection of representative ground water samples, or is not completed in a manner that is protective of ground water quality, the permittee shall install a replacement well(s) within 90 days of notification from NMED. The replacement well location(s) shall be approved by NMED prior to installation and completed in accordance with the attachment titled *Ground Water Discharge Permit Monitoring Well Construction and Abandonment Conditions*, Revision 1.0, July 2008. Construction and lithologic logs shall be submitted to NMED within 30 days of well completion.

	Upon completion of the replacement monitoring well(s), the monitoring well(s) requiring replacement shall be properly plugged and abandoned. The well(s) shall be plugged and abandoned in accordance with the abandonment details in the attachment titled *Ground Water Discharge Permit Monitoring Well Construction and Abandonment Conditions*, Revision 1.0, July 2008, and any applicable local, state, and federal regulations. Documentation describing the plugging and abandonment procedures, including photographic documentation, shall be submitted to NMED within 30 days of completed well abandonment. [20.6.2.3107 NMAC]
20.	In the event that ground water flow information obtained pursuant to this Discharge Permit indicates that a monitoring well(s) was not installed hydrologically downgradient of the intended discharge location(s), the permittee shall install a replacement well(s) within 90 days of notification from NMED. The well location(s) shall be approved by NMED prior to installation and completed in accordance with the attachment titled *Ground Water Discharge Permit Monitoring Well Construction and Abandonment Conditions*, Revision 1.0, July 2008. Construction and lithologic logs shall be submitted to NMED within 30 days of well completion. [20.6.2.3107 NMAC]
21.	In the event of a spill or release that is not authorized under this Discharge Permit, the permittee shall initiate the notifications and corrective actions as required in Section 20.6.2.1203 NMAC. The permittee shall take immediate corrective action to contain and remove or mitigate the damage caused by the discharge. Within 24 hours after discovery of the discharge, the permittee shall verbally notify NMED and provide the information required by Paragraph (1) of Subsection A of 20.6.2.1203 NMAC. Wastewater shall be contained, pumped and/or transferred to the concrete sump, pond and/or land application area as necessary. Failed components shall be repaired or replaced within 48 hours from the time of failure or as soon as possible. Within seven days of discovering the discharge, the permittee shall submit a written report to NMED verifying the oral notification and providing any additional information or changes. The permittee shall submit a corrective action report within 15 days after discovery of the discharge. [20.6.2.1203 NMAC]
22.	In the event NMED or the permittee identifies any other failures of the Discharge Permit or system not specifically noted herein, NMED may require the permittee to develop for NMED approval contingency plans and schedules to cope with the failures. [20.6.2.3107.A(10) NMAC]

CLOSURE PLAN

#	**Terms and Conditions**
23.	Upon closure of the facility, the permittee shall perform the following closure measures: a) Complete the installation of all monitoring wells as required by this Discharge Permit. b) Empty ponds and dispose of algae growth media in a manner that is protective of ground water quality. c) Perforate or remove the pond liner(s) and re-grade the pond(s) with clean fill to blend with surface topography and prevent ponding. d) Continue ground water monitoring as required by this Discharge Permit for two years after closure to confirm the absence of ground water contamination. If monitoring

	results show that the ground water standards in Section 20.6.2.3103 NMAC are being violated, the permittee shall implement the contingency plan required by this Discharge Permit. e) Following notification from NMED that post-closure monitoring may cease, the permittee shall plug and abandon the monitoring well(s) in accordance with the attachment titled *Ground Water Discharge Permit Monitoring Well Construction and Abandonment Conditions*, Revision 1.0, July 2008. When all post-closure requirements have been met, the permittee may request to terminate the Discharge Permit. [20.6.2.3107.A(11) NMAC]

GENERAL TERMS AND CONDITIONS

#	Terms and Conditions
24.	RECORD KEEPING - The permittee shall maintain at its facility a written record of all data and information related to field measurements, sampling, and analysis conducted pursuant to this Discharge Permit. The following information shall be recorded and shall be made available to NMED upon request: a) The dates, exact place and times of sampling or field measurements; b) The name and job title of the individuals who performed each sample collection or field measurement; c) The date of the analysis of each sample; d) The name and address of the laboratory and the name and job title of the person that performed the analysis of each sample; e) The analytical technique or method used to analyze each sample or take each field measurement; f) The results of each analysis or field measurement, including raw data; g) The results of any split sampling, spikes or repeat sampling; and h) A description of the quality assurance and quality control procedures used. [20.6.2.3107.A NMAC]
25.	RECORD KEEPING - The permittee shall maintain a written record of any spills, seeps, and/or leaks of effluent, and of leachate and/or process fluids not authorized by this Discharge Permit. [20.6.2.3107.A NMAC]
26.	RECORD KEEPING - The permittee shall maintain a written record of the operation, maintenance, and repair of all facilities/equipment used to treat, store or dispose of wastewater, to measure flow rates, to monitor water quality, or to collect other data required by this Discharge Permit. This record shall include repair, replacement or calibration of any monitoring equipment and repair or replacement of any equipment used in the permittee's waste or wastewater treatment and disposal system. [20.6.2.3107.A NMAC]
27.	RECORD KEEPING - The permittee shall maintain a written record of the amount of wastewater, effluent, leachate or other wastes discharged pursuant to this Discharge Permit. [20.6.2.3107.A NMAC]
28.	RECORD KEEPING - The permittee shall retain records of all monitoring information, including all calibration and maintenance records, copies of all reports required by this

	Discharge Permit, and records of all data used to complete the application for this Discharge Permit for a period of at least five years from the date of the sample collection, measurement, report or application. This period may be extended by request of the Secretary at any time. [20.6.2.3107.A NMAC]
29.	INSPECTION and ENTRY - The permittee shall allow the Secretary or an authorized representative, upon the presentation of credentials, to: a) Enter at regular business hours or at other reasonable times upon the permittee's premises or other location where records must be kept under the conditions of this Discharge Permit, or under any federal or WQCC regulation. b) Inspect and copy, during regular business hours or at other reasonable times, any records required to be kept under the conditions of this Discharge Permit, or under any federal or WQCC regulation. c) Inspect, at regular business hours or at other reasonable times, any facility, equipment (including monitoring and control equipment or treatment works), practices or operations regulated or required under this Discharge Permit, or under any federal or WQCC regulation. d) Sample or monitor, at reasonable times for the purpose of assuring compliance with this Discharge Permit or as otherwise authorized by the WQA, any effluent, water contaminant, or receiving water at any location before or after discharge. [20.6.2.3107.D NMAC, 74-6-9(B) & (E) WQA]
30.	INSPECTION and ENTRY - Nothing in this Discharge Permit shall be construed as limiting in any way the inspection and entry authority of NMED under the WQA, the WQCC Regulations, or any other applicable law or regulation. [20.6.2.3107 NMAC, 74-6-9(B) & (E) WQA]
31.	DUTY to PROVIDE INFORMATION - The permittee shall furnish to NMED, within a reasonable time, any documents or other information which it may request to determine whether cause exists for modifying, terminating and/or renewing this Discharge Permit or to determine compliance with this Discharge Permit. The permittee shall also furnish to NMED, upon request, copies of documents required to be kept by this Discharge Permit. [20.6.2.3107.D NMAC, 74-6-9(B) & (E) WQA]
32.	SPILLS, LEAKS, and OTHER UNAUTHORIZED DISCHARGES - This Discharge Permit authorizes only those discharges specified herein. Any unauthorized discharges violate Section 20.6.2.3104 NMAC and must be reported to NMED and remediated as required by Section 20.6.2.1203 NMAC. [20.6.2.1203 NMAC]
33.	MODIFICATIONS and/or AMENDMENTS - The permittee shall notify NMED of any changes to the permittee's wastewater treatment and disposal system, including any changes in the wastewater flow rate or the volume of wastewater storage, or of any other changes to operations or processes that would result in any significant change in the discharge of water contaminants. The permittee shall obtain NMED's approval, as a modification to this Discharge Permit pursuant to Subsections E, F, or G of 20.6.2.3109 NMAC, prior to any increase in the quantity discharged, or any increase in the concentration of water contaminants discharged, above those levels approved in this Discharge Permit. [20.6.2.3107.C NMAC]
34.	PLANS and SPECIFICATIONS - The permittee shall file plans and specifications with NMED for the construction of a wastewater system and for proposed changes that will

	change substantially the quantity or quality of the discharge from the system. The permittee shall file plans and specifications prior to the commencement of construction. Changes to the wastewater system having a minor effect on the character of the discharge shall be reported as of January 1 and June 30 of each year to NMED. [20.6.2.1202 NMAC]
35.	CIVIL PENALTIES - Any violation of the requirements and conditions of this Discharge Permit, including any failure to allow NMED staff to enter and inspect records or facilities, or any refusal or failure to provide NMED with records or information, may subject the permittee to a civil enforcement action. Pursuant to WQA 74-6-10(A) and (B), such action may include a compliance order requiring compliance immediately or in a specified time, assessing a civil penalty, modifying or terminating the Discharge Permit, or any combination of the foregoing; or an action in district court seeking injunctive relief, civil penalties, or both. Pursuant to WQA 74-6-10(C) and 74-6-10.1, civil penalties of up to $15,000 per day of noncompliance may be assessed for each violation of the WQA 74-6-5, the WQCC Regulations, or this Discharge Permit, and civil penalties of up to $10,000 per day of noncompliance may be assessed for each violation of any other provision of the WQA, or any regulation, standard, or order adopted pursuant to such other provision. In any action to enforce this Discharge Permit, the permittee waives any objection to the admissibility as evidence of any data generated pursuant to this Discharge Permit. [74-6-10 WQA, 74-6-10.1 WQA]
36.	CRIMINAL PENALTIES – Any person who knowingly violates or knowingly causes or allows another person to: 1) make any false material statement, representation, certification or omission of material fact in an application, record, report, plan or other document filed, submitted or required to be maintained under the WQA; 2) falsify, tamper with or render inaccurate any monitoring device, method or record required to be maintained under the WQA; or 3) fail to monitor, sample or report as required by a permit issued pursuant to a state or federal law or regulation, is subject to felony charges and shall be sentenced in accordance with the provisions of Section 31-18-15 NMSA 1978. [74-6-10.2(A-F) WQA]
37.	COMPLIANCE WITH OTHER LAWS - Nothing in this Discharge Permit shall be construed in any way as relieving the permittee of the obligation to comply with all applicable federal, state, and local laws, regulations, permits or orders. [20.6.2 NMAC]
38.	RIGHT to APPEAL - The permittee may file a petition for review before the WQCC on this Discharge Permit. Such petition shall be in writing to the WQCC within thirty (30) days of the receipt of this Discharge Permit. Unless a timely petition for review is made, the decision of NMED shall be final and not subject to judicial review. [74-6-5(O) WQA]
39.	TRANSFER of DISCHARGE PERMIT - Prior to the transfer of any ownership, control, or possession of this permitted facility or any portion thereof, the permittee shall notify the proposed transferee in writing of the existence of this Discharge Permit and include a copy of this Discharge Permit with the notice. The permittee shall deliver or send by certified mail to NMED a copy of the notification and proof that such notification has been received by the proposed transferee. [20.6.2.3111 NMAC]

40.	TERM - Pursuant to the WQA 74-6-5(I) and Subsection H of 20.6.2.3109 NMAC, the term of this Discharge Permit Modification shall expire on July 11, 2012, the same day the Discharge Permit replaced by this Discharge Permit Modification would automatically expire. To renew this Discharge Permit, the permittee must submit an application for renewal at least 180 days before the termination date. [20.6.2.3109.H NMAC, 74-6-5(I) WQA]
41.	Payment of permit fees is due at the time of Discharge Permit approval. Permit fees shall be paid in a single payment or shall be paid in equal installments on a yearly basis over the term of the Discharge Permit. Single payments shall be remitted to NMED no later than 30 days after the Discharge Permit effective date. Initial installment payments shall be remitted to NMED no later than 30 days after the Discharge Permit effective date; subsequent installment payments shall be remitted to NMED no later than the anniversary of the Discharge Permit effective date. An approved Discharge Permit shall be suspended or terminated if the facility fails to remit an installment payment by its due date. [20.6.2.3114.F NMAC, 74-6-5(K) WQA]

EFFECTIVE DATE: effective date
EXPIRATION DATE: July 11, 2012

WILLIAM C. OLSON
Chief, Ground Water Quality Bureau
New Mexico Environment Department

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NEW MEXICO ENVIRONMENT DEPARTMENT
GROUND WATER QUALITY BUREAU

DISCHARGE PERMIT APPLICATION

Type of Application. Check appropriate box.

