



TAKANORI KAWAMATA

Meisei University

Kawamata.takanori@gmail.com

Abstract

In, 1999 a severe accident happened at a nuclear fuel factory in Tokai Village, 130 km northeast of Tokyo. The Tokai Village accident is the third most serious accident in the history of nuclear power, after the 1986 Chernobyl accident and the 1979 Three Mile Island accident. Following this accident, Tokai village held 16 public briefing meetings. The meetings were intended to reassure villages of the plants' safety measures. This analysis indicates that these meetings provided opportunities for corporate and governmental power to be legitimized. Based on the minutes from three of the meetings and three types of publications after the accident, a critical discourse analysis was conducted. The identities of victims and company and village officials are expressed in multiple ways. Moreover an appraisal analysis involving concordancing and referencing to corpora was conducted using keywords in the Tokai Village Corpus. This corpus is a compilation of various documents concerning the accident. In this study, the rationale for the corpus construction and the selection of key words will be described together with the results from the keyword concordancing procedure. These findings will be interpreted in light of the participants' narratives.

Key words: accident, keyword, legitimacy, nuclear, hedging, victim

1. The Background of JCO Accident

On September 30th, 1999 a severe accident happened at a nuclear fuel factory in Tokai Village, 130 km northeast of Tokyo. The factory was run by JCO, a subsidiary of Sumitomo Metals and Mining Company. According to Time magazine (1999) and the Tokai village accident report, this accident is the third most serious accident in the history of nuclear power, after the 1986 Chernobyl accident and the 1979 Three Mile Island accident. Families living near the plant were temporarily evacuated and 300,000 people were asked to stay indoors for more than a day. Unlike these other cases, the Tokai village accident did not involve a nuclear power station but a nuclear fuel factory where no nuclear chain reaction should ever have happened. Since there was no mechanical system to interrupt the reaction that was sustained from 17 to 20 hours, for several days the ventilation system in the factory was left running, blowing contaminated air from the inside of the building into the surrounding village. The accident happened when workers were preparing nuclear fuel by mixing uranium oxide with nitric acid. They used a stainless

steel container instead of a mixing apparatus. By doing this, an excessive amount of nuclear fuel could be inserted at any one time, which leads to a nuclear chain reaction. Most likely, the illegal shortcut was an attempt to save costs in order for the company to be competitive with foreign fuel suppliers. The shortcut had been used for seven or eight years before the accident happened. The three workers were performing this task for the first time and were wearing t-shirts instead of protective clothing without the required film badges to measure radioactive exposure. Two of the three workers died in 1999, one is still alive but has seriously damaged his health. The number of people who were exposed to radiation is 667 people. In 2000, JCO Co. Ltd. and manager of JCO Tokai office were sent the papers pertaining to the case by the Public Prosecutor's Office and six officers of JCO were prosecuted for violation of Nuclear Reactors Regulations and the Occupational Safety and Health Act. In 2003, they were convicted and sentenced with probation.

Tokai village has an estimated population of 35,467 with a total area of 37.48 square kilometres. This nuclear fuel plant was established in 1963 and other research institutes were established soon after, creating a nuclear energy community. There are at least 16 major nuclear facilities of the area, including power reactors. A large number of families in the area have direct connections with the nuclear industry, including various equipment manufacturers that have facilities there. The municipal assembly includes many members who have family ties with people connected with the industry. Presently, the nuclear industry employs about a third of Tokai village's residents. The village's tax base depends on the nuclear industry. It also receives significant subsidies from the central government and corporations for accepting nuclear facilities. It is clear that the village needs nuclear facilities and that this reality affects the attitudes of its residents.

In this article the aftermath of the accident will be described through a critical analysis of texts. I will first describe the nature of the corpus together the rationale for the construction of the corpus and the selection of keywords. Results from the keyword concordancing procedures will be interpreted in light of genre analysis of the reference corpus and individual narratives of the participants in the discourse.

