

## **Review of the 114 Days spent responding to the Nakhodka Incident**

### **Shigeo Nakayama**

Director of the Fire & Disaster Prevention Division, Fukui Prefecture

When the bow of the Nakhodka-the symbol of this oil spill disaster--reached the bottom of the sea off Fukui prefecture, the Fukui prefectural government set up the Contingency Countermeasure Headquarters for the first time in 16 years, where it practiced an office-wide thoroughgoing emergency action for disaster prevention, centering around the supervisory division. I will herein attempt to review our struggling efforts that lasted as long as 114 days. I sincerely hope that you will find this helpful as reference material for oil pollution disasters hereafter, as well as other kinds of accidents and calamities.

### **1. Initial Response**

On the evening of January 3, the 8th Regional Maritime Safety Headquarters phoned me at home to inform me of the Nakhodka incident for the first time. In response to this, I immediately instructed the person in charge to forward the warning fax that had come to the Prefectural Office, to each of the concerned divisions and sections in the Office, municipalities, fishery guilds, and relevant fire stations. On the next day (4th), all the section staff were urgently called up, and our 120-day struggle to respond to the oil spill disaster began.

We had had another experience in an oil spill incident with the Liberia cargo boat, "Maritime Gardenia," which was stranded off Kyogamisaki in Kyoto prefecture in January 1990. This hastened us to access the recorded data on that incident and acquire all of the know-how we could from the last oil spill.

The record revealed these findings: They responded to the incident primarily through human-wave tactics under the supervision of the Maritime Disaster Prevention Center. Because the same center was set up in Maizuru, Kyoto, it failed to supply enough guidance and instructions. The contingency response was prolonged, until it lasted beyond summer that year.

Due to a lack of materials/equipments such as booms, dippers and drum cans, sufficient care and treatment could not be provided. The Prefectural Office confronted complex difficulties in responding to the incident, as the oil skimmers were difficult to prepare.

In the last incident, approx. 6,240 kiloliters of oil spilled out, while 900 kiloliters of oil flowed out of the Maritime Gardenia. Accordingly, the scale of the last disaster could be presumed to be further enlarged. Around noon on January 4, we launched a nationwide order for material and equipment such as booms, dippers, drum cans, oil mats, and hip boots.

On the same day, the staff of 14 relevant divisions in the Office were urgently called up, and the "In-Office Coordinating Conference for Tanker Oil Spill Incidents" was set up to discuss possible measures against the oil spill incident that had been caused by the sunk tanker and the drifting bow.

Moreover, since we at the Prefectural Office had some difficulty in getting information of our own due to the incident occurring on the open sea, two staff members of the supervisory section were dispatched to the Disaster Control Division of the 8th Regional Maritime Safety Headquarters in order that they might serve as a pipeline for data collection and disaster response consultation.

On the evening of the 4th, we contacted the Japan Maritime Disaster Prevention Center and commenced the consultation over the basics of the oil-spill cleanup operation. They instructed us to "resort to human-wave tactics, as there was no appropriate mechanical force available." "Due to the scale of the disaster, once the oil has begun washing up on the shore, a patient and laborious response will be needed for quite a long time," they said.

## **2. Role Allotment among this Prefecture, Municipalities, and Concerned Organizations for Disaster Prevention**

The 2nd Coordinating Conference for Tanker Oil Spills was held on January 5, to discuss how to share the roles of contingency operations among this prefecture, municipalities (cities, towns and villages), and fishery guilds. (The coastland was divided into a construction area, transportation area, farmland, and quasi-national parkland, etc.)

In the prefectural conference, it was pointed out that the shipowner was naturally responsible for removal of oil expected to wash up on the shore.

At the same time, serious concern was shown that the secondary disaster could possibly be enlarged, should the administrative authority take a step backward in coping with the disaster simply because of the shipowner's responsibility. As a result, the major concern in the conference focused upon how the prefecture, municipalities, and relevant organizations for the disaster prevention should share their roles in advancing emergency actions. The conference determined a rough scheme of the duty allotment as

follows:

<<Fishery Associations & Members of the Fukui Harbor Oil Spill Countermeasure Conference>>

Oil recovery on the sea near the coastland was to be done by the fishery associations that possess fishing boats or oil skimmers as well as by the members of the Fukui Harbor Oil Spill Countermeasure Conference.

