# NZ School Science Technicians Workforce Survey

*For 'The Professional School Science Technician in 2017'*

An on-line survey of school science technicians was carried out in August-September 2007 to guide future planning for the profession. Survey questions were designed to determine the characteristics of the NZ school science technician workforce, and the environment in which they work. Some of the information can be compared with that in UK and Australian science technician surveys. NZ information on employment hours, from an earlier survey, is also considered.

**Ian de Stigter**
**September 2007**

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Background paper for *'The Professional School Science Technician in 2017'*

By Ian de Stigter

**Abstract**

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## Age and Gender of Science technicians

In a 2001 UK study (1), concern was expressed that the ratio of female to male science technicians was 3:1, and the age distribution was skewed towards the older group, with 72% being over 40, and only 8% being under 30. The NZ survey indicated that the proportion of female to male technicians was almost 11:1, that 93% were over 40, and only 2% under 30.

The UK concern was that young people were not being recruited into schools as technicians, and that there was therefore some concern about being able to replace those who retired or found non-school employment.

However, it appears from the gaps in NZ service data that the majority of NZ science technicians are mothers who have returned to employment after an extended time out of the workforce to look after children. The school hours and holidays appeal to these, at least initially. The relatively low wages and limited hours make the work less attractive to other science-qualified personnel.

The median age at which the 131 female science technicians began work as school science technicians was 40, and after average service of 11 years and 1 month, have a median age of 51. The recruiting age seems to be increasing: the median age of the 50 female technicians recruited in the last 5 years had increased to 42. The 12 male science technicians in the survey were recruited at a median age of 51, and their median age is now 59.

## Current Hours of Technician Work

There were no questions in this survey about the number of hours worked, since that was dealt with already in a 2007 survey (2) on technician employment. The report on that survey considered only the ratio of technician hours to science teaching hours, and did not look into the data distribution for those hours, which is examined here.

The restricted number of hours which many technicians work is a difficulty. Those with the limited hours have also in many cases to find other work to do: in the same school, as a technician in another school, or something outside of school employment. Appendix 1 gives distributions of hours of work for technicians in 152 state and integrated schools, in 19 independent schools, and in three different size divisions of the state/integrated schools.

It can be seen from the plots that all except the independent schools have a major grouping of technicians with reduced hours, and particularly in the smaller schools. This shows why science technicians, in smaller schools particularly, discover a range of additional talents!

## Increased Hours of Technician Work

In the technician employment report it was argued that there should be a minimum for the ratio of school science technician hours to science teaching hours (service factor). The UK recommendation is much higher, but a proposal for NZ State and integrated schools, endorsed by Science Technicians' Association of NZ, is for a minimum service factor of 0.25. Currently about 10% of State and integrated schools achieve this ratio, as do about 60% of independent schools. A report from LTB-STAV (3) in Australia notes an average service factor for Victorian school science of 0.47, and a proposal for a minimum of 0.55.

If funding becomes available to increase service factor to the proposed minimum level of 0.25, it is going to affect the required number of science technicians, and the distribution of their hours. We have data for Science teaching hours and hours of individual technicians in State and Integrated schools. In a simulation exercise, the technician hours were supplemented so that service factors now below 0.25 were increased to that level. To achieve this, schools would need an average of 40% more technician hours than they currently have.

The results, illustrated in Appendix 2, were increased hours for most part-time technicians, and an increase in technicians required to be employed. At least 23% more science technicians would be needed if current technicians could work more hours. However, since some will not be willing to work many more hours, an increase in excess of 25% in technician numbers is probable.

The efforts of NZEI to gain central funding for science technicians' salaries need technician backing, and as technicians we should be supplying information to strengthen the arguments presented.

In the meantime, science technicians concerned at the situation in their schools should be making their own submissions to/through Heads of Science asking for increased technician time. A sample funding submission letter is attached as Appendix 3**.** The arguments will vary from school to school, but this report may suggest some possible approaches.

## Qualifications and experience

In the NZ context, schools need to attract and retain science technicians with suitable qualifications and experience. Since schools do minimal training after taking staff on, they are highly reliant on the training and experience which employees bring with them.

The largest group of school technicians has a medical lab background [33 recorded], school teaching [12], while others have worked in a university [7], science research [5], food industry lab [5], industrial lab [5], textiles [2], Crown research institute [2], pharmacy [2], electronics/avionics [2], as dental nurse [2], Hort/Ag science/Animal health [3]). Other roles recorded were public analyst, water analyst, power station lab work, registered nurse, occupational therapist, quantity surveyor.

Many of the science technicians with good science qualifications did not list their previous experience. While some may have had little work experience, the impression is given rather that details are being withheld because present realities are more mundane than their previous roles.

The table in Appendix 4 gives a classification of qualifications into groups, with the first two groups being those with qualifications below Level 6 on the NZ Qualifications Framework. The third group contains Level 6 qualifications, and the remaining groups are above Level 6.

The survey shows the remarkably high level of qualification of the NZ school technicians: overall 74% have level 6 qualifications or higher. The survey of UK school science technicians indicated only 40% had (on the NZ framework) Level 6 or higher qualifications.

Currently we have no recommended minimum qualifications for NZ school science technicians, but LTB-STAV propose a Diploma of Applied Science or equivalent as appropriate for a Senior Laboratory Technician, and the same with extensive relevant experience for a Laboratory Manager. The qualification is equivalent to NZCS or the new National Diploma of Science, i.e. Level 6. The titles are those of role descriptions LTB-STAV believes to fit sole technicians in small and large schools respectively.

**Pay Issues**

All state and integrated schools are expected by the Ministry of Education to pay their science technicians according to the NZEI Support Staff Collective Agreement (or equivalent rates). The NZEI agreement is also said by one survey respondent to provide guidelines for the site collectives and individual contracts in independent schools.

NZEI interprets its agreement as requiring science technician members of NZEI to be paid on the Associate C scale, and in 2006 obtained an Employment Tribunal judgment to back that interpretation. However many science technicians complain they are not paid on the Associate C scale (or equivalent).

Appendix 5 tabulates the responses of technicians, shown according to the category of the employing school. Overall, 38 of 122 state school technicians who indicated their pay scale, or 31%, are paid below the C scale. There are serious compliance issues here.

If the Associate C scale is indeed a guideline for independent school negotiations, then technicians in those schools also need to improve their familiarity with it.

In addition to the appropriate pay scale, another issue which arises is the qualifications allowance paid to Support Staff who have recognised qualifications. Level 4 and 5 qualifications merit a Group One allowance, Level 6 qualifications a Group Two allowance, and Level 7 and above should be paid the Group 3 Allowance.

The survey asked respondents whether they were paid the appropriate allowance. Some answered no when the answer should have been yes, because in fact, they did not have a qualification to attract an allowance. One interesting answer came from a respondent who was being generously paid by a school as if she had a qualification, but had never completed it.

