



The State  
of Wyoming



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October 28, 2002

Mrs. Donna Wichers  
COGEMA Mining, Inc. - *DOCKET 40-8502*  
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 2002 Annual Inspection of the Irigaray-Christensen ISL Operations. This inspection was conducted October 15, 2002, in the presence of John Vaseline 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. Vaseline are greatly appreciated.

Please feel free to call if you have any questions.

Sincerely,

*Glenn Mooney*  
Glenn Mooney  
Senior Geologist

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Attachment

cc: Cheyenne file w/attach.  
NRC-MD w/attach.

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## ANNUAL INSPECTION REPORT

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

**Permit No.:** 478

**Inspectors:** <sup>GM</sup> Glenn Mooney, Senior Geologist

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

**Date of Inspection:** October 15, 2002

### Introduction

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

At Irigaray restoration of Wellfield Units 1 through 9 has been completed, although COGEMA has not yet applied for bond release for any of these well fields.

All staff formerly assigned to Irigaray have been reassigned to the Christensen project. A total of seventeen people remains employed at the Christensen site.

Mining was completed at Christensen Ranch in June 2000. The only activities continuing 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 and COGEMA plans on beginning the use of hydrogen sulfide gas in November at Christensen Ranch.

**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 nine was completed in June 2001 and January 2001, respectively.

Restoration of Irigaray Units 7 and 6 was completed in June 2002 and August 2002, respectively. District III Office staff collected split samples from selected wells in Wellfield Unit 7 on June 5, 2002, and Wellfield Unit 6 on August 13, 2002.

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

Review of the ponds at Irigaray did not find any problems. The process water ponds appeared in good shape with considerable freeboard. Restoration ponds RA and RB also seemed to be in good condition and their contents have evaporated to water only a foot or two deep each.

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 (Photos Nos. 6, 7). The leak detection piping has been removed and the site radiometrically

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surveyed. Material which did not pass was shipped to Shirley Basin. Mr. Vasein said they were waiting on NRC approval of their survey results before the site can be declared decontaminated and the pond areas completely regraded and reseeded. He indicated he hoped at least some of this reclamation work could be done this fall.

Also in the 5I7 site area, an old waste pit has been excavated and surveyed. A quantity of radiologically contaminated material was removed and shipped to Shirley Basin (Photos Nos. 3, 4 and 5). This material was generated during operation of the 5I7 plant back in the 1970's.

Mr. Vasein indicated that he would like to dispose of a quantity of concrete from the foundations of the nearby USMT plant building in the excavated disposal pit (Photo No. 2). With removal of the contaminated material there is room in the hole for burial of the concrete. A pending NonSignificant Revision (TFN 3 3/389) would require that concrete so buried would have to be buried at least four feet deep, exclusive of the thickness of any replaced topsoil.

Some gravel has been removed from the 5I7 site, but considerably more needs to be removed. Some remaining gravel is between 6 and 8 inches thick and was planned atop native topsoil back when the site was active in the mid-1970's (Photo No. 1). When most of the gravel has been removed, Mr. Vasein said he would have the site tilled to remove compaction and prepare a good seed bed. Any removed gravel can easily be disposed by placing it on the nearby main access road.

The two reverse osmosis (RO) units in the Irigaray Plant have been shut down. The plant building is being kept heated to prevent the RO membranes and other sensitive equipment from freezing. Mr. Vasein indicated the Irigaray site is inspected daily.

Used plastic pipe from around the mine site had been chipped prior to final disposal at the Shirley Basin licensed disposal site, but then the chipper was shipped off to COGEMA's Texas operations. Mr. Vasein indicated they would probably purchase another chipper for use at Irigaray and Christensen. 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.

Mr. Vasein revealed that COGEMA had been contacted recently by the BLM regarding placement of material on BLM surface in a portion of the boneyard. When the BLM learned that the boneyard area was within the permit area and COGEMA's plans were to have the area cleaned during the next two years, they relented and said that would be soon enough for removal of the junk from the BLM surface.

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Two major runoff events 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.

Nothing was currently going on in either Units 2 or 3 Groundwater sweep and RO permeate production and injection have been completed in those wellfields. In Module 4-2 active reinjection and recovery of RO permeate operations were on-going. COGEMA plans to begin injection of hydrogen sulfide reductant in this module by the end of the month. Reinjection and recovery of RO permeate is on-going in Wellfield Modules 5-4 and 5-5. In a month or so the RO permeate will be started in Module 5-3. Unit 6 has been in the groundwater sweep phase of restoration operations since September of 2000. Groundwater restoration is scheduled for completion in 2004.

There has been no surface discharge of the permeate since October 9, according to Mr. Vaselein.

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. Stacks of PVC well casing are still on-site.

