Response to the Body Contamination That Occurred during the Cleaning of Additionally Installed ALPS Pipes

November 16, 2023

TEPCO

Tokyo Electric Power Company Holdings, Inc.

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1. Overview

- At around 10:30AM※ on October 25, 2023, when the inside of the additionally installed ALPS (shut down for inspection) crossflow filter outlet pipe (B) was being cleaned, a temporary hose leading into the receiving tank to which waste cleaning liquid was being transferred became dislodged thereby causing waste cleaning liquid to splash onto two contractors (A, B) that were working in the vicinity.
- The Alarm Pocket Dosimeter (APD (beta rays)) alarm on aforementioned contractor (A), who immediately put the end of the dislodged hose back into the tank, went off.
- Due to potential body contamination of the workers that were working in the vicinity, they were measured for contamination in the on-site emergency room (ER), and it was found that out of the five workers in the vicinity, the two workers onto which waste cleaning liquid splashed (A, B), and two workers that helped to clean up the splashed liquid (D, E), had been subject to body contamination. The fifth worker (C) suffered no body contamination.
- Thereafter, the four workers that had been subject to body contamination (A, B, D, E) were decontaminated, and the decontamination of the two workers that cleaned up the splashed liquid (D, E) was completed. Although the level of contamination of the two workers onto which waste cleaning liquid splashed (A, B) was reduced, they could not be decontaminated to the point where the decontamination level fell below requirements for evacuation from the area (4Bq/cm2), so they were transported to Fukushima Medical University Hospital.
- Nasal cavity smears were also taken of the five workers that were measured for contamination and it was confirmed that none of the workers had ingested any contamination. Furthermore, the ER physician diagnosis was that there were no burns from the chemical agents and that the possibility of heat burns from radiation was small.
- The two workers that were transported to Fukushima Medical University Hospital (A, B) were admitted after being diagnosed. After receiving treatment at the hospital they were released on October 28. According to Toshiba Energy Systems, the contractor of the cleaning work, there are currently no health problems with either of the workers (A, B), and no significant abnormalities have been seen on the skin at the location of contamination.

※ Confirmed by looking at the APD history（The report from the field was received around 10:40 AM)

2. Sequence of events (1/2)

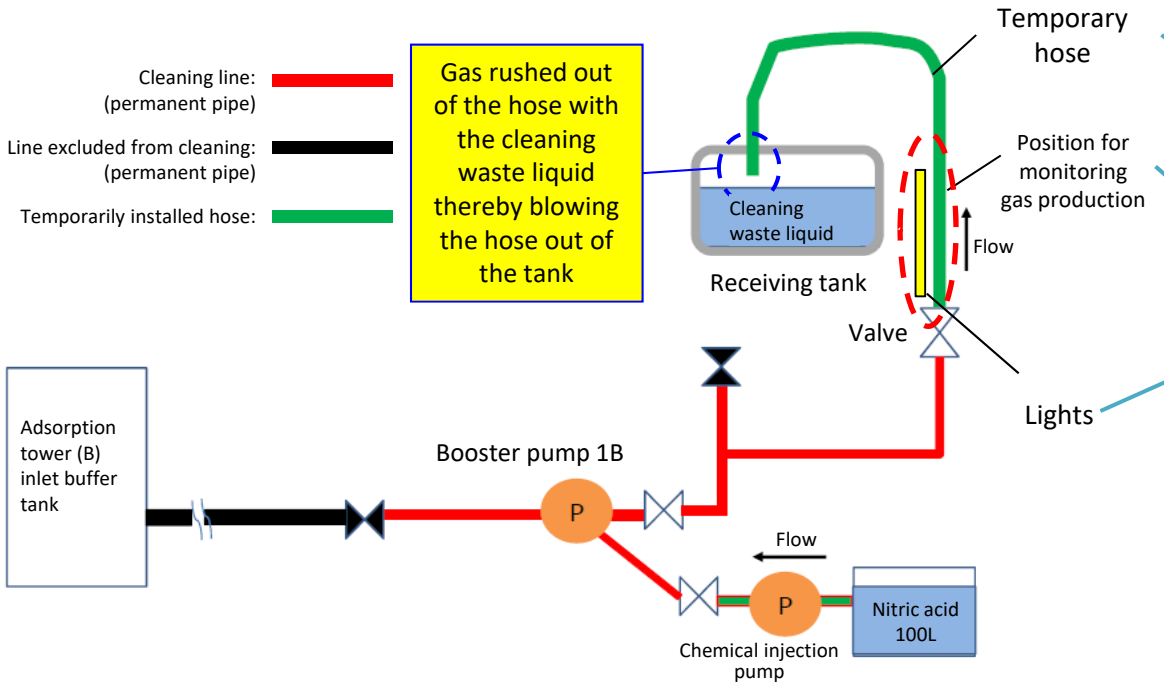
Sequence of events（10/25）	
Around 5:30am	• Morning meeting, toolbox meeting and safety briefing
Around 7:30am	• Safety briefing on the Field, commencement of work
Around 8:20~10:00am	• Chemical injection pump is repeatedly started up and shutdown in conjunction with the production of gas
Around 10:00am	• Worker C, who was monitoring the tank, took over from worker A and moved to another area in which work was being done. • The design manager adjusts the valve opening (in the direction of closing)
Around 10:10am	• Worker D starts up the chemical injection pump
10:25am	• Worker D shuts down the chemical injection pump after noticing that the pump is unable to inject out the cleaning agent
Around 10:30am～（Report from the field is received around 10:40am)	• Cleaning waste liquid splashes onto workers A and B when the hose comes loose • Worker A puts the end of the dislodged hose back • After being splashed, worker A's APD alarm goes off the first time (setting: γ0.5mSv) • Worker A changes PPE (takes off one layer of rubber gloves and coveralls and puts on the bottom of an Anorak suit) • Worker B changes PPE (Puts on the bottom of an Anorak suit) • Workers C~E receive a radio call from the work supervisor informing them of the incident, and they relocate to the aforementioned area
Around 10:45	• Simple cleanup and cleaning of the splashed liquid (by workers B~E, and the work manager) • Radiation controller 1 orders worker A, who was holding the hose, to evacuate the area after his APD continuously sounds after exceeding the planned value for beta rays (5mSv). Worker A takes off the bottom of his anorak suits and evacuates the area. • Radiation controller 1 asks the work manager to implement measures to prohibit entry to the aforementioned area. He also takes laminated mats and a change of shoes and heads to the radiation control storeroom inside of the building, retrieves PPE, an returns to the aforementioned area. • The work manager changes his shoes and heads off to grab materials to rope off the area (ropes/signs). He returns to the aforementioned area after obtaining these materials and implements measures to prohibit entry to the area. • Radiation controller 1, checks the APD (beta) values of his own APD and the APD's of the design manager and worker C, and orders everyone to evacuate the area

2. Sequence of events (2/2)

Sequence of events	
Around 10:45am	• Worker C takes off the top and bottom of his Anorak suit, and the work manager and worker B take off the bottom of their Anorak suits (workers D and E assist them) • Worker E takes off the top and bottom of his Anorak suit (worker D assists) • Worker D takes off the top and bottom of his Anorak suit (the work manager assists)
Around 10:50am	• All the remaining workers change their shoes and evacuate to the rest house in the registration center
Around 11:10am	• TEPCO is notified (The five workers that were contaminated are subject to simple body decontamination at the rest house in the registration center)
12:28	• First worker (A) with body contamination arrives at the ER (worker that was the closest to where the water splashed)
12:32am	• Commencement of decontamination of first worker (A)
12:40	• Clause 25 (first notification) notification made
12:42	• Four remaining workers (B~E) arrive at the ER and decontamination procedures commence
13:08	• Entry to the additionally installed ALPS building restricted to essential personnel only
14:45	• It is confirmed that there was no ingestion of radioactive substances by the five workers • It is confirmed that one out of the five workers (C) was not subject to body contamination, and decontamination of two of the workers (D,E) is completed
19:23	• It is determined that the remaining two workers (A,B) cannot be decontaminated to the point where the contamination level is below criteria for removal from the controlled zone
19:52	• Clause 25 (second notification) notification made
20:59	• Two workers (A,B) leave for Fukushima Medical University Hospital
22:25	• Arrival at Fukushima Medical University Hospital
00:10	• The two workers (A,B) are diagnosed and admitted to the hospital.
10/28PM	• Workers A and B are released from the hospital.