More concerning, however, were the replies from 11 respondents (8%) who had recognisable qualifications, but these were not being recognised by payment of the appropriate allowance.

One technician then entered negotiations about the amount of back-pay owed for this non-payment!

It cannot be claimed that school science technicians are paid in an overly generous manner. A group with the high level of academic qualification, practical skills and experience which science technicians possess (and need to possess) could be expected to earn well over the average hourly rate. (Short weekly hours, and reduction for the school's convenience in weeks worked per year, could also justify a higher hourly rate.)

As part of school Support Staff, however, their wages are bulk-funded through the school operations grant, and this puts all Support Staff at a disadvantage in negotiating wages. The result is that the highest hourly rate for science technicians remains below the NZ average hourly rate. This could be addressed as a gender parity issue. University technicians may prove to be suitable as a group with which broad parity observations could be made.

In both UK and Victoria there are proposals for a 4 level career and pay structure for technicians, with progression between levels allowing advancement, and encouraging technicians to remain in the education sector.

## Performance Review

All performance reviews deal with a critique of employee performance, but some go no further. To make the exercise useful, there should also be a management commitment to aid that performance by personal development and adequate resourcing, and to meet defined organisation goals.

The tabulated data in Appendix 6 indicate nearly two-thirds of science technicians have an annual performance review. They are less common in independent schools. However, for 10% of schools it is limited to an employee critique, and does not personal development and resourcing. (Independent schools do not have these nominal reviews.)

Despite their low rate of performance reviews, independent schools are rated by science technicians almost as highly as State and integrated schools in addressing developmental and resourcing issues. In independent schools these are at least as likely to be dealt with (if at all) without a formal performance review.

The preferred approach of a performance review which takes into account developmental and resource requirements is provided for 53% of technicians.

However, 26% of technicians have neither performance review nor consideration of resources and professional development (like one technician in the survey who waited 20 years to get a desk).

For a profession there needs to be a more consistent approach to performance review than the survey indicates is now customary in NZ schools.

## Professional Development

There is a wide variation evident in the degree of technicians' involvement with professional development, as tabulated in Appendix 7. While some have a range of involvements, others can

report none at all over 2 years, or the occasional cluster group meeting, if they have time to attend.

The average science technician respondent has involvement with one and a half of the categories of PD in the table over two years. (Some of the categories are recurring, so attending, for example, several cluster group meetings, would still count as only one category).

Some schools are quite generous in the opportunities their technicians have to attend courses and group meetings, but there are no guarantees, because there is no entitlement in the terms of employment. Many are attending meetings in their own time, at their own cost. Professional development should be related to development needs identified during a performance review and should be funded by the employer accordingly.

After looking at the development arrangements for UK school science technicians, the Royal Society (4) came to similar conclusions:

"The better trained technicians are, the better the support and advice they will be able to offer science teachers. Better supported teachers lead to improved science education for young people. Continued professional development of teachers is now firmly established as a priority in science education, and rightly so. It is in the interests of good science education that we now invest also in the professional development of science technicians."

"The Government should make available to schools... ring-fenced funding for the continuing professional development (CPD) of science technicians.

Heads of Science, Headteachers and Principals and Governors should ensure that science technicians in their school or college are encouraged and supported to undertake appropriate professional training throughout their career." (5)

**Professional Development Prospects**

Lists like the PD deficiencies table in Appendix 7 are valuable in the current organisation of PD. Some of the workshops at SCITECH are a direct response to areas that science technicians asked to be addressed.

A different and more organised approach to PD is needed to improve technicians' support for science teaching. Most science technicians starting in the school system, however well-qualified, do not have the spread of skills desirable for a sole technician in a semi-autonomous role. To provide maximum assistance to teaching, every new technician should start with a skills audit and a training plan, which needs to be updated annually and funded realistically by the school/Ministry of Education.

The increased investment in professional development envisaged here emphasises the ongoing need in hiring new staff to ensure they bring appropriate qualifications and strong practical skills.

While science technicians will always be involved in PD for other science technicians, we need to look past the model where such PD is provided almost exclusively by unpaid volunteers in their holidays, or in time they can wheedle from their employers. PD providers also require some certainty that those who need the PD, and may have requested it, will be given the time to attend it.

## Staffing Changes in the next 5 years

Based on the current intentions of science technicians and the record of new employment, and assuming the level of technician support in school science departments remains unchanged, about 7% of the current technician workforce will need to be replaced each year.(See Appendix 8). This low turnover, much less than for teachers, makes PD a long-term investment.

To assess what changes in qualification of the technician workforce this turnover may produce, the qualifications of those planning changes in their employment were compared with the qualifications of those hired in the last 5 years. Of those planning changes, 72% have Level 6 qualifications or higher. Of those hired in the last 5 years, 78% have Level 6 qualifications or higher.

If progress can be made to fund increased technician support for science teaching, then the numbers of new science technicians in schools may increase substantially as indicated previously. While current recruiting is at least maintaining qualification levels, they are likely to fall if recruiting is increased substantially.

## Practical Skills of Science Technicians

Appendix 9 tabulates the responses for a number of workshop practical skills which were suggested in the survey. There were ticks from 20% or fewer of respondents for most of the items. The exceptions, where there was a higher rate (above 40%) were: microscope servicing, and soldering. In both of these skills, there are recognised courses for science technicians to attend, and the opportunities obviously have made a difference.

Much of the technician job depends on having a range of practical skills, to supply practical solutions to problems encountered. Enhancing those practical skills through PD can make science technicians more effective in their work.

## The Technician Job Description

It is assumed that technicians do most of the things in the typical technician job description in Appendix 10. This technician job description as outlined involves operating a set of procedures which have already been developed.

The position involves a high degree of specialist knowledge and responsibility, and the job description describes in some detail the expected ways of managing the specialist equipment and resources to significantly contribute to the delivery of the science curriculum. The Associate C scale is intended and appropriate for technicians who meet the requirements of this job description.

## Sole Technician positions

Most NZ school technicians operate with a degree of autonomy; they take initiative to develop systems and resources, and demonstrate skills beyond the technician job description. Gleadall (6) pointed out that sole technicians in Victorian schools take more responsibility than is acknowledged in the basic technician job description. The 2007 LTB-STAV policy statement says that a sole technician “would be a senior technician in a small school or a lab manager in a larger one.” The same point is made by a CLEAPSS report (7) on technician jobs in the UK, which

recommends a senior technician grading for sole positions (assumed to exist only in small schools).

In the survey of hours of work for NZ school science technicians, of 174 technicians in state and integrated schools, 139 had sole positions. There were 10 schools with 2 technicians, and 5 schools with 3.

**Initiative and Development Roles**

It is important to identify activities that NZ school technicians do, beyond the basic job description, and how common these initiatives are. Appendix 11 lists these activities, and the proportion of technicians involved.

