

The Secret Nuclear Accident at Kyshtym

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Overview

- Short historical breakdown
- Kyshtym accident
- Measures taken
- Secrecy, Consequences of secrecy
- Consequences on health
- Mayak today



Thesis

- The fatal explosion in one of the plutonium tanks was caused by ignorance associated with deepest human disrespect. Technical safety, protection of human life and of the environment had been unconditionally sacrificed in the SU by the race to nuclear rearmament.
- If something in Mayak/Kyshtym worked perfectly, it was the system of secrecy. This must have been as bad for the people affected as the accident itself.



Short historical breakdown I

- Starting point: nuclear armement
- 1947 first reactor for the production of Pu
- No effective instruments for the retention of radioactive emissions
- 1956-64 Construction of the Techa-Reservoir-Cascade
- After 1967 draining L. Karachay
- 1977 Start of the Repr.plant RT-1



Short historical breakdown II

- Technical features
 - open cooling circuit that used natural waters as coolant
 - Hardly radiation protection or dosimetry for workers
 - Uncontrolled releases of (radio-)chemical substances
 - No environmental monitoring in the beginning



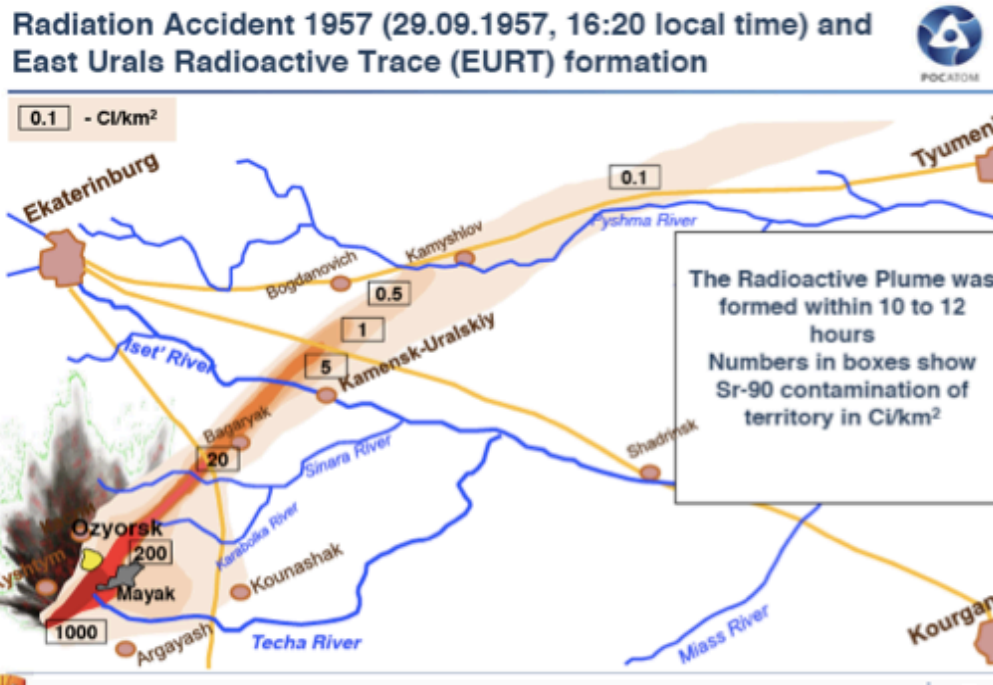
Nuclear test Orenburg/Totskoye 1954

Kyshtym accident I

- Doubts about the reliability of the official data
- But: Release to a comparable extent as Chernobyl
- No reliable picture material of the destruction, of liquidators or patients, no verifiable eye witness reports, no systematic historical reconstruction

Kyshtym accident II

The official data from the Russian source



Quelle: Experience In Eliminating The Consequences Of The 1957 Accident At The Mayak Production Association
G.Sh. Batorshin, Y.G. Mokrov, Mayak PA, Russia, Folie 7

International Experts' Meeting on Decommissioning and Remediation After a Nuclear Accident, IAEA, Vienna, 28.01-01.02.2013

Measures taken after accident

Secrecy !!!