3. Conditions at the time of the incident

- On October 24 and 25※, Toshiba Energy Systems was cleaning the carbonate that accumulates in the cross-filter outlet pipe (B) in conjunction with the operation of additionally installed ALPS, by dissolving it with nitric acid.

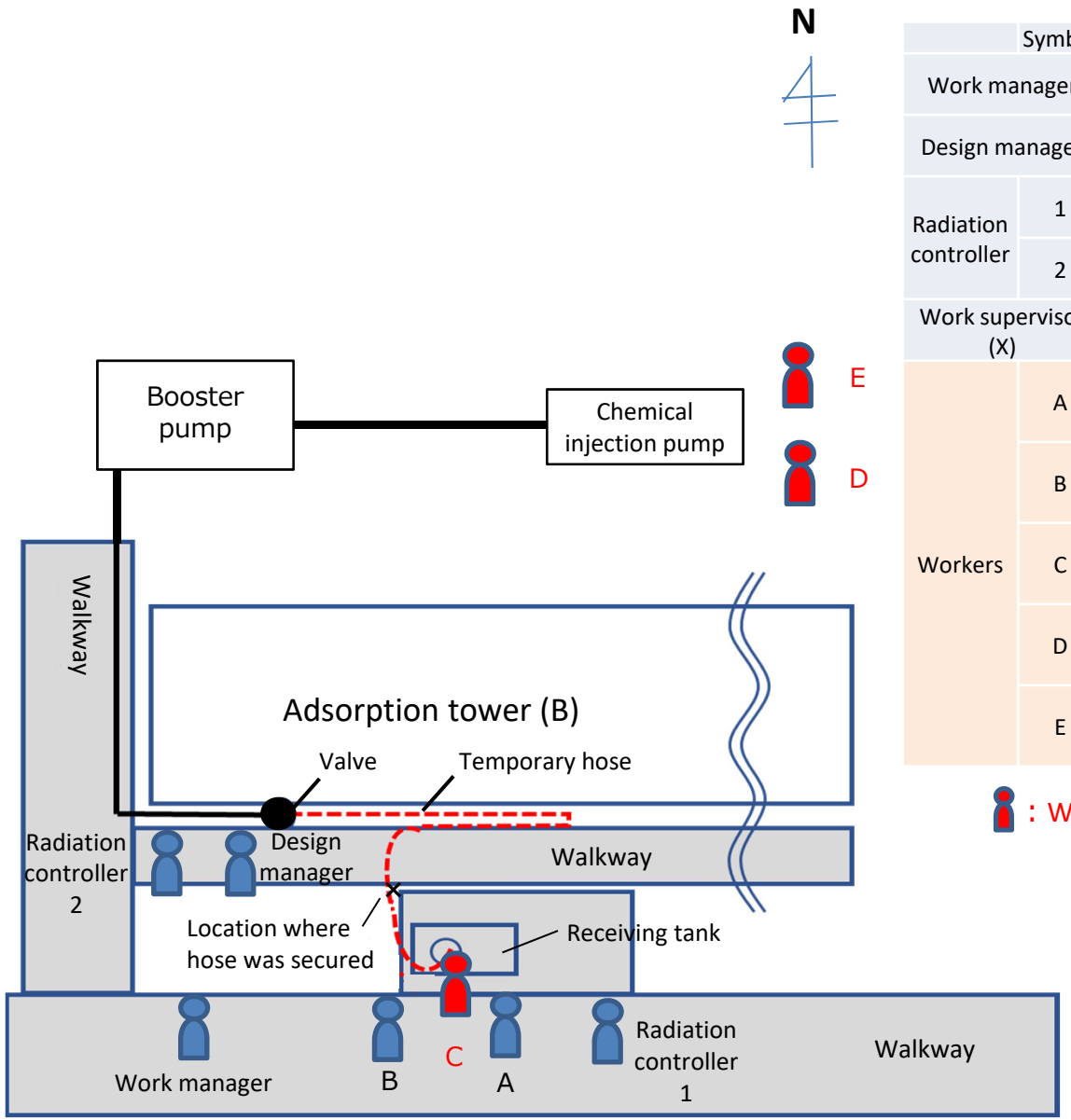


※ TEPCO's managing department completed Pre-work safety measure and handed over to the contractor on September 28

Photograph of adsorption tower (B) from the walkway

- Gas produced through the chemical reaction of carbonate that had accumulated inside the pipes together with the cleaning agent (nitric acid) rushed out of the hose that was leading into the receiving tank causing it to blow out of the tank and splash cleaning waste liquid onto two workers (A,B) that were working nearby thereby contaminating them.
- It is assumed that the two workers (D,E) that cleaned up the splashed cleaning waste liquid were contaminated either during the cleaning process or when they removed their PPE (anorak suit).

4.1 Work management system/worker assignments (Prior to the incident)

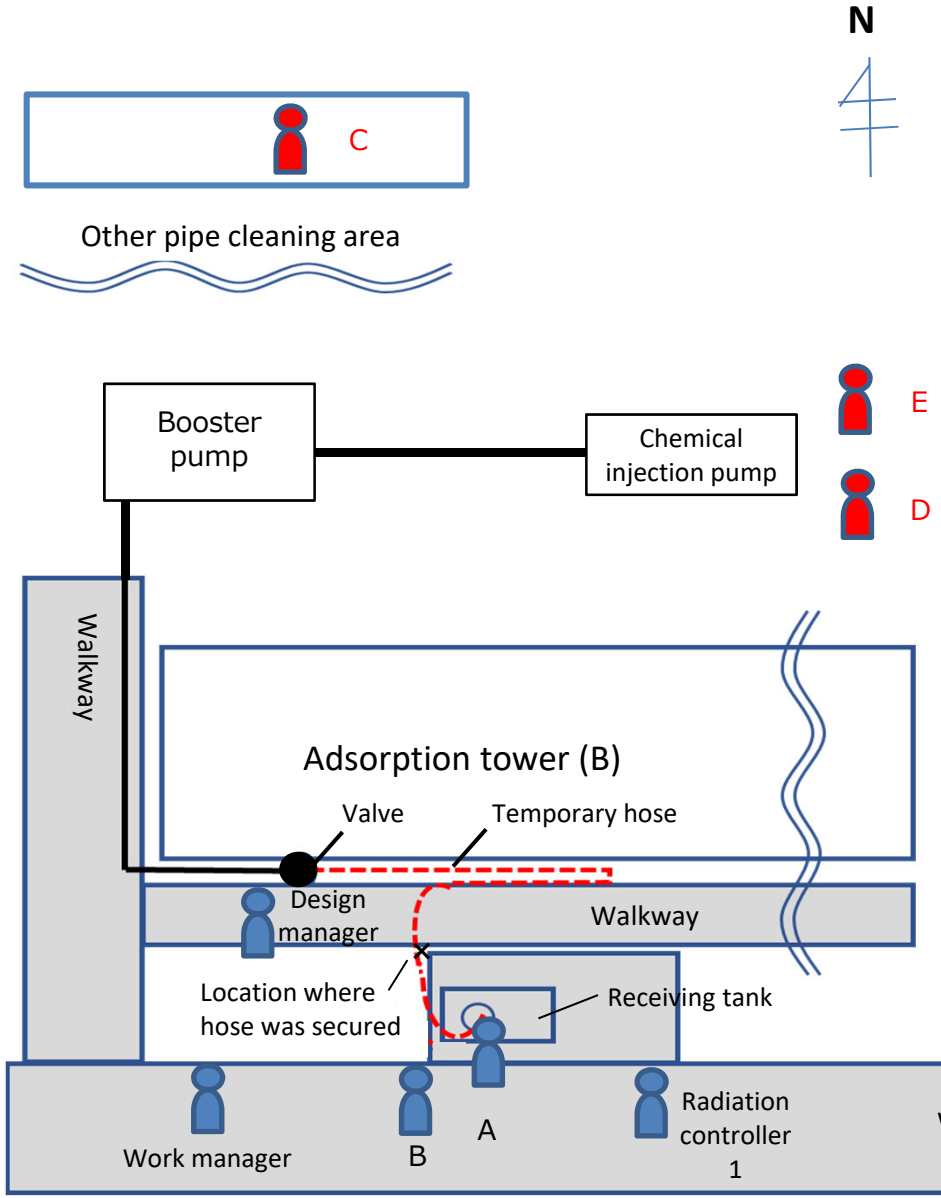


	Symbol	Responsibility	PPE
Work manager		Work management	Coveralls One layer Anorak bottom
Design manager		Monitors flow conditions inside the temporary hose	Coveralls One layer
Radiation controller	1	Radiation control duties	Coveralls Two layers
	2	Radiation control duties	Coveralls Two layers
Work supervisor (X)		Serves as proxy for third subcontractor 1 team leader	Different worksite
Workers	A	Receiving tank monitoring (assistance) ※	Coveralls Two layers
	B	Instructs work team Receiving tank monitoring (assistance) ※	Coveralls Two layers
	C	Receiving tank monitoring	Coveralls One layer Anorak top/bottom
	D	Chemical injection pump operation	Coveralls One layer Anorak top/bottom
	E	Chemical injection pump monitoring	Coveralls One layer Anorak top/bottom

: Workers wearing both tops and bottoms of Anorak suits

※ Workers A and B, who were monitoring the receiving tank (assistance), were wearing coveralls because it was assumed that they would not be subjected to body contamination on the day the task was being implemented.