<<Municipalities & Local Residents>>

Human-wave tactics had to be employed for recovery of the oil that evaded the skimming work on the sea and reached the shore, so the oil ashore was to be recovered by the municipalities (cities, towns and villages) which were convenient for mobilization of the residents.

<<Fukui Prefecture>>

The prefectural authority was to provide all information on the drifting oil on the sea, etc., and distribute--at its expense--all material and equipment such as booms, drum cans, dippers, and hip boots that each city, town, or village would need for their contingency activities, since difficulty or competition was presumed to come about in procuring/ordering them.

At first, such role allotment was ascertained among the relevant divisions in the Prefectural Office. The personnel of 12 municipalities and the relevant fire stations that cover the coastland were summoned on the afternoon of the 5th, and were briefed about the respective role allotment in the clean-up operation. Plus, the order of the coast patrols was completely enforced in readiness for the oil to be stranded.

On the same day, the Fishery Supervisory Division held the "Fishery Environment Countermeasure Conference" (composed of the fishery associations and the related organizations) and the "Fishery Coordinating Conference for Tanker Oil Spills", where the best possible control system was mapped out in preparation for the oil to be drifted ashore.

[What We Learned from Initial Response]

a. Significance of risk management in normal times... Ensured an alert system and a personnel call-up system in case of the emergency and data gathering equipment which was started up etc., two staff members were put on the alert due to the high seas warning that had lasted from January. 2.

b. Strategies against crises (decision-making when uncertainty remains)

- c. Initial response to a disaster completely depends upon contingency information that may occasionally change, gathering data for countermeasures, and their analysis.
- d. Explicit role allotment and information sharing among those concerned
- e. Effective assistance by the prefectural authority for the municipalities that suffer from being short-staffed.

### **3. Wide-Area Supporting System**

Following lessons learnt from the Hanshin-Awaji Great Earthquake which fit the broadening of a disaster and its scale, we made cooperative agreements with nine prefectures in the Kinki district and nine prefectures and one city in the Chubu district. Based on these engagements, we were supplied with a string of booms approx. 15,000 meters long and approx. 7,000 drum cans. It is presumable that we could not receive truly effective assistance unless we concluded these wide-area cooperative agreements.

Likewise, since Fukui prefecture was scheduled to prepare its own contingency helicopter only in April, 1997, we were provided with the dispatched helicopters by Aichi, Gifu, Shiga, Wakayama, and Nagoya prefectures. Sure enough, they showed us all of their power and potential in scouting the drifting oil from the sky above, making us realize the significance of the wide-area cooperative agreements.

### **4. Setting up the Contingency Countermeasure Headquarters**

On January 7 when the bow reached the seabed off Anto, Mikuni-cho, Fukui, the Contingency Countermeasure Headquarters were set up with the governor as a central figure, and also the local office was established in Mikuni-cho.

Generally, natural disasters are the main assumption when a local public organization (including Fukui) organizes a central office for disaster prevention in its local contingency. As such, some special ideas and considerations are to be exerted in organizing a home office that is intended to work on a contingency plan. Some of them may include:

Self-contained organization type that can swiftly suit any incident and disaster.

Judging from the disaster type, each action or treatment must be left in charge of the most appropriate division. For example, the procurement of drum cans, etc. should be arranged via the commerce/industry division that is closely connected to the industrial circle; oil treatment ought to be arranged via the health/sanitation division that handles industrial waste; and the drum cans, etc., collected by municipalities ought to be arranged via the civil engineering division which manages many of the prefectural vehicles.

In each of these significant divisions, the staff of the Fire & Disaster Prevention Division should be designated as the responsible person until the respective operation works smoothly; after that, all responsibility is to be left in charge of the director of the respective division.

Based on these ideas, we organized the following divisions in the Contingency Countermeasure Headquarters, where up to 160 staff were constantly stationed and engaged in the contingency activities.

