

My involvement in radiation control at the Sellafield Reprocessing Plant

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1. Introduction

Sellafield is situated on the West Coast of England in the beautiful Lake District, and has four operating nuclear reactors, two major reprocessing plants, fuel manufacturing plants and many waste storage facilities. There are about 7000 BNFL employees and about 4000 Contractors working at Sellafield.

I have been a Monitor at Sellafield for about twenty years, working on the Nuclear Reactors, the Reprocessing Plants and decommissioning operations. I am a Shop Steward for my Trade Union and I have been a Safety Representative for many years. I get involved mainly in radiological issues, but I am also very involved in ensuring that my colleagues are protected from every type of hazard. The plant is a major user of chemicals and includes many different hazards, both radiological and conventional. In addition I have been involved in helping to explain to the Public the work that we do. I was once photographed on the beach at Sellafield for a pro-BNFL advert.

2. External Pressures on Dose Reduction

In 1977, the Company adopted a more restrictive Annual Dose Limit of 50 mSv per year; (to recognise new international guidance from ICRP) compared to the then Legal Limit of 30 mSv per quarter. We established many Dose Reduction committees, consisting of Managers, Specialists and worker representatives to help manage these new Limits and to drive down the exposures. Also at this time recognised the need for many new plants at Sellafield and introduced new Company Design Limits for operators and the public. All new plants since that time have been designed to these higher standards.

Summation of Internal and External doses (new Ionising Radiation Regulations in 1986) led to increased internal pressure. We began using Personal Air Samplers in a big way (600,000 per year). These led to increased awareness of chronic airborne activity and reductions. In one case it led to permanent respiratory protection in a building.

Radiation Risk changes (1988) led to a reduction to a 30 mSv dose Company Limit, whilst the Legal Limit remained at 50mSv per year. This led to further pressure on Managers to continue finding more ways of reducing exposures.

The TV Programme “Windscale the Nuclear Laundry” in 1982, followed by the Black Study in 1984 into childhood leukaemia and Gardner Epidemiology Report in 1990 led to reduction of the Sellafield site dose limit to 15 mSv per year, and a much increased awareness of radiation.

Throughout this period the Company recognised the need to reduce radiation exposures and demanded reductions from each of its Operating Sites.

All of these pressures led to increased work for Monitors and Job Security and significant improvements in Safety for my Members.

3. The introduction of the ALARP Process

“ALARP is an input into decision making involving any aspect of Health and Safety from the largest decision to the smallest by all levels of authority.”

The ALARP process is applied to both small jobs and large jobs. For the larger jobs a much more structured approach is used, against a Company methodology in our Safety Documentation.

It includes :-

Involving -

Plant Operators, Maintenance Engineers, Monitors, and Radiation Specialists are included in the ALARP Process at various stages.

Planning -

Long before a job begins the key stages in the process are discussed.

Budgeting -

Every part of the job is dose estimated and the outcome of the work compared with the budget, just like a financial project. This was first introduced in a major way in the South Dissolver Project on the Magnox Reprocessing Plant.

Monitoring -

Personal Alarmed Dosimeters (PADs) allowed us each operator in a job to keep a close eye on his own radiation exposure, and attribute it to each job.

Feedback -

The use of a Computer Database of all the Job related exposures, helped all the operators to maintain a big picture of the progress during a job and hence improve feedback to the people doing the job.

Reviewing -

Reviews of the progress and successes (or otherwise) of the job were mainly reviewed by the Radiation Protection Specialist so that he could influence the future planning stages.

Awareness -

The improved involvement of the operators, increased monitoring, budgeting and availability of the radiation exposure information led to much increased awareness amongst the operators and a different attitude generally to their own and others radiation exposure.

Reduction of the Chronic radiation background -

The Dose Reduction groups which brought together many disciplines and particularly the workers, led to a realisation that a large part of their radiation exposures were due to chronic exposure in high occupancy areas. For example in some cases control rooms, offices, workshops or even rest areas were badly located in zones of significant "background" radiation. Challenging and changing those factors was often more effective in reducing both individual and whole plant average doses than a programme which concentration on a few "high profile" operations.

4. Effective use of people

The change from a government organisation to a publicly owned organisation with an accountability to a shareholder (albeit the government) led to increased pressure to make more effective use of all the people employed. This led to studies of people effectiveness and the value of operations being undertaken was questioned. ALARP studies led to more investment in automation and remote operations. In turn this led to reductions in the number and duration of jobs in active cells etc. These led to significant reductions in collective and average exposures due to reduced number of Operators and Monitors.

5. Better awareness of radiation doses and doserates

In addition to the increased awareness due to the increased use of PADs and more available radiation exposure data, we also focussed on reducing contamination levels in the workplace, leading to reduced internal dose. Also there became an increased awareness of exposure to hands for manipulating high beta dose rate items and major reductions in hand doses resulted.

6. Better Management Systems

Safe Systems of Work have evolved over the years and led to an increased requirement to carry out Risk Assessments prior to jobs being formally authorised. These Risk Assessments involve the Workers so that first hand relevant, practical advice was available to minimise all risks including radiation and convention hazards.

The balance between conventional safety risk reduction and radiation often led to conflict. Earlier it was sometimes expected that the Monitor would be put to a degree of physical hazard beyond the value of the measurements he was taking. For example, the entry into hazardous area to assess the radiological environment for the operator. (E.g. Active Cells and Cranes) was undertaken by fellow Monitors without hesitation or consideration of risk. Latterly it has been replaced by the general philosophy that “No job is so important that it should not be done safely.”

Better accountability, auditing and reviewing. Earlier Management was often heard to say that Safety was the responsibility of the Safety Department. Now it is clearly understood that the Line Manager of an Area is solely accountable for the safety of his plant, and that my role is to help him understand how safe he is and how to improve it. But it is the Plant Manager who makes it safer. This applies equally to conventional and radiation safety, and I am involved in both. I am also involved in auditing his radiation performance in terms of the things he is supposed to be doing to control radiation. Formal reviews of the methods of working take place after radiological events, to learn lessons and improve. Routine reviews of working practices are carried out by the Safety Specialists.

7. Safety Culture

Change from *Safety is Safety Departments job*
To *Safety is everyones job.*

There have been major changes at Sellafield regarding the Safety Culture. This has been brought about by increased involvement, increased availability of radiation information and specific workshops addressing cultural issues. In the last five years we have introduced Behavioural Safety Processes which involve everyone in looking after each other and helping each other to improve their and their colleagues safety. The focus has been mainly on the conventional safety front, but improvements in radiation safety have benefited as well. This has led to a major improvement in conventional safety performance to match the earlier major improvement in radiation safety.

The famous dictum “Shielding, Distance and Time” now includes “**Attitude**”.

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