



# Rössing uranium : ideological attacks hamper scientific objectivity

by Ben Hochobeb

In May 1993 the International Atomic Energy Agency published a report on radiation and other hazards at the Rössing uranium mine in Namibia. In a critical article, published in *Raw Materials Report* vol. 9, no. 3, Greg Dropkin of the British Namibia Support Committee reviewed the report.

In this article Ben Hochobeb, Chief Environmentalist of Rössing Uranium Limited, closes the debate.

Ben Hochobeb is Chief Environmentalist, Rössing Uranium Limited. Address Rössing Uranium Ltd., PO Box 22391, Winhoek, Namibia.

In *Raw Materials Report* Vol. 9 No 3 Greg Dropkin of the so-called Namibia Support Committee launches the latest in his long series of attacks on Rössing Uranium Mine in Namibia. At the same time he attacks the International Atomic Energy Agency for its 1993 report on radiological safety at Rössing. However, he does not reject the IAEA report in its entirety - he accepts those parts which are critical of Rössing but rejects those parts which praise the company.

He claims that "the IAEA is hardly an unbiased observer" but he avoids mentioning that the radiological audit of Rössing was carried out not only by the IAEA but that the mission also represented the International Labour Organization (ILO) and the World Health Organization (WHO). He refers to the general conclusions of the report as "effective propaganda... not justified by the facts" and describes the mission as "this circus". The three UN agencies so described are well able to defend themselves, but it will be difficult for any reasonable person to accept the implication of Mr Dropkin's attack that the IAEA, the ILO and the WHO are engaged in a conspiracy to "whitewash" a mining company.

The five experts who participated in the audit and who wrote the report are specialists eminent in their fields. While Mr Dropkin has every right to disagree with them, it would perhaps be useful to readers if he were to disclose his qualifications for doing so, other than his anti-nuclear and anti-uranium mining convictions.

Nevertheless, let us examine and comment on some of his many allegations -

*Allegation:* "At first, the mine depended heavily on contract labour. Black men would leave their homes in the north and work on 11 month contracts, living in all-male hostels and sleeping on concrete bunks, up to 16 to a room."

*Comment:* Mr Dropkin must be confusing Rössing with some other employer. Rössing has never employed contract la-

bour, nor has it required employees to sleep on "concrete bunks" etc.

*Allegation:* "Many were housed in camps situated right next to the tailings dam containing radioactive mill wastes."

*Comment:* In the early years of the mine about 500 Rössing employees were housed in "A" village, which was about 3km from the centre point of the tailings impoundment. From 1980 the number was systematically reduced as more family housing was completed in the nearby town of Arandis. "A" Village was completely vacated in 1984, all buildings were subsequently demolished and the area was rehabilitated. Although there are no radiation monitoring data on "A" Village, conclusions have been drawn from Namib Lodge, situated about 2km from the tailings pile. Doses calculated from measurements in Namib Lodge indicated that an effective dose equivalent of approximately 3.97 mSv a year was received there, of which 78 per cent was accounted for by natural background radiation. At that time the ICRP's recommended dose limit for radiation workers was 50mSv a year and today it is 20mSv a year.

*Allegation:* That an internal survey of health, safety and house-keeping in April 1977 resulted in a report strongly critical of conditions in the sample preparation room.

*Comment:* Self-criticism has long been used at Rössing as a management method aimed at continual improvement of standards.

*Allegation:* "When the workers went on strike in the winter of 1978, they appealed: '... Our bodies were covered with dust and one can hardly recognize us. We are inhaling this uranium dust into our lungs that many of us have already suffered the effect. We are

***"An environmental control officer taking readings at a seepage dewatering well below the tailings dam."***

not provided with remedies and there is no hospital to treat us. Our bodies are cracking and sore..."

*Comment:* Mr Dropkin leaves out the last sentence of the quote, which reads: "The nearest clinic is 130km away... and it is very complicated to be consented to be absent from work for medical purposes." The veracity of the whole quotation can be judged from the fact that a Rössing information brochure published in 1978 shows a photo of medical staff at the Arandis Medical Clinic, 13km from the mine, and at the mine's first aid station.

