Uranium Exploitation and Environmental racism:

Why environmental despoliation and the ignorance of radiological risks of uranium mining cannot be justified by the nuclear weapons states for the procurement of the raw stock material for their nuclear explosives

Vienna Conference on the Humanitarian Impact of Human Weapons
8-9 December 2014, Hofburg Palace Vienna, Austria

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Context

I want make this submission following on the presentation by Dr Arjun Makijani of the US-based Institute for Energy and Environmental Research in the US in session 1b, who highlighted the often overlooked environmental degradation, lack of remediation and health hazards posed by uranium mining for the raw materials to make nuclear explosives for the nuclear arsenals of the nuclear weapons states (NWS). I note that this joint human health and environmental concern is the focus of an excellent and disturbing poster exhibition outside the main door to the stage of this Conference Hall.

I also note the conclusions of the interpretation of existing environmental law to military nuclear activities discussed in depth and breadth by the excellent panel in Session IV.

Both this conference and the predecessor Civil Society Conference in Vienna over the weekend have heard the moving testimony of radiation victims from the testing and belligerent us eof nuclear weapons: the Japanese “Hibakusha”, direct victims of nuclear weapons deliberately used upon on their communities, and the US, Marshallese Islanders, Australian indigenous peoples, and Kazakh “Downwinders, who have sufferd from nuclear testing.

But there are hundreds of thousands of radiation victims worldwide from the production of nuclear weapons, even if we remain lucky enough that they are never used by deliberate decision, or detonated by accident.

I raised this matter of concern with the United Kingdom delegation, representing the country of which I am a citizen, in the margins of this conference, to be told the exposure to radiation from uranium procurement was a long time ago. That is true, but the impact of exposure lives on through genetic transfer across generations, as the compensation agreements in the United States ( surprising not mentioned by the US
Ambassador to this conference in either contribution he made from the floor) have demonstrated recognise the responsibility of current political administrations for past administration' actions.

Therefore, as my own Government has declined to take moral responsibility for the significant deleterious impact of the production process for the procurement of the raw uranium that, in its converted form, now makes up the nuclear explosives in each of the UK's 180 nuclear warheads, I will set out below some examples of the impacts, especially to inform my own Government why they have a duty to wider humanity to take responsibility for the desecration of sacred land and for damaging the health of exposed indigenous peoples and their successor generations, especially as indigenous people's land in former colonies were used as the sources of the UK's uranium used in nuclear warheads.

Governments have accepted the importance of recognizing and mitigating the carbon footprint of the production process of commercially tradable goods; they also need to accept the radiological footprint of past nuclear explosive materials production needs to be mitigated, and act accordingly in a moral fashion.

Nuclear warheads, even if never detonated, have not only an extraordinary financial cost, but even more importantly, an ecological, environmental, and enduring health cost – both radiological and toxicological - to the people whose communities have been exploited for the procurement of the uranium, which in processed and manufactured form, currently sits in the global nuclear arsenals of over 16,000 warheads, to no positive benefit a huge detriments for the human communities from which it was expropriated.

This submission includes as illustration primary materials (and associated references) covering problems encountered in the major uranium production countries (Australia, United States, Canada, Kazakhstan, & Namibia, and some more minor ones such as the Czech Republic, France and eastern Germany).

Prolegomena

In March 2009, an American Civil Society non governmental organization, Beyond Nuclear, published in its regular information bulletin, Thunderbird, a review and summary of a conference held in Washington DC in February 2009, addressing the issue of the impact on indigenous people of uranium mining, milling and its waste streams. I reproduce the summary immediately below:

Beyond Nuclear Bulletin

March 5, 2009
Standing Room Only as Indigenous Speakers Describe Atomic Genocide

It was standing room only at the huge PowerShift 2009 youth conference on climate change in Washington, DC, February 27, when Beyond Nuclear hosted a panel that included three indigenous activists, a scientist and a prominent actor. The panel - Human Rights, Uranium Mining and Unfolding Genocide - featured actor, James
Cromwell; French nuclear scientist, Bruno Chareyron, Manuel Pino of the Acoma Pueblo; Sidi-Amar Taoua, a Touareg from Niger; and Mitch, an Australian Aboriginal. The panel held a press conference, briefed legislators on Capitol Hill and spoke at PowerShift to more than 500 students. The activists described how uranium mining has disproportionately targeted indigenous communities across the world and represents a deliberate genocide. Mine workers were poorly protected and informed and suffered from often deadly diseases without proper treatment. Most disused mine sites have never been cleaned up while water supplies remain contaminated. "Poison Wind," a documentary by Jenny Pond, was also shown to a packed room at Busboys and Poets in Washington, DC at an event hosted by Cromwell. The three days of events represent the beginning of a new Beyond Nuclear campaign to draw attention to the consistent violation of fundamental human rights caused by uranium mining. The Beyond Nuclear tour of indigenous speakers on human rights and uranium mining received a variety of press coverage, including an article by Agence France Presse that appeared in the Melbourne Age, the Melbourne Sun and the Economic Times (of India) among other publications. View the articles here. In addition, James Cromwell was interviewed live on CleanSkies TV.

The history of neglect

**Uranium mining legacies remediation and renaissance development: an international overview**

In an overview paper, Peter Waggitt
Today’s legacy problems arose because due to the lack of legislation in earlier times. With no obligation to plan for, or undertake remediation and with no funds having been put aside to carry out the work, remediation did not happen. This last point is a major issue when legacy remediation programmes are discussed or efforts are made to plan work. Mining legacy remediation is a very expensive business, more so when uranium is involved…. Few of the countries most affected by the uranium mine legacy issue have adequate finance or resources and infrastructure in their regulatory networks to plan, develop and manage such programmes. Neither do many of the countries most affected have sufficiently well developed environmental protection laws and resources. So the diagnosis is one of neglect and lack of resources. The prognosis is not very good at first glance due to the vast amounts of financial support required at a time when there are many other priorities for Governments expenditure in many of the most affected nations. Public health, education and re-building economies are all activities competing for the money available. But all may not be lost if legacy remediation can be incorporated with other development plans. In today’s market this has increased interest in the possibility of re-treating tailings, and perhaps other residues from legacy sites, to extract uranium. A number of proposals are being considered by mining companies and governments in former uranium mining centres around the world. Such plans should only be considered if they are a component of a comprehensive remediation programme. Any new processing scheme should be designed to ensure that the end state of the project
remediated site i.e. no new legacy is created.

Country-by-country reports

AUSTRALIA

I would draw all national delegations to an excellent technical paper produced by an Australian academic, Gr Gavin Mudd, then at the University of Queensland, now Senior Lecturer in Environmental Engineering, at Monash University

(http://eng.monash.edu.au/civil/about/people/profile/gmudd)

Email: Gavin.Mudd@monash.edu; Homepage: http://users.monash.edu.au/~gmudd/

Remediation of Uranium Mill Tailings Wastes in Australia:
A Critical Review
G.M. Mudd
Dept. Civil Eng., Uni. of Queensland, St Lucia, QLD., 4072, AUSTRALIA

ABSTRACT: Australia has been an active participant in the global uranium mining industry since its inception in the 1940s. By the late 1950s five major mining and milling projects were operating, several small mines supplied custom ores. All of these projects were closed by the early 1960s, except for Rum Jungle which continued under government subsidy. Most sites have had lasting environmental impacts. The advances in nuclear power in the 1960s saw increasing demand for uranium and Australia again explored with remarkable success in the Northern Territory, South Australia and Western Australia. After several government inquiries in the 1970s, Ranger, Nabarlek and Olympic Dam were operating by the mid 1980s. The principal risks from uranium mill tailings wastes arise from their radioactive nature and often their chemical toxicities. A critical review of the rehabilitation of abandoned uranium mines and mill tailings as a comparison for current projects is presented.

Editor C D Johnston. Vol. 2, 777)

CZECH REPUBLIC

Adversaries of Uranium Mining Agreed That Water Is More Precious Than Uranium

Kotel, 20th September 2008 - Almost two hundred of people gathered under the thousand-year-old linden in village Kotel near Oseëná in Liberec region to declare their protest against planned uranium mining in this area. Similar activities on the today's occasion of International Uranium Action Day were taking place in other six countries of Europe, in Russia and in Australia - at the places where local communities are endangered by uranium mining.

A part of this action in Kotel was apart from other things a theatre performance of a local amateur theatre group Vojan. They parody efforts of foreign speculators to mine uranium in Bohemia.

Uranium was begun to mine in Strazpod Ralskem area in the 1960's of last century. It was being done by the worst known method - insitu acid leaching. During almost 20 years sulfuric was pumped underground in such amount that would fill up the Slapy dam
(270 000 000 m³). This act caused not only the massive contamination of underground but also a great danger of the drinking water reservoir for whole region. That was the reason why the mining was stopped here.

"The problem of contamination after the uranium mining in Stra¾ pod Ralskem is so large that we will fight with it for tens of years and its stabilization will be paid by tens of milliard crowns of all of us from our tax. Nevertheless mining companies dare to suggest renewing of uranium mining nowadays. This time even in more inhabited areas towards Liberec," informed Hana Gabrielová from Calla organization which acts actively against renewing of uranium mining.

"Drinking water is obviously more precious for people than uranium. It seems to us absolutely absurd that mining companies plan renewing of mining only 5 kilometers far from the place where the reservoir of drinking water is. This reservoir supplies with drinking water nearby Liberec - the town with more than a hundred thousand inhabitants," emphasized Josef Jadrný, an organizer of today's action from organization Na¹e Podje¹tìdí.

"From experience I know how incredibly difficult and expensive removing contamination after uranium mining from an area is," said Dr. Gavin Mudd, an Australian hydrogeologist dealing with impacts of uranium mining, who came to Kotel near Oseèná to get to know the local situation and support the local community. "Uranium mining is a business, whose the only aim is to earn money. Water is for all people and its value is going to be more and more precious," emphasized Mudd.


(Former eastern) GERMANY (GDR)
BUND accuses Wismut of amateurish reclamation of uranium wastes

At press conference the German Branch of Friends of the Earth, BUND (the Society for the Conservation of Nature), accused Wismut, the former uranium producing company in Eastern Germany, of amateurish reclamation of uranium mine and mill wastes. (371.3646) WISE-Amsterdam - Wismut is now owned 100% by the German government and has stopped all uranium mining. The only task it has now is to reclaim the sites disturbed by uranium mining in Thuringia and Saxony: large open pit and underground mines, and the very hazardous uranium mill tailings piles containing a total amount of 220 million tonnes of solids in sludges.

The main points of BUND's criticism centers around the dumping of low grade ores (resulting from heap leaching) in former open pit mines (where they will be in contact with groundwater) and the flooding of underground mines without prior environmental assessments.

Some proposed measures were also criticized, specifically: the dumping of various contaminated wastes in uranium mill tailings deposits, which make reclamation much more difficult if different types of waste are mixed, and the lack of hydrogeologic investigations on the uranium mill tailings deposits, as well as the fact that no collection and treatment of seepage waters from these piles has been done.

Besides criticism regarding the technical side of reclamation, the BUND also raised concerns about the new and rising (but already well known from the former communist era) secrecy surrounding all reclamation efforts at the Wismut sites: the reclamation
plans are not disclosed to the public and there are no public inquiries, thus people and environmental groups concerned about the issue have no chance to become involved in the decision-making process regarding planned reclamation measures. The BUND also criticized the government regarding its proposed changes in the allowable dose limit to the public from reclaimed uranium sites. The changes would mean that the limit at these sites would be set at 100 mrem (1 mSv) per year although the present level for all nuclear installations in the western part of Germany is 30 mrem. Sources: Taz
Frankfurter Rundschau (FRG), 22 April 1992.

Wismut: 10% higher cancer risk

Harmful waste from uranium mining by Wismut in the former GDR is clearly increasing the danger to get cancer for hundred thousands of people living in the Federal states of Saxony and Thuringia. This is the conclusion of a study carried out and presented by the German "Öko-Institut" on March 14, 1994 in Berlin.

(410.4062) WISE Amsterdam - According to the study, people living in uranium mining areas are running a ten-percent higher risk to become ill with cancer compared to the whole of Germany. According to Goerg Heydecke -radiation expert from the local branch of BUND (Friends of the Earth Germany) based in Zwickau in the Wismut-area - parts of these calculations have already been discussed on the second yearly meeting of the NGO "Gesellschaft für Strahlenschutz" (Foundation for Radiation Protection) in Dresden in October 1993.

In the Saxon town Oberschlema sixty out of thousand inhabitants could become additionally ill because of Radon gas escaping from slag-heaps, the use of contaminated overburden as building material and the time that employees spent in uranium mines. "The mayor of Oberschlema attacked massively professor Kuni and Langfelder (Langfelder is chairman of the "Gesellschaft für Strahlenschutz") when they discussed the radiation danger for people living in this area, because he just feared the risks", Mr.Heydecke reported in a statement to WISE-Amsterdam.

Besides that, co-author Gerhard Schmidt from the "Öko-Institut" said that increased radiation would lead to six additional deaths per year in the area around the Thuringian town Ronneburg.

According to the "Öko-Institut" one billion tonnes of overburden and some extra 200 million tonnes chemical contaminated and irradiating mud came up while 45 years of uranium mining was carried out by the "Deutsch-sowjetische Wismut Gesselschaft" (German Soviet Wismut Company). At least 5000 humans lost their life by occupational disease in that period.

