

[Webinar] 10 years after the Fukushima nuclear crisis – The spread of radioactive material

October 18th, 2020

Situation updates : What is happening on the radioactive materials?



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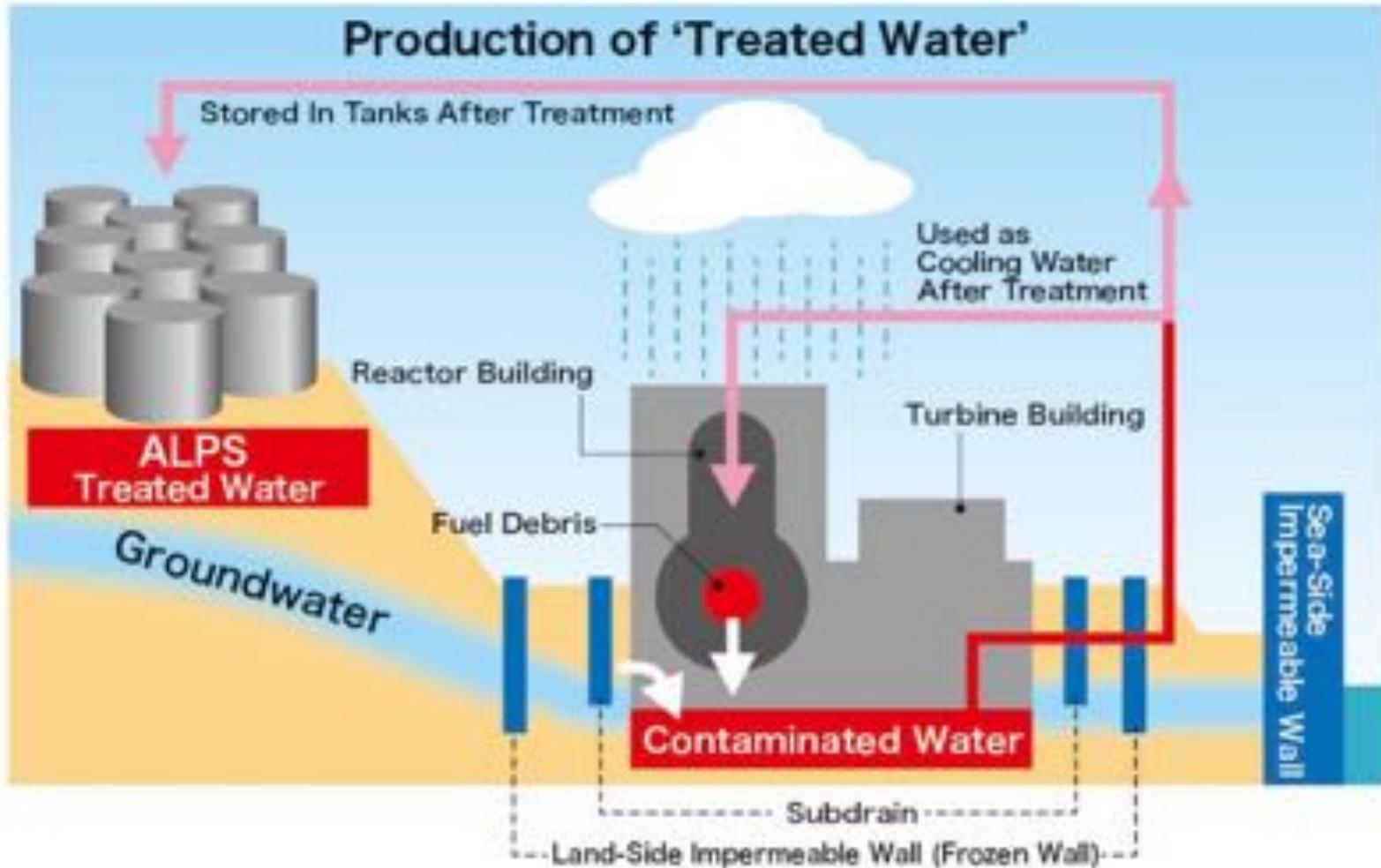
Japan to release treated water from crippled Fukushima plant into sea

“The Japanese government plans to release into the sea treated radioactive water from the Fukushima Daiichi nuclear power plant crippled by a powerful earthquake and tsunami in 2011 amid concerns over the environmental impact, sources close to the matter said Thursday.

An official decision may be made as early as this month and will put an end to seven years of debate over how to dispose of the water used to cool the power station that suffered core meltdowns in the disasters.” *October 16, 2020 - Kyodo News*

<https://english.kyodonews.net/news/2020/10/fe0fae3622a5-urgent-japan-to-release-treated-water-from-fukushima-plant-into-sea.html>

What is Treated but still contaminated water?



Status of ALPS(Advanced Liquid Processing System) treated contaminated water

Over 1.2 million m³

860 trillion becquerels of tritium

The Fukushima Dai-ichi NPS released 2.2 trillion becquerels into the sea per year in 2010.

