

# **Contaminated Soil Investigations and Groundwater Monitoring Plan Following the Water Leak at H4 Area**

August 23, 2013

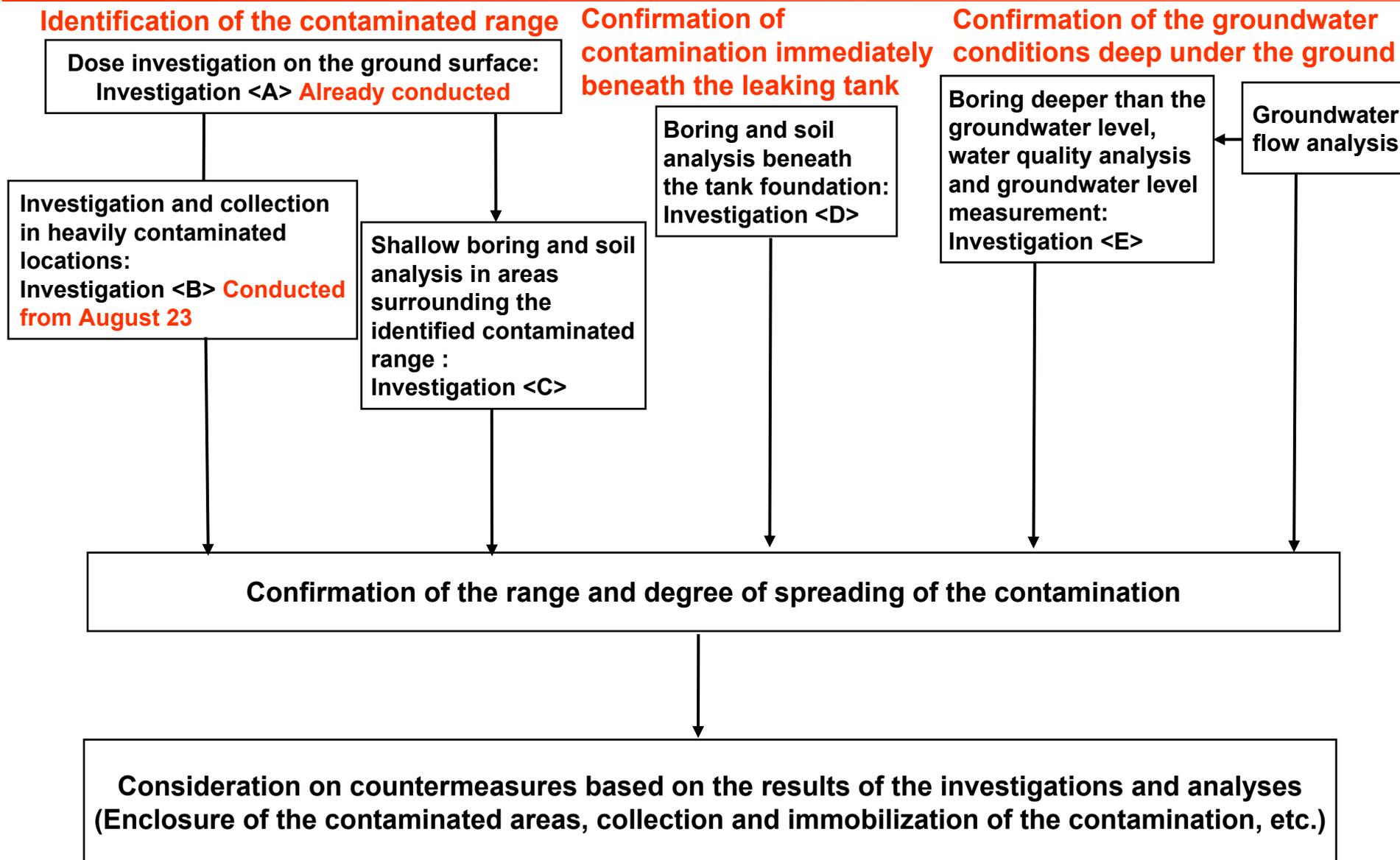
Tokyo Electric Power Company



**東京電力**

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# 1. Flow Chart of Investigations and Consideration of Countermeasures



