

SUBMISSION¹ TO THE

INQUIRY COMMITTEE ON ROKKASHO REPROCESSING PLANT

COMPREHENSIVE INSPECTION

[ROKKASHO SAISHORI SHISETSU SOUTENKEN NI KANSURU KENTOUKAI]

ROKKASHO REPROCESSING PLANT

Large & Associates² and WISE-Paris³ were instructed by Greenpeace International to investigate and report upon progress towards commissioning of the Japanese Nuclear Fuel Limited (JNFL) Rokkasho fuel reprocessing plant. The instructions included for preparation⁴ in advance of a visit to Japan during January/February 2004, the study of a representative bundle of documentation translated from Japanese, and meeting with and interviewing a number of interested individuals and involved groups in Tokyo, Hachinohe, Aomori and Rokkashomura.⁵

Noting that the scope of our investigation is different from that of the Inquiry Committee on Rokkasho Reprocessing Plant Comprehensive Inspection, we consider it worthwhile for us to summarise our principal and preliminary findings to the Inquiry Committee:

○ **Regulatory Framework and the Design Authority⁶**

We examined a number of examples that involved modification to the plant, its equipment and/or its processes, giving particular regard to the recent modifications and repairs to the irradiated fuel storage pond liner. Much of the information provided to us on the pond liner was anecdotal, although we were able to access a number of JNFL documents⁷ considered by the Inquiry Committee itself.

Setting aside the detailed nature of the liner failure and its subsequent modification, this example raised concerns over the effectiveness of the regulatory and quality

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⁴ Large, J H, Draper P, Literature Search & Review, *Rokkasho Irradiated Fuel Reprocessing Plant Japan*, R3101-A1, November 2003.

⁵ We also approached JNFL (by telephone and e-mail of 28 January, Mr Hiroshi Chikaraishi) to meet and discuss the issues but although Mr Hiroshi Chikaraishi was receptive on the telephone, we never received a reply to our formal request for a meeting.

⁶ By 'Design Authority' we mean the group or panel made up of representatives from the involved parties (JNFL, BNFL and COGEMA) who review and effectively sanction any changes and/or departures from the original 'as bought' or licensed design of the plant and its processes.

⁷ We had access to all of the documents submitted to the Inquiry Committee from the 1st through to the 8th meetings, those of interest were translated in scant detail, others of greater interest were fully translated.

assurance regimes in practice at Rokkasho and, particularly, the effectiveness of JNFL's control of its sub-contractors:

- i) We are surprised that the weld defects arising from the initial misalignment of the fuel storage pond liner had lain undetected until after the storage pond had received a considerable consignment of irradiated fuel;
- ii) that the erection of a coffer dam within the pool to provide dry access for welding was apparently not pre-qualified by a nuclear safety case assessment and, indeed, the method deployed to erect the coffer dam itself introduced additional safety issues;
- iii) that the final acceptance of the storage pond modifications was not conducted in an open and accountable way, there being uncertainty in the role of the Nuclear and Industrial Safety Agency (NISA), with its function possibly being displaced by the endorsement of Inquiry Committee itself; and
- iv) that the modification scheme had not, apparently, been referred to a *Design Authority* comprised JNFL, COGEMA (or SGN) and possibly BNFL, each with an interest in the overall safety of the plant.

Our disquiet is that the apparent loss of regulatory, quality and assurance controls could apply to other safety critical areas of the reprocessing plant. The apparent absence of consultation with a Design Authority, comprising the European partners of this venture, is disturbing particularly inasmuch that the wealth of experience gained at the La Hague and Sellafield facilities is not being drawn upon.

o **Access to Information and Data**

Many of the interviewees made much of the lack of information being passed into the public sector by JNFL and, indeed, a NISA staff member confidentially acknowledged that JNFL's secrecy often heightened the loss of public confidence.

A particular area of concern was the seismic qualification of the Rokkasho plant which we understand to have been upgraded following the 1995 Kobe earthquake. However, it is not at all clear to us if the French model plant (UP3 La Hague) had been subject to an initial study to determine the feasibility of upgrading its seismic qualification to Rokkasho, and if this had been reviewed following the 1995 Rokkasho seismic upgrade. We note that the French UP3 plant has been developed over many years,⁸ well before the present more rigorous seismic standards were introduced, so much so that some of the Rokkasho design precepts may not be readily adaptable for the harsher seismic regime of Japan.

We are concerned that nothing on this fundamental safety issue seems to be available in the public domain. We believe that demonstration of the seismic

⁸ We understand that the current Japanese standards require a seismic qualification of, typically, 0.25g (S1) and 0.375g (S2) with nuclear reactor plants requiring to automatically shut down at 0.2g. However, the seismic qualification of fuel reprocessing plants should not be directly compared with nuclear power plants because of the different processes involved and that it is not possible to effectively 'shut down' certain of the batch processes at a moments notice.

qualification of the Rokkasho plant would serve to placate elements of concern and uncertainty in the public perception of the plant's future safe operation.