But instead of trying to solve the biggest ecological problem in East Germany at the places of the highest risks, renovation of dangerous radio-active waste doesn't take place because of a chaotic situation with regard to finances and competencies with authorities.

Georg Heydecke from BUND said in this context: "Competencies between the 'BMD' (Federal Ministry for Environment), the 'BWiM' (Federal Ministry of Economic Affairs), the 'BfS' (Federal Department for Radiation Protection), the Wismut Company, mining authorities and Ministries of the provinces are rather unclear. Besides that, different interests came into being. One of the involved authorities already concluded in the
meantime that there is an emergency situation and German law is not suitable to solve it. Some Federal Departments could take advantage of this situation - as Georg Heydecke thinks - to ignore the observance of some goals in the law such as protecting the local population. By doing so they want to keep the costs for renovation as low as possible".

After German reunification the Federal government has taken economical responsibility for all consequences from the mining activities of the "Deutsch-sowjetische Wismut-Gesellschaft".

However the same government refuses the renovation of harmful radioactive waste that was accumulated in the forties and fifties. In the view of the Federal government local authorities and new owners should pay for the cleanup of this harmful waste. Background of that decision is that the planned DM 15 billion (US$8.6 bil-lion) are not sufficient for the entire renovation.

According to Georg Ueydecke, "the Federal Ministry of Economic Affairs is not willing to support local authorities to solve this gigantic financial problem. Besides that, construction of a hazardous waste dump in the middle of an irradiated slag-heap as planned, makes an optimal renovation on a later date impossible. In general a coherent and clear concept for a renovation the legislature determines no standards and prevailing conditions".

"It is a scandal that until now no authority could give any statement regarding the radiation exposure to the population in a way that it is comprehensible to all", criticizes Georg Heydecke.

As immediate measurements scientists from the "Öko-Institut" are demanding to fill some of the radio-active slag-heaps in shafts and pit-holes of the former uranium mines. Others have to be moved to suitable places or covered for the time being.

Finally the "Öko-Institut" criticized the Federal government for treating the affected people in East Germany as second class citizens. They are exposed to higher radioactive doses as permitted in the West. The real radiation doses is partially over 10 Mili-Sievert per year and therewith thirty times as high as permittable in West-Germany.

This is possible under German law: In the reunification treaty a passage is included to regulate this. The old GDR maximum permissible limit for radiation exposure, which was higher than in West Germany, is still into force in East Germany. A lawsuit against this discriminating law, filed by several local authorities and private persons, will be decided in the coming months by the Federal Constitutional Court.

Source: Fax from BUND Zwickau (FAG), 5 April 1994; die tageszeitung (FAG), 15 March 1994

**Russia**

**Ecologists Decry Arrival of Nuclear Waste**

By Irina Titova

Special to The St. Petersburg Times

About 30 members of St. Petersburg’s ecological organizations protested on Thursday the transportation of nuclear waste* from other countries to Russia.

“No to the Import of Nuclear Waste!” read the slogan held by a group of ecologists in front of Avtovo metro station — the area of the city through which trains transporting nuclear waste from Europe usually pass.
“We are protesting nuclear transportation through St. Petersburg,” said Rashid Alimov, co-chairman of the ECOperestroika ecological organization at a press conference on Thursday. “We also declare the start of a public campaign against the construction of a terminal for receiving radioactive waste cargo in the port of Ust-Luga,” he said. The protest was prompted by the arrival of the ship MV Schouwenbank loaded with 1,250 tons of depleted uranium hexafluoride from Germany to St. Petersburg on Thursday. It was the biggest transfer of German radioactive waste to Russia in history, ECOperestroika said.

“Another shipment of radioactive waste to Russia is arriving despite such activities being completely illegal, and in violation of the promises of the Russian Nuclear Energy State Corporation, or RosAtom, to stop the import of so-called uranium tailings,” Alimov wrote earlier on the organization’s web site.

“The transportation of such cargo is extremely dangerous. It is fraught with incidents in which containers have become depressurized, which can lead to the poisoning of a large number of people, and to the toxic and radioactive pollution of large areas, including Russia’s big cities,” he said.

Alimov said ecologists intend to measure radiation levels in the vicinity of the current cargo along its route through Russia.

At the end of the protest, police detained Alimov for what they called “the violation of fire safety rules and rules on holding public events,” said Vera Ponomaryova, representative of ECOperestroika.

Russia has already accumulated more than 700,000 tons of uranium hexafluoride. The uranium tailings being sent to Russia belong to Urenco, a western European company, whose shareholders are the two major energy firms E.On and RWE. Urenco has a contract with RosAtom, during the term of which cargos of waste have already been shipped to Novouralsk in the Sverdlov Oblast, Seversk in the Tomsk Oblast, Angarsk in the Irkutsk Oblast and Zelenogorsk in the Krasnoyarsk region.

The annual reports of Russian Technical Watch for 2003-2007 showed that the safety norms for the storage of such waste were not met at any of the enterprises in the above cities. The tailings are kept outside, and there were also cases of containers becoming depressurized, ECOperestroika said.

The transportation of the tailings began on the night of March 12 from a uranium plant in Gronau, Germany. The shipment of the cargo from railway sidings to the ship took 36 hours, the environmental group said.

Vladimir Slyvnyak, co-chairman of the Ecozashchita (Ecological Defense) group, said that when sending its tailings to Russia, Urenco tries to find the cheapest way to get rid of the responsibility for radioactive and toxic waste.

“We demand a stop to this cynical and immoral business that contradicts the Russian legislation,” Slyvnyak said.

From St. Petersburg port, the train with the tailings will go to the city of Novouralsk. The train travels through St. Petersburg, passing by residential buildings, ECOperestroika said.

Last year a train carrying similar nuclear waste from Germany was discovered by ecologists near residential buildings in the city’s Avtovo district. The ecologists measured the radiation background near the containers and found that it exceeded the normal level of background radiation by 30 times, environmental groups said.
Oleg Bodrov, head of the Green World ecological organization based in the town of Sosnovy Bor in the Leningrad Oblast, said that the Ust-Luga port west of St. Petersburg is currently building new infrastructure for the import and export of nuclear materials. In two years cargos of nuclear waste will be transported via Ust-Luga, he said. “This is a threat for the Kurgalsky peninsula,” Bodrov said.

Nuclear experts recognize the danger from the transportation of uranium tailings. The British nuclear company BNFL has said that “the sudden emission of a large quantity of uranium hexafluoride, if taken by the wind, may lead to a large number of victims. Theoretically, in certain weather conditions the deadly concentrations may spread over a radius of 32 kilometers from the place of emission.”

RosAtom’s press-service said on Thursday that deliveries of depleted uranium hexafluoride or OGFU is carried out on the basis of contracts signed by Technabexport in the mid 1990s, and that the ministry will end the agreement in 2009-2010, Interfax reported.

“In 2009-2010 the old contracts on the additional concentration of OGFU will run out, and we will not prolong them or sign new contracts,” said Igor Konyshyev, head of RosAtom’s public relations department. “We said it in 2007, and we will keep our word.” Konyshyev said the “various enterprises of RosAtom possess more effective technologies for the enrichment of uranium than European enterprises.” Russian technologies enable OGFU of European origin to be used as a raw material for producing U-235 — the isotope used for the production of fuel for nuclear power stations, he said.

Starting in 1996, under such contracts Russia has received more than 80,000 tons of uranium tailings from Europe. Ecologists say that by the end of 2009, another 20 tons of waste is to be delivered to Russia.

Russia and other countries have currently accumulated several million tons of OGFU. In the U.S. such waste officially became considered as radioactive waste in 2005. European countries do not consider the substance to be radioactive waste, and send it for burial to Russia.

RosAtom head Sergei Kiriyenko said earlier that after the OGFU is enriched in Russia, it is returned to its country of origin, Interfax reported.

Protests against the import of nuclear waste to Russia are also taking place in other Russian cities, including Yekaterinburg. On Monday ecologists plan to hold a protest action in front of RosAtom’s office in Moscow.

*Note: It is not nuclear waste that is being protested against, but uranium hexafluoride, which the article goes on to make clear.*- DL

**BELLONA: Roundtable discussion of uranium tail transports through St. Petersburg provides no reassurances on city's safety**

The St.Petersburg Times, Friday, September 26, 2008

ST. PETERSBURG – A roundtable discussion on depleted uranium hexafluoride imports to Russia hosted by the Bellona and Ecodefence environmental organisations, and the local newspaper Moi Raion (My
Region) provided a frightening glance at what disasters may loom as a result of transporting the lethal loads of radioactive waste (comprising depleted uranium tailing) through this city of 5 million people.


Ecologists: 10,000 Tons Of Waste Headed for City
By Galina Stolyarova

Up to 10,000 tons of depleted uranium hexafluoride are expected to travel through St. Petersburg in the next six months, according to the local branch of the international environmental pressure group Bellona. The next cargo is expected to arrive in town in early October.

Arriving by sea, the radioactive material will then be sent by rail to the town of Novouralsk in Siberia for reprocessing and storage. Most of the cargo arrives in Russia from the Netherlands and Germany but Russia has signed contracts with India, Pakistan and China — states that are rapidly bolstering their nuclear programs — and looks set to receive even more spent nuclear fuel and uranium hexafluoride for reprocessing.

"Alarmingly, the trains that carry the hazardous cargo originate at the Avtovo railway station, very near residential areas," said Rashid Alimov, head of Bellona's St. Petersburg branch, at an environmental conference on nuclear safety this week. "Worse, as our investigations have shown, most of the locals in the area have absolutely no idea about the risks that they are regularly being exposed to as a result of the dangerous transfers."

According to official sources, cargos containing depleted uranium hexafluoride arrive in the city on average ten times a month.

Alimov said radioactivity levels near the trains have significantly exceeded the norm on several occasions over the past year.

"For example, when we measured the levels in March 2008, our equipment showed 680 microroentgen per hour, which is a health-threatening level: the norm is less than ten percent of that amount," Alimov said.

The environmentalists described "a cloud of secrecy" surrounding nuclear transportation.
"We are especially worried by the fact that Russian environmental groups are constantly denied any opportunity of an independent control and monitoring of the traffic," Alimov said. "Despite numerous requests, officials have refused to inform us about rescue or clean-up plans that would be implemented should an accident happen."

The authorities insist they are in full control and do not welcome any help from ecological groups.

Speaking at the conference earlier this week, Oleg Muratov, head of the public council of the Russian Atomic Energy Agency, said there has not been a single road accident involving radioactive materials during the history of its transportation in the country.

"The nuclear industry is crucially important for Russia; our country provides nuclear fuel for every third nuclear reactor in the world," Muratov said. "This earns the state budget a tremendous amount of money: the export of nuclear fuel is Russia's third most profitable export, after the export of oil and gas."

Tatyana Minina, a spokeswoman for the Oktyabrskaya Railroads, said her company has invested over 100 billion rubles into enhancing the safety of trains — both passenger and cargo trains — over the past five years.

"We also have our own environmental monitoring service and provide a round-the-clock control over leaks, crashes or any other potentially dangerous situations," Minina said.

Alimov warns, however, that transport accidents are still very common in Russia, with trains sometimes colliding or going off the rails and even falling off bridges.

"Russia's transport system is not immune to accidents and if an accident involving radioactive material happens in St. Petersburg, the price that the city would pay would be much too high," Alimov said. "If a transport accident occurs that breaks the hermetic seal of a container which is loaded with spent nuclear fuel, it may result in lethal cases of radiation poisoning in a 32-kilometer radius from the site of the spill."

Igor Merkushev, a lawmaker with the St. Petersburg Legislative Assembly, said the parliament's Health Care and Environment Commission will investigate the details of the transport of nuclear materials. The deputy also said the assembly is working on a law on radiation safety and has discussed the possibility of persuading the federal
authorities not to allow nuclear traffic to pass through St. Petersburg.

Protest in Irkutsk against import of depleted uranium tails from Western Europe to Russia [http://www.wise-uranium.org/eproj.html]
ANGARSKIEC (Ecodefense Oct. 12, 2006)
Protest in Moscow against import of depleted uranium tails from Germany to Russia
On Oct. 12, 2006, environmentalists staged a brief protest in front of Germany's embassy in Moscow against long-standing shipments of German nuclear waste to Russia. Brandishing a banner scrawled with "Stop the entry of nuclear waste", a dozen Germans and Russians demonstrated for about 10 minutes before the Russian protesters were seized, handcuffed and hauled away by police.
"German authorities must stop burying radioactive waste in Russia which threatens the health of future generations of Russians," Vladimir Slivjak of the Russian environmental group Ecodefense, said in a statement. "German authorities must not take advantage of the fact that the Russian atomic industry can violate laws and ignore public opinion," he added.
According the Ecodefense, some 100,000 tons of nuclear waste have been imported to Russia over the past decade. Up to 90 percent of the waste is stored by Russian companies, awaiting final disposal, the group said. The radioactive material arrives in Saint Petersburg's port in the northern part of the country, Ecodefense said, where it is carried by train toward the Ural mountains, and western and eastern Siberia.

