Department of Environmental Quality

To protect, conserve and enhance the quality of Wyoming's environment for the benefit of current and future generations.

Matthew H. Mead, Governor

John Corra, Director

October 21, 2011

Mr. Kenneth Garoutte
Cameco Resources, Inc.
PO Box 1210
Glenrock, WY 82637

Subject: June 2011 Inspection Report & Compliance Concerns
Cameco Resources, Permits 603 & 633

Dear Mr. Garoutte:

Please find enclosed the above referenced report. The June inspection was conducted with assistance from Cameco Resources (CR) staff on June 14 and June 16, 2011. Additional inspection was conducted on June 23, 2011 to address well completions and split sampling for a well excursion compliance issue. LQD also evaluated the reclamation on abandoned drill holes under drill notification DN236. Separate reports will be issued to address the additional inspections.

Through the April and June 2011 inspections of the permits, the LQD identified many compliance concerns with regard to drill hole and well abandonment, open and uncapped drill holes and wells, topsoil salvage and protection, erosion and sediment control, drilling without notification or approval of notification and compliance with the wellfield restoration schedule. Additional concerns identified through self-reporting of missed sampling events, failure to report a significant spill, abatement of spills and surety deficiencies has compounded the compliance issues from the inspections.

The CR executive and mine staff met with Department of Environmental Quality Director, John Corra and LQD staff in effort to resolve the issues on August 9, 2011. As a result of the meeting, CR agreed to resolve all legacy compliance issues and work with the LQD to resolve the recent compliance issues. LQD continues to work through the issues with CR. The task to clearly identify the issues and find a path forward has been cumbersome and complicated due to historical procedures and permitting that has not been kept up to date. Despite efforts to schedule compliance commitments and deadlines it was found that resolution to the issues will require time.

LQD is continuing to work on the Draft Commitments and Deadlines Schedule. CR is working cooperatively to resolve many of the issues. The intent is to finalize the Schedule and track the prescribed deadlines for compliance. A decision to issue Notice of Violations or Letters of Conference and Conciliation has not been determined.

If you have any questions, please do not hesitate to contact me at prothw@wyo.gov or 777-7048.

Sincerely,

Pam Rothwell

Pam Rothwell
District 1 Assistant Supervisor
Land Quality Division

Enclosure

cc: Cameco Resources, Cheyenne, WY w/att
Douglas Mandeville, NRC w/att

PERMITS 603 & 633 INSPECTION REPORT
JUNE 2011
DISTRICT 1/LAND QUALITY DIVISION

COMPANY:	Cameco Resources Incorporated
LOCATION:	North of Glenrock, Converse County (Smith-Highland Ranch Uranium Project)
DATE OF INSPECTION:	June 14 & 16, 2011
DATE OF REPORT :	July 16, 2011
INSPECTORS:	Pam Rothwell, LQD District 1 Assistant Supervisor Steve Ingle, LQD Hydrologist Julie Powell, LQD Project Engineer Robin Jones, LQD Vegetation Ecologist
CONDITIONS:	Sunny to cloudy with occasional rain showers, 50-75°, light winds (15 mph)
CO. STAFF PRESENT:	Dawn Kolkman, Cameco SHEQ Manager Dave Moody, Cameco, Wellfield Operations Manager Mike Bryson, Cameco, Wellfield Supervisor Nick Blackburn, Wellfield Supervisor Perry Herschberger, Drilling Supervisor Craig Heiser, Wellfield Development Supervisor

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INTRODUCTION

The focus of this inspection was to investigate numerous aspects of the SHRUP operation. LQD identified the following items to be investigated during the scheduled inspection:

- Plug and abandonment of drill hole sites.
- Abandoned wells.
- Deep disposal wells.
- PSR2 monitor wells.
- Irrigator.
- Booster pumps.
- Radium pond reclamation.

PRE-MEETING (June 14, 2011)

Pam Rothwell and Steve Ingle participated in a meeting prior to field inspection:

- CM-32 e-log showed no indication of mineral as explained by CR; working on well completion;
- Cameco has hired Dave McGee, Wildlife Biologist. He is mapping out raptors and sage grouse on the permit to delineate restricted areas;
- Excursion locations presented on a map by Dave Moody; CM-32 still stable; CM-33 may be indicating an increase toward excursion again; DM-03 still on excursion; DM-10 something going on, may be result of biofouling or influence of underground workings- Bob Lewis is reviewing – influence of abandoned haulage ways and production pattern;.
- MU-D – intense effort in restoration; upgradient end of wellfield, IX @ 240 gpm in May;
- MU-C – over-pumping for restoration, need restoration wells, waiting on P&A cost decision;
- MU-E – waiting on the end of the sage grouse restriction (end of June) to continue installation of wells;
- MU-F – added 18 bell holes, looking at trend wells to determine header houses needed and also will be determining wells needed; watching for excursions; communication with landowner (Domsalla) for new production;
- Dave showed inspectors a map of the trunkline infrastructure that is planned to connect the satellites. Construction will not begin until the surety is updated;

INSPECTION SUMMARY (June 14, 2011)

Abandoned Drill Holes

Julie Powell was accompanied by Perry Herschberger and Craig Heiser to continue the inspection of a percentage of abandoned drill holes reported in the "*2009 Annual Reports for PT 603 & 633*". Cameco was provided a list of thirty (30) drill holes to be inspected in March 2011. Thirteen (13) of the holes were inspected during the April 2011 field inspection and are noted in that inspection report. Results from this inspection are documented in ***Table 1*** and include the abandoned drill hole ID number, northing, easting, total hole depth, completion date, surface soil cap integrity result, concrete cap integrity result, and the depth measured to plugging material.

