

HUNTER RIDGE ENERGY SERVICES LLC
370 17th STREET, SUITE 1700
DENVER, CO 80202

Via Electronic Mail and Hand Delivery

October 28, 2016

Julie Murphy, Secretary
Colorado Oil & Gas Conservation Commission
1120 Lincoln Street, Suite 801
Denver, CO 80203

Re: Answer to Notice of Alleged Violation No. 401105510

Dear Ms. Murphy:

Hunter Ridge Energy Services LLC ("Hunter Ridge") by this letter submits its Answer to the Notice of Alleged Violation ("NOAV") that it received from the Colorado Oil and Gas Conservation Commission ("Commission") on September 20, 2016.¹ The NOAV results from a pinhole leak in a six-inch steel pipeline that is used to deliver water and condensate downstream from the A27 Central Delivery Point ("CDP") in the North Parachute Mountain area of Garfield County (the "Liquids Pipeline"). Hunter Ridge immediately self-reported the leak to the Commission; it also notified the affected landowners, Garfield and Rio Blanco counties ("Counties"), the Colorado Department of Public Health and Environment ("CDPHE"), the Environmental Protection Agency ("EPA"), and the National Response Center ("NRC").

As explained below, Hunter Ridge immediately shut down the pipeline and contained the release. In consultation with Commission staff, Hunter Ridge has sampled springs, outfalls, and water wells that have the potential to be impacted by the leak, installed more than 45 temporary groundwater monitoring wells, completed environmental and site assessments, and installed a remediation system for collecting and treating the impacted water.

Background

A. Relationship of Encana and Hunter Ridge

Hunter Ridge is currently a wholly owned subsidiary of Encana Oil & Gas (USA) Inc. At the time of the incident, Hunter Ridge was a limited liability company 50% owned by Encana and 50% owned by Nucor Energy Holdings Inc. Hunter Ridge owns the gathering pipeline system that services Encana operated wells in this area of the Piceance Basin. Encana and its affiliates operate the pipeline system as agents for Hunter Ridge.

B. The Liquids Pipeline

¹ On October 17, Enforcement Supervisor Peter Gowen granted Hunter Ridge an extension to answer the NOAV through October 28, 2016.

The Liquids Pipeline was designed and used to convey condensate and water from the A27 CDP to Encana's Middle Fork Compressor Station. The Liquids Pipeline begins at the A27 CDP in a valley and is laid up gradient to a ridge line where it connects to the main 12-inch condensate pipeline for the area. The 12-inch pipeline also transports condensate from the K22 CDP. Condensate from both CDPs is sold to Pinnacle Midstream, LLC at Middle Fork Compressor Station.

The A27 CDP was originally intended to serve multiple well pads but currently serves only one well, the M23, located on a separate pad, approximately 1,300 feet northeast of the A27 CDP. Oil, gas, and water are separated at the M23 well pad; oil is collected in sales tanks, and gas is metered and piped to the A27 CDP. Prior to November 2015, water was drained into the M23 596 Pit. In November 2015, Encana closed the M23 596 Pit to comply with Commission Rules. Since that time, the minimal volume of water produced by the single well has been recombined with the gas and conveyed to the A27 CDP, where it is separated again. The gas then flows to Encana's Story Gulch Compressor Station, and the condensate and water are pumped into the Liquids Pipeline for ultimate delivery as described above.

The K22 CDP collects and separates 3-phase products from multiple well pads. Condensate leaving the K22 CDP passes through a Lease Automated Custody Transfer ("LACT") Unit before being pumped into the main 12-inch condensate pipeline for the area. Occasionally, due to topography and low flows from the A27 CDP, condensate from the 12-inch pipeline would backflow into the Liquids Pipeline. Ultimately, however, the condensate was returned to the main 12-inch line during the periodic A27 CDP pumping operations.

Custody transfer for condensate produced by the M23 well is at the pad oil sales tanks. For liquids handled by the K22 CDP, initial custody transfer from Encana to Hunter Ridge is at the K22 CDP LACT. A second custody transfer occurs from Hunter Ridge to Encana near the Middle Fork Compressor Station. Final custody transfer is achieved when the product is sold by Encana to Pinnacle Midstream. At the location of the of leak, Hunter Ridge had custody of the product.

B. The Leak

It has been determined that condensate associated with the Liquids Pipeline leak moved via sub-surface flow approximately 4,200 feet to the north where it surfaced at a spring and then traveled via surface flow further north approximately 5,700 feet to a stock pond. On June 14, 2016, Hunter Ridge identified hydrocarbons during routine sampling of the above-referenced spring. Within approximately four hours, Hunter Ridge identified the Liquids Pipeline as the source of the hydrocarbons. The M23 well was shut in and operation of the A27 CDP was immediately discontinued. The Liquids Pipeline was subsequently blocked, bled of remaining liquids, and decommissioned, eliminating any further subsurface release of liquids.

Inspection and testing of the Liquids Pipeline indicated a pinhole leak approximately 1/16th inch in diameter, which was associated with isolated pitting on the interior pipe wall. At this stage of the investigation, corrosion specialists believe that the isolated pitting is attributable to bacterial corrosion and that the Liquids Pipeline materials, design, cover, and operating pressure were not contributing factors. Hunter Ridge has replaced the relevant portion of the Pipeline although it has not yet been put back in service.

