October 21, 2009

Mr. Larry Teahon
Manager of Environmental
Health and Safety
Crow Butte Resources, Inc.
86 Crow Butte Road
P.O. Box 169
Crawford, NE 69339-0169

SUBJECT: LICENSE AMENDMENT NO. 24, 2009 SURETY UPDATE, CROW BUTTE RESOURCES, INC., CRAWFORD, NEBRASKA, SOURCE MATERIALS LICENSE SUA-1534 (TAC J00575)

Dear Mr. Teahon:

By letter dated September 29, 2008, Crow Butte Resources, Inc. (CBR) submitted its 2009 surety update to U.S. Nuclear Regulatory Commission (NRC) staff. NRC staff accepted the surety update for review via e-mail to CBR dated December 31, 2008 (ML083660010). However, NRC stated in the e-mail that the pore volume estimate for restoration must be revised to more closely represent that which was required to restore Mine Unit 1. Subsequent to this e-mail, NRC staff issued a Request for Additional Information (RAI) on February 12, 2009, requesting this information. CBR responded to this RAI in a letter dated February 25, 2009, transmitting the revised 2009 surety update.

This surety update seeks to increase the 2008 surety amount by $2,663,498.00 to $27,871,170.00. This increase is based on an adjustment to projected restoration pore volumes to 11; an expansion of operations in wellfields 10 and 11; an adjustment to the calculated area and average completed thicknesses for wellfields 10 and 11; an expansion of the restoration plant for the addition of two ionic exchange columns; the installation of an additional deep disposal well; modifications to the reverse osmosis treatment unit and the recirculation process; an adjustment in the accounting of total production (gallons) under evaporation pond reclamation and well abandonment labor; and adjustments for project management, overhead, contract profit, project contingency, and inflation.

NRC staff has reviewed the surety update and finds it to be acceptable. Therefore, NRC staff is approving the new surety amount of $27,871,170.00. However, as discussed in the Technical Evaluation Report (TER) enclosed with this letter (Enclosure 1), NRC staff will require that CBR re-baseline its unit costs for labor and equipment, as part of the surety update following the staff's review of the license renewal application. License Amendment No. 24 is also enclosed (Enclosure 2).

This licensing action meets the categorical exclusion provision for surety changes in 10 CFR Part 51.22(c)(10)(i). Therefore, no further environmental review is required for this action. If you have any questions, please contact Mr. Ronald Burrows, Project Manager, at 301-415-6443 or, by email at Ronald.Burrows@nrc.gov.

In accordance with 10 CFR 2.390 of the NRC's Rules of Practice for Domestic Licensing Proceedings and Issuance of Orders, a copy of this letter will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records component of NRC's Agency-wide Documents Access and Management System (ADAMS). ADAMS is accessible from the NRC Web site at http://www.nrc.gov/reading-rm/adams.html.

Sincerely,

/RA/

Keith I. McConnell, Deputy Director
Decommissioning and Uranium Recovery
Licensing Directorate
Division of Waste Management
and Environmental Protection
Office of Federal and State Materials
and Environmental Management Programs

Docket No.: 40-8943
License No.: SUA-1534

Enclosures:
1. Technical Evaluation Report
2. License Amendment No. 24

cc: Stephen Collings, CBR
Michael Linder, NDEQ

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(CLOSES TAC J00575)

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TECHNICAL EVALUATION REPORT
2009 SURETY UPDATE
CROW BUTTE RESOURCES, INC.
CRAWFORD, NEBRASKA

DATE:	July 29, 2009
DOCKET NO.:	40-8943
LICENSEE NO.:	SUA-1534
FACILITY LOCATION:	Crawford, Nebraska
PROJECT MANAGER:	Ron A. Burrows
TECHNICAL REVIEWER:	Thomas R. Lancaster

SUMMARY AND CONCLUSIONS:

By letter dated September 29, 2008, Crow Butte Resources, Inc. (CBR) submitted its 2009 surety update to U.S. Nuclear Regulatory Commission (NRC) staff. NRC staff accepted the surety update for review in an e-mail to the licensee dated December 31, 2008. However, NRC stated in the e-mail that the pore volume estimate for restoration must be revised to more closely represent that which was required to restore Mine Unit 1. Subsequent to this e-mail NRC staff issued a Request for Additional Information (RAI) on February 12, 2009. CBR responded to this RAI by its letter dated February 25, 2009, transmitting the revised 2009 surety update.

This revised surety update sought to increase the 2008 surety amount by $2,663,498.00 to $27,871,170.00. Significant changes to the revised 2009 surety update from that of surety update for 2008 included: (1) an adjustment to projected restoration pore volumes to 11; (2) an expansion of operations in wellfields 10 and 11 and an adjustment to the calculated area and average completed thicknesses for wellfields 10 and 11; (3) an expansion of the restoration plant for the addition of two ionic extraction columns; (4) the installation of an additional deep disposal well; (5) modifications to the reverse osmosis (RO) treatment unit and the recirculation process; (6) an adjustment in the accounting of total production (gallons) under evaporation pond reclamation; (7) well abandonment labor; and (8) adjustments for project management, overhead, contract profit, project contingency, and inflation. NRC staff reviewed the revised surety update and determined that the changes are acceptable and, therefore, approves the proposed surety amount.