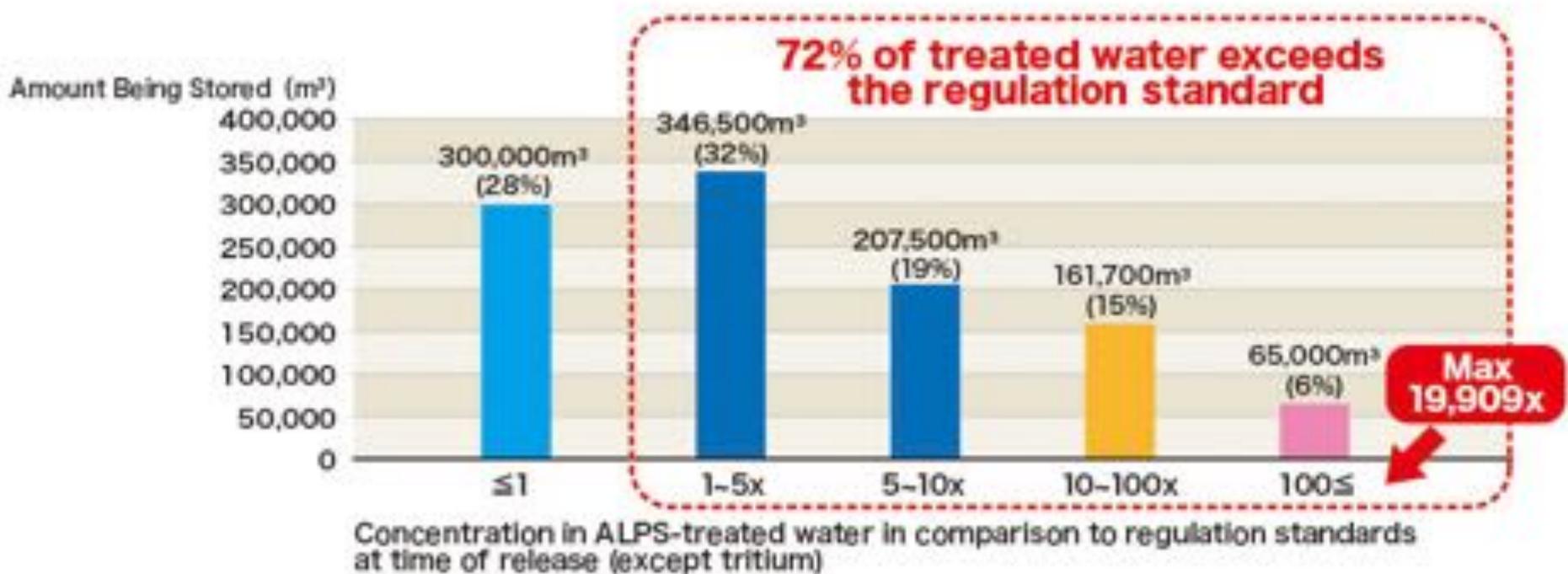
Liquid emissions from BWRs in Japan:

approximately 0.31 ~ 1.9 trillion Bq/year

Some overseas reprocessing plants release 10¹⁶ Bq/year.

Radioactive materials such as cesium 137, cesium 134, strontium 90, and iodine 129 remain in the water, and water containing more than 70% of radioactive materials exceeds the limit.

More than 70% of the water in the tanks exceeded the standard value for the total of 62 nuclides other than tritium.



Diluted and released.

secondary treated, diluted,
and released.

Report of the Subcommittee on the handling of ALPS treated water under METI

- The disposal of ALPS treated water should also be completed by the time the decommissioning of the Fukushima Dai-ichi NPS is completed, in 30 – 40 years from December 2011.
- Vapor release and discharge into the sea have been conducted and recognized as feasible methods.
- There are precedents for discharge into the sea in Japan and it is easy to operate necessary facilities. Thus this can be conducted with certainty.

Draft of "disposal" of water announced by TEPCO on March 24

- It does not release large amounts of tritium at a time, and the annual tritium release is estimated to be over the 30 to 40 year period required for decommissioning
- "secondary treatment" - Reduction of nuclides other than tritium as much as possible - > Reduce total concentration to less than the notified concentration limit of 1
- For ocean releases, dilute with seawater. Review the operation standard of 1,500 Bq/L for groundwater bypass and subdrain.
- conduct sampling and analysis in the vicinity of the outlet

Fishermen repeatedly express their opposition

- Local fishermen as well as Mr. Tetsu Nozaki, head of the Fukushima Prefectural Federation of Fisheries Co-operative Associations, have repeatedly voiced their opposition.

“We make a living by catching fish grown in the local ocean. From this point of view, we are strongly opposed to the discharge of treated water into the sea and call for strict land storage.”

- The Federation of Ibaraki Coastal Fisheries Cooperative Associations also expressed their opposition
- The National Federation of Fishermen's Associations unanimously adopted a special resolution saying, "be staunchly opposed to the release of ~ into the ocean".

多核種除去設備等処理水の取扱いに関する小委員会 における取りまとめを受けた意見書

「多核種除去設備等処理水の取扱いに関する小委員会」の議論が終了し、処理水の処分方法について、水蒸気放出及び海洋放出を技術的に実績のある選択肢とし、「海洋放出の方が確実に実施できる」とする取りまとめ（案）が国へ提言された。

我々福島県の漁業者は、地元の海洋を利用し、その海洋に育まれた魚介類を漁獲することを生業としている観点から、海洋放出には断固反対であり、タンク等による厳重な陸上保管を求める。

我々は、国が廃炉に向け進めてきた重要事項の一つ汚染水対策において、原発建屋へ流入する地下水を減少させ、汚染水の総量を抑制させるための対策として、地下水バイパス・サブドレンの運用に苦渋の決断ながら協力してきた。

また、その過程において、トリチウムを含む水については、「関係者の理解なしにはいかなる処分も行わない」旨の回答を受けている。

本県沿岸漁業では、「鮮魚」という対象から全量検査を行えないが、操業口毎一魚種一枚体以上の抽出検査を行い、科学的調査・分析により安全を確認して試験漁業を実施し流通させてきた。

令和元年の本県漁業は被災前漁獲量の約14%にとどまっているが、国による出荷制限が全て解除され、これから増産に向け舵を切るところであり、トリチウム処理水の海洋放出には絶対反対である。

令和2年4月6日

福島県漁業協同組合連合会
代表理事会長 野 崎 啓



“From the viewpoint that we make a living by using the local ocean and catching the fish and shellfish grown in the ocean, we are strongly opposed to the discharge into the ocean and require strict land storage using tanks, etc.”

History of contaminated water

- In April 2011, a highly contaminated water leakage into the ocean was discovered. At least about 500 tons.
- In April 2011, TEPCO released 10,000 tons of "low-concentration contaminated water" radioactive materials into the ocean as "unavoidable action in an emergency" (intentionally). There was no consultation with fishermen. The Japan Federation of Fisheries Cooperatives and others lodged a protest against TEPCO.
- On April 4, 2011, 4,080 Bq/kg of radioactive iodine and 447 Bq/kg of radioactive cesium were collected from sand lance in Kita-Ibaraki Prefecture, Japan. On April 13, 12,500 Bq/kg of radioactive cesium and 12,000 Bq/kg of radioactive iodine were detected in a sand lance off the coast of Iwaki City.
- On July 22, 2013, TEPCO later admitted that highly contaminated groundwater, which had been pointed out even before the leak of contaminated water, was continuing to flow from the premises of the Dai-ichi NPS. "Seawater and contaminated water in the harbor come and go underwater." TEPCO said.
- March 2014: "groundwater bypass" Plan approved. July 2015 "subdrain plan" approved. Water release started (1500 Bq/kg).
- At this time, Fukushima prefectural fisheries cooperative association requested ALPS water should not be released if it is "fail to gain public understanding" not only by fishermen. - Tokyo Electric Power Company promised not to punish "Without the understanding of stakeholders".

