EMD Uranium (Nuclear Minerals) Committee

EMD Uranium (Nuclear & REO Minerals) Annual Committee Report

Michael D. Campbell, P.G., P.H., Chair

April 5, 2012

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COMMITTEE ACTIVITIES

During the past 6 months, the Uranium Committee continued to monitor the expansion of the nuclear power industry and associated uranium exploration and development in the U.S. and overseas. New power-plant construction continues and the country is returning to full confidence in nuclear power as the Fukushima incident is placed in perspective. India, Africa and South America continue to be serious exploration targets with numerous projects offering considerable merit in terms of size, grade, and mineability.

Regarding publications, the bi-annual update for the ***Journal Natural Resources Research*** under the leadership of Peter Warrick was published during the period (see (PDF). A link will also be posted at the bottom-right column of the EMD Home page (http://emd.aapg.org/index.cfm).

The ***AAPG Memoir 101: The History and Path Forward of the Human Species into the Future: Energy Minerals in the Solar System, with the Uranium Committee's contribution*** *as* Chapter 9: *Nuclear Power and Associated Environmental Issues in the Transition of Exploration and Mining on Earth to the Development of Off-World Natural Resources in the 21st Century*.

This Memoir is now in press and will likely be released during the second quarter of 2012 (June or July). The EMD Annual Report, published in the December issue of the AAPG Bulletin announced the anticipated release dates for this and other EMD publications (p.2128) (more).

This 2012 Annual Report of the Uranium Committee provides information on the current status of the uranium industry published by the EIA and for the uranium corporate activities via Robert Odell's report on industry activity based on excerpts from his *Rocky Mountain Scout*, a popular source of information on the uranium industry activities in the U.S. and Canada. Thorium activities are also summarized. Finally, the Committee continues to report on rare-earth activities.

STATUS OF U.S. URANIUM INDUSTRY

U.S. Uranium Production as of: 4th Quarter 2011
(the most recent information available from EIA.

Summary

http://www.eia.gov/uranium/production/quarterly/
The next EIA Report is due May, 2012.

4TH QUARTER 2011 PRODUCTION

U.S. production of uranium in the fourth quarter 2011 was 892,058 pounds U_3O_8, up 5 percent from the previous quarter and down 22 percent from the fourth quarter 2010.

During the fourth quarter 2011, U.S. uranium was produced at six U.S. uranium facilities.

U.S. Uranium Mill in Production

1. White Mesa Mill

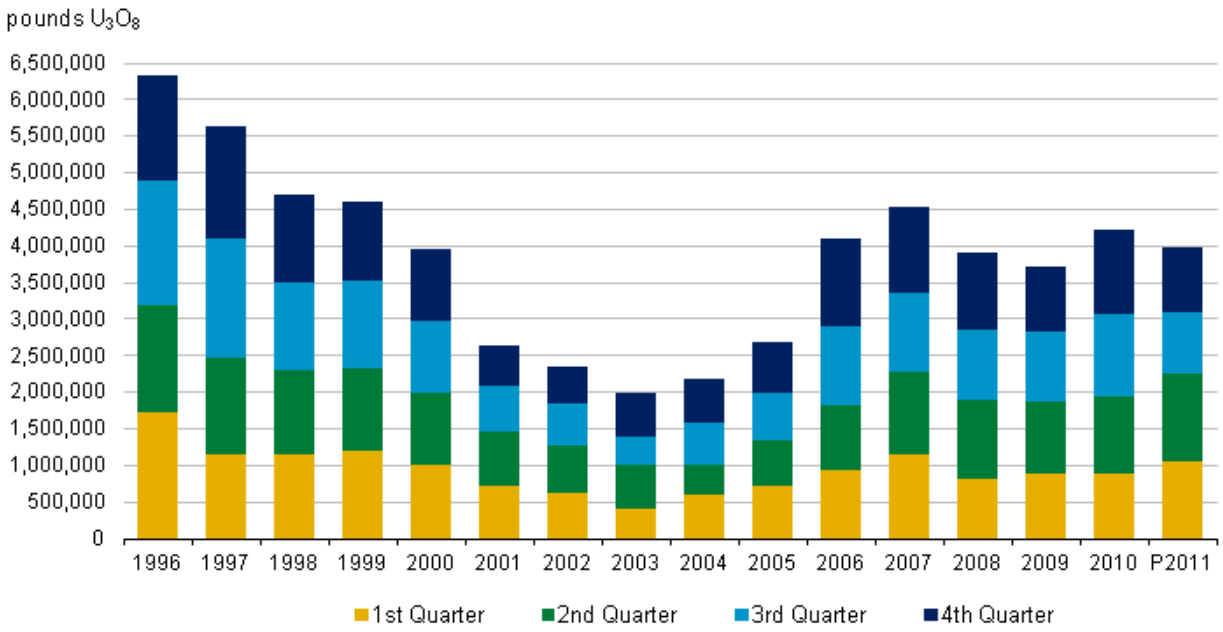
U.S. Uranium In-Situ-Leach Plants in Production

1. Alta Mesa Project
2. Crow Butte Operation
3. Hobson ISR Plant / La Palangana
4. Smith Ranch-Highland Operation
5. Willow Creek Project (Christensen Ranch and Irigaray)

Preliminary 2011 total

U.S. uranium concentrate production totaled 3,990,812 pounds U_3O_8 in 2011. This amount is 6 percent lower than the 4,228,192 pounds produced in 2010. See Figure 1.

Figure 1. Uranium concentrate production in the United States, 1996 - 4th Quarter 2011



URANIUM SALES AND PRICES

Owners and operators of U.S. civilian nuclear power reactors ("civilian owner/operators" or "COOs") purchased a total of 47 million pounds U_3O_8e (equivalent)[1] of deliveries from U.S. suppliers and foreign suppliers during 2010, at a weighted-average price of $49.29 per pound U_3O_8e. The 2010 total of 47 million pounds U_3O_8e decreased 7 percent compared with the 2009 total of 50 million pounds U_3O_8e.

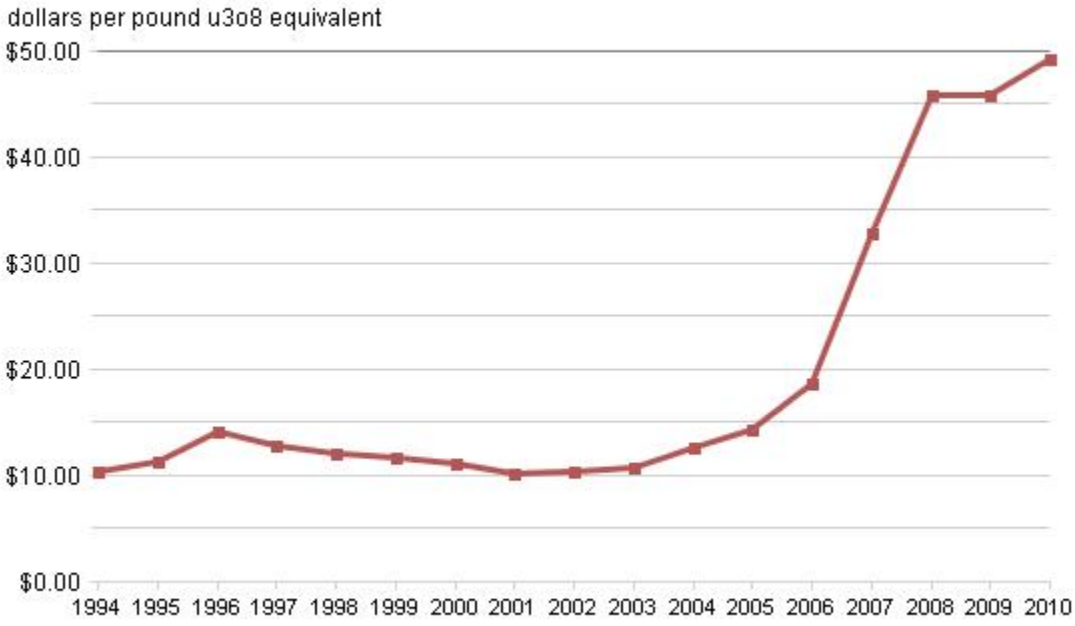
Eight percent of the U_3O_8e delivered in 2010 was U.S.-origin uranium at a weighted-average price of $45.25 per pound. Foreign-origin uranium accounted for the remaining 92 percent of deliveries at a weighted-average price of $49.64 per pound.

