

M. H. Chew and Associates, Inc.

**Compliance Inspection Report for the Colorado Oil and Gas
Conservation Commission**

Project Rulison Sampling and Analysis Plan

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/s/ Robert L. Morris
(signed copy on file)

August 15, 2008

August 2008 Rulison Inspection Report

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1. Introduction

In June 2008, M. H. Chew and Associates, Inc was contracted by the Colorado Oil and Gas Conservation Commission (COGCC) to inspect gas well drilling and production operations for compliance with the Rulison Sampling and Analysis Plan (RSAP). The scope of the inspection included review of documentation to determine compliance with schedule sampling and on-site inspection. The RSAP was reviewed and an inspection checklist was developed. Following a written request for information regarding the implementation of the RSAP, Mr. Richard Henry, Senior Project Manager, URS Corporation (URS), provided documentation on:

- allowed substitutions of radiological instrumentation,
- produced water sampling,
- produced gas sampling,
- gamma log evaluations,
- radiological instrument calibration and performance testing,
- site safety officer training,
- hazardous material shipper training,
- field sampling records, and
- outreach to local emergency responders.

On-site inspection of drilling operations was performed on August 5 and 6, 2008.

Noble Energy Production, Inc (Noble) and URS provided full cooperation, submitted data as requested, and provided unlimited access to operations during the on-site inspection.

2. Summary

Objective evidence is available to confirm that a vigorous and effective effort is being made to comply with the provisions of the RSAP. No Rulison-related isotopes have been observed in any sample.

Since initial approval of the RSAP, a complete set of radiological instrumentation has been procured, installed, and is in use. Initial sampling of produced water and produced gas at existing wells has been completed and routine sampling is occurring as required by the RSAP. Laboratory reports are being received as expected. Personnel have been trained, records are being kept, and outreach to the local emergency response community has been initiated.

As of this inspection, only Noble is performing new drilling operations subject to the RSAP. Consequently only Noble operations were evaluated during the on-site inspection.

3. Review of Documentation

Many of the items of interest in this inspection are amenable to desk review. The review of documentation is based on information submitted by URS as of July 22, 2008.

3.1. *Inventory of wells*

URS provided the inventory of wells subject to the RSAP (see next page). URS also explained that gas wells BM35-32A (Tier I) and BM35-21D (Tier II) were drilled and partially fraced in 2007, before the RSAP was developed or approved. They also noted that gas wells BM26-42 and Chevron 34-4 (also called BM34-4) are is shut in (i.e., not producing) and gas well BM36-23 is currently shut in due to excess loading pressures.

URS reported that during 2007, prior to approval of the RSAP, Noble voluntarily contracted URS to perform continuous radiation monitoring while gas wells BM35-21D and BM35-32A were drilled, from the top of the Williams Fork Formation to total depth. After the RSAP was approved, Noble returned to these wells in February 2008 to frac some additional zones. Noble treated the second fracing as though it was subject to the RSAP. Sampling was performed in accordance with the RSAP. But, for purposes of this inspection, these wells are categorized as being in existence prior to RSAP approval.

Inventory of Gas Wells Under Rulison Sampling and Analysis Plan as of July 22, 2008

Well No.	Owner	Status	Tier Zone	Sector	Existing or New Well ?	Closest ?	Date Drilled	Fracing Date	Flowback Date	First Gas Delivery Date	30-Day Sample Date	Baseline Sample Date	Quarterly Sample Date
BM 36-13	Noble	Producing	Tier I	6	Existing	Yes	----	----	----	----	----	04/23/08	06/16/08
BM 36-23	Noble	Producing	Tier I	6	Existing	No	----	----	----	----	----	04/23/08	07/08/08
BM 35-32A	Noble	Producing	Tier I	8	Existing	Yes	----	----	----	03/17/08	04/09/08	----	07/15/08
PA 24-12	Williams	Producing	Tier II	1	Existing	Yes	----	----	----	----	----	06/26/08	TBD
PA 44-12	Williams	Producing	Tier II	1	Existing	No	----	----	----	----	----	06/26/08	----
BM 34-4	Noble	Shut-in	Tier II	9	Existing	No	----	----	----	----	----	NS	----
BM 27-44	Noble	Producing	Tier II	9	Existing	No	----	----	----	----	----	04/23/08	----
BM 34-24	Noble	Producing	Tier II	9	Existing	No	----	----	----	----	----	04/23/08	----
BM 35-21D	Noble	Producing	Tier II	9	Existing	No	----	----	----	03/09/08	04/09/08	----	TBD
BM 35-12	Noble	Producing	Tier II	9	Existing	No	----	----	----	----	----	04/23/08	----
BM 26-42	Noble	Shut-in	Tier II	9	Existing	Yes	----	----	----	----	----	04/23/08	Shut-in
Federal 28-15X	EnCana	Producing	Tier II	10	Existing	Yes	----	----	----	----	----	06/17/08	TBD
Gardner Federal 21-15	EnCana	Producing	Tier II	10	Existing	No	----	----	----	----	----	06/19/08	----
Clem 15-23	EnCana	Producing	Tier II	11	Existing	No	----	----	----	----	----	06/17/08	----
Clem 15-24	EnCana	Producing	Tier II	11	Existing	No	----	----	----	----	----	06/17/08	----
Clem Warren 15-34	EnCana	Producing	Tier II	11	Existing	No	----	----	----	----	----	06/17/08	----
Clem Warren 15-33D	EnCana	Producing	Tier II	11	Existing	Yes	----	----	----	----	----	06/17/08	TBD
Bentley 11-44	EnCana	Producing	Tier II	12	Existing	No	----	----	----	----	----	06/17/08	----
Bentley 11-43	EnCana	Producing	Tier II	12	Existing	Yes	----	----	----	----	----	06/17/08	TBD

