

Nuclear Report from Taiwan



VOLUME 2

NUMBER 1

JAN-MAR 1994

Radioactive City Taipei's Contaminated Building Case Unfolds

CONSIDER for a moment a hypothetical version of the near future in Taipei. Taiwan's tourist industry, plugging the same stale combination of famous sites around the island for over twenty years, has come up with a package truly befitting the post-industrial age: radioactive apartment tours. There will be many different sites to choose from, all convenient to various interesting parts of Taiwan's bustling capital. A bus will ferry Geiger counter-equipped tourists to several apartment buildings, where they can measure radiation levels in the stairwells and in the empty apartments of the residents who were rich enough to move out. Our tour group can even talk with some of the remaining residents and their children to see what it's like to live between radioactive walls for over a decade.

This imaginary situation may be slightly fanciful, but considering the way the Atomic Energy Council has been handling things, it might not be too far from the truth. Residents of nineteen buildings, including Min Sheng Villa, are still living in their apartments over eighteen months after the AEC discovered the contamination. The problem now affects more than one thousand people, and nobody knows how many more might be affected in sites still to be discovered. Some of the residents have been living in their apartments for almost a decade; many have health conditions which may be radiation-caused.

In spite of the rising number of cases and increased media exposure, the Atomic Energy Council (AEC) has been extremely uncooperative and uncreative in handling this situation. The residents have repeatedly petitioned and protested for fair treatment, but the Council, far from putting forth a reasonable compensation plan, has bickered over technical and legal details for months, while 1000 people go on living in irradiated homes. More disturbingly, while publicly stating that they "are looking at the situation from the residents' perspective," the AEC's actions have in fact proven the opposite.

Overlooking the Problem

Since the AEC first acknowledged the radioactive building problem in August 1992, they have mishandled it at almost every step. To start with, the AEC knew about the abnormal radiation levels at Min Sheng Villa back in 1985, but did nothing about it. (Three high-level Council officials

involved in covering up the results of the initial inspection were impeached in the summer of 1993 for negligence.) Later the Council told the Min Sheng Villa residents that their radiation exposure was minor; it is now known that the residents in the most seriously exposed apartments receive more radiation in a year than the International Committee on Radiation Protection (ICRP) recommends for an entire lifetime (7rems). When the AEC finally got around to offering compensation, more than a year after the problem surfaced, the terms were ridiculous; only the eight most highly contaminated apartments (with nine-year dosages of over fifty REMs!) were eligible for government purchase. Further, as part of the compensation deal the AEC refused to allow the residents the right to sue the Council for possible future medical expenses.

Now that the problem has expanded dramatically in scope, the pattern of reluctance has remained in place. For example, the AEC refuses to use internationally-recognized standards of "acceptable" radiation exposure in evaluating who should be compensated, and has been wasting valuable time in trying to collar compensation funds from other branches of government. The AEC continues to use radiation limits which are too high as criteria for compensation, and has been wasting time trying to cobble together aid packages with funds from different parts of the government when it should have been moving the residents out of their homes to safer quarters.

In an important sense, the gradual expansion of the case as each new irradiated building gets "discovered" is artificial, since the AEC evidently knows about almost fifty buildings apart from the nineteen the AEC has already acknowledged. (See box on page 4.) It seems clear that the AEC has been releasing information at a certain rate, in order to control the development of the situation. The case has not been "coming to light;" rather, the AEC has carefully brought it to light. Further, the AEC has made much of the word "only." When the Min Sheng Villa case first broke in August 1992 there was "only one" radioactive building. When twelve had been discovered by October 1993, the Council reassured the media that there were "only twelve." The AEC evidently wants to take its time, afraid that moving too quickly on compensation will prove financially disastrous if the number of contaminated buildings continues to rise. The Council is

Collection Latha Foundation
(See Radioactive City, page 4)
www.lsktd.org
Digitized 2018

Taipower Over A Barrel

Low-level waste piling up at nuclear plants

WHAT to do with Taiwan's ever-growing quantities of nuclear waste is becoming one of the nuclear establishment's biggest problems. The "temporary" storage site on Orchid Island will reach capacity within this year. To take up the slack Taipower has been storing low-level waste at plants Number One and Number Two under metal shed roofs. Opposition legislators who visited these facilities revealed that at some locations in the vicinity of these sheds radiation levels exceed normal background readings by 8000 to 8500 times. Long term plans for choosing a permanent waste storage site are no farther along than they were when we reported on this issue last year. (See our May-June 1993 newsletter.)

On December 31 last year opposition legislators Chen Wan-chen, Chen Che-nan, and representatives from the Taiwan Environmental Protection Union (TEPU) held a press conference to report the results of their December 2 trip to Number One's on-site storage facility. They revealed that radiation levels at some areas around the stacked barrels of waste reach 800 to 850 μ Sv/hr, 8000 to 8500 times normal background levels. Levels around crates of waste barrels awaiting shipment to Orchid Island reached 100 μ Sv. The TEPU accused Taipower of "playing with the lives of workers and nearby residents," and demanded that the plant be shut down immediately.

Taipower has been storing low- and mid-level solid waste in steel barrels at both Number One and Number Two. The barrels are stacked four or five high, jammed together under shed roofs. Taipower is currently storing 45,000 barrels at Number One and 40,000 barrels at Number Two. Professor of Marine Science at Taiwan University Yang Tzao-yueh pointed out at the press conference that the humid climate at Number One, which sits on the northern coast in Taipei County, could quickly rust the barrels and allow radioactive materials to leak into a nearby stream. From there any leaked wastes would have only a one and a half kilometer trip to the sea, adversely affecting marine ecology.

The legislators and TEPU officials accused Taipower of lacking any long term plan to deal with the waste. They pointed out that neither of the storage sites had undergone any kind of environmental impact assessment before construction began. It is unclear whether Taipower ever notified the Atomic Energy Council (AEC) of its plans to build temporary storage facilities. Taipower countered that it in fact does have a plan,

which it has already submitted to the AEC.

Both the Number One and Number Two sites have run into bureaucratic tangles with the Taipei County government. Taipower waited until it had received building permits from the county before constructing the sheds at Number One, but at Number Two the utility had already finished the storage area when the building permits came through. Taipower applied to the county for operating licenses for Number One and Two in September 1993 and June 1991 respectively, but the county refuses to grant them. Taipei County Mayor Yu Ching, an opposition party politician of the Democratic Progressive Party (DPP), is an outspoken critic of nuclear power who once led a platoon of earth moving equipment to the construction site at Number Four in an unsuccessful attempt to destroy a weather tower Taipower had erected there.

It seems clear that Taipower built these two sites to relieve pressure on the low and mid level storage site on Orchid Island. There are already 89,000 barrels at that site, less than 10,000 short of its designed capacity of 98,112 barrels. With both Number One and Number Two producing 3,000 to 4,000 barrels of low and mid level waste per year, it only takes some basic math to figure out that Taiwan is facing a major problem. Taipower does not expect to be able to send waste to Orchid Island after the end of this year. Originally, Taipower had planned to expand the capacity of the site at Orchid Island to 120,000 barrels, but the National Legislature cut the entire budget (US\$8 million) last summer in the face of safety concerns and protest by the Yami people who live on the island.