Australian-origin and Canadian-origin uranium together accounted for 37 percent of the 47 million pounds. Uranium originating in Kazakhstan, Russia and Uzbekistan accounted for 41 percent and the remaining 14 percent originated from Brazil, Czech Republic, Germany, Hungary, Malawi, Namibia, Niger, South Africa, and Ukraine. Owners and operators of U.S. civilian nuclear power reactors purchased uranium for 2010 deliveries from 23 sellers, down from the 29 sellers in 2009.

COOs purchased uranium of several material types. Uranium concentrate was 63 percent of the deliveries in 2010; natural hexafluoride (UF_6) and enriched uranium were 37 percent. During 2010, 18 percent of the uranium was purchased under spot contracts at a weighted-average price of $43.99 per pound. The remaining 82 percent was purchased under long-term contracts at a weighted-average price of $50.43 per pound. See Figure S2.

[1] Uranium quantities are expressed in the unit of measure U_3O_8e (equivalent). U_3O_8e is uranium oxide (or uranium concentrate) and the equivalent uranium-component of hexafluoride (UF_6) and enriched uranium.

Figure S2. Weighted-average price of uranium purchased by owners and operators of U.S. civilian nuclear power reactors, 1994-2010 deliveries



Sources: U.S. Energy Information Administration: 1994-2002-Uranium Industry Annual reports. 2003-2010-Form EIA-858, "Uranium Marketing Annual Survey".

Spot contracts are contracts with a one-time uranium delivery (usually) for the entire contract and the delivery is to occur within one year of contract execution (signed date). Long-term contracts are contracts with one or more uranium deliveries to occur after a year following the contract execution (signed date) and as such may reflect some agreements of short and medium terms as well as longer term.

THE EIA URANIUM MARKETING REPORT

The uranium marketing report is based on the EIA report of 2011:

http://www.eia.gov/uranium/marketing/

New and Future Uranium Contracts

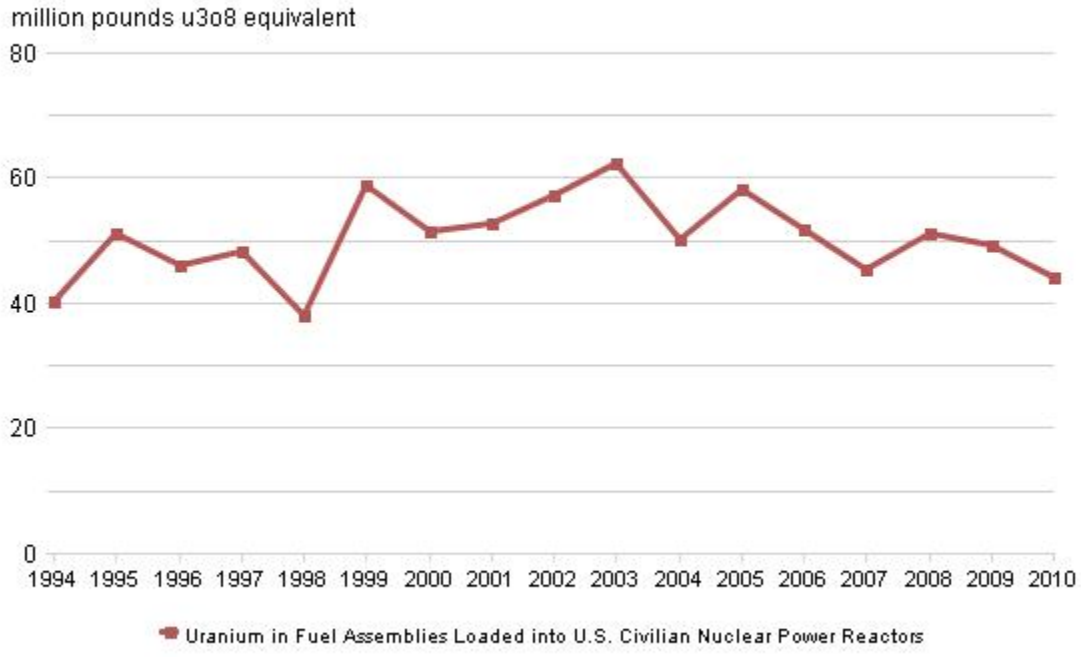
As a summary, in 2010, COOs signed 35 purchase contracts with deliveries in 2010. Thirty-one were new spot contracts with deliveries of 6 million pounds U_3O_8e in 2010 at a weighted-average price of $43.17 per pound. Four were new long-term contracts with deliveries of less than one million pounds U_3O_8e in 2010 at a weighted-average price of $43.69 per pound.

As of the end of 2010, the maximum uranium deliveries for 2011 through 2020 under existing purchase contracts for COOs totaled 258 million pounds U_3O_8e. Also as of the end of 2010, unfilled uranium market requirements for 2011 through 2020 totaled 255 million pounds U_3O_8e. These contracted deliveries and unfilled market requirements combined represent the maximum anticipated market requirements of 513 million pounds U_3O_8e over the ten-year period for COOs.

Uranium Feed, Enrichment Services, Uranium Loaded

In 2010, COOs delivered 45 million pounds U_3O_8e of natural uranium feed to U.S. and foreign enrichers. Fifty-seven percent of the feed was delivered to U.S. enrichment suppliers and the remaining 43 percent was delivered to foreign enrichment suppliers. Fourteen million separate work units (SWU) were purchased under enrichment services contracts from 7 sellers in 2010. The average price paid by the COOs for the 14 million SWU was $136.14 per SWU, a 4-percent increase compared with the 2009 average price of $130.78 per SWU. See Figure S3.

Figure S3. Uranium loaded into U.S. civilian nuclear power reactors, 1994-2010



Sources: U.S. Energy Information Administration: 1994-2002-Uranium Industry Annual reports. 2003-2010-Form EIA-858, "Uranium Marketing Annual Survey".

In 2010, the U.S.-origin SWU share was 16 percent and foreign-origin SWU accounted for the remaining 84 percent. Russian-origin SWU was 37 percent of the total. Germany, Netherlands, and the United Kingdom had an aggregate share of 37 percent.

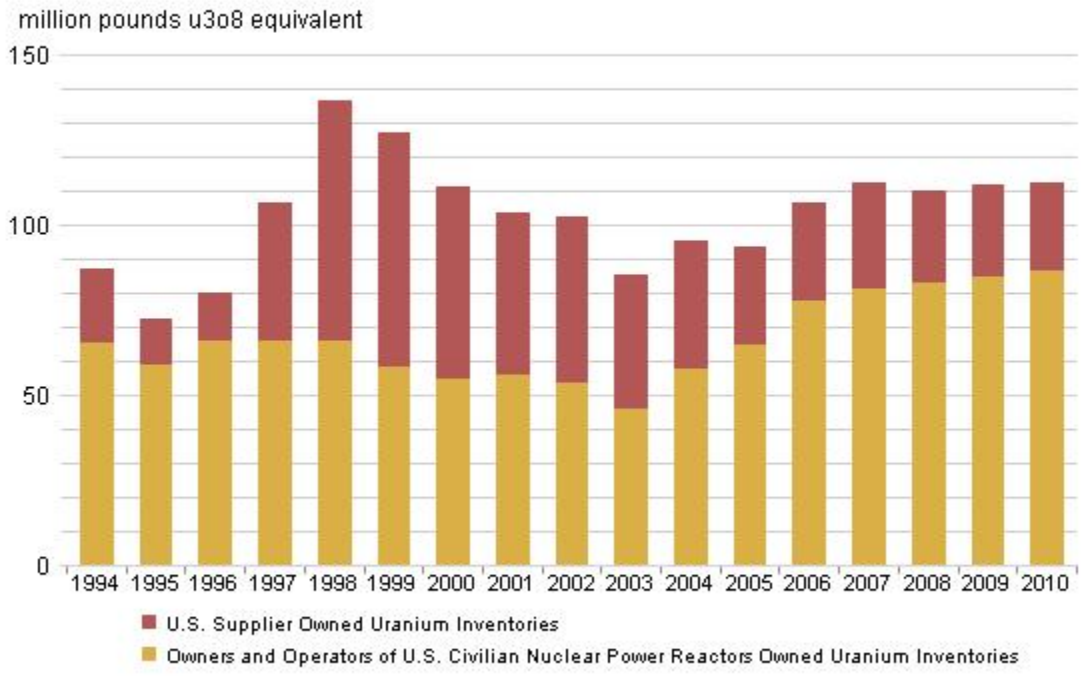
Uranium in fuel assemblies loaded into U.S. civilian nuclear power reactors during 2010 contained 44 million pounds U_3O_8e, compared with 49 million pounds U_3O_8e loaded during