3.2. One-time baseline sampling of existing Tier I wells

Show that one-time sampling of existing Tier I wells occurred within 90 days following approval of the RSAP.

URS provided information on the sampling dates of the existing Tier I wells. The following table is based on an approval date for the RSAP of January 15, 2008.

Well No.	Due Date	Sample Date	Compliance Status
BM36-13	4/13/2008	4/23/2008	Acceptable
BM36-23	4/13/2008	4/23/2008	Acceptable
BM35-32A	4/13/2008	4/9/2008	Compliant

The two wells subject to this requirement were sampled more than 90 days after approval of the RSAP. However these wells had been sampled May 22, 2007 and November 15, 2007 prior to approval of the RSAP and the sampling dates are acceptable to meet the intent of the RSAP.

3.3. **One-time baseline sampling of existing Tier II wells**

Show that one-time sampling of existing Tier II wells occurred following approval of the RSAP. No time frame for sampling is specified.

URS provided information on the baseline sampling dates of the existing Tier II gas wells.

Well No.	Status	Sample Date	Compliance Status
PA 24-12	Producing	6/26/2008	Compliant
PA 44-12	Producing	6/26/2008	Compliant
Chevron 34-4	Shut-In	Not sampled	N/A See note 1
BM27-44	Producing	4/23/2008	Compliant
BM34-24	Producing	4/23/2008	Compliant
BM35-21D	Producing	4/09/2008	Compliant
BM35-12	Producing	4/23/2008	Compliant
BM26-42	Shut-In	4/23/2008	Compliant
Federal 28-15X	Producing	6/17/2008	Compliant
Gardner Federal 21-15	Producing	6/19/2008	Compliant
Clem 15-23	Producing	6/17/2008	Compliant
Clem 15-24	Producing	6/17/2008	Compliant
Clem Warren 15-34	Producing	6/17/2008	Compliant
Clem Warren 15-33D	Producing	6/17/2008	Compliant
Bentley 11-44	Producing	6/17/2008	Compliant
Bentley 11-43	Producing	6/17/2008	Compliant

Note 1: well Chevron 34-4 (also called BM34-4) is shut-in and is not producing. Sampling was not possible.

All baseline sampling of existing Tier II wells is complete and compliant with the RSAP.

3.4. **Composite sampling of Tier I drill cuttings**

Show that one-time composite sampling of drill cuttings for closest new Tier I wells in each sector occurred.

As of August 6, 2008 no new Tier I wells were drilled through the intervals in which composite sampling was required. Therefore, this inspection goal did not apply as of August 6, 2008

Prior to approval of the RSAP, Noble voluntarily sampled the drill cuttings remaining in the reserve pits at wells BM36-13 and BM36-23 on August 7, 2007. This exceeds requirements of the RSAP.

3.5. Initial produced gas sampling from new wells

Show that initial (one-time) sampling of produced natural gas occurred as soon as possible after fracing but not more than 30 days after first gas delivery.

No new gas wells have been brought on-line since approval of the RSAP so this is not applicable at this time.

3.6. Quarterly sampling from the closest well in a sector during first year of production

Show that quarterly sampling of produced water and produced natural gas occurred from the closest well in each sector, after initial sampling occurred.

URS provided information listing the closest well in each sector and the associated sampling dates.

Well No.	Status	Sector	Baseline or Initial Sample Date	Most Recent Quarterly Sample Date	Compliance Status
PA 24-12	Producing	1	6/26/2008	TBD	Not yet due
BM36-13	Producing	6	4/23/2008	6/16/2008	Compliant
BM35-32A	Producing	8	4/9/2008	7/15/2008	Compliant
BM26-42	Shut-In	9	4/23/2008	Shut-In	N/A
Federal 28-15X	Producing	10	6/17/2008	TBD	Not yet due
Clem Warren 15-33D	Producing	11	6/17/2008	TBD	Not yet due
Bentley 11-43	Producing	12	6/17/2008	TBD	Not yet due

The wells that are due for quarterly sampling have been sampled in compliance with the RSAP.