The Federation of All Fisheries Cooperative Associations submitted a request to the government not to discharge the treated water into the ocean.

この記事シェア



福島

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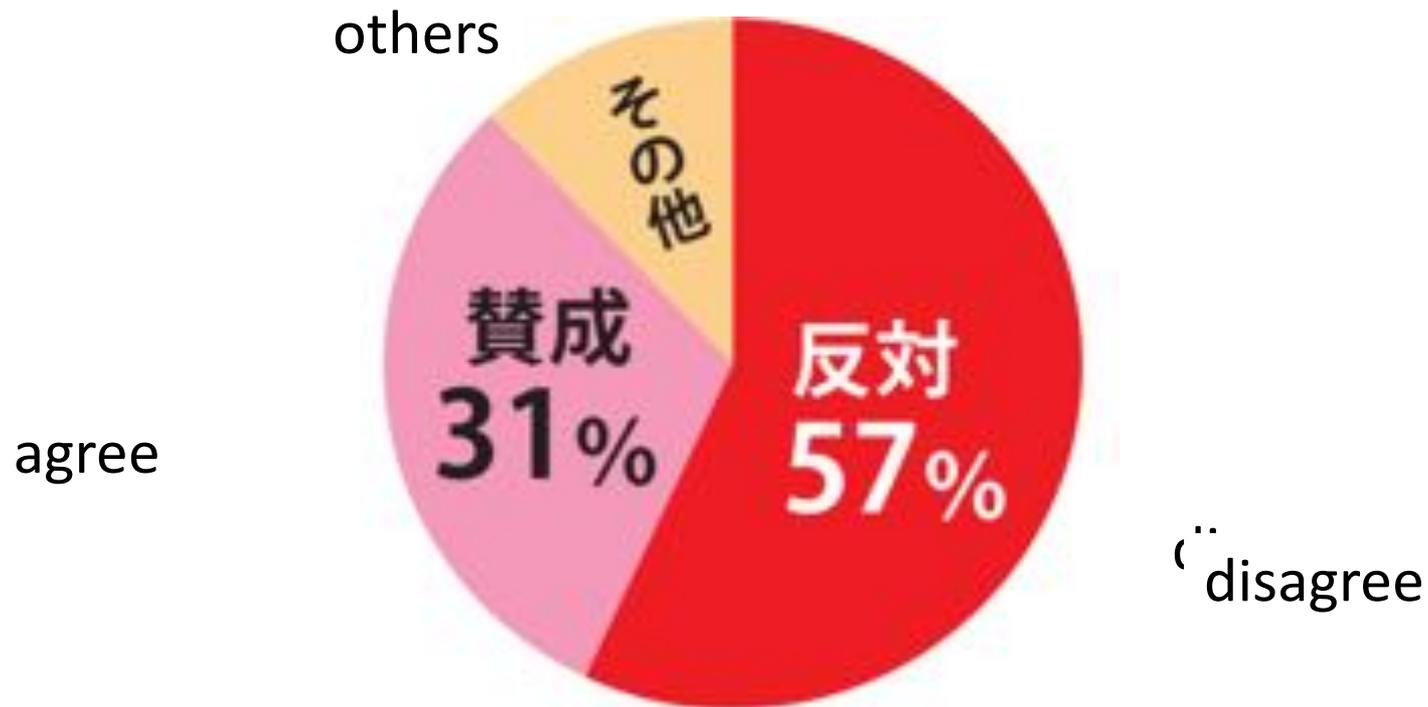


Survey of fisheries cooperatives in six prefectures (Iwate, Miyagi, Fukushima, Ibaraki, Chiba, and Tokyo)

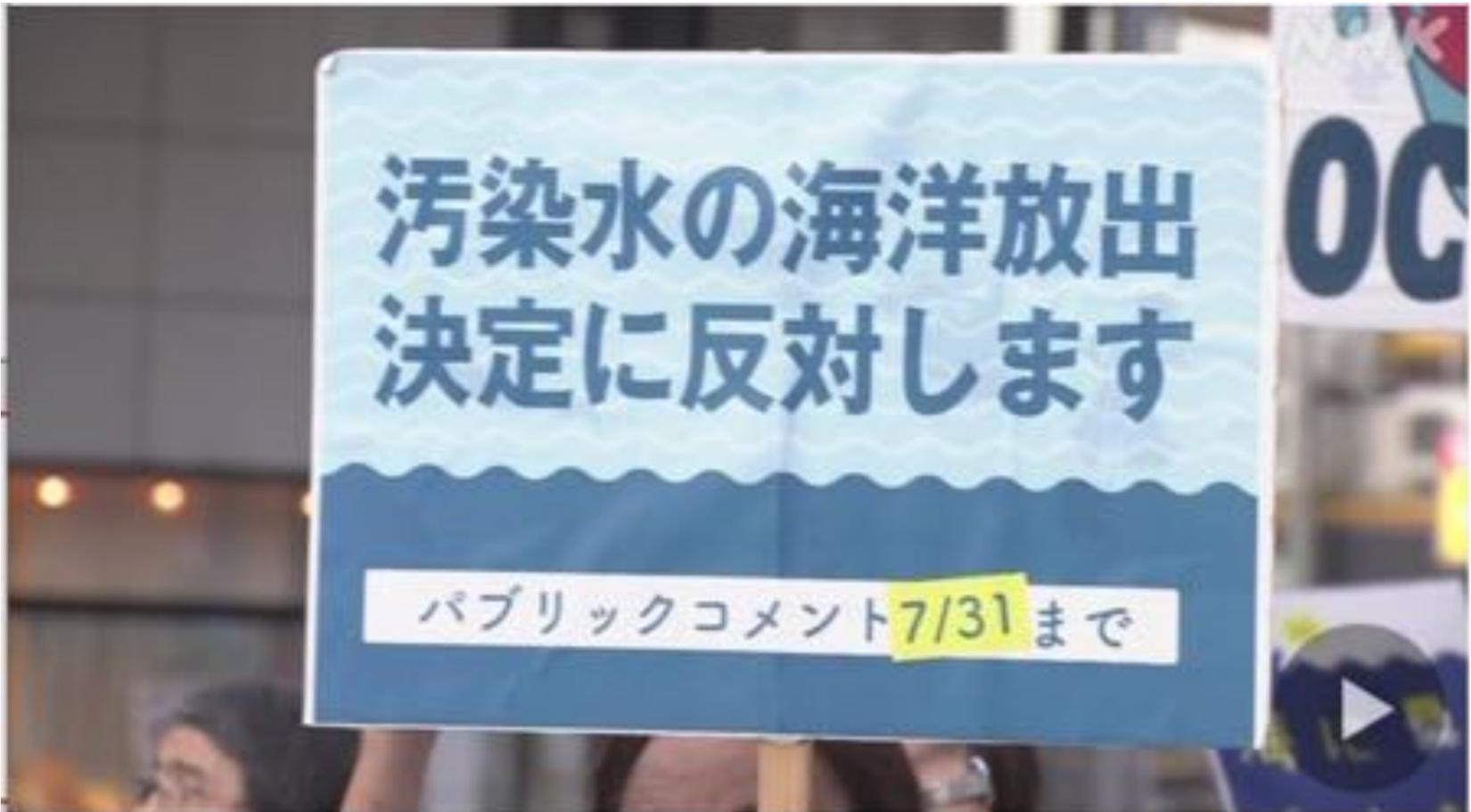
Opinions on the discharge of treated water into the sea