<<Configuration of the Fukui Contingency Countermeasures Headquarters>>

(1) Supervisory Division, (2) General Affairs/Facilities Division, (3) General Countermeasures Division, (4) Personnel & Employees Service Division, (5) Public Relations/Document Control Division. (6) Coordinating Division for Related Organizations, (7) Data Gathering Division, (8) Material/Equipment Procurement Division (heavy machinery), (9) Materials/Equipments Procurement Division (consumable supplies), (10) Oil Spill Aftertreatment Division. (11) Fisheries Countermeasure Division, (12) Liaison Division, (13) Rescue/Relief Division, (14) Relief Parties Acceptance Division, (15) Volunteer Division. (16) Coordinating Division for the Police, (17) Coordinating Division for the Maritime Safety Office, (18) Coordinating Division for the Self-Defense Force, (19) Liaison Division for Bow-Related Works, (20) Contingency Helicopter Division. (21) Local Office, (22) In-Site Office, (23) Liaison Office for Volunteers, (24) Staff Dispatch (to the 8th Regional Maritime Safety Office Division. the Mikuni Maritime Safety Station. and the Japan Maritime Disaster Prevention Center), and (25) Mobile Picture Division.

These subdivisions were set up in the 1st sublevel of the Prefectural Office, except for (20) through (25) which were set up outside.

## **5. Setting up Project Teams**

In our contingency plan, different project teams were characteristically established to give close and careful consideration to the relevant disaster and take full advantage of the features and prompt response that are only possible with an organization. Each

project team shown below was put under the supervision of the Contingency Countermeasures Headquarters, and the existing organizations were utilized fully and cross-sectionally.

- (1) Project team for environmental preservation
- (2) Project team for casualty allowances
- (3) Liaison conference for technical control of heavy oil recovery
- (4) Liaison conference for urgent measures for image improvement
- (5) Working group for usage of disaster contributions
- (6) Engineering group for temporary roads

[What We Learned from Organizing Process]

a. For a disaster response, a close and careful consideration is requested when organizing the divisions.

b. Each division must be self-contained and the respective authority should be delegated as such.

c. A project team shall be set up to cope with such problems that involve more than one division or that the existing prefectural administrative should handle in a cross-sectional manner.

d. The most crucial missions of the Contingency Countermeasure Headquarters in case of emergency are clarifying how to organize an office-wide control system both in name and in reality, and how to swiftly switch the minds of the staff from the normal to emergency mode.

This is typically reflected in the excavation work of a pit (45 m x 30 m x 3 m) in Mikuni-cho.

e. Shift work & smooth take-over of operations/a 24-hour system and health control.

f. Among the operations by the Contingency Countermeasure Headquarters, responding to the press took much time (three regular press interviews a day/document preparation), proving to be fairly bothersome.

## **6. Collection & Transmission of Contingency Information**

The following is a summary of the tools we used to gather information on the oil drifting on the Sea of Japan, and the means and forms in which we conveyed such information to the relevant organization of the municipalities:

(1) Major information from the 8th Regional Maritime Safety Headquarters

A hart showing the current status of the drifting oil, and a chart showing its predicted float.

A chart showing the condition of the oil spilled from the bow

Vessels, aircraft, etc., mobilized on that given day and the next

Construction status of temporary roads

Bow condition

Oil recovery condition on that given day

Data released by the press

(2) Information from the relevant 12 municipalities

Condition of the oil drifted ashore

Operation status on that given day and plans for the next day

Oil recovery condition on that given day

Condition of volunteer activities, etc.

Condition of supplies, materials and equipment via the in-site office

(3) Information from the nuclear power station, etc.

Condition of the stranded oil

Operation status on that given day and plans for the next day

Oil recovery conditions on that given day

(4) Information from the Japan Maritime Disaster Prevention Center

Operation status on that given day and plans for the next day

Oil recovery conditions on that given day

(5) Information from those concerned in the construction of temporary roads

Operation status on that given days and plans for the next day

Actual results on that given day

(6) Information from those concerned in oil removal from the bow

Operation status on that given day and plans for the next day

Actual results on that given day

(7) Oil removal from the bow and construction of temporary roads

The remote-controlled telephoto lens installed in the local office in Yasushima, Mikiuni-cho were used to monitor their progress at the Contingency Countermeasure Headquarters on a 24-hour basis. The Internet was used to transmit still pictures.