A total of seven (7) holes were inspected in the permit area during today's inspection. Two (2) holes could not be located after extensive excavation (#451 and #986) and the inspection attempt was abandoned. It was also noted that hole #1029 was cemented to ground surface. Mr. Heiser indicated that this drill hole was completed with an eight (8) inch diameter size bit and was abandoned due to unacceptable vertical deviation. Due to the large diameter (larger than six (6) inches), Cameco policy dictated that the abandoned drill hole must be completely filled with cement. The hardened concrete was observed to ground surface elevation.

MU-K-North

While investigation for abandoned drill holes in the Mine-Unit K North area, numerous deficiencies were observed with erosion and sediment control. A small topsoil pile was noted near hole #3673-19-996 with no sediment control measures (see ***Fig.1***). Steep vertical cuts with no sediment control measures were also encountered in this area (see ***Fig. 2***). Sediment was visibly being transported over existing straw wattles (***Fig. 3***) and abandoned silt fence was noted

in disrepair (***Fig. 4***). Mine-Unit K North was noted as a very active development area (see ***Fig. 5***) and is lacking in adequate erosion and sediment control.

Plug & Abandonment of Wells

MU-15 investigation of wells requesting release of plug and abandonment cost (through 2010-2011 Annual Report). The wells inspected were plugged with concrete to surface, however the casing was not cut off and surface reclamation was not complete. CR will need to complete the abandonment part of P&A to receive the release of bond. No wells were given consent for P&A bond release during the inspection.

The inspectors noted many wells without caps and open with standing water at depth. Further investigation of the wellfield header houses noted many wells were not in operations as indicated by the tags in the header houses (see ***Figs. 15 & 16)***. Header houses 15-1, 15-2, 15-3, 15-4, 15-5, and 15-6 were observed with similar findings of few operational wells and low flow rates for production and injection.

The inspectors observed the plugging activities at a well (CP-241). The well was 539 feet deep. The equipment required includes a hose reel, a mixing unit, water truck, fork lift, backhoe and two pickup trucks; one with a flatbed and one used to two the hose reel. A three man crew is needed to operate the equipment. The steps to abandon the well are outlined below:

1 A mud pit is dug to contain the water displaced from the well and the clean-out water from the hose reel. (see ***Fig. 6)***
2 A measured amount of water is added to the mixing tub (see ***Fig. 7)***.
3 A hopper of dry cement is moved to the mixing unit and added with a cyclone mixer attached to the mixing unit (see ***Fig. 8)***.
4 The cement mixture is then added to the mixing tub (see ***Fig. 9)***.
5 For this well to get the correct cement/bentonite mixture, six sacks of plug gel (bentonite) is added to the cyclone mixer and the mixing tub (*see* ***Fig. 10***). The pickup truck with the flatbed and a hopper of cement is in the background of this picture.
6 The cement and bentonite are mixed in the mixing tub until the desired consistency is achieved (see ***Fig. 11)***.
7 A mud weight is measured with a mud scale (see ***Fig. 12.)***
8 When the correct mud weight is determined, the mixture is pumped through the hose reel and displaces the water in the well from the bottom to the top (see ***Fig. 13)***.
9 As the cement bentonite mixture is added to the well, the hose is gradually removed and the well is filled to the top of the casing with cement allowed to settle and refill (see ***Fig. 14)***.
10 The hose and mixing unit are flushed with clean water, which discharges into the mud pit.
11 The hole is temporarily capped.
12 The driller stated that the cement is allowed to set for approximately two days and a crew will check the well and add cement as needed to top of the hole.

INSPECTION SUMMARY (June 16, 2011)

Abandoned Drill Holes

Julie Powell continued the inspection of abandoned drill holes with Perry Herschberger and Nick Blackburn (Craig Hiser was unavailable). The inspection began in Mine-Unit 15 area where holes #1107 and #180 were located. The inspection moved into Mine-Unit 10. Attempts to locate hole #404 was unsuccessful. The inspector chose another hole nearby at random and hole #412 was located (substitute for #404). Holes #380, #1043, and #1019 were located. The remaining hole (#3673-23-1) is located a minimum one hour away. Due to its location and time remaining in the day, it was decided that this will be inspected during the next scheduled visit.

Of the thirty (30) abandoned drill holes needing to be inspected as part of the "*2009 PT 603 & 633 Annual Reports*", twenty-three (23) have been completed at the conclusion of this inspection.