The table shows clearly that, even with the limited hours that some technicians have, there are very few operating at a basic level – most have a semi-autonomous role which allows them room for initiative. In addition there is a further list of individual contributions that technicians have volunteered.

NZEI has been in discussion with science technicians about career paths, and achieving a higher grading in some cases where more responsibilities can be demonstrated. The evidence from the survey is that the actual duties and responsibilities of the majority of science technicians have been wrongly assessed, because the job description on which they are graded does not fit well.

This supports the argument that a grading above Associate C should be more widely available than initially contemplated. This conclusion is in line with the Gleadall comments, and the CLEAPSS report.

**Other Work by Technicians**

School Science technicians have wider school involvements as part of their technician hours.

"A/V equipment responsibilities" was mentioned as a possibility in the basic job description. This is a responsibility for 43% of technicians – some for the science department, and some for the whole school. Some roles shown in Appendix 12 to be important ones for many science technicians are:

- In-class support 59%
- Field Trips 55%
- Science Fairs 43%
- Demonstrating 38%
- First Aid 35%
- Safety Committee 33%

Other activities were identified as being carried out within that technician role, many administrative, but the others vary from gardening and support in student projects to preparing relief lessons and giving HSNO instruction to teachers.

**Other Paid Positions**

Because many science technicians have limited technician hours, many have other paid positions. The other aspects of their role in the school are listed in Appendix 12. There is a

crossover with activities which some others do in their science technician hours, such as field trips and safety committee, but there are also more diverse roles such as computer administration, and community and special education.

## Unpaid Work

In general, unpaid work is voluntary work with school teams and clubs, or running science technician PD. Some of it is also related to the science technician job; where the claim process for shopping etc is too onerous.

There was a survey question about the incidence of job-related unpaid work, and over half of technicians do unpaid work at least occasionally. While some may have legitimate grumbles, the majority of those who have made claims for payment have found them accepted readily.

## The Working Environment

Appendix 13 lists survey data related to the physical environment that school science technicians work in: building levels and lifts, integration of science facilities, provision of storage space, and prep room design to be HSNO-compliant and adequately extract fumes.

### Multiple Levels, and Lifts

Two-thirds of all school technicians work in schools where science spaces are all on one level. The other third deal with multiple levels, and are evenly divided between those with lifts to use, and those without. Given the physical requirements of the job, this raises health and safety issues for the schools with multiple levels and without lifts.

### Integration of Science Facilities

While some schools have grown in a well-planned manner, it is obvious that in others the provision for science teaching could be described as *ad hoc,* resulting in science facilities split between different parts of the school site, which is difficult for teachers as well as science technicians. Only 40% of technicians could say that science facilities were together on site.

### Storage Space

In State and integrated schools of all sizes, only one third have enough storage space. (Almost 60% of independent schools have enough space.) Some of the responsibility for this can be placed with the Ministry of Education, which has no standard for required space allocation for science preparation and storage areas. It is left to each school to allocate what they think appropriate. Many have underestimated their needs.

In the UK school science technician survey, storage deficiencies were noted. These were compared against a prep area/storage space formula. The formula suggests 0.4-0.5 square metres for every laboratory workplace. (Thus the prep and storage area should be 12-15 square metres for every laboratory built for 30 students, multiplied by the number of laboratories.) Only 19% of UK schools surveyed had such space allocated.

**Chemical Prep Areas**

The total of all schools which had both HSNO-compliant design and appropriate fume extraction was 38%, compared with 41% which meet HSNO design requirements only. In general, those who have gone to the trouble of ensuring proper chemical storage have also sorted out fume extraction needs. On the other hand, 89% of those who have not achieved HSNO-compliant storage also have inadequate fume extraction. While some schools have made commendable efforts to improve workplaces and to fully meet requirements, others still have not made the most basic provisions. No other questions were asked about compliance with chemical safety requirements, but the answers to these two suggest a pattern.

## Conclusions and Recommendations

1. We should look to encourage recruitment of mature science-trained staff in schools. The main labour pool appears to be mothers returning to the workforce. We could look at the problems of transition for these and the generally older male candidates.
2. Issues of retention should be addressed. Some technicians have planned to work elsewhere when their children are older. Some examples of issues are hours of work, friction over rates of pay, environment, PD.
3. STANZ should follow up an idea of Peter Spratt's: to organise a research project to look at the effect on student outcomes of science technician support for teaching.
4. STANZ should adopt a strong advocacy role for the professional issues of science technicians, and make it a primary organisational goal.
5. Technicians need to involve themselves more with NZEI and ISTANZ efforts that will help the profession, and offer guidance to those efforts.
6. Technicians should support NZEI initiatives to obtain central funding of wages with an increased total amount, to increase school service factors to the target level.
7. The profession needs more than one approach to properly grading science technician work in schools. NZEI moves for the higher D grade are acknowledged. STANZ should also have a professional view, and liaise with Australian and UK groups on this.
8. Compliance issues on pay scales and allowances must be eliminated. While these continue, science technicians cannot be regarded as serious professionals. All members of the profession have a responsibility to resolve personal underpayment, and to encourage others affected to also deal with it.
9. Technicians in schools which have insufficient technician hours should take initiative to request an increase in next year's budget.
10. The low pay of school science technicians relative to their necessary qualifications and experience should be explored as a gender equity issue, brought about or made worse by funding Support Staff pay through the school operations grant.
11. STANZ should be requested to define some standards and improvements to: entry qualifications for school science technicians, skills audits, training plans, and mentoring by a member of the profession.
12. STANZ should be requested to develop proposals to have a Ministry-funded provider offer some training courses for science technicians. (Teachers don't have to organise and run all their courses. We should expect similar funded professional arrangements.)
13. STANZ should recommend a process to schools for conducting professionally-acceptable performance reviews for science technicians, in the context of a specific, mentored training plan, or of continuing professional development.