2. The Construction of the Tokai Village Corpus

In January 2004, Tokai village hall consented to offer some documents. They offered three types of documents. These are; *Genshiryoku shisetsu tō bōsai senmon bukai genshiryoku anzen iinkai* [The Section of Atomic Energy Protection Institution Section Meeting records 2000], *Jūmin kondankai gijiroku* [Tokai Village Public Discussion Meeting records 2003], and *JCO jūmin hōkoku kai* [JCO Public Briefing Meeting records 2004]. These documents provide a great deal of information. They were written in dialogue form reflecting the dialogic nature of the proceedings. I wanted to receive at least one document per year representing each year since the accident. I therefore requested further data from the Village Hall, but was refused on several grounds: first, it takes too much time to find them; then, they forgot to look for them; and in the end, all the data were lost. I take this to highlight the sensitivity of the authorities toward the accident.

The format of the transcripts of meetings itself legitimises corporate and governmental power. These transcripts have the following features.

1. The text is divided into turns and labelled with speakers or categories of speakers.
2. No prosodic information is included and no information on overlaps.
3. No introductions or summaries.

The transcripts of meetings mix the discourse of official documentation with the discourse of meeting discussion to give the impression of authenticity. However, the actual transcripts have been heavily edited, though we don't know what has been left out. We do know that the Village Hall prepared the transcripts, and they identify only the Town Officials, the mayor, and two other officials, one department manager and one technical officer.

Many books have been published about Tokai Village accident. Among these, three books were selected which included interviews of Tokai Village residents and the mayor. Most of the published books were scientific reports so to compare with the meeting transcripts I focused on books compiled of interviews. These include: *Mienai kyōfu wo koete –Murakami Tatsuya tōkai sonnchō no shōgen* [Beyond the invisible terror: Testimony of Tokai Village mayor Tatsuya Murakami] (2002), *Tokai mura rinkai jiko no machikara –1999 nen 9 gatsu 30 nichi jikotaiken no shougen* [From critical nuclear accident town –Tokai Mura: the testimony of the accident experience](2001), and *Genshiryoku Mura* [The nuclear power Village](2003). In addition, texts about civic development from the internet were collected, which may contain attitudes toward the future of the village. Tokai village and neighbouring towns have documents of civic development available in PDF files. I downloaded the documents of Tokai Village, Naka-city, Hitachinaka-city, Hitachi city, and Mito city (the capital of Ibaraki Prefecture) which were all affected by the accident. The Tokai village texts include transcripts and documents. These are research reports (expository prose) policy reports (expository prose), pamphlets and websites, documents of civic development. (expository prose and persuasive prose).

The Tokai Village Corpus (henceforth, TVC) is made up from these texts. The components of the corpus are Tokai village meeting minutes, interview books, and documents of civic development. Two of four are transcripts, the others are expository texts. The TVC contains a total of 331,685 words and consists of interview books (40%), meeting minutes and the mayor's interview book (25%), and the pamphlets and websites of civic development (10%). All pages from these sources were scanned - the accuracy of scanning of these texts is over 84%. However, the original texts were compared to scanned text and any errors were corrected. The Tokai Village corpus is divided into four different positions: texts by victims, interviews of the mayor, documents of civic development and meeting minutes, and newspaper articles up until after the accident. They are compared to see if positional identities are reflected in language use.

To provide multiple perspectives, I obtained interview data from five people who have suffered from the accident. Due to the wishes of the informants, the data is in the form of field notes. The ages of the interviewees were 20 to 60 and they were collected from 2007 to 2008. These include a farmer, nuclear

facility worker, and workers in nuclear related industries. These informants provided what Davis (1995) calls ‘debriefing by peers’. They are victims but they provide a peers’ perspective. I also called upon the assistance of additional ‘critical readers’ in the interpretive process (Kawamata, 2005). A ‘critical reader’ is one who reads against the text or examines the data to detect patterns of ideology, power, and legitimization. These readers are colleagues at Meisei University.