2009. Nine percent of the uranium loaded during 2010 was U.S.-origin uranium, and 91 percent was foreign-origin uranium.

Uranium Foreign Purchases/Sales and Inventories

U.S. suppliers (brokers, converters, enrichers, fabricators, producers, and traders) and COOs purchase uranium each year from foreign suppliers. Foreign purchases totaled 55 million pounds U_3O_8e in 2010, and the weighted-average price was $47.01 per pound U_3O_8e. Also, U.S. suppliers and COOs sold uranium to foreign suppliers. Foreign sales totaled 23 million pounds U_3O_8e in 2010, and the weighted-average price was $42.78 per pound U_3O_8e. See Figure S6.

Figure S6. Total commercial uranium inventories of u.s. suppliers and owners and operators of U.S. civilian nuclear power reactors, 1994-2010



Sources: Energy Information Administration: 1994-2002-Uranium Industry Annual reports. 2003-2010-Form EIA-858, "Uranium Marketing Annual Survey" .

Year-end commercial uranium inventories represent ownership of uranium in different stages of the nuclear fuel cycle (in-process for conversion, enrichment, or fabrication) at domestic or foreign nuclear fuel facilities. Total U.S. commercial inventories (including inventories owned by COOs, U.S. brokers, converter, enrichers, fabricators, producers, and traders) was 112.3 million pounds U_3O_8e as of the end of 2010. Commercial uranium inventories owned at the end of 2010 by COOs totaled 86.5 million pounds U_3O_8e, an increase of 2 percent from year-end 2009. Uranium inventories owned by U.S. brokers and traders were 12.1 million pounds U_3O_8e. U.S. converter, enrichers, fabricators and producers owned 13.6 million pounds U_3O_8e of inventories at the end of 2010.

World uranium production and demand estimates are available via Trade Tech (Ref).

According to Brown (2012), Canadian Prime Minister Stephen Harper negotiated a new agreement that will allowed uranium mining companies to increase their uranium exports to China as part of a number of joint initiatives aimed at renewing existing bilateral trade in energy, resources, agriculture, technology, and education (see Ref).

Although specifics of the new uranium trade agreement were not formally announced, a statement from Harper's office said, "The Protocol is a legally binding instrument that will govern and facilitate the export of Canadian uranium to China, supporting China's energy needs and Canada's long-term economic interests. As the Protocol is in full accordance with Canada's longstanding nuclear non-proliferation policies and obligations, it will ensure that Canadian supplied uranium is being used in China's nuclear program strictly for peaceful, civilian purposes."

Strengthening Commerce

The new deal will supplement a previous nuclear cooperation agreement between the Chinese and Canadian governments, which has existed since 1994. The final text is expected to be completed by the two countries' representatives over the next few months, and will be followed by a timely adoption phase.

Implications for Canadian Uranium Producers and Exploration Companies

A statement from the Government of Saskatchewan welcomes the development: "the Athabasca Basin contains the world's largest, high-grade uranium deposits. Uranium production in Saskatchewan is expected to nearly double by 2017."

Although Canadian uranium producer Cameco (TSX:CCO,NYSE:CCJ) signed long-term uranium supply deals with China in the past, pre-existing trade restrictions have meant that it had to source uranium from non-Canadian operations. The company has major uranium projects in Canada, Australia, Kazakhstan, and the US. Cameco president and CEO Tim Gitzel offered his positive response stating, "once ratified this will help us build our position as a key uranium supplier to China and grow employment and investment in Canada's uranium mining industry. We commend the governments of both countries for getting this done." From its most recent quarterly results, Cameco indicated that it is on track with a strategy to increase annual production to 40 million pounds a year by 2018. This increase is expected to come from operating properties, development projects, and projects under evaluation.

Joe Oliver, Canadian Natural Resources Minister, was also involved in the discussion, explaining that "we did enter into an arrangement with China to be able to export raw uranium to that country, and that is a significant development for Saskatchewan and really for the whole country because it could result in some $3 billion in export sales for Cameco, and other companies as well."

The news will energize the Canadian junior uranium exploration sector, as the new market should mean additional interest in stocks. Junior exploration companies could benefit from immediate capital investments and the potential to stimulate more appetite for merger and acquisition activity.

Vice-Chair Reports:

I. Uranium-Related Industry Activity

By Robert Odell, P.G. (Vice-Chair: Industry), Consultant, Casper, Wy.

Excerpts from *The Rocky Mountain Scout* – Vol. 2012, No. 02
The full February report (Here)

This Month in the News

On January 2nd - the *Steel Guru* reported **Peninsula Energy** has completed a feasibility study of its Lance and Ross uranium projects in Wyoming. The results should make it possible for Peninsula to gain project funding and become a uranium producer in 201(see: Ref).

January 3rd - *Mining Review.com* reported **Gold One International's** offer of ($250million US) for 100% of **Rand Minerals** has been approved by the South Africa Department of Mineral Resources (see: Ref)

January 3rd - Rueters Africa reported **Cameco** has constructed a second shaft at its Cigar Lake Project in the Athabasca Basin. The shaft will provide added ventilation as well as a second access to it's main mine workings (see Ref).

January 12th - Senators John McCain (R-AZ), Orrin Hatch(R-UT), John Barraso (R-WY), Mike Lee(R- UT) also Congressmen Rob Bishop (UT-01), Jeff Flake(AZ-06), David Schweiker (AZ-05) and Ben Quayle (AZ-03) issued a statement denouncing the Obama Administrations decision to ban uranium mining in Northern Arizona. In the statement Senator John McCain states "It is deeply unfortunate that certain environmental groups have chosen to break faith with a 30 year-old compromise with environmentalist that successfully balanced conservation with mining and other commercial activities." (see Ref).

A *Marketwire* press release Jan 12th reports **Formations Metals Inc.** has been advised by the Virgin River Uranium Project operator, Cameco Corp. that budgets for the 2012 drill program have been approved after the completion of a successful 2011 program (see Ref)..

January 12th *Market Watch* reported **Crosshair** announces its initial uranium resource at Juniper Ridge. The results of the initial independent national instrument (NI) 43-101 include a total indicated resource of 5.2 million pounds of uranium oxide, using a grade thickness (GT) cut-off of 0.1%-ft.(see Ref)

January 14th the *Denverpost.com* reported **Cotter Corp** adds $6.8 million to an already existing $20.8 mil- lion surety fund in an agreement to settle a long running dispute over the fund. A statement from the Colorado Department of Public Health and Environment takes a positive light on Cotters attempt to speed-up reclamation efforts (see Ref).

The Dayton Daily News reported January 14th that US Energy Secretary Steven Chu has offered to assume responsibility for tailings. This would free up $44 million (US) **USEC** (the company) has in escrow to further fund the Piketon enrichment plant in Ohio (see Ref).

January 16th - *ESO Uranium* announced the start of their winter drill program at Patterson Lake South JV, Saskatchewan. The 50% joint venture with Fission Energy will include sonic and/or RC drilling, Core drilling, and Airborne and ground geophysics (see Ref).

