Observations Regarding Past and Potential Future Mining and Its Impacts At Bokan Mountain, Prince of Wales Island, Alaska: Potential Rare Earth Element Mining and Uranium Mine Remediation

Presented at Organized Village of Kasaan Mining Symposium
May 10, 2012

Paul Robinson, Research Director
Southwest Research and Information Center
PO Box 4524, Albuquerque, New Mexico 87106 USA
sricpaul@earthlink.net

Paul earned his Masters in Community and Regional Planning with an emphasis on Natural Resource Management from University of New Mexico (UNM) in Albuquerque in 1992 and a BA from the Technology Assessment Program at Washington University, St. Louis, MO in 1974. His professional project for this Masters addressed “Planning for Reclamation of the Uranium Waste Sites in the Former East Germany.”

Paul developed and taught Environmental Assessment Methods and Environmental Policy courses at the undergraduate and graduate level at UNM between 1983 and 2000 and developed and taught a course on Sacred Site and Environmental Protection on Native American Lands in the Native American Studies Program at UNM.

Selected current contracts related to remediation of uranium mine and mill sites subject to the USA Superfund (Comprehensive Environmental Responsibility Cleanup Liability Act, CERCLA):

- Technical Assistance for Superfund Communities (TASC) contractor to US EPA assisting Spokane Tribe of Indians and SHAWL Society Pond Road Community Association on the Navajo Nation and other communities affected by the Dawn Mining/Newmont Mining Midnite uranium mine Superfund Site– 2012

- Technical Assistance Grant (TAG) contractor to Bluewater Valley Downstream Alliance affected by the Barrick Gold/Homestake Mining Company uranium mill and mill tailings site Superfund Site. – 2010 – present

- TASC contractor to US EPA assisting Red Water Pond Road Community Association on the Navajo Nation and other communities affected by the General Electric/United Nuclear Northeast Churchrock uranium mine removal action – 2011 – present

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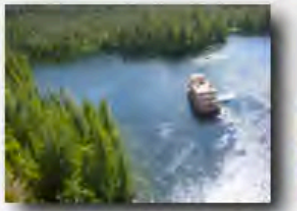
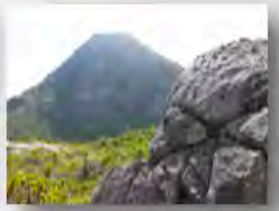
- Technical Outreach to Superfund-affected Native American Communities (TOSNAC) contractor to EPA to assist Spokane Tribe of Indians and tribal members affected by Midnite Mine Superfund Sites – 2005

Market Cap – "Market Capitalization" = Value of shares times number of shares

1.1 Ucore

Rare Metals Inc.





- **TSX-V:UCU / OTC:UURAF**
- **Five years of rapid growth:**
  - Recent Market Cap - $100 Million+
  - Shares Issued/Outstanding – 149M
  - Cash - $12 Million
- **Specializing in Rare Metals exploration & development**
  - 2007 Merger – TSX-V:LML
  - 100% Control of Bokan Mountain
  - Focus on Dysprosium (Dy) & Heavy Rare Earths (HREE's)

Ucore Resource Estimate – August 2011

Inferred Resource (NI 43-101 Compliant)				
%TREO[1]	Tonnes	TREO	HREO/TREO	Contained TREO (lbs)
0.8	1,021,000	1.054	36.80%	23,712,000
0.7	1,549,000	0.951	37.70%	32,457,000
0.6	2,489,000	0.834	39.60%	45,661,000
0.5	**3,669,000**	**0.746**	**38.60%**	**60,214,000**
0.4	5,276,000	0.654	40.00%	75,926,000
0.3	6,126,000	0.613	40.80%	82,556,000
0.2	6,702,000	0.58	41.30%	85,465,000

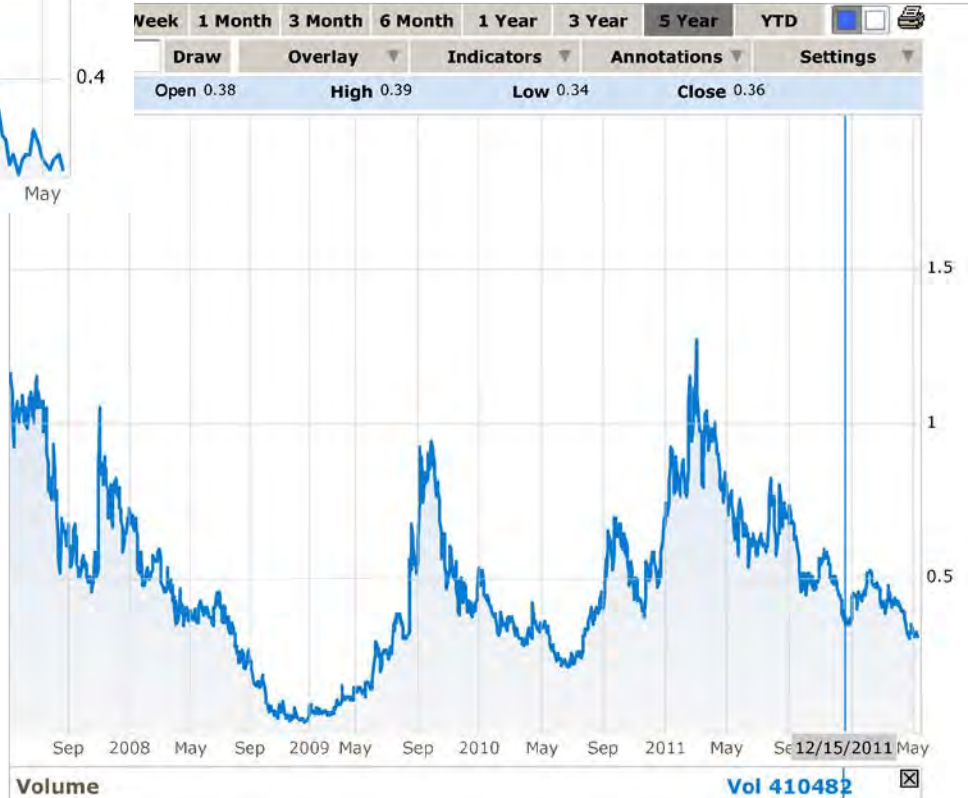
[1]TREO includes Yttrium oxide.

Mineral resource estimate was completed by Mr. Jim Robinson, Senior Resource Geologist.

Ucore's stock price has fallen significantly since its peak of $1.30 in early 2011.

Ucore's stock price has been below $0.55
per share throughout 2012, thus far, less than half the per share value a year ago.

Charts are from businessweek.com



A '***Mineral Resource***' is a concentration or occurrence of material of intrinsic economic interest in or on the earth's crust in such form ,quality and quantity that there are reasonable prospects for eventual economic extraction.

Mineral Resources are further sub-divided, in order of increasing geological confidence, into Inferred, Indicated and Measured Categories.

Measured resources are indicated resources that have undergone enough further sampling that a 'competent person' (defined by the norms of the relevant mining code; usually a geologist) has declared them to be an acceptable estimate, at a high degree of confidence, of the grade, tonnage, shape, densities, physical characteristics and mineral content of the mineral occurrence.

Indicated resources are simply economic mineral occurrences that have been sampled (from locations such as outcrops, trenches, pits and drillholes) to a point where an estimate has been made, at a reasonable level of confidence, of their contained metal, grade, tonnage, shape, densities, physical characteristics.

Inferred Mineral Resources is those parts of a mineral resource for which tonnage, grade and mineral content can be estimated with a low level of confidence. It is inferred from geological evidence and assumed but not verified geological/or grade continuity. It is based on information gathered through appropriate techniques from location such as outcrops, trenches, pits, workings and drill holes which may be of of limited or uncertain quality and reliability.