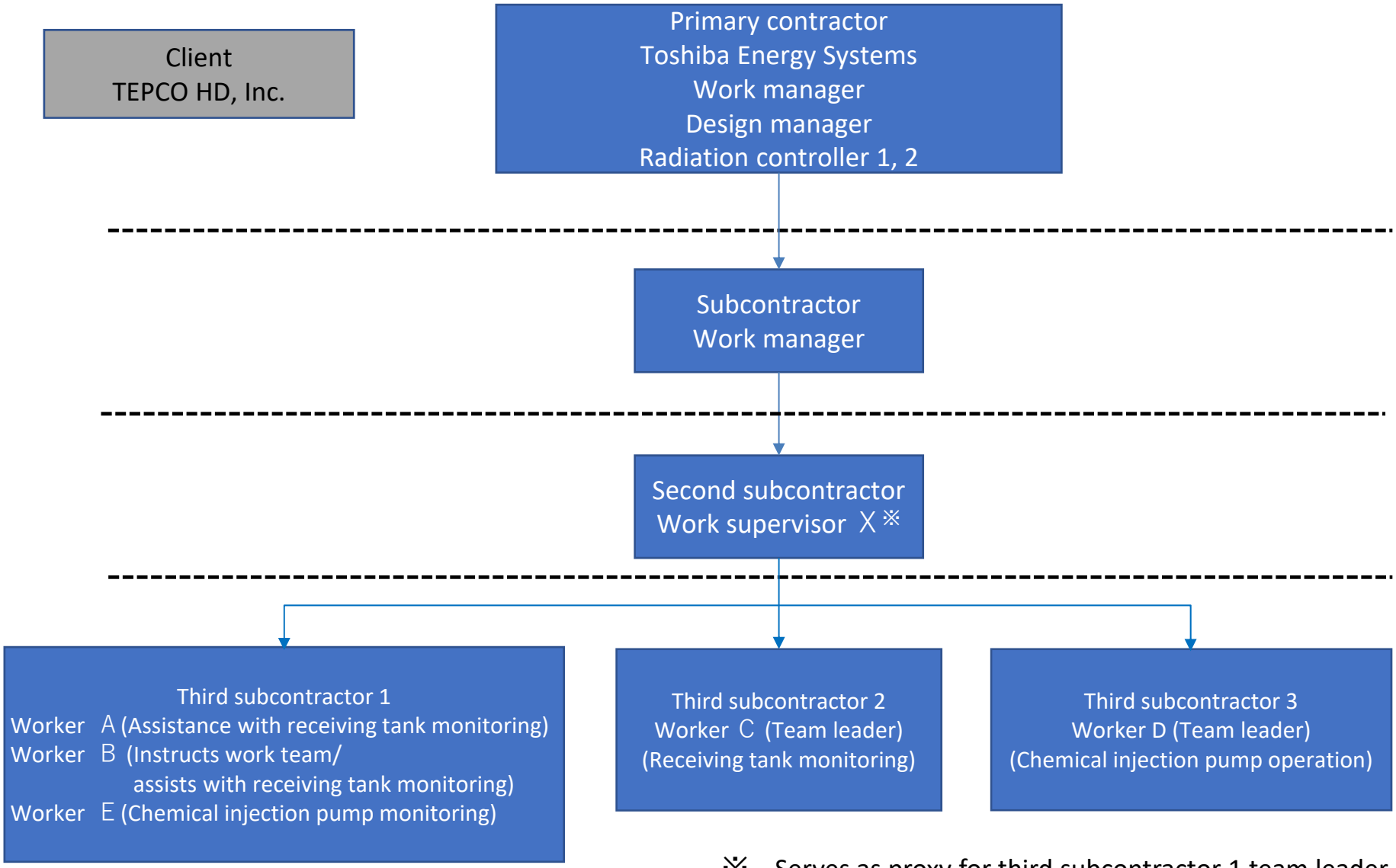
4.2 Work management system/worker assignments (At the time of the incident)



	Symbol	Responsibility	PPE
Work manager		Work management	Coveralls One layer Anorak bottom
Design manager		Monitors flow conditions inside the temporary hose	Coveralls One layer
Radiation controller	1	Radiation control duties	Coveralls Two layers
	2	Absence (on break)	—
work supervisor (X)		Serves as proxy for third subcontractor 1 team leader	Different worksite
Workers	A	Receiving tank monitoring	Coveralls Two layers
	B	Instructs work team Receiving tank monitoring (assistance)	Coveralls Two layers
	C	Checks conditions after the cleaning of other pipes	Coveralls One layer Anorak top/bottom
	D	Chemical injection pump operation	Coveralls One layer Anorak top/bottom
	E	Chemical injection pump monitoring	Coveralls One layer Anorak top/bottom

: Workers wearing both tops and bottoms of Anorak suits

4.3 Contractor work assignments



※ Serves as proxy for third subcontractor 1 team leader (absent because he was patrolling a different worksite)

The roles mentioned were determined prior to the incident

5. October 25 exposure dose

Units: mSv

worker	APD value	Internal ingestion? Y/N	Equivalent dose for skin (Total of APD value (γ+β) and equivalent dose evaluation for skin contamination)	Effective dose (Added to APD value (γ) if the result of multiplying the equivalent dose for skin by the weighted coefficient for tissue (0.01) exceeds 0.1mSv)
A	γ：0.11 β：6.6	No • No significant contamination found using face and nasal cavity smears	Under evaluation（※）	Under evaluation（※）
B	γ：0.07 β：1.6			
C	γ：0.16 β：2.0		2.2	0.16
D	γ：0.02 β：0.2		0.2	0.02
E	γ：0.02 β：0.3		0.5	0.02

※ The equivalent dose for skin and the effective dose for the worker that experienced body contamination during the cleaning of additionally installed ALPS pipes is still under evaluation. The timing of the completion of the evaluation is uncertain because the evaluation results will be summarized only after TEPCO obtains the diagnosis report from the primary contractor upon obtaining authorization from the worker, which will only be possible after the diagnosis report is provided by the hospital. Upon the completion of all these tasks, the evaluation can be finalized, and the evaluation results can be certified. Furthermore, during the course of the evaluation, if it looks like the equivalent dose for skin exceeds 500mSv/year or the effective dose received during the aforementioned work exceeds 5mSv, an immediate report to the Nuclear Regulation Authority will be made.

[Reference] October 25 exposure dose

Units: mSv

Role	APD value	Equivalent dose for skin (Total of APD value (γ＋β) and equivalent dose evaluation for skin contamination)	Effective dose (Added to APD value (γ) if the result of multiplying the equivalent dose for skin by the weighted coefficient for tissue (0.01) exceeds 0.1mSv)
Work manager	γ：0.05 β：0.7	0.8	0.05
Design manager	γ：0.05 β：0.6	0.7	0.05
Radiation controller 1	γ：0.08 β：1.5	1.6	0.08
Radiation controller 2	γ：0.06 β：0.2	0.3	0.06
Work supervisor X (at different worksite)	γ：0.06 β：0.0	0.1	0.06

※The 5 personnel mentioned above were not subjected to body contamination.

