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Extending the Lifespan of Takahama Units 1 and 2: Sloppy RPV Surveillance Method

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On April 30, 2015, Kansai Electric Power Company (KEPCO) applied to the Nuclear Regulation Authority (NRA) for an extension of the operating limit of Units 1 and 2 of their Takahama Nuclear Power Station from 40 to 60 years.

In order to implement this operating limit extension, it is necessary to update the security regulations by performing meticulous inspections and formulating a maintenance and management policy document as well as receiving the necessary approvals and certifications, such as the “approval of alteration of reactor installation” in compliance with the new regulatory requirements. In all of this, one of the crucial points of controversy is the soundness of the reactor pressure vessel (RPV). Neutron irradiation causes embrittlement of the pressure vessel. The benchmark for irradiation embrittlement is the ductile-brittle transition temperature (DBTT), which rises as embrittlement proceeds. The difference in the temperature of the water injected at the time of a reactor accident and the temperature of the inner face of the RPV could cause the RPV to experience a fracture failure.

Surveillance specimens of steel materials made from the same material as the RPV are placed inside nuclear reactors and withdrawn occasionally to monitor the change in their DBTT, etc. The DBTT of the RPV itself is thus predicted, but is it possible to make correct predictions using this method? We asked Hiromitsu Ino, a professor of metallurgy and materials science, to explain for us the problems with the surveillance test method for structural materials of nuclear reactors and their relation to the soundness of the RVPs of Takahama Units 1 and 2.

In January 2015, NRA organized an Investigation Team on Technical Assessment of the Surveillance Method for Nuclear Reactor Structural Materials.¹ The team’s mission was to prepare “... a technical assessment paper and draft document interpretation of the standards for the surveillance method [which should be] finalized by about March 2015,” indicating that the deliberations were expected to be cleared away in around three months. However, a variety of controversies arose and the debate continued into April and beyond. It is thought that the reason why there was little option but to engage in somewhat prudent deliberations was perhaps that this author’s claims had an impact on the team after reaching their ears due, among other things, to the meeting organized by CNIC in the Diet buildings as well as the House of Representatives Member Takashi Shinohara’s NRA hearing and written questions submitted to the NRA commissioners.

These deliberations bear a close relation to the 20-year lifespan extensions of aging nuclear reactors exceeding 40 years of operation. KEPCO filed its operation extension applications for Takahama Units 1 and 2 with NRA on April 30.

The assessment of the soundness of the RPVs, a crucial item in the application, was influenced by the conclusion reached by the investigation team. These two units are aged reactors which began operation in 1974 and 1975. The DBTT of surveillance specimens placed within the Takahama-1 RPV had reached 99°C when removed in 2009, becoming Japan’s worst by overtaking the 98°C of Genkai-1.

Steel is ductile (capable of being bent or pulled into different shapes) at temperatures higher than a certain temperature, but becomes brittle at lower temperatures. There are numerous examples of accidents involving brittle failure, such as the sinking of the Titanic in 1914, hull fracture in large numbers of the American Liberty transport

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1. Technical specifications for power generating nuclear facilities start from those established by the three organizations, the Japan Society of Mechanical Engineers, the Atomic Energy Society of Japan, and the Japan Electric Association. The regulatory authorities endorse these after a technical assessment and put them into practice.

ships during the 2nd World War, and the rupture of the expressway girders in Kobe when the Great Hanshin-Awaji Earthquake struck in 1995. In the case of the Titanic, the post-accident investigation revealed that the ship had been built using poor quality steel with a DBTT of 27°C.

RPV steel is progressively damaged by neutrons from the reactor core, resulting in a gradual increase in the DBTT. As this occurs, the pressure vessel becomes more susceptible to shocks. When considering an extension of operating lifespan, it is necessary to carry out investigations to ascertain that the steel plate of the pressure vessel is able to withstand the heat shock of rapid cooling in an emergency situation. That investigation requires a prediction of the DBTT of the steel, and this is carried out using the Japan Electric Association's technical specification "Monitoring Test Method for Structural Materials of Nuclear Reactors JEAC4201-2007."

The shift of DBTT by irradiation is indicated in the numerical tables of JEAC4201-2007 as a function of neutron fluence and flux, and the chemical concentrations of Cu and Ni in the RPV steel. The future predicted curve of DBTT is drawn by plotting the values from the table, and then adjusted so that the actual measured data from the surveillance specimens are included below the curve. The fracture toughness (a value indicating how much force imposed on the leading edge of a crack the material can withstand without fracturing) is calculated and a judgment made about whether or not the RPV can withstand a pressurized thermal shock. For this judgment, a separate regulation, the "Method of Confirmation of Fracture Toughness for Nuclear Reactor Power Generation Equipment: JEAC4206-2007" is used.

Technical standards developed by professional associations (the Japan Society of Mechanical Engineers, the Atomic Energy Society of Japan, and the Japan Electric Association) are subjected to evaluation by the regulatory agency, i.e. NRA, and then endorsed. The JEAC4201-2007 (2013 supplement) prepared by JEA is currently undergoing this process.

As it happens, at the time of the Nuclear and Industrial Safety Agency's Hearing Committee on the Technical Assessment of Aging (November 2011 to August 2012) faults were found with this JEAC4201-2007. Not only could the DBTT of 98°C of the Genkai-1 surveillance test not be predicted using this prediction formula, it was also pointed out by the present author, a member of the hearing committee, that there was a simple error in the reaction rate formula.² As there were committee members at the hearing who claimed that there was no problem with the prediction formula in terms of engineering, the conclusion was held over and deliberations were ended, leaving the matter up to discussions between the relevant organizations.

The Japan Electric Association nevertheless accepted this admonishment, but with almost no substantive deliberations altered the parameters of the reaction rate formula, the basis of the prediction formula, to fit measured values in order to establish the 2013 supplemented edition of JEAC4201-2007. What the NRA Investigation Team on Technical Assessment of the Nuclear Reactor Structural Materials Surveillance Test Method presented as one of its items for consideration was the notion that "We evaluate the technical adequacy of the differences in the 2007 edition, which has already undergone technical assessment, ... and the 2013 supplemented edition ... and therefore the appropriateness of the prediction method is evaluated as providing adequate prediction results," thereby blocking off any discussion on the 2007 edition itself.

Even under this restriction, two of the three external specialist members of the Investigation Team expressed critical opinions of the prediction method. These opinions included the following. "Determination of the coefficients of the reaction rate formula and so on when deriving the prediction formula indicated only the results and could not be checked by anyone except the persons actually involved. If this was a scientific paper, it would be rejected, and therefore the data and process of calculation should be disclosed in order to make it possible to verify the coefficients." "Willy-nilly alteration of the coefficients each time data was added cannot be called a prediction formula, and is actually nothing more than a correlating equation. Isn't it dangerous to make predictions that exceed the scope of observation of the data?"

2. In steel that has been irradiated by neutrons, impurities such as copper atoms become mobile due to atomic vacancies and form clusters. These clusters obstruct plastic deformation, causing the DBTT to rise by hardening the steel. The speed of movement of copper atoms is determined by what is known as the diffusion coefficient. The frequency of two copper atoms meeting (the reaction rate) is proportional to the second power of the number of copper atoms and first power of their speed of movement (the diffusion coefficient). Thinking about it for a moment, since both atoms move, it would seem that their frequency of meeting would be proportional to the second power of the diffusion coefficient, but this is not so. This is because of the notion of the random walk – the random movement of atoms. Being similar to the way drunkards walk, it is also sometimes known as the drunkard walk. Thus the frequency of the meeting of two atoms is determined as linearly proportional to the movement of one atom, since it makes no difference if one atom is moving or two atoms are. It appears that the authors at the Central Research Institute of Electrical Power Industry (CRIEPI), members of the specification committee at the Japan Electric Association, which devised the prediction formula, unwittingly made this elementary mistake. While they should have recognized the mistake and reconstructed the formula, perhaps fearing the consequences of recognizing the error, one of the authors, Mr. Naoki Soneda, aggressively stated at the hearing and elsewhere, "The second power does not stem from theoretical considerations... What I'm saying is that this model serves well to describe the process."