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. One of the units is used to concentrate the brine from the other units so that it could be injected into either of the two deep disposal wells.

Review of the evaporation ponds that serve the Christensen Ranch plant found them in good shape and with considerable freeboard. The water level of the permeate pond was down perhaps a foot from its maximum level and was being used by numerous small ducks.

Previously, the permeate pond was used to degas carbon dioxide from the permeate and raise the pH of the water without the need for addition of chemicals that would also raise the TDS. Now this task is accomplished by using two large air-stripping units in the plant that bubble air through the circulating water.

Erosion of several wellfield access road borrow ditches was noted during the 2001 annual inspection at the south end of Christensen Ranch Unit 2 and along the Christensen Ranch Unit 5 access road. To reduce this erosion, a chain of small basins were dug in the road ditches in these

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areas. This seems to have been largely successful as the several runoff events this past summer have filled many of the basins. Grassy areas between the basins have resisted being washed out for the most part. To continue this success, the sediment will have to be cleaned from the basins periodically. Since the sediment is largely topsoil- and subsoil-derived, it could be used to repair erosion elsewhere.

Severe erosion of a road track on a steep hillside in Unit 5 was also noted. I asked Mr. Vasein to repair the erosion, possibly by installing a water bar across the road track.

The flash flooding of Willow Creek also occurred at Christensen. The high waters badly damaged the low water crossing that provides access to Unit 2. It has now been repaired.

The flash flooding also caused high water in a side drainage running through Unit 6. A drainage just south of the archeological site had experienced both erosion and sedimentation which had blocked a culvert under the access road though Unit 6. Mr. Vasein said cleaning of the culvert was planned.

### **Mechanical Integrity Testing**

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

A number of wells which have failed MIT are being returned to service as injection wells by installing packers and 2-inch casings past the failed areas. The area between the packers and the annulus between the failed casing and the 2-inch casing is filled with cement slurry.

Some of this cementing work was ongoing at the time of the inspection in Unit 4, but the inspection was interrupted by news the cementing unit had broken down mid-job, leaving the tank filled with about 75 gallons of hardening cement slurry. To make things more interesting, the hitch on the trailer holding the cementing unit had broken, making it immovable. The solution was to bring a backhoe in and dig a mudpit next to the trailer and draining the cement into the pit. As long as enough subsoil and topsoil are used to cover the cement, this should be no different from the thousands of other mudpits used during exploration and development of the wellfields.

### **Vegetation**

The grass cover in Christensen Ranch Units 2, 3, 4, 5 and 6 was generally good, although much shorter than seen in previous wetter years.

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

### **Archeological Site**

The archeological site in Unit 6 was reviewed. It appeared unaffected. The south end of the fence needed repair. Mr. Vasein made a note to have repairs made.

### **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.

### **Bond**

The bond for Permit No. 478 is Letter of Credit No. NR 0034900 written in the amount of \$13,575,224.00 by HSBC Bank USA. The bond amount will be reexamined during the upcoming review of the 2001-2002 Annual Report for Permit No. 478.

### **Conclusion**

The inspection found that all items reviewed were in compliance. A few follow-up items were:

- repair of fence around archeological site
- cleaning of culvert under Unit 6 access road at Christensen
- cleaning of erosion control basins along Christensen Units 2 and 5 access roads

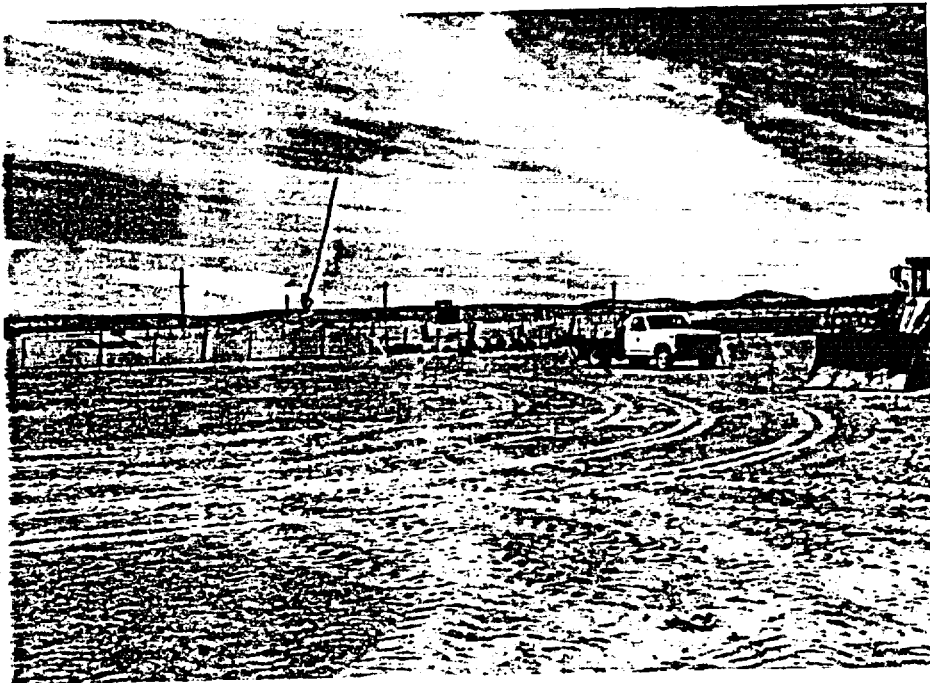
Attachment: photos taken during August 13, 2002, split sampling collection trip