Protests in Tomsk against import of depleted uranium tails from Western Europe to Russia
On August 1, 2006, activists from ten Russian cities protested in Tomsk against the import of depleted uranium tails from Western Europe for re-enrichment in Russia. They were participants of an anti-nuclear camp held by the organisation Ecodefense from July 26 to August 3, 2006. (Ecodefense July 26 and Aug. 1, 2006)
Russia could expand re-enrichment of foreign depleted uranium tails
Russia could increase its share of the global market for the treatment of depleted uranium to 45% by 2010, from 40% at present, Vladimir Korotkevich, director of the state-owned Siberian Chemical Combine at Tomsk, told reporters. He also said that Techsnabexport, the Russian government's authorized exporter of nuclear materials and nuclear power plant fuel, had contracts worth more than $3 billion annually to process depleted uranium hexafluoride from abroad. This does not include contracts signed under the Megatons to Megawatts deal with the United States. (Interfax Dec. 28, 2005)
Ecodefense calls for end of import of depleted uranium tails from Western Europe to Russia, releases detailed report on re-enrichment business
On August 2, 2005, Ecodefense Russia held a press conference in Moscow demanding an end to the imports of depleted uranium tails to Russia for re-enrichment. Since the secondary tails remain in Russia, the import would represent an illegal import of radioactive waste.

UNITED STATES OF AMERICA
By Brenda Norrell

TUCSON, Ariz. -- Indigenous Peoples from throughout the Americas fighting mining gathered to organize and support one another to halt the mining destroying their communities and the environment. The first in the series of articles focuses on the delegation from Peru, fighting copper mining and the poisoning of water sources.

Coal, gold, silver, copper and uranium mining in Indigenous territories has reached the level of a global crisis. Nikos Pastos of Alaska's Big Village Network said climate change and melting ice, combined with oil drilling, result in unprecedented dangers for polar bears, walruses and whales.

On the Navajo Nation and near its borders, proposals for new uranium mines, coal mining and the Desert Rock Power Plant pose threats to land and air already heavy with toxins. Manny Pino, Acoma Pueblo, said the sacred sites endangered by new proposed uranium mining include Mount Taylor in New Mexico, sacred to Pueblos, Navajos and other tribes in the region.

At the root of the problem, says Western Shoshone Carried Dann, are the IRA tribal governments who are acting in the best interest of energy companies, rather than the best interest of the people.

http://bp3.blogger.com/_McMU28y8NxQ/Rv9ERoEgvXI/AA

Uranium Milling and the Church Rock Disaster

Extracted from 'Killing Our Own' (1992)
Chronicling the Disaster of America's Experience with Atomic Radiation, 1945-1982
By Harvey Wasserman & Norman Solomon, with Robert Alvarez & Eleanor Walters

Church Rock, New Mexico, would seem an improbable spot for a nuclear disaster. A dusty cluster of industrial machinery set in the arid mesas of the great Southwest, its most distinguishing feature might be considered a large pond of murky liquid, unusual in such dry terrain. Church Rock also hosts a series of underground uranium mine shafts, a mill, and a scattered community of Navajo families who survive by herding cattle, goats, and sheep.

A deep gully leads from the mine site into the Rio Puerco, which once flowed only when fed by spring rains. Now it is wet year round, bolstered by water pumped from the mine shafts to keep them from flooding. That water flowing from the mine is laced with radioactive isotopes. And the pond hides a burden of contaminated waste.

The 350 families who water livestock in the Rio Puerco rely on their small herds to eke out a meager existence. Many are members of the Dine--Navajo--Nation, with incomes in the range of two thousand dollars per year. During the hot days of the desert summer local children would play in the stream as their parents tended the goats, sheep, and cattle.

A Wall of Radioactive Water
In the early morning hours of July 16, 1979--fourteen weeks after the accident at Three Mile Island--all of that changed. The dam at Church Rock burst sending eleven hundred tons of radioactive mill wastes and ninety million gallons of contaminated liquid pouring toward Arizona. The wall of water backed up sewers and lifted manhole covers in Gallup, twenty miles downstream, and caught people all along the river unawares. "There were no clouds, but all of a sudden the water came," remembered Herbert Morgan of Manuelito, New Mexico. "I was wondering where it came from. Not for a few days were we told."[1]

No one was killed in the actual flood. But along the way it left residues of radioactive uranium, thorium, radium, and polonium, as well as traces of metals such as cadmium, aluminum, magnesium, manganese, molybdenum, nickel, selenium, sodium, vanadium, zinc, iron, lead and high concentrations of sulfates.[2] The spill degraded the western Rio Puerco as a water source. It carried toxic metals already detectable at least seventy miles downstream.[3] And it raised the specter that uranium mining in the Colorado River Basin may be endangering Arizona's Lake Mead, and with it the drinking water of Las Vegas, Los Angeles, and much of Arizona.

Except for the bomb tests, Church Rock was probably the biggest single release of radioactive poisons on American soil. Ironically it occurred thirty-four years to the day after the first atomic test explosion at Trinity, New Mexico, not far away.

The source of the catastrophe was uranium mill wastes. Usable uranium is extracted from the sandstone in which it is usually found by grinding it fine and leaching it with sulfuric acid. The acid carries off the desired isotopes. But the leftover waste sands--"tailings"--still contain 85 percent of the ore's original radioactivity, and 99.9 percent of its original volume. There are now some 140 million tons of them scattered around the West. NRC commissioner Victor Gilinsky and others consider them "the dominant contribution to radiation exposure" of the entire nuclear fuel cycle.[4] The acid milling liquids--called "liquor"--also dissolve dangerous traces of thorium 230, radium 222, lead 210, and other isotopes. Because of their high radioactivity the tailings and liquor both must be isolated from the environment--but nobody has yet demonstrated a method with any long-term success.

At Church Rock several hundred million gallons of the liquor were being held in a large pond so the liquids could evaporate off and the solid tailings be stored. The whole complex was owned by the United Nuclear Corporation (UNC), a Virginia-based firm with assets in the hundreds of millions of dollars and influence in the New Mexico state government. Its dam and pond at Church Rock were opened with the understanding that they would operate just eighteen months; twenty-five months later, at the time of the accident, no alternative sites were being developed.

The UNC dam wall was an earthen structure with a clay core, twenty-five feet high and thirty feet wide. On the morning of the accident a twenty-foot-wide section of it gave way, wreaking havoc downstream. In the desert, water is synonymous with life. In contaminating the Rio Puerco, UNC had threatened the basis of existence for all of the people who lived downstream. For the first time they confronted the terrors of radioactivity. "Our hearts have been broken," said Bodie McCray of Tsayotah. "We don't sleep worrying about it. I worry about our children and their children."

Indeed the hundreds of families living near the spill now had to live with the same kinds of uncertainties just beginning to plague the people of central Pennsylvania. "Ever since
the accident we've been wanting the truth," said Kee Bennally, a silversmith playing a lead role in the multimillion-dollar lawsuit against UNC. "They say it's not dangerous and in a couple of days they say it is dangerous. It's been really confusing, especially for the old people. They don't know anything about this, the contamination, the radiation. . ___”[5]

What made the Church Rock disaster especially tragic was that it could have been avoided. Soon after the spill an angry U.S. representative Morris Udall (D-Ariz.) told a congressional hearing that "at least three and possibly more Federal and state regulatory agencies had ample opportunity to conclude that such an accident was likely to occur." Even before the dam had been licensed "the company's own consultant predicted that the soil under this dam was susceptible to extreme settling which was likely to cause [its] cracking and subsequent failure."[6]

Cracks had developed in the dam the year it opened, said Udall. Aerial photographs revealed that liquor, which was supposed to be kept away from the dam face, was lapping against it. State-required seepage devices and monitoring wells had never been built or inspected for.[7]

UNC's chief operating officer, J. David Hann, countered Udall by blaming the accident on "a unique rock point, beneath the breach." Because the dam had been built partly on bedrock and partly on softer ground, that rock point "served as a fulcrum, resulting in transverse cracking." The breach was "like many things you undertake," Hann told the congressional hearing. "They have a risk, and we undertook this. There was a circumstance that was not foreseen at the time."[8]

But coming in the wake of Three Mile Island, and in light of considerable evidence of impending disaster, Hann's arguments seemed to carry little weight. In a special report the U.S. Army Corps of Engineers charged that if the dam had been built to legal specifications, according to approved design, "it is possible that the failure would not have occurred."[9] And a spokesman from the New Mexico State Engineer's Office added that a "consensus" of engineers who reviewed the accident agreed that "had the drain zone been constructed according to the approved plans and specifications, and had the tailings beach been in place as recommended by [UNC's] engineers, it is likely that failure would not have occurred."[10]

At the time of the disaster the dam was carrying a load of tailings liquor at least two feet higher than allowed for in its designs. The company had also failed to tell the state that cracking had been observed. "There were significant warnings appearing before the dam broke," said William Dircks, director of the NRC's Office of Nuclear Material Safety and Safeguards. "I think that is the troubling part of it."[11]

Ultimately, for the company, the accident would mean a loss of some revenue and bad publicity. For the people downstream life itself was at stake. "Somehow," complained Frank Paul, vice-president of the Navajo Tribal Council, "United Nuclear Corporation was permitted to locate a tailings pond and a dam on an unstable geologic formation. Somehow UNC was allowed to design an unsafe tailings dam not in conformance to its own design criteria. Somehow UNC was permitted to inadequately deal with warning cracks that had appeared over two years prior to the date the dam failed. Somehow UNC was permitted to continue a temporary dam for six months beyond its design life. Somehow UNC was permitted to have a tailings dam without either an adequate
contingency plan or sufficient men and material in place to deal with a spill. Somehow UNC was permitted to deal with the spill by doing almost nothing."[12]

Ironically the Church Rock dam was a "state-of-the-art" structure. Paul Robinson, an Albuquerque-based expert on mining issues, warned the Udall hearings that "UNC-Church Rock was the most recently built and the most carefully engineered tailings dam in the state." Similar dams owned by Anaconda, Kerr-McGee, UNC-Homestake Partners, and Sohio were "disasters waiting to happen."[13]

1. Kathie Saltzstein, "Navajos Ask $12.5 Million in UNC Suits," Gallup Independent, August 14, 1980 (hereafter cited as "Navajos"); for a general analysis of the relationship between Indians and uranium development, see Joseph G. Jorgenson, et al., "Native Americans and Energy Development" (Cambridge, Ma.: Anthropology Resources Center, 1978); for a broad range of information on the issue of uranium mining and milling, contact the Black Hills Alliance, Box 2508, Rapid City, SD 57709.
7. Ibid.
8. Ibid., p. 120.
9. Ibid., p. 3.
10. Ibid., p. 42.
11. Ibid., p. 39.
12. Ibid., p. 8.

