PRESERVING NEW ZEALAND'S VOICES OF WORLD WAR II

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These 1600 discs have survived bumpy truck rides across war-torn deserts, journeys across the globe by 1940s air and ocean transport, editing, broadcasts, numerous location moves within New Zealand, and even several major earthquakes. That they now sit carefully stored in crates four doors down from my office is miraculous. Although not without their imperfections or preservation challenges, they have kept remarkably well through 80 adventurous years .

The aluminum (and occasionally zinc or steel) base of these lacquer transcription discs is coated in a thin layer of cellulose nitrate lacquer. Tracks were cut into this lacquer by a recording engineer using a lathe fixed in the back of a modified van or on a portable 'Presto' disc recorder. Although the manufacturing origins of these discs are unknown, it is suspected that they were sourced from different companies, which would explain the discrepancy in base materials. The composition of the lacquer includes a plasticiser that was used to soften the cellulose nitrate and reduce surface noise. However, over time this plasticiser exudes from cellulose nitrate in the form of palmitic acid, stearic acid, or lauric acid, depending on the plasticiser used. The acidic surface can eat away at the lacquer and have the opposite effect of increasing surface noise. It is not uncommon to pull out a disc for digitisation and find the surface covered in white crystals and fatty deposits associated with this type of decomposition (Figure 1). After the disc is spun through a diluted detergent solution in an ultrasonic cleaner to help loosen and remove any dust or grime, ammonia hydroxide is wiped over the grooves of the affected discs to clean off any acidic deposits. The label in the centre of the disc, which carries important information, is protected during this cleaning process (Figure 2).

Figure 1. Disc suffering from palmitic acid, prior to cleaning [Sandy Ditchburn, Ngā Taonga Sound & Vision].

Figure 2. A cleaned series of discs ready for digitization [Sandy Ditchburn, Ngā Taonga Sound & Vision].

The loss of plasticiser stresses the lacquer's structure leading to cracking, shrinking, and peeling away from the metal base. Capturing playback on a cracked record requires patience and good audio editing software. Sometimes the easiest solution is to continuously place the needle in different grooves and edit the audio together in post-production. The preservation principle of capturing as much audio as possible from a degrading disc must be kept in mind when this work is undertaken. A stray stylus needle in a crack can easily cause more damage, so drop-ins need to be calculated and precise. Revolutions per minute may also be reduced for more accurate capture before being processed back up to normal speed with editing software.

Dealing with natural grime build-up, cracking lacquer, and acidic deposits is just the beginning of readying a disc for preservation. A team of engineers, censors, and broadcasters each added their own marks to these war recordings. Often the black lacquer grooves are scrawled over in yellow chinagraph wax pencil to convey to the broadcaster which parts of the recording were to be used, or where a certain speech or event begins (Figure 3). These marks tell a story themselves, but also add crackles and distortion to the recording. However, they are often left untouched for posterity. There are also instances of deep scratches or grooves embedded into a disc in attempts to 'delete'

sections of audio. In this case, the audio is captured using the same process that is used for cracked discs. When these discs are recorded to a digital format, every part of the audio is captured, regardless of the quality or fidelity of the original audio and, as these recordings were happening in the middle of a war zone or desert, the recording quality is, at times, decreased.

Figure 3. Disc with chinagraph pencil instructions for broadcasters [Sandy Ditchburn, Ngā Taonga Sound & Vision].

The digitisation process for these lacquer discs takes place on a Technics SP-15 turntable. The signal is passed through a Elberg MD12 preamp to a MOTU 1248 analogue-to-digital converter, which captures the audio at 96 kHz 24 bit into Wavelab 10.0 audio editing software. The turntable is readied with anti-skating and the tone arm weight set at 3g or higher to ensure the stylus stays in the grooves, the correct playback speed selected, and the disc is placed on the turntable's platter. Next comes the selection of an appropriate reproduction stylus. There are a number of different sizes and shapes to choose from, with the objective of finding the best signal-to-noise ratio and widest frequency capture. The years in which these discs were recorded dictate that larger sized styli (approximately 0.00035 – 0.00020 inches) produce the most accurate reproduction. This selection process is usually done by ear and spectrometer monitoring. An elliptical shaped stylus tends to capture an improved frequency response and lower distortion than a conical stylus.

Once the disc has been assessed, cleaned, and accurately captured, it is given a unique identifying filename, and catalogued into a digital database. Metadata is embedded into the WAV file (Figure 4) which reflects the recording and processing equipment used as well as the disc's title, unique accession number, and filename. This metadata is also recorded into the digital database along with the date of capture (Figure 5). The digital

file is safely stored in a mirrored and backed-up LTO array and the processed disc is re-housed into a flat, acid-free card which is then placed into an archival plastic bag. The bag is mostly, but not completely, sealed to allow for continued off-gassing. A temperature and humidity controlled vault is the final resting place of these unique discs. They are stored with the belief that this preservation and digitisation process may be changed or repeated in the future with the advancement of knowledge and technology.

Figure 4. Screeshot of Wavelab showing a file description and coding history [Image:Sandy Ditchburn].

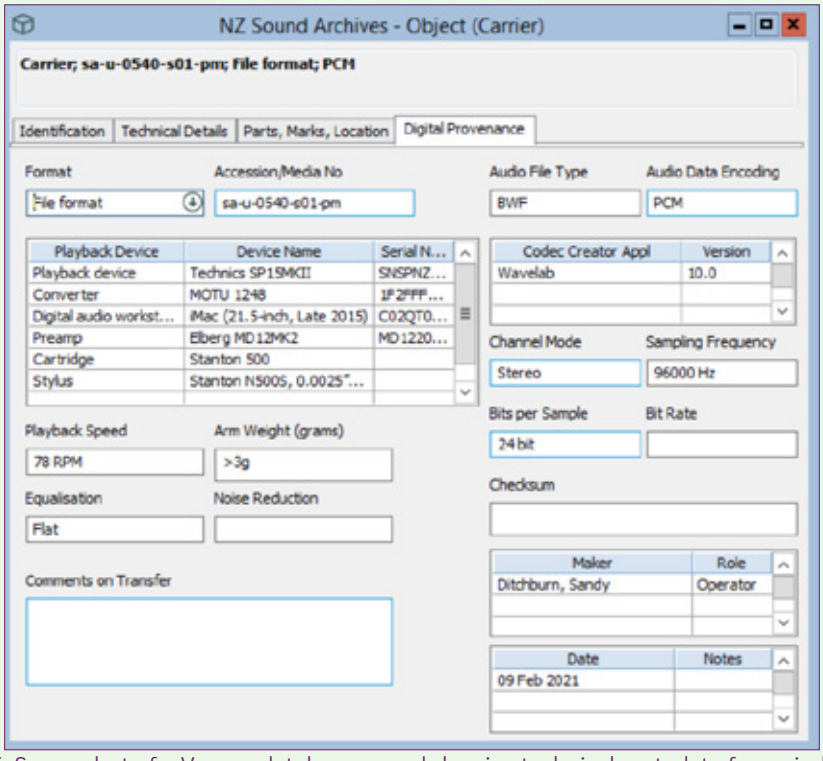

Figure 5. Screenshot of a Vernon database record showing technical metadata for an individual digital file [Image: Sandy Ditchburn].

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