## 2. Investigation Plans (Tentative)

### Investigations to identify the contaminated range

#### (1) Identification of the contaminated range

(In the planar direction):

Dose measurement on the ground surface → Investigation <A>

(In the depth direction):

Investigation and collection of heavily contaminated soil → Investigation <B>

(Both in the planar direction and in the depth direction):

Shallow boring and soil analysis in areas surrounding the identified contaminated range → Investigation <C>

#### (2) Confirmation of contamination immediately beneath the leaking tank:

Boring and soil analysis beneath the tank foundation → Investigation <D>

#### (3) Confirmation of the groundwater conditions deep under the ground

(confirmation of influences on the environment):

Boring deeper than the groundwater level, and water quality analysis and groundwater level measurement (requiring continuous monitoring) → Investigation <E>

\* Boring locations will be determined based on results of the groundwater analysis and investigations listed above as (1) and (2).

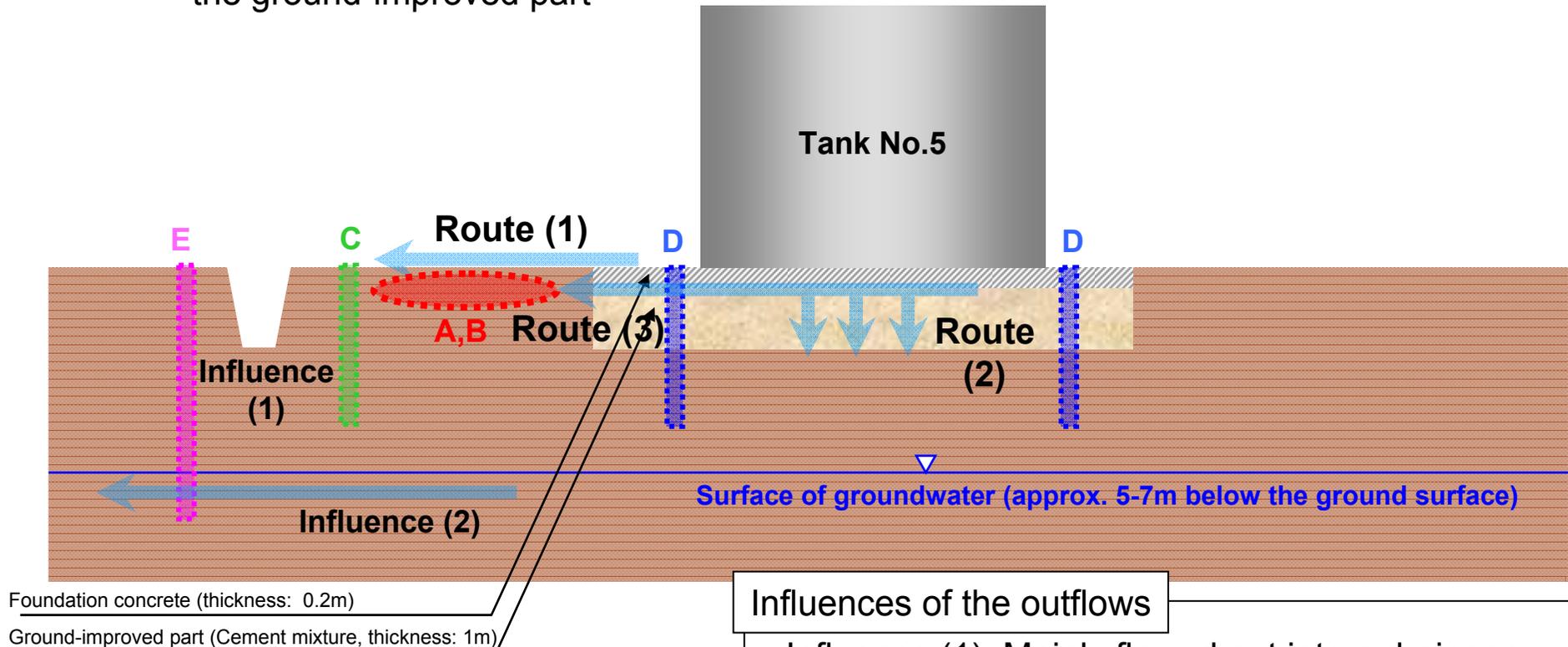
### 3. Outflow Routes and Range of the Contaminated Water and Schematic Plan of Investigations on the Routes and Range (Tentative)