Takahama-1 DBTT changes with age

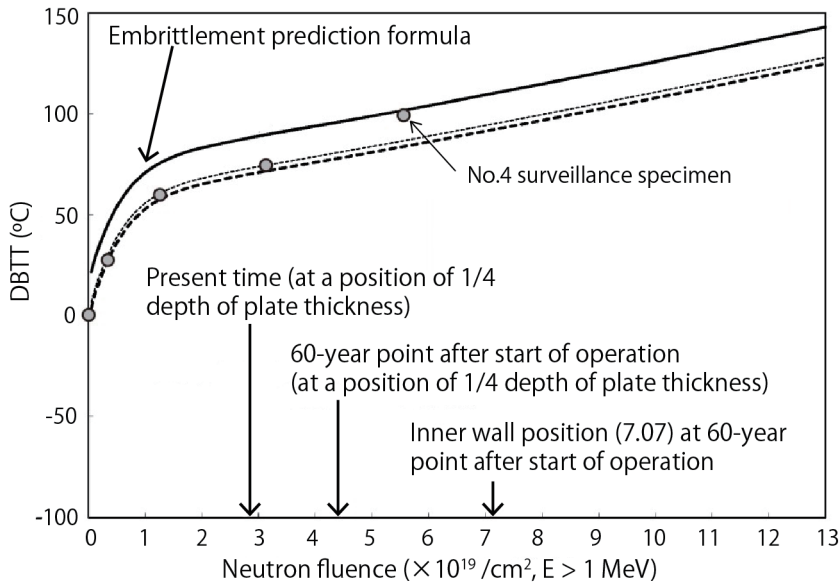


Figure 1. DBTT measured by monitoring tests at Takahama-1 (circles) and the embrittlement prediction curve based on the 2013 supplemented edition of JEAC4201-2007. Note that the 60-year position has been revised downward compared with previous reports.

At the third meeting, a “Draft Technical Evaluation of the 2013 supplemented edition of JEAC4201-2007” was presented by NRA and several important issues were discussed.

One of these issues was how to treat the discrepancy between measured values and predicted values. Measured values suffer from measurement errors, and these could be expressed statistically by standard deviation (indicated as M_R in JEAC4201-2007), but it was also said that adding in a deviation (indicated as M_C) for each plant would greatly improve predictions. However, the real nature of M_C is not that it derives from data scattering, but is a bias arising from inadequacies in the prediction formula. Saying that adding in M_C improves predictions is, in other words, the same as hinting that either there are errors in the prediction formula or that there are unknown factors that had not been considered. Clearly, a review is necessary.

The second issue is the grave problem of “whether or not this prediction formula can be used to make predictions.” The forceful opinion was put forward by one of the external specialists that a formula for which the formula coefficients change each time measured values are added is nothing more than a correlating equation and cannot be used for extrapolation. The NRA executive Masashi Hirano also stated that “(To extend the lifespan of a reactor from 40 years) we want to know the degree of irradiation embrittlement that corresponds to the fluence (amount of irradiation) in 20 years’ time.” To this, Mr. Aoki, head of the Technical Basis Department stated that “... it is not necessarily a condition that we have the data for 60 years at the 40-year point,” and thus opinions were split. What

this means is that when deciding on the lifespan extension, even if the predicted value 20 years in the future cannot be known by interpolation, it is appropriate to take additional surveillance data during the extended period. The participants from the Japan Electric Association reacted strongly against all opinions (including those of NRA) to block off extrapolation.

Jointly with Prof. Masahiro Koiwa, this author submitted a written opinion to the Investigation Team chairman, NRA Commissioner Satoru Tanaka, demanding that cautious deliberations be conducted regarding the above matter.

At the fourth Investigation Team meeting held on 25 June, a technical assessment of the 2013 supplemented edition was presented by NRA and largely agreed upon. It was then decided to submit the technical assessment to NRA for the solicitation of public comments.

Since the draft technical assessment approved of the 2013 supplemented edition almost as it was, the content is far from being acceptable. There was, however, little option but to accept our claim that M_C is a value representing a bias and not data scattering. Nonetheless, this was not clearly stated, and the half-hearted rhetoric of the assessment cautiously avoided criticism of the Japan Electric Association’s claims.

The most problematic aspect of all of this is that there is a pretence not to carry out extrapolation, as emphasized by the external specialists, but on condition of taking surveillance data during the extended period, embrittlement prediction of RVPs is to be also carried out for higher neutron fluences than those for which surveillance data exist at present.

This now has a direct bearing on the reviews for Takahama Units 1 and 2, for which operating extension applications have been filed. The prediction data for Takahama Units 1 and 2 for 20 years in the future have not yet been derived. As the surveillance specimens inside the reactors are placed closer to the reactor core than the inner wall of the RPV, it is possible to “foresee” the future to some degree. However, as shown in **Figure 1**, since the data from the latest 4th surveillance specimen in Takahama-1 is the equivalent to a neutron fluence of $5.6 (\times 10^{19} \text{ n/cm}^2)$, at the point in time 60 years from the start of operations (after a 20-year extension) the estimated fluence at the

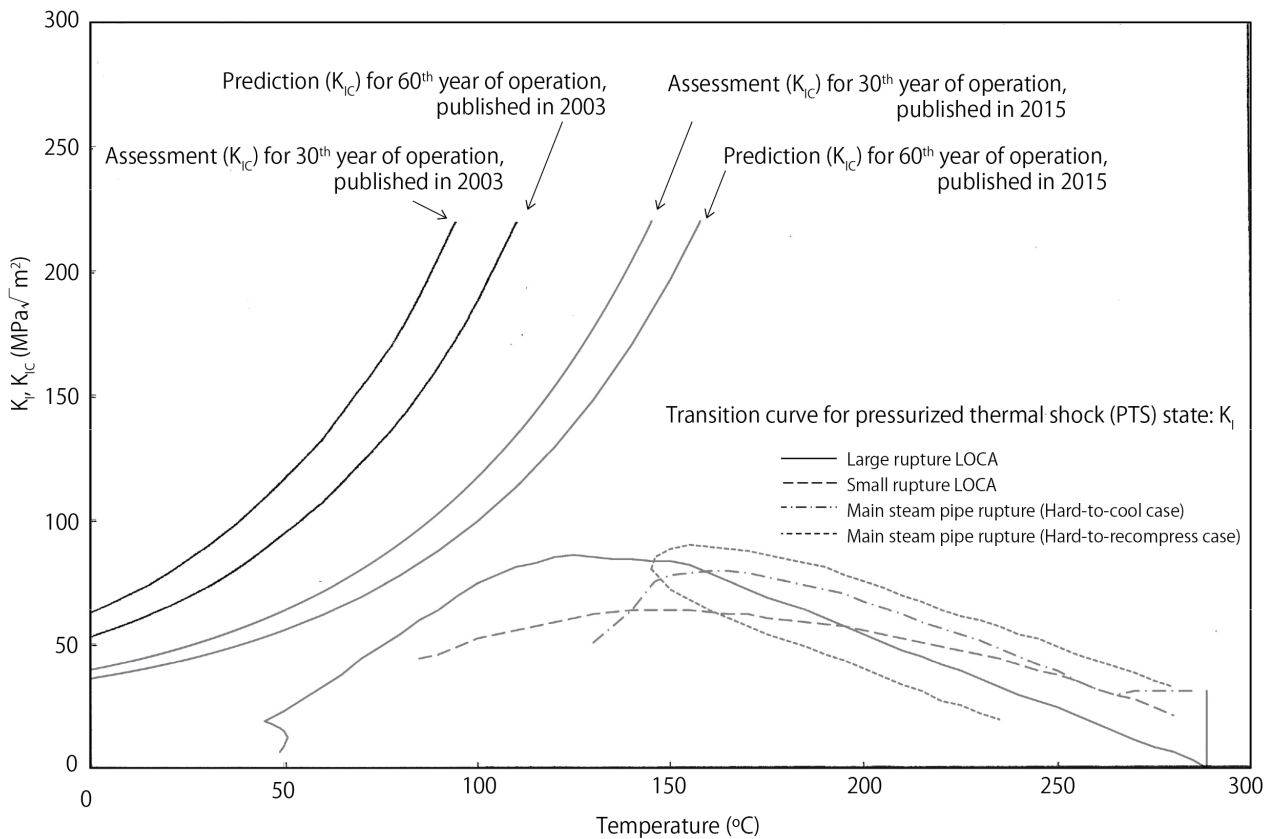


Figure 2. Takahama-1 pressurized thermal shock (PTS) assessment. Comparison of fracture toughness curves in the 30th year and 40th year Aging Technical Assessment Reports

position of the inner wall of the RPV is expected to be lower than $7.07 (\times 10^{19} \text{ n/cm}^2)$. In other words, DBTT cannot be estimated without extrapolation. There is no guarantee that things will turn out as shown by the prediction curve in the figure, and it rather looks from the trend of the data points more like the curve will shoot unfortunately upwards.

