La Hague, France -> 1,400 tons / year -> emitting 1 Million Curie of Tritium

Praxis hat sich gezeigt, daß die bestehenden Verfahren noch verbessert werden können.

G. Höhlein schrieb 1977 zu diesem Thema:

Die langjährige positive Erfahrung bei der Behandlung schwach- und mittelaktiver Abfälle zeigt, daß mit den angewandten Verfahren und maschinentechnischen Einrichtungen die gestellten Aufgaben gelöst werden konnten. Planung und Bau einer 1400-jato-Wiederaufarbeitungsanlage mit angeschlossener Plutonium-Brennelementherstellung stellt die Entsorgungstechnologie vor keine grundsätzlich neuen Fragen, jedoch werden wegen der größeren Abfallmengen und der höheren spezifischen Aktivitäten die vorhandenen Verfahren erweitert werden müssen. Im wesentlichen betrifft dies

- die Verbrennung fester, α-haltiger Abfälle,
- die Behandlung tritiumhaltiger, schwachaktiver Destillate,
- die Reduzierung des Salzgehaltes mittelaktiver, flüssiger Rohabfälle,
- die Zementierung mittelaktiver, flüssiger Rohabfälle und
- die Endlagerung mittelaktiver Abfälle in verlorenen Abschirmungen.

Feste α-haltige Abfälle können verbrannt werden, vorausgesetzt die vorhandenen Anlagen werden den Standards der Plutoniumtechnik angepaßt.
In einer 1400-jato-Wiederaufarbeitungsanlage fallen etwa 1 M Ci Tritium jährlich an. Eine Ableitung dieser Menge über einen Vorfluter oder als Wasserdampf über einen Kamin ist aus radioökologischen Gründen nicht vertretbar. Drei Alternativen bieten sich an:

In water and by exhaust chimney:

1. Die Anreicherung des Tritiums durch Rückhaltung und Rezyklierung der tritiumhaltigen Ströme im ersten Zyklus des PUREX-Prozesses bzw. die Anreicherung des Tritiums in Abfallströmen durch Rektifikation. Das mit Tritium hoch angereicherte Wasser (10^3 bis 10^4 Ci/m³) müßte für die Endlagerung in Zement fixiert werden.
2. Die elektrolytische Zerlegung der tritiumhaltigen Abwässer und Abgabe des HT über den Kamin. HT diffundiert in die Troposphäre und wird dort, nach über 1 Jahr zur Hälfte oxydiert sein [11]. Die lokale Anreicherung des Tritiums wird somit verhindert.
3. Das Einpressen tritiumhaltiger Abwässer in poröse Gesteine des tiefen Untergrundes.

1,000 and 10,000 Curie per m³

Der Nitratgehalt mittelaktiver, salpetersaurer Lösungen kann durch chemische oder elektrochemische Denitrierung reduziert werden. Inaktive Technikumsversuche sind abgeschlossen.
Die Zementierung wäßriger, mittelaktiver Abfälle in Verbindung mit der Einlagerung in großvolumigen Endlagerstätten weist ein großes Entwicklungspotential auf, insbesondere wegen der Einfachheit des Verfahrens und der Strahlenbeständigkeit der Endprodukte. Die Sammlung zusätzlicher Betriebserfahrung sowie die konsequente Untersuchung der chemischen und mechanischen Stabilität der zementierten Abfälle ist jedoch erforderlich.

(Chemie der Nuklearen Entsorgung II: 245f.)

SOURCE: 1981 Secret Study of DWK German Society for the reprocessing of nuclear fuels not for the public

High Active Waste

8.4. Ungelöste Probleme

Das große, bis Ende 1976 noch nicht vollends gelöste Problem stellte damals - wie heute - der HAW dar. Er ist bis 600°C heiß, hochaktiv, flüssig und fällt bei dem Purex-Verfahren im ersten Extraktionszyklus an. Diese Lösungen enthalten u.a. über 99,9% der mit dem Brennstoff gelösten, nicht flüchtigen Spaltstoffe, bis zu 0,5% des Urans und Plutoniums sowie praktisch die gesamte Menge der übrigen Aktiniden, die im abgebrannten Brennstoff anwesend waren.