Thorium and Other Damage

Soon after the spill UNC sent small crews downstream with shovels and fifty-five-gallon drums to begin cleaning up. Bitter complaints from local residents and the state soon forced UNC to expand its crews to thirty to thirty-five workers. "We have removed more than 3500 tons of potentially affected sediment from the streambed to a distance of more than 10 miles from the mill," Hann told the Udall hearings. "The combination of
these clean-up efforts, and natural effects, such as rain, have largely restored normal conditions in the area."[14]
But an Arizona water-quality official complained in an interview with us that the rains had merely transported the pollutants into his state.[15] And Robinson pointed out that UNC had in fact removed just 1 percent of the tailings and liquid known to have spilled from the dam. More than eighteen months after the accident indications were strong that radiation and other pollutants had penetrated thirty feet into the earth. A report by a Cincinnati-based firm brought in as a consultant by the EPA warned that at least two nearby aquifers had been put "at risk."[16]
Furthermore when the spill overflowed the banks of the Rio Puerco, it left behind a series of pools. When ordered by the state to monitor them, UNC chose to look for their uranium content.
But uranium was precisely what the company had been working to remove in the milling process. "It was a subterfuge on the company's part," said Dr. Jorge Winterer, an M.D. working with the Indian Health Service in Gallup at the time of the spill. "There were children up and down the river playing in those stagnant pools, and they were deadly poisonous. But UNC chose to monitor them for the element they knew was least likely to be there."[17]
In fact the NRC's William Dircks told the Udall hearing that those pools showed levels of radiation one hundred to five hundred times natural background. What UNC might have missed were substantial quantities of thorium 230 and radium 226. Both are alpha-emitters and are extremely dangerous if ingested or inhaled.
Thorium 230, for example, has a half-life of eighty thousand years and is believed by some to be as toxic as plutonium. A silver-white metal, thorium tends to deposit in the liver, bone marrow, and lymphatic tissue, where even minute quantities can cause cancer and leukemia. If inhaled as dust it can cause lung cancer. According to a study by Winterer, under some circumstances thorium can become "trapped" in the body, making it "a permanent source of radiation" there, and thus doing untold damage to the human organism.[18]
Winterer soon came under personal attack in the wake of his candid comments. UNC was a power in state politics. It had twenty-three hundred employees and an annual budget within New Mexico of $140 million.[19] When Winterer contradicted assertions from his superiors that there were no health effects from the spill, he was threatened with legal action. And when he began holding seminars in the local library on the dangers of radiation, Winterer was told by a former friend that he and his family "would be a lot better off if we got out of New Mexico right away."[20]
Jorge Winterer was not the only one concerned about UNC's assessment of the spill. Dr. Thomas Gesell, a health physics professor at the University of Texas School of Public Health, and a staff member of the Presidential Kemeny Commission on the effects of the accident at Three Mile Island, also testified at the Udall hearings. Gesell said UNC's monitoring data were self-contradictory and out-of-phase with the state's. One UNC report had listed background levels as being lower after the spill than before it. Some company reports on downstream radiation levels claimed findings 150 times lower than the state's.[21]
Meanwhile contamination had apparently spread to local animals. One veterinarian told a documentary crew from Eleventh Hour Films that abnormal radiation levels had been
found in the tissues of goats and sheep that were drinking Rio Puerco water.\[22\] A
study of eleven animals by the Center for Disease Control confirmed the problem. The
CDC warned that kidneys and livers of local livestock might concentrate high doses and
should not be eaten.
The CDC also warned locals not to drink water from the river, and to avoid its banks
during windstorms, when radioactive particles might be more easily inhaled. The CDC
emphasized that radiation levels in local animals did not exceed New Mexico standards.
But it was important to exercise caution because "the health risks of low doses of
radiation" were "not completely understood."\[23\]
A year after the spill Cubia Clayton of the state's Environmental Improvement Division
confirmed that the Rio Puerco was still too dangerous for human or animal
consumption. Clayton stated that it was "obvious" that "there has been some buildup of
radiation" in some of the animals tested.\[24\]
Ironically some of those animals had drunk upstream of the spill, indicating the stream--
fed by water pumped out of the uranium mines--may well have been contaminated even
before the accident.
Soon after the dam break, two West German radiation biologists, Bernd Franke and
Barbara Steinhilber-Schweb, sharply criticized the CDC report for downplaying the
potential dangers of the accident and for sampling too few of the local livestock. They
urged chromosome checks on area residents and called for the establishment of cancer
and birth registries as well as intense ongoing radiation monitoring in the area. They
also warned that thorium and other isotopes from the spill could enter the human body
not only through eating contaminated animals, but also when radioactive dust settled on
vegetables.\[25\]
Dr. Carl Johnson, director of Colorado's Jefferson County Health Department, further
warned that detectable radiation levels in the tissues of children might only surface
"over a period of many years." Dangerous levels of thorium, radium, and other isotopes
could build up through the ingestion of contaminated food, air, and water. Thus he too
urged careful monitoring of local children, plus a shutdown of the mines and mills until
the public had determined that "a satisfactory method for preventing a subsequent
incident" had been found.\[26\]
But the UNC mine and mill were back in operation in less than five months. The same
pond was in use. Some changes were made in the dam, but constant seepage--up to
eighty thousand gallons of contaminated liquid per day--had become a mainstay.\[27\]
UNC had promised to provide local residents and their animals with clean drinking
water. But an Arizona newspaper confirmed that the company was delivering just half
the promised amounts.\[28\] A request by some of the downstream residents for
emergency food stamps to replace their lost livestock was denied by the government.
And at least one family was forced to eat a sheep known to have ingested radioactive
residues. "If you come to Lupton, you will see a lot of shepherds running along the side
of the wash trying to keep the sheep out," said Navajo shepherd Tom Charlie.
The UNC had put up signs saying "contaminated wash, keep out. But our cows, sheep
and horses can't read that. Most of us can't read, write or speak English. The signs do
no good. If [neighbors] know we are from the Rio Puerco wash, they won't shake our
hands," he added. "They think we have a high level of radiation. They ran from me.
They are afraid of us. That's why people look at us, that's why no one comes to help us.
It is wet now, but on days when it dries up, the wind will come along. The dust settles on the grass. The sheep eat it. We eat the sheep. We wonder what that does to our lives."[29]

_14. Ibid., pp. 120-121._

15. Swanson interview.


20. Winterer interview.


22. Allan Shauffler, interviewed for In Our Own Back Yard.


25. Bernd Franke and Barbara Steinhilber-Schwab, press statement, Albuquerque International Airport, Albuquerque, N.M., July 24, 1980. The question of contamination in local humans did come up when seven local residents were sent to Los Alamos for testing. Seven months later reports indicated no contamination. But it was soon discovered that the equipment used to measure the radiation levels was not capable of recording small doses--doses that were nonetheless large enough to do harm. See Shuey, "Calamity," Part 2, pp. 5-6.


27. Robinson interview.


29. Saltzstein, "Navajos." In a July 1981 letter to authors, Edwin Swanson said the state of Arizona asked UNC to post signs along the river as far as Navajo, Arizona, but that the company did not do it.

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Tailings Forever

Church Rock was the biggest tailings spill on record, but it was not the only one. And though the Navajo and other New Mexicans nearby were the most directly affected, people as far away as Los Angeles had cause for concern. As Congressman Udall put it, Church Rock fit a pattern of "sloppy and haphazard" handling of mill tailings throughout the nation. Other spills, he said, had dumped "millions of gallons of hazardous liquids" and jeopardized the water supply of much of the West.[30] In fact NRC statistics acknowledged at least fifteen accidental releases of tailings solution from 1959 to 1977, including seven dam breaks, six pipeline failures, and two floods. In at least ten of the events radioactivity reached a major watercourse.[31] One accident cited by Udall sent twenty-five thousand gallons of slurry directly into the Colorado River. A flood washed some fourteen thousand tons of tailings directly into Utah's Green River.[32]
At Durango, Colorado, a huge hundred-foot-high tailings pile sits just sixty feet from the Animas River, a tributary of the Colorado. The state Department of Health has found abnormal radium levels in water thirty miles downstream.[33] According to Washington-based uranium expert David Berick operators of the Durango mill "just took the residues and threw them in the river. There's really no way of knowing how much of it went how far downstream."[34]

Because the milling process renders many of the isotopes in the tailings highly soluble, they can be washed into streams and water tables by rain. A 1979 Oak Ridge National Laboratory study noted groundwater contamination at two New Mexico tailings piles.[35] Company records admit to severe groundwater contamination at Colorado's Uravan mill.[36] One tailings dam near Wyoming's Sweetwater River failed six times between 1957 and 1979 and was reporting a daily seepage rate of 1.7 million gallons.[37] And a major 1976 EPA study indicated that some 200,000 kilograms of dissolved uranium had been introduced to subsurface water by seepage and "direct injection" at mills belonging to Anaconda and Kerr-McGee. The study warned the problem was widespread: "The stark contrast between a typical 20-year mill life and an 80,000-year half life for the dominant radionuclide (thorium 230) necessitates a much greater forward look than is now evident in waste disposal practices and preservation of ground-water quality."[38]

Nor has the problem stayed underground. As early as 1964 the Federal Water Pollution Control Administration told a congressional hearing that fish caught downriver from the Naturita and Uravan uranium mills showed higher radium concentrations than those caught upriver. Downriver hay samples also showed contamination, as did cows' milk. "In this case," said the authorities, "the prime source of radium intake for the cows is believed to be from eating hay irrigated with contaminated river water."[39]

As for Church Rock, Edwin Swanson, a water-quality expert for the state of Arizona, told us traces of the spill--though dilute and possibly undetectable--would eventually reach Arizona's Lake Mead, 470 miles downstream.[40]

And though most of America's uranium mills seem far removed from major population centers, concern is growing for such crucial water sources as Lake Mead, which supplies southern California, Las Vegas, and parts of Arizona with much of their drinking water.

The huge reservoir sits downstream from numerous uranium mining and milling operations. The distances are sometimes great, but so are the half-lives of many of the isotopes slowly making their way downriver. As early as 1972, H. Peter Metzger, writing in The Atomic Establishment, warned that bottom sediments in Lake Mead were showing three times the concentration of radium as similar sediment samples taken upstream of the uranium mills.[41]

The implications of a contaminated Lake Mead, and of a radioactive western water system, are catastrophic. But the uranium problem involves an immense volume of tailings and is not limited just to water quality.

According to the Government Accounting Office (GAO) at least twenty-two uranium mills had shut down on the continental United States by 1978. They left behind some twenty-five million tons of tailings in "unattended piles and ponds" in eight western states plus Pennsylvania and New Jersey. Another sixteen mills were in operation, with an additional 115 million tons on site--bringing the total to 140 million tons. In the early 1980s another six to ten million tons of tailings were being produced per year. Based on
high growth estimates, the NRC in 1981 predicted another 109 mills could be operating by the year 2000 producing 470 million more tons of tailings and scores of acid ponds like the one at Church Rock.[42] One estimate from Los Alamos Laboratory put the total far higher, predicting 900 million tons of tailings by the year 2000 in New Mexico alone.[43] Such a total would involve some twenty trillion cubic feet of tailings.

And the piles threaten air as well as water, a problem considered by many experts—including NRC Commissioner Gilinsky—even more serious than the better-known "high-level" wastes from reactors and bomb factories. The reason is radon gas, the same deadly substance that has caused a five-fold increase in lung cancer among uranium miners. Because radon is a gas, it is possible, as Gilinsky said, "for large populations thousands of miles away from the source to be exposed, albeit to an extremely low dose."[44]

In fact the NRC has attempted to present long-term calculations for New Mexico tailings-gas emission levels in such distant locations as Los Angeles, Chicago, Miami, Washington, D.C., and New York City.[45] NRC staff member Reginald Gotchy told us that despite its short half-life (3.8 days) radon gas from a tailings pile in New Mexico can carry to the East Coast of the United States. On its way contamination would appear "on grain grown in the Midwest" and elsewhere. "This stuff," he said, "goes everywhere." Gotchy hastened to add that he and the NRC consider the doses "minuscule."[46]

But in 1977 Dr. Chauncy Kepford, a chemist based in State College, Pennsylvania, testified during hearings on the license for Three Mile Island Unit 2 (which caused the 1979 accident) that the quantity and health effects of radon tailings emissions had been vastly underestimated. Kepford stated that the NRC had failed to account for continued emissions over the full decay chains of the elements involved. Assuming a stable human population and society, he estimated that tailings from the fuel needed to operate TMI-2 for just one year could cause a million cancer cases over time.[47]

In 1978 Dr. William Lochstet of Pennsylvania State University argued that the operation of a single uranium mine could result in 8.5 million deaths over time.[48] And Dr. Robert O. Pohl of Cornell told the NRC that the potential health effects from mill tailings could "completely dwarf" those from the rest of the nuclear fuel cycle and add significantly to the worldwide toll of death and mutations.[49]

The essence of those conclusions was substantiated, surprisingly, from within the Nuclear Regulatory Commission itself. In the fall of 1977 Dr. Walter H. Jordan of the commission's Atomic Safety and Licensing Board wrote an internal memorandum arguing that the NRC "had underestimated radon emissions from tailings piles by a factor of 100,000."

Because of the long half-lives of the isotopes in the solid tailings, radiation will continue to be emitted from the tailings piles for billions of years. Said Jordan: "It is very difficult to argue that deaths to future generations are unimportant."[50]

In estimating the long-term effects of radon gases, the NRC assumed the tailings piles would be covered with dirt. The belief is that covering the piles will trap the gas and force it--after its relatively short half-life--to deposit its radioactive "daughters" in the form of less mobile solids.

But questions have been raised about how long dirt covering the piles would last through the millennia the tailings will be radioactive. Or if the piles can actually be covered at all. In some instances they are a hundred feet high and more, and cover hundreds of acres of ground. Huge strip-mining operations would be required just to get enough soil to do the job.[51]

The NRC has also considered returning the tailings to the mines from which they came. In some instances the procedure may be viable. But many workers would be contaminated in the process, and much fuel consumed. One estimate for removing the Durango tailings involves 65,860 trips with twenty-five-ton dump trucks. Returning the 140 million tons of tailings now lying around the U.S. would require more than 5.5 million such truck trips.[52]

In the meantime NRC Commissioner Gilinsky has warned that "none of the abandoned sites can be considered to be in satisfactory condition from the long-term standpoint."[53] In fact most of the piles continue to lie exposed to the winds and rain. Residents of Durango, Colorado, have experienced plumes of dust towering thousands of feet in the air, covering cars and houses with radioactive dust. Children have played in the "dunes." The piles were "the biggest, best sandpile in the world," Greta Highland of Durango told the High Country News. "After school my friends would sneak into the mill yard and play in the tailings."[54]

But the consequences may be lethal. High levels of background radiation from thorium, for example, have been linked to spontaneous abortion and mental retardation.[55] Leukemia and lung-cancer rates in south Durango, near the piles, have been reported higher than the rest of the town and the state.[56]

And Monticello, Utah (population: 1900), has also reported problems. From 1949 to 1960 the town hosted a large uranium mill, which processed weapons material for the AEC. In the mid-1960s four young residents died of leukemia. A fifth began a long battle against it. In a normal town Monticello's size just one case would be expected every twenty-five years.