6. Toshiba Energy Systems report details

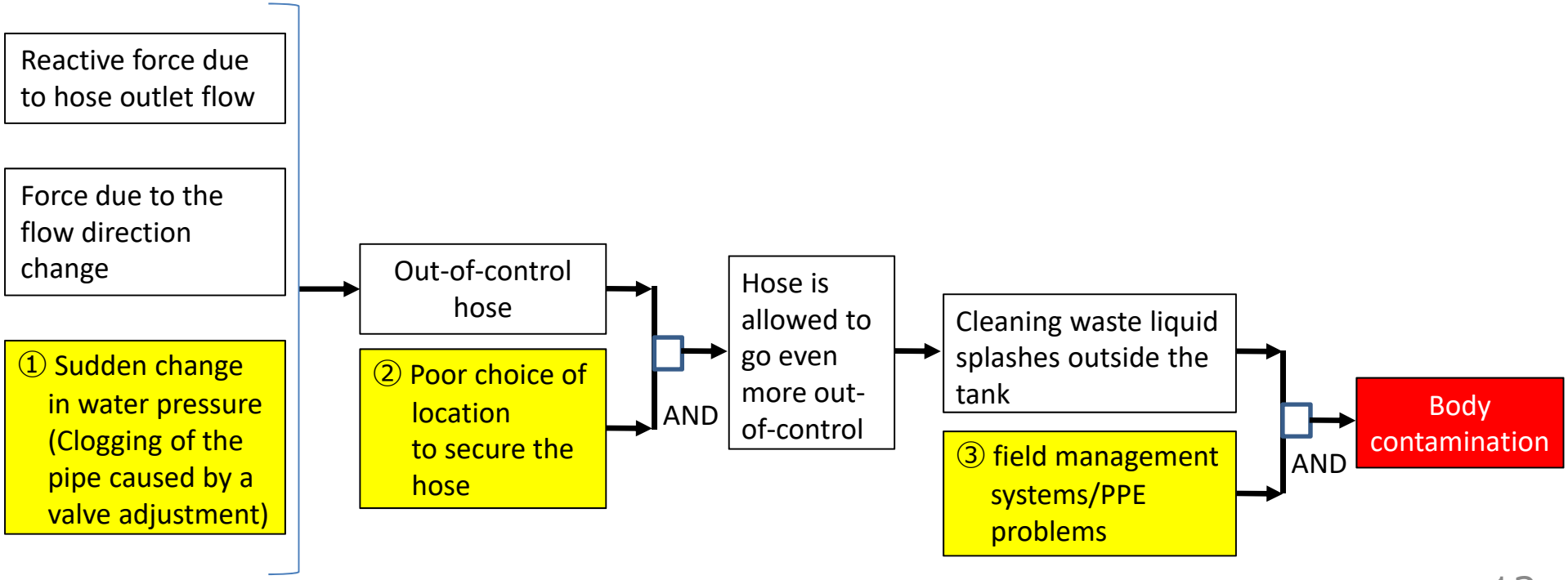
- On November 16, TEPCO received a report from Toshiba Energy Systems (hereinafter referred to as, "Toshiba") on the causes of this incident and recurrence prevention measures.

- TEPCO has closely examined the causes of this incident and recurrence prevention measures through interviews with Toshiba. Consequently, TEPCO deemed the causes of this incident and the equipment countermeasures to be suitable and asked Toshiba to implement these countermeasures.

[Reference] Cause overview (Factor block diagram)

Created with quotations from Toshiba report

- There were 3 causes that led to the body contamination of workers as mentioned below.
- The 3 causes were ① Sudden change in water pressure (clogging of the pipe caused by valve adjustment), ② Poor choice of location to secure the hose, and ③ Insufficient field management and personal protective equipment.
  The combination of these factors resulted in the occurrence of the body contamination.



[Reference] Cause ①
(Clogging of the pipe due to valve adjustment)

Created with quotations from Toshiba report

Dislodging of the hose due to valve adjustment

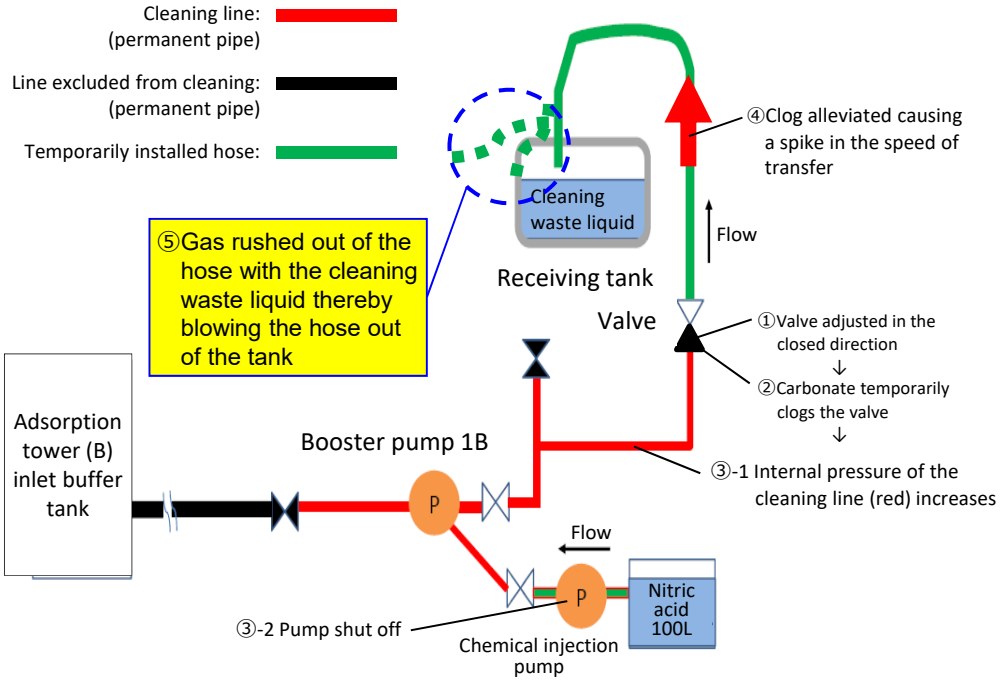
① Upon fearing an increase in the amount of cleaning waste liquid that was being expelled into the receiving tank, Toshiba's design manager on site adjusted (in the closed direction) the opening of the valve (the connection point between the permanent pipe and the temporary hose) which had not been planned, in order to expel only CO2 gas into the receiving tank.

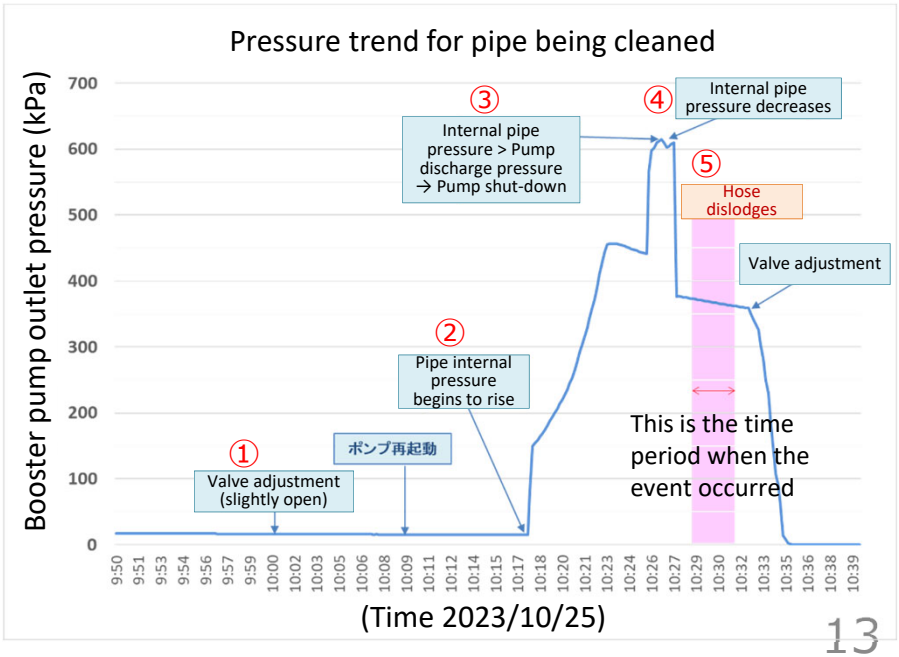
② Thereafter, it is assumed that carbonate broke off from the inside wall of the pipe due to dissolution by the nitric acid, and temporarily clogged the valve.

