



The State  
of Wyoming



## Department of Environmental Quality

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November 16, 2001

40-8502

Mrs. Donna Wichers  
COGEMA Mining, Inc.  
P. O. Box 730  
Mills, WY 82644

**RE: Irigaray-Christensen Operations Annual Inspection Report, Permit No. 478**

Dear Mrs. Wichers:

Enclosed is a copy of the report on the 2001 Annual Inspection of the Irigaray-Christensen ISL Operations. This inspection was conducted October 16, 2001, in the presence of John Vaselein of COGEMA.

A copy of this report will be placed in the permanent inspection file for the Irigaray-Christensen ISL Operations, as will any written comments you may have.

The cooperation and assistance of Mr. Vaselein are greatly appreciated.

Please feel free to call if you have any questions.

Sincerely,

*Glenn Mooney*  
Glenn Mooney  
Senior Geologist

\gm

Attachment

cc: R. Chancellor w/attach.  
NRC-MD w/attach.

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*NMS&I Public*

*11-16-01  
SRK*

## ANNUAL INSPECTION REPORT

**Subject:** COGEMA Mining Inc.'s Irigaray and Christensen Ranch In Situ Uranium Operations

**Permit No.:** 478

**Inspectors:** *GM*  
Glenn Mooney, Senior Geologist

**Person Contacted:** John Vasein, COGEMA Mining, Inc.

**Date of Inspection:** October 16, 2001

### Introduction

Mining has been completed at both the Irigaray Ranch and Christensen Ranch operations.

At Irigaray restoration of well field units 1, 2, 3, 4, 5, 8 and 9 has been completed, although COGEMA has not yet applied for bond release for any of these well fields. Restoration activity is underway in the remaining Units 6 and 7.

Mining was completed at Christensen Ranch in June 2000. The only activities planned at Christensen Ranch are well field aquifer restoration and surface reclamation. The dismally low price for uranium led COGEMA to suspend construction of mining Units 7 and 8 several years ago, as well as all other future mining.

Groundwater restoration at COGEMA's operations consists of four phases:

1. Groundwater sweep

The procedure removes the affected groundwater within the well field and replaces it with native groundwater from outside the mining zone. The affected water pumped from the well field is treated with reverse osmosis (RO) where the cleaned portion (permeate) is surface-discharged and the reject portion is disposed in evaporation ponds or deep well injection.

2. Reverse osmosis with permeate injection

Water from the well field is processed by a RO unit with the cleaned permeate reinjected into the well field and the reject portion disposed in evaporation ponds or deep well injection.

The use of chemical reductants is authorized by the restoration plan during this phase, but to date, their use has not been required.

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### **3. Groundwater recirculation**

Water from the well field is pumped from the recovery wells and reinjected into the mining zone aquifer through the injection wells. No treatment of the water is normally done. The effect is to insure the complete mixing of cleaned and partially cleaned groundwater. Up to one pore volume is involved in this procedure.

### **4. Stabilization monitoring**

This is a nine-month-long period where the baseline wells are sampled for a full suite of chemical and radiological parameters at the beginning, at three-month intervals during and again at the end of the period for a total of four samples. This procedure is intended to demonstrate that the restoration effort has been complete and that the aquifer and ore zone have reached equilibrium.

## **Irigaray Ranch Operations**

Restoration of Irigaray Units 1-3 was completed in 1993 and restoration of Units 4 and 5 was completed in 1999. Restoration of Irigaray Units 8 and 9 was completed in June 2001 and January 2001, respectively.

The recirculation phase had just begun the previous week on October 11 in Irigaray Unit 6. Recirculation had ended in the adjacent Unit 7 on August 30 which is now in the stabilization phase.

The restoration of Unit 6 has been blamed for an on-again, off-again excursion in Monitor Well M2 this past year. The work in Unit 6 is suspected of drawing water from the nearby restored E well field across the location of M2. Pumping of Trend Well T-10 has proven effective each time and the well was removed from excursion status again on October 10.

Most of the surface pipe and wiring has been removed from Units 1 - 5. The well boxes remain in Units 1 and 6-9.