☐ Application for new Discharge Permit -- new facility

☐ Application for new Discharge Permit -- existing (unpermitted) facility

☐ Application for Discharge Permit Renewal

☐ Application for Discharge Permit Modification
"Modification" is defined as a change to the permit requirements that result from a change in the location of the discharge, a significant increase in the quantity of the discharge, or a significant change in the quality of the discharge.

X Application for Discharge Permit Renewal and Modification

For an existing Discharge Permit, please indicate: DP Number 1634 Expiration date 7/11/12

Checklist of Application Components.

x Part A: Administrative Completeness.	*Instructions for completing the application are included on the form itself and on Supplemental Instructions for Parts A and B.* *You may fill out the application manually, or a Microsoft Word version may be downloaded from www.nmenv.state.nm.us (Ground Water Quality) and filled out electronically.*
x Part B: Operational, Monitoring, Contingency and Closure Plans, with required attachments. *Choose appropriate option*: ☐ Septic Tank System x General – Various Facility Types	
x Part C: Site Information, with required attachments.	
x $100 Filing Fee, payable to the New Mexico Environment Department. *Required from all applicants.* An additional fee will be assessed prior to permit issuance. Permit fees are listed in Section 20.6.2.3114 NMAC.	

Certification. Signature must be that of the person named in Item A-3 of Part A of the application.

I certify under penalty of law that I am knowledgeable about the information contained in this application. The information is, to the best of my knowledge and belief, true, accurate and complete.

Signature: _____ Date: 10-5-09

Printed Name: Doug Lynn

Title: Executive Director

Send three complete copies of this application and the filing fee to:

Program Manager
Ground Water Pollution Prevention Section
New Mexico Environment Department
PO Box 26110
Santa Fe, NM 87502-6110

Form updated May 2006

GROUND WATER DISCHARGE PERMIT APPLICATION
PART A: ADMINISTRATIVE COMPLETENESS
All Facilities

A-1. Facility Information. See Supplemental Instructions to determine what constitutes the "facility." The physical location of the facility must be provided. If the facility does not have an address, the location can be described by road intersections, mile posts, or landmarks, as appropriate.

Facility Name: CEHMM Experimental Algae Propagation Ponds

Former Names (if any): N/A

Physical address/location *(mandatory)*: 67 E. Four Dinkus Road, Artesia, NM

County: Eddy

Mailing address: 505 N. Main Street

Carlsbad, NM 88220

Contact person: Doug Lynn

Title: Executive Director

Telephone number(s): 575-885-3700

Fax number: 575-885-6422 E-mail address: doug.lynn@cehmm.org

A-2. Type of Discharge and Type of Facility. See Supplemental Instructions.

Type of discharge: ☐ Domestic X Agricultural ☐ Industrial ☐ Mining

Type of facility: Algae propagation ponds

A-3. Applicant Information. The applicant is the person or entity (e.g., corporation, partnership, organization, municipality, etc.) legally responsible for the discharge and for complying with the terms of the Discharge Permit. If the applicant is an entity, then the name and title of a contact person must be provided. This application must be signed by the applicant or contact person named here.

Applicant Name: Center of Excellence Hazardous Material Management (CEHMM)

Mailing address: 505 N. Main Street

Carlsbad, NM 88220

Contact person: Doug Lynn

Title: Executive Director

Telephone number(s): 575-885-3700

Fax number: 575-885-6422 E-mail address: doug.lynn@cehmm.org

A-4. Consultant Information (if applicable). If the consultant is a company or organization, then the name and title of a contact person must be provided.

Consultant/Firm Name: N/A

Mailing address: _____

_____

Contact person: _____

Title: _____

Telephone number(s): _____

Fax number: _____ E-mail address: _____

A-5. Permit Contact Information (if applicable). If someone other the applicant listed in Item A-3 or a consultant listed in Item A-4 is a primary contact for this application and/or facility, list here.

Permit Contact Name: Lou Ogaard

Title: Environmental Scientist

Mailing address: 505 N. Main Street

Carlsbad, NM 88220

Telephone number(s): 575-885-3700

Fax number: 575-885-6422 E-mail address: lou.ogaard@cehmm.org

A-6. Ownership.

The applicant owns (check as appropriate): x the facility ☐ some discharge sites ☐ all discharge sites

If other parties own the facility or any of the discharge sites, attach their names and contact information.

A-7. Discharge Quantity.

Your Discharge Permit will specify a maximum discharge volume, which is typically expressed as the maximum number of gallons per day that may be treated and/or disposed of. Please indicate below the maximum discharge volume for your facility. You must show how it was determined in Part B of your application. For further explanation, see Supplemental Instructions for Part B.

Maximum discharge volume: 0 gallons per day (or other units: _____)

A-8. Processing, Treatment, Storage and Disposal System. Briefly describe how wastewater, sludge, etc. is processed, treated, stored, and/or disposed of at your facility. See Supplemental Instructions for examples of system components.

This is not a wastewater treatment facility–it is an aquaculture facility. Three ponds are already in operation. This permit modification is to add twenty additional 1/4-acre ponds proximal to the three existing ponds. These new quarter-acre "raceway" ponds will increase the needed discharge limit from 1,340,000 gallons per year for the existing three ponds to 14,740,000 gallons per year for the entire facility. CEHMM is investigating technology to treat processed water as makeup to mitigate evaporative losses.

Irrigation water will be added to the new pond from well RA00827 and amended with sodium chloride and nutrients as appropriate for the target algae strain. The additional pond will then be inoculated with the target algae strain. Each algae pond will be circulated with a paddle wheel or other device. Algae will be harvested for the purpose of biodiesel research. Makeup water from well RA00827 will be added to the ponds as needed to compensate for losses due to evaporation and water entrained in harvested biomass. Water amendments will be added as necessary to maintain the algal culture.

Because this is a research facility, operational parameters and associated equipment will varied to determine optimal process for biodiesel feedstock production. Operating parameters may include, but not be limited to the following:

a) water depth (not to exceed 12 inches)

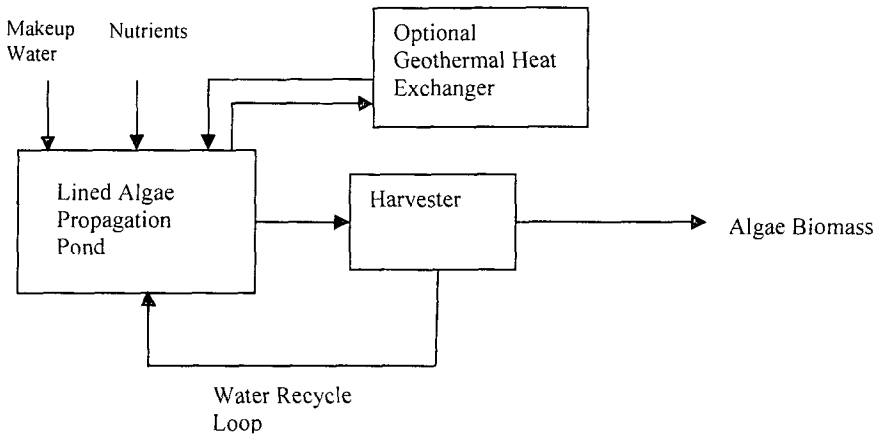
b) nutrient concentrations

c) circulation rates and methods

d) harvesting methods

Any water derived from harvesting that is not consumed by the harvesting process will be returned to the ponds. Salt and nutrients required for pond maintenance will be stored in a covered and enclosed structure safe from flooding to minimize any accidental release of these materials to the environmental. Any solid waste generated by the facility will be managed in accordance with applicable solid waste requirements. A simple process flow diagram is provided in Figure A-8.

Figure A-8
Pond Process Flow Diagram



A-9. Discharge Locations. List the locations of your facility and of all components of your processing, treatment, storage and/or disposal system. Examples of components include septic tanks, lagoons, leachfields, irrigation sites, mine stockpiles, etc. Additional examples are listed in the Supplemental Instructions. Latitude and longitude are optional unless township, range and section are not available.

Components	Township	Range	Section(s)	Latitude	Longitude
Experimental Algae Propagation Ponds	18 S	26 E	16		
Well RA00827	18 S	26 E	16		

A-10. Discharge Quality.

Indicate the expected quality of the discharge -- wastewater, leachate, sludge, etc. -- generated, stored, treated, processed and/or discharged at your facility. List the contaminants of concern and the expected concentrations. *Not all facilities need to characterize influent quality.* See Supplemental Instructions for typical contaminants and additional guidance.

Expected or Known Contaminants	**Expected concentration range** Indicate units: mg/L, CFU/100 ml, etc.	
	Incoming (Influent)	Final (Effluent)
Nitrate	N/A	<40 mg/l
Total Kjeldahl nitrogen (TKN)	N/A	<12 mg/l
Total Dissolved Solids	N/A	<40,000 mg/l
Chloride (Cl)	N/A	<36,000 mg/l
pH	N/A	7.0 – 9.0

For **new** septic tank systems, you may either fill out the chart above or simply check one of the following options:

☐ typical domestic wastewater

☐ low-strength domestic wastewater (large gray water component; e.g., laundromat, spa, etc.)

☐ high-strength domestic wastewater (low water use; e.g., RV park, low-flow toilets at campground, etc.)

A-11. Ground Water Conditions.

All applicants must provide the depth to and pre-discharge TDS concentration of the ground water that could be affected by the discharge. Refer to Supplemental Instructions for details on how to obtain these values.

Indicate the depth to the most shallow ground water beneath the discharge site. If there are multiple discharge sites, indicate the range of depths.	Indicate the total dissolved solids (TDS) concentration of most shallow ground water beneath the discharge site. Attach copies of analyses.
Depth to water (feet): 52.23 (MW-3)	TDS (mg/L): 2,390 (MW-3)
Reference:	Reference:
X Measurement, nearby monitoring well	X Analysis from upgradient monitoring well
☐ Measurement, nearby supply well	☐ Analysis from on-site supply well
☐ Well log from nearby well (attach copy)	☐ Analysis from shallow nearby supply well
☐ Office of the State Engineer http://www.ose.state.nm.us/	☐ Concentration provided in previous Discharge Permit application
☐ Report or study (give citation here and attach relevant portion):	☐ Report or study (give citation here and attach relevant portion):
☐ Other (describe):	☐ Other (describe):

A-12. Public Notice. See Supplemental Instructions.

a) The public notice packet including instructions and materials should be sent to:

x Applicant ☐ Consultant ☐ Other: _____

b) Copies of the public notice packet (excluding sign) should be sent to:

☐ Applicant ☐ Consultant ☐ Other: N/A

c) The applicant is required to provide public notice of this application by placing a display ad in a newspaper of general circulation near the location of the proposed discharge. Indicate newspaper you intend to place the ad in:

Newspaper: Artesia Daily Press, 503 W. Main Street, Artesia, NM 88210

d) *For new or modification applications only:* The applicant must post a sign for 30 days in a conspicuous location at or near the facility, as approved by NMED. One sign must be posted for each 640 contiguous acres or less of the discharge site. An additional notice must be posted at an off-site location conspicuous to the public. Describe the locations below where you intend to post the notices. You may also attach sketches or photographs.

At or near facility: Sign placed on the public road frontage bordering the SE1/4 of the N1/2 of Section 16, Township 18S, Range 26 E.

2 by 3 feet in size

Off-site location: The Artesia Public Library, 306 West Richardson, Artesia, NM 88210

Supplemental Instructions for Part A
All Facilities

Please note: Discharge Permits are required for a wide range of facilities that process, treat, store and/or dispose of wastewater, sludge, septage, leachate, contaminated soils, mine tailings, industrial waste, mine ore, waste rock, or other similar materials. For the purposes of this application form, the term "discharge" applies to any of these materials whether they are actually discharged or whether they represent only a potential discharge that could occur due to factors such as poor maintenance, improper installation, equipment failure or accidents.

A-1. Facility Information.

The "facility" may be identified as:

a) a treatment facility, such as a municipal wastewater treatment plant;
b) the source of the discharge, such as a subdivision, dairy, or waste rock pile;
c) a disposal facility or operation, such as for sludge or septage;
d) the discharge location or recipient of reclaimed wastewater for reuse, such as a golf course or cement plant;
e) a storage and/or processing facility with off-site disposal;
f) a collection of facilities, such as numerous comfort stations at a state park; or
g) a project or operation, such as a construction project or a system to distribute reclaimed wastewater throughout a city.

A-2. Type of Discharge and Type of Facility.

Characterize the type of discharge, wastewater, sludge, leachate, etc. generated, processed or received by your facility as domestic, agricultural, industrial or mining. Examples of a variety of facility types are categorized below.

Domestic Waste

"Domestic" waste contains human excreta or originates from typical residential plumbing fixtures.