*Allegation:* "But the very dangerous period from 1976 to 1982 is bound to have medical consequences, some of which will only show up during the 1990s or later because of the long delay between exposure and cancer."

*Comment:* The IAEA Report on Rössing states: "All individual dose records commence in 1976 but most of the data for the early years are currently based on a backward extrapolation." "Radiation levels at various facilities are very low, much lower than the current international limits. At such low levels of exposures, the probabilities of radiation-induced occupational illnesses are extremely small, and well within acceptable levels of risk in safe industries." The IAEA report further points out that alleged cases of cancer can only be addressed by comparing the incidence among Rössing's employees with the national incidence of the disease, which is as yet unknown. Rössing has been encouraging research into national cancer statistics for some time and would welcome an acceleration of such work by qualified and unbiased scientists.

*Allegation:* "Here [in the Product Recovery Area] there are only black workers. Many work 8 hours a day for a continuous period of 7 days."

*Comment:* There are not only black workers in the Product Recovery Area, but most of Rössing's employees happen to be black. The shifts referred to are organized on a recognised standard pattern of a 28-day cycle comprising 7 afternoon shifts, 7 day shifts and 7 night shifts with 2 days off between afternoon and day shift, 1 day off between dayshift and nightshift and 4 days off between nightshift and the commencement of the next cycle. This is broadly equivalent to a 40-hour working week throughout a calendar month.

*Allegation:* "We are never out of the dusty area [in Product Recovery] - even our lunch facility faces the Product Recovery Area. At one time we were told to work inside the dust collector. We wore protective equipment. After an exposure of 8 hours we showered and changed. I cleaned my nose and throat and found that I had uranium dust blocking my nose. I showed this to the General Man-

ager, but he said it was not uranium dust. The company did not want to pay a safety allowance and so would not admit that we may have been contaminated with uranium dust. Many of us in Product Recovery experience feelings of drowsiness and lethargy. When this is reported workers are transferred to another area."

*Comment:* Most of the Product Recovery operations are a wet process and dust is not generated. However, there is dry processing in the roaster area and special precautions are taken in this area to prevent dust escaping from inside the roasters. When the employee wears his protective equipment correctly and in the manner in which he has been trained, he will not experience dust in his throat and nose. Lunch facilities are outside and separate from the roaster area and lunch rooms and changehouses are strictly monitored. The company does not have a safety allowance scheme as such payments are not justified. The experience



*"Water samples are analyzed in a laboratory at the mine."*



of drowsiness and lethargy has no correlation with the work environment in the Product Recovery Area.

*Allegation:* "The union also suggested a scheme of safety representatives with full access to information. The company refused to consider the proposal..."

*Comment:* The company has expressed willingness on several occasions to negotiate a health and safety agreement with the union. Discussions between the two parties on this subject have been taking place for the past three years, and draft agreements have been exchanged. As a result of the IAEA audit, the Union and the company participated in a joint visit to Canada to examine health and safety practices in the mining industry in that country. The report of the delegates is highly complimentary of Rössing practice.

*Allegation:* "... major flaws in Rössing's approach to radiation control in the early 1980s, even by the standards of the ICRP at that time."

*Comment:* Rössing has followed the ICRP principles of radiation protection throughout the years, continually seeking to improve working practices and conditions. Past exposures have not exceeded ICRP limits.

*Allegation:* "Procedures for analyzing uranium in urine were a shambles." "All mine data prior to 1986 is ... suspect but the IAEA presents this data as accurate."

*Comment:* The procedures for analyzing uranium in urine were never a shambles. The analysis of the urine samples has always been conducted by external accredited laboratories which have included the South African Institute for Medical Re-

search (SAIMR) in Swakopmund, and the Atomic Energy Corporation of South Africa (AEC). To ensure the integrity of the urine sampling programme, strict quality control measures are in place. These measures have included the submission of control samples together with the urine samples. As with any analytical laboratory, there were occasions when these control samples were outside the required specifications. On these occasions, the causes were investigated and the urine sampling data rectified accordingly.