- Ensuring continued operation, decontamination of the site
- Environmental measurements SR-90 concentrations (and other nuclids)
- Evacuation of the villages after weeks and months
- Destruction of villages and agricultural facilities by liquidators (e.g. soldiers, prisoners, children)

Secrecy, Consequences of secrecy I

Where there was no problem, none could develop:

- military secrecy - freedom of movement restricted
- No media, no information of the population
- Isolation of patients, no information about the illness, no diagnoses, no adequate medication
- No environmental problems related to the atomic complex

Secrecy, Consequences of secrecy II

- Uncertainty and insecurity among the population
- Unknown symptoms and health consequences
- No medical pre- and aftercare
- Hardly repairable loss of confidence after announcing some of the facts after more than 30 years

Secrecy, Consequences of secrecy III

- A whole population group has been stolen from its history. To date, the consequences of the Mayak disaster remain diffuse, unclear, and without convincing information.
- The victims were left in the contaminated area in a state of uncertainty. For them, the only reliable evidence was, and still is, the health of their families and the memory of the victims. If something in Mayak worked perfectly, it was the system of secrecy.



Other Kyshtym – „catastrophes“

- Discharges into Techa river, flood in 1951



Techa River

1949-1956

Aquatic

10^{17}

^{89}Sr

$^{90}\text{Sr} + ^{90}\text{Y}$

^{137}Cs

$^{95}\text{Zr} + ^{95}\text{Nb}$

$^{103}\text{Ru} + ^{106}\text{Ru}$

U + Pu

Others^a

8 (1-12)

21 (8-42)

11 (8-18)

12 (8-24)

24 (12-51)

2

22 (13-27)

Other Kyshtym – „catastrophes“

So called Wind resuspension from the banks of Lake Karachai



Wind resuspension
from the banks of
Lake Karachai

1967

Aerial

2.2×10^{13}

$^{90}\text{Sr} + ^{90}\text{Y}$

34

^{137}Cs

48

$^{144}\text{Ce} + ^{144}\text{Pr}$

18



Consequences on health I

- The assumptions are based on official information that is incomplete
- Official Russian view (2013 IAEA): **Not a single case of chronic or acute radiation disease resulted from the accident among the Mayak workers or the population was recorded**

Eastern Ural radioactive trace resulting from the Kyshtym accident	1957	Aerial	7.4×10^{16}	$^{90}\text{Sr} + ^{90}\text{Y}$	5.4
				$^{95}\text{Zr} + ^{95}\text{Nb}$	24.9
				$^{106}\text{Ru} + ^{106}\text{Rh}$	3.7
				^{137}Cs	0.036-0.35
				$^{144}\text{Ce} + ^{144}\text{Pr}$	65.96

Consequences on health II

- Inhabitants along the Techa River can be regarded today as one of the most studied cohorts – but
 - quantity and distribution of the released and incorporated radioactive substances remained in the dark
 - data collected after 30 years secrecy were based on available figures but did not include all those who had died or left the area



Consequences on health III

- Compared to the survivors of Hiroshima and Nagasaki, the workers of Mayak, the inhabitants of the valley of the Techa as well as those in the downfall area of the bomb trial site of Semipalatinsk were exposed to higher collective - and in some cases - also to higher individual doses

Burkart, W: Strahlenepidemiologie im Gefolge des Nuklearprogramms der ehemaligen Sowjetunion. Institut für Strahlenhygiene des BfS, Oberschleissheim/München,1996



Mayak today

- products for civil and military use
- Osjorsk still „closed city“
- Reprocessing of Spent Fuel in RT-1 with aerial and liquid discharges (Techa River)
- New contracts. Decommissioning and reprocessing of high radioactive waste (Submarine, Andreeva Bay)

as 16:30 horas se sintió el estruendo de una explosión y comenzó a elevarse al cielo una columna de humo



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Conclusions I

- Mayak will continue to pose a tremendous risk to humans and the environment for decades, if not centuries. In this light, the Kyshtym accident appears as a link in a long chain of innumerable environmental and human rights violations.