A field discussion with Mr. Herschberger regarding the mixing procedure for plugging material was conducted. According to Mr. Herschberger, plugging material is mixed on-site in a pit by emptying bags of dry material into the un-lined pit and adding an unmeasured volume of water until the viscosity reaches sixty-two (62) seconds per the Marsh Funnel Testing Procedure. The dry material and water is hand mixed with a wooden paddle and the resulting material is utilized in the plugging operation. A volume of water added to the dry material cannot be reported to LQD for the purpose of conducting volume calculations due to this inexact mixing procedure.

Mr. Herschberger also indicated that the Casper office completes exploration drill holes and the on-site crew at SHRUP completes production well drill holes. Each crew completes their own plug and abandonment procedures for drill holes and wells. He also reinforced Cameco's position that they are in compliance with all plug and abandonment requirements and that the fallback in each drill hole is a result of the plugging material seeking the static water level of the aquifer.

The inspector requested the abandonment drilling sheets for the holes inspected. All drilling sheets for the abandoned holes inspected were obtained with the exception of hole #3673-19-1029. Cameco indicated that some of the abandonment sheets had not been provided to their office by the Casper operation. They also indicated that the missing sheets would be obtained and copies forwarded to the LQD. The information contained in the drilling sheets provided is summarized in ***Table 2***.

MU-H Inspection

The inspectors noted wells without caps and open with standing water at depth (see ***Figs. 17a, 17b and 17c***). Many of these wells did not appear to be operating. Also, the well covers for many of the wells were removed and stacked on the side of the wellfield (see ***Fig 18***). Further investigation of the wellfield header houses confirmed that many wells were not in operations as indicated by the tags in the header houses (see ***Figs. 19, 20 & 21***). Header houses H-1, H-2, H-3,

H-4, H-5, H-6, H-11, H-12, H-14 and H-16 were inspected. Limited injection and production were observed in many of the header houses.

Deep Disposal Well – Morton #1

The Morton #1 was not operating at the time of the inspection. CR was investigating the low annulus pressure and had repair parts ordered. The pressure reading was around 253 psi and the allowable range is 200-780 psi. DDW's 5-7 were operating. A pipeline was being installed to the Morton #1. There was substantial disturbance associated with the installation.

Satellite #2

CR is currently producing 91 gpm from Mine Unit C and re-injecting 55 gpm which represents a 25% RO bleed. Well DP-7 was being pumped to help control the excursion at Well DM-3 and Well DP-22 was being pumped to control the excursion at Well DM-10. Well DM-10 was being rewired at the time of the inspection to hopefully raise the production rate from two gpm to ten gpm. There is an apparent groundwater mound in the DP-21 and DP-22 area. CR's consultant Bob Lewis is investigating the drift problem. CR is currently in the RO phase in the D-Extension and is producing 281 gpm, not including the D-7 header house.

Radium Pond Reclamation

The reclamation project was observed. Pin flagging on the surface marked the grid of soil sampling that has been conducted.

MU-I Inspection

A booster house was inspected and found to include two large pumps. LQD inquired whether the booster pumps were included in the surety. This will be reviewed during the next surety review. The inspectors investigated header houses HH-1, HH-2, HH-3, HH-4, HH-5, and HH-6. From inspection of the header houses, it appeared the wellfield was in full operation with many production and injection wells in operation.

The inspector noted several drill rigs in the MU-I area and inquired as to whether the drilling was to expand the wellfield and whether there was LQD approval as the inspector was not aware of the locations in the Annual Report. CR could not provide a response during the inspection.

PSR2 and Irrigation Circle

The inspectors drove around the pond to evaluate the locations of the four new monitor wells installed at the request of the Nuclear Regulatory Commission. The irrigation circle was noted to be in operation.

Revegetation and Reclamation

Observations were made at the Cameco in-situ site mines of the following reclamation:

- The condition of some of the topsoil piles in Mine Unit 21 were observed. Two typical topsoil piles were observed. These piles were well vegetated, had a stable containment berm around the pile and were signed (see ***Figs. 22 & 23)***.

- Various re-seedings and repair areas were also visited. The bell-hole repair in Mine Unit 9 had been re-seeded. It was obvious the newly seeded plants were growing. Another area in Mine Unit 9, a recent re-seeding was also viewed. This area had young grass seedlings coming up in obvious drill seeder rows. Additionally, the K-8 thru K-9 area was viewed. The re-seeding in this area was young but coming along.

Abandoned Drill Holes:

The following table indicates the inspection results of each abandoned drill hole observed.