#### Possible outflow routes

Route (1): Water flowed out from a valve to the outside of the dike

Route (2): Water flowed out directly from the foundation of the tank

Route (3): Water flowed out to the outside of the dike from between the foundation concrete and the ground-improved part

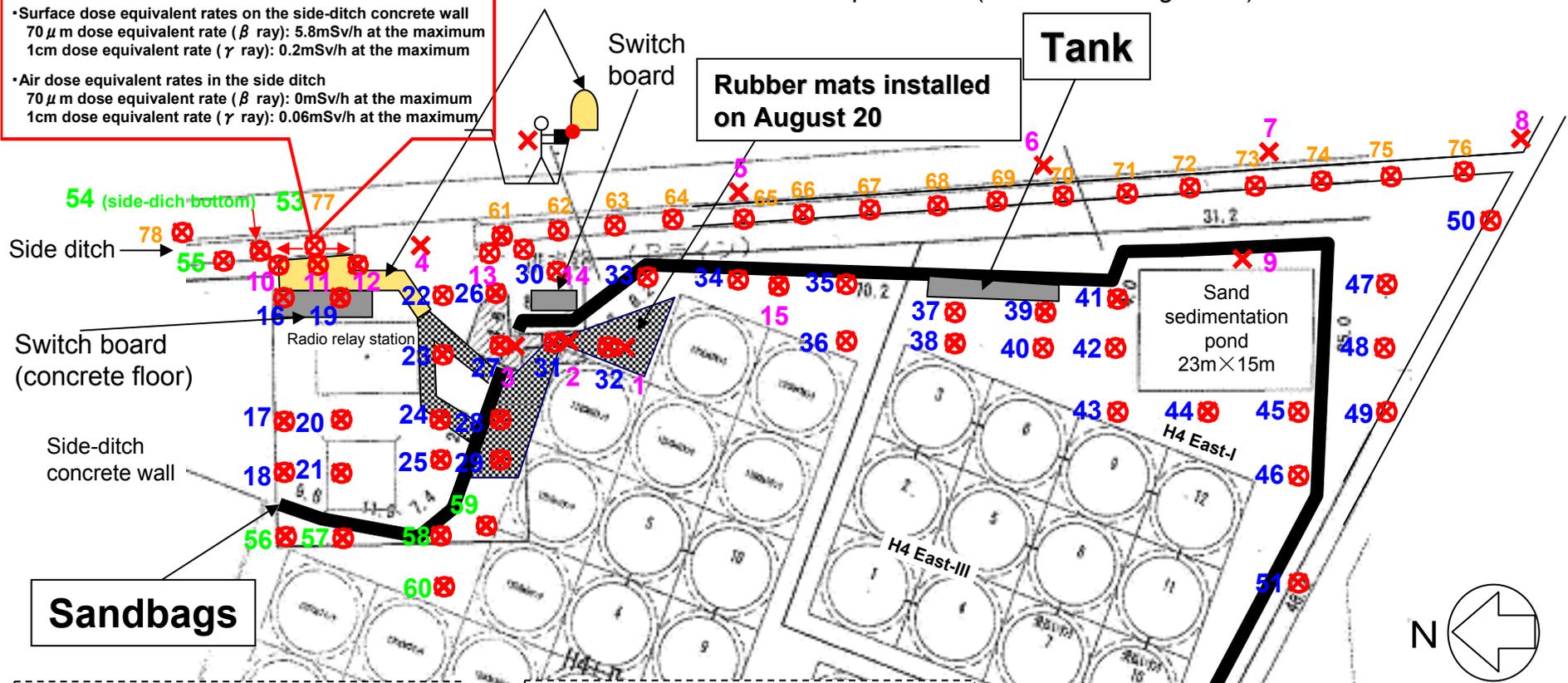


# 4. Dose investigation on the ground surface: Investigation <A>

**August 12 (Wed), 2013 2: 30 PM or later**

- Surface dose equivalent rates on the side-ditch concrete wall  
70 μm dose equivalent rate (β ray): 5.8mSv/h at the maximum  
1cm dose equivalent rate (γ ray): 0.2mSv/h at the maximum
- Air dose equivalent rates in the side ditch  
70 μm dose equivalent rate (β ray): 0mSv/h at the maximum  
1cm dose equivalent rate (γ ray): 0.06mSv/h at the maximum

Covered with blue sheets for protection (Installed on August 20)



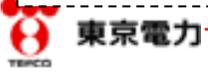
Measurement point 1-15  
Date and time of measurement:  
4:00 – 5:00 PM on August 19, 2013  
Weather: Sunny

Measurement point 53-60  
Date and time of measurement:  
2:30 – 3:10 PM on August 21, 2013  
Weather: Sunny

Measurement point 16-52  
Date and time of measurement:  
4:00– 5:00 PM on August 20, 2013  
Weather: Rainy

Measurement point 61-78  
Date and time of measurement:  
2:40 – 4:20 PM on August 22, 2013  
Weather : Sunny

⊗ Measurement point of surface dose rate  
⊗ Measurement point of ambient dose rate



## ■ Dose rate measurement results

Measurement point 1-15

Date and time of the measurement:  
4:00 – 5:00 PM on August 19, 2013