Proposals for how to solve the nuclear industry's waste problem have been in the works for several years, but as in other countries, solutions have been difficult to find. We reported last year (issue #3, May-June '93) that the AEC has been searching for a permanent site for low and mid level waste. Thirty one sites are under consideration, some on Taiwan's main island, and some on the much smaller islands in the vicinity. Building the site on Taiwan itself seems certain to fail, since the media and the public no longer place much faith in the government's ability to handle nuclear issues. Environmental concern has been rising steadily since Taiwan became wealthy in the 80's, and this has given rise to a powerful protest movement. Nevertheless, the AEC has said it will select a site by 1996, with a target date for completion in 2002.

(See WASTE, page 10)

<u>Nuclear Report from Taiwan</u>		<p>* Nuclear Report from Taiwan is printed on 100% recycled paper.</p> <p>* BAD NEWS!</p> <p>We are sorry to inform our readers that, due to a lack of funds, ANCT will be changing from a bimonthly to a quarterly publication beginning with this issue. We have recently been seeking grant aid here in Taiwan but have so far met with little success. If any of our readers have any suggestions about applying for assistance from organizations outside Taiwan, please send your advice.</p>
Editorial Board	Prof. Lin Pi-yao Prof. Lin Jun-yi Mr. Chang Jun-yan	
Address	Box 843 Tunghai University Taichung, Taiwan 40704	
Telephone & Fax	886-4-359-5622	
We encourage the use of our material; please give credit when reprinting.		

Nuclear Diplomacy

Taiwan Enters NEA, Will Apply To IAEA

TAIWAN'S charge back onto the world stage is unfortunately being led by the nuclear establishment, with the Nuclear Energy Agency (NEA) accepting Taiwan as a probationary member in January. Taiwan will also apply to the UN's International Atomic Energy Agency (IAEA) sometime in March. Taiwan has lately been pursuing membership in any and all international organizations in an attempt to achieve a diplomatic position more commensurate with its strong place in the world economy.

The NEA is a branch of the Organization of Economic Cooperation and Development (OECD). It is one of the world's most important nuclear power organizations, with close ties to the IAEA. Although Taiwan is now only a probationary member, it hopes to rise through the ranks to observer status and finally full membership. Chair of Taiwan's AEC Hsu Yi-Yun, accompanied by a small AEC delegation, flew to France on January 10 for talks with high-level NEA officials. Hsu has been aggressively seeking to internationalize Taiwan's nuclear establishment ever since he took office in June 1990.

In addition to Japan, a full member, South Korea sits on the NEA as an observer, and is currently applying for full membership. According to anonymous officials, NEA director Uematsu hopes to see more Asian nations on the NEA in the near future.

Even more tasty for Taiwan's nuclear establishment than NEA membership would be successful application to the IAEA, which is the world body for promoting nuclear power. Acceptance would mean prestige for Taiwan, and the AEC has been carefully laying the groundwork by uniting seven existing nuclear organizations into a Joint Nuclear Commission. It is

this specially-created body, technically an NGO, and not the AEC, which will apply to the IAEA. Taiwan is not a member of the UN and therefore is ineligible to apply as a country or under the auspices of a government body. Should the Joint Nuclear Commission's application be accepted, this shell organization would become an NGO member of the IAEA.

Membership in both the NEA and the IAEA is attractive to the nuclear establishment primarily because it would give Taiwan instant and official access to a wide range of information services, as well as make it possible for Taiwan to participate in training programs and symposia. For example, the IAEA keeps data which would be quite useful in the radioactive housing case. Taiwan currently has to rely on personal connections within the IAEA to acquire such information. NEA membership, already secured, gives Taiwan many of these advantages by itself, but IAEA membership would send a signal to the world that Taiwan's nuclear program has really arrived.

Taiwan's nuclear industry doubtless feels that membership in the NEA and other international nuclear organizations will be increasingly important to Taiwan, both from the safety and development perspectives, as its nuclear industry becomes more international. Taiwan's leaders, aware that membership in any international organization will give more weight to Taiwan's efforts to re-enter the UN, will not object either. From another perspective, however, joining the NEA is the wrong move, for surely it will only strengthen Taiwan's nuclearization drive, pushing the country away from a sustainable energy future and into the trap of endlessly trying to satisfy the public's ever-growing demand for electricity. ♣

"Watts Up, Doc?"

Taipower Changes Plans For Number Four

TAIWAN'S planned fourth nuclear plant, out of the news since the legislature finally passed the budget last July, has been making headlines again after the Atomic Energy Council (AEC) and Taipower announced plans to build two 1300MW reactors instead of the two 1000MW reactors originally envisioned. The plan, announced suddenly towards the end of January, has drawn fire from the legislature on both procedural and environmental grounds.

At a January 8 press conference Taipower announced that three companies out of seven remain in the bidding process for the reactors at Number Four: Westinghouse, contractor for the PWR's at Number Three; Framatome, which is building a reputation for good cooperation with Chinese industry based on its work at the Daya plant in Guangdong, and the US firm Combustion Engineering (CE), a newcomer to the Taiwan nuclear scene. US nuclear giant GE had been in the running, but pulled out in mid-December, apparently deciding that bidding for the reactor contract was economically and politically risky. After an expected evaluation period of six to eight months Taipower and the AEC will announce the final winner for the reactor contract.

During the same press conference Taipower also announced that seven companies have submitted bids for the generation equipment. Taipower is continuing its strange