A preliminary study by the Center for Disease Control concluded that "there appears to be no relationship" between the mill and the leukemias. But the authors conceded that such a high leukemia incidence "would be expected to occur in fewer than one of 1,000 towns this size or smaller during the same period of time." The report also said that gamma readings at the perimeter of the tailings areas "ranged up to twenty times background" and that "a nuisance and possibly a hazard also existed due to blowing of the tailings as they dried out."[57] All five of the young victims had grown up within a half mile of the mill. "For a place this small, it had to be something," said Dale Maughan, whose son Alan died of leukemia in 1966, at age sixteen.[58]

The damage has not been limited to humans. Farmers near the Cotter mill at Canon City, Colorado, have also complained of unexplained problems with their animals, problems reminiscent of those reported by Lloyd Mixon at Rocky Flats. Local residents Clarence Ransome and Wanda Bosco told us the illnesses among their livestock included diarrhea, weight loss, hair falling out, and difficulties in reproduction. Tests discovered contamination in at least one local well and in alfalfa being raised nearby. Bosco told us the problems with her animals disappeared when they were given uncontaminated water trucked in from town.[59]
The presence of uranium mining and milling has also been linked to high birth-defect rates in the states of New Mexico, Arizona, Colorado, and Utah. Overall conclusions are tenuous, complicated by a wide range of social and environmental factors. But Dr. Alan Goodman, director of Program Development for the Area Health Education Center at the University of New Mexico's School of Medicine, has cited "a disturbing pattern" of sex ratio changes and birth defects that correspond to "the same patterns of uranium mining and milling on the Colorado Plateau. I'm not saying that they are caused by uranium, but one would have to be a fool not to see that there is a possibility that they are related."[60]

Particular attention has been focused on the twenty-thousand-person community of Shiprock, New Mexico, where an abandoned 1.7-million-ton tailings pile covers seventy-two acres in the heart of town. According to Dr. Leon Gottleib, a pulmonary specialist long associated with the Indian Health Service, during the rainy season, water leaching through the tailings pile carries radioactive particles into the nearby San Juan River. "Children swim in the contaminated river; cattle drink from the river; and contaminated fish inhabit these waters," he told us in a letter. In windstorms, radioactive particles are blown into school and residential areas, as well as onto grazing and garden land.

In January 1981 Dr. Evelyn Odin, a Shiprock pediatrician, told The Albuquerque Tribune that she had been disturbed by the number of babies being born prematurely with small heads. One child, she said, was born with its esophagus and trachea joined together; another was born without an abdominal wall and with its intestines hanging out. Dr. John Ogle, also of Shiprock, hesitated to blame the defects on radiation. But he told the Tribune that "my gut feeling is that the incidence here is too high." Ogle said in six months he had seen three infants born with heart diseases two with cleft lips and palates, two with skull defects, two with Down's syndrome one with a section of backbone missing, and several with thyroid conditions.[61] A study by Sarah Harvey, director of the Community Health Representative Program, found a doubling of spontaneous abortions, stillbirths, and congenital abnormalities among children of uranium-mining families as opposed to nonminers. Her survey has formed the basis for an investigation of the area partially funded by the March of Dimes.[62]

Problems in the Shiprock area may be compounded by the fact that numerous local residents have built their homes with radioactive rock from the mines, or with tailings from the mills. The use of tailings as a building material was widespread throughout the 1950s and early 1960s. Despite repeated warnings from independent experts, the AEC did not investigate the possibility that such use of tailings could harm people.[63]

The carelessness has had a direct cost. In Grand Junction, Colorado, more than six thousand structures--including several schools--are now known to have tailings deposits in the building materials or in the landfill under them. Streets and sidewalks were also laid with them. In all at least 270,000 tons of tailings were used, resulting in dangerous radiation levels in many Grand Junction houses. A state- and federal-funded program that has thus far cost taxpayers at least $6.5 million has brought "remedial action" to only seven hundred sites. Costs have been estimated at fifteen thousand dollars per home and seventy-five thousand dollars per commercial building.[64]

For some the cleanup may have come late. A 1978 study by the state of Colorado indicated cancer rates in Mesa County, where Grand Junction is the prime population
center, showed an acute leukemia rate twice the state average. More women were suffering from the disease than men, an indication of radiation poisoning.[65] At Edgemont, South Dakota, an EPA study found sixty-four "hot spots" related to a nearby tailings pile.[66] In 1978 the Neil Brafford family was forced to abandon their home there when they learned it had been built on tailings. The basement in which their young son Chris lived showed radiation levels thirty-nine times normal background. Brafford had bought the house from a mill worker and only later discovered tailings had been used as backfill. "We don't know how much he used," Brafford explained, "but we do know that we're never going to live here again."[67] When they moved out, Brafford's young daughter stopped suffering from a long bout of diarrhea, which had begun when the family moved in. Laboratory tests showed that young Chris Brafford had broken chromosomes. He was also suffering from aching bones, a symptom of potential leukemia. In May of 1981 the Braffords filed a forty-million-dollar lawsuit against the Susquehanna Corporation, owners of the nearby tailings pile.[68]

31. Ibid., p. 9.
34. David Berick, interview, March 1981.
37. Ibid., December 14, 1979, p. 10.
40. Swanson interview.


46. Reginald Gotchy, interview, April 1981.


49. Robert O. Pohl, "In the Matter of Public Service Company of Oklahoma, Associated Electric Coop., Inc. and Western Farmers Coop., Inc. (Black Fox Station Units 1 and 2," testimony before the Atomic Safety and Licensing Board, Docket Nos. STN 50-556 and STN 50-557.


51. NRC, Radon 0757, p. 4-7.


57. Peter McPhedran and John R. Crowell, "Leukemia in Monticello, Utah," EPI-67-48-2, Memorandum to the Director, National Communicable Disease Center, Atlanta, July 5, 1967. See also, John R. Crowell and Clark W. Heath, Jr., "Leukemia in Parowan and Paragonah, Utah," EPI-67-70-2, memorandum to the Director, National Communicable Disease Center, Atlanta, April 26, 1967. In a June 1981 interview, Peter McPhedran told us a more detailed study of Monticello "looked like a good idea, but nobody asked us to pursue it any further." As a result, he said, the study was dropped. Area drinking water had not been studied.

58. Bill Curry, "Small Utah Town, 4 Leukemia Deaths," Washington Post, July 16, 1978. In a March 1981 interview Alan Maughan's mother told us she was certain the tailings piles had caused her son's death. Dr. Carroll Goon, whom we also interviewed, said the large number of leukemia cases surfacing at the same time did seem extraordinary, but that there was no conclusive proof they had been caused by the tailings. There has been, he said, "nothing like it since" in Monticello.
Canonsburg

Ironically one of the worst tailings problems occurred in a community east of the
Mississippi--Canonsburg, Pennsylvania, twenty miles southwest of Pittsburgh. As early
as 1911 the Standard Chemical Company was importing carload after carload of
radioactive ore from a mine at Montrose, Colorado, to extract uranium. At the time, it
took about five hundred tons of ore to produce a single gram of radium--a gram that
sold for up to $150,000.

There were few questions asked. In 1914 company president Joseph M. Flannery told a
local newspaper that radium would cure "such things as insanity, tuberculosis,
rheumatism and anemia, and a lot of cancers." Flannery and at least two other
principals in the company eventually died of radiation sickness.[69]

Standard Chemical and the companies that followed it quit the radium business in
Canonsburg in 1942. But by then the push was on to build the atomic bomb. The
government contracted in secret with the Vitro Corporation to extract leftover uranium
from the discarded ore.

When Vitro finished operations in the late fifties, it was ready to go into the waste-
storage business. At least 160,000 tons of radioactive residues were strewn around
Canonsburg, some of them lining the bottom of a three-acre lagoon where local children
regularly waded in the summer and skated in the winter.

In the early sixties the AEC allowed the lagoon to be filled in with tailings. It was an
extraordinary decision, since--contrary to regulations--the government did not own the
site. Health physicist Robert Gallagher, who performed a preliminary survey there,
called the move "incredible." He charged that the AEC approval was either "a special
favor or an oversight of gigantic magnitude."[70] As for the fill job, Joseph Swiger,
project manager for the dumping, termed it "the worst and sloppiest job I've ever worked
on." It was "morally objectionable," he told The Pittsburgh Press, "because the material was hazardous."[71]

In 1967 the site was sold for $130,000 to a local entrepreneur named Vaughn Crile, who was never warned that there might be a radiation problem. Crile built an industrial park on top of the tailings and brought in fourteen tenants along with his family business. The DOE surveyed the site in 1978 and found that the 125 workers there were being exposed to radon concentrations fourteen times above the level officially considered safe.[72]

The news was not well received by Crile's tenants. At least eight had left by early 1981. Workers were hesitant to take jobs there, and at least one claimed the place had ruined his health.

He was George Mahranus, a mechanic at the park for eight years, who finally quit in fear. "Towards the end," he told us, "I could hardly lift anything, couldn't pull on the wrenches. I got a soreness in my joints. Most of my hair fell out. My front teeth came loose on me. I never felt like this before in my life." Mahranus, who was in his forties, spent most of his working days on the plant floor, fixing tires and engines. "The radiation never occurred to me till they started drilling at the site to test for it," he said. "Then I decided to get the hell out of there." With just ten teeth left in his mouth and an unexplained lump behind his ear, Mahranus was apprehensive of doctors confirming his worst fears. "I do feel better since I left there," he told us. "But now I can't sit long and my fingertips go numb on me. I always did hard work. But now there's no way for me to go out and put in eight hours. It would kill me."[73]

Park owner Vaughn Crile was skeptical of Mahranus's claims, but was also deeply bitter toward the government, which he said had cost him thousands of dollars. "They should relocate us, but they're so ungodly slow," he complained.[74]

At least eighteen other radioactive "hot spots" were identified around town including a ballfield and an American Legion park. A spot near the lagoon registered five hundred times normal background levels.

Some locals complained that their gardens would not grow; others were warned not to eat the vegetables that did come up. A rain barrel at one Canonsburg home showed radiation levels eight thousand times background, while materials used to build one house registered 240 times the normal radium count. At least 150 homes were marked for decontamination.[75]

But, as at Grand Junction, the cleanup orders may have been too late. Epidemiologist Evelyn Talbott of the University of Pittsburgh studied the area. She told us preliminary figures indicated a lung-cancer rate twice normal among men over forty-five, and three times normal among men over seventy.[76]

Informal studies indicate things may be even worse. Agnes Engel, a mother of two in her late thirties and a lifelong resident, surveyed 150 of her neighbors. She found an astonishing fifty-three of them complaining of thyroid problems. Like scores of other local children, Engel had been drawn to the contaminated lagoon when she was young. Before it was filled in, she told us, "there were cattails and frogs there. It was an irresistible attraction."

But there had been no warning of the radioactive chemicals at the lagoon's bottom. Engel has since suffered from multiple health disorders including strange bleeding problems, a thyroid condition at age seventeen, a minimally brain-damaged son, a
hysterectomy at thirty-five. "My two sisters have also had similar problems," she told us. "And there are so many other women here who've had them . . . so many strange things. . . ."

72. Franklin, "U.S. Testing Workers."
74. Vaughn Crile, interview, April 1981.

Decommissioning of Moab, Utah, Uranium Mill Tailings
(17 Oct 2008)
http://www.wise-uranium.org/udmoa.html

Fourteen members of Congress criticize delays in cleanup of the Atlas uranium mill tailings pile
The lawmakers told Energy Secretary Spencer Abraham in a March 11, 2004, letter that his agency is taking too long deciding how to remove the massive mound of polluted waste from the banks of the Colorado River near Moab. And they also criticized his agency's refusal to identify which of five cleanup options the Energy Department favors in a soon-to-be-released draft cleanup plan. (Salt Lake Tribune March 19, 2004)
DOE to keep decision on fate of Moab tailings to itself until October
Federal agencies usually identify a "preferred alternative" when they release a draft of the environmental impact statement (EIS) required under the National Environmental Policy Act (NEPA), considered the premier law to ensure public involvement in environmental decision-making.
With a draft expected in April 2004 on the Atlas project, the public normally could count on learning what the DOE sees as the best solution. Instead, the agency has opted to keep its preferences to itself until it releases its final EIS in October 2004.
In effect, the public will have just 45 days to weigh in on DOE's five complex and high-priced solutions, which include options from capping the tailings in place on the banks of the Colorado to pumping it by pipeline to the White Mesa uranium recycling mill in nearby San Juan County. (Salt Lake Tribune Feb. 2, 2004)
BLM reserves land for tentative alternative disposal sites
Manny Pino, the Scottsdale Community, US, described his community as a living example of the disastrous consequences of unsustainable uranium mining, emphasizing that neither the mining industry nor the federal government took real action to address these problems. He highlighted the global character of the mining industry, and called on the WSSD to ensure accountability of the mining industry and national governments.

http://www.ratical.org/radiation/WorldUraniumHearing/index.html

Poison Fire, Sacred Earth,
extract from: THE WORLD URANIUM HEARING, SALZBURG 1992
pages 146-148

I ask you, people of Salzburg, how would you feel if we came here and stuck a jackhammer into the Salzburg Cathedral? That's the way we feel about what is being done to our sacred mountain. It is our life, it is our existence, it is our future, it is our present and it is our past. We come to you here in your western culture which exemplifies the characteristics of western culture, and that is the idea that humans are superior to the world they inhabit.

Well, us Indian people contradict that argument. We live the opposite. We believe that Mother Earth is not to mess with. And all those species and living things from the smallest insects that crawl to the elk, to the buffalo, they are all our brothers and sisters. This is the San Juan Basin Mineral Belt in New Mexico, Arizona, Colorado and Utah, the Four Corners. In this area, over 30 years uranium was developed from the 1950's to the closing of the last mine, the Chevron mine, which had the world's deepest uranium mining shaft into our sacred mountain. The Grants Mineral Belt extends from about 15 miles West of Albuquerque to the Arizona border. It's approximately 60 miles wide and 100 miles long. Along with the world's deepest mineshaft was also the world's largest uranium mill at Ambrosia Lake. Within the Pueblo of Laguna lay the world's largest open pit strip mine, in operation from 1953 to 1982. You know, these are "world bests" we don't want on our land anymore, we don't want to be known for all the world's deepest and worst uranium atrocities on our land, never again!