Zu diesem Thema schrieb H. Eschrich; Mol, weiter folgendes:

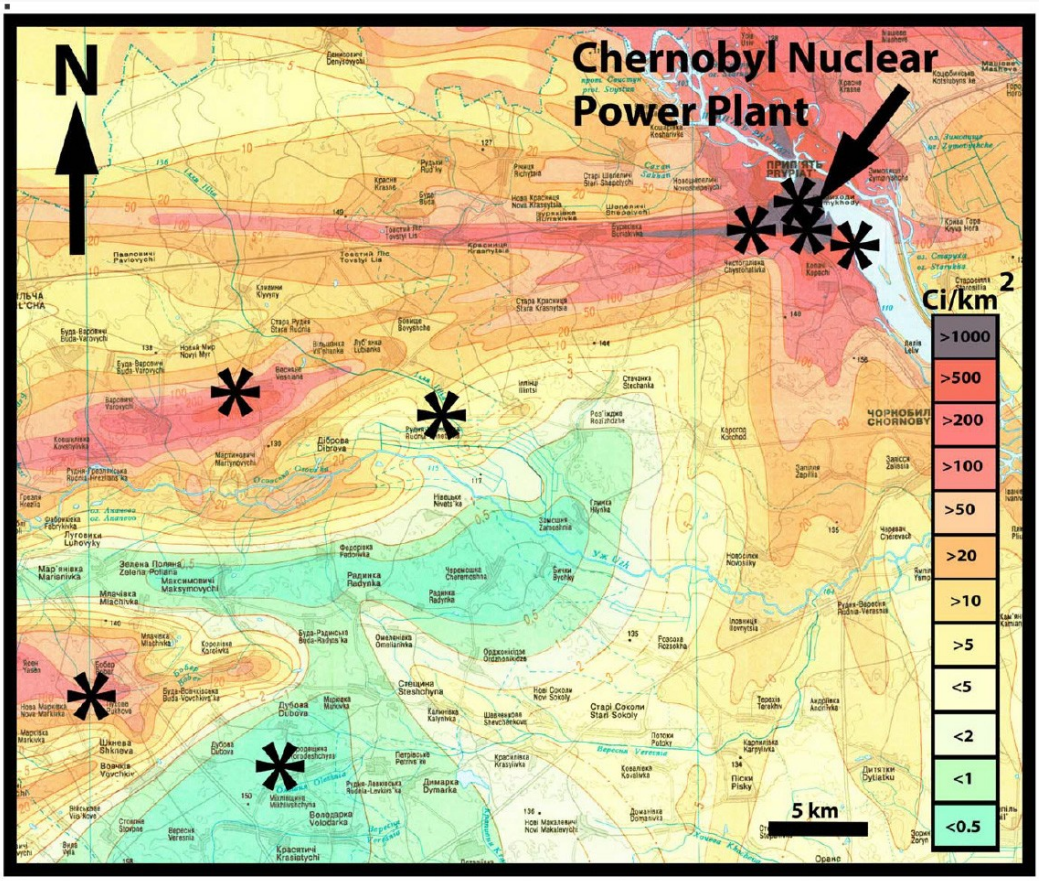
Mit dem Ziel, die Freisetzung schädlicher Konzentrationen der in den hochaktiven Abfallösungen enthaltenen Radionuklide in die Biosphäre auszuschließen, wird gegenwärtig folgendes Behandlungsschema allgemein als technisch zuverlässig durchführbar und erfolgversprechend betrachtet:

a) Konzentrieren der primären Abfallösung und Zwischenlagerung des Konzentrats in flüssiger Form in gekühlten Tanks;
b) Verfestigung des flüssigen Abfallkonzentrats nach einer angemessenen Abklingperiode und Verpacken des Verfestigungsproduktes in einen geeigneten Lagerbehälter;
c) Zwischenlagerung der hochaktiven Festprodukte in rückholbarer Weise in geschützten und überwachten Ingenieurbauwerken auf oder unter der Erdoberfläche;
d) Endlagerung (»Beseitigung«) der Festprodukte in einer geeigneten geologischen Formation (auf dem Lande oder evtl. unter dem Meeresboden).