In a production-well update on January 18th, **Uranerz** (the company) reports good uranium grades in holes drilled for well-field installation. Highlights from the 34 cased wells and 2 associated monitor wells include

8ft 0.931% (GT) 7.45 and 14.0ft 0.432% (GT) 6.05.

Kurtis Brown Sr. Vice President, Geology and Development states "Although we were aware of the grade of mineralization in Production Area 1 from our previous exploration and delineation drilling, we are very pleased to find the level and extent exceeds our original expectation." This press release is another in a string of positive news from **Uranerz**. The company has a no non-sense approach that is bringing results to the table and building an example of how a Wyoming company gets the cake in the can.

January 31st, 2012 **UEC** announced the completion of a second uranium sale which will be reflected in their upcoming second quarter fiscal report. 60,000 pounds of U_3O_8 were sold with gross proceeds equaling $3.12 million. This brings the companies total sales for the fiscal 2012 year to 120,000lbs U_3O_8.

In a press release on January 16th, **Delta Uranium Inc.** states Mr. John V. Torkasky has been appointed to the board of directors, replacing resigning company director Mr. Stewart Wright.

U_3O_8 Corp. a Canadian based company, confirms on January 18th significant NI 43-101 compliant uranium and vanadium resources on the Berlin Project, Columbia. The resource was prepared by Coffey Mining and is based on 16,685 ("m") drilled.

UR-Energy Inc. was reported by Reuters on January 23rd to have entered into an agreement with a North American based utility company. In the agreement UR-Energy will supply 200,000 lbs. of uranium concentrate a year in this multi-year deal. Delivery is set to begin in 2013. See:

http://af.reuters.com/article/commoditiesNews/idAFL4E8CN6QI20120123

Mesa Exploration Corp. announced January 25th that a rotary drill program will commence in two weeks at the 100% owned Moonshine Springs Uranium Project in northwestern Arizona. See:

Upcoming Events

April 17th	World Nuclear Fuel cycle NEI/WNA Helsinki, Finland http://www.nei.org/newsandevents/
April 23-25	Nuclear New Build Summit 2012

Vienna, Australia
http://www.nuclearnewbuildsummit.com/

May 17-18 China Nuclear Energy Congress
China decision makers Beijing, China
http://www.cdmc.org.cn/cnec2012/

For more information on upcoming events visit http://www.uranium.info

UNITED STATES ACTIVITY

Arizona

Vane

Reported no rigs drilling in January. Kris Hefton indicates drilling may start in April.

Colorado

Black Range Minerals

Taylor Ranch reported no drilling for January 2012.

Energy Fuels

Dick White reported no drilling in January and Don Pillmore reports mines are currently on standby.

Powertech

Reported no drilling at their Weld County facility during January.

Nebraska

Cameco

Bob Blackstone, of the Casper office, reported two exploration rigs drilling at their Crow Butte facility during January.

New Mexico

Homestake

George Hoffman reports reclamation drilling may re-start in February on the 22 million tons of tailings at the Super Fund Site 5 miles north of the interstate west of Albuquerque.

Neutron Energy

Was unable to be reached for a report in January.

Quaterra Resources

Reported Copper exploration will begin early February in New Mexico.

Uran Ltd.

Armijo project reported no drilling.

Uranium Energy Corp. (UEC)

No drilling to report for the month of January in New Mexico.

South Dakota

Powertech Uranium

No drilling in the month of January.

Texas

Mestena

Sam Talbott reported 10 drills operating in January. No change from December.

SIGNAL EQUITY

Uranium properties in Live Oak County are on stand-by in January according to Bill Armstrong.

Uranium Energy Corp.

Had three production rigs at the Palangana Site and two exploration rigs at the Salvo Site.

Uranium Resources

Mark Poliza reported one exploration drill in January at the Los Finados Site. Drilling may extend into March.

Utah

Denison Mines Corp.

Reported three underground drills in Utah. One each at the Beaver, Daneros, and Pandora Mines.

Energy Fuels

No drilling for the month of January.

Wyoming

AUC

Two exploration rigs working at Reno Creek according to Dan Dowers of the Denver office.

Cameco

No exploration for the Gas Hills while Smith Ranch had 22 production drills in January reported by Tom Nicholson. At the North Butte Project Bob Blackstone reported three development rigs.

Crosshair Energy

No report for January.

Pennisula

Jim Guilinger reported two exploration rigs at the Lance Project in January.

Stakeholder Energy LLC

Reports no drilling for the month of January but is in the process of gearing up for exploration.

Strathmore Minerals

No January drilling according to Dave Scott, but plan to start as soon as weather cooperates in the Gas Hills.

Titan Uranium

All drilling operations are on stand-by pending corporate decisions with Energy Fuels Nuclear.

Uranerz

Reported 5 development rigs running at Nichols Ranch during January.

Ur-Energy

Steve Hatten indicated no drilling in January due to the nesting habits of Sage Grouse. Nesting continues into July.

Uranium One

Dayton Lewis reported 11 development drills at Willow Creek (PRB), on well field installation

CANADIAN ACTIVITY

CAMECO

Reported 10 drills running at eight projects as the season begins in Northern Saskatchewan and the Athabasca basin.

DENISON

Reported 1 drill at it's Wheeler River project in January.

GREAT BEAR RESOURCES

Secretary indicated no drilling for January.

JNR RESOURCES

Don Machasiw, Geologist reported no drilling in January, with a possible start in late February. Winter weather has been too mild in January for Muskeg exploration.

In April 2011, Quantum Rare Earth Developments Corp. commenced the first drill program at its Elk Creek Nebraska Project in over 25 years. During the remainder of the year, the company reached several milestones and an estimated resource of 80.1 million tons of 0.62% NB_{205} containing ~1.1 billion pounds of NB_{205}.

In 2012, their goals include proceeding with drilling to evaluate the deposit towards the indicated and measured categories. Engagement of an outside engineering firm to complete an up-dated resource calculation and further discussions with potential "off-take" or strategic partners to accelerate development of the Elk Creek Project.

The Elk Creek Niobium deposit is the richest discovered niobium deposit in America and contains high-grade rare earth also. Niobium is crucial to the steel industry and is used in wind turbines. Quantum Rare Earth reports in an e-mail to investors that they are trading at 1% of the potential value of the project even though the deposit compares favorably to the Niobec mine owned by IAMGOLD.

Regulatory Issues – January 2012

Courtesy of Oscar Paulson

1. Environmental Protection Agency – 40 CFR Part 61 Subpart W/Impoundments

Radon data collection at the request of the Agency by several licensees was completed on September 30, 2009.

The EPA, in spite of industry input to the contrary, continues to state that fluid retention ponds at in-situ uranium recovery facilities will fall under 40 CFR Part 61 Subpart W. This statement was made again by Reid Rosnick of the EPA at a public meeting on September 15, 2010 in Tuba City, Arizona. He also stated at this meeting that he expected a draft rule to be released at the end of 2011.

At a meeting with representatives of the uranium recovery industry on October 29, 2009 in Washington, D.C. he stated that 40 CFR Part 61 Subpart W as it is written, gives the EPA jurisdiction over fluid retention ponds containing 11(e).2 byproduct material fluids. He reiterated that the Agency must review and approve any plans for construction new tailings impoundments, fluid retention ponds and heap leach pads prior to commencement of work. In this latest discussion, heap leach pads were included in addition to fluid retention ponds. He also stated that fluid retention ponds would count against the two (2) operating forty (40) acre impoundment limit in 40 CFR Part 61 Subpart W.

Additional information may be found at:

http://www.epa.gov/radiation/neshaps/subpartw/rulemaking-activity.html

The uranium recovery industry as represented by the National Mining Association (NMA) is planning to prepare a technical paper for publication in a peer reviewed journal regarding radon fluxes from fluid retention impoundments.

The Sheep Mountain Alliance (SMA) and Colorado Citizens Against Toxic Waste (CCAT) recently (April 18, 2011) sub- mitted comments to the Environmental Protection Agency (EPA) on 40 CFR Part 61 Subpart W and its application to the proposed Pinon Ridge Mill.