- Municipal wastewater treatment plant
- Septage disposal
- Sludge disposal
- Mobile home/RV park
- Campground/park
- School/educational facility
- Restaurant
- Subdivision/apartment complex
- Unincorporated community
- Lodging/resort/spa
- Residential facility
- Commercial/shopping complex
- Laundromat
- Facility using reclaimed domestic wastewater

Agricultural Waste

- Dairy
- Food processing
- Slaughter facility
- Nursery/greenhouse
- Manufacture/processing of agricultural chemicals
- Feedlot
- Livestock truck washout

Industrial Waste

- Manufacturing
- Power plant
- Military installation
- Vehicle/equipment wash
- Mortuary
- Hydrocarbon landfarm
- Ground water remediation
- Ethanol plant
- Asphalt plant

Mining Discharges

- tailing impoundment
- mine dewatering
- waste rock pile
- smelter slag
- in-situ leach
- leach piles
- pipelines
- collection ponds
- concentrator – other beneficiation

This listing is only a guide, as there can be crossover between categories. For example, a golf course might use treated industrial wastewater for irrigation. The type of facility in that case is "golf course" and the type of waste is "industrial." A mining operation may need a permit for its restroom and shower facilities. In that case, the type of facility is a "mining operation" and the type of discharge is "domestic waste."

A-7. Discharge Quantity.

Refer to the Supplemental Instructions for Part B for information on how to calculate the maximum discharge volume for your facility.

A-8 and A-9. Treatment, Storage, Disposal System.

The following are examples of treatment, storage and disposal methods:

Treatment Methods

- Septic tank
- Grease interceptor
- Oil/water separator
- Manure separator
- Wetlands
- Lagoon (indicate whether aerated and type of liner)
- Trickling filter
- Activated sludge (extended air, SBR, etc.)
- Sand filter
- Membranes
- Sludge drying bed
- Disinfection (specify type)
  - chlorination
  - UV/ozone
- Water treatment plant

Storage Methods

- Above/below ground tank
- Storage lagoon (indicate type of liner)
- Holding tank
- Pit toilet
- Stockpile
- Tailing impoundment

Disposal Methods

- Leachfield
- Infiltration gallery
- Evaporation lagoon (indicate type of liner)
- Evaporation tank
- Impoundment
- Discharge to waters of the US (NPDES permit required)
- Ongoing land application (specify type)
  - subsurface irrigation
  - sprinkler irrigation
  - flood irrigation
  - drip irrigation
  - surface spreading (solids)
  - surface injection (solids)
- Temporary uses of reclaimed wastewater

- Ongoing use of reclaimed wastewater for:
  - manufacturing
  - construction or dust control

A-9. Discharge Quality.

Untreated wastewater entering a treatment facility (also referred to as "influent") must be characterized so that the treatment process can be evaluated. It is not necessary to provide influent quality for systems providing minimal treatment prior to discharge or disposal, such as systems relying on crop uptake for treatment (e.g., dairies), septic tank – leachfield systems, storage/processing facilities or evaporative systems. The final quality of the waste or wastewater disposed of or discharged must be characterized for all facilities.

For most agricultural and domestic facilities, the contaminants of concern include nitrate as nitrogen (NO_3-N), total Kjeldahl nitrogen (TKN), total dissolved solids (TDS), and chloride (Cl). For domestic facilities with advanced treatment, additional contaminants include total suspended solids (TSS), biochemical oxygen demand (BOD_5), and fecal coliform bacteria. Contaminants of concern at industrial and mining sites include pH, metals, and organic compounds. List all that apply.

A-10. Ground Water Conditions.

The depth to ground water beneath your facility and/or discharge site must be provided. This is true even if your facility or operation is intended to have no discharge. Discharge Permits are required for "no-discharge" lagoons, storage tanks, etc. because of the potential for a discharge to occur due to factors such as improper installation, poor maintenance, equipment failure or accidents.

The best way to determine the depth to water is to measure it in an on-site or nearby monitoring well. If a monitoring well is not available, the measurement may be from a water supply well. If there is a well but it is not possible to access it for a measurement, you could refer to the well log for that well and/or others in the vicinity. Well log information is available on the website of the State Engineer's office:

http://www.ose.state.nm.us/.

Be aware that water levels have dropped in many areas of the state, so more recent well logs in those areas are more reliable.

There may be a significant discrepancy in the depth to water in different wells, even when falling water levels is not a factor. One reason for this is that a water supply well may rely on a deep aquifer rather than water in the "first" or most shallow aquifer. Discharge Permits are intended to protect all ground water, so it is important to report the most shallow depth in the vicinity of your site.

The total dissolved solids (TDS) concentration of the ground water prior to discharge must be provided. As explained for the depth to water, this is true even if your facility or operation is intended to have no discharge. The TDS value provides a general indication of the quality of the ground water that could be affected by your operation.

The best way to obtain a pre-discharge TDS concentration is to sample an on-site or nearby well before your facility begins operating. It is better to sample a shallow rather than a deep well, if possible. It may be that a neighboring facility has existing analytical data for its Discharge Permit. (If so, be sure to obtain data from a non-impacted well.)

If there are no wells in your vicinity or it is not possible to sample them, you may find general TDS concentrations in reports available from sources such as a university, the State Engineer's Office (http://www.ose.state.nm.us/) or the US Geological Survey (http://nm.water.usgs.gov/). If you are renewing or modifying your Discharge Permit, you may refer to the TDS concentration previously determined if there was a sound basis for it. Monitoring data or other information obtained since the permit was issued, however, may warrant listing a different value.

A-12. Public Notice.

The latest revision of 20.6.2.3108 NMAC, which specifies the applicant's public notice requirements, is effective as of July 16, 2006. Once NMED has determined that your application is administratively complete, **the instructions and materials necessary to complete the public notice requirements will be sent to you.**

GROUND WATER DISCHARGE PERMIT APPLICATION
PART B: OPERATIONAL, MONITORING, CONTINGENCY AND CLOSURE PLANS
GENERAL FORM (VARIOUS FACILITY TYPES)

Operational Plan *[Section 20.6.2.3106.C, 3109.C NMAC]*

B-1. Source(s) of the Discharge. Describe what generates the wastewater, sludge or other discharges processed and/or disposed of at your facility. Identify all sources. Attach additional pages, if needed. See Supplemental Instructions.

There will be no discharges from this facility. This is not a wastewater treatment facility—it is an aquaculture facility. The facility is being operated to conduct research on the propagation and harvesting of algae to produce oil feedstock for biodiesel. The facility is being modified to add twenty "raceway" ponds proximal to the three that already exist. Additionally there are aquaculture media, pumps, valves, motors, piping, harvesting and algae oil extraction equipment.

Chemicals used by the facility, such as water amendments, will be stored in a manner to prevent their release to the environment. Any solid waste generated by the facility will be managed in accordance with applicable solid waste requirements. A simple process flow diagram is provided in Figure A-8.

B-2. Discharge Quantity. Describe the methods/calculations used to determine the maximum discharge volume listed in Item A-6 in Part A of your application. Attach additional pages, if needed. See Supplemental Instructions.

N/A. There will be no discharges from this facility

B-3. Site Map. Attach a site map showing the components of your proposed system and relevant surrounding features, clearly labeled, such as:

- treatment units
- lagoons
- tanks
- sumps
- manure separators
- land application fields
- domestic wastewater reuse areas
- pits
- stockpiles
- leachfields
- sludge drying beds
- roads
- buildings
- supply wells
- monitoring wells
- extraction/injection wells
- arroyos
- nearby water bodies such as ponds or canals
- property boundaries
- other permitted discharges
- required setbacks
- north arrow

If map is not to scale, mark distances on the map.

x Site map is attached.

B-4. Flood Protection. Describe the methods used to prevent flooding and run-off at the facility (tank protection, berms, diversion channels, etc.)

Three algae ponds have already been constructed with drainage swales to prevent flooding of the ponds. The new 1/4-acre ponds will be constructed in a like manner. A minimum of 12 inches of freeboard will be maintained in all twenty-three ponds. Ponds will be routinely inspected to maintain integrity of swales.

Best management practices will be followed when storing and transferring sources of pollutants used in the process. This will include routine inspections of dry material storage areas.

B-5. Plans and Specifications. For new facilities and for new components of existing systems, attach plans and specifications certified by a New Mexico registered professional engineer. *[Section 20.6.2.1202 NMAC]*

☐ Not applicable because no new facilities are proposed.

☐ Plans and specifications are attached

x Plans and specifications were previously submitted. Submittal date(s): 10/27/2008

A stamped set of plans for a ¼-acre algae pond was part of Modification #1 to this permit and will be used as the design for the additional twenty ponds.

B-6. Description of Components. Provide descriptive details of all components of your processing, treatment, storage and/or disposal system. Include all components listed under Item A-8 in Part A.

Component	Description (construction material, liner type, irrigation method, capacity, dimensions, area, etc.)
Synthetic liner	40 mil non-reinforced HDPE with melted seals between liner segments
Makeup water supply	Well RA00827, underground 8" PVC irrigation line with standpipe control valves, fittings, meter, and hoses
Circulation device	One or more of the following: paddlewheel, drive motor, air pump, water pump, PVC pipe
Optional geothermal heat exchanger	2' deep excavation, drive motor, air pump, water pump, PVC pipe, valves, condensate pot
Harvesting loop	Drive motor, harvesting device, water pump, PVC pipe, valves

B-7. Operational Plan. Attach a detailed description of how you operate your processing, treatment, storage and/or disposal system.

Animal feeding operations: include stormwater management, nutrient management plans, method for mixing irrigation and wastewater.

Domestic wastewater treatment facilities: include pre-treatment, solids management, vegetation management for land application.

Facilities using reclaimed domestic wastewater above ground: include proposed water quality classification(s), effluent monitoring, setbacks, irrigation schedules, etc. that will result in protection of public health and the environment. Please refer to *NMED Ground Water Quality Bureau Guidance: Above-Ground Use of Reclaimed Domestic Wastewater* for further information. A copy of the guidance document is available on the NMED website www.nmenv.state.nm.us under "Ground Water Quality".

x Operational plan is attached. (See attachment B-7)

☐ Operational plan was previously submitted. Submittal date(s): _____

B-8. **System Maintenance**. Attach a description of the operations and maintenance procedures which ensure that your processing, treatment and disposal system functions properly; e.g., inspections, pumping schedules, equipment maintenance, etc.

X O & M procedures are attached. (See attachments B-7 and B-8)

☐ O & M procedures were previously submitted. Submittal date(s): _____

B-9. **Backflow Prevention.** If wastewater is used for land application or irrigation, describe methods used to protect wells from contamination by wastewater backflow. For new facilities or new systems at an existing facility, only air gap or reduced pressure valve assemblies are acceptable methods.

a) Clearly describe and/or sketch the location of air gaps or devices and attach specifications.

N/A

b) Describe how devices are maintained.

N/A

B-10. **Water Rights.** Animal feeding operations which land apply wastewater must attach documentation of irrigation water rights for the proposed land application fields, sufficient to sustain the intended crop rotation.

☐ Water right documentation is attached.

x Not applicable.

B-11. **Past Ground Water Monitoring Results**. *This item applies only to existing facilities seeking renewal and/or modification of a Discharge Permit that required ground water monitoring.*

a) Attach a graph or a table showing all analytical results from ground water sampling at your facility. If preparing graphs, a separate graph should be developed for each constituent, except that nitrate and TKN may be shown on the same graph. Multiple wells may be shown on the same graph. See Supplemental Instructions for sample table and graph.

b) If the monitoring results indicate that ground water standards have been violated or that there is an upward trend approaching standards, attach a description of what actions you have taken or will take to address the elevated concentrations. Ground water standards are listed in Section 20.6.2.3103 NMAC. See the Supplemental Instructions for frequently referenced standards.

Monitoring Plan *[Section 20.6.2.3107.A NMAC]*

B-12. **Discharge Volumes.** Describe how and where the monthly discharge volume at your facility will be. For all measuring devices, provide type, location, and units of measure including multipliers (e.g., gallons, gallons x 100, acre-ft, etc.) See Supplemental Instructions. Attach additional pages, if necessary.

N/A. There will no discharges from this facility; therefore, there will be no discharge volume monitoring devices or locations.

B-13. Discharge Quality Monitoring. Discharge Permits typically require that the discharge (treated wastewater, sludge, septage, etc.) be sampled on a regular basis. The frequency of sampling varies by type of facility, as do the contaminants of concern. Domestic and agricultural Discharge Permits typically require sampling for total Kjeldahl nitrogen (TKN), nitrate-nitrogen (NO_3-N), total dissolved solids (TDS) and chloride on a quarterly or semi-annual basis. *(continued on next page)*

If reclaimed domestic wastewater will be discharged for above ground uses, testing of the discharge for additional parameters is appropriate. Please refer to the *NMED Ground Water Quality Bureau Guidance: Above-Ground Use of Reclaimed Domestic Wastewater* for further information.