3.7. Quarterly sampling from new Tier I wells for the first year of production

URS provided information on an existing Tier I well BM35-32A being treated as though it were a new Tier I well. This is discussed in Section 3.1.

Well No.	Status	Baseline or Initial Sample Date	Most Recent Quarterly Sample Date	Compliance Status
BM35-32A	Producing	4/9/2008	7/15/2008	Compliant

This complies with the requirement of the RSAP.

3.8. Quarterly sampling from existing Tier I wells

Show that quarterly sampling of produced water and produced natural gas from existing Tier I wells (requirement ends one year after initial SAP approval date) is occurring

URS provided information listing the closest Tier I well in each sector and the associated sampling dates.

Well No.	Status	Baseline Sample Date	Most Recent Quarterly Sample Date	Compliance Status
BM36-13	Producing	4/23/2008	6/16/2008	Compliant
BM36-23	Producing	4/23/2008	7/8/2008 - gas 8/8/2008 - water (see note)	Acceptable

Note: Sampling was unsuccessfully attempted on well BM36-23 on 6/16/2008 due to excess loading pressures. Additional attempts were made to sample without complete success. On July 8, 2008 a natural gas sample was obtained, but produced water was not. A produced water sample was successfully collected on August 8, 2008.

Well BM36-13 is compliance with the RSAP. A good faith effort of compliance has been made at well BM26-23 and this is judged to be acceptable.

3.9. Sampling of injected fluids prior to use

Show that samples of makeup water, fracing fluids and flowback fluids were taken prior to use.

URS reported that gas wells BM35-21D and BM35-32A were drilled and partially fraced in 2007, before the RSAP was approved. In February 2008, Noble returned to these wells to frac additional zones. Noble treated the second fracing as though it were subject to the RSAP and sampled fracing and flowback waters in accordance with the RSAP.

URS reported that the makeup water for new Tier I gas well BM36-23C was sampled prior to use on June 26, 2008. This complies with the requirement of the RSAP.

3.10. Annual areal environmental sampling of well and surface water

Show that annual area environmental sampling of 14 existing water well, spring, or surface water sampling locations is occurring.

Annual areal environmental sampling is not yet due. URS reported that sampling is scheduled for September 2008. This is acceptable.

3.11. Gamma log evaluations

Show that initial (one-time) gamma log evaluation was performed after drilling was completed.

URS reported that gamma log evaluations of the Tier I and II wells that existed when the RSAP was approved were completed on June 16, 2008. Gamma values above 500 API units were not observed. This complies with the requirement of the RSAP.

3.12. Laboratory reports

Show that data reports from the laboratories are nominally as expected

URS provided example laboratory reports for the radionuclides analyzed by GEL Laboratories, LLC and Isotech Laboratories, Inc. The reports are adequate and contain the expected information. URS states that no evidence of Project Rulison-related radionuclides in natural gas, produced water, fracing water, or flowback water has been observed in any report to date.

3.13. Site Safety Officer training

Show that Site Safety Office Training has occurred.

URS provided training rosters and stated that Noble Site Safety Officers (SSO), Mr. Randy Cates and Mr. Clifford Kester, have been trained. The initial radiation safety training occurred on June 22, 2008. Additional time was spent training Mr. Cates and Kester once the rig for the first Tier I well to be drilled was moved on to the pad. The additional training included a review of the contents of the RSAP, Version 2, Appendix A Radiation Incident Management Plan and discussion of what steps to take if an alarm occurs.

As of the date of this inspection only Noble has been involved in drilling wells subject to the RSAP, consequently there is no expectation that site safety officers employed by other companies would be trained. This complies with the RSAP.

3.14. Instrument calibration and performance testing

Show that instruments are calibrated, performance checked and control charted.

URS provided documentation that all radiation instruments in use at the drilling site have been calibrated, routinely performance checked, and control charted as necessary. This complies with the requirements of the RSAP and is further evaluated during the on-site inspection.

3.15. DOT shipper training for gas cylinder shippers

Show that the individual(s) who prepare LP tank (natural gas) sample shipments is (are) properly trained in accordance with U. S. Department of Transportation (DOT) or International Air Transport Association (IATA) regulations.

URS provided evidence that Ms. Sally Miller and Mr. Tim Joseph, URS Health and Safety Managers, have received DOT hazardous materials shipping training and stated that Mr. Mike Mestas and Mr. Richard Henry are scheduled for DOT hazardous materials shipping training in August 2008. URS provided evidence showing that the hazardous material shipping papers were appropriately signed by Ms. Miller and Mr. Joseph. This demonstrates compliance with the requirements of the RSAP.