Table 1 – Abandoned Drill Hole Inspection Results

Hole Delineation Number	Northing	Easting	Total Hole Depth	Completion Date	Surface Cover	Concrete Cap	Depth to Plug
3673-19-996	880017	365647	880'	11/13/09	Good	Installed	120'
3673-19-1029	881022	365552	880'	2/24/10	Good	Installed	Cement to surface
3674-24-481	879794	364317	900'	1/22/10	Good	Installed	146'
3674-24-469	879448	364125	880'	11/25/09	Good	Installed	141'
3674-24-451	879646	364341	900'	9/15/09	-	Not found	Not found
3673-19-986	878716	364845	900'	10/20/09	-	Not found	Not found
3574-9-349	860408	339103	1001'	3/22/10	Good	Installed	17'
3574-16-380	852000	345000	1080'	10/22/09	Good	Installed	59'
3574-16-404	852750	344300	980'	10/16/09	Good	Installed	113'
3574-17-1019	852400	338600	1000'	11/10/10	Good	Installed	191'
3574-17-1043	853250	340650	1100'	11/14/09	Good	Installed	-
3574-19-207	849750	333600	920'	12/17/09	Good	Installed	71'
3673-23-1	880310	386098	400'	3/12/10	-	-	-
3574-9-180	859148	346578	961'	2/24/10	Good	Installed	6'
3574-10-1107	859077	349516	901'	3/15/10	Good	Installed	41'

The following table represents pertinent data provided on the drilling sheets for inspected plugged and abandoned drill holes. LQD continues to have concerns with the accuracy of the reported data. When comparing the data provided on the drill sheets, it becomes apparent that there are inconsistencies or incorrect information. By grouping similar depths of drill hole depths, the reported number of bags of plug gel used can easily be compared. These comparisons revealed a wide range of bags reported to be used for like sizes of drill holes and the same number of bags with similar viscosities reported to be used to fill holes with one-hundred (100) feet difference in depth. These situations clearly cannot be accurate or feasible.

Table 2 Drilling Sheet Summary of Information

Hole ID Number	Depth (ft)	Bags (ea)	Viscosity (sec)
3673-19-996	880	11	71
3674-24-469	880	7	75
3673-19-986	900	18	80
3674-24-451	900	10	72
3574-10-1107	901	10	89
3574-19-207	920	12	85
3574-9-180	961	10	65
3574-16-404	980	10	65
3574-8-349	1000	20	87
3574-17-1019	1000	12	75
3674-24-481	1000	10	68
3574-16-380	1080	12	90
3574-19-207	1100	10	80

Specific examples of inconsistency include:

- A variation of four (4) bags to fill drill holes eight hundred eighty (880) feet in total depth.
- A variation of eight (8) bags to fill drill holes nine hundred (900) feet in total depth.
- A variation of eight (8) bags to fill drill holes one thousand (1000) feet in total depth.
- Ten (10) bags reported to fill drill holes ranging from nine hundred (900) feet and eleven hundred (1100) feet in total depth.

COMPLIANCE ASSESSMENT

1. All but one abandoned drill hole (#3573-19-1029 was cemented to the surface due to its diameter of eight (8) inches and was abandoned due to MIT failure) inspected by LQD within the permitted area were out of compliance with the following Wyoming State Statute:

   W.S. § 35-11-404(b)(ii): *"Sealing. Drill holes which have encountered any ground water shall be sealed by leaving a column of drilling mud in the hole or by such other sealing procedure which is adequate to prevent fluid communication between aquifers"*

   As noted in the April 2011 inspection report, Cameco Resources has explained to LQD that according to their assessment, the plug gel being utilized for abandonment seeks that static water level once circulated into the drill hole. Based on the widely varying depths to plugging material observed during the April 2011 inspection, LQD was unable to confirm that this theory was feasible. It is LQD's recommendation that Cameco provide detailed analysis of their plugging and abandonment procedures and supporting documentation which indicates a feasible and accurate cause of the varying fall-back depths. Additionally, Cameco needs to advise LQD how these holes will be corrected to comply with the plugging requirement and the method to be used in the future to ensure proper plugging of all abandoned holes.

2. Similar to the April 2011 inspection results and report, the data contained on the ***"Uncased Well Abandonment Delineation Drilling Sheets for SR/HO"*** appears to be questionable in several instances. When comparing the reported bags of plugging material and viscosity for the same diameter and depth drill holes (see ***Table 2***), the large variations of data presents difficulty in analysis. The questionable reported data needs to be verified and explained to LQD by Cameco.

3. Significant deficiency in sediment and erosion control continues to be a very high concern for LQD at the SHRUP mine sites. The lack of sediment control in the Mine Unit K North exploration areas are a repeat violation that LQD has attempted to impress upon the operator as a serious problem on numerous occasions. The inspector encountered instances of sediment washed onto native areas as a result of the mining activities. According the WEQA, § 35-11-415 (b)(viii), *"The operator...shall...prevent, throughout the mining and reclamation operation...the pollution of surface and subsurface waters on the lands affected..."* and according to the Wyoming Land Quality Division Noncoal Rules and Regulations (R&R), Chapter 3, Section 2(c)(i)(A), *"All topsoil or approved surface material shall be removed from all areas to be affected in the permit area prior to these areas being disturbed..."*. The disturbance in Mine Unit K North does not include adequate sediment control with significant sediment being deposited on native areas.

4. It appears that Cameco is attempting to provide more protection of salvaged stockpiles with straw wattles and signs. However there were many instances of poorly protected topsoil stockpiles in areas of active drilling operations (specifically Mine Unit-K North). The instances noted during the inspection include topsoil stockpiles located on slopes without toe ditches or berms to contain the soil in the stockpile on the downslope sides of the piles.