In a similar vein, our concern also applies to other safety critical areas of adaptation of the Rokkasho plant from original UP3 design. For example, at the back-end of the chemical separation process, the introduction of the combined uranium and plutonium stream (to obtain a pre-mix oxide powder), has no precedent in the UP3 stream design and the European reprocessing operators have no experience of it, nor has it been demonstrated at commercial scale in Japan.

○ **Comparison to Abnormal Performance of Reprocessing Plants in the West**

Two interviewees referred us to a JNFL document⁹ submitted to the Inquiry Committee which made reference to past incidents at other nuclear fuel reprocessing plants worldwide, relating and comparing these incidents by the 1 to 7 severity grade of accident/incident defined by the International Nuclear Event Scale (INES) of the International Atomic Energy Authority (IAEA).¹⁰

Without going into detail, we were surprised how misleading some of these comparisons are: We found certain quite serious incidents had been underrated and trivialised, that the environmental and health impact of other incidents had been grossly played down,¹¹ and that a number of serious incidents at the Sellafield and Dounreay (Scotland) reprocessing plants had been entirely omitted. If such comparisons are to be made, particularly if these are presented to justify the safety of operation of the Rokkasho plant, then the listing should be comprehensive and accurate. In our opinion, the information provided by JNFL to the Inquiry Committee falls far short of that required to enable the Committee to properly analyse and evaluate the necessary countermeasures to safeguard the plant, the environment and the local communities in Rokkashomura.

Moreover, we consider that greater emphasis should be placed on the experience of operating such plants, so much so that invaluable lessons may be learnt from the overall safety record of the plant, and not from just by focussing on the most serious incidents, however inaccurately these may be recalled.¹²

We are of the opinion that assessing the future normal and abnormal performance of a complex plant such as Rokkasho should extend beyond that of simply making comparisons with other reprocessing plants abroad. There are a number of fundamental nuclear safety issues that will be unique to Rokkasho (siting, seismic, design modifications and repairs, operational procedures, management, etc) and, as

⁹ Document 5-6 of the 5th Committee meeting.

¹⁰ Sometimes referred to as the World Association of Nuclear Operators (WANO) Accident Severity Scale.

¹¹ The 1981 fire in a waste silo at La Hague, for example, was considered a major accident, leading to radioactivity releases 10 times above the authorized annual limits for radionuclides such as caesium. Significant strontium-90 contamination was found up to 6km away from the plant. However, the information presented to the Inquiry Committee suggested that it was radiologically insignificant not being rated at all on the INES which is contrary to the fact that it was a postpriori rated at level 3 on the INES.

¹² For instance, during the period 1996-2000, more than 15 incidents on average were declared each year in the operation of the La Hague reprocessing plants. Although none of them was rated more than 1 on the INES scale, their pattern may be relevant to identify areas of safety and radioprotection hazard.

such, these need to be specifically addressed. Simply relying upon the past record of overseas reprocessing plants is no portent for the future safe operation of Rokkasho and, moreover, it is a flawed if not a dangerous reliance.

○ **Nuclear Safety and the Maximum Design Accident (MDA)**

Again setting aside the detail, we are not convinced that the nature and scale of damage severity of the Rokkasho MDA is realistic and representative of the types and severities of damaging incidents that should not be discounted for the locality of Rokkasho. Candidate incidents should include for severe seismic disruption; military aircraft impact, including fully fuelled refuelling aircraft; disruption of and interaction with the national crude oil tank farm; and acts of sabotage and terrorism.

We consider that the Inquiry Committee should include the MDA in its remit because the design and construction of the Rokkasho plant inherently relates to the safety of operation of the plant and its processes. The whole design composite, including practises of quality control and assurance, determines nuclear safety and the design-in-depth that sets the safe operating margin for the plant. It stands to reason that if there are doubts about the quality control and assurance regimes during the construction and commissioning of the plant (such as those we have briefly considered here) then, via these defaults, the severity and/or frequency of occurrence of the MDA might be exceeded.

The Inquiry Committee's present role of surveying the quality and assurance controls of construction and commissioning should not and cannot be sensibly isolated from the overall safety qualification of the plant. In this respect, our strong conclusion is that it is necessary for the Inquiry Committee to consider nuclear safety and regulatory issues and not confine itself to quality control matters. Thus, the work of the Inquiry Committee should not be entirely isolated from regulatory and nuclear safety issues presently the preserve of the Nuclear Fuel Cycle Safety Sub-Committee¹³ and its closed working groups, preferably with the two committees and the working groups sharing information in these crucial areas in a publicly accountable and transparent way.