What is the public opinion in Fukushima Prefecture?



Questionnaire survey of voters in Fukushima Prefecture conducted by Asahi Shimbun and Fukushima Broadcasting (February 2020)



Youth protest against the release of tritiated water into the sea



**Is there no other way but
discharge into the
ocean/air?**

Recommendations of the Citizens' Commission for Nuclear Energy, a private organization that includes engineers and researchers

- **Stable long-term land storage using large tanks**
- **land disposal by mortar**



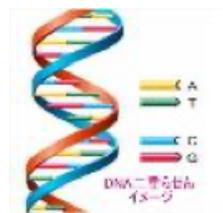
Has the health risk of tritium been discussed?

The Government emphasizes the following

- exist in nature
- be released in large quantities from nuclear power plants both at home and abroad
- It has the same properties as water, so it has not been confirmed to be concentrated in humans or organisms.
- no tritium-related health effects have been reported

On the other hand, the following is pointed out.

- tritium remains long in the body when it replaces hydrogen in organic compounds and substances that make up the body through food
- Some papers report bioaccumulation
- The effect of exposure becomes strong when it is replaced with hydrogen constituting DNA.
- DNA is damaged when tritium decays into helium



Was the voice of the people heard?

Briefing by the ALPS Subcommittee Secretariat (August 2018)

Held in two locations in Fukushima and one location in Tokyo

According to the explanatory document, the ALPS treated water contained only "tritium"

Public invitation for people who wish to state their opinions

It was reported just before that that other nuclides also remained.

At a government hearing, 42 out of 44 people voiced opposition to or cautioned against the discharge into the sea

Many people suggest "Land storage plans such as large tanks"

Recent hearing

“Hearing from related parties” ... Ministry of Economy ,
Trade and Industry selected “related parties”

1. April 6 ... Fukushima Prefecture, Fukushima Prefecture
Ryokan Hotel Sanitation Association, Fukushima
Prefecture Federation of Chambers of Commerce and
Industry, Fukushima Prefecture Federation of Forest
Owners' Cooperative Associations, Fukushima Prefecture
Federation of Fisheries Cooperative Associations,
Fukushima Prefecture Municipal Association, and Soma
Local Municipal Association

2. April 13 ... Federation of Commerce and Industry
Associations of Fukushima Prefecture, York-Benimaru,
Central Association of Agricultural Cooperatives of
Fukushima Prefecture, Iwaki City, and Futaba District
Village and Village Association

3. May 11... Nippon Keidanren, Japan Association of Travel
Agents, Japan Association of Travel Agents, Japan
Supermarket Association, and Japan Chain Stores
Association

4. ... National Federation of Societies of Commerce and Industry, Japan Voluntary Chain Association, and National Liaison Council of Consumer Organizations

5. ... Fukushima Prefectural Assembly, Fukushima Prefecture Fruit and Vegetable Market Federation, Fukushima Prefecture Fishery Market Federation, "Fukushima Prefecture Nuclear Power Plant Decommissioning Conference for Safety Assurance" 3 members

6.... The Japan Chamber of Commerce and Industry, Chiba Prefecture, Miyagi Prefecture and Ibaraki Prefecture

7.... Fukushima Prefecture Federation of Fishery Processors' Associations, Japan Federation of Fisheries Cooperative Associations

Of the 43 people who expressed their opinions, 42 were men.

Questions about the hearings

In the midst of a new corona infection

Comments were invited only from
“related parties” selected by METI. an
elderly man who is a representative of
an industrial organization or
municipality

There was no room for discussion.

The public could express their opinions
only in writing.