C. The Response

Immediately after discovering the leak, Hunter Ridge implemented emergency response efforts to contain and collect the release, including deploying absorbent booms around and below the seep and skimming and collecting oil from the stock pond. Within the next four hours, Hunter Ridge notified the Commission, the affected landowners, and the Counties, and within 24 hours the CDPHE, EPA, and NRC were each notified. Both the spring and the stock pond are located on privately owned property (the "Johnson Property"). Response activities were coordinated with the owners of the Johnson Property and the adjacent Bishop property further to the north. The Bishop property is the closest property to the leak with potable water wells. Replacement water was offered to the Bishops and other similarly-situated landowners while their wells were tested.

The first phase of the response lasted from June 14, 2016 until June 28, 2016. During that period, Hunter Ridge collected 12 surface water samples from the Johnson property and potable use groundwater samples from the Bishop property. Hunter Ridge also implemented efforts to remove oil from the spring and stock pond and conducted sampling of additional private water wells further north.

The second phase of the response lasted from June 28, 2016 through October 4, 2016. During that period, Hunter Ridge installed 25 temporary groundwater monitoring wells, analyzed multiple additional potable use groundwater samples, obtained 31 surface water samples, and undertook other work to delineate the area and release. Hunter Ridge also installed an interim remediation system designed to collect impacted water near the spring and pass it through an oil/water separation system and an air stripping unit in order to remove free-phase liquids and dissolved volatile organic compounds before returning the water back to the drainage. In addition, a new head-gate was installed at the discharge of the stock pond thereby ensuring no further discharge of spring water to the environment until such time as the adequacy of the water quality could be ensured.

The third phase of the response began on October 4, 2016 and is ongoing. At this point in time, 20 additional temporary monitoring wells have been installed. Additional water sampling, analyses and slug testing is scheduled for the immediate future in an effort to allow further refinement of the delineation of the nature and extent of the release; this information will support the development and execution of a final remediation plan. An alternative hydrocarbon recovery and water disposal system is in its final design stages with installation and operation planned in the next 60 days. The new system will facilitate safe and effective year-round operation, including E&P waste disposal to an existing underground injection well. A Form 19, Initial Spill/Release Report was submitted on June 15, 2016 and supplemented on June 24, 2016. A Form 27, Remediation Workplan was submitted on June 27, 2016, and approved on July 7, 2016.

To date, Encana has sampled springs, outfalls, and water wells that have the potential to be impacted by the leak. Based upon analytical results from multiple sampling events, the leak did not affect any potable use wells or deep groundwater. Nor is there evidence that the leak caused any wildlife or livestock mortality or damage to crops. Flows have diminished over time, and the volume of hydrocarbons collected at the spring has decreased substantially. Additional information regarding the response activities, including analytical results from the water and soil sampling, is included in the Supplemental Site Assessment.

Response to Alleged Violations

Hunter Ridge asserts two general defenses to the regulatory violations alleged in the NOAV. First, Rules 1101, 1102.a, and 605.d are all directly or indirectly limited to flowlines,² and the Liquids Pipeline is not a flowline as defined by the Commission. The Commission's recent guidance on this issue explains that "COGCC rules related to Flowlines apply to those lines located upstream of sales meters or custody transfers." The regulatory definition similarly provides that flowlines end at "the gas metering equipment" for gas and at "the oil loading point or LACT unit" for oil. As explained above, the gas and associated liquids that came from the A27 CDP were metered and custody of them transferred at the M23 Well Pad, while the condensate that came from the K22 CDP was metered and custody of it transferred at the K22 CDP LACT Unit. In both cases, custody transferred upstream of the Liquids Pipeline, and so Rules 1101, 1102.a, and 605.d do not apply to the Liquids Pipeline.

Second, the alleged violations of Rules 1101, 1102.a, 605.d, and 907.a reflect duplicative and alternative theories. The crux of the NOAV is the Commission's allegation that the leak is due to a failure by Hunter Ridge regarding the Liquids Pipeline. Under Rule 1101, the Commission alleges that Hunter Ridge failed to install the Pipeline with appropriate materials, design, cover, and testing. Under Rule 1102.a, the Commission alleges that Hunter Ridge failed to maintain the Pipeline using reasonable precautions to prevent failure, leakage, and corrosion. Under Rule 605.d, the Commission claims that Hunter Ridge failed to ensure that the Pipeline was in good mechanical condition, which is at most a semantic difference. Under Rule 907.a, the Commission argues that Hunter Ridge failed to properly manage E&P waste so as to protect the waters of the state, which is another semantic variation. The alleged violations of Rules 605.d and 907.a should be rescinded as duplicative, while the alleged violations of Rules 1101 and 1102.a should be treated as alternative theories and not additive claims.