The last conference call was held on Thursday, January 5, 2012. Reid Rosnick discussed current work stating that the work group process is ending and that the proposed rule and preamble language is being prepared. He stated that on Tuesday, January 10, 2012 a request to perform a Final Agency Review (FAR) will be submitted. The package will be prepared as a proposed rule and sent to the Office of Policy. It will then go to the Office of Management and Budget (OMB) for a ninety (90) day review. It will then be ready for publication in the Federal Register. It will be published in either April or May 2012. Katie Sweeney of the National Mining Association (NMA) asked about the length of the comment period on the proposed rule, to which Reid Rosnick replied that the comment period length is generally sixty (60) days. Katie Sweeney requested a ninety (90) day comment period.

The next conference call is scheduled for Thursday April 5, 2012 at 11:00 a.m. Eastern Time. The call in number is 1-866-299-3188. You will be prompted for a conference code, which will be 2023439563. After entering the conference code press the # key and you will then be placed into the conference call.

On Thursday, November 10, 2011, the Environmental Protection Agency (EPA) released the awaited S. Cohen and Associates report entitled *Risk Assessment Revision for 40 CFR Part 61 Subpart W –Radon Emissions from Operating Mill Tailings.* This document may be downloaded at:

http://www.epa.gov/radiation/docs/neshaps/subpart-w/historical-rulemakings/subpart-w-risk.pdf

This document has several flaws including the fact that the population numbers were derived using 2000 census data, a 2009 estimate and a program called SECPOP. No actual population surveys around uranium recovery sites were per- formed. In addition, CAP88 was used instead of MILDOS to calculate radon doses. CAP88 has problems addressing doses from Radon-222 decay products.

2. Updates to Uranium Recovery Guidance by the Nuclear Regulatory Commission (NRC)

The following is the schedule for updating uranium recovery guidance presented by Stephen J. Cohen and Dominick A. Orlando of the Nuclear Regulatory Commission (NRC) in a presentation entitled:

- *Guidance Update and Licensing Logistics* presented at the uranium recovery workshop on Thursday, May 26, 2011 in Denver, Colorado:

- *In-situ uranium recovery rulemaking (Deferral of Active Regulation of Ground-Water Protection at In Situ Leach Uranium Extraction Facilities)* – delayed until the Environmental Protection Agency (EPA) completes the 40 CFR 192 rule- making

- *Regulatory Guide 8.30 - Health Physics Surveys in Uranium Recovery Facilities* – delayed

- *NUREG-6733 - A Baseline Risk-Informed Performance-Based Approach for In Situ Leach Uranium Extraction Licensees* - delayed

- *NUREG-1569 – Standard Review Plan for In Situ Leach Uranium Extraction License Applications* - delayed

- *Regulatory Guide 4.14 – Radiological Effluent and Environmental Monitoring at Uranium Mills* - work beginning

- *Regulatory Guide 3.51 – Calculational Models for Estimating Radiation Doses to Man from Airborne Radioactive Materials Resulting from Uranium Milling Operations* - Complete in Fiscal Year 2012

- *Regulatory Guide 3.59 – Methods for Estimating Radioactive and Toxic Airborne Source Terms for Uranium Milling Op- erations* - Complete in Fiscal Year 2012

It has been decided not to revise *Regulatory Guide 3.63 - Onsite Meteorological Measurement Program for Uranium Recovery Facilities -- Data Acquisition and Reporting.*

In a Federal Register notice (Federal Register /Volume 76, Number 185 / Friday, September 23, 2011 (Notices pages 59173 to 59174) the Nuclear Regulatory Commission (NRC) withdrew *Draft Regulatory Guide (DG)-3024 Standard Format and Content of License Applications for Conventional Uranium Mills stating, "…has decided not to revise RG 3.5 at this time. For this reason, DG–3024 will be withdrawn.*"

3. Response to Comments on Regulatory Issues Summary *(RIS)* ***2009-05 URANIUM RECOVERY POLICY RE-GARDING:***

1) THE PROCESS FOR SCHEDULING LICENSING REVIEWS OF APPLICATIONS FOR NEW URA- NIUM RECOVERY FACILITIES AND

2) THE RESTORATION OF GROUNDWATER AT LICENSED URANIUM IN SITU RECOVERY FACILITIES

The NMA and the WMA submitted comments on this document to the Commission on or about June 2009. No response from the Commission has been received. A NMA conference call to discuss this issue was held on Thursday, December 3, 2009. The WMA has sent a reminder letter to Commission staff regarding these comments.

The regulation (10 CFR Part 40 Appendix A Criterion 5B) referenced in this document may ultimately be revised if the underlying Environmental Protection Agency (EPA) regulation (40 CFR part 192) is revised. 40 CFR part 192 is currently under review by the Agency and potentially may be revised.

This Regulatory Issues Summary (RIS) is impacting the use of the Standard Review Plan for In Situ Leach Uranium Extraction License Applications. NRC Staff has stated that, despite any indications otherwise, applicants should follow NUREG-1569 Standard Review Plan for In Situ Leach Uranium Extraction License Applications exactly as published, presumably with the exception of guidance regarding 10 CFR Part 40, Appendix A, Criterion 5(B)(5) incorporated in the Regulatory Issues Summary (RIS). At the May 25 to 26, 2011 Uranium Recovery Workshop in Denver, Colorado, it was stated that any proposed revisions to 10 CFR Part 40 Appendix A Criterion 5B will not be released until after the Environ- mental Protection Agency (EPA) has completed its review of 40 CFR Part 192. In addition, any revisions to *NUREG-1569 – Standard Review Plan for In Situ Leach Uranium Extraction License Applications* will be delayed until completion of the review of 40 CFR Part 192 as well.

4. Preparation of NUREG document entitled "*Standard Review Plan for Conventional Mill and Heap Leach Uranium Extraction License Applications*."

The NRC has decided to revise some existing Regulatory Guides and NUREGS as well as write new ones. The Com- mission has contracted with the Southwest Research Institute to prepare a NUREG entitled *Standard Review Plan for Conventional Mill and Heap Leach Uranium Extraction License Applications*. They are seeking input and data from industry. Two of the four current conventional uranium mill licensees are Association members. A conference call on this issue hosted by the NMA involving all of the four conventional mill licensees as well as two (2) companies planning conventional mills was held on Friday, March 26, 2010.

If you have questions, please contact:

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The draft table of contents for this document is as follows:

- *Proposed Activities*
- *Site Characterization*
- *Description and Design of Proposed Facility (including liner design)*
- *Management*
- *Monitoring*
- *Reclamation*
- *Accidents*

An internal draft is scheduled for completion by September 30, 2011. It is unclear how the withdrawal of *Draft Regulatory Guide (DG)-3024 Standard Format and Content of License Applications for Conventional Uranium Mills will impact this work.*

5. Discharge of Pump Test Water from Pump Testing Related to Proposed or Operating Uranium Recovery Operations

The Wyoming Mining association (WMA) submitted a letter to the Department of Environmental Quality (DEQ) Water Quality Division (WQD) regarding discharge of pump test water exceeding 60 pCi/L radium on the ground surface. Currently such water cannot be discharged but must be either treated and released, evaporated in holding ponds or hauled to a deep disposal well. The Association is arguing that it would be best, due to the low risks involved with such water, to allow it to be discharged on to the ground surface. Members of the uranium recovery industry discussed this issue with Nancy Nuttbrock the new Land Quality Division (LQD) Administrator on Wednesday, October 12, 2011.

A meeting between members of industry and Department staff was held on Monday, December 19, 2011 to discuss this and other issues. At this meeting, a series of issues which included this one were identified for discussion at one of twelve (12) planned monthly meetings during 2012 between industry representatives and Land Quality Division (LQD) staff.

6. Linear No Threshold Hypothesis

Below please find a link to a news release entitled *New Take on Impacts of Low Dose Radiation:*

See: http://newscenter.lbl.gov/news-releases/2011/12/20/low-dose-radiation/

This news release discusses a study completed at the Lawrence Berkeley National Laboratory that has "*...found evidence to suggest that for low dose levels of ionizing radiation, cancer risks may not be directly proportional to dose. This contradicts the standard model for predicting biological damage from ionizing radiation – the linear-no-threshold hypothesis or LNT – which holds that risk is directly proportional to dose at all levels of irradiation*."