These instances have resulted in loss of soil to the downslope disturbed areas. Failure to adequately protect topsoil is a violation of WEQA, § 35-11-406 (b)(viii).

5. Based upon discussions with Cameco staff as noted above regarding the method being utilized to mix plugging material coupled with the wide variations in bags of material used and their corresponding viscosities, LQD has concerns that the plugging material is not properly mixed prior to use. The specifications for plug gel indicate a specific ratio of water to be added to the dry material. This does not appear to be the method that Cameco or its subcontractors are utilizing. The specifications also note specific levels of water purity that will affect the performance of the material and treatments to counteract these performance inhibitors. Without specific information regarding the amount and quality of water being utilized to mix the plug gel material, it is impossible to perform analysis regarding the volume of material being utilized. LQD requests that Cameco address these concerns and provide specific information regarding the method of mixing plug material and an analysis of the inconsistent quantity and viscosity of plug material reported on the abandonment data sheets.

6. As noted in the inspection summary, Cameco does not have all of the abandonment drilling sheets onsite and would be receiving them from the Casper office. There is only one plug and abandonment sheet that has not been provided to LQD for this portion of the inspection. The plug and abandonment sheet for the following drill hole needs to be submitted to LQD:
   - 3673-19-1029

7. MU-15 and MU-H indicate very little production and no evidence of preparing for restoration. The approved permit schedule shows MU-15 beginning groundwater sweep in January 2010. The permit schedule indicates MU-H beginning groundwater sweep in January 2013. Both wellfields have many wells that are not in operations. An inspection of the header houses in each of the wellfields indicates minimal injection or production flows. There is concern that the wellfield reserves have been depleted and have not been moving into restoration. CR will need to provide evidence of sustained production in these wellfields or begin restoration. The LQD may recommend enforcement action for the lack of restoration in these wellfields.

8. The reclamation of the radium ponds appears to moving extremely slowly. LQD requests a formal update of the reclamation of these ponds by **November 1, 2011**.

9. Based upon a field review of the reclamation at the Cameco property, reclamation work seems to be progressing well. Especially, considering the conditions observed at this property during the 2010 growing season, Cameco appears to be making progress towards a reclamation program capable of repairing surface disturbance related to the mining operation. However, this is not to say perfection has been attained but it is obvious Camaeco is putting forth more effort and committing more resources to the reclamation related issues at this property.

PHOTOS

Figure 1 Unprotected topsoil pile in Mine Unit K North near hole #996

Figure 2 Steep cuts with no sediment control in Mine Unit K North

Figure 3 Sediment over-topping straw wattles in Mine Unit K North

Figure 4 Abandoned silt fence and erosion in Mine Unit K North

Figure 5 Mine Unit K North Development Activities without downslope erosion control

Figure 6 Hose reel and mud pit.