Review of the ponds at Irigaray did not find any problems. The process water ponds appeared in good shape with adequate freeboard (Photos Nos. 1, 2). Restoration ponds RA and RB also seemed to be in good condition and have been drawn down so they have considerable available capacity. Some water was being added.

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COGEMA has largely completed reclamation of the 517 ponds. The liners and sludge have been removed to the Shirley Basin licensed disposal area. The earthen basins of the ponds remain, along with a small pile of sludge and earth, covered by plastic (Photos Nos. 3, 4) which will be shipped to Shirley Basin. Mr. Vasein said they were waiting on a more sophisticated radiological survey and NRC approval of their survey plan before the site can be declared decontaminated and the pond areas completely regraded and reseeded.

Inspection of the NPDES discharge point (001-2) along Willow Creek north of the plant and well fields found that erosion was minimal. Discharge from this point was shut down some time ago.

The two reverse osmosis units in the Irigaray Plant have been shut down.

Accumulation of yellowcake slurry from the groundwater restoration operations at Christensen Ranch will require reactivation of the yellowcake drier at Irigaray soon. The drier will be restarted around the end of October and run for about three weeks to process some 38,000 pounds of yellowcake slurry. Once that is completed, Mr. Vasein said the drier will likely have to be restarted at least once more in the future to process slurry from uranium accumulated during future restoration at Christensen Ranch.

Used plastic pipe from around the mine site has been chipped prior to final disposal at the Shirley Basin licensed disposal site. Much more pipe, wiring and other old equipment need disposal. The bone yard is filled with used equipment and supplies of all description. No petroleum products or possible hazardous wastes were seen, however, in a quick tour of the area.

Two major runoff events in early July and in August caused major flows in Willow Creek and the tributary flowing past the well fields, but no significant damage.

### **Christensen Ranch Operations**

Mining at Christensen Ranch ceased in June of 2000 so all attention is now being directed toward restoration activities.

Restoration in the form of the RO treatment and permeate injection was underway in Unit 2 where it has been on going since October of 2000.

RO treatment and permeate injection has been completed in all but one module of Unit 3. This phase has not been run in Module 3-4 yet, but COGEMA was making preparations for that work.

RO treatment and permeate injection are running in Module 4-3 of Unit 4. Modules 4-1 and 4-2 will be run next.

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The groundwater sweep phase of restoration was completed in Unit 5 in June of 2001. RO treatment and permeate injection are planned to begin there in early 2002.

Groundwater sweep has been running in Unit 6 since September of 2000 and will continue for another year.

Unit 7 remains unchanged as it has for the past couple of years, Some of the wells were completed in preparation for mining of the unit, but work was abruptly halted in mid-construction and no mining was ever begun there.

In Unit 8, preparations had barely begun several years ago in preparation for drilling the well field by the sealing of exploration drill holes. In the past year some 20 wells left over from old aquifer tests were plugged and abandoned.

Six RO units at the Christensen Ranch plant were running involved both in RO treatment and permeate injection and treatment of the water from the groundwater sweep operations.

Review of the evaporation ponds that serve the Christensen Ranch plant found them in good shape. They are currently being used as surge ponds for the deep disposal wells. The permeate pond is being used to degas the RO permeate prior to reinjection. Removal of the carbon dioxide raises the pH without the need for addition of chemicals that would raise the Total Dissolved Solids (TDS) levels in the well field groundwater.

Review of the original deep disposal well, DDW-1 found it was operating at an injection rate of 64.7 gallons per minute at a pressure of 1139 pounds per square inch. Its annular pressure was noted at 450 psi. The new deep disposal well, DW18-3, a recompleted oil well, was operating at a similar injection rate. The annular pressure here was noted at 397 psi. and the injection pressure at 1161 psi. Both of these wells are being used to dispose of the RO reject.

RO permeate was being surface discharged into Willow Creek. No erosion was noted at the discharge point.

The contractors' yard located south of the Christensen Ranch plant and office area was viewed. No problems were noted.

