



ASTA Science Awareness Raising Project

WESTERN AUSTRALIA CASE STUDY:

The Mount Walton Intractable Waste Facility

The purpose of the WA case study is to illustrate the adaptations made by the Kalgoorlie Community to the ASTA Science Awareness Raising Model.

The case study has been prepared from information collated from the project proposal, mid-project report, teleconference notes, final project report and STA Coordinator feedback.

Background

The Mount Walton Intractable Waste repository is located 125 km north west of Kalgoorlie-Boulder. It is in the shire of Coolgardie and was established in 1992. As a Class 5 waste repository, the Mt Walton facility is the site for the burial of low-level radioactive and chemical wastes.

ATA Environmental is the Project Management body for the facility and co-ordinates the transportation of wastes to and burial of wastes at Mt Walton. It also carries out environmental monitoring and manages the emergency and safety issues related to the site.

In the past there has been a disposal 'campaign' approximately every two years. The campaign involves many different steps and often takes between one to two months to complete. The campaign involves all aspects of site preparation, transportation of wastes and burial, site rehabilitation and environmental monitoring.

At the time of the ASTA Science Awareness Raising Project, a campaign was in progress at Mt Walton. This involved the disposal of radio active and chemical wastes in the same trench. Prior to the 2000 campaign, radioactive wastes and chemical wastes were stored in separate trenches.

The lack of understanding and awareness about the existence, location and use of the Mount Walton Intractable Waste Facility was identified as a community issue. This was a timely focus as a company had begun investigations as to the suitability of the Goldfields area as a site for the development of a high level radioactive waste dump.

Aim of the project

The aim of the project was to inform the local community about the location, use and future of the Mt Walton Intractable Waste Facility.

It was envisaged that students and the community would work together to investigate the science underpinning the use, location and future of the Mt Walton site. As a result of the investigations, students would inform the community about the environmental management of the Mt Walton site, including the safety and environmental considerations in moving and storing intractable waste.

Project involvement

The original project submission listed six organisations willing to be involved in the ASTA Science Awareness Raising project:

- Eastern Goldfields High School
- South Kalgoorlie Primary School
- Primary Extension And Challenge Centre
- John Paul College
- Goldfields Family Network Incorporated.

Prior to the commencement of the project both Local Leaders took on new professional roles in different organisations. This change added challenges to the organisation and coordination of the project from the outset.

The project reports indicate the actual project participants were:

- Year 10 science students from Eastern Goldfields High School,
- Two Year 6/7 classes at Kalgoorlie Primary School,
- Year 4 – 7 Talented and Gifted (TAG) students from South Kalgoorlie Primary School.

In addition to the teachers and students from the three schools, representatives from a number of community groups were involved.

- Resource personnel – WA Museum, Kalgoorlie-Boulder Department of Mineral and Petroleum Resources, William Grundt Memorial Library, Kalgoorlie Regional Hospital, University of Wollongong.
- Local interest groups – Centre for the Management of Arid Environments, Goldfields Against Serious Pollution Committee, ATA Environmental, Enviroskill International, Intractable Waste Disposal Facility Community Liaison (IWDF)
- Local/Shire Council – Kalgoorlie Boulder City Council, Coolgardie Shire Council, Goldfields Land and Sea Council.

- Government Departments/Politicians – Department of Environmental Protection, Water and Rivers Commission, Department of Indigenous Affairs, Department of Main Roads, Member for Kalgoorlie, Member for Eyre, Mining and Pastoral Greens MLC, Federal Member for Kalgoorlie.
- Media – Kalgoorlie Miner, Golden Mail, Radio West
- Service providers – Curriculum Officer, printing companies (assisted with poster and brochure production) and Boulder Markets.

Doing the project

Two Local Leaders shared the project coordination role. With their change in work positions, locations and professional responsibilities prior to the commencement of the project, the amount of time and the level of interaction around the project the Local Leaders could have with students, the classroom program and project teachers was reduced.

