

The norms, rules and motivational values driving sustainable remediation of contaminated environments: A study of implementation

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Highlights

- Systematic study of rules, norms and motivational values in sustainable remediation. □
- Identification of core norms and rules operating across three Australian sites. □
- Norms align with a range of environmental management principles, exceeding ESD. □
- Rules (sanctions) align with norms, and site conditions determine enforcement. □
- Motivational values influence compliance with norms and rules. □

Abstract: Efforts to achieve sustainability are transforming the norms, rules and values that affect the remediation of contaminated environments. This is altering the ways in which remediation impacts on the total environment. Despite this transformation, few studies have provided systematic insights into the diverse norms and rules that drive the implementation of sustainable remediation at contaminated sites, and no studies have investigated how values motivate compliance with these norms and rules. This study is a systematic analysis of the rules, norms and motivational values embedded in sustainable remediation processes at three sites across Australia, using in-depth interviews conducted with 18 participants between 2011 and 2014, through the application of Crawford and Ostrom's Institutional Grammar and Schwartz's value framework. These approaches offered methods for identifying the rules, norms, and motivational values that guided participants' actions within remediation processes at these sites. The findings identify a core set of 16 norms and 18 rules (sanctions) used by participants to implement sustainable remediation at the sites. These norms and rules: define the position of participants within the process, provide means for incorporating sustainability into established remediation practices, and define the scope of outcomes that constitute sustainable remediation. The findings revealed that motivational values focused on public interest and self-interest influenced participants' compliance with norms and rules. The findings also found strong interdependence between the norms and rules (sanctions) within the remediation processes and the normative principles operating within the broader domain of environmental management and planning. The paper concludes with a discussion of: the system of norms operating within sustainable remediation (which far exceed those associated with ESD); their link, through rules (sanctions) to contemporary

styles of regulatory enforcement; and the underlying balance of public-interest values and self-interest values that drives participants' involvement in sustainable remediation.

1. Introduction

Soil and groundwater contamination is a common concern in many countries. A wealth of studies describes methods and technologies used for remediating contaminated environments (Bayer et al., 2005). This literature has traditionally been dominated by studies based on a narrow range of remediation benefits. They often involve cost benefit analysis, and the best-value remedial design is defined as the one which involves the lowest cost for an effective remedy over the lifetime of the remedy, whilst maximizing other key factors such as land value (Elmore and Graff, 1999). Over time, the scope of remediation practice has extended to include the “lost” costs and benefits of remediation, or what welfare economists call the “positive and negative externalities” (Ellis and Hadley, 2009) associated with contaminants (Tonin et al., 2011). Consideration of externalities has led to more comprehensive appraisals of the impacts of remediation decisions upon the total environment (Paleologos, 2008). These appraisals have involved engagement with a multitude of participants ranging from representatives of major multinational corporations through to local neighbours, and they have been influenced by an increased focus on sustainability across diverse international jurisdictions. This has acted as a driver in remediation processes (Bardos et al., 2011; Pollard et al., 2004). Crucially, these participants engage with each other within sustainable remediation

processes using extensive, multifaceted and interactive value sets, beliefs, norms and rules that motivate, forbid, permit and require specific actions under certain situations. The outcomes of these remediation processes can have far-reaching effects on different aspects of the total environment (e.g. species abundance, soil quality and productivity, ground and surface water quality, air quality, land-use potential, economic output, human health and safety) (Geckeler et al., 2010; Simon, 2010, 2011). Given the increasing diversity of participants that inform remediation processes, Pollard et al. (2004) argue that considering participant values and how those values are incorporated into remediation processes is a key challenge for scholarly and professional communities dealing with remediation. Similarly, others have highlighted the need for a greater understanding of how the norms and rules that guide our environmental decision-making “fit the values of those involved” (Ostrom, 2011 p.16).

A broad cross section of professional organizations have sought to state what some of these norms, rules and values might be through the development of sustainable remediation guidance (SuRF Australia et al., 2011a; SuRF-UK, 2010). However, the ability to map the inventory of norms, rules and values that are used by participants in sustainable remediation practice, and in any remediation practice, has been restricted by the absence of systematic methodologies for carrying out such mappings. Having an understanding of the inventory of norms, rules and values being used by participants within a remediation process can be extremely valuable for regulators and professional organizations in helping them to understand how to create effective guidance, policies and legislation to support sustainable remediation (McGinnis, 2011). If these developed

guidelines and frameworks are not effectively linked to actual practice, they become irrelevant to those directly responsible for implementing remediation initiatives.

Moreover, they can mislead those who are seeking to understand what is appropriate, and they may contribute to the development of regulations and legislation that are difficult to comply with.

Addressing this challenge entails developing a systematic way of deconstructing the components (e.g. aims, performers, prescriptives, sanctions and conditions) of the norms and rules being used every day by participants in sustainable remediation practice. This enables the emerging guidance, policy and legislation to be informed by a clear understanding of what is considered appropriate practice. In this study we utilized the Institutional Grammar Tool (IGT) as a means to systematically understand the norms and rules that guide the implementation of sustainable remediation (McGinnis, 2011). The grammar for the IGT was initially formulated by Crawford and Ostrom (Crawford, 2004; Crawford and Ostrom, 1995) and has since been revised and developed (Basurto et al., 2010; McGinnis, 2011; Schluter and Theesfeld, 2010; Siddiki et al., 2011). The IGT has been developed over the past decade to provide a methodological approach which can analyse the micro-level components of norms and rules. Such an approach is needed to support analyses of macro-level challenges such as those highlighted in this study. Whilst the IGT has been applied in an increasingly broad range of contexts, it has not previously been applied to remediation (Feiock et al., 2014; Roditis et al., 2014).

Another part of the challenge involves developing a systematic way of understanding the values that motivate participants to comply with the norms and rules being used in day-

to-day activities within sustainable remediation practice (Schwartz, 2012; Stern et al., 1999). To systematically understand the values that motivate participants' compliance with the norms and rules of sustainable remediation, the study utilized Schwartz's theory of universal values, which focuses on the motivational concerns embodied in values (Schwartz, 1973, 1999, 2011, 2012; Schwartz and Bilsky, 1987). Increasingly, studies based on the Schwartz value system have sought to highlight the important connections between values and norms in the context of environmental management and sustainability (de Groot and Steg, 2008; Ibtissem, 2010; Nordlund and Garvill, 2002; Steg et al., 2014; Stern et al., 1999; Thøgersen, 1999; Thøgersen and Ölander, 2002). The approach that this study uses to apply Schwartz's motivational value system to remediation is different from the approaches used in prior research. Previous studies have explored how techniques such as group deliberation and value-based thinking can elicit and synthesize what participants 'value' in remediation (Abbotts and Takaro, 2005; Armacost et al., 1994; Geldermann et al., 2009; Grell et al., 1998; Keeney and Winterfeldt, 1996).

Using the IGT and the Schwartz value system as theoretical frameworks, this study devised a methodology to identify the norms, rules and motivational values that commonly guided participants' involvement in sustainable remediation processes at a series of Australian sites. In some contexts sustainable remediation is limited to "greening" remediation processes so that they maximize net environmental benefits (e.g. carbon mitigation) (Adamson et al., 2011; Simon, 2010). In other contexts, including those examined in this study, a focus on sustainability also opens remediation processes

to broader economic, cultural and social accountability (Bardos et al., 2000; Dixon, 2006, 2007; Doick et al., 2009; Wernstedt et al., 2004).

The study addresses three research questions in an attempt to gain a better understanding of the norms, rules and motivational values driving sustainable remediation:

RQ1. What are the norms that guide participants' involvement in sustainable remediation?

RQ2 To what extent do formal sanctions (rules) promote compliance with these norms?

RQ3: To what extent do motivational value priorities drive compliance with norms and rules in sustainable remediation?

1.1. An institutional grammar for norms and rules in sustainable remediation

Using the logic of their institutional analysis and development (IAD) framework (Ostrom, 2005, 2011) Crawford and Ostrom have sought to unify interpretations of norms and rules by developing a 'grammar' for their contents (Crawford, 2004; Crawford and Ostrom, 1995). Their institutional grammar has since been revised and developed into the IGT (Basurto et al., 2010; McGinnis, 2011; Schluter and Theesfeld, 2010; Siddiki et al., 2011). This study applies this IGT to identify the norms and rules that operate in sustainable remediation. Each norm or rule is a "shared linguistic constraint or

opportunity that prescribes, permits, or advises actions or outcomes for actors (both individual and corporate)” (Crawford and Ostrom, 1995, p. 583).

Table 1 lists the components that each norm and rule in the institutional grammar is required to have. It also provides sample statements which describe the components of particular norms or rules, components that are used in this study. Both norms and rules contain an aim component that outlines its goals, actions or outcomes, and a prescriptive component which indicates what may, must, or must not be done. In both norms and rules, the aims are framed by three other components: performer of aim, receiver of aim and condition (McGinnis, 2011; Ostrom, 2005, p. 149). Whilst these shared components of norms and rules mean that they are conceptually related, rules are distinguished from norms by the presence of a tangible and formal sanction — what Crawford and Ostrom call the Or else component (Crawford and Ostrom, 1995; McGinnis, 2011). For example, a sanction might be a monetary penalty, it might involve having to perform a particular task, or it might involve the withdrawal of a certain right (Crawford and Ostrom, 1995).