Further responses to each of the alleged violations are set forth below:

A. Alleged Violation of Rule 1101

Allegation: *Operator failed to install pipeline with materials, design, and cover sufficient to maintain structural integrity and prevent failure, and/or failed to complete pressure testing prior to operating this segment of flowline, resulting in the June 14, 2016 release, violating Rule 1101.*

Response: Based on Hunter Ridge's investigation, the Liquids Pipeline was generally in good condition both internally and externally. The affected portion of the pipeline was removed for inspection and only a single point of corrosion was found. The materials, design, and cover of the Liquids Pipeline neither caused nor contributed to the leak. Nor would prior pressure testing have

² The Commission limited Rules 1101 and 1102 to flowlines in Order No. 1R-103 (Sept. 2006), which describes them as "Flowline Regulations," and explains in the statement of basis and purpose that the Commission "[r]evis[e][d] [the] 1100 Series Rules so that they apply only to flowlines." See also, e.g., Rules 1101 and 1102: Flowline Guidance at 1 (Feb. 25, 2016) (stating that Rules 1101 and 1102 "regulate[] . . . Flowlines") ("Flowline Guidance"). The Commission limited Rule 605.d. to flowlines in Rule 601, which states that the 600 Series Rules are intended to provide protection "during the . . . operation of oil and gas wells and producing facilities." There is no regulatory definition for "producing facilities," but there is one for "production facilities." It specifically mentions flowlines but not gathering lines, and it encompasses only equipment that, unlike the Liquids Pipeline, is "directly associated" with oil, gas, and injection wells.

yielded any information that would have prevented or predicted the leak. Therefore, no violation of the Rule occurred.

In addition, the materials, design, and cover of the Liquids Pipeline were sufficient to maintain integrity and prevent failure as required by Rule 1101. The Pipeline was made of steel, with a 0.188-inch thick wall, a maximum allowable operating pressure of 1480 psig and a 50% design safety factor. The material was strength tested by the manufacturer. At the time of the leak, the Pipeline was routinely operated at pressures of approximately 300 psig. The Pipeline was also covered with 4 feet of soil and bedding, which was sufficient to protect it from external damage. The risk of such damage was further reduced by the location of the Pipeline in a remote, steeply-graded area, where it was not at risk from vehicle traffic or human disturbance.

Because the Liquids Pipeline is not a flowline Hunter Ridge is not required to pressure test it. Nevertheless, throughout the period in question Hunter Ridge employed a combination of best management practices ("BMPs") to maintain the integrity of, and prevent releases from, all of its pipelines that carry hydrocarbons in the Piceance Basin, including the Liquids Pipeline. These BMPs include:

- Continuous monitoring of pipeline pressures and flows, with the results transmitted in real time to a central monitoring center with remote shut-in capability, staffing 24 hours a day and seven days a week, and quarterly calibration of meters and transmitters;
- A Supervisory Control and Data Acquisition ("SCADA") system, which incorporates the pressure monitoring results and triggers alarms based upon anomalous pressure, flow rate, and fluid level results;
- Personnel who "walk-the-line" regularly to check equipment and verify that it is working properly;
- A Leak Detection and Repair ("LDAR") Program, which includes quarterly, semi-annual, and annual facility and equipment inspections using a FLIR camera to detect leaks; and
- Continuous chemical injection using corrosion inhibitors as well as spot checks with corrosion coupons, surface corrosion analyses, and downhole ER Probes to monitor and evaluate the chemical program.

These BMPs formed the basis for a June 18, 2015 variance request by Encana Services Company Ltd. from the annual pressure testing requirements of rule 1101 for all Piceance Basin flowlines (Document 400855779).³ Although the Commission has not yet ruled on that request, the Commission's Flowline Guidance indicates that a continuous monitoring program like that employed by Hunter Ridge protects public health, safety, and welfare in a manner that is equivalent to annual pressure monitoring. It also encourages the use of SCADA programs.

³ Encana Services Company Ltd. is an affiliate of Encana, and Encana operates the Hunter Ridge assets. Acting on behalf of Hunter Ridge, Encana applies the BMPs to the Hunter Ridge gathering pipeline system.

For all of these reasons, Hunter Ridge respectfully denies any violation of Rule 1101.

B. Alleged Violation of Rule 1102.a

Allegation: *Operator failed to take reasonable precautions to prevent failures, leakage and corrosion of pipelines, resulting in the June 14, 2016 release, violating Rule 1102.a.*

Response: Rule 1102.a requires operators to take “reasonable precautions” to prevent pipeline failures, leakage, and corrosion.

As discussed above, Hunter Ridge employed a number of BMPs to prevent pipeline failures, leakage, and corrosion that qualify as reasonable precautions. Hunter Ridge continuously monitored pipeline pressures and flows, and incorporated the monitoring results into a SCADA system. In addition, Hunter Ridge had personnel check pipeline locations, and employed LDAR and continuous chemical injection programs. These measures collectively constituted “reasonable precautions” to prevent pipeline failures, leakage, and corrosion. Among other things, they met or exceeded the measures identified by the Commission’s Flowline Guidance as protecting public health, safety, and welfare in a manner that is equal to annual pressure tests, and upon information and belief they also met or exceeded industry standards for preventing pipeline failures, leakage, and corrosion in remote areas. Therefore, the Liquids Pipeline leak does not conclusively establish that a violation of the Rule occurred. If it did, the Rule’s language regarding “reasonable precautions” would be meaningless. Accordingly, Hunter Ridge respectfully denies any violation of Rule 1102.a.