○ **Off-Site Planning and the MDA**

Whereas we acknowledge that off-site emergency planning is not within the mandate of the Inquiry Committee, we consider it useful to comment on the emergency arrangements at Rokkasho.

We visited the Nuclear Emergency Response Operations Facility (Offsite Centre), meeting with staff members of NISA and the executive in charge of radiological monitoring in the Nuclear Safety Technology Centre. We were impressed with the comprehensive range of equipment and organisation of the Offsite Centre and, particularly, by the diligence and openness of those members of staff that we met at the Centre.

¹³ In ROMAJI – 'Kakunen Saikuru Anzen Sho Iinnkai'.

However, we are concerned that the plant operator, JNFL, maintains considerable sway over when the incident and any radioactive release is notified to the Centre, which could result in considerable delays in initiating radiation exposure control countermeasures in the public domain. Particularly, because the MDA defined by JNFL is so limited, the Centre staff are unable to practice the appropriate response scenarios to a range of what we consider to be realistic radiological incidents.¹⁴

We are thus troubled that the costly resource invested in the Offsite Centre may not be effective if JNFL continues to maintain dominance in the off-site emergency notification procedures. We believe that the off-site emergency plans would be greatly improved if:

- i) The MDA be reviewed to include a range of incident types and damage severities, including for terrorist attack and acts of sabotage;¹⁵
- ii) the Offsite Centre being able to act independently, setting in play the appropriate countermeasures and actions in the offsite areas as it sees fit;
- iii) there should be established an automatic countermeasures zone, say at a minimum of 1km radius, in which countermeasures are automatically evoked once that a radiological emergency has been declared;
- iv) that such a radiological emergency be defined on the basis of any one individual exposure projected over a period of one year, or a similar longer term period, say at an exposure at or exceeding 5mSv, this being the standard currently adopted in Europe – the Centre should have complete autonomy to declare the radiological emergency from off- as well as on-site radiation readings or, indeed, in the absence of a radioactive release but on its own assessment of a developing incident at or in the locality of the Rokkasho plant; and
- v) that the 5km off-site emergency zone be redefined to be expandable in both incident severity and type, and also in extent or geographical distance from the Rokkasho plant.

Certain of our recommended changes for emergency planning also apply to the uranium enrichment and waste storage facilities at Rokkasho and, very certainly, all of these recommendations should be developed and put in place prior to the fuel reprocessing plant commencing active operation in future years.

¹⁴ For example, the limit set to trigger operation of the Offsite Centre is based on criteria centred on the radiation exposure to any individual at the boundary of the plant, but this cannot be relied upon to cover all potential accident situations, especially those including significant and lofted aerial releases.

¹⁵ As well as plant malfunctions and external hazards, the range of MDAs should include for aircraft crash involving a large commercial and/or military refuelling aircraft tanker, Design Basis Threats (DBTs) in account of terrorist or extreme sabotage events, including for deliberate aircraft crash, truck bombing and/or armed insurgency groups, and disruption and knock-on events from incidents at the nearby National Oil Storage Tank Centre

In Summary: Our investigation raises a number of important issues relating to the future safe operation of the Rokkasho fuel reprocessing plant.

We are very concerned over the development undetected of the so-called 'welding problems' and we doubt that this has been satisfactorily and completely resolved in quality and assurance (Q&A) control terms. Moreover, we could find no sound evidence that similar Q&A inadequacies and failures had been thoroughly investigated and eliminated from all other areas of the plant construction and its commissioning to date. The process of relying upon the discovery of faults during commissioning (and early operation phases as with the 'welding problem') and then applying an expedient 'fix', is a most inappropriate and unreliable means of qualifying nuclear safety in such a complex and highly hazardous plant.

We have also raised a number of generic issues relating to the extensive adaptation of the COGEMA and BNFL existing plant designs, particularly a) whether these European plants are wholly suited for adaptation to meet the more stringent safety and radioprotection standards that have evolved since the time(s) of their original design; b) whether the quite specific requirements of the Japanese operator are compatible to the European limits and conditions of operation; c) if the European plants are readily compatible with key additional technologies, such as the separation of a mixed uranium and plutonium powder; and d) if it is indeed practicable to operate a safe nuclear plant that has, after all, been assembled from a jigsaw of existing plants and new technologies, drawn together with separate countries with quite different nuclear safety regulatory practises and regimes.

We trust that the Inquiry Committee will give consideration to our preliminary findings, noting that we have been instructed by our Client to provide further submissions and assistance to the Committee if requested.



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