As Jackpile opened in 1953, 24 million tons of ore were mined over a 30 year period. This was a 24-hour-a-day, 365-days-a-year operation for 30 years until it shut down on March 31, 1982. Right now, Jackpile Mine lies like a sore in the middle of the New Mexico desert. And within 1,000 feet from the world's largest open pit uranium mine lies the village of Paguate. When the wind blows from an easterly to westerly direction, these people are directly in line with the waste overburden and tailings that laid unreclaimed from when the mine closed in 1982 till the reclamation project began in 1989. Seven years these people had to endure radioactivity in their backyard. This is what we had to deal with, this is what we have to live with, and this is what my people will reiterate to you here, today.
We went from being agriculturalists and livestock raisers to wage earners, and that impacted our traditional culture, our traditional language, participation in our ceremonies. During the height of uranium mining, people prioritized their eight-to-five-job, their eight-hour-a-day-job over participating in the ceremonies. This is what lies undocumented among our people. Our Elders cry today that the generation below us cannot speak our language. Some of them don't have any idea of how to participate in the ceremonies. These are the issues that go unaccounted for, that we bring to you here, that we bring to the world.

Manuel Pino, Acoma Nation, New Mexico, USA. Currently working on a Ph.D. about the effects of uranium mining on the identity of the Indian people, i.e. loss of traditional values and an increase in suicide and alcoholism.

Greetings to all the Indigenous people and European people! We are here representing our Elders from Acoma and the Laguna Pueblo. We bring our Elders' message because flying across the great Atlantic Ocean is something they cannot conceive. We are still a very traditional people. Us, like the Hopis and Acoma, claim to be the oldest continuous village in North America. As you can see by the transparency upon the screen here, we come from the southwestern part of the United States and like numerous of the groups that have preceded here today, we have been impacted by uranium development for over 40 years, and we bring the message of our Elders because they are our wisdom. They are our future and they are our past.

We brought some of our children with us to give you an idea of how they feel about this development and how it impacts them and their children and their children's children. As we speak to you here today we are very humble people. That is the traditional way of the Acoma and the Laguna. We come here to address the issues that have confronted our people. One of the hardest things for us to deal with as human beings, is to watch and sit throughout this 30 year period of development as our sacred mountain, Mount Taylor, was desecrated. They stuck the world's deepest uranium mine shaft into our sacred mountain.

I ask you, people of Salzburg, how would you feel if we came here and stuck a jack hammer into the Salzburg Cathedral? That's the way we feel about what is being done to our sacred mountain. It is our life, it is our existence, it is our future, it is our present and it is our past. We come to you here in your western culture which exemplifies the characteristics of western culture, and that is the idea that humans are superior to the world they inhabit. According to your book of Genesis, humans were made in the image of God who told them: "Be fruitful and multiply and replenish the earth and subdue it and have dominion over the fish of the sea and over the birds of the sky and every living thing that moves upon this earth." This is the way western culture tends to view nature as a wilderness to be conquered and tamed by human effort. The art, the literature and the folk tales of the West repeatedly show people in heroic struggles against the forces of nature.

Well, us Indian people contradict that argument. We live the opposite. We believe that Mother Earth is not to mess with. And all those species and living things from the smallest insects that crawl to the elk, to the buffalo, they are all our brothers
and sisters. So, when we come to your land that has shoved these types of ideologies down the throats of our people, our youth, in school curriculums, through the BIA boarding school assimilation process that our grandfathers, grandmothers and parents had to endure. Part of this struggle is tied to uranium development. It is that generation that had to live through the assimilative policies of this country that made the decision to mine uranium on our land. They had been to World War II, they had been through World War I, and they were told that they were heroes and that in order to continue to protect our land, uranium would have to be mined. This is the generation that has affected us for the future, that made those decisions.

In the bureaucracy of our federal government in the United States is the Bureau of Indian Affairs who helped negotiate these leases on behalf of the tribe in the 1950's. As our trustee, the Bureau of Indian Affairs misled our people -- granted, uranium was still a new industry in the United States, but they didn't tell our people the truth. The economic benefits that the corporations received compared to my people is outrageous, and they leave us with the contaminants that my brothers and sisters will address here today. I showed you the map of the region where we come from. This is the San Juan Basin Mineral Belt in New Mexico, Arizona, Colorado and Utah, the Four Corners. In this area, over 30 years uranium was developed from the 1950's to the closing of the last mine, the Chevron mine, which had the world's deepest uranium mining shaft into our sacred mountain. The Grants Mineral Belt extends from about 15 miles West of Albuquerque to the Arizona border. It's approximately 60 miles wide and 100 miles long.

At the height of uranium development within a 30 miles radius of our reservation are Laguna Pueblo, Acomita, McCartys -- all communities within the Acoma Reservation -- and Paraje and Paguate on the Laguna Reservation. You can see by the numbers of all the mines that existed were downwinders from the Grants Mineral Belt and the Ambrosia Lake Area to the West and the uranium that was developed on the Navajo Land. You know, this area produced great amounts of uranium during the height of development.

In this area, Indians owned or controlled about 50 percent of the nation's uranium supply and mostly concentrated on Navajo and Laguna reservations. Within the Grants Mineral Belt, 25 percent of the United States' uranium in the 1970's and eleven percent of the world's uranium were mined in this area within a 30 mile radius of our people's native lands. Along with the world's deepest mineshaft was also the world's largest uranium mill at Ambrosia Lake. Within the Pueblo of Laguna lay the world's largest open pit strip mine, in operation from 1953 to 1982. You know, these are "world bests" we don't want on our land anymore, we don't want to be known for all the world's deepest and worst uranium atrocities on our land, never again!

As Jackpile opened in 1953, 24 million tons of ore were mined over a 30 year period. This was a 24-hour-a-day, 365-days-a-year operation for 30 years until it shut down on March 31, 1982. The Atomic Energy Commission was the primary buyer of uranium from Jackpile, so we know this uranium went directly to build the nuclear arsenal of the United States of America, which has the capacity to blow the world, I don't know how many times, over. But this was coming from our land, our sacred mountain, at the disgust of our traditional Elders and our traditional leaders.
Right now, Jackpile Mine lies like a sore in the middle of the New Mexico desert. And within 1,000 feet from the world’s largest open pit uranium mine lies the village of Paguate. When the wind blows from an easterly to westerly direction, these people are directly in line with the waste overburden and tailings that laid unreclaimed from when the mine closed in 1982 till the reclamation project began in 1989. Seven years these people had to endure radioactivity in their backyard. This is what we had to deal with, this is what we have to live with, and this is what my people will reiterate to you here, today.

Granted, uranium development improved the quality of life on the reservation when you look at it from a monetary perspective. Over 800 Laguna Pueblo Indians were employed at the mine at the height of development, the unemployment rate dropped to less than 20 percent. Prior to uranium mining it was in the 70 percentiles. But after the bust it has returned to that percentage. With an improved quality of life came increased wages. For Indian people, that is not always a positive outcome. Increased wages meant increased access to alcohol. Increased alcohol meant greater crime rate, more domestic violence among our people, spouse abuse, child abuse, an increased suicide rate and drug-use. All these issues that the technological culture does not consider that we have to live with in their environmental impact statements: destruction to our traditional life styles.

We went from being agriculturalists and livestock raisers to wage earners, and that impacted our traditional culture, our traditional language, participation in our ceremonies. During the height of uranium mining, people prioritized their eight-to-five job, their eight-hour-a-day-job over participating in the ceremonies. This is what lies undocumented among our people. Our Elders cry today that the generation below us cannot speak our language. Some of them don’t have any idea of how to participate in the ceremonies. These are the issues that go unaccounted for, that we bring to you here, that we bring to the world.

If uranium mining would have continued in the Grants Mineral Belt, this is what we would be looking at today. These many mines within the San Juan Basin area and the aboriginal homelands of the Diné and the Acoma and Laguna people. So I ask you today here at this World Uranium Hearing: Put yourself in our place! Think about with what we have to live, what we have to endure, what we have to continue to endure, and I will leave you with the words and wisdom of my grandfather who entered the spirit world four years ago. I’ve been in this struggle a long time, when it was unpopular to speak out about the mine. When those 800 people were employed, I was a very unpopular person because I was speaking the issues that I speak here today. No one wanted their job threatened, no one wanted the tribal budget threatened, no one wanted to take a stand about these issues that we're talking about here today. But my grandfather gave me a basic philosophy that I continue to live by today and that is: “To destroy the land is to destroy the people.”

My brothers and sisters, my fellow panel members will show you how this destruction has taken place. As a humble Acoma man I thank you for giving me this opportunity to come half way around the world to address you here today.

[Manny Pino is now Professor of Sociology and Director of American Indian Studies at Scottsdale Community College, Arizona, USA]
MISSION: Southwest Research and Information Center is a multi-cultural organization working to promote the health of people and communities, protect natural resources, ensure citizen participation, and secure environmental and social justice now and for future generations.

The Navajo Uranium Mining Experience

In the late 1970s, Navajo uranium miners and their families asked for help to show that their lung diseases had been caused by their work in underground uranium mines in the 1940s-1960s. SRIC staff responded with medical and scientific data, in-community education strategies, and legislative support. As a result, Congress adopted legislation in 1990 to compensate former miners and their survivors. Ten years later, with SRIC’s ongoing technical support to advocacy groups, the law was amended to cover virtually all uranium miners who worked before 1971.

Despite making great strides in protecting miners’ and community health, compensating former miners and their families, and cleaning up uranium mill sites, significant problems stemming from the legacy of uranium development still exist today in the Four Corners Area. Hundreds of abandoned mines have not been cleaned up and present environmental and health risks in many Navajo communities. Health conditions in those communities have never been studied despite being impacted by uranium development that dates back to the late-40s and early-50s.

Some of these same communities are now confronted with proposed new uranium solution mining that threatens the only source of drinking water for 10,000 to 15,000 people living in the Eastern Navajo Agency in northwestern New Mexico. Since 1994, SRIC has worked with those communities and the community-based group, Eastern Navajo Diné Against Uranium Mining (ENDAUM-CCT), to stop the proposed mines through community education, interaction with Navajo Nation leaders, and a seven-year-long legal challenge of the mines’ federal license. The work of SRIC, ENDAUM-CCT and their law firms - the New Mexico Environmental Law Center (NMELC) and the Harmon-Curran firm in Washington, D.C. - has erected major roadblocks to the proposed mining, but has not yet terminated the license. Citizen opposition to mining is widespread, and the Navajo Nation leadership recently determined that uranium solution mining is unsafe and that the proposed mines are too risky to the health and environment of the Navajo people.

Against this background, working with Navajo groups and communities to stop new mining and continuing to assess and document the health and environmental effects of past uranium development are the principal focuses of UIAP work.

NAVAJO NATION PRESIDENT SIGNS BILL BANNING URANIUM MINING AND MILLING

Crownpoint, N.M., April 29, 2005. Navajo Nation President Joe Shirley, Jr., today signed what is believed to be the first Native American tribal law banning uranium mining and milling. With dozens of community members and dignitaries looking on, Shirley signed
the Diné Natural Resources Protection Act (DNRPA) of 2005, which was passed by the Navajo Nation Council by a vote of 63-19 on April 19. As amended by the Council during floor debate, the act states, "No person shall engage in uranium mining and processing on any sites within Navajo Indian Country." The law is based on the Fundamental Laws of the Diné, which are already codified in Navajo statutes. The act finds that based on those fundamental laws, "certain substances in the Earth (doo nal yee dah) that are harmful to the people should not be disturbed, and that the people now know that uranium is one such substance, and therefore, that its extraction should be avoided as traditional practice and prohibited by Navajo law."

FRANCE

MINES D’URANIUM Impact des anciennes mines d’uranium

Communiqué CRIIRAD
11 février 2009

Les demandes de la CRIIRAD

La CRIIRAD a apporté son appui scientifique à la réalisation de reportages pour un numéro de « Pièces à conviction » consacré aux déchets et pollutions laissées par l’exploitation des mines d’uranium. Sous le titre « le scandale de la France contaminée », il doit être diffusé mercredi 11 février à 20h35 sur France 3.
Le sujet reprend plusieurs des études réalisées par le laboratoire de la CRIIRAD : à Saint-Priest-La-Prugne (site des Bois Noirs) dans la Loire, La Crouzille en Haute-Vienne, Gueugnon en Saône-et-Loire, Saint-Pierre dans le Cantal…. Nous espérons que cette émission permettra au grand public de prendre conscience de la nécessité de corriger de graves dysfonctionnements dont certains sont dénoncés par la CRIIRAD depuis plus de 15 ans : contamination des ressources en eau, des sols, de l’air ; réglementation laxiste et incohérente privilégiant les intérêts de l’industriel au détriment de la protection sanitaire ; législation inadaptée qui ne permet pas à la justice de condamner des pollutions pourtant avérées ; dispositif d’autosurveillance totalement inadapté conduisant à cacher la réalité des contaminations ; revente de terrains contaminés ; expertises complaisantes réalisées par les différents laboratoires qui se sont succédés qu’ils soient associés à l’Etat (SCPRI, OPRI, IPSN, IRSN) ou privés (SUBATECH, ALGADE)…

The use of mine tailings as construction fill is age-old, well known, public, studied (pluralistic study) and without health effects. No one at present can estimate the quantity of mine tailings (fill) given to municipalities and individuals by former mine operators. The backfill is by nature barren rock (i.e. does not contain uranium ore). Deducing that radioactivity levels in all of the tailings combined is greater than natural radioactivity based on a few hot spots does not make sense.
Proof of this was given by the aerial detection campaign run by the CEA, for example, which showed that roads in the Forez region of France, some of which were made with the mine tailings, are not radioactive. Only two locations were above normal levels: the Poyet Mill and the square in front of the Mondière sawmill. As soon as this information came to light, AREVA took remedial action.