The release continues by stating:

"Our data show that at lower doses of ionizing radiation, DNA repair mechanisms work much better than at higher doses," says Mina Bissell, a world-renowned breast cancer researcher with Berkeley Lab's Life Sciences Division. "This non-linear DNA damage response casts doubt on the general assumption that any amount of ionizing radiation is harmful and additive."

Special thanks to Mike Neumann of Neutron Energy and Richard Blubaugh of PowerTech Uranium for alerting RMS to this press release.

7. Legacy Boreholes/Borehole Plugging

The State of Wyoming is delving deeper into the issue of legacy bore holes (old exploration holes drilled in the 1960s and 1970s) in areas now being permitted for in-situ uranium recovery. One critical issue is the interpretation of WS 35-11-404 which states:

35-11-404. Drill holes to be capped, sealed or plugged.

(a) All drill holes sunk in the exploration for locatable or leasable minerals on all lands within the state of Wyoming shall be capped, sealed or plugged in the manner described hereinafter by or on behalf of the discoverer, locator or owner who drilled the hole. Prospecting and exploration drill holes shall include all drill holes except those drilled in con- junction with the expansion of an existing mine operation or wells or holes regulated pursuant to W.S. 30-5-101 through 30-5-204.

And also states:

(iii) "Surface Cap". Each drill hole is to be completely filled to the collar of the hole or securely capped at a minimum depth of two (2) feet below either the original land surface or the collar of the hole, whichever is at the lower elevation. If capped, the cap is to be made of concrete or other material satisfactory for such capping. The hole shall be backfilled above the cap to the original land surface;

The Department is raising issues regarding fall back of plugging material into legacy boreholes as well as potential hydrologic impacts of legacy bore holes on in-situ recovery well-fields, specifically the impacts to water-bearing sands above and below the resource-bearing sands.

On Monday, October 17, 2011, the Land Quality Division (LQD) posted proposed revisions to Chapters 8, 9 and 10 of the Non-coal Rules and Regulations. These proposed revisions address, among other items, plugging of bore- holes. The proposed revisions to Chapter 8 have now been withdrawn. A meeting between members of industry and Department staff was held on Monday, December 19, 2011 to discuss this and other issues. At this meeting, a series of issues which included this one were identified for discussion at one of twelve (12) planned monthly meetings during 2012 between industry representatives and Land Quality Division (LQD) staff. This issue was discussed in further detail in a meeting on between Department of Environmental Quality (DEQ) staff and uranium recovery industry representatives in Casper, Wyoming on Wednesday, January 18, 2012.

This order is a severe blow to the uranium recovery in Arizona. The order and associated documents may be found at the following links:

http://www.blm.gov/pgdata/etc/medialib/blm/az/pdfs/withdraw/feis.Par.24671.File.dat/NAZ_WLDL_PLO_1_5_2012.pdf - Order

8. Withdrawal of Public and National Forest System Lands in the Grand Canyon Watershed; Arizona

On January 9, 2012, Secretary Ken Salazar, Secretary of the Interior signed *Public Land Order No. 7787; Withdrawal of Public and National Forest System Lands in the Grand Canyon Watershed; Arizona***.** This order withdrew approximately 1,006,545 acres of public and National Forest System lands from location and entry under the Mining Law of 1872. These lands are home to breccia pipes that can contains uranium, however the order effects all minerals not just uranium.

http://www.blm.gov/pgdata/etc/medialib/blm/az/pdfs/withdraw/feis.Par.88586.File.dat/NorthernArizona-ROD-v20-1%2011%202012_wsignederrata.pdf – Record of Decision

9. Format and Content of Source Material License Applications for Conventional Uranium Mills - Use of Draft Regulatory Guide DG 3024 - Standard Format and Content of License Applications for Conventional Uranium Mills

Regarding the draft regulatory guide, Stephen Cohen of the Nuclear Regulatory Commission (NRC) stated in an e-mail to Steve Brown of SENES, "*Stakeholders who have used the information in DG-3024 may continue to use it...." There- fore, if an*

applicant has been using DG 3024, its use is still allowed as the information in this draft guide is still valid."

A special thanks to Steve Brown of SENES for providing this information.

10. State of Wyoming Uranium Leasing Form

The Office of State Lands and Investments is revising the State's Uranium Lease Form and proposing new leasing rates. The Wyoming Mining Association (WMA) provided a response in the form of a proposed draft lease agreement by the end of July 2011. A meeting of the Board of Land commissioners (BLC) was held on Thursday, February 2, 2012 to dis- cuss the new lease form. Language was added to the form allowing royalty rates to be changed during the term of the lease. The language states:

> "*…however, shall otherwise pay its royalties based on the following rates (s) unless a different rate is specifically authorized by Lessor after appropriate action by the Board of Land Commissioners during the existing term of this lease."*

The "*most favored nation clause*" opposed by industry was removed from the lease form. The new form is expected to be finalized soon.

11. Environmental Protection Agency Review and Potential Revision of Health and Environmental Standards for Uranium and Thorium Milling Facilities

The EPA will be reviewing and potentially revising its regulations for uranium and thorium milling to bring them up-to- date. For additional information, see:

http://www.epa.gov/radiation/docs/tenorm/40cfr192-063009-announcement.pdf

The Agency has established a discussion blog regarding the revision of 40 CFR Part 192. It may be found at: http://blog.epa.gov/milltailingblog/

This regulation covers inactive uranium processing sites and includes control of residual radioactive material and remediation of land and buildings. It addresses the management of byproduct materials including uranium processing and thorium processing wastes. It covers specific areas including byproduct materials and uranium processing. It addresses construction of impoundments and incorporates the double liner requirement in 40 CFR Part 264.92, effluent limitations in 40 CFR Part 440 and radiation protection standards in 40 CFR Part 190. It addresses reclamation including remediation of buildings, supplemental standards, alternate concentration limits (ACLs), radon releases following radon barrier emplacement and soil remediation standards (5/15 rule).

On Tuesday, July 27, 2010, Tony Nesky of the Environmental Protection Agency (EPA) sent an e-mail to various stake-holders requesting input on their blog at:

http://blog.epa.gov/milltailingblog/

If you have questions please contact Tony Nesky at: Nesky.Tony@epamail.epa.gov

In the Federal Register Volume 75, Number 226 dated Wednesday, November 24, 2010, the EPA issued a notice entitled Science Advisory Board Staff Office; Request for Nominations of Experts for Review of EPA's Draft Technical Re- port Pertaining to Uranium and Thorium In-Situ Leach Recovery and Post-Closure Stability Monitoring. This notice requests nominations for technical experts to review and provide advice on the planned draft scientific and technical report on Health and Environmental Protection Standards for Uranium and Thorium Mill Tailings (40 CFR part 192). The dead- line for nominations was December 15, 2010. The NMA submitted a list of nominees on behalf of the uranium recovery industry. Please contact Katie Sweeney of the National Mining Association (NMA) at KSweeney@nma.org if you require a copy of the list.

The draft technical report is available at:

http://www.epa.gov/radiation/docs/tenorm/post-closure-monitoring.pdf

This review will directly impact the Nuclear Regulatory Commission's (NRC's) proposed revision of Appendix A of 10 CFR Part 40. These revisions will be delayed until the review of 40 CFR Part 192 is complete.

A nationwide public teleconference regarding the draft technical report was held at 1 p.m. (Eastern) on Tuesday, July 12, 2011. It was followed by a public meeting in Washington, D.C., on Monday to Tuesday July 18 to 19, 2011. Members of the Science Advisory Board were present on the teleconference and included Dr. Doug Chambers of SENES and Dr. Thomas Johnson of Colorado State University (CSU).

On Tuesday, September 6, 2011, a second public conference call included comments to the effect that post restoration groundwater modeling of restored in-situ uranium recovery well fields should be required to model up to 10,000 years in the future as is done for Yucca Mountain.