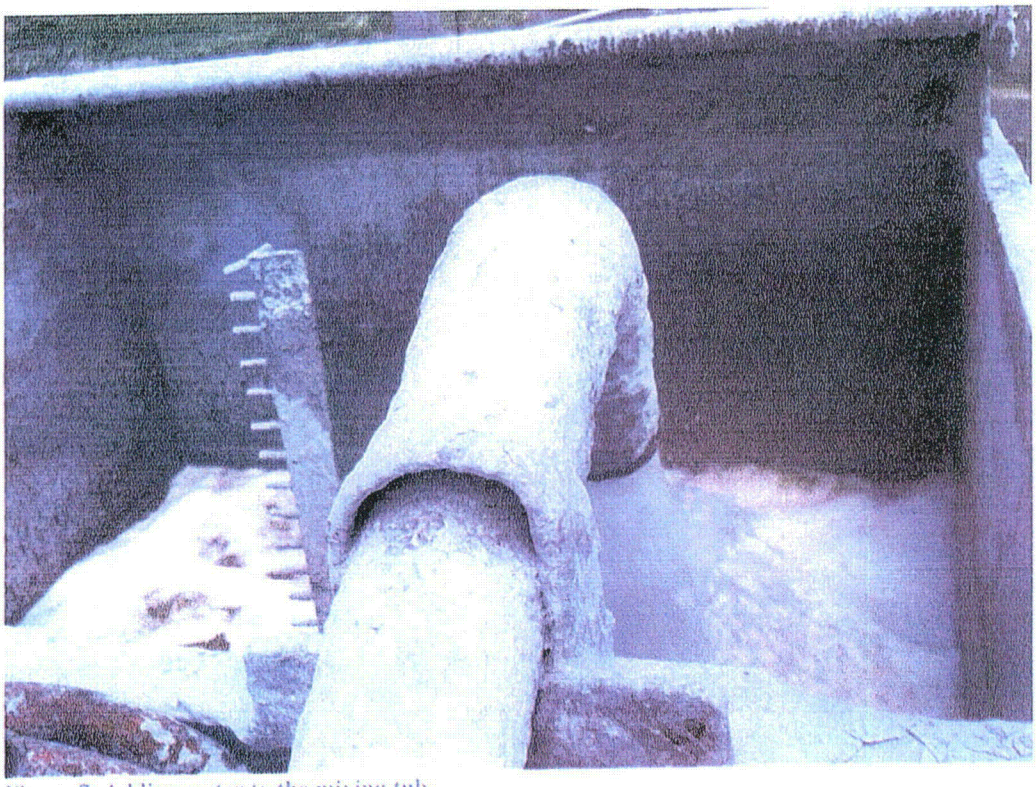

Figure 7 Adding water to the mixing tub

Figure 8 Adding cement to the cyclone mixer

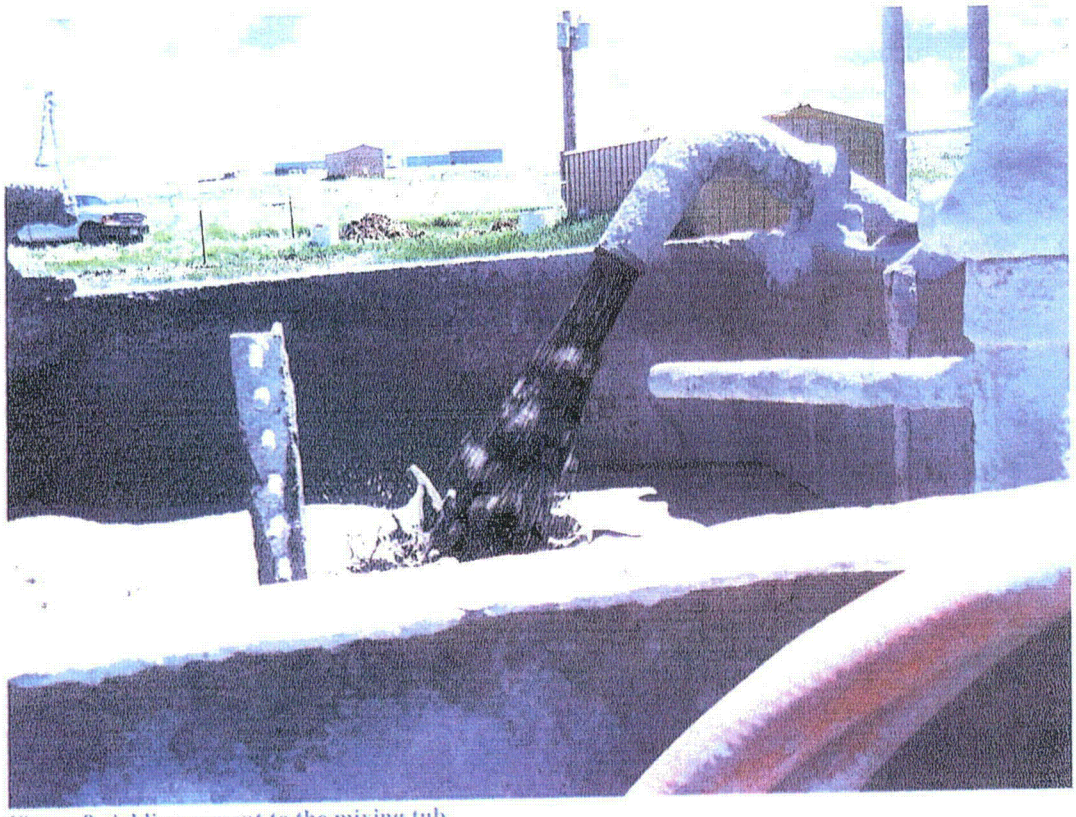

Figure 9 Adding cement to the mixing tub

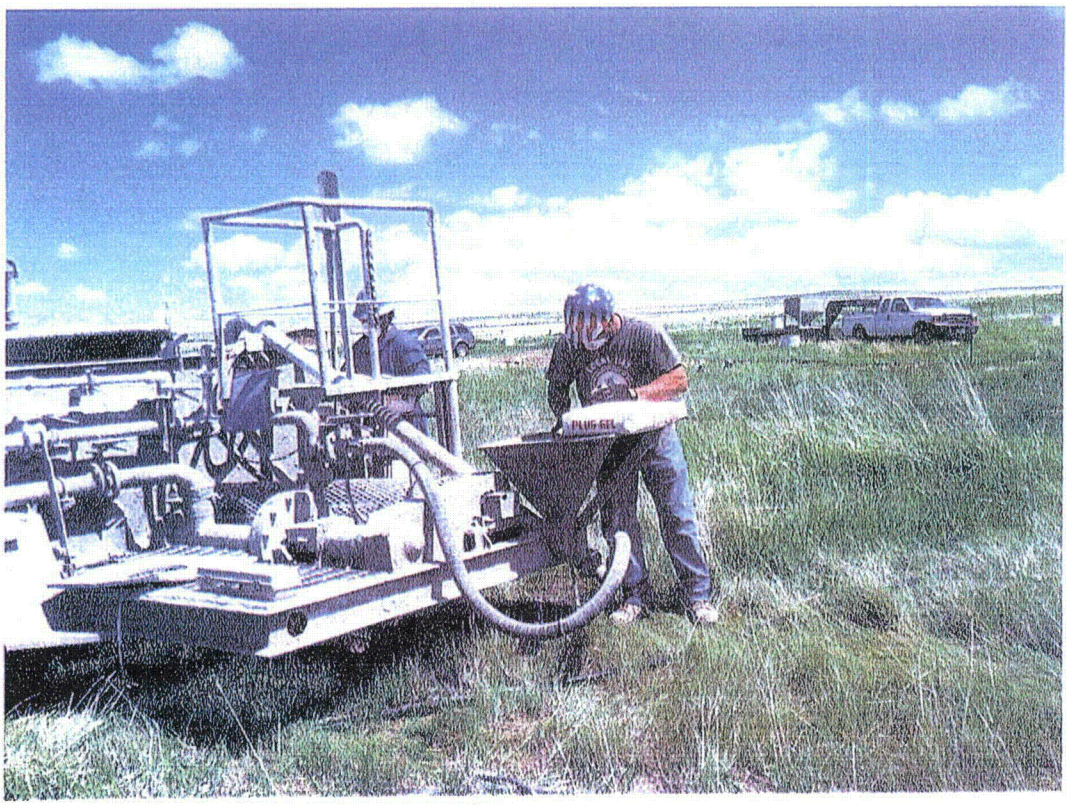

Figure 10 Adding bentonite to the cyclone mixer.