The implementation of norms and rules is dependent on their context. Norms and rules only exist within remediation decision-making if they have some collective authority among participants (Crawford and Ostrom, 1995). Furthermore, they may not be exclusive to such processes and may be shared across society (e.g. effective management of risks to human health is a broad aim across diverse sectors of society and is not just limited to remediating contaminated land and groundwater, but is practised by

communities, markets, private associations and governments at all scales) (Ostrom, 2005).

A number of studies have shown that the institutional grammar described here can be used to parse written legislation, regulations and policies (Siddiki et al., 2011). This study sought to use the grammar to identify norms and rules through the analysis of interviews with respondents belonging to the participant types involved in sustainable remediation processes at the site level. Norms and rules can be spoken or tacitly understood; they do not need to be written (Crawford and Ostrom, 1995). In this study the titles of the components of the institutional grammar have been simplified for a general audience (see Table 1) (Basurto et al., 2010; Crawford and Ostrom, 1995; Schluter and Theesfeld, 2010).

1.2. The structure of motivational values influencing compliance with the norms and rules in sustainable remediation

The study explores values as a factor that motivates participants' compliance with norms and rules within sustainable remediation. Values held by people are generally described as rather stable broad life goals that are important to them in their lives and guide their perceptions, judgments and behaviours (Rohan, 2000; Schwartz and Bilsky, 1987).

Schwartz and Bilsky (Schwartz, 2011, 2012; Schwartz and Bilsky, 1987) developed a systematic theory about values by focusing on the motivational concern embodied in each value (e.g. ambition). These motivational values are what guide each participant to make

judgments about what they believe will enable them to live the best possible life (Rohan, 2000, p. 265). Schwartz argues that people differ only in the relative priorities they place on the items in a universally important set of approximately 10 value types (e.g. achievement, stimulation, universalism, hedonism) (Schwartz, 1999, 2011) (see Fig. 1). Accordingly for Schwartz, these universal value types are organized in a circle based on their interrelationships, such that value types that are more positively correlated are closer to one another and are thought to be based on compatible motivations (see Fig. 1). For example, both power and achievement are based on the desire to achieve social superiority and esteem, and are therefore positively correlated and adjacent to one another in the value circle (see Fig. 1) (Schwartz, 1992, p. 14). Value types from opposite sides of the circle are negatively correlated and are based on conflicting motivations. For example, whilst achievement stems from the desire for social superiority and esteem, it conflicts with the motivation to enhance the wellbeing of others and transcend self, that underlies universalism (see Fig. 1). The 10 motivational value types may each contain a range of values (e.g., the orientation of achievement contains such individual values as ambitious, capable, and successful). These 10 motivational value types can be further grouped into four higher order domains of values organized on two bi-polar dimensions: self-enhancement versus self-transcendence, and openness to change versus conservationism (see Fig. 1) (Schwartz, 2012). Values within two of these higher order types were the focus of this study. These values are self-enhancement, which relates to the conflict between concern for the consequences of one's own and others' actions, and self-transcendence, which is a concern for the consequences of one's own and others' actions in the social context. Self-transcendence and self-enhancement are higher order

value types that have been found to hold significant relevance to environmental management and sustainability (Ibtissem, 2010; Thøgersen, 1999; Thøgersen and Ölander, 2002).

This study examines how the motivational values of the different types of participants (e.g. auditors, regulatory authorities, local council officers) within the sustainable remediation processes influence their compliance with the norms and rules operating within the processes. Arguably, the motivational values which influence their decisions are a reflection not only of their personal values, but also of the ideological value systems of their professions (e.g. auditors, regulators) (Rohan, 2000, p. 265).

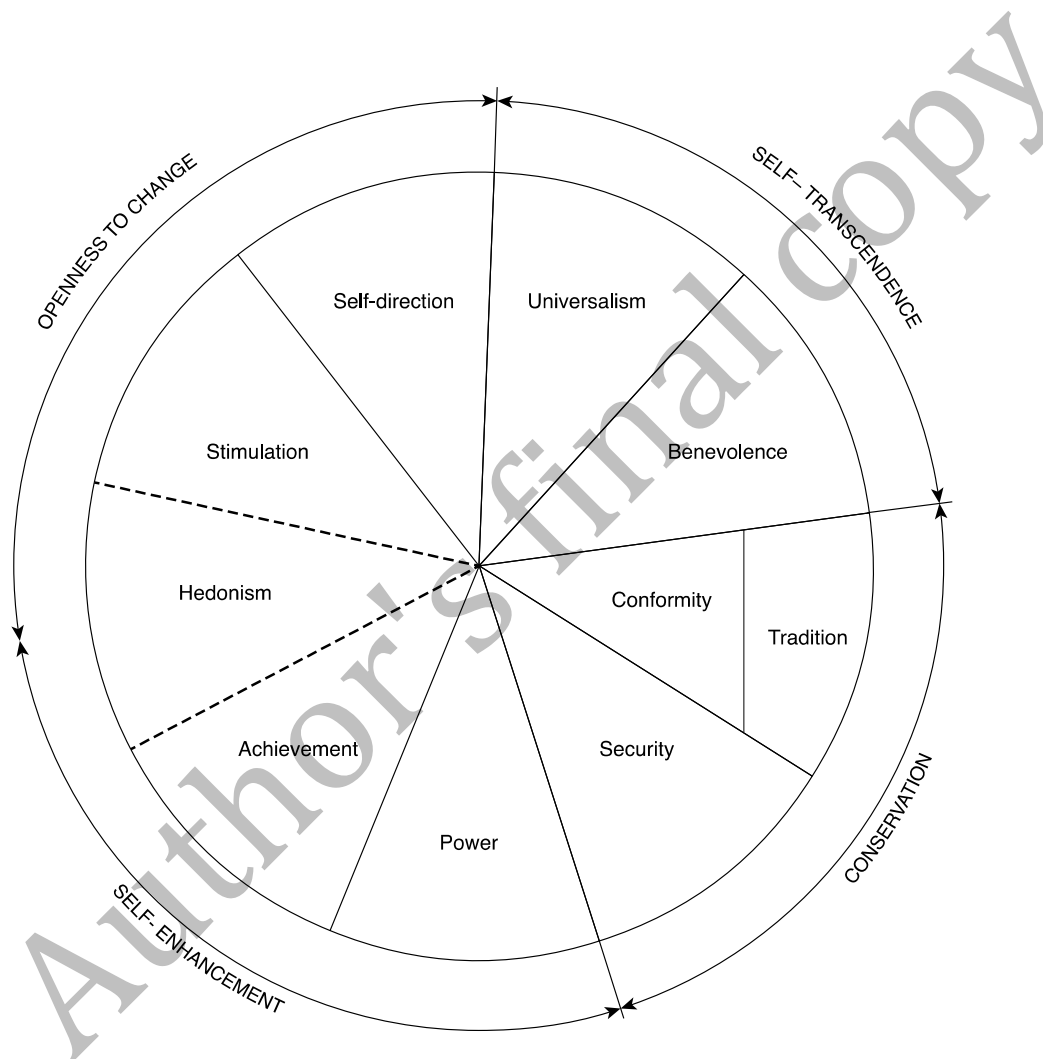
Table 1: Sample coding of an institutional statement: Problem Holder must accept liability for the contaminant's containment, remediation, avoidance and abatement indefinitely, or else Regulatory Authority will impose responsibilities using orders, notices and directions.

Component	Explanation of component	Norm	Rule	Coding of sample statement with relevant component underlined
Aim	Describes the particular goal or action that the prescriptive refers to.	☐	☐	Problem Holder must <u>accept liability</u> for the contaminant remediation, avoidance and abatement indefinitely.
Prescriptive ^a	The prescriptive component stipulates whether the aim <i>may</i> , <i>must</i> , or <i>must not</i> be done.	☐	☐	Problem Holder <u>must</u> accept liability for the contaminant remediation, avoidance and abatement indefinitely.
Performer of aim ^b	The individual(s), group(s) of individuals, or organization(s) that performs the aim.	☐	☐	<u>Problem Holder</u> must accept liability for the contaminant remediation, avoidance and abatement indefinitely
Receiver of aim ^c	The receiver of the aim may be an object(s), individual(s) or group(s) of individuals, or organization(s)	☐	☐	Problem Holder must accept liability for <u>the contaminant remediation, avoidance and abatement</u> indefinitely
Condition	Qualifies the 'when,' 'where,' and 'how' of the aim.	☐	☐	Problem Holder must accept liability for the contaminant remediation, avoidance and abatement <u>indefinitely</u>
Formal Sanction ^d	The sanction experienced by performer of aim if the prescriptive isn't adhered to.	X	☐	Problem Holder must accept liability for the contaminant remediation, avoidance and abatement indefinitely, <u>or else Regulatory Authority will impose responsibilities using orders, notices and directions.</u>

Table Footnotes:

- a. Called the 'Deontic' in the institutional grammar
- b. Called the 'Attribute' in the institutional grammar
- c. Called the 'Object' in the institutional grammar
- d. Called the 'Or Else' in the institutional grammar

Figure 1. Schwartz's theory of universal motivational values (Schwartz, 2011).