Resources may also make up portions of a mineral deposit classified as a mineral reserve, but: Have not been sufficiently drilled out to qualify for Reserve status; or have yet to meet all criteria for Reserve status. Source: CIM NI43-101 Guidelines

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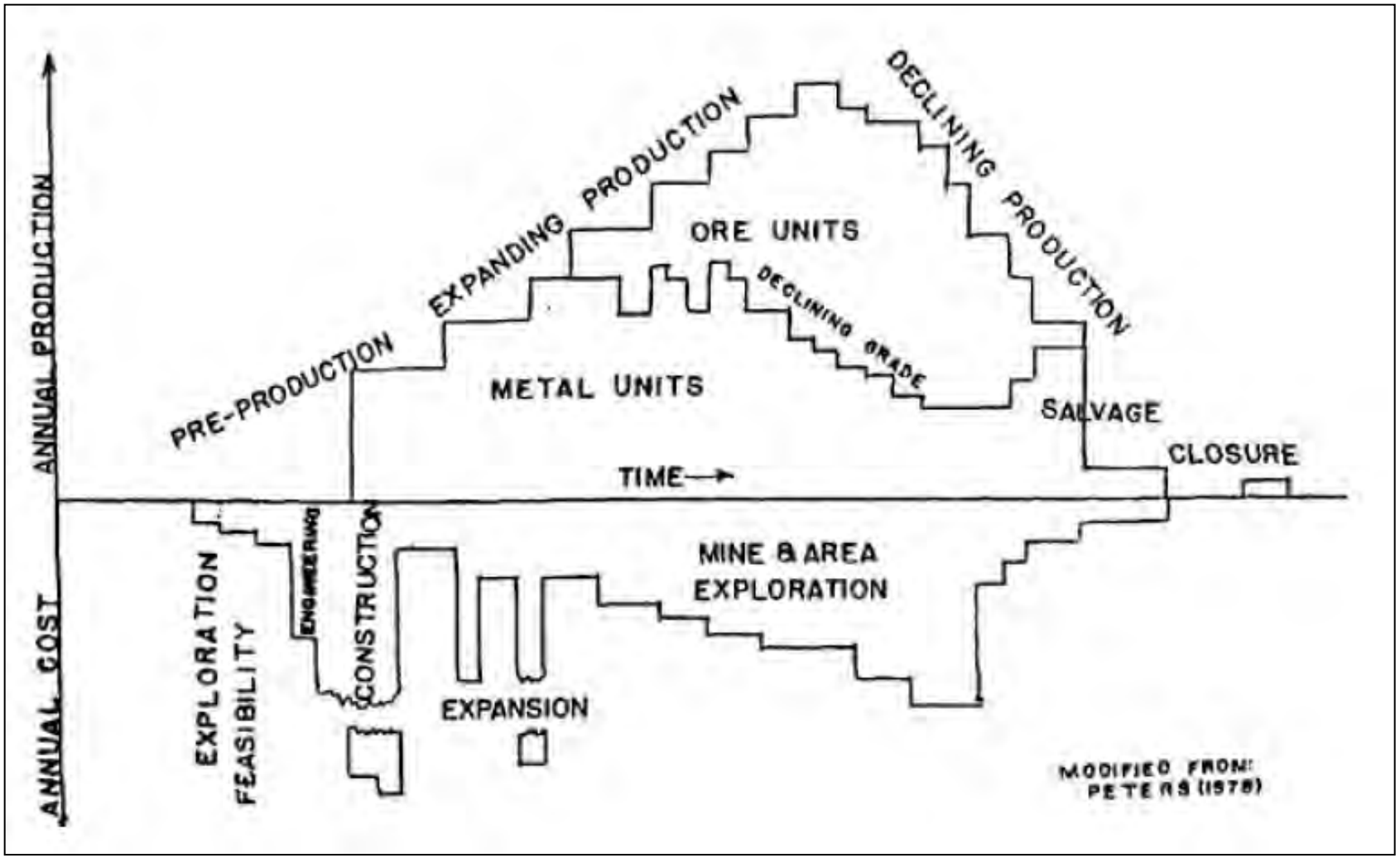
How do we get to a mine?

Stage	Exploration Cycle Stage	Objective	Time Required
1	Grassroots	Conceptual, land acquisition	1 year
2	Target Generation & Drilling	Filtering for drill targets	1-2 years
3	Discovery Delineation	Defining the limits of a discovery - tonnage & grade	1-2 years
4	Infill Drilling	Producing a mineral resource estimate & scoping study 43-101 (3/11)	1-2 years
5	Bulk Sample & Metallurgy	Evaluating recoveries and optimal processing method	1 year
6	Prefeasibility	Produce a mineable reserve, establish a mining plan and associated costs	1-2 years
7	Permitting, Marketing & Feasibility	Securing approval, negotiating offtake, making a production decision	1-3 years
8	Construction	Building the mine	1-3 years
9	Production	Mining cash flow	10-20 years

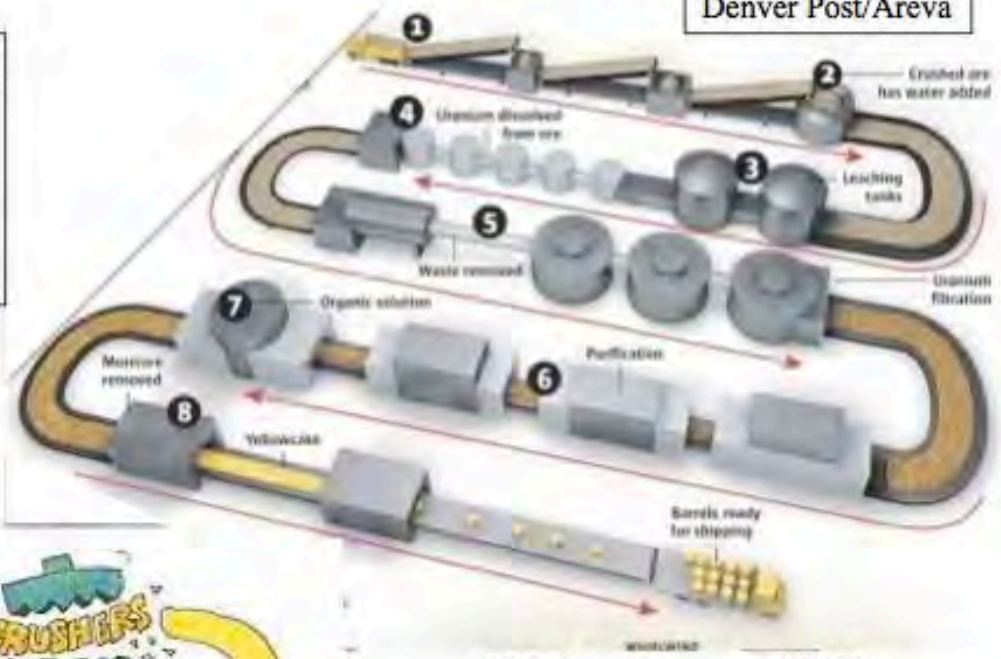
FINANCIAL AND PRODUCTION LIFE CYCLE OF A MINE



Uranium Mining and Milling and Uranium Fuel Cycle Graphics –

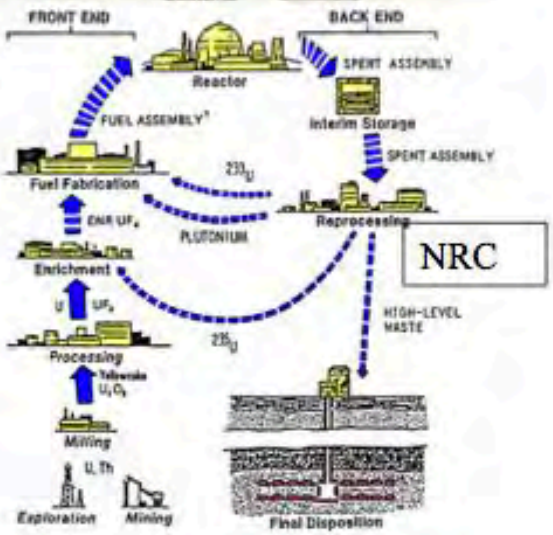
Volume of Mine and Mill Waste vs. Uranium Product Ignored

