

The Light company

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December 20, 1985
ST-HL-AE-1564
File No.: G9.17

Mr. Vincent S. Noonan, Project Director
PWR Project Directorate #5
U. S. Nuclear Regulatory Commission
Washington, DC 20555

South Texas Project
Units 1 and 2
Docket Nos. STN 50-498, STN 50-499
Offsite Radiological Impact

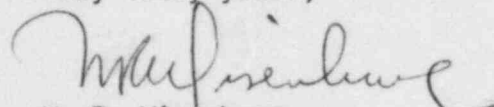
Reference: ST-HL-AE-1533, November 22, 1985

Dear Mr. Noonan:

As stated in the above reference, changes have been made in the calculations of offsite radiological impacts, more specifically, ingestion from the nearest milk cow. To supplement the referenced letter, attached are mark-ups of FSAR Section Appendix 11.A and ER-OL Sections 5.3 and 6.1. These changes will be incorporated into future FSAR and ER-OL amendments.

If you should have any questions on this matter, please contact Mr. M. E. Powell at (713) 993-1328.

Very truly yours,


M. R. Wisenburger
Manager, Nuclear Licensing

REP/yd

Attachments: 1. FSAR Section 11.A.3.3.3
2. ER-OL Sections 5.3 and 6.1

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Houston Lighting & Power Company

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APPENDIX 11.A

2. External Population Dose

External population doses from gaseous effluents were calculated for cloud immersion and ground-plane contamination pathways. Dispersion factors (X/Qs) and relative deposition were those discussed in Section 11.A.3.2 of this Appendix. The estimate of the population distribution projected for the year 2030 (Figure 2.1-11) was used. 44

Predicted doses to the population within 50 miles of the South Texas Project are listed in Table 11.A-5. Exposure to radioactive materials deposited on the ground and ingestion of staple crops exposed to radioactive particulates appear to be the major contributors to the whole body population dose. 44

11.A.3.3.3 Internal Dose From Gaseous Effluents (Radiohalogens, Radioparticulates, and Tritium). The maximum individual dose calculated from the air inhalation pathway was found at the residence in the north-northwest sector, 2.8 miles from the plant. The maximum dose to an organ of an individual at this location inhaling radioiodine and radioparticulates in the plant effluent was calculated to be $7.1E-2$ mrem/yr to a child's thyroid. Maximum whole-body dose was calculated to be $1.0E-3$ mrem/yr to an adult at the same location. 44

The calculated dose to an individual consuming vegetables grown in a garden adjacent to a nearby residence was also determined. Maximum calculated exposure from this pathway was $4.3E-4$ mrem/yr to a child's thyroid at a residence 3.4 miles east-southeast of the plant. Maximum total-body dose was $6.5E-3$ mrem/yr to a child at the same residence. 44

Calculated doses from ingestion of milk from animals grazing year-round on land contaminated by radioparticulates deposited from the effluent plume were evaluated at the location of the nearest ^{goat} assumed cow in the east sector at 5.4 miles from the plant. The maximum organ dose from ingestion of milk from a goat cow grazing year-round at this location was $1.7E-2$ mrem/yr to an infant's thyroid. The adult is expected to receive the maximum total-body dose of $3.3E-2$ mrem/yr. Since there is no indication that goats are used as milk animals in the vicinity of the plant, consumption of contaminated ^{cow's} goat's milk is not an expected pathway to man during the life of the plant, and doses from this pathway were not evaluated. 44

Because non-milk cattle graze near the site, exposure from consumption of meat was evaluated at the point of maximum concentration on the 1.0 mile east site boundary. The maximum organ dose to an individual from ingestion of meat from a cow grazing year-round at this location was $1.7E-2$ mrem/yr to the thyroid of a child. The maximum total-body dose from the meat ingestion pathway was $4.5E-3$ mrem/yr to an adult. 44

11.A.3.4 Radiation Dose From Liquid Effluents

11.A.3.4.1 Estimated Liquid Effluents and Concentrations. Estimated annual liquid releases from the South Texas Plant and Cooling Reservoir concentrations are listed in Table 11.A-1. The methodology for calculating the release values is discussed in Section 11.2.