③ The internal pressure between the pump and the aforementioned valve (permanent pipe of the cleaning line) increased, thereby preventing the injection of nitric acid, causing the pump to shut off.

④ As the carbonate dissolved, the clog was alleviated and liquid allowed to flow, which decreased the internal pressure of the pipe causing the speed of transfer of the cleaning waste liquid downstream from the valve (temporary hose) to spike.

⑤ Gas and cleaning waste liquid rushed out of the hose, thereby causing a reactive force that dislodged the hose.

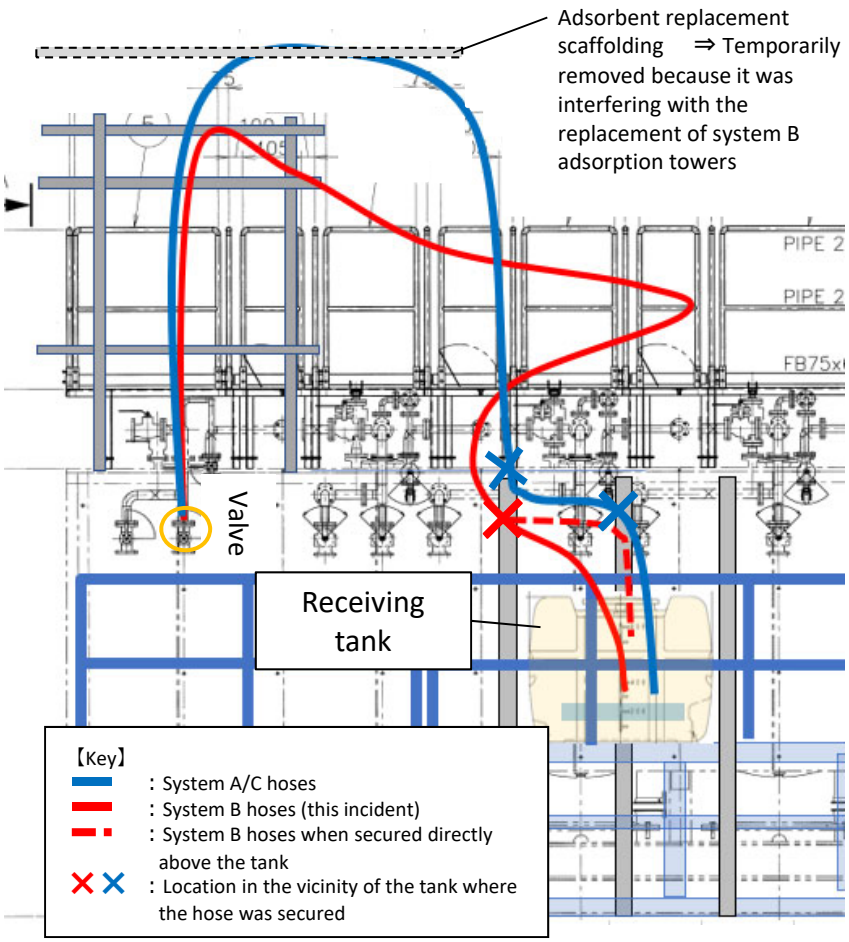




[Reference] Cause ②
(Poor choice of location to secure the hose)

Created with quotations from Toshiba report

■ Change in the location where the hose is secured



- When systems A and C were cleaned in the past, it was possible to bring the hose high up from the valve outlet, allowing a simple hose layout (blue line in the diagram).
- For system B, there were no high structures in the vicinity to secure the hose to, as observed when systems A and C were cleaned. In order to minimize any reverse slope, the hose had to be laid out in a complicated matter (red line in the diagram).
- In this case, concerns arose regarding the securing of the hose directly above the tank (red dotted line) which could lead to a shallow insertion depth into the tank, causing an increased separation between the hose tip and the liquid surface. Consequently, this arrangement would hinder the adjustment of the hose end height according to the liquid level and dust dispersion during waste cleaning liquid discharge.
- Therefore, compared to the cleaning of systems A and C, when system B was cleaned, the hose was secured at a location far from the tank thereby making it easier for the end of the hose to jump out of the tank.
- Since there were no details on where the hose should be secured in the manual, and there were no signs of the hose jumping out of the tank when systems A and C were cleaned, the primary contractor work manager decided that there would be no problem with securing the hose in the location marked by the ×.

[Reference] Cause ③
(Insufficient field management/personal protective equipment)

Created with quotations from Toshiba report

Cause	Problems	Contractor actions	Results	TEPCO requirements
Worker A was monitoring tank liquid levels without wearing an Anorak suit	①Absent work team leader Toshiba deviated from TEPCO's field management rules (fieldwork was prioritized)	• Work supervisor X, who served as proxy team leader for the third subcontractor 1, handed over the team instruction role to worker B, who was not qualified to be team leader. • Work supervisor X relocated to another worksite after implementing the safety briefing on the field. • Toshiba allowed worker B from the third subcontractor, who was not qualified to be team leader, to serve the role of team leader. • Even though the team leader plays an important role in work implementation, Toshiba (work manager) allowed the work to be carried out in the absence of the team leader. • Toshiba believed, based on past experience with the same task, that the work could be carried out in the absence of the team leader and prioritized the task with the awareness that they were deviating from TEPCO field management rules.	Body contamination occurred due to the failure to wear or instruct on the appropriate PPE (Anorak)	• There must be one team leader for each work team • The role of the team leader is to instruct workers • The team leader must be qualified to serve as a team leader (Common work specifications)
	②Lack of instructions from the work manager/radiation controller	• When worker C took over from worker A, neither the work manager nor the radiation controller instructed worker A to put on an Anorak suit because they did not think it was possible for radioactive liquid to be splashed about based on their experience in the past with the hose.		• Radiation protection guidance/instructions are given to workers (Common work specifications) (Radiation control specifications)
	③Worker A had poor awareness about the personal protective equipment he should be wearing	• Worker A was aware that he was involved in work with radioactive liquid, but based on past experience with the hose, he did not think it was possible for radioactive liquid to be splashed about and therefore decided it was not necessary to wear an Anorak suit.		• Anorak suits must be worn when engaging in work that involves radioactive liquids (Radiation control specifications)
Worker B was in the vicinity where the radioactive liquid splashed	④ It was not foreseen that radioactive liquid may splash over a wide area even though the worker was not directly working with radioactive liquid	• Worker B was aware that he was involved in work with radioactive liquid, but based on experience performing the same task in the past, did not think it was possible for radioactive liquid to be splashed about and therefore did not wear an Anorak suit. • The work manager and the radiation controller left instructions about whether or not to put on an anorak suit up to worker B who was acting as the team leader.	Body contamination occurred due to the unforeseen splashing of radioactive liquid	• Anorak suits must be worn when engaging in work that involves radioactive liquids (Radiation control specifications)

[Reference] Equipment countermeasures (1/2)

Created with quotations from Toshiba report

Countermeasures for preventing the clogging of pipes due to valve adjustments

- Adjustment of the aforementioned valve during the cleaning of pipes will be prohibited using chain locks and display tags, etc.
- In the event of any unexpected or non-routine incidents, operations will be temporarily suspended, and a response strategy, including risk assessment, will be discussed

Countermeasures to prevent the hose from being secured at a poor location

- Equipment will be fundamentally renovated so that the structure prevents waste liquid from splashing. The best location to secure the hose will be determined using a mockup to be implemented before permanent countermeasures can be put in place. Furthermore, a house structure will be used to isolate the area in order to prevent contamination from spreading if waste liquid is allowed to splash about.

《Permanent countermeasures》: The hose will be secured at a location near the joint between the hose and the tank. The joint will be directly above the tank, and measures will be implemented to prevent the hose from dislodging. And, this will be isolated with a temporary housing. Furthermore, liquid levels will not be monitored directly, but by level gauges instead.