A crew was busing pulling stuck pumps from wells in Unit 5. The pumps from most of the wells in Unit 5 had been removed earlier to allow MIT of the well field wells.

Erosion of well field access road borrow ditches was noted at the south end of Christensen Ranch Unit 2 (Photo No. 5) and the Christensen Ranch Unit 5 access road. Repair of this erosion was

requested because, while topsoil was not being directly threatened by the erosion, sediment from the erosion was being deposited on vegetation and topsoil in the nearby drainage bottoms.

### **Mechanical Integrity Testing**

No Mechanical Integrity Testing (MIT) was occurring the day of the inspection.

### **Vegetation**

The grass cover in Christensen Ranch Units 2, 3, 4, 5 and 6 was generally good, although showing the effects of the year (Photo No. 6).

The grass cover in the partially developed Unit 7 was also quite thin, but adequate. The isolated and undeveloped Unit 8 was not inspected.

Spraying of noxious weeds, especially Canada thistle, has been effective in reducing the amount of weeds seen.

A clump patch of tamarisk (*Tamarix ramosissima*) was found next to the Willow Creek channel just above the NPDES discharge point from the Christensen Ranch plant. This shrub is on the noxious weed list and is an invader of riparian areas where it replaces the native vegetation. It is unpalatable to wildlife and livestock and consumes large quantities of water. It has proven to be a major problem in the desert Southwest where tamarisk, known there as salt cedar, has radically altered the ecology of many drainages.

I requested that Mr. Vasein instruct the contractor responsible for weed spraying to give special attention to spraying any tamarisk plants he might find.

A small grass fire caused by an electrical short recently burned several acres in Unit 4, Module 3.

### **Archeological Site**

The archeological site in Unit 6 was reviewed. It appeared unaffected with the fence intact.

### **Signs**

Permit identification signs carrying the required information were in place along the access roads to both the Irigaray and Christensen Ranch plant areas. Topsoil identification signs were in place on all topsoil stockpiles seen.

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**Bond**

The bond for Permit No. 478 is Letter of Credit No. NR 0034900 written in the amount of \$15,018,000.00 by HSBC Bank USA. The bond amount will be reexamined during the upcoming review of the 2000-2001 Annual Report for Permit No. 478.