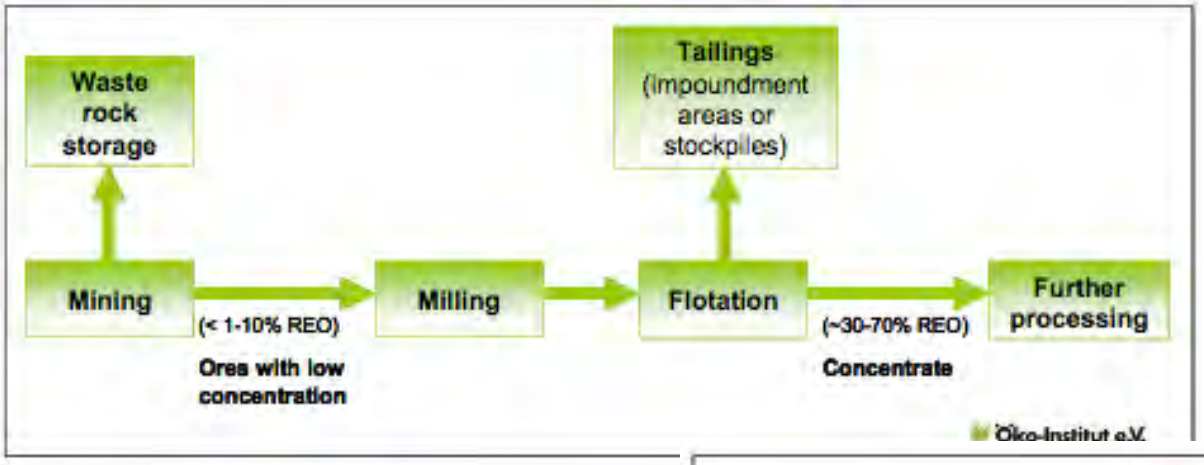
Denver Post/Areva



CAMECO

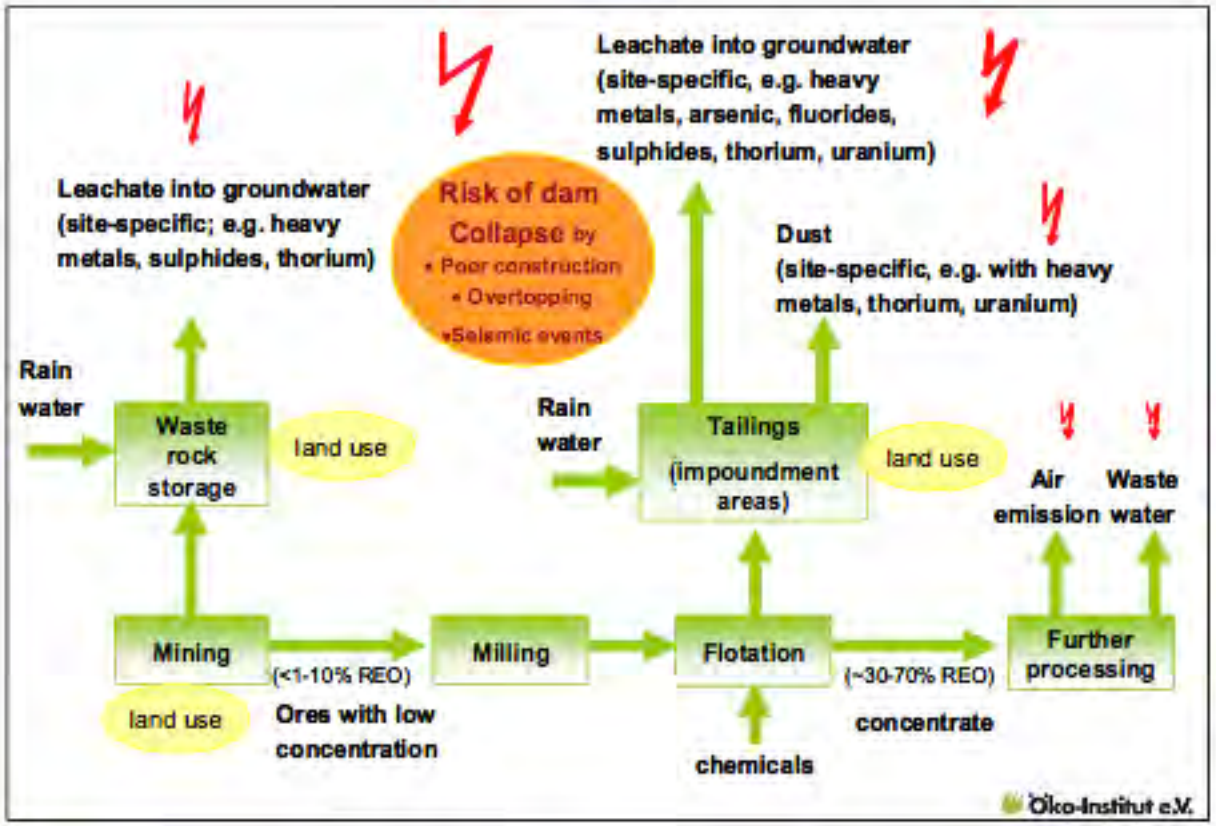
NRC





Main processing steps in Rare Earth mining and processing

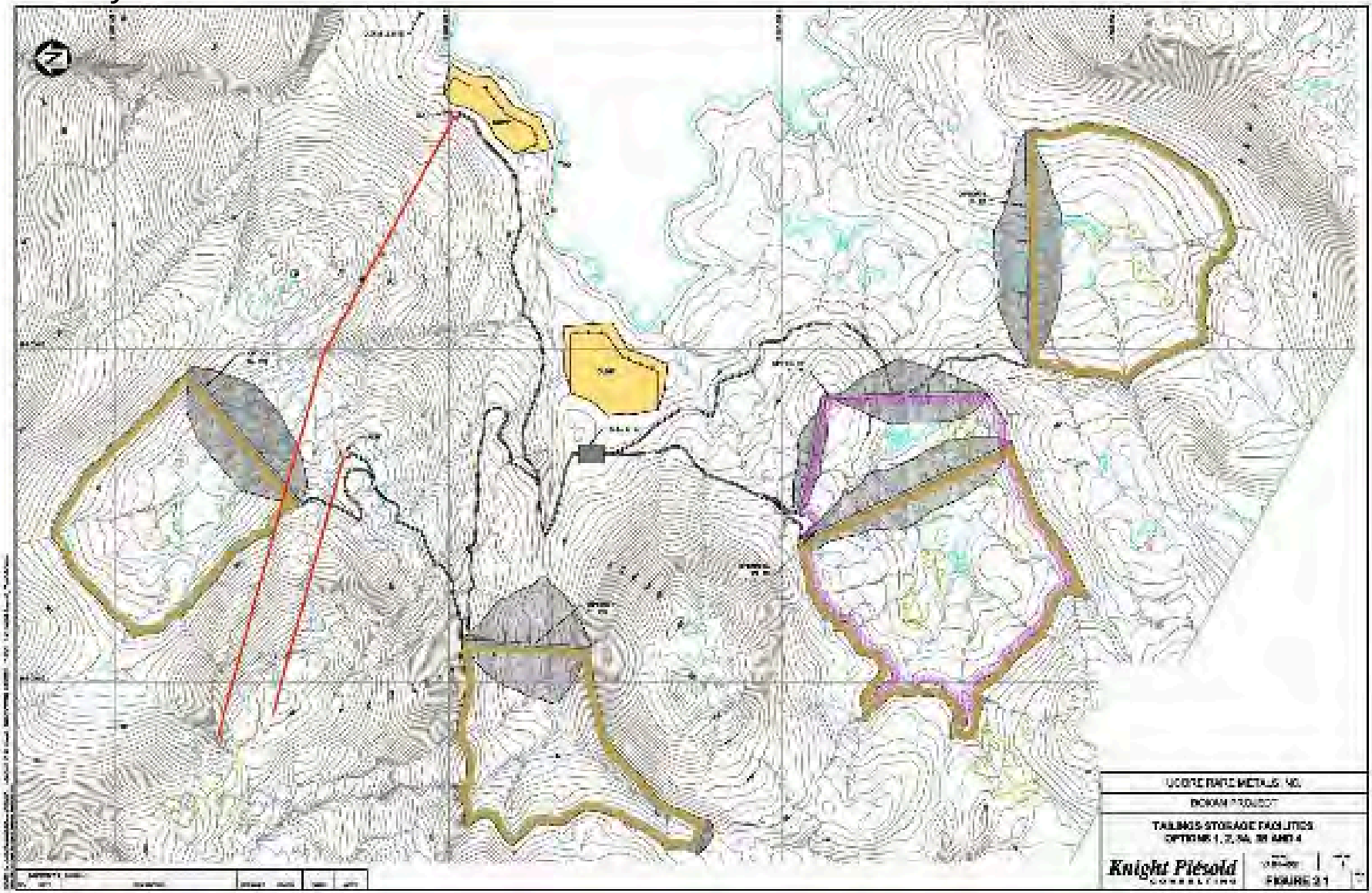
Risks from Rare Earth mining with or without insufficient environmental protection systems



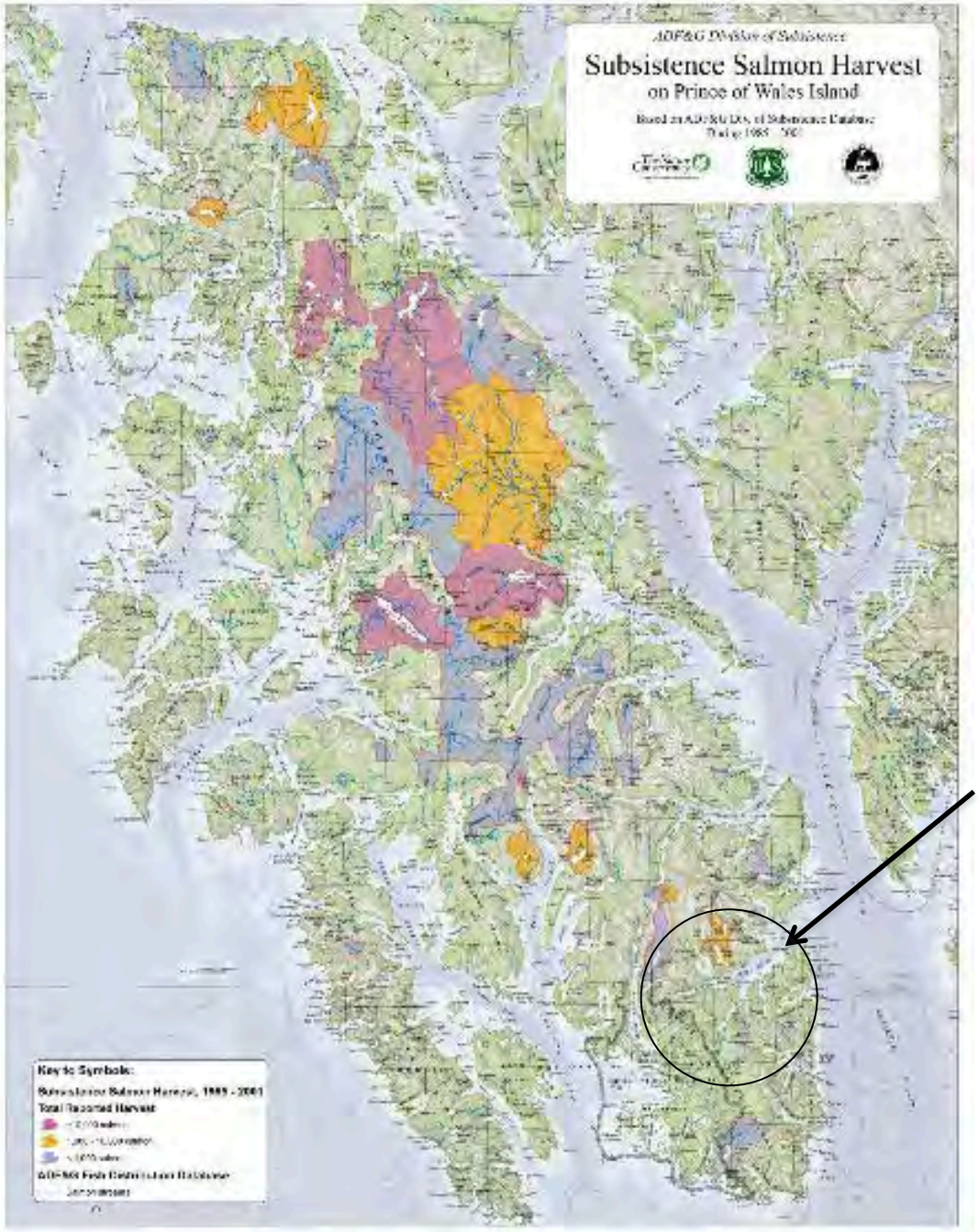
From: Study on Rare Earths and Their Recycling, January 2011, Oeko Institute, Germany