Unit: [mSv/h]

Measure ment point	Measure ment date	Dose rate		Weather	Note
		Dose equivalent rate measured from 70 μm (β ray)	Dose equivalent rate measured from 1cm (γ ray)		
1	8/19	>98.5	1.5	Sunny	No rubber mat, approx. 50cm above the ground
2	8/19	5.4	0.1	Sunny	No rubber mat
3	8/19	0.03	0.05	Sunny	No rubber mat
4	8/19	0	0.04	Sunny	
5	8/19	0	0.06	Sunny	
6	8/19	0	0.06	Sunny	
7	8/19	0	0.045	Sunny	
8	8/19	0	0.06	Sunny	
9	8/19	0.135	0.015	Sunny	
10	8/19	89.64	0.36	Sunny	No sheet
11	8/19	95.55	0.45	Sunny	No sheet
12	8/19	89.65	0.35	Sunny	No sheet
13	8/19	0.28	0.07	Sunny	
14	8/19	0.01	0.11	Sunny	
15	8/19	0.009	0.015	Sunny	

Measurement point 16-30

Date and time of the measurement:  
4:00 – 5:00 PM on August 20, 2013

Unit: [mSv/h]

Measure ment point	Measure ment date	Dose rate		Weather	Note
		Dose equivalent rate measured from 70 μm (β ray)	Dose equivalent rate measured from 1cm (γ ray)		
16	8/20	8.96	0.04	Rainy	On concrete
17	8/20	0.03	0.10	Rainy	
18	8/20	0.02	0.08	Rainy	
19	8/20	1.96	0.04	Rainy	On concrete
20	8/20	0.02	0.08	Rainy	
21	8/20	0.09	0.08	Rainy	
22	8/20	0.12	0.03	Rainy	
23	8/20	2.90	0.10	Rainy	
24	8/20	0.04	0.16	Rainy	On rubber mat
25	8/20	1.24	0.06	Rainy	
26	8/20	0	0.11	Rainy	
27	8/20	0.04	0.03	Rainy	Same as No.3
28	8/20	0.08	0.03	Rainy	On rubber mat
29	8/20	0.8	1.2	Rainy	On rubber mat
30	8/20	0.02	0.12	Rainy	

\* Measurement device: Shallow ionization chamber survey meter (AE-133B)

## ■ Dose rate measurement results

Measurement point 31-52

Date and time of the measurement:  
4:00 – 5:00 PM on August 20, 2013

Unit: [mSv/h]