In 2003, KEPCO submitted an “Aging Technical Assessment Report (30th Year)”, and recently, in April 2015, KEPCO has submitted an “Aging Technical Assessment Report (40th Year)” in the request for a lifespan extension. What is surprising when comparing the fracture toughness assessment graph in both reports is that there is a huge difference in fracture toughness assessment at the point where the reactor has been operated up to 60 years (**Figure 2**). The 40th year assessment shows the fracture toughness curve at the 60-year point approaching the pressurized thermal shock (PTS) state transition curve. That there should appear such a great difference in the assessment for the same 60-year point is obvious visual proof of just how unreliable the fracture toughness curve assessment is. Since interception of the two curves means that the RVP will be in a state ready to crack open, the uncertainty surrounding the fracture toughness curve is truly frightening.

The reasons why this difference has appeared are firstly that the DBTT rose beyond expectations compared with the 30th year assessment because the embrittlement prediction formula was revised upwards. Secondly, and this is an inference that is not backed up by published measured data, it seems likely that the fracture toughness of the fourth surveillance test showed embrittlement that was beyond expectations. Data disclosure and cautious deliberations are required.

The Japan Electric Association, consisting almost completely of nuclear power-related corporations and very few individual members, is, in fact, an industry organization. It is more exclusive than other organizations such as the Japan Atomic Energy Society. It would seem unreasonable to expect it to be capable of the “fairness, equitability and transparency important in a process to formulate specifications”. Specifications established by such an organization should not be adopted as technical standards. It is necessary to insert the scalpel into the fundamental policy of regulation that delegates the establishment of specifications to the three organizations, which form one wing of the promotion of nuclear power.

Current State of Post-Accident Operations at Fukushima Daiichi Nuclear Power Station February to June 2015

State of the Plant

Many of the measuring instruments installed in the Fukushima Daiichi Nuclear Power Station (FDNPS) measuring system continue to malfunction as a result of the accident. Although there is no guarantee of the accuracy of values being measured, if the values from the measuring instruments are taken as the premise, from the water temperature in the containment vessels and the spent fuel pools, and from the releases of Xenon-135, for example, it can be estimated that the state of the reactors is stable.

Current State of Post-Accident Operations

1. State of Operations concerning Spent Fuel Pools

Removal of all of the fuel assemblies stored in the Unit 4 spent fuel pool (SFP) was completed on Dec. 22, 2014.

Measures are being implemented at Unit 3 to reduce the radiation dose level in preparation for the work of removing the fuel. Furthermore, preparatory work for removal of large pieces of debris is currently being carried out in the Unit 3 SFP. The debris fell into the pool in an accident that occurred in August 2014.

The work to dismantle the cover in place around the Unit 1 reactor building began on May 15. As preparatory work for dismantling the cover, application of an anti-dispersal agent was implemented to prevent dispersal of radioactive substances remaining in the building. On May 21, it was discovered that the balloon installed in June 2014 to block the equipment hatch opening was out of position. As a result, the work to dismantle the cover roof panels from the Unit 1 building that had been scheduled for late May had to be postponed.

There has been no great progress in Unit 2.

2. The Problem of Contaminated Water

According to an estimate by Tokyo Electric Power Company (TEPCO), roughly 800-1,000 m³ of groundwater is flowing into FDNPS Unit 1 to 4 per day, about 300 m³ of which is flowing into the reactor buildings.

Measures taken to suppress the flow of groundwater are as follows:

1. Groundwater pumping wells have been installed on the mountain side of the site as a "groundwater bypass," to reduce the inflow of groundwater by pumping it up and releasing it into the ocean after measuring its contamination level. (This operation began in April 2014, with a total of 112,748 m³ water having been released in 71 releases, up to June 30, 2015. Combined with the water suppression measures taken at the high-temperature incinerator building, this operation reduced the groundwater inflow by 80 m³ per day.)
2. It is planned to pump up groundwater from the sub-drains in the vicinity of the reactor buildings and from the groundwater drains near the embankment (roughly 50-100 m³ of water from the groundwater drains and roughly 500-700 m³ from the sub-drains per day. This is expected to reduce groundwater inflow into the buildings by 150 m³ per day.) TEPCO plans to release the pumped-up water into the ocean after purification.
3. Construction of an inland water barrier (creation of a frozen earth barrier by burying 1,551 refrigeration pipes and 336 temperature measuring tubes at set intervals around Unit 1 to 4. Freezing of the water barrier started on a trial basis on April 30 at 18 locations using 58 freezing tubes.)

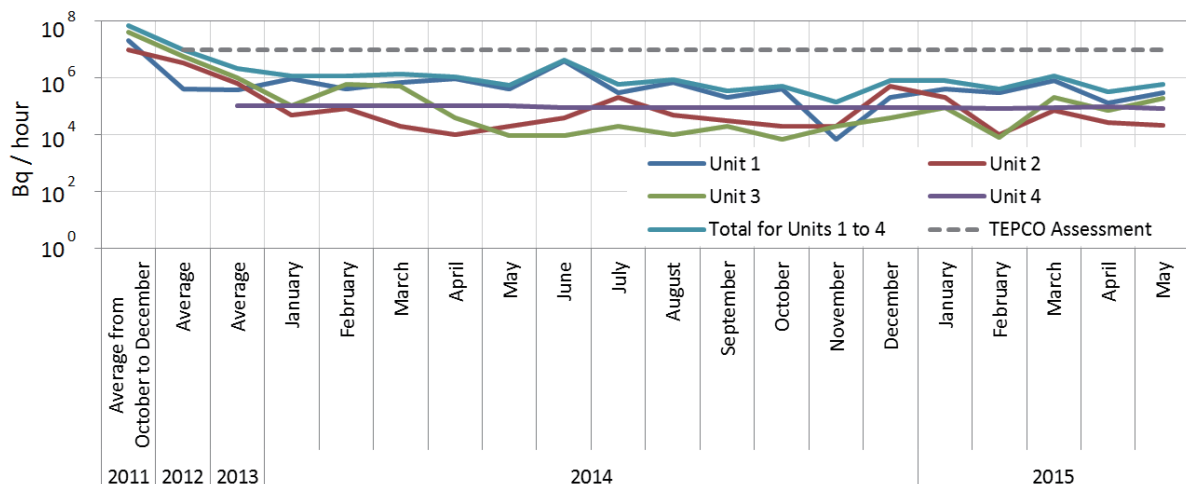


Figure 1. Releases of radioactivity from Units 1 to 4 of Fukushima Daiichi Nuclear Power Station (Bq/h)
* An assessment by TEPCO shows 10 million Bq/h up to May 2014, and less than 10 million Bq/h after May 2014

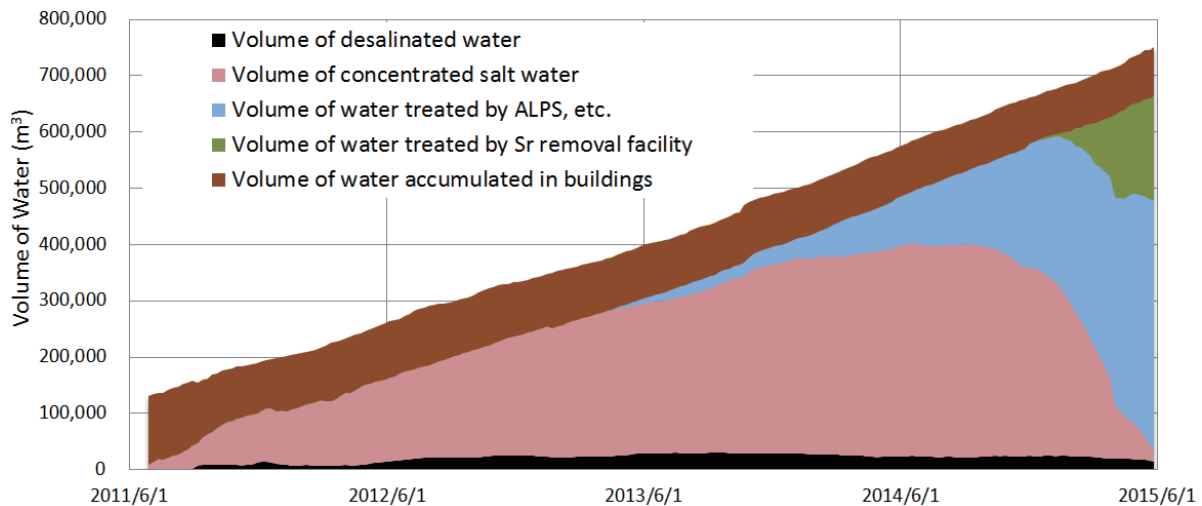


Figure 2. Total Volume of Contaminated and Treated Water Accumulated in Buildings and Tanks (as of May 28, 2015)
Desalinated water is circulated to cool the reactors after cesium salt removal.