It is not expected from monthly urine sampling and urinalysis to provide a full picture of the radiation safety programme. Urinalysis forms one component of the monitoring programme and is an indication of the employee's adherence to standard hygiene procedures. The assessment of the internal radiation exposure is obtained from the measurement of radon working levels and airborne radioactive dust. No results in excess of the limits set by the ICRP have been measured.

The IAEA team in their report following their technical visit in 1992 commented that the urine sampling system in place at Rössing facilitates the accuracy of results.

*Allegation:* "Workers encountered very high levels of uranium dust in the yellowcake drying and packing area (final product recovery) and very high dose rates of external (beta/gamma) radiation in this department during 1981-82. High cumulative whole body doses and corresponding cancer risks for workers in final product recovery are implied by the data."

*Comment:* The average whole body dose in final product recovery in 1981 and 1982 was 4.25 mSv and 3.06 mSv respectively. Occupational radiological exposure at Rössing was - and still is - in compliance with ICRP recommendations. In terms of ICRP risk factors and assuming 30 years of continual exposure, no excess fatal cancers are expected in Final Product Recovery.

**"An employee passes through a radiation monitor at the exit from the final product area, to ensure that he is clean."**

*Allegation:* "Uncontrolled liquid seepage from the tailings dam before 1981 amounted to an estimated 780 million gallons over a 12-month period."

*Comment:* At no stage has liquid seepage left the mine's property.

*Allegation:* "If current standards at Rössing were excellent and the past practices were also fine, why not open the books? Let the *MUN* and scientists of its choice have access to all environmental data, dose records, medical records, etc. back to 1976, so that a full independent analysis could proceed."

*Comment:* Rössing did open its books to the UN mission representing the IAEA, the ILO and the WHO (accompanied throughout by *MUN* observers) but their report was unacceptable to Mr Dropkin because it did not support his prejudices. Rössing welcomes visits by qualified independent scientists but will not welcome people who purport to be "independent" but who in fact have ideological bias and who have already made up their minds about Rössing.

*Allegation:* "In January 1993 the union tabled a comprehensive Environmental Health and Safety Agreement, drawing on international experience. Six months later there had been no negotiation on the substance of the proposal."

*Comment:* Both the company and the union have tabled proposals on an Environmental Health and Safety Agreement. While the two parties were in the process of negotiations, an invitation to visit Canada was extended by Brian Allen of the ILO who came as part of the IAEA technical team. This visit was to enable representatives of the company and the union to familiarise themselves with health and safety issues and committees in Canadian mines. A joint Rössing and union delegation made the trip during August of 1993. The members of this delegation are currently engaged in

compiling a draft agreement. This draft will then be negotiated between the company and the union, for subsequent implementation.

*Allegation:* "The IAEA confirm published 1982 data on high levels of beta/gamma radiation in final product recovery."

*Comment:* The average beta/gamma dose in final product recovery in 1982 was 1.88 mSv, in compliance with ICRP recommendations.

*Allegation:* "The IAEA discovered that 16 years after starting production, Rössing had still not completed a plan for the decommissioning and longterm stabilization of the tailings."

*Comment:* The IAEA report stated: "The mill tailings management programme of Rössing, and the associated surveillance programme, are of good standard and conform with the current international standards." Rössing has had a decommissioning plan for many years but it has been a living document subject to change as decommissioning technology has improved. The current plan, dated 1992, is comprehensive and detailed. Rössing is making provision for an amount of about N\$165 million (in 1993 N\$) for decommissioning the mine. This amount is reviewed yearly to allow for inflation.

*Allegation:* "The Executive Summary [of the IAEA Report] then selected the favourable data from Part 2. The less favourable results are either omitted or presented in more general terms, without the data."