A third public teleconference to discuss the draft advisory report related to uranium and thorium in-situ leach recovery and post-closure stability monitoring was held on Wednesday, October 5, 2011, from 1 p.m. to 4 p.m. (Eastern Daylight Time).

A fourth public teleconference to discuss the draft advisory report related to uranium and thorium in-situ leach recovery and post-closure stability monitoring was held on Wednesday, December 21, 2011. Issues regarding the availability of data related to baseline (pre-operational), operational and post operational groundwater quality were discussed. The latest draft of the report *Considerations Related to Post-Closure Monitoring of Uranium In-Situ ISL/ISR Sites* was dis- cussed at this teleconference as well.

The revised draft report entitled *Considerations Related to Post-Closure Monitoring of Uranium In-Situ ISL/ISR Sites* dated Tuesday, November 22, 2011 has been posted on the Environmental Protection Agency's (EPA's) web site and may be found at:

http://yosemite.epa.gov/sab/sabproduct.nsf/c91996cd39a82f648525742400690127/0314cef928df63cc8525775200482fa3!OpenDocument&TableRow=2.2#2.

12. Deferral of Active Regulation of Ground-Water Protection at In Situ Leach Uranium Extraction Facilities/New Regulatory Section for Uranium Recovery

The Nuclear Regulatory Commission (NRC) released a Regulatory Issues Summary (RIS entitled *NRC REGULATORY ISSUE SUMMARY 2009-05 URANIUM RECOVERY POLICY REGARDING: (1) THE PROCESS FOR SCHEDULING LICENSING REVIEWS OF APPLICATIONS FOR NEW URANIUM RECOVERY FACILITIES AND (2) THE RESTORA- TION OF GROUNDWATER AT LICENSED URANIUM IN SITU RECOVERY FACILITIES* dated April 29, 2009. In it they stated, "*As indicated above, the staff is now working with the EPA to resolve groundwater protection issues at ISR facilities and to revise Appendix A of 10 CFR Part 40 accordingly. The NRC expects that a draft of the proposed revisions to Appendix A will be published for public comment in 2010.*"

This Regulatory Issues Summary (RIS) states:

"Accordingly, the requirements in Criterion 5B of Appendix A apply to restoration of groundwater at uranium ISR facilities."

Around May 21, 2010, the Environmental Protection Agency (EPA) announced it was reviewing and may revise 40 CFR Part 192. This regulation contains specific language regarding Alternate Concentration Limits (ACLs) which undoubtedly is being considered for potential revision. Changes to 40 CFR Part 192 would impact 10 CFR Part 40 Appendix A Criterion 5B. The EPA's review and potential revision of 40 CFR Part 192 will further delay work on deferral of active regulation of ground water protection at in-situ leach uranium extraction facilities. The primary focus of the EPA's revision effort of 40 CFR Part 192 would be related to long term stability of groundwater restoration in depleted in-situ uranium recovery well fields and that this issue would be the primary focus of the expert review panel that the Agency is in the process of selecting.

Any proposed revisions will not be released until after the Environmental Protection Agency (EPA) has completed its review of 40 CFR Part 192. This was discussed at the May 25 to 26, 2011 Uranium Recovery Workshop in Denver, Colorado.

STATUS OF THE THORIUM INDUSTRY

Thorium activity

India's Plans for Thorium Cycle

With huge resources of easily-accessible thorium and relatively little uranium, India has made utilization of thorium for large-scale energy production a major goal in its nuclear power program, utilizing a three-stage concept:

- Pressurized heavy water reactors (PHWRs) fuelled by natural uranium, plus light water reactors, producing plutonium.
- Fast breeder reactors (FBRs) using plutonium-based fuel to breed U-233 from thorium. The blanket around the core will have uranium as well as thorium, so that further plutonium (particularly Pu-239) is produced as well as the U-233.
- Advanced heavy water reactors (AHWRs) burn the U-233 and this plutonium with thorium, getting about 75% of their power from the thorium. The used fuel will then be reprocessed to recover fissile materials for recycling.

This Indian program has moved from aiming to be sustained simply with thorium to one 'driven' with the addition of further fissile plutonium from the FBR fleet, to give greater efficiency. In 2009, despite the relaxation of trade restrictions on uranium, India reaffirmed its intention to proceed with developing the thorium cycle.

A 500 MWe prototype FBR under construction in Kalpakkam is designed to produce plutonium to enable AHWRs to breed U-233 from thorium. India is focusing and prioritizing the construction and commissioning of its sodium-cooled fast reactor fleet in which it will breed the required plutonium. This will take another 15-20 years and so it will still be some time before India is using thorium energy to a significant extent.

Developing a Thorium-Based Fuel Cycle

Thorium fuel cycles offer attractive features, including lower levels of waste generation, less transuranic elements in that waste, and providing a diversification option for nuclear fuel supply. Also, the use of thorium in most reactor types leads to significant extra safety margins. Despite these merits, the commercialization of thorium fuels faces some significant hurdles in terms of building an economic case to undertake the necessary development work.

A great deal of testing, analysis and licensing and qualification work is required before any thorium fuel can enter into service. This is expensive and will not eventuate without a clear business case and government support - abundant uranium is available.

Other impediments to the development of thorium fuel cycle are the higher cost of fuel fabrication* and the cost of reprocessing to provide the fissile plutonium driver material.

* The high cost of fuel fabrication is due partly to the high level of radioactivity that builds up in U-233 chemically separated from the irradiated thorium fuel. Separated U-233 is always contaminated with traces of U-232 which decays (with a 69-year half-life) to daughter nuclides such as thallium-208 that

are high-energy gamma emitters. Although this confers proliferation resistance to the fuel cycle by making U-233 hard to handle and easy to detect, it results in increased costs. There are similar problems in recycling thorium itself due to highly radioactive Th-228 (an alpha emitter with two-year half life) present.

Nevertheless, the thorium fuel cycle offers enormous energy security benefits in the long-term due to its potential for being a self-sustaining fuel without the need for fast neutron reactors. It is therefore an important and potentially viable technology that seems able to contribute to building credible, long-term nuclear energy scenarios (see WNA).

A well-known blog of thorium, provides some interesting insight:

http://nucleargreen.blogspot.com/2008/03/advice-to-new-thorium-industry.html

Older Papers on the Use of Thorium:

http://www.iaea.org/inisnkm/nkm/aws/fnss/fulltext/0412_1.pdf

http://www.iaea.org/inisnkm/nkm/aws/fnss/fulltext/0412_5.pdf

http://large.stanford.edu/courses/2012/ph241/bordia1/docs/0412.pdf

II. Uranium-Related University Research Activity

By Steven N. Sibray, P.G., (Vice-Chair: University), University of Nebraska, Lincoln, NE

No report to Date

III. Uranium-Related Government Research Activity

By Robert W. Gregory, P.G., (Vice-Chair: Government), Wyoming State Geological Survey, Laramie, WY

No report to Date

STATUS OF THE RARE EARTH INDUSTRY

REPORT HIGHLIGHTS

- The global market for rare earths increased from 111.5 thousand metric tons of equivalent rare earth oxides (REO) in 2009 to 141.3 thousand metric tons in 2010, and is estimated to reach 158.2 thousand metric tons by the end of 2011. Consequently, the total market for rare earths is forecast to grow at a CAGR of 10.3% through 2016, leading to the

consumption of nearly 258 billion tons of REO in 2016.

- The mechanical/metallurgical sector is estimated to account for 32.1% of total REO consumption in 2011. This sector was 44.8 thousand metric tons in 2010 and is expected to reach 51 thousand metric tons by the end of 2011. BCC expects this market to grow to 77 billion tons by 2016 increasing at a CAGR of 8.6%.