4. Removal of highly contaminated water flowing from the buildings into trenches on the sea side. (After having failed to stop the water by freezing it at the junctions between the trenches and the buildings, the insertion into the Units 2, 3 and 4 trenches of packing materials consisting of a mixture of concrete and other materials was begun on October 16, 2014. Preventing leaks and removing contaminated water from Unit 4 was completed on April 28, though part of this project was suspended. Removing contaminated water from Unit 2 and 3 was scheduled to be carried out before the end of June.
5. Operation of the Advanced Liquid Processing System (ALPS - Three existing systems, three additional ALPS systems, and a high performance ALPS system). These are used to separate contaminants, including nuclides, from contaminated water, although tritium still remains in the treated water, and to reduce the strontium content of concentrated salt water. (Reduction of strontium in concentrated salt water was completed on May 27. See **Figure 2** for total volume of contaminated and treated water accumulated in buildings and tanks).

3. Others

The number of workers at FDNPS is expected to increase from around 2,950 daily as of March 2013, to 6,800 in July 2015. May 31, 2015 saw the opening of a large rest house built on the plant's premises for the purpose of improving the working environment.

On February 24, 2015, TEPCO announced that the highly radioactive water that had accumulated on the roof of the large equipment service entrance of the Unit 2 reactor building had been flowing into the open ocean through a drainage channel. Although the utility became aware of this fact sometime before April 2014, it did not disclose the leakage to the public. Local fishermen reacted strongly against the company's announcement, and as a result, their negotiations with

TEPCO on the release of the contaminated sub-drain water will have to start all over again from scratch.

On April 2, 2015, a pool of water was discovered at the periphery of the lid of a high integrity container (HIC), a polyethylene container for storing slurry created in the preprocessing systems of ALPS and other systems, slurry from the the adsorption tower, and also for storing spent adsorbent. This prompted TEPCO to conduct an investigation of the HICs. The result was that similar pools of water were found on 30 of the 684 HICs inspected up to June 15. After confirming slurry precipitation, TEPCO removed water from 32 of the HIC containers.

On May 27, the work to dismantle the flange-type tanks (374 in total) began, and 40 of them are slated to be dismantled by the end of January 2016. Leakage of contaminated water from this type of tank has occurred frequently, but it has yet to be decided if all of the flange-type tanks should be dismantled.

On April 30, 2015, the Nuclear Damage Compensation and Decommissioning Facilitation Corporation released its "Technical Strategic Plan 2015 for Decommissioning of TEPCO's Fukushima Daiichi Nuclear Power Station." Based on this plan, the mid-term and long-term roadmaps for the plant's decommissioning were revised, and TEPCO finalized this revision on June 12. The utility has regretted that its traditional stick-to-schedule work policy put excessive pressure on workers, causing a number of problems at the plant. The company therefore changed its policy and gave priority to the reduction of risks. Although the scheduled time for completing the decommissioning work remains the same, the period given for removing spent nuclear fuel was extended for up to three years. The stick-to-schedule policy was a target of popular criticism from the very beginning, and TEPCO seems to have eventually succumbed to the pressure after myriad troubles occurred at the nuclear accident site.

(Hajime Matsukubo, CNIC)

Japan's atomic ambivalence over nuclear relations with UK

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Japan has an ambivalent relationship with Britain over nuclear. The history is not encouraging.

On 11 October 1941, US President Roosevelt asked British Prime Minister Winston Churchill in a letter that US and British atomic research efforts be co-ordinated, or conducted jointly. Churchill agreed, and many of Britain's top scientists left their war-threatened research labs in the UK to join a unique group of international scientists in the secret Manhattan Atomic Bomb project in the US.

Originally aimed at halting the Nazi German government, when Hitler was defeated in April 1945 in Europe, the atomic attentions were turned towards Japan. After the successful testing of the first atomic bomb at the Trinity site in Socorro, in New Mexico, on 16 July 1945, three weeks later, the US dropped the Little Boy and Fat Man atomic bombs on Hiroshima and Nagasaki on 6 and 9 August respectively.

Senior British atomic scientist, Sir John Anderson, a fellow of the British Royal Society, said in a statement on 7 August 1945, that by the scientists combining their skills and knowledge, they had managed to develop the atomic bomb in just four years, which in peacetime would have taken up to fifty years. So the British were essential in the design and manufacture of those two deadly atom bombs that immolated the two Japanese cities

A decade later, Britain sold one of only two nuclear plants it has ever exported, to Japan, established as the Tōkai Nuclear Power Plant (Tōkai NPP) in Ibaraki Prefecture, about 110 kilometers from Tokyo. It was Japan's first commercial nuclear power plant, built in the early 1960s to the British Magnox design, a scaled-up version of Britain's Calder Hall and Chapel Cross Magnox reactors, which were used to generate plutonium and tritium, respectively, for military uses.

Tokai generated electricity from 1966 until it was decommissioned in 1998. But it also created spent fuel, containing plutonium. In a detailed 70-page analysis presented to the International Plutonium Conference held in Omiya in 1991, I explained how the plutonium from this reactor - as reprocessed at the UK reprocessing factory

at Sellafield - with almost total certainty was added to the UK military stockpile of nuclear explosive materials for the British nuclear warhead programme. Some might also have been exported to the US, for use in its nuclear weapons programme, under a 1959 mutual cooperation agreement on atomic energy matters between the US and UK.¹⁾

I suggested at the time that this was contrary to Japan's "Three Non-Nuclear Principles of not possessing, not producing and not permitting the introduction of nuclear weapons, in line with Japan's Peace Constitution." (Statement by Prime Minister Eisaku Sato at the Budget Committee in the House of Representatives, December 11th, 1967.)

This solemn statement was repeated by a successor Prime Minister, Naoto Kan, four years ago, demonstrating continuity of the importance of the pledge at the highest level of Japanese diplomacy and politics: "People must never forget, nor repeat, the horrors caused by nuclear weapons here in Hiroshima 66 years ago. On behalf of the Government of Japan, I pledge that Japan, the only country to have experienced nuclear devastation in war, will observe its Constitution and firmly maintain the Three Non-Nuclear Principles for the sake of the ultimate elimination of nuclear weapons and the realization of eternal world peace."²⁾

Kan changes tune on nuclear reactors

The same Mr. Kan, who was Prime Minister during the Fukushima Daiichi nuclear disaster, has since reversed his former support for nuclear power, and has taken to the international stage to demonstrate his opposition. Earlier in 2015, he took a lecture tour in Europe, including the UK, to explain why he opposed new nuclear power plants. He viewed the site of a proposed new nuclear plant near the existing Wylfa power station, on Anglesey, in North Wales, with Yoshiko Aoki, a Fukushima evacuee.³⁾

1) *NukeInfoTokyo, No.26, Nov/Dec 1991*; http://www.cnic.jp/english/newsletter/pdf/files/nit26_.pdf

2) *Prime Minister Naoto Kan at the Hiroshima Peace Memorial Ceremony (August 6, 2011)*, http://japan.kantei.go.jp/kan/statement/201108/06hiroshima_e.html

3) "One-time Japanese premier was in charge at time of 2011 nuclear disaster and says meltdown shows technology is too risky," <http://www.walesonline.co.uk/news/wales-news/japans-former-prime-minister-warn-8713266>; *Wales On Line, 25 February 2015*



Wylfa Power Station

Mr. Kan said: “What occurred in Fukushima in 2011 was caused by humans, not natural disaster. It is clear to me that what caused this catastrophe was our commitment to an unsafe and expensive technology that is not compatible with life on this planet.” Mr. Kan added that nuclear investment is “irresponsible” and the cash should instead go on renewables.

But Alan Raymant, chief operating officer of Hitachi’s UK-based subsidiary, Horizon Nuclear Power, who want to build the second reactor at the Wylfa site on Anglesey Island in north Wales, said: “Major advancements in reactor design and safety systems, aligned with the UK’s robust and independent regulatory system and a commitment to responsible operations mean the proposed reactors will offer strength against all viable risks.”