In the space below, provide a description or sketch of the sampling point(s) to be used for sampling the discharge at your facility.

There will be no discharges from this facility; therefore there will be no discharge sampling points. However, operating parameters will be monitored to maintain the algae culture. These parameters will include water temperature, pH, nitrate (NO3-N), TDS, salinity (NaCl), oxygen, CO2, phosphate (PO4) and turbidity. Grab samples will be collected and analyzed according to Attachment B-7, Operational Plan for Experimental Algae Propagation Ponds.

Optional: In the space below (or as an attachment), you may propose revisions or additions to the standard discharge quality monitoring requirements. If you do, provide the rationale for your proposal.

There is no discharge from this facility; therefore, the owners propose that sample and analyses be performed as described in Attachment B-7, Operational Plan for Experimental Algae Propagation Ponds. This will include water quality parameters as well as inspection to maintain facility integrity and identify unintentional discharges.

B-14. Ground Water Quality Monitoring. Discharge Permits typically require that ground water samples be collected quarterly from properly constructed monitoring wells located downgradient from discharge locations. The samples must be analyzed for contaminants of concern. For most domestic and agricultural Discharge Permits, the typical contaminants of concern are total Kjeldahl nitrogen (TKN), nitrate-nitrogen (NO_3-N), total dissolved solids (TDS) and chloride.

Optional: In the space below (or as an attachment), you may propose revisions or additions to the standard ground water monitoring requirements. If you do, provide the rationale for your proposal.

Because there will be no discharge from this facility, groundwater will not be impacted. Therefore, the owners propose that procedures to maintain facility integrity and promptly identify and respond to unintentional discharges be substituted for groundwater quality monitoring.

For existing facilities:

Indicate number of existing monitoring wells: 3

Attach copies of monitoring well logs.

x Well logs attached. ☐ Well logs cannot be located.

x Well logs previously submitted. Submittal date(s): July 27, 2009

Attach copy of monitoring well survey (typically not applicable if fewer than 3 monitoring wells).

x Survey attached. ☐ No survey has been conducted.

x Survey previously submitted. Submittal date(s): July 27, 2009

B-15. Other Monitoring. In addition to discharge volumes, discharge quality monitoring and ground water sampling, Discharge Permits typically require the following monitoring, depending on the type of facility:

- inspection and pumping of septic tanks, grease tanks, lift stations
- inspection of leachfields
- inspection of lagoons
- process testing for treatment plants
- land application data sheets (LADS)
- tracking of chemical fertilizer applications to land application areas
- soil sampling (agricultural and selected other facilities land applying wastewater)
- harvested plant material testing (agricultural facilities)

Optional: In the space below (or as an attachment), you may propose revisions or additions to the other standard monitoring requirements for your type of facility. If you do, provide the rationale for your proposal.

The owners propose the following monitoring based on the design and use of this facility:

a) discharge quality monitoring described in B-13

b) inspection of pond liners (Attachment B-8, System maintenance for Experimental Algae Propagation Ponds)

c) tracking amount of makeup water added to ponds

d) tracking the type and quantity of water amendments added to ponds

e) tracking biomass harvested

Contingency Plan *[Section 20.6.2.3107.A.10 NMAC]*

B-16. System Failure. Describe your contingency plan in the event there is a failure of your wastewater or discharge system (e.g., wastewater back-up, pump failure, pipe breaks, tank overflow, leachfield failure, saturated fields etc.)

System failure will defined as a release from the pond system due to liner failure or broken/leaking piping and/or releases from associated pumps, valves, etc. In the event of system failure, facility operators will place system in a safe condition and notify management. Affected components will be isolated, removed from service and repaired or replaces as necessary. In the event of liner failure, provisions will be made to empty the contents of the failed pond into a containment device (such as an above ground tank) to a point at which repairs can be made.

B-17. Contingency Leachfield Location. *This item applies only if your disposal system includes a leachfield.* Identify a location on your site map (Item B-3) for a contingency leachfield in the event that your leachfield must be replaced. If no land is available for a contingency leachfield at an existing facility, describe how you will address a failed leachfield. New facilities must provide for a contingency leachfield location.

N/A

B-18. Other Contingencies. Discharge Permits typically contain standard contingencies to address:

- exceeding wastewater quality limits
- violation of ground water or surface water standards
- spills or illegal releases of wastewater
- migration of soil nitrogen
- loading nitrogen above limit

Propose additional contingency plans, if appropriate:

N/A

Closure Plan *[Section 20.6.2.3107(A)11 NMAC]*

B-18. Facility Closure and Post-Closure Monitoring. Discharge Permits contain standard requirements to address the closure of part or all of your discharge system, as follows:

- cap or plug lines to prevent the flow of wastewater to treatment or disposal system
- empty and remove or backfill tanks
- empty lagoons, perforate or remove liners, re-grade to surface topography
- appropriately dispose of solids
- regrade and cover stockpiles at mine facilities
- continue ground water monitoring for at least two years, longer as appropriate
- enact contingency plans if ground water standards are violated
- financial assurance may be required.

Propose additional closure plans in the space below or as an attachment, if appropriate:

The facility will be closed as follows:

a) The liquid in the ponds will be allowed to evaporate

b) Solids remaining after evaporation will be disposed of according to solid waste management regulations

c) Liners will be pulled up and disposed of according to solid waste management regulations

d) Berms will be reduced and ponds will be filled with natural material to return site to original grade

Please Note: You must also complete Part C of the application.

Supplemental Instructions for Part B – General Form

B-1. Source(s) of the Discharge.

Be specific in describing all sources. Consider the following examples:

- Municipalities – identify particular industries or specialized facilities contributing wastewater.
- RV Parks – identify showers, dump stations, laundromat, etc.
- Subdivisions – identify homes, apartments, commercial developments, water softener backwash, etc.
- Landfarms or disposal facilities – specify type of materials accepted, e.g., residential septage, car wash grit trap waste, contaminated soils/water, treated municipal sludge, etc.
- Dairies – identify milking parlors, type of washdown used, sources of stormwater runoff, etc.
- Schools – identify cafeteria, gym, showers, etc.
- Truck stops – identify restaurant, showers, car wash, etc.
- Facilities receiving reclaimed wastewater – identify the treatment facility providing the reclaimed wastewater.
- Food processing and industrial facilities – describe the processes which produce the waste stream and chemicals used.
- Mines – identify processes including beneficiation, tailing, waste rock, leach facilities, pipelines, ponds, catchments, booster stations, in-situ leach facilities.

You do not need to include solid wastes, hazardous wastes or discharges being managed under other permits; however, these should be listed under Item C-7 in Part C of the application.

B-2. Discharge Quantity.

Your Discharge Permit will allow for the treatment, processing and/or discharge of up to a specified volume, generally, a maximum number of gallons per day. The flow at your facility on any given day must not exceed this "maximum discharge volume." It is determined based on the expected contributions from the sources you identified in Item B-1.

NMED will carefully review the basis of the maximum discharge volume you propose. Show all your calculations and assumptions.

Animal feeding operations must provide calculations based on the number of animals and water conservation practices in place.

Landfarms, disposal facilities, processing facilities typically identify the expected number of loads to be delivered.

For septic systems and wastewater treatment plants, the maximum discharge volume is also referred to as the "design flow." It includes a peaking or safety factor to guard against back-ups and overflows.

Municipal wastewater treatment facilities should identify the population served, growth assumptions, and expected per capita usage considering any contributing industries.

On-site domestic wastewater treatment facilities should rely on published design flows such as those provided in the NMED Liquid Waste Regulations (20.7.3 NMAC), the Uniform Plumbing Code or the USEPA On-site Wastewater Treatment Systems Manual.

For existing facilities, the maximum discharge volume may be based on a record of measured flows if no changes are anticipated. At least two years of flow data must be submitted, and the highest monthly discharge volume must be multiplied by a peaking factor of 1.5.

NMED will verify that your proposed or existing facility can handle maximum discharge volume you propose.

B-11. Past Monitoring Results.

A complete list of ground water standards can be found in Section 20.6.2.3103 NMAC. The standards for contaminants most frequently monitored under Discharge Permits are as follows:

Nitrate-nitrogen (NO_3-N) ..... 10 mg/L
Chloride ..... 250 mg/L
Total dissolved solids (TDS).... 1000 mg/L
Sulfate (SO_4) ..... 600 mg/L
pH ..... between 6 and 9

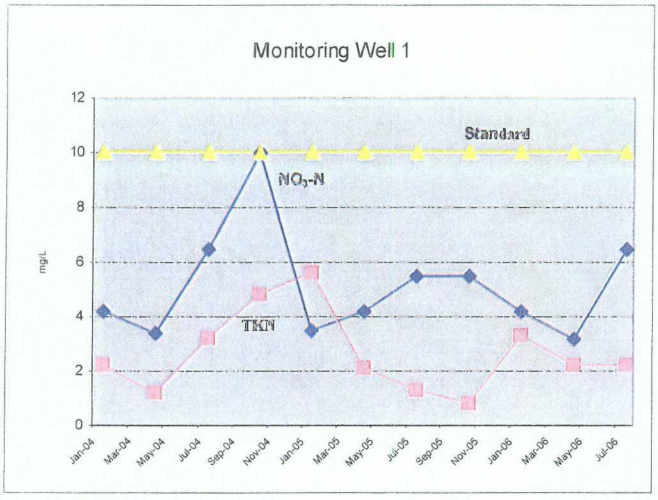
There is no ground water standard for total Kjeldahl nitrogen (TKN). Because TKN converts readily to nitrate as it moves through the vadose zone, however, concentrations approaching or exceeding 10 mg/L are of concern.

Additional parameters typically apply at mining or industrial facilities.

Some ground waters in the state have TDS or chloride concentrations that naturally exceed these standards. In that case, the standard is the naturally occurring level. You must provide documentation of such elevated natural conditions, such as analytical results from a non-impacted well.

An example table and graph follow:

Date	Monitoring Well 1	
	NO3-N	TKN
Jan-04	4.2	2.2
Apr-04	3.4	1.2
Jul-04	6.5	3.2
Oct-04	10	4.8
Jan-05	3.5	5.6
Apr-05	4.2	2.1
Jul-05	5.5	1.3
Oct-05	5.5	0.8
Jan-06	4.2	3.3
Apr-06	3.2	2.2
Jul-06	6.5	2.2



Monitoring well data from MW-2 and MW-3 from 6/29/09 showed1.85 mg/l and 7.26 mg/l for NO3-N respectively and <.25 TKN for both wells.

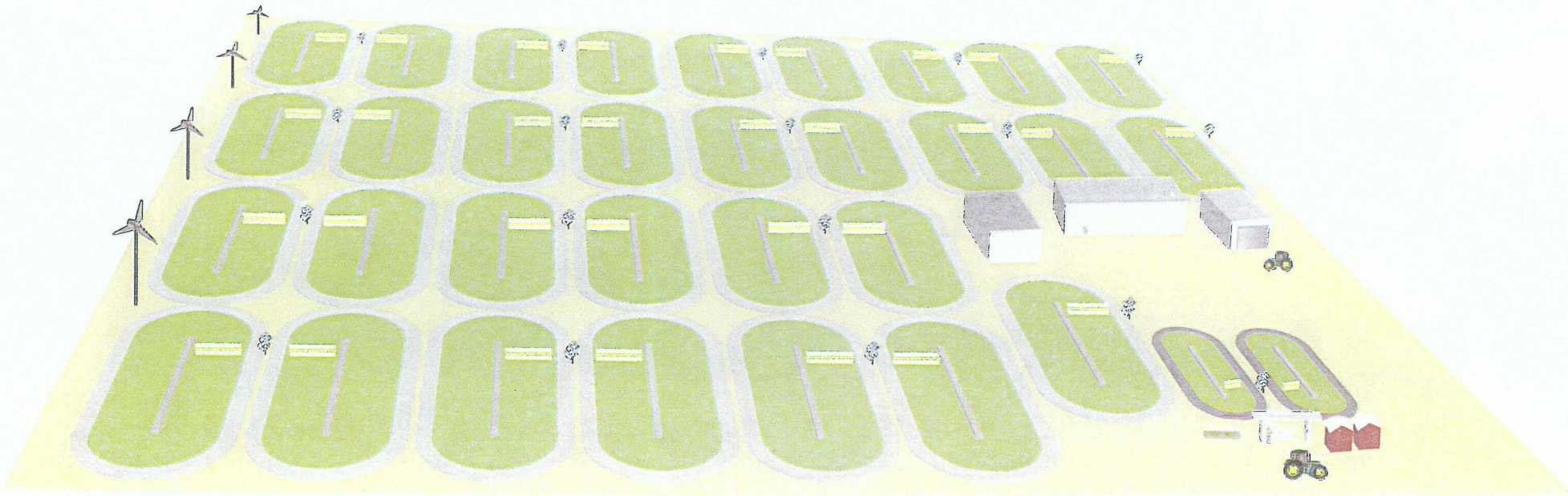
B-12. Discharge Volumes.