2.1 Reference corpus

In conducting analyses with corpora, it is useful to compare the analyses with the same kind of analyses of a large, general corpus, so that we can see whether the results from our corpus differ from general language use (O’Halloran and Coffin 2004; Biber 1998; Stubbs 1996). To do this, I compared results from the TVC with results from the *Nihongo Hanashikotoba Corpus* [Corpus of Spontaneous Japanese] (henceforth, CSJ), which was prepared by *Kokuritsu Kokugo Kenkyujo* (National Institute for Japanese Language) in 2003. According to the National Institute for Japanese Language, the CSJ is ‘a richly annotated speech and language database of spontaneous speech. It contains more than 650 hours of spontaneous Standard Japanese. CSJ contains two-way transcription of about 7.5 million words, two-way POS annotation, speaker information, and impressionistic rating of the way the talks are being spoken.’. The contents of CSJ include transcripts of conference presentations, simulated public speaking, oral interpretation, interviews about conference presentations, group talks, and free conversation. Although CSJ is based on ‘spontaneous data’ from many institutional texts, it is not entirely spoken text. The TVC may have a higher proportion of written texts than the CSJ, although half of the CSJ is in written mode. For some of my keywords searches of the CSJ returned no hits. In these cases, I used a corpus that is based on journalistic texts from the *Asahi Shinbun* (henceforth, ASC), a major newspaper in Japan. Constructing the ASC involved accessing the Kikuzo II, which is an on-line database of *Asahi Shinbun* Publishing and downloading the morning paper’s front-page articles from 1990 to 2006. ASC contains 1,455,828 words and various topics.

3. The Construction of the Tokai Village Corpus

3.1 Word frequency analysis

The Japanese language presents its own particularities for conducting corpus analysis. There are four scripts, which are *kanji*, *hiragana*, *katakana*, and *rōmaji*. The existence of these scripts makes corpus analysis more complicated in comparison to corpus studies of English, which, of course, uses only the Roman alphabet. To deal with Japanese, I used the KH Corder software which developed by *Ritsumeikan* University (Higuchi 2001). The KH Corder sorts the text into syntactic features in Japanese, so that I can see patterns according to the categories of noun, verb and sub-noun. KH Corder made it possible to provide frequency lists for each category of documents in the corpus. Frequency lists are presented below.

Figure 1. Frequency list of nouns

Mayor		meeting minutes		Victim	
Genshiryoku [nuclear power]	377	Genshiryoku [nuclear power]	309	Jiko [accident]	653
Jiko[accident]	321	Iin[committee]	231	Kodomo [child]	191
Jūmin [residents]	183	Bukai[section]	184	Rinkai [critical period]	183
Rinkai [critical Period]	100	Senmon [expert]	150	Telebi [TV]	179
Nenryou [fuel]	94	Jiko [accident]	113	Genshiryoku [nuclear power]	161
Sonchō [mayor]	80	Iryou [medical treatment]	98	Jibun [myself]	136
Chiiki [area]	68	Jūmin [residents]	90	Gakkou [school]	134
Jigyou [business]	66	Siryou [documents]	63	Okunai [indoor]	101
Genppatsu [nuclear power plant]	65	Saigai [disaster]	59	Jōhō [information]	93

Figure 2. Frequent list of adverbs

Tōzen [definitely]	17	Tokuni [especially/ nothing much]	17	Hontōni [truly]	49
Tokuni [especially/ nothing much]	12	Jissai [actually]	14	Sukoshi [a little bit]	42
Sukoshi [a little bit]	11	Sukoshi [a little bit]	11	Hajimete [for the first time]	24
Hajimete [for the first time]	10	Hontōni [truly]	11	Tokuni [especially/ nothing much]	20

Zenzen [absolutely]	9	Mattaku [entirely]	10	Jissai [actually]	19
Doujini [consequently]	8	Mousukoshi [little bit more]	6	Betsuni [nothing]	18
Betsuni [nothing]	8	Kiwamete [extremely]	6	Ichiou [just in case]	16
Sō tō [quite]	7	Nochihodo [later]	6	Kekkou [pretty]	16
Mottomo [most always]	6	Sudeni [already]	4	Mattaku [entirely]	13
Yō suruni [in short]	6	Zuibun [very]	4	Zenzen [absolutely]	13