However, Robat Idris, a local vet, and campaigner with Anglesey anti-nuclear group PAWB, said the project will damage tourism, claiming “One of the jewels in the crown that Carwyn Jones (Wales’ First Minister) alluded to recently was the Wales Coast Path. The path circumvents the current Wylfa, but this is something which is much bigger and somewhat tarnishes that jewel.”

Subsequently, earlier in April, a consultancy report suggested the building of a new Wylfa 2 reactor (called ‘Wylfa Newydd’, ie new Wylfa, in Welsh), and decommissioning of the original reactor, could provide a “gross value added boost of £5.7bn” and 6,800 jobs during construction over 20 years. The independent research by Miller Research - commissioned by the Welsh Government - investigated the current and latent capability of businesses in Wales to respond to opportunities in the nuclear supply chain over the next 20 years.

Welsh Government Economy Minister Edwina Hart said: “This report clearly illustrates the scale of the potential investment, the opportunities for Welsh businesses and some of the issues and perceptions that need to be addressed in order to maximise the potential benefits. It is a

once in a generation opportunity and a concerted effort is needed across the board – by businesses and industry and the public and private sectors if we want to ensure that as much of that investment as possible is spent in Wales.”⁴⁾

Hinkley’s big collapse

While Mr. Kan understandably visited Wylfa, as it has the Hitachi interest, currently the big new build reactor controversy in Britain is over the Hinkley Point C reactor planned by France’s government-owned Électricité de France subsidiary, EDF Energy, using the European Pressurized Reactor design developed by EDF and France’s bankrupt nuclear design company, Areva, also state-owned.

Another consortium wants to build the AP-1000 reactor, designed by US reactor builder Westinghouse Electric corporation, owned by Toshiba.

So Japan has a keen industrial interest in Britain’s nuclear future.

Hinkley C troubles

The UK’s troubled Hinkley C nuclear power station faces a legal challenge from Germany’s biggest energy co-op, which claims that the subsidy package will distort energy markets across Europe and disadvantage renewable generators and vendors.

A new reactor built at Hinkley Point, supported by billions of taxpayers money, is not a purely British affair, but directly disadvantages renewable energy companies active in the European electricity market.

German green power supply company Greenpeace Energy (<http://www.greenpeace-energy.de/index.html>, GPE) will take legal action against the European Commission - the centralized bureaucracy of the European Union - because it has approved State aid worth billions of pounds for the building of the UK’s new Hinkley Point C nuclear plant.

A German law firm, Beck Buttner Held (BBH), is representing a co-operative of energy suppliers and traders fighting the decision in a commercial action.

4) “Once in a lifetime £5.7bn boost for Welsh economy from new nuclear power at Wylfa,” <http://www.walesonline.co.uk/business/business-news/once-lifetime-57bn-boost-welsh-8989250/>; **Wales On Line**, 7 April 2015; <http://www.miller-research.co.uk/>

According to GPE, the nuclear subsidy "threatens to distort competition in the European Union against genuine clean energy" and "could act as precedent and further undermine the EU energy market."

"Highly subsidized nuclear power from this plant will noticeably distort European competitiveness. It will have an effect on prices at the power exchange in Germany as well," says Sönke Tangermann, GPE's managing director, adding. "This effect will have economic disadvantages for committed green power providers like us, and that's why we are going to court."

He adds that GPE will file a plea for annulment at the European Court of Justice in Luxembourg "as soon as the Commission's State aid approval is published in the EU's Official Journal and the period prescribed for bringing an action begins."

Austria is also expected to launch a legal action against the Hinkley C subsidies - in the face of menacing threats from UK diplomats that the UK would "embrace any future opportunity that arises to sue or damage Austria in areas which have strong domestic political implications."

Background to nuclear subsidies debate

The situation in the European Union (EU) over subsidies for energy projects - fossil fuels, renewables or nuclear - is complex. Last October the European Commission approved State aid for the new build of two nuclear reactors at Hinkley Point in Somerset. GPE estimates that the immediate subsidy is worth about €22 billion, or £16 billion.

However the picture is complex as the aid package includes an inflation-proof generation subsidy of £92.50 per MWh for 35 years, construction guarantees, limits on liability for decommissioning, and a low accident liability cut-off. Other analysts believe the true cost is far higher and could amount to £30 billion or more.

Adding all the elements together, says GPE, "The resulting subsidy is far higher than that for wind or solar power in Germany." And it is far higher than renewable energy subsidies in the UK.

According to The Ecologist magazine, the effect of the UK's energy policy will be to almost kill off the flourishing solar sector, reducing the rate of new solar build from 2,000-3,000 MWh per year, to an estimated 32 MW.

It has also emerged that the British Government is seeking European Commission approval to hold a "golden share" in the £24.5bn Hinkley Point C nuclear power plant, which could have the effect of strengthening pending legal challenges against the plant's construction.

In a Parliamentary answer to the Labour MP Paul Flynn in March, energy minister, Matthew Hancock said the Department for Energy and Climate Change (DECC) had started "initial discussions with the Commission on the possibility of a special (or "golden") share for the Hinkley Point C project".

European opponents of the plant, which would be the third at the site on the Somerset coast, have seized on the Government's disclosure. They believe it dramatically alters the UK's state aid case, meaning they could, at least, delay a project that is supposed to herald a new generation of British nuclear power plants.⁵⁾

Fatal flaws in new EPR nuclear plant design and manufacture

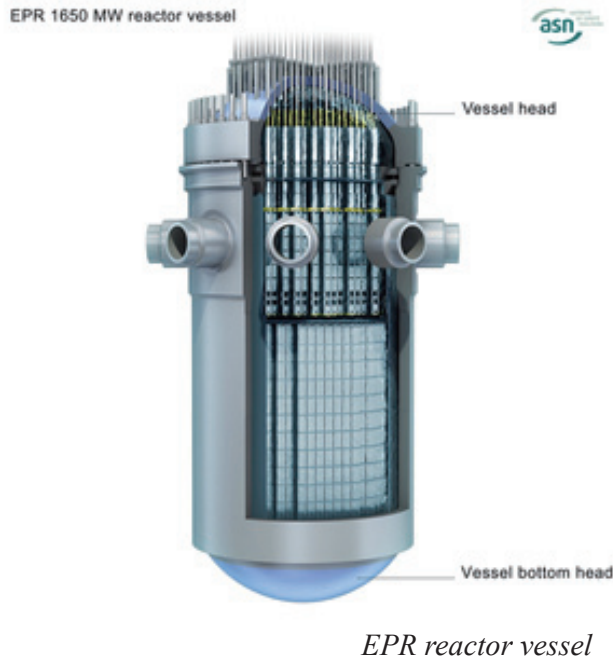
As if the massive cost and time overruns of the model French EPR for Hinkley Point C, at Flamanville in Normandy, were not enough to dissuade potential investors, a new problem has emerged with the plant this month.

In short, a serious flaw has been identified in the steel reactor vessel of what is currently the world's biggest nuclear reactor. Technical specialists have checked the problem - which involves fabrication defects discovered, but not revealed publicly, at the end of 2014 - in the upper and lower heads of the reactor pressure vessel.

The French nuclear engineering firm Areva, involved in the EPR's design and development, and which has run into serious financial difficulties itself, found the flawed steel contaminated by carbon at the Creusot Forge, in Burgundy (which it owns), and reported the problem to the French nuclear regulator, Autorité de Sûreté Nucléaire (ASN) which has ordered an investigation. ASN said in a statement: "The nuclear pressure equipment regulation requires that the manufacturer limits the risks of heterogeneity in the materials used for manufacturing the components most important for safety. In order to address this technical requirement, AREVA carried out chemical and mechanical tests on a vessel head similar to that of the Flamanville EPR."⁶⁾

5) *Government's 'golden share' request could stall construction of Hinkley C nuclear plant Exclusive: Opponents hope it could delay a project that is supposed to herald a new generation of British nuclear power plants; Mark Leftly, Associate Business Editor, Independent, 5 March 2015; www.independent.co.uk/news/business/news/governments-golden-share-request-could-stall-construction-of-hinkley-c-nuclear-plant-10086821.html*

6) *'Flamanville EPR reactor vessel manufacturing anomalies', ASN, 7 April 2015, <http://www.french-nuclear-safety.fr/Information/News-releases/Flamanville-EPR-reactor-vessel-manufacturing-anomalies>*



ASN added: "The results of these tests, in late 2014, revealed the presence of a zone in which there was a high carbon concentration, leading to lower than expected mechanical toughness values. Initial measurements confirmed the presence of this anomaly in the reactor vessel head and reactor vessel bottom head of the Flamanville EPR."