disposal below the sea seabed

Andere Behandlungsstrategien sind durchaus möglich und werden auch weiterhin untersucht.
Mit jedem Schritt in dem angegebenen Schema wird der Sicherheitsgrad der Isolation des Abfalles von der Biosphäre erhöht und der erforderliche Überwachungsaufwand verringert.
Die sichere Ausführung jeder einzelnen Phase der Behandlung, Zwischenlagerung und Endlagerung des hochaktiven Abfalles wird oft als die schwierigste Aufgabe der Kernenergieindustrie angesehen, von deren Lösung die künftige Entwicklung der friedlichen Kernenergieanwendung entscheidend beeinflußt werden wird.

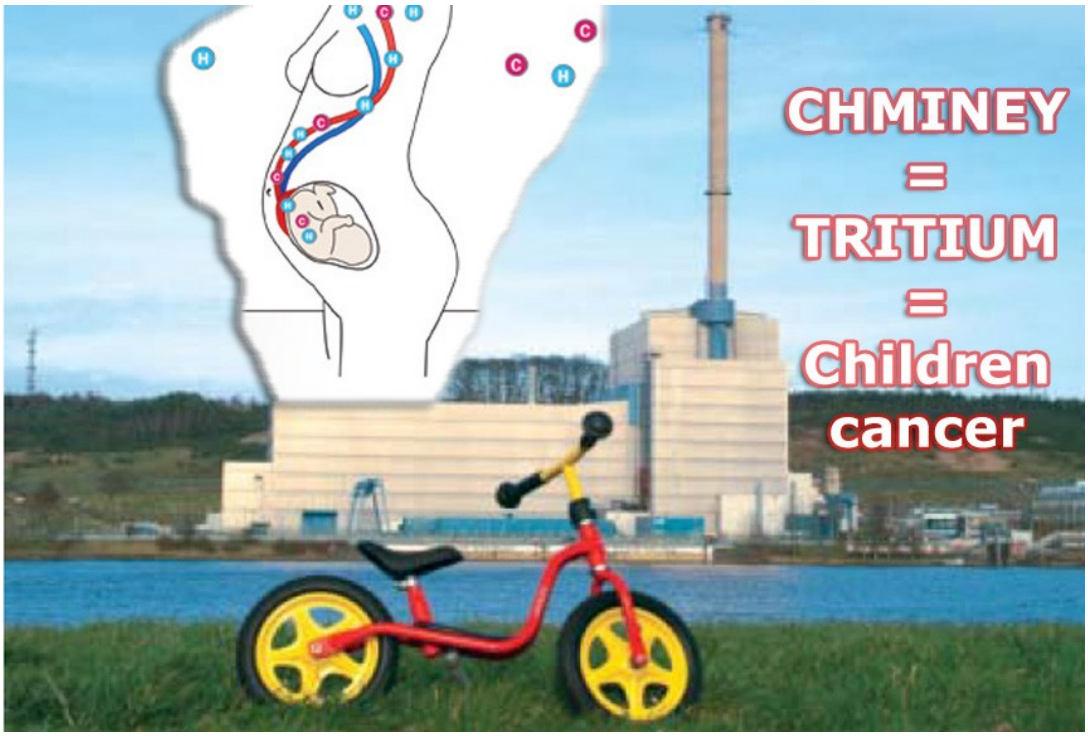
The La Hague (FRANCE / Castor) reprocessing plant irradiates our planet with more than one million Curie per year (Tritium). At Chernobyl there is 1000 Curie per m²:



Source

Chernobyl Birds Have Smaller Brains - Anders Pape Møller1*, Andea Bonisoli-Alquati2, Geir Rudolfsen3, Timothy A. Mousseau2

For example: 15 Curie per km² means: 550,000 Curie per m². Source:
http://www.life-upgrade.com/DATA/Lazyuk-ChernobylBelarus.pdf p. 1 - 2



1 Curie per km² = 37 kBq/m² (37,000 Bq/m²):

www.alfred- koerblein.de/chernobyl/downloads/saeuglingssterblichkeit.pdf

One Bequerel = One Atomic Decay.