Figure 3. Frequency list of Irregular conjugation of ‘suru’ verbs

Shisetsu [facilities]	101	Bōsai [protection against disaster]	180	Denwa [calling]	235
Hinan refuge]	96	Iken [comment]	107	Renraku [contact]	138
Taisaku [measures]	87	Setsumei [explanation]	104	Hanashi [talk]	129
Shori [settle]	80	Taisaku [measures]	87	Shinpai [worry]	116
Kenkyu [research]	77	Hibaku [exposed radiation]	84	Taihi [evacuate]	108
Haki [dispose]	65	Shisetsu [facilities]	82	HōSō [broadcasting]	94
Housha [emission]	58	Kenkyu [research]	68	Kensa [examination]	75
Hatsuden [generation of electricity]	55	Tekkyo [remove]	68	Hinan [refuge]	72
Hanashi [talk]	54	Hozon [preservation]	63	Kankei [relation]	70

Kankei [relation]	51	Kentō [consideration]	46	Hibaku [exposed radiation]	to	57
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Figure 4. Frequency list of place names

Tōkai [Tokai]	260	Tōkai [Tokai]	25	Tōkai [Tokai]	275
Nihon [Japan]	134	America [America]	12	Ibaraki [Ibaraki]	58
Ibaraki [Ibaraki]	40	Nihon [Japan]	11	Naka[Naka]	38
America [America]	36	Ibaraki [Ibaraki]	9	Nihon [Nihon]	37
Naka [Naka]	28	Nimura [Nimura]	8	Hitachinaka [Hitachinaka]	34
Mito [Mito]	26	Murauchi [Murauchi]	5	Mito [Mito]	34
Tōkyō [Tokyo]	18	Aomori [Aomori]	3	Hitachi [Hitachi]	32
Muramatsu [Muramatsu]	15	Mutsu [Mutsu]	2	America [America]	22
Hitachinaka [Hitachinaka]	13	Cherunobuiri [Chernobyl]	2	Yatabe [Yatabe]	13
Doitsu [Germany]	13			Motokomezaki [Motokomezaki]	13

The noun with a highest frequency is ‘genshiryoku [nuclear power]’ for the mayor’s interview and meeting minutes part of the corpus. On the other hand, in the victim’s documents ‘jiko [accident]’ is the highest. This noun frequency list suggests that victims are concerned about the accident, but the mayor and officials are concerned with nuclear power. In the victims’ corpus, ‘child’, ‘myself’ and ‘school’ are frequent. On the other hand, in the mayor’s corpus ‘nuclear power’, ‘fuels’, and ‘businesses’ are frequent. However, in the mayor’s text the third highest frequency is ‘jūmin [residents]’. The mayor’s affiliation seems to have been shifting between the institutions and the victims.

3.2 Keyword analysis

To investigate whether speakers and writers perceived this discursive event as an accident or incident, I compared results with the reference corpus for the words *jiko* [the accident] and *jiken* [the incident]. The TVC represents all positions regarding the accident. The most frequently used word, according to the results of concordancing, is *jiko*. *jiken* is used more in human action like *tero-jiken* [terror incident]. Due to the press coverage, this event was called as ‘JCO accident’. However, the victims don’t know whether this was an accident or an incident: ‘*jiken ka jiko ka wakaranai*’ [I don’t know whether it was an accident or incident.] (Interview books: 127). In ASC, *jiken* is more frequent than *jiko*. *Jiken* includes crimes like murder, tax evasion, and so on. Therefore, the victims have not decided whether this was an accident or crime.

Another instance is the word *higai* [damage] or *saigai* [disaster]. This distinction reflects whether people perceived this accident as man-made or a natural disaster. The word *saigai* has more uses in the minutes and mayor’s speech but victims don’t use it. Rather, victims tend to use *higai* collocating with *fuhyō* [rumor], in other words, collateral damage, not direct damage. For example, they are concerned more about their crops than being victims.

Fuhyō no taishō to natteori, nougyō, suisangyō nimo eikyō wo oyoboshite imasu.’ [the rumor influences on agriculture and the marine products industry.] (Meeting minutes, 2003)

Soreto jimoto no fuhyō higai ga shinpai desunē. [In addition, I am concerned that the rumor will be damaging in this (Ibaraki) area] (Saito et al. 2002: 27)

Different perspectives of victims and government officials become evident in analyzing keyword frequencies. In the victim corpus, there are many local place names such as ‘Naka’, ‘Yatabe’ and ‘Motokomezaki’. But in the government officials and expert corpus, there are larger place names such as ‘Nihon [Japan]’, ‘America’ and ‘Ibaraki [name of prefecture]’. Victims seem to look for information concerning a more specific area. The Victim’s view is based on their daily life so they are concerned with what is going on at the local level of the accident. However, the officials and experts are concerned with wider implications. They are concerned with how much impact this accident has for the Japanese government and the world. This is one of the rhetorical strategies that appear to diffuse responsibility. They do this by raising place names abroad such as ‘Chernobyl’, ‘Germany’, and ‘America’. By doing so, the uniqueness of the JCO accident is lessened. After all, many countries have nuclear accidents.