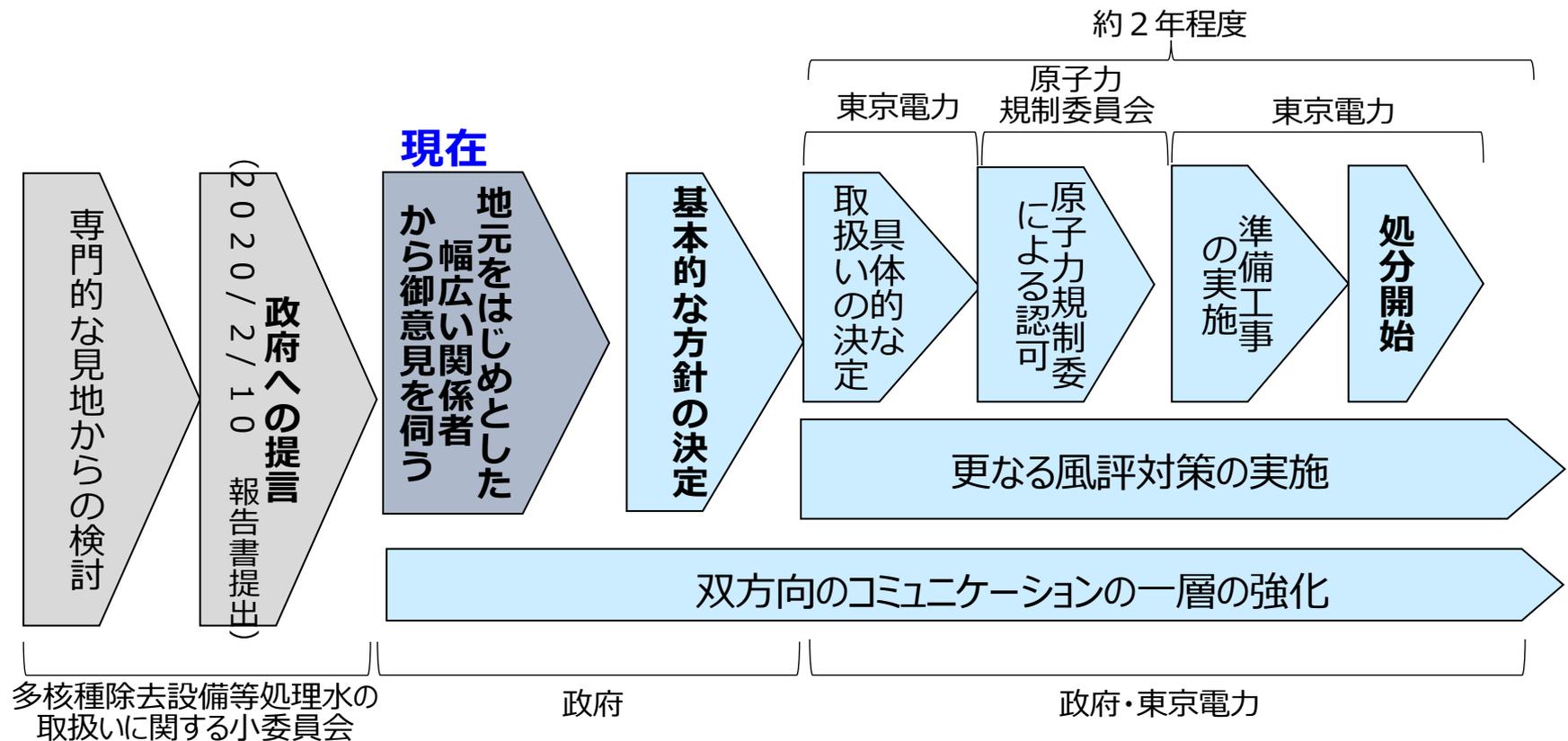
International opposition



23 environmental NGOs in Taiwan submitted written opinions stating that "The discharge of contaminated water into the sea runs counter to the spirit of the London Convention, which bans the dumping of radioactive materials into the sea."

処理水の取扱いをどのように決めていくのか？

- ◇ 今後、ALPS小委員会の報告も踏まえ、地元をはじめとした幅広い関係者のご意見をお伺いした上で、風評対策を含め、政府としての方針を決定します。
- ◇ 政府方針を踏まえ、東京電力が具体的な取扱い方法を決定し、原子力規制委員会の認可を得た上で、処分を開始します。



Contaminated soil generated by
decontamination



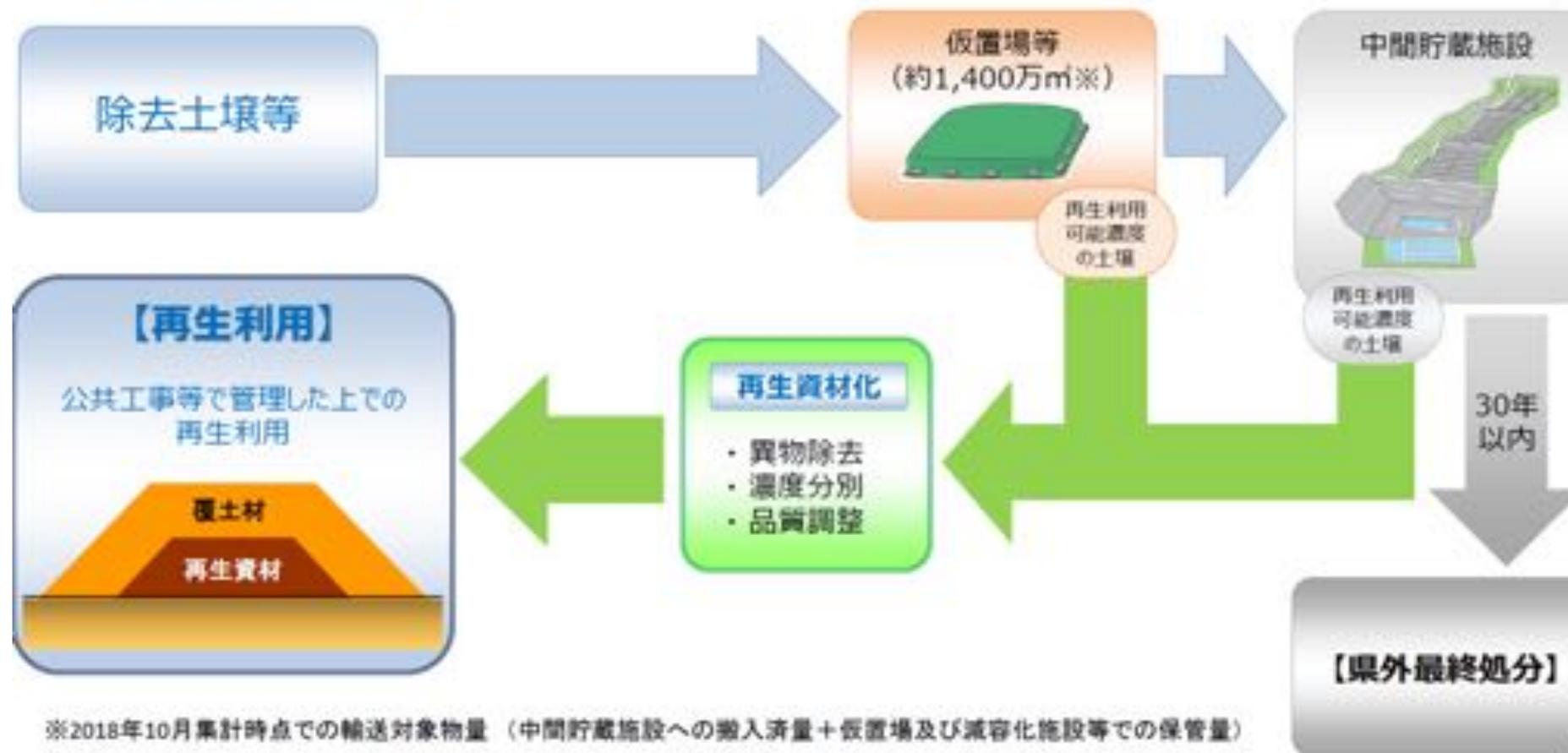
- The soil generated by decontamination in Fukushima Prefecture is about 14 million m³.
- The Ministry of the Environment announced a policy to "reuse" contaminated soil generated by decontamination of 8,000 Bq/kg or less on roads, railways, green areas, disaster prevention forests, seawalls, farmland, etc.