Measure ment point	Measure ment date	Dose rate		Weather	Note
		Dose equivalent rate measured from 70 μm (β ray)	Dose equivalent rate measured from 1cm (γ ray)		
31	8/20	4.89	0.11	Rainy	On rubber mat, same as No.2
32	8/20	15	1	Rainy	On rubber mat, same as No.1
33	8/20	0	0.06	Rainy	
34	8/20	0.06	0.02	Rainy	
35	8/20	0.01	0.02	Rainy	
36	8/20	0	0.02	Rainy	
37	8/20	0.03	0.04	Rainy	
38	8/20	0.01	0.04	Rainy	
39	8/20	0	0.04	Rainy	
40	8/20	0.03	0.03	Rainy	
41	8/20	0	0.03	Rainy	
42	8/20	0	0.03	Rainy	
43	8/20	0.06	0.03	Rainy	
44	8/20	0	0.03	Rainy	
45	8/20	0	0.03	Rainy	

Measurement point 53-60

Date and time of the measurement:  
2:30 – 3:10 PM on August 21, 2013

Unit: [mSv/h]

Measure ment point	Measure ment date	Dose rate		Weather	Note
		Dose equivalent rate measured from 70 μm (β ray)	Dose equivalent rate measured from 1cm (γ ray)		
46	8/20	0.01	0.02	Rainy	
47	8/20	0	0.04	Rainy	
48	8/20	0	0.04	Rainy	
49	8/20	0.03	0.03	Rainy	
50	8/20	0.04	0.03	Rainy	
51	8/20	0.02	0.03	Rainy	
52	8/20	0.02	0.03	Rainy	
53	8/21	5.80	0.20	Sunny	
54	8/21	0	0.06	Sunny	
55	8/21	0.02	0.08	Sunny	
56	8/21	0	0.05	Sunny	
57	8/21	0.01	0.04	Sunny	
58	8/21	0.01	0.04	Sunny	
59	8/21	0.01	0.04	Sunny	
60	8/21	0	0.05	Sunny	

\* Measurement device: Shallow ionization chamber survey meter (AE-133B)

## ■ Dose rate measurement results

Measurement point 61-78  
Date and time of the measurement:  
2:40 – 4:20 PM on August 22, 2013

Unit: [mSv/h]

Unit: [mSv/h]