You must provide a method for measuring the discharge volume (Section 20.6.2.3109.H.1 NMAC). At facilities with treatment or storage lagoons, it is necessary to measure both the volume entering the treatment system as well as the volume ultimately discharged.

If you land apply wastewater to more that one discharge location, you must be able to track the volume to each location.

If your facility is small and relies on gravity to carry wastewater to the treatment and disposal system, it may be acceptable to estimate the wastewater flow. This can be done by metering water usage and deducting the volume of water used for fresh-water irrigation, swimming pools, evaporative cooling, livestock watering or other uses that do not result in wastewater flowing to the treatment system.

Attachment B3
Site Map



CEHMM
Experimental Algae Propagation Ponds
12/29/2006

In addition to the drawings, the following construction requirements shall be adhered to:

LINER MATERIAL

1. The liner shall be chemically compatible with any material that will contact the liner;
2. The liner material shall be resistant to deterioration by sunlight if any portion of the liner will be exposed;
3. Liner material shall be 40 mil HDPE.

LAGOON SITE PREPARATION

1. The lagoon shall be lined with sufficient liner material to accommodate shrinkage due to temperature changes and with no folds in the liner.

2. The area shall be cleared and grubbed so that at least 6 inches below the liner is free of sharp rocks, vegetation and stubble. The soil surface in contact with the liner shall be compacted to a smooth surface to a minimum of 90% ASTM D-698 and shall be dry during liner installation. The liner shall not be installed in temperatures below freezing.

3. A liner vent shall be installed in each pond and shall be properly sealed.

4. The installer of the liner shall be certified by the liner manufacturer and shall follow manufacturer's installation and field seaming guidelines. All seams shall be field tested by the installer and certification of the adequacy of the seams shall be supplied.

Experimental Algae Propagation Ponds -
Stamped drawings available from CEHMM upon request.

ATTACHMENT B-7

Operational Plan for Experimental Algae Propagation Ponds

Revision 0, January 12, 2007

Operational Plan for Experimental Algae Propagation Ponds

1. Filling and Make-up

The twenty-three experimental algae ponds will contain a total of approximately 7,370,000 gallons of water (half the total pond volume). The initial fill and subsequent make-up water for the ponds will come from a well owned by NMSU and located on the NMSU Agricultural Science Center property. The actual volume of water added will be measured and recorded in CEHMM operational records. CEHMM procedures call for the pond salinity (NaCl) to be maintained between 2.8 and 3.6%. The ponds will be brought to the required salinity using salt obtained from deposits in the Culebra Member of the Rustler Formation. A calculated weight of dry NaCl crystals will be dissolved in fresh water and physically added to circulating pond water as a solution.

1.1. Initial Fill

1.1.1. Determine desired water level for test series (not to exceed 12 inches).
1.1.2. Using make-up water hydrant, fill pond to desired level and record actual volume used per flow meter, date and time.
1.1.3. Measure salinity and calculate amount of NaCl to be added to pond. Dissolve required NaCl in container using water.
1.1.4. With pond circulating, add NaCl solution to pond.
1.1.5. Measure salinity again to ensure desired concentration in pond.
1.1.6. Repeat steps 1.1.3 through 1.1.5 as necessary until desired concentration is met. Record total NaCl added, date and time.

1.2. Adding Make-up Water

1.2.1. Add make-up water from the make-up water hydrant as needed to maintain pond level required for the test series.
1.2.2. Record the actual volume used per flow meter, date and time.

2. Inoculation

The ponds will be inoculated with selected species of algae. Nutrients to support these organisms will be added to the pond as required. Typical agricultural nutrients will contain nitrogen, phosphorous and carbon along with other trace elements. Salt and nutrients required for pond maintenance will be stored in a covered and enclosed structure safe from flooding to minimize any accidental release of these materials to the environment.

2.1. Strain

2.1.1. Obtain an algae culture of the proper volume and concentration for the strain selected for the test series.

2.1.2. Determine amounts of water amendments required. Add amendments to circulating pond and record amendments added, date and time.
2.1.3. Measure concentrations of amendments in pond and repeat step 2.1.2 as necessary until required concentration in pond is achieved.
2.1.4. Add algae culture obtained in step 2.1.1 to circulating pond and measure and record turbidity, chemical parameters in 3.0, date and time.

3. Testing

Testing of pond biological and chemical parameters will occur weekly or more frequently if necessary per specific procedures. Analyses will include algal density, pond turbidity, pH, TDS, O_2, CO_2, water temperature, salinity (NaCl), nitrate (NO_3-N), and phosphate (PO_4^{3-}). Peripheral measurements of photosynthetically active radiation (PAR) will be taken every 4 minutes with the hourly average recorded, ambient air temperature will be measured and recorded in a like manner. Rainfall will be collected continuously and recorded daily (M-F) in operational logs. Pond depths will be measured daily (M-F) and results will be recorded and charted to maintain operational control.

3.1. Specific Test Procedures (Attachment 1)

3.1.1. Determine parameter to test and identify applicable procedure(s).
3.1.2. Verify all items required for test are available.
3.1.3. Perform test per procedure and record results, date and time.

4. Harvesting

Algae will be harvested using proprietary equipment. Water removed from the pond will be returned to the pond minus water entrained in the harvested algae. During harvesting operations pond water will be transferred to and from harvesting equipment via above ground schedule 40 PVC pipe. During harvesting operations all piping, pumps, and valves will be fully visible with operators present to discontinue harvesting operations in the event of a leak.

4.1. Equipment Set-up

4.1.1. Obtain plans and specification of harvesting equipment from test engineer.
4.1.2. Procure materials necessary to install harvesting equipment in the harvesting loop.

4.2. Equipment Operation

4.2.1. In conjunction with the test engineer, develop operator aids and required log sheet specific to equipment to be tested.

4.2.2. Place system in operation. Unless specifically authorized by the approved test plan, an operator will be present when pond water is being actively harvested and circulated in the harvesting loop.
4.2.3. If leaks or other system failure occurs, shut down the system and isolate any releases. Notify management.

5. Pond Heating/Cooling

Algae grow best within certain water temperature ranges. The optimum range may vary from one algae strain to another. An optional geothermal heat exchanger may be installed and operated to assist in regulating water temperature. If installed, the geothermal heat exchanger will use the stable temperatures underground to moderate pond temperatures. Pond water, fresh water, or air will be used as the heat exchanger fluid. Multiple configurations may be tested. The system would likely be constructed of schedule 40 PVC pipe and associated pumps, and valves. Periodic pressurized testing will ensure early detection of underground leaks in the heat exchange system.

5.1. Equipment Set-up

5.1.1. Obtain plans and specification of geothermal heat exchanger equipment from test engineer.
5.1.2. Procure materials necessary to install geothermal heat exchanger equipment.
5.1.3. Install equipment in excavation and perform leak test prior to backfill.

5.2. Equipment Operation

5.2.1. In conjunction with the test engineer, develop operator aids and required log sheet specific to equipment to be tested.
5.2.2. Place system in operation.
5.2.3. Perform a weekly pressurized leak test on the geothermal heat exchanger.
5.2.4. If leaks or other system failure occurs, shut down the system and isolate any releases. Notify management.

ATTACHMENT B-8

Maintenance Plan for Experimental Algae Propagation Ponds

Revision 0, January 12, 2007

System Maintenance for Experimental Algae Propagation Ponds

1. Maintenance

In general, the facility will consist of synthetically lined ponds, PVC pipes, motors, pumps, and harvesting vessels. Equipment will be maintained according to the manufacturer's instructions. Motor driven water paddles or other devices will be located in each pond to maintain circulation of the cultures.

1.1. Motors

1.1.1. Check motor amperages weekly; record amps, date and time.
1.1.2. Check motor temperatures weekly; record temperatures, date and time.

1.2. Gear Reducers and Bearings

1.2.1. Check gear reducer and bearing temperatures weekly; record temperatures, date and time.
1.2.2. Lubricate bearings according to manufacture specifications and record date and time.

1.3. Structural Elements

1.3.1. Inspect all structural elements associated with the motor, gear reducer, paddle and catwalk monthly and record condition, date and time.
1.3.2. Inspect pond liners, berms and ground swales daily (M-F) and record condition, date and time. Any observations that indicate a degradation of the pond liner will be reported to management immediately.

2. Cleaning

Each pond will be emptied and cleaned as required to maintain operational parameters.

2.1. Water Removal

2.1.1. Cease pond operations and allow pond to evaporate to dryness.
2.1.2. Water will not be discharged to groundwater or to surface waters under any circumstances during maintenance operations.

2.2. Solids Removal

2.2.1. Collect solids remaining in bottom of pond and dispose of in accordance with solid waste management requirements.
2.2.2. Record method of solids disposal, amounts, date and time.

2.3. Returning Pond to Service

2.3.1. Visually inspect liner and record condition, date and time.
2.3.2. Report any observed liner defects to management.
2.3.3. Complete any necessary liner repairs.
2.3.4. Fill and inoculate according to the *Operational Plan for Experimental Algae Propagation Ponds*.

3. Erosion Control

Drainage swale around ponds will divert storm water and prevent overtopping of the ponds during heavy rainfall events. These structural elements must be maintained to ensure continued effectiveness.

3.1. Inspection

3.1.1. Inspect berms, swales, and surrounding ground cover weekly and record condition, date and time.

3.2. Repair

3.2.1. Repair erosion using natural material compatible with the structural component being repaired. Record location and type of repair, material used, date and time.

4. Site Security

The entire pond area will be fenced to prevent entry of livestock from the surrounding area. Signs will be posted to discourage unauthorized entry. Access to the pond area will be through a gate that will be locked during off hours. Security lights will operate from dusk until dawn each night. Certain areas may be lighted with flood lights activated by motion sensors.

Attachment 1

Operational Plan for Experimental Algae Propagation Ponds

Specific Test Procedures

Contents:

PROCEDURE: DETERMINATION OF OXYGEN IN WATER

1. Press PROGRAM on the HACH Photometer
2. Press 70 and ENTER
3. Fill a sample cell with at least 10 mills of sample water
4. Fill a blue ampule cap with sample water
5. Submerge ampule stem below sample water surface
6. Break stem against beaker wall and allow ampule to fill
7. Place cap on ampule without inverting ampule
8. Shake for 30 seconds
9. Press TIMER and ENTER
10. When timer sounds shake ampule for an additional 30 seconds
11. Place blank into cell holder and cover cell with cap
12. Press ZERO
13. Replace blank with ampule, cover cell with cap
14. Wait approximately 30 seconds
15. Press READ
16. Record results onto data sheet

Approved: _____ Date: _____

PROCEDURE: DETERMINATION OF TURBIDITY IN WATER

1. Press PROGRAM on HACH Photometer
2. Press 95 and ENTER
3. Fill a sample cell with 10 ml of distilled water
4. Place into cell holder and cover with cap
5. Press ZERO
6. Fill another sample cell with 10 ml of sample water
7. Place into cell holder and cover with cap
8. Press READ
9. Record results onto data sheet

Approved: _____ Date: _____

PROCEDURE: DETERMINATION OF pH AND CARBON DIOXIDE IN WATER

1. Remove pH electrode from electrode storage solution and rinse with distilled water
2. Dry exterior of probe with towels
3. Attach probe to digital titrator and pH meter
4. Insert Sodium Hydroxide Cartridge (0.3636 N) into digital titrator body
5. Insert clean delivery tube into cartridge
6. Purge delivery tube with Sodium Hydroxide solution
7. Reset counter to zero and wipe the tip
8. Add 200 ml of sample water to glass beaker
9. Place 2 inch stirring bar into beaker and place onto titra-stir
10. Place pH electrode (and NaOH tip into solution)
11. Press ON pH meter and press READ on pH meter
12. When meter sounds and locks record sample pH onto data sheet
13. Press READ on meter
14. Add NaOH to sample until meter locks at 9.3 pH
15. Multiply digital reading by 0.1 and record result on data sheet