If not km² Soil, 1 Curie = 37,000,000,000 Bq

Cesium-137 in relatively small doses (20-30 Bq/kg); a breach of the regulatory processes in the body: PAGE 2 – 3: http://chernobyl-today.org/images/stories/BANDAJEVSKI_UNSCEAR_-_REUTERS_Sept_22nd_2010_Eng_V2.pdf

MODIFICATIONS IN **CARDIAC-VASCULAR SYSTEM OF CHILDREN**, LIVING IN CONTAMINATED WITH **RADIOISOTOPES**: http://chernobyl-today.org/images/stories/Bandajevski_2001_Radiocaesium_and_heart.pdf

LEGAL EMSSIONS = MASS MURDERER

On the occasion of the many reactions to the publication of official data on radioactive emission peaks from the nuclear power plant Gundremmingen at the beginning of this year's audit declares IPPNW board member Reinhold Thiel:

During a revision with exchange of high level radioactive fuel discharged by opening the reactor pressure vessel increased amounts of radioactive substances from nuclear power plant over the chimney arise into the environment. At the beginning of this year's revision in Gundremmingen the noble gas concentration at the maximum is 500 times the value reached before the revision. The organization Physicians for IPPNW has official numbers as proof of the Bavarian State Office for the Environment. On the basis of the Environmental Information Act, it had succeeded, **after years of refusal, finally, unembellished and not half-hourly average emission readings to get sent to from nuclear power station** Gundremmingen.

Since then, the state authority, the nuclear power plant operators and the Dillinger District will not become tire of emphasizing that all requirements have been met and were even "just" "exhausted" to around 13 to 15 percent. This does not deny the IPPNW. The reactions proceed at the core of the problem, however, because:

Do these limits protect pregnant women and their unborn children enough? Emissions below an official threshold does not automatically mean that there would be no health risk for humans.

Authorities and operators generally refer to like and respect the limits. **It is thereby given the impression that such compliance - would protect against any disease threat - supposedly scientifically backed.**

Which is not so.

For example, the European Commission, implemented **after the meltdown of the Fukushima limits on food imports** from Japan clearly **upwards**. This decision was pragmatic and useful **for the economy, but not in terms of our health**. Later corrected this decision, the EU again, etc. so because the fixed contamination limits are even less stringent than in Japan itself were. It is also remarkable: In the Ukraine, and Belarus is 1**00 becquerels of cesium-137 per kilogram of a much stricter limit for dairy products than in the EU with basically 370 with 200 becquerels Becquerel** and for Japan's imports into the EU.

With which scientific principles can such threshold differences be explained?

Limits are always political in the "practically feasible" adapted and not necessarily protect our health in the first place. Besides, **limits are based on computer models whose conditions are often reviewed and new scientific findings should be adjusted.**

Generally, there is no limit could be set below the radioactivity no harm. It is common for decades, scientific dogma.

During a pregnancy X-ray examination should be avoided to protect the embryo. **Pregnant women or their unborn children are treated in radiation protection norms to nuclear power plants as adults**.

Computational basis is a "Reference Man", a healthy adult and Central Europeans with an intact immune system. Embryos are much more sensitive to radiation.

An embryo immediately respond to any radiation peak and "remembers" each individual radiation exposure. The "rays account" of an embryo, not the mean values calculated. After the tissue of an embryo was exposed to a load, threatens that is triggered by any further "irritation" of children's tissue cancer and leukemia.

SOURCE: http://www.ippnw.de/startseite/artikel/ca5ac624ef/schuetzen-amtliche-grenzwerte-embryo.html

Radioactive noble gas emissions at the nuclear plant Gundremmingen

at the beginning of the revision on 18/09/2011:
http://www.ippnw.de/commonFiles/pdfs/Atomenergie/Edelgasemissionen_Gundremminge_.pdf

Contact: Angelika Wilmen, Tel. 030-69 80 74-15, Henrik Paulitz, Tel. 0171-53 888 22. Deutsche Sektion der Internationalen Ärzte für die Verhütung des Atomkrieges, Ärzte in sozialer Verantwortung (IPPNW), Körtestr. 10, 10967 Berlin, www.ippnw.de, Email: ippnw[at]ippnw.de