cc: Cheyenne file w/attach.

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Irigaray-Christensen Ranch  
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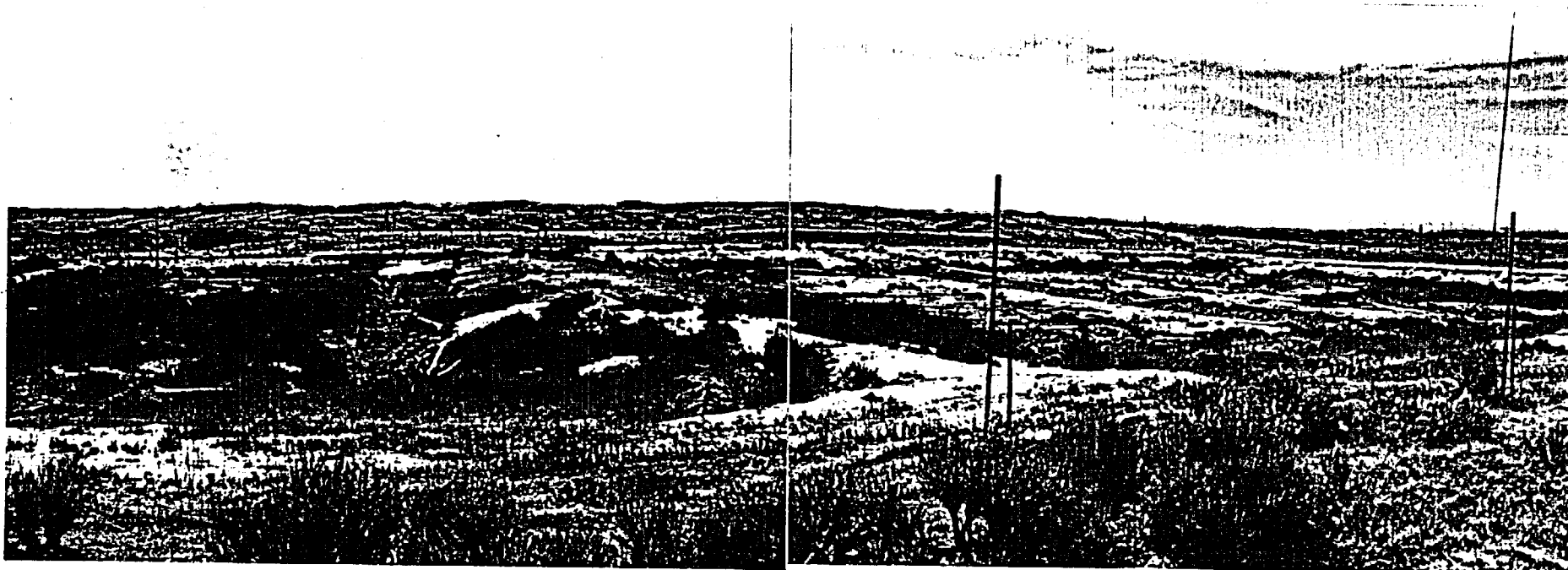
**Photo No. 1**  
Looking west at area on western side of 5I7 site where some gravel has been removed from in-place topsoil. The main access road and fenced pond area are partially visible in right distance.



**Photo No. 2**  
Looking north at western end of 5I7 site where clean-up work is in progress. Arrow points to concrete rubble from USMT plant foundation. Plans are now to dispose of non-radiolocally - contaminated concrete in 5I7 site.