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Conclusions II

The lack of reconsideration legitimates such practices and can lead to the reintroduction of inhuman methods in the hands of authoritarian regimes.

The critique of both, the civil and military use of nuclear energy, therefore remains an important and urgent task.

Thank you!

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Annex 1: Fiction / Reality check

Urgent Management System Aimed at mitigation of the Accident Consequences



- Right after the accident, the enterprise established an emergency center to deal with the accident consequences. The emergency center consisted of senior management and experts representing the Mayak PA and the Ministry of Medium Machine Building (Minsredmash, currently the Rosatom State Corporation)
- Urgent emergency actions were taken to ease off the accident consequences
- The emergency actions were directly guided by Minsredmash and the Mayak PA senior management and appropriate medical authorities



Presentation of Rosatom 2013 IAEA (left PPT leaflet): <http://www-pub.iaea.org/iaeameetings/IEM4/Session2/Mokrov.pdf>

and historical recording (undated), which shows how it actually happened in reality (right picture)



Annex II

Pictures are rare. There are none of the destruction and the damage. A few photographs show the situation in Mayak in the 50's

Slide show:

<http://dayonline.ru/incidents/photo/malenkiy-chernobyl-kyshtymkaya-avariya-o-kotoroy--48680#image=1>

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Annex III Transparency

- *Mayak: Mayak does not violate environmental law. The liquid discharge is in the norm of the legislation.*
- *Aber: Mayak liefert weder an die IAEA noch an andere UN-Unterorganisationen Zahlen zu den flüssigen Abgaben (Bsp. UNSCEAR 2016: SOURCES, EFFECTS AND RISKS*
- *OF IONIZING RADIATION United Nations Scientific Committee on the Effects of Atomic Radiation Abs 65.: Data for both atmospheric and aquatic discharges were obtained for the reprocessing facilities at Sellafield, United Kingdom and La Hague in France for the year 2010 [E2] and **for atmospheric discharges only** at Ozersk (Mayak), Russian Federation [F2].*

Discharged radionuclide	Discharges to atmosphere			Aquatic discharges		
	Sellafield	La Hague	Mayak	Sellafield	La Hague	Mayak
¹³⁴ Cs	—	3.6×10^{-3}	—	—	5.1×10^1	—
¹³⁷ Cs	—	3.0×10^{-3}	—	—	7.3×10^2	—
²³⁹ Pu	—	1.3×10^{-3}	—	—	6.3×10^0	—
²⁴¹ Am	—	—	—	—	1.3×10^1	—
AVERAGE DISCHARGE RATE OVER A YEAR (Bq/s)						
³ H	3.1×10^6	1.8×10^6	—	4.4×10^7	3.2×10^8	—
¹⁴ C	8.7×10^3	5.1×10^5	—	1.4×10^5	2.3×10^5	—
⁴¹ Ar	—	—	1.2×10^6	—	—	—
⁵⁴ Mn	—	—	—	—	6.4×10^1	—
⁵⁸ Co	—	—	—	—	3.3×10^0	—
⁶⁰ Co	—	2.3×10^{-1}	3.4×10^{-1}	3.1×10^3	2.0×10^3	—
⁸⁵ Kr	1.4×10^9	7.1×10^9	—	—	—	—
⁹⁰ Sr	1.3×10^0	—	4.2×10^1	3.2×10^4	4.2×10^3	—
¹⁰⁶ Ru	2.4×10^1	2.2×10^0	5.7×10^0	3.7×10^4	6.5×10^4	—