"Conceptual Options Tailings Desktop Study"

All of Ucore's Tailings Disposal Options identified are located in the Moira Bay Watershed



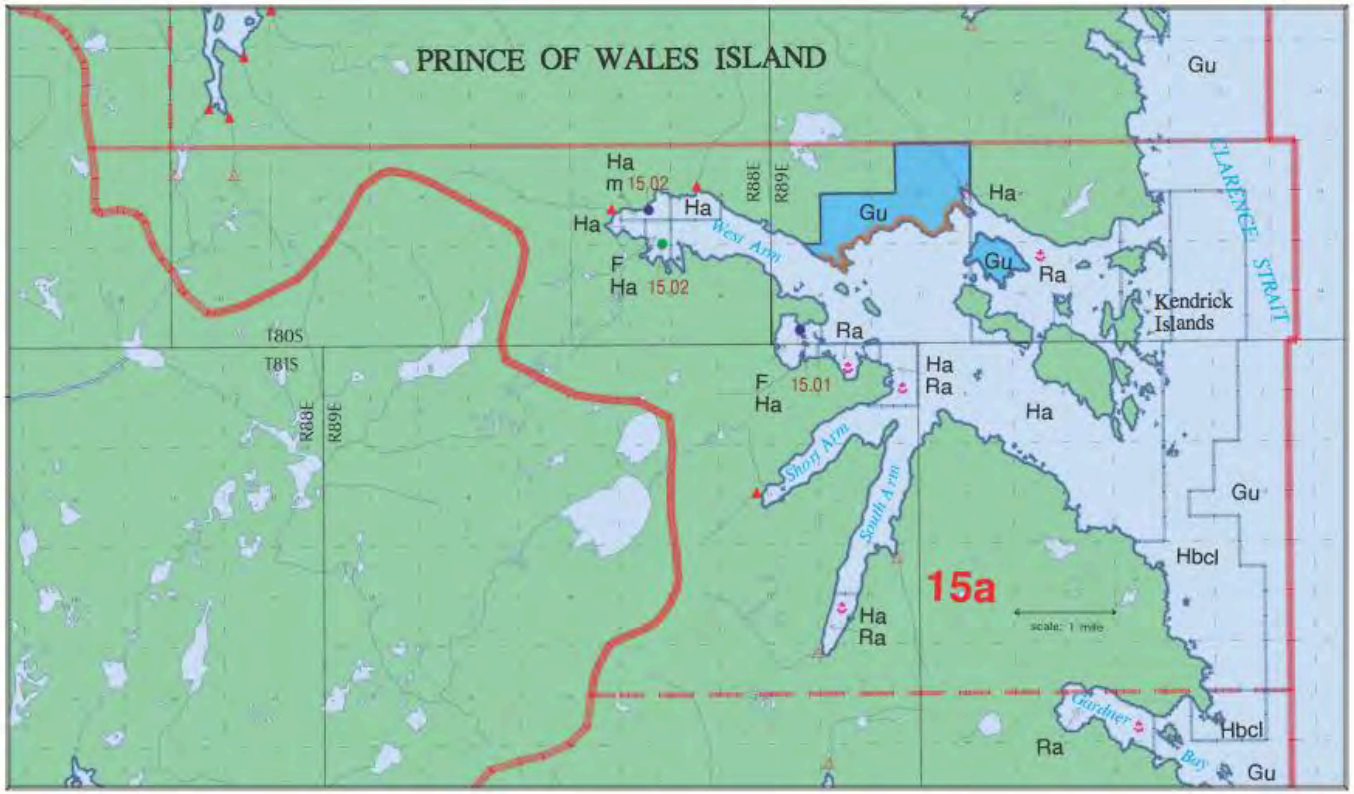
Ucore Presentation at http://ucore.com/MikePower_2011.pdf



"A Framework for Setting Watershed-Scale Priorities for Forest and Freshwater Restoration on Prince of Wales Island," 2007 shows….

Salmon streams surround Bokan Mountain

Prince of Wales Island Area Plan shows….



May 10, 2000

UNIT 15
Kendrick
Subunit 15a

Prince of Wales Island Area Plan, Chapter 3 - Page 271

Salmon Streams – “Closed to Mining” surround Bokan Mountain
On the west –in the Moira Bay Watershed – and in the East – in the Kendrick Bay Watershed

Major risks of Rare Earth mining and processing with insufficient environmental techniques

Risk	Affected compartments	Relevant toxic compounds
Overtopping of tailings dam	groundwater, surface water, soil	**Water emissions:** • in most cases radionuclides, mainly thorium and uranium; • heavy metals; • acids; • fluorides; **Air emissions:** • in most cases radionuclides, mainly thorium and uranium; • heavy metals; • HF, HCl, SO_2 etc.
Collapse of tailings dam by poor construction	groundwater, surface water, soil	
Collapse of tailing dam by seismic event	groundwater, surface water, soil	
Pipe leakage	groundwater, surface water, soil	
Ground of tailing pond not leak-proof	groundwater	
Waste rock stockpiles exposed to rainwater	groundwater, surface water, soil	
Dusts from waste rock and tailings	air, soil	
No site-rehabilitation after cease of mining operation	land-use, long-term contaminated land	
Processing without flue gas filters	air, soil	
Processing without waste water treatment	surface water	

Beside the impacts mining has on the environment, mining also entails social impacts which have to be carefully considered when planning and realizing mining projects.

Nearly all Rare Earth deposits which are currently under exploration around the world have some more or less high contents of uranium and thorium and their decay products.

Environmental Concerns at Molycorp Mountain Pass, CA Rare Earth Mine - 1 (Oeko 2011, p. 56)

According to Molycorp Minerals. the major issues in terms of the environment are as follows:

- The ore at Mountain Pass contains 0.02 % thorium and 0.002 % uranium by weight, as uranium and thorium occur in the bastnaesite mineral. Therefore, radionuclides will be part of the tailings and the concentrate. For the permission of the new plant operation, Molycorp received a broad scope license, which allows facility personnel to conduct the day-to-day management of radioactive materials under the oversight of a Radiation Safety Officer and a Radiation Safety Committee.

- Molycorp plans the installation of a salt recovery (recovery of hydrochloric acid, sodium hydroxide, sodium hypochlorite) and water recycling facilities in order to reduce water consumption. The aim is to reduce the fresh water consumption of the mid-1990s (when the mine had an output of 20 000 t REO per year) by approximately 90 %.

Environmental Concerns at Molycorp Mountain Pass, CA Rare Earth Mine - 2
(Oeko 2011, p. 56)

According to Molycorp Minerals. the major issues in terms of the environment are as follows:

- A ground water remediation system will be operated.

- The open pit water will be pumped, treated and re-used. The facility is constructed with a series of storm water diversion ditches and settling ponds, along with a series of check dams and silt fencing to minimize erosion.

- The hazardous waste (mainly containing lead) shall be disposed of on exterior landfills for hazardous wastes.

- Flue gas treatment plants will be installed in order to reduce air emissions.

- The remediation of the area after mine closure was also part of the approval in 2004.