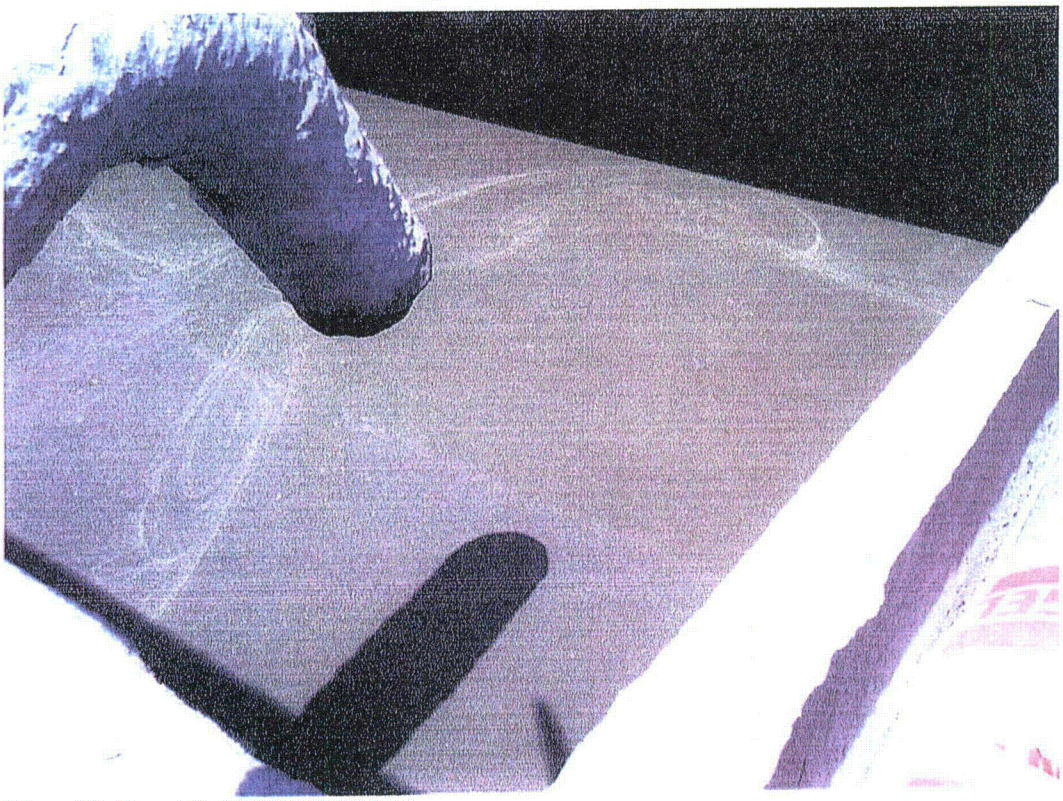

Figure 11 Cement/bentonite mixture

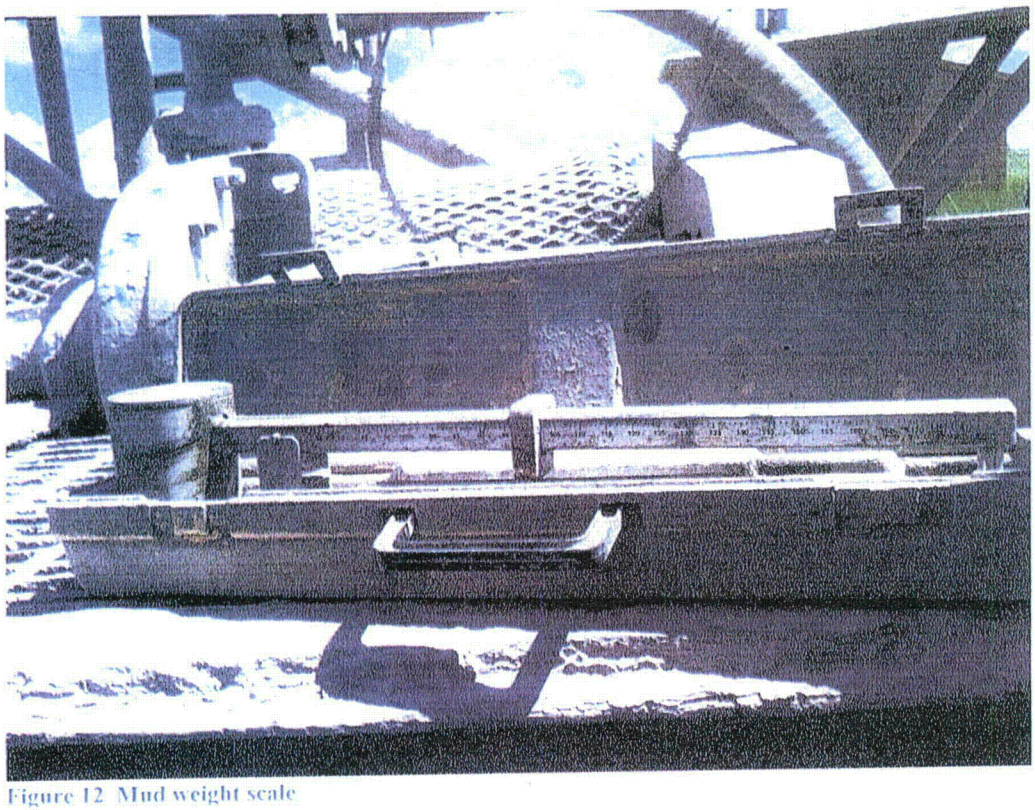

Figure 12 Mud weight scale

Figure 13 Pumping the cement/bentonite mixture to the bottom of the well

Figure 14 Removing the hose as the well fills with cement

Figure 15 Panel inside a header house in MU-15 showing which wells are out of service (tagged out)

Figure 16 Well pipelines inside header house in MU-15 with many out of service (tagged out)