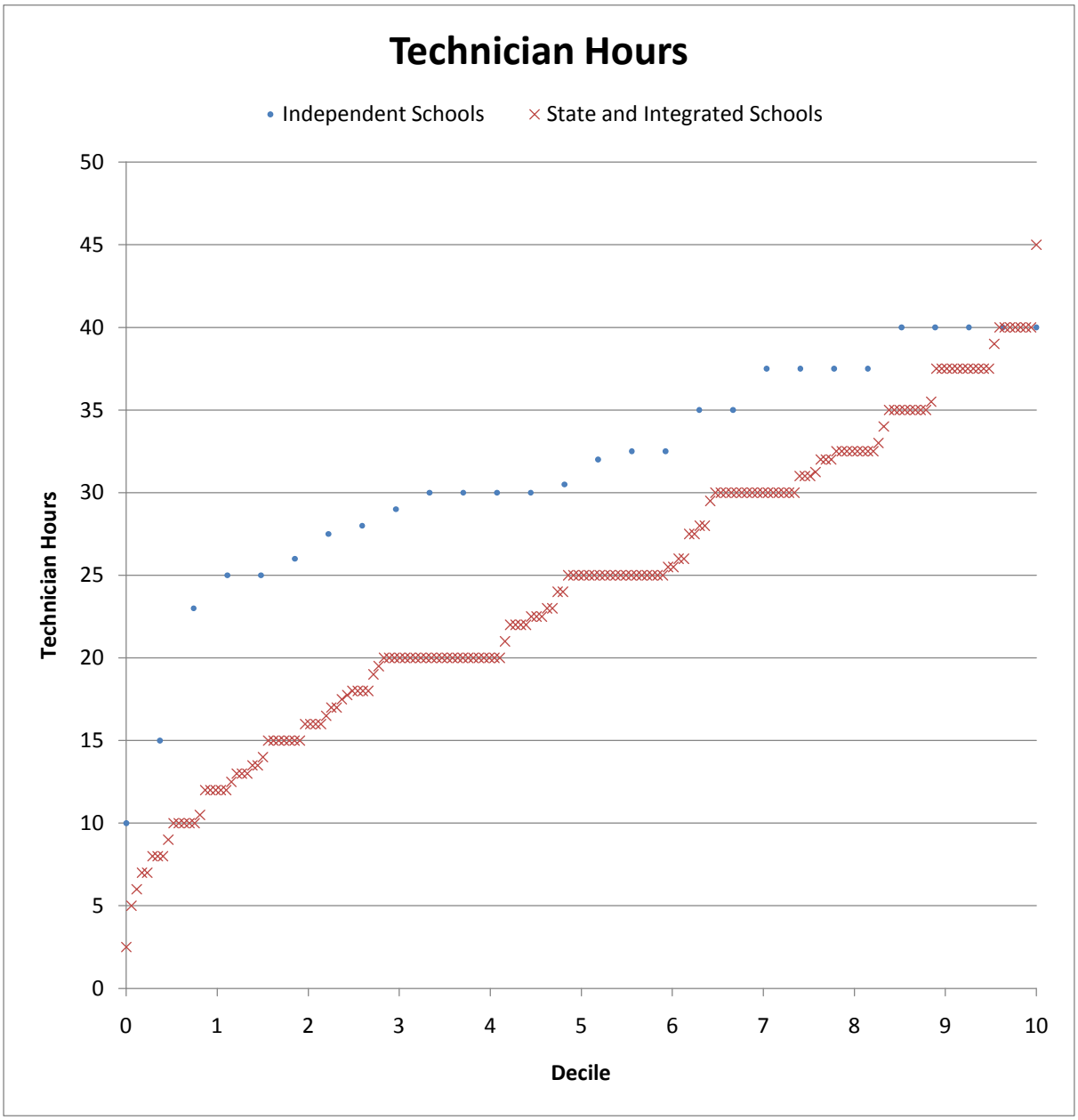
14. Generic problems in the working environment of science technicians, and in the chemical and physical safety of technicians, should also be addressed by STANZ with the variety of agencies which can be influential.
15. Because of the range of professional and employment issues needing to be addressed, and with limited resources, it is important that science technicians study these recommendations (and others of similar consequence), and decide priorities. It may pay to start with some that are easier to do.

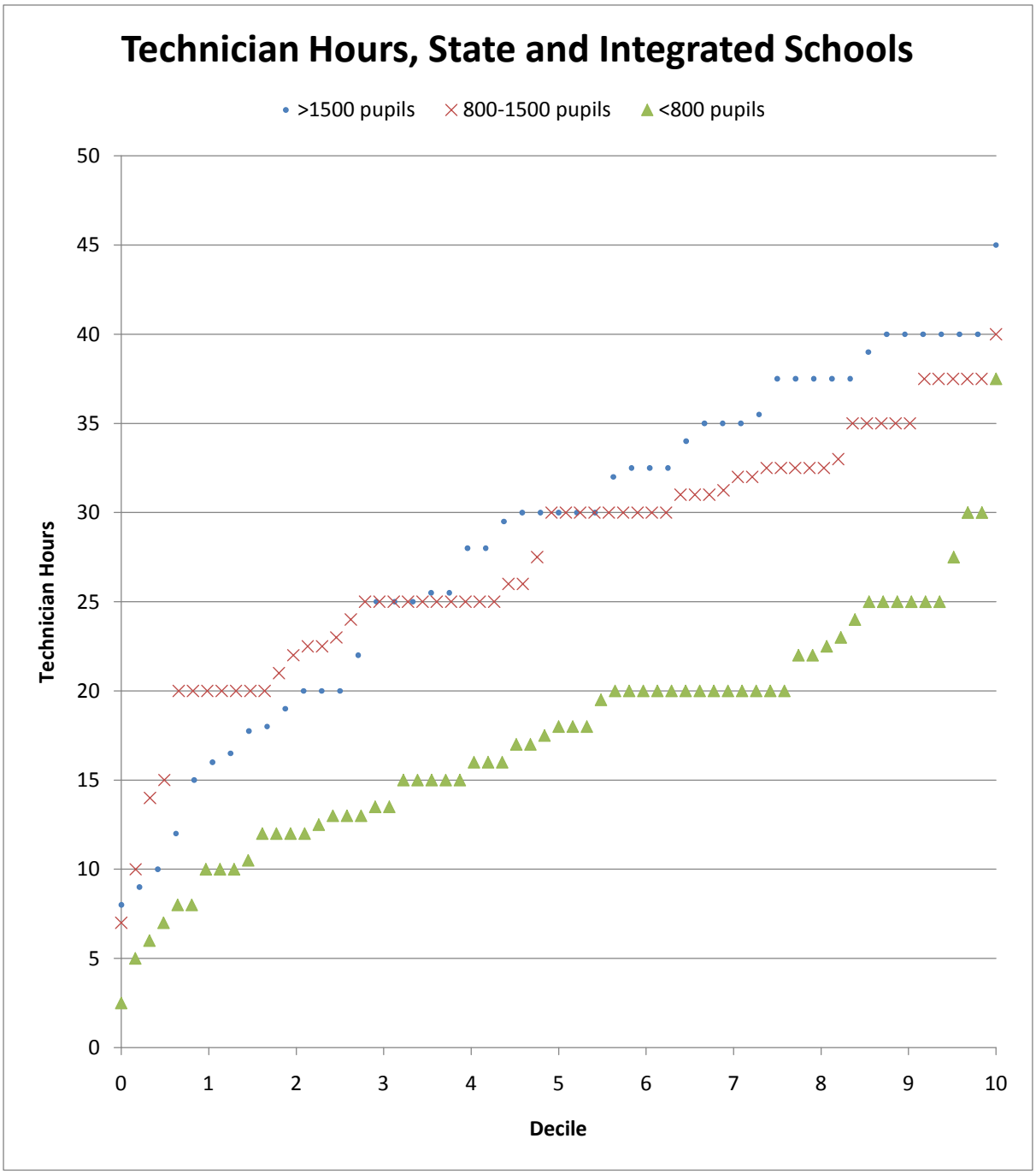
Ian de Stigter Science Technician Mt Albert Grammar