(8) The satellite image transmission system of the Fire Defense Agency, the Ministry of Home Affairs, was employed for still pictures of the above (7); and except at nighttime, the animated pictures were used to grasp the in-site conditions at the Contingency Countermeasure Headquarters.

(9) The helicopter TV system of the prefectural main police office was used to project the status from a bird's eye view, during the Contingency Countermeasure Conference so that the current conditions could be grasped on a constant basis.

(10) The current condition and estimation of the wave height and swelling were caught by the marine weather observation system (Namiheikun).

(11) Condition of the drifting oil

Information from the helicopter rented from the Maritime Disaster Prevention Center

Video image data from the aircraft of the Air Self-Defense Force (Komatsu base)

Aerial photos from the aircraft "Phantom" of the Air Self-Defense Force (Hyakuri Base)

Information from 5 contingency helicopters of other prefecturers, etc.

Information from S prefectural vessels

Information from the fishing boats owned by the prefectural fishery guilds

Information from the escort vessel of the Maritime Self-Defense Force

Information from the vessels of the Maritime Safety Headquarters

Information from the vessels rented from the Maritime Disaster Prevention Center

[What We Learned from Data Collection & Transmission]

a. Volume of the oil clots drifting on the sea was unclear.

b. Although the drift prediction was provided, its probability and accuracy was no better than those provided by a weather forecast.

c. Integral data control for the drifting oil was essential, as major drifts continued till the end of May (8th and 9th Regions).

d. Because the same copies had to be faxed repeatedly, the characters/symbols were deformed so that complaints about illegible copies came one after another.

This applies to the areas out of service for cellular phones.

e. The latest information transfer means, such as the Internet, proved to be a powerful tool for contingency responses.

## **7. Recovery of Drifting Oil on the Sea and Assistance from the Petroleum Association of Japan.**

The above-stated information of the drifting oil was obtained and projected on the map. Based on that, the plan of operations was elaborated, and the vessels owned by the prefecture, the gut boats arranged by the prefecture, and the fishing boats were organized into a large fleet in an attempt to recover the waste oil clots moving shoreward.

The Sea of Japan in the wintertime raged wilder than we had expected, so there were few opportunities to set out toward the open sea with ease. Weather permitting, however, we were more successful in recovering oil than we had anticipated.

In particular, the gut boats with cranes brought about outstandingly successful results in oil recovery work on the sea.

Here, permit us to express our sincere thanks to the Petroleum Association of Japan for their special attention and cooperation.

A string of booms for Kansai Electric Power Co., Nihon Atomic Co. Hokuriku Electric Power Co., Ltd., etc. (all located in Fukui prefecture), the oil skimmers used by the Self-Defense Force in Mikuni-cho, the oil skimming devices used for oil removal from the bow, etc.-We deeply appreciate their kindness and courtesy for renting us all of the material/equipment.

We were also indebted for exceptional care and courtesy of the Japan National Oil Corporation "Shirashima Oil Storage Company" for letting us use the recovery pump of the "Hakuryu" from January 23 to February 23.

Not only "Shirashima Oil Storage Company," the Japan's real top oil skimmer "Daisantakahoko-Maru" of the "Mutsu-Ogawara Oil Storage Company" showed us a devoted contribution from January 11 to February 10.

## **8. Effective Oil Recovery on the Sea, Using Heavy Oil Recovery Technology**

The attached sheet of paper includes the report "About Technical Countermeasure & Information for Heavy Oil Recovery" that the above-mentioned project team "Liaison Conference for Heavy Oil Recovery Technology" presented to the Fukui Contingency Countermeasure Headquarters in March.

We are distributing the same report to you, as we believe there would be no such close and minute data on the test results and consequently that this would aid every individual in the petroleum industry.

