SUMMARY OF TAILINGS SLURRY RELEASES: 1972-1977

Submitted to:

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Submitted by:

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INTRODUCTION

This report is an update of information contained in Table 7.1, "Summary of Accidental Tailings Slurry Releases", of the Western Nuclear Impact Statement (also used in other uranium mill accident sections prepared by Teknekron), which documented accidental tailings releases from uranium mills in the years 1959 through 1971. Teknekron has conducted a comprehensive search to uncover data pertaining to the years 1972 through 1977, inclusive. In the course of this search, the following sources were utilized:

- NRC Division of Inspection and Enforcement Data Files to obtain information on mills under NRC jurisdiction.
- Officials in the regulatory agencies of four western Agreement States to obtain information on those mills under state jurisdiction during this time period.
- In the special case of New Mexico, which became an Agreement State in May 1974, both state officials and retired NRC data files were surveyed to obtain information prior to the time at which these mills became subject to state jurisdiction.

All information on uranium mills located in Utah and Wyoming was obtained from NRC Inspection and Enforcement Files. Information on mills located in NRC Agreement States was obtained from the following state officials:

STATE	PERSON(S) CONTACTED
Colorado	James Montgomery Dick Gamewell Bob Funderburg
New Mexico	Ted Wolff Pat Donahue
Texas	Martin Wukash
Washington	Bob Will Lee Grotemeyer

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OPERATING URANIUM MILLS, 1972-1977

Tables 1 and 2 list mills in operation from 1972 through 1977 in Agreement States and NRC States, respectively. Included are the name, location, and average capacity of all operating mills, plus an indication of any accidental releases during this time period. From these tables it can be seen that there were a total of 18 operating mills with a combined capacity of roughly 35,000 tons of ore per day (69% of total capacity is located in the Agreement States). This corresponds to 104 plant-years* of operation at a nominal capacity of 767,000 tons/yr, assuming continuous operation.

ACCIDENTAL TAILINGS SLURRY RELEASES

A summary of documented accidental tailings releases, including a brief description of each event, is given in Table 3. Table 4 lists each event in terms of quantity of liquids and solids released and an indication of whether or not the material reached the surrounding watercourse. There were three releases during this time period (all occurring in 1977); one of which, involved the release of material to the watercourse. As seen from Table 4, two of the releases in this time period were the result of pipeline failure, while the third was a result of tailings dam failure (one of the pipeline failures resulted in a portion of the material entering the watercourse).

DAM FAILURES

From the data given in Table 4, the only dam failure in this period involved the release of 7.6×10^6 liters of liquids and 8.2×10^6 kg. of solids. Combining these data with those given in the accident section of the Morton Ranch mill report for the period 1959 through 1971, yields an average release of

*Two of the eighteen mills did not operate continuously throughout this period (see Table 2).

1.4×10^7 liters of liquids and 1.6×10^7 kg. of solids from incidents involving either dam failure or flooding in the period 1959 through 1977.

The likelihood of release to the watercourse through dam failure in the period covered by this report is non-existent, since in the only documented incident, the material was contained on company property. However, five out of the nine recorded incidents from 1959 through 1977 involved a release to the watercourse. In this same time period there were 394 plant-years of operation handling a nominal 423,000 tons of ore per year. Thus, the likelihood of release to the watercourse is in the range of 1 to 2×10^{-2}/plant-year, or an average of roughly one release per 33 million tons of ore processed.

PIPELINE FAILURES

From Table 4, the two pipeline failures in this period yielded an average release of 9.5×10^6 liters of liquids and 2.3×10^7 kg. of solids. Combining this with data from the Morton Ranch report as before, gives an average release of 3.5×10^6 liters of liquids and 8.2×10^6 kg. of solids from pipeline failure over the period 1959 through 1977. [NOTE: These figures are considerably lower than corresponding quantities released through dam failures].

One pipeline failure in the period covered by this report resulted in the release of material to the watercourse. As stated previously there were 104 plant-years of operation at a nominal capacity of 767,000 tons/yr from 1972 through 1977, therefore the likelihood of release to the watercourse is 0.9 to 1.0×10^{-2} per plant-year.* Four out of the seven pipeline failures reported in the period 1959 through 1977 involved a release to the watercourse. Using historical data on operation and capacity as before,

*This is an admittedly small sample and should be judged more as a statement of fact than an estimate of probability.

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the likelihood of release from the tailings pipeline to the watercourse is 1×10^{-2}/plant-year or roughly one release per 42 million tons of ore processed between 1959 and 1977.