**References**

(1) The Royal Society, "Survey of Science Technicians in schools and colleges",p15. July 2001. From www.ase.org.uk/careerstructure.php
(2) de Stigter, Ian. "New Zealand Secondary School Science Technician Employment", August 2007.
(3) Gleadall, Geoff. President LTB-STAV, Personal communication, 20 June 2006.
(4) The Royal Society, "Supporting Success: Science Technicians in Schools and Colleges", p7, Jan 2002. From www.ase.org.uk/careerstructure.php
(5) The Royal Society, "Supporting Success", pp11-12.
(6) CLEAPSS School Science Service, "Technicians and their Jobs". Report L228, p26. Dec 2002. From www.ase.org.uk/careerstructure.php
(7) LTB-STAV, "Technical Staff in Schools, Staffing and Conditions. September 2007. From http://www.sciencevictoria.com.au/labtech.html

## Appendix 1: Distribution of Technician Hours for School Types




Technician Hours, State and Integrated Schools
>1500 pupils
800-1500 pupils
<800 pupils
Technician Hours
0
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10
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20
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40
45
50
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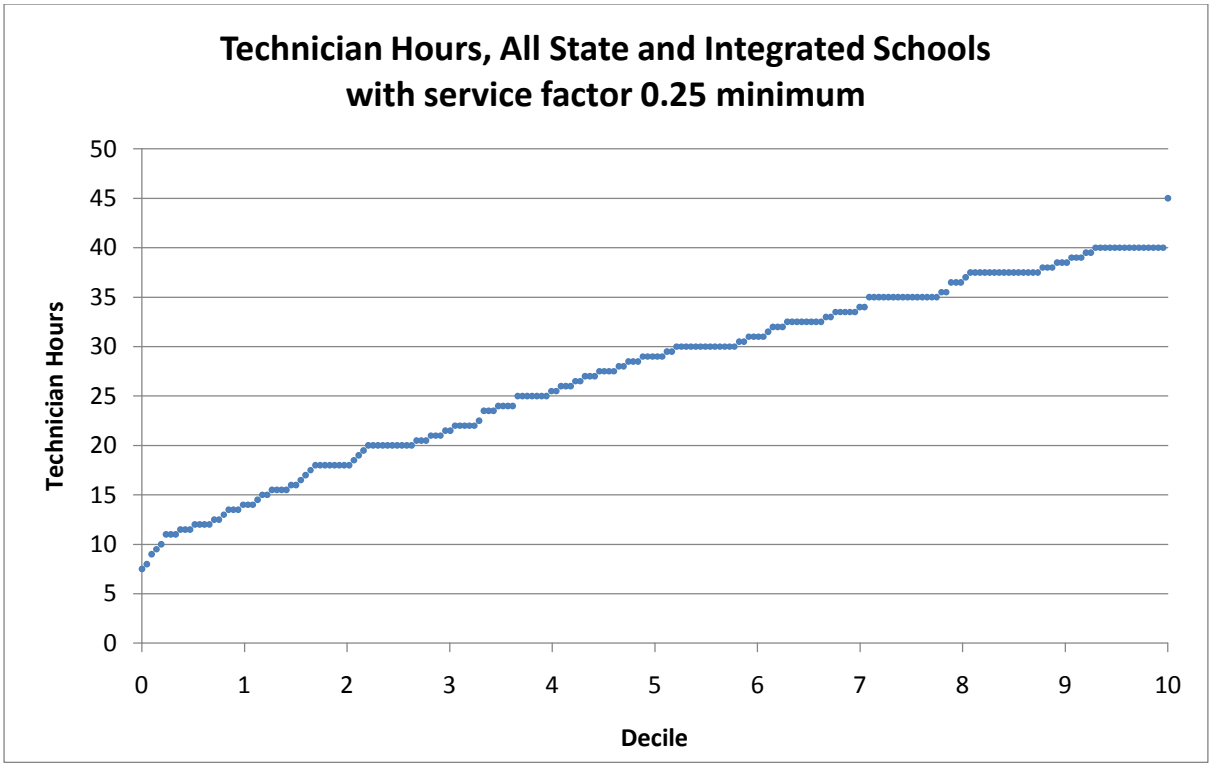
## Appendix 2: Effects of Increased Service Factors

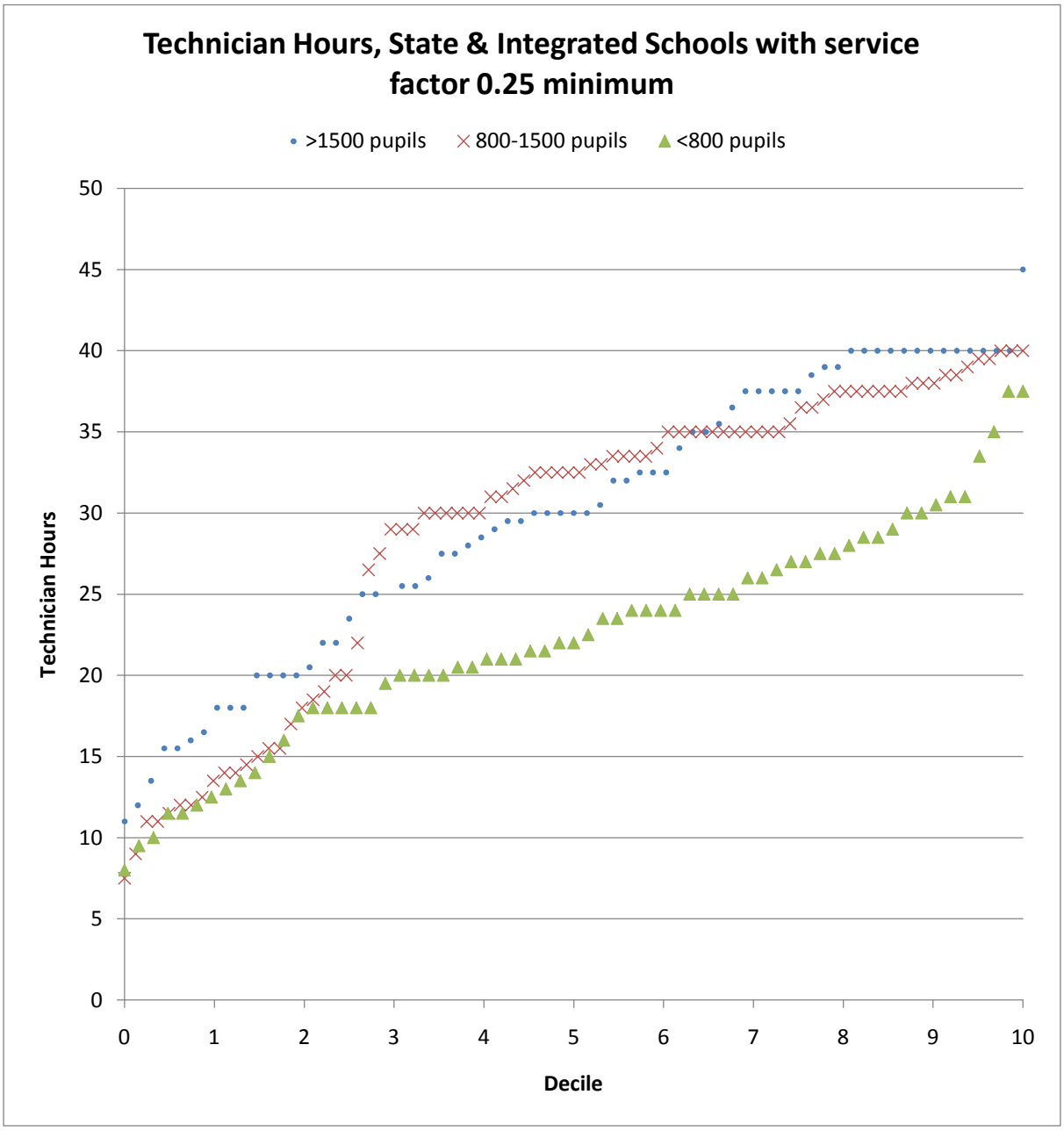
### Technician Hours Worked in Various Schools currently