Besides data preparation, this liaison conference has made various attempts, such as fabrication of countermeasures against the oil that secreted into the sand. We are thinking of introducing some of their trials in the Fukui home page on the Internet-- both in Japanese and in English.

Likewise, in the Maizuru Regional District Headquarters of the Maritime Self-Defense Force, another report was presented on the results of the trial that used the recovery utensils obtained by processing the tableware cases or waste cans within the vessel. We are also planning to detail them in our report that will integrally deal with such oil recovery trials or attempts in Fukui Prefecture.

## **9. Post-Collection Separation and Countermeasures**

In early January when recovery of the drifting oil commenced, the Oil Spill Aftertreatment Division and some other divisions pointed out that there was concern that trouble might be caused in later incineration, because in the sites the polluted mackintosh or gloves were discarded in the drum cans for oil recovery.

In response to this, we promptly instructed the sites to strictly follow the separate collection of oil and refuse in which the oil drum cans were to be distinguished from the refuse cans in order to prevent the post-collection trouble beforehand.

As of late June, all of the oil drum cans were carried outside the prefecture; only those for refuse are presently waiting to be delivered.

Also, in the Municipalities Personnel Meeting of January 5, an explanation was made regarding the adverse effects that could be occasioned by oil recovery work on the beach that used heavy machinery, which helps sneak the oil content into the sand.

We believe that the post-collected treatment was greatly facilitated by resorting to the all-out human-waste tactics.

## 10. Future Responses and Potential Problems

The following list of the oil recovered in our contingency plan, suggests which aspect of the response each authority or agency should improve in the future.

### Oil Recovery Condition (as of May 25, 1997)

(Measured by kiloliter)

Authorities concerned	A		Details of A	
	Total recovered amount	Composition ratio: %	Recovery of stranded oil	Recovery of drifting oil
Niigata Prefecture	3,794.7	7.3	3,774.6	20.1
Akita Prefecture	225.0	0.4	225.0	
Yamagata Prefecture	1.3	-	1.3	
Toyama Prefecture	1.5	-		1.5
Ishikawa Prefecture	22,151.9	42.5	18,331.8	3
Fukui Prefecture	18,608.1	35.7	17,479.0	
Kyoto Prefecture	3,613.9	6.9	No distinction between stranded oil/drifting oil	
Hyogo Prefecture	1,425.0	2.7	No distinction between stranded oil/drifting oil	
Tottori Prefecture	70.4	0.1	5.6	
Shimane Prefecture	7.8	-	No distinction between stranded oil/drifting oil	
<b>Total</b>	<b>49,899.6</b>	<b>95.6</b>		
Maritime Safety Agency	641.1	1.2		641.1
Maritime Self-Defense Force	625.3	1.2		625.3
Fisheries Agency	42.9	0.1		42.9
Ministry of Transport	938.0	1.8		938.0
<b>Total</b>	<b>2,247.3</b>	<b>4.3</b>		<b>2,247.3</b>
<b>Total</b>	<b>52,146.9</b>	<b>100.0</b>		

1. Times of aggregation may differ with respective recovery agencies.
2. Data on prefectural agencies are based on information exchange, and data on national agencies come from the respective public relations material.
3. Presumably, an oil spill of 6,240 kl was caused by the hull breakage, when the amount of 2,800 kl had remained in the bow.

4. The heavy oil not only formed into mousse but contained seawater, sand, and algae, so that the total recovered amount resulted in several times of the net oil collected.

[Future Problems]

a. Because of "No distinction between stranded oil/drifting oil" for Kyoto, etc., the recovered amount of the stranded oil was 39,817 Id and that of the drifting oil was 7,282 kl.

These amounts result in approx. 85% for the former and approx. 15% for the latter.

b. This suggests that should an oil spill incident of this scale occurs again, a vast amount of oil can be stranded even if several high performance skimmers are dispatched.

c. Consequently, it is essential that the national government appeal the necessity for preventive measures against the recurrence of a disaster both internally and externally, including the reinforcement of PSC, etc.

d. The local public organizations need to consider proper countermeasures on a steady basis. They are specifically advised to reevaluate the ongoing local contingency plans, hold fast to the organization control, and stock the materials and equipment in readiness for an emergency.