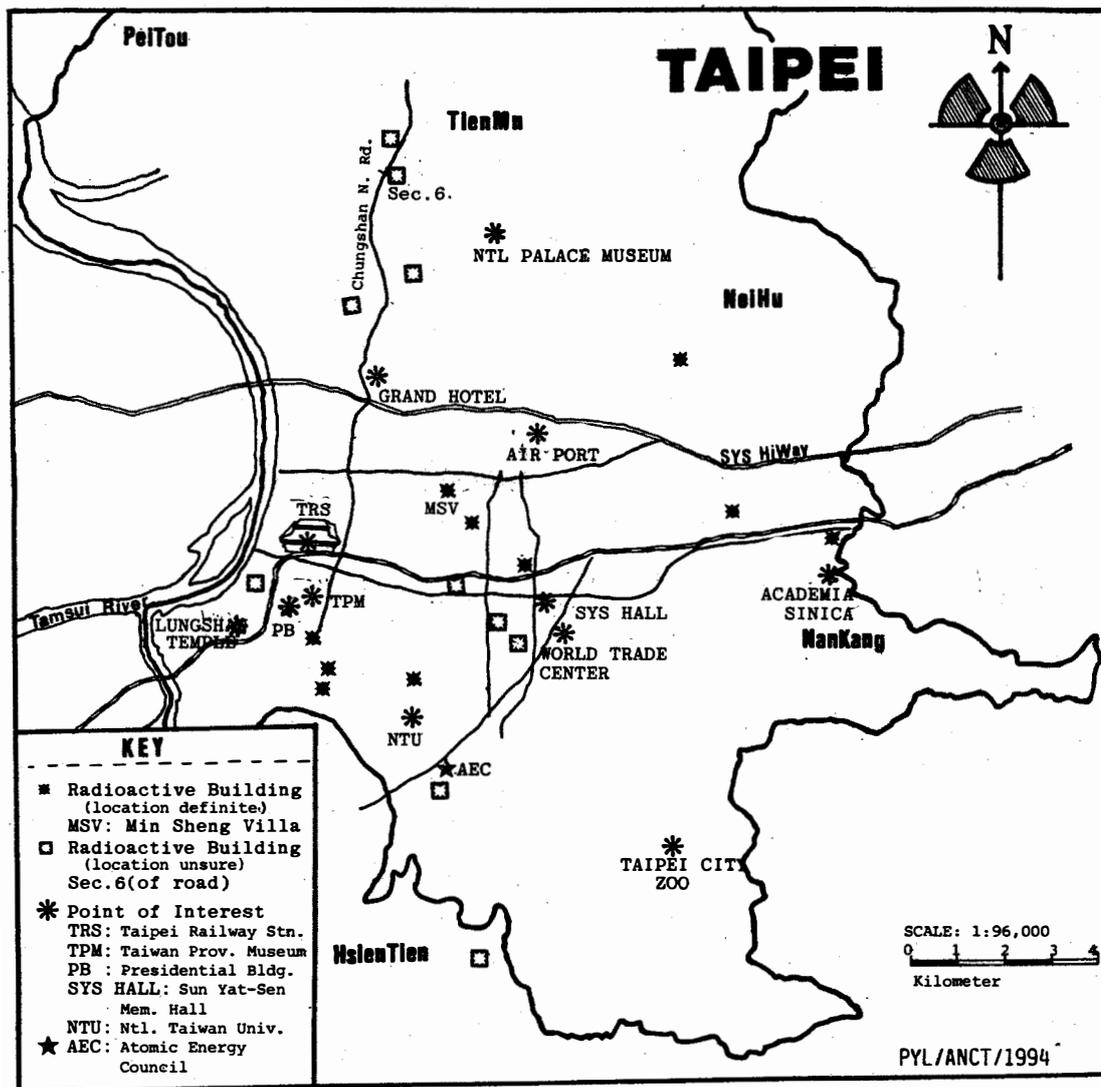
tradition of separating the bidding for the reactor and the generation equipment, a practice which in the past has resulted in hybrid systems built by different corporations. Under consideration are: Sweden's ABB, GE, Westinghouse, Hitachi, Siemens AG, and the UK's Alsthom. This is the first time that Taipower has accepted bids for generation equipment from countries in continents other than North America and Europe.

Taipower, which currently estimates Number Four to cost well over US\$6 billion, wants to begin reactor construction in June 1996, and projects a completion date in early 2001. The utility wants to have the plant on line by February 2002. Unlike the contracts for the previous three nuclear plants, the arrangements for Number Four stipulates transfer of technology worth 20% of the total budget from the contractors to Taipower. Taipower and the AEC are interested in nine specific areas of nuclear technology, including advanced concrete construction techniques. Taiwan is clearly interested in trying to develop self-sufficiency in a broad range of nuclear technologies.

Taipower and the AEC threw a monkey wrench into their own plans for Number Four when they announced that they had changed the power output requirements of the plant from 1000MW to 1300MW. They want to take advantage of so-called "advanced" PWR (also known as ALWR) designs in

(See CHANGES PLANS, page 10)

Radioactive City *(cont'd from front page)*



SOURCE: MAINLY from an AEC Special Report, June 1993, provided to ANCT by Min Sheng Villa resident and representative Wang Yu-lin

NOTE: The AEC has confirmed the existence of nineteen radioactively contaminated buildings with a total of about 250 apartment units. This represents approximately 1000 people at risk.

also undoubtedly afraid of the public relations crisis which the revelation of many irradiated buildings at one time would create.

More International Attention

The contaminated buildings case has continued to attract international attention. In December 1993 Yukio Sato, the latest in a series of Japanese researchers, came to Taipei to visit one of the buildings and take some measurements. Sato is a professor at the Nuclear Medicine and Biology Research Center at Hiroshima University, and he has lately been studying the effects of radiation exposure on Chernobyl survivors.

Sato, accompanied by Min Sheng Villa representative and resident Wang Yu-lin; ANCT's Lin Pi-yao (professor of chemistry at Tunghai University), and several members of the Taiwan Environmental Protection Union (TEPU), went to an
(continued on next page)

Radioactive Buildings May Total Over Fifty

Late last summer the press started to report that although the AEC had confirmed the existence of ten radioactively contaminated buildings, approximately fifty others were suspected to exist. This speculation came from an AEC document acquired by Wang Yu-lin and passed to several newspapers. The document states that the AEC had sent thermoluminescent dosimeters (TLD's) to each of 11,523 Taipei households. Only 6,715 TLD's were returned, and of those 6,668 were analyzed by the AEC. This leaves 47 TLD's unaccounted for, which is why some suspect that the AEC knows about more contaminated buildings than it wants to admit. This stands in clear contrast to the AEC's policy of only admitting to a certain fixed number at any given time. When KMT legislator Hung Hsiu-chu asked AEC chairman Hsu Yi-yun how many radioactive buildings exist, he said, "There are only twelve, and there won't be any more!" Hsu accuses the residents of dreaming up the idea that there are fifty other buildings the AEC is not disclosing. ☘

apartment building on Kuang Fu South Road on December 27. This building is one of the most seriously contaminated ones discovered so far.

Sato's Geiger counter picked up abnormally high readings as soon as the group approached the entrance to the building, and the radioactivity only increased as they proceeded into the stairs and apartment units. Sato found several places in the building, including a child's bedroom, in which he said the radiation levels approached 300 times the natural levels of background radiation in Hiroshima. (When the press reported this information the next day, the AEC was flooded with calls by people who thought that he meant Hiroshima in 1945 right after America dropped the atomic bomb.) The highest level the group recorded was $20\mu\text{Sv/hr}$. Average natural background radiation in present-day Hiroshima is $.07\mu\text{Sv/hr}$. Sato expressed surprise that steel reinforcing bar (rebar) could emit such levels of radiation. According to those present, he kept saying to himself over and over in Japanese, "This is incredible." Later, in wonderment, he said, "I can't believe people are still living here." He advised residents to move out as soon as possible, but of course this was no surprise to them.

Compensation

Since the potentially vast scope of this problem has come to light, the government has been forced to consider how it will compensate the residents of contaminated housing units. Since the beginning the AEC has adopted a standard of 1.5rems/yr exposure as the cut-off for compensation, and in late December the AEC reiterated this position. There are 41 such units in the buildings examined so far, out of a total of 214 units. At the AEC's annual year-end press conference on December 31 last year, AEC chairman Hsu Yi-yun said that the Council would buy back any such units, and provide the residents with free long term health examinations. This left residents of the other units, who make up the majority, out in the cold.

The Council broke the contaminated buildings down into three groups, according to degree of radioactivity, with .5rem/year and below equaling "light," .5rem/yr to 1.5rems/yr equaling "middle," and 1.5rems/yr and up equaling "heavy." There are 155 units in the first category, 18 in the second, and 41 in the third. Hsu said that the Council would like to be able to help all the residents, but that progress was hampered by the lack of legal and organizational framework for dealing with a case like this one, and that bureaucratic red tape was stalling action. In fact, as we will see later, the red tape has mostly been coming straight from the AEC itself.