Figure 17a Uncapped well in MU-H

Figure 17b, Uncapped well in MU-H

Figure 17c, Uncapped well in MU-H

Figure 18 Well covers set along side of wellfield; not over wells

Figure 19 disconnected wells in MU-H header house

Figure 20 Panel in MU-H header house showing many wells tagged out.

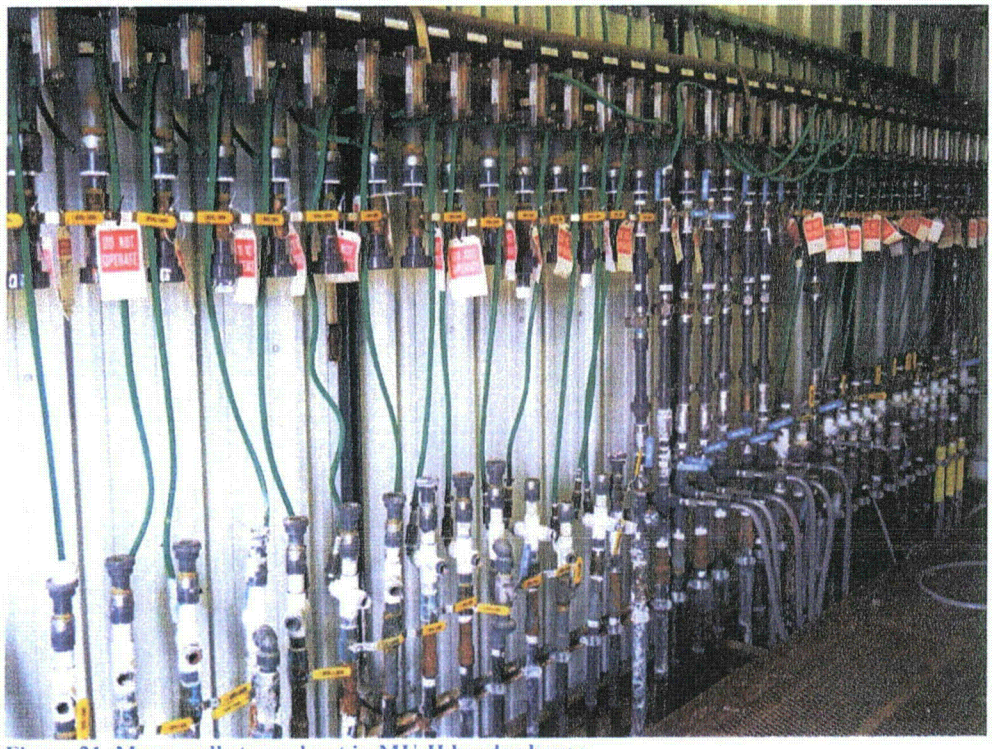

Figure 21 Many wells tagged out in MU-H header house

Figure 22 Topsoil pile in Mine Unit 21

Figure 23 Topsoil pile in Mine Unit 21