## **11. Guideline for Removal of the Stranded Oil**

When the contingency response had progressed into the second half of the plan and the fatigue of the coast inhabitants and the number of volunteers had increased, the concerned municipalities raised a vital question: Which guidepost should be followed in determining the amount of the stranded oil to be removed? In response to this, the Fukui Contingency Countermeasure Headquarters mapped out the "Standard Guidelines for Removal of the Stranded Oil" on February 20 and reported it to the concerned organizations accordingly.

This guideline not only served as a standard for the removal operation that every relevant agency was working on, but it also requested that the removal work be implemented flexibly while considering the natural condition of each area, the state of each coastal area, and the local authority's discretion. Refer to the attached sheet, for details of the standard removal operation stipulated in this guideline.

## **12. Conditions of Major Contingency Activities (Reference)**

The following is a summary of the major contingency activities for the period between

the time when the Contingency Countermeasure Headquarters were set up on January 7, 1996 and the time when the same were abolished on April 30.

(1) Material/equipment deployed

Length of a string of booms	:21,720 m
Dram cans	:70,152 pcs.
Dipper	:11,404 pcs.
Hip boots	: 3,442 pcs.

(2) Oil recovery work [as of May 28]

Number of oil recovery workers (including volunteers)	:162,743
Amount of oil spill recovered <sup>1</sup>	: 18,610.5 kl

(Amount recovered on the coast - 16,934.4 kl, that recovered by the prefecture - 547 kl, that recovered on the sea - 1,129.1 kl)

Quantity removed	: 18,659.4 kl
Removal rate	: 100.2%

\* The removal rate exceeds 100%, due to the fact that the quantity removed included the drum cans containing oily mackintosh or dippers.

(3) Volunteer activity (application ended on 3/3 1)

Fukui-shi	18,363
Tsuruga-shi	15,157
Obama-shi	1,331
Mikuni-cho	38,035
Awara-cho	122
Kono-mura	151
Echizen-cho	1,704
Koshino-mura	1,479
Mikata-cho	1,496
Mihama-cho	12,067
Takahama-cho	72
Takahama-cho	41
<b>Total</b>	<b>90,018</b>

(4) The Self-Defense Force (withdrew on 3/4)

Fukui/Mikuni region	2,864
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Tsuruga zone	1,018
Mikata/Mihama zone	1,635
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Total	5,517

(5) Investigations by helicopters, etc.

Contingency helicopters (Shiga, Gifu, Aichi, and Wakayama Prefectures and Nagoya City)	: 30 times
Prefectural police helicopters (Fukui and Mie Prefectures)	: 40 times
The Air Self-Defense Force	: 22 times
The Maritime Self-Defense Force	: 219 times
The Maritime Safety Agency (within 2nd, 8th and 9th Regions)	: 619 times
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Total	: 930 times

(6) Mobilized skimmers, etc.

The Maritime Safety Agency (within 8th Region)	1,991
The Maritime Self-Defense Force	913
Prefectural vessels	97
Fishing boats	2,114
Other working boats	452
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Total	5,567

(7) Disaster contributions [as of May 28]

Number of contributions	8,115
Amount	727,778,475 yen

(8) Contributed supplies [as of April 30th]

Number of contributions	2,294
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### 13. Conclusions

Each and every one of the Fukui inhabitants is deeply grateful to every individual and organization for providing us with hearty contributions and supplies from all across the country, as well as to every volunteer for working on volunteer activities in the harsh winter season. We would like to express our deepest thanks to them all.

Likewise, we would sincerely appreciate all contingency countermeasure agencies and inhabitants of the prefectures in Chubu and Kinki blocks, for supplying material equipment, and valuable information.

We are planning to prepare a record of the actual conditions of the incident and know-how for disaster prevention derived therefrom. For all the kindness and thoughtfulness we received, we at the Fukui Prefectural Office would like to express our deepest thanks by forwarding our records to relevant agencies all across the country.