C. Alleged Violation of Rule 605.d

Allegation: *Operator failed to assure the pipeline was in good mechanical condition, violating Rule 605.d.*

Response: Rule 605.d applies to mechanical conditions within oil and gas facilities, but the Liquids Pipeline leak is not a “mechanical condition” and it did not occur at an “oil and gas facility” within the meaning of the Rule. The 100 Series Rules provide that the term “mechanical” should be given its customary and accepted meaning, which has to do with machinery. The segment of pipe in question is not machinery, that is, an apparatus consisting of different parts. It also is not part of an “oil and gas facility” subject to Rule 605.d because Rule 601 effectively limits such facilities to oil and gas wells and production facilities.

But even if the Liquid Pipeline were subject to Rule 605.d no violation of the Rule occurred. As explained above, the Pipeline was generally in good condition except for the single anomaly that is attributable to bacterial corrosion. In addition, Hunter Ridge employed a range of BMPs to maintain its pipelines in good condition. Under these circumstances, Hunter Ridge respectfully denies that any violation of Rule 605.d occurred.

D. Alleged Violation of Rule 907.a

Allegation: *Operator failed to manage E&P Waste in a manner protective of waters of the state, causing or threatening to cause significant adverse impacts, violating Rule 907.a.*

Response: As demonstrated above, Hunter Ridge managed its gathering pipeline system and the associated E&P waste in a manner that was protective of waters of the state. To this end, Hunter Ridge implemented a number of state-of-the-art BMPs that sought to maintain pipeline integrity, prevent leaks, and ensure that any release was promptly identified and remedied. The isolated bacterial corrosion that caused the leak does not demonstrate that Hunter Ridge failed to properly manage E&P waste or otherwise fulfill its regulatory responsibilities.

With respect to the discharge of "hydrocarbon-impacted water" referenced by the NOAV, Hunter Ridge notes that upon discovery of this situation it took immediate steps to identify and isolate the leak and begin mitigation in a manner consistent with Rule 907.a. As summarized above, these emergency response efforts included the following:

- Immediately deploying and frequently replacing booms and diapers;
- Immediate negotiating improved access so that proper equipment and vehicles could access the remote area for response and recovery;
- Initiating skimming operations as soon as a vacuum truck could access the stock pond;
- Installing fencing to prevent wildlife, livestock, and people from entering the spring;
- Installing a 12-inch polyline to transport the impacted water to the oil/water separator to prevent the water from coming into contact with wildlife, livestock, and people;
- Testing of all springs, outfalls, and water wells five miles downgradient of the impacted spring seep with all lab tests expedited;
- Offering replacement water to the landowners downgradient while water samples were analyzed;
- Contacting the affected landowners immediately, and notifying all regulatory agencies within 24 hours; and
- Replacing the head-gate at the stock pond discharge to prevent further release of surface water north of the stock pond until such time as acceptable water quality can be assured.

Hunter Ridge therefore denies any violation of Rule 907.a.

Corrective Actions

Because the Liquids Pipeline is not a flowline and because Hunter Ridge implemented the BMPs, Hunter Ridge did not have the Pipeline annually pressure tested. Therefore, Hunter Ridge does not have three years' worth of pressure testing results for the Pipeline.

Proof of membership with Colorado 811 is attached to this answer.

A written plan for avoiding future leaks is attached to this answer.

Hunter Ridge has provided the Commission with a Supplemental Site Assessment Report delineating the extent of the impacted area. The first and second phases of the site investigation have been completed, and the third phase is currently in process.

Hunter Ridge will continue to provide the Commission with monthly Supplemental Form 27 progress reports through September 2017 or until this matter has been closed.

Hunter Ridge will continue cleanup of the impacted area to meet the Table 910-1 standards, including soil investigation and remediation.

Mitigating Factors

Hunter Ridge respectfully requests that the Commission close this NOAV without further process or penalty based on the above information and the commitment of Hunter Ridge to complete the remediation process. Such a result would be consistent with the resolution of the Parachute Creek Gas Plant leak, which involved a similarly inadvertent release of hydrocarbons in Garfield County in 2013.

Should the Commission disagree and seek penalties for this matter, then Hunter Ridge asks the Commission to consider Hunter Ridge's cooperation with the Commission and the landowners and its response to the leak. Under these circumstances, Rule 523.c.3 authorizes penalty reductions for each of the following mitigating factors:

1. Self-reporting;
2. Prompt, effective and prudent response, including assistance to impacted parties;
3. Good faith effort to comply with the applicable requirements before the Commission learned of the violation;
4. The cost of correcting the violation reduced or eliminated any economic benefit from the event; and
5. A demonstrated history of compliance with the Act, Rules, order, and permits.

All of these factors apply in this case. Hunter Ridge discovered and promptly reported the leak. It immediately initiated work to investigate, contain, and collect the release, and it has undertaken

extensive work to assess the area and remove the hydrocarbons. It has also provided assistance to the landowners. It made good faith efforts to comply with applicable requirements before the leak occurred, including implementing a number of BMPs as contemplated by the Commission's Flowline Guidance. To date, Hunter Ridge has spent in excess of \$800,000 in corrective action, with an additional \$350,000 anticipated to be spent in 2016 for the year-round collection and disposal system. This amount greatly exceeds any conceivable economic benefit associated with the events leading to the leak, and expenses will continue to accrue as Hunter Ridge proceeds with remediation. And Hunter Ridge has a history of overall regulatory compliance.