Much controversy surrounded the AEC's adoption of 1.5rems/yr as the cutoff point for compensation. Nowhere in the Council's own guidelines for nuclear power issues does this number appear. The Council provided no scientific basis for choosing this cutoff, and it appears in none of the international literature on radiation protection. In all radiation protection matter the AEC still uses the 1977 ICRP guidelines of 0.5rem/yr for the general public and 5.0rems/yr for nuclear plant workers. The AEC refuses to recognize the current guidelines of 0.1rem/yr and 1.0 rem/yr. Wang Yu-Lin, who has been a persistent thorn in the AEC's side throughout this affair, joked at a public hearing on December 28 that the Council had developed this standard with him in mind; Wang's own apartment was measured at 1.48rems/yr. "Why don't they just make it 1.49?" he smiled.



Prof. Yukio Sato (left) with Min Sheng Villa residents representative Wang Yu-lin taking measurements at the building on Kuang Fu South Road, December 27, 1993. (photo: ANCT/PYL)

Criticism of the AEC

The first highly organized criticism of the AEC's compensation plan came at a public hearing sponsored by opposition legislator Yeh Chu-lan on December 28 at the Legislative Building in Taipei. In attendance were Yukio Sato, representatives of the residents, several scholars, the press, and chief of the AEC's Radiation Protection Division Chen Wei-Li.

Representatives of the residents said that the government should tear down contaminated buildings and erect new ones. (See box on page 7.) Professor of Nuclear Engineering at Ching Hwa University Minsun Ouyang echoed this opinion, maintaining that the construction companies who built the buildings should be held responsible for the problem and should replace the structures free of charge. He said that if it is impossible for these companies cannot handle the financial strain the AEC should assume full responsibility for building new apartments.

Legislator Yeh, anxious to get the wheels of government turning more quickly, argued that the Health Department should get involved on the grounds of the dangers of radiation to the residents' health. She urged the Health Department to assume an active role in seeking solutions to the residents' dilemma.

Chang Kuo-long, professor of physics at National Taiwan University and chairman of the TEPU, expressed dissatisfaction that the AEC had still not released the locations of all the buildings known to be contaminated. There are believed to be at least fifty such buildings besides the seventeen already publicized. He also stated that the government should provide free long term examinations to monitor residents' health.

The most biting criticism at the public hearing came from Minsun Ouyang, who dismissed the AEC's use of the 1.5rems/yr compensation cutoff as "crude." He said that this figure is not to be found in the AEC's own guidelines and was certainly not taken from international sources; current International Council of Radiation Protection (ICRP) standards suggest 0.1rem/yr as an acceptable exposure level for the

Researchers to Study MSV Residents

The Medical Professionals Alliance in Taiwan (MPAT), Taiwan University Hospital and a coalition of Min Sheng Villa residents announced on December 17 last year that they would establish the first research program in the world to use human subjects to research the biological effects of long-term low-dose radiation exposure.

Researchers worldwide are taking more of an interest in low-dose radiation exposure, but until now no research had been done with humans, and the biological effects of this kind of radiation had simply been extrapolated from findings with victims who had undergone short term, high-dose exposure, such as the people at Hiroshima, Nagasaki, and Chernobyl. The Min Sheng Villa case has unfortunately afforded scientists a unique opportunity—a pool of subjects who have been exposed to known amounts of radiation over periods of years.

Because Min Sheng Villa is the first known case of such long-term exposure to so many people, scientists at Taiwan University Hospital hope to be able to offer ground-breaking insights into what radiation can do to our bodies. To start off the research, the one hundred and twelve Min Sheng Villa residents began going in groups to the University towards the end of December to have blood samples taken for various tests.

Once again, the residents are looking to Japan for assistance. An identical set of the residents' blood samples will be sent to Hiroshima University's Radiation Effects Research Foundation for analysis, and the results will be compared at a later date.

This program, which is privately conducted, receives no support from the AEC. Currently the Health Department is providing financial assistance. ☘



AEC Chairman Hsu Yi-yun in answer to KMT legislator Hung Hsiu-chu's question about who is responsible for the contaminated buildings: "We are not responsible at all! We didn't know anything about it...we don't know how it happened." (photo: ANCT)

housing, financial assistance in removing and replacing irradiated rebar, property tax reduction, and free medical exams for the residents. The amounts of compensation are all very conservative, however, and these measures will mean a substantial effort from the residents in applying for them all. It seems that the AEC is being deliberately stingy at the outset for fear that an increase in the problem's scope will bankrupt the Council.

Even if the residents accept the AEC's offers of compensation, it is not clear where the money is going to come from. The AEC has met twice with a host of other government departments to ask for various kinds of assistance, but the other departments see this problem as a result of past AEC negligence, and are not inclined to offer much support. The AEC's attitude towards its fellow departments has not won any friends either; they perceive the Council as a dictatorial figure telling everyone what they should contribute, without contributing anything itself.

Medical Evidence

According to exams by both Taiwanese and Japanese doctors, some of the residents of Min Sheng Villa, especially children, have some unusual health problems, such as lymph and thyroid disorders and cataracts. Some women have had miscarriages, and residents have reported that several long term residents have died of cancer. However, the AEC and doctors in Japan and Taiwan have been very careful to make it clear that it is impossible to say whether these conditions are in fact caused by radiation exposure. To clear up this doubt was one of the reasons why thirteen residents of Min Sheng Villa went to Japan last October for chromosome testing. The results of that series of tests were finally released in February. They

general population, and 0.5rem/yr for nuclear power plant workers. Ouyang insisted that Taiwan must use accepted international standards in setting any kind of cutoff for compensation.

Professor Yukio Sato offered some sobering advice on the medical front. He said, "the long term effects of low-level radiation exposure are not well understood. We should be worried about what will happen to these people in five years, six years, even thirty years from now. This is why it is imperative to offer them long term medical observation."

Who Will Pick Up the Mess?

Despite the scientific baselessness of the "light," "medium," and "heavy" contamination categories the AEC has adopted, the Council continued to apply them in a revised compensation scheme unveiled on January 23. The Council had been under pressure to improve compensation measures since both President Lee Tung-Hui and Premier Lian Chan expressed concern that the "Min Sheng Villa problem" be solved quickly.

Under the new plan, units classified as "heavy" and "medium" are eligible for certain kinds of assistance, including purchase by the government, low interest loans for new



15th radioactive apartment in Nan Kang--the first instance of public housing built by Taipei City contaminated by radiation. (photo: ANCT)

show that ten of the twelve residents whose chromosomes were successfully tested (the blood sample of one child was spoiled) show a rate of chromosomal mutation between one and two percent, significantly higher than the average nuclear power plant worker's 0.4 percent mutation rate. Of fifty-seven residents who underwent similar testing by NRI researchers in Taiwan, twenty-eight exceeded this average. As it turned out, this testing did not clear up the doubts about whether radiation was a factor; scientists stress that these results are not conclusive.