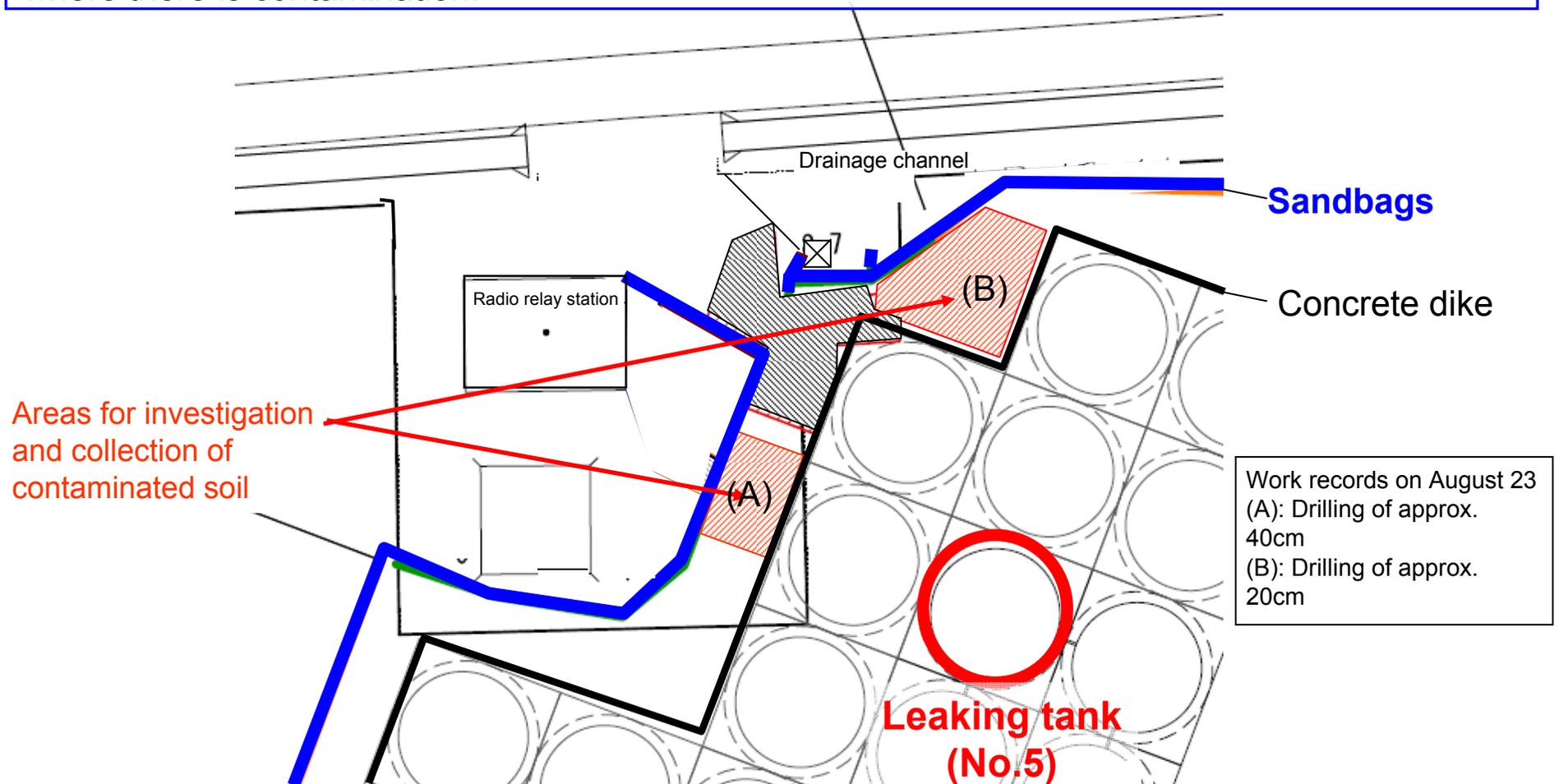
Measure ment point	Measure ment date	Dose rate		Weather	Note
		Dose equivalent rate measured from 70 $\mu$ m ( $\beta$ ray)	Dose equivalent rate measured from 1cm ( $\gamma$ ray)		
61	8/22	0.005	0.010	Sunny	
62	8/22	0.004	0.010	Sunny	
63	8/22	0.005	0.011	Sunny	
64	8/22	0.004	0.011	Sunny	
65	8/22	0.001	0.011	Sunny	
66	8/22	0.002	0.011	Sunny	
67	8/22	0	0.012	Sunny	
68	8/22	0.002	0.013	Sunny	
69	8/22	0.003	0.011	Sunny	

Measure ment point	Measure ment date	Dose rate		Weather	Note
		Dose equivalent rate measured from 70 $\mu$ m ( $\beta$ ray)	Dose equivalent rate measured from 1cm ( $\gamma$ ray)		
70	8/22	0.001	0.011	Sunny	
71	8/22	0.001	0.011	Sunny	
72	8/22	0.002	0.011	Sunny	
73	8/22	0	0.010	Sunny	
74	8/22	0.001	0.010	Sunny	
75	8/22	0.001	0.009	Sunny	
76	8/22	0	0.010	Sunny	
77	8/22	0.143	0.007	Sunny	Same as No.53
78	8/22	0.002	0.008	Sunny	