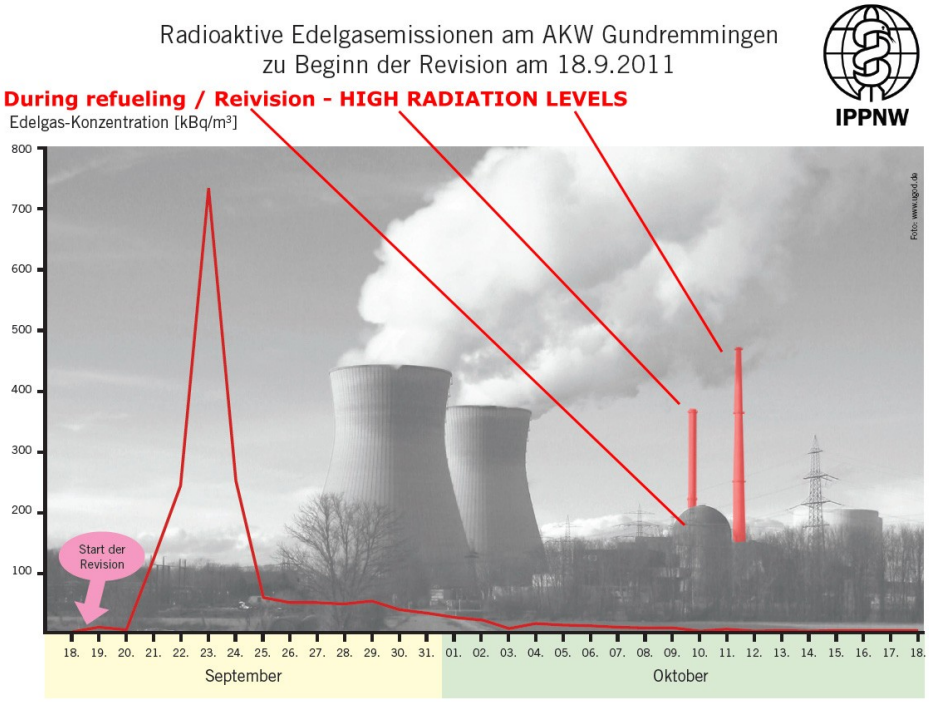
MORE: **European Union kills legallly 150,000 people each year with irradiated food in Germany**

http://tekknorg.wordpress.com/2011/09/25/european-union-kills-legallly-150000-people-each-year-with-irradiated-food-in-germany/

German "foodwatch": Lower japanese 500 Bequerel radiation limit for Food to 16 Bequerel!