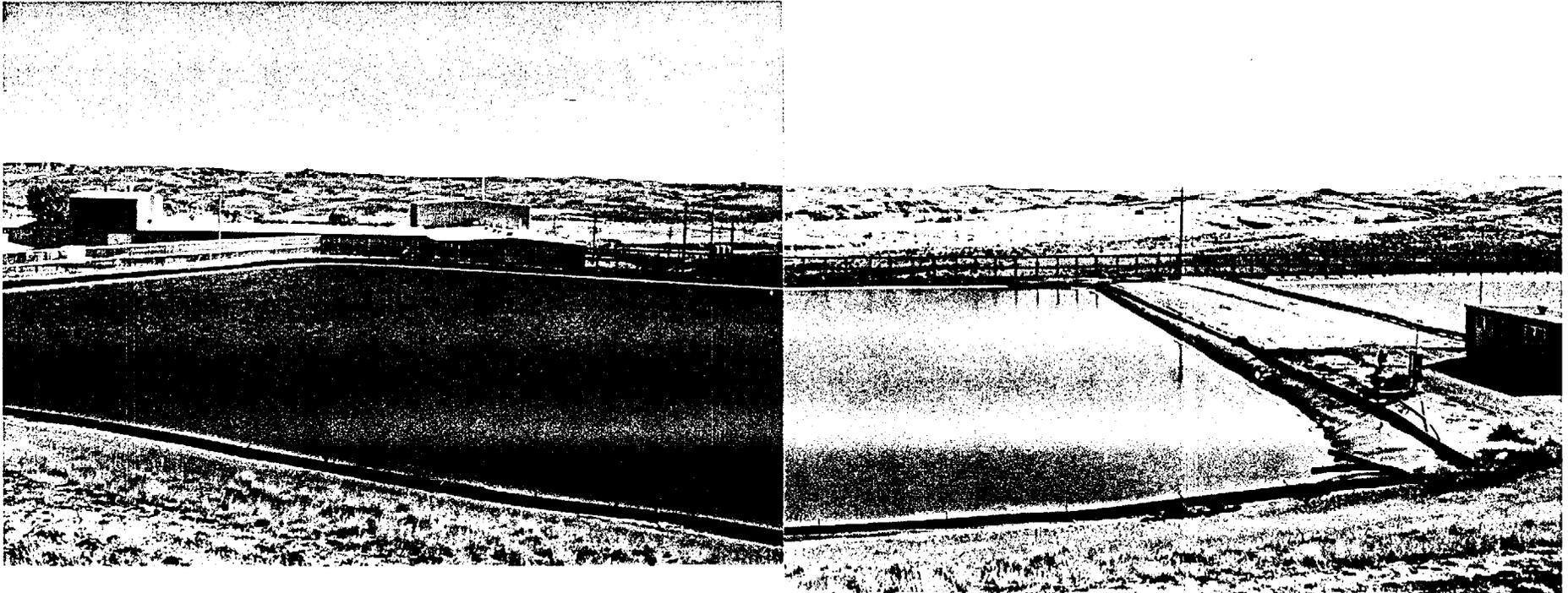
**Conclusion**

The inspection found that all items reviewed were in compliance. The repair of two areas of roadside erosion was requested.

Attachment: photo pages

cc: R. Chancellor w/attach.

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Irigaray-Christensen Ranch  
In Situ Operations  
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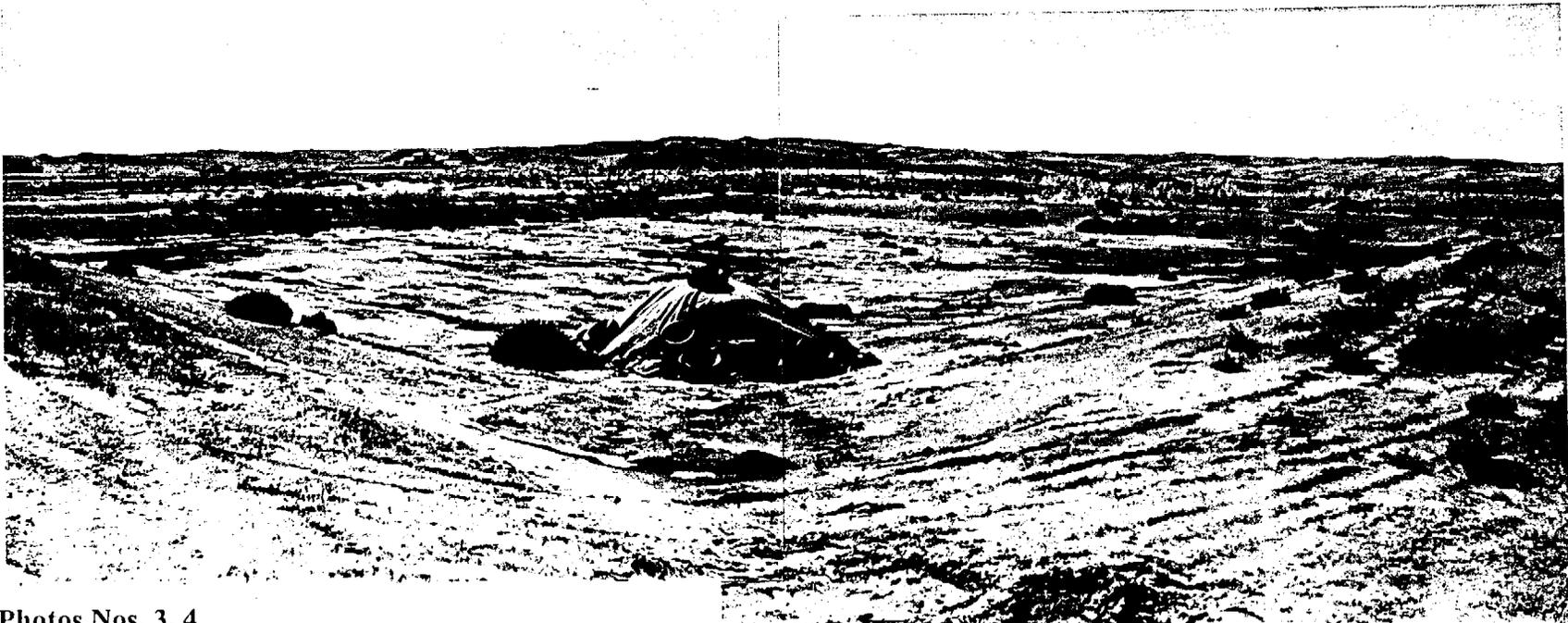