2. Methods

To address the research questions, the researcher collected data on the norms, rules and values used by participants within the sustainable remediation processes at three different Australian sites (Byrne, 2009). Whilst the analysis in this study focuses on the implementation of sustainable remediation at particular sites, it aims to allow generalizability of findings beyond these unique instances (Byrne, 2009). It does so by using the IGT to elicit those rules and norms that are commonly used by participants to implement sustainable remediation at all sites, and to examine how participants' values influence these rules and norms (Crawford and Ostrom, 1995). This study used a two-part methodology: the first involved collecting and processing interview data about the norms and rules used by participants in implementing sustainable remediation at these sites; the second involved collecting and analysing survey data on the values that motivated participants to comply with norms and rules. The University of Technology Sydney Human Research Ethics Committee approved the research, and the research was conducted between 2011 and 2014.

At each site members of the same six participant types were interviewed (giving a total of 18 interviewees across all three sites). The participant types were: Problem Holder (PH), Local Government (LG), Auditor (A), Remedial Service Provider (RSP), Neighbours (N), and Regulatory Authority (RA). In this study the PH were all owners of the sites that were the points of origin of the environmental contamination (i.e. the source site). RA were representatives of state environmental protection authorities that had jurisdiction over the Problem Holders' sites. RSP were professionals of large engineering companies who specialized in remediation techniques. LG were local council planners who dealt

with environmental remediation in their local areas. N were adjoining property owners affected by contamination from the source site.

To protect the confidentiality of participants, only generic information is provided on the processes at each site. One was located in Western Australia (WA), one in New South Wales (NSW), Australia, and the third in South Australia (SA). The WA site involved a small-scale soil and groundwater remediation project located in an industrial area of a city. The focus was on remediating contamination that had emanated from a single point. This had resulted in a plume of contaminants in groundwater under adjacent industrial properties, which extended towards waterways. The NSW site was in an industrial area surrounded by residential neighbourhoods and had various contaminants. Contamination associated with this site included a groundwater plume which extended under nearby residences and various areas of contaminated soil. The SA site was a single urban site surrounded on all sides by residential neighbourhoods. Contamination associated with this site included various areas of contaminated soil.

2.1. Norms and rules data collection

Whilst archival documentation of policies, legislation and other materials relating to remediation processes at the sites was collected at the outset of this project, the primary focus of the analysis was on semi-structured in-depth interviews with representatives of the participant types engaged in the remediation processes at the three sites. These

interviews were used to capture data on norms and rules that participants used to implement sustainable remediation at these sites.

At the time of our study the IGT had not previously been applied to interview data to identify norms and rules, but only to policy and legislation (Basurto et al., 2010). Each interview commenced with the interviewer explaining that the research project aimed to understand the norms and rules in use at the site, and outlining the key components of the institutional grammar. Questions asked during interviews were directly related to the interviewee's role as a participant type (e.g. Auditor) and to their understanding of the roles of other participant types. Interviews were structured around the IGT components (see Table 1) in order to obtain data on the norms and rules that each participant type thought were relevant to the sustainable remediation process at their site. The interviewees were asked to address the following principal questions across the life of the sustainable remediation processes:

- As a [interviewee's participant type] what are the particular outcomes, goals and actions that you must, may or must not perform during the sustainable remediation process at [site name]?
- What are the particular outcomes, goals and actions that [other participant types] must, may or must not perform during the sustainable remediation process at [site name]?
- What sanctions can [interviewee's participant type] utilize during the sustainable remediation process at [site name] to ensure [other participant types] perform their role?

- Who is responsible for sanctioning [interviewee's participant type] if they do not perform their role during the sustainable remediation process? □

When necessary, these questions were followed by a series of questions designed to elicit the when, where and how of each answer. Finally, interviewees were asked to provide references to documentation that detailed their or other participant types' roles and responsibilities within the sustainable remediation processes (e.g. legislation, policies or guidelines). The interview instrument was trialed and feedback was used to clarify the instrument. Interviews took between two and four hours each, and were conducted by two interviewers. The interview questions sought to collect as complete and salient a set of norms and rules as possible by asking each interviewee to comment, not only on their own roles and responsibilities, but also on those of the other participant types at each site, and by collecting background supporting documentation.

2.2. Norms and rules data coding and nested analysis

To address Research Questions 1 and 2 (Section 1) the interview data was transcribed and coded using IGT components detailed in Table 1 using NVIVO™ qualitative analysis software (QSR International). Coding of norms and rules involved six steps:

- To maintain confidentiality, coding commenced by replacing the names of the participants with the six participant types listed in Section 2 above. □
- Aims that were performed by the six participant types were then coded. In many cases more than one participant type performed the same aim. □

- The coding of aims was restricted by omitting all aims that were not prefaced by a prescriptive: must, must not, or may, either explicit or implicit (e.g. the verb “required” or “shall” suggests a “must”) (Basurto et al., 2010). □
- Next, formal sanctions were coded for each aim remaining from step 3. □
- Identified norms and rules were then separated out from the interview transcripts for further analysis. Norms or rules were reduced to their most fundamental forms (e.g. all synonyms for prescriptives were reduced to must, must not, or may). In addition, all norms and rules that were not common to the processes at all three sites were □ removed, and so were duplicate norms and rules. □
- The final step involved nesting the norms and rules (formal sanctions) □ that emerged from the coding (see Fig. 2). Using the IAD framework, norms and rules were nested into specific categories (see Table 3): position, aggregation and scope (McGinnis, 2011). Position norms/rules specify a set of positions for participants within the remediation processes (Ostrom, 2005). Each position has a unique combination of resources, opportunities, preferences and responsibilities within the remediation processes (Feiock et al., 2014). For participant types within the remediation processes, aggregation norms/rules clarify “who is to decide which action or set of activities is to be undertaken” in order to achieve intermediate or final outcomes (McGinnis, 2011, p. 174; Ostrom, 2005, p. 202). Ostrom acknowledges the great diversity of aggregation rules/norms (e.g. joint control over an action by different participant types, or designation of control to participant types). Scope norms/rules specify a set of outcomes for the remediation processes (McGinnis, 2011; Ostrom, 2005). Whilst decisions about

categorization were based on these three types of rules/norms, this does not mean that other rule types specified in the IAD framework were not present (e.g. boundary rules, information rules, payoff rules). □

Two researchers coded the data. In order to maximize intra-coder □reliability, the second researcher verified the coding of the first. An industry expert was engaged to adjudicate coding differences; in some cases the original interviewee was contacted to determine the accuracy of the researchers' interpretations. A high degree of agreement between the researchers was evident during the coding.

2.3. Motivational values data collection and analysis

To address Research Question 3 motivational values were measured using a short version of Schwartz's value scale (Schwartz, 1992), developed by Thøgersen and Ölander, which included only 16 values (see Table 4) (Thøgersen and Ölander, 2002). The reduced instrument is defensible on substantive grounds: the short version of Schwartz's value framework has been extensively tested and validated in studies (de Groot and Steg, 2008; Steg et al., 2014; Thøgersen and Ölander, 2002); and the type of motivational values that are related to sustainability and environmentally related behaviour has a strong link to the values in the self-enhancement versus self-transcendence dimension of Schwartz's framework (Dietz et al., 2005; Thøgersen and Ölander, 2002). Data collection targeted the motivational values that informed participants' professional decisions in the context of the remediation processes, rather than their private or personal views. All 18 of the

respondents from the first part of the study were asked to rate the importance of each of the 16 values “as guiding principles in your role as [participant type] in the decisions you made within the remediation process at [the site]” on an 11-point scale ranging from 0 = not important to 10 = extremely important. They were urged to vary the scores and to rate only a few values as extremely important (de Groot and Steg, 2008). Given the small sample size, and the fact that respondents differ in the way they use response scales, we only sought to identify the values that were the most important as guiding principles for each participant type (Schwartz, 1999, 2011, 2012) (see Table 4). They were also asked to explain how the values they identified as most important influenced their compliance with norms and rules that operated within the remediation processes at each site. NVIVO™ qualitative analysis software (QSR International) was used to code the interview data.

Fig. 2. Structure of nested analysis of Norms and Rules (Norm + Formal Sanction) using IGT components detailed in Table 1.

Type of Norms and Rules: e.g. Positioning, Aggregation or Scoping

Norm No. X: [Performer of aim] [*Prescriptive*] [Aim] [Receiver of aim] [Condition]

Example: [Problem Holder] [*must*] [accept liability for] [the contaminant's containment, remediation, avoidance and abatement] [indefinitely]

Formal sanction: [*Or else* statement]

Example: [*Or else* Regulatory Authority will impose responsibilities using orders, notices and directions].