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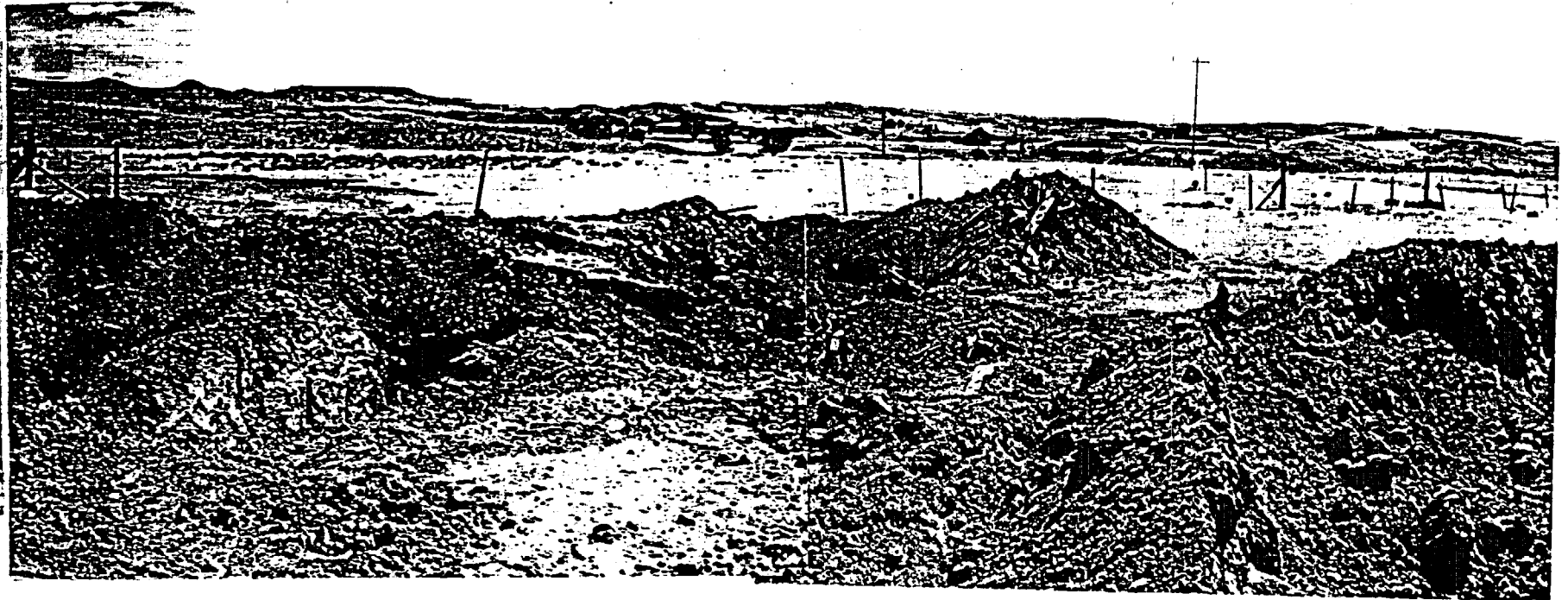
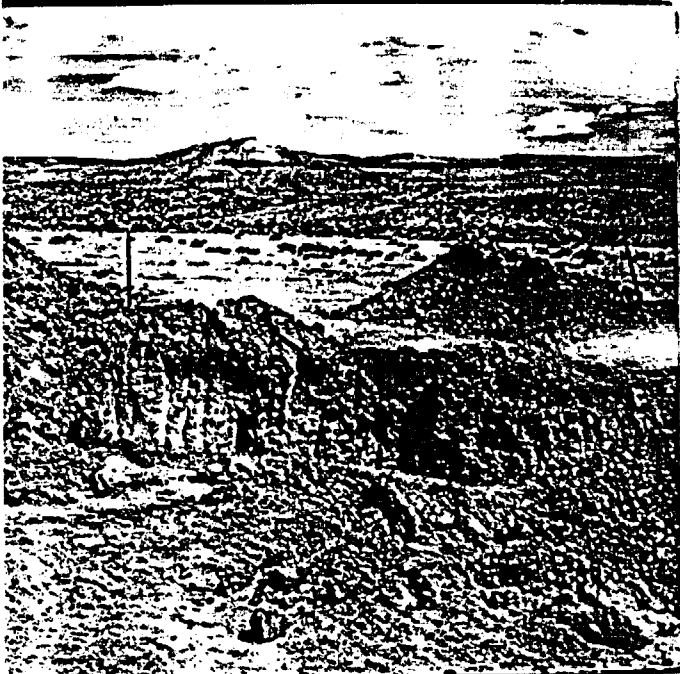


**Photos Nos. 6,7**

Looking west at the 517 site ponds where the liners and sludge have been removed and the leak detection tubes have been dug up and are waiting on a radiological survey before final disposal.

Photos taken August 13, 2002, by Glenn Mooney

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**Photos Nos. 3, 4, 5 and 6**

Looking east to southeast at partially excavated disposal pit on eastern side of 5I7 site. Some radiologically contaminated trash has been found here and some has been already hauled to Shirley Basin for permanent disposal. The Irigaray plan building is visible in the upper right distance.

Photos taken August 13, 2002, by Glenn Mooney