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Hunter Ridge appreciates the opportunity to present this information and looks forward to working with the Commission to ensure that the leak is fully and adequately remediated. Should you have further questions or desire more information in the interim, please contact Miracle Pfister at 720-876-3761 or via email at miracle.pfister@encana.com. We look forward to meeting with Commission representatives on November 1, 2016, at 2:00 p.m. at your office.

Sincerely,



Jessica Cavens
Managing Director
Hunter Ridge Energy Services LLC

Attachments

Cc: Steven Mah, NOAV Specialist – COGCC
Britta K. Beckstead, Asst. Attorney General
John Keil – Encana Oil & Gas (USA) Inc.
Miracle Pfister – Encana Oil & Gas (USA) Inc.
Allison S. Woolston, Senior Attorney – Encana Oil & Gas (USA) Inc.,
Dave Neslin, Davis Graham & Stubbs

Appendix to Answer

Plan for Avoiding Future Leaks like the A27 CDP Liquids Pipeline Leak

Notice of Alleged Violation ("NOAV") 401105510 requires that Hunter Ridge Energy Services LLC ("Hunter Ridge") submit "a written plan that addresses how this problem will be avoided in the future, to include engineering, pressure testing of this segment of flowline, management, and training actions, as necessary." This appendix fulfills that requirement.

As explained in the Answer to the NOAV, the Liquids Pipeline condensate release involved a pinhole leak in a six-inch pipeline that was used to deliver condensate and water downstream from the A27 Central Delivery Point ("CDP") in the North Parachute Mountain area of Garfield County (the "Liquids Pipeline"). The Liquids Pipeline is part of the Hunter Ridge gathering system; it is not a flowline as defined by the Commission because it is located downstream of the relevant sales meters and custody transfers.

The investigation conducted to date indicates that the leak was an isolated event caused by bacterial corrosion and that the Liquids Pipeline material, design, cover, and operating pressure were not contributing factors to the event. Instead, the corrosion is likely associated with a unique combination of hydraulic and topographic circumstances involving the Liquids Pipeline. These circumstances are described in detail in the Answer to the NOAV.

A number of best management practices ("BMPs") are currently employed by Encana on behalf of Hunter Ridge to maintain the integrity of, and prevent releases from, the Hunter Ridge pipelines that carry hydrocarbons in the Piceance Basin.¹ These BMPs include continuous pressure monitoring, a supervisory control and data acquisition system ("SCADA"), operator inspections, leak detection and repair and continuous chemical injection at well sites. These BMPs are further described in the June 18, 2015 Rule 1101.e.(1) variance request by Encana Services Company Ltd. for all Piceance Basin flowlines (Document 400855779) ("Variance Request"). Encana will continue to apply these BMPs in its management of the Hunter Ridge pipeline system. The description of the BMPs in the Variance Request effectively provides a written plan describing the measures Hunter Ridge has taken and will continue to take to manage its pipeline system to avoid future leaks. As contemplated by the NOAV, the BMPs include both engineering and management actions, and involve significant staff training. Please note that the BMP program is implemented on a system-wide basis, with individual BMPs being selectively applied on pipeline segments that will benefit most from that specific practice and where the application of such BMPs is both practicable and achievable.

To address the possible future recurrence of the anomalous circumstances associated with the Liquids Pipeline leak, Hunter Ridge will establish policies requiring that whenever there is a change of product in a pipeline, or a significant change in flow rates, a Management of Change document will be created to assist Hunter Ridge in evaluating the potential risks. Where there is a significant risk of bacterial corrosion or other adverse consequences from such action, Hunter Ridge will take appropriate action to mitigate the risk. Such action may include not using the pipeline for the contemplated use or in the

¹ Encana Oil & Gas (USA) Inc. serves as the operator of the Hunter Ridge assets, and it applies the BMPs to the Hunter Ridge pipeline system. Encana Services Company Ltd. is an affiliate of Encana Oil & Gas (USA) Inc.

contemplated manner, applying one or more of the BMPs to the affected pipeline specifically, or implementing other appropriate mitigation.

Appendix to Answer

Proof of Membership with Colorado 811



October 28, 2016

Encana Oil and Gas
2717 County Road 215, Suite 100
Parachute, CO 81635

To whom it may concern,

This letter serves as confirmation that Encana Oil and Gas, in Colorado, is a Tier One member, in good standing in the year 2016, with UNCC (Utility Notification Center of Colorado AKA Colorado 811).

Please contact me if further information is necessary.