3. Results

3.1. Norms guiding sustainable remediation

Table 2 shows the results of the basic frequency count of the total number of norms from our nested analysis. Frequency counts such as those displayed in Table 2 are useful for identifying overall trends and tendencies. In our analysis, the frequency count revealed that all norms identified across the three sites, except one, were obligations (i.e. the prescriptive was ‘must’) and in most cases the Problem Holder was held to be responsible for performing them with support from the Remediation Service Provider. The aims, receiver of aims and conditions specified within the norms were diverse, so they could not be subjected to frequency analysis.

Table 3 details the 16 norms that emerged from the analysis. These norms are divided into three types: position norms, aggregation norms and scoping norms. The first six norms (Norms 1 to 6) in Table 3 stipulate the position of each participant type within the sustainable remediation process. Whilst the Problem Holder, remediation Regulatory Authority, Local Government and Auditor all carried out their roles within the

Table 2: Frequency counts of norms and formal sanctions and who performs them.

	Frequency of units			
	Position	Aggregation	Scope	Total
Norms identified within all three Remediation processes:				
<u>Norms: Total</u>	6	7	3	16
<u>Norms: Must</u>	5	7	3	15
<u>Norms: May</u>	1	-	-	1
<u>Norms: Must not</u>	-	-	-	-
Performers of Norms:				
<u>Problem Holder</u>	4	7	3	14
<u>Remediation Service Provider</u>	-	7	3	10
<u>Regulatory Authority</u>	1	-	-	1
<u>Local Government</u>	1	-	-	1
<u>Auditor</u>	1	-	-	1
<u>Neighbour</u>	-	-	-	-
Sanctions associated with norms observed in all three remediation processes:				
<u>Sanction: Formal</u>	6	8	4	18
Performers of formal sanctions:				
<u>Problem Holder</u>	1	2	-	3
<u>Remediation Service Provider</u>	-	-	-	-
<u>Regulatory Authority</u>	4	6	4	13
<u>Local Government</u>	3	6	4	12
<u>Auditor</u>	-	4	-	4
<u>Neighbour</u>	1	-	-	1

remediation process by fulfilling the particular responsibilities prescribed to them through Norms 1 through 6, it was only possible to determine the positions of the Neighbour and Remediation Service Provider by analysing their responses to the Problem Holder's fulfilment of Norms 2, 4, and 5. For example, in Norm 4 the Problem Holder [must] [legitimately engage with] [affected neighbours/surrounding population], and it is only through this action that the Neighbours are able to [... understand and participate in decision making that may affect them as a result of site assessment, remediation and management planning that may affect them].

Furthermore, the Problem Holder, with the support of the Remediation Service Provider, is the sole performer of the aggregation norms (see Norms 7–13, Table 3) which specify the means by which actions will achieve intermediate and final outcomes, and also the scoping norms (see Norms 14–16, Table 3) which specify a set of outcomes for the sustainable remediation process. The high number of aggregation norms (see Norms 7–13, Table 3) highlights the significant effort that is currently expended by participant types on developing a pathway for obtaining sustainable remediation outcomes that acknowledge, integrate and build on well-established environmental planning and remediation principles (e.g. the precautionary principle, risk-based fit-for-purpose, ESD, waste minimization). The scoping norms (see Norms 14–16, Table 3) highlight that sustainable remediation as practised at the study sites is not just limited to the selection of “greening” remedies that maximize net environmental benefits (e.g. carbon mitigation). Rather, sustainable remediation includes processes which involve a much broader consideration of environmental, economic, cultural (e.g. indigenous customs) and social (e.g. intergenerational and intragenerational equity) accountability. Table 3 also highlights where norms guiding sustainable remediation were identified as comprising elements traced from, and interdependent with, a broader emerging context of normative practices (principles) associated with sustainability and environmental management. For example the Problem Holder's responsibilities in Norm 1 are aligned with the polluter pays principle.

3.2. Rules promoting compliance with norms

The frequency counts detailed in Table 2 highlight a total of 18 formal sanctions that in most cases the Regulatory Authorities were responsible for enforcing, supported by Local Government and other areas of government. These 18 formal sanctions were associated with 15 of the 16 norms detailed in Table 3. Within the institutional grammar a norm is transformed into a rule through the development of a formal sanction. Therefore, the study identified 18 rules operating in association with 15 of the norms in the studied sustainable remediation processes, with some of these norms having two associated rules (e.g. see Norm 8, Table 3). The nested analysis reveals a close alignment between the norms that emerge in the sustainable remediation processes and the rules that emerge in the same processes.

As one interviewee noted, this close relationship between norms and rules creates a certain economy of compliance within sustainable remediation processes because participant types are likely to act in accordance with norms that have been well socialized within the remediation industry. In many cases they will also have been institutionalized as rules through the formation of a social sanction, but the sanction is rendered unnecessary by the socialization. This economy of compliance was further emphasized by the fact that all interviewees responsible for enforcing formal sanctions indicated that they preferred to deal with non-compliance issues on a case-by-case basis rather than by imposing blanket formal sanctions. Generally, they said they sought to be lenient when implementing sanctions, and said this largely reflected the desire to maintain harmonious and cooperative relations between regulating agencies and members of the industry. Of the six regulatory authorities and local government representatives interviewed, only one stated that they interpreted sanctions very literally and five stated that they interpreted the

different sanctions with some degree of leniency. One of the latter interviewees noted that she only used sanctions when a Problem Holder or a member of another participant type was not actively seeking to comply with their obligations. She then stated that, oftentimes, non-compliance with norms had minor or negligible implications, and that it was not appropriate to enact sanctions in these cases. She further stated that conditions largely shaped her interpretation of the need to enact sanctions. For example, a 'must' was really only a must in a norm under certain conditions (e.g. extreme risk to human health).

The participant types identified one sanction (i.e. Formal Sanction 5) that was implemented by Neighbours and broader communities against the Problem Holder if the Problem Holder didn't obtain a social licence to operate (SLO) a specific remediation technology from the affected community. The researchers decided to call this Neighbour and broader communities-based sanction a formal sanction because it involved tangible acts such as limiting access to neighbouring land and punishing the Problem Holder through 'spotlighting' their actions. These sanctions are not unlike those that are often imposed by environmental courts. Environmental courts have demonstrated some willingness to use sanctions such as 'spotlighting' instead of more traditional penalties such as monetary penalties and sentencing. Similarly, the Australian Institute of Criminology notes that orders that might be particularly effective are those that put a spotlight on the fact that a wrongdoing has been committed (Bricknell, 2010). The fact that an environmental wrongdoing has been committed can be highlighted by publicizing the offence in a medium available to the public and/or the offender's peer group. This

targets the prestige, profit and stability of larger corporations and may have a greater deterrence effect than traditional pecuniary penalties (Fisse and Braithwaite, 1988).

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Table 3 Norms and Rules (norm + formal sanction) guiding Sustainable Remediation

PART 1: Norms and rules stipulating the <u>position</u> of each participant type within the sustainable remediation process	
<p>Norm 1: [Problem Holder] [<u>must</u>] [accept liability and responsibility for] [the containment remediation, avoidance or abatement] [indefinitely].</p> <p><u>This norm is related to the polluter pays principle: those who generate pollution or waste should bear the costs of containment cleanup, avoidance or abatement.</u></p> <p>Formal sanction 1: [<u>Or else</u>] [Regulatory Authority and/or other areas of government] [will apply a legislated hierarchy to identify the Problem Holder and impose responsibilities using orders, notices and directions] ^a.</p> <p><u>The hierarchy generally commences with the polluter. If it is not practicable to assign responsibility to the polluter, responsibility is allocated to others, including the owner who as acquired the title, followed usually by the relevant public authority.</u></p>	All (n)
<p>Norm 2: [Problem Holder] [<u>may</u>] [contract] [remediation service providers to undertake the remediation processes for the contaminated site and engage with participants] [as needed].</p> <p>Formal Sanction 2: [<u>Or else</u>] [the Problem Holder] [may sue Remediation Service Provider for breach of agreed contract and possible associated penalties].</p>	
<p>Norm 3: [Regulatory authorities and local government] [<u>must</u>] [take responsibility for regulating] [the remediation processes for contaminated sites in their jurisdictions] [through reviews, licensing, notices, orders and approvals in accordance with jurisdictional legislation].</p> <p><u>This norm is related to the principle of share responsibility: protection of the environment and society is a responsibility shared by all levels of government and</u></p>	All (n)

industry, business, and communities.

Formal Sanction 3: [Or else] [Government Regulator and/or other areas of government] [may issue penalties (e.g. monetary) or impose responsibilities using orders, notices and directions]^b

Norm 4: [Problem Holder] [must] [legitimately engage with] [affected neighbours/surrounding population] [so they can understand and participate in decisions about any site assessment, remediation and management planning that may affect them]. **All (n)**

This norm is related to the principle of accountability: the local community has a legitimate right to understand and be engaged in decisions that may affect them about the restoration, protection and enhancement of the environment.