Approved: _____ Date: _____

PROCEDURE: DETERMINATION OF TDS IN WATER

1. Add 1 ml of sample water to 500 ml beaker
2. Add 100 ml of distilled water to beaker
3. Mix well
4. Turn on Pocket Pal TDS tester
5. Record result on data sheet

Approved: _____ Date: _____

PROCEDURE: DETERMINATION OF SALINITY (NaCl) IN WATER

1. Insert delivery tube into Mercuric Nitrate Titration Cartridge (2.570 N)
2. Flush delivery tube by turning meter
3. Wipe tip and reset counter to zero
4. Place 2.0 ml of water sample into titration vial and fill to 10 ml mark with DW
5. Add 1 diphenylcarbazone powder pillow to contents of vial and mix
6. Place vial on titra-stir with paper towel beneath vial
7. Add Mercuric Nitrate until solution turns purple
8. Multiply digits required on micro-titrator by 0.1 to get ppt salinity
9. Multiply ppt salinity by 940 to get mg/l NaCl
10. Record mg/l NaCl on data sheet

Approved: _____ Date: _____

PROCEDURE: HOBO Data Logger

1. Open HOBO Software
2. Click on Readout Device Icon
3. Click OK
4. Click on "Don't Stop" Data Logging
5. Name file (use today's date)
6. Click on "Plot"
7. Click on "File"
8. Click on "Export File as Excel Text"
9. Click on "Export"
10. Save File in Desktop as "CSV" file
11. Close HOBO software
12. Close computer

Approved: _____ Date: _____

PROCEDURE: NO_3 –N Determination (mg/l)

1. Press Program
2. Press 5 and 1 then ENTER
3. Fill Sample Cell with 10 mls of sample
4. Add entire contents of NitraVer 5 Power Pillow to sample cell
5. Press TIMER and ENTER (starts 1 minute)
6. Shake vigorously until timer beeps
7. After timer beeps press ENTER (starts 5 minute)
8. Fill second sample cell with sample for blank
9. Place blank in cell holder and cover with cap
10. When timer beeps press ZERO
11. Place prepared sample in holder and cover with cap
12. Press READ
13. Record results in lab log book

Approved: _____ Date: _____

PROCEDURE: Reactive Phosphorus in wastewater & seawater (mg/l)

1. Press PROGRAM
2. Press 79 and ENTER
3. Fill Sample cell with 10 ml of sample
4. Add 1 Phosver 3 power pillow
5. Shake for 15 seconds
6. Press TIMER and ENTER (2 minutes)
7. Fill a second sample cell with sample for blank
8. Place blank in cell holder and cover with cap
9. Press EXIT and then ZERO
10. After timer beeps place prepared sample in and cover with cap
11. Press READ
12. Record results in lab logbook

Approved: _____ Date: _____

GROUND WATER DISCHARGE PERMIT APPLICATION
PART C: SITE INFORMATION
All Facilities

C-1. Area Map. Attach a current area map showing roads and clearly mark the location of your facility.

C-2. Directions to Site. Provide driving directions to the site from the nearest town or, if located in a town, from an easily identifiable location.

See "MAPQUEST" Attachment C-2

C-3. Topographic Map. Attach a copy of the appropriate US Geological Survey topographic map. You may provide just the relevant portion. USGS maps are available at many outdoor equipment stores or bookstores, from the USGS at www.usgs.gov or 1-888-ASKUSGS, and from commercial websites.

On the map clearly indicate the location of your facility. Also identify the approximate locations of all wells within 1,000 feet of your discharge locations. The Office of the State Engineer has a searchable database of supply wells on its website at www.ose.state.nm.us.

x USGS map attached with facility location and neighboring wells marked. (See Attachment C-3)

C-4. Flood Potential. Attach a copy of the latest Federal Emergency Management Agency (FEMA) flood map with your facility's location clearly marked, to the best of your ability. Information about how to obtain this map, formally known as a Flood Insurance Rate Map (FIRM) is available at www.fema.gov, insurance agencies or county government offices. A site specific analysis may be substituted.

x FEMA map or site-specific analysis attached. (See attachment C-4)

☐ Previously submitted and still up-to-date. Submittal date(s): _____

C-5. Soils. Attach either:

a) A copy of the appropriate Natural Resource Conservation Service (NRCS) soil survey map, with your site clearly identified to the best of your ability. Include the descriptive information for soils associated with the discharge locations. To obtain the map, contact your local NRCS office – there is one in every county.

b) A site-specific assessment showing the soils classifications. This is preferred over the more generalized NRCS surveys.

x NRCS soil survey or site-specific assessment attached. (See Attachment C-5)

☐ Previously submitted. Submittal date(s): _____

C-6. Geology. Provide information on the geology beneath the site by attaching relevant portions of geologic reports, well logs for on-site or nearby wells, or site specific assessments. A variety of geology publications and resources are available from the New Mexico Bureau of Geology and Mineral Resources at http://geoinfo.nmt.edu or 505-835-5420 (Socorro). Well logs are available from the New Mexico State Engineer's Office at http://www.ose.state.nm.us/.

x Geologic report attached. (See Attachment C-6.a)

x Well log(s) attached. (See Attachment C-6.b

☐ Geologic information previously submitted. Submittal date(s): _____

C-7. **Ground Water Hydrology.** Ground water hydrology refers to the occurrence, distribution, movement and chemistry of ground water. The ground water hydrology at your site will determine in large part whether your discharge will adversely affect ground water quality. You may need to present detailed information in order to "demonstrate that the Discharge Permit will not result in concentrations in excess of the standards of Section 20.6.2.3103 NMAC or the presence of any toxic pollutant." (20.2.3106.C.7 NMAC)

At a minimum, provide information below on the direction of ground water flow. Ground water may not flow in the same direction as water on the surface of the ground. A monitoring well survey is one of the best methods to determine the direction of ground water flow at a particular site. Such surveys are routinely required for many Discharge Permit locations.

If a survey is not available, check with well drillers, the city water department, staff at the Office of the State Engineer, environmental consultants or other knowledgeable persons in your area. In addition, relevant reports have been published for some areas. See the OSE website at www.ose.state.nm.us or the NMBGMR website at http://geoinfo.nmt.edu.

Direction of ground water flow: To the east

If ground water flow shifts seasonally, describe here: N/A

Reference:

X On-site well survey attached. X Previously submitted. Submittal date(s): July 27, 2009

☐ Nearby well survey attached. ☐ Previously submitted. Submittal date(s): _____

x Other. Specify: Direction based on water elevation shown on map provided by the Office of the State Engineer, See Attachment C-7

☐ Relevant portion attached.

☐ Previously submitted. Submittal date(s): _____

Attach any additional information available about ground water hydrology at the site.

C-8. **Other Permitted Discharge Locations.** If applicable, list other locations of wastewater or stormwater discharges on your site that are not described in this application and indicate what permits apply to them. Examples include discharges from small septic systems (covered by Liquid Waste Permits, discharges to surface waters under a NPDES permit, a discharge covered by a separate Discharge Permit, etc. Be sure these other discharge locations are identified on the site map required in Item B-3.

Discharge Type	Permit Identification
None	

C-9. **Other Information.** Describe below or attach any additional information to demonstrate that your proposed discharge plan will be protective of ground water quality, public health and property.

N/A

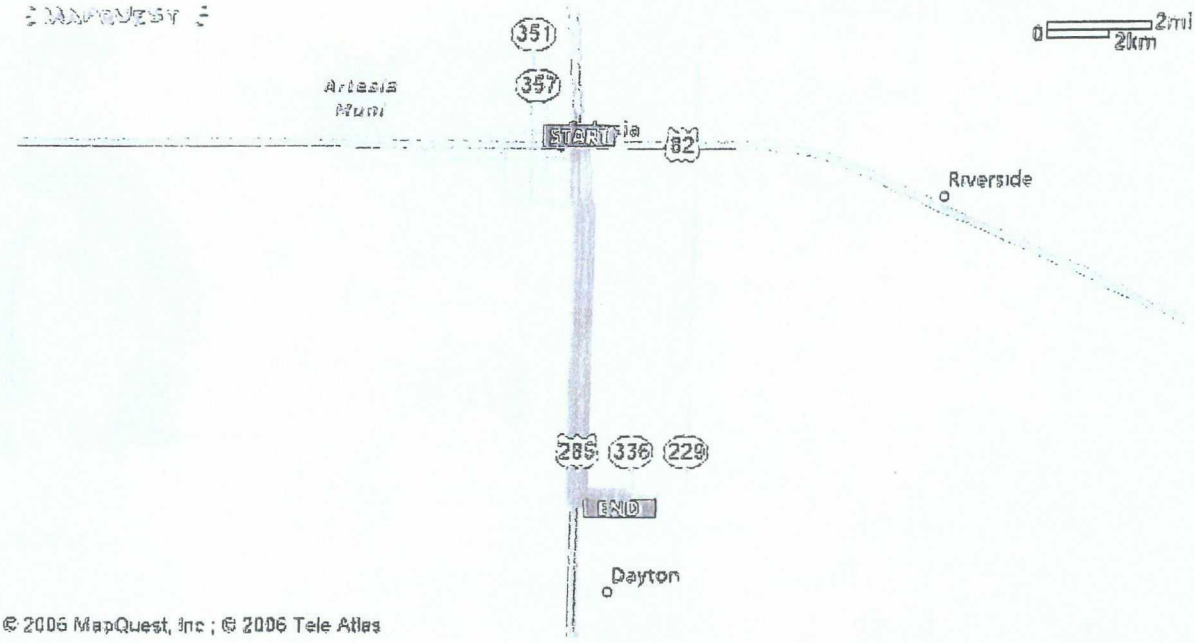
MAPQUEST

Start: S 1st St & W Main St
Artesia, NM 88210, US

End: 67 E Four Dinkus Rd
Artesia, NM 88210-9110, US

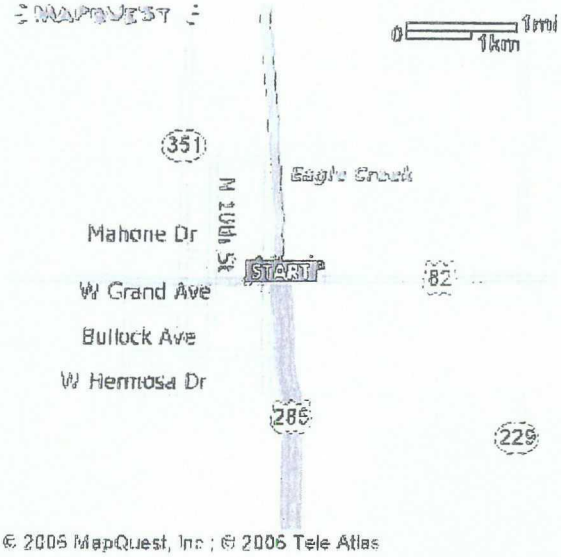
Notes:
Attachment C-2

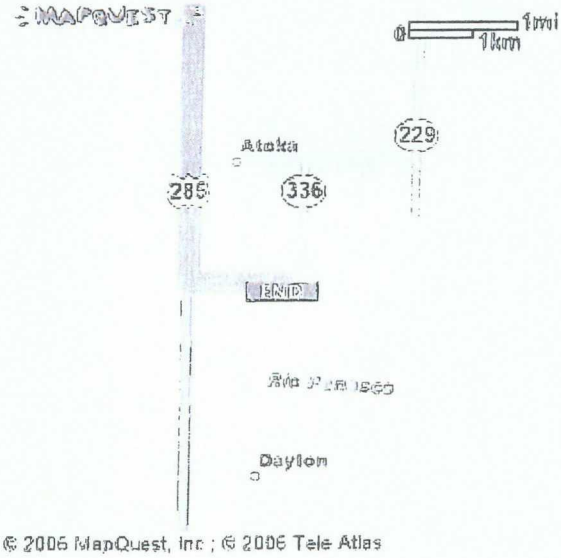
Directions	Distance
Total Est. Time: 10 minutes **Total Est. Distance:** 6.88 miles	
1: Start out going SOUTH on S 1ST ST / US-285 S toward W QUAY AVE. Continue to follow US-285 S.	6.0 miles
2: Turn LEFT onto CR-39.	0.8 miles
3: End at **67 E Four Dinkus Rd** Artesia, NM 88210-9110, US	
Total Est. Time: 10 minutes **Total Est. Distance:** 6.88 miles	