3.3 Grammatical analysis: Irregular conjugation of ‘*suru*’ verbs

Issues of agency can be found in the irregular conjugation of ‘*suru*’ verbs [*Sagyō henkaku katsuyō*] in Japanese. As victims, governmental officials and company officials grapple with the aftermath of the accident, their discourse contains varying degrees of agency. Irregular conjugation of ‘*suru*’ verb group needs the suffix ‘*suru* [do]’. The subject and objects of the verb are indicated by means of particles and the grammatical functions of the verb. Tense and voice are primarily indicated by means of conjugation. The subject is often omitted; if the verb happens to be intransitive, then it might not have

any objects either, in which case the entire sentence consists of a single verb. It is often claimed that verbs are the most important parts of speech in Japanese (Jacobsen 1992). Verbs have two tenses indicated by conjugation, past and non-past. The semantic difference between present and future tenses is not indicated by means of conjugation. Usually there is no ambiguity because few verbs can operate in both uses. Voice and aspect are also indicated by means of conjugation, and possibly agglutinating auxiliary verbs. *Suru* is typically classified as an irregular verb and used as the most frequent verb in Japanese.

In the mayor and meeting minutes, verbs with high frequencies are '*hinan* [refuge]', '*taisaku* [measures]', and '*shori* [settled]'. These verbs are transitive, The mayor and meeting minutes therefore describe the accident in the passive voice. In other words, they deal with the JCO accident in a detached way:

Kore wo suguni hinan wo saremashita chiiki no minasamagata ni haifu sasete itadaita tokorodesu. [We immediately distributed this to the local people who took refuge.] (Meeting minutes)

Dekirudake hayaku taisaku wo toranakereba naranakatta. [I had to take the measures as soon as possible.] (Migawa 2002:64)

Turning to the victim corpus, there are high frequencies of '*denwa* [calling]', '*renraku* [contact]' and '*hanashi* [talk]'. These are intransitive verbs indicating victims' agency. Victims describe the here-and-now issues in the active voice. The interview data also contains a similar sense of agency.

Nande jikonokoto bakari kinisitenda? Oretachi wa omanma no shinpai sinakereba ikenainoni. [Why do you keep thinking about that accident? We have got to think where our rice comes from.] (Farmer interview 2007)

Imanotokoro, ore niha kono shigoto shika naikarane. Soreni kono shigoto ha kokodewa kanari hyōban ga īshi kyūryō mo iikarasa. [Right now, this is the only job that I can do. After all, it is a good job in this town and does pay well.] (Nuclear factory worker interview 2007)

The officials seem to engage in delayed action but the victims seem to immediately deal with the aftermath of the accident. The significance of this difference is that the expression of agency is a mark of identity.

3.4 Pragmatic analysis: Hedging

Hedging is defined as linguistic avoidance of full commitment or precision. It is a vague but useful term covering a range of phenomena (Bloor and Bloor 2007). Hedging includes strategic devices for approximation and modality. Hedging may be intentionally or unintentionally employed in both spoken and written language. The comparison of the three corpora revealed differences in hedging expressions. The mayor texts and meeting minutes have low frequencies in numbers of hedging. However, the victim corpus has many hedge expressions such as '*sukoshi* [a little bit]', '*tokuni* [particularly]', '*betsuni* [Nothing much]' and '*ichiō* [just in case]'. On the other hand, the Mayor tends to use more confident expression such as '*tōzen* [definitely]',

'*zenzen* [nothing]', and '*mottomo* [most always]'. Victims appear to be sensitive to the issue of JCO accident and the nuclear industry. By contrast, the mayor and institutions reflect the individuals' status or class differences. As described in section 1, from an economical point of view, Tokai Village depends on nuclear industries and so do many of the victims. From this perspective, victims tend to use hedging before their opinion or comments to mitigate their identification with victimhood. The mayor and JCO officials tend to use more straight declarative expressions to strengthen their opinion and their their positions. Results from the reference corpora indicate small numbers of the strategic use of hedging.