Formal Sanction 4: [Or else] [Regulatory Authority and/or other areas of government] [may issue orders or directions to carry out local community engagement processes and demonstrate how the communities' input has been taken into consideration]^c

Norm 5: [Problem Holder] [must] [gain approval from] [affected local community, particularly affected Neighbours, for the remediation and management plan to be implemented, particularly in relation to the remediation technologies that are to be utilized.] [The approval may be unwritten.] PH, RSP,

This norm is related to the idea of 'Social License to Operate: the local community has a legitimate right to accept or reject a proposed remediation and management plan based on their concerns'. N, LRC(n)

Formal Sanction 5: [Or Else] [Neighbours and the broader affected community] [may impose a range of sanctions on the Problem Holder's plans, ranging from Neighbours restricting the Problem Holder's access to their property through to collective public/political campaigns to oppose the plans implementation].

Norm 6: [Auditors] [must] [independently review and provide guidance on] [assessment and remediation work conducted by site consultants in undertaking contaminated site investigations and remediation] [to ensure that the work complies with the requirements of legislation (unless supported by clear reasoning), and that the remediation meets the standard applicable to the proposed land use.] **All (n)**

Formal Sanction 6: [Or else] [Regulatory Authority and/or other areas of government] [may revoke the accreditation and /or impose penalties.]^d

PART 2: Aggregation norms and rules 7 through 13 clarify who is to decide which action or set of activities is to be undertaken that leads to sustainability outcomes

Norm 7: [Problem Holder and Remediation Service Provider] [must] [seek the trust and confidence] [of other participants, including the local community] **All (n)**
[throughout the remediation and management of the contaminant(s)]

Norm 8: [Problem Holder and Remediation Service Provider] [must] [effectively assess] [the remediation and management planning for contaminated sites] **All (n)**
[using clear and transparent ecologically sustainable development (ESD) principles and tools with other participants].

This norm utilises the principle of ESD: integrated assessment of environmental, economic and social impacts of development must meet the needs of the present generations without compromising the ability of future generations to meet their needs.

Formal Sanction 8a: [Or else] [Regulatory Authority, Auditor, Local Government and/ or other areas of government in NSW and SA] [may issue notices, orders or directives to the Problem Holder to ensure that contaminated sites are managed so as to maintain ESD] ^e

Formal Sanction 8b: [Or else] [the Problem Holder] [may take formal action against the Remediation Service Provider for breach of agreed contract and seek associated penalties].

Norm 9: [Problem Holder and Remediation Service Provider] [must] [use] [the precautionary principle] [to address the current site contamination and prevent further contamination at the site]. **PH, RSP, A, LC, RA**

This norm utilizes the precautionary principle: where there is a threat of serious or irreversible environmental degradation from a particular action, lack of scientific certainty about the environmental impacts of that action should not be used as a reason to postpone measures to prevent environmental degradation. **(n)**

Formal Sanction 9a: [Or else] [the Regulatory Authority, Auditor, local government and/or other areas of government] may issue orders, notices or directions to ensure the precautionary principle or precautionary approach is adopted by the Problem Holder]^f.

Formal Sanction 9b: [Or else] [the Problem Holder] [may sue the Remediation Service Provider for breach of contract and possible associated penalties].

Norm 10: [Problem Holder and Remediation Service Provider] [must] [clearly demonstrate] [the remediation and management option selected for the contaminated site] [has an equivalent or higher level of performance than other options]. PH, RSP,A (n)

Formal Sanction 10: [Or else] [Regulatory Authority, Auditor and/or local government and / or other areas as of government][will impose an options hierarchy to guide selection of the remediation and management option for the contaminated site]^g.

Norm 11: [Problem Holder and Remediation Service Provider] [must] [ensure] [sustainable remediation approaches] [are compatible with risk-based fit-for-purpose approaches when carrying out site assessment, and developing the remediation and management plan for the contaminated site]. All (n)

This norm utilizes the risk-based fit-for-purpose philosophy which: determines landuse scenarios for which risk-based health investigation levels and ecological investigation levels have been derived. The intended use of the site determines the level of contamination risk that may be permitted to remain on the site.

Formal Sanction 11: [Or else] [Regulatory Authorities, Auditor, local government and/or other areas of government] must issue instructions, orders and notices requiring the Problem Holder to carry out site assessment and develop remediation and management plans that include a coordinated set of activities and methods to control risks so as to promote the likelihood that the site can be made suitable for the proposed use and provide adequate protection of human health, property and the environment]^h.

Norm 12: [Problem Holder and Remediation Service Provider] [must] [integrate] [contaminated site remediation and management decision-making] [with local, regional and state planning and development processes] PH, RSP,A,

This norm utilizes the principle of localization: Locally tailored solutions are understood as key – site and local circumstances were understood to drive a LRC,

remediation strategy that is sustainable.

RA (n)

Formal Sanction 12: [Or else] [Regulatory Authority, local government and/or other areas of government] [will impose orders and directions such as management plans, cleanup notices, ongoing maintenance orders and enforcement, financial assurances, abatement notices, contaminated site registers, memorials or notations on land titles, and aligned planning and development permit approval processes. Should the land use of the site change, the process is re-instituted and the assessment, management and remediation procedures are carried out in accordance with the new intended land use. All jurisdictions have post-remediation/management controls.]

Norm 13: [Problem Holder and Remediation Service Provider] [must] [pursue site-specific remediation technologies and approaches] [using:

PH,

- the most cost effective option, by establishing incentive structures, including market mechanisms, that enable those best placed to maximise benefits or minimise costs to develop their own solutions and responses to environmental problems.
- full life cycle of costs of providing services, including the use of natural resources and assets and the ultimate disposal of any waste, in a way that minimises local, regional and global impacts. Consideration needs to be given to management of energy, water and other material resources. Taking into consideration the scarcity, minimization, depletion rates, regional availability, recycling and recovery of water, energy and material resources, as well as hazardous and non-hazardous waste generated through remediation, residual contamination, rehabilitation needs (e.g. to restore soil and ground functions), and the fate of treated contaminants (destruction, versus removal, versus containment/ stabilization, permanence of the solution)].

RSP,A,

LRC,

RA (n)

This norm utilizes the principle of prevention: that steps need to be taken to minimize the creation of any additional contamination; to prevent the further contamination of already contaminated sites by reducing risk to human health; and to prevent the degradation of the environment by using mechanisms that promote cleaner production, eliminate harmful wastes, reduce the use of materials and promote the re-use, recovery or recycling of materials.

This norm also utilises the principle of waste minimisation: that wastes should be managed in accordance with the following order of preference: avoidance, re-

cycling, recovery of energy, containment and only lastly disposal.

Formal Sanction 13: [Or else] [Regulatory Authority, local government and/or other part of government] [may impose restrictions, requirements, notices or orders requiring that all decisions made to remediate and manage contamination at the site use the principles of prevention adopted in that jurisdiction]¹

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PART 3: Norms and rules 14 through 16 scope the anticipated sustainability outcomes from the remediation processes

Norm 14: [Problem Holder and Remediation Service Provider] [must] [ensure] [remediation and management planning for contaminated sites] [is carried out to safeguard intragenerational and intergenerational equity]. PH, RSP,

This norm utilizes the ideas of intragenerational equity (the rights of people within the current generation of fair access to natural resources e.g. access to safe land and groundwater) and intergenerational equity (the responsibility of current generations to ensure that their resource use does not limit the resources available to future generations e.g. access to safe land and groundwater). Together they make up the ‘principle of equity’. LC, RA, N (n)

Formal Sanction 14a: [Or else] [Regulatory Authority, local government and/or other area of government within NSW and SA] [may impose requirements upon the Problem Holder that ensure that the principle of intergenerational equity is incorporated into remediation decision-making processes]^j.

Formal Sanction 14b: [Or else] [Regulatory Authority, local government and/or other area of government] [may impose requirements upon the Problem Holder that ensure that the principle of is incorporated into remediation decision-making processes].

Whilst specific references to intragenerational equity were not found in NSW, SA or WA remediation legislation, it was understood to be implicit within the ‘polluter pays’ aspects of existing legislation, in which a person must be held responsible for the way in which they misuse current resources to the disadvantage of others within that generation.

Norm 15: [Problem Holder and Remediation Service Provider] [must] [protect] [essential ecological processes and life-support systems within the context of the principle of sustainable use] [during the remediation process by protecting: **All (n)**

- human health and safety (anthroposphere) from impacts of contaminants and adverse effects resulting from remediation.

- air (atmosphere) from the impacts of contaminants, the impacts of substances added during remediation such as chemical solvents, and the impacts of remediation by-products and emissions (toxic substances, greenhouse gases, stratosphere ozone depleting gases such as CFCs).
- ground and surface water (hydrosphere) by reducing the impacts of substances added during remediation (e.g. nutrients and fertilizers, chemical reagents) and the impacts of remediation by-products and emissions (e.g. toxic inorganic substances, substances that change pH)
- flora and fauna (biosphere) by reducing the impacts of organisms added during the remediation (e.g. bacteria, fungi, plants) on ecosystems (naturally occurring organisms), and the impacts on the “quality of the nature” (conservation of biological value and biodiversity), ecosystem
- soil function (lithosphere) by reducing the impacts of substances added during the remediation on soil systems (nutrients, fertilizers, surfactants), the impacts of organisms added to soil system (organisms), the impacts of process by-products and emissions on soil systems, and changes in soil function or the impacts on subsurface structure of remediation work.]