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TABLE 1

OPERATING URANIUM MILLS, 1972-1977
NRC AGREEMENT STATES

STATE	MILL	LOCATION	AVERAGE CAPACITY TONS/DAY	ACCIDENTAL RELEASES THIS PERIOD
Colorado	Cotter, Corp.	Canon City, Co	250	No
	Union Carbide, Corp.	Uravan, Co.	1000	No
	Union Carbide, Corp.	Rifle, Co.	600	No
New Mexico	United Nuclear-Homestake Partners	Grants, New Mexico	3500	Yes
	United Nuclear-Church Rock	Church Rock New Mexico	3000	Yes
	The Anaconda Co.	Grants, New Mexico	6000	No
	Kerr McGee Nuclear, Corp.	Grants, New Mexico	7000	No
Texas	Conoco and Pioneer Nuclear, Inc.	Falls City, Texas	2300	No
Washington	Dawn Mining Co.	Ford, Washington	400	No

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TABLE 2

OPERATING URANIUM MILLS, 1972-1977
STATES UNDER NRC JURISDICTION

STATE	MILL	LOCATION	AVERAGE CAPACITY TONS/DAY	ACCIDENTAL RELEASES THIS PERIOD
Utah	Atlas Minerals	Moab, Utah	250	No
	Rio Algom, Corp.	Moab, Utah	500	No
Wyoming	Union Carbide	Riverton Wyoming	1650*	No
	Western Nuclear, Inc.	Jeffrey City, Wyoming	1000	Yes
	Utah International, Inc.	Gas Hills, Wyoming	1470	No
	Utah Interantional, Inc.	shirley Basin, Wyoming	1800	No
	Federal American Partners	Riverton, Wyoming	950	No
	Petrotomics, Inc. (Getty Oil, Co.)	Shirley Basin, Wyoming	1750**	No
	Exxon Company, U.S.A.	Powder River, Wyoming	3000***	No

*Addition of 1095 tons/day capacity in November 1974; average reflects weighted capacity over six year period. (Current capacity 2190 tpd)

**Mill didn't operate between 1974 and 1977, inclusive.

***Mill startup November 26, 1972.

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TABLE 3

URANIUM MILL TAILINGS RELEASES

1972-1977

	DATE	MILL & LOCATION	TYPE OF INCIDENT	REMARKS
1.	2/5/77	United Nuclear-Homestake Partners Grants, New Mexico	Slurry Pipeline Rupture	Tailings slurry pipeline ruptured due to high pressure buildup in a frozen line. The slurry released eroded a "V" cut in the dam face, which led to the escape of approximately 50,000 tons of soilds and slimes and somewhere between 2 million and 8 million gallons of liquid. All material released was confined to company property.
2.	4/77	Western Nuclear, Inc. Jeffrey City, Wyoming	Failure of Tailings Pond Embankment	Tailings slurry overtopped the embankment due to insufficient freeboard space; considerably less slope than the requisite 3 horizontal to 1 vertical; and a loss in structural integrity occasioned by the melting of snow that was interspersed with fill used to construct the embankment. Approximately 2 million gallons of liquid tailings (55 cubic yard of solids) were released. The grind mill and mill yard were completely covered, but no material was released to unrestricted areas.
3.	9/26-27/77	United Nuclear Church Rock, New Mexico	Release from Tailings Slurry Line	In the process of flushing tailings line, it was discovered that a 2 inch water line had insufficient pressure to flush out plug. The line was uncoupled and roughly 1/4 ton of tails ran out of the line. With the line still uncoupled, flushing was inadvertently initiated again, resulting in the release of 4,000 gallons

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TABLE 3 (Cont.)

URANIUM MILL TAILINGS RELEASES

1972-1977

DATE	MILLS & LOCATION	TYPE OF INCIDENT	REMARKS
3. Continued			of flush water and an additional ton of tailings. Approximately 1 ton of solids and slurries and 900 gallons of liquid entered the watercourse. The liquid flowing to the watercourse was almost entirely mine water, a portion of which had not been treated (i.e., high in uranium and radium values).

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TABLE 4

SUMMARY OF ACCIDENTAL TAILINGS SLURRY RELEASES, 1972-1977

	CAUSE	SOLIDS RELEASES kg (lb)	LIQUIDS RELEASED liters (gal)	REACHED WATERCOURSE
1.	Pipeline Failure	4.5×10^7 (1×10^8)	$8\text{-}30 \times 10^6$ ($2\text{-}8 \times 10^6$)	No
2.	Dam Failure	8.2×10^6 ($1.8 \times 10^{7*}$)	7.6×10^6 (2×10^6)	No
3.	Pipeline Failure	1.1×10^3 (2.5×10^3)	1.5×10^4 (4×10^3)	Roughly 80% of solids and 20% of liquids reached watercourse.

*Assuming equal weights of solids and liquids released, and the density of the liquids to be approximately 9 lbs/gallons.

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