3.16. Briefing to community responders

Show that a briefing on the Radiological Incident Management Plan (RSAP Appendix A) has been provided to Community Responders including fire departments, law enforcement, EMS and hospitals.

URS stated that Mr. Jim Sears, the Garfield County Emergency Response Commander, was contacted by phone on July 15, 2008 to discuss an annual briefing for the community responders. Mr. Sears asked URS to send him a current copy of the RSAP (Version 2) and the Radiation Safety briefing materials used to train the SSO and drilling crews. The RSAP and Radiation Safety briefing were forwarded to Mr. Sears via e-mail on July 16, 2008. A reply from Mr. Sears regarding the briefings is pending.

During the on-site inspection discussion revealed that the annual community responder briefing has not yet been done. URS reported that Grand Valley Fire will allow URS to provide the briefing during their training during either August or September of 2008. Cooperation from the local agencies is necessary to complete this requirement. All that can be expected is a good faith effort on the part of the Companies. Efforts to directly contact law enforcement and local hospitals, including the helicopter ambulance service in Grand Junction, should be emphasized.

3.17. Expedited water analysis from new Tier I wells

Show that produced water samples from new Tier I wells receive expedited tritium and gross alpha/beta analysis.

No new gas wells have been brought on-line since approval of the RSAP so this requirement is not currently applicable.

3.18. Radiological instrument equivalence

In the RSAP certain radiological instrumentation models were specified, with allowance for equivalent substitution. A list of the substitutions and the basis for the substitutions is evaluated.

URS reported that the following substitutions were made and provided the basis for their judgment that the substituted instruments provide functional equivalence to those named in the RSAP. All substitutions were reviewed and, based on a review of the manufacturer's specifications and professional judgment, are acceptable.

Original Instrument	Substituted Instrument
Overhoff Model 1400 tritium monitor	Canberra TAM100D Tritium in Air monitor
TSA Systems, Ltd. Real-time, continuous gamma monitor	Ludlum Measurements, Inc. Model 375P-336-2 gamma monitoring system
Ludlum Model 3 ratemeter with Ludlum Model 44-2 gamma scintillation probe	Ludlum Model 375 area monitor with Ludlum 44-10 (2-inch x 2-inch) NaI(Tl) gamma scintillator, ruggedized for outdoor use
Ludlum Model 16 portable analyzer with Ludlum Model 44-2 gamma scintillation probe.	Berkeley Nucleonics Corp. (BNC) 1035 areaSAM gamma spectrometer
Ludlum Model 3A ratemeter with Ludlum Model 44-2 NaI(Tl) scintillator and Ludlum Model 2241 Digital Survey Meter with Ludlum Model 44-9 pancake GM detector	Fluke Biomedical Advanced Survey Meter 990 with Fluke Model 489-110D pancake GM detector and Fluke Model 489-55 1.5-inch x 1.5-inch NaI(Tl) gamma scintillator
Ludlum Model 3A ratemeter with μ R face and Ludlum Model 44-2 NaI(Tl) gamma scintillator	Fluke Model 451P Pressurized μ R Ion Chamber Survey Meter

3.19. Review samplers field logbook

Show that field logbooks used to document sampling contain the information specified in RSAP section 7.1.

Field logbook entries were examined for the following samples:

Well or Pad	Sample Description	Date
BM26-42	Baseline sampling of produced water and gas	4/23/2008
BM27-44	Baseline sampling of produced water and gas	4/23/2008
BM34-4	Baseline sample - none collected due to problems in the well	4/23/2008
BM34-24	Baseline sampling of produced water and gas	4/23/2008
BM35-12	Baseline sampling of produced water and gas	4/23/2008
BM36-13	Baseline sampling of produced water and gas	4/23/2008
BM36-23	Baseline sampling of produced water and gas	4/23/2008

Each of the twenty-two topics listed in RSAP Section 7.1 were evaluated for each logbook entry. The field sampling logbook notes are compliant with the requirements in the RSAP. Section 6.3 contains some recommendations that may improve the sampling logbook notes.

3.20. Background survey report for each Tier I well

Show that the 9-point grid survey for background of drill pad of each Tier I well drilled from the pad is documented as required.

The background survey reports for Pad 26N and for Pad 36L, both performed on June 11, 2008 were examined. Background radiation measurements were made using a pancake GM detector, gamma scintillation meter, and ion chamber. The reports included data on 9-point sampling grids as required in the RSAP. In some details the surveys exceed the quality of a typical report found in an operating nuclear facility. Section 6.3 contains some recommendations that would improve the reports

4. On Site Inspection

Only Noble has performed drilling operations subject to the RSAP since approval of the plan. During the August 5, 2008 on-site inspection of the Tier I well drilling operation on pad 36L was evaluated. New Tier I gas well BM36-13B was being drilled at the time of inspection.