This norm utilizes the principle of sustainable use: whilst a certain sovereign right exists over the exploitation of natural resources, this right is qualified by a duty to refrain from causing irreparable damage to the ecological system.^k

Formal Sanction 15: [Or else] [Regulatory Authority, Local Government and other areas of government in NSW, WA and SA] [may issue notices, orders or directives ensuring that contaminated sites are managed so as to maintain ESD and broader legislation in WA, SA, NSW.]^l

Norm 16: [Problem Holder and Remediation Service Provider] [must] [minimize impacts] [on local and regional amenity] [during the remediation processes from: **All** increased vehicular traffic; infrastructure changes to public rights of way for road, rail and other transport; noise, dust, litter and vibration; the visual impact of operations; restrictions to the physical use of space; and remediation by-products and emissions (light, heat, organisms)].

Formal Sanction 16: [Or else] [Regulatory Authority, Local Government and/or other part of government] [may impose restrictions, requirements and penalties in accordance with a broad cross section of legislation and guidelines for: volatile odor and gas emissions, noise emissions, vibration etc.]^m

Table Footnotes:

- a. Western Australia Contaminated Site Act (2003); New South Wales Contaminated Land Management Act (1997); South Australia Environment Protection Act (1993); ANZECC position paper on Financial Liability for Contaminated Site Remediation (1994).
- b. New South Wales Contaminated Land Management Act (1997); ,South Australia Development Act 1993.
- c. New South Wales Environment Protection Act (1993); Western Australia Contaminated Sites Act (2003); Western Australia Contaminated Sites Management Series, Community Consultation (n.d); Australian National Environmental Protection (Assessment of Site contamination) Measures, Schedule B(8) (1999).
- d. New South Wales Contaminated Land Management Act (1997); Western Australia Contaminated Sites Act (2003).
- e. New South Wales Contaminated Land Management Act (1997); New South Wales Environment Protection Act (1993); South Australia Development Act (1993); and the Australian National Strategy of Ecologically Sustainable Development (1992) for references to ESD. ESD is not included in the Western Australia Contaminated Sites Act (2003) or Western Australia Environmental Protection Act 1993.
- f. The New South Wales Contaminated Land Management Act (1997) identifies the precautionary principle as one principle of ESD.
- g. See Western Australian Environment Protection Authority Guidance Statement for Remediation Hierarchy for Contaminated land No17. (n.d); South Australia Environment Protection Authority Guidelines for Site Contamination Audit System (EPA SA); New South Wales Department of Environment and Conservation Guidelines for the NSW Site Auditor Scheme (2006); and the Australian National Environment Protection (Assessment of Site Contamination) Measure (1999).
- h. See New South Wales Managing Land Contamination – Planning Guidelines SEPP 55 (1998); South Australian Environment Protection Act (1993); Western Australian Contaminated Sites Act (2003); AS/NZS ISO 31000 Risk Management (2009); Australian National Environmental Protection (Assessment of Site contamination) Measures (1999).
- i. New South Wales Protection of the Environment Act (1997), South Australia Environment Protection Act (1993), New South Wales Contaminated Land Management Act (1997),and the Western Australia Contaminated Sites Act (2003). Central to this approach as stated in the New South Wales Contaminated

Land Management Act (1997) is ‘improved valuation, pricing and incentive mechanisms—namely, that environmental factors should be included in the valuation of assets and services’

j. See New South Wales Contaminated Land Management Act (1997), South Australia Environment Protection Act (1993). Intergenerational equity is not incorporated into the Western Australia Contaminated Site Act (2003).

k. See Principle 21, Stockholm Declaration (1972).

l. See New South Wales Contaminated Land Management Act (1997); New South Wales Protection of the Environment Operations Act (1997); South Australia Development Act (1993), and the Australian National Strategy of Ecologically Sustainable Development (1992); Australian National Environmental Protection (Assessment of Site contamination) Measures, Schedule B(9) Guideline on Protection of Health and the Environment During the Assessment of Site Contamination; and, specific guidelines for soil, surface and ground water protection, fauna and flora (e.g. Development Acts, National Parks and Wildlife Act, Native Vegetation Acts, Environment Protection and Biodiversity Conservation Acts in each Australian state)

m. For volatile odor and gas emissions see for example: Australian National Environmental Protection (Assessment of Site contamination) Measures, Schedule B(9) Guideline on Protection of Health and the Environment During the Assessment of Site Contamination; Australian National Environment (Ambient Air Quality) Protection Measure (1998), and environmental health risk assessment guidelines in each state.

n. Indicates the participant types that identified the associated Norm during the research: Problem Holder (PH), Local Government (LG), Auditor (A), Remedial Service Provider (RSP), Regulatory Authority (RA), and Neighbours (N). ‘All’ is used when all participant types identified the Norm.

3.3. Motivational value priorities driving compliance with norms and rules (sanctions)

Next, interviewees' responses regarding the motivational value priorities that encouraged their compliance with norms and with the enforcement of sanctions (rules) were analysed. All eighteen interviewees who participated in the study responded to this set of questions.

In the survey all interviewees in each participant type, except Neighbours, identified similar priority value orientations for their participant types that motivated them to comply, or not comply, with the norms associated with the sustainable remediation. These similarities across professional types could be explained by the fact that, as Rohan notes, there is often a clear parallel between personal value systems and the value systems of a professional group that one might join (e.g. Auditors as a professional group) — that is, people are attracted to professions that suit their value systems (Rohan, 2000, p. 265). This would also explain why a group like Neighbours, which does not constitute a professional group, may not share priority motivational values. The three interviewees who identified as Neighbours each had different priority value orientations (achievement, self-direction, benevolence). We witnessed symmetry between those professional participant types (Regulatory Authority, Local Government) which

transcended self- interest by showing concern for the welfare and interests of others (universalism) and those (Problem Holder, Remediation Service Provider, Auditor) which promoted self-enhancement by emphasizing pursuit of self-interest and relative success and dominance over others (power, achievement) (see Table 4). Whilst those who valued power and achievement, in particular the Problem Holder and the Remediation Service Provider, were responsible for performing most of the norms, the Regulatory Authority and Local Government, who showed concern for the welfare and interests of others, were responsible for enacting most of the formal sanctions to enforce norms if needed.

Table 4: Highest mean scoring motivational value types for each participant type is marked with an ‘X’.

Motivational Value Types	How important or unimportant is ... as a guiding principle in your role as [participant type] for the decisions you made within the remediation process at [site].	Participant type					
		Problem Holder	Auditor	Remediation Service Provider	Regulatory Authority	Local Council Planner	Neighbour
Benevolence	<u>Helpfulness</u>						
	<u>Honesty</u>						
	<u>Responsibility</u>						
	Overall Benevolence						
Universalism	<u>Equity</u>				X	X	
	<u>Protecting the environment</u>				X	X	
	<u>Social justice</u>				X	X	
	Overall Universalism				X	X	
Achievement	<u>Capability</u>		X	X			
	<u>Ambition</u>		X	X			
	<u>Success</u>		X	X			
	Overall Achievement		X	X			
Power	<u>Social Recognition</u>	X					
	<u>Authority</u>	X					
	<u>Wealth</u>	X					
	Overall Power	X					
Hedonism	<u>Pleasure</u>						
	<u>Enjoy life</u>						
	Overall Hedonism						

All interviewees who identified as Problem Holders identified “power”, that is, “social status and prestige, and importance of control and dominance over people and resources”, as a priority value orientation influencing their decisions. These interviewees emphasized the importance of three single values – authority, wealth and social recognition – that are central to the value orientation of power. Seeking to maintain “wealth” by “reducing expenses to the problem holder in the short and longer term” was the strongest motivator for complying with or flouting norms. One of the Problem Holder interviewees noted that their company would not accept liability (Norm 1), and preferred to work voluntarily with the Regulatory Authority to remediate the site in order to limit the company's formal financial liabilities. Another interviewee argued that it was important to build a trusting relationship with others (Norm 7) because “trust lowered the Problem Holder's transaction costs by reducing the amount of time, communication and resources that they needed to spend reassuring other participants of information and plans for remediation and management processes”. Seeking to maintain “Authority” over “processes in which the Problem Holder was involved” was another motivator for compliance with norms, where compliance could “reduce the level of enforcement and monitoring that Regulatory Authorities and Local Governments impose on the Problem Holder”. Where the Problem Holders established sanctions (Formal Sanctions 2, 8b and 9b) within the remediation process their primary intention was to maintain their “authority over the remediation process” by incentivizing the actions of the Remediation Service Provider through contract agreements. Finally, seeking to enhance the Problem Holder's “social

recognition” or seeking to “preserve positive public image” were important reasons for their compliance with norms. Two interviewees noted that compliance with these norms “aligned with the corporate social responsibility policies of the Problem holder”(e.g. sustainability charter or strategy).