4. Conclusion

This study has involved the construction of a corpus. The Tokai Village Corpus is made up from Tokai village meeting minutes, interview books, and documents of civic development. Two of the four are in the speech mode, and the others are expository text. In conducting analyses with the corpus, the results were compared to large, general corpora, so that we can see whether the results from our corpus differ from general language use. The Tokai Village Corpus was divided into participant positions. The items studied include frequencies, keywords, verb-forms, and hedging. Frequency analysis indicates that victims and the mayor and the officials have different perspectives on the accident. Based on keyword analyses, the officials are interested in nuclear power, while the victims are interested in 'the accident'. Grammatical analysis suggests a discursive strategy of agency amongst victims, in contrast to the mayor and officials, who tend to use the passive voice. This difference illustrates the officials' concern for 'moving on' while victims are concerned with 'here-and-now' issues. Pragmatic analysis reveals that the victims hedge more than the officials. This is interpreted as reflecting their weakened position of living in a situation where they are both beneficiaries and victims of nuclear industry. I hope that through these kind of analyses, we can understand the multiple levels of discourse of people trying to cope with disaster.

References

- Biber, D. (1998). *Variation in Speech and Writing*. Cambridge: Cambridge University Press.
- Bloor, M. and Bloor, T. (2007). *Practice of Critical Discourse Analysis: An Introduction*. Oxford: Oxford University Press.
- Davis, K.A. (1995). Qualitative Theory and Methods in Applied Linguistics Research. *TESOL Quarterly*, 29, (3), 427-453.
- Higuchi, K. (2001). KH Corder <http://khc.sourceforge.net/> retrieved in 2008/10/19.
- Ibaraki Shinbunsha (ed.) (2003). *Genshiryoku Mura*. [The nuclear power Village]. Ibaraki: Naka Shobo.
- Jacobsen, W.M. (2001). The Transitive Structure of Events in Japanese. Tokyo: Kuroshio.
- Japan's nuclear nightmare (1999, October 11th). *TIME Magazine*. 23-27.
- Kawamata, T. (2006). The aftermath of a nuclear power plant accident; Critical discourse analysis of Tokai Village public briefing meetings. *Annual Bulletin of the Graduate Schools of Humanities and Social Sciences* 4: 3-27. Tokyo: Meisei University.

- Kokuritsu Kokugo Kenkyujo (2003). Nihongo Hanashikotoba kopasu no naiyō
<http://www.kokken.go.jp/katsudo/seika/corpus/releaseinfo/010/> retrieved in
2008/04/30.
- O'Halloran, K. and Coffin, C. (2004). Checking overinterpretation and underinterpretation:
Help from corpora in critical linguistics. In C. Coffin, A. Hewings and K. O'Halloran
(eds.), *Applying English Grammar*. London: Edward Arnold. pp. 275-297.
- O'Halloran, K. (2005). The role of appraisal and corpora in analysing dog-whistle journalism.
Paper presented at Symposium on Text, Pretext, and Interpretation. Tokyo: Waseda
University.
- Stubbs, M. (1996). Human and inhuman geography: A comparative analysis of two long texts
and a corpus. In C. Coffin, A. Hewings and K. O'Halloran (eds.), *Applying English
Grammar*. London: Edward Arnold. pp. 245-274.
- Migawa, T. (2002). *Mienai kyōfu wo koete -Murakami Tatsuya tōkai sonnchō no shōgen*
[Beyond the invisible terror: Testimony of Tokai Village mayor Tatsuya Murakami].
Ibaraki: Naka Shobo.
- Saito, S., Someya, T., Fujita, S., Horiguchi, S. and Mochizuki, T. (2001). *Tokai mura rinkai
jiko no machikara- 1999 nen 9 gatsu 30 nichi jikotaiken no shōgen-*. [From Critical
Nuclear Accident Town- Tokai Mura: The Testimony of the Accident Experience] . Tokyo:
Shunpousha.