| | S/Int to 800 | S/Int>800,<1500 | S/Int 1500+ | All S/Int | Independent |
|---|---|---|---|---|---|
| Upper Quartile | 20 hours | 32.5 hours | 37.5 hours | 31 hours | 37.5 hours |
| Median | 18 hours | 30 hours | 30 hours | 25 hours | 30.5 hours |
| Lower quartile | 13 hours | 23.5 hours | 20 hours | 17.9 hours | 27.5 hours |

### Effects of Introducing a Minimum Service Factor of 0.25

| | S/Int to 800 | S/Int>800,<1500 | S/Int 1500+ | All S/Int | |
|---|---|---|---|---|---|
| Upper Quartile | 27 hours | 36 hours | 38 hours | 35 hours | |
| Median | 22 hours | 32.5 hours | 30 hours | 29 hours | |
| Lower quartile | 18 hours | 21hours | 24 hours | 20 hours | |
| Extra technicians | 0% | 32% | 41% | 23% | |
| Extra hours | 28.0% | 39.9% | 47.2% | 39.5% | |




Technician Hours, State & Integrated Schools with service factor 0.25 minimum
>1500 pupils
800-1500 pupils
<800 pupils
Technician Hours
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## Appendix 3: An extra science technician for [Unamett] School?

**Context:**

Proposals for additional technician time have been around for at least 5 years, so it isn't a new idea. I assume that if someone is hired at this stage, that the new position would be essentially full-time during school terms. This would not be out-of-line for a school of our size and status – I can comment further on that if desired. The comments below relate to the assumption of a second full-time position.

**What would the science teachers and faculty get, that they don't get now?**

1. It would be possible to look after gear return as well as delivery, and so keep equipment in good order, limit loss and damage, reduce equipment hassles for teachers.
2. Better maintenance and replacement of gear in labs and resource room.
3. Safety hazards (chemicals) could be regularly cleared from labs, instead of just being left.
4. More frequent top-up of lab chemicals; extras like unblocking sinks
5. Orientation assistance available to new teachers, and where wanted, in-lab assistance and demonstration.
6. Opportunities to further develop physical resources for science teaching.
7. Available time, and possibly additional skills, to do departmental work – horticulture, physics etc.
8. Ensure good technician assistance at peak demand times when practical assessment requirements etc, coincide.
9. Ensure that technician absences from sickness etc can be accommodated without disrupting teaching plans.
10. Make time available to support the HSNO Lab Manager in giving effect to the COP
11. Make possible a return to a previous role of administrative assistance in checking invoices and monitoring budgeted expenditure.

**Other advantages?**

It would be possible to provide technician PD, to develop skills and put them into practice, according to a development plan, and in line with school and Faculty goals. This, along with items 1-11 above has been deficient in recent years, because of extreme pressure on technician functions.

Cheers, [Wonderwoman?]

## Appendix 4: Summary of School Science Technician Qualifications

| Major qualification | No in survey | Percentage |
|---|---|---|
| S.C./U.E./6th Form Cert/GCSE | 21/143 | 14.7 |
| NZCS Int/QTA/NZIMLT Cert/Dental nurse cert | 14/143 | 9.8 |
| NZCS/HNC/NZCQS/RGN | 41/143 | 28.7 |
| Dip MLT/Dip Ag/Dip I-H/Higher Dip MT | 8/143 | 5.6 |
| BHSc/BE/B Food Tech/B Pharm/BA | 7/143 | 4.9 |
| BSc/Dip Sc/Q.T.O./B App Sc | 34/143 | 23.8 |
| BSc Hons/MSc/PhD | 16/143 | 11.2 |
| Total | 141/143 | 98.6% |

Note: The two technicians who did not specify any qualifications (so are assumed to have none) were in integrated schools.

The different types of schools had differences in the qualification of their technicians. The proportions of science technicians with qualifications of Level 6 or higher are summarised below.

**Differences in school science technician qualifications**

| | State to 800 | State >800,<1500 | State1500+ | Integrated | Independent |
|---|---|---|---|---|---|
| Level 6 or higher | 55% | 79% | 73% | 70% | 100% |

## Appendix 5: School Science Technician salary scale responses

| | State to 800 | State8-1500 | State 1500+ | Integrated | Independent |
|---|---|---|---|---|---|
| B scale | 11 | 11 | 8 | 8 | 1 |
| C scale | 16 | 34 | 21 | 12 | 4 |
| Don't know | 1 | | | | 9 |
| Blank | 1 | 2 | | | 1 |
| Above C scale | | | 1 | | 1 |
| No pay scale! | | | | | 1 |
| Total | 29 | 47 | 30 | 20 | 17 |
| %B of known | 41% | 24% | 27% | 40% | |

## Appendix 6: Performance Review

To establish whether performance review is occurring, and whether it serves a purpose, the survey asked two questions about performance review:

- Do you have an annual performance review?
- Are your development and resourcing need identified?

The first question was answered by 137 respondents, the second by 133. Four respondents who had performance reviews did not answer the second question, so have been left out of the summary.