- Early in 2002 educators from Eastern Goldfields Senior High School, South Kalgoorlie Primary School, John Paul College, Kalgoorlie Primary School and Coolgardie Christian Aboriginal Parent Directed School (CAPS) met to discuss project strategies that would bring the project to the attention of the community
- one Local Leader attended a meeting with Coolgardie Shire Council, ATA Environmental, Enviroskill International, and Intractable Waste Disposal Facility Community Liaison (IWDF) to find out about the planned campaign to bury waste at the Mt Walton site
- a meeting of the Community Reference Committee (CRC) was held in April 2002, and attended by the Science Teachers Association (STA) Coordinator who outlined the project procedures as detailed in the *Package* which provided direction and energy to the project.

The Local Leaders found time and communication difficulties arose as they tried to progress the project. Some of the obstacles they reported were:

- *meetings to get everyone together at the one time were almost impossible.*
- *communication with a group heading in various directions was one of the obstacles for moving ahead as a large group.*
- *little or no contact with the other teachers prior to or during the project.*
- *it was difficult to gauge the response or enthusiasm of some of the teachers involved.*
- *finding time to support the teachers and meet with them was also an issue.*
- *trying to slot in a project like this into a secondary class without much time for planning was difficult.*
- *being able to take time out of class to do this sounds good but is often difficult to actually put in place and can affect the progress and outcomes of the lessons it impinges on.*

Local Leader

As a result the CRC only met once.

Only one meeting occurred where everyone attended. After that meetings occurred at a local school event or via email.

Meetings involved eating into too much time for many individuals.

As the project was short term it was not seen as necessary to meet more often. Local Leader

Apart from the initial meeting the group (CRC) did not have a large impact on the direction of the project. STA Coordinator

To get around these issues the project was re-scoped and divided into three projects. One Local Leader coordinated the projects at Kalgoorlie Primary School and South Kalgoorlie Primary School and the other Local Leader at Eastern Goldfields High School.

Subsequently this enabled each Local Leader to establish a manageable working relationship

with their relevant project teacher. Local Leaders communicated regularly and worked on project coordination and administrative tasks on weekends, with assistance from the STA Coordinator.

- In Term 2, a Communications Officer was employed (from the project budget) for 2 hours per week to assist students to develop community links, update weekly information to the school community, and coordinate media releases for the primary schools.

Each of the three participating schools worked separately on class investigation projects and school community information strategies. An outline of each school projects follows.

1. Kalgoorlie Primary School project

Students critically analysed the impact of the facility on their local environment and the impact of further waste storage options proposed by Local, State and Federal Governments. Using ethical inquiry approaches and a range of scaffolding frameworks, students developed skills, knowledge and understandings that enabled them to participate in ethical debates over the issues, publicise findings through the local media and produce a brochure to heighten community awareness of the facility.

Student activities

Term 1 – Exploratory phase

- gathering background data on the Mt Walton site through a web quest and from secondary sources (internet sites, newspapers) and primary sources (interviews, surveys)
- development of display boards in each classroom to exhibit information
- communications with a number of stakeholders and resource people (phone, fax, emails, open discussions, guest speakers) to identify the myths and misconceptions held by students and the community about radio-active material and low-level radio-active waste.
- researching information

Term 2 – Investigation phase

- students formed a working party and worked in ‘expert groups’ on different aspects of the investigations
- a display board was erected in the senior hall of the school to raise awareness about the Mt Walton site with peers, parents and teachers. The Communications Officer assisted students in the development of displays and weekly updates
- students met and discussed issues about the site and radioactive waste with many stakeholders. They invited guest speakers into the school; viewed a video explaining how the waste was stored; investigated the condition of the road to the site and followed up media reports concerning storage of waste at Mt Walton from outside WA
- from these experiences students developed first hand, a ‘big picture’ perspective about the Mt Walton site issues. This included being exposed to different points of view and developing understandings about the state and federal political responsibilities.
- students decided on a range of mediums for raising community awareness about the Mt Walton facility.

The science experiences for students from executing the project

Investigations of

- what is intractable waste and how it is produced
- how intractable waste is stored safely
- the environmental impact of intractable waste
- geological stability of the Mt Walton region
- alternative use of waste.

The students conducted an investigation and used the information to critically analyse the impact of human activities on the local environment. They became informed contributors to debates about

sensitive moral and ethical and environmental issues.