Double Victims

One of the disturbing things about this whole case is that the residents are in a sense double victims; they have been extremely active in trying every means to make the AEC listen to their needs and see their position, yet the AEC slaps them in the face by refusing to offer them any real assistance. This pattern started when the case first broke in August 1992 and has continued through the present. When residents of Min Sheng Villa initially called the AEC in August 1992, they were told to contact a private radiation inspection company if they thought their building might be contaminated. When they went to Japan for chromosome testing they paid their own way. And if they want to move out, they have to take a financial loss to do so. In February the residents received another blow from the AEC. The Council's Nuclear Research Institute (NRI) announced that after spending tens of millions of US dollars, it had discovered how to use radiation to inhibit the growth of daffodils while simultaneously making the flowers' stems less vulnerable to breakage. The NRI also performed experiments on changing the color of jade by bombarding samples with radiation. This is in line with the AEC's propaganda about "the peaceful usage of radiation."

These ridiculous "research projects" must rank as the world's least useful radiation experiments, and prompt two questions. First, why would the AEC waste so much money and research talent on frivolous experiments when it should be

Residents Demand Fair Treatment

The following is a set of demands prepared by Wang Yu-lin, representative for and resident of Min Sheng Villa, on behalf of the residents of radioactively contaminated buildings, including Min Sheng Villa. These demands were presented to the AEC at the press conference on December 27, 1993.

All households in which radiation levels exceed 0.5rem/yr must be moved to safe housing.

Any area within which radiation levels exceed 1.5rems/yr should be classified as a restricted area, and should be provided with appropriate signs and equipment.

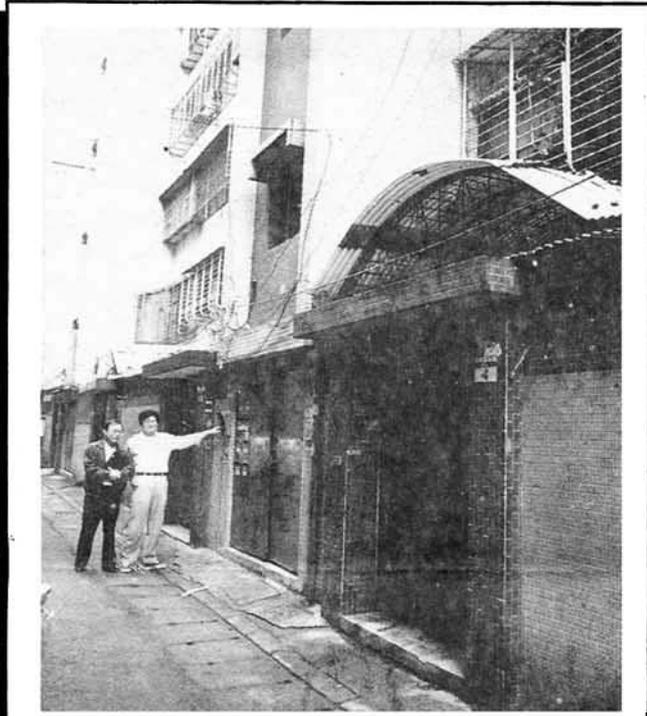
Any apartment units which are exposed to radiation between 0.1rem/yr and 0.5rem/yr and whose radioactivity will naturally decay within a seven year period to under 0.1rem/yr should have lead panels installed to bring the radioactivity immediately down to under 0.1rem/yr. Financial responsibility should belong to the AEC, the steel company which supplied the structural steel, and the construction company which built the building.

Buildings with radiation levels over 0.5rem/yr should be torn down and rebuilt. Buildings can be rebuilt higher than the originals, and the top floors can be sold off to help cover the cost of the entire building. All other financial responsibility will belong to the AEC.

The government has the responsibility to provide the residents with free medical checks, and must guarantee free medical care for the residents' children and grandchildren in the event that they develop diseases as a result of radiation exposure. Long term medical checks and follow-up treatment should be the responsibility of the Health Department. If residents develop cancers or other radiation-linked diseases, the AEC must cover all medical fees.

The strain of knowing that we are living in a building which has given us medical problems such as miscarriages, cataracts, and lymph disorders has had serious consequences for our emotional health. We request that a committee of relevant experts--lawyers, sociologists, and psychologists be called together to arrive at a reasonable figure of compensation for these effects. This compensation should come from the AEC, the steel company which supplied the structural steel, and the construction company which built the building. ♡

applying all available resources to the problem of contaminated housing? Second, having already wasted the money, why did it go ahead and triumphantly release the results, hailing them as perfect examples of "the beneficial side of radiation?" The insensitivity of this is startling; how must the residents of these buildings feel, seeing such resources thrown away on flowers and jade while the AEC, like an old miser, wastes time trying to pinch away the pennies of other government agencies to finance its "compensation" program? Maybe the AEC should



Dangerous Doorbell

If you go this building on Kuang Fu South Road in Taipei to visit Mr. Chao (at right, with Wang Yu-lin), you should follow Chao's lead and bring a long stick, because the doorbell is the most radioactive spot in the entire building. When Prof. Yukio Sato took readings here on December 27 he recorded a level of 60 μ Sv/hr. AEC chairman Hsu Yi-yun steadfastly maintains that it is the "ambient" radiation level rather than the surface level that matters in our daily lives. We wonder who rang the bell for Hsu when, not to be outdone, he followed in Sato's footsteps to make his own visit just a few days later. (photo: PYL/ANCT) ♡

have saved itself a little money and done its research in Min Sheng Villa by giving out daffodils to all the residents eighteen months ago.

Understandably, the residents were less than impressed with the AEC's foray into nuclear horticulture. They certainly have more critical things to worry about, such as the fact that many of their younger children, the ones born after they moved into the radioactive apartments, are noticeably short for their ages. On February 3 over twenty residents and members of the TEPU held a protest outside AEC headquarters in Taipei, carrying daffodils and raising banners saying, "Your short daffodils are pretty; our short children are tragic."

The AEC's Radiation Protection Division head Chen Wei-li met with the residents outside the building, stating that the Council is trying to put itself in the residents' shoes as it develops proposals. Wang Yu-lin said that if this were true, the AEC would involve the residents' themselves in the process instead of conducting their proceedings out of the public eye.

Wanted: Humanitarian Concern

The most obvious failure of the AEC in this case has been its inability to operate on humanitarian principles rather than technical and legal ones. The Council has been so busy trying to lay a legal foundation for compensation that it has

forgotten the bottom line: over 1000 people, through no fault of their own, are still living in housing units which are indisputably unsafe. Further, these people find themselves in this situation as a direct result of the AEC's regulatory negligence in failing to monitor steel products during the 1980's. Every day that the AEC hides behind legal and technical excuses is another day of exposure for families living in a radioactive environment. This is not the way an enlightened government should treat its people.

Every time the AEC tries its hand at putting a human touch in its treatment of this case, it bungles the job and reveals an underlying institutional cynicism. For example, AEC Chairman Hsu Yi-yun has repeatedly said that he "feels terrible" for the residents of these buildings, that he "understands what they're going through," that he "wants to help." But Hsu's pronouncements have a hollow ring; the only building he ever actually visited was the one on Kuang Fu South Road, the day after Professor Sato had been there. Hsu even made a point of talking with the same family that Sato had talked to. This attitude of sudden concern seems paradoxical coming from the same man who angrily told the Min Sheng Villa residents to "move to another country" if they weren't satisfied with the medical exams arranged by the Council.