The French energy minister, Ségolène Royal, said the results of tests to check the extent of the problem would be made public in October.

The Ecologist on-line magazine comments that this discovery is another serious blow to the French nuclear industry, which already faces severe financial problems, partly because of lengthy delays and massive cost overruns to the EPR reactors at Flamanville and at Finland's Olkiluoto site. It points out that the Finnish reactor is not affected by this problem because its pressure vessel steel comes from Japan, not France, but stresses it is already nine years behind schedule for other reasons and has more than doubled in cost.

Cost overruns overwhelm EPR

France is already considering merging Areva and EDF, which recently estimated the construction costs of Flamanville at €8 billion (US\$8.7bn) compared with an original estimate of €3.3bn. That was before this new pressure vessel fault setback, and costs will undoubtedly escalate again. The plant start date had already been put back to 2017 despite the fact that it was to have been working by now.

Analysts suggest that this latest setback will force a revision of the UK Government's plan to offer EDF £10 billion in construction finance guarantees for Hinkley C, creating cost inflation.^{7,8)}

Election impact

The decision on whether to go ahead with the two reactors at Hinkley Point had already been postponed until the summer, after the British General Election on 7 May, and now it seems certain to be postponed yet again until the issue of the safety of the French and Chinese pressure vessels has been resolved.

Perversely, the two major UK political parties, Labour, the major opposition party, and the Conservatives, who have been in coalition with the minority party, the Liberal Democrats for five years, came out in support of new nuclear power plants in their manifestos for the Election, barely days after the EPR pressure vessel problems became known.⁹⁾

Both parties have long insisted that the expansion of nuclear power is vital to UK energy security and its ability to meet its greenhouse gas reduction targets.

In 2008, a landmark Labour government nuclear white paper (ie. policy document) overturned long-running policy objections to a new nuclear power programme after years in the wilderness.¹⁰⁾

Hinkley construction halt

As many as 400 workers at the Hinkley Point site were laid off work early in April while the French owners of the project decide whether to make an investment in the multi-billion pound project. GMB trades union's national officer, Phil Whitehurst, described the news as devastating. "The problem seems to be the stalled final investment decision. This should now be a wakeup call for the next UK government to take charge and manage

7) *Nuclear reactor flaws raise Hinkley C safety fears; Paul Brown & Oliver Tickell, The Ecologist, 14 April 2015; http://www.theecologist.org/News/news_round_up/2829257/nuclear_reactor_flaws_raise_hinkley_c_safety_fears.html*

8) *"Fabrication Flaws in the Pressure Vessel of the EPR Flamanville-3" By Yves Maignac, Director, WISE-Paris; WISE-Paris Briefing, Updated version, 12 April 2015, <https://dl.dropboxusercontent.com/u/25762794/20150412Fabrication-Flaws-EPR-Flamanville-v2.pdf>*

9) *<https://www.conservatives.com/manifesto>; <http://www.labour.org.uk/manifesto>*

10) *Government's 'golden share' request could stall construction of Hinkley C nuclear plant Exclusive: Opponents hope it could delay a project that is supposed to herald a new generation of British nuclear power plants; Mark Lefly, Associate Business Editor, Independent, 5 March 2015; www.independent.co.uk/news/business/news/governments-golden-share-request-could-stall-construction-of-hinkley-c-nuclear-plant-10086821.html*

Action at Hinkley, 1 April 2015

Anti-nuclear campaigners block road to Hinkley Point B nuclear power station in Somerset:
<http://t.co/4ftbXAJDIX>



Anti-nuclear campaigners block road to Hinkley Point B

HINKLEY Point B workers were prevented from getting to work after anti-nuclear protestors chained themselves together, blocking the road



*Anti-nuclear Shutdown of EDF shutdown
Campaigners from South West Against Nuclear, Nuclear Free Bristol & Bristol CND shut down the EDF at Hinkley Point B in Somerset*

the failing energy policy we have in place,” he said. “We cannot tolerate our energy new-build destiny being managed by companies who are in such disarray on funding when so deep into a project’s development.”^{11,12)}

A public consultation is due to start in May on NuGen’s plans to construct a new nuclear power station based on the Hitachi design at the proposed Moorside site, near Sellafield, in Cumbria, in England’s scenic Lake District. More than 20 consultation events are to be held across Cumbria and the process is expected to last for 10 weeks.

“NuGen is very keen to hear the public’s views on the project and I encourage everyone to take the opportunity to either come to one of the Cumbrian events, drop into the Moorside Information Centre, or register to “Have Your Say” through the consultation website,” Fergus McMorrow, NuGen’s planning lead in Cumbria said in a recent Television interview.¹³⁾

Radioactive waste impasse

The other major problem facing new nuclear is the failure to deliver a long-term management solution for high-level nuclear waste. Britain has tried for over thirty years to develop a programme, but has run into safety, environmental and public concerns problems.

The current plan by DECC is to secure communities volunteering potential sites for permanent, high-level nuclear waste geological disposal in return for local community benefits, an approach recommended by the independent Committee on Radioactive Waste Management (CORWM) as long ago as July 2006.

The Energy Secretary set up a Geological Disposal Implementation Board in 2012, to oversee the development of the Geological Disposal Facility (GDF) project.¹⁴⁾ But after plans for continuation of research were blocked by local authority (council) opposition in January 2014, the programme was halted, and a new approach was launched with consultation last summer.

To avoid running into a similar blockage in future, ministers decided to reduce the democratic options of local authorities to decide whether they want to have a GDF in their community, giving ministers more powers to decide on the likely GDF by far away central Government.¹⁵⁾

11) “Hinkley Point C nuclear project workers face layoff,” *Guardian* 2 April 2015; <http://www.theguardian.com/environment/2015/apr/02/hinkley-point-c-nuclear-project-workers-face-layoff-power-station-investment-edf>

12) “EDF axes 400 jobs at Hinkley Point nuclear project,” Christopher Adams, Energy Editor, *Financial Times*, 3 April 2015; <http://www.ft.com/cms/s/0/644db33e-d91a-11e4-b907-00144feab7de.html?siteedition=uk#axzz3WHR0h1Yd>

13) “Public consultation over new nuclear power station,” *ITV*, 15 April 2015, <http://www.itv.com/news/border/update/2015-04-15/public-consultation-over-new-nuclear-power-station/>

14) <https://www.gov.uk/government/groups/geological-disposal-implementation-board>

15) “Law changed so nuclear waste dumps can be forced on local communities: legislation rushed through in the final hours of parliament allows local planning laws to be bypassed, seriously alarming anti-nuclear campaigners; by Juliette Jowit; *Guardian*, Monday 6 April 2015; <http://www.theguardian.com/environment/2015/apr/05/law-changed-so-nuclear-waste-dumps-can-be-forced-on-local-communities>; <http://www.ciwm-journal.co.uk/archives/12954>

New nuclear reactor regulatory landscape

A new generic design assessment (GDA) safety and environmental approval process has also been set up with the creation of the integrated Office of Nuclear Regulation, (ONR) – previously the Nuclear Installation Inspectorate and Office for Civil Nuclear Security – and Environment Agency, working in tandem to identify design flaws needing correction by developers at an early stage. Although reports are put on the ONR GDA website, there is very little involvement of nongovernmental organizations in this process. ONR does however fund a stakeholder forum, currently chaired by a nongovernmental organization representative.

A generic justification process, derived from European Union regulations, led by the energy and climate secretary and dealing with acceptability of public safety risks from each design was another important component. Planning was streamlined under the Planning Act 2008, and moved applications for major infrastructure – such as large power plants – out of lengthy public inquiries and ultimately into the Planning Inspectorate under the communities secretary, with consultation and decision-making set at just 12 months (which is essentially what they have also now done with radioactive waste management).

ENDNote:

A local NGO, Cumbrians Opposed to a Radioactive Environment (CORE) issued this statement on 27 March, to mark the 21st anniversary of the operation of the Thorp reprocessing plant at Sellafield, which has handled considerable volumes of spent nuclear fuel (SNF) sent from Japan for treatment.