School and broader community awareness raising strategies included

- Project update in the school newsletter 2 July 2002
- Student contact with guest speakers and other community members and stakeholder groups as they arranged project activities and gathered information
- Project article and photo in the *The Kalgoorlie Miner* on 31 July 2002 and in the *Golden Mail* on 2 August 2002
- School hall display board
- Posters communicating factual information about the facility, were prepared by students and displayed in classrooms and around the school
- Discussion of issues by students with family and friends
- Students were guests on a talk back segment on Radio West on 15 August 2002, talking about the project
- A brochure titled *Mt Walton Intractable Waste Facility* was prepared by students and approved by the Department of Environmental Protection. Brochures were distributed to the Kalgoorlie-Boulder community during Education Week. Copies were sent to guest speakers and other community members and students took two home, one for family and one for a neighbour.

Project outcomes

Year 6/7 Kalgoorlie Primary School students engaged in learning about a real issue. It provided them with opportunities to demonstrate their understandings of Working Scientifically with a focus on Acting Responsibly and the values of Environmental Responsibility. These included

conservation of the environment, sustainable development, diversity of species and ethical behaviour and responsibility.

Skills developed by students covered a range of competencies that support student centred, outcome based learning, such as working collaboratively, goal setting, time management, and critical analysis.

Working partnerships have been established between the school and the community.

Students experienced working with 'real' scientists.

Students produced the brochure *Mt Walton Intractable Waste Facility*.

Project continuation beyond the trial

The ASTA Science Awareness Raising Project was expected to take one term. In actual fact the students at Kalgoorlie Primary School became deeply involved and the project evolved to a two-term focus. This has enabled students to develop broader scientific understandings about intractable waste, and to achieve a range of outcomes through an integrated curriculum, negotiated and driven by the students themselves.

2. South Kalgoorlie Primary School project

The Years 4 – 7 Talented and Gifted Students (TAGS) undertook a seven week science investigation on the Mt Walton Waste facility and communicated their findings to the local community.

Student activities:

- Research into radioactive waste and how it is stored
- Investigating the role and location of the Mt Walton facility
- Assessment of the awareness of the community about the facility
- Informing the community about the facility.

The science experiences for students from executing the project

The scientific data was collected by students through interviews, videos, internet searches, brainstorming and discussions.

School and broader community awareness raising strategies

The community was informed about the use of appliances that produce low level radioactive waste, why waste needs to be stored, and the scientific program and process for storing low level waste through:

- interviews with resource people and community members
- a Powerpoint presentation at parent night
- a poster display in the school office.

Project outcomes

Students enjoyed working on the project and took the opportunity to inform other people about their learning through the strategies noted above. They learnt new skills, such as using Powerpoint for the presentation of data. Student awareness about the need for safe storage of low-level radio-active waste in a scientific way was raised.

3. Eastern Goldfields High School project

The Local Leader for the high school and the class teacher prepared for the project by:

- liaising with school staff, and establishing contacts and communications with community resource people. This developed relationships that enabled access to information and a pathway for student communication
- conducting internet searches for background information from useable sites which were distributed for student reference

- project planning with students in readiness for activities from Week 7, Term 2.

Student activities

- researched background information about intractable waste, guided by a list of prepared questions
- worked in groups, taking on specialist roles (internet searcher, community contact, illustrator, lettering, design and layout) in the preparation of a group poster
- met with a graphic designer to discuss poster planning and layout
- designed and completed posters for display in the community.

The science experiences for students from executing the project

Scientific data about intractable waste was collected from emails, photographic information, regulatory guidelines, meetings and internet searches. Students developed a mechanism for analysing the data for bias and evaluating its accuracy.

School and broader community awareness raising strategies

Posters developed by students were displayed at:

- Eastern Goldfields High School parent night, 31 July 2002
- the William Grundt Memorial Library and local community library for 3 weeks, including National Science Week (16 – 24 August 2002).
- during the Boulder Market Day in the Boulder Town Hall on the Sunday of National Science Week 18 August 2002.

A hand out was available to the public at the poster displays and the teacher and students were on hand to discuss the issues

An article for National Science Week was published in *The Kalgoorlie Miner*.

Project outcomes

Positive relationships were developed between community people and students. Students communicated with a range of community audiences (government, industry, media, council), and made their learning relevant to their local environment.

The school/community links demonstrated to students the connections between curriculum and life in the community. Student outcomes included the further development of critical analysis skills.