Policy to reuse contaminated soil by decontamination in Fukushima Prefecture

- Purpose ... To reduce the amount of contaminated soil generated by decontamination requiring final disposal
- Target ... Of 22 million m³ (Estimates as of January 2015) of soil and waste generated from decontamination work in Fukushima Prefecture, about 10 million m³ of soil was below 8,000 Bq/kg
- The "Strategic Study Group for Development of Technology for Volume Reduction and Recycling of Soil Removed from Intermediate Storage" by the Ministry of the Environment began its study in July 2015.
- Where to use ... embankment materials for roads, railways, coastal disaster prevention forests, and seawalls, final cover materials for waste disposal sites, intermediate cover materials, landfill materials for land development and water surface reclamation, raising materials for farmland, etc.

福島県内で発生した除去土壌等について

- 福島県内で発生した除去土壌等については、中間貯蔵開始後三十年以内に、福島県外で最終処分を完了するために必要な措置を講ずることとしている。
- 福島県内の除去土壌等の県外最終処分量を低減するため、政府一体となって、除去土壌等の減容・再生利用等に取り組んでいるところ。



【基本的考え方】

- 除去土壌を適切な前処理や分級などの物理処理をした後、用途先の条件に適合するよう品質調整等した再生資材を、管理主体や責任体制が明確となっている公共事業等における人為的な形質変更が想定されない盛土材等の構造基盤の部材に限定した上で、適切な管理の下で限定的に利用する。

※管理下での利用を行うものであり、放射線防護に関する規制の枠組みから外すクリアランスとは異なる。

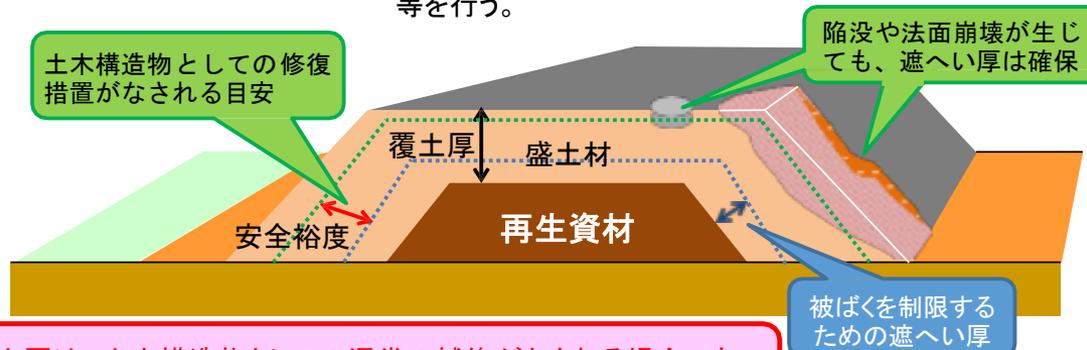
用途の限定

- 長期間にわたって人為的な形質変更が想定されない防潮堤、海岸防災林、道路等の盛土材の構造基盤の部材や、廃棄物処分場の覆土材、土地造成における埋立柱・充填材、農地(園芸作物・資源作物)等に用途を限定する。



適切な管理

- 管理主体や責任体制が明確となっている公共事業等に限定。
- 追加被ばく線量を制限するための放射能濃度を設定。具体的には、追加被ばく線量が施工中1mSv/年を超えないようにする。(供用中は、その1/100を超えないように覆土等の遮へいをする。)
- 覆土等の遮へい、飛散・流出の防止、記録の作成・保管等を行う。



覆土厚は、土木構造物としての通常の補修がなされる場合でも、被ばくを制限するための遮へい厚が確保されるように設計する。

再生利用の進め方

再生利用の本格化に向けた環境整備として、上記の考え方に従って実証事業、モデル事業等を実施し、放射線に関する安全性の確認、具体的な管理方法の検証、関係者の理解・信頼の醸成等を行う。

用途先の例

土木構造物等の例

盛土材

- ・土砂やアスファルト等で被覆
- ・コンクリート等で被覆
- ・植栽覆土で被覆

埋立・充填材

廃棄物処分場

- ・覆土材
- ・処分場土壌堤

農地(園芸作物・資源作物)



道路・鉄道盛土等



防潮堤等



海岸防災林等



土地造成・水面埋立て等



廃棄物処分場 (最終処分場)



農地

Ministry of the Environment "Basic Approach to Safe Use of Recycled Soil"

The government aims to secure safety and gain the understanding of local residents for the use of recycled materials whose radioactivity concentration is appropriately limited according to their use. Specifically, it is limited to structural base materials such as embankment materials for public works, etc., for which the management entity and responsibility system are clearly defined. Based on the additional exposure dose assessment, radiation concentration is set to limit the additional exposure dose and shielding measures such as covering soil are taken, and then limited use is made under appropriate management in accordance with the standards based on the Special Measures Act.