Environmental Concerns Regarding the Greenland Mineral and Energy Rare Earth Project at Kvanefjeld, Greenland - 1 (Oeko 2011, p. 58)

- Large resources of rare earths with a high content of HREE of about 14% can be found in the Kvanefjeld region in southern Greenland, which is currently discussed for the joint mining of uranium and rare earths. Greenland Minerals and Energy Ltd. (GMEL) which plans to start construction work in 2013 and to initiate production in 2015.

- A very critical point for environmental hazards in this project is the tailing's management. According to current considerations GMEL favour tailings disposal in the nearby natural Lake Taseq. An extensive study concluded that the outlet from contaminated water from Taseq would cause pollution of the whole fluvial system (from the lake, via rivers, into the ocean) with radioactive substances, fluorine and heavy metals.

- It is very doubtful if waste water treatment installations at the outlet of the lake are capable to manage the large amounts of water particularly in times of heavy rain or snow melting.

Environmental Concerns Regarding the Greenland Mineral and Energy Rare Earth Project at Kvanefjeld, Greenland - 2 (Oeko 2011, p. 58)

- The open pit and the waste dump as the most important sources of pollution. In the long term (> 100 years) the tailings pond will be the most critical point.

- The two tailings disposal options considered, direct inlet of the tailings into the sea and the tailings disposal in the nearby natural lake Taseq, each raise concerns. Lake disposal was considered worse in terms of environmental impacts than the direct inlet into the ocean.

Though waste disposal in oceans was frequently practised in the past, the procedure is not acceptable at all either. Inlet of toxic tailings into natural water bodies does not meet any environmental standards.

The situation in Greenland seems particularly critical when considering the fact that the expected climate change – it is linked to melting of glaciers and unfreezing of permafrost soils – might alter water bodies and the stability of soils considerably.

Conclusion on environmental aspects of rare earth mining and processing - 1 (OEKO 2011 p. 61)

- The rare earth mining shows high environmental risks.

- The main risks are the tailings, which are a mixture of small-size particles, waste water and flotation chemicals and arise at the concentration of the mined ore. They are stored in impoundment areas. The tailing dam is exposed to manifold risks such as overtopping due to storm water, poor construction or seismic events. A failing dam leads to site-specific emissions such as thorium, uranium, heavy metals and fluorides.

- Generally, most rare earth deposits contain radioactive materials which impose the risk of radioactive dust and water emissions. Further potential damages are other air emissions, soil contamination, land use, etc.

Conclusion on environmental aspects of rare earth mining and processing - 2 (OEKO 2011 p. 61)

- There are serious environmental damages in the Chinese rare earth mines and their surroundings. The Chinese government intends to reduce the environmental harm by installing environmental technologies in the large mines and by reducing the numerous small illegal mines which probably have no environmental technologies at all. China also aims at higher efficiencies in mining and processing and is running some research projects on a sustainable rare earth economy.

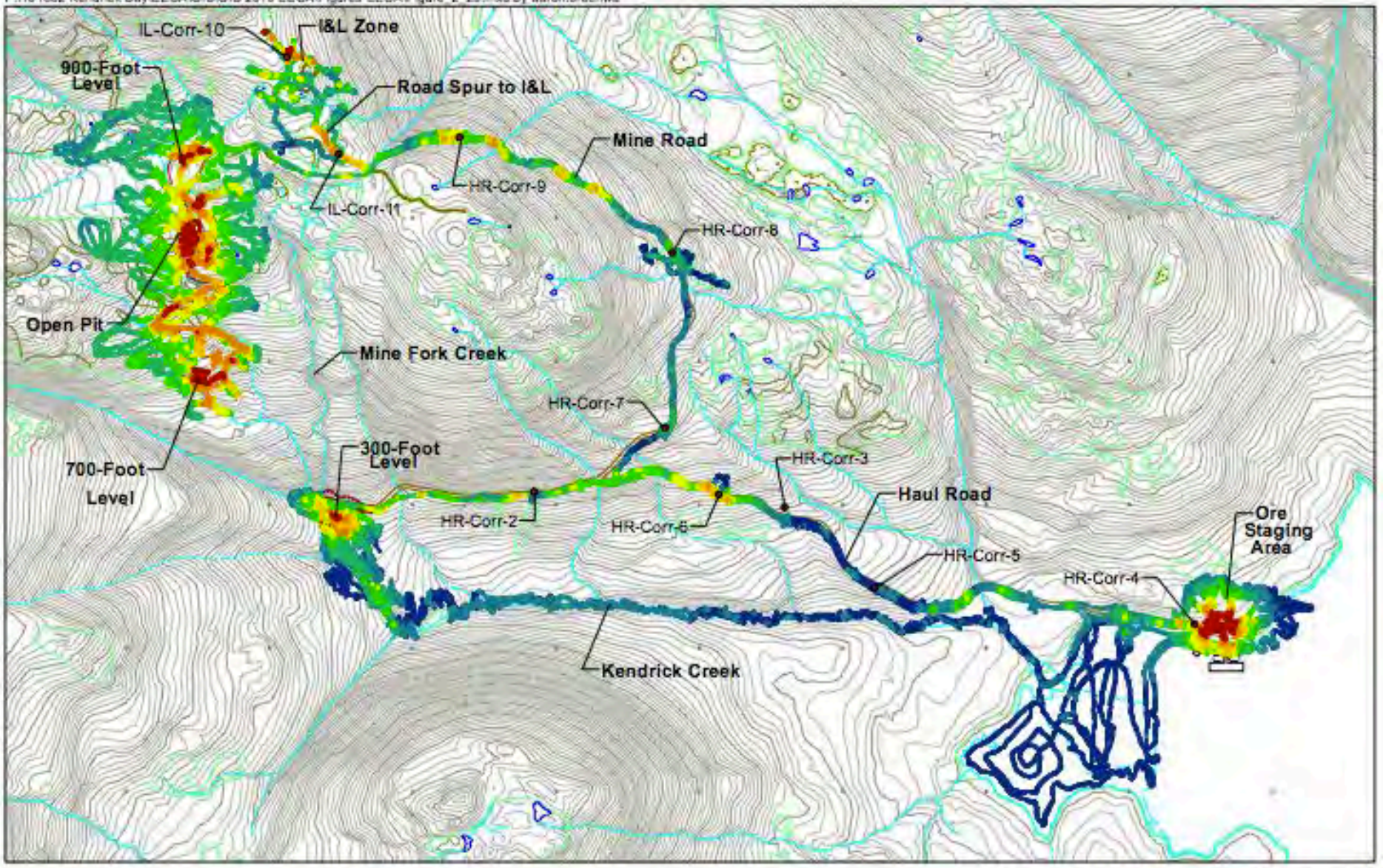
- The most advanced mines outside of China at the Mountain Pass in the United States and at Mt. Weld in Australia will provide environmental protection systems, which will significantly reduce the environmental damage compared to old outdated techniques, if the management and the monitoring are conducted responsibly by the authorities and the operators.

- One example of potential concern about environmental damage is the plan for joint mining of uranium and rare earths in Greenland. The interested mining company intends to store the tailings in a natural lake with connection to maritime waters.

Ross-Adams Mine Abandoned Uranium Mine

700-900 foot level working at Bokan Mountain

P:\181862 Kendrick Bay\EECA\GIS\GIS 2010 EECA\Figures EECA\Figure_2_29.mxd by aaron.orechwa



Gamma Exposure Rate (uR/hr)