TABLE 11.A-3

SUMMARY OF CALCULATED GASEOUS PATHWAY DOSES
SOUTH TEXAS PROJECT

<u>Pathway</u>	<u>Location</u>	<u>Organ Receiving</u>		<u>Dose</u> (mrem/yr)	<u>Total-Body</u> <u>Dose</u> (mrem/yr)
		<u>Maximum</u> <u>Age Group</u>	<u>Maximum Dose</u> <u>Organ</u>		
Cloud Immersion	Nearest Residence (2.8 ⁰ mi NNW) 0 N	All	Skin	6.7E-2 8.39E-2	2.4E-2e (All) 3.06E-2
Ground Plane Contamination	Nearest Residence (2.8 ⁰ mi NNW) 0 N	All	Skin	5.4E-1e 7.98E-1	4.7E-1e (All) 6.82E-1
Inhalation	Nearest Residence (2.8 ⁰ mi NNW) 0 N	Child	Thyroid	7.1E-2e 9.15E-2	1.0E-3e (Adult) 1.39E-3
Vegetable Ingestion	Nearest Home Residence Garden (9.4 ⁰ mi ESE) 4.0 NNW	Child	Thyroid	4.3E-1e 3.35	6.5E-3e (Child) 2.93E-1
Goat Cow Milk Ingestion	Nearest As- sumed Milk Goat Cow (1.0 mi East) 5.4 mi ENE	Infant	Thyroid	3.2e 1.77E-1	3.3E-2e (Adult) 4.49E-2
Cow Meat Ingestion	Nearest Cow (1.0 mi East) .93 mi NNW	Child	Thyroid	1.7E-2e 2.02E-1	4.5E-3e (Adult) 5.47E-2
Cow Milk Ingestion	Nearest Milk Cow (4.8 mi WNW)	Infant	Thyroid	1.2	1.23E-2 (Adult)

The calculated dose to an individual consuming vegetables grown in a garden adjacent to the residence 4.0 miles NNW of the plant was also determined. Maximum calculated exposure from this pathway was 3.35 mrem/yr to a child's thyroid, and maximum total-body dose was 2.93E-1 mrem/yr to a child.

Goats have been found at 5.4 miles ENE of the plant. The maximum organ dose from ingestion of milk from a goat grazing year-round at this location was 1.77E-1 mrem/yr to an infant's thyroid. The adult is expected to receive the maximum total-body dose of 4.49E-3 mrem/yr. The consumption of contaminated cow's milk is considered at the location of the nearest milk cow (4.8 mi WNW) which results in an infant thyroid dose of 1.2 mrem/yr (Reference 5.3-3).

Exposure from consumption of meat was evaluated at the point of maximum concentration .93 miles NNW of the plant. The maximum organ dose to an individual from ingestion of meat from a cow grazing year-round at this location was 2.02E-1 mrem/yr to the thyroid of a child. The maximum total-body dose from the meat ingestion pathway was 5.47E-2 mrem/yr to an adult.

Results of the dose calculations for gaseous pathways (summarized in Table 5.3-3) indicate that the largest total-body dose will result from the ground plant contamination. Cloud immersion air inhalation, vegetable and milk ingestion pathways make a smaller contribution to the total body dose.

5.3.3.2 Population Doses

Population doses from gaseous effluents were calculated for cloud immersion, ground-plane contamination, air inhalation, and vegetable, milk, and meat ingestion pathways and are presented in Table 5.3-2. Dispersion factors (X/Q 's) and relative deposition were those discussed in Section 5.2.2.2. The estimate of the population distribution projected for the year 2030 (Figure 2.2-6) was used. Total milk, meat, and vegetable production within the 50-mile radius were taken to be 5.20E+6, 1.07E+8, and 6.64E+9 kg/yr, respectively.

Staple crop consumption appears to be the most important pathway for total-body population dose. Consumption of cattle products and inhalation do not make a significant contribution to the total-body population dose.

Due to limited milk production within the 50-mile radius of the plant, the thyroid dose resulting from milk consumption is negligible.