Noble provided a demonstration of the database used to track samples and sample results. The compliance database is a sophisticated tool to prompt sampling at the appropriate time and notify responsible personnel of specific requirements. This database appears to be well suited to its intended purpose. A similar information system would be useful to any company drilling in the Rulison Project area.

No field sampling activities for produced water, produced gas, or surface water and well water sampling were observed during the inspection because these activities were not occurring during the inspection.

4.1. Tier I well BM-36-13B

On August 5, 2008 an on-site inspection of was performed well BM36-13B, a Noble Tier I gas well which is the closest well in Sector 6. Mr. Robert Morris performed the inspection. He was accompanied by COGCC staff members Mr. Chris Canfield, Mr. David Andrews, and Mr. Kevin King. Mr. Chris Del Hierro of Noble guided the tour. Prior to on-site inspection Ms. Lindsay Voss of LT Environmental, Inc. demonstrated the database used by Noble to manage Rulison Project compliance issues and sampling schedule. On site, the site tour was led by Mr. Don Cox, Noble's drilling supervisor and Mr. Cliff Kester the Site Safety Officer.

Routine drilling operations were occurring during the on-site tour. The well depth was nominally about 3000 feet, far above the depth of the Williams Fork Formation where Project Rulison-related radionuclides may be of concern. Approximately thirteen people are normally present on the well site. The following checklists were used during the inspection. A checkmark notation (✓) indicates the item in the checklist is acceptable or compliant with requirements.

4.1.1. Ambient environmental radiation monitoring

(TLD or equivalent) in place on drilling rig of the closest new Tier I well within a sector during drilling

Requirement	Documentation
4 on each well pad	1 in the company man office, 1 in the Rig Manager office, 1 at the shale shaker, 1 offsite for background
In work areas or near drilling fluid and cuttings discharge	✓
1 away from work area on well pad for background	✓
3 to 6 feet above ground in location unlikely to be disturbed	6 to 7 feet above floor level. This meets the intent of the requirement. Locations at 7 feet were to avoid interference or because of available mounting fixtures
Placed prior to drilling start	Placed on 6/26/2008
Retrieved after fracing and flowback completion	Still in service
Shipping control for transport stored away from any source	Still in service, not yet shipped
Duplicate for every 10th one	N/A
Personnel occupancy time logs maintained adequate to reconstruct dose	Sign in logs at the well pad access point identify every individual access the site and the time of entry and exit

Comments: Consider revising the RSAP to allow placement between 3 and 9 ft above floor level.

4.1.2. Tritium monitoring of the closest new Tier I well within a sector during drilling

Requirement	Documentation
Overhoff Model 1400 or equivalent	Canberra TAM100D in service as described in Section 3.18
Linked to computers in drilling control station to the extent possible for recording and review	Yes, linked to Pason display and accessible remotely via internet
Alarms set at screening and action levels	✓
How is data stored	In the drilling computer system. Printouts of data associated with testing events were provided.
Performance test procedure for daily checks	✓
Calibration	✓
Continuous and real time and in use	✓
Simulate alarm and observe	<p>The following actions were described by the SSO</p> <ul style="list-style-type: none"> • Stop drilling • Don PPE (Appendix A3.5.3) • Collect mud sample • Extract water from mud • Prepare water for counting in Triathler Bioscan • Perform Triathler Bioscan count (action level 2000 pCi/L) • Call RSO if necessary

4.1.3. Bioscan LSC for closest new Tier I well within a sector during drilling

Requirement	Documentation
Available	Available in the URS offices in Glenwood Springs, approximately 1 hour away
Adequate supplies	✓
Daily before and after source and background checks in logbook	Performance tests are done only on the days when the system is in use.

Comments: clarify in the RSAP that this instrument is not routinely tested on daily basis. It is tested only on days when it is in use. Since it unlikely that this will ever be in use, a monthly test is advised. Also the system and supplies should be packaged for easy relocation and people who may be called on to operate the system should routinely practice with it. A recommended schedule of practice with the instrument is once each quarter during the first year of assignment as an operator, then twice in each subsequent year.