<20	80-160	631-1250
20-40	160-316	>1250
40-80	316-631	

● Gamma/Soil Correlation Plot Sample

N

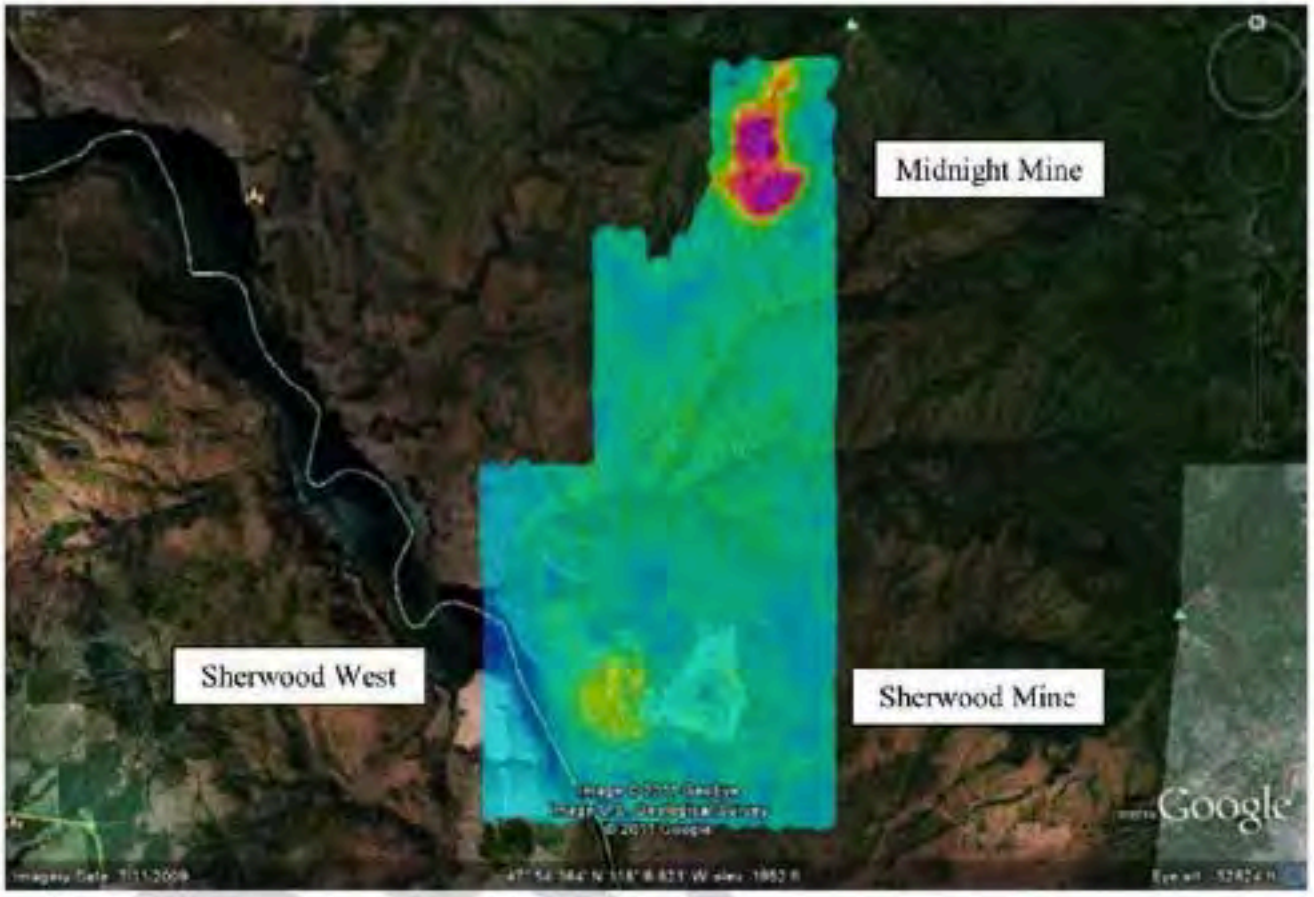
Feet

0 1,000

November 2011

Figure 2-29
Ross-Adams Site
Site Gamma Survey Data
Unkriged Site Map

Midnite Mine and Sherwood Mine, Washington State, Aerial Radiological Survey Data Showing emission rate in microRoengtens/hour



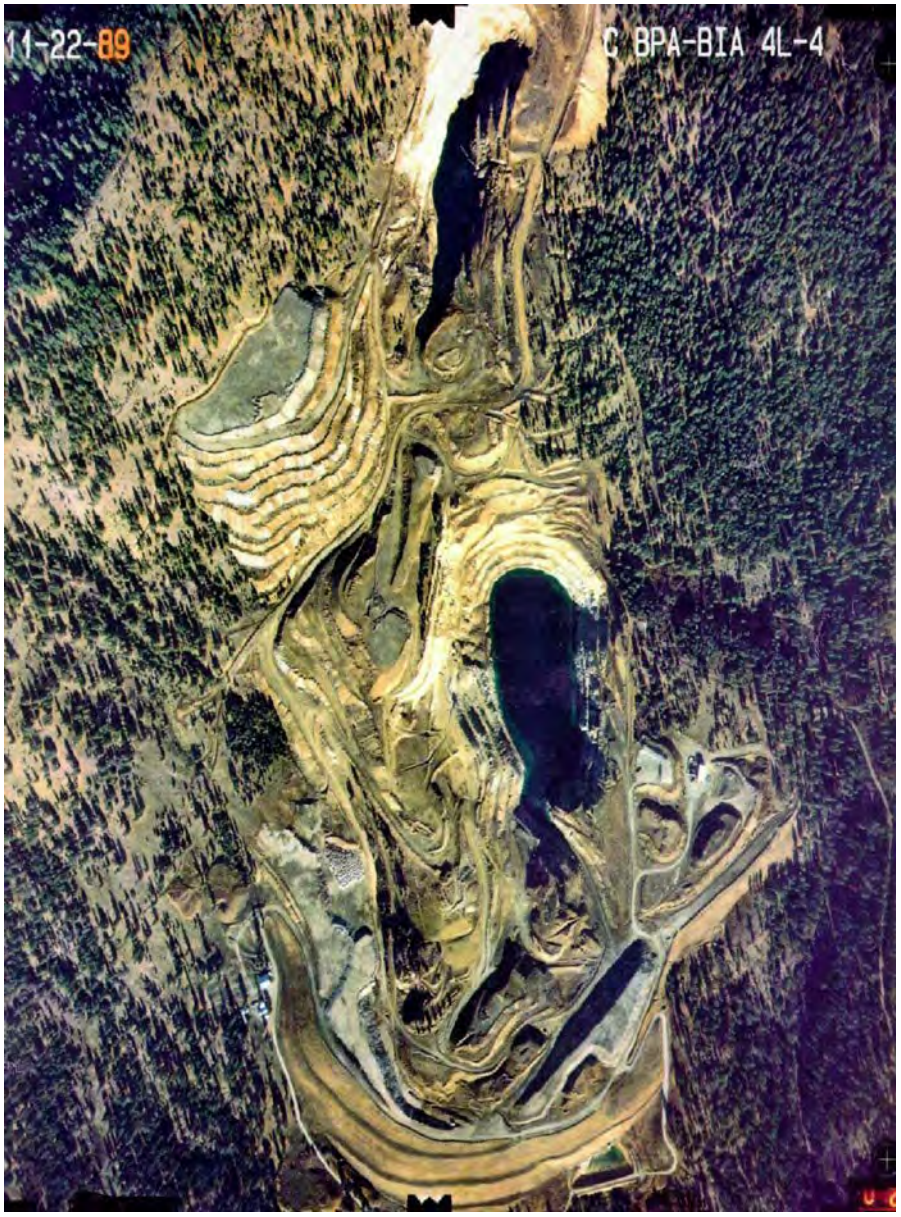
Parameter: Exposure Rate (µr/hr)

< 5.0000	25.000 : 30.000
5.0000 : 10.000	30.000 : 35.000
10.000 : 15.000	35.000 : 40.000
15.000 : 20.000	40.000 : 45.000
20.000 : 25.000	> 45.000

ASPECT Program

Flight Parameters

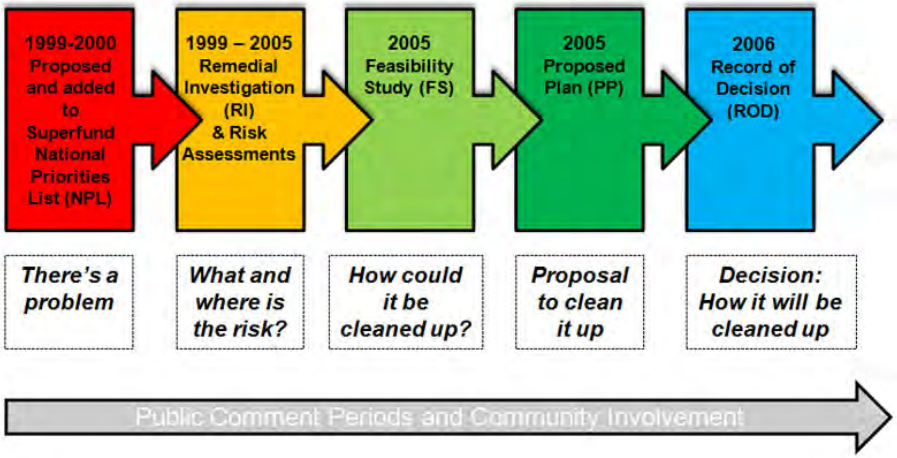
500 ft altitude
500 ft line spacing
120 knots
1 second acquisition time



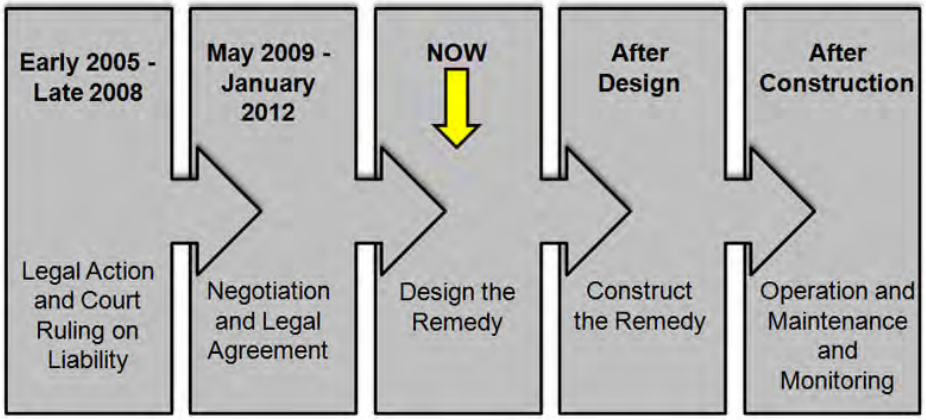
Aerial Photograph of Midnite Mine from 1989