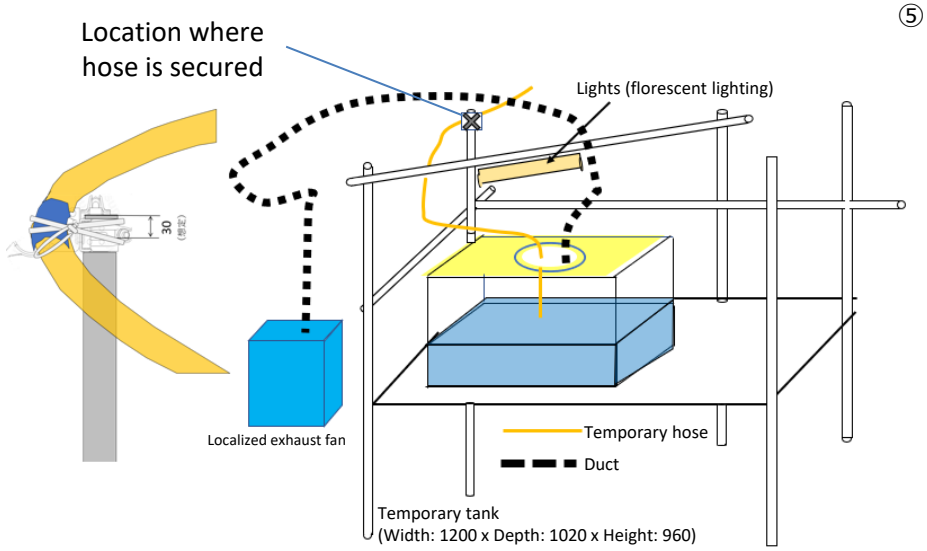


Figure 1: Current configuration

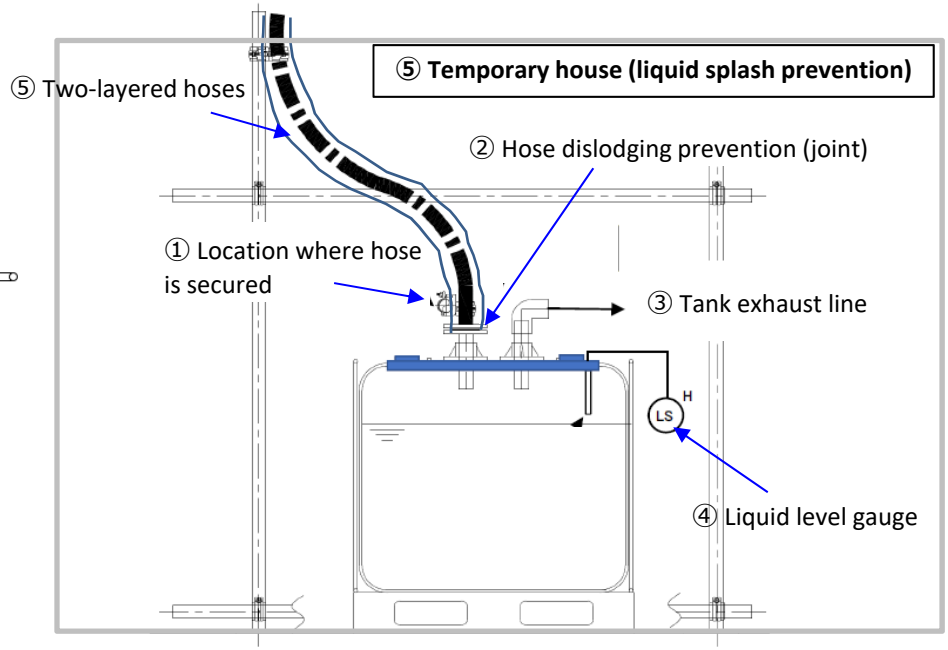


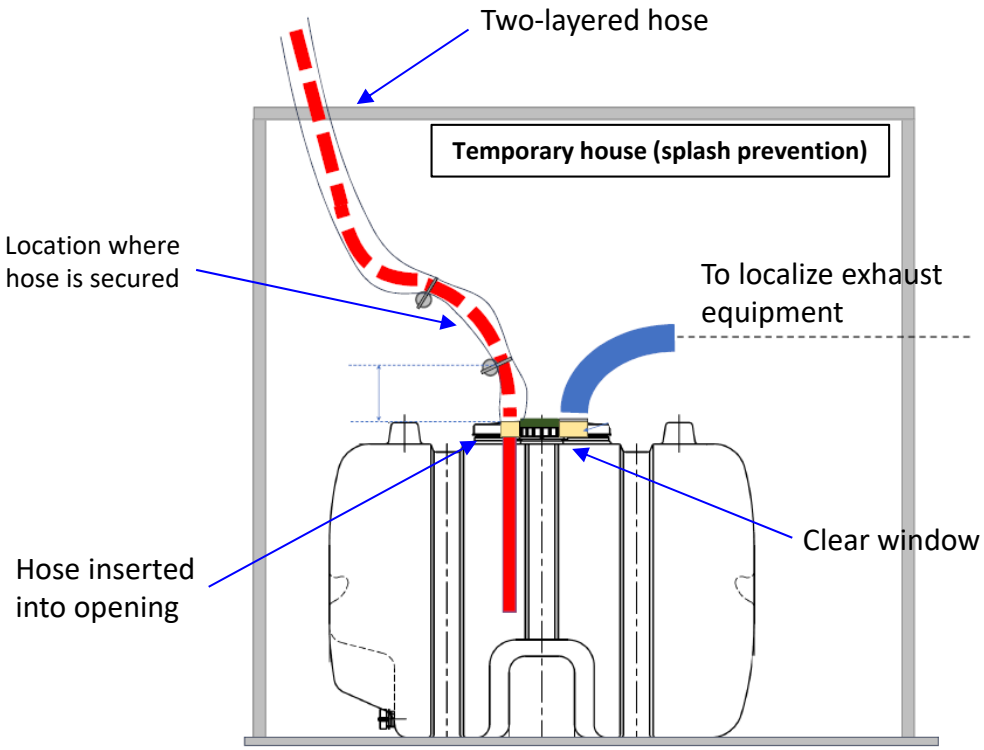
Figure 2: Concept drawing of implemented countermeasures (under deliberation)

[Reference] Equipment countermeasures (2/2)

Created with quotations from Toshiba report

《 Measures implemented until permanent countermeasures are completed 》 :

A hole that is the same diameter as the hose will be opened in the lid of the tank opening and the hose will be inserted into the hole. The hose will be secured directly above the tank lid. This will prevent the hose from dislodging from the tank. A temporary house will be built to isolate the area in order to prevent contamination from spreading in the event of a leak.



Concept drawing of temporary measures (under deliberation)

※ Upon recommencing this task, an actual hose will be used on a mockup that simulates pressure and the gas-liquid two-phase environment in order to determine the suitable insertion depth of the hose and the location at which the hose should be secured.

7. Management countermeasures

- The results of our investigation showed that Toshiba had not been abiding by some contractual management obligations required by TEPCO. TEPCO has asked Toshiba to implement corrective measures to ensure suitable work plans and field management, including protective equipment.

- TEPCO has taken this issue very seriously and is implementing recurrence prevention measures in light of this incident. These measures will also be laterally disseminated so as to ensure safety during the decommissioning process.

7. Management countermeasures (1/2)

■ Countermeasures for insufficient field management/protective equipment ＜ *For Toshiba* ＞

- As the primary contractor was not satisfying TEPCO's requirements, TEPCO has asked Toshiba to implement the following measures to ensure that work plans and field conditions are suitable. (an agreement has been reached with Toshiba about the steps it must take).
- Upon recommencement of this task, TEPCO will confirm that the primary contractor is fulfilling its duties by sending employees into the field and checking records.

Problems	Measures to be implemented
①Absent work team leader The primary contractor and subcontractor deviated from TEPCO's field management rules (fieldwork was prioritized)	• Under the supervision of the primary contractor chief, the primary contractor shall re-implement education on the role of team managers throughout all levels of its company and the primary contractor chief shall implement patrols to ascertain field conditions, and ensure that the team leaders are present and are instructing/guiding work teams
②Lack of instructions from the work manager/radiation controller	• In addition to conventional education on radiation protection, radiation control rules and the responsibilities and roles of each individual at all levels of the company, education that focuses on mutual understanding shall be reimplemented in order to prevent gaps in awareness between different layers of company management.
③Worker A had poor awareness about the personal protective equipment he should be wearing	• Under the supervision of the primary contractor chief, the primary contractor shall re-implement education on the role of team managers throughout all levels of its company and the primary contractor chief shall implement patrols to ascertain field conditions, and ensure that the team leaders are present and are instructing/guiding work teams • In addition to conventional education on radiation protection, radiation control rules and the responsibilities and roles of each individual at all levels of the company, education that focuses on mutual understanding shall be reimplemented in order to prevent gaps in awareness between different layers of company management.
④It was not foreseen that radioactive liquid may splash over a wide area even though the worker was not directly working with redirect liquid	• For work that involves the use of temporary equipment for handling liquid waste, the primary contractor shall remain aware of the possibility of splashing this liquid over a wide area and require that workers wear protective equipment if they are within the foreseen area of such splashing even if they are not directly working with radioactive liquids.