**Performance Reviews plus Development and Resourcing needs**

| | State 800 | State 800-1500 | State 1500+ | Integrated | Independent | All schools |
|---|---|---|---|---|---|---|
| Per f Rev and Devt & Res | 13/27<br>48% | 25/41<br>61% | 18/30<br>60% | 10/19<br>53% | 4/16<br>25% | 70/133<br>53% |
| No Perf Rev Devt & Res | 31/27<br>11% | 3/41<br>7% | 1/30<br>3% | 2/19<br>11% | 5/16<br>31% | 14/133<br>11% |
| No Perf Rev No Devt & Res | 6/27<br>22% | 8/41<br>22% | 9/30<br>30% | 5/19<br>26% | 7/16<br>44% | 35/133<br>26% |
| Perf Rev and No Devt & Res | 5/27<br>19% | 5/41<br>12% | 2/30<br>7% | 1/19<br>5% | 0/16<br>0% | 13/133<br>10% |

## Appendix 7: Professional Development

The survey asked 4 questions on professional development:

- What professional development have you had in your current school?
- What professional development have you had in the last 2 years?
- Is there any area you feel particularly deficient in?
- Or needing update?

There were 118 respondents to the first question, 108 to the 2nd, 62 to the 3rd, and 33 to the 4th.

The questions about what professional development people have produced similar answers, so only the 2 year list is presented.

**Science Technician Professional Development for the last 2 years**

| PD resource/course etc | Technicians listing | % involvement |
|---|---|---|
| Cluster groups | 32/108 | 30 |
| SCITECH conference | 31/108 | 29 |
| HSNO courses/workshops | 30/108 | 28 |
| In-service days | 20/108 | 19 |
| First Aid training | 18/108 | 17 |
| SCICON technicians' day | 11/108 | 10 |
| H & S rep training | 6/108 | 6 |
| ICT | 6/108 | 6 |
| Electronics | 4/108 | 4 |
| CIE annual seminar | 4/108 | 4 |
| Stage lighting | 1/108 | 1 |
| Photography | 1/108 | 1 |
| A/V | 1/108 | 1 |
| Total | 165/108 | 153 |

**PD deficiencies noted by respondents to survey**

| Biology | Chemistry | Physics | General | Safety |
|---|---|---|---|---|
| Ag/Hort/biology | Chemistry (2) | Instr calibrn | Rocks/minerals (2) | First Aid |
| Microbiology (2) | Titrant Stndsn (2) | Repair PX gear (4) | Data loggers | H & S (2) |
| Cultures (2) | Glass calibration | Physics (6) | A/V | Lab safety |
| Microscopes (9) | Glassblowing (3) | Soldering (3) | ICT (8) | Safety Regns |
| Electrophoresis | Chem disposal | Electronics (3) | Inventories | |
| | COP/ hazchem (9) | Elec/Elec repair (7) | Database Mgt | |
| | | Electrochecks (2) | | |

**Areas needing update for respondents**

The responses to the question of updates turned out to be largely a sampling of the PD deficiencies list above. The differences were that First Aid now appeared 8 times, Fire Safety and curriculum changes were added.

## Appendix 8: Planned Staff Changes in the next 5 Years

The survey asked whether technicians planned changes to their employment in the next 5 years:

- Change to non-school employment Date____
- Reduce hours Date____
- Retire Date____

The returns established that 6 of the 12 male science technicians intended to retire in the next 5 years (which is no surprise at a median age of 59).

The female science technicians' plans for change were more diverse. Although 40 of them planned changes in the next 5 years, some were to non-school employment, some to reduced hours, some to retirement, and with various combinations as possibilities. Most were not able to give dates. The total of male and female technicians planning changes corresponds to 6.4% annually.

As a check on how reliable these claims of departure (or reduced availability) were likely to be, the school service record was checked to see how many started in the last 5 years. In the last 5 years, 50 of the science technicians surveyed began employment in a school. Based on the 143 respondents to the survey, this corresponds to an annual science technician turnover of 7%.

In the last 2 years, 18 of them began employment, which is an annual turnover of 6.3%.

## Appendix 9: Practical Skills of Science Technicians

The survey asked about some of the practical abilities that technicians use in their work:

- Do you have trade, craft, and other occupational skills employed at work?

The responses to those suggested by the survey are tabled.

**Science Technician trade/craft skills used at work**

| Skill area | No. involved | % |
|---|---|---|
| Electrical checks | 31/143 | 22 |
| Electrical repairs | 28/143 | 20 |
| Electronic circuit assembly/repair | 28/143 | 20 |
| Glassblowing | 28/143 | 20 |
| Metalworking | 9/143 | 6 |
| Microscope servicing | 63/143 | 44 |
| Painting | 23/143 | 16 |
| Plastics fabrication | 5/143 | 3 |
| Soldering | 58/143 | 41 |
| Woodwork | 20/143 | 14 |

Other practical skills volunteered were glass-cutting, digital photography, stage sets and lighting, sewing, clerical and accounting, book covering and repair, gardening, instrument servicing, furniture and equipment repairs.

## Appendix 10: Science Technician Role description

Responsible to: Principal/Head of Department

Key Tasks
Set up, operate and run checks on general equipment in the department.
Make simple pieces of equipment and carry out simple repairs.
Arrange for repairs and maintenance.
Advise staff about practical work and resources and equipment available.
Maintain a satisfactory storage system in line with school safety policies.
Operate a system for chemical storage, labelling, use, disposal, and inventory to meet HSNO and departmental policy requirements.
Maintain Safety Data Sheet records for chemicals.
Operate an efficient system of stacking, storing, transporting, distributing and return of other equipment, materials and resources used in the laboratory.
Conduct periodic inventory check of science equipment, books, paper resources.
Review equipment needs within the science department.
In cooperation with the HOD, arrange budgeting, accounting, ordering, and resources to meet the department's needs.
Obtain and care for living specimens, plants etc.
Obtain/collect non-living materials specimens for dissections and experiments.
Prepare equipment, materials and solutions required for demonstration and class practical work.
Prepare equipment for practical tests and examinations.
Assist teachers and students with equipment and equipment manipulation during practical sessions and examinations.
Demonstrate experiments when required.
Assist students with equipment requests for individual projects.
Clean special equipment and glassware which needs extra cleaning or special treatment.
Assist with security of science laboratory and equipment.
May assist with use of A/V equipment and resources, and maintenance.

This job description derives from an old NZEI handout of some years ago, but has been updated to account for A/V assistance, HSNO, Safety Data Sheets, and a role in security.

## Appendix 11. Initiative and Development Roles

The survey question asked:

- Do you have a development role, take initiative with....?

The responses to the suggested areas are tabulated below.