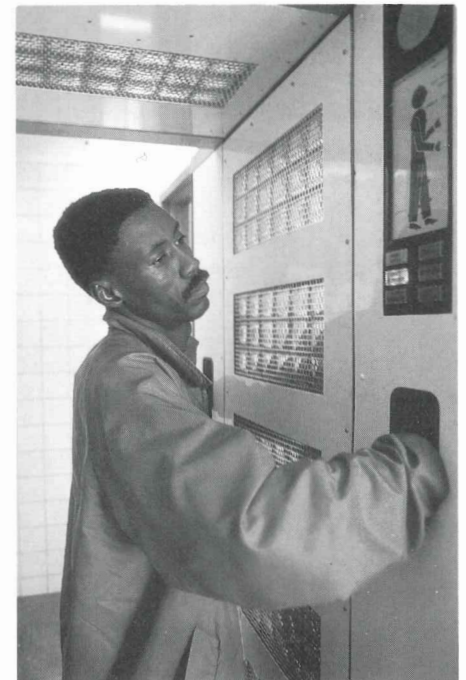
*Comment:* This remark reveals paranoia. In fact the Executive Summary contains the significant findings of the mission.

*Allegation:* "In the final product recovery area Viljoen found a gamma dose rate... around 25 times higher than the background levels measured in Arandis."

*Comment:* The dose rate inside the roasters is certainly high, but roasters are not at all frequented except when maintenance is required, which occurs very rarely. Strict work procedures have always been used during such shutdowns. These procedures detail the precleaning that is required to lower the dose rate, the length of time an employee spends inside the roasters, and the personal protective equipment, including an air-line respirator, which is to be used.

Jacques Viljoen commented in the IAEA report that the final product recovery was visited on two occasions. On both occasions, conditions were found to be satisfactory.

*Allegation:* "At the end of the second screw conveyor the gamma-beta rate is given explicitly as 40 microsieverts/hour with a gamma dose of 7 microsieverts/hour. This rate is extremely high : exposure for 10 hours per week would produce an annual dose of 20 mSv, the current ICRP guideline, without any additional internal dose from radon or dust."



*"A routine lung function test is carried out on employee."*

*Comment:* Mr Dropkin does not appear to understand the difference between measuring radiation at a location and measuring the radiation dose received by a person, which is modified by time exposed, distance of the person from the source, and by safety equipment worn.

*Allegation:* "I doubt that the company has reliable records of 'dust dose' for 1982..."

*Comment:* Some 168 airborne measurements were carried out in 1982 in final product recovery. The results averaged 0.035 mg/m<sup>3</sup>. Although 32 per cent of the measurements were above the 0.03 mg/m<sup>3</sup> ICRP radiological limit, when the respiratory protection factor is applied to these results, only three values (1.8 per cent) were in excess of the limit. The use of protective equipment, which includes respirators, has always been strictly enforced in final product recovery.

*Allegation:* "By their own account Rössing standards were seriously out of compliance with the ICRP standards for 'total Alpha in

dust' (uranium in ore) in 1979, 1980 and 1981, according to Table 1."