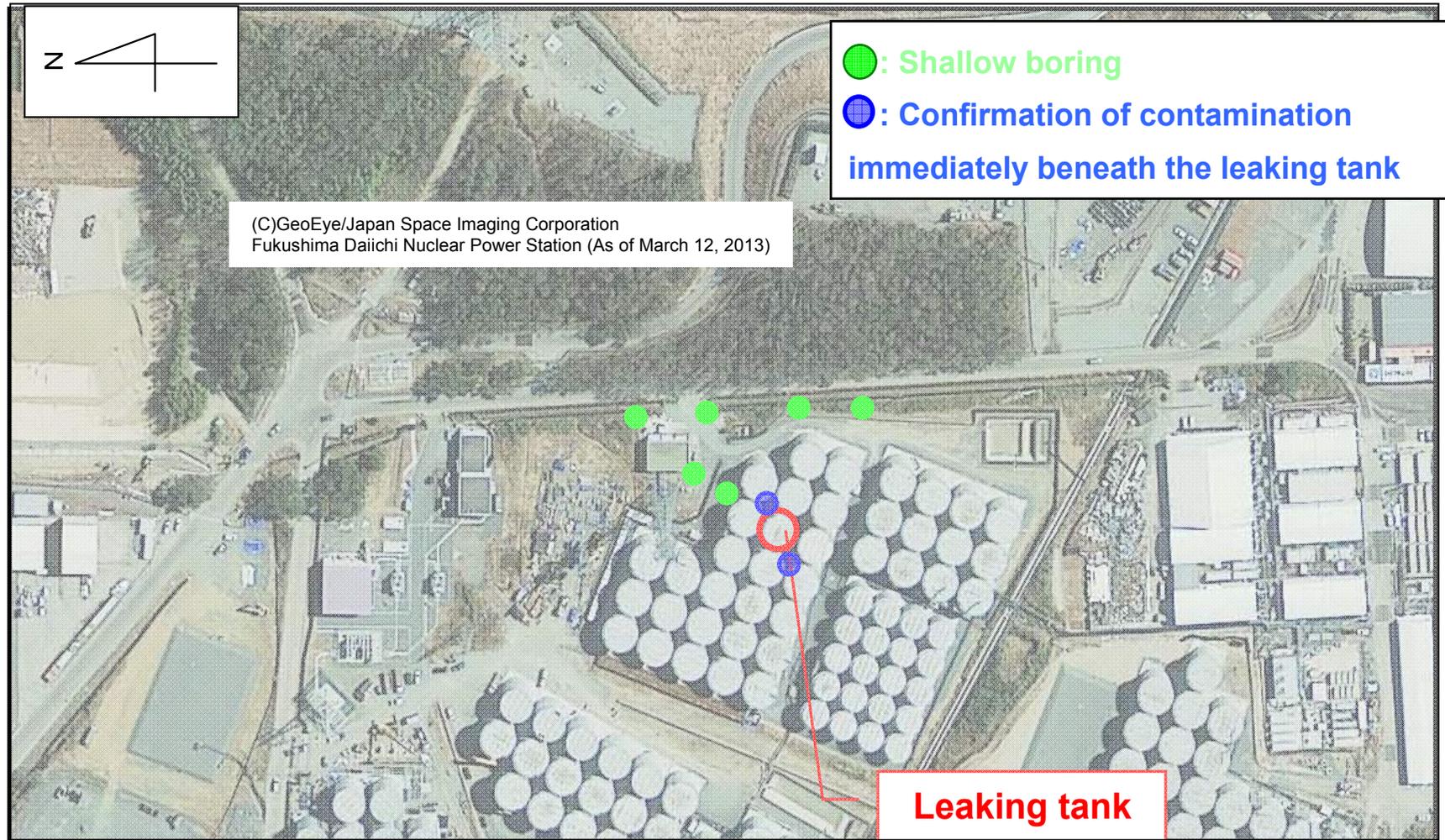
\* Measurement device: Shallow ionization chamber survey meter (AE-133B)

## 4. Investigation and Collection of Heavily Contaminated Soil: Investigation <B>

- Conduct experimental drilling in the contaminated range for the purposes of confirming the conditions of contamination in the depth direction and collecting contaminated soil.
- Check dose rates after drilling to the depth of approx. 50cm. Conduct further drilling in a case where there is contamination.



## 5. Shallow Boring, and Boring and Soil Analysis Immediately Beneath the Tank Foundation: Investigations <C> and <D>



## 6. Boring deeper than the groundwater levels, water quality analysis and groundwater level measurement: Investigation <E>