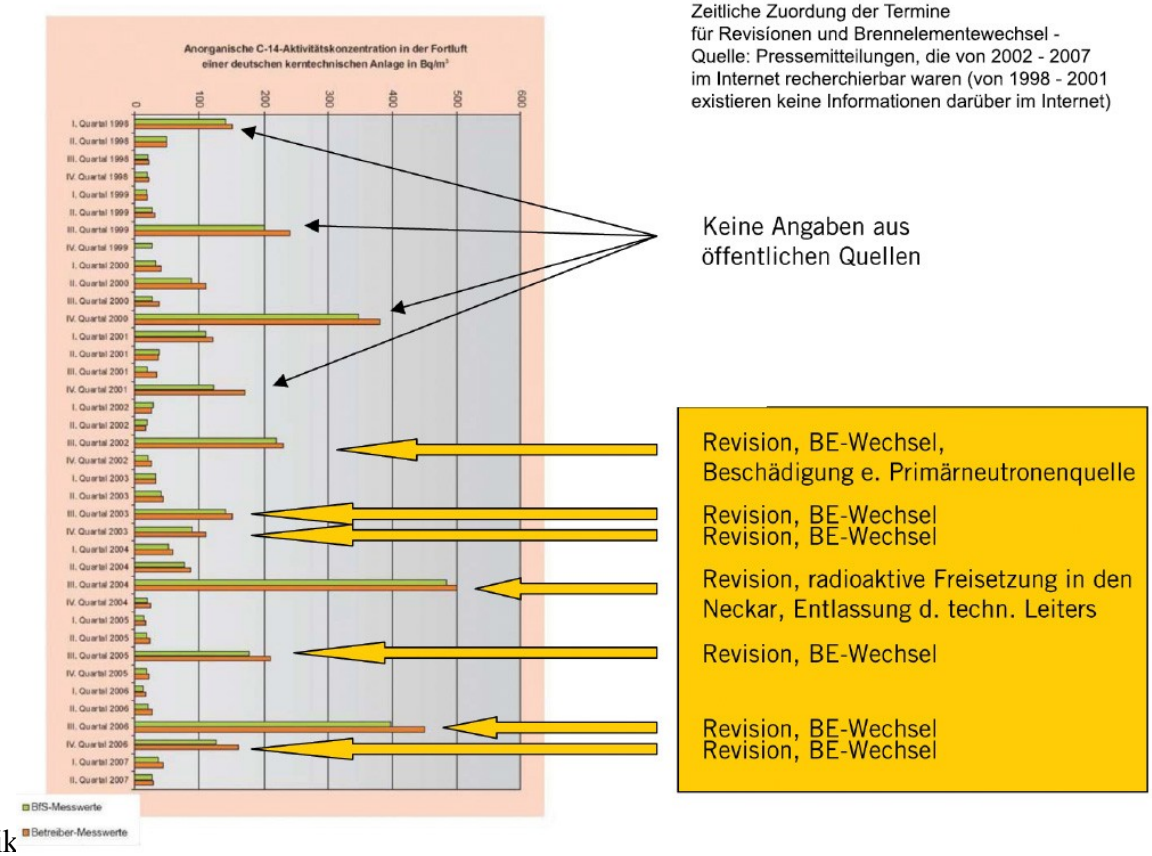
http://tekknorg.wordpress.com/2011/09/20/german-foodwatch-lower-japanese-500-bequerel-radiation-limit-for-food-to-16-bequerel/

MOVIE: www.youtube.com/watch?v=kZMhTAnXE_4



Auswertung durch Dr. Alfred Körblein, Nürnberg

Vergleich der vom Betreiber und dem BfS ermittelten Kohlenstoff-14-Aktivitätskonzentrationen in der Fortluft am Beispiel eines süddeutschen Druckwasserreaktors (KKW Neckarwestheim 2)



Mik

http://www.fraw.org.uk/mei/archive/magnox_a1_28.pdf

http://pgs.ca/wp-content/uploads/2009/06/TRITIUM.Fairlie.2010.IJOEH_July10_Fairlie1.pdf

http://www.odwac.gov.on.ca/standards_review/tritium/Tritium_Radiation_Risks_Additional_Note_for_ODWAC_Fairlie.pdf

http://www.hse.gov.uk/newreactors/presentations/250609/ian-fairlie.pdf

http://www.ippnw.de/commonFiles/pdfs/Atomenergie/factsheet_risiken_normalbetrieb.pdf

And this will continue with **FUSION ENERGY:**

http://www.cyberacteurs.org/cyberactions/presentation.php?id=337

Translation / quote: **Tritium** is a radioactive gas, highly toxic if inhaled. It falls to earth with precipitation in the form of tritiated water. The tritium atoms can replace hydrogen atoms (about half the atoms of the human body are composed of hydrogen) and in the form of tritiated water, the isotope of hydrogen can enter the food chain and set in the body, leading to **damage** and **mutations** in **DNA**. ASN in its "White Paper Tritium" published on Aug 7th 2010, revealed that they had underestimated the possible consequences of this radionuclide on the environment and living organisms, the risk estimate was incorrect, that further research was needed.

The authors of this paper conclude that "the re-evaluation of the toxicity of tritium requires to revisit the practices on releases and storage of tritiated waste," giving due warnings of long-standing Commission for Research and Information independent radioactivity **CRIIRAD**. Studies of the confinement and release of tritium in **ITER** have not been adequately carried out while the construction of **ITER** is already underway! This finding is unacceptable, the studies must be conducted in priority to any continuation of the project.