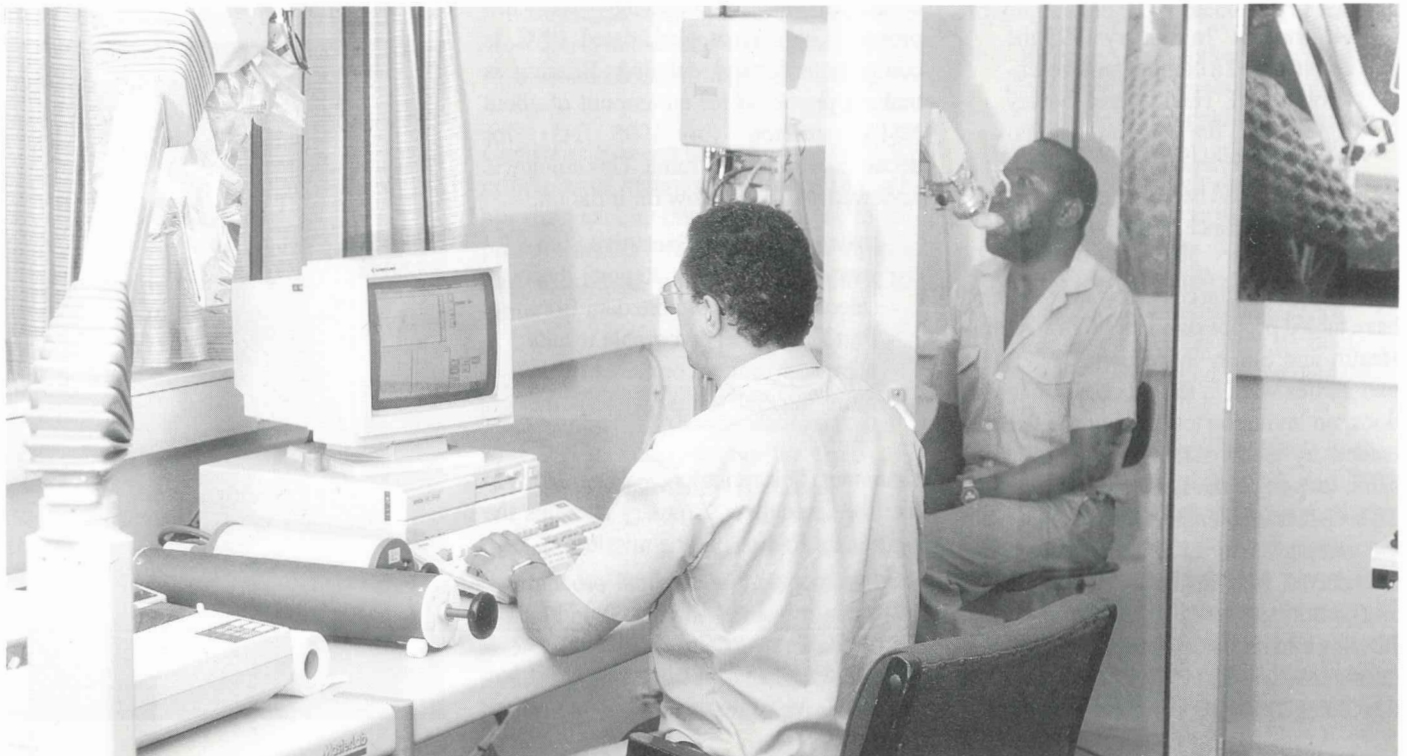
"... Rössing was out of compliance with the ICRP in 1979, 1980 and 1981 when they adopted a limit for total alpha in ore dust which was over three times too high. After 1982, when Rössing claims to have adjusted their total alpha limit to match the ICRP requirement, they failed to calculate the appropriate radiological dust standard. They now claim that in 1982 they adopted a figure of 0.03 mg/m<sup>3</sup> when they should have adopted 0.025 mg/m<sup>3</sup> for uranium concentrate and 0.01 mg/m<sup>3</sup> for uranium in ore dust in order to comply with the ICRP recommendations published in 1979."

*Comment:* Rössing's uranium standards are based on the guidelines of the International Commission on Radiological Protec-

tion (ICRP) and the International Atomic Energy Agency (IAEA).

In areas such as final product recovery where airborne dust may comprise significant quantities of uranium the radiological standard for insoluble uranium has been adopted. There appears to be confusion by Mr Dropkin between the chemical toxicity of uranium on which the industrial hygiene standards are based and the derived air concentration (DAC) which are secondary standards for radiation protection. The chemical toxicity standard used by Rössing in 1982 was 0.15 mg/m<sup>3</sup> (the AGCIH TWA is 0.2 mg/m<sup>3</sup>), and the radiological standards applied were 0.73 Bq/m<sup>3</sup> for uranium ore dust and 0.61 Bq/m<sup>3</sup> for uranium concentrate. Both standards are based on the recommendations included in ICRP 30 for 1979.

In areas where the potential for exposure to ore dust was greater, the standards applied were those based on the silica content. This standard is more restrictive than the radiological standard. The Rössing ore body has a known low radiological content



and, as such, the potential for silicosis is greater than the radiation exposure from the long lived alphas in ore dust.

Tables 1 and 2 referred to as being "erroneous" correctly reflect the historical standards that have been implemented at Rössing. Radiation standards are set to control the exposure risks. The dust standards applied are conveniently used by Mr Dropkin to distract readers from the low radiation levels to which people are exposed at Rössing.