Valence le 20 juillet 2008.
Note CRIIRAD N°08-119
Analyses radiologiques de solides dans le secteur de l’ancienne mine d’uranium de Rosglas (Morbihan)
1 / Contexte
Les études conduites par le laboratoire de la CRIIRAD depuis le début des années 90 sur plusieurs anciens sites miniers uranifères, en particulier en Haute-Vienne et Loire Atlantique, et depuis lors dans le Cantal, l’Hérault, la Loire, l’Allier, le Puy-de-Dôme, etc. ont démontré la persistance de contaminations radiologiques significatives en termes de doses. Les points les plus marquants sont le plus souvent l’abandon ou la dispersion de matériaux radioactifs solides (stériles, minéraux, résidus d’extraction de l’uranium) et la contamination radiologique des cours d’eau.
Des précisions sont disponibles sur le site de la CRIIRAD :
http://www.criirad.org/actualites/uraniumfrance/somuraniumfrance1.html

CANADA
In the early 1930’s a radium refinery was built at Port Hope and tons of uranium-bearing wastes accumulated around the town. During WWII Canada was approached by UK and USA to make that left-over uranium available for the atomic bomb project. The company was quietly taken over by the Canadian government and the refinery was used to process uranium from Great Bear Lake (Deline) and from the Congo (wastes that had been stored on Long Island near New York) to fuel the uranium enrichment plants at Oak Ridge that produced the explosive for the Hiroshima bomb, and also to fuel the nuclear reactors at Hanford Washington that produced the plutonium for the Trinity test and the Nagasaki bomb. After the war Canadian uranium production boomed on military contracts and mines opened up, first in the Northwest Territories and Northern Saskatchewan, then in Northern Ontario (the Elliot Lake region). All of this uranium was refined at Port Hope. By 1959 uranium had become the fourth largest export from Canada, after wheat, hardwoods, and pulp -- and it was all for the bomb program. In 1975, a scandal erupted when it was discovered that 100s of homes were badly contaminated with radioactive wastes from the government-owned uranium refinery, an elementary school had to be evacuated because the levels of radon in the cafeteria were higher than those allowed in uranium mines, and three waste dumps were in a lamentable state with radioactive wastes leaching into water and being tracked out of the dump sites on the tires of dump trucks.
Dr Gordon Edwards, director, Canadian Coalition for Nuclear Security
Port Hope - Canada’s Nuclear Wasteland

Port Hope has had a longer exposure to radioactive contamination and its
lethal effects than any community on Earth. Uranium ore and its waste products have been hauled along our streets and processed in our harbour since 1932, or 13 years before the first nuclear bomb was dropped on Japan. We have 3.5 million cubic metres (4.6 million cubic yards) of radioactive waste spread under our homes, schools, parks and in our harbour. Port Hope is saturated with radioactive, heavy metal and chemical contamination. We also face daily emissions of uranium, ammonia, nitrous oxide, arsenic and fluorides from 2 nuclear processing facilities in the middle of our town of 12,500 people. Neither facility has a buffer zone around them to protect us. The Canadian Government refused to conduct comprehensive health studies they first promised Port Hope in 1979 despite troubling results released in Health Canada's 2000 and 2002 indicator studies:

Four times the expected number of brain cancers in children from 1971-1985
100 excess female deaths from circulatory disease from 1986-1997
Five times the provincial rate of nasal cancers in men from 1971-1985
Two times the provincial rate of female brain cancers from 1986-1997
48% elevation for all childhood cancer deaths

In the absence of government health studies, the Port Hope Community Health Concerns Committee has been raising money through silent auctions and book sales to pay for biological testing of Port Hope residents. This is outrageous in a country as rich as Canada.

I was not a nuclear activist in 2004. I was a carpenter who volunteered to improve the playground at my daughters’ school. I knew nothing about radioactive waste nor did I have any intention of looking into it. In the intervening three-and-a-half years, I have spent 7000-8000 hours studying and researching every aspect of the nuclear industry and radioactive waste. I have made over 100 presentations totaling 200,000 words to MPs, MPPs (MLAs), Municipal Councils, Federal and Provincial agencies, scientists, professors, university classes and our local School Board on the dangers we face in Port Hope.

Our Canadian Government has knowingly been harming and killing our children and our friends in Port Hope for over 60 years to keep its actions secret. This is the story of the nuclear violation of Port Hope by the Canadian Government.

The Long-Term Management of Former Uranium Mine Sites  World Nuclear Association Annual Symposium 2006, London
http://www.world-nuclear.org/sym/2006/clinebio.htm

The Need for a Framework

Saskatchewan currently has one of Canada's most effective and efficient regulatory frameworks covering all facets of mine and mill development, operation and decommissioning. This regulatory oversight begins with the exploration phase and continues with the requirement for every new development to prepare an environmental
assessment for public review and approval by the Minister of Environment pursuant to The Environmental Assessment Act. The environmental assessment for the development and operation of a project must also include a plan for the decommissioning and reclamation of a mine/mill to restore the site to an environmentally acceptable condition.

However, a phase of mine site management was missing from the province's regulatory framework. The province did not have an effective mechanism for managing and monitoring mine/mill sites once decommissioning was complete. In the past, this was not generally considered in corporate planning and government regulatory activities, but it is gaining additional international scrutiny. Mining companies wanted to know what requirements have to be met after decommissioning is complete to be able to transfer custodial responsibility back to the province. The public and neighbouring communities wanted to know who will be responsible for the site once the company is gone. The Institutional Control Management Framework (ICMF), which is the focus of this paper, sets out the terms under which the province will accept custodial responsibility and upon which the site will be monitored and maintained in perpetuity. It completes the regulatory framework to bring it "Full Circle."

The absence of a framework to transfer custodial authority back to the province led to serious concerns by the uranium mining industry with respect to its ability ever to be released from a surface lease issued by the province and the licensing requirements of the Canadian Nuclear Safety Commission (CNSC) for a mine site. If companies were to be responsible for perpetual care and maintenance at former uranium mines, this would be a significant barrier to investment in new uranium developments. As well, in the province's opinion, this was not an optimal solution to the issue of long-term care and maintenance. While larger mining companies tend to be in existence for long timeframes, companies are not expected to exist for the timeframes required to undertake these activities. The International Atomic Energy Agency (IAEA) has stated that "In many cases, the body that has the greatest potential for maintaining these controls is a governmental organization." Governments are long-term institutions that operate on these time horizons, and that have the interests of the general public in mind.

Uranium mine operations in Canada also operate under a federal regulatory framework. This is a constitutional requirement under the Nuclear Safety and Control Act (NSCA). The CNSC is the agency responsible for carrying out the federal government's mandate. The federal regulatory oversight extends from the initial environmental assessment phase through to decommissioning and reclamation. While the province recognizes the requirement for federal oversight, the province is also mandated to manage its resources and regulates uranium mines/mills as it regulates other mineral developments. In recognition of the mining industry’s concerns that duplicate regulatory requirements can be onerous, the province and the CNSC continue to work towards harmonization of their roles.
It made sense that responsibilities for long-term management of these sites rest with government and that a framework be developed and implemented that respected Canada’s international obligations, federal regulatory requirements and provincial regulatory requirements and responsibilities to:

- Protect human health and safety;
- Protect the environment;
- Ensure future generations are not burdened with the costs of long-term monitoring and maintenance and for unforeseen future events for mining development decisions taken today; and
- Add greater resiliency and scope to the province’s regulatory regime.

2. CONSULTATIONS WITH THE MINING INDUSTRY

Provincial officials held a one-day open session with representatives from the mining industry. Following this session, a small committee of senior company representatives was struck to meet with provincial representatives for detailed discussions. Four facilitated meetings were held comprising intensive discussions on all aspects of the ICMF with particular attention given to funding requirements and options.

Industry conducted a number of internal meetings to do its own due diligence through to late November 2005. Industry provided a document through the Saskatchewan Mining Association identifying its key issues and the preferred options that were evaluated.

3. CONSULTATIONS WITH THE EQC AND THROUGH PUBLIC MEETINGS

Provincial officials undertook EQC, public and stakeholder consultations. Although turnouts were very low at the public meetings, discussions with the public and stakeholders on the initiative were very positive. The EQC, public and stakeholders also supported the position that the province should proceed with finalization and implementation of the ICMF.

Conclusions

The Institutional Control Management Framework is the first of its kind. It builds on the "discovery to decommission" environmental protection mechanisms already in place in the province. The Framework recognizes Canada’s international obligations, Canada’s national requirements and the province’s responsibilities. It is the environmental protection mechanism for the perpetual management of mine and mill sites and completes the regulatory cycle to bring mechanisms "Full Circle." By building a policy development model based on interdepartmental and intergovernmental cooperation and intensive and extensive industry and public consultation, the province has developed a Framework that enjoys a high level of support by both the mining industry and the public.
Based on Saskatchewan's current uranium resources and new uranium discoveries, Saskatchewan will continue to be a world leader in uranium production. While an abundance of natural resources is necessary, it is equally important to have an efficient, effective and competitive regulatory framework for the development and management of those resources. The province will continue to work with the public and industry to build and improve policy and regulatory frameworks. The Institutional Control Management Framework is an important component of the province’s commitment to the development of our industry and the protection of our future generations. Source: _

**NIGER**

COMMUNIQUE CRIIRAD*

du Lundi 26 juin 2006

Contexte

Un article paru dans le journal « Aïr actualités » du 15 mai au 15 juin 2006 met en cause les conditions d’exploitation de l’uranium, au Niger, par les sociétés SOMAÏR et COMINAK, filiales de COGEMA-AREVA NC.

Cet article pose les problèmes de l’accès aux soins et à l’école, des conditions d’entreposage des résidus radioactifs à l’air libre, de la gestion des déchets et ferrailles, de la pollution des eaux souterraines et des risques liés à la radioactivité. Cet article cite monsieur Almoustapha Alhacen, président de l'ONG AGHIRIN’MAN.

Suite à la parution de cet article, Monsieur Alhacen a fait l’objet le 21 juin 2006, d’une demande d’explication écrite de la part de son employeur, la SOMAÏR. Il est en effet tout à la fois salarié de la compagnie minière et président d’une ONG créée à ARLIT, il y a plus de 4 ans, pour améliorer les conditions de vie des populations.

Nécessité de soutenir Monsieur Alhacen

La CRIIRAD invite les associations de protection de l’environnement et des droits de l’homme à rester vigilantes quant à la situation de monsieur Alhacen. Il faut rappeler que c’est à sa demande que la CRIIRAD a pu conduire sur place, en décembre 2003, une mission préliminaire de contrôles radiologiques, alors que monsieur Alhacen avait déjà fait l’objet de pressions pour annuler son invitation.

Cette mission conduite par la CRIIRAD et SHERPA, a permis de constater de graves anomalies :

- présence de ferrailles contaminées en ville à ARLIT,
- stockage des résidus radioactifs à l’air libre,
- distribution d’eau dépassant les normes de l’OMS,
- mauvaise gestion des déchets ménagers.

Voir les rapports de mission CRIIRAD et SHERPA sur :


**WISE/NIRS Nuclear Monitor, May 13, 2005**

**NIGER: RADIATION EXPOSURE FEARED**

In a follow up to investigative work carried out in 2004, CRIIRAD, an independent French laboratory specializing in the monitoring of and protection against radiation, has collected new data which suggests that areas surrounding two uranium mines exploited by subsidiaries of French company Areva-Cogema were contaminated by dangerously high levels of radioactivity.
Residents of Arlit, one of two desert towns in the North of Niger specifically constructed to accommodate mine workers, had long been aware of the various mysterious illnesses affecting some of their neighbours but when more people began to get increasingly sick, residents turned to French NGOs to investigate. The mines at Arlit and Akokan have been operated for some 40 years by the Areva-Cogema subsidiaries, Somaïr and Cominak. When constructing the towns deep boreholes were sunk to supply the 70,000 residents with drinking water but according to CRIIRAD, not enough measures were taken to contain the radioactive gases when the infrastructure was built. The exploitation of uranium, a dense metal, generates the release of radioactive gases and dust into the environment, which should be carefully controlled.

Aghir In'Man, a local NGO led by Almoustapha Alhacen, a former mine worker of 27 years who fell ill with tuberculosis 10 years ago, already suspected a link between the worsening health of the town's folk and the uranium mines and was determined to discover what was responsible for all the illnesses. "...We have noticed...a lot of diseases such as respiratory problems, tuberculosis, hypertension, difficult deliveries, impotence, hair falling out, cataracts, and that people died with inflated stomach," he told IRIN news agency.

CRIIRAD analysed samples of water, air, soil and scrap metals and found that water samples contained from between 10 to 110 times higher levels of contamination than considered acceptable by the World Health Organization. Bruno Chareyon, the nuclear physicist who carried out the analysis, told IRIN that "The French multinational Areva-Cogema and its subsidiaries ... released contaminated metal scrap from their site, distributed water contaminated with uranium to the populations, left radioactive waste in the open while desert winds may disperse them far away, disregarded internationally recognised international norms for the protection against radioactivity". Chareyon also said that a spill caused by a collision involving a truck carrying uranium ore last year was not properly cleaned up resulting in radiation levels ten times higher than normal even one month afterwards.