Because reactors depend on **heavy water as a moderator**, they release larger amounts of tritium to the environment than light water reactors (…) Tritium is a carcinogen, mutagen, teratogen and developmental toxin. It becomes incorporated into DNA and disrupts the genetic code of men's and women's reproductive cells: http://www.iicph.org/files/IICPH-Final-Statement-re-Darlington-NNPP-May-17-2011.pdf – current Guideline and Drinking Water Quality Standard for tritium is 7,000 Bq/L, which is based on the permissible ICRP dose limit of 1 mSv/year (lowered to 0.1 mSv in water). This "standard" corresponds to a risk of 350 excess fatal cancers per million people from just one year's consumption of drinking water, not a

lifetime (70 years) 300 million people living in the US: 105,000 DEATHS PER YEAR x 30 years = 3,150,000 murdered people by the peaceful atom! Multiplied x global = weapons of mass destruction

"But tritium can be deadly (…) However tritium behaves chemically and biochemically like ordinary hydrogen. When ingested, it can incorporate itself into all forms of body cells, including those of the reproductive system…" Source: http://ratical.org/radiation/KillingOurOwn/KOO10.html

Sampling http://www.houseoffoust.com/fukushima/ge-bwr6.pdf

Sampling lines are used to sample the various collector tanks, and to monitor and control the process. Sample lines, vented to a central sampling station, provide sample flows for continuous monitoring instrumentation (conductivity, turbidity, radioactivity) and also provide for grab samples. These are taken to the station laboratory for analysis. Samples of circulating water are also taken at the intake to the station and in the circulating water discharge to audit the background and discharge levels of radioactivity as necessary.

Ventilation Sources — During all phases of plant operation, various portions of the containment, turbine and auxiliary buildings are provided with fresh air. This ventilation air is exhausted to the atmosphere via building vents and/or a stack. It is required that less than 50 μCi/sec of radiogases and 0.001 to 0.01 μCi/sec of I-131 are released via this pathway. These small releases are estimated to contribute a whole body dose of less than 0.1 mRem/yr to the nearest neighbor and a thyroid dose in the range of a few mRem/yr if the milk-exposure pathway exists in the immediate off-site environment. These ventilation sources do not require treatment to meet the proposed guidelines of 10CFR50, Appendix I.

Offgas Release Monitoring — Air ejector offgas release rates are continually monitored and recorded by duplicate, monitor-recorders after about 2 minutes of delay.

Duplicate, continuous monitors near the release point of the offgases record the gross activity release rate for radiogases. Particulate and iodine samplers also permit monitoring of any significant release of these species, and gas samples are taken for isotopic analysis.

To obtain background data on radiation levels and meteorological information, an environs and plant site monitoring program is instituted in advance of plant startup. Environmental monitoring is normally continued during plant operation to verify the information

The following are typical of potentially radioactive solid wastes:

- Filter and resin sludges
- Concentrated wastes from liquid waste treatment concentrators
- Air filters from offgas and ventilation systems
- Solid laboratory wastes
- Contaminated clothing, tools and small pieces of equipment which cannot be economically decontaminated
- Miscellaneous paper, rags, etc., from contaminated areas
- Used reactor equipment such as spent control rod blades, fuel channels and in-core ion chambers

Waste Resulting from Process

The sludges result from filters and filter-demineralizers in the reactor water cleanup, condensate treatment (if a filter-demineralizer type), fuel building and containment pool cooling and cleanup, and in the radwaste systems. Reactor water cleanup sludges are generally kept separate because of the usually higher radiation levels of the resultant solid wastes. This minimizes the shielding required for off-site shipment of the other solid wastes.

Reactor water cleanup filter-demineralizer backwashes are collected in backwash receivers located beneath the cleanup filter-demineralizers. The backwash slurry is pumped to one of two cleanup phase separators located in the radwaste facility. After settling, water is decanted from the phase separator and sent to low conductivity tanks. The remaining sludge is accumulated for radioactive decay prior to further processing as solid waste. After accumulation in a phase separator for a predetermined time, input is switched to the other phase separator. Decay occurs in the first phase separator for about 60 days until accumulation in the second phase separator is to be stopped. At this time, the decayed slurry is filtered through the traveling

http://www.houseoffoust.com/fukushima/ge-bwr6.pdf