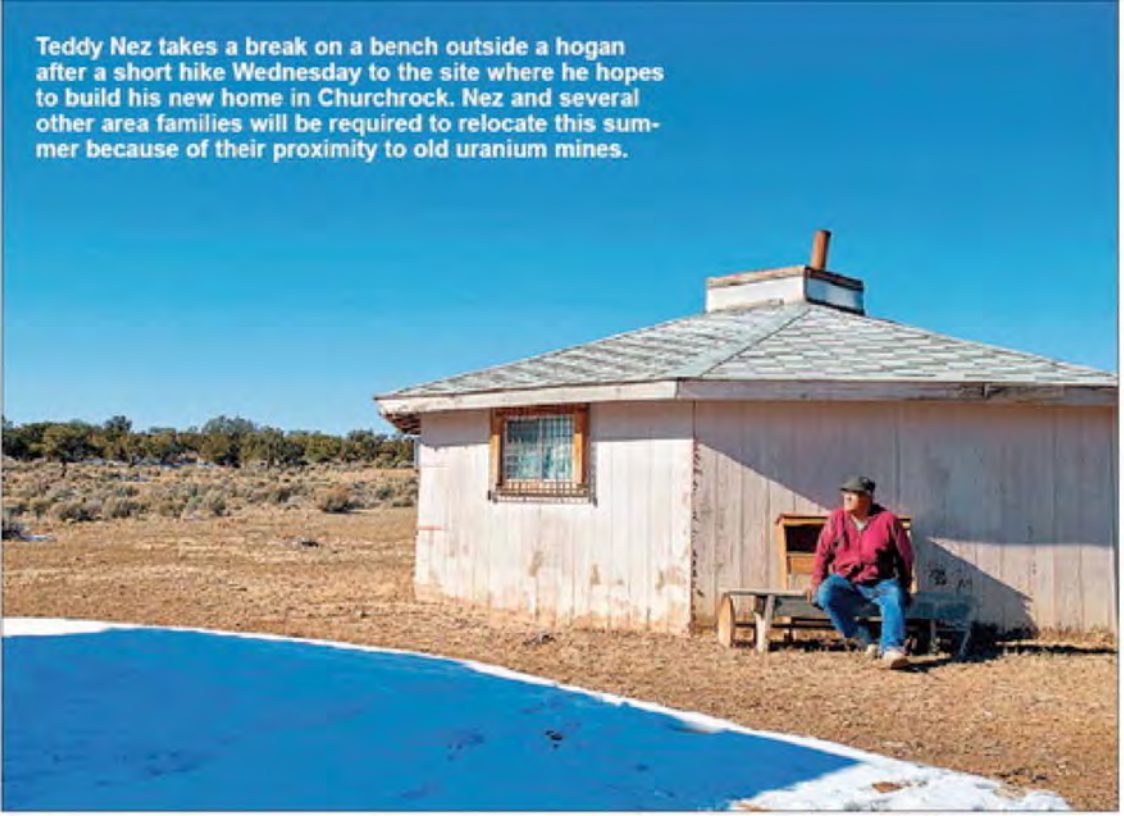
Midnite Mine Google Earth Image from 2009

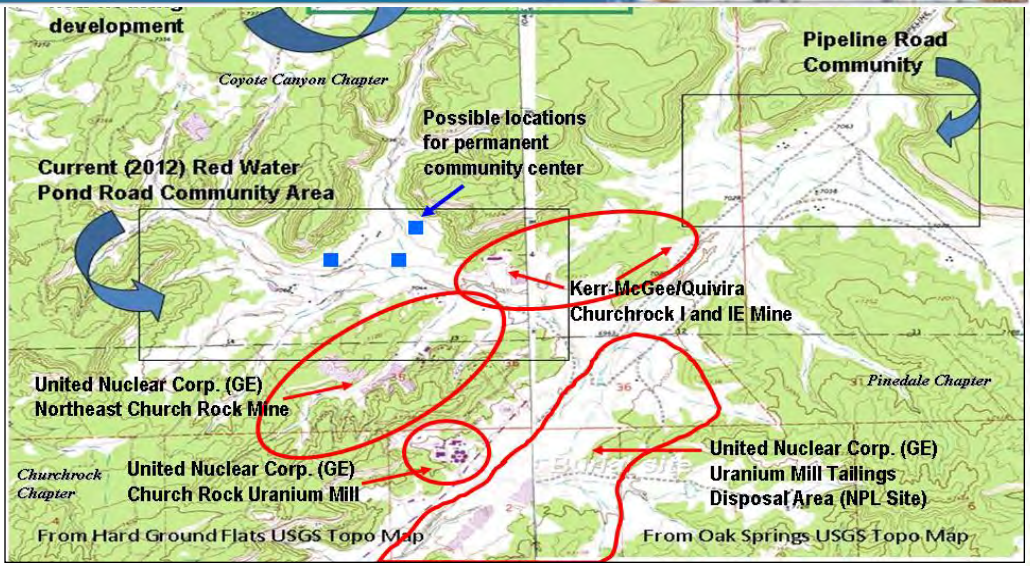
Key Milestones Already Met



Next Steps




Teddy Nez takes a break on a bench outside a hogan after a short hike Wednesday to the site where he hopes to build his new home in Churchrock. Nez and several other area families will be required to relocate this summer because of their proximity to old uranium mines.


development
Coyote Canyon Chapter
Pipeline Road Community
Possible locations for permanent community center
Current (2012) Red Water Pond Road Community Area
Kerr-McGee/Quivira Churchrock I and IE Mine
United Nuclear Corp. (GE) Northeast Church Rock Mine
Pinedale Chapter
United Nuclear Corp. (GE) Uranium Mill Tailings Disposal Area (NPL Site)
Churchrock Chapter
United Nuclear Corp. (GE) Church Rock Uranium Mill
From Hard Ground Flats USGS Topo Map
From Oak Springs USGS Topo Map

Churchrock Uranium District - New Mine Proposed While Remediation Of Old Mines and Mills Continues

http://www.epa.gov/region09/superfund/navajo-nation/images/ne-church-rock-mine-aerial.jpg

Comparison of Attributes of Remediation Plans for Four Abandoned Uranium Mines*

Attributes	Midnight Mine	Northeast Church Rock Mine	(Gulf) Mariano Lake Mine	Skyline Mine
Location	Spokane, WA	Church Rock, NM	Mariano Lake, NM	Monument Valley UT
Operator During Mining	Dawn Mining Co.	United Nuclear Corp.	Gulf Mineral Resources	Vanadium Corp of America
Current Responsible Party	Newmont Mining Inc.	General Electric Co.	Chevron USA Inc.	none
Years of Operation	1954-1964, 1969-1981	1969-1982	1977-1982	1960s
Years before 1971	12	2	0	10?
Years Including & After 1971	10	11	5	0
Proportion of Duration of Production Under AEC Contract	54.5%	15.4%	0%	100%
Type of Mine	Open Pit	Underground w/ surface facilities	Underground w/ surface facilities	Underground w/ surface facilities
Acres	350	125	31	?
Most Recent EPA Action	Federal district court settlement implementing 2006 EPA clean-up plan	Action Memo: implementing plan to move NECR mine wastes to UNC uranium mill tailings site	Administrative Order on Consent: further radiological assessment, interim removal of wastes	Construction of disposal cells, relocation of mine wastes to cells on top of Oljato Mesa
Estimated Clean-up Costs**	$193 million	$45 million	not estimated	$7.5 million
Estimated Federal Share	$54 million	$13.5 million - $14.9 million	$0	$7.5 million
Calculated Federal Proportion	27.9%	30% - 33%	0%	100%
Land Status	Tribal (Spokane)	Tribal (Navajo) and private (UNC)	Tribal (Navajo & BIA)	Tribal Trust
On-site soil clean-up standard	4.7 pCi/g Radium	2.24 pCi/g Radium-226+228	to be determined	2.24 pCi/g Radium-226+228
Off-site mine-affected area	13 pCi/g Radium	none	none	none

* Compiled by Chris Shuey and Paul Robinson, SRIC, version of March 23, 2012 ** - Based on EPA's Preferred Alternative

What are the Potential Health Effects from Exposure to Uranium?[1]

- Uranium is a heavy metal and acts similar to lead (another heavy metal) in the body.
- Accordingly, for natural uranium, national and international human exposure standards are based on the possible **chemical toxicity** of uranium (e.g., effect on kidney—nephrotoxicity), not on radiation and possible "cancer effects" (radiotoxicity)

[1]Sources: (1) U.S. Nuclear Regulatory Commission. Standards for protection against radiation. 10 CFR Part 20; 1992. (2) International Commission on Radiological Protection. Limits for intakes of radionuclides by workers. ICRP Publication 30, Part 1.1979. (3) Agency for Toxic Substances and Disease Registry. Toxicological profile for uranium. Department of Health and Human Services, Public Health Service; 1999. Available at: http://www.atsdr.cdc.gov/toxprofiles/tp150.html.