**Photos Nos. 1, 2**

Looking east across Process Water Pond C at Irigaray Ranch. The plant building is partially visible at far left and the well fields are visible in the center and right distances. A portion of Process Water Pond A is visible at far right. The red structure surrounding the ponds is a plastic snow fence erected as a windbreak to prevent spray from pond evaporation systems from being blown away from ponds.

Photos taken October 16, 2001, by Glenn Mooney

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**Photos Nos. 3, 4**

Looking south at the site of Pond 1 in the 517 site. The contents and membrane liner of this pond have been removed as part of the process to reclaim all four of the ponds at this site. Some potentially contaminated material is temporarily stored under the tires and plastic at center. One of the other ponds is partially visible at far left. COGEMA is waiting on a more sensitive radiological survey of the site before completing cleanup work and dirtwork at this site.

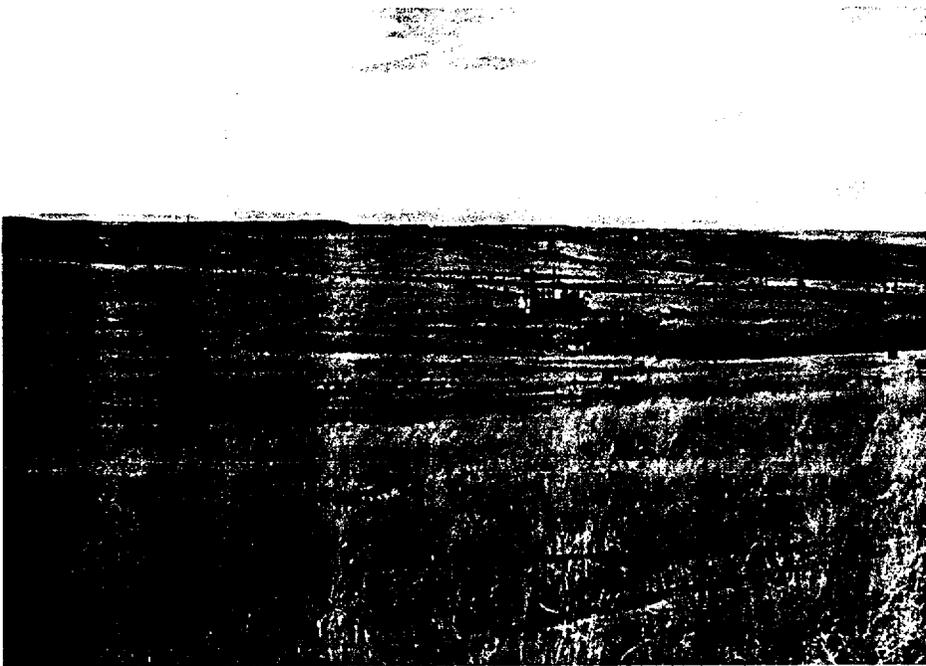
Photos taken October 16, 2001, by Glenn Mooney

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**Photo No. 5**

Looking north at erosion in borrow ditch along access road to the north end of Unit 2. Sediment from erosion is covering topsoil and vegetation in bottom of nearby drainage.



**Photo No. 6**

Looking northwest across Unit 5 showing condition of vegetation. Area was also site of Willow Creek R&D project in 1980s.