**Technician Initiative and Development Roles**

| | No. involved | % |
|---|---|---|
| Budget management | 86/143 | 60 |
| Chemical database | 133/143 | 93 |
| Chemical hazard management | 126/143 | 88 |
| Consumables budget prep | 101/143 | 71 |
| Equipment database | 121/143 | 85 |
| Glassware calibration | 36/143 | 25 |
| Meter calibration | 36/143 | 25 |
| Micro cultures | 61/143 | 43 |
| Rocks and minerals | 36/143 | 25 |
| Storage system development | 112/143 | 78 |
| Storeroom/prep room design | 84/143 | 59 |
| Titrant standardisation | 60/143 | 42 |

Other roles that were volunteered by respondents are given below.

| |
|---|
| Safety audit of labs, recommend upgrading to comply. |
| Computer network. Chemistry website devt/management |
| Develop & organise electronic teaching resources |
| Run course in handling dangerous chemicals |
| Curriculum development, Unit Planning |
| New Teacher orientation. New HOD assistance/training |
| Development of practicals. Dissection microscopy. |
| Assistance/guidance for students doing Crest/Science Fair |
| Science Quiz night gear and contacts. Cell biology/Human anatomy |
| Processing of marks. Dept admin and filing. |
| Development & purchase of resources. PAT testing |
| Catalogue/maintain department resources |
| Organise filing for internal tests/externals |

## Appendix 12: Other Work by Technicians

### During Technician Hours

Science technicians often have wider involvements as part of their technician hours.
The survey question asked:

- As part of your paid technician hours, are you involved with....?

The responses to the suggested involvements are tabulated.

**Other paid roles in science technician hours**

| | | |
|---|---|---|
| A/V equipment and media | 49/143 | 43% |
| School camps | 11/143 | 8% |
| prizegivings | 13/143 | 9% |
| Parent evenings | 25/143 | 17% |
| Demonstrating | 55/143 | 38% |
| Tutoring | 10/143 | 7% |
| In-class support | 84/143 | 59% |
| ICT | 19/143 | 13% |
| First Aid | 50/143 | 35% |
| Field Trips | 78/143 | 55% |
| Science Fairs | 62/143 | 43% |
| Teaching | 11/143 | 8% |
| Safety Committee | 47/143 | 33% |
| Organising PD | 12/143 | 8% |

Science technicians also listed other activities included in their paid hours:

Weekly departmental newsletter
Computer network administrator
Care and maintenance of Hort plot
Prepare relief lessons
Setup and supervise assessment
Barcode, issue, returns of books
Buy, catalogue, cover texts
Class rolls
Desktop publishing, handbook updating
Drama and music performances
Food Technology
NZQA data entry
Supervise correspondence students
Teacher instruction on HSNO and Code of Practice
Science Roadshow
Technician Rep on Science Teachers Association
Regional Technicians' Group Committee
Reader/Writer for exams
Taking technician PD
Clubs
Wearable Arts
Open night
Student project support

**Other Positions Held**

Some technicians also fill other paid roles in a school, separate from their science technician hours:

Community education organiser (2)
Community education tutor (2)
Community Education prep/cleaning
Computer admin and data entry
Stationery, photocopy, laminating (2)
Reader/writer for exams (2)
Special floral arrangements
Parent evenings (3)
Careers assistant
Library assistant
Special Education reliever
ICT Tutor support
Holiday plant care
Tutoring (2)
Harassment Coordinator
Pastoral Care Tutor
Field trips (2)
Prospective New Students evening
Science Fair
Electrical testing
Food technology
Exam supervision (2)
Teacher aide (2)
Safety committee (2)

**Unpaid Work by Science Technicians**

Many science technicians are involved in unpaid work, usually because they have volunteered for it, but in some cases they are activities the school expects them to do as part of the technician role. The items listed by survey respondents:

Manage sports team (4)
Drama productions
Health & Safety committee
Table tennis coaching
Care of plants/animals in holidays
Field trips
Teacher refresher days
Shopping for supplies
First Aid training
Science fair help (2)
Desk top publishing
Organise PD
STANZ Executive
NZASE executive
Electrical repairs
Take-home bookwork
Advocacy for science technicians
New students evening
Prize giving
Open night
School camp

**Comments on Unpaid Work**

A survey question asked: Is part of your technician work unpaid?

Occasionally (75 responses) Frequently: (9 responses) Routinely: (7 responses)

**Claims for extra work**

A survey question asked about claims for extra work:

- Have you claimed for extra hours at school, or shopping for resources? (Yes 88, No 48)
- If so, how were your claims received? (Accepted readily 76)
  (Resisted but paid 11)
  (Dismissed 6)

## Appendix 13: The Working Environment

### Multiple levels and lifts

The survey questions asked:

- Are your science labs/rooms on more than one level?
- If so is there a lift?

The two questions were answered by 138 respondents.

### Incidence of multiple levels and lifts in school science facilities

| | State 800 | State 800-1500 | State 1500+ | Integrated | Independent | All schools |
|---|---|---|---|---|---|---|
| All 1 level | 24 | 32 | 17 | 10 | 8 | 91 |
| | 86% | 73% | 57% | 53% | 47% | 66% |
| Levels, with lifts | 0 | 5 | 10 | 3 | 5 | 23 |
| | 0% | 11% | 33% | 16% | 29% | 17% |
| Levels, no lifts | 4 | 7 | 3 | 6 | 4 | 24 |
| | 14% | 16% | 10% | 32% | 24% | 17% |

### Integration of science facilities

The survey question asked:

- Are the science facilities all together on the site?

It was answered by 141 respondents.

### Technicians in schools with integrated science facilities

| State to 800 | State 800-1500 | State 1500+ | Integrated | Independent | All schools |
|---|---|---|---|---|---|
| 12 | 10 | 13 | 13 | 9 | 57 |
| 41% | 21% | 45% | 68% | 53% | 40% |

### Adequacy of Storage

The survey question asked:

- Is there adequate storage for science equipment?

It was answered positively or negatively by 141 respondents.

### Technicians in schools with adequate storage for science equipment

| State to 800 | State 800-1500 | State 1500+ | Integrated | Independent | All schools |
|---|---|---|---|---|---|
| 10 | 16 | 10 | 6 | 10 | 52 |
| 36% | 34% | 33% | 32% | 59% | 37% |

**Chemistry Prep Rooms**

The survey had two questions relating to the area where chemicals are handled:

- Is there a well-designed chemistry prep room that meets HSNO requirements?
- Is prep room fume extraction adequate?

The first question was answered by 135 respondents, and the second by 141.

**Technicians in schools with appropriate chemistry prep areas**

| | State 800 | State 800-1500 | State 1500+ | Integrated | Independent | All Schools |
|---|---|---|---|---|---|---|
| HSNO OK? | 11 | 17 | 10 | 7 | 10 | 55 |
| | 39% | 37% | 36% | 41% | 63% | 41% |
| Extractn OK? | 11 | 22 | 15 | 12 | 8 | 68 |
| | 39% | 47% | 50% | 63% | 50% | 49% |