Community members responded and were interested in the students' presentations and they actively sought more information about the issue.
Local Leader

Project costs

The majority of the budget for the WA ASTA Science Awareness Raising Project distributed expenditure between three main items: consumables, payments of \$300 to guest speakers and teacher release time.

Project continuation beyond the trial

Kalgoorlie Primary School students continued their project beyond the trial dates. At this school there were two Year 6/7 classes and a critical mass of teachers working together on a negotiated curriculum model. At Eastern Goldfields High School and South Kalgoorlie Primary School individual teachers and their respective classes completed the project in Term 2.

The Local Leaders recognised the diminished impact a short term project has on promoting greater understanding in the educational and broader community about why science is important.

Essentially there needs to be an ongoing focus. One

off projects provide impetus in the short term.

Local Leader

The outcomes need to be ongoing and varied i.e. displays, lectures, debates, newspaper, TV, radio articles, so saturation of the project occurs.

STA Coordinator

Was the project successful?

From the perspective of each participating school, classroom teachers considered the project had been a worthwhile learning experience for students. The teachers and librarians involved in the public poster displays indicated the student's work triggered interest in this local issue and there were requests for more information about the facility.

The display of children's work on the project and the raising of awareness within the education community were positive outcomes.

STA Coordinator

The project appeared to be centred on the education institution. STA Coordinator

There were several factors which prevented this (achievement of the intended project outcomes) from happening –

- *lack of community involvement*
- *limited number of people exposed to the project thus diminishing its 'awareness'.*

STA Coordinator

What was learnt?

The Package was comprehensive and easy to follow. If the reference group (CRC) followed the guidelines in the Package then the project stood a good chance of being successful. STA Coordinator

The project reports prepared by the Local Leaders reflect mainly on student learning processes and outcomes. Each report does identify processes they would use next time to achieve the intended project outcomes.

Plan, plan, plan

- Develop a project plan early.

As schools did not receive confirmation of their participation in the project until after planning for the 2002 school year had commenced, the project needed to be added onto existing commitments.

Putting the project into the timetable at the beginning of the year instead of having to squeeze it into a current program would have been a good idea. Classroom teacher

Communications with a group heading in various directions was one of the obstacles for moving ahead as a large group. Local Leader

Keep it simple

- Design the project to be small and easy to manage.

The Local Leader found the large project group hard to coordinate as there was little direct contact with teachers from other schools. The high school timetable and set curriculum made the development and management of the project across different school settings difficult. However the inclusion of a range of students in the project added another level of understanding and community interaction.

Finding the time to support the teachers and meet with them was also an issue. Local Leader

Being able to take time out of class to do this sounds good but is often difficult to actually put into place and can affect the progress and outcomes of the lessons it impinges on. Local Leader

Involve the community more

The reference group (CRC) must have a diverse representation from the community.

STA Coordinator

The Local Leader suggested a meeting, chaired by the organising body (ASTA), of local stakeholder groups prior to the commencement of the project. The purpose would be as a form of validation and to have the significance and value of the project promoted. Alternatively an information leaflet could be distributed.

Use of media

The role of the CRC Communication Officer could be extended to coordinate all communications. This includes internal communications between CRC members and project stakeholders and external communications in the wider community. A communication plan developed as part of the project strategic plan could include media, marketing, and promotion activities.

Community feedback for the Western Australian case study

The Mt Walton Intractable Waste project in WA aimed to inform the community about the location, use and future of the intractable waste facility. As described earlier in the case study, due to the relocation of the project leaders in 2002, the nature of the project had to be changed and three separate projects at three schools eventuated. Although they had a similar focus, they probably had different impacts. We don't know where the interviewees "fit" in terms of these projects, so the results must be interpreted in that light. Further, there were only 14 interviewees for the pre-project interview, with one unavailable for the post-project interview, and this was the smallest group of all projects. This, too, must be borne in mind. The only letter surveys received were 26 from Kalgoorlie Primary School, and these will be discussed separately in the context of that project.