4.1.4. Contact the RSO and verify accessibility

Requirement	Documentation
Larry Lockett, CHP, URS, 210 481-5338 (o) 210 872 3812 (c)	Contacted Mr. Lockett by phone at 10:00 on 8/5/2008
Have any notices been made to RSO? When, why	The only notices received to date are automatic emails generated during instrument alarms tests
Do you have an alternate if you are on vacation or sick? Who?	Mr. Lockett always answers the phone. Mr. Henry has been designated as an alternate RSO.
Describe advice, actions and notifications if drilling fluids or cuttings were released and a positive survey was reported?	Contact company management Contact COGCC, CDPHE, Garfield County Sheriff, Emergency Management Office
Do you have a copy of the SAP?	Yes, approval date on cover page is March 31, 2008 which is the most current version

Comments: The alternate RSO should be listed in RSAP.

4.1.5. Gamma Screening of Cuttings and Return Fluid of the closest new Tier I well within a sector during drilling

Requirement	Documentation
TSA gamma monitoring system or equivalent	The actual instruments in use are Ludlum Measurements, Inc. Model 375P-336-2 gamma monitoring system and Ludlum Model 375 area monitor with Ludlum 44-10 (2-inch x 2-inch) NaI(Tl) gamma scintillator, ruggedized for outdoor use and Berkeley Nucleonics Corp. (BNC) 1035 areaSAM gamma spectrometer are used instead. See Section 3.18
Linked to computers in drilling control station to the extent possible for recording and review	Yes, connected to the Pason drilling acquisition and control system and linked to the company intranet
Performance test procedure for daily checks	✓
Alarms set at screening and action levels	✓
How is data stored?	In the Pason drilling control system computer
Calibration	All in calibration with current stickers from the manufacturers
Continuous and real time and in use	✓
Simulate alarm and observe response	SSO stated he would observe the data readout, and evacuate drilling rig if he deemed the alarm to be actual based on continuing signal, and call RSO for assistance

Comments: The SSO provided a printout showing the instrument response while a Halliburton well logging truck was lowering a radiation source into a well and as that source re-emerged from the well. An alarm and unmistakable momentary increase in radiation level was recorded. This information should be captured in the RSAP Supervisors and potentially affected workers should be alerted to the possibility of a false alarm when logging trucks are on the pad.

4.1.6. Required on site equipment during drilling and completion

Requirement	Documentation
Ludlum Model 3A Survey Meter, or equivalent	Instrument in service is Fluke Biomedical Advanced Survey Meter 990 with current calibration by the manufacturer
Ludlum Model 2241 Digital Survey Meter, or equivalent (2 each)	Instrument in service is Fluke Biomedical Advanced Survey Meter 990 with current calibration by the manufacturer. The Berkeley Nucleonics Corp. (BNC) 1035 areaSAM gamma spectrometer fills a similar function
Ludlum Model 16 Portable Gamma Analyzer, or equivalent (1 each)	Instrument in service is Berkeley Nucleonics Corp. (BNC) 1035 areaSAM gamma spectrometer with current calibration by the manufacturer
Ludlum Model 44-9 Pancake GM detector or equivalent, capable of detecting alpha, beta, and gamma radiation (1 each)	Instrument in service is Fluke Biomedical Advanced Survey Meter 990 with Fluke Model 489-110D pancake GM detector with current calibration by the manufacturer
Ludlum Model 44-2 NaI(Tl) Gamma Scintillator or equivalent, capable of measuring low levels of gamma radiation in the range of 60 kilo electron volts (keV) to 1.25 million electron volts (MeV) (1 each)	Instrument in service is Fluke Model 451P Pressurized μ R Ion Chamber Survey Meter with current calibration by the manufacturer

Comments: Clarify in RSAP that this instrumentation is required only on Tier I sites, and that performance testing is required only on days when the equipment is used. Advise monthly checking for instruments not in routine daily service. Also note that control charting is not commonly done on handheld survey instruments.

4.1.7. Radiation Safety Briefing Attendance for all Tier I drill site and production personnel

Requirement	Documentation
See briefing log sheet or equivalent attendance documentation	Training records for all hands were provided during document inspection. Training was provided in two sessions to 25 people on 6/22/08, and to 23 people in two sessions on 6/23/08. Documentation of training of three new workers was seen in the SSO office. The radiation safety briefing was conducted as specified in the RSAP.

4.1.8. Demonstrate actions during release or loss of well control.

Demonstrate actions in the event of a release of drilling fluids or cuttings or loss of well control.

The SSO used the incident plan as a guide when discussing the emergency action steps, which is appropriate. The on-site staff demonstrated that they know the required actions to take during an emergency.

Requirement	Documentation
Implement company emergency plan	SSO: ✓
Follow incident response procedure in 3.8 and determine if release is radiological	SSO: ✓
Don PPE	Not mentioned
SSO survey using on site hand-help instruments	SSO: ✓
Readings above action levels require RSO contact	SSO: ✓
RSO contacts company management	SSO: ✓
Company informs COGCC, CDPHE, Garfield County Sheriff and Emergency Management Office	Don Cox, Noble's Drilling Supervisor, stated he would do this notification
Minimize runoff	SSO: ✓
Limit access	SSO: ✓

Comments: missed the PPE step, but it is clear that the intent of the incident management plan was met.