As anniversaries go, the 27th March 2015 – which marks 21 years since THORP chopped up its first batch of spent nuclear fuel – warrants little celebration. Opened in 1994, the £2.85Bn plant had been dubbed by BNFL as the Jewel in Sellafield's Crown and a World Beating Flagship Plant that would reprocess 7,000 tonnes of fuel in its first ten years, win more overseas business and make a profit of £500M in that first decade. Now scheduled to close in 2018, the Jewel has been tarnished beyond recovery by a catalogue of accidents, poor performance and business loss.

The record of the last 20 years exposes the true worth of those BNFL claims and, as the statistics below show, vindicates the major challenges to THORP's opening launched by local, national and international campaigners. For example, as a 'world-beating flagship', THORP's record against the comparable French plant at La Hague speaks volumes. For despite an annual design capacity of 800 tonnes compared to THORP's 1,200 tonnes, the French UP2 plant

still managed to outstrip THORP by a wide margin over the ten-year period 1994-2003 inclusive, dealing with 7,142 tonnes of spent fuel compared to THORP's 5,045 tonnes.

THORP's failure to reprocess the projected 7,000 tonnes – by almost 2,000 tonnes – in the first ten years resulted from a catalogue of unplanned closures over the decade, the first striking within days of the plant's opening when a spillage of nitric acid ate its way through cables and instrumentation and forced a shut-down of several weeks. The official down-playing of the extent and consequences of the leak was to become a common feature of many future accidents and unplanned stoppages which, when added to the planned outages, have contributed to a major loss of operational time over the last 20 years – and resulted in the 7,000 tonne baseload contracts being completed only in December 2012, some 9 years late.

Now in its 21st year of operation, THORP has been subjected to a series of closures – a majority unplanned – totalling some 6 years over the last 20 years. Almost three of those lost years are attributed to the 2005 leak of 18,000 litres of dissolved fuel which, despite warnings and alarms, was ignored by workers for nine months before action was taken. Rated at Level 3 on the International Nuclear Event Scale, the accident cost BNFL significant loss of face, a Crown Court fine of £500,000, permanently cut THORP's future spent fuel throughput by almost 50% and was described as being 'a failure worthy of Homer Simpson'.

Other stoppages have included replacing corroded dissolver baskets, pipe leaks and blockages, equipment failure and plant closure enforced by the Regulator (NII, now ONR) relating to the management of THORP's liquid high level wastes. The operational restrictions enforced by these events have been a major factor in the almost routine failure by THORP to meet its annual targets – some by a large margin – a failure rate that has increased since plant ownership was transferred to the NDA in 2005. In the 10 years following its takeover by the NDA, THORP has missed 8 out of 10 annual targets.

As a further damning indictment of THORP's under-performance, these missed annual targets, set recently at around 400 tonnes per year, are but a pale shadow of BNFL's original claim that THORP would reprocess 1,000 tonnes per year in the first ten years of operation (a design target not once achieved) and 800 tonnes per year thereafter – now wholly out of THORP's reach.

Little wonder then that overseas customers from whom two-thirds of the plant's baseload order book had been secured soon lost faith in THORP and patience with Sellafield's management of the

plant. At a meeting in 2,000, frustrated customers complained of BNFL's inability to reprocess their fuel within the contracted timeline, and annoyance at the ever-rising costs being forced on them by BNFL including the additional charges being levied for plant repair and refurbishment needed after equipment failure and accidents – the blame for which they placed firmly at Sellafield's door.

Against this background it is unsurprising that those customers – whose continued support was being relied on by BNFL – were unprepared to give THORP any further business. Indeed, rather than securing a single new contract from overseas, as originally projected, contracts from German utilities were cancelled in the plant's first year of operation – losing BNFL an estimated £250M. Further overseas contracts were abandoned subsequently, losing THORP some 961 tonnes of vital overseas business from the 5,334 tonnes originally contracted – an order book loss of 18%. A majority of the losses came from German utilities who, by 2005, had opted to store their spent fuel at the power station site rather than have it reprocessed, an option that had cost them dearly.

When summarised, THORP's poor reprocessing performance together with years lost through unplanned stoppages, the failure to meet targets and the loss of contracts and customer confidence, paint a picture of a plant that bears no resemblance to the world-leading flagship image portrayed by BNFL 21 years ago. The only 'attribute' still to be qualified is the claim of THORP's £500M profit in the first ten years of operation.

Whilst the repeated refusal by Sellafield to publish individual accounts for THORP raises its own suspicions, the plant's profitability was clearly dented by the Government's one-year delay in approving plant opening, which BNFL complained was 'losing THORP £2M per week'. This loss of some £100M – plus the £260M loss of those early German contracts leaves little of the projected £500M profit intact. Any balance will have been further eroded by the loss of further overseas business and the costs of accidents – the 2005 leakage accident was estimated by the NDA to have resulted in £112M of lost revenues.

Though its faltering performance and inept management has badly holed the overrated THORP flagship below the waterline, the views of an ex-BNFL Director who was heavily involved in the battle to open THORP, add a further dimension. In his book *Inside Sellafield*, the long serving Harold Bolter suggests that the figures fed into the plant's economic case by BNFL 'have turned out to be incorrect in several important respects' and more tellingly that 'if the highly complex plant fails to operate to its projected standard, it will become a huge financial drain on the nation.'

("Sellafield's THORP reprocessing plant - A Lame Duck and Loser," 27 March 2015)

Continued from page 16 "News Watch"

In Negotiating Japan-India Nuclear Cooperation Pact, will Japan Allow Reprocessing by India?

Negotiations toward conclusion of a nuclear cooperation pact between Japan and India got underway in June 2010, and on June 18, Kyodo News ran an article saying that Japan's government had relayed to India's government its intention to recognize reprocessing by India of spent fuel used in the nuclear reactors Japan was to provide. As a check on diversion for military utilization, Japan is requesting that a record of the amount of plutonium retrieved and the location of its storage be presented each year, but India has rejected that. Ways around this impasse continue to be sought behind the scenes.

Application for Safety Review of the Hamaoka NPS Unit 3 Reactor for Conformity to New Regulatory Standards

Chubu Electric Power Co. applied on June 16 to the Nuclear Regulation Authority of Japan for a review of the Hamaoka NPS Unit 3 reactor (BWR, 1,100 MW) to ascertain its conformity to the new regulatory safety requirements in preparation for a restart of operation. This is the second reactor at the Hamaoka plant for which it has filed such an application, the first being Unit 4 reactor (BWR, 1,137 MW) in February 2014. The Nuclear Regulation Authority opened its first investigation of the Unit 3 reactor on June 23 and indicated its intention to give priority to its review of the Unit 4 reactor, which is currently in progress.

Anti-Nuke Who's who

Story performer Kazuno Tanabe travels around the country telling the story of Daigo Fukuryū Maru (S.S. Lucky Dragon 5)

Kazuno Tanabe is a traditional Japanese-style story performer, or a *kōdanshi*. The history of *kōdanshi* can be traced back to the *samurai* warriors, who were thrown out of work after the end of the wartime in the early *Edo* era, and started to deliver oral presentations of written war stories to commoners in an easily understandable style. Currently there are only 80 *kōdanshi* performers in Japan.

A *kōdanshi* tells stories on a stage called a *kōza*, dressed in *kimono*. Some of the readership might have seen performances by *kōdanshi*, who generate sound effects by slapping the *shakudai* pedestal with a folding fan called a *hariōgi*.

Ms. Tanabe adapted the history of the Japanese fishing vessel Daigo Fukuryū Maru (S.S. Lucky Dragon 5) into a performable story, or a *kōdan*, after investigating the facts of the vessel, which was exposed to radiation resulting from a U.S. hydrogen bomb test near Bikini Island in 1954. The main character of the story is the vessel. Ms. Tanabe travels around the country performing the *kōdan* at the request of various groups, both large and small.

Following the Fukushima Daiichi Nuclear Power Station accident in 2011, Tokyo experienced radioactive fallout. At that time, Ms. Tanabe stayed in her house in Tokyo listening to the news media carefully, prepared to evacuate as soon as the evacuation order was issued. She was very concerned because she doubted that correct information would be reported amongst the mess of the nuclear power station accident, and because she was not well-informed about nuclear power or radioactivity. Her ignorance was the cause of her anxiety. She thought that if she were better-informed, she would be relatively free from the vague fears she was feeling.



Kōdanshi, Kazuno Tanabe

Near her house is the Daigo Fukuryū Maru Exhibition Hall, where the vessel actually exposed to radiation from the H-bomb test is exhibited. She knew that there was an H-bomb test near Bikini Island, but had not studied it in detail. She thought that if she was well-versed in the suffering from the H-bomb tests and the exposure to radiation suffered by the Daigo Fukuryū Maru, she would not have been so anxious. She then decided to study about the Daigo Fukuryū Maru and adapt the story of the vessel to tell it to other people as a *kōdan*. That is how the story “Daigo Fukuryū Maru” was created.