Sincerely,

Carla Sanchez
Member Services Administrator

State County

Grid notification for ENCANA1C active 09/30/16-09/30/16

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| | | | | 04NW | 04NE | 03NW | 03NE | | | | | | | |
| | | | | 04SW | 04SE | 03SW | 03SE | | | | | | | |
| | | | | 08NE | 09NW | 09NE | 10NW | 10NE | | | | | | |
| | | | | 08SE | 09SW | 09SE | 10SW | 10SE | 11SW | 11SE | 12SW | | | |
| 18NW | 18NE | 17NW | 17NE | 16NW | | | 15NW | 15NE | 14NW | 14NE | 13NW | 13NE | | |
| 18SW | 18SE | 17SW | 17SE | | | | 15SW | 15SE | 14SW | 14SE | 13SW | 13SE | | |
| 19NW | 19NE | 20NW | 20NE | | | | 21NE | 22NW | 22NE | 23NW | 23NE | 24NW | 24NE | |
| 19SW | 19SE | 20SW | | | | | 21SE | 22SW | 22SE | 23SW | 23SE | 24SW | 24SE | |
| 30NW | 30NE | | | | | | 28NE | 27NW | 27NE | 26NW | 26NE | 25NW | 25NE | |
| 30SW | 30SE | | | | | | 28SW | 28SE | 27SW | 27SE | 26SW | 26SE | 25SW | 25SE |
| 31NW | 31NE | 32NW | 32NE | 33NW | 33NE | 34NW | 34NE | 35NW | 35NE | 36NW | | | | |
| 31SW | 31SE | 32SW | 32SE | 33SW | 33SE | 34SW | | 35SW | 35SE | 36SW | | | | |

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|------|------|------|------|------|
| | | 23SW | | 24SE |
| 27NW | 27NE | 26NW | | 25NE |
| 27SW | 27SE | 26SW | 25SW | 25SE |
| | 34NE | 35NW | 36NW | 36NE |
| | | 35SW | 36SW | 36SE |

| 04S095W | | | | | | | | | | | |
|---------|------|------|------|------|------|------|------|------|------|------|------|
| 18SW | 18SE | | | | | | | | | | |
| 19NW | 19NE | 20NW | 20NE | | | | | | | | |
| 19SW | 19SE | 20SW | 20SE | | | | 22SE | 23SW | | | |
| 30NW | 30NE | 29NW | 29NE | | | | | | | 25NW | 25NE |
| 30SW | 30SE | 29SW | 29SE | 28SW | 28SE | | | 26SW | 26SE | 25SW | 25SE |
| 31NW | | | | 33NW | 33NE | 34NW | 34NE | 35NW | 35NE | 36NW | |
| | | | | | 33SE | 34SW | 34SE | 35SW | 35SE | 36SW | |

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|------|------|------|------|------|------|------|------|------|------|------|------|--|
| 06NW | | | | | | | 03NW | 03NE | | | | |
| 06SW | | | 05SE | | | | 03SW | 03SE | 02SW | | | |
| 07NW | 07NE | | 08NE | | | | | 10NE | 11NW | | | |
| 07SW | 07SE | 08SW | 08SE | 09SW | | | 10SW | 10SE | 11SW | 11SE | | |
| | 18NE | 17NW | 17NE | 16NW | 16NE | 15NW | 15NE | 14NW | 14NE | 13NW | 13NE | |
| | 18SE | 17SW | 17SE | 16SW | 16SE | 15SW | 15SE | 14SW | 14SE | 13SW | 13SE | |
| 19NW | 19NE | 20NW | 20NE | 21NW | 21NE | 22NW | 22NE | 23NW | 23NE | 24NW | 24NE | |
| 19SW | 19SE | 20SW | 20SE | 21SW | 21SE | 22SW | 22SE | 23SW | | 24SW | 24SE | |
| 30NW | 30NE | 29NW | 29NE | 28NW | 28NE | 27NW | 27NE | 26NW | 26NE | 25NW | 25NE | |
| 30SW | 30SE | 29SW | 29SE | 28SW | 28SE | 27SW | 27SE | 26SW | 26SE | 25SW | 25SE | |
| 31NW | 31NE | 32NW | 32NE | 33NW | 33NE | 34NW | 34NE | 35NW | 35NE | 36NW | 36NE | |
| 31SW | 31SE | 32SW | 32SE | 33SW | 33SE | 34SW | 34SE | 35SW | 35SE | 36SW | 36SE | |

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|------|------|------|------|------|------|------|------|------|------|------|------|
| 06NW | | 05NW | 05NE | 04NW | 04NE | 03NW | 03NE | 02NW | 02NE | | 01NE |
| 06SW | 06SE | 05SW | 05SE | 04SW | 04SE | 03SW | 03SE | 02SW | 02SE | | 01SE |
| | 07NE | 08NW | 08NE | 09NW | 09NE | | 10NE | 11NW | 11NE | 12NW | 12NE |
| | 07SE | 08SW | 08SE | | 09SE | 10SW | 10SE | 11SW | 11SE | 12SW | |
| 18NW | 18NE | 17NW | 17NE | | 16NE | 15NW | 15NE | 14NW | 14NE | 13NW | |
| 18SW | 18SE | 17SW | 17SE | 16SW | 16SE | 15SW | 15SE | 14SW | 14SE | | |
| 19NW | 19NE | 20NW | 20NE | 21NW | 21NE | | 22NE | 23NW | 23NE | 24NW | 24NE |
| 19SW | 19SE | | 20SE | 21SW | 21SE | | 22SE | 23SW | 23SE | 24SW | 24SE |
| 30NW | 30NE | 29NW | 29NE | 28NW | 28NE | 27NW | 27NE | 26NW | 26NE | 25NW | 25NE |
| 30SW | | 29SW | 29SE | 28SW | 28SE | 27SW | 27SE | 26SW | 26SE | 25SW | 25SE |
| | 31NE | 32NW | | 33NW | 33NE | 34NW | | 35NW | 35NE | 36NW | 36NE |
| 31SW | 31SE | | | 33SW | | 34SW | 34SE | 35SW | 35SE | 36SW | 36SE |