4.1.9. Demonstrate decontamination procedure

The SSO used the incident plan as a guide when discussing the decontamination steps, which is appropriate. The on-site staff demonstrated that they know the required actions to take in response to contamination. It is important to continually reinforce the idea that decontamination should never interfere with life-saving or limb-saving actions.

Requirement	Documentation
Where is nearest hospital equipped and trained to treat patients who may be radiologically contaminated? How do you know?	Rifle. The Glenwood Springs hospital has also been contacted by the SSO and their ability to treat contaminated patients has been verified.
Personnel leaving contaminated zone remove gross soil from outer clothing and boots	SSO: ✓
Remove coveralls, gloves, hardhats, boots and/or boot covers	SSO: ✓
Frisk all personnel upon exiting the area	SSO: ✓
Compare frisking results to Table A-1 guidance. Count rate > 2 time background at 1/2 inch	SSO: ✓
For positive survey: Wash with soap and water. Contain rinse water. Contact RSO	SSO: ✓
For positive survey: wash with soap and water. Bleach may be applied as needed to decon	SSO: ✓
Survey the worker to find contaminated skin	SSO: ✓
Wipe with gauze sponge or cotton applicator dipped in mild antiseptic detergent. Do not spread to uncontaminated areas	SSO: ✓
Rub skin lightly to produce lather	SSO: ✓
Use soft brushes for fingernails and other areas as long as skin is intact	SSO: ✓
Dry with tissue	Missed step
After dry, resurvey	SSO: ✓
After decon, apply hand cream	SSO: ✓

4.1.10. Demonstrate radiological incident response procedures

The SSO used the incident plan as a guide when discussing appropriate actions, which is appropriate. The on-site staff demonstrated that they know the required actions.

Requirement	Documentation
If radiation release above Table A-1 actions levels is verified notify Company management and RSO	SSO: ✓
Company notifies COGCC, CDPHE, Garfield Sheriff, and Emergency Management Office	Don Cox, Noble's Drilling Supervisor: ✓
Suspend all operations	SSO: ✓
Do not allow vehicles to leave until released by RSO (much later)	SSO: ✓
Rescue and provide first aid. Do not take people off site. Wait for first responders	SSO: ✓
Notify first responders of radiation levels	SSO: ✓
Survey any potentially contaminated personnel with GM	SSO: ✓
Decon uninjured people	SSO: ✓
Cordon off involved areas with 100 foot buffer	SSO: ✓
Move people away and upwind	SSO: ✓

4.1.11. Tier I Access Control

Requirement	Documentation
Access to Tier I is controlled 24/7 by guard at a gate	✓ Records of vehicles and each occupant entering the area are collected by a guard

Comment: Disposition of the vehicle access log is unclear.

4.1.12. Emergency Communications

Requirement	Documentation
"Satellite and cellular phones are the primary means of outside communication available at the drill site." Do cell phones work?	No cell phone coverage.
If cell phone does not work is satellite phone available? Make a test call on it to an office phone.	Three satellite phones are available. One was used to make a call to the COGCC office in Rifle.

4.1.13. Bioassay bottles

Requirement	Documentation
Pre-cleaned leak proof 125 ml HDPE environmental sample bottle for tritium bioassay	✓ One case of bottles on site.
Pre-cleaned leak proof 1000 ml HDPE environmental sample bottle for other than tritium bioassay	✓ One case of bottles on site.

4.1.14. On-site decon equipment

Requirement	Documentation
Hand-held radiation survey instruments for verifying alarms and frisking potentially contaminated personnel	✓
Disposable protective clothing (e.g., Tyvek disposable coveralls, overshoes, gloves)	✓
Standard first aid kit, including cotton swabs, nail clippers, etc	✓
Shower facility in on-site trailer. Where does it drain?	✓
Portable eye wash station	✓
Soft bristle scrub brushes (e.g., fingernail brush, etc.)	✓
Soap and shampoo (e.g., Johnson's baby shampoo)	✓
Hand cream	✓
Trash bags	✓
Radioactive waste labels	✓

5. Adverse Findings

No adverse findings are made.

6. Concerns, Observations and Recommendations

6.1. *List of Concerns*

1. The requirement to annually brief community responders has not yet been fully satisfied. Cooperation from community responders and additional efforts by the Companies are needed. Efforts to directly contact law enforcement and local hospitals, including the helicopter ambulance service in Grand Junction, should be emphasized.
2. The instrumentation wiring to detectors mounted on the shale shaker may pose safety hazards in the event that gas is released nearby. It appears that other wiring in the vicinity is explosion proof. This was discussed with Don Cox, Noble's Drilling Supervisor and Chris Del Hierro of Noble.
3. Instrumentation wiring for detectors mounted on the shale shaker may not hold up well during use due to environmental stress, making the instruments subject to premature failure.
4. Emphasize to all responsible personnel that radiological contamination concerns should never interfere with lifesaving or treatment of a serious injury.