SHERPA, an NGO working to protect human and workers' rights against multinationals, found that Arlit residents are suffering from a wide range of illnesses - including lung cancer, tuberculosis, and various skin diseases - that could be attributed to the mining activities but admitted that proving the uranium mine as the definitive source of the contamination would be difficult without further research. Unsurprisingly, the French multinational operating the mine has consistently denied the allegations, and has attributed the high number of illnesses to the harsh desert climate. "The most frequently observed maladies are allergic reactions that are characteristic of desert zones because of the abundance of sand and dust," said Areva in a statement issued on 25 April.

No protection for workers

After interviewing residents, workers and doctors in Arlit, SHERPA discovered that international norms for the protection of workers had not been applied at the mines. No protective measures were taken and no protective equipment or masks were made available to stop workers being exposed to deadly gases. The organisation is considering suing on behalf of the workers, many of which have suffered or died of pulmonary or skin disorders, but knows this would be very difficult because medical
doctors, paid by the mining companies, were extremely reluctant to identify patients' symptoms that could potentially be linked to mining. "No cancer caused by exposure to ionising radiation has ever been found in the hospitals in the region," according to the Areva statement though it did promise to carry out independent research into the allegations. The French NGOs and the local population all agree that more research is needed, but do not trust Areva to be impartial. Almoustapha Alhacen, who has set up the NGO Aghir In'Man to increase environmental awareness in Niger, remains worried for the future. Source: IRIN news agency, 28 April 2005; WISE/NIRS Nuclear Monitor 30 January 2004 ("Independent Radiation Surveys at Niger Uranium Mines Obstructed") http://www.criirad.org

NAMIBIA

Namibia’s Rössing – Rio Tinto mine causes environmental and health problems

Posted by Nick on May 12th, 2014

Through two reports and a documentary, the EJOLT team working on nuclear energy sheds light on the dangers of uranium mining in Namibia.

Two NGOs in Namibia (Earthlife Namibia and LaRRI), a Brazilian university (FIOCRUZ), a French independent laboratory specialised in radiation (CRIIRAD) and team coordinator Marta Conde (UAB) partnered to produce this remarkable set of action oriented resources. After a public event on the 10th April 2014 in London – together with other activists from Madagascar, Papua New Guinea and the US who are also impacted by the activities of Rio Tinto – an article appeared in The Guardian. This event was organised prior to the Annual General Meeting (AGM) of Rio Tinto that took place on the 15th April 2014. In the AGM, Roger Moody from PARTIZANS presented the results of the study carried out by Earthlife and LaRRI on the impact of uranium mining on workers.

While both reports are in the process of integration with other reports for a broader Environmental Justice Organizations, Liability and Trade (EJOLT) publication on uranium mining – we decided to already share the insights EJOLT gathered on uranium mining in Namibia.
Radiological impact of the Rössing uranium mines (Namibia)

This report is based on radioactivity measurements and soil, sediment and water samples taken in the vicinity of the Rössing Rio Tinto mine.

It raises concerns regarding the management and contamination caused by the radioactive waste rock dumps and the tailings dam, where almost all the waste from mining the uranium is deposited.

The waste rock dam is creating external irradiation and radon exhalation that is a risk to workers as well as tourists. Regarding water contamination, the team detected a significant increase of fluoride, nitrates and sulphates downstream of the mine. Uranium concentration increased by a factor of 2155, from 0.2 µg/l upstream to 431 µg/l downstream. WHO recommendation for uranium concentration limit in drinkable water is now 30 µg/l. Keeping any freshwater drinkable in a desert country like Namibia is a key issue – even if the drinkable water is not tapped yet.

The tailings dam is further causing aerial dissemination of radionuclides, as wind gusts are carrying away radioactive particles. Also of concern is the risk of dam failure. That risk will be aggravated if plans of an additional 200 million tonnes materialise.

The team has detected that tailings of radioactive material have been used to build the parking area at Rössing. Rössing’s management considers these levels are of no concern. However the ICRP states that all radiation exposure should be maintained as low as reasonably possible. Moreover there are concerns that tailings could have been re-used in other areas of the mine.

Study on low-level radiation of Rio Tinto’s Rössing Uranium mine workers

The study is based on 45 interviews with workers and ex-workers of Rössing. 39 of them have complained of health problems. Most workers stated they are not informed about their health conditions and generally don’t know whether they have been exposed to radiation or not. Some workers consult a private doctor to get a second opinion – that, however, is a measure that most workers cannot afford.

Even though they receive courses on safety every year, some workers still confuse dust with radiation and believe wearing protective equipment protects them from radiation. In fact, protective equipment limits exposure (for example limiting dust inhalation) but does not protect workers from ionising radiation.

Of main concern are those workers who started working in the mine in the 1970s and early 80s when safety conditions were non-existing or very poor. The interviews
confirmed that many of these workers are by now retired and many have already died of cancer or unknown diseases.

A previous study done by LaRRI in 2009 focused on the general working conditions whereas this study attempts to establish a connection between occupational exposure to low level radiation and toxicity and the health condition of workers.

The main demands extracted from both studies are:

- Perform a large-scale epidemiology study with independent medical experts to examine those workers who started working in the 1970s or early 1980s.

- The Ministry of Health and Social Services must get unrestricted access to all medical reports of all workers employed by Rössing.

- Likewise all mine-workers should be able to have access to their own medical reports.

- Rössing should allow independent specialists like CRIIRAD to have access to the mining facilities to carry out an independent monitoring of the mine. This could include detection of tailings re-use and checking the efficiency of the water pumping facilities of the tailings.

- Rössing should provide CRIIRAD access to base-line monitoring data in order to confirm that the contamination of the river is caused by the mine.

- An independent assessment of the stability of the tailings dam should be carried out.

- CRIIRAD recommends that the tailings and waste rock dam are put undercover to avoid dust and radionuclides being carried away by the wind.

In the Annual General Meeting of Rio Tinto, Roger Moody asked the CEO of Rio Tinto Sam Walsh, why mineworkers didn’t have access to their medical files, Sam Walsh stated that “All workers at Rössing are entitled to their medical records” and when enquired by Roger Moody on how to obtain them he replied “They only have to ask”.

http://www.ejolt.org/2014/05/namibias-rossing-rio-tinto-mine-causes-environmental-and-health-problems/

Impact of Rössing Rio Tinto Uranium Mine
This report is based on on site radioactivity measurements and laboratory analysis of soil, sediments and water samples taken in the vicinity of the Rössing Rio Tinto mine. It raises concerns regarding the management and contamination caused by the radioactive waste rock dumps and the tailings dam, where almost all the waste from mining the uranium is deposited.

The waste rock dump is creating external irradiation and radon exhalation that is a risk to workers as well as tourists. Regarding water contamination, the team detected a significant increase of fluoride, nitrates and sulphates downstream of the mine. Sulphates and nitrates are an indicator of the leaching of waste rocks. The data also show an increase for arsenic, zinc, boron, radon 222, vanadium and zinc (factor of 9 to 35), Molybdenum (factor 85) and selenium (factor 131).

The highest impact concerns the uranium concentration that increased by a factor of 2155, from 0.2 μg/l upstream to 431 μg/l downstream. WHO recommendation for uranium concentration limit in drinkable water is now 30 μg/l. Keeping any freshwater drinkable in a desert country like Namibia is a key issue – even if the water is salty and not tapped yet.

The tailings dam is further causing aerial dissemination of radionuclides as wind gusts are carrying away radioactive particles. In all four samples of topsoil the radium 226 / uranium 238 ratio is between 2.3 and 5, indicating that this dust contains the finest fraction of the tailings (radioactive waste from the mills). Also of concern is the risk of dam failure. This risk will be aggravated if plans of mining expansion go underway and an additional 200 million tonnes are deposited in the tailings dam (Rössing, 2011). As stated in their own expansion report “geotechnical stability [of the tailings dam] is expected to be sufficient but requires further confirmatory analysis” (Rössing, 2011, pg.33).

The team has also detected very high uranium concentration downstream of the tailings dam (between 554 and 3 164 μg/l) compared to 0.2 μg/l upstream of Rössing mine. Rössing has a network of dewatering wells and trenches designed to pump back the contaminated water of the tailings dam before it reaches the Khan river system. These findings question the efficiency of this system. It also raises the question: For how long are these pumping activities planned in the Closure Plan by Rössing? Uranium by-products contained in the tailings dam have a half-life of more than 75000 years (Thorium 230).

The team has detected radioactive tailings on the parking area at Rössing which currently has a dose rate 6 times above natural background value (0.9 μSv/h compared to 0.15 μSv/h). This was communicated to Rössing’s EJOLT Report.

The Radiological Impact of Rössing Rio Tinto Uranium Mine management who responded that these levels “are of no cause of concern”. However the ICRP (International Commission on Radiological Protection) states that all radiation exposure should be maintained as low as reasonably achievable. This is due to the fact that with exposure to ionizing radiation there is no safe limit. The highest is the value of accumulated dose, the highest is the risk of developing cancer on the long term. Moreover there are concerns that radioactive
materials could have been re-used in other areas of the mine.
The main recommendations given by CRIIRAD and Earthlife Namibia are:
- Rössing should allow independent specialists like CRIIRAD have access into the mining facilities to carry out an independent monitoring of the mine. This should include detection of the re-use of radioactive material and checking the efficiency of the water pumping facilities.
- Rössing should provide CRIIRAD and Earthlife access to base-line monitoring data in order to further confirm the contamination of underground water and trace its evolution since the operation of the mine.
- An independent assessment of the stability of the tailings dam should be carried out.
- CRIIRAD recommends that the tailings and waste rock dump should be put undercover to avoid dust and radionuclides being transported with the wind and limit underground water pollution.
- The studies of the Social and Environmental Impact Assessment should be reviewed by independent experts.

http://www.criirad.org/mines-uranium/namibie/radiological-impactofriotintorossing-CRIIRAD-EJOLT.pdf

For other African countries, there are already some legacy sites, in Zambia and the Democratic Republic of Congo for example, but there are also examples of remediation as at Mounana in Gabon.

At Shinkolobwe in the Democratic Republic of Congo (DRC) the uranium mining operation ran from the 1920s until about the mid-1960s - during which time the uranium used as the explosive in both of the atomic bombs detonated over Japan in August 1945 was procured from these mine workings - when the site was closed out by the operator. There was little remediation and the main structures were left standing, whilst waste rock and tailings piles were abandoned as they stood.

The underground workings were sealed off by plugging the shafts with concrete and the open cut was left as it was with some water in the bottom. The site was open to public access and many local footpaths criss-cross the site. Since then artisanal miners have returned to the site from time to time. This activity took place most notably in 2003 and 2004 when miners were seeking the cobalt-rich mineral heterogenite, which also contains uranium. Clearly if the current market boom for uranium continues there may well be pressure to re-open the mine on a commercial basis. Should this happen then the issues of managing and remediating the legacy wastes will need to be fully addressed before the new operations start to ensure that both legacy and new waste management will be integrated into a programme that meets international safety standards.

KAZAKHSTAN

Kazakhstan is situated in the centre of Eurasian continent and it has an area of more than 2.7 million square kilometers. It is among the ten richest countries in the world in
natural resources. Kazakhstan is the third country in the world for uranium production volumes, and Kazatomprom is the fourth largest uranium producer in the world.

Kazakhstan has undertaken a significant amount of remediation work in the former mining areas in the north of the country, but at sites in the west of the country action much remains to be cleaned up. Current uranium production in Kazakhstan generally uses in-situ leach technology. The centralised tailings storage facility at Stepnogorsk, in the north of the country, remains to be remediated.

_Uranium production in Kazakhstan_ was a paper presented Moukhtar Dzhakishev at the World Nuclear Association Annual Symposium 2004, London (http://www.world-nuclear.org/sym/2004/dzhakishevbio.htm)

**The In-Situ Leaching method**

In-Situ Leaching is a method of ore deposits development without having to bring up the ore to the surface by selective transfer of natural uranium ions into the pregnant solution in place. [http://www.world-nuclear.org/sym/2004/fig-h.htm]

In-Situ Leaching is the most attractive method of uranium production from the standpoint of operational simplicity. In-Situ Leaching does not affect geological conditions of the subsurface resources since the ore mass is not extracted. Total area of an ISL facility with processing plant for 500mtU3O8/year, is 3-4 times less than the area of a standard hydrometallurgical plant of the same capacity.

In the course of the In-Situ Leaching process, less than 5% of radioactive elements are mobilized and moved out to the surface, compared to 100% in the conventional uranium mining. **Therefore, it is not necessary to build tailing ponds to store high level radiation waste.** It has been unambiguously determined that the natural hydrogeochemical environment in the South Kazakhstan uranium deposits has a unique capacity of self-restoration from the industrial impact. Due to the gradual restoration of natural oxidation-reduction conditions, groundwater of the ore-bearing aquifers are slowly but irreversibly restored to the pre-production state. We have also developed a method of substantial intensification of this process, which would accelerate the restoration ten times.

A result of 13-year monitoring at the Irkol deposit, the author asserts it may serve as an example of natural demineralization of residual solutions.