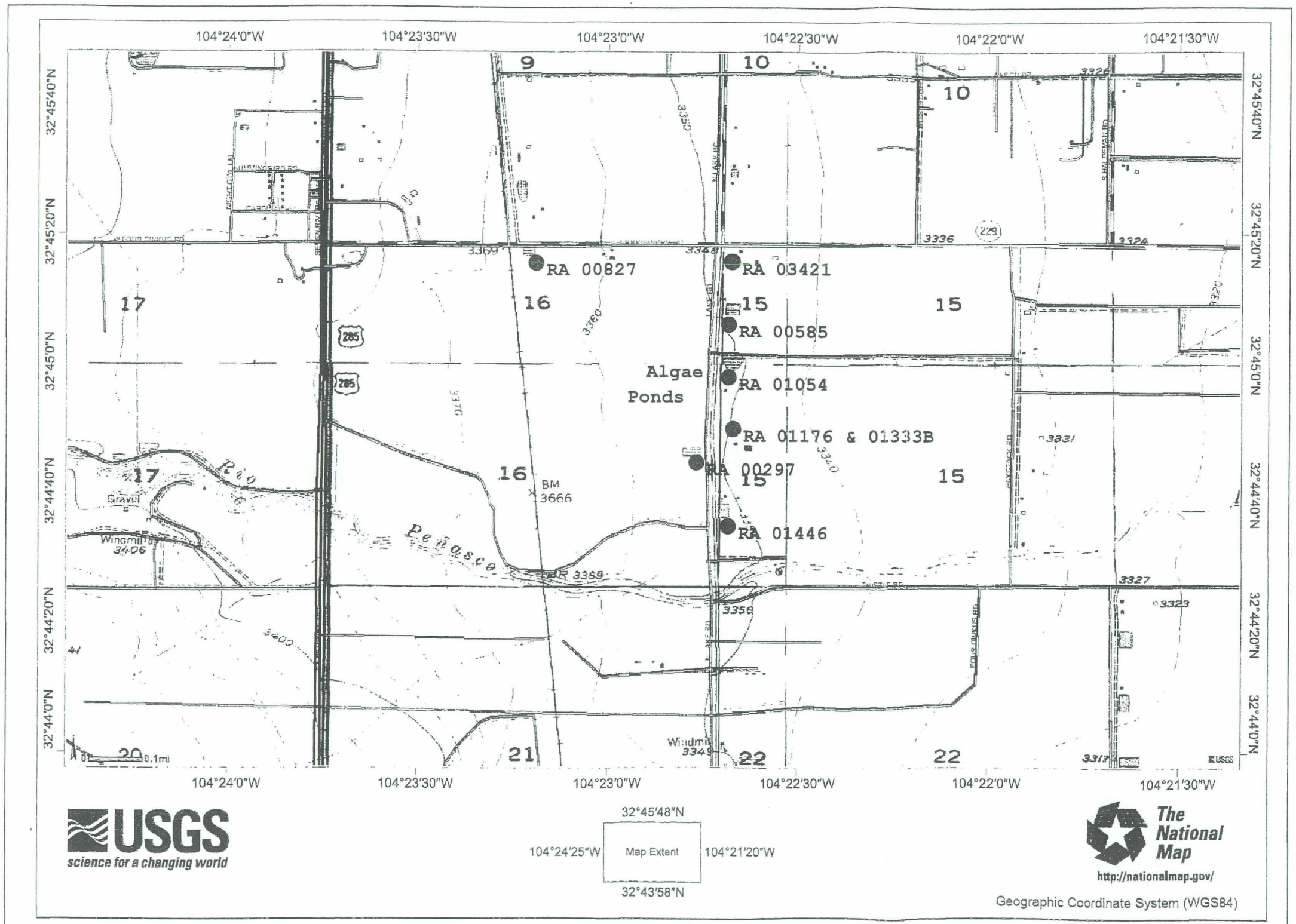
Start:
S 1st St & W Main St
Artesia, NM 88210, US

End:
67 E Four Dinkus Rd
Artesia, NM 88210-9110, US





Attachment C-3
USGS Topographic Map



Legend

Algae Ponds

Production Wells

TOPOGRAPHIC MAPS
100,000 Index
Quad Index - 100K
USGS Raster Graphics (Topo Maps)
No legend available

BOUNDARIES
US States
National Atlas States
National Atlas States
National Atlas States

TRANSPORTATION
County Road Labels (USGS)
No legend available
National Road Dataset (CENSUS)
No legend available
National Road Dataset Labels (CENSUS)
No legend available
New Mexico Roads (BTS)

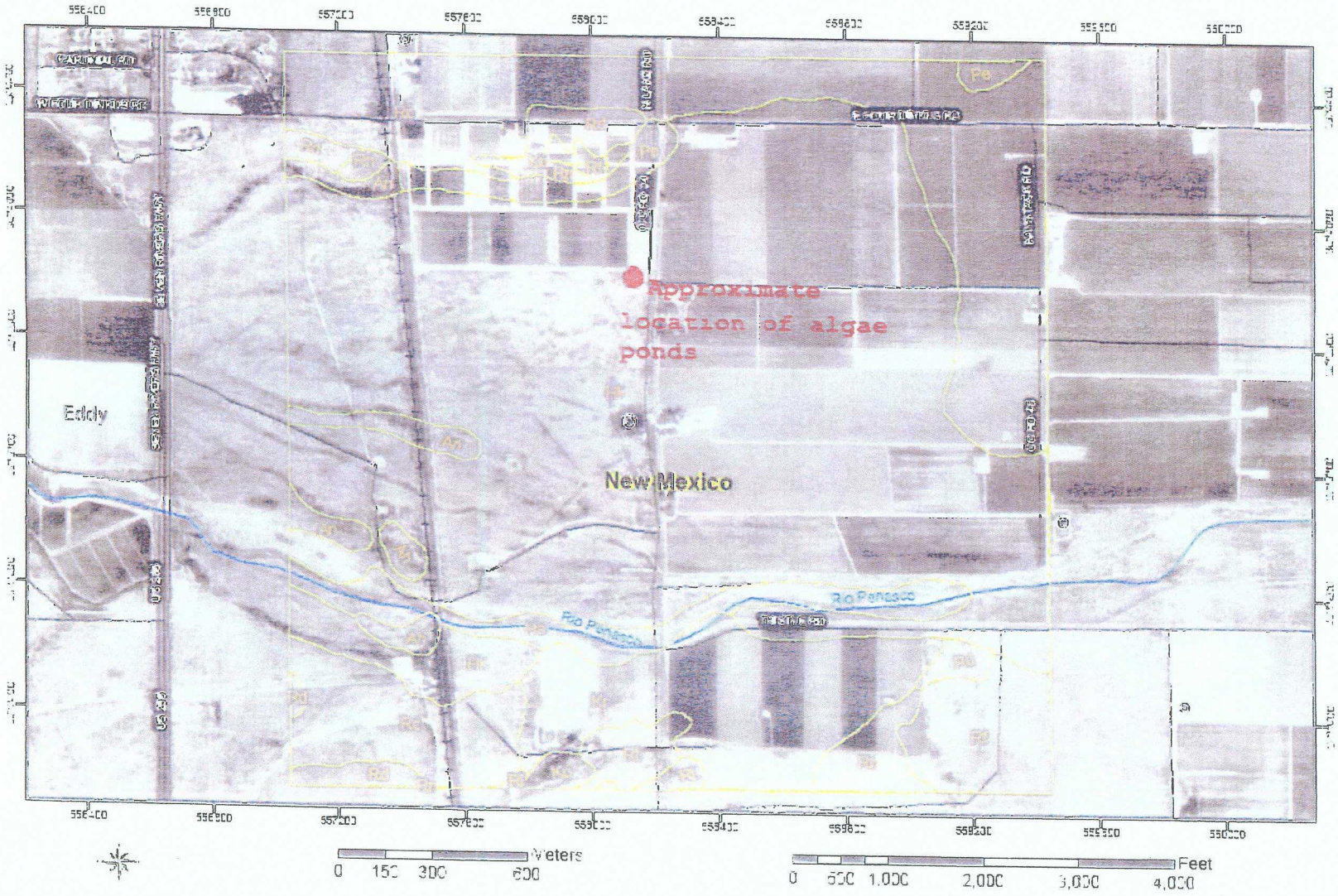
BTS Roads-New Mexico Ferry Crossings
BTS Roads-New Mexico Interstates
BTS Roads-New Mexico Local Roads
BTS Roads-New Mexico Local Roads (Small Scale)
BTS Roads-New Mexico Secondary Roads
BTS Roads-New Mexico Trails
BTS Roads-New Mexico US/Major St. Highway

State Highway Labels (USGS)
No legend available
US Highway Labels (USGS)
No legend available
US Road Labels (BTS)
No legend available
US Roads (BTS)
Light Duty Road
Primary Highway
Secondary Highway
Trail
Other Road

OTHER
Section Labels (BLM)
No legend available
Township Boundaries (BLM)
detail_twp
Township Labels (BLM)

No legend available

ELEVATION
1/3 ArcSecond NE CONUS


Approximate location of algae ponds
Eddy
New Mexico
Rio Penasco
Rio Penasco
Meters
0 150 300 600
Feet
0 500 1,000 2,000 3,000 4,000

Rio Penasco

MAP LEGEND

- Soil Map Units
- Cities
- Detailed Counties
- Detailed States
- Interstate Highways
- Roads
- Rails
- Water
- Hydrography
- Oceans
- Escarpment, bedrock
- Escarpment, non-bedrock
- Gully
- Levee
- Slope
- Blowout
- Borrow Pit
- Clay Spot
- Depression, closed
- Eroded Spot
- Gravel Pit
- Gravelly Spot
- Gully
- Lava Flow
- Landfill
- Marsh or Swamp
- Miscellaneous Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Slide or Slip
- Sinkhole
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Perennial Water
- Wet Spot

MAP INFORMATION

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov

Coordinate System: UTM Zone 13

Soil Survey Area: Eddy Area, New Mexico
Spatial Version of Data:
Soil Map Compilation Scale: 1:20000

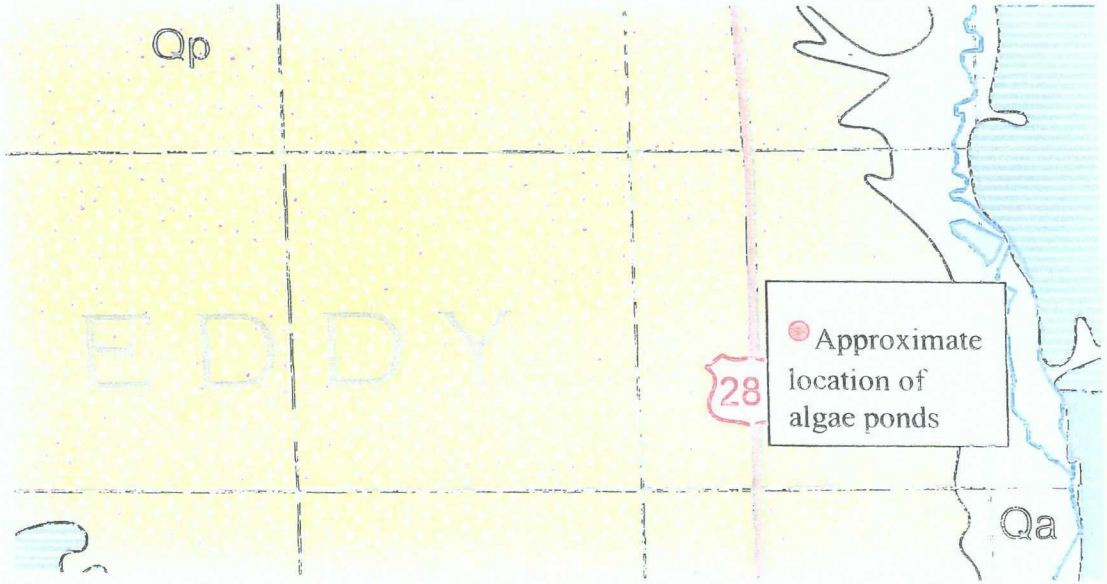
Maps comprised of aerial images photographed on these dates:
07/9/1997

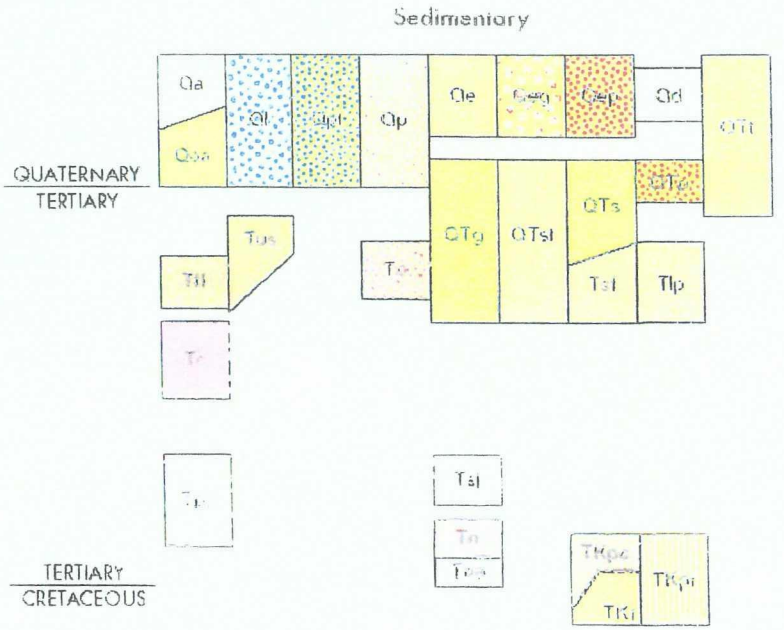
The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend Summary