Brown, 2009 NRC/NMA Symposium

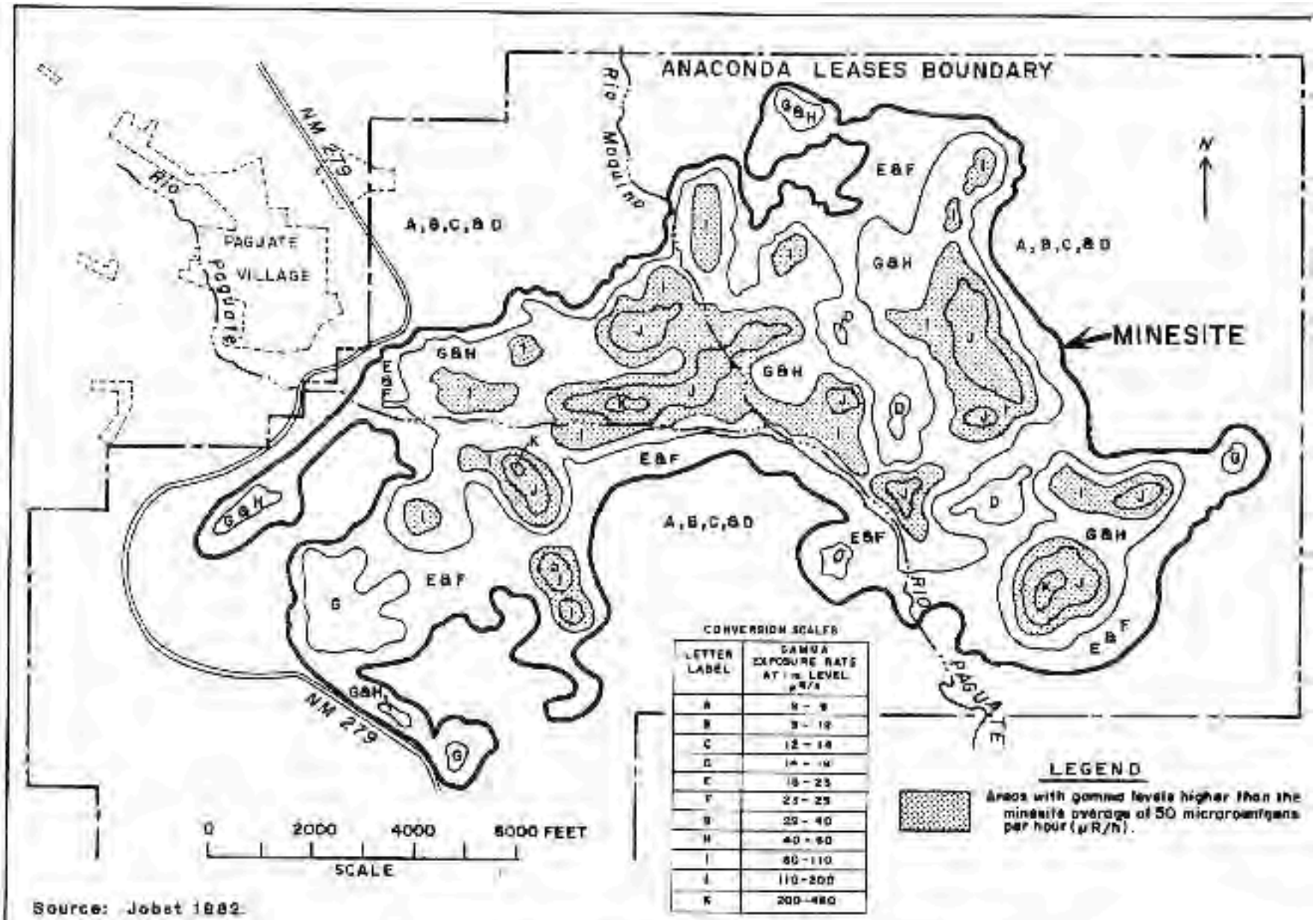
Udall: Contaminated Laguna Mine Proposed for 'Superfund' Cleanup Status
March 13, 2012 - http://www.tomudall.senate.gov/?p=press_release&id=1040

WASHINGTON - U.S. Senator Tom Udall issued a statement today following the Environmental Protection Agency's (EPA) proposal to list the Jackpile-Paguate Uranium Mine in Cibola County to the National List of Priorities of Superfund sites. Udall, a member of the Environment and Public Works Committee, has been urging the EPA to expedite the cleanup of uranium contamination on Tribal lands in New Mexico.

Udall said: "Today EPA is getting serious about the uranium contamination cleanup that the Pueblo of Laguna has long recognized as vital….

Village Paguate and Jackpile Mine when mine was operating

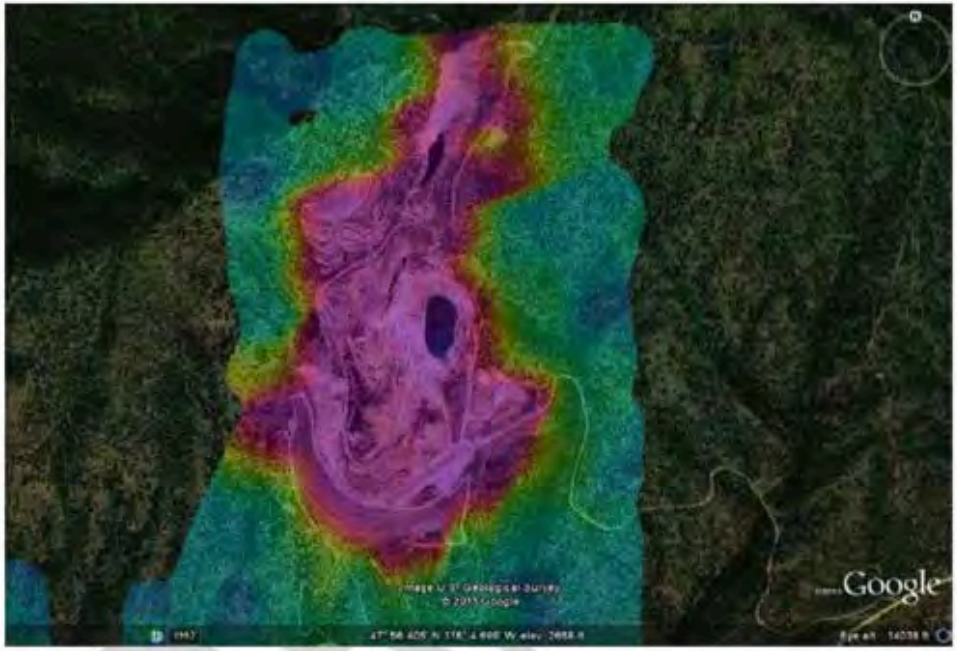

Paguate Village
Jackpile Uranium Mine – Reclaimed Pits and Waste Rock Piles

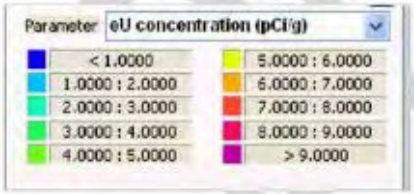


Source: Jobst 1982

MAP 2-2 Aerial Gamma Survey of the Minesite

Midnite Mine – radiation releases as "uranium equivalent"

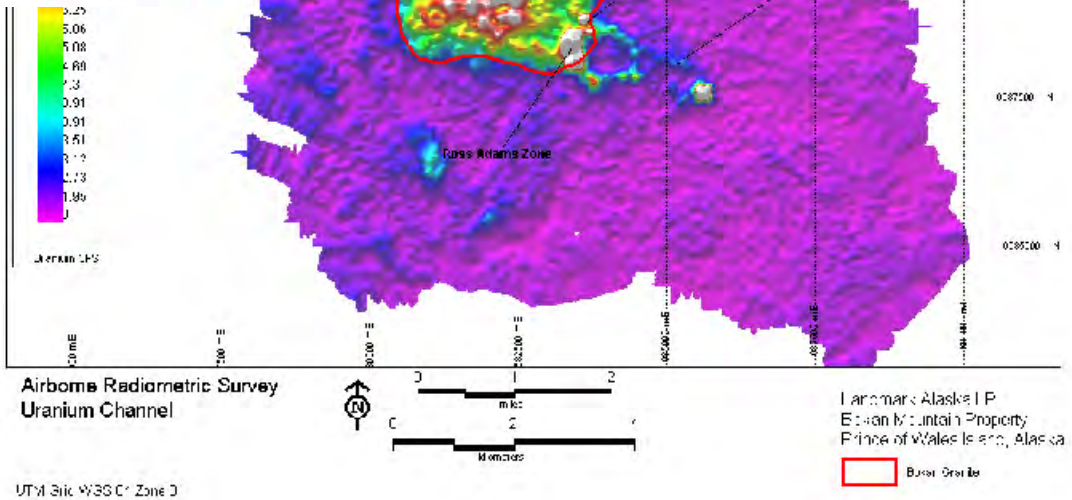




Flight Parameters

500 ft altitude
500 ft line spacing
120 knots
1 second acquisition time

Ross-Adams – radiation releases as "uranium equivalent"



Thank you for your time and attention