The residents of the contaminated apartments are not the only ones who feel that the AEC has not done its job well. The Consumer Protection Foundation, a private organization which looks out for consumers' rights, recently ranked the AEC at the very bottom of a list of government bureaus surveyed for responsiveness to citizens' needs. Ironically, out of a possible ten points, the AEC received only 1.5! A CPF spokesperson said that the AEC's bungling of the irradiated apartment case was what drove the Council to the bottom of the pack.

The AEC clearly needs to redeem itself, and what this requires is a major shift in attitude. The key is for the AEC to accept responsibility for the consequences of failing to adequately monitor radiation sources, thus allowing contaminated steel to slip into the construction market. Only after admitting its obligation to sort out the current mess can it begin to build any kind of trust with the residents who need the Council's help and support. If it doesn't act now to repair the social damage done by its indifferent, slippery handling of this case, then the chances of entering into a positive dialogue with these people are slim indeed. The AEC should immediately take concrete steps to rehouse those who need rehousing, and it should use the current ICRP standard of 0.1rem/yr exposure as a cutoff. Before humanity truly understands the effects of long term exposure to low level radiation, it is far better to err on the side of caution than to risk fellow citizens' health by saving a few dollars. Looking farther ahead, the AEC should provide free health care for the rest of the residents' lives, using the Japanese system of free care for A-bomb survivors as a model by working the whole plan into the national health care system. Finally, the Council must strengthen the regulatory framework to more tightly control radiation sources to prevent a repetition of this situation. That it is in all sides' best interest to make these changes is indisputable. The residents, lawmakers, foreign and domestic experts have all done their part. It is time for the AEC to join in. ♡

NEXT ISSUE:

The Evolution of Taiwan's Anti-Nuclear Movement

Radioactive Remodeling

The AEC has found an imaginative new use for a badly contaminated apartment unit in the Min Sheng Villa complex; it wants to convert it to office space! AEC assistant chairman Wang Man-Tzao announced on March 1 that this is the first such effort in the world at remodeling radioactive buildings. It seems that once again the Council is trying to put a happy face on radiation.

The Radiation Protection Division at the AEC stated that the most important goal of the remodeling is to explore the feasibility of pursuing similar remodeling in other units to make them habitable by the original residents.

The units to be converted are on the fourth floor of Min Sheng Villa. According to AEC measurements the apartment are exposed to 1.8rems/yr. The AEC Nuclear Research Institute (NRI) figures that by installing lead panels on the walls and by removing and replacing some of the rebar, the radiation could be reduced to between 0.7 and 0.8rem/yr. Of course this is substantially higher than the ICRP's current "acceptable" limit of 0.1rem/yr, and even exceeds the 1977 ICRP standard of 0.5rem/yr. True to form, the AEC found a bright side; the Council was quick to point out that its target level of radiation is well below the old 5.0rems/yr ICRP limit for nuclear plant workers. Of course, nuclear plant employees generally get to wear protective clothing. It seems unlikely that the AEC will be issuing radiation suits to whoever ends up working in this new office.

Previous offices in Min Sheng Villa have gone through tough times due to the radiation contamination. When the Taiwan Business Bank, on the fourth floor of the building,

found out that the Min Sheng Villa building was contaminated, the employees were worried, even though the AEC assured them that in their office the radiation levels were only three times higher than background. The management decided at first not to move the office, but then in December finally changed their mind. Some of the workers, who on top of their normal work stress had been worrying about radiation exposure, cried with relief when they heard the news. Obviously, it is easy to suspect that the reason the bank wanted to move was because customers were scared off by Min Sheng Villa's radioactive reputation.

Perhaps it is because the AEC knows the radiation levels are excessive that they changed their plans for who will occupy the space. Originally the Council was going to set up an office of its own, but now it has a better idea—rent it to someone else! The AEC plans to offer the space for a super-low rent to the Nuclear Energy Technology Development Council, but would the NETDC really want it?

Wang Yu-lin, longtime Min Sheng Villa resident and representative, said in a statement on March 1 that even if the plans to reduce radiation exposure are successful, it is far from clear that this will be a suitable solution to the problem. Wang emphasized that many of the residents have already been exposed to more radiation than the ICRP recommends for an entire lifetime, and therefore should not have to risk further exposure by continuing to live in their apartments. He also pointed out that converting one unit is one thing, but that modifying many may not be structurally feasible. ☹

The Search Is On How Many Radioactive Buildings Are There?

The AEC is faced with a daunting task: survey over 140,000 apartment and condominium units constructed between 1982 and 1984 to find out just how many families are living in radioactive homes. To start off, the AEC has set a goal of surveying 50,000 units in four major cities within six months. The AEC says it will assign 100 employees to carry out this work. Taipei city government will contribute 40 employees of its own to aid in the search.

Most of the work will involve distributing, collecting and analyzing thermoluminescent dosimeters (TLD's), tiny radiation detectors which will supposedly alert residents to the presence of unacceptable levels of radiation in their homes. Each household will receive eight TLD's and residents are supposed to stick them on beams and columns in their apartments for up to thirty days before returning them by mail to the AEC for analysis. According to the plan, if the detectors show excessive radiation levels, a team of technicians will visit the unit to do further checks.

The TLD method is not off to a great start. According to a June 1993 AEC report, the Council sent out one TLD to each of 11,523 households during that spring. Residents were to return them by mail after leaving them stuck to their walls for two weeks. Unfortunately, the return rate proved to be little better than fifty percent. There is no reason to expect that a greater percentage will return them this time. There is also the worry that the AEC will absolve itself of legal responsibility to households that do not return their TLD's but

which are in fact contaminated. Moreover, due to the uneven distribution of contaminated steel in columns and beams, it is possible that eight correctly installed TLD's may not pick up an accurate reading. Of course, some people will install their TLD's the wrong way, such as too close to a heat source. Finally, there is reason to question how seriously the AEC takes the TLD survey; some astonished Taipei residents who had never sent their TLD's in received letters from the AEC that said their apartments were not contaminated.

The AEC has been trumpeting its TLD program as proof that the Council is taking the lead in dealing with the radioactive building problem, but of course the big question is why the Council waited until a year and a half to begin a large scale survey like this. Also, the TLD program is doubtless attractive to the AEC because it continues the AEC tradition of giving as much responsibility as possible to the residents and as little as possible to itself.

The AEC also has tried to enlist the aid of other government agencies in the search for radioactive housing units and for radioactive steel. The AEC wants help from the Ministry of Communications in setting up roadside detecting stations to spot-check trucks carrying structural steel, and it wants local building inspectors to carry Geiger counters to check newly-constructed buildings. So far, these two agencies have not been enthusiastic about joining in the search; they complain that they don't have the staff to spare and that the problem is after all the AEC's responsibility. ☹

Taipower Changes Plans For Number Four *(cont'd from page 3)*

the 1300MW range. This will lengthen the bidding process and delay the start-up of the plant, if in fact it is ever completed. It also added thirty percent to the original budget.