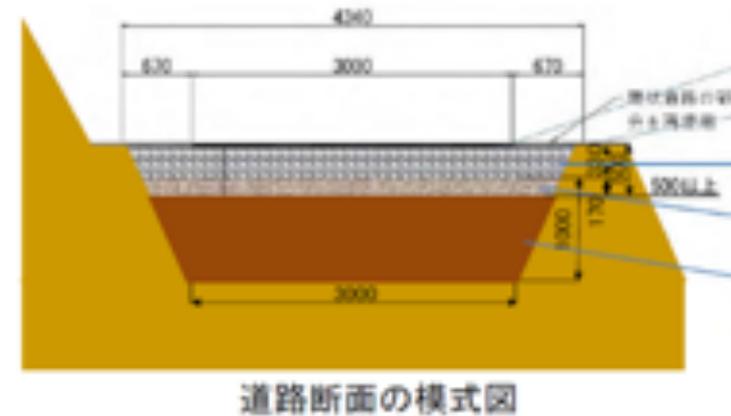
Problems

- It allows the diffusion of radioactive materials into the environment.
- In the event of a disaster, there is a possibility that soil containing radioactive materials will diffuse.
- Under the clearance system based on the Reactor Regulation Act, the standard clearance level (= "Substances that do not need to be treated as radioactive materials") is 100 Bq/kg for cesium 137. (Calculated based on 0.01 mSv/year). Double standard.
- When used as a road embankment, it takes 170 years to decay to 100 Bq/kg. On the other hand, the life of the mound is 70 years.
- Contaminated soil may be used for public works without the knowledge of residents.

Demonstration Project

- Demonstration test and test embankment at a temporary storage site in Minamisoma City
- Reuse of roads as roadbed material in Nihonmatsu City: Suspended due to opposition from citizens
- Minamisoma City's revival of four lanes on the Joban Expressway has been delayed due to opposition from citizens.
- Reuse for farmland reclamation in Nagadoro area of Iitate Village = > Present progress type

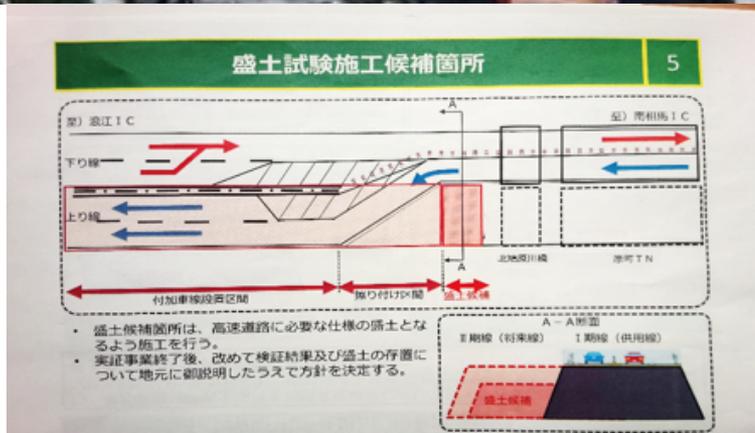
The demonstration project in Nihonmatsu, Fukushima Prefecture, was stopped due to opposition from residents.



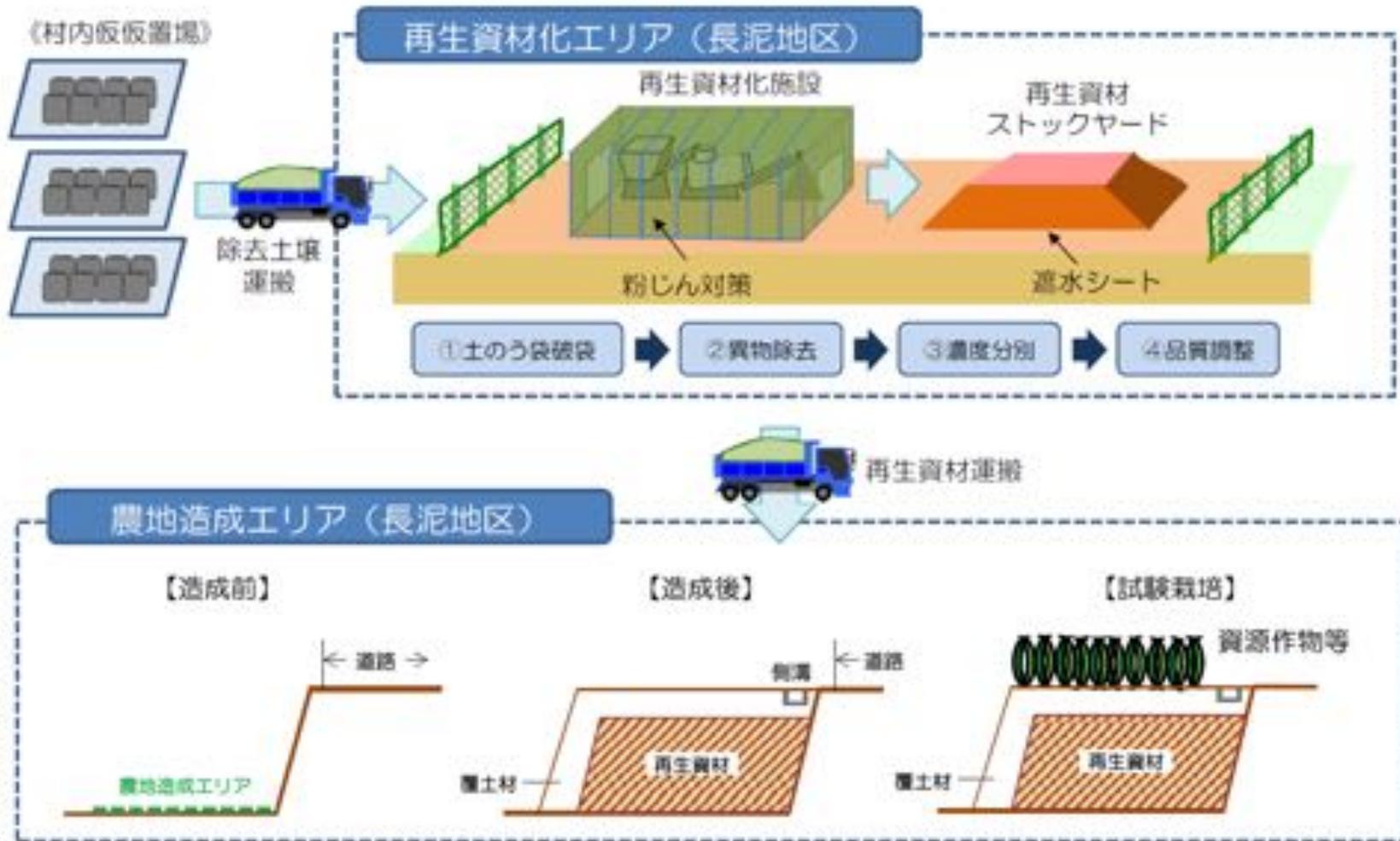
The plan was to excavate a 200 meter-long farm road, take out 500 bags of decontamination soil piled up at a nearby temporary storage site, bury them as subgrade material, and cover them with soil of about 50 cm.