TECHNICAL REVIEW

CBR's 2009 surety update included costs for groundwater restoration, plant decommissioning, surface reclamation, deep disposal well installation and reclamation, evaporation pond reclamation, and shallow aquifer restoration. The licensee's proposed changes to the revised 2009 surety update from that of the surety update for 2008 included:

- an adjustment of the projected number of restoration pore volumes to 11 (based on results of a groundwater flow model);
- an adjustment to the estimated 1991 to 2009 total production (in gallons) within the data/assumptions under evaporation pond reclamation (adjusted to include total production for 2009);
- an adjustment to the RO treatment unit (e.g., a change in RO unit pump horsepower from 405 to 170, a change in the RO production rate from 400 to 600 gpm, and replacement of RO membranes);
- the elimination of the addition of chemical reductant during the recirculation phase of restoration;
- further construction of wellfields 10 and 11 (installation of four well houses and 105 wells) and corrections of the area and average completed thickness of wellfields 10 and 11;
- the installation of one additional deep disposal well;
- the expansion of the restoration building for the addition of two IX columns and associated piping;
- accounting adjustments for well abandonment labor; and
- adjustments for project management, overhead, contract profit, project contingency, and inflation.

The surety update included a report by Worley Parsons, dated February 19, 2009, entitled "Wellfield Restoration Modeling Crow Butte Resources Mine Units 2-5." The report summarizes the results of a three-dimensional groundwater flow model (MODFLOW2000) and particle-tracking (MODPATH) for the optimal restoration in the shortest time possible of wellfields 2 to 5.

The model incorporated pre-production water level data and aquifer properties and other hydrogeologic information into six model layers representing the hydrogeologic units from the Brule Formation down through the basal Chadron Formation. Based on the observed discharge/outcrop areas and the observed pre-production groundwater flow to the north-northwest through the permit area, no flow (streamline) boundaries were set up on the east and west model boundaries and constant head boundaries were set up on the north and south model boundaries. Aquifer properties used in the model included hydraulic conductivity, porosity, and storativity for the basal Chadron Sandstone. These properties were obtained from results of four aquifer tests provided in NRC license applications. The vertical hydraulic conductivity of the overlying Chadron Formation and underlying Pierre Shale were obtained from core testing data.

The model was calibrated to pre-production conditions with observed pre-production water level values. The calibration was conducted using slight adjustments of aquifer properties and boundary conditions. NRC staff noted that graphical evaluation of the calibration (linear regression) indicated a satisfactory correlation between computed versus observed values.

The calibrated model was used to simulate groundwater flow and particle tracking over time. Observed extraction and injection restoration flows for wells in wellfields 2 to 5 were used in the modeling effort. Different well configurations over 120 to 180 days were run as a means of determining the configuration that offers the most efficient restoration. The simulation assumed an RO treatment/injection rate of 400 gallons per minute. Results of the modeling effort with particle tracers were displayed on maps of wellfields 2 to 5.

Based on a review of information provided for above-referenced model, NRC staff has determined that the model is reasonable and acceptable. CBR used the results of the model to propose 11 pore volumes for restoration (three pore volumes for IX treatment, six pore volumes for RO treatment, and two pore volumes for recirculation). NRC staff notes that when compared to the nine (9) pore volumes that was required to restore wellfield 1, the proposed 11 pore volumes is acceptable. However, staff notes that temporal changes in the model validation data in the future should be tracked for significant deviations, which may require the submittal of a model update with an upcoming surety update.

NRC staff reviewed the other above-referenced changes to the 2009 surety update from that of surety update for 2008 (i.e., bulleted items). NRC staff determined that the changes are technically acceptable and generally consistent with guidance in Appendix C of NUREG 1569. Staff also compared the unit costs to standard industry cost rates and determined that the surety cost rates are reasonable and acceptable.

Unit costs for the labor and equipment associated with the site reclamation and decommissioning were increased by an escalation factor of 1.05 percent based on the Consumer Price Index (CPI) from June 2007 (208.352) and June 2008 (218.815). NRC staff notes that this escalation factor is currently conservative when compared to escalation factor of 1.035 percent for the period from June 2007 (208.352) to June 2009 (215.693). NRC staff reviewed the computations and concurs with the proposed 1.05 percent escalation factor. However, NRC staff will require that CBR re-baseline its unit costs for labor and equipment, as part of the surety update following the staff's review of the license renewal application.

PROPOSED LICENSE AMENDMENTS

LC 9.5

Crow Butte Resources, Inc., shall continuously maintain an approved surety instrument for the Crow Butte Project, in favor of the State of Nebraska, in the amount of no less than $27,871,170 for the purpose of complying with 10 CFR 40, Appendix A, Criterion 9, until a replacement is authorized by both the State of Nebraska and NRC.

REFERENCES

Crow Butte Resources, Inc., Revised 2009 Surety Estimate, February 25, 2009 [ADAMS Accession No. ML090750920]

Crow Butte Resources, Inc., 2009 Surety Estimate, September 29, 2008 [ADAMS Accession No. ML082970545]

U.S. Nuclear Regulatory Commission, Request for additional Information, 2009 Surety Estimate, February 12, 2009 [ADAMS Accession No. ML090420216]

U.S. Nuclear Regulatory Commission, Surety Acceptance Review, e-mail dated December 31, 2008 [ADAMS Accession No. ML083660010]