The *kōdan* performances have the function of sharing past experiences to provide present-day audiences with the information necessary to live, and to enable them to make use of the inherited knowledge. *Kōdan* stories inconspicuously include useful information as part of the entertainment. Many *kōdan* stories, such as the one about a large earthquake and tsunami, or another concerning flood damage resulting from a river washout, are not only entertaining but also informative. Ms. Tanabe hopes that the *kōdan* about Daigo Fukuryū Maru will also deliver something useful to those living in the present day.

At the end of the interview, Ms. Tanabe told me: “I would be happy if someone said to me that he or she was able to survive a great difficulty by remembering a *kōdan*.”

(Interview by Nobuko Tanimura)

NEWS WATCH

Nuclear Fuel Loaded into Sendai NPS Unit 1

On July 7-10, the Kyushu Electric Power Company loaded 157 nuclear fuel assemblies into the Sendai NPS Unit 1 reactor (PWR, 890 MW), which is undergoing official inspection by the Nuclear Regulation Authority prior to resuming operation. The company is expected to restart this reactor in mid-August, generating and transmitting electricity in test runs with gradually increasing power, commencing commercial operation in mid-September.

Fiscal Year 2030 Energy Mix Plan Decided

A subcommittee of the Electric Power Development Coordination Council issued a draft energy supply and demand outlook for FY2030 on June 1, and solicited public comments on it for one month. The energy source ratios, which were the focal point, are 20 to 22% from nuclear, 22 to 24% from renewable energy sources (whereby if the former is greater, the latter is less), with 27% LNG-powered, 26% coal-powered, and 3% petroleum-powered.

There is no way to achieve such a ratio for nuclear power except by restarting all of the idled reactors, which presupposes continued operation of reactors past the 40 year limit, stipulated as exceptional under Japan's Nuclear Reactor Regulation Law. New construction is said not to be under consideration, but it is plain to see that they are insisting against reason that reactors under construction and others for which construction permits have been issued "are not new additions."

Another big problem is that coal-powered energy is emphasized.

The energy mix plan was finalized on July 16.

Fukushima Daiichi NPS Decommissioning Work Schedule Revised

The Fukushima Daiichi NPS decommissioning work schedule created by Japan's government and TEPCO (medium-to-long-term road map) was revised on June 12 for the first time in two years. The work schedule was first drawn up in December 2011, with revisions made in July 2012 and June 2013. The previous revisions accelerated and gave shape to the schedule under the direction of Toshimitsu Motegi, who was then Minister of Economy, Trade and Industry. This, however, put a burden on the workers, leading conversely to delays, and therefore the new revisions have laid out a stance emphasizing reduction of adverse risks to people and the environment.

Looking at the actual circumstances, the work schedule can be said not to have been grounded in reality from the start. Removal of fuel rods from the Unit 3 spent fuel pool, which was supposed to have started in June 2015, is being delayed until the latter half of 2017. This was because, despite decontamination efforts, radioactivity at the pool continued to remain above a certain level, necessitating difficult tasks such as installing shielding plates over the collapsed walls. One problem after another occurred, including leaks of contaminated water and accidents involving workers.

On the other hand, though removal of debris (fuel and other fused materials), which was scheduled to commence in early FY2020 for Units 1 and 2 and late FY2021 for Unit 3, was rescheduled for FY2021 for one of the three reactors, this appears to be just a minor delay. One wonders if they are thinking that more revisions are likely anyway, so the work can be delayed further when the time comes. Since no one knows where or in what form the debris is in any of these three reactors, it cannot be said that the current schedule is based in reality either.

Accelerated Resident Repatriation Policy

As decommissioning measures have advanced and progress has been made in decontaminating the evacuated areas, the policy of repatriating residents to areas with high annual radiation dose levels of 20 mSv is being accelerated. The cabinet resolution "Towards Acceleration of Fukushima's Recovery from the Nuclear Accident" was passed on June 12, the same day as the work schedule revision. Evacuation orders for the Restricted Habitation Areas and Evacuation Directive Lift Prepared Area are to be lifted by March 2017. They are attempting to further strengthen policies

of effectively abandoning people to their own devices under the nice-sounding names of "new life support" and "support for independence and rebuilding of businesses, livelihoods and lives."

On the basis of these revisions, on June 15, Fukushima Prefecture mapped out a policy of ending the provision of free-of-charge temporary housing and privately leased housing by March 2017. TEPCO decided on June 17 to end compensation for psychological damage to residents of the areas for which evacuation orders had been lifted by March 2018.

Residents of Naraha Town Opposed to Lifting of Evacuation Orders

The entire population of Naraha Town, Fukushima Prefecture remains evacuated under orders following the Fukushima nuclear accident, and the government's local nuclear emergency response headquarters has announced its decision to lift these evacuation orders on September 5. The lifting of the orders was initially declared for early August, but there was such an outburst of concerns and opposition expressed at the ward chief administrators' meeting and residents' round-table conference in June that on July 2, the town council requested State Minister Yosuke Takagi of METI at the local nuclear emergency response headquarters not to lift the orders until the environment for the residents' return was in sufficiently good order. In response to these concerns, the lifting of the orders has been delayed by about three weeks, but the residents are not satisfied.

Minamisoma Residents File Lawsuit Requesting Lifting of Evacuation Encouragement Points be Rescinded

Claiming that lifting the evacuation encouragement point designation on the basis of a dose of 20 mSv/y is in violation of the law, on April 17, 534 residents of 132 households of Minamisoma City, Fukushima Prefecture filed a lawsuit in the Tokyo District Court against the government of Japan requesting the lifting of the designation be rescinded. Evacuation encouragement points are specific points from which evacuation is encouraged, but which lie outside of evacuation order zones, which refer to entire areas. This is the first battle in a court of law with regard to the lifting of evacuation orders or evacuation encouragement.

Return of 124 HLW Casks in September

The return to Japan of high-level radioactive vitrified waste which it had entrusted to Britain and France for spent fuel reprocessing has proceeded with 1,310 casks having been brought in from France to the storage facilities in Rokkasho-mura, Aomori Prefecture. Following that, waste was also brought back from Britain, with 264 casks having arrived so far. Another shipment is scheduled for arrival in September.

This shipment will consist of 124 casks belonging to three companies, TEPCO, Kansai Electric Power Co. and Kyushu electric Power Co. Ultimately, the return of 1,000 casks is planned.

Establishment of the Federation of Nuclear Accident Victims' Organizations

The Federation of Nuclear Accident Victims' Organizations (abbreviated as "Hidanren") was founded on May 24 by nuclear accident victims in Japan who have filed suits or taken other action seeking compensation for damages and clarification of responsibility for the Fukushima Daiichi nuclear accident. It held a meeting in Nihonmatsu City, Fukushima Prefecture to mark its establishment. It consists of 13 organizations, including ten groups throughout Japan and three observer groups, and may expand in the future.

Hidanren says its goals are to "obtain an apology to the victims from TEPCO and Japan's government," to "ensure the victims are completely compensated and can recover their lives and livelihoods," as well as "implementation of detailed medical examinations for the victims, with medical security and reduction of exposure levels," and "pursuit of responsibility for the accident." It adopted a founding manifesto of "Overcoming various forms of fragmentation and combining our strength to fight for restoration of our wounded dignity."

Request for Preservation of a Sign Extolling Nuclear Power as an "Embarrassing Legacy"

In Futaba Town, one of the towns hosting TEPCO's Fukushima Daiichi NPS, there is a signboard hanging over the town entrance with large letters saying, "Nuclear Power: Energy for a Bright Future." The slogan's originator (who was then an elementary school student) learned that a budget had been allocated in the current fiscal year for its removal, and on June 8, he submitted a petition with 6,502 signatures seeking the permanent preservation of the signboard in its location as an embarrassing legacy.

In response, the mayor said that the signboard's removal could not be avoided, because it was deteriorating and in danger of falling down, but he indicated that he was considering preserving it in a condition in which it could be restored, with a view to displaying it in the future.

Continued on page 13

Nuke Info Tokyo is a bi-monthly newsletter that aims to provide foreign friends with up-to-date information on the Japanese nuclear industry as well as on the movements against it. It is published in html and pdf versions on CNIC's English website: <http://cnic.jp/english/>

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