7. Management countermeasures (2/2)

TEPCO's role and measures to implement

In order to ensure the safety of its nuclear power stations and work safety, TEPCO has clarified its work management requirements and requires vendors to fulfill their contractual obligations. In order to confirm that requirements are being met, TEPCO employees have participated in advanced safety countermeasure review meetings and implemented certain measures, such as performing field checks during various work stages.

However, in light of the deviation from requirements by Toshiba that led to body contamination, we are now aware that these initiatives need to be strengthened.

- In light of this incident, TEPCO will strengthen its measures in confirming that Toshiba fulfills its obligations.
  - TEPCO employees will go into the field to check conditions when tasks are being done for the first time, when work locations are changed, and when procedures are changed. Furthermore, there will be an enhanced on-site verification, covering not only these tasks but also other activities under Toshiba's main contract.
    When performing these checks, protection instructions and field conditions will be compared to ensure that they match and to confirm who is acting as team leader, if they are fulfilling their roles, and if suitable protective equipment is being worn.

  Contractors will also be required to implement these initiatives when performing work for the first time, if the work location changes, or if there are changes to procedures.
- In the context of Toshiba's management deficiencies in this instance, our company observed ambiguity in the protective instructions submitted by Toshiba, particularly in the documentation related to work arrangements, protective equipment, and the work area. Consequently, TEPCO shall clarify its approach to and the method in which protective equipment is detailed in protection instructions and how the work area is described in these instructions
- In light of this incident TEPCO shall re-examine its contractor outsourcing system due to the fact that the contractor, Toshiba, allowed the team leader to be absent, was not sufficiently managing the worksite, and had a vague understanding of the roles and responsibilities of the primary, secondary, and tertiary subcontractors.

[Reference] Results of task checks in other work (1/2)

■ Safety management checks were performed in light of this incident

TEPCO work supervisors checked all field conditions at the Fukushima Daiichi Nuclear Power Station between November 6 and 10 to confirm the following:

1. Are work manuals clear around field management (sharing of responsibilities) and details of work tasks?
2. Are work schedules/protection instructions (hereinafter referred to as, protection instructions) sufficient?
3. Are the aforementioned parameters appropriately implemented in the field?
   - Are team leaders taking command in the field?
   - Are worker assignments and roles clear?
   - Have there been changes since the protection instructions were created?
   - Are all workers aware of what protective equipment needs to be worn, and are they wearing them appropriately?
4. Do they understand who should be notified first in the event of an emergency?
   - At Fukushima Daiichi NPS, the first person to notice an incident must immediately contact the repair team leader (in the event of field abnormalities/troubles), ER physician (in the event of an injury), or 119 (in the event of a fire)

Furthermore, all of this has been presented to contracted vendors as TEPCO requirements in the form of common work specifications, safety measure specifications, radiation control specifications, etc. and we have once again confirmed that these measures are being suitably implemented and that there is no delinquency with regard to such implementations. Furthermore, on November 7, TEPCO conveyed these initiatives to primary contractors and asked them to check the status of compliance with TEPCO requirements on a daily basis.

■ Results of reconfirming safety management systems

- ✓ No insufficiencies were found with protection instructions (for each team) in the field.
- ✓ Also, some things that will lead to future improvement were noticed during field checks. Key examples have been noted below.

[Reference] Results of task checks in other work (2/2)

【Issues noticed】

・Two team leaders were jointly writing a set of protection instructions (for different work being done at the same site)

→ Primary contractors were asked to create individual protection instructions for each work team so as to clarify assignments and the equipment needed for each work team.

・Protection instructions mentioned "protective equipment" but did not give any space for specific details.

→ Primary contractors were asked to specify details for protective equipment. As TEPCO's standard form for common work specifications does not include a space for giving details on protective equipment, the format will be revised.

・Some less-experienced workers were not clear of who to notify first.

→ We asked team leaders to follow up with this and suggested posting an emergency contact sheet in an easy-to-see location.

→ We conveyed that emergency notification numbers are saved in mobile phones (GPS phones) that are lent out.

【Best practices】

・Work was commenced after the safety briefing at field detailed field risks based on the work site and countermeasures were formulated.

・Innovative steps were taken to identify worker responsibilities when armbands could not be seen because of coveralls, such as using helmet bands or directly writing the worker's role on his/her coveralls.

【Other initiatives】

In light of the fact that some protective equipment was not worn, TEPCO has been implementing education on radiation protection behavior that incorporates warnings about this incident, since October 27. And, this training shall continue.

8. Information disclosure-related problems/countermeasures to enable the dissemination of correct information

【Problem ①】
The amount of waste cleaning liquid that was splashed

- When the incident occurred (October 25), it was explained that the amount of waste cleaning liquid found on the floor was 100ml.
- This was limited information provided by three workers, directly partaking in the clean up of the waste cleaning liquid, out of five on-site workers. Information could not be obtained from the two workers that the waste cleaning liquid had splashed on who were subsequently hospitalized.
- **Out of the strong desire to convey all information known at the time as quickly as possible, when the aforementioned information was released, it only noted "the amount found on the floor at current time," and it was not clearly conveyed that "this is the information available at this time."**
- After release of the two workers from the hospital, it was confirmed through interviews with them that the total amount of water that splashed on their bodies and onto the floor was several liters, so this additional information was provided on October 30.

Countermeasures

- If initial information is limited **and there is a possibility of additional information, that fact shall be clearly conveyed.**
- **Information shall be shared within corporate communications upon clarifying the status of information** to enable the person giving the explanation to provide correct and easy-to-understand information.

【Problem ②】
Corrections to the subcontracting system

- On the day of the incident (October 25), it was reported to TEPCO by Toshiba that all five workers belong to the same company. **Corporate communications obtained the same information from Fukushima Daiichi and mistakenly believed that "all five workers belong to the same subcontractor" and conveyed that to the media.** (The manager from the managing department had known through the work manual that there were three third subcontractors)
- Thereafter, this correct information was not shared within the managing department, and detailed information about the subcontractors involved was not updated at Fukushima Daiichi.
- At a later date, the managing department corrected the disclosed information, and it was confirmed that the five workers were from three different third subcontractors, so the disclosed information was corrected on October 30.