All interviewees who identified as Remediation Service Providers or Auditors identified “achievement”, that is, “personal success through demonstrating competence according to social standards”, as the primary value orientation motivating their decisions to comply with norms that they must perform within the remediation processes. These interviewees emphasized the importance of two single values – being capable and being successful – that are central to the value orientation of achievement. “Capability,” that is “demonstrating competent performance within sustainable remediation that generates resources necessary for individuals to survive and for institutions to research their objectives” was the strongest motivator for their compliance with or rejection of norms. One interviewee noted that their compliance with norms increased their competence and “furthered demand for their consulting expertise within the remediation industry”. “Success” was also a strong motivator for compliance. As one interviewed Remediation Service Provider noted, a “Remediation Service Provider may develop technologies and approaches that can be replicated across the international remedial industry. This will enhance the service provider's status as a benchmark operator within the industry”. When an Auditor enforced sanctions, a key motivator was to demonstrate their capability to appraise remediation processes.

All interviewees who nominated as Regulatory Authorities and Local Government identified “universalism”, that is, “to understand, appreciate and protect the welfare of all people and nature (within their jurisdiction)”, as the primary value orientation motivating their decisions to comply with norms that they must perform within the remediation processes. These interviewees highlighted the importance of three single values – social justice, equity, and protection of the environment – that are central to the value orientation of universalism. The values of “equity” and “social justice”, that is “concern for the welfare of the broader population in their jurisdictions” were the strongest motivators for their compliance with or rejection of norms. These values were also the strongest determinants of the intensity with which they implemented the sanctions that they were responsible for enforcing. As one interviewee noted, compliance with norms (see Norm 3) and implementation of sanctions helped them to “ensure procedural justice for all participants involved in the process, and [enabled] the [Regulatory Authority and Local Council] to protect the welfare of all people within the jurisdiction”. Whilst the values of equity and justice, which had direct anthropocentric benefits, were their strongest motivators for compliance, these interviewees also strongly supported compliance with norms and sanctions that enabled them to manage natural resources in a manner that was of benefit to their jurisdiction. In protecting the environment, the emphasis was on how the atmosphere, hydrosphere, biosphere and lithosphere could be maintained to support the anthroposphere.

The overall mapping of the relationships between the norms, rules (sanctions) and priority motivational values operating within the remediation processes at all three sites are detailed in Fig. 3.

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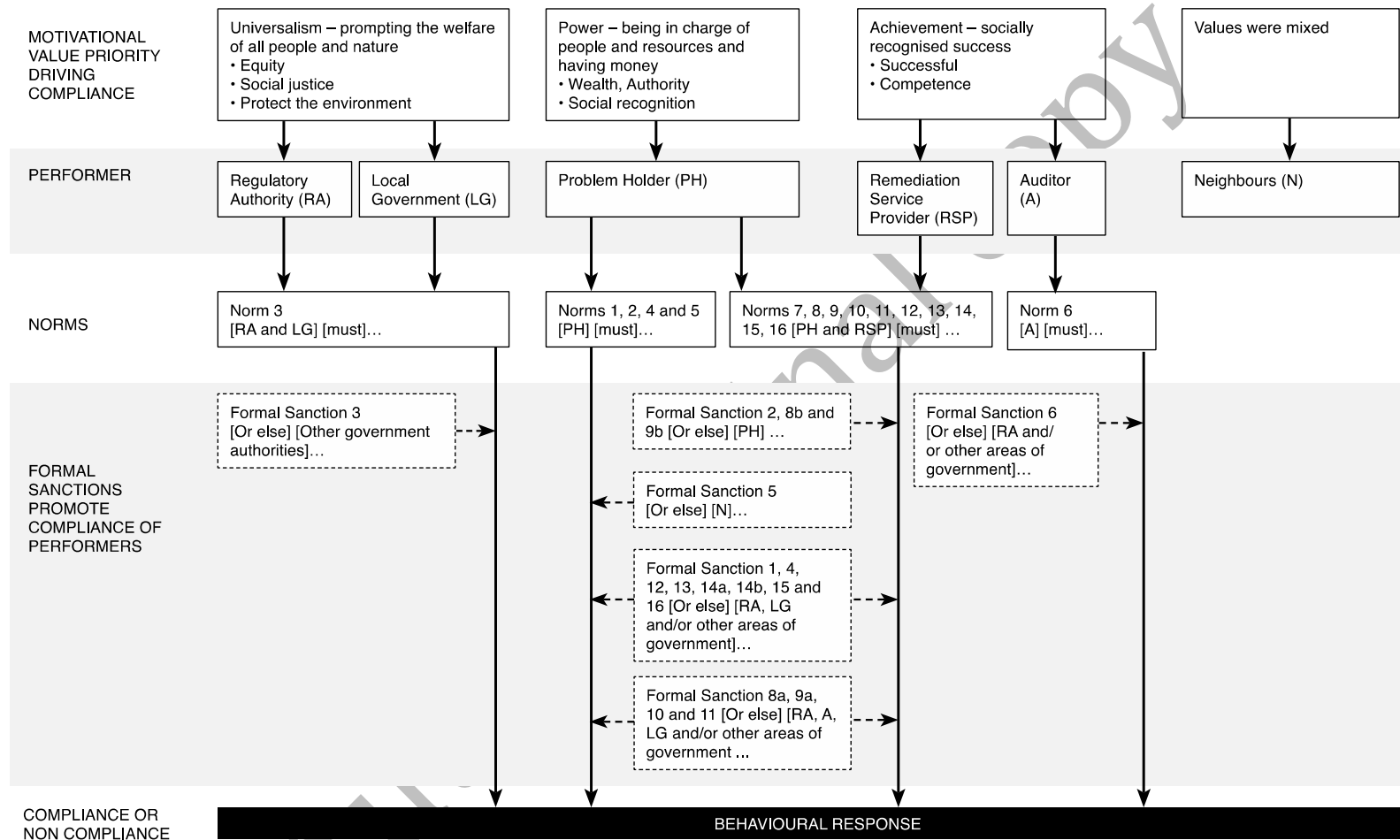


Fig. 3. Mapping of relationships between participant types, priority motivational values types, norms and rules (norm + sanction) operating in sustainable remediation.

4. Concluding discussion

A key theoretical and practical challenge that has faced professionals, communities and public policy scholars has been the need to develop a systematic understanding of the institutional arrangements – the norms and rules – that guide practices such as remediation. This understanding is essential to the development of professional guidelines and public policies. In response to this challenge, the present study uses the recently developed IGT to identify the basic elements of the norms used by the participant types who engage in sustainable remediation, and to identify the rules (formal sanctions) that inform their compliance with those norms. Furthermore the application of Schwartz's value framework provided a means of illustrating how the professional values of each participant type motivated them to comply with those norms and rules in different ways.

4.1. Normativity operating within sustainable remediation

The IGT analysis revealed the common norms shared by participants across three sustainable remediation processes. What the IGT helps to illustrate are the overall interrelationships between who is involved in fulfilling the norms that make up sustainable remediation processes, who is permitted to perform what actions, who is forbidden to perform them, and under what conditions. That is, the IGT helps to uncover the microelements of the norms at the same time as it reveals a macro view of the norms

used in remediation, to help policy analysts and remediation professionals to understand who are the main participants (performers) involved, and where most of the decision-making power is located, which in turn might determine the overall degree of enforceability of the set of norms being analysed. Given that the formal sanctions provided for by specific remediation legislation and policy in Australia tend to be used only sparingly, and given that the emphasis is on negotiated and voluntary remediation processes, it is important to understand and articulate the micro and macro structures of the norms that guide such negotiated and voluntary processes. As Fowler notes: Regulators have preferred... [a] negotiated approach because it avoids the possibility of legal appeals or other forms of litigation designed to contest liability to potentially responsible parties. The negotiated approach understandably has also been attractive to potentially responsible parties because it avoids the imposition of formal orders on them. This can be a significant consideration in terms of corporate reporting requirements (Fowler, 2008, n.p.).

One of the most striking findings from the IGT analysis is the key role that the Problem Holder plays in performing the vast majority of norms, and the imperative that they must perform these norms, usually supported by the Remediation Service Provider. Notable by its absence in the majority of these norms is an expectation that affected communities, Auditors, Local Councils and Regulatory Authorities should contribute to the performance of the aims within the norms. Their responsibility, as has been discussed, is focused upon the implementation of sanctions to encourage compliance. Arguably, the focus of responsibility on the Problem Holder reflects the current acceptance and

dominance of the polluter pays principle within Australian remediation practice, which does not just imply, as the phrase might suggest, that the Problem Holder monetarily support the remediation, but that they must perform the remediation.