6.2. *List of Observations*

1. Control charting for portable instruments exceeds typical industry practice.
2. The objective evidence provided by URS and Noble demonstrates attention to detail rarely seen in a newly developed program. This is a noteworthy achievement.

6.3. List of Recommendations

1. The COGCC should periodically review sample data against criteria to confirm that no Project Rulison-related radionuclides have been detected.
2. The COGCC may consider inspecting sampling of produced gas, produced water, and well water and surface water. These activities were not occurring during this on-site inspection.
3. Re-evaluate the threshold for API gamma logs. Currently the threshold is arbitrarily set at 500 API units. The range of API units observed in the evaluations performed on existing wells should be used to inform the decision regarding an appropriate threshold.
4. Clarify instrument testing requirements in the next revision of RSAP. In several instances the RSAP requires instruments to be tested on a daily basis. But in most instances the intent is that the instrument be performance tested prior to use only on days it is in use.
5. Routinely practice operation of the emergency response instruments. Some instruments, particularly the liquid scintillation counter, which is an emergency response instrument, may never be used during routine operations. An acceptable schedule of practice with the instrument is once each quarter during the first year of assignment as an operator, then twice in each subsequent year
6. Package the liquid scintillation system and supplies to enable easy relocation.
7. Clarify that the liquid scintillation counter calibration is derived from a working standard source packaged as a liquid scintillation sample. That working standard is used in a procedure to normalize the instrument response. The instrument itself is not routinely returned to the manufacturer for re-calibration.
8. Update the radiological instrument equivalent substitutions in the next revision of the RSAP.
9. Add a requirement to the RSAP for emergency drills involving response to alarms and contaminated individuals who may or may not be injured.
10. Add a formal approval section to the next revision of the RSAP including the approval date. Because this plan is part of the regulatory system

- include formal approval documentation in the cover section of the RSAP. This should include version control for the Safe Work Plan and the Radiological Incident Management Plan which are embedded in the RSAP. Note that individual names and telephone numbers are included in the incident management plan and routine changes may be necessary.
11. Anticipate that at some wells it may impossible to sample produced water and produced gas as scheduled due to adverse weather. Devise a preapproved method to skip or delay samples without penalty when necessary.
 12. Observe scheduled field sampling for produced water and produced gas and surface water. This was not done during this inspection because sampling was not occurring. The next schedule sampling is planned for September 2008.
 13. Clarify what the Tier I access control gate guard does with log sheets.
 14. Reduce emphasis on the use of bleach in the decontamination procedure.
 15. Clarify the restrictions on who may manipulate valves during produced gas sampling. The Safe Work Plan says that the Company (e.g. Noble) employee manipulates valves needed to obtain gas samples, but the sampling procedure does not impose that restriction.
 16. List the alternate RSO in the next revision of the RSAP.
 17. Instructions are unclear on exactly how many sample bottles are needed when collecting water samples. Instructions cautioning against diluting preservative imply that the preservative is in the bottle before filling, but no step in the procedure calls for addition preservative. This should be clarified.
 18. Alert supervisors and potentially affected workers to the possibility of a false alarm when Halliburton logging trucks are on the pad. The SSO provided a printout showing the instrument response while a Halliburton well logging truck was lowering a radiation source into a well and as that source re-emerged from the well. A momentary increase in radiation level and alarm was recorded. Document this possibility in the next revision of the RSAP.
 19. Relax the height restriction on placement of TLDs so they may be located between 3 and 9 ft above floor level.

20. Add a flag to the compliance scheduling database that identifies which produced water samples should receive expedited tritium and gross alpha/beta analysis.
21. The following changes would improve the background radiation survey reports:
 - record the check source identification used to performance test
 - specifically identify the well, not just the well pad
 - sign the report
 - remove unused fields from the pre-printed form
 - correct the page count on the survey form to show that the data form is page 1 of 2 and the map is page 2 of 2.
22. The following changes would improve the field sampling logbook documentation:
 - lighten the shading on the form headers to improve legibility of reprints
 - routinely document the results of radiation screening associated with each sample
 - sampler(s) should sign or initial the form
 - separately document produced water and produced gas samples or add fields in the data form to show which information is pertinent only to water and only to gas.
23. Clarify in the RSAP that the portable and real-time radiation instruments are required only on Tier I sites and that performance testing is required only on days when the equipment is used. Advise monthly checking for instrument not in routine daily service.