Residents "While only nine out of the 21 households in the area were participating, a briefing session was held and they decided, "local understanding"." "The project will cost 80 billion yen to decontaminate soil and 350 million yen to restore it."

A demonstration project to reuse the four-lane road on the Expressway in Minamisoma City as a mound
The residents are fiercely opposed.



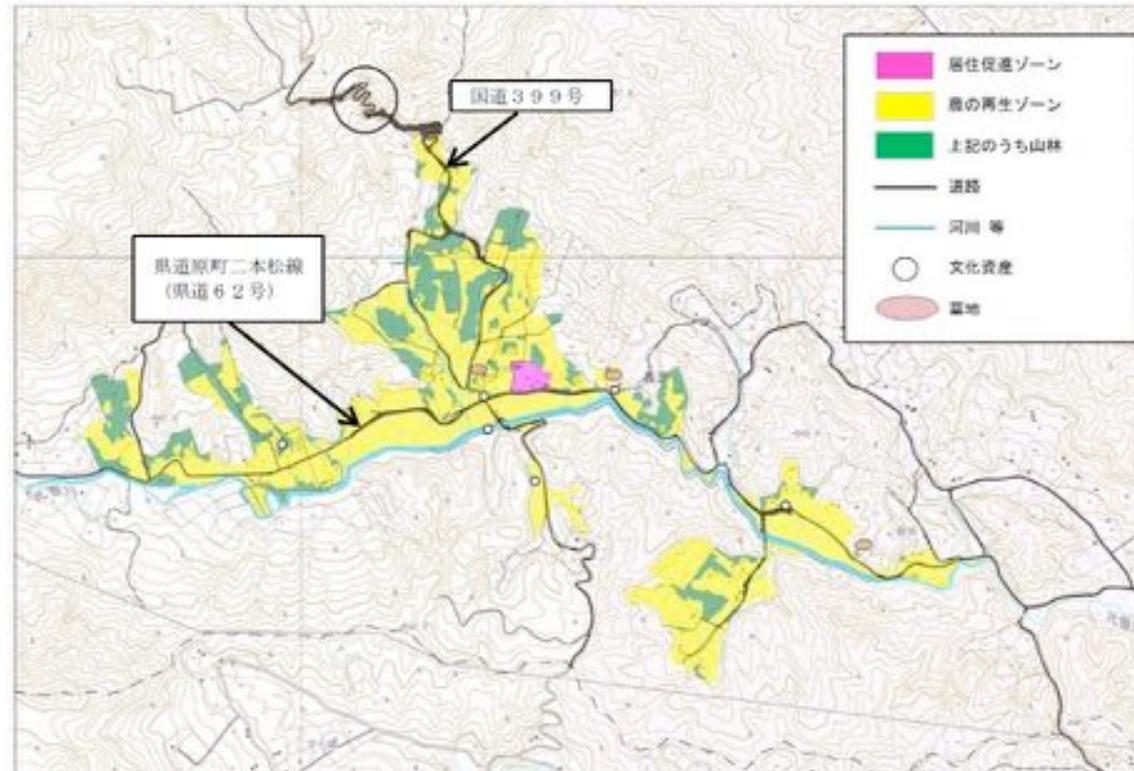
In the Nagadoro area of Iitate Village, which is located in an area where it is difficult for people to return home, a demonstration project is under way in which contaminated soil from Iitate Village as a whole is brought in and used for farmland development.



※実証事業中は適宜、放射線モニタリング等を実施

As part of the Reconstruction Project

“Of the agricultural land, etc. in Nagadoro District that can be developed, after confirming the safety through the demonstration project, by embankment with recycled materials and covering the soil through the environmental regeneration project, the dose reduction effect will be brought about and the utilization will be promoted.”



Changed from the original plan

- Planned to grow crops for bioenergy and flowers=> they also cultivated vegetables.
- 50 cm soil cover → Also demonstration without soil cover

3. 東側盛土 (ハウス/露地) 栽培計画

5



Harvesting vegetables using decontaminated soil - Demonstration project in Iitate and Nagadoro - Radioactive material concentration below standard

2020/10/07 05:00



除染土の上に土をかぶせて栽培されている野菜や植物（6日、飯館村長宅で）

According to the Environment Ministry, the concentration of radioactive substances in vegetables grown on covered soil was 0 to 1 ~ 2 becquerels per kilogram, well below the national standard of 100 becquerels.

In the area, decontamination soil of less than 2100 ~ 2400 becquerels per kilogram was used to create farmland. Since last fiscal year, the group has been experimenting with growing amaranthus and other plants by covering them with 50 centimeters of soil. This year, the government expanded the

For radioactive materials, the establishment of a "Radioactive Contamination Prevention Law" that requires regulation, does not spread, and should be centrally controlled as a "pollution-causing substance"