Feedback from the community based on the pre-project and post-project interviews (reported fully in Chapter 8) indicates that, overall, the project was reasonably successful in raising community awareness. The percentage of interviewees who had heard about the project increased from 64% to 92% (see Table 8.8) by the post-project interview, and there was a very late start to interviewing due to a delay in receiving the contacts for interviews. The largest proportion of interviewees increasing their knowledge about any project was the 85% change for this project (see Table 8.10). By the end of the project, 92% had at least some knowledge of the project, and there was an increase from

0% to 31% of interviewees who had a good or comprehensive understanding (see Table 8.9). This project had the largest change in interviewees' ratings of their understanding of the science behind the issue, but the change was negative (see Table 8.11). In other words, people felt they understood less about the intractable waste facility after the project than before. However, their confidence in being able to find out more about the project if they wanted to, increased (see Table 8.11). Given the increased community awareness about the project, the decrease in understanding about the issue is best explained by the fact that the science, involving both chemical and radioactive waste, is actually very complex, and once they knew a little about it, it is easy to imagine that people then realised that they had a lot to learn.

There was a large increase in the interviewees' belief that it was important for the ordinary person to know about science (see Table 8.6), and interviewees commonly responded that science was behind most everyday things, and that people needed some knowledge about science (see Table 8.7). Interviewees from WA gave the second highest rating to the importance of the community knowing something about the issue. The rating was 4.62 on the 5-point scale (see Table 8.11), and Table 8.12 shows a spread of reasons for this importance, but the main one, given by 69% of interviewees, was that people needed to understand more about the science behind it (see Table 8.12). There were changes in the reasons interviewees thought science was taught at school (see Table 8.5), with the 22% initially giving rather vague responses all changing to a more comprehensive view by the time of the post-project interview.

Of the 26 letter survey respondents from Kalgoorlie Primary School, 21 knew about the project. All 16 who answered the question asking what they thought the project was about had at least some understanding of it (see Table 8.14). Nineteen answered the question about its purpose and they responded that it was aimed at students learning science (37%), linking science with the real world

(32%, see Table 8.15), and promoting community awareness (37%). More than half thought the project achieved its purpose, and the rest thought it had been partly achieved (see Table 8.16).

Overall, the project was considered to have had a large effect on the community (see Table 8.19). It is difficult to make general statements because of the separate projects, but they had similar focus and some quite good media coverage, so, based on the feedback received, it seems there was an impact in all of the criteria considered in Table 8.19.

Summary points

The ASTA Awareness Raising Project was about trialing and evaluating an awareness raising 'model' in a diverse range of Australian schools and their communities. The data gathered from each trial identifies appropriate ways of increasing the community's awareness of science, what science is and what it can do through the real life circumstances of each community.

As the WA trial progressed, time, coordination and communication difficulties arose. In order to manage the project in the given timeline the intended collaborative approach evolved into three separate school programs. Community partnerships became community resource assistance to students with their investigations. This happened within the school, rather than students going 'beyond the school fence' to work with stakeholders in the community.

The WA project focused mainly on the learning environment and processes of the students involved in the trial of the ASTA Science Awareness Raising Project. Each of the three participating schools conducted separate school-based projects. Community member involvement included assistance to students in gathering resources and information, and as an audience for student outcomes.

A project plan developed by the CRC would have assisted the Local Leaders in their role as project coordinators. CRC members would take responsibility for a range of tasks within their area

of expertise, for example budget and finance and communication. The project then becomes a CRC responsibility so issues such as time constraints, changing staff roles and limited community participation are shared across a group of interested people.

Continuity and consistency across the three projects was also an issue. For example the brochure produced by Kalgoorlie Primary School was checked for accuracy by the Department of Environmental Protection before printing and distribution. However there is no mention that this validation process was used for the Posters displayed to the public by Eastern Goldfields or Kalgoorlie South Primary School.

The community feedback from the interview data and the letter survey indicated the overall project was reasonably successful in raising community awareness about the Mt Walton Intractable Waste Facility. While awareness was raised, there is scope to further develop the community's understanding about the intractable waste facility and the issues arising from low level radio-active waste storage.

Appendix 7.7

1. Brochure: *Mount Walton Intractable Waste Facility*, by Kalgoorlie Primary School Years 6/7 students
2. Media Release
3. *Kalgoorlie Miner* article Wednesday April 24 2002
4. *Golden Mail* article 'Students study waste issue' Tuesday 2 July 2002
5. *Kalgoorlie Miner* article Wednesday July 24 2002
6. Display of student posters in William Grundt Library Kalgoorlie
7. Display of student posters at Kalgoorlie South Primary School
8. Project questions for students to consider
9. Mt Walton Waste Repository handout at public displays.