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|------|------|------|------|------|------|------|------|------|------|------|------|
| | | | | | | | | | 02NE | 01NW | 01NE |
| | | | | | | | | | 02SE | 01SW | 01SE |
| | | | | | | | 11NW | | 11NE | 12NW | |
| 07SW | | | | | 09SE | 10SW | 10SE | 11SW | 11SE | 12SW | 12SE |
| | | | | 16NW | 16NE | 15NW | 15NE | 14NW | 14NE | | |
| 18SW | 18SE | | | 16SW | 16SE | 15SW | 15SE | 14SW | 14SE | 13SW | 13SE |
| 19NW | | | | | 21NE | 22NW | | | 23NE | 24NW | 24NE |
| 19SW | 19SE | 20SW | 20SE | | 21SE | 22SW | | | | | |
| 30NW | 30NE | 29NW | 29NE | 28NW | 28NE | 27NW | | | | 25NW | 25NE |
| | | | 29SE | 28SW | 28SE | 27SW | 27SE | | | | 25SE |
| | | | | | | 34NW | 34NE | | 35NE | 36NW | |
| | | | | | | | 34SE | | | | |

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|------|------|------|------|------|
| | | | 01SW | |
| 10NE | 11NW | 11NE | 12NW | 12NE |
| 10SE | 11SW | 11SE | 12SW | 12SE |
| | 14NW | 14NE | 13NW | 13NE |
| | 14SW | 14SE | | |
| | | 23NE | 24NW | |
| | | 23SE | 24SW | 24SE |

05S095W

| | | | | | | | |
|------|------|------|------|------|------|------|------|
| | 18NE | 17NW | 17NE | 16NW | | | |
| 18SW | 18SE | 17SW | 17SE | 16SW | 16SE | 15SW | 15SE |
| 19NW | 19NE | 20NW | 20NE | 21NW | 21NE | | |
| 19SW | 19SE | 20SW | 20SE | | 21SE | 22SW | |
| 30NW | 30NE | 29NW | 29NE | 28NW | 28NE | 27NW | 27NE |
| 30SW | 30SE | 29SW | 29SE | 28SW | 28SE | 27SW | 27SE |
| 31NW | | 32NW | | | | | 26SW |
| 31SW | | 32SW | 32SE | | | 34NE | 35NW |

05S096W

| | | | | | | | | | | | |
|------|------|------|------|------|------|------|------|------|------|------|------|
| 06NW | 06NE | 05NW | 05NE | 04NW | 04NE | 03NW | 03NE | 02NW | 02NE | 01NW | 01NE |
| 06SW | 06SE | 05SW | 05SE | 04SW | 04SE | 03SW | 03SE | 02SW | 02SE | 01SW | 01SE |
| 07NW | 07NE | 08NW | 08NE | 09NW | 09NE | 10NW | 10NE | 11NW | 11NE | | |
| 07SW | 07SE | 08SW | 08SE | 09SW | 09SE | 10SW | 10SE | 11SW | 11SE | | |
| 18NW | 18NE | 17NW | 17NE | 16NW | 16NE | 15NW | 15NE | 14NW | 14NE | | |
| 18SW | 18SE | 17SW | 17SE | 16SW | 16SE | 15SW | 15SE | 14SW | 14SE | 13SW | 13SE |
| 19NW | 19NE | 20NW | 20NE | 21NW | 21NE | 22NW | 22NE | 23NW | 23NE | 24NW | 24NE |
| 19SW | 19SE | 20SW | 20SE | 21SW | 21SE | 22SW | 22SE | 23SW | 23SE | 24SW | 24SE |
| | | | | 28NW | 28NE | 27NW | 27NE | 26NW | 26NE | 25NW | 25NE |
| | | | | 28SW | 28SE | 27SW | 27SE | 26SW | 26SE | 25SW | 25SE |
| | | | 32NE | 33NW | 33NE | 34NW | 34NE | 35NW | 35NE | | 36NE |
| | | | | | | 34SW | 34SE | | | 36SW | 36SE |

05S097W

| | | | | | | | | | | | |
|------|------|------|------|------|------|------|------|------|------|------|------|
| 06NW | 06NE | 05NW | | | 04NE | 03NW | 03NE | 02NW | 02NE | 01NW | |
| 06SW | | 05SW | | | 04SE | 03SW | 03SE | 02SW | 02SE | 01SW | 01SE |
| 07NW | | 08NW | 08NE | 09NW | 09NE | | 10NE | 11NW | | | 12NE |
| | | 08SW | 08SE | 09SW | 09SE | | 10SE | | | | |
| | | | 17NE | 16NW | 16NE | 15NW | 15NE | 14NW | 14NE | 13NW | 13NE |
| | | | 17SE | 16SW | 16SE | 15SW | 15SE | 14SW | 14SE | 13SW | 13SE |
| | | | | 21NW | 21NE | 22NW | 22NE | 23NW | 23NE | 24NW | 24NE |
| | | | | 21SW | 21SE | 22SW | 22SE | 23SW | 23SE | 24SW | 24SE |
| | | | | 28NW | 28NE | 27NW | 27NE | | | | |
| | | | | | | 27SW | 27SE | | | | |
| | | | | | | 34SW | 34SE | | | | |