- The energy segment is the fastest growing segment of the global rare earths market. This segment has grown from 23 thousand metric tons in 2010 to 27.3 thousand metric tons in 2011. By 2016 the energy segment will reach 62 thousand metric tons increasing at a CAGR of 17.8%.see (Ref)

Misconceptions in the rare earth industry (Ref)

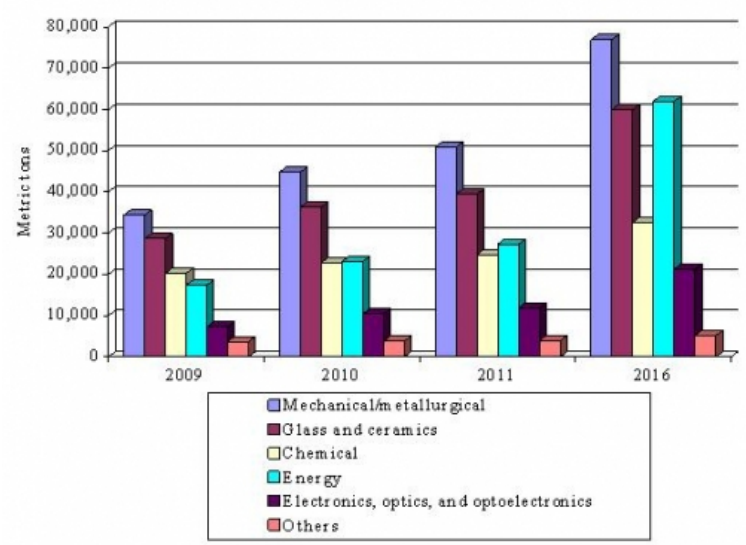
Research in the rare earth industry (Ref)

China has set up a rare earths industry association to fend off trade complaints and help promote development of the sector that is critical to high-tech manufacturing globally.

The Ministry of Industry and Information Technology announced the group's founding Sunday, saying it would coordinate mining, smelting and processing and seek to form a "reasonable price mechanism" for the materials, used in many high-tech applications.

China has about a third of the world's rare earth reserves but supplies about 90 percent of what is consumed.

GLOBAL MARKET FOR RARE EARTHS, 2009–2016
(METRIC TONS — REO EQUIVALENT)



U.S. Taking Steps to Improve Rare Earth Supplies (Ref)

US, EU and Japan Offsetting China's Impact (Ref)

China has imposed limits on its exports, citing a need to impose order on an unruly domestic market and to reduce environmental damage, raising protests from Japan, the U.S. and other countries relying on supplies from China (Ref).

China Tightens Rare Earths Grip with New Development Agency

Acharjee reports (2012) that China has set up a rare earth association to streamline the sector's development, which has come under criticism from Western governments for price hikes linked to tightening supplies (Ref).

Su Bo, an industry minister, said Beijing is looking to further tighten its policies for the sector. "China will continue to clean up the rare earth industry, expand rare earth environmental controls, strengthen environmental checks, and implement stricter rare earth environmental policies," Su Bo told China's state news agency Xinhua.

According to Xinhua, the association will have 155 members, including some of the biggest producers of rare earths, and report to the nation's Ministry of Industry and Technology, which regulates production of rare earth elements. Rare earths elements refer to the lanthanide group of 15 specific elements, plus scandium and yttrium, used for everything from smartphones to guided missiles.

While some rare earths are relatively common, they are dispersed in a way that makes it difficult to find deposits with high enough ore grades to economically exploit. Due to their unique attributes, new applications are constantly being developed for rare earths. Demand for the metals is expected to continue to grow steadily as China, which produces 97 percent of the world's rare earths, has cut exports drastically in recent years. Last month, the US, Japan and the European Union filed a case at the World Trade Organization, challenging China's restrictions on rare earth supply, arguing that Beijing has kept prices low for domestic buyers, while international firms have had to pay more. China has denied these allegations and said it imposed the restrictions to ensure that excessive mining of these elements did not cause environmental damage.

A recent blockbuster deal in the rare earths space might be a sign that consolidation in the field is beginning. In March, rare earth miner Molycorp (NYSE:MCP) agreed to acquire Canada's Neo Material Technologies (TSE:NEM) in a $1.3 billion deal, creating one of the most vertically-integrated rare earth companies in the world. The deal gives Molycorp access to Neo Material's rare earths processing capabilities and patents as well as adds magnetic powders and rare metals such as gallium, indium and rhenium as well as zirconium oxide to its portfolio.

Molycorp's deal has prompted interest - as well as stock price gains - in a number of junior rare earth explorers, some of which have outpaced the underlying market for the year to date. Great Western Minerals (CVE:GWG) is a company which combines upstream resource exploration and extraction at its Steenkampskraal mine in South Africa with downstream metals processing facilities in the US and UK. Great Western is working on completing an NI 43-101 compliant

report for the Steenkampskraal mine to confirm historical data and expand the size of the resource, expected in the first half of 2012.

Main zone historic estimates from the property contained TREO grades of 11.6 percent. In January, the company inked a joint venture deal with China's Ganzhou Qiandong Rare Earth Group for the construction of a rare earth separation plant nearby the South African property. Since the start of the year, Great Western stock is up over 14 percent.

Tasman Metals (CVE:TSM) is seen as a prime target in the rare earths industry as it holds the only NI 43-101 compliant resource situated in mainland Europe - its flagship Norra Karr project in Sweden. Tasman's chief executive Mark Saxon says the property is significantly enriched with dysprosium and yttrium and has the highest grade dysprosium deposit in the world.

Demand for dysprosium is expected to soar over the next decade from both the traditional automotive and emerging electric car and wind turbine industries. Supply of the metal, which is a key contributor to high temperature magnets, has become tight over the past year, with prices increasing more than 600 percent since January 2011.

Tasman shares have moved up 42 percent since the start of the year.

Other players in the Canada-listed rare earths space include Quest Rare Minerals (CVE:QRM)(AMEX:QRM); Rare Element Resources (TSE:RES)(AMEX:REE), which has 100 percent interests in two opportunities on its Bear Lodge Property in Wyoming; and Quantum Rare Earth Developments (CVE:QRE) (OTCQX:QREDF), which is seeking out potentially economic deposits of niobium and rare earth elements in North America and elsewhere.

Frontier Rare Earths (TSE:FRO) is the only Canadian junior miner that has an NI 43-101 compliant study that includes a process all the way through to the separation of rare earths.

It is aiming to become the next major producer of rare earths outside China after Lynas (ASX:LYC) and Molycorp, with its Zandkopsdrift rare earth element project in South Africa.

Frontier is on track to complete a pre-feasibility study by the third quarter of this year, and a definitive feasibility report by next year's third quarter. The company has also inked a strategic partnership with Kores, the Korean government-owned mining and natural resources company, to help accelerate the project's development. Shares in the company are up over 15 percent since the start of the year.

Meanwhile, the Market Vectors Rare Earths/Strategic Metals ETF, which tracks an index of rare earths companies, is up 11 percent for the year to date.

Molycorp lifts Mountain Pass Reserves 27%

As reported by Hill (2012), Molycorp boosted reserves at its Californian Mountain Pass mine by 27% to 1.3-million tons of the metals in their oxide form (see Report)..

CEO Mark Smith said exploration drilling at the project could continue to grow reserves at the mine, which Molycorp is refurbishing and aims to be producing at a rate of 19 050 t/y of rare earths oxides by the end of the third quarter. In a statement, he added that the 5% cutoff grade consulting engineers SRK used to calculate the reserves was higher than the head grades of most other known rare-earth projects around the world. The cutoff grade is the level of mineralisation that is deemed to be economically extractable, while head grades is the concentration of minerals in the ore actually mined and processed.

Colorado-based Molycorp produces elements such as cerium and lanthanum at the Mountain Pass mine, used in refineries as catalysts. The company on March 8 announced a $1.3-billion friendly deal to buy Neo Material Technologies, which processes rare-earth elements to make products including permanent magnets, in locations including China and Thailand. Molycorp last year agreed to buy European rare-earth processor Silmet, and in February announced Chile's Molymet had bought a 13% stake in the U.S. firm for $390-million.

China, which produces over 90% of the world's rare-earth supplies, has been cutting exports and curtailing production of the 17 rare-earth elements used in a wide range of modern technologies from smart phones to wind turbines, driving prices higher. Users seeking to substitute rare earths because of surging prices and a broader retreat in commodities buying in the second half of 2011 pushed prices lower.

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