Taipower sent letters of clarification to the three bidders for the reactor equipment early in February. Each bidder's proposals needed "more detailed explanation" of over 800 separate items. Taipower reportedly has over one hundred people working full time on the bids and is taking its time; after years of farming bid evaluation out to consulting firms the utility is trying its hand at doing its own evaluations.

The decision to go from 1000Mw to 1300Mw immediately drew criticism from some legislators and from environmental groups. Ironically, it was a ruling party legislator and supporter of nuclear power, Wang Shih-hsiung, who first expressed opposition. In a press conference on January 24 Wang stated that increasing power output by such a large amount will require a new environmental impact assessment (EIA) statement.

Accompanying Wang at the press conference were several members of the TEPU and several former members of the EIA committee which evaluated the original plans for Number Four. Professor Cheng Chin-lung of the Chinese Economics Institute maintained that increasing the power output would: 1) increase the amount of normal (and of course accidental) radiation release, 2) increase the amount of nuclear waste, 3) put further strain on the marine ecology near the plant by using greater amounts of sea water for cooling and by increasing the water temperature, 4) adversely affect municipal water supply in the areas around the plant, and 5) increase the impact of electrical transmission equipment on the surrounding environment.

The AEC's official position is that even a one-third increase in power output does not require going through a new EIA process. According to their reasoning, a 1000MW plant is basically the same as a 1300MW plant. Taipower put out a "mini" EIA statement which identifies only three significant differences: cooling system water temperature, length of outflow pipes for the cooling system, and amount of water required. Legislator Wang said at the press conference that he had it on good authority that Taipower had spent a mere two days putting the statement together.

Wang's basic complaint is that the AEC and Taipower have not been nearly open enough with the public about Number Four. He maintains that Taipower should build what it originally said it would build. If the utility wants to change plans, says Wang, it should be prepared to go through another round of EIA work. He called for the AEC and Taipower to freeze Number Four's budget, do a new EIA, and take concrete steps to assure openness in the planning process. ♣

Number Four Update

At the beginning of February ANCT the No Nukes Asia Forum in Japan informed us that they had acquired information that Taipower had already selected a winner in the bidding for the reactors at Number Four. If the information is accurate, Sweden's ABB and America's Combustion Engineering (CE) have won a bid to build the Advanced Pressurized Reactor (SYSTEM 80+). This would be strange for two reasons: Taipower had previously stated that it wouldn't make a decision on the reactor bids until June, and (SYSTEM 80+) has not been licensed yet. We at ANCT are puzzled that our knowledge does not coincide with this latest news. Another tip: Mitsubishi and Hitachi will be invited to a bidding conference on turbine equipment on April 7.

Waste Piling Up At Nuclear Plants *(cont'd from page 2)*

It is conceivable that a site might be constructed on outlying islands such as Penghu (the Pescadores) or Chinmen (Quemoy), but opposition there could be substantial as well. From the point of view of the AEC and Taipower, the ideal site would be an uninhabited island, but the islands around Taiwan are either inhabited, too small, or disputed with other nations.

At the Third Chinese Experts Radwaste Symposium in Taipei on December 21 and 22 last year, Taipower general manager Chang Szu-ming reiterated a possibility that has been on many experts' minds: coming to an agreement with the Peoples' Republic of China that would allow Taiwan to ship all its low and mid level wastes there. Three years ago the PRC's China National Nuclear Corporation proposed to Taiwan that it would take care of Taiwan's waste. The PRC has many uninhabited coastal islands which Taipower has said would be "ideal" storage sites for low level waste. Right now Taiwan is not happy with this possibility because it would entail an unequal relationship with the PRC, which still sees Taiwan as a renegade province. Taiwan suspects that the mainland would use future Taiwanese reliance on the mainland for waste disposal as a political bargaining chip. Also, Taiwan fears the mainland's political instability could scuttle any program and leave Taiwan suddenly without a storage facility. Taiwan says that any progress on this front must go hand in hand with government policy on both sides.

Taiwan may have another international option for waste disposal--Russia. In Taiwan's first formal step to seek

foreign assistance on this issue, a six-member delegation flew to Moscow on February 19 to exchange views and information. The group consists of Taipower consultant Lin Yin, Chief of Taipower's Nuclear Terminal Operations Division Chien Pei-chen, Head of the National Enterprise Division Huang Jen-chu, an AEC representative, and two professors from the AEC's Nuclear Research Institute (NRI). The group is on a tight schedule and cannot talk about details, and bad weather will make it impossible to visit waste disposal sites, but the group will visit the Kurchatov Nuclear Research Center to learn about Russia's waste disposal situation. The two sides have said they will definitely talk in the future, but no date has been set. A deal with Russia might be attractive, since the former Soviet republic has a firmly-established nuclear industry with many waste disposal sites available, whereas the PRC has yet to construct such a site. Russia's dumping of radwaste into the Sea of Japan last November certainly calls into question Russian commitment to safety.

Unfortunately, progress with both the PRC and Russia will be a long term proposition, and Taiwan needs to move quickly towards a solution to the waste problem. In the short term, storing low and mid level wastes will reach the most critical point between 1994, when the Orchid Island site fills up, and some future date when Taipower finishes construction

(See WASTE, next page)

Waste *(cont'd from previous page)*

of a permanent site. In the long term, however, high level waste will present even more of a problem. Taiwan's reactors are all PWR's, which burn up less than half of one percent of the fissile material in the fuel. The rest, including plutonium bred from the uranium 238, gets stored in special pools. Taipower currently plans to store all high level waste this way for twenty years. The second stage will be dry storage for fifty to one hundred years. There are as yet no firm plans for the third stage.

That Taipower has a long time to think about how to deal with high level waste is perhaps only small consolation when one considers how difficult it is for even countries with highly developed nuclear programs to solve this problem. Sweden, the United States and Japan are all projecting dates in

the first third of the next century for the completion of permanent high level waste facilities. These countries can all draw upon a highly advanced "nuclear culture" to move towards solutions. Where does this leave Taiwan, with its fledgling and problem-plagued nuclear program?

Meanwhile, at plants Number One and Number Two, barrels of waste continue to pile up, with no place to go. The AEC says that the facility is "within safety levels, but we have requested that Taipower make improvements." Taipower maintains that it can store everything safely until 2002, when the permanent storage site is to be completed. We hope they are right, because it looks like no solution will appear until then. ♣

Politics Go Nuclear

Anti-nuclear Stances In Local Politics

AS anti-nuclear sentiment has grown in Taiwan, the political process has responded. In recent local elections, anti-nuclear sentiments formed an important part of many candidates' platforms, cutting across party lines. Although this trend has only affected the political scenes of those areas near the four nuclear sites, it may be a precursor of a broader trend.

In the Yen Liao area, where Number Four is under construction, the phenomenon has been especially obvious, with both candidates for township mayor decrying the spread of nuclear power. Liao Pin-lang, the opposition candidate from the Democratic Progressive Party (DPP), was the more convincing of the two, having served as the Taiwan Environmental Protection Union's general secretary and participating in numerous anti-nuclear protests. His Kuo Min Tang (KMT) opponent, Chao Kuo-teng pointed eagerly to his own anti-nuclear credentials, which were less convincing than Liao's. Candidates from both parties in the townships around Yen Liao have also been jumping on the anti-nuclear

bandwagon with startling speed, raising questions about just who is truly sincere on the issue.