5.3.4 DIRECT RADIATION DOSES

Significant exposure at the exclusion area boundary to direct radiation resulting from plant activities will not exist.

The STP will not store radwaste outside any plant buildings. Designated storage areas located within buildings are well shielded. Therefore, skyshine will be negligible. The conservatively estimated dose at the exclusion boundary would be less than 1.0 mrem/yr for two-unit operation.

Table 5.3-2

PREDICTED DOSES TO THE POPULATION WITHIN 50 MILES
OF THE SOUTH TEXAS PROJECT

<u>Pathway</u> ¹	<u>Total-Body Dose</u>		<u>Thyroid Dose</u>	
	<u>(man-rem)</u>	<u>Percent of Total</u>	<u>(thyroid-rem)</u>	<u>Percent of Total</u>
Gaseous Effluents				
Plume Immersion	1.88E-1	6.4	1.88E-1	10.4
Ground Plane				
Contamination	7.95E-1	27	7.95E-1	44
Inhalation	8.39E-3	<1	5.48E-1	30
Vegetable Ingestion	1.74	59	9.74E-1	<1
Cow Milk Ingestion	1.44E-3	<1	1.67E-2	<1
Meat Ingestion	2.13E-1	7.2	2.64E-1	14.6
Total, Gaseous Pathways	2.95	100	1.81	100
Liquid Effluents				
Fish Ingestion	6.0E-2	13	5.4E-3	5
Shellfish Ingestion	3.96E-2	87	1.1E-1	95
Total, Liquid Pathways	4.6E-1	100	1.1E-1	100
Total Population Dose	3.41		1.92	

¹ Reference 5.3-3 provides the site specific information that was used in the analysis.

Table 5.3-3

SUMMARY OF CALCULATED GASEOUS PATHWAY DOSES
SOUTH TEXAS PROJECT

<u>Pathway</u>	<u>Location (1)</u>	<u>Minimum Age Group</u>	<u>Organ Receiving Maximum Dose</u>		<u>Total-Body Dose (mrem/yr)</u>
			<u>Organ</u>	<u>Dose (mrem/yr)</u>	
Cloud Immersion	Assumed Nearest Individual (2.0 miles N)	All	Skin	8.39E-2	3.06E-2 (All)
Ground Plane Contamination	Assumed Nearest Individual (2.0 miles N)	All	Skin	7.98E-1	6.82E-1 (All)
Inhalation	Assumed Nearest Individual (2.0 miles N)	Child	Thyroid	9.15E-2	1.39E-3 (Adult)
Vegetable Ingestion	Nearest Home Garden (4.0 miles NW)	Child	Thyroid	3.35	2.93E-1 (Child)
Goat Milk Ingestion	Nearest Milk Goat (5.4 miles ENE)	Infant	Thyroid	1.77E-1	4.49E-2 (Adult)
Cow Meat Ingestion	Nearest Cow (0.93 miles NNW)	Child	Thyroid	2.02E-1	5.47E-2 (Adult)
Cow Milk Ingestion	Nearest Milk Cow (4.8 mi WNW)	Infant	Thyroid	1.2	1.23E-2 (Adult)

(1) Reference 5.3-3 provides the site specific information that was used in the analysis.

6.1.5.9 Game

Game will be obtained on site or within 10 miles of the site, when available. The edible tissue will be analyzed for gamma-emitting radionuclides.

6.1.5.10 Program Summary

Table 6.1-16 summarizes the environmental monitoring program. The table describes sample media, sampling locations, type of sampling, collection frequency, methods of analysis and analysis frequency.

The design and implementation of all radiological environmental surveillance activities shall be performed by Houston Lighting and Power Company. Radiological environmental surveillance shall be performed in such a manner as to meet the intent of USNRC Regulatory Guide 4.15 "Quality Assurance for Radiological Monitoring Programs" (Rev. 11, February 1979). In addition, the analysis laboratory will be required to participate in an NRC approved Inter-Laboratory Comparison Program to provide assurance of the accuracy of analysis.

Detection capabilities for environmental sample analysis are provided in Table 6.1-17.

[This preoperational environmental monitoring program began in July, 1985, and will continue until issuance of the Operating License.]