05S098W

| | | | | |
|--|------|------|------|------|
| | 03NE | 02NW | | |
| | 03SE | 02SW | 02SE | 01SE |
| | | 11NW | 11NE | 12NE |
| | | 11SW | 11SE | |

06S096W

| | | | | | | | |
|------|------|------|------|------|------|------|------|
| 06NW | 06NE | 05NW | 05NE | 04NW | 04NE | 03NW | 02NW |
| 06SW | 06SE | | 05SE | 04SW | 04SE | 03SW | |
| 07NW | 07NE | 08NW | 08NE | 09NW | 09NE | 10NW | |
| 07SW | 07SE | 08SW | 08SE | 09SW | 09SE | | |
| | | 17NW | 17NE | 16NW | 16NE | | |
| | | 17SW | 17SE | 16SW | 16SE | | |
| | | 20NW | 20NE | 21NW | | | |
| | | 20SW | 20SE | 21SW | | | |
| | | | 29NE | 28NW | 28NE | | |
| | | | 29SE | 28SW | 28SE | 27SW | |
| | | | | 33NW | 33NE | 34NW | 34NE |
| | | | | | 33SE | 34SW | 34SE |
| | | | | | | | 35SW |

06S097W

| | | | | | | |
|------|------|--|--|--|------|------|
| 06SW | 06SE | | | | | 01NE |
| | | | | | 02SE | 01SW |
| | | | | | | 01SE |
| | | | | | | 12NW |
| | | | | | | 12NE |
| | | | | | | 12SW |
| | | | | | | 12SE |

06S100W

| | |
|------|------|
| 07SW | 07SE |
| | 18NE |
| | 18SE |
| 19NW | 19NE |

06S101W

| | | | | | | | | | |
|------|------|------|------|------|------|------|------|------|------|
| | | | | | | 03NE | | 02NE | |
| | | | | | | | | 02SE | 01SW |
| | | | | | | | | | 12NE |
| | | | | | | | | | |
| | | | | | | | | 14SE | 13SW |
| | | | | | | | | 23NE | 24NW |
| | | | | | | | | | 13SE |
| | | | | | | | | 23SE | 24NE |
| 19SW | 19SE | 20SW | 20SE | | | | | 26NW | |
| 30NW | 30NE | 29NW | 29NE | 28NW | 28NE | | | 26NE | |
| | | | | 28SW | 28SE | 27SE | 26SW | 26SE | |
| | | | | | 33NE | 34NW | 34NE | 35NW | |
| | | | | | 33SE | 34SW | 34SE | | |

06S102W

| | | | | | | | | | |
|--|--|--|--|--|--|------|------|------|------|
| | | | | | | | | | 25SE |
| | | | | | | 34NE | 35NW | 35NE | 36NW |
| | | | | | | 34SE | 35SW | 35SE | 36NE |

06S103W

| | | | | | | |
|------|------|------|------|------|------|------|
| | | 04NW | 04NE | 03NW | 03NE | 02NW |
| | 06SE | 04SW | 04SE | 03SW | 03SE | 02SW |
| 07NW | 07NE | | | 10SW | 10SE | |

18SW

| | |
|------|------|
| 29SE | 28SW |
| 32NE | 33NW |

31SW

06S104W

| | | | |
|------|------|------|------|
| | | 12NW | 12NE |
| | | 13NW | 13NE |
| | | 23NE | 24NW |
| | | 23SE | 24SW |
| 27SE | 26SW | | |
| 34NE | 35NW | 35NE | 36NE |
| | | 35SE | 36SE |

07S096W

| | | | | | |
|------|------|------|------|------|------|
| | | | 02NW | 02NE | |
| | | | 02SW | 02SE | |
| | | 10NE | | 11NE | 12NW |
| | | | | 11SE | 12SW |
| | | | | 14NE | |
| 15NW | 15NE | | | | |
| 17SW | 17SE | 15SW | 15SE | 14SW | |

07S101W

| | | |
|------|------|------|
| 04NE | 03NW | |
| 04SE | 03SW | 03SE |
| | | 10NE |
| | | 10SE |
| 15NW | 15NE | |
| 15SW | 15SE | |

07S103W

| | | | | | |
|------|------|------|------|------|------|
| 06NW | 06NE | 05NW | | | |
| 06SW | 06SE | 05SW | | | |
| | 07NE | 08NW | | | |
| | 07SE | | 08SE | 09SW | 09SE |
| | | | 17NE | 16NW | 16NE |

07S104W

| | | | | | | | | |
|------|------|------|--|------|------|------|------|------|
| | | 05NE | | 03NE | 02NW | 02NE | 01NW | 01NE |
| | | | | 03SE | | | | |
| | 07NE | 08NW | | 10NW | 10NE | 11NW | | 12NE |
| | | | | | | 11SW | | |
| | | | | | | 14NW | | |
| | | 18SE | | | | 14SW | 14SE | |
| 19NW | 19NE | | | | | | | |