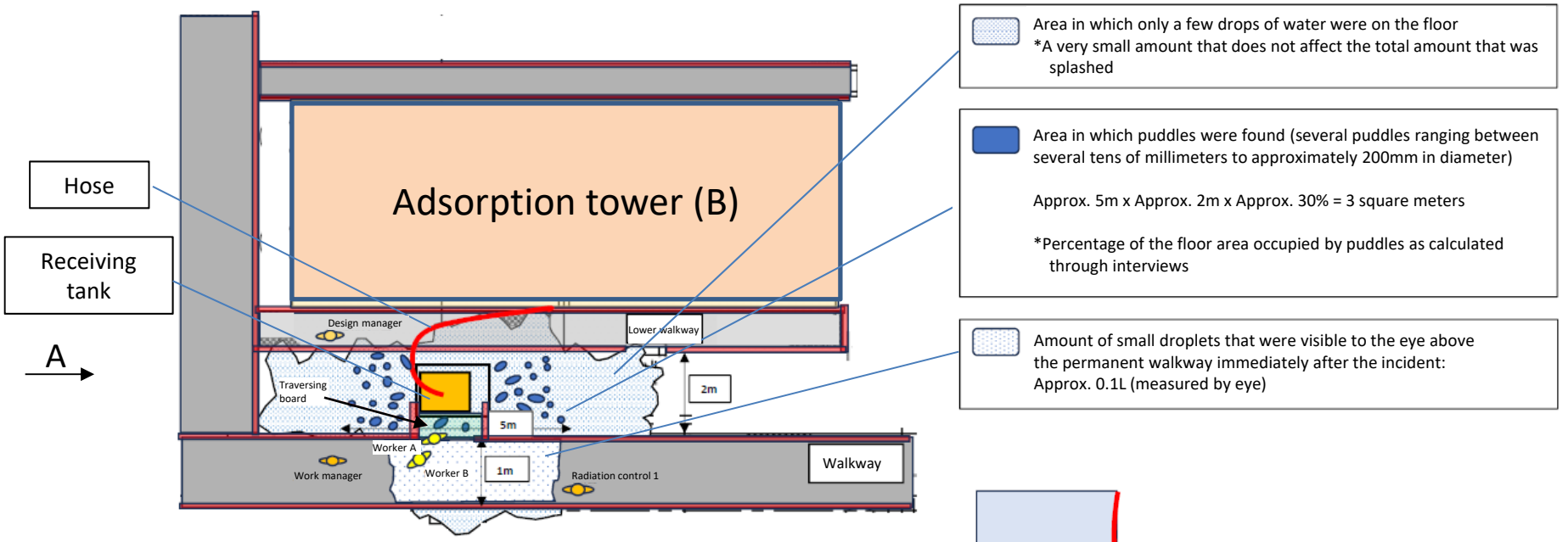
Countermeasures

- Since work details differ depending on the contractors involved, **in addition to the first notification received from the management department, corporate communications will confirm evidence** to ensure that the information collected is correct as we strive to quickly convey accurate information.

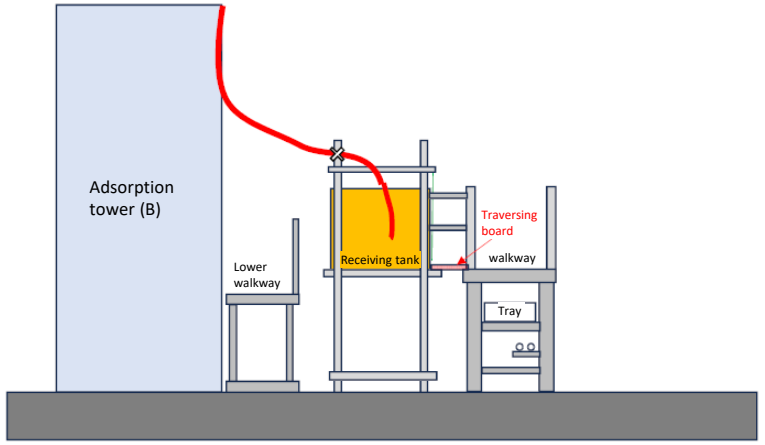
[Reference] Splashed waste cleaning liquid

Created with quotations from Toshiba report

- Interviews with workers in the area and workers that were involved in decontaminating the area have indicated that several liters of water had splashed, including the water that splashed on workers.

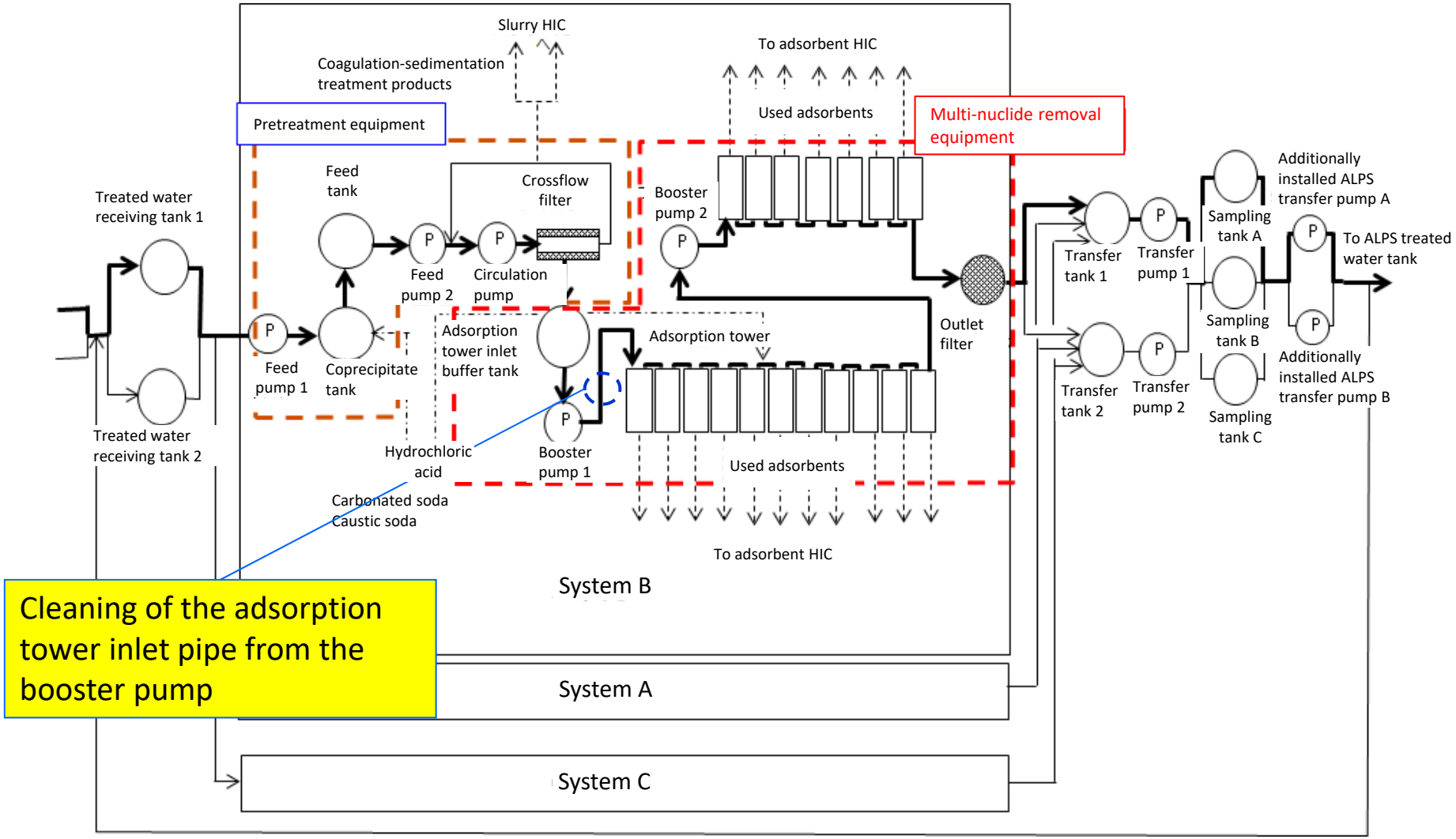


Water splashed on the floor



Cross-section (from direction A)

[Reference] System diagram of additionally installed ALPS



[Reference] Certification requirements for work team leaders and work supervisors

TEPCO

Certification requirements

1. Work team leader

a. The number of years of experience in the aforementioned type of work
- 5 or more years experience with nuclear power outages or similar work (*1)
- 3 or more years of experience is required for applicants that have graduated from university or vocational school

b. Must be 23 years of age or older

c. Must have no health concerns that may hinder the aforementioned work

d. Must have completed foreman education pursuant to Clause 60 of the Industrial Safety and Health Act

e. Must have completed training based on team leader training curriculum (*2). (Applicants must repeat training within the valid certification period)

f. Amount of required experience at the Fukushima Daiichi Nuclear Power Station following the disaster (March 11, 2011)
- 3 months or more experience working at the post-disaster Fukushima Daiichi Nuclear Power Station

※1 Thermal power plant outages or nuclear power plant construction, repairs or daily repair work (unit price contract work), etc.

※2 Subjects related to safety management, radiation control, quality control, nuclear power equipment, etc.

2. Work supervisors (maintenance example*)

a. Applicants that satisfy requirements ① and ② below

① Must have completed all required training and certifications. Certifications include skills certification class B, parts of class C, and training that uses soft skill training educational materials

② Must have undergone fire protection education and hazard prediction training within one year of application.

※ Details differ depending on the type of work supervisor (maintenance, civil engineering, construction, radiation controllers, etc.)

The relationship between protection instructions and the incident

- Radiation protection instructions mention of the wearing of anorak suits and it is consistent with TEPCO rules.
- The work team leader signed the team leader column meaning that a team leader were to be on-site.