In Orchid Island township, site of Taiwan's low and mid level nuclear waste dump, Yami activist Siamen Vengayen (Chinese name: Kuo Chien-ping) ran as a dark horse against a more powerful opponent in elections for township representative to the county council.

Politics in the southern township of Heng Chun near Number Three has an anti-nuclear flavor as well, but it is more subdued than the other areas. Heng Chun lies close to the Kenting National Park, an extremely popular resort and beach area usually teeming with tourists. Number Three has caused problems for the tourist industry before, with coral bleaching and releases of radioactive water into the sea off Heng Chun. Residents in Kenting don't like to say the word nuclear at all, even when it has an "anti-" attached to the front. Politicians, mindful of the value of tourist dollars, kept pretty quiet about nuclear issues during the local campaign, but now that it's over debate may heat up again. ♣

In the News

Taking Advantage of Radiation

Unscrupulous people are already taking advantage of opportunities offered by the radioactive building case.

The biggest problem so far has been apartment owners who find out their units are contaminated and then try to sell them off to unsuspecting buyers. Officials at the Consumer Protection Foundation (CPF), a private consumer advocacy group, say that although it is illegal for development corporations to do this, a loophole in current consumer protection law does not prevent individuals from selling contaminated housing units.

According to the CPF, consumer protection law states that any business enterprise whose product endangers consumers' lives, health, or property can be held financially

responsible for the results. The CPF maintains that therefore responsibility in this case clearly falls to the development companies which built the contaminated housing units.

CPF officials further stated that the AEC should immediately release the locations of all known radioactive buildings, and forbid their sale to third parties.

A second problem involves some people in Taipei County who have been posing as AEC inspectors and charging unsuspecting residents US \$40 to "inspect" their apartments. This has the AEC angry; the AEC stressed in a special statement at the beginning of March that it does not charge for its inspections, and reminded residents that all AEC inspectors wear photo ID badges.

In the News

Leak at Number Three

A leak in the heat exchanger of one of Unit 1's two steam turbines was below the "scram threshold," according to Taipower. Engineers discovered water leaking from the device at a rate of five liters per hour. The "scram threshold" is eighty liters per hour. Taipower termed the leak "within normal limits."

Nuke Network

The AEC announced in December that a new on-line information service with eighty-one databases is ready for use. Users will be able to access information about the operating status of each of Taiwan's six reactors, radiation monitoring at the three nuclear plants, waste management statistics, and general news about the nuclear industry. An interesting feature of this service is that users cannot print anything out.

It appears that this new on-line service, called BBS, will not offer anything new in the way of hard information and facts, but merely make existing information available in the impressive new guise of a publicly accessible database.

Taiwan-Indonesia Nuclear Cooperation?

During Taiwan President Lee Teng-Hui's recent visit to Indonesia, he raised the possibility of cooperation on nuclear power development. Lee, who was doing a little "vacation" diplomacy on the tourist island of Bali, did not go into detail, but any future cooperation between the two countries will likely involve training of Indonesian management and operations personnel by Taiwan's nuclear establishment. In a news broadcast here in Taiwan, a CBC reporter said that environmental groups were surprised when the Indonesian government expressed admiration for Taiwan's nuclear power plants.

Indonesia is considering constructing a nuclear power plant near a small village on Java. Westinghouse and Mitsubishi are reportedly both involved, and construction could begin as early as next year. If the plans go ahead, this would be the first nuclear plant for Indonesia and the first export opportunity for the Japanese nuclear industry. Japan is also hungrily considering the possibility of exporting to Taiwan and Thailand.

Mitsubishi has a terrible reputation on the environment, and any involvement in this Indonesian deal would be cause for grave concern. In Indonesia, would it be bound by the same strict safety standards imposed on nuclear development in Japan? Its record so far has not inspired confidence. In Malaysia, a Mitsubishi subsidiary called the Asian Rare Earth Co. has "left radioactive wastes out in the yard and caused serious health problems among the local residents." If Mitsubishi ends up building a nuclear plant for Indonesia, we wonder what it will do with the waste.

More Cracking Turbines

During a maintenance shutdown at Number One's Unit 1 this January, engineers discovered numerous cracked blades in one of the steam turbines which drives the generators. This is the seventh such case in Taipower's sixteen year history of operating nuclear plants. Number One's Unit 1 is the oldest reactor, coming on line in 1978.

The turbine in question had undergone repairs to replace cracked blades before, in June 1992. The blades which

cracked this time were apparently original.

Taipower, faced with growing incidence of this problem, is considering replacing all the older turbines at Number One and Number Two. Because the units will have to be custom-made, the utility estimates the total cost will be several hundred million US dollars.

Number Three Unit 2 Back On Line

Number Three's Unit 2 came back on line on January 12 after being down for a two-month annual repair period. Officials at the plant said that because engineers are so familiar with the system by now, they were able to finish work on Unit 2 five days ahead of schedule. With a two-month long annual maintenance period those engineers certainly ought to be familiar with it! Number Three has been the least efficient of the three nuclear power plants. Because of water supply problems for the cooling system, the plant can only run at about fifty percent power output. Taipower reportedly takes a per diem operating loss of US \$800,000 on the plant.

Fears About PRC's Da Ya NPP

The People's Republic of China's first commercial nuclear power plant, fifty kilometers from Hong Kong at Da Ya Bay in Guangdong Province, has already begun powering up operations in one reactor, and should have the whole plant on line in April. The plant has been heavily criticized by Hong Kong and Taiwanese environmental groups due to construction problems and fears about inadequate safety measures. Several French engineers at Framatome, which designed and built the plant, have walked off the job in protest at shoddy construction practices by Chinese subcontractors.

Guangdong is starved for electricity to power its booming economy, and has already applied to the central government in Beijing to build two more nuclear power plants. Provincial governor Zhu Sen-lin said recently, "We hope we can build a few extra ones soon." This attitude is worrisome, as no one knows how the first plant will perform, or even if it is safe. Pressure groups in Hong Kong protest that it is unclear how the Da Ya plant will do in the hands of its mainland operators, and thus dangerous to the entire area, including Hong Kong, to go ahead with plans to build other nuclear plants. Hong Kong investors jointly invested US\$4,000,000 with the mainland in the project, and seventy percent of the Da Ya plant's electricity will go to the British territory.

Some Taiwanese officials have also been quick to criticize the plant, noting the construction problems and delays, questions about safety systems, and worries about operator quality and waste management. This is richly ironic, since Taiwanese environmental groups have leveled the same criticisms at Taiwan's own nuclear power plants.

Number Two "Hotter" Than One & Three

On February 28 the AEC released a report on radiation monitoring around the nuclear plants for 1993. Interestingly, the average readings at Number Two were twice as high as at Numbers 1 and 3. The readings supposedly reflect the largest amount of radiation which people living around the borders of the plants have been exposed to. The measurements were as follows: Number One, 0.277 μ Sv/yr; Number Three, 0.263 μ Sv/yr; Number Two, 0.493 μ Sv/yr. The AEC uses 500 μ Sv/yr as an "acceptable" upper limit of exposure.