Eddy Area, New Mexico

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
An	Anthony sandy loam, 0 to 1 percent slopes	9.5	0.2
Ao	Arno silty clay loam, 0 to 1 percent slopes	15.2	0.3
At	Atoka loam, 1 to 3 percent slopes	20.2	0.5
Gs	Gypsum land-Cottonwood complex, 0 to 3 percent slopes	56.3	1.2
Ha	Harkey sandy loam, 0 to 1 percent slopes	62.1	1.7
Hk	Harkey very fine sandy loam, 0 to 1 percent slopes	1,191.3	25.5
Kr	Karro loam, 0 to 1 percent slopes	232.9	5.0
Ku	Karro loam, 1 to 3 percent slopes	50.4	1.1
Pe	Pima silt loam, 0 to 1 percent slopes	104.6	2.2
Rc	Reagan loam, 0 to 1 percent slopes	1,498.4	32.1
Rd	Reagan loam, 1 to 3 percent slopes	154.2	3.3
Rf	Reagan loam, saline, 0 to 1 percent slopes	704.7	15.1
Rl	Reeves loam, 0 to 1 percent slopes	70.1	1.7
Rn	Reeves loam, 1 to 3 percent slopes	365.5	7.8
Rr	Reeves loam, shallow, 0 to 1 percent slopes	43.5	0.4
Uo	Upton gravelly loam, 0 to 9 percent slopes	7.0	0.2





DESCRIPTION OF MAP UNITS

QUATERNARY

Qa — Alluvium (Holocene to upper Pleistocene)

Ql — Landslide deposits and colluvium (Holocene to Pleistocene)—Landslide deposits on western flanks of Socorro Mountains not shown for clarity

Qpl — Lacustrine and playa deposits (Holocene)—Includes associated alluvial and eolian deposits of major lake basins

Qp — Piedmont alluvial deposits (Holocene to lower Pleistocene)—Includes deposits of higher gradient tributaries bordering major stream valleys, alluvial veneers of the piedmont slope, and alluvial fans. May locally include uppermost Pliocene deposits

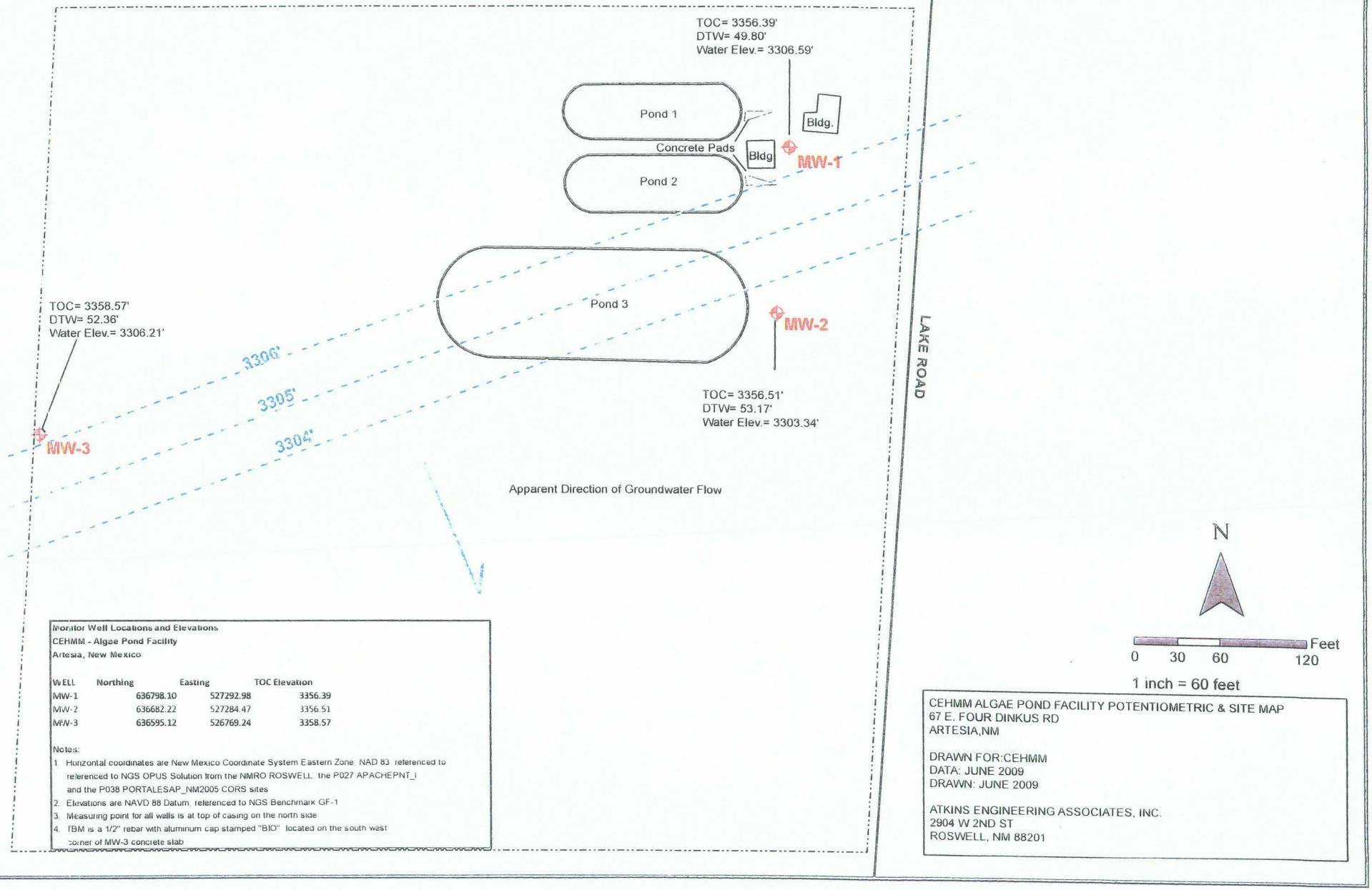
Qe — Eolian deposits (Holocene to middle Pleistocene)

Qeg — Gypsiferous eolian deposits (Holocene to middle Pleistocene)

Qep — Eolian and piedmont deposits (Holocene to middle Pleistocene)—Interlayed eolian sands and piedmont-slope deposits along the eastern flank of the Pecos River valley, primarily between Roswell and Carlsbad. Typically capped by thin eolian deposits

CITATION – Please cite this work as follows:
New Mexico Bureau of Geology and Mineral Resources, 2003,
Geologic Map of New Mexico, 1:500,000:
New Mexico Bureau of Geology and Mineral Resources

Attachment C-6b consists of well records
on file at CEHMM.
Available upon request.



Monitor Well Locations and Elevations
CEHMM - Algae Pond Facility
Artesia, New Mexico

WELL	Northing	Easting	TOC Elevation
MW-1	636798.10	527292.98	3356.39
MW-2	636682.22	527284.47	3356.51
MW-3	636595.12	526769.24	3358.57

Notes:

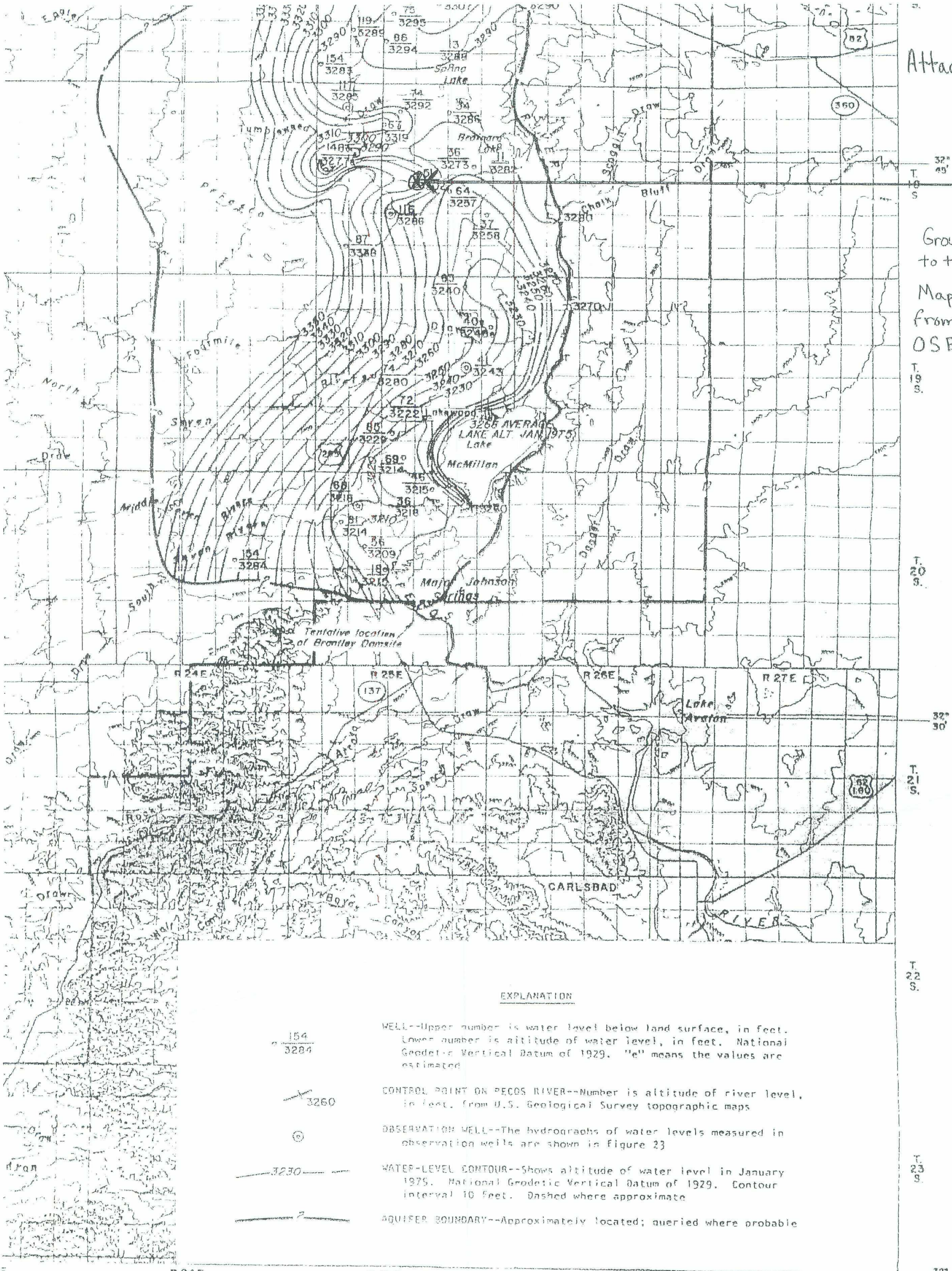
1. Horizontal coordinates are New Mexico Coordinate System Eastern Zone, NAD 83, referenced to referenced to NGS OPUS Solution from the NMRO ROSWELL, the P027 APACHEPNT_I and the P038 PORTALESAP_NM2005 CORS sites
2. Elevations are NAVD 88 Datum, referenced to NGS Benchmark GF-1
3. Measuring point for all wells is at top of casing on the north side
4. TBM is a 1/2" rebar with aluminum cap stamped "BIO" located on the south west corner of MW-3 concrete slab

CEHMM ALGAE POND FACILITY POTENTIOMETRIC & SITE MAP
67 E. FOUR DINKUS RD
ARTESIA,NM

DRAWN FOR:CEHMM
DATA: JUNE 2009
DRAWN: JUNE 2009

ATKINS ENGINEERING ASSOCIATES, INC.
2904 W 2ND ST
ROSWELL, NM 88201

Attachment C-7



Modified from Welder, G. E. (1977. Map showing the altitude and configuration of the water level in the shallow aquifer, January 1975, Roswell basin, Chaves and Eddy Counties, New Mexico: U.S. Geological Survey Open-File Map 77-505).

the water level in the shallow aquifer in January 1975,

and Eddy Counties, New Mexico.