The IGT analysis revealed that the norms operating in sustainable remediation comprise elements traced from, and interdependent with, a broader emerging context of normative principles associated with sustainability and environmental management; that is, sustainable remediation can be thought of as being a component of a complex system of normative principles operating within society (see Table 3). In emerging international and Australian sustainable remediation industry guidelines this complex system of normative principles that make up sustainable remediation is often overly simplified and attributed to the idea of ESD (Bardos et al., 2011; SuRF ANZ, 2012; SuRF Australia et al., 2011b). Whilst ESD “is itself not [conceived of] as a norm: [but is] no more than a name for a set of norms ... a meta-principle ... exercising a kind of interstitial normativity, pushing and pulling the boundaries of true primary norms” (Lowe, 1999, p. 19, 30), the collection of norms that is often considered to constitute the ESD principle are far fewer than those illustrated in Table 3. As illustrated in Table 3, sustainable remediation has a normative core that extends beyond ESD to incorporate a broad range of normative principles which include, among others: the polluter pays principle, the principle of shared responsibility, the principle of accountability, the principle of localization, the precautionary principle, the risk-based fit-for-purpose principle, the principle of prevention, the principle of intergenerational and intragenerational equity, the principle of sustainable use and the principle of waste minimization. A characteristic of this collection of normative

principles that constitute the meta-principle of sustainable remediation is that they cannot be defined in precise terms, yet they are absolutely indispensable components of sustainable remediation practice at the sites that we examined. Within the remediation processes at these sites participant types often failed to achieve the ideals expressed within each principle (as several of the participants noted during the data collection), and they often had to trade off one outcome against another in order to achieve the overall goal of sustainable remediation. Sustainable remediation is much broader in scope than ESD, but like ESD, its significance is that it might be considered to be (to paraphrase Lowe's words) a meta-normative principle exercising a kind of interstitial normativity, pushing and pulling the boundaries of the norms that constitute it when they threaten to overlap or conflict with each other (Lowe, 1999, p. 30). That is, the significance of this overarching meta-normative principle is that it allows the participant types to consider and engage a range of individual norms, but to gauge their importance collectively.

4.2. Formal sanctions promoting compliance

Whilst the Problem Holders were obliged to perform most norms within the remediation processes (with the support of the Remediation Service Providers), the IGT analysis highlights that the prime responsibility of other participant types – Regulatory Authority, Local Council, Neighbour, Auditor – across the three sites was to ensure that this performance complied with the expectations, needs and interests of the broader public (e.g. see Norms 3 and 5). An interesting development in the Australian context in recent decades has been the development of a system of environmental auditors (see Norm 6)

which represents a partial privatization of the administration of state governments' responsibilities for monitoring and supervising remediation in line with the public's interest (Fowler, 2008, p. 25).

The formal sanctions detailed in Table 3 were identified by participants as key means for ensuring that the public interest is protected, largely through deterrence. It is claimed that there is a lack of regulatory drivers for sustainable remediation, and that there is a need for a firmer mandate to carry it out. Observers who highlight these alleged problems claim they are limiting the implementation of sustainable remediation (see Ellis and Hadley, 2009; Deyi et al., 2014). However, this study identified a broad cross section of state and federal regulatory mechanisms which permit sustainable remediation to be enforced by government (see notes to Table 3). The degree to which regulatory authorities seek to enforce such regulations is reflective of the environmental regulatory hierarchy that has been in operation in the Australian context (and in many other international jurisdictions) for some decades. Environmental misdemeanours are dealt with using a sequential regulatory pyramid which commences at the base with attempts to promote voluntary clean-ups by wrongdoers (via mechanisms such as corporate due diligence). If these attempts are not successful the next steps are administrative actions such as notices which are designed to educate perpetrators and rectify wrongdoings. If these actions do not have the desired effect, the next step on the regulatory pyramid is to launch a prosecution that involves deterrents in the form of fines and custodial sentences (Abbot, 2005; Kagan and Scholz, 1984). The emphasis is on voluntary remediation by the industry and regulatory authorities, as discussed in Section 3.2. This reflects best practice

deterrence and prevention models in which formal sanctions are a last resort. Both Scholz's tit-for-tat enforcement strategy (Scholz, 1984) and Ayers and Braithwaite's enforcement pyramid (Braithwaite, 1985; Grabosky and Gant, 2000) are based on the premise that best-practice regulation must involve a mix of persuasion and punishment, although they differ on how intricate or complex that mix needs to be (Bricknell, 2010). Punishment should be “in the background until there is no choice but to move it to the foreground” (Ayers and Braithwaite, 1992, p. 47). However, punishment must be perceived as unavoidable for those who do not cooperate and adjust their behaviour following intervention at the lower levels of the pyramid. Best practice models require environmental protection agencies to play dual roles as regulators and enforcers. A key consequence of this regulatory pyramid is that formal sanctions need to have an inbuilt flexibility so that authorities are able to use their enforcement discretion based on the Problem Holder's performance of remediation.

This research revealed one formal sanction that was implemented by the Neighbour and broader community that was explicitly recognized by most participant types. This sanction was associated with Problem Holders obtaining a social licence to operate (SLO) from Neighbours (and broader surrounding communities) for the remediation option selected (see Norm 5). SLO refers to the (often tacit) “contract” with members of an affected community, which enables a Problem Holder to enter a community and implement a remediation solution (Nelsen, 2006). This contract is a complement to the provision of formal regulatory approval for the remediation solution, and the two are by no means identical. In the remediation processes studied in this research, the attainment of an SLO was closely linked to the selection of technologies and methods, and in

particular, to the ability of experts engaged in the processes to incorporate external perspectives and social values into the design of those technologies and methods. Consequently, technology assessment was seen to exist not only within the ‘non- social’ domain of technical expertise and the fields of science and engineering, but also within society more broadly. Ultimately, the selection of remediation technologies was seen as being based on a holistic examination of how they addressed the full spectrum of aims which participant types associated with sustainability.

4.3. Motivational values driving compliance

Values are central components of our natures and personalities. They are distinct from our attitudes, beliefs and norms, and are critical motivators of the behaviours and attitudes that define, for example, how participant types comply with the norms and rules operating within the sustainable remediation processes discussed in this study (Schwartz, 2012, p. 17). As Schwartz has noted:

Our values affect whether we accept or reject particular norms. Because norms prescribe behaviors with specific consequences, we are more or less inclined to accept them depending on whether these consequences are compatible or in conflict with our valued goals (2012, p. 16).

Similarly, the developers of the IGT acknowledge the important role values play in the formation of norms or rules (Schluter and Theesfeld, 2010; Siddiki et al., 2011), although they do not provide a framework or structure for eliciting those values. In this study the Schwartz motivational values framework was used to elicit the motivational values

driving the compliance of different participant types with the norms and rules operating in sustainable remediation. Whilst other studies have acknowledged and sought to elicit the values operating in sustainable remediation (Abbotts and Takaro, 2005; Armacost et al., 1994; Keeney and Winterfeldt, 1996; Rio Tinto Alcan, 2009), the present study is the first to provide insight into the association between participant values and the diverse rules and norms that are collectively used by participants when implementing sustainable remediation processes.

The findings of this study indicate that the motivational values in the domain of self-transcendence (e.g. universalism) were a key driver for those participant types who support public interest in sustainable remediation, predominantly through regulation and sanctions (i.e. Regulatory Authority, Local Government), whilst for other participant types the domain of self-enhancement (e.g. power, achievement) was a key driver for their compliance with norms and rules. In many instances there may be a direct value fit or reconciliation between the participants' priority motivational values for acting and their compliance with a particular norm or rule within sustainable remediation. This was apparent for the Regulatory Authority and Local Government participant types, with their focus on ensuring compliance to protect the public interest (Rohan, 2000). In other instances, the fit between priority motivational values and compliance with norms and rules was not so direct (or, we could say, not so obvious). This was more common among participant types that were motivated by values within the domain of self-interest – power and achievement – such as the Auditor, Remediation Service Provider and Problem Holder (Rohan, 2000). In

these instances, the relationships between their motivational values of power and achievement (and their associated emotions) and compliance with norms and rules was through a delayed gratification. For example the Problem Holder's ability to maintain 'wealth' in the longer term was the strongest motivator for compliance or rejection of norms.

4.4. Limitations

This study is of course subject to many of the limitations that beset institutional studies. Some of these limitations are obvious, for example the sample used in this study may have been biased due to the small sample size. Also, whilst in the theory behind the IGT the distinctions between norms and rules and their grammatical components are clear-cut, in practice the borders between various components are seldom as clear. This is because norms and rules are social phenomena (Searle, 2005). Like the grammar of everyday language, any grammar created for norms and rules is subject to misinterpretation and human error. Moreover, in an empirical situation the identification of grammar components or values is often beset with problems. For example, in the present study people were at first reluctant to reveal the motivational values that drove their decisions. Nevertheless, the researcher believes that the use of the IGT together with Schwartz's value system has helped to increase analytical rigour and the ability to articulate what is happening within sustainable remediation processes. The great achievement of the IGT is that it allows differentiation and classification of the components of norms and rules. Despite its limitations, the Schwartz value system provided insights into the association

between values and norms and rules. Such insights are rarely, if ever, available through other approaches.

Limitations are not restricted to the study's methodology; our findings may also be limited by the study's scope and timeframe. Such limitations may only become apparent once further comparative studies have been conducted. Finally, it is worth noting that the study's findings are limited by its focus on Australian remediation processes. This is important to note given the paper's focus on values, which are often culturally dependent.

4.5. Future research

This study of the norms, rules and values driving sustainable remediation opens up several new perspectives on how such processes operate. The evidence from this study certainly supports the argument that we need to pay greater attention to understanding how norms, rules and values are incorporated into remediation. The evidence from our analysis provides compelling support for the development of pragmatic tools, studies and methods to encourage and enable participants within such processes to make explicit their diverse norms, rules and values, and the associations between them.

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