*Allegation:* Under the heading of "Seepage", Mr Dropkin quotes the following sentence from the IAEA Report: "The appearance of an acidic seepage is perhaps the indication that the buffering capacity is being exhausted."

*Comment:* The buffering capacity of the alluvium of Pinnacle Gorge *beneath* the tailings impoundment is partly used up. consequently acidic seepage was noted at the toe of the tailings impoundment, slowly moving in the direction of the seepage dam, which is approximately km from the tailings starter wall. the acidic seepage was however neutralized before entering the seepage dam, which has a pH of . engineering methods of preventing development of an acid front started with the introduction of a paddy deposition system within the existing tailings impoundment. Apart from conferring other operational benefits, the paddy system allows a longer reaction time between the acid solution and the unused calcium carbonate material in the ore. In line with water and acid conservation strategies, the acidic solution pumped into the paddies is immediately decanted and returned to the plant for use in the pulping and leaching processes. One can therefore state categorically that the development of an acid seepage has been eliminated.

*Allegation:* "Significantly, the IAEA discloses that the first medium-scale test against radon, dust dispersion and run-off is scheduled for late 1992 - again, 16 years after mining began."

*Comment:* It is untrue that the monitoring of emissions only began in 1992, 16 years after the start of the operation. The quantification and the confinement of emissions from the tailings impoundment have always been seen as a critical operational and decommissioning aspect of tailings management. This concern for the emissions from the tailings impoundment is not only related to radiological exposure for the employees and the members of the public, but also to the cost of decommissioning at mine closure. Numerous studies have been conducted to address the past and present risks and the implications for decommissioning.

Since the beginning of the operations, radon working level and dust level measurements have been carried out throughout the mine, which includes the tailings impoundment. Occupational internal dose from radon and dust were determined from these measurements. The international consultants, Dames & Moore, were contracted in 1982 to carry out radon exhalation and wind erosion calculations on the tailings impoundment. Their scope of work also included the investigation of a suitable cover for the tailings at decommissioning which would be sufficiently strong to protect against wind and water erosion, and the attenuation of the exhalation of radon to below the United States Environmental Protection Agency's standard of 0.74 Bq/m<sup>3</sup>. The Dames & Moore studies and measurements that have been routinely carried out since show the exhalation of radon from the tailings to be low, reflecting the low radiological content of the Rössing orebody. Dames & Moore also determined that the exhalation of radon and the wind erosion of tailings could be limited by applying a specified thickness of alluvium (sand-gravel) and/or waste rock (rip-rap), both of which are readily available locally. The design for the tailings cover has since been completed based on the Dames & Moore and other studies that have been conducted subsequently.

The "medium scale test" referred to in the IAEA report relates to the revision of

the tailings cover. This revision is conducted to optimise the performance of the tailings cover based on conclusions drawn from the current monitoring and modelling programme.

A recent article in the London Financial Times, by Bronwen Maddox, makes the point that many of the claims made by environmentalists in the name of science should be treated with caution. "The arguments put forward often lack intellectual rigour", she writes, "and they indulge the pressure groups' worst vice: the reluctance to rank some environmental threats as more significant than others."

In a similar vein, Mr Dropkin's preoccupation with the risks associated with working at Rössing must be seen in proper context.

Dr Bernard L Cohen, professor of physics and radiation health at the University of Pittsburgh, has published a table showing loss of life expectancy (LLE) due to various risks. He states that, in the USA, LLE due to smoking is 2 300 days; to drinking alcohol 230 days; to motor vehicle accidents 180 days; to drowning 40 days and to being a radiation worker 25 days. Thus on the basis of degree of risk, a reasonable critic of risky activities might consider campaigning against smoking, drinking, the use of motor vehicles and swimming - as well as many other activities in between - before concentrating on the risks of being a radiation worker.

But even within the nuclear industry with its relatively low risks, Rössing is singled out by the IAEA report as follows: "The mission is of the opinion that the radiation safety, occupational safety and medical surveillance programmes of Rössing Mine can serve as good examples to many similar industries around the world." One can only speculate about the